NOTICE

All drawings located at the end of the document.

Final
Phase III RFI/RI

Rocky Flats Plant
881 Hillside Area

(Operable Unit No. 1)

June 1994

ADMIN RECORD

A-OU01-000647

ERRATA

Text within Appendix A was xerographically reproduced in anticipation of a March submittal date and, therefore, reflects a footer date of March 1994. The appendix is as intended for this June 1994 submittal.

OVERVIEW
TABLE OF CONTENTS

VOLUME I

SECTION 1—INTRODUCTION (Text, Tables, and Figures)

SECTION 2—OU1 FIELD INVESTIGATION (Text, Tables, and Figures)

SECTION 3—PHYSICAL CHARACTERISTICS OF OU1 (Text, Tables, and Figures)

VOLUME II

SECTION 4—NATURE AND EXTENT OF CONTAMINATION (Text, Tables, and Figures)

SECTION 5—CONTAMINANT FATE AND TRANSPORT (Text, Tables, and Figures)

SECTION 6—BASELINE RISK ASSESSMENT (Text, Tables, and Figures)

SECTION 7—SUMMARY AND CONCLUSIONS

SECTION 8—REFERENCES

VOLUME III

APPENDIX A — GEOLOGIC DATA
A1 DRILLING AND SAMPLING DATA

VOLUME IV

APPENDIX A — GEOLOGIC DATA
A2 GEOTECHNICAL DATA
A3 SURVEYING DATA
A4 FRENCH DRAIN GEOLOGIC DATA

OVERVIEW
TABLE OF CONTENTS (continued)

VOLUME V

APPENDIX A — GEOLOGIC DATA
- A4 FRENCH DRAIN GEOLOGIC DATA (continued)
- A5 HOT SPOT INVESTIGATION

VOLUME VI

APPENDIX B — HYDROGEOLOGIC DATA
- B1 BOREHOLE AND SINGLE WELL TEST DATA
- B2 MULTIPLE WELL TEST DATA
- B3 GROUNDWATER ELEVATION DATA
- B4 FRENCH DRAIN HYDROGEOLOGIC ASSESSMENT
- B5 SURFACE WATER FLOW DATA
- B6 GROUNDWATER CONTAMINANT MIGRATION VELOCITY CALCULATIONS

VOLUME VII

APPENDIX C — ANALYTICAL DATA
- C1 BACKGROUND SOIL DATA
- C2 STATISTICAL SUMMARIES
- C3 PHASE III SUBSURFACE SOIL SAMPLES
- C4 SURFACE SOIL SAMPLES
- C5 SURFACE WATER
- C6 SEEP/SPRING WATER
- C7 SEDIMENTS
- C8 GROUNDWATER
- C9 FIELD PARAMETER DATA FOR OU1 GROUNDWATER MONITORING
- C10 BIOLOGICAL TISSUE SAMPLES
- C11 PHASE III FIELD PROGRAM UNIQUE SAMPLES
- C12 AIR QUALITY
- C13 SUBSURFACE SOIL CONTAMINANT SUMMARY

VOLUME VIII

APPENDIX D — DETERMINATION OF CONTAMINANTS

OVERVIEW
TABLE OF CONTENTS (continued)

VOLUME IX

APPENDIX E — ENVIRONMENTAL EVALUATION

VOLUME X

APPENDIX F — PUBLIC HEALTH EVALUATION

VOLUME XI

APPENDIX G — QUALITY ASSURANCE

APPENDIX H — TECHNICAL MEMORANDA

VOLUME XII

APPENDIX I — RESPONSES TO AGENCY COMMENTS

APPENDIX J — DISTRIBUTION LIST

A2
GEOTECHNICAL DATA

Geotechnical samples were collected during the Phase III Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) at Operable Unit No. 1 (OU1) at the Rocky Flats Plant (RFP). The purpose of collecting samples for geotechnical analysis was to quantify certain physical characteristics of soils and bedrock within OU1 including Atterberg limits, grain size distributions, specific gravity, permeability, soil moisture, and both dry and wet density. These data are crucial to the development of both groundwater and contaminant fate and transport models. The following is a summary of sampling locations, and both the field and the analytical methods employed. Results are presented and briefly discussed in the final section of this appendix. Attachment A2-1 contains the raw geotechnical data.

A2.1 SAMPLE LOCATIONS

Twenty-three intervals from 11 boreholes (Figure A2-1) were sampled for geotechnical analysis in an off-site laboratory. In general, following the geotechnical field sampling plan, each of the 11 boreholes was sampled in alluvium within 6 feet (1.83 meters) of the surface and in alluvium just above the alluvium/bedrock contact. Boreholes slated for completion as bedrock wells or piezometers were also sampled just below the alluvium/bedrock contact and from within the anticipated screen interval. This sampling protocol, illustrated in Figure A2-2, was followed within site-specific constraints.

Table A2-1 compares the proposed number of intervals to be sampled as outlined in the geotechnical field sampling plan to the actual number of intervals sampled during the Phase III field investigation at OU1. In boreholes 37391 and 37591, samples were collected in strict accordance with the field sampling plan. In boreholes 37891, 37991, 38591, 39191, and 39691, only one alluvial interval was sampled due to prohibitively shallow bedrock contacts. A single alluvial interval was also sampled in borehole 37491 as a result of sampling error. The first interval sampled in borehole 37691 was from 7.4 to 7.8 feet (2.26 to 2.38 meters), falling outside the prescribed 0- to 6-feet (1.83-meter) range as a result of

poor recovery in the first 6 feet. In borehole 38991, the target interval for bedrock screening (sandy siltstone or sandstone) was not encountered and no samples were collected; the interval chosen for well screening (fractured clayey siltstone) was, therefore, not sampled for geotechnical analysis. Two unscheduled samples were collected at the discretion of the rig geologist: a bedrock sample from 37891, and an alluvial sample from borehole 39091. The cumulative effects of these variances from the field sampling plan resulted in a total of 23 sampled intervals, rather than the proposed 28 intervals.

A2.2 FIELD METHODS

Two samples were taken from each of the prescribed intervals to help expedite laboratory analyses. The first was collected in a 3-inch-long stainless steel sleeve. The second sample was taken from immediately above or below the stainless steel sleeve as outlined in the field sampling plan, and placed in a 500-milliliter (16.9-fluid-ounce) amber jar. Sample numbers were assigned to each individual sample, resulting in a total of 46 samples from the 23 unique intervals.

All samples were drive samples collected with a sleeve-mounted, split-spoon sampler in conformance with American Society for Testing and Materials (ASTM) D1586. ASTM D1586 methods were employed in preference to ASTM D1587 because the thin-walled shelby tubes used in ASTM D1587 procedures do not have sufficient structural strength to penetrate alluvial and bedrock materials at OU1. Because split-spoon procedures were followed, the permeability values presented in Tables A2-2 and A2-3 should be used with caution (EPA 1991). Internal method consistency does, however, justify the relative permeability analysis of alluvial and bedrock materials made in Section 3.7 of this report.

A2.3 ANALYTICAL METHODS

Analytical methods followed standardized ASTM procedures. Geotechnical analyses requested were Atterberg limits including liquid and plastic limits and plasticity index (ASTM D4318), grain-size analyses including sieve analysis and hydrometer testing (ASTM D422), specific gravity (ASTM D854), back-pressure permeability (ASTM D5084),

and moisture/density analyses including moisture content (ASTM D2216) and both dry and wet density (ASTM D2937). In accordance with ASTM D2487, Atterberg limits data were also used to classify alluvial samples according to the Unified Soil Classification System (USCS).

Although all procedures are standardized by ASTM guidelines, simplifying assumptions and variations from RFP standard operating procedures (SOPs) (EG&G 1991) call for more detailed discussion. Specifically, back-pressure permeability tests were run using standardized rather than sample-specific confining pressures, and the sieves used for grain-size analysis were not, as prescribed by RFP SOPs, altered for bedrock and alluvial materials. The remainder of this section addresses the potential impacts of these two procedures nuances.

Back-pressure permeability tests were performed in a triaxial compression chamber. Within the pressurized chamber, in situ hydrostatic forces can be reproduced, making laboratory measurements more truly representative of actual conditions. However, samples tested in this program were all placed under a standard hydrostatic pressure (1,152 pounds per square foot) corresponding to approximately 10 feet of depth in a clay soil. The applicability of this standard pressure as an approximation of in situ conditions varies from sample to sample. Assuming that variations in the density of overlying material are relatively insignificant, the applicability of the chosen standard pressure depends primarily on the sample depth.

Samples from a depth greater than 10 feet were tested at artificially low confining pressures, and the permeability values calculated may, as a result, be slightly high. Samples collected from 0 to 10 feet, on the other hand, were tested under unrealistically high pressures, that generally yield slightly depressed permeability values. Correcting for these shifts would, in general, accentuate trends of decreasing permeability with depth. Most importantly, any such corrections would only magnify the disparity between alluvial and bedrock permeabilities noted in Section 3.7 of this report, reinforcing the conclusion that flow in bedrock is much slower than flow in surficial materials.

Geotechnical SOP GT.1 calls for the use of different classification systems when logging alluvial and bedrock materials; the USCS is to be used for alluvial materials, and Compton's *Manual of Field Geology* (1962) is to be used for bedrock materials. When describing grain sizes, the USCS is to be used for alluvial material, and the Wentworth grain-size scale (as referenced by Compton 1962 and EG&G 1991) is to be used for bedrock materials.

For purposes of the Phase III RFI/RI, the critical difference between the USCS and Wentworth systems is the grain-size limit used to define the silt-sand boundary. Specifically, the USCS uses a #200 standard sieve (0.074 millimeter) to define the silt-sand boundary, and the Wentworth scale uses the #230 mesh sieve (0.0625 millimeter). Therefore, as illustrated in Figure A2-3, the silt fraction of the USCS scale includes coarser material than the silt fraction of the Wentworth scale. Because of this discrepancy, Geotechnical SOP GT.1 calls for a modification of ASTM D422 procedures for grain-size analysis when analyzing bedrock materials, substituting a #230 mesh sieve for the standard #200 mesh sieve.

In deviation from the SOP guidelines, the #200 standard sieve was used for all laboratory grain-size analyses, including those performed on bedrock material. By superimposing the #230 sieve cutoff, however, Wentworth-scale percentages were read directly from the grain-size distribution curves presented in the raw data (Attachment A2-1). Based on these curves, the grain-size percentages for bedrock materials presented in Table A2-3 reflect Wentworth rather than USCS ranges. Although this correction does not reflect a strict procedural compliance with the Geotechnical SOPs, the data presented in Table A2-3 are gauged to the correct scale and are considered reliable to within 1 percent.

A2.4 RESULTS

Tables A2-2 and A2-3 summarize the results from all geotechnical analyses for alluvial and bedrock samples, respectively. Sand, silt, and clay percentages were read from the grain-size distribution curves provided by geotechnical analyses (Attachment A2-1). Because the USCS does not define a specific silt-clay boundary, the silt-clay boundary of the Wentworth scale was applied to alluvial as well as bedrock materials. Following Geotechnical

SOP GT.1, all samples were classified according to their sand, silt, and clay percentages. Alluvial samples were further classified according to the USCS based on the results of Atterberg limits tests.

Bedrock lithology classifications show a 100-percent correlation between laboratory and field results, and USCS classifications made in the laboratory conform to the original core log descriptions in 80 percent of the cases. These results support a high level of confidence in the core log descriptions made during the OU1 Phase III RFI/RI field investigation.

Attachment A2-1 presents the geotechnical data for the 23 samples collected at OU1 in individual packets. Because samples were taken in sets of two, not all analyses were performed on each individual sample. Each sample data packet is prefaced by an index sheet that shows the data available, broken down into the following five categories:

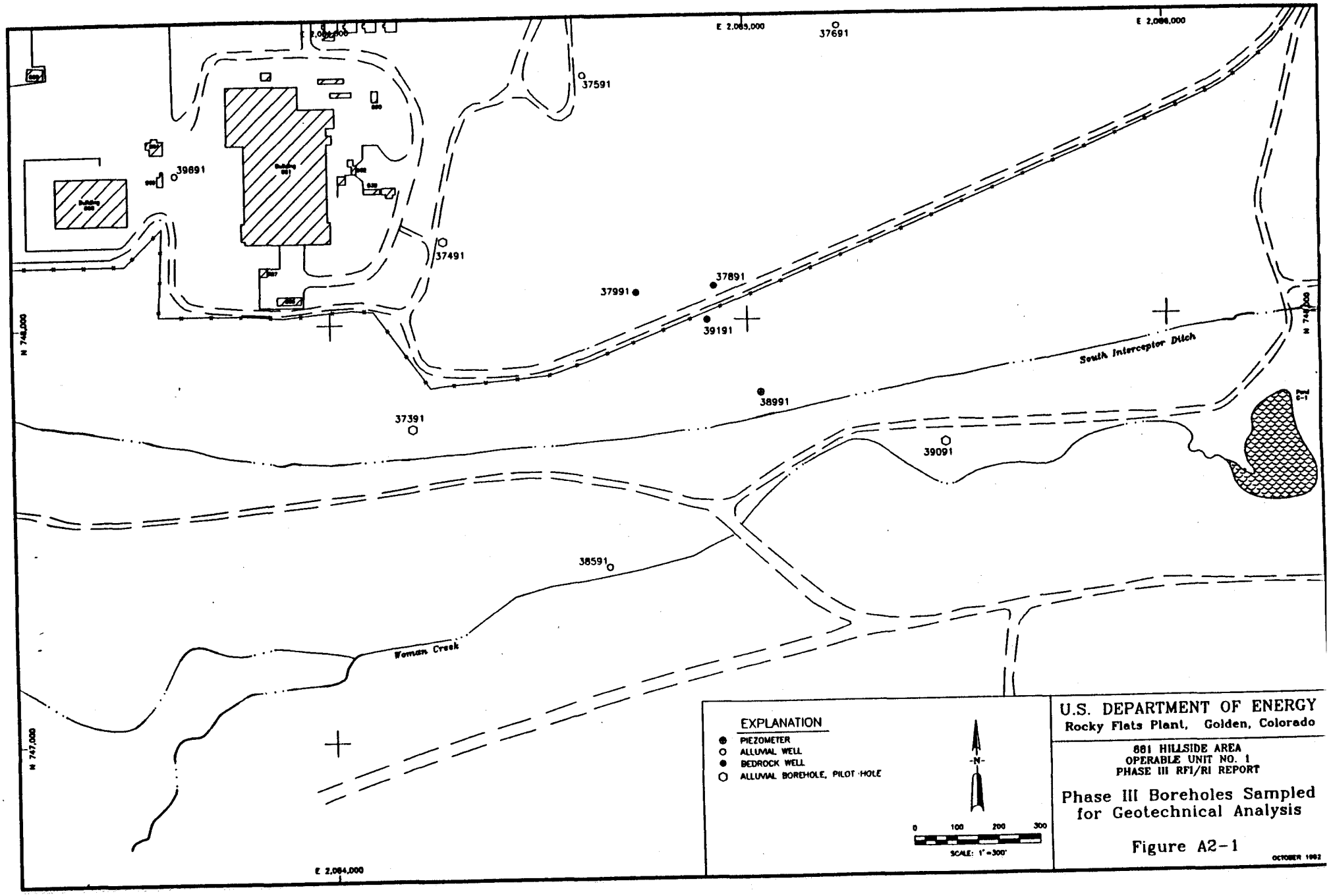
- Grain-size analysis (sieve and hydrometer test) data
- Atterberg limits test data
- Specific gravity test data
- Moisture/density and back-pressure permeability (triaxial compression test) data
- Core sample photograph

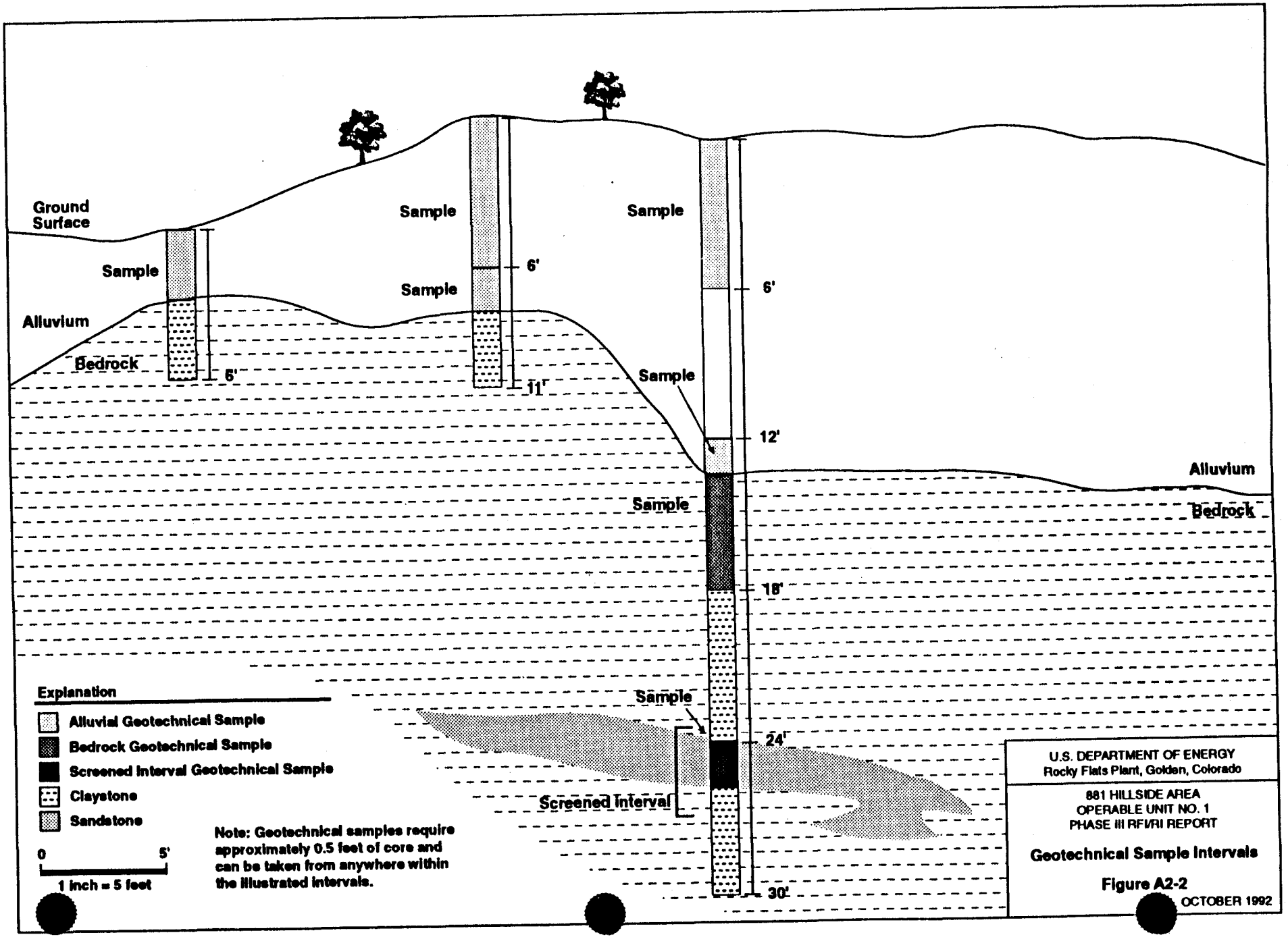
All tests conducted on the stainless steel sleeve samples are combined in the fourth group, which includes back-pressure permeability, moisture content, and both dry and wet density. Core sample photographs are also included for stainless steel sleeve samples. All other data, including grain-size analyses, Atterberg limit tests, and specific gravity tests are grouped together in data packets that correspond to the amber jar samples. Data packets are arranged in numerical order by borehole location number.

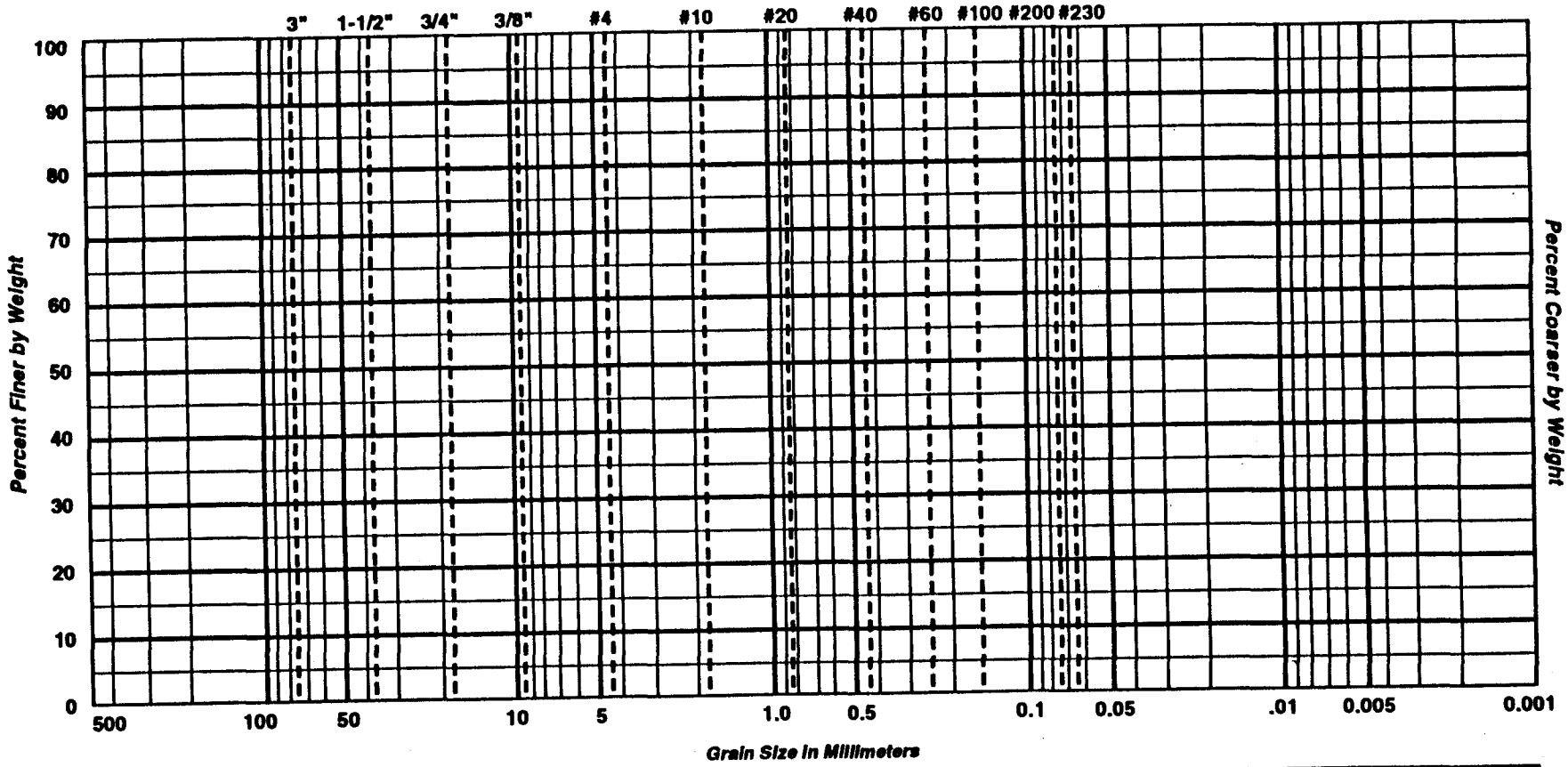
A2.5 REFERENCES

American Society for Testing and Materials. 1991. *Annual Book of Standards*, ASTM, Philadelphia, PA.

Compton, R.R. 1962. *Manual of Field Geology*, John Wiley & Sons, Inc., New York, NY.


E 2,085,000
E 2,086,000
37691
37591
39691
37491
37991
37891
39191
38991
37391
39091
38591
South Interceptor Ditch
Woman Creek
N 748,000
N 747,000
E 2,084,000
EXPLANATION
PIEZOMETER
ALLUVIAL WELL
BEDROCK WELL
ALLUVIAL BOREHOLE, PILOT HOLE
-N-
0 100 200 300
SCALE: 1" = 300'
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
881 HILLSIDE AREA
OPERABLE UNIT NO. 1
PHASE III RFI/RI REPORT
Phase III Boreholes Sampled for Geotechnical Analysis
Figure A2-1
OCTOBER 1992


Ground Surface
Sample
Sample
Sample
Sample
Sample
Sample
Sample
Sample
Screened Interval
Alluvium
Bedrock
Alluvium
Bedrock
6'
6'
11'
6'
12'
18'
24'
30'
Explanation
Alluvial Geotechnical Sample
Bedrock Geotechnical Sample
Screened Interval Geotechnical Sample
Claystone
Sandstone
0
5'
1 inch = 5 feet
Note: Geotechnical samples require approximately 0.5 feet of core and can be taken from anywhere within the illustrated intervals.
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
881 HILLSIDE AREA
OPERABLE UNIT NO. 1
PHASE III RFI/RI REPORT
Geotechnical Sample Intervals
Figure A2-2
OCTOBER 1992



USCS	Cobbles	Gravel		Sand			Silt or Clay			
		Coarse	Fine	Coarse	Medium	Fine				
Wentworth	Cobbles to Boulders	Pebble Gravel				Sand			Silt	Clay
		Coarse	Med	Fine	Gran	Coarse	Med	Fine		

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

881 HILLSIDE AREA
OPERABLE UNIT NO. 1
PHASE III RFI/RI REPORT

U.S. Standard Sieve Sizes for USCS and Wentworth Classifications

Figure A2-3

OCTOBER 1992

Attachment A2-1
Geotechnical Data

Phase III
RFI/RI Report

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00738EBU1**
Sample Depth:	**10.00-10.20 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-06-91 KM,JN
DEPTH	10.00 - 10.20 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00738EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	44.11
Wt. Dry Soil & Pan (g)	43.45
Wt. Lost Moisture (g)	0.66
Wt. of Pan Only (g)	3.80
Wt. of Dry Soil (g)	39.65
Moisture Content %	1.7
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.02

WASH SIEVE ANALYSIS

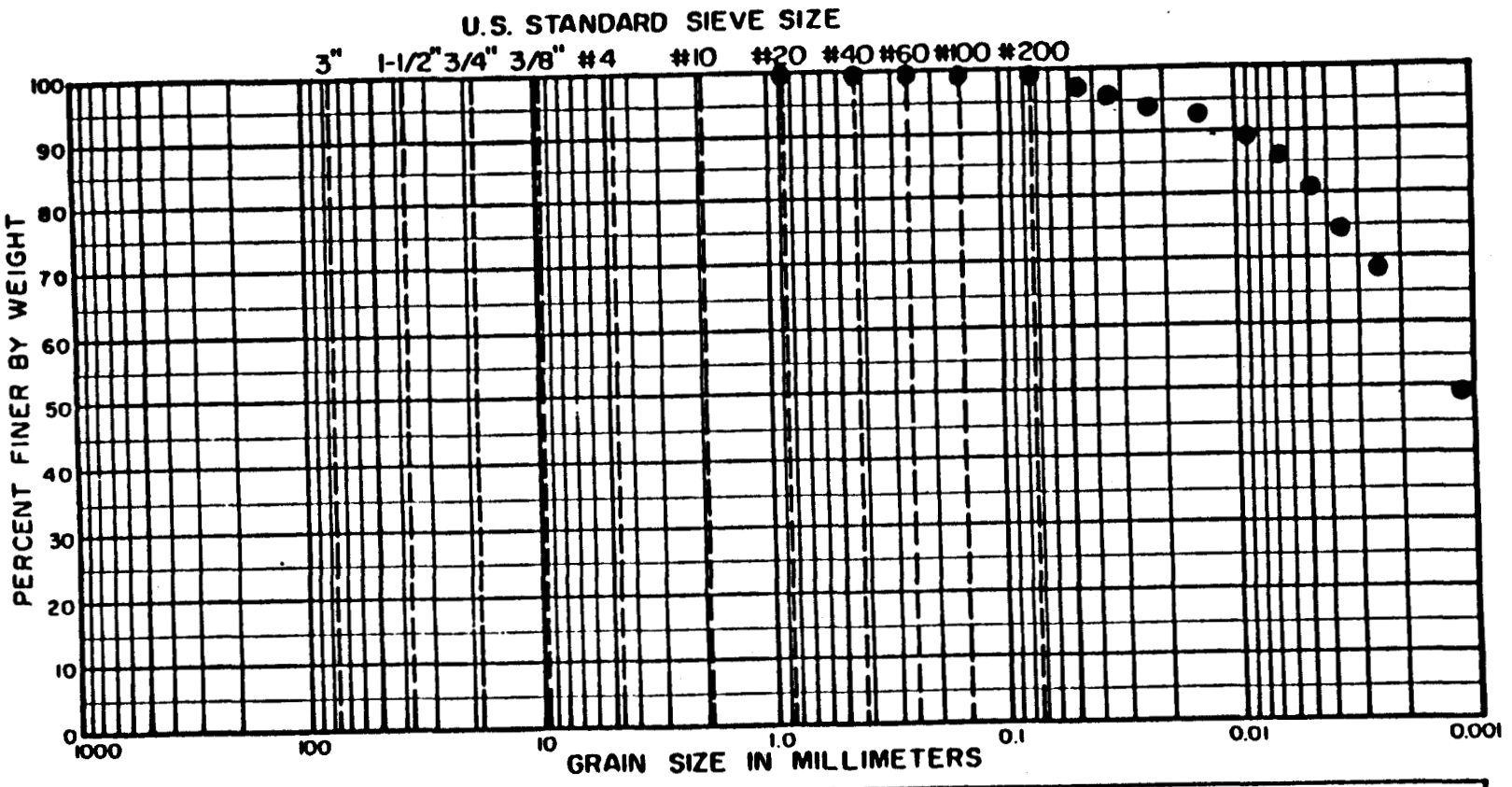
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	59.02
Wt. Total Sample Dry (g)	59.02
Calc. Wt. "W" (g)	59.02
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	1.38	0.07	0.07	0.1	99.9
#40	1.31	1.38	0.07	0.14	0.2	99.8
#60	1.32	1.36	0.04	0.18	0.3	99.7
#100	1.29	1.34	0.05	0.23	0.4	99.6
#200	1.31	1.43	0.12	0.35	0.6	99.4

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	10.00 - 10.20 FT
SAMPLE NO.	BH00738EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-06-91 KM,JN
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	44.110
Wt. Dry Soil & Pan (g)	43.450
Wt. of Pan Only (g)	3.800
Sieve:	
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.690
Value of "a"	0.992
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	21.000
Temp. Coef. K	0.01332
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00738EBUI	10.0 - 10.2'	#37891

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-06-91 KM,JN
DEPTH	10.00 - 10.20 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00738EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	21.000
Sp. Gr. of Soil	2.690	Temp. Coef. K	0.01332
Value of "a"	0.992	Wt. Dry Sample "W"	59.018
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.000		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	63.00	58.00	97.5	97.5	5.96	0.0460
1.0	62.00	57.00	95.8	95.8	6.12	0.0330
2.0	61.00	56.00	94.1	94.1	6.29	0.0236
5.0	60.00	55.00	92.4	92.4	6.45	0.0151
15.0	58.00	53.00	89.1	89.1	6.78	0.0090
30.0	56.00	51.00	85.7	85.7	7.11	0.0065
60.0	53.00	48.00	80.7	80.7	7.60	0.0047
120.0	49.50	44.50	74.8	74.8	8.17	0.0035
250.0	45.50	40.50	68.1	68.1	8.83	0.0025
1440.0	34.50	29.50	49.6	49.6	10.63	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER EBASCO

LOCATION 37891

BORING EB11 SAMPLE ____ DEPTH 10.5-10.2'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

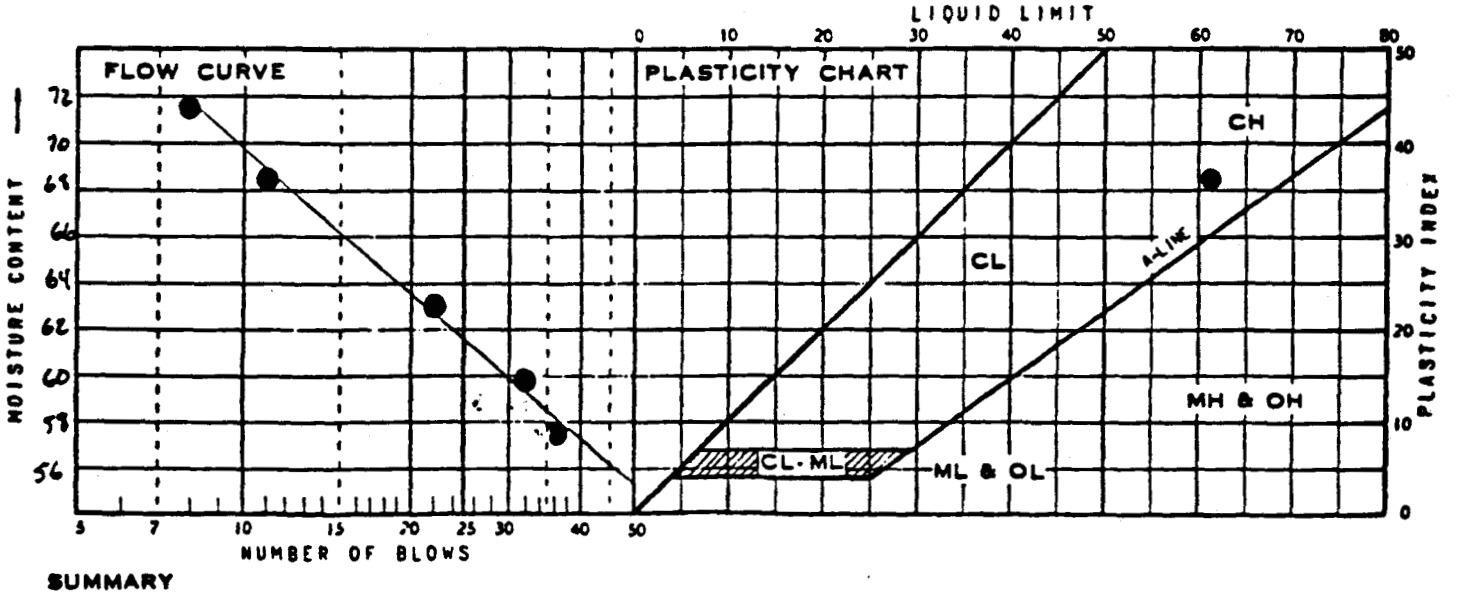
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY AM 1/15/92

DETERMINATION	1	2	3	4	5	6
DISH	96C	59C	16C			
WT OF DISH + WET SOIL g	10.63	11.34	10.84			
WT OF DISH + DRY SOIL g	8.74	9.29	8.95	—	—	—
WT OF MOISTURE g	1.89	2.05	1.89			
WT OF DISH g	1.06	1.07	1.08	—	—	—
WT OF DRY SOIL g	7.68	8.22	7.87			
MOISTURE CONTENT %	24.6	24.9	24.0			

LIQUID LIMIT ?

DETERMINATION	1	2	3	4	5	6
DISH	19C	69C	53C	3	2	38C
NUMBER OF BLOWS	36	32	26	22	11	8
WT OF DISH & WET SOIL g	14.72	13.98	13.06	13.37	12.58	11.51
WT OF DISH + DRY SOIL g	9.74	9.14	8.61	8.61	7.91	7.15
WT OF MOISTURE g	4.98	4.84	4.45	4.76	4.67	4.36
WT OF DISH g	1.08	1.06	1.06	1.06	1.07	1.06
WT OF DRY SOIL g	8.66	8.08	7.55	7.55	6.84	6.09
MOISTURE CONTENT %	57.5	59.9	58.9	63.0	68.3	71.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		61.5	24.5	37.0	CH	

ADVANCED TERRA TESTING inc

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

JOB NO. 2031-05 NAME EBASCO

* Specific Gravity = $W_o / [W_o + (W_a \quad b)]$

BORING NO.	BH00734EBU1	BH00840EBU1	BH00812EBU1	BH00738EBU1	BH00775EBU1	BH00766EBU1
DEPTH	46'	11.50-11.75'	4.8-5.05'	10.0-10.2'	41.75-42.25'	11.5-11.75'
Sample # SAS Tag #	37991	38991	38591	37891	39191	39191
Sampled BY:	10-29-91 KM & MC	11-12-91 BP & KH	11-05-91 KH & MC	1-6-91 KM & JN	11-20-91 KM & Nelson	11-14-91 KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.82g	177.840g	177.89g	177.790g	177.960g	177.690g
Temperature °C, (T_x)	20.7	21.5	22.0	21.6	18.2	19.0
Weight of water and flask at T_x (from cal. curve) (W_a)	162.101g	162.095g	162.084g	162.094g	162.175	162.153
Specific Gravity = *	2.69	2.70	2.72	2.69	2.76	2.64
Ran #	13	21B	27	6C	32	26B

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00737EBU1**
Sample Depth:	**10.20-10.45 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

__ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-12-91 KH
DEPTH	10.20 - 10.45 FT	TEST STARTED	12-07-91 DCW
SAMPLE NO.	BH00737EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	351.5	367.4
Wt. Wet Soil & Pan (g)	360.9	376.8
Wt. Dry Soil & Pan (g)	298.1	298.1
Wt. Lost Moisture (g)	62.8	78.7
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	288.7	288.7
Moisture Content %	21.7	27.2
Wet Density PCF	122.5	132.4
Dry Density PCF	100.6	104.1

Init. Diameter (in)	2.288	(cm)	5.812
Init. Area (sq in)	4.112	(sq cm)	26.527
Init. Height (in)	2.659	(cm)	6.754
Vol. Bef. Consol. (cu ft)	0.00633		
Vol. After Consol. (cu ft)	0.00611		
Effective Porosity %	45.43		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
92.0	5520	49.7	49.4	15.6	1.1E-07
1038.0	62280	49.4	47.3	16.9	6.9E-08
1338.0	80280	47.3	45.5	19.0	4.7E-08
1453.0	87180	45.5	43.5	21.0	4.9E-08
1351.0	81060	43.5	41.7	23.0	4.8E-08
1503.0	90180	41.7	39.8	25.0	4.6E-08
1481.0	88860	39.8	38.1	27.0	4.3E-08
1477.0	88620	38.1	36.4	28.8	4.4E-08
1320.0	79200	49.5	47.7	16.6	4.7E-08
1473.0	88380	47.7	45.7	18.6	4.7E-08
1417.0	85020	45.7	43.8	20.7	4.7E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	10.20 - 10.45 FT
SAMPLE NO.	BH00737EBU1
SOIL DESCR.	SS LINER
SAMPLED	11-12-91 KH
TEST STARTED	12-07-91 DCW
TEST FINISHED	12-25-91
SETUP NO.	1P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	351.470
Wt Soil & Moist at	367.370
Wt. Dry Soil & Pan	298.100
Wt. of Pan Only (g)	9.400
Consol Info:	
Init. Diameter in.	2.288
Initial Height in.	2.659
Vol. change (sat. con.) CC	23.400
Cell Exp.	17.400
Height Change in.	0.045
Test info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-12-91 KH
DEPTH	10.20 - 10.45 FT	TEST STARTED	12-07-91 DCW
SAMPLE NO.	BH00737EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	-0.2	12.4				
50.0	48.0	10.0	11.3	38.2	47.2	9.0	0.90
60.0	58.0	11.7	12.9	48.4	57.6	9.2	0.92
70.0	68.0	13.2	14.4	58.4	67.8	9.4	0.94
80.0	78.0	14.7	15.8	68.3	77.9	9.6	0.96

CONSOLIDATION DATA

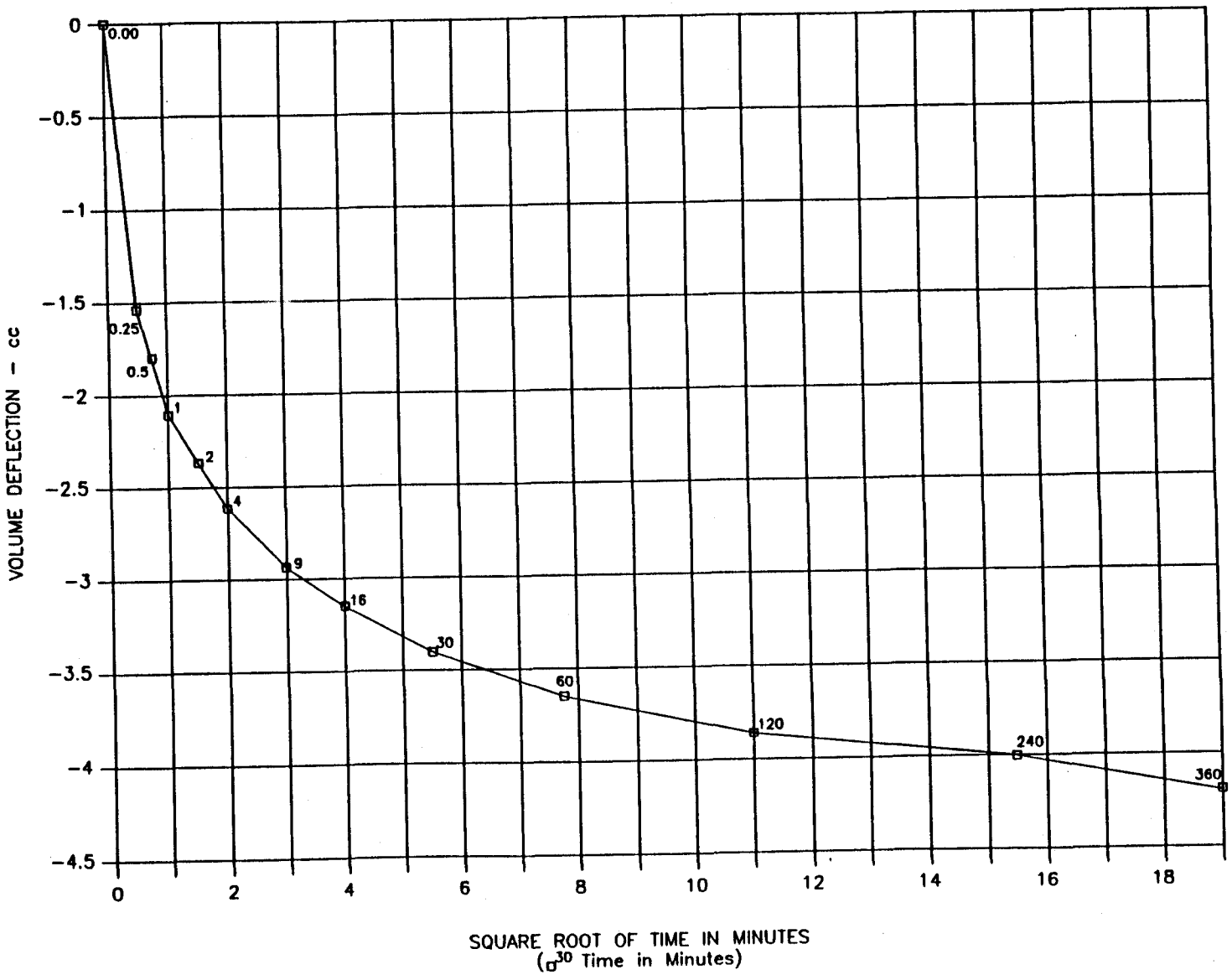
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	17.60	0.00
0.25	0.50	19.15	-1.55
0.5	0.71	19.40	-1.80
1	1.00	19.70	-2.10
2	1.41	19.95	-2.35
4	2.00	20.20	-2.60
9	3.00	20.53	-2.92
16	4.00	20.75	-3.15
30	5.48	21.00	-3.40
60	7.75	21.25	-3.65
120	10.95	21.48	-3.88
240	15.49	21.60	-4.00
360	18.97	21.80	-4.20

Initial Height (in)	2.659	Init. Vol. (CC)	179.18
Height Change (in)	0.045	Vol. Change (CC)	23.40
Ht. After Cons. (in)	2.614	Cell Exp. (CC)	17.40
Initial Area (sq in)	4.112	Net Change (CC)	6.00
Area After Cons. (sq in)	4.042	Cons. Vol. (CC)	173.18

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00737EBU1 @ 10.20-10.45', 1152 psf (confining pressure)



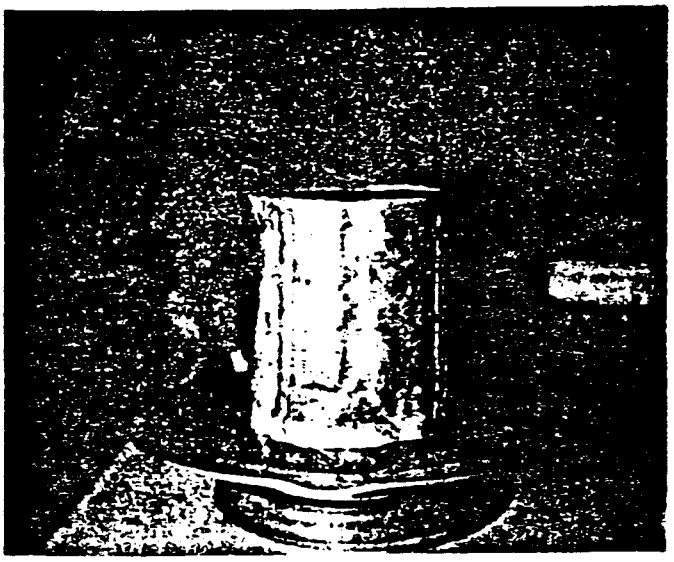
TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-12-91 KH
DEPTH	10.20 - 10.45 FT	TEST STARTED	12-07-91 DCW
SAMPLE NO.	BH00737EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS Liner	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No
Init. Ht. (in)	2.659	Init. Area (sq in)	4.112
Consol. Ht. (in)	2.614	Consol. Area (sq in)	4.042
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.042	0	89.00	0.0	1152	0	0.00
125.0	4453	0.01	0.38	4.058	4512	49.50	-5688.0	6840	11352	1.66
165.0	5878	0.02	0.77	4.073	5933	50.00	-5616.0	6768	12701	1.88
187.0	6662	0.03	1.15	4.089	6698	51.00	-5472.0	6624	13322	2.01
193.0	6875	0.04	1.53	4.105	6886	54.50	-4968.0	6120	13006	2.13
190.0	6769	0.05	1.91	4.121	6753	56.80	-4636.8	5789	12542	2.17
185.0	6590	0.06	2.30	4.137	6549	57.00	-4608.0	5760	12309	2.14
180.0	6412	0.07	2.68	4.153	6347	57.40	-4550.4	5702	12050	2.11
176.0	6270	0.08	3.06	4.170	6182	57.60	-4521.6	5674	11856	2.09
172.0	6127	0.09	3.44	4.186	6018	57.70	-4507.2	5659	11677	2.06
167.0	5949	0.10	3.83	4.203	5820	57.80	-4492.8	5645	11464	2.03
151.0	5379	0.15	5.74	4.288	5157	57.80	-4492.8	5645	10802	1.91
140.0	4987	0.20	7.65	4.377	4685	57.80	-4492.8	5645	10329	1.83
139.0	4952	0.25	9.56	4.470	4555	57.80	-4492.8	5645	10200	1.81
150.0	5344	0.30	11.48	4.566	4811	57.80	-4492.8	5645	10456	1.85
157.5	5611	0.35	13.39	4.667	4943	58.00	-4464.0	5616	10559	1.88
164.5	5860	0.40	15.30	4.773	5048	58.40	-4406.4	5558	10607	1.91
175.0	6234	0.45	17.21	4.883	5249	58.70	-4363.2	5515	10765	1.95
149.0	5308	0.50	19.13	4.998	4366	59.20	-4291.2	5443	9809	
140.0	4987	0.55	21.04	5.119	4005	59.50	-4248.0	5400	9405	
140.0	4987	0.60	22.95	5.246	3908	59.70	-4219.2	5371	9280	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37891

BH00737EBUI

10.20-10.45 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00747EBU1**
Sample Depth:	**45.70-46.15 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-07-91 KM,MC
DEPTH	45.70 - 46.15 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00747EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	36.36
Wt. Dry Soil & Pan (g)	36.10
Wt. Lost Moisture (g)	0.26
Wt. of Pan Only (g)	3.60
Wt. of Dry Soil (g)	32.50
Moisture Content %	0.8
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.52

WASH SIEVE ANALYSIS

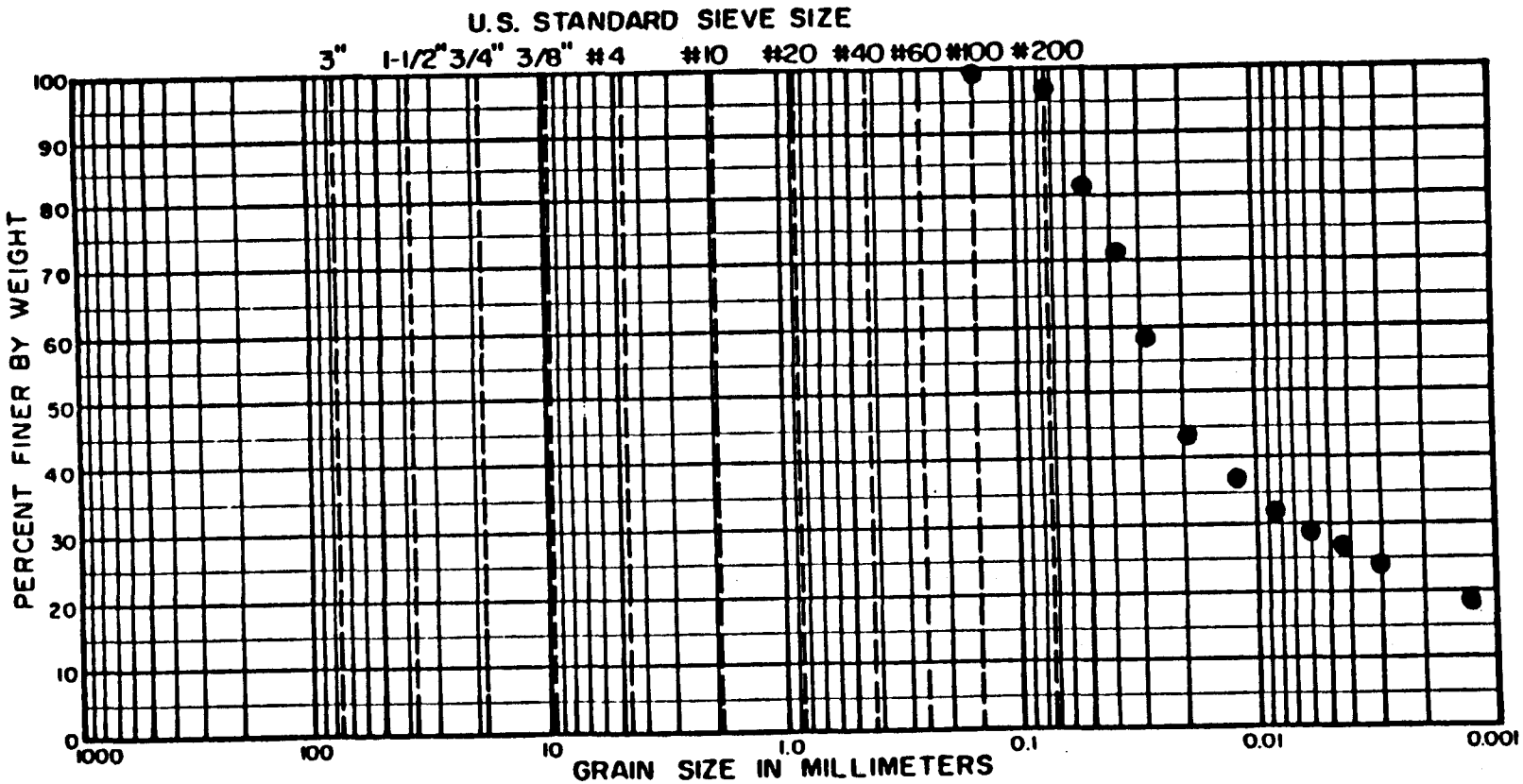
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	59.52
Wt. Total Sample Dry (g)	59.52
Calc. Wt. "W" (g)	59.52
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	1.32	0.00	0.00	0.0	100.0
#40	1.32	1.33	0.01	0.01	0.0	100.0
#60	1.31	1.32	0.01	0.02	0.0	100.0
#100	1.31	1.34	0.03	0.05	0.1	99.9
#200	1.31	3.39	2.08	2.14	3.6	96.4

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	45.70 - 46.15 FT
SAMPLE NO.	BH00747EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-07-91 KM,MC
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	36.360
Wt. Dry Soil & Pan (g)	36.100
Wt. of Pan Only (g)	3.600
Sieve:	
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.720
Value of "a"	0.986
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	21.000
Temp. Coef. K	0.01304
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00741EBU1	45.7 - 46.15'	#37891

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-07-91 KM,MC
DEPTH	45.70 - 46.15 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00747EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	21.000
Sp. Gr. of Soil	2.720	Temp. Coef. K	0.01304
Value of "a"	0.986	Wt. Dry Sample "W"	59.524
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	54.50	49.00	81.2	81.2	7.35	0.0500
1.0	48.50	43.00	71.2	71.2	8.34	0.0377
2.0	40.50	35.00	58.0	58.0	9.65	0.0286
5.0	32.00	26.50	43.9	43.9	11.04	0.0194
15.0	27.50	22.00	36.4	36.4	11.78	0.0116
30.0	25.00	19.50	32.3	32.3	12.19	0.0083
60.0	23.00	17.50	29.0	29.0	12.52	0.0060
120.0	21.50	16.00	26.5	26.5	12.76	0.0043
250.0	20.00	14.50	24.0	24.0	13.01	0.0030
1440.0	17.00	11.50	19.0	19.0	13.50	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-6

CLIENT/OWNER EFASCO

LOCATION 37891

BORING RH00747 EBUL SAMPLE ____ DEPTH 45.7-46.1'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

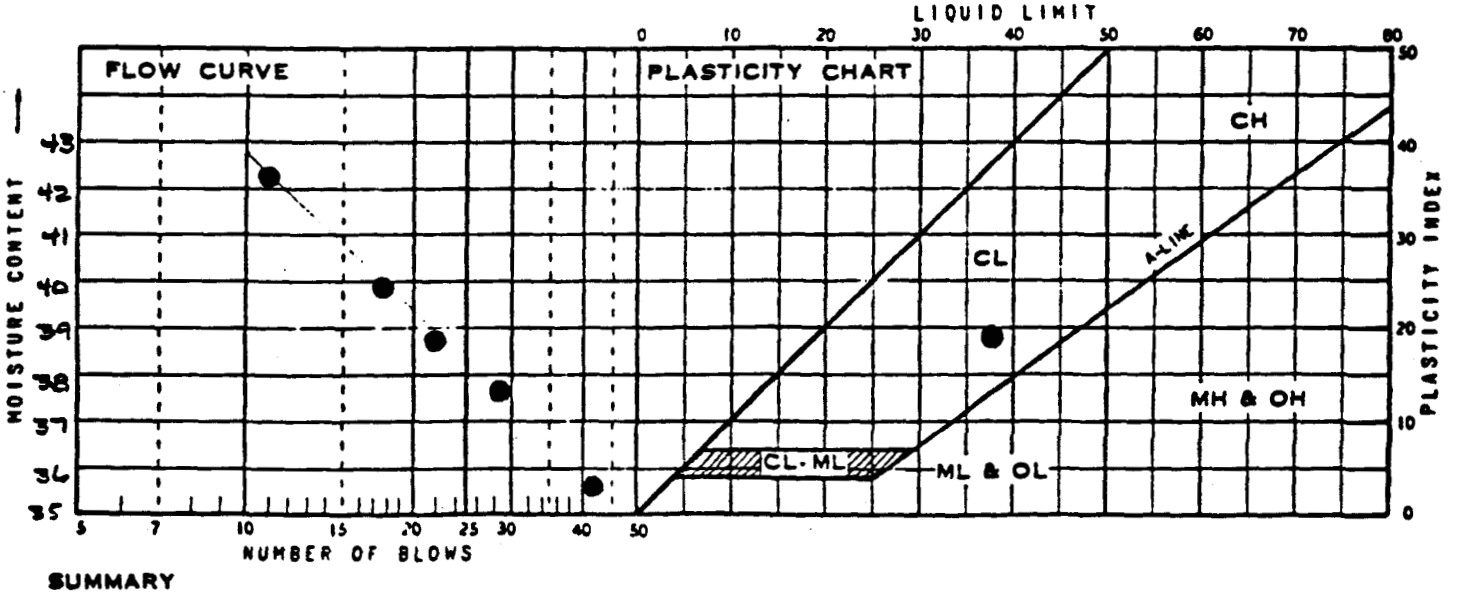
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR.J.114/92.

DETERMINATION	1	2	3	4	5	6
DISH	134	105	70A			
WT OF DISH + WET SOIL g	12.60	11.51	9.84			
WT OF DISH + DRY SOIL g	10.70	9.89	8.44	—	—	—
WT OF MOISTURE g	1.90	1.70	1.40			
WT OF DISH g	1.31	1.32	1.33	—	—	—
WT OF DRY SOIL g	9.39	8.57	7.11			
MOISTURE CONTENT %	20.2	19.8	19.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	22A	05	54	29B	23.1	
NUMBER OF BLOWS	42	29	22	18	11	
WT OF DISH + WET SOIL g	13.14	15.20	12.40	19.13	16.89	
WT OF DISH + DRY SOIL g	10.65	11.40	9.31	14.08	12.27	—
WT OF MOISTURE g	3.31	3.80	3.07	5.05	4.62	
WT OF DISH g	1.34	1.31	1.32	1.42	1.32	—
WT OF DRY SOIL g	9.31	10.09	7.99	12.66	10.95	
MOISTURE CONTENT %	35.6	37.7	38.7	39.9	42.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		38.3	17.7	18.4	CL	

ADVANCED TERRA TESTING INC

* Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

BORING NO.	BH00866EB01	BH00711EB01	BH00761EB01	BH00845EB01	BH00833EB01	BH00759EB01
DEPTH	5.0-5.25'	45.7-46.5'	3.0-3.25'	20.9-21.15'	1.5-1.75'	0.5-0.9'
Sample # SAS Tag #	39691	37891	39191	38991	38991	39091
Sampled	11-25-91	11-07-91	11-14-91	11-12-91	11-11-91	11-18-91
BY:	BP & KH	KM & MC	KM & MC	BP & KH	BP & MS	KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.86 g	177.860 g	178.070	178.010 g	177.99	177.730
Temperature °C, (T_x)	22.4	22.8	22.9	22.0	22.8	23.1
Weight of water and flask at T_x (from cal. curve) (W_a)	162.076 g	162.062 g	162.066	162.071 g	162.062	162.061
Specific Gravity = *	2.71	2.72	2.78	2.76	2.75	2.68
PAN #	2C	34+	517	34	80	31

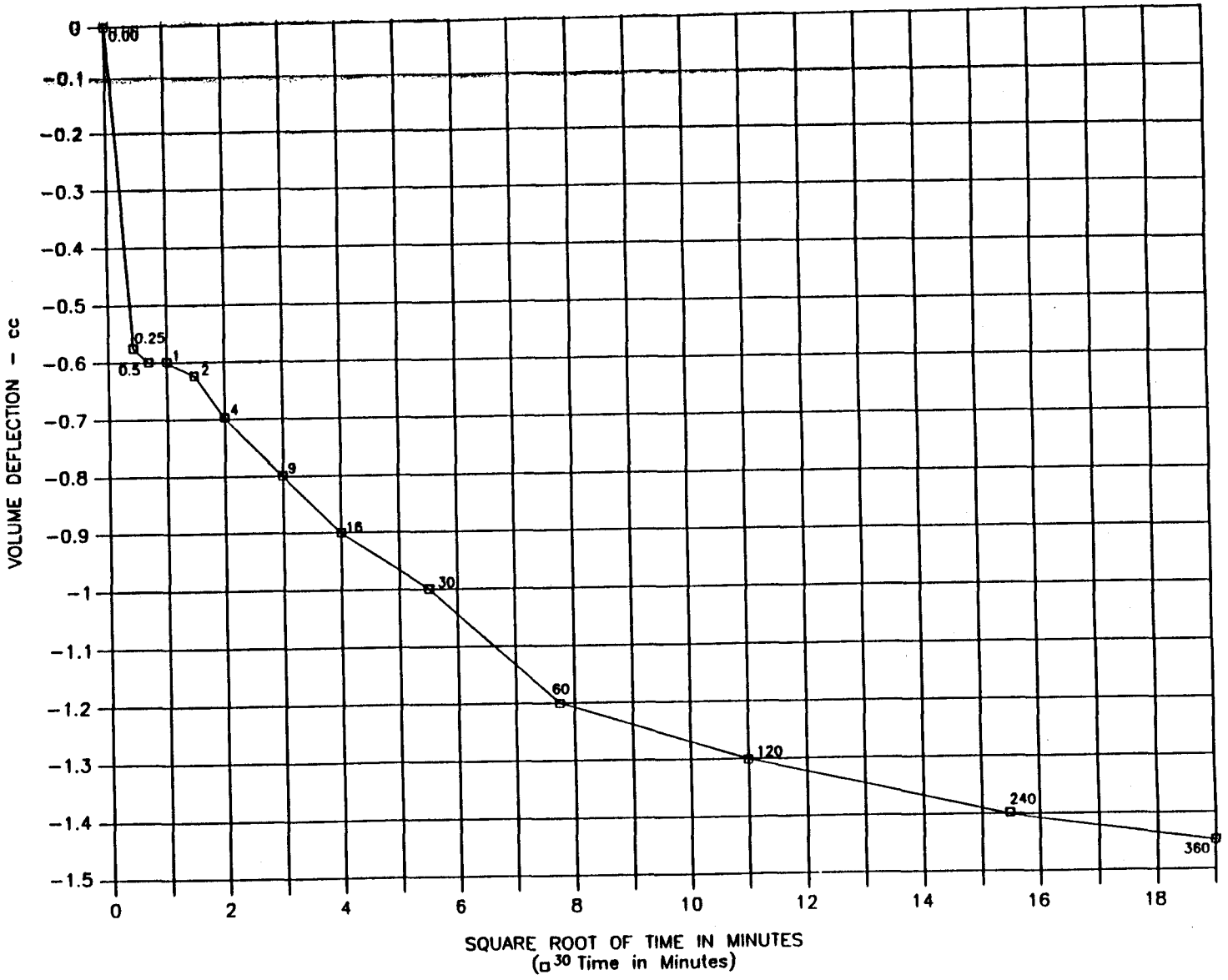
JOB NO. 2031-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

Page No. ___ of ___

CONSOLIDATION DATA

BH00595EBU1 @ 13.80-14.00', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-17-91 KM&AC
DEPTH	13.80 - 14.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00595EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	5P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.874	Init. Area (sq in)	4.501
Consol. Ht. (in)	2.868	Consol. Area (sq in)	4.488
Back Pres. PSI	79.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.488	0	79.00	0.0	1152	0	0.00
125.0	4010	0.01	0.35	4.504	4008	49.50	-4248.0	5400	9408	1.74
165.0	5294	0.02	0.70	4.520	5272	50.00	-4176.0	5328	10600	1.99
187.0	5999	0.03	1.05	4.536	5954	51.00	-4032.0	5184	11138	2.15
193.0	6192	0.04	1.39	4.552	6123	54.50	-3528.0	4680	10803	2.31
190.0	6096	0.05	1.74	4.568	6007	56.80	-3196.8	4349	10356	2.38
185.0	5935	0.06	2.09	4.584	5828	57.00	-3168.0	4320	10148	2.35
180.0	5775	0.07	2.44	4.601	5650	57.40	-3110.4	4262	9913	2.33
176.0	5647	0.08	2.79	4.617	5505	57.60	-3081.6	4234	9738	2.30
172.0	5518	0.09	3.14	4.634	5360	57.70	-3067.2	4219	9580	2.27
167.0	5358	0.10	3.49	4.651	5186	57.80	-3052.8	4205	9391	2.23
151.0	4845	0.15	5.23	4.736	4604	57.80	-3052.8	4205	8809	2.10
140.0	4492	0.20	6.97	4.825	4190	57.80	-3052.8	4205	8395	2.00
139.0	4460	0.25	8.72	4.917	4083	57.80	-3052.8	4205	8287	1.97
150.0	4812	0.30	10.46	5.013	4321	57.80	-3052.8	4205	8526	2.03
157.5	5053	0.35	12.20	5.112	4449	58.00	-3024.0	4176	8625	2.07
164.5	5278	0.40	13.95	5.216	4555	58.40	-2966.4	4118	8673	2.11
175.0	5614	0.45	15.69	5.324	4747	58.70	-2923.2	4075	8822	2.16
149.0	4780	0.50	17.43	5.436	3958	59.20	-2851.2	4003	7962	
140.0	4492	0.55	19.18	5.553	3641	59.50	-2808.0	3960	7601	
140.0	4492	0.60	20.92	5.676	3562	59.70	-2779.2	3931	7493	

ADVANCED TERRA TESTING, INC.

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00746EBU1**
Sample Depth:	**46.15-46.40 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	11-07-91 KM
DEPTH	46.15 - 46.40 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00746EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	2P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	388.5	423.2
Wt. Wet Soil & Pan (g)	397.9	432.6
Wt. Dry Soil & Pan (g)	347.7	347.7
Wt. Lost Moisture (g)	50.2	84.9
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	338.3	338.3
Moisture Content %	14.8	25.1
Wet Density PCF	115.2	131.7
Dry Density PCF	100.3	105.3

Init. Diameter (in)	2.388	(cm)	6.066
Init. Area (sq in)	4.479	(sq cm)	28.897
Init. Height (in)	2.870	(cm)	7.290
Vol. Bef. Consol. (cu ft)	0.00744		
Vol. After Consol. (cu ft)	0.00709		
Effective Porosity %	42.29		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1501.0	90060	50.2	46.6	16.8	7.5E-08
1480.0	88800	46.6	43.9	20.2	5.9E-08
1360.0	81600	43.9	40.7	23.4	7.8E-08
1327.0	79620	40.7	38.6	26.2	5.4E-08
1460.0	87600	50.0	47.7	16.3	4.9E-08
1415.0	84900	47.7	45.4	18.8	5.2E-08
2868.0	172080	45.4	41.0	22.4	5.0E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	46.15 - 46.40 FT
SAMPLE NO.	BH00746EBU1
SOIL DESCR.	SS LINER
SAMPLED	11-07-91 KM
TEST STARTED	12-06-91 DCW
TEST FINISHED	12-25-91
SETUP NO.	2P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	388.540
Wt Soil & Moist at	423.200
Wt. Dry Soil & Pan	347.730
Wt. of Pan Only (g)	9.400
Consol Info:	
Init. Diameter in.	2.388
Initial Height in.	2.870
Vol. change (sat. con.) CC	23.200
Cell Exp.	13.200
Height Change in.	0.174
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	11-07-91 KM
DEPTH	46.15 - 46.40 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00746EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	2P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	10.2				
50.0	48.0	8.3	9.8	38.3	47.0	8.7	0.87
60.0	58.0	10.2	11.5	48.5	57.4	8.9	0.89
70.0	68.0	11.8	13.0	58.5	67.6	9.1	0.91
80.0		13.3	13.4	68.4	77.9	9.5	0.95

CONSOLIDATION DATA

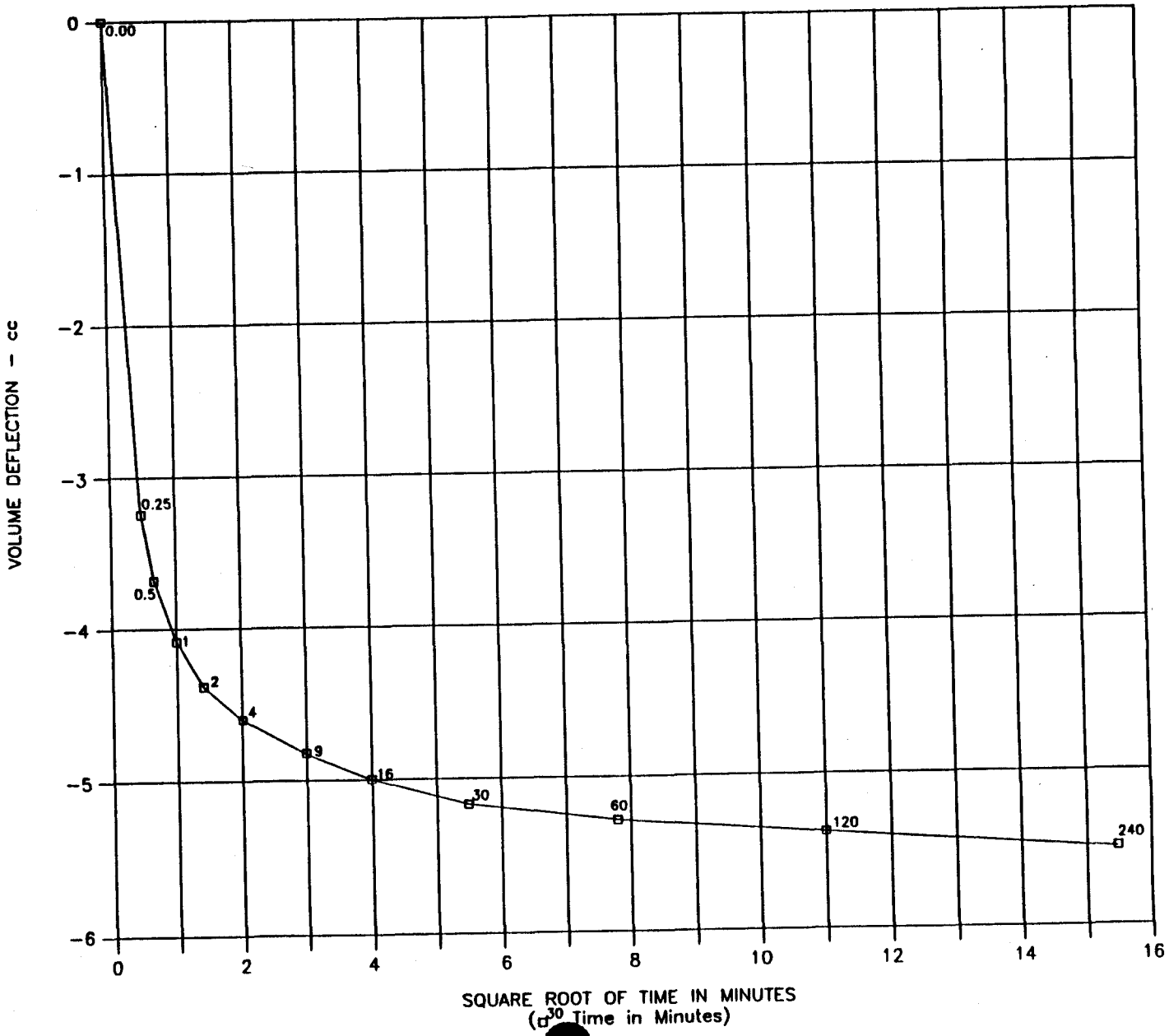
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	13.40	0.00
0.25	0.50	16.65	-3.25
0.5	0.71	17.10	-3.70
1	1.00	17.48	-4.08
2	1.41	17.78	-4.37
4	2.00	18.00	-4.60
9	3.00	18.23	-4.83
16	4.00	18.40	-5.00
30	5.48	18.58	-5.17
60	7.75	18.68	-5.28
120	10.95	18.78	-5.37
240	15.49	18.90	-5.50

Initial Height (in)	2.870	Init. Vol. (CC)	210.68
Height Change (in)	0.174	Vol. Change (CC)	23.20
Ht. After Cons. (in)	2.696	Cell Exp. (CC)	13.20
Initial Area (sq in)	4.479	Net Change (CC)	10.00
Area After Cons. (sq in)	4.542	Cons. Vol. (CC)	200.68

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00746EBU1 @ 46.15-46.40', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

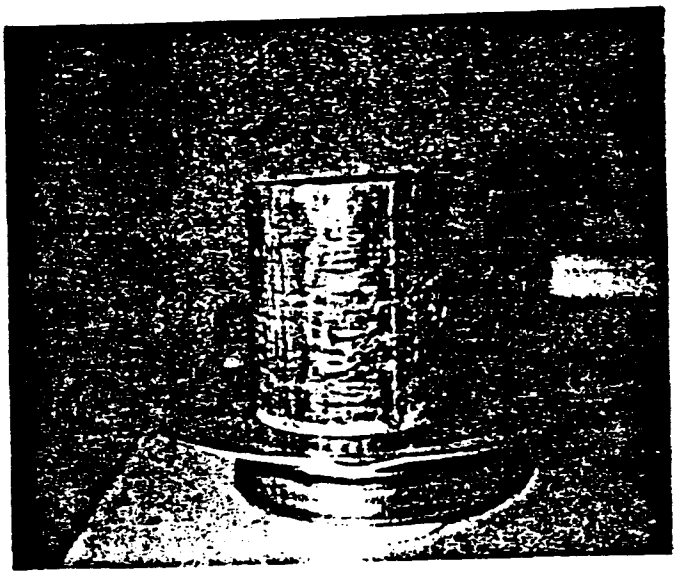
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	11-07-91 KM
DEPTH	46.15 - 46.40 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00746EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	2P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.870	Init. Area (sq in)	4.479
Consol. Ht. (in)	2.696	Consol. Area (sq in)	4.542
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.542	0	69.00	0.0	1152	0	0.00
125.0	3963	0.01	0.37	4.558	3894	49.50	-2808.0	3960	7854	1.98
165.0	5232	0.02	0.74	4.575	5121	50.00	-2736.0	3888	9009	2.32
187.0	5929	0.03	1.11	4.593	5782	51.00	-2592.0	3744	9526	2.54
193.0	6120	0.04	1.48	4.610	5945	54.50	-2088.0	3240	9185	2.84
190.0	6024	0.05	1.85	4.627	5831	56.80	-1756.8	2909	8740	3.00
185.0	5866	0.06	2.23	4.645	5656	57.00	-1728.0	2880	8536	2.96
180.0	5707	0.07	2.60	4.663	5482	57.40	-1670.4	2822	8305	2.94
176.0	5581	0.08	2.97	4.680	5340	57.60	-1641.6	2794	8134	2.91
172.0	5454	0.09	3.34	4.698	5199	57.70	-1627.2	2779	7978	2.87
167.0	5295	0.10	3.71	4.716	5028	57.80	-1612.8	2765	7793	2.82
151.0	4788	0.15	5.56	4.809	4459	57.80	-1612.8	2765	7224	2.61
140.0	4439	0.20	7.42	4.905	4053	57.80	-1612.8	2765	6818	2.47
139.0	4407	0.25	9.27	5.006	3943	57.80	-1612.8	2765	6708	2.43
150.0	4756	0.30	11.13	5.110	4168	57.80	-1612.8	2765	6933	2.51
157.5	4994	0.35	12.98	5.219	4286	58.00	-1584.0	2736	7022	2.57
164.5	5216	0.40	14.84	5.333	4381	58.40	-1526.4	2678	7059	2.64
175.0	5549	0.45	16.69	5.451	4559	58.70	-1483.2	2635	7194	2.73
149.0	4724	0.50	18.55	5.576	3795	59.20	-1411.2	2563	6358	
140.0	4439	0.55	20.40	5.705	3485	59.50	-1368.0	2520	6005	
140.0	4439	0.60	22.26	5.842	3403	59.70	-1339.2	2491	5895	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37891

BH00746EBUI

46.15–46.40 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37991**
Sample Number:	**BH00720EBU1**
Sample Depth:	**3.00-3.50 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37991	SAMPLED	10-17-91
DEPTH	3.00 - 3.50 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00720EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	38.14
Wt. Dry Soil & Pan (g)	37.39
Wt. Lost Moisture (g)	0.75
Wt. of Pan Only (g)	3.69
Wt. of Dry Soil (g)	33.70
Moisture Content %	2.2

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.70

WASH SIEVE ANALYSIS

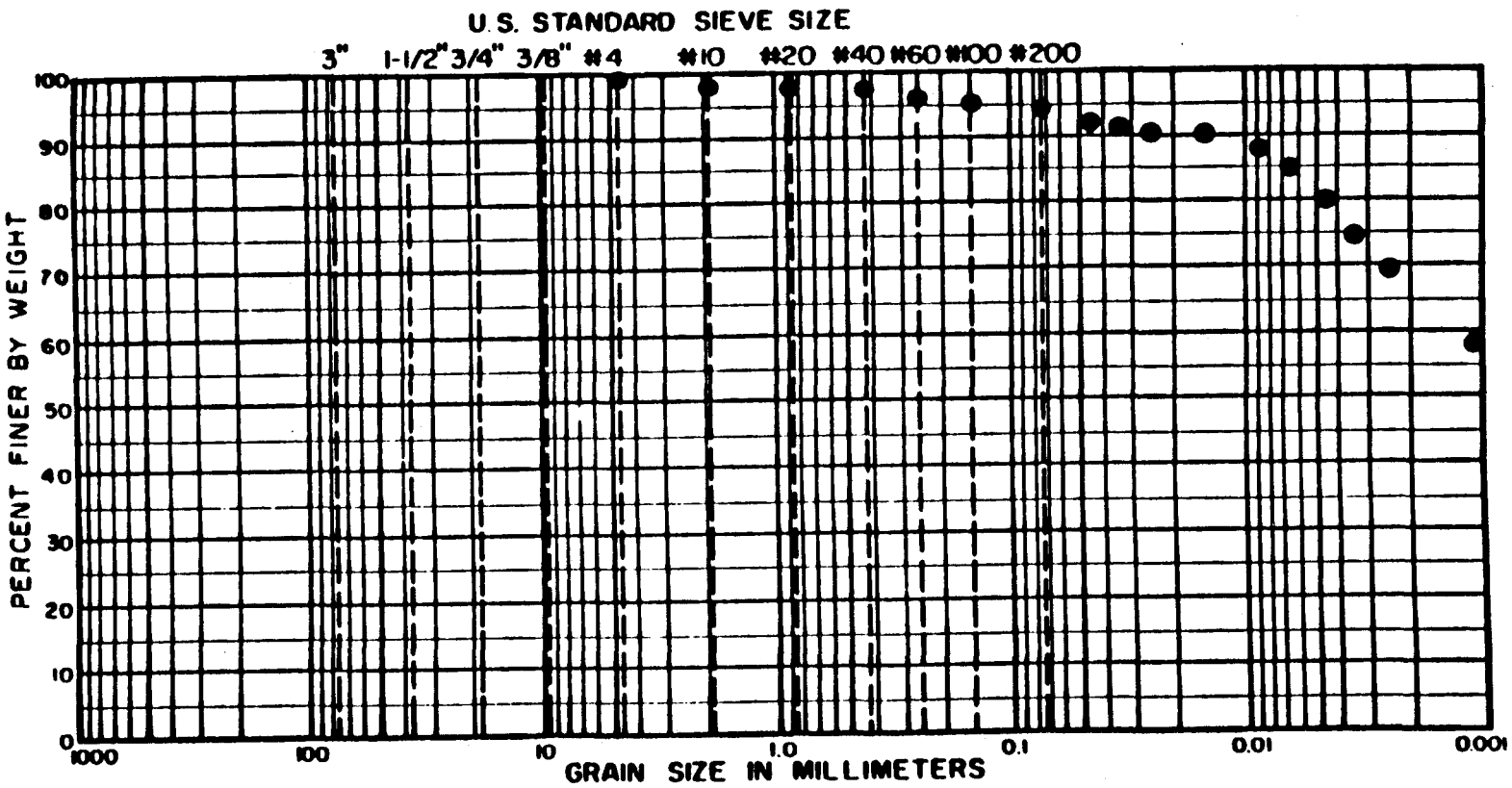
Wt. Total Sample Wet (g)	295.47
Weight of + #10 Before Washing (g)	16.30
Weight of + #10 After Washing (g)	6.42
Weight of - #10 Wet (g)	279.17
Weight of - #10 Dry (g)	282.76
Wt. Total Sample Dry (g)	289.18
Calc. Wt. "W" (g)	60.03
Calc. Mass + #10	1.33

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	2.36	2.36	2.36	0.8	99.2
#10	0.00	4.06	4.06	6.42	2.2	97.8
#20	3.69	3.72	0.03	0.03	2.3	97.7
#40	3.63	3.69	0.06	0.09	2.4	97.6
#60	3.69	4.40	0.71	0.80	3.6	96.4
#100	1.31	1.77	0.46	1.26	4.3	95.7
#200	1.41	1.56	0.15	1.41	4.6	95.4

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37991
DEPTH	3.00 - 3.50 FT
SAMPLE NO.	BH00720EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-17-91
DATE TESTED	11-11-91 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	38.140
Wt. Dry Soil & Pan (g)	37.390
Wt. of Pan Only (g)	3.690
Sieve:	
Wt. Total Sample Wet (g)	295.47
Weight of + #10 Before Washing (g)	16.30
Weight of + #10 After Washing (g)	6.42
Weight of - #10 Wet (g)	279.17

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.003
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW00720EBUI	3 - 3.5'	Sample# 979

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-17-91
DEPTH	3.00 - 3.50 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00720EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	60.029
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	61.00	56.00	93.3	93.3	6.29	0.0467
1.0	60.00	55.00	91.6	91.6	6.45	0.0334
2.0	59.75	54.75	91.2	91.2	6.49	0.0237
5.0	59.75	54.75	91.2	91.2	6.49	0.0150
15.0	58.00	53.00	88.3	88.3	6.78	0.0089
30.0	56.00	51.00	85.0	85.0	7.11	0.0064
60.0	53.00	48.00	80.0	80.0	7.60	0.0047
120.0	49.50	44.50	74.1	74.1	8.17	0.0034
250.0	46.50	41.50	69.1	69.1	8.66	0.0025
1440.0	39.50	34.50	57.5	57.5	9.81	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2091-05
CLIENT/OWNER EBASCO
LOCATION 379
BORING ____ SAMPLE ____ DEPTH 3.0-3.5'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

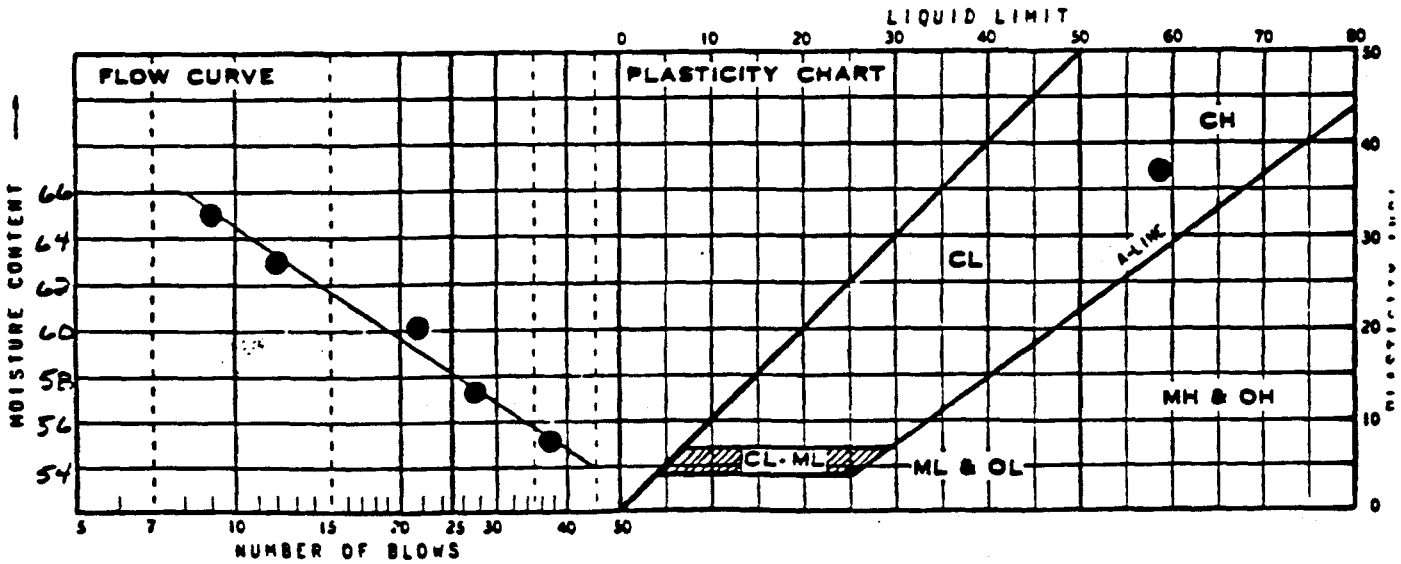
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 11/12/91

DETERMINATION	1	2	3	4	5	6
DISH	4	14C	58C			
WT OF DISH + WET SOIL g	6.89	7.23	5.34			
WT OF DISH + DRY SOIL g	5.90	6.20	4.60	—	—	—
WT OF MOISTURE g	.99	1.03	.74			
WT OF DISH g	.96	1.06	1.06	—	—	—
WT OF DRY SOIL g	4.84	5.14	3.54			
MOISTURE CONTENT %	20.5	20.0	20.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	44C	3	62C	6	8	
NUMBER OF BLOWS	39	28	22	11	9	
WT OF DISH + WET SOIL g	14.28	15.70	15.64	18.93	18.90	
WT OF DISH + DRY SOIL g	9.58	10.36	10.13	12.00	11.87	—
WT OF MOISTURE g	4.70	5.34	5.51	6.93	7.03	
WT OF DISH g	1.06	1.06	1.05	1.08	1.06	—
WT OF DRY SOIL g	8.52	9.30	9.08	10.98	10.81	
MOISTURE CONTENT %	55.2	57.4	60.7	63.1	65.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		58.1	20.5	37.6	CH

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37991**
Sample Number:	**BH00719EBU1**
Sample Depth	**3.50-3.75 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	3.50 - 3.75 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00719EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	3P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	386.1	409.9
Wt. Wet Soil & Pan (g)	395.6	419.3
Wt. Dry Soil & Pan (g)	344.5	344.5
Wt. Lost Moisture (g)	51.1	74.8
Wt. of Pan Only (g)	9.5	9.5
Wt. of Dry Soil (g)	335.1	335.1
Moisture Content %	15.2	22.3
Wet Density PCF	130.8	132.8
Dry Density PCF	113.5	108.5

Init. Diameter (in)	2.385	(cm)	6.058
Init. Area (sq in)	4.468	(sq cm)	28.824
Init. Height (in)	2.518	(cm)	6.396
Vol. Bef. Consol. (cu ft)	0.00651		
Vol. After Consol. (cu ft)	0.00680		
Effective Porosity %	38.83		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1499.0	89940	49.6	48.7	5.4	1.6E-08
1337.0	80220	48.7	47.9	6.2	1.6E-08
1443.0	86580	47.9	47.0	7.0	1.6E-08
1459.0	87540	47.0	46.2	7.8	1.4E-08
1420.0	85200	46.2	45.4	8.5	1.5E-08
1450.0	87000	45.4	44.7	9.2	1.3E-08
1569.0	94140	44.7	44.0	9.9	1.3E-08
1396.0	83760	44.0	43.3	10.5	1.3E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37991
DEPTH	3.50 - 3.75 FT
SAMPLE NO.	BH00719EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-23-91 KM&CB
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-25-91
SETUP NO.	3P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	386.100
Wt Soil & Moist at	409.890
Wt. Dry Soil & Pan	344.510
Wt. of Pan Only (g)	9.460
Consol Info:	
Init. Diameter in.	2.385
Initial Height in.	2.518
Vol. change (sat. con.) CC	7.250
Cell Exp.	15.600
Height Change in.	0.015
Test info:	
Pore pres @ begin. psi	79.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	3.50 - 3.75 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00719EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	3P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	7.5				
50.0	48.0	3.8	5.1	38.0	41.4	3.4	0.34
60.0	58.0	0.6	1.8	48.0	54.2	6.2	0.62
70.0	68.0	0.1	2.0	58.4	66.4	8.0	0.80
80.0	78.0	1.9	3.3	68.2	77.4	9.2	0.92
90.0		3.4	3.6	78.4	87.9	9.5	0.95

CONSOLIDATION DATA

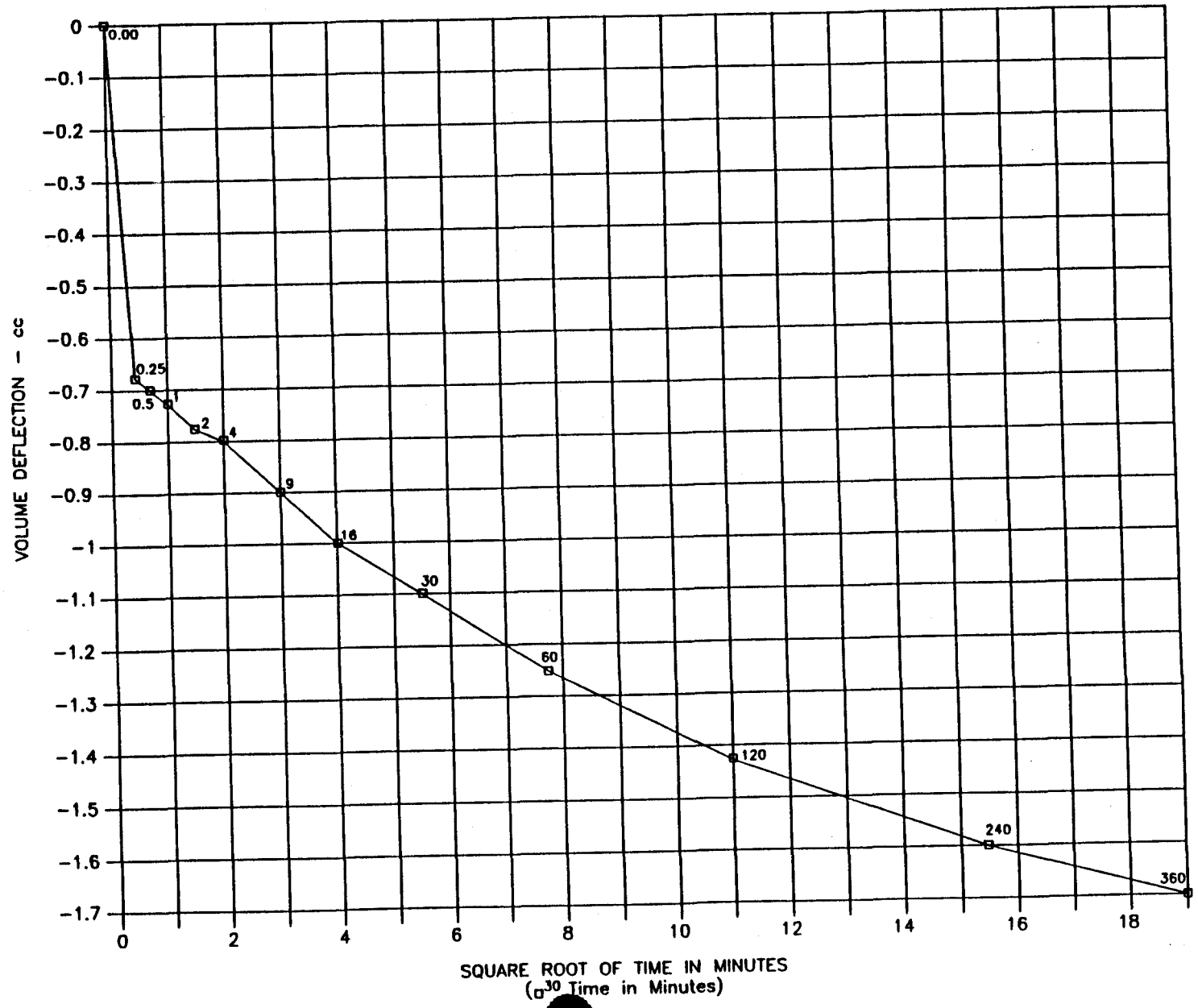
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	3.60	0.00
0.25	0.50	4.28	-0.68
0.5	0.71	4.30	-0.70
1	1.00	4.33	-0.73
2	1.41	4.38	-0.77
4	2.00	4.40	-0.80
9	3.00	4.50	-0.90
16	4.00	4.58	-0.98
30	5.48	4.70	-1.10
60	7.75	4.85	-1.25
120	10.95	5.03	-1.43
240	15.49	5.20	-1.60
360	18.97	5.30	-1.70

Initial Height (in)	2.518	Init. Vol. (CC)	184.37
Height Change (in)	0.015	Vol. Change (CC)	7.25
Ht. After Cons. (in)	2.503	Cell Exp. (CC)	15.60
Initial Area (sq in)	4.468	Net Change (CC)	-8.35
Area After Cons. (sq in)	4.698	Cons. Vol. (CC)	192.72

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00719EBU1 @ 3.50-3.75', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

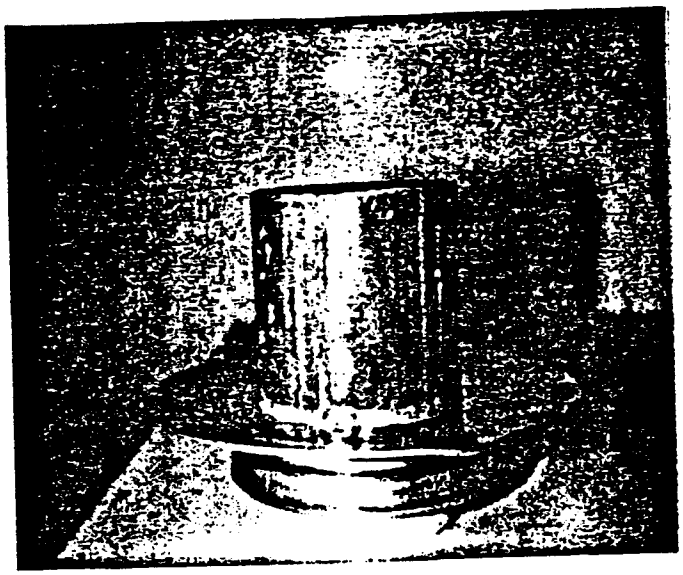
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	3.50 - 3.75 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00719EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	3P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.518	Init. Area (sq in)	4.468
Consol. Ht. (in)	2.503	Consol. Area (sq in)	4.698
Back Pres. PSI	79.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.698	0	79.00	0.0	1152	0	0.00
125.0	3832	0.01	0.40	4.717	3629	49.50	-4248.0	5400	9029	1.67
165.0	5058	0.02	0.80	4.736	4771	50.00	-4176.0	5328	10099	1.90
187.0	5732	0.03	1.20	4.755	5386	51.00	-4032.0	5184	10570	2.04
193.0	5916	0.04	1.60	4.774	5536	54.50	-3528.0	4680	10216	2.18
190.0	5824	0.05	2.00	4.794	5428	56.80	-3196.8	4349	9777	2.25
185.0	5671	0.06	2.40	4.813	5263	57.00	-3168.0	4320	9583	2.22
180.0	5517	0.07	2.80	4.833	5100	57.40	-3110.4	4262	9363	2.20
176.0	5395	0.08	3.20	4.853	4966	57.60	-3081.6	4234	9200	2.17
172.0	5272	0.09	3.60	4.873	4833	57.70	-3067.2	4219	9053	2.15
167.0	5119	0.10	4.00	4.893	4674	57.80	-3052.8	4205	8878	2.11
151.0	4629	0.15	5.99	4.997	4138	57.80	-3052.8	4205	8343	1.98
140.0	4291	0.20	7.99	5.106	3755	57.80	-3052.8	4205	7960	1.89
139.0	4261	0.25	9.99	5.219	3647	57.80	-3052.8	4205	7852	1.87
150.0	4598	0.30	11.99	5.338	3848	57.80	-3052.8	4205	8053	1.92
157.5	4828	0.35	13.98	5.462	3949	58.00	-3024.0	4176	8125	1.95
164.5	5042	0.40	15.98	5.591	4029	58.40	-2966.4	4118	8147	1.98
175.0	5364	0.45	17.98	5.728	4184	58.70	-2923.2	4075	8259	2.03
149.0	4567	0.50	19.98	5.871	3476	59.20	-2851.2	4003	7479	
140.0	4291	0.55	21.97	6.021	3184	59.50	-2808.0	3960	7144	
140.0	4291	0.60	23.97	6.179	3103	59.70	-2779.2	3931	7034	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37991

MW00719EBUI

3.50-3.75 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37991**
Sample Number:	**BH00724EBU1**
Sample Depth:	**11.10-11.40 feet (Bedrock)**

Data Available:

- ✓ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✓ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	11.10 - 11.40 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00724EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	34.24
Wt. Dry Soil & Pan (g)	33.65
Wt. Lost Moisture (g)	0.59
Wt. of Pan Only (g)	3.81
Wt. of Dry Soil (g)	29.84
Moisture Content %	2.0
Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	58.84

WASH SIEVE ANALYSIS

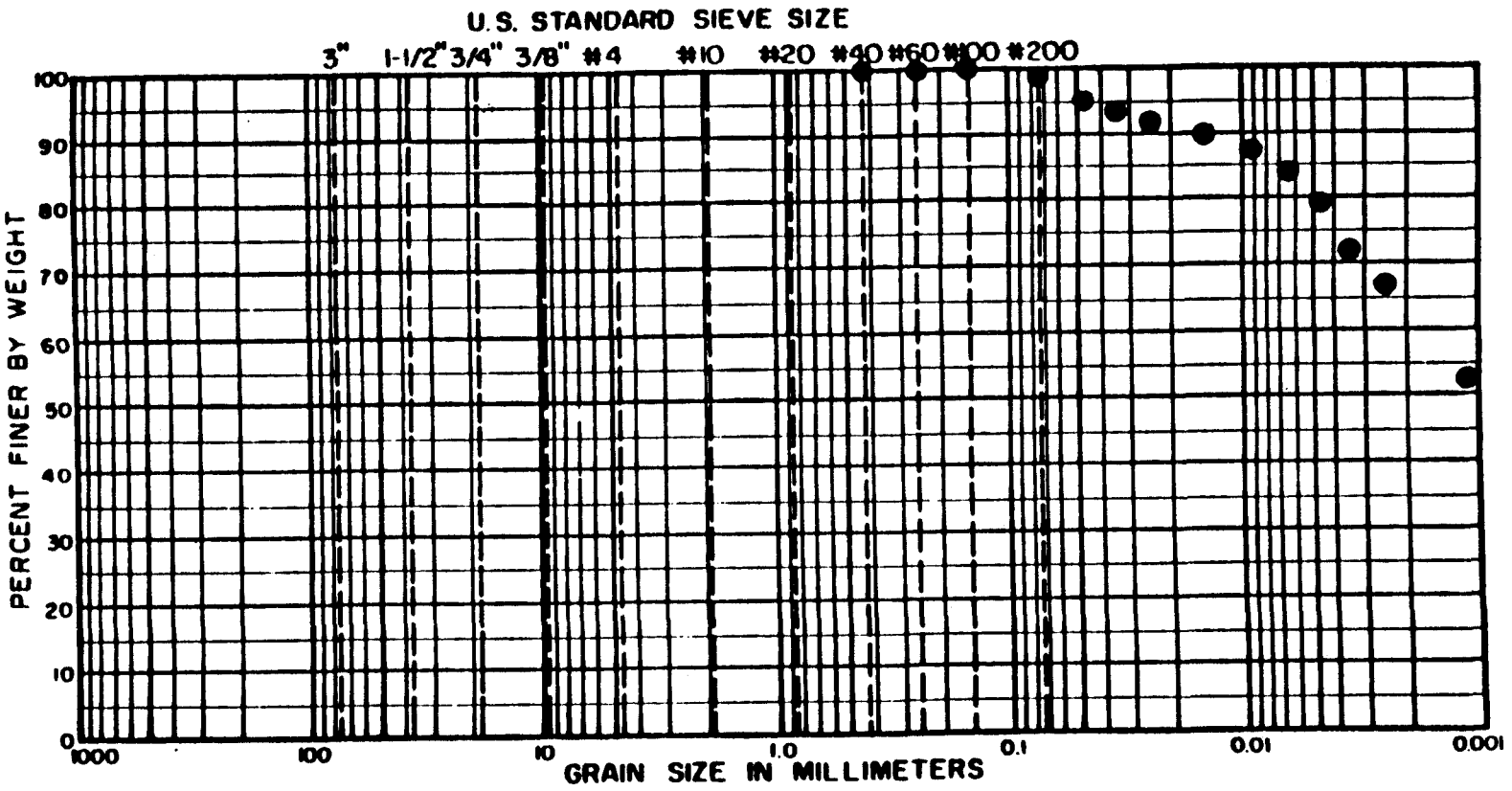
Wt. Total Sample Wet (g)	60.01
Weight of + #10 Before Washing (g) -	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.01
Weight of - #10 Dry (g)	58.84
Wt. Total Sample Dry (g)	58.84
Calc. Wt. "W" (g)	58.84
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	1.32	0.01	0.01	0.0	100.0
#40	1.32	1.34	0.02	0.03	0.1	99.9
#60	1.32	1.34	0.02	0.05	0.1	99.9
#100	1.31	1.34	0.03	0.08	0.1	99.9
#200	1.29	1.38	0.09	0.17	0.3	99.7

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37991
DEPTH	11.10 - 11.40 FT
SAMPLE NO.	BH00724EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-23-91 KM&CB
DATE TESTED	11-08-91 SR
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	34.240
Wt. Dry Soil & Pan (g)	33.650
Wt. of Pan Only (g)	3.810
Sieve:	
Wt. Total Sample Wet (g)	60.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.01

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.008
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW0072412EBUI	11.1 - 11.4'	Sample # 379

ADVANCED TERRA TESTING -

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	11.10 - 11.40 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00724EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	58.845
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	60.50	55.50	94.3	94.3	6.37	0.0470
1.0	60.00	55.00	93.5	93.5	6.45	0.0334
2.0	59.00	54.00	91.8	91.8	6.61	0.0240
5.0	58.00	53.00	90.1	90.1	6.78	0.0153
15.0	57.00	52.00	88.4	88.4	6.94	0.0090
30.0	54.25	49.25	83.7	83.7	7.39	0.0065
60.0	51.50	46.50	79.0	79.0	7.84	0.0048
120.0	47.50	42.50	72.2	72.2	8.50	0.0035
250.0	44.25	39.25	66.7	66.7	9.03	0.0025
1440.0	35.75	30.75	52.3	52.3	10.43	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2071-05

CLIENT/OWNER ERASCO

LOCATION 379 [illegible]

BORING ____ SAMPLE ____ DEPTH [illegible]

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

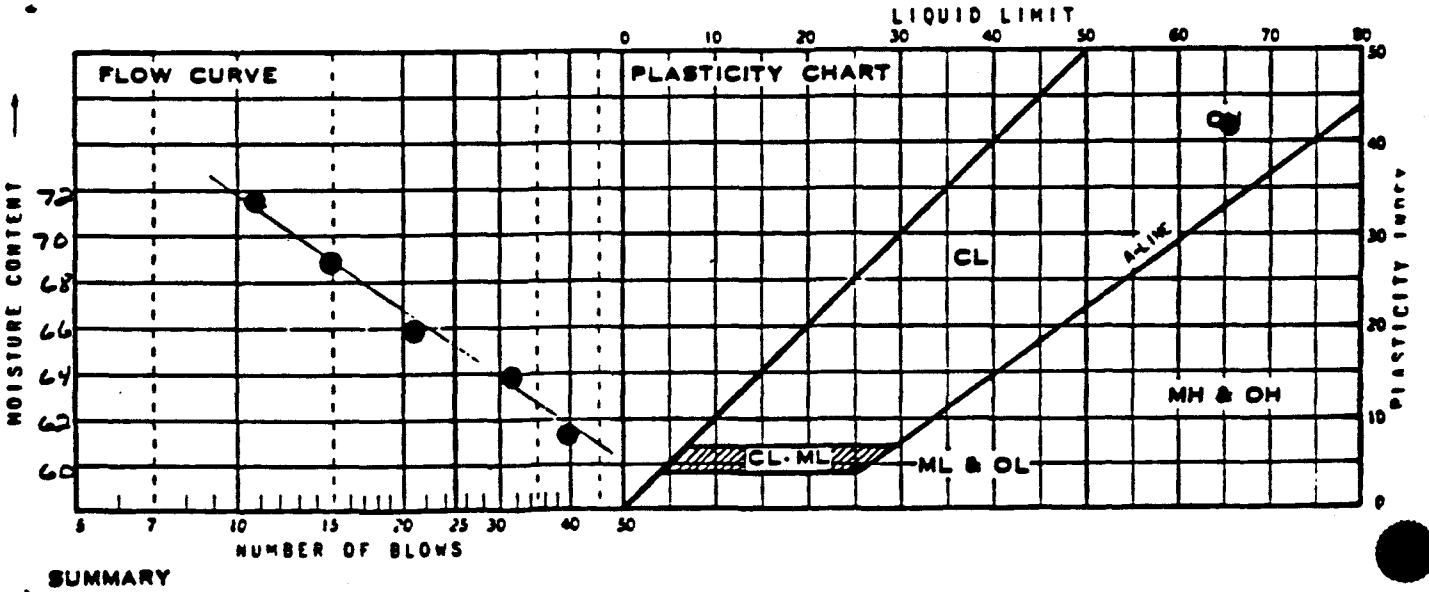
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. [illegible]

DETERMINATION	1	2	3	4	5	6
DISH	21	20 C	43 C			
WT OF DISH + WET SOIL g	7.61	6.66	6.28			
WT OF DISH + DRY SOIL g	6.39	5.62	5.29	—	—	—
WT OF MOISTURE g	1.22	1.04	.99			
WT OF DISH g	1.06	1.06	1.05	—	—	—
WT OF DRY SOIL g	5.33	4.56	4.24			
MOISTURE CONTENT %	22.9	22.8	23.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	23	20	6 C	48 C	17	
NUMBER OF BLOWS	40	33	21	15	10	
WT OF DISH + WET SOIL g	12.85	14.64	14.94	16.74	16.08	
WT OF DISH + DRY SOIL g	8.36	9.34	9.43	10.34	9.81	—
WT OF MOISTURE g	4.49	5.30	5.51	6.40	6.27	
WT OF DISH g	1.05	1.05	1.07	1.05	1.05	—
WT OF DRY SOIL g	7.31	8.29	8.36	9.29	8.76	
MOISTURE CONTENT %	61.4	63.9	65.9	68.9	71.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		65.2	22.7	42.5	CH	

ADVANCED TEDDA [illegible]

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37991**
Sample Number:	**BH00723EBU1**
Sample Depth:	**11.40-11.65 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	11.40 - 11.65 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00723EBU1	TEST FINISHED	11-30-91
SOIL DESCR.	SS LINER	SETUP NO.	13S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	393.2	406.3
Wt. Wet Soil & Pan (g)	402.6	415.7
Wt. Dry Soil & Pan (g)	329.9	329.9
Wt. Lost Moisture (g)	72.7	85.8
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	320.5	320.5
Moisture Content %	22.7	26.8
Wet Density PCF	126.8	129.6
Dry Density PCF	103.4	102.2

Init. Diameter (in)	2.391	(cm)	6.073
Init. Area (sq in)	4.490	(sq cm)	28.970
Init. Height (in)	2.630	(cm)	6.680
Vol. Bef. Consol. (cu ft)	0.00683		
Vol. After Consol. (cu ft)	0.00691		
Effective Porosity %	43.83		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1421.0	85260	48.9	48.6	16.4	6.4E-09
1449.0	86940	48.6	48.3	16.7	6.3E-09
1570.0	94200	48.3	48.1	17.0	3.9E-09
1420.0	85200	48.1	47.8	17.3	6.5E-09
1336.0	80160	47.8	47.6	17.6	4.6E-09
1444.0	86640	47.6	47.3	17.8	6.4E-09
1425.0	85500	47.3	47.1	18.1	5.4E-09
1690.0	101400	47.1	46.8	18.4	5.5E-09

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37991
DEPTH	11.40 - 11.65 FT
SAMPLE NO.	BH00723EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-23-91 KM&CB
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-30-91
SETUP NO.	13S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	393.170
Wt Soil & Moist at	406.270
Wt. Dry Soil & Pan	329.870
Wt. of Pan Only (g)	9.420
Consol Info:	
Init. Diameter in.	2.391
Initial Height in.	2.630
Vol. change (sat. con.) CC	6.750
Cell Exp.	9.000
Height Change in.	0.002
Test info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	11.40 - 11.65 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00723EBU1	TEST FINISHED	11-30-91
SOIL DESCR.	SS LINER	SETUP NO.	13S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	8.0				
50.0	48.0	4.7	5.6	37.8	42.4	4.6	0.46
60.0	58.0	2.2	3.0	47.9	54.5	6.6	0.66
70.0	68.0	1.6		58.1	65.8	7.7	0.77
80.0	78.0	1.9		68.3	77.1	8.8	0.88
90.0	88.0	2.5	3.3	78.4	87.6	9.2	0.92
100.0		3.4	3.4	88.3	97.8	9.5	0.95

CONSOLIDATION DATA

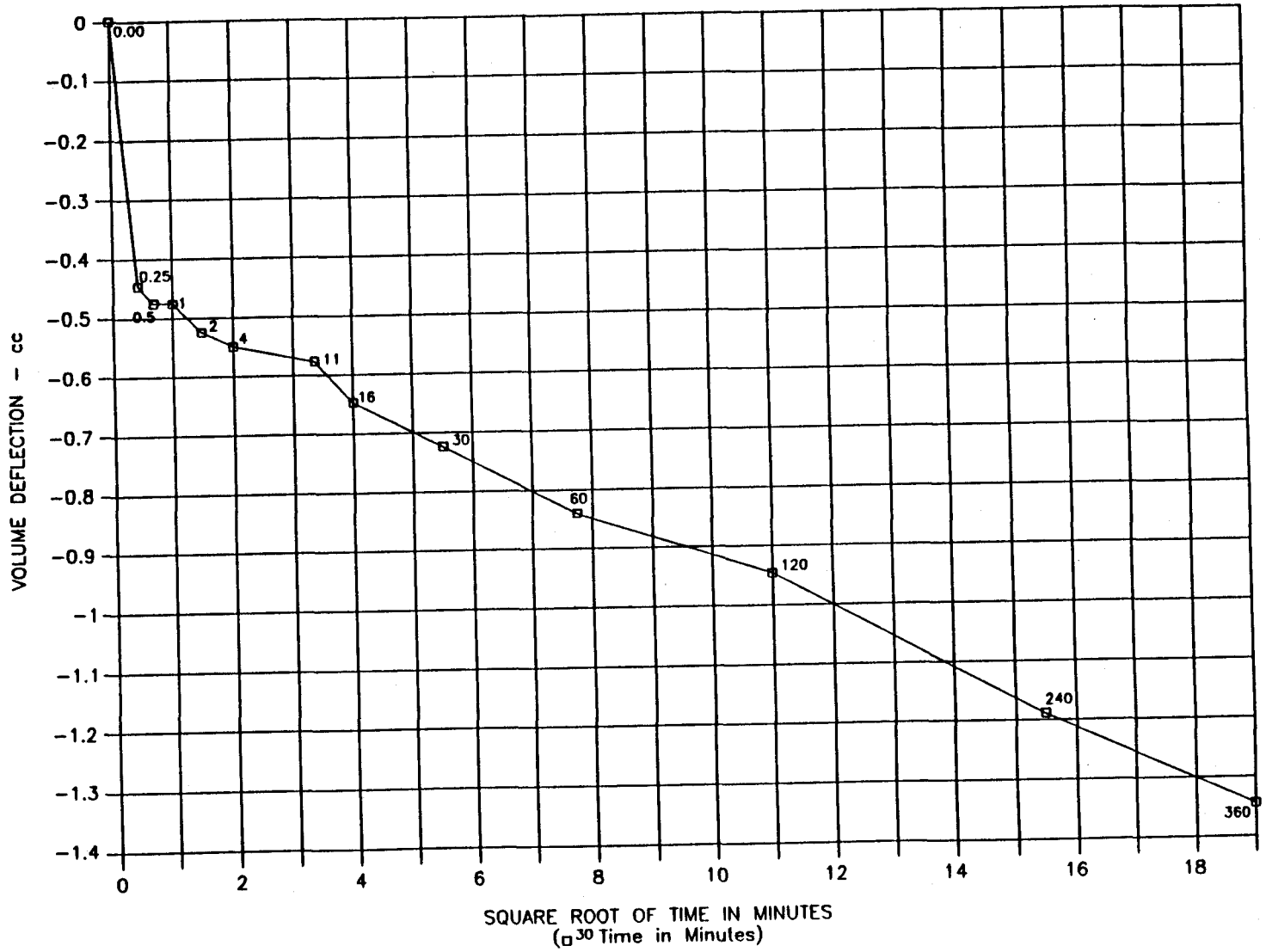
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	3.35	0.00
0.25	0.50	3.80	-0.45
0.5	0.71	3.83	-0.48
1	1.00	3.83	-0.48
2	1.41	3.88	-0.52
4	2.00	3.90	-0.55
11	3.32	3.93	-0.57
16	4.00	4.00	-0.65
30	5.48	4.08	-0.73
60	7.75	4.19	-0.84
120	10.95	4.30	-0.95
240	15.49	4.54	-1.19
360	18.97	4.70	-1.35

Initial Height (in)	2.630	Init. Vol. (CC)	193.55
Height Change (in)	0.002	Vol. Change (CC)	6.75
Ht. After Cons. (in)	2.628	Cell Exp. (CC)	9.00
Initial Area (sq in)	4.490	Net Change (CC)	-2.25
Area After Cons. (sq in)	4.546	Cons. Vol. (CC)	195.80

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00723EBU1 @ 11.40–11.65', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05

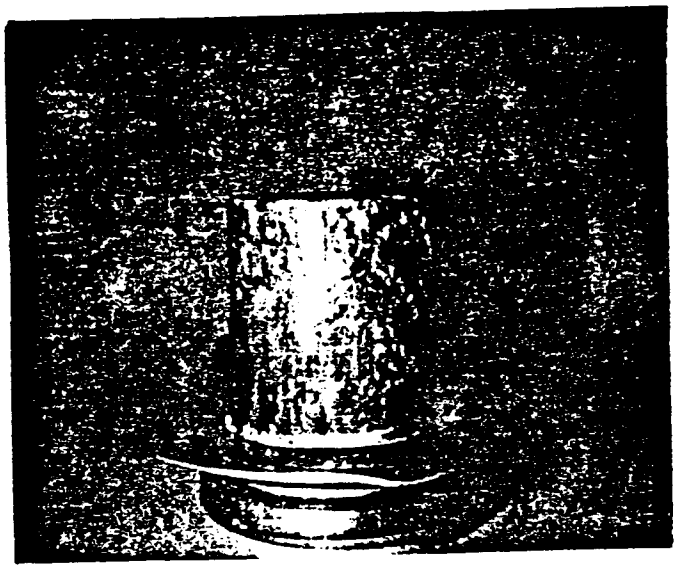
BORING NO.	37991	SAMPLED	10-23-91 KM&CB
DEPTH	11.4 - 11.65 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00723EBU1	TEST FINISHED	11-30-91
SOIL DESCR.	SS LINER	SETUP NO.	13S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.630	Init. Area (sq in)	4.490
Consol. Ht. (in)	2.628	Consol. Area (sq in)	4.546
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.546	0	89.00	0.0	1152	0	0.00
125.0	3960	0.01	0.38	4.563	3896	49.50	-5688.0	6840	10736	1.57
165.0	5227	0.02	0.76	4.581	5124	50.00	-5616.0	6768	11892	1.76
187.0	5924	0.03	1.14	4.598	5785	51.00	-5472.0	6624	12409	1.87
193.0	6114	0.04	1.52	4.616	5947	54.50	-4968.0	6120	12067	1.97
190.0	6019	0.05	1.90	4.634	5832	56.80	-4636.8	5789	11621	2.01
185.0	5861	0.06	2.28	4.652	5657	57.00	-4608.0	5760	11417	1.98
180.0	5702	0.07	2.66	4.670	5482	57.40	-4550.4	5702	11185	1.96
176.0	5575	0.08	3.04	4.688	5339	57.60	-4521.6	5674	11013	1.94
172.0	5449	0.09	3.42	4.707	5198	57.70	-4507.2	5659	10857	1.92
167.0	5290	0.10	3.81	4.725	5027	57.80	-4492.8	5645	10671	1.89
151.0	4783	0.15	5.71	4.821	4455	57.80	-4492.8	5645	10100	1.79
140.0	4435	0.20	7.61	4.920	4047	57.80	-4492.8	5645	9692	1.72
139.0	4403	0.25	9.51	5.024	3936	57.80	-4492.8	5645	9580	1.70
150.0	4752	0.30	11.42	5.131	4158	57.80	-4492.8	5645	9803	1.74
157.5	4989	0.35	13.32	5.244	4272	58.00	-4464.0	5616	9888	1.76
164.5	5211	0.40	15.22	5.362	4364	58.40	-4406.4	5558	9922	1.79
175.0	5544	0.45	17.12	5.485	4538	58.70	-4363.2	5515	10053	1.82
149.0	4720	0.50	19.03	5.614	3775	59.20	-4291.2	5443	9218	
140.0	4435	0.55	20.93	5.749	3464	59.50	-4248.0	5400	8864	
140.0	4435	0.60	22.83	5.891	3381	59.70	-4219.2	5371	8752	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37991

MW00723EBUI

11.40–11.65 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37991**
Sample Number:	**BH00732EBU1**
Sample Depth:	**46.45-46.70 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37991	SAMPLED	10-29-91 KM
DEPTH	46.45 - 46.70 FT	TEST STARTED	12-15-91 DCW
SAMPLE NO.	BH00732EBU1	TEST FINISHED	01-06-91
SOIL DESCR.	SS LINER	SETUP NO.	11S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	269.2	293.6
Wt. Wet Soil & Pan (g)	278.6	303.0
Wt. Dry Soil & Pan (g)	243.3	243.3
Wt. Lost Moisture (g)	35.3	59.8
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	233.9	233.9
Moisture Content %	15.1	25.5
Wet Density PCF	105.9	136.6
Dry Density PCF	92.0	108.8

Init. Diameter (in)	2.396	(cm)	6.086
Init. Area (sq in)	4.509	(sq cm)	29.091
Init. Height (in)	2.147	(cm)	5.453
Vol. Bef. Consol. (cu ft)	0.00560		
Vol. After Consol. (cu ft)	0.00474		
Effective Porosity %	44.52		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
20.0	1200	49.5	7.2	38.4	6.4E-05
18.0	1080	49.4	1.8	41.4	8.2E-05
20.0	1200	49.6	8.8	37.5	6.1E-05
20.0	1200	49.8	7.9	37.9	6.3E-05
20.0	1200	49.9	7.4	38.1	6.4E-05
19.0	1140	49.5	-0.2	42.4	8.2E-05
20.0	1200	49.6	5.3	39.4	6.8E-05
18.0	1080	49.6	1.2	41.6	8.4E-05
20.0	1200	49.8	-0.4	42.3	7.9E-05
20.0	1200	49.7	0.1	42.1	7.8E-05

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37991
DEPTH	46.45 - 46.70 FT
SAMPLE NO.	BH00732EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-29-91 KM
TEST STARTED	12-15-91 DCW
TEST FINISHED	01-06-91
SETUP NO.	11S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	269.190
Wt Soil & Moist at	293.620
Wt. Dry Soil & Pan	243.290
Wt. of Pan Only (g)	9.420
Consol Info:	
Init. Diameter in.	2.396
Initial Height in.	2.147
Vol. change (sat. con.) CC	32.200
Cell Exp.	7.750
Height Change in.	0.181
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-29-91 KM
DEPTH	46.45 - 46.70 FT	TEST STARTED	12-15-91 DCW
SAMPLE NO.	BH00732EBU1	TEST FINISHED	01-06-91
SOIL DESCR.	SS LINER	SETUP NO.	11S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
50.0	48.0	0.8	15.4				
60.0	58.0	18.0	19.9	48.5	57.5	9.0	0.90
70.0	68.0	21.0	22.7	58.4	67.6	9.2	0.92
80.0		23.5	23.6	68.6	78.1	9.5	0.95

CONSOLIDATION DATA

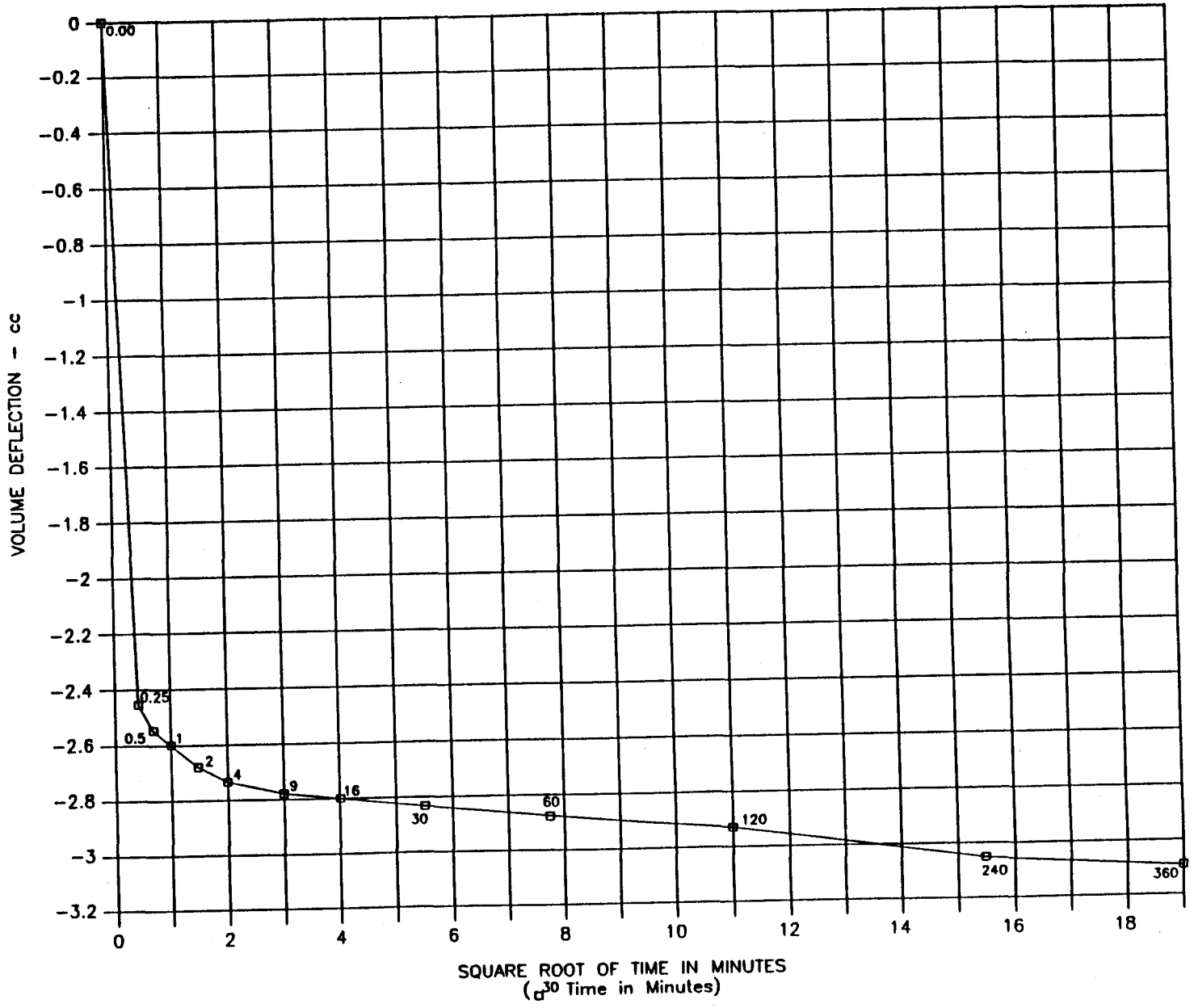
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	24.60	0.00
0.25	0.50	27.05	-2.45
0.5	0.71	27.15	-2.55
1	1.00	27.20	-2.60
2	1.41	27.28	-2.67
4	2.00	27.33	-2.72
9	3.00	27.38	-2.77
16	4.00	27.40	-2.80
30	5.48	27.43	-2.82
60	7.75	27.48	-2.88
120	10.95	27.53	-2.92
240	15.49	27.65	-3.05
360	18.97	27.70	-3.10

Initial Height (in)	2.147	Init. Vol. (CC)	158.66
Height Change (in)	0.181	Vol. Change (CC)	32.20
Ht. After Cons. (in)	1.966	Cell Exp. (CC)	7.75
Initial Area (sq in)	4.509	Net Change (CC)	24.45
Area After Cons. (sq in)	4.165	Cons. Vol. (CC)	134.21

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00732EBU1 @ 46.45-46.70', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

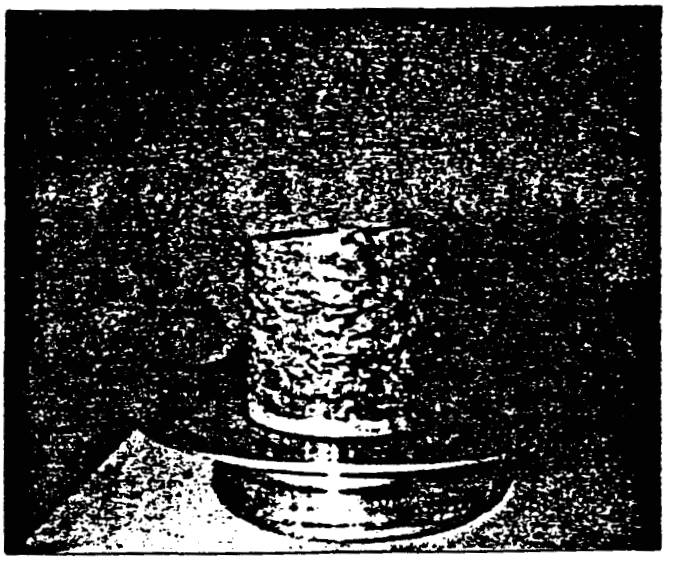
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37991	SAMPLED	10-29-91 KM
DEPTH	46.45 - 46.70 FT	TEST STARTED	12-15-91 DCW
SAMPLE NO.	BH0073	TEST FINISHED	01-06-91
SOIL DESCR.	SS LINER	SETUP NO.	11S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.147	Init. Area (sq in)	4.509
Consol. Ht. (in)	1.966	Consol. Area (sq in)	4.165
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.165	0	69.00	0.0	1152	0	0.00
125.0	4322	0.01	0.51	4.186	4654	49.50	-2808.0	3960	8614	2.18
165.0	5704	0.02	1.02	4.208	6112	50.00	-2736.0	3888	10000	2.57
187.0	6465	0.03	1.53	4.230	6892	51.00	-2592.0	3744	10636	2.84
193.0	6673	0.04	2.03	4.252	7076	54.50	-2088.0	3240	10316	3.18
190.0	6569	0.05	2.54	4.274	6930	56.80	-1756.8	2909	9839	3.38
185.0	6396	0.06	3.05	4.296	6712	57.00	-1728.0	2880	9592	3.33
180.0	6223	0.07	3.56	4.319	6497	57.40	-1670.4	2822	9319	3.30
176.0	6085	0.08	4.07	4.342	6319	57.60	-1641.6	2794	9112	3.26
172.0	5946	0.09	4.58	4.365	6142	57.70	-1627.2	2779	8922	3.21
167.0	5774	0.10	5.09	4.388	5932	57.80	-1612.8	2765	8697	3.15
151.0	5220	0.15	7.63	4.509	5220	57.80	-1612.8	2765	7985	2.89
140.0	4840	0.20	10.17	4.637	4707	57.80	-1612.8	2765	7471	2.70
139.0	4806	0.25	12.72	4.772	4541	57.80	-1612.8	2765	7305	2.64
150.0	5186	0.30	15.26	4.915	4757	57.80	-1612.8	2765	7522	2.72
157.5	5445	0.35	17.80	5.067	4845	58.00	-1584.0	2736	7581	2.77
164.5	5687	0.40	20.35	5.229	4904	58.40	-1526.4	2678	7582	2.83
175.0	6050	0.45	22.89	5.402	5050	58.70	-1483.2	2635	7686	2.92
149.0	5151	0.50	25.43	5.586	4158	59.20	-1411.2	2563	6721	
140.0	4840	0.55	27.98	5.783	3774	59.50	-1368.0	2520	6294	
140.0	4840	0.60	30.52	5.995	3640	59.70	-1339.2	2491	6132	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37991

BH00732EBUI

47.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37991**
Sample Number:	**BH00734EBU1**
Sample Depth:	**46.70-48.00 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37991	SAMPLED	10-29-91 KM,MC
DEPTH	46.70 - 48.00 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00734EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	40.78
Wt. Dry Soil & Pan (g)	40.51
Wt. Lost Moisture (g)	0.27
Wt. of Pan Only (g)	3.66
Wt. of Dry Soil (g)	36.85
Moisture Content %	0.7

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.56

WASH SIEVE ANALYSIS

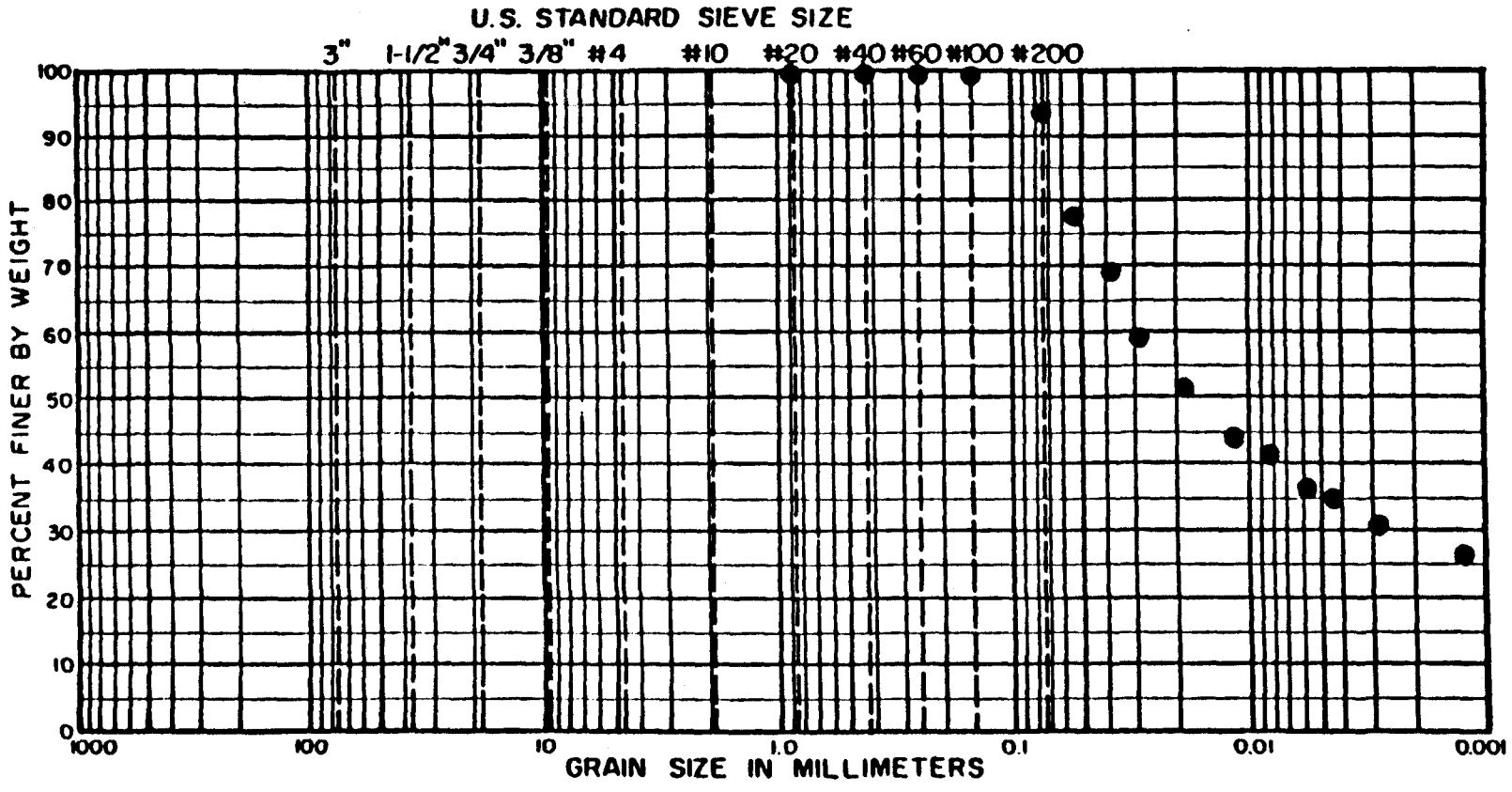
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	59.56
Wt. Total Sample Dry (g)	59.56
Calc. Wt. "W" (g)	59.56
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.29	1.34	0.05	0.05	0.1	99.9
#40	1.32	1.35	0.03	0.08	0.1	99.9
#60	1.30	1.34	0.04	0.12	0.2	99.8
#100	1.31	1.38	0.07	0.19	0.3	99.7
#200	1.31	4.63	3.32	3.51	5.9	94.1

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37991
DEPTH	46.70 - 48.00 FT
SAMPLE NO.	BH00734EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-29-91 KM,MC
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	40.780
Wt. Dry Soil & Pan (g)	40.510
Wt. of Pan Only (g)	3.660
Sieve:	
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.690
Value of "a"	0.992
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	22.000
Temp. Coef. K	0.01316
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00734 EB UI	46'	#37991

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
0.000	37991	SAMPLED	10-29-91 KM,MC
DEPTH	46.70 - 48.00 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00734EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.000
Sp. Gr. of Soil	2.690	Temp. Coef. K	0.01316
Value of "a"	0.992	Wt. Dry Sample "W"	59.564
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	52.00	46.50	77.4	77.4	7.76	0.0519
1.0	47.00	41.50	69.1	69.1	8.58	0.0386
2.0	41.00	35.50	59.1	59.1	9.57	0.0288
5.0	36.00	30.50	50.8	50.8	10.39	0.0190
15.0	32.00	26.50	44.1	44.1	11.04	0.0113
30.0	30.00	24.50	40.8	40.8	11.37	0.0081
60.0	27.50	22.00	36.6	36.6	11.78	0.0058
120.0	26.50	21.00	35.0	35.0	11.94	0.0042
250.0	24.00	18.50	30.8	30.8	12.35	0.0029
1440.0	21.00	15.50	25.8	25.8	12.85	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 20[illegible]-05

CLIENT/OWNER EPASCO

LOCATION 37991

BORING BH00734 EBDL SAMPLE ____ DEPTH 46'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

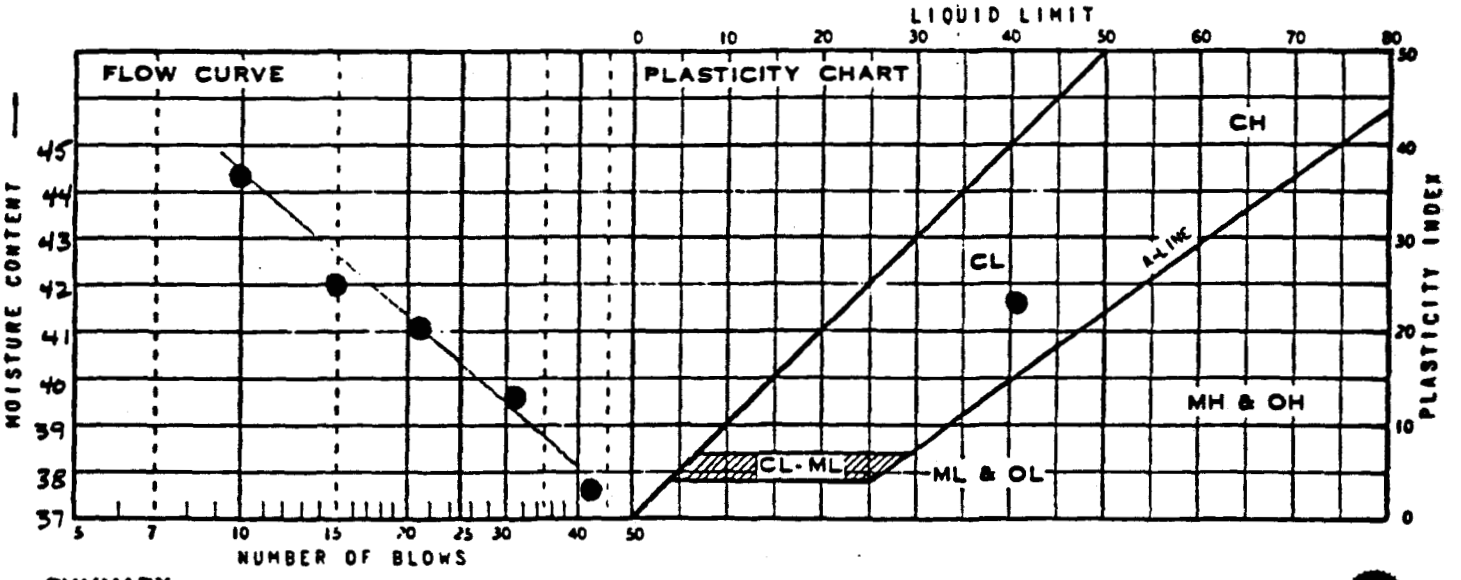
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 1/14/92

DETERMINATION	1	2	3	4	5	6
DISH	6	64C	10			
WT OF DISH + WET SOIL g	9.35	11.07	11.32			
WT OF DISH + DRY SOIL g	8.17	9.62	9.81	—	—	—
WT OF MOISTURE g	1.18	1.45	1.51			
WT OF DISH g	1.05	1.06	1.05	—	—	—
WT OF DRY SOIL g	7.12	8.56	8.76			
MOISTURE CONTENT %	16.6	16.9	17.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	25C	28C	50C	67C	22C	
NUMBER OF BLOWS	43	31	21	15	10±	
WT OF DISH + WET SOIL g	16.42	15.82	13.56	14.92	12.37	
WT OF DISH + DRY SOIL g	12.23	11.63	9.92	10.82	8.89	—
WT OF MOISTURE g	4.20	4.19	3.64	4.10	3.48	
WT OF DISH g	1.07	1.06	1.06	1.05	1.06	—
WT OF DRY SOIL g	11.16	10.57	8.86	9.77	7.83	
MOISTURE CONTENT %	37.6	39.6	41.1	42.0	44.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		40.3	16.9	23.4		

ADVANCED TERRA TESTING inc

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

JOB NO. 2031-05 NAME EBASCO

Page No. ___ of ___

* Specific Gravity = $W_o / [W_o + (W_a -$

HOLING NO.	BH00734EBU1	BH00840EBU1	BH00812EBU1	BH00778EBU1	BH00775EBU1	BH00766EBU1
DEPTH	46'	11.50-11.75'	4.8-5.05'	10.0-10.2'	41.75-42.25'	11.5-11.75'
Sample # SAS Tag #	37991	38991	38591	37891	39191	39191
Sampled BY:	10-29-91 KM & MC	11-12-91 KM & KH	11-05-91 KH & MC	1-6-91 KM & JN	11-20-91 KM & NELSON	11-14-91 KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.82g	177.840g	177.89g	177.790g	177.960g	177.690g
Temperature °C, (T_x)	20.7	21.5	22.0	21.6	18.2	19.0
Weight of water and flask at T_x (from cal. curve) (W_a)	162.101g	162.095g	162.084g	162.091g	162.175	162.153
Specific Gravity = *	2.69	2.70	2.72	2.69	2.76	2.64
Pan #	13	21B	27	6C	32	26B

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**38591**
Sample Number:	**BH00812EBU1**
Sample Depth?	**4.80-5.05 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	38591	SAMPLED	11-05-91 KH,MC
DEPTH	4.80 - 5.05 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00812EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	44.67
Wt. Dry Soil & Pan (g)	44.58
Wt. Lost Moisture (g)	0.09
Wt. of Pan Only (g)	3.64
Wt. of Dry Soil (g)	40.94
Moisture Content %	0.2
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.87

WASH SIEVE ANALYSIS

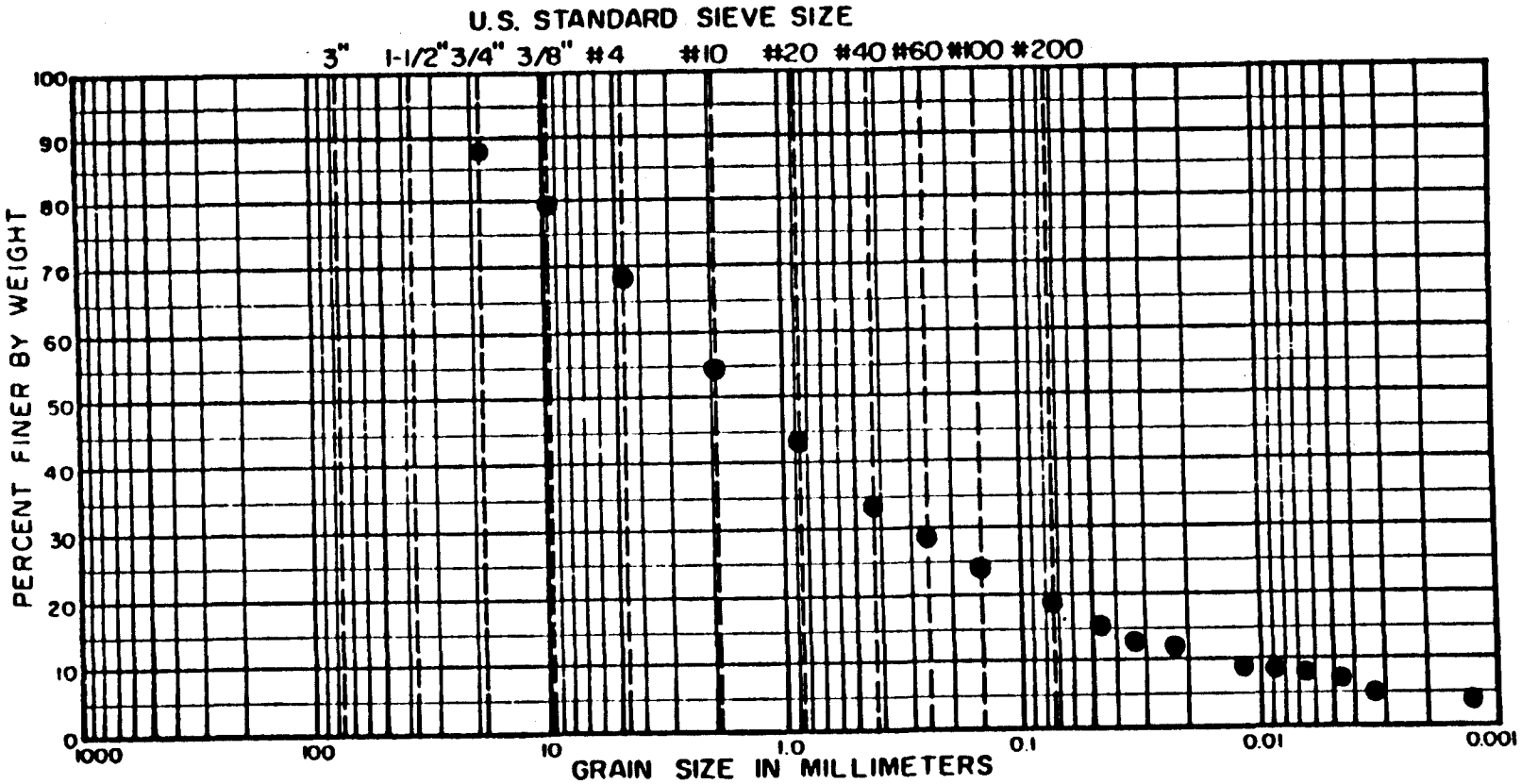
Wt. Total Sample Wet (g)	563.90
Weight of + #10 Before Washing (g)	276.45
Weight of + #10 After Washing (g)	254.28
Weight of - #10 Wet (g)	287.45
Weight of - #10 Dry (g)	308.94
Wt. Total Sample Dry (g)	563.22
Calc. Wt. "W" (g)	109.14
Calc. Mass + #10	49.28

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	63.93	63.93	63.93	11.4	88.6
3/8"	0.00	50.22	50.22	114.15	20.3	79.7
#4	0.00	65.05	65.05	179.20	31.8	68.2
#10	0.00	75.08	75.08	254.28	45.1	54.9
#20	1.30	13.94	12.64	12.64	56.7	43.3
#40	1.30	11.51	10.21	22.85	66.1	33.9
#60	1.31	6.93	5.62	28.47	71.2	28.8
#100	1.29	6.18	4.89	33.36	75.7	24.3
#200	1.32	7.03	5.71	39.07	80.9	19.1

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38591
DEPTH	4.80 - 5.05 FT
SAMPLE NO.	BH00812EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-05-91 KH,MC
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	44.670
Wt. Dry Soil & Pan (g)	44.580
Wt. of Pan Only (g)	3.640
Sieve:	
Wt. Total Sample Wet (g)	563.90
Weight of + #10 Before Washing (g)	276.45
Weight of + #10 After Washing (g)	254.28
Weight of - #10 Wet (g)	287.45

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.720
Value of "a"	0.986
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	22.000
Temp. Coef. K	0.01305
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00812EBUI	4.8 - 5.05'	#38591

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38591	SAMPLED	11-05-91 KH,MC
DEPTH	4.80 - 5.05 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00812EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.000
Sp. Gr. of Soil	2.720	Temp. Coef. K	0.01305
Value of "a"	0.986	Wt. Dry Sample "W"	109.144
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.000		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	23.00	18.00	16.3	16.3	12.52	0.0653
1.0	22.00	17.00	15.4	15.4	12.68	0.0465
2.0	19.50	14.50	13.1	13.1	13.09	0.0334
5.0	18.00	13.00	11.7	11.7	13.34	0.0213
15.0	15.00	10.00	9.0	9.0	13.83	0.0125
30.0	15.00	10.00	9.0	9.0	13.83	0.0089
60.0	13.50	8.50	7.7	7.7	14.08	0.0063
120.0	12.00	7.00	6.3	6.3	14.32	0.0045
250.0	10.50	5.50	5.0	5.0	14.57	0.0032
1440.0	10.00	5.00	4.5	4.5	14.65	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-05

CLIENT/OWNER EBASCO

LOCATION 38591

BORING BH00B12 EBUL SAMPLE ____ DEPTH 4.8-5.05'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

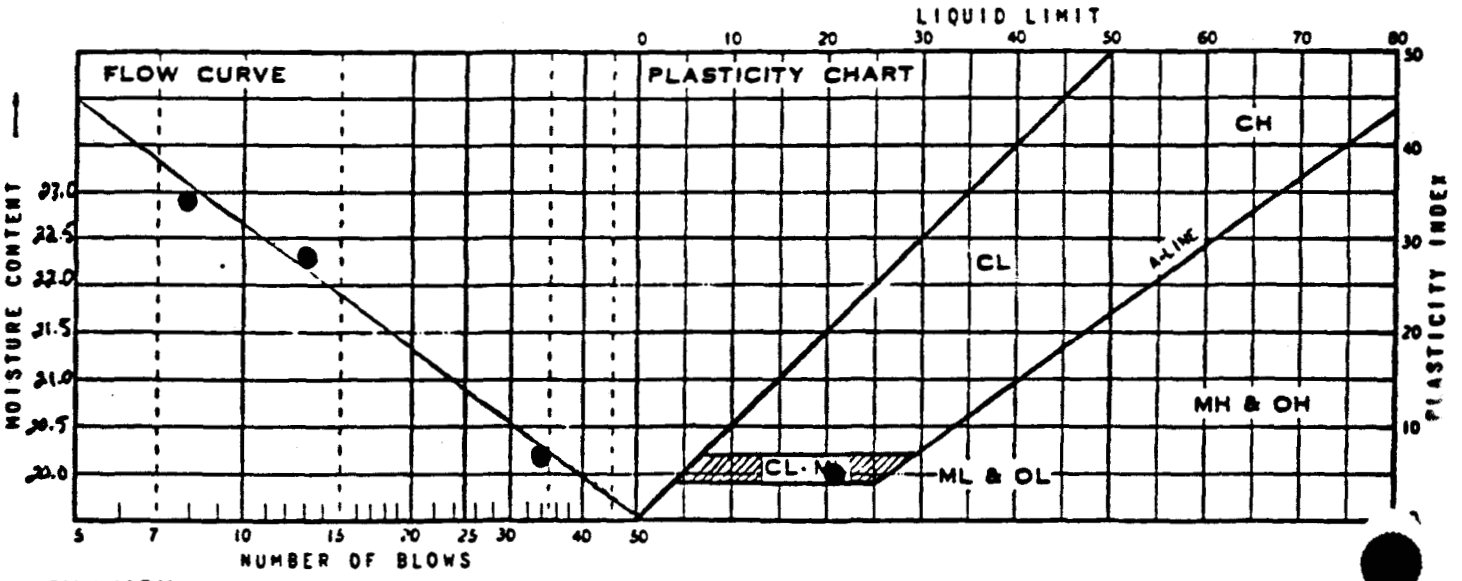
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ___/__/__

DETERMINATION	1	2	3	4	5	6
DISH	10C	17	58C			
WT OF DISH + WET SOIL g	10.61	9.57	8.51			
WT OF DISH + DRY SOIL g	9.34	8.40	7.46	—	—	—
WT OF MOISTURE g	1.27	1.19	1.05			
WT OF DISH g	1.06	1.06	1.07	—	—	—
WT OF DRY SOIL g	8.28	7.34	6.39			
MOISTURE CONTENT %	15.3	16.2	16.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	29C	32C	45C	22		
NUMBER OF BLOWS	34	19	13	8		
WT OF DISH + WET SOIL g	13.77	14.63	13.09	11.95		
WT OF DISH + DRY SOIL g	11.64	12.37	10.90	9.92	—	—
WT OF MOISTURE g	2.13	2.26	2.19	2.03		
WT OF DISH g	1.07	1.04	1.06	1.06	—	—
WT OF DRY SOIL g	10.57	11.33	9.84	8.86		
MOISTURE CONTENT %	20.2	19.9	22.3	22.9		



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		20.9	15.9	5.0	CL-ML	

ADVANCED TERRA TESTING inc

• Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

BORING NO.	BH00734EBU1	BH00840EBU1	BH00812EBU1	BH00738EBU1	BH00775EBU1	BH00766EBU1
DEPTH	46'	11.50-11.75'	48-5.05'	10.0-10.2'	41.75-42.25'	11.8-11.75'
Sample # SAS Tag #	37991	38991	38591	37891	39191	39191
Sampled BY:	10-29-91 KM & NC	11-12-91 RP & KH	11-05-91 KH & MC	1-6-91 KM & JN	11-20-91 KM & NB	11-14-91 KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry)(W_o)g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.82g	177.840g	177.89g	177.790g	177.902g	177.690g
Temperature °C, (T_x)	20.7	21.5	22.0	21.6	18.2	19.0
Weight of water and flask at T_x (from cal. curve) (W_a)	162.101g	162.095g	162.084g	162.091g	162.175	162.153
Specific Gravity = *	2.69	2.70	2.72	2.69	2.76	2.64
PAN #	13	21B	27	6C	32	26B

JOB NO. 201-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**38991**
Sample Number:	**BH00833EBU1**
Sample Depth:	**1.50-1.75 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-11-91 PB,MS
DEPTH	1.50 - 1.75 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00833EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	35.82
Wt. Dry Soil & Pan (g)	35.57
Wt. Lost Moisture (g)	0.25
Wt. of Pan Only (g)	3.67
Wt. of Dry Soil (g)	31.90
Moisture Content %	0.8
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.53

WASH SIEVE ANALYSIS

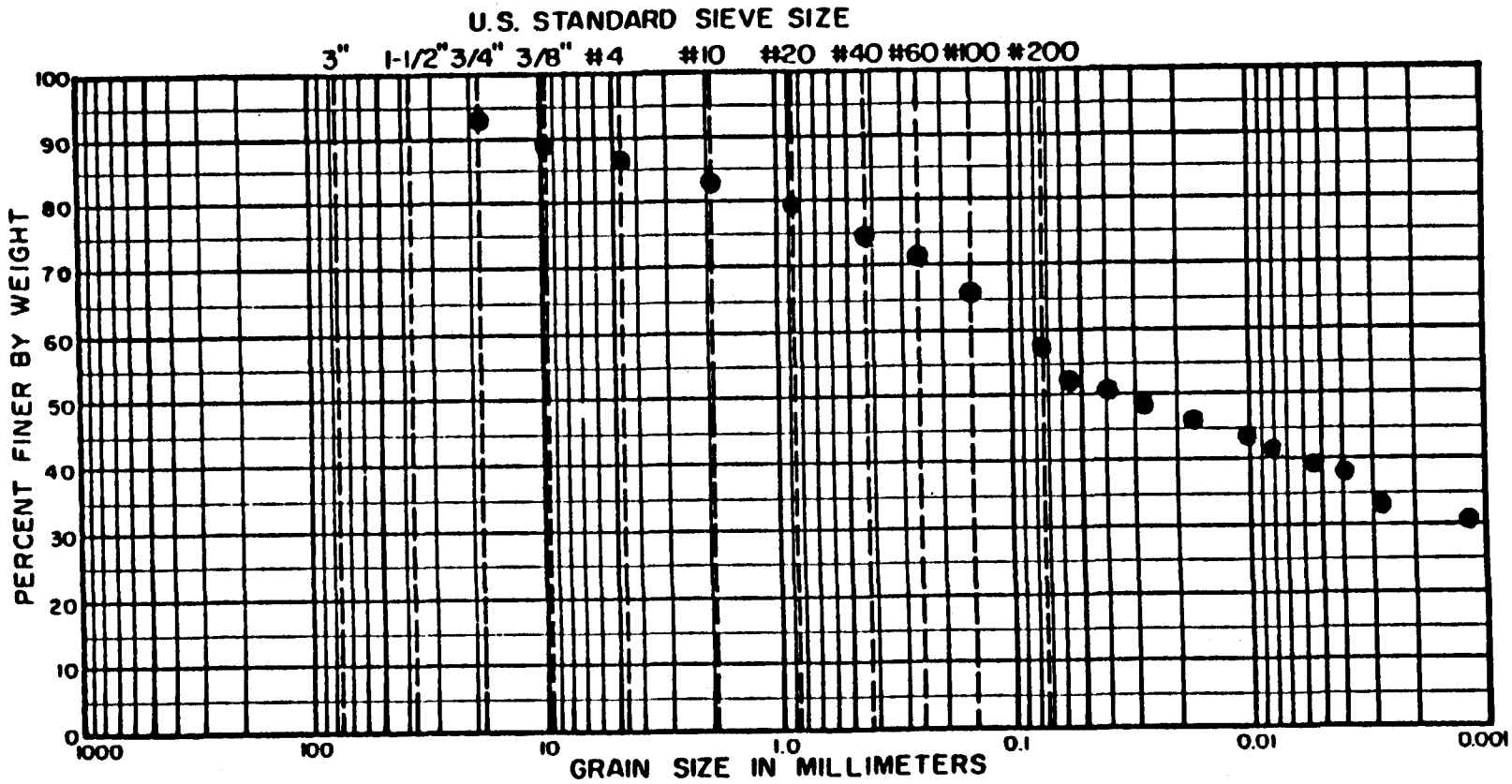
Wt. Total Sample Wet (g)	443.51
Weight of + #10 Before Washing (g)	111.66
Weight of + #10 After Washing (g)	73.09
Weight of - #10 Wet (g)	331.85
Weight of - #10 Dry (g)	367.54
Wt. Total Sample Dry (g)	440.63
Calc. Wt. "W" (g)	71.37
Calc. Mass + #10	11.84

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	32.19	32.19	32.19	7.3	92.7
3/8"	0.00	14.36	14.36	46.55	10.6	89.4
#4	0.00	13.22	13.22	59.77	13.6	86.4
#10	0.00	13.32	13.32	73.09	16.6	83.4
#20	1.31	3.90	2.59	2.59	20.2	79.8
#40	1.31	4.81	3.50	6.09	25.1	74.9
#60	1.31	4.47	3.16	9.25	29.5	70.5
#100	1.31	5.02	3.71	12.96	34.7	65.3
#200	1.46	6.75	5.29	18.25	42.2	57.8

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38991
DEPTH	1.50 - 1.75 FT
SAMPLE NO.	BH00833EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-11-91 PB,MS
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	35.820
Wt. Dry Soil & Pan (g)	35.570
Wt. of Pan Only (g)	3.670
Sieve:	
Wt. Total Sample Wet (g)	443.51
Weight of + #10 Before Washing (g)	111.66
Weight of + #10 After Washing (g)	73.09
Weight of - #10 Wet (g)	331.85

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.750
Value of "a"	0.980
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	22.000
Temp. Coef. K	0.01294
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH0083EBUI	1.5' - 1.75'	# 38991

ADVANCED TERRA TESTING -

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-11-91 PB,MS
DEPTH	1.50 - 1.75 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00833EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.000
Sp. Gr. of Soil	2.750	Temp. Coef. K	0.01294
Value of "a"	0.980	Wt. Dry Sample "W"	71.372
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	43.50	38.00	52.2	52.2	9.16	0.0554
1.0	42.00	36.50	50.1	50.1	9.40	0.0397
2.0	40.50	35.00	48.1	48.1	9.65	0.0284
5.0	39.00	33.50	46.0	46.0	9.89	0.0182
15.0	38.00	32.50	44.6	44.6	10.06	0.0106
30.0	36.00	30.50	41.9	41.9	10.39	0.0076
60.0	34.50	29.00	39.8	39.8	10.63	0.0054
120.0	33.00	27.50	37.8	37.8	10.88	0.0039
250.0	30.00	24.50	33.6	33.6	11.37	0.0028
1440.0	27.50	22.00	30.2	30.2	11.78	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-05

CLIENT/OWNER EBASCO

LOCATION 38991

BORING B-0083 EWL SAMPLE ____ DEPTH 15-1.75'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

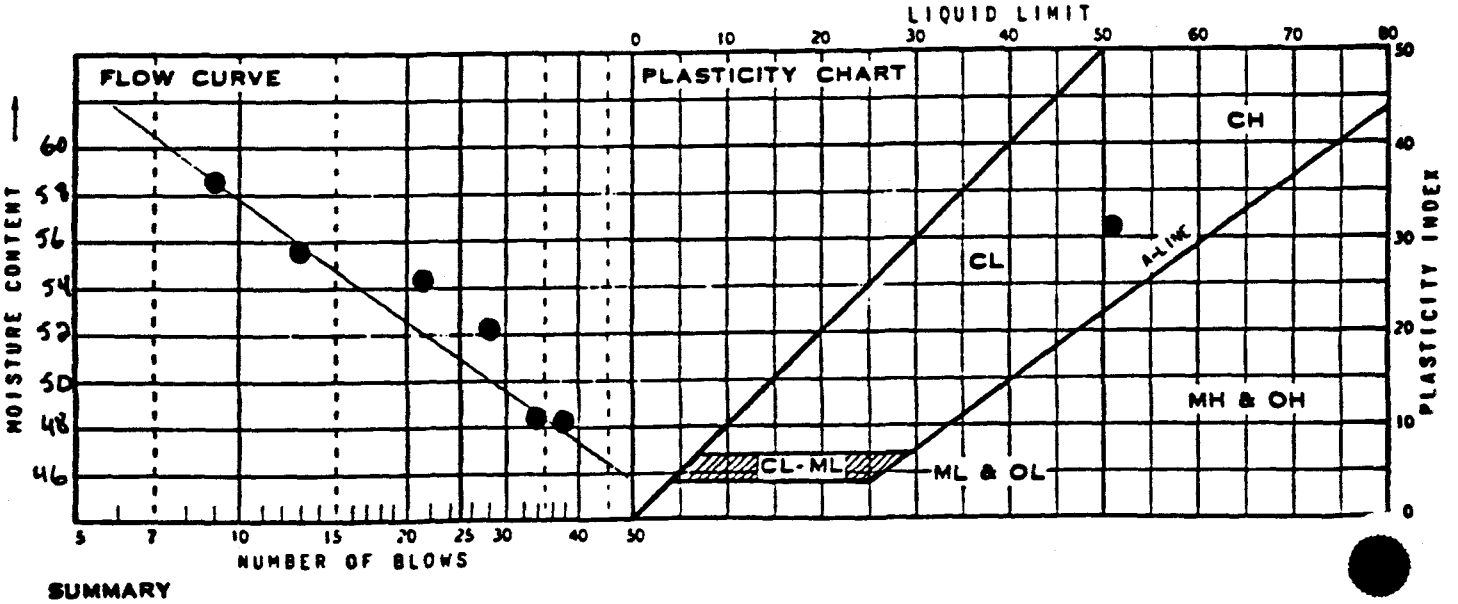
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DU 1/1592

DETERMINATION	1	2	3	4	5	6
DISH	8	61C	8			
WT OF DISH + WET SOIL g	6.22	7.78	6.22			
WT OF DISH + DRY SOIL g	5.38	6.67	5.38	—	—	—
WT OF MOISTURE g	.84	1.11	.84			
WT OF DISH g	1.09	1.06	1.09	—	—	—
WT OF DRY SOIL g	4.29	5.61	4.29			
MOISTURE CONTENT %	19.6	19.8	19.6			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	4	111C	43C	40	56C	30C
NUMBER OF BLOWS	38	34	28	21	13	9
WT OF DISH + WET SOIL g	13.15	12.53	12.17	11.08	16.06	12.84
WT OF DISH + DRY SOIL g	9.22	8.79	8.36	7.55	10.71	8.50
WT OF MOISTURE g	3.93	3.74	3.81	3.53	5.35	4.34
WT OF DISH g	1.08	1.08	1.08	1.06	1.08	1.09
WT OF DRY SOIL g	8.14	7.71	7.28	6.49	9.63	7.41
MOISTURE CONTENT %	48.3	48.5	52.3	54.4	55.6	58.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		50.8	19.7	31.1	CH	

ADVANCED TERRA TESTING inc

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

JOB NO. 203-05 NAME EBASCO

Page No. ___ of ___

* Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

HOLING NO.	BH00866EB01	BH00741EB01	BH00761EB01	BH00845EB01	BH00833EB01	BH00759EB01
DEPTH	5.0-5.25'	45.7-46.5'	3.0-3.25'	20.9-21.15'	1.5-1.75'	0.5-0.9'
Sample # SAS Tag #	39691	37891	39191	38991	38991	39091
Sampled	11-25-91	11-07-91	11-14-91	11-12-91	11-11-91	11-13-91
BY:	BP & KH	KM & MC	KM & MC	BP & KH	PB & MS	KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.86 g	177.860 g	178.070	178.010 g	177.79	177.730
Temperature °C, (T_x)	22.4	22.8	22.9	22.0	22.8	23.1
Weight of water and flask at T_x (from cal. curve) (W_a)	162.076 g	162.062 g	162.066	162.024 g	162.062	162.061
Specific Gravity = *	2.71	2.72	2.78	2.76	2.75	2.68
PAN #	2C	34+	517	34	80	31

INDEX OF GEOTECHNICAL DATA

Borehole Number: **38991**

Sample Number: **BH00832EBU1**

Sample Depth: **1.75–2.00 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	38991	SAMPLED	11-11-91 BP
DEPTH	1.75 - 2.00 FT	TEST STARTED	01-13-92 DCW
SAMPLE NO.	BH00832EBU1	TEST FINISHED	01-24-92
SOIL DESCR.	–	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	365.6	403.6
Wt. Wet Soil & Pan (g)	374.4	412.4
Wt. Dry Soil & Pan (g)	328.1	328.1
Wt. Lost Moisture (g)	46.3	84.3
Wt. of Pan Only (g)	8.8	8.8
Wt. of Dry Soil (g)	319.3	319.3
Moisture Content %	14.5	26.4
Wet Density PCF	111.9	133.0
Dry Density PCF	97.7	105.2

Init. Diameter (in)	2.391	(cm)	6.073
Init. Area (sq in)	4.490	(sq cm)	28.970
Init. Height (in)	2.773	(cm)	7.043
Vol. Bef. Consol. (cu ft)	0.00721		
Vol. After Consol. (cu ft)	0.00669		
Effective Porosity %	44.51		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
40.0	2400	49.2	4.2	26.1	4.1E-05
102.0	6120	49.9	4.6	25.6	1.6E-05
100.0	6000	49.9	3.9	26.0	1.7E-05
106.0	6360	49.8	1.9	26.9	1.7E-05
94.0	5640	49.8	4.6	25.7	1.7E-05
110.0	6600	49.8	0.5	27.6	1.7E-05
103.0	6180	49.9	3.3	26.2	1.7E-05
96.0	5760	49.7	4.9	25.6	1.7E-05
89.0	5340	50.0	7.1	24.4	1.7E-05
105.0	6300	49.6	2.2	26.9	1.7E-05

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38991
DEPTH	1.75 - 2.00 FT
SAMPLE NO.	BH00832EBU1
SOIL DESCR.	--
SAMPLED	11-11-91 BP
TEST STARTED	01-13-92 DCW
TEST FINISHED	01-24-92
SETUP NO.	1P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	365.570
Wt Soil & Moist at	403.590
Wt. Dry Soil & Pan	328.070
Wt. of Pan Only (g)	8.810
Consol Info:	
Init. Diameter in.	2.391
Initial Height in.	2.773
Vol. change (sat. con.) CC	32.100
Cell Exp.	17.500
Height Change in.	0.058
Test Info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-11-91 BP
DEPTH	1.75 - 2.00 FT	TEST STARTED	01-13-92 DCW
SAMPLE NO.	BH00832EBU1	TEST FINISHED	01-24-92
SOIL DESCR.	–	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	11.2				
50.0	48.0	14.7	16.5	38.4	46.0	7.6	0.76
60.0	58.0	17.9	19.5	48.5	56.4	7.9	0.79
70.0	68.0	20.0	21.3	58.3	66.7	8.4	0.84
80.0	78.0	21.7	22.9	68.5	77.3	8.8	0.88
90.0	88.0	23.2	24.5	78.5	87.7	9.2	0.92
100.0		24.8	24.9	88.7	98.2	9.5	0.95

CONSOLIDATION DATA

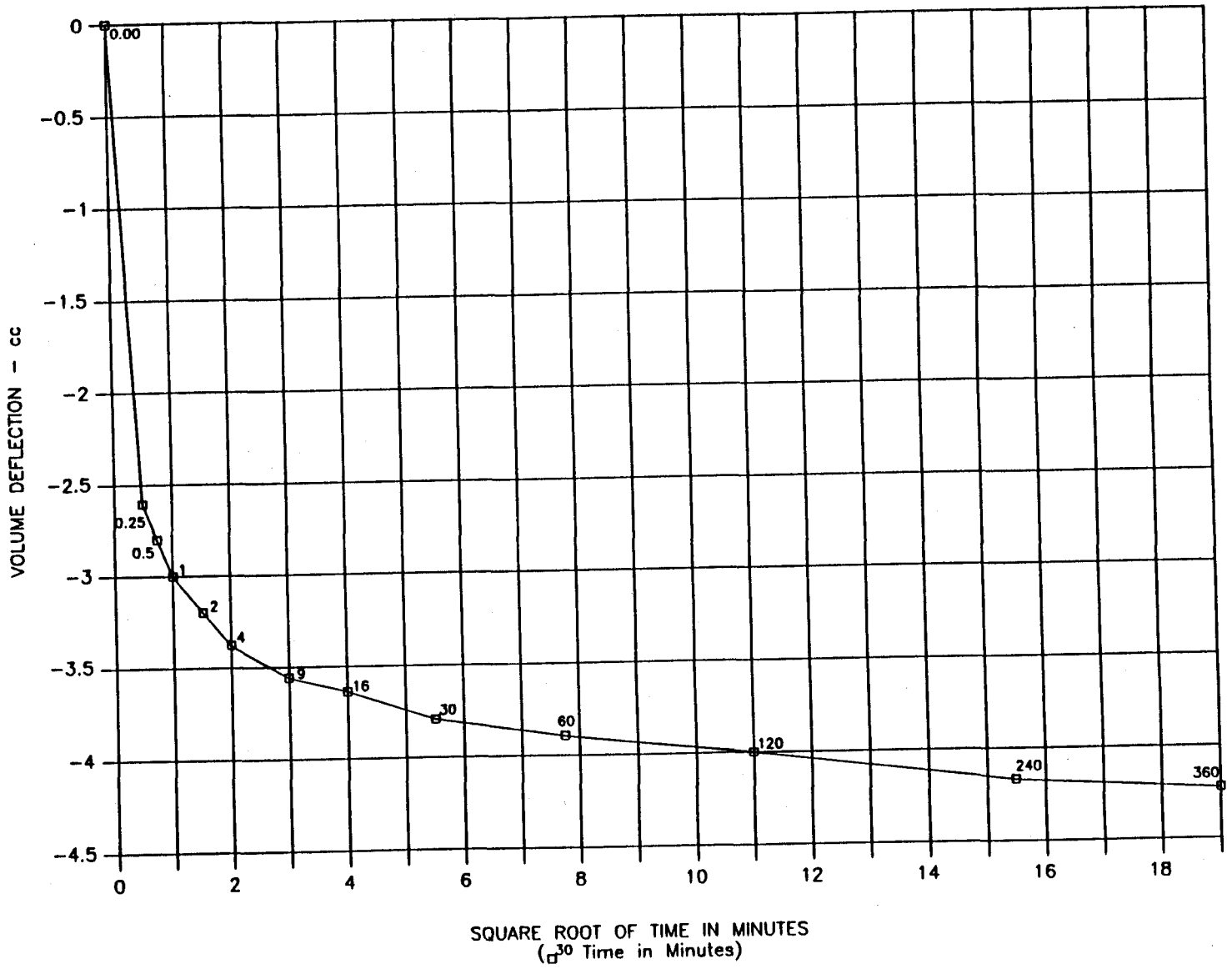
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	24.90	0.00
0.25	0.50	27.50	-2.60
0.5	0.71	27.70	-2.80
1	1.00	27.90	-3.00
2	1.41	28.10	-3.20
4	2.00	28.28	-3.38
9	3.00	28.45	-3.55
16	4.00	28.53	-3.63
30	5.48	28.70	-3.80
60	7.75	28.80	-3.90
120	10.95	28.90	-4.00
240	15.49	29.08	-4.18
360	18.97	29.13	-4.23

Initial Height (in)	2.773	Init. Vol. (CC)	204.07
Height Change (in)	0.058	Vol. Change (CC)	32.10
Ht. After Cons. (in)	2.715	Cell Exp. (CC)	17.50
Initial Area (sq in)	4.490	Net Change (CC)	14.60
Area After Cons. (sq in)	4.258	Cons. Vol. (CC)	189.47

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00832EBU1 @ 1.75-2.00', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

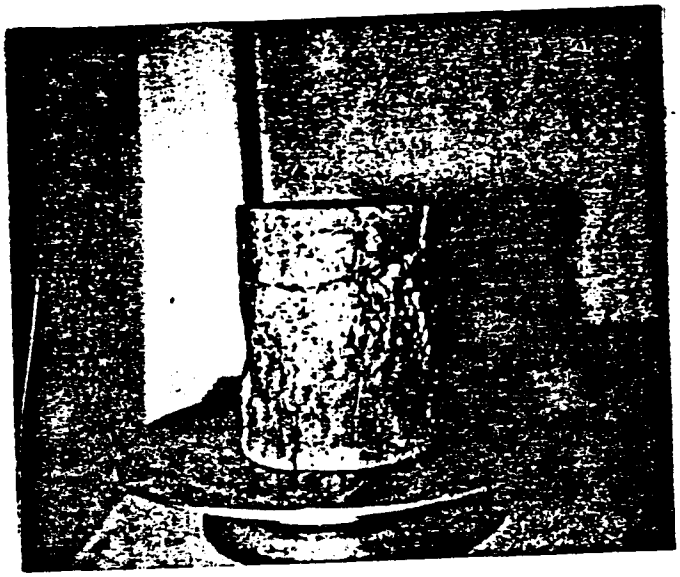
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-11-91 BP
DEPTH	1.75 - 2.00 FT	TEST STARTED	01-13-92 DCW
SAMPLE NO.	BH00832EBU1	TEST FINISHED	01-24-92
SOIL DESCR.	–	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.773	Init. Area (sq in)	4.490
Consol. Ht. (in)	2.715	Consol. Area (sq in)	4.258
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.258	0	89.00	0.0	1152	0	0.00
125.0	4227	0.01	0.37	4.274	4442	49.50	-5688.0	6840	11282	1.65
165.0	5580	0.02	0.74	4.289	5841	50.00	-5616.0	6768	12609	1.86
187.0	6324	0.03	1.10	4.305	6595	51.00	-5472.0	6624	13219	2.00
193.0	6527	0.04	1.47	4.322	6782	54.50	-4968.0	6120	12902	2.11
190.0	6426	0.05	1.84	4.338	6651	56.80	-4636.8	5789	12440	2.15
185.0	6257	0.06	2.21	4.354	6452	57.00	-4608.0	5760	12212	2.12
180.0	6088	0.07	2.58	4.371	6254	57.40	-4550.4	5702	11956	2.10
176.0	5952	0.08	2.95	4.387	6092	57.60	-4521.6	5674	11766	2.07
172.0	5817	0.09	3.31	4.404	5931	57.70	-4507.2	5659	11590	2.05
167.0	5648	0.10	3.68	4.421	5737	57.80	-4492.8	5645	11381	2.02
151.0	5107	0.15	5.52	4.507	5088	57.80	-4492.8	5645	10733	1.90
140.0	4735	0.20	7.37	4.596	4625	57.80	-4492.8	5645	10270	1.82
139.0	4701	0.25	9.21	4.690	4501	57.80	-4492.8	5645	10146	1.80
150.0	5073	0.30	11.05	4.787	4758	57.80	-4492.8	5645	10403	1.84
157.5	5327	0.35	12.89	4.888	4893	58.00	-4464.0	5616	10509	1.87
164.5	5563	0.40	14.73	4.994	5002	58.40	-4406.4	5558	10561	1.90
175.0	5918	0.45	16.57	5.104	5207	58.70	-4363.2	5515	10722	1.94
149.0	5039	0.50	18.42	5.219	4335	59.20	-4291.2	5443	9779	
140.0	4735	0.55	20.26	5.340	3982	59.50	-4248.0	5400	9382	
140.0	4735	0.60	22.10	5.466	3890	59.70	-4219.2	5371	9261	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



38991

BH00832EBUI

1.75–2.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Location Number: **38991**

Sample Number: **BH00840EBU1**

Sample Depth: **11.50-11.75 feet (Alluvium)**

Data Available:

✔ Grain Size Analysis (Sieve and Hydrometer Test) Data

✔ Atterberg Limits Test Data

✔ Specific Gravity Test Data

__ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

__ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	38991	SAMPLED	11-12-91 BP,KH
DEPTH	11.50 - 11.75 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00840EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	44.49
Wt. Dry Soil & Pan (g)	44.05
Wt. Lost Moisture (g)	0.44
Wt. of Pan Only (g)	3.85
Wt. of Dry Soil (g)	40.20
Moisture Content %	1.1
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.35

WASH SIEVE ANALYSIS

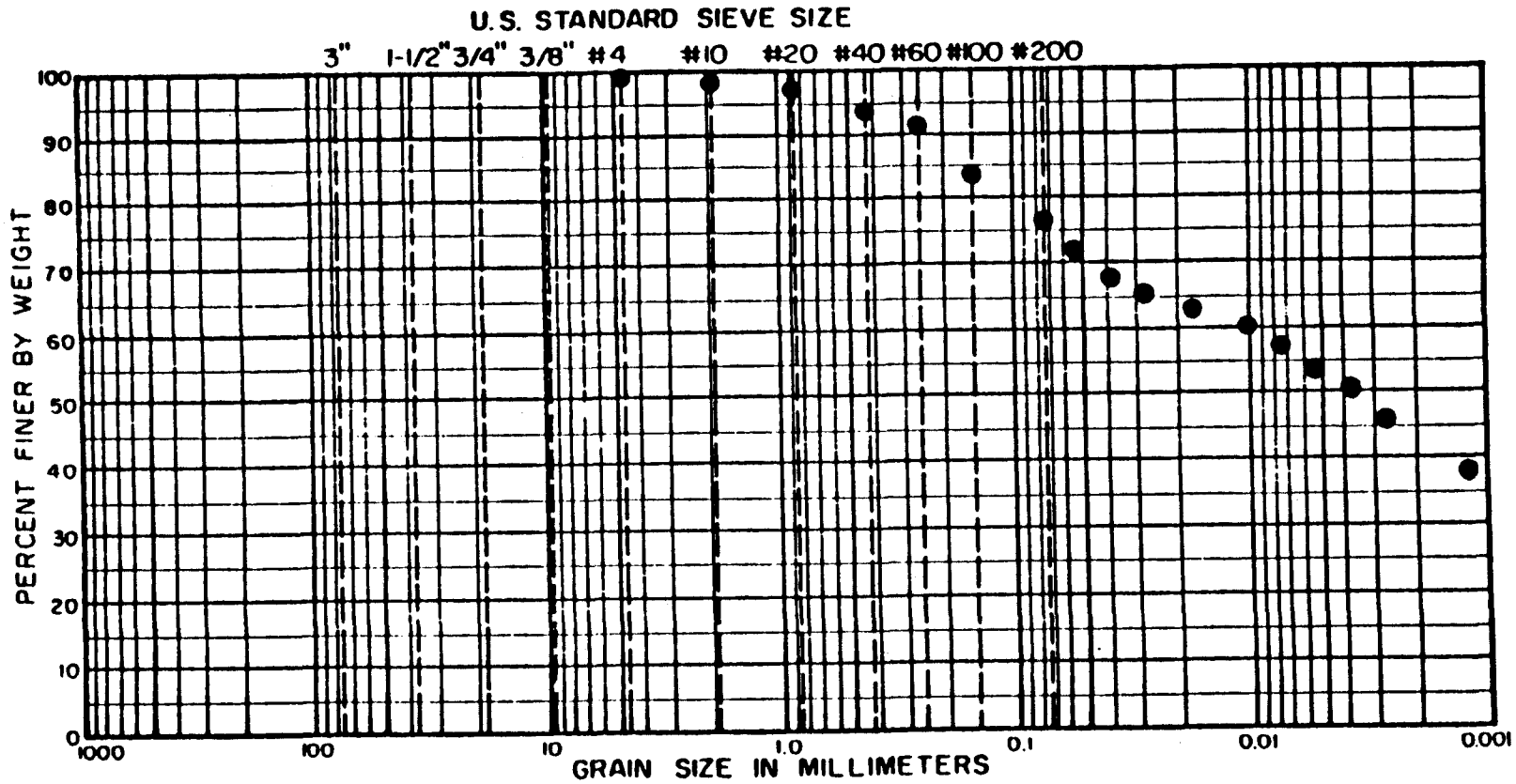
Wt. Total Sample Wet (g)	416.13
Weight of + #10 Before Washing (g)	11.34
Weight of + #10 After Washing (g)	6.05
Weight of - #10 Wet (g)	404.79
Weight of - #10 Dry (g)	405.64
Wt. Total Sample Dry (g)	411.69
Calc. Wt. "W" (g)	60.24
Calc. Mass + #10	0.89

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	3.18	3.18	3.18	0.8	99.2
#10	0.00	2.87	2.87	6.05	1.5	98.5
#20	1.29	2.30	1.01	1.01	3.1	96.9
#40	1.30	2.72	1.42	2.43	5.5	94.5
#60	1.32	3.63	2.31	4.74	9.3	90.7
#100	1.32	5.22	3.90	8.64	15.8	84.2
#200	1.30	6.44	5.14	13.78	24.3	75.7

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38991
DEPTH	11.50 - 11.75 FT
SAMPLE NO.	BH00840EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-12-91 BP,KH
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	44.490
Wt. Dry Soil & Pan (g)	44.050
Wt. of Pan Only (g)	3.850
Sieve:	
Wt. Total Sample Wet (g)	416.13
Weight of + #10 Before Washing (g)	11.34
Weight of + #10 After Washing (g)	6.05
Weight of - #10 Wet (g)	404.79

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.700
Value of "a"	0.990
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	21.000
Temp. Coef. K	0.01328
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00840EBUI	11.50 - 11.75'	#33991

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-12-91 BP,KH
DEPTH	11.50 - 11.75 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00840EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	21.000
Sp. Gr. of Soil	2.700	Temp. Coef. K	0.01328
Value of "a"	0.990	Wt. Dry Sample "W"	60.236
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.000		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	49.00	44.00	72.3	72.3	8.25	0.0540
1.0	46.25	41.25	67.8	67.8	8.71	0.0392
2.0	44.75	39.75	65.3	65.3	8.95	0.0281
5.0	43.75	38.75	63.7	63.7	9.12	0.0179
15.0	41.50	36.50	60.0	60.0	9.48	0.0106
30.0	40.00	35.00	57.5	57.5	9.73	0.0076
60.0	38.00	33.00	54.2	54.2	10.06	0.0054
120.0	35.50	30.50	50.1	50.1	10.47	0.0039
250.0	33.00	28.00	46.0	46.0	10.88	0.0028
1440.0	28.00	23.00	37.8	37.8	11.70	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-05

CLIENT/OWNER EIBMSD

LOCATION 36991

BORING MWD8-10 EMOL SAMPLE ____ DEPTH 11.50-11.75'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

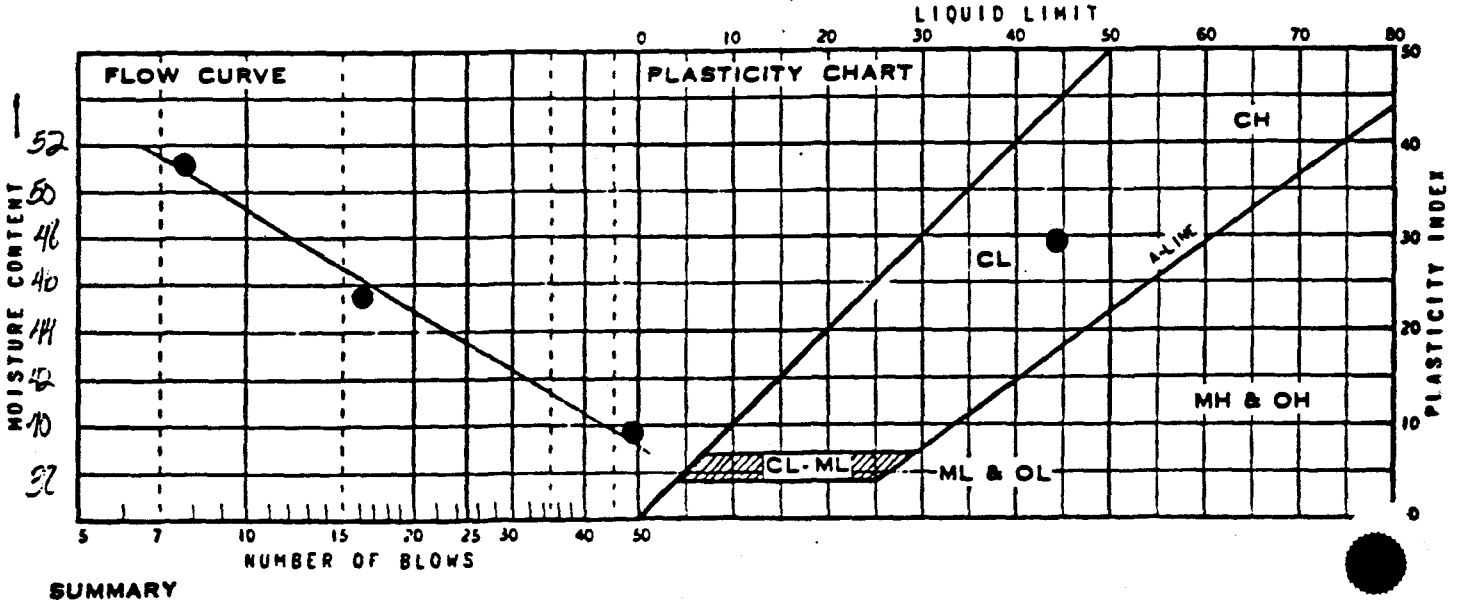
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY JMW 11/11/92

DETERMINATION	1	2	3	4	5	6
DISH	32C	36C	48C			
WT OF DISH + WET SOIL	10.57g	9.05g	8.25g			
WT OF DISH + DRY SOIL	9.35g	8.01g	7.30g	—	—	—
WT OF MOISTURE	1.22g	1.05g	.95g			
WT OF DISH	1.05g	1.07g	1.00g	—	—	—
WT OF DRY SOIL	8.31g	6.94g	6.31g			
MOISTURE CONTENT	14.7%	15.1%	15.2%			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	22	17	59C	10C	29C	
NUMBER OF BLOWS	49	35	25	16	7	
WT OF DISH + WET SOIL	13.21g	19.77g	18.27g	16.33g	18.79g	
WT OF DISH + DRY SOIL	9.75g	13.12g	11.47g	11.54g	12.78g	—
WT OF MOISTURE	3.46g	6.75g	5.80g	4.79g	6.01	
WT OF DISH	1.00g	1.05g	1.00g	1.07g	1.07g	—
WT OF DRY SOIL	8.69g	12.07g	13.41g	10.47g	11.79g	
MOISTURE CONTENT	39.8	55.9	28.5	45.8	51.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		43.5	15.0	28.5	CL	

ADVANCED TERRA TESTING INC

* Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

HOLING NO.	RH00734EBU1	RH00840EBU1	RH00812EBU1	RH00738EBU1	RH00775EBU1	RH00766EBU1
DEPTH	46'	11.50-11.75'	4.8-5.05'	10.0-10.2'	41.75-42.25'	11.8-11.95'
Sample # SAS Tag #	37991	38991	38591	37891	39191	39191
Sampled BY:	10-29-91 KM & MC	11-12-91 KM & KH	11-05-91 KH & MC	1-6-91 KM & JN	11-20-91 KM & NBLSON	11-14-91 KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.82 g	177.840 g	177.89 g	177.790 g	177.962 g	177.690 g
Temperature °C, (T_x)	20.7	21.5	22.0	21.6	18.2	19.0
Weight of water and flask at T_x (from cal. curve) (W_a)	162.101 g	162.095 g	162.084 g	162.091 g	162.175	162.153
Specific Gravity = *	2.69	2.70	2.72	2.69	2.76	2.64
Pan #	13	21B	27	6C	32	26B

JOB NO. 2031-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

Page No. ___ of ___

INDEX OF GEOTECHNICAL DATA

Borehole Location Number: **38991**

Sample Number: **BH00839EBU1**

Sample Depth: **11.75-12.00 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	38991	SAMPLED	11-12-91 KH
DEPTH	11.75 - 12.00 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00839EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	422.0	457.6
Wt. Wet Soil & Pan (g)	430.7	466.4
Wt. Dry Soil & Pan (g)	391.9	391.9
Wt. Lost Moisture (g)	38.8	74.5
Wt. of Pan Only (g)	8.8	8.8
Wt. of Dry Soil (g)	383.1	383.1
Moisture Content %	10.1	19.4
Wet Density PCF	125.8	144.0
Dry Density PCF	114.2	120.5

Init. Diameter (in)	2.391	(cm)	6.073
Init. Area (sq in)	4.490	(sq cm)	28.970
Init. Height (in)	2.845	(cm)	7.226
Vol. Bef. Consol. (cu ft)	0.00739		
Vol. After Consol. (cu ft)	0.00701		
Effective Porosity %	37.53		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
91.0	5460	50.0	49.8	15.2	7.6E-08
1038.0	62280	49.8	47.6	16.5	7.4E-08
1339.0	80340	47.6	45.5	18.8	5.6E-08
1452.0	87120	45.5	43.3	21.1	5.5E-08
1352.0	81120	43.3	41.3	23.4	5.5E-08
1502.0	90120	41.3	39.2	25.6	5.3E-08
1481.0	88860	39.2	37.3	27.7	4.9E-08
1477.0	88620	37.3	35.5	29.7	4.8E-08
1320.0	79200	49.8	47.8	16.4	5.3E-08
1474.0	88440	47.8	45.7	18.6	5.1E-08
1416.0	84960	45.7	43.7	20.8	5.1E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38991
DEPTH	11.75 - 12.00 FT
SAMPLE NO.	BH00839EBU1
SOIL DESCR.	SS LINER
SAMPLED	11-12-91 KH
TEST STARTED	12-06-91 DCW
TEST FINISHED	12-25-91
SETUP NO.	10S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	421.950
Wt Soil & Moist at	457.590
Wt. Dry Soil & Pan	391.870
Wt. of Pan Only (g)	6.770
Consol Info:	
Init. Diameter in.	2.391
Initial Height in.	2.845
Vol. change (sat. con.) CC	35.400
Cell Exp.	24.500
Height Change in.	0.015
Test Info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	38991	SAMPLED	11-12-91 KH
DEPTH	11.75 - 12.00 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00839EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	15.3				
50.0	48.0	11.4	13.3	38.2	45.8	7.6	0.76
60.0	58.0	14.9	16.6	48.4	56.2	7.8	0.78
70.0	68.0	17.7	19.3	58.2	66.6	8.4	0.84
80.0	78.0	20.2	22.0	68.2	77.1	8.9	0.89
90.0	88.0	23.3	25.0	78.6	87.8	9.2	0.92
100.0		25.6	25.7	88.7	98.2	9.5	0.95

CONSOLIDATION DATA

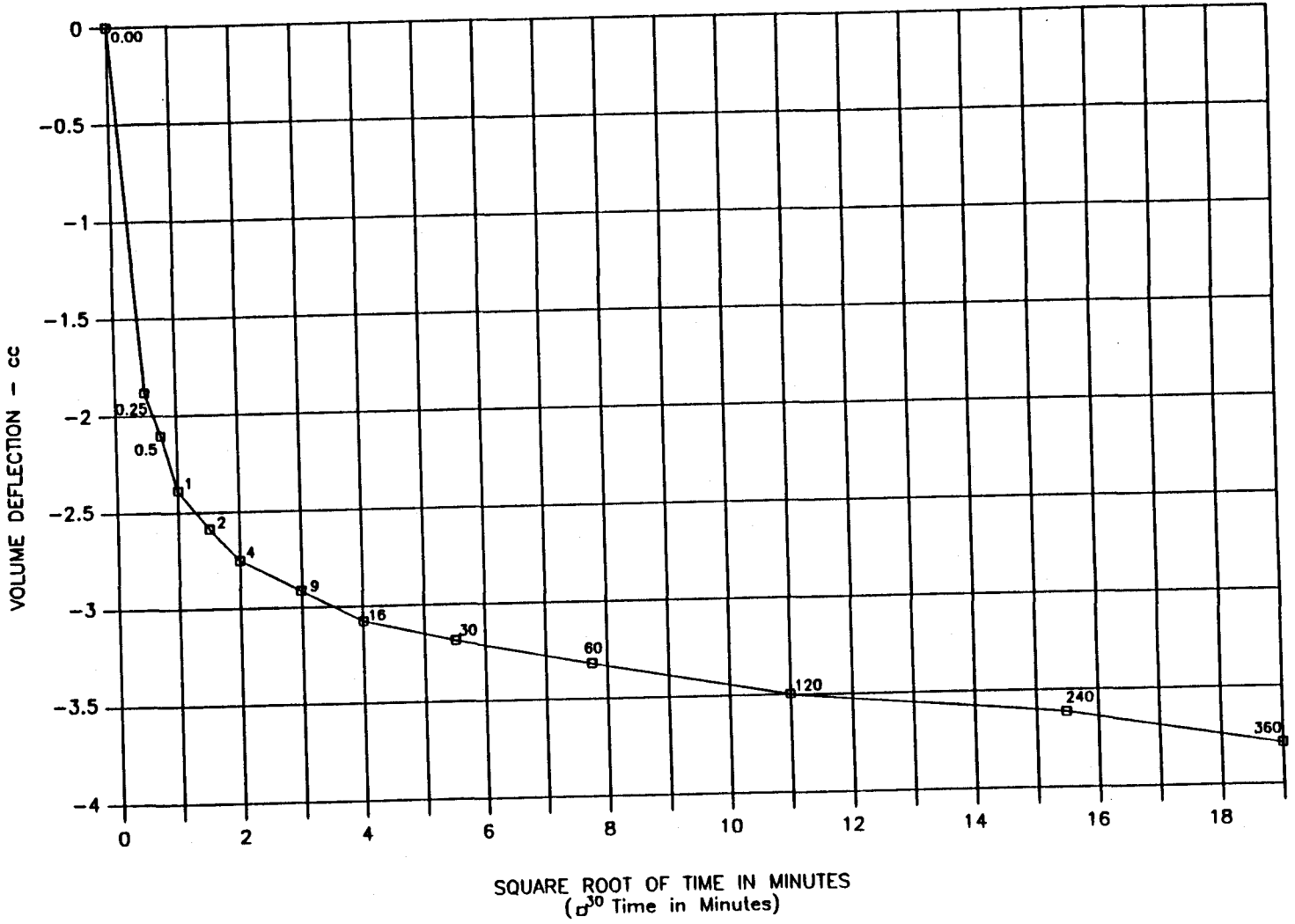
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	25.70	0.00
0.25	0.50	27.60	-1.90
0.5	0.71	27.83	-2.13
1	1.00	28.10	-2.40
2	1.41	28.30	-2.60
4	2.00	28.45	-2.75
9	3.00	28.63	-2.93
16	4.00	28.78	-3.07
30	5.48	28.90	-3.20
60	7.75	29.03	-3.32
120	10.95	29.20	-3.50
240	15.49	29.33	-3.63
360	18.97	29.50	-3.80

Initial Height (in)	2.845	Init. Vol. (CC)	209.37
Height Change (in)	0.015	Vol. Change (CC)	35.40
Ht. After Cons. (in)	2.830	Cell Exp. (CC)	24.50
Initial Area (sq in)	4.490	Net Change (CC)	10.90
Area After Cons. (sq in)	4.279	Cons. Vol. (CC)	198.47

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00839EBU1 @ 11.75-12.00', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

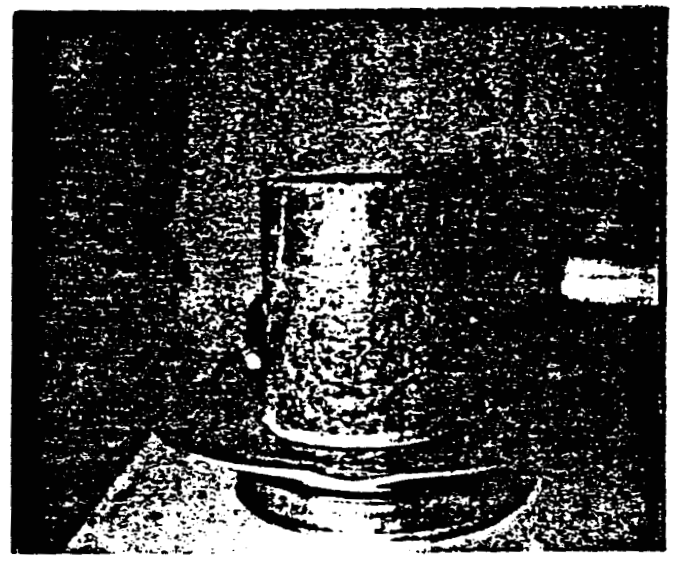
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-12-91 KH
DEPTH	11.75 - 12.00 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00839EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.845	Init. Area (sq in)	4.490
Consol. Ht. (in)	2.830	Consol. Area (sq in)	4.279
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.279	0	89.00	0.0	1152	0	0.00
125.0	4207	0.01	0.35	4.294	4399	49.50	-5688.0	6840	11239	1.64
165.0	5553	0.02	0.71	4.309	5786	50.00	-5616.0	6768	12554	1.85
187.0	6293	0.03	1.06	4.325	6534	51.00	-5472.0	6624	13158	1.99
193.0	6495	0.04	1.41	4.340	6719	54.50	-4968.0	6120	12839	2.10
190.0	6394	0.05	1.77	4.356	6591	56.80	-4636.8	5789	12380	2.14
185.0	6226	0.06	2.12	4.372	6395	57.00	-4608.0	5760	12155	2.11
180.0	6058	0.07	2.47	4.387	6199	57.40	-4550.4	5702	11902	2.09
176.0	5923	0.08	2.83	4.403	6040	57.60	-4521.6	5674	11713	2.06
172.0	5788	0.09	3.18	4.419	5881	57.70	-4507.2	5659	11540	2.04
167.0	5620	0.10	3.53	4.436	5689	57.80	-4492.8	5645	11334	2.01
151.0	5082	0.15	5.30	4.518	5050	57.80	-4492.8	5645	10695	1.89
140.0	4712	0.20	7.07	4.604	4595	57.80	-4492.8	5645	10240	1.81
139.0	4678	0.25	8.83	4.693	4475	57.80	-4492.8	5645	10120	1.79
150.0	5048	0.30	10.60	4.786	4736	57.80	-4492.8	5645	10381	1.84
157.5	5301	0.35	12.37	4.883	4874	58.00	-4464.0	5616	10490	1.87
164.5	5536	0.40	14.13	4.983	4988	58.40	-4406.4	5558	10547	1.90
175.0	5889	0.45	15.90	5.088	5197	58.70	-4363.2	5515	10713	1.94
149.0	5014	0.50	17.67	5.197	4332	59.20	-4291.2	5443	9775	
140.0	4712	0.55	19.43	5.311	3983	59.50	-4248.0	5400	9383	
140.0	4712	0.60	21.20	5.430	3896	59.70	-4219.2	5371	9267	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



38991

BH00839EBUI

11.75-12.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37391**
Sample Number:	**BH00661EBU1**
Sample Depth:	**2.20-2.55 feet (Alluvium)**

Data Available:

- ✓ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✓ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37391	SAMPLED	10-16-91 T.C.&B.P.
DEPTH	2.55 - 2.8'	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00661EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	29.84
Wt. Dry Soil & Pan (g)	29.04
Wt. Lost Moisture (g)	0.80
Wt. of Pan Only (g)	3.83
Wt. of Dry Soil (g)	25.21
Moisture Content %	3.2

Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	58.16

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	381.83
Weight of + #10 Before Washing (g)	106.00
Weight of + #10 After Washing (g)	81.11
Weight of - #10 Wet (g)	275.83
Weight of - #10 Dry (g)	291.47
Wt. Total Sample Dry (g)	372.58
Calc. Wt. "W" (g)	74.35
Calc. Mass + #10	16.19

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	39.62	39.62	39.62	10.6	89.4
3/8"	0.00	20.18	20.18	59.80	16.1	83.9
#4	0.00	10.55	10.55	70.35	18.9	81.1
#10	0.00	10.76	10.76	81.11	21.8	78.2
#20	1.30	3.51	2.21	2.21	24.7	75.3
#40	1.32	3.69	2.37	4.58	27.9	72.1
#60	1.46	4.16	2.70	7.28	31.6	68.4
#100	1.32	4.94	3.62	10.90	36.4	63.6
#200	1.30	6.80	5.50	16.40	43.8	56.2

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37391
DEPTH	2.55 - 2.8'
SAMPLE NO.	BH00661EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-16-91 T.C.&B.P.
DATE TESTED	11-06-91 SR
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	29.840
Wt. Dry Soil & Pan (g)	29.040
Wt. of Pan Only (g)	3.830
Sieve:	
Wt. Total Sample Wet (g)	381.83
Weight of + #10 Before Washing (g)	106.00
Weight of + #10 After Washing (g)	81.11
Weight of - #10 Wet (g)	275.83

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.007
% of Total Sample	100.0

HYDROMETER ANALYSIS - SEDIMENTATION DATA

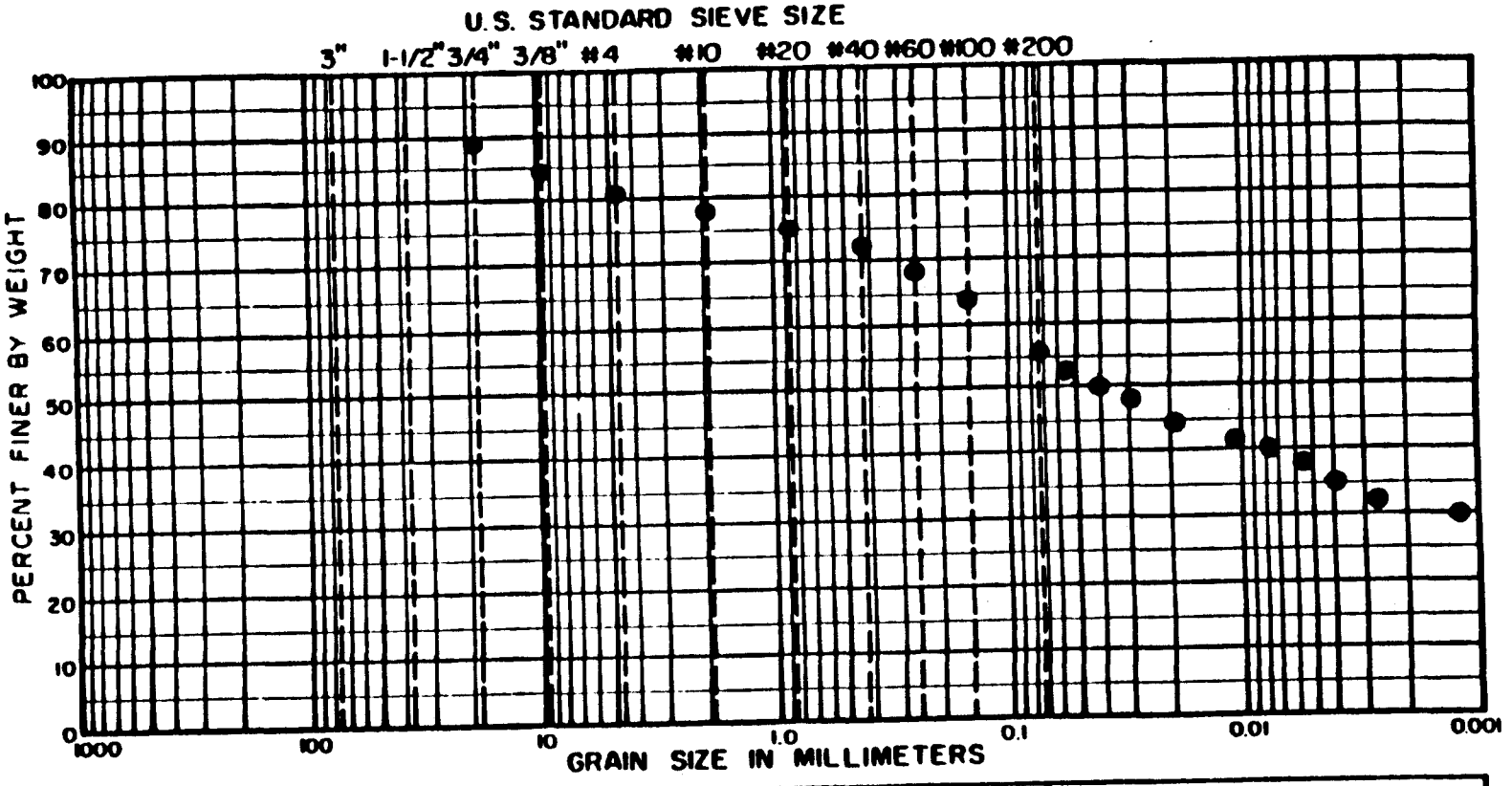
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 T.C.&B.P.
DEPTH	2.55 - 2.8'	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00661EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	74.346
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.00	39.00	52.5	52.5	9.07	0.0561
1.0	42.00	37.00	49.8	49.8	9.40	0.0404
2.0	41.00	36.00	48.4	48.4	9.57	0.0288
5.0	37.50	32.50	43.7	43.7	10.14	0.0188
15.0	36.00	31.00	41.7	41.7	10.39	0.0110
30.0	35.00	30.00	40.4	40.4	10.55	0.0078
60.0	33.00	28.00	37.7	37.7	10.88	0.0056
120.0	31.00	26.00	35.0	35.0	11.21	0.0040
250.0	29.00	24.00	32.3	32.3	11.53	0.0028
1440.0	27.00	22.00	29.6	29.6	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00661&BUI	2.55 -2.8'	Sample # 379

ADVANCED TERRA TESTING

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2021-[illegible]

CLIENT/OWNER EBASCO

LOCATION [illegible]

BORING [illegible] SAMPLE ____ DEPTH [illegible]

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

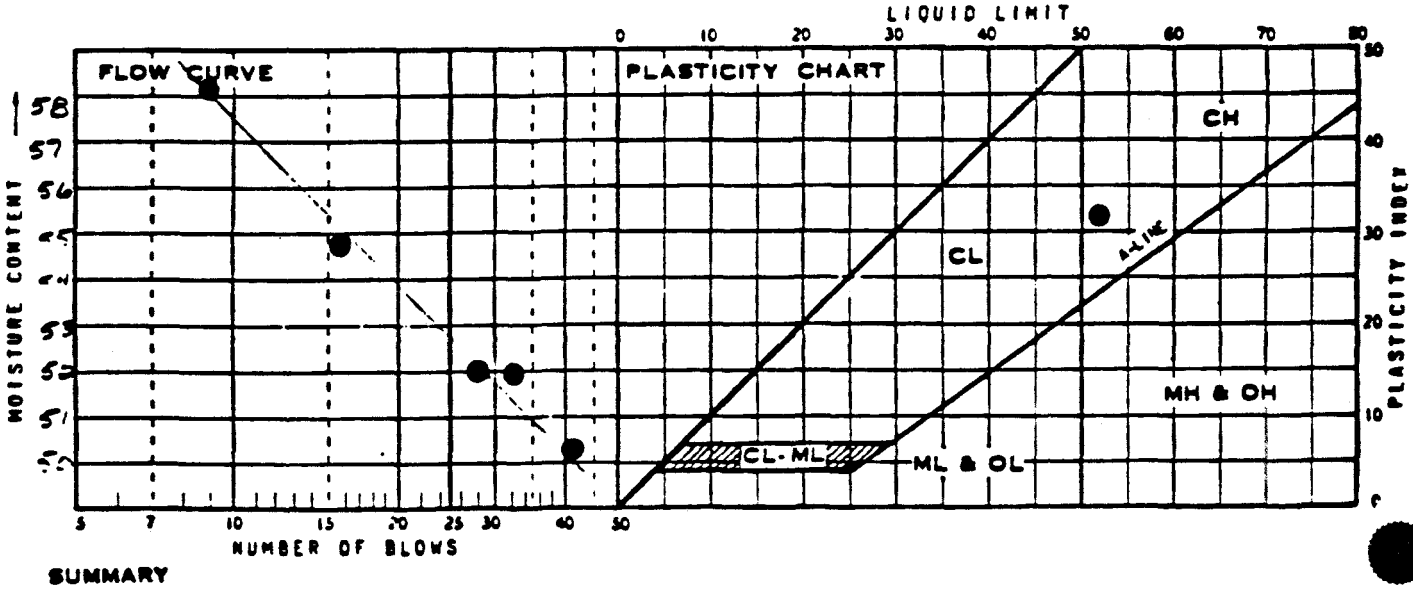
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible]

DETERMINATION	1	2	3	4	5	6
DISH	61 C	29 C	36 C			
WT OF DISH + WET SOIL g	7.05	8.96	8.87			
WT OF DISH + DRY SOIL g	6.77	7.48	7.41	—	—	—
WT OF MOISTURE g	1.28	1.48	1.41			
WT OF DISH g	1.06	1.06	1.06	—	—	—
WT OF DRY SOIL g	5.71	6.42	6.35			
MOISTURE CONTENT %	22.4	23.1	22.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	24	22	3C	60 C	28 C	
NUMBER OF BLOWS	41	33	28 ±	16	10 ±	
WT OF DISH + WET SOIL g	15.13	14.50	16.11	16.99	16.36	
WT OF DISH + DRY SOIL g	10.41	9.90	10.96	11.36	10.73	—
WT OF MOISTURE g	4.72	4.60	5.15	5.63	5.63	
WT OF DISH g	1.03	1.04	1.05	1.06	1.05	—
WT OF DRY SOIL g	9.38	8.86	9.91	10.30	9.68	
MOISTURE CONTENT %	50.3	51.9	52.0	54.7	58.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		52.8	22.6	30.2	[illegible]

ADVANCED [illegible]

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37391**
Sample Number:	**BH00648EBU1**
Sample Depth:	**2.55-2.80 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 TC & BP
DEPTH	2.55 - 2.80 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00648EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	15S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	351.8	361.4
Wt. Wet Soil & Pan (g)	361.1	370.7
Wt. Dry Soil & Pan (g)	297.5	297.5
Wt. Lost Moisture (g)	63.6	73.2
Wt. of Pan Only (g)	9.3	9.3
Wt. of Dry Soil (g)	288.2	288.2
Moisture Content %	22.1	25.4
Wet Density PCF	120.6	131.9
Dry Density PCF	98.8	105.2

Init. Diameter (in)	2.385	(cm)	6.058
Init. Area (sq in)	4.468	(sq cm)	28.824
Init. Height (in)	2.488	(cm)	6.320
Vol. Bef. Consol. (cu ft)	0.00643		
Vol. After Consol. (cu ft)	0.00604		
Effective Porosity %	42.77		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
997.0	59820	49.8	49.1	15.7	2.2E-08
1492.0	89520	49.1	48.5	16.4	1.2E-08
1453.0	87180	48.5	48.0	17.0	1.1E-08
1339.0	80340	48.0	47.5	17.5	1.2E-08
1440.0	86400	47.5	47.1	18.0	8.7E-09
1459.0	87540	47.1	46.7	18.4	9.7E-09
1421.0	85260	46.6	46.2	19.0	8.9E-09
1450.0	87000	46.2	45.8	19.4	8.7E-09
1569.0	94140	45.8	45.4	19.8	8.1E-09

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37391
DEPTH	2.55 - 2.80 FT
SAMPLE NO.	BH00648EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-16-91 TC & BP
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-25-91
SETUP NO.	15S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	351.770
Wt Soil & Moist at	361.370
Wt. Dry Soil & Pan	297.520
Wt. of Pan Only (g)	9.320
Consol Info:	
Init. Diameter in.	2.385
Initial Height in.	2.488
Vol. change (sat. con.) CC	18.000
Cell Exp.	6.900
Height Change in.	0.019
Test info:	
Pore pres @ begin. psi	59.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 TC & BP
DEPTH	2.55 - 2.80 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00648EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	15S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	13.4				
50.0	48.0	11.4	12.3	38.0	46.8	8.8	0.88
60.0	58.0	12.3	13.0	48.2	57.4	9.2	0.92
70.0		13.3	13.4	58.3	67.8	9.5	0.95

CONSOLIDATION DATA

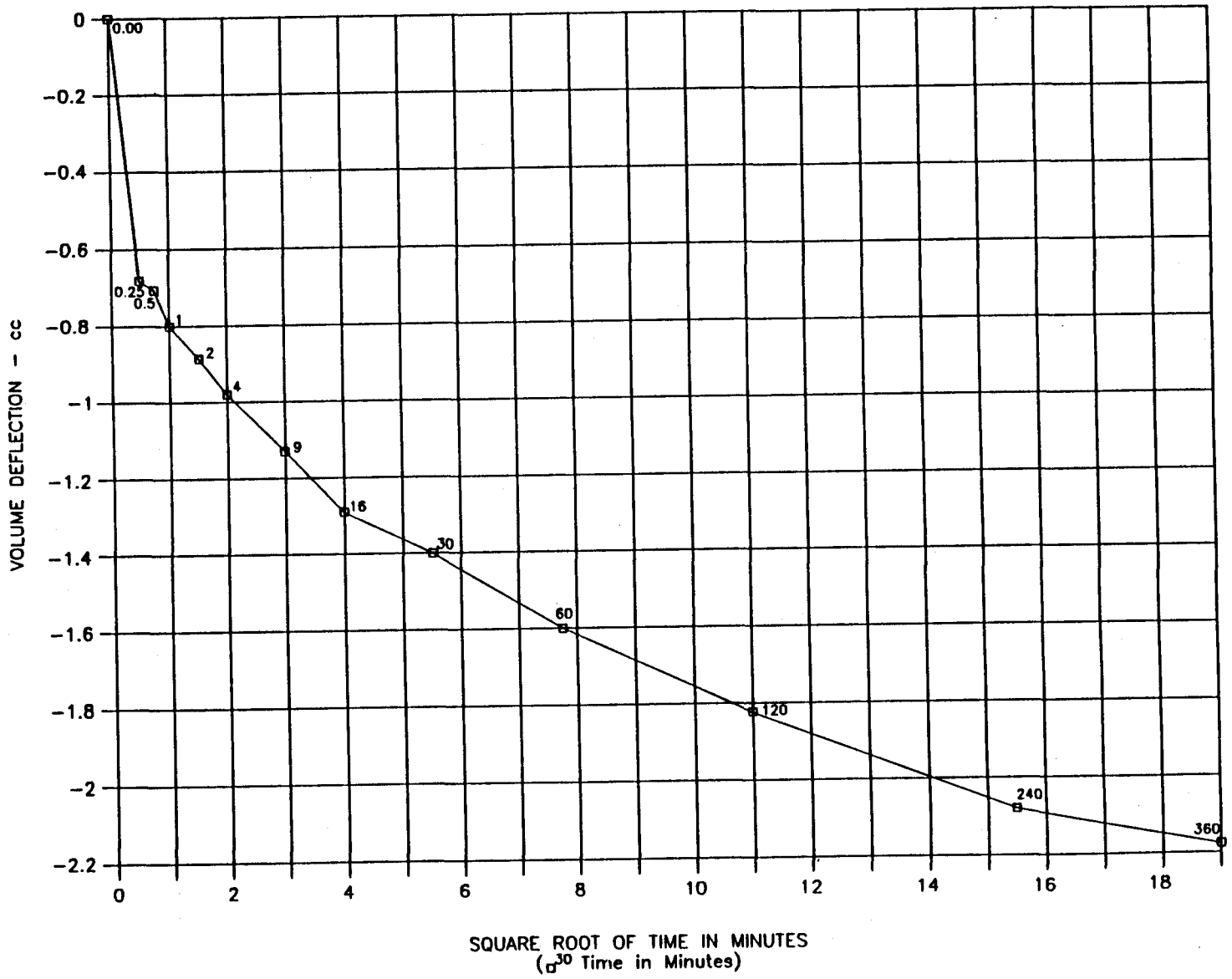
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	13.40	0.00
0.25	0.50	14.08	-0.67
0.5	0.71	14.10	-0.70
1	1.00	14.20	-0.80
2	1.41	14.28	-0.88
4	2.00	14.38	-0.97
9	3.00	14.53	-1.13
16	4.00	14.68	-1.28
30	5.48	14.80	-1.40
60	7.75	15.00	-1.60
120	10.95	15.23	-1.82
240	15.49	15.48	-2.07
360	18.97	15.58	-2.17

Initial Height (in)	2.488	Init. Vol. (CC)	182.18
Height Change (in)	0.019	Vol. Change (CC)	18.00
Ht. After Cons. (in)	2.469	Cell Exp. (CC)	6.90
Initial Area (sq in)	4.468	Net Change (CC)	11.10
Area After Cons. (sq in)	4.228	Cons. Vol. (CC)	171.08

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00648EBU1 @ 2.55-2.80', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 TC & BP
DEPTH	2.55 - 2.80 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00648EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	15S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No
Init. Ht. (in)	2.488	Init. Area (sq in)	4.468
Consol. Ht. (in)	2.469	Consol. Area (sq in)	4.228
Back Pres. PSI	59.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.228	0	59.00	0.0	1152	0	0.00
125.0	4258	0.01	0.41	4.245	4481	49.50	-1368.0	2520	7001	2.78
165.0	5620	0.02	0.81	4.262	5891	50.00	-1296.0	2448	8339	3.41
187.0	6370	0.03	1.22	4.280	6649	51.00	-1152.0	2304	8953	3.89
193.0	6574	0.04	1.62	4.297	6834	54.50	-648.0	1800	8634	4.80
190.0	6472	0.05	2.03	4.315	6701	56.80	-316.8	1469	8169	5.56
185.0	6301	0.06	2.43	4.333	6497	57.00	-288.0	1440	7937	5.51
180.0	6131	0.07	2.84	4.351	6295	57.40	-230.4	1382	7678	5.55
176.0	5995	0.08	3.24	4.369	6130	57.60	-201.6	1354	7483	5.53
172.0	5859	0.09	3.65	4.388	5965	57.70	-187.2	1339	7305	5.45
167.0	5688	0.10	4.05	4.406	5768	57.80	-172.8	1325	7092	5.35
151.0	5143	0.15	6.08	4.501	5105	57.80	-172.8	1325	6430	4.85
140.0	4769	0.20	8.10	4.600	4631	57.80	-172.8	1325	5956	4.50
139.0	4735	0.25	10.13	4.704	4497	57.80	-172.8	1325	5821	4.39
150.0	5109	0.30	12.15	4.812	4743	57.80	-172.8	1325	6068	4.58
157.5	5365	0.35	14.18	4.926	4866	58.00	-144.0	1296	6162	4.75
164.5	5603	0.40	16.20	5.045	4962	58.40	-86.4	1238	6200	5.01
175.0	5961	0.45	18.23	5.170	5151	58.70	-43.2	1195	6346	5.31
149.0	5075	0.50	20.25	5.301	4277	59.20	28.8	1123	5400	
140.0	4769	0.55	22.28	5.439	3917	59.50	72.0	1080	4997	
140.0	4769	0.60	24.30	5.585	3815	59.70	100.8	1051	4866	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH

37391

BH00648EBUI

2.55-2.80 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37391**
Sample Number:	**BH00660EBU1**
Sample Depth:	**11.00-11.75 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-17-91
DEPTH	11.00 - 11.75 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00660EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	34.33
Wt. Dry Soil & Pan (g)	33.83
Wt. Lost Moisture (g)	0.50
Wt. of Pan Only (g)	3.66
Wt. of Dry Soil (g)	30.17
Moisture Content %	1.7

Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	59.03

WASH SIEVE ANALYSIS

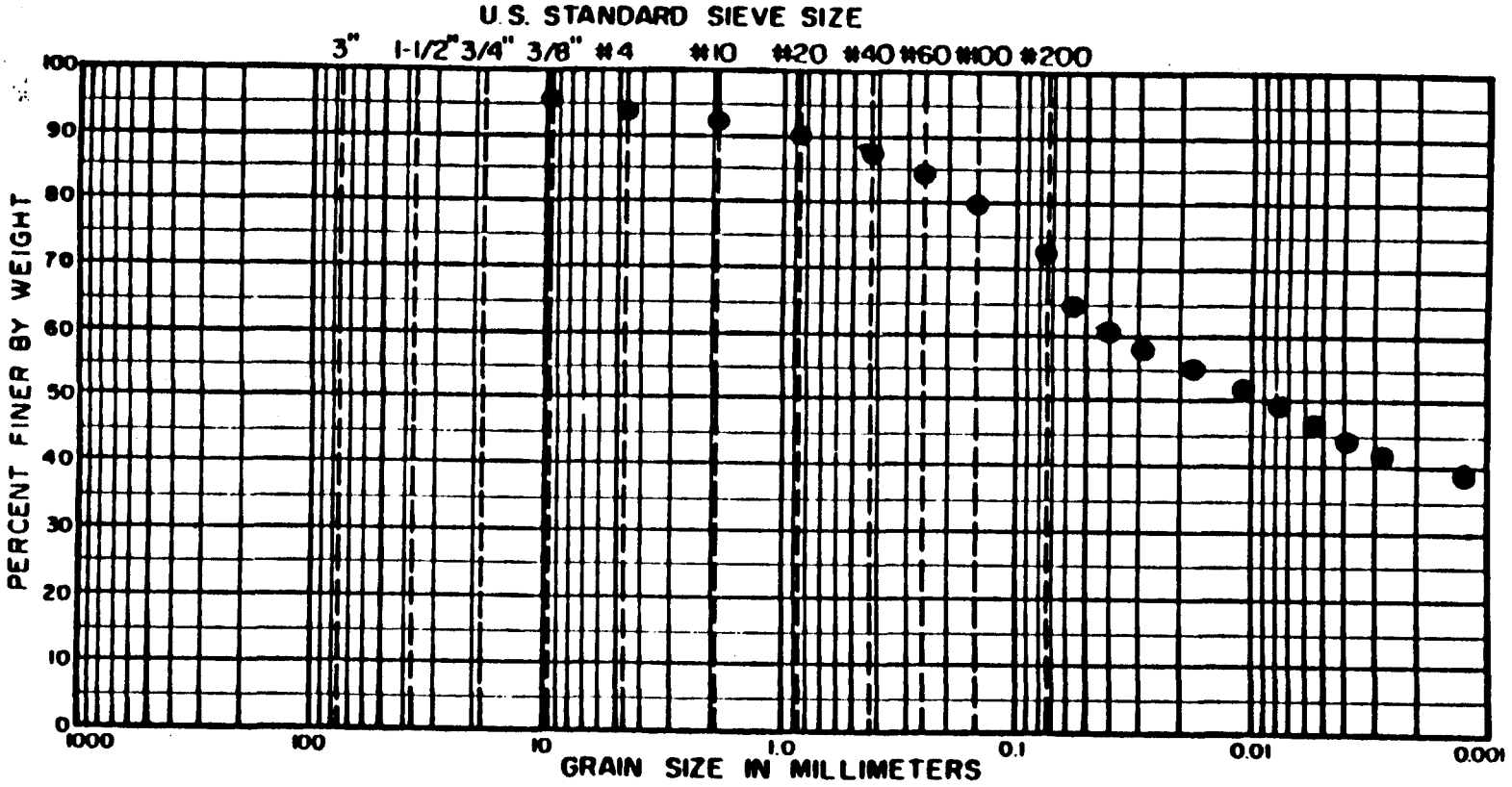
Wt. Total Sample Wet (g)	415.74
Weight of + #10 Before Washing (g)	36.85
Weight of + #10 After Washing (g)	28.94
Weight of - #10 Wet (g)	378.89
Weight of - #10 Dry (g)	380.49
Wt. Total Sample Dry (g)	409.43
Calc. Wt. "W" (g)	63.52
Calc. Mass + #10	4.49

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	22.00	22.00	22.00	5.4	94.6
#4	0.00	4.13	4.13	26.13	6.4	93.6
#10	0.00	2.81	2.81	28.94	7.1	92.9
#20	1.33	3.16	1.83	1.83	9.9	90.1
#40	1.30	3.08	1.78	3.61	12.8	87.2
#60	1.32	3.28	1.96	5.57	15.8	84.2
#100	1.31	3.93	2.62	8.19	20.0	80.0
#200	1.30	5.76	4.46	12.65	27.0	73.0

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37391
DEPTH	11.00 - 11.75 FT
SAMPLE NO.	BH00660EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-17-91
DATE TESTED	11-11-91 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	34.330
Wt. Dry Soil & Pan (g)	33.830
Wt. of Pan Only (g)	3.660
Sieve:	
Wt. Total Sample Wet (g)	415.74
Weight of + #10 Before Washing (g)	36.85
Weight of + #10 After Washing (g)	28.94
Weight of - #10 Wet (g)	378.89

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.011
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH006600EBUI	11- 15'	Sample # 373

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-17-91
DEPTH	11.00 - 11.75 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00660EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	63.523
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	46.50	41.50	65.3	65.3	8.66	0.0548
1.0	43.75	38.75	61.0	61.0	9.12	0.0398
2.0	42.00	37.00	58.2	58.2	9.40	0.0286
5.0	40.50	35.50	55.9	55.9	9.65	0.0183
15.0	38.00	33.00	51.9	51.9	10.06	0.0108
30.0	36.50	31.50	49.6	49.6	10.30	0.0077
60.0	35.00	30.00	47.2	47.2	10.55	0.0055
120.0	33.00	28.00	44.1	44.1	10.88	0.0040
250.0	31.50	26.50	41.7	41.7	11.12	0.0028
1440.0	30.00	25.00	39.4	39.4	11.37	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2021-05

CLIENT/OWNER EBASCO

LOCATION 373

BORING B-00 40 EBOI SAMPLE ____ DEPTH 1/2.5'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 2/8-INCH THREAD

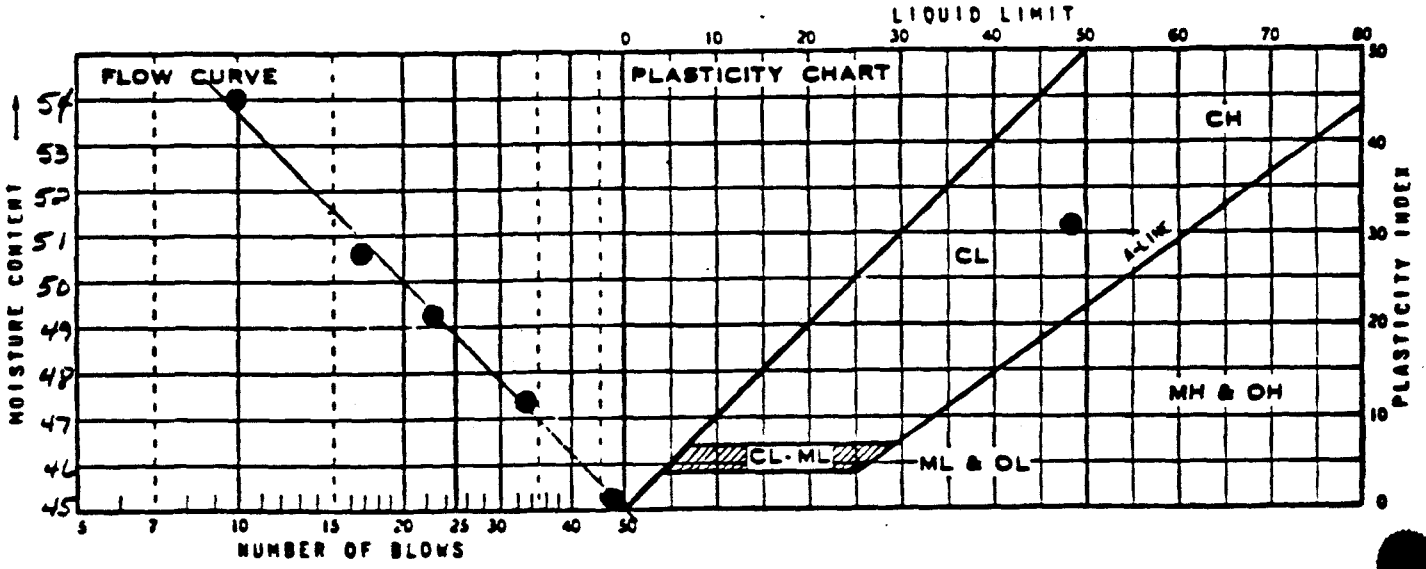
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 11/29/91

DETERMINATION	1	2	3	4	5	6
DISH	1	35 C	69 C			
WT OF DISH + WET SOIL g	9.00	8.62	770			
WT OF DISH + DRY SOIL g	7.82	7.50	6.76	—	—	—
WT OF MOISTURE g	1.18	1.12	.94			
WT OF DISH g	1.04	1.05	1.04	—	—	—
WT OF DRY SOIL g	6.78	6.45	5.72			
MOISTURE CONTENT %	17.4	17.4	16.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	32 C	46 C	50 C	54 C	30 C	
NUMBER OF BLOWS	49	34	23	17	10	
WT OF DISH + WET SOIL g	17.75	16.32	18.08	17.03	16.23	
WT OF DISH + DRY SOIL g	12.55	11.42	12.47	11.66	10.92	—
WT OF MOISTURE g	5.20	4.90	5.61	5.37	5.31	
WT OF DISH g	1.04	1.05	1.06	1.05	1.08	—
WT OF DRY SOIL g	11.51	10.37	11.41	10.61	9.84	
MOISTURE CONTENT %	45.2	47.3	49.2	50.6	54.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		48.8	17.1	31.7	CL

ADVANCED TERRA TESTING

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37391**
Sample Number:	**BH00658EBU1**
Sample Depth:	**11.75-12.00 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 TC&BP
DEPTH	11.75 - 12.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00658EBU1	TEST FINISHED	11-30-91
SOIL DESCR.	SS LINER	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	398.1	404.4
Wt. Wet Soil & Pan (g)	407.6	413.8
Wt. Dry Soil & Pan (g)	325.9	325.9
Wt. Lost Moisture (g)	81.7	87.9
Wt. of Pan Only (g)	9.5	9.5
Wt. of Dry Soil (g)	316.4	316.4
Moisture Content %	25.8	27.8
Wet Density PCF	129.6	127.9
Dry Density PCF	103.0	100.1

Init. Diameter (in)	2.386	(cm)	6.060
Init. Area (sq in)	4.471	(sq cm)	28.849
Init. Height (in)	2.617	(cm)	6.647
Vol. Bef. Consol. (cu ft)	0.00677		
Vol. After Consol. (cu ft)	0.00697		
Effective Porosity %	44.55		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1370.0	82200	49.7	49.4	15.6	6.5E-09
1569.0	94140	49.4	49.2	15.8	3.8E-09
1420.0	85200	49.2	49.0	16.0	4.2E-09
1335.0	80100	49.0	48.9	16.2	2.2E-09
1444.0	86640	48.9	48.7	16.4	4.1E-09
1426.0	85560	48.7	48.6	16.5	2.1E-09
1205.0	72300	48.4	48.3	16.9	2.5E-09

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37391
DEPTH	11.75 - 12.00 FT
SAMPLE NO.	BH00658EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-16-91 TC&BP
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-30-91
SETUP NO.	4P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	398.110
Wt Soil & Moist at	404.360
Wt. Dry Soil & Pan	325.890
Wt. of Pan Only (g)	9.460
Consol Info:	
Init. Diameter in.	2.386
Initial Height in.	2.617
Vol. change (sat. con.) CC	6.900
Cell Exp.	12.500
Height Change in.	0.005
Test info:	
Pore pres @ begin. psi	99.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 TC&BP
DEPTH	11.75 - 12.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00658EBU1	TEST FINISHED	11-30-91
SOIL DESCR.	SS LINER	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	7.2				
50.0	48.0	4.2	5.0	36.8	39.7	2.9	0.29
60.0	58.0	2.3	2.9	47.6	52.1	4.5	0.45
70.0	68.0	1.5	2.3	57.6	63.7	6.1	0.61
80.0	78.0	1.7	2.8	67.8	75.0	7.2	0.72
90.0	88.0	2.3	3.3	77.6	85.8	8.2	0.82
100.0	98.0	3.1	4.1	87.6	96.6	9.0	0.90
110.0		4.0	4.0	97.7	107.0	9.3	0.93

CONSOLIDATION DATA

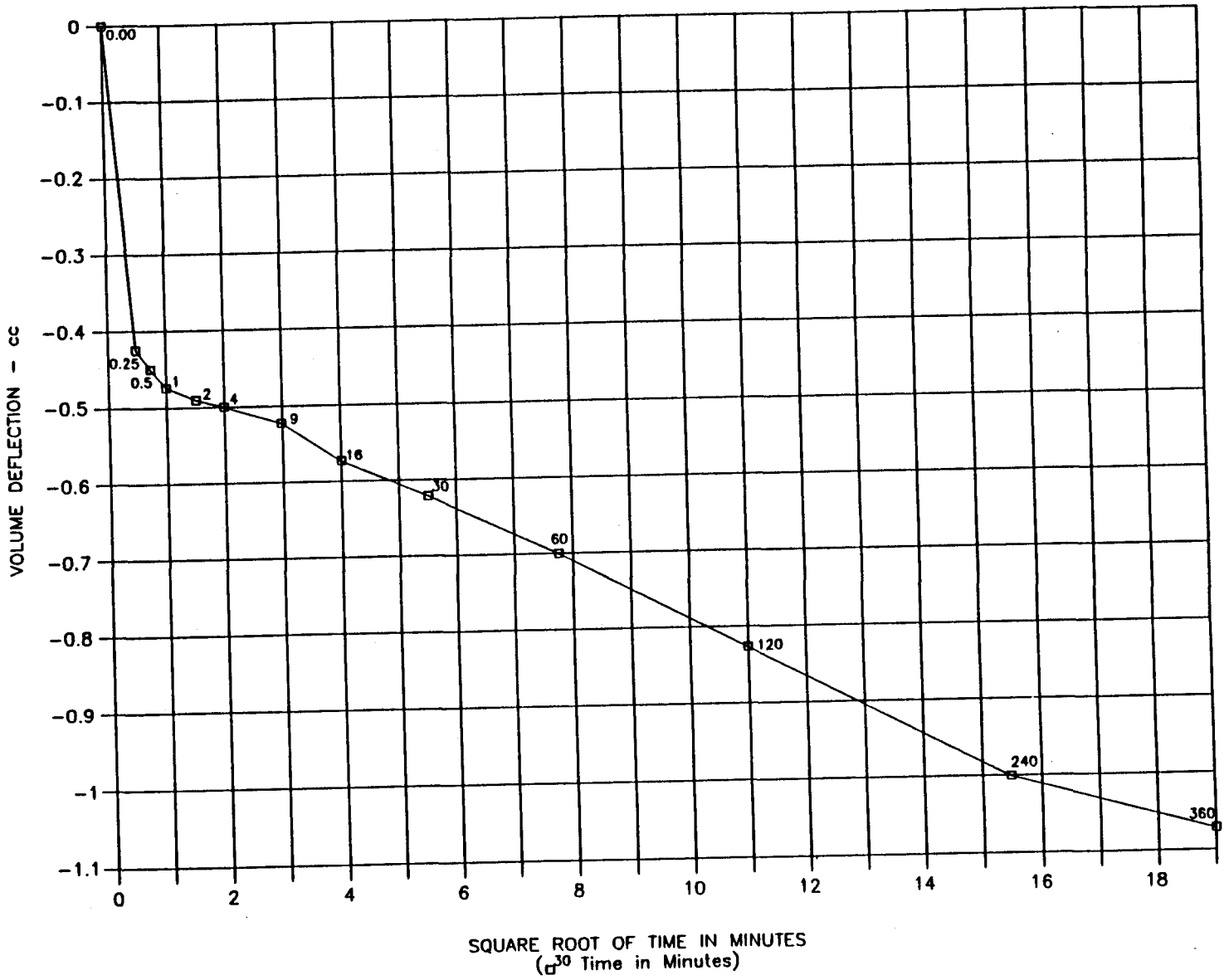
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	3.90	0.00
0.25	0.50	4.33	-0.43
0.5	0.71	4.35	-0.45
1	1.00	4.38	-0.48
2	1.41	4.39	-0.49
4	2.00	4.40	-0.50
9	3.00	4.43	-0.52
16	4.00	4.48	-0.57
30	5.48	4.53	-0.63
60	7.75	4.60	-0.70
120	10.95	4.73	-0.82
240	15.49	4.90	-1.00
360	18.97	4.98	-1.07

Initial Height (in)	2.617	Init. Vol. (CC)	191.78
Height Change (in)	0.005	Vol. Change (CC)	6.90
Ht. After Cons. (in)	2.612	Cell Exp. (CC)	12.50
Initial Area (sq in)	4.471	Net Change (CC)	-5.60
Area After Cons. (sq in)	4.611	Cons. Vol. (CC)	197.38

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00658EBU1 @ 11.75-12.00', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

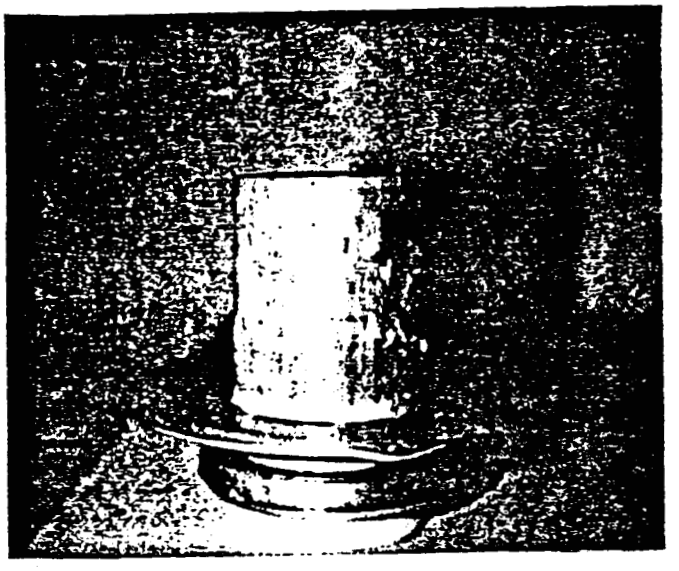
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37391	SAMPLED	10-16-91 TC&BP
DEPTH	11.75 - 12.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00658EBU1	TEST FINISHED	11-30-91
SOIL DESCR.	SS LINER	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.617	Init. Area (sq in)	4.471
Consol. Ht. (in)	2.612	Consol. Area (sq in)	4.611
Back Pres. PSI	99.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.611	0	99.00	0.0	1152	0	0.00
125.0	3904	0.01	0.38	4.628	3772	49.50	-7128.0	8280	12052	1.46
165.0	5153	0.02	0.77	4.646	4959	50.00	-7056.0	8208	13167	1.60
187.0	5840	0.03	1.15	4.664	5599	51.00	-6912.0	8064	13663	1.69
193.0	6028	0.04	1.53	4.682	5756	54.50	-6408.0	7560	13316	1.76
190.0	5934	0.05	1.91	4.701	5645	56.80	-6076.8	7229	12873	1.78
185.0	5778	0.06	2.30	4.719	5475	57.00	-6048.0	7200	12675	1.76
180.0	5622	0.07	2.68	4.738	5306	57.40	-5990.4	7142	12448	1.74
176.0	5497	0.08	3.06	4.756	5167	57.60	-5961.6	7114	12281	1.73
172.0	5372	0.09	3.45	4.775	5030	57.70	-5947.2	7099	12129	1.71
167.0	5216	0.10	3.83	4.794	4864	57.80	-5932.8	7085	11949	1.69
151.0	4716	0.15	5.74	4.892	4311	57.80	-5932.8	7085	11396	1.61
140.0	4372	0.20	7.66	4.993	3916	57.80	-5932.8	7085	11000	1.55
139.0	4341	0.25	9.57	5.099	3807	57.80	-5932.8	7085	10892	1.54
150.0	4685	0.30	11.49	5.209	4021	57.80	-5932.8	7085	11106	1.57
157.5	4919	0.35	13.40	5.324	4131	58.00	-5904.0	7056	11187	1.59
164.5	5138	0.40	15.31	5.444	4219	58.40	-5846.4	6998	11218	1.60
175.0	5466	0.45	17.23	5.570	4387	58.70	-5803.2	6955	11342	1.63
149.0	4654	0.50	19.14	5.702	3649	59.20	-5731.2	6883	10532	
140.0	4372	0.55	21.06	5.840	3347	59.50	-5688.0	6840	10187	
140.0	4372	0.60	22.97	5.986	3266	59.70	-5659.2	6811	10077	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37391

BH00658EBUI

11.75–12.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37491**
Sample Number:	**BH00570EBU1**
Sample Depth:	**2.70-3.00 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37491	SAMPLED	10-16-91 AC&KM
DEPTH	2.70 - 3.00 FT	TEST STARTED	11-16-91 DCW
SAMPLE NO.	BH00570EBU1	TEST FINISHED	12-05-91
SOIL DESCR.	SS LINER	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	391.2	396.0
Wt. Wet Soil & Pan (g)	400.7	405.4
Wt. Dry Soil & Pan (g)	342.6	342.6
Wt. Lost Moisture (g)	58.1	62.8
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	333.2	333.2
Moisture Content %	17.4	18.9
Wet Density PCF	132.9	133.2
Dry Density PCF	113.2	112.0

Init. Diameter (in)	2.392	(cm)	6.076
Init. Area (sq in)	4.494	(sq cm)	28.994
Init. Height (in)	2.495	(cm)	6.337
Vol. Bef. Consol. (cu ft)	0.00649		
Vol. After Consol. (cu ft)	0.00656		
Effective Porosity %	33.84		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
921.0	55260	50.1	48.7	5.2	4.0E-08
1359.0	81540	48.7	47.2	6.5	2.9E-08
735.0	44100	47.2	46.6	7.5	2.2E-08
709.0	42540	46.6	45.9	8.1	2.6E-08
1425.0	85500	45.9	44.6	9.0	2.5E-08
1686.0	101160	44.6	43.4	10.2	2.0E-08
1211.0	72660	43.4	42.5	11.2	1.9E-08
1538.0	92280	42.5	41.5	12.0	1.8E-08
1611.0	96660	41.5	40.5	12.9	1.7E-08
1147.0	68820	40.5	39.8	13.7	1.7E-08
1563.0	93780	48.6	47.6	6.4	1.7E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37491
DEPTH	2.70 - 3.00 FT
SAMPLE NO.	BH00570EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-16-91 AC&KM
TEST STARTED	11-16-91 DCW
TEST FINISHED	12-05-91
SETUP NO.	1P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	391.230
Wt Soil & Moist at	395.980
Wt. Dry Soil & Pan	342.590
Wt. of Pan Only (g)	9.440
Consol Info:	
Init. Diameter in.	2.392
Initial Height in.	2.495
Vol. change (sat. con.) CC	14.600
Cell Exp.	16.500
Height Change in.	0.021
Test info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37491	SAMPLED	10-16-91 AC&KM
DEPTH	2.70 - 3.00 FT	TEST STARTED	11-16-91 DCW
SAMPLE NO.	BH00570EBU1	TEST FINISHED	12-05-91
SOIL DESCR.	SS LINER	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	8.1				
50.0	48.0	5.1	6.3	38.5	46.6	8.1	0.81
60.0	58.0	6.0	7.3	48.4	57.0	8.6	0.86
70.0	68.0	7.1	8.3	58.6	67.7	9.1	0.91
80.0	78.0	8.5	9.7	68.6	78.0	9.4	0.94
90.0		9.7	11.0	78.4	88.0	9.6	0.96

CONSOLIDATION DATA

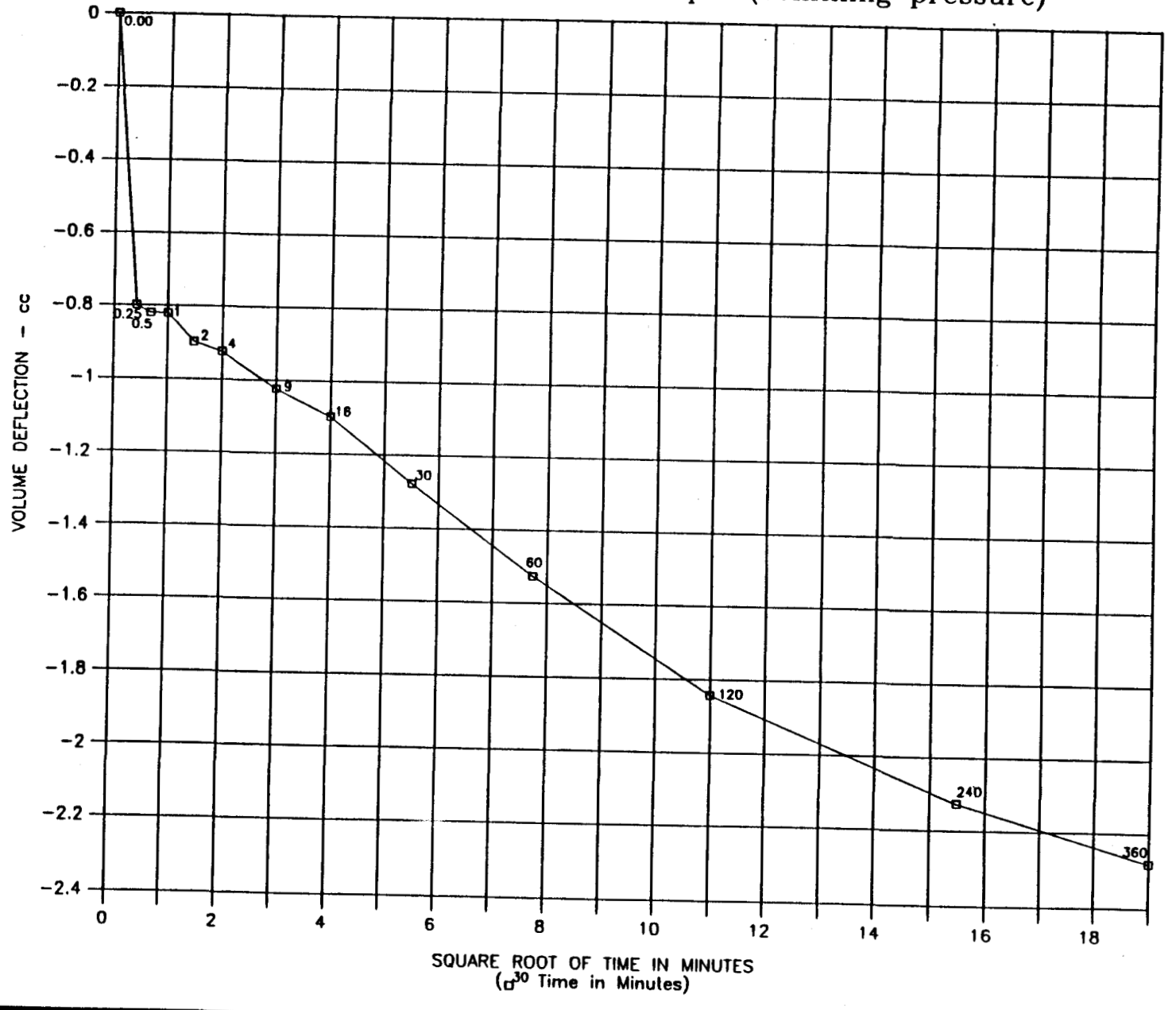
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	11.10	0.00
0.25	0.50	11.90	-0.80
0.5	0.71	11.93	-0.83
1	1.00	11.93	-0.83
2	1.41	12.00	-0.90
4	2.00	12.03	-0.93
9	3.00	12.13	-1.03
16	4.00	12.20	-1.10
30	5.48	12.38	-1.28
60	7.75	12.63	-1.53
120	10.95	12.95	-1.85
240	15.49	13.23	-2.13
360	18.97	13.38	-2.28

Initial Height (in)	2.495	Init. Vol. (CC)	183.76
Height Change (in)	0.021	Vol. Change (CC)	14.60
Ht. After Cons. (in)	2.474	Cell Exp. (CC)	16.50
Initial Area (sq in)	4.494	Net Change (CC)	-1.90
Area After Cons. (sq in)	4.579	Cons. Vol. (CC)	185.66

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00570EBU1 @ 2.70-3.00', 1152 psf (confining pressure)



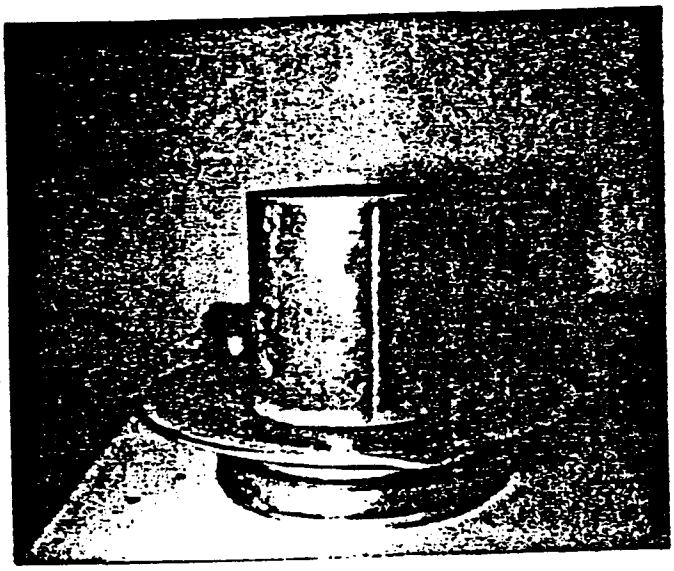
TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37491	SAMPLED	10-16-91 AC&KM
DEPTH	2.70 - 3.00 FT	TEST STARTED	11-16-91 DCW
SAMPLE NO.	BH00570EBU1	TEST FINISHED	12-05-91
SOIL DESCR.	SS LINER	SETUP NO.	1P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No
Init. Ht. (in)	2.495	Init. Area (sq in)	4.494
Consol. Ht. (in)	2.474	Consol. Area (sq in)	4.579
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.579	0	89.00	0.0	1152	0	0.00
125.0	3931	0.01	0.40	4.597	3843	49.50	-5688.0	6840	10683	1.56
165.0	5189	0.02	0.81	4.616	5052	50.00	-5616.0	6768	11820	1.75
187.0	5881	0.03	1.21	4.635	5702	51.00	-5472.0	6624	12326	1.86
193.0	6070	0.04	1.62	4.654	5861	54.50	-4968.0	6120	11981	1.96
190.0	5975	0.05	2.02	4.673	5746	56.80	-4636.8	5789	11535	1.99
185.0	5818	0.06	2.43	4.693	5572	57.00	-4608.0	5760	11332	1.97
180.0	5661	0.07	2.83	4.712	5399	57.40	-4550.4	5702	11101	1.95
176.0	5535	0.08	3.23	4.732	5257	57.60	-4521.6	5674	10930	1.93
172.0	5409	0.09	3.64	4.752	5116	57.70	-4507.2	5659	10775	1.90
167.0	5252	0.10	4.04	4.772	4946	57.80	-4492.8	5645	10591	1.88
151.0	4749	0.15	6.06	4.874	4378	57.80	-4492.8	5645	10023	1.78
140.0	4403	0.20	8.08	4.981	3972	57.80	-4492.8	5645	9617	1.70
139.0	4371	0.25	10.11	5.093	3857	57.80	-4492.8	5645	9502	1.68
150.0	4717	0.30	12.13	5.211	4068	57.80	-4492.8	5645	9713	1.72
157.5	4953	0.35	14.15	5.333	4174	58.00	-4464.0	5616	9790	1.74
164.5	5173	0.40	16.17	5.462	4256	58.40	-4406.4	5558	9815	1.77
175.0	5504	0.45	18.19	5.597	4419	58.70	-4363.2	5515	9934	1.80
149.0	4686	0.50	20.21	5.739	3670	59.20	-4291.2	5443	9113	
140.0	4403	0.55	22.23	5.888	3361	59.50	-4248.0	5400	8761	
140.0	4403	0.60	24.25	6.045	3273	59.70	-4219.2	5371	8644	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37491

BH00570EBUI

2.70–3.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37491**
Sample Number:	**BH00571EBU1**
Sample Depth:	**3.00-3.25 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37491	SAMPLED	10-15-91 K.M.&A.C.
DEPTH	3.00 - 3.25 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00571EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	52.08
Wt. Dry Soil & Pan (g)	51.27
Wt. Lost Moisture (g)	0.81
Wt. of Pan Only (g)	3.77
Wt. of Dry Soil (g)	47.50
Moisture Content %	1.7
Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	59.00

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	389.75
Weight of + #10 Before Washing (g)	8.68
Weight of + #10 After Washing (g)	6.65
Weight of - #10 Wet (g)	381.07
Weight of - #10 Dry (g)	376.68
Wt. Total Sample Dry (g)	383.33
Calc. Wt. "W" (g)	60.04
Calc. Mass + #10	1.04

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	1.28	1.28	1.28	0.3	99.7
#10	0.00	5.37	5.37	6.65	1.7	98.3
#20	1.31	3.07	1.76	1.76	4.7	95.3
#40	1.33	4.34	3.01	4.77	9.7	90.3
#60	1.33	5.54	4.21	8.98	16.7	83.3
#100	1.31	8.16	6.85	15.83	28.1	71.9
#200	1.33	10.83	9.50	25.33	43.9	56.1

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37491
DEPTH	3.00 - 3.25 FT
SAMPLE NO.	BH00571EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-15-91 K.M.&A.C.
DATE TESTED	11-08-91 SR
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	52.080
Wt. Dry Soil & Pan (g)	51.270
Wt. of Pan Only (g)	3.770
Sieve:	
Wt. Total Sample Wet (g)	389.75
Weight of + #10 Before Washing (g)	8.68
Weight of + #10 After Washing (g)	6.65
Weight of - #10 Wet (g)	381.07

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.009
% of Total Sample	100.0

HYDROMETER ANALYSIS - SEDIMENTATION DATA

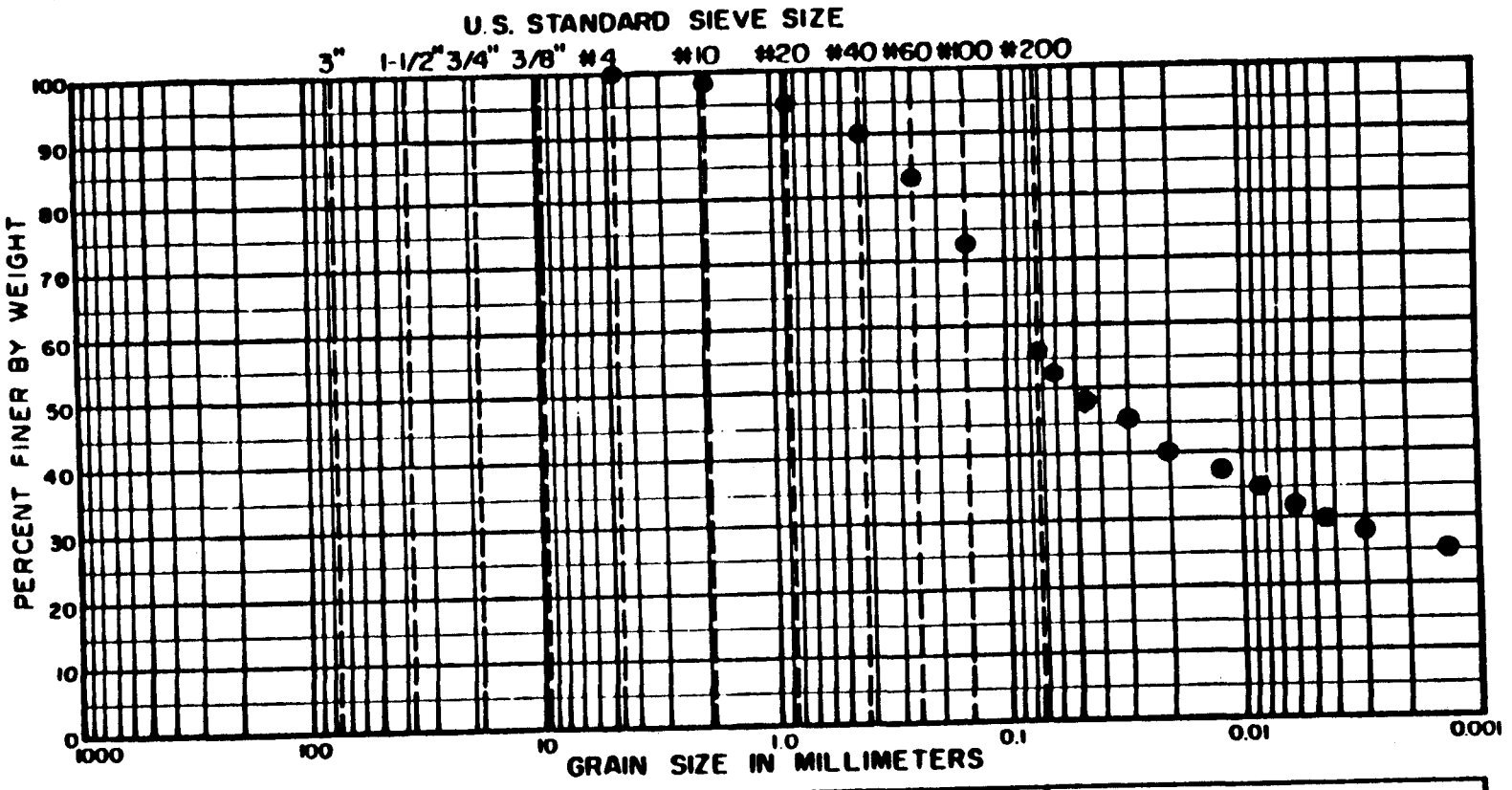
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37491	SAMPLED	10-15-91 K.M.&A.C.
DEPTH	3.00 - 3.25 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00571EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	60.045
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	36.50	31.50	52.5	52.5	10.30	0.0598
1.0	34.00	29.00	48.3	48.3	10.71	0.0431
2.0	32.75	27.75	46.2	46.2	10.92	0.0308
5.0	29.00	24.00	40.0	40.0	11.53	0.0200
15.0	28.00	23.00	38.3	38.3	11.70	0.0116
30.0	26.00	21.00	35.0	35.0	12.03	0.0083
60.0	24.25	19.25	32.1	32.1	12.31	0.0060
120.0	23.00	18.00	30.0	30.0	12.52	0.0043
250.0	21.50	16.50	27.5	27.5	12.76	0.0030
1440.0	19.75	14.75	24.6	24.6	13.05	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH005THEBUI	3 - 3.25'	Sample # 374

ADVANCED TERRA TESTING

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

[illegible]

CLIENT/OWNER [illegible]

LOCATION 374

BORING ____ SAMPLE ____ DEPTH [illegible]

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

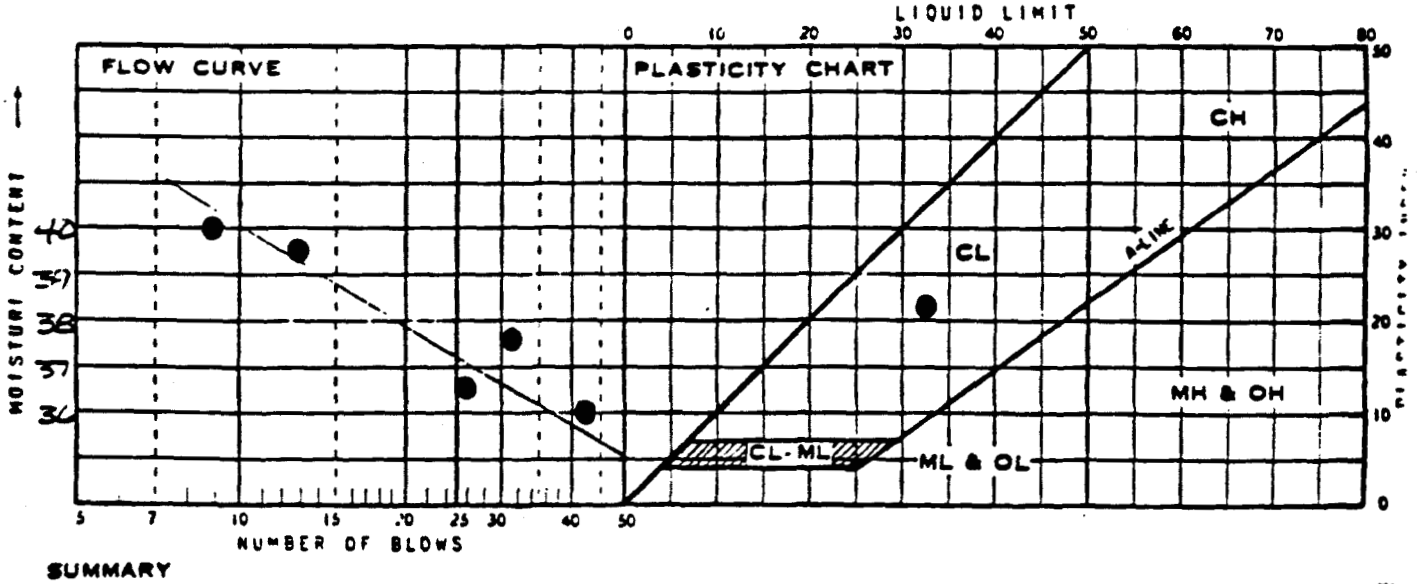
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB.11/3/91.

DETERMINATION	1	2	3	4	5	6
DISH	115	21A	25A			
WT OF DISH + WET SOIL g	7.37	7.71	7.92			
WT OF DISH + DRY SOIL g	6.60	6.87	7.04	—	—	—
WT OF MOISTURE g	.77	.84	.88			
WT OF DISH g	1.47	1.32	1.30	—	—	—
WT OF DRY SOIL g	5.13	5.55	5.74			
MOISTURE CONTENT %	15.0	15.1	15.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	05	122	10	36A	105	
NUMBER OF BLOWS	43	32	26	12±	9	
WT OF DISH + WET SOIL g	17.23	16.53	14.65	15.67	19.71	
WT OF DISH + DRY SOIL g	13.01	12.36	11.08	11.61	14.45	—
WT OF MOISTURE g	4.22	4.17	3.57	4.06	5.26	
WT OF DISH g	1.29	1.30	1.31	1.32	1.31	—
WT OF DRY SOIL g	11.72	11.06	9.77	10.29	13.14	
MOISTURE CONTENT %	36.0	37.7	36.5	39.5	40.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		373	51	222	2L	

ADVANCED TERRA TESTING inc

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37591**
Sample Number:	**BH00665EBU1**
Sample Depth:	**3.00-3.25 feet (Alluvium)**

Data Available:

- ✓ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✓ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37591	SAMPLED	10-17-91
DEPTH	3.00 - 3.25 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00665EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	47.85
Wt. Dry Soil & Pan (g)	46.08
Wt. Lost Moisture (g)	1.77
Wt. of Pan Only (g)	3.66
Wt. of Dry Soil (g)	42.42
Moisture Content %	4.2
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	57.60

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	373.44
Weight of + #10 Before Washing (g)	71.96
Weight of + #10 After Washing (g)	56.81
Weight of - #10 Wet (g)	301.48
Weight of - #10 Dry (g)	303.95
Wt. Total Sample Dry (g)	360.76
Calc. Wt. "W" (g)	68.36
Calc. Mass + #10	10.77

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	37.33	37.33	37.33	10.3	89.7
#4	0.00	10.38	10.38	47.71	13.2	86.8
#10	0.00	9.10	9.10	56.81	15.7	84.3
#20	1.31	4.12	2.81	2.81	19.9	80.1
#40	1.30	4.30	3.00	5.81	24.2	75.8
#60	1.32	4.33	3.01	8.82	28.6	71.4
#100	1.30	4.41	3.11	11.93	33.2	66.8
#200	1.31	4.98	3.67	15.60	38.6	61.4

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37591
DEPTH	3.00 - 3.25 FT
SAMPLE NO.	BH00665EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-17-91
DATE TESTED	11-11-91 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	47.850
Wt. Dry Soil & Pan (g)	46.080
Wt. of Pan Only (g)	3.660
Sieve:	
Wt. Total Sample Wet (g)	373.44
Weight of + #10 Before Washing (g)	71.96
Weight of + #10 After Washing (g)	56.81
Weight of - #10 Wet (g)	301.48

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.001
% of Total Sample	100.0

HYDROMETER ANALYSIS - SEDIMENTATION DATA

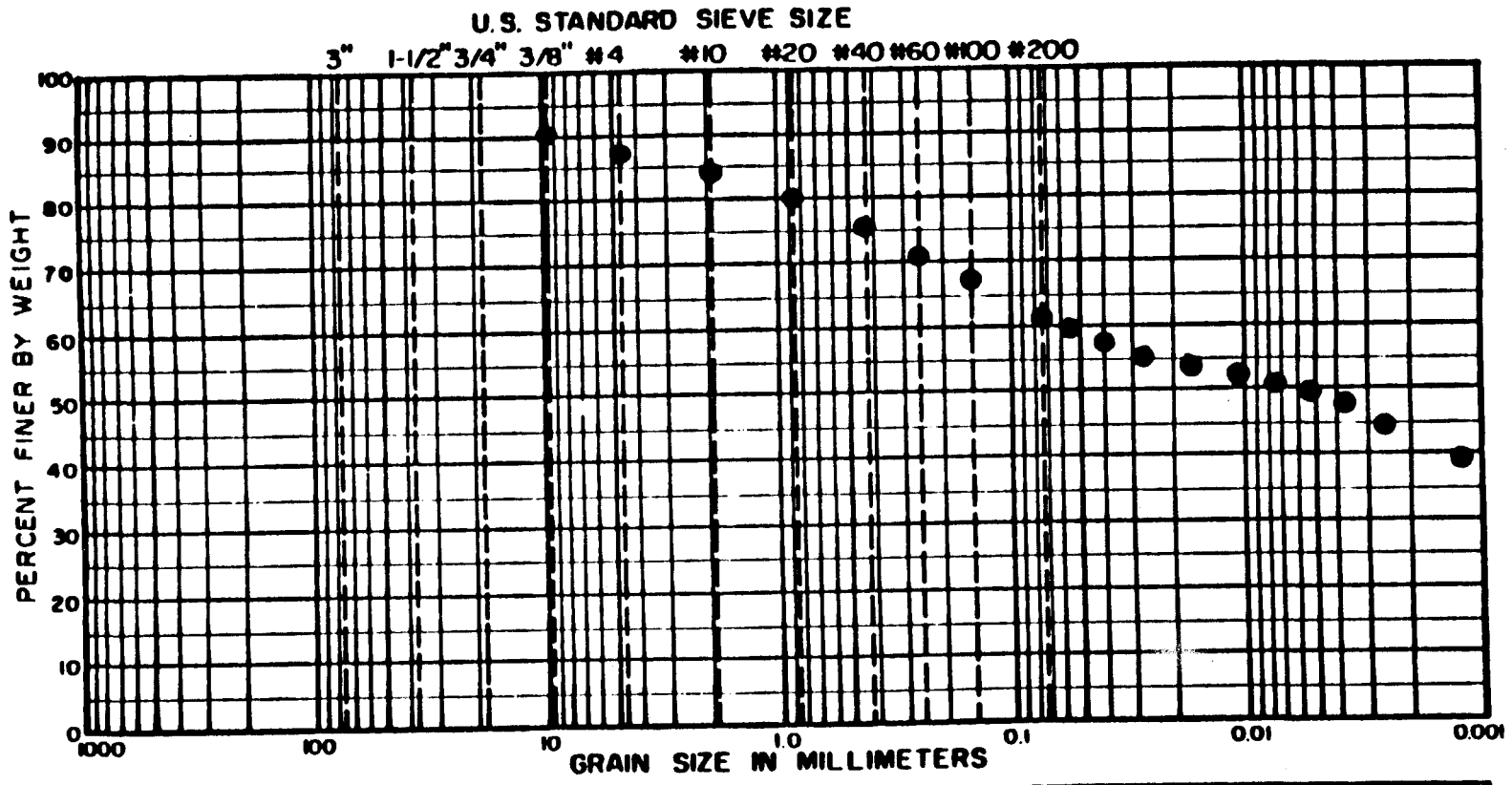
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37591	SAMPLED	10-17-91
DEPTH	3 - 3.25'	DATE TESTED	11-11-91 TNU
SAMPLE NO.	MW00665EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	68.363
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	46.00	41.00	60.0	60.0	8.75	0.0551
1.0	44.00	39.00	57.0	57.0	9.07	0.0397
2.0	43.00	38.00	55.6	55.6	9.24	0.0283
5.0	42.00	37.00	54.1	54.1	9.40	0.0181
15.0	41.00	36.00	52.7	52.7	9.57	0.0105
30.0	40.00	35.00	51.2	51.2	9.73	0.0075
60.0	39.00	34.00	49.7	49.7	9.89	0.0053
120.0	37.50	32.50	47.5	47.5	10.14	0.0038
250.0	35.00	30.00	43.9	43.9	10.55	0.0027
1440.0	31.50	26.50	38.8	38.8	11.12	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW0665BLI	3 - 3.25'	Sample # 375

ADVANCED TERRA TESTING -

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 203-05

CLIENT/OWNER EBASCO

LOCATION 375

BORING MW00665EBX SAMPLE ____ DEPTH 24.125

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

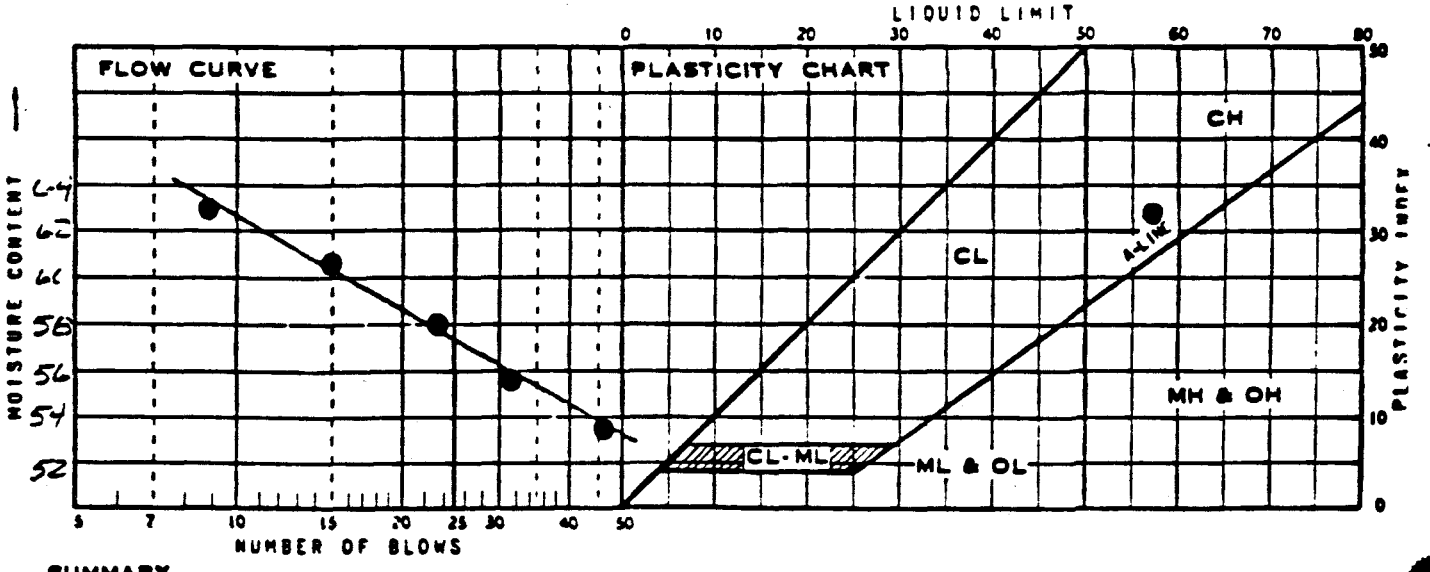
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ____/__/__

DETERMINATION	1	2	3	4	5	6
DISH	75 B	13 A	70 A			
WT OF DISH + WET SOIL g	10.18	10.13	6.86			
WT OF DISH + DRY SOIL g	8.37	8.37	5.78	—	—	—
WT OF MOISTURE g	1.81	1.76	1.08			
WT OF DISH g	1.30	1.31	1.32	—	—	—
WT OF DRY SOIL g	7.07	7.06	4.46			
MOISTURE CONTENT %	25.6	25.0	24.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	35 A	4 A	79 B	91	129	
NUMBER OF BLOWS	46	31±	23±	15	8	
WT OF DISH + WET SOIL g	16.36	18.40	17.79	17.41	16.04	
WT OF DISH + DRY SOIL g	11.12	12.28	11.73	11.36	10.34	—
WT OF MOISTURE g	5.24	6.12	6.06	6.05	5.70	
WT OF DISH g	1.32	1.30	1.29	1.32	1.29	—
WT OF DRY SOIL g	9.80	10.98	10.44	10.04	9.05	
MOISTURE CONTENT %	53.5	55.7	58.0	60.3	63.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.3	25.[illegible]	[illegible]	[illegible]	

ADVANCED TERRA TESTING

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37591**
Sample Number:	**BH00664EBU1**
Sample Depth:	**3.25-3.50 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37591	SAMPLED	10-17-91 SC & BP
DEPTH	3.25 - 3.50 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00664EBU1	TEST FINISHED	11-20-91
SOIL DESCR.	SS LINER	SETUP NO.	14S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	387.9	398.5
Wt. Wet Soil & Pan (g)	396.1	406.7
Wt. Dry Soil & Pan (g)	318.7	318.7
Wt. Lost Moisture (g)	77.4	88.0
Wt. of Pan Only (g)	8.2	8.2
Wt. of Dry Soil (g)	310.5	310.5
Moisture Content %	24.9	28.3
Wet Density PCF	120.3	128.0
Dry Density PCF	96.3	99.7

Init. Diameter (in)	2.391	(cm)	6.073
Init. Area (sq in)	4.490	(sq cm)	28.970
Init. Height (in)	2.735	(cm)	6.947
Vol. Bef. Consol. (cu ft)	0.00711		
Vol. After Consol. (cu ft)	0.00686		
Effective Porosity %	45.27		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
70.0	4200	48.7	31.9	25.5	8.4E-06
60.0	3600	31.9	21.1	40.4	7.2E-06
60.0	3600	21.1	13.0	50.6	6.0E-06
120.0	7200	47.8	24.3	30.1	7.1E-06
120.0	7200	48.8	25.3	29.0	7.0E-06
122.0	7320	48.5	25.3	29.2	6.9E-06
120.0	7200	48.6	26.2	28.6	6.7E-06
187.0	11220	48.7	16.9	33.6	6.4E-06
180.0	10800	48.4	18.4	33.0	6.2E-06
184.0	11040	48.7	18.6	32.7	6.1E-06
186.0	11160	48.5	19.0	32.6	5.9E-06
185.0	11100	48.1	18.8	32.9	5.9E-06
186.0	11160	48.4	18.9	32.7	5.9E-06
186.0	11160	48.3	18.9	32.7	5.9E-06

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37591
DEPTH	3.25 - 3.50 FT
SAMPLE NO.	BH00664EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-17-91 SC & BP
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-20-91
SETUP NO.	14S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	387.890
Wt Soil & Moist at	398.510
Wt. Dry Soil & Pan	318.700
Wt. of Pan Only (g)	8.190
Consol Info:	
Init. Diameter in.	2.391
Initial Height in.	2.735
Vol. change (sat. con.) CC	13.900
Cell Exp.	7.000
Height Change in.	0.039
Test info:	
Pore pres @ begin. psi	59.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37591	SAMPLED	10-17-91 SC & BP
DEPTH	3.25 - 3.50 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00664EBU1	TEST FINISHED	11-20-91
SOIL DESCR.	SS LINER	SETUP NO.	14S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	7.7				
50.0	48.0	7.9	8.6	37.9	46.4	8.5	0.85
60.0	58.0	9.1	9.8	48.2	57.4	9.2	0.92
70.0		10.3	10.3	58.3	67.9	9.6	0.96

CONSOLIDATION DATA

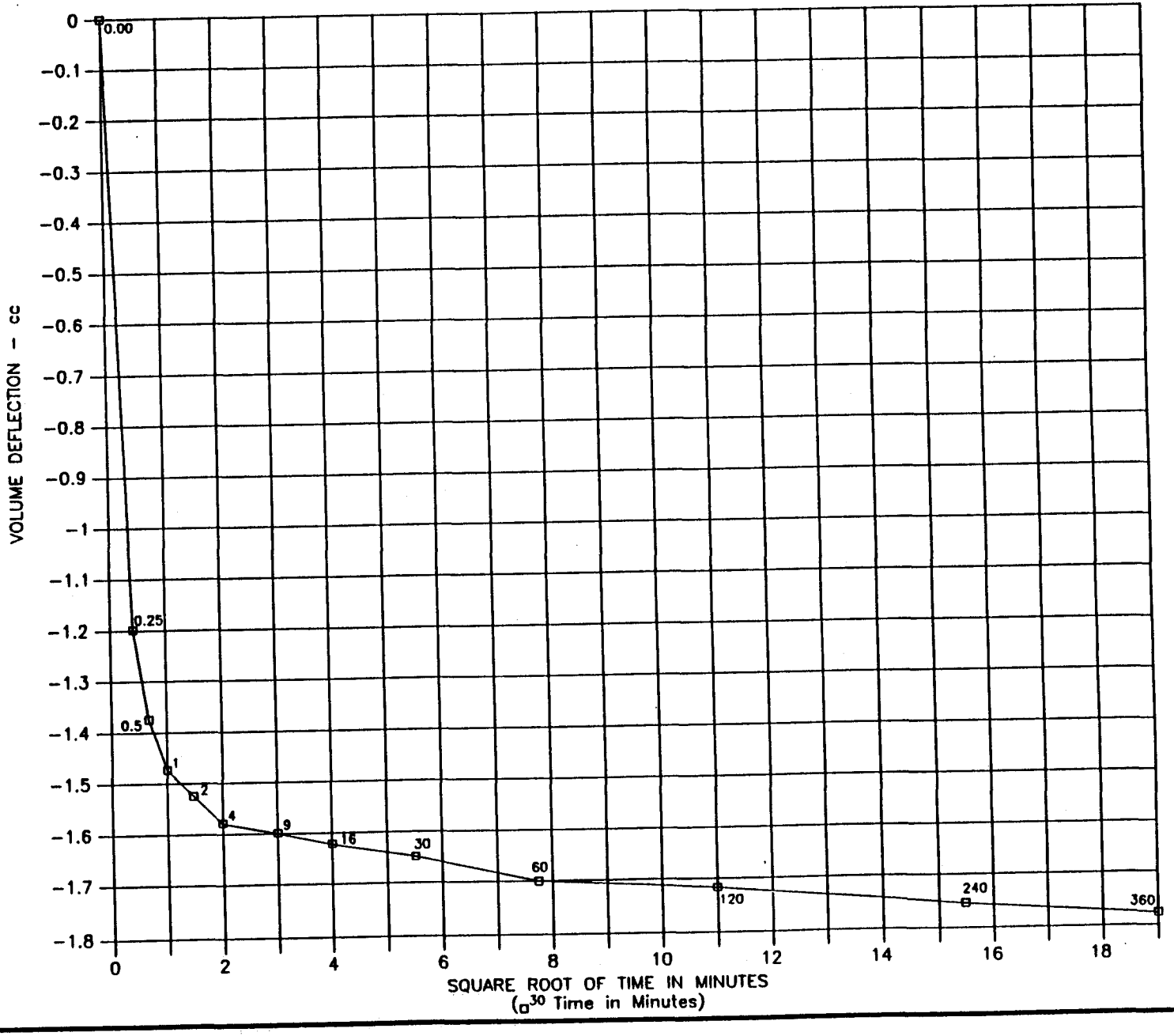
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	10.30	0.00
0.25	0.50	11.50	-1.20
0.5	0.71	11.68	-1.38
1	1.00	11.78	-1.47
2	1.41	11.83	-1.52
4	2.00	11.88	-1.57
9	3.00	11.90	-1.60
16	4.00	11.93	-1.63
30	5.48	11.95	-1.65
60	7.75	12.00	-1.70
120	10.95	12.02	-1.72
240	15.49	12.05	-1.75
360	18.97	12.08	-1.77

Initial Height (in)	2.735	Init. Vol. (CC)	201.27
Height Change (in)	0.039	Vol. Change (CC)	13.90
Ht. After Cons. (in)	2.696	Cell Exp. (CC)	7.00
Initial Area (sq in)	4.490	Net Change (CC)	6.90
Area After Cons. (sq in)	4.399	Cons. Vol. (CC)	194.37

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00664EBU1 @ 3.25-3.50', 1152 psf (confining pressure)



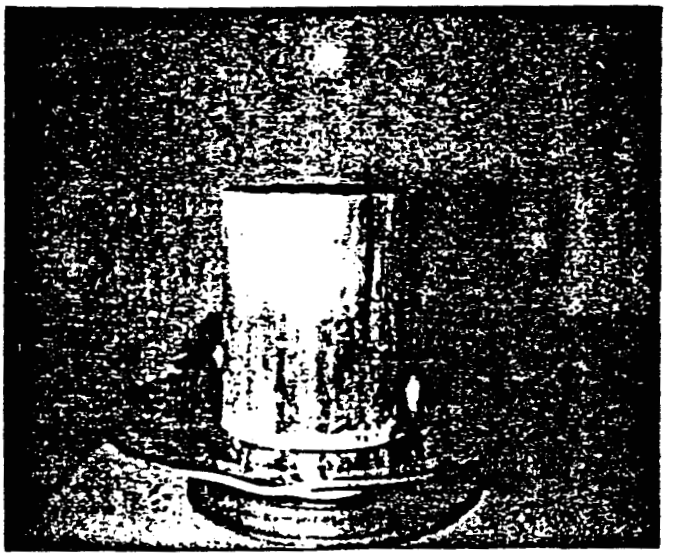
TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37591	SAMPLED	10-17-91 SC & BP
DEPTH	3.25 - 3.50 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00664EBU1	TEST FINISHED	11-20-91
SOIL DESCR.	SS LINER	SETUP NO.	14S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No
Init. Ht. (in)	2.735	Init. Area (sq in)	4.490
Consol. Ht. (in)	2.696	Consol. Area (sq in)	4.399
Back Pres. PSI	59.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.399	0	59.00	0.0	1152	0	0.00
125.0	4092	0.01	0.37	4.415	4161	49.50	-1368.0	2520	6681	2.65
165.0	5401	0.02	0.74	4.432	5473	50.00	-1296.0	2448	7921	3.24
187.0	6122	0.03	1.11	4.448	6179	51.00	-1152.0	2304	8483	3.68
193.0	6318	0.04	1.48	4.465	6353	54.50	-648.0	1800	8153	4.53
190.0	6220	0.05	1.85	4.482	6231	56.80	-316.8	1469	7700	5.24
185.0	6056	0.06	2.23	4.499	6044	57.00	-288.0	1440	7484	5.20
180.0	5892	0.07	2.60	4.516	5858	57.40	-230.4	1382	7241	5.24
176.0	5762	0.08	2.97	4.533	5706	57.60	-201.6	1354	7060	5.22
172.0	5631	0.09	3.34	4.551	5555	57.70	-187.2	1339	6895	5.15
167.0	5467	0.10	3.71	4.568	5373	57.80	-172.8	1325	6698	5.06
151.0	4943	0.15	5.56	4.658	4765	57.80	-172.8	1325	6090	4.60
140.0	4583	0.20	7.42	4.751	4331	57.80	-172.8	1325	5656	4.27
139.0	4550	0.25	9.27	4.848	4214	57.80	-172.8	1325	5539	4.18
150.0	4910	0.30	11.13	4.950	4454	57.80	-172.8	1325	5779	4.36
157.5	5156	0.35	12.98	5.055	4580	58.00	-144.0	1296	5876	4.53
164.5	5385	0.40	14.84	5.165	4681	58.40	-86.4	1238	5920	4.78
175.0	5729	0.45	16.69	5.280	4872	58.70	-43.2	1195	6067	5.08
149.0	4878	0.50	18.55	5.400	4055	59.20	28.8	1123	5179	
140.0	4583	0.55	20.40	5.526	3724	59.50	72.0	1080	4804	
140.0	4583	0.60	22.26	5.658	3637	59.70	100.8	1051	4688	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37591

BH00664EBUI

3.25–3.50 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37591**
Sample Number:	**BH00670EBU1**
Sample Depth:	**7.45-7.70 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37591	SAMPLED	10-18-91 SC&BP
DEPTH	7.45 - 7.70 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00670EBU1	TEST FINISHED	11-19-91
SOIL DESCR.	SS LINER	SETUP NO.	2P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	327.8	339.3
Wt. Wet Soil & Pan (g)	337.3	348.7
Wt. Dry Soil & Pan (g)	300.6	300.6
Wt. Lost Moisture (g)	36.6	48.1
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	291.2	291.2
Moisture Content %	12.6	16.5
Wet Density PCF	128.3	139.1
Dry Density PCF	114.0	119.4

Init. Diameter (in)	2.387	(cm)	6.063
Init. Area (sq in)	4.475	(sq cm)	28.873
Init. Height (in)	2.175	(cm)	5.525
Vol. Bef. Consol. (cu ft)	0.00563		
Vol. After Consol. (cu ft)	0.00538		
Effective Porosity %	31.54		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
60.0	3600	48.9	22.4	17.9	1.2E-05
63.0	3780	49.4	22.3	17.7	1.1E-05
60.0	3600	49.8	23.7	16.9	1.1E-05
60.0	3600	49.6	23.0	17.3	1.2E-05
60.0	3600	49.3	22.0	17.9	1.2E-05
61.0	3660	49.3	20.1	18.8	1.3E-05
64.0	3840	49.4	18.5	19.5	1.3E-05
60.0	3600	49.5	17.9	19.7	1.4E-05
71.0	4260	49.5	16.3	20.4	1.3E-05
61.0	3660	49.7	20.9	18.2	1.3E-05
87.0	5220	49.5	10.2	23.2	1.3E-05

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37591
DEPTH	7.45 - 7.70 FT
SAMPLE NO.	BH00670EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-18-91 SC&BP
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-19-91
SETUP NO.	2P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152.00
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	327.830
Wt Soil & Moist at	339.270
Wt. Dry Soil & Pan	300.640
Wt. of Pan Only (g)	9.420
Consol Info:	
Init. Diameter in.	2.387
Initial Height in.	2.175
Vol. change (sat. con.) CC	22.000
Cell Exp.	14.800
Height Change in.	0.027
Test info:	
Pore pres @ begin. psi	79.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37591	SAMPLED	10-18-91 SC&BP
DEPTH	7.45 - 7.70 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00670EBU1	TEST FINISHED	11-19-91
SOIL DESCR.	SS LINER	SETUP NO.	2P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	13.3				
50.0	48.0	13.2	14.4	38.4	47.0	8.6	0.86
60.0	58.0	14.8	16.0	48.4	57.7	9.3	0.93
70.0	68.0	16.3	17.6	58.5	68.2	9.7	0.97
80.0	78.0						

CONSOLIDATION DATA

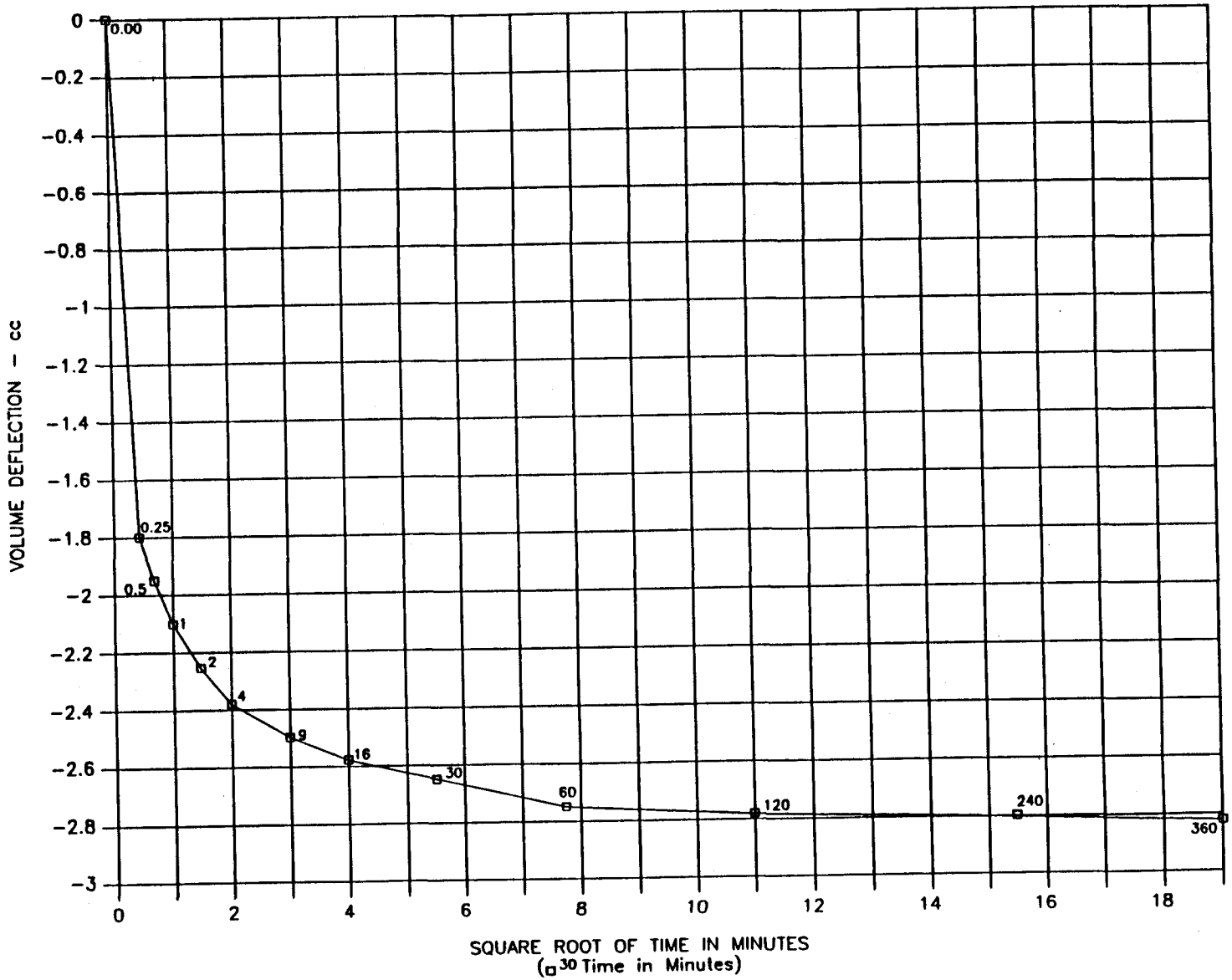
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	19.10	0.00
0.25	0.50	20.90	-1.80
0.5	0.71	21.05	-1.95
1	1.00	21.20	-2.10
2	1.41	21.35	-2.25
4	2.00	21.48	-2.38
9	3.00	21.60	-2.50
16	4.00	21.68	-2.57
30	5.48	21.75	-2.65
60	7.75	21.85	-2.75
120	10.95	21.88	-2.77
240	15.49	21.90	-2.80
360	18.97	21.93	-2.82

Initial Height (in)	2.175	Init. Vol. (CC)	159.53
Height Change (in)	0.027	Vol. Change (CC)	22.00
Ht. After Cons. (in)	2.148	Cell Exp. (CC)	14.80
Initial Area (sq in)	4.475	Net Change (CC)	7.20
Area After Cons. (sq in)	4.327	Cons. Vol. (CC)	152.33

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00670EBU1 @ 7.45-7.70', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

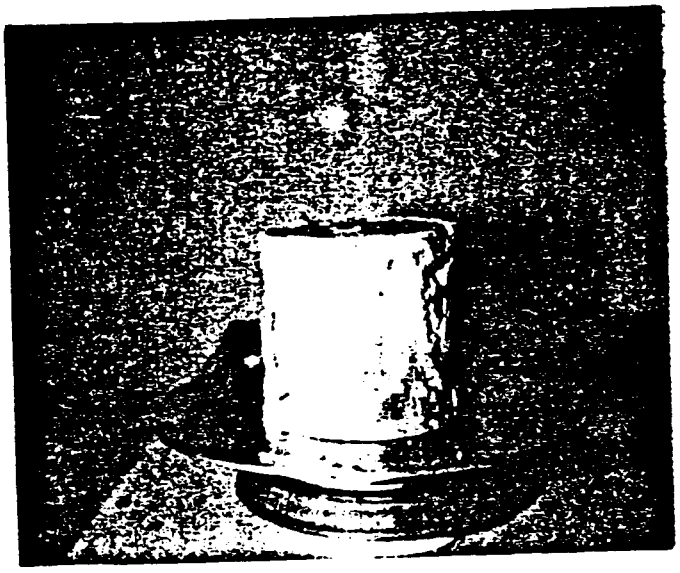
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37591	SAMPLED	10-18-91 SC&BP
DEPTH	7.45 - 7.70 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00670EBU1	TEST FINISHED	11-19-91
SOIL DESCR.	SS LINER	SETUP NO.	2P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.175	Init. Area (sq in)	4.475
Consol. Ht. (in)	2.148	Consol. Area (sq in)	4.327
Back Pres. PSI	79.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.327	0	79.00	0.0	1152	0	0.00
125.0	4160	0.01	0.47	4.347	4283	49.50	-4248.0	5400	9683	1.79
165.0	5491	0.02	0.93	4.367	5627	50.00	-4176.0	5328	10955	2.06
187.0	6224	0.03	1.40	4.388	6347	51.00	-4032.0	5184	11531	2.22
193.0	6423	0.04	1.86	4.409	6520	54.50	-3528.0	4680	11200	2.39
190.0	6323	0.05	2.33	4.430	6388	56.80	-3196.8	4349	10737	2.47
185.0	6157	0.06	2.79	4.451	6190	57.00	-3168.0	4320	10510	2.43
180.0	5991	0.07	3.26	4.473	5994	57.40	-3110.4	4262	10256	2.41
176.0	5858	0.08	3.72	4.494	5833	57.60	-3081.6	4234	10066	2.38
172.0	5724	0.09	4.19	4.516	5672	57.70	-3067.2	4219	9892	2.34
167.0	5558	0.10	4.66	4.538	5481	57.80	-3052.8	4205	9686	2.30
151.0	5025	0.15	6.98	4.652	4835	57.80	-3052.8	4205	9040	2.15
140.0	4659	0.20	9.31	4.771	4370	57.80	-3052.8	4205	8575	2.04
139.0	4626	0.25	11.64	4.897	4228	57.80	-3052.8	4205	8433	2.01
150.0	4992	0.30	13.97	5.029	4442	57.80	-3052.8	4205	8647	2.06
157.5	5242	0.35	16.29	5.169	4538	58.00	-3024.0	4176	8714	2.09
164.5	5475	0.40	18.62	5.317	4608	58.40	-2966.4	4118	8726	2.12
175.0	5824	0.45	20.95	5.473	4762	58.70	-2923.2	4075	8837	2.17
149.0	4959	0.50	23.28	5.639	3935	59.20	-2851.2	4003	7938	
140.0	4659	0.55	25.61	5.816	3585	59.50	-2808.0	3960	7545	
140.0	4659	0.60	27.93	6.004	3473	59.70	-2779.2	3931	7404	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37591

MW00670EBUI

7.45-7.70 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37591**
Sample Number:	**BH00671EBU1**
Sample Depth:	**7.45-7.70 feet (Alluvium)**

Data Available:

- ✓ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✓ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37591	SAMPLED	–
DEPTH	6.95 - 7.45 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00671EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	27.14
Wt. Dry Soil & Pan (g)	26.78
Wt. Lost Moisture (g)	0.36
Wt. of Pan Only (g)	3.75
Wt. of Dry Soil (g)	23.03
Moisture Content %	1.6

Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	59.08

WASH SIEVE ANALYSIS

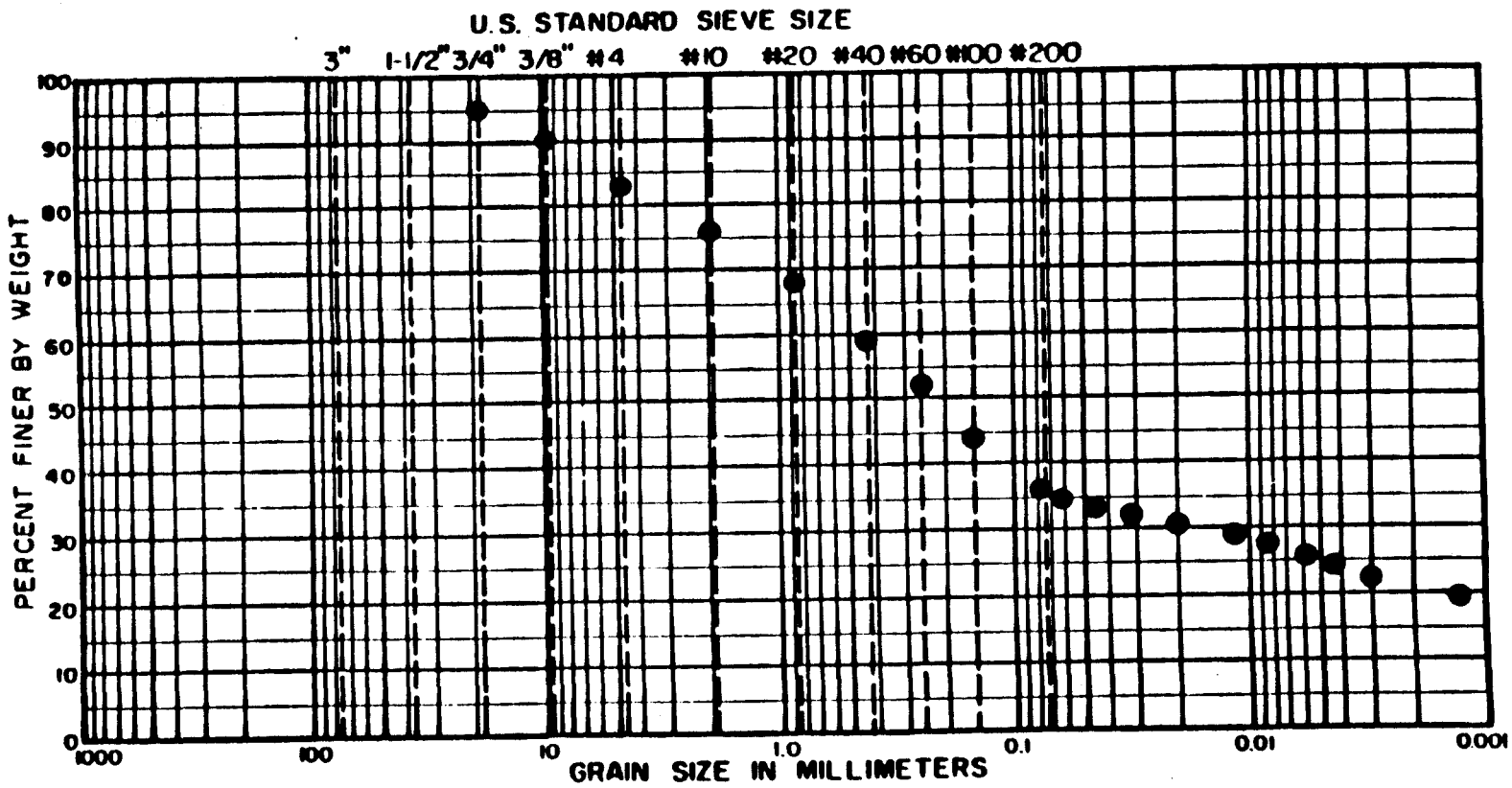
Wt. Total Sample Wet (g)	399.20
Weight of + #10 Before Washing (g)	99.60
Weight of + #10 After Washing (g)	93.19
Weight of - #10 Wet (g)	299.54
Weight of - #10 Dry (g)	301.24
Wt. Total Sample Dry (g)	394.43
Calc. Wt. "W" (g)	77.36
Calc. Mass + #10	18.28

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	21.15	21.15	21.15	5.4	94.6
3/8"	0.00	19.09	19.09	40.24	10.2	89.8
#4	0.00	25.13	25.13	65.37	16.6	83.4
#10	0.00	27.82	27.82	93.19	23.6	76.4
#20	1.31	7.98	6.67	6.67	32.2	67.8
#40	1.31	7.79	6.48	13.15	40.6	59.4
#60	1.32	7.27	5.95	19.10	48.3	51.7
#100	1.31	7.13	5.82	24.92	55.8	44.2
#200	1.31	7.44	6.13	31.05	63.8	36.2

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37591
DEPTH	6.95 - 7.45 FT
SAMPLE NO.	BH00671EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	--
DATE TESTED	11-08-91 SR
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	27.140
Wt. Dry Soil & Pan (g)	26.780
Wt. of Pan Only (g)	3.750
Sieve:	
Wt. Total Sample Wet (g)	399.20
Weight of + #10 Before Washing (g)	99.60
Weight of + #10 After Washing (g)	93.19
Weight of - #10 Wet (g)	299.54

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.006
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW00671EBUI	6.95 - 7.45'	37591 AL MW KLM 04/09/92

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37591	SAMPLED	--
DEPTH	6.95 - 7.45 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00671EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	77.360
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	32.00	27.00	34.9	34.9	11.04	0.0619
1.0	31.25	26.25	33.9	33.9	11.17	0.0440
2.0	30.75	25.75	33.3	33.3	11.25	0.0312
5.0	29.00	24.00	31.0	31.0	11.53	0.0200
15.0	27.75	22.75	29.4	29.4	11.74	0.0117
30.0	26.75	21.75	28.1	28.1	11.90	0.0083
60.0	25.00	20.00	25.9	25.9	12.19	0.0059
120.0	24.75	19.75	25.5	25.5	12.23	0.0042
250.0	22.00	17.00	22.0	22.0	12.68	0.0030
1440.0	20.00	15.00	19.4	19.4	13.01	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-05

CLIENT/OWNER EMASCO

LOCATION 37591 ALMN

MW006918801

BORING ____ SAMPLE ____ DEPTH 6.75-7

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

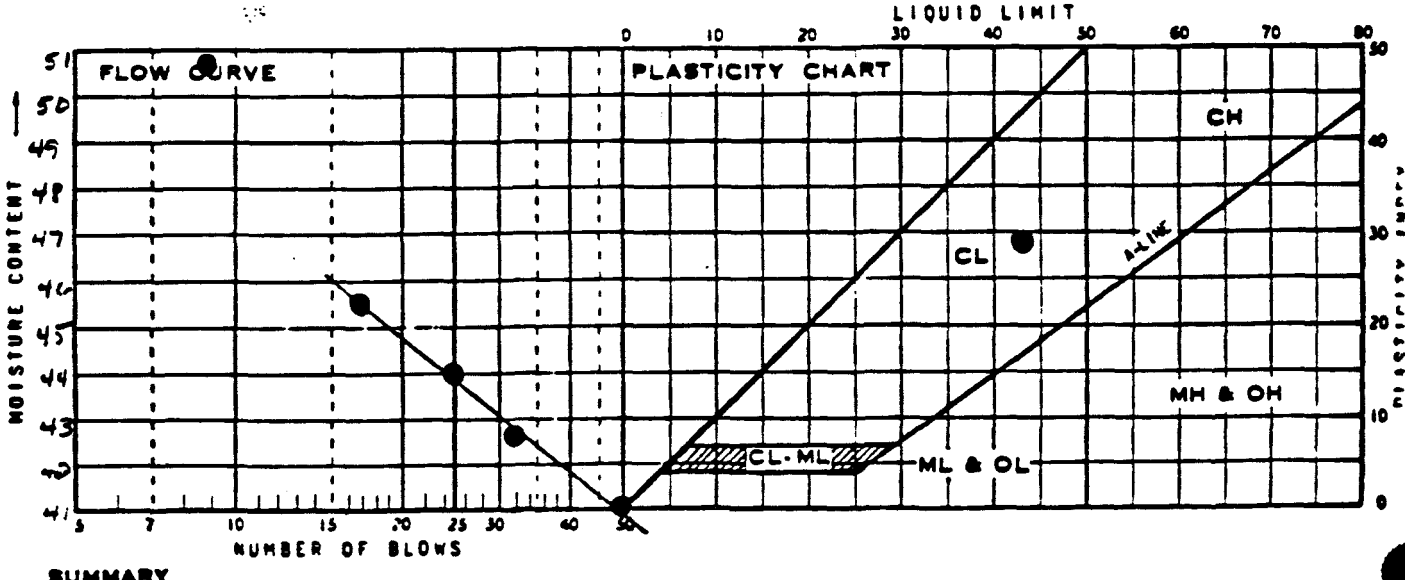
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 11/18/91

DETERMINATION	1	2	3	4	5	6
DISH	15C	49C	45C			
WT OF DISH + WET SOIL g	6.87	6.62	6.82			
WT OF DISH + DRY SOIL g	6.10	5.87	6.06	—	—	—
WT OF MOISTURE g	.77	.75	.76			
WT OF DISH g	1.06	1.06	1.06	—	—	—
WT OF DRY SOIL g	5.04	4.81	5.00			
MOISTURE CONTENT %	15.3	15.6	15.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	11	66C	37C	56C	2	
NUMBER OF BLOWS	50	32	25	17	9	
WT OF DISH + WET SOIL g	13.88	16.24	16.35	14.21	13.09	
WT OF DISH + DRY SOIL g	10.15	11.70	11.68	10.10	9.04	—
WT OF MOISTURE g	3.73	4.54	4.67	4.11	4.05	
WT OF DISH g	1.05	1.04	1.07	1.07	1.05	—
WT OF DRY SOIL g	9.10	10.66	10.61	9.03	7.99	
MOISTURE CONTENT %	41.0	42.6	44.0	45.5	50.7	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		43.8	15.4	28.4	CL	

ADVANCED TERRA TESTING

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37691**
Sample Number:	**BH00592EBU1**
Sample Depth:	**7.40-7.55 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37691	SAMPLED	10-17-91
DEPTH	7.40 - 7.55 FT	DATE TESTED	11-08-91 TNU
SAMPLE NO.	BH00592EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	31.36
Wt. Dry Soil & Pan (g)	31.03
Wt. Lost Moisture (g)	0.33
Wt. of Pan Only (g)	3.60
Wt. of Dry Soil (g)	27.43
Moisture Content %	1.2
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.29

WASH SIEVE ANALYSIS

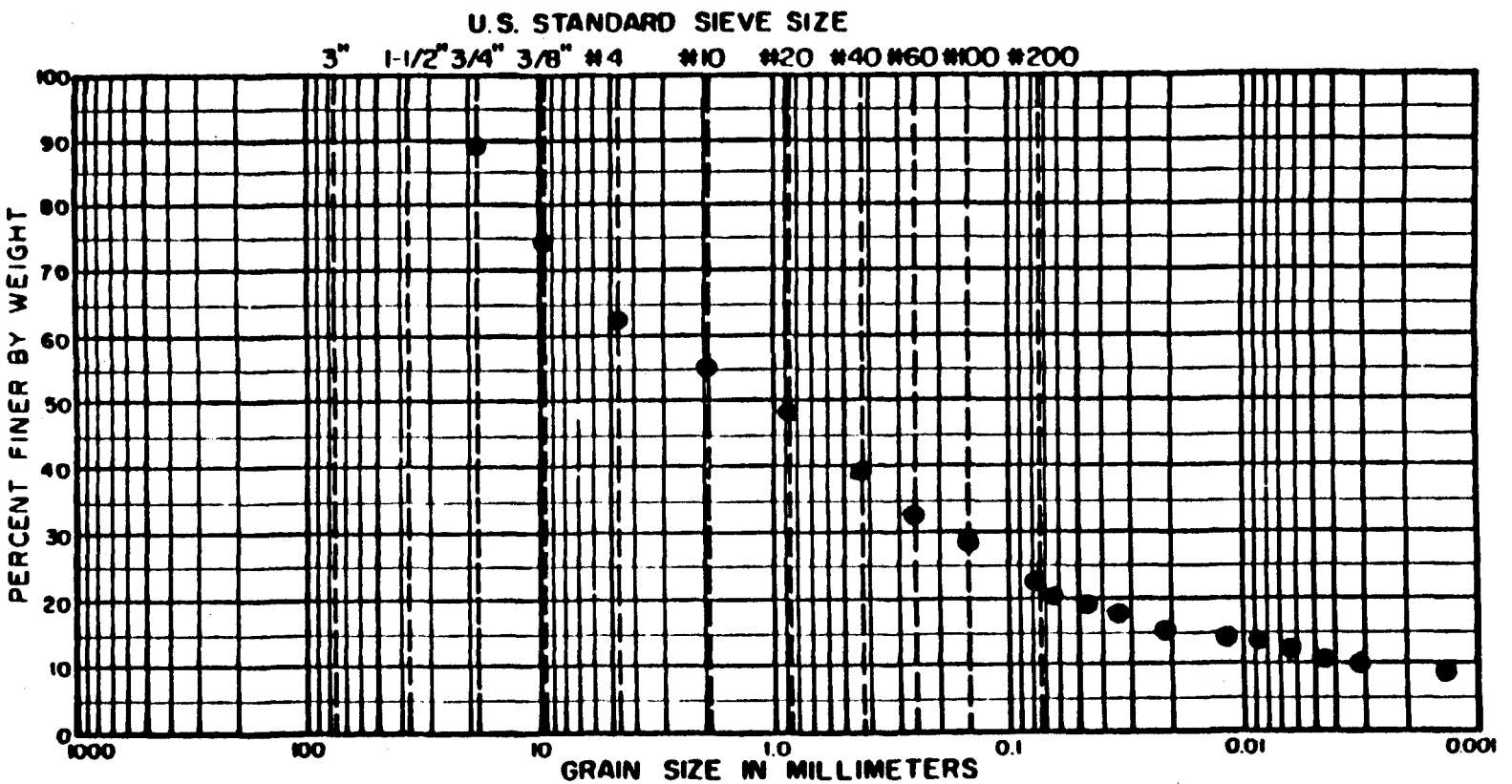
Wt. Total Sample Wet (g)	616.28
Weight of + #10 Before Washing (g)	300.35
Weight of + #10 After Washing (g)	276.44
Weight of - #10 Wet (g)	315.93
Weight of - #10 Dry (g)	335.80
Wt. Total Sample Dry (g)	612.24
Calc. Wt. "W" (g)	108.10
Calc. Mass + #10	48.81

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	66.40	66.40	66.40	10.8	89.2
3/8"	0.00	93.24	93.24	159.64	26.1	73.9
#4	0.00	70.33	70.33	229.97	37.6	62.4
#10	0.00	46.47	46.47	276.44	45.2	54.8
#20	1.32	9.23	7.91	7.91	52.5	47.5
#40	1.33	10.36	9.03	16.94	60.8	39.2
#60	1.30	8.16	6.86	23.80	67.2	32.8
#100	1.31	7.09	5.78	29.58	72.5	27.5
#200	1.32	7.66	6.34	35.92	78.4	21.6

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37691
DEPTH	7.40 - 7.55 FT
SAMPLE NO.	BH00592EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-17-91
DATE TESTED	11-08-91 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	31.360
Wt. Dry Soil & Pan (g)	31.030
Wt. of Pan Only (g)	3.600
Sieve:	
Wt. Total Sample Wet (g)	616.28
Weight of + #10 Before Washing (g)	300.35
Weight of + #10 After Washing (g)	276.44
Weight of - #10 Wet (g)	315.93

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.001
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW00591EBUI MW00592EBUI	7.4 - 7.56'	Sample # 576

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-17-91
DEPTH	7.40 - 7.55 FT	DATE TESTED	11-08-91 TNU
SAMPLE NO.	BH00592EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	108.095
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	26.25	21.25	19.7	19.7	11.99	0.0645
1.0	25.00	20.00	18.5	18.5	12.19	0.0460
2.0	24.25	19.25	17.8	17.8	12.31	0.0327
5.0	21.50	16.50	15.3	15.3	12.76	0.0210
15.0	20.50	15.50	14.3	14.3	12.93	0.0122
30.0	20.00	15.00	13.9	13.9	13.01	0.0087
60.0	18.25	13.25	12.3	12.3	13.30	0.0062
120.0	17.25	12.25	11.3	11.3	13.46	0.0044
250.0	16.25	11.25	10.4	10.4	13.63	0.0031
1440.0	15.25	10.25	9.5	9.5	13.79	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2631-05
CLIENT/OWNER BRASCO
LOCATION 376
BORING MW-2 SAMPLE MW-2 DEPTH 7.4-7.55'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

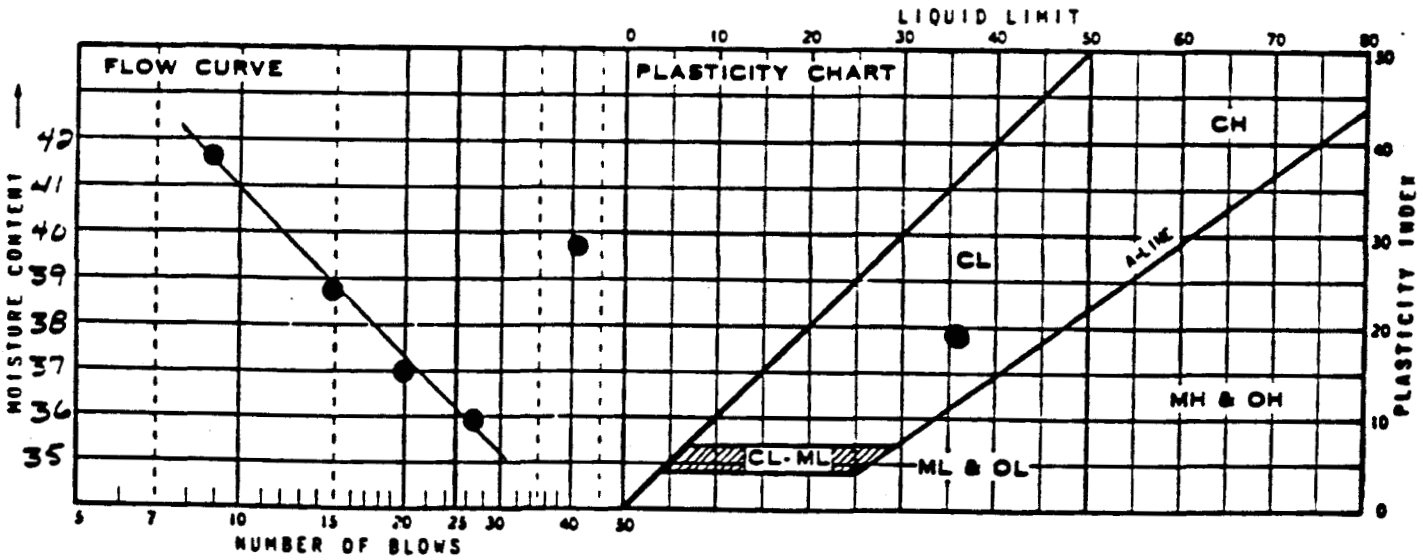
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY 11/12/91

DETERMINATION	1	2	3	4	5	6
DISH	19 C	59 C	64 C			
WT OF DISH + WET SOIL g	9.28	9.13	7.73			
WT OF DISH + DRY SOIL g	8.13	7.93	6.79	—	—	—
WT OF MOISTURE g	1.15	1.20	.94			
WT OF DISH g	1.04	1.06	1.08	—	—	—
WT OF DRY SOIL g	7.09	6.87	5.71			
MOISTURE CONTENT %	16.2	17.5	16.5			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	38 C	1D	2D	3D	4D	
NUMBER OF BLOWS	41	27	20	15	9	
WT OF DISH + WET SOIL g	16.36	14.61	15.71	19.22	16.25	
WT OF DISH + DRY SOIL g	12.01	11.03	11.74	14.14	11.78	—
WT OF MOISTURE g	4.35	3.58	3.97	5.08	4.47	
WT OF DISH g	1.04	1.05	1.02	1.05	1.03	—
WT OF DRY SOIL g	10.97	9.98	10.72	13.09	10.75	
MOISTURE CONTENT %	39.7	35.9	37.0	38.8	41.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		36.2	16.7	19.5	CL	

ADVANCED TERRA TESTING

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37691**
Sample Number:	**BH00596EBU1**
Sample Depth:	**13.50-13.80 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-19-91
DEPTH	13.50 - 13.80 FT	DATE TESTED	11-11-91
SAMPLE NO.	BH00596EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	35.00
Wt. Dry Soil & Pan (g)	34.38
Wt. Lost Moisture (g)	0.62
Wt. of Pan Only (g)	3.76
Wt. of Dry Soil (g)	30.62
Moisture Content %	2.0
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.81

WASH SIEVE ANALYSIS

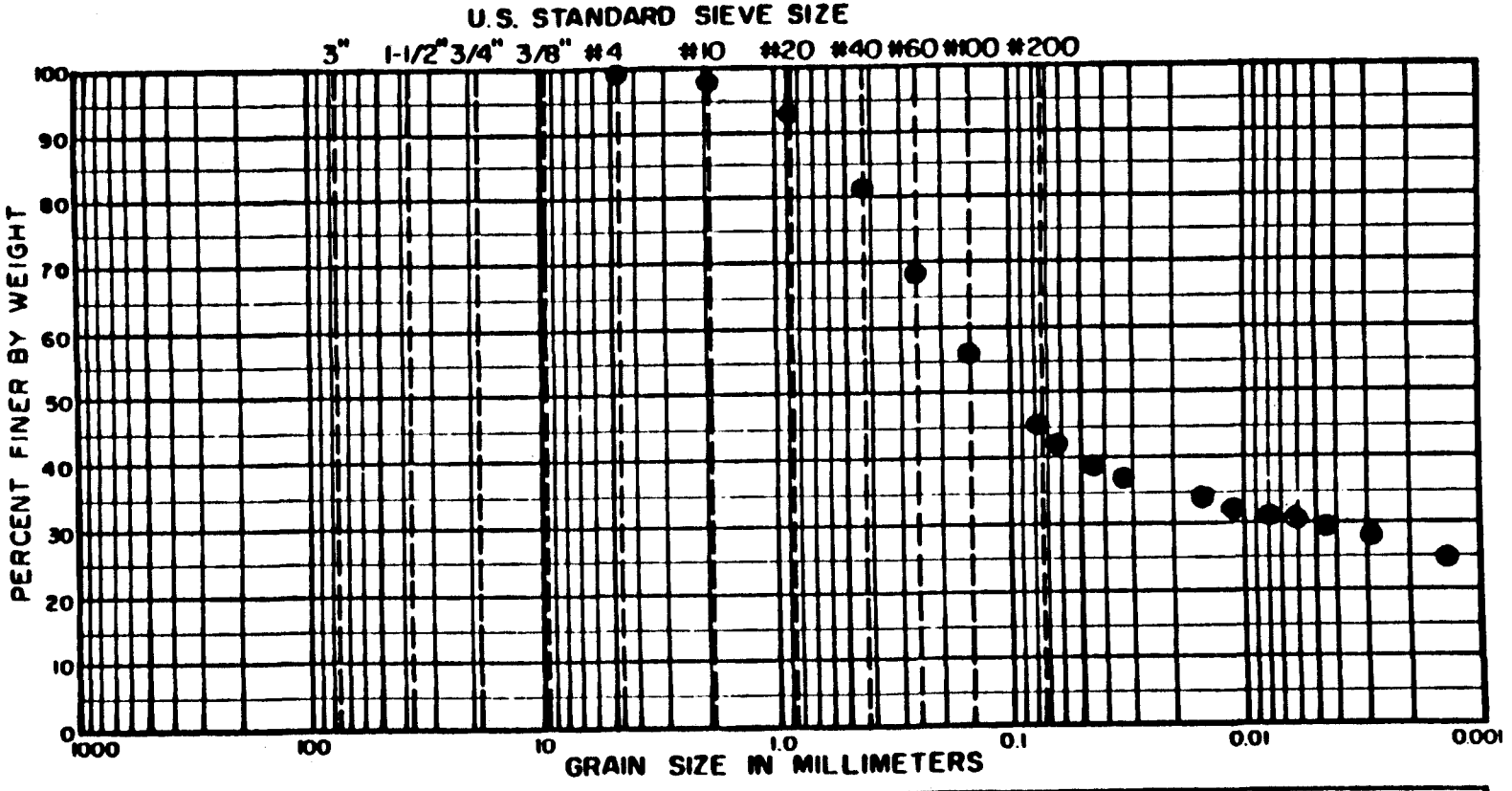
Wt. Total Sample Wet (g)	353.42
Weight of + #10 Before Washing (g)	10.22
Weight of + #10 After Washing (g)	6.83
Weight of - #10 Wet (g)	343.20
Weight of - #10 Dry (g)	339.71
Wt. Total Sample Dry (g)	346.54
Calc. Wt. "W" (g)	59.99
Calc. Mass + #10	1.18

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	3.11	3.11	3.11	0.9	99.1
#10	0.00	3.72	3.72	6.83	2.0	98.0
#20	1.32	4.26	2.94	2.94	6.9	93.1
#40	1.30	8.37	7.07	10.01	18.7	81.3
#60	1.31	9.10	7.79	17.80	31.6	68.4
#100	1.32	8.67	7.35	25.15	43.9	56.1
#200	1.31	8.17	6.86	32.01	55.3	44.7

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37691
DEPTH	13.50 - 13.80 FT
SAMPLE NO.	BH00596EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-19-91
DATE TESTED	11-11-91
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	35.000
Wt. Dry Soil & Pan (g)	34.380
Wt. of Pan Only (g)	3.760
Sieve:	
Wt. Total Sample Wet (g)	353.42
Weight of + #10 Before Washing (g)	10.22
Weight of + #10 After Washing (g)	6.83
Weight of - #10 Wet (g)	343.20

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW00596EB41	13.5 - 13.8'	Sample # 376

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-19-91
DEPTH	13.50 - 13.80 FT	DATE TESTED	11-11-91
SAMPLE NO.	BH00596EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	59.992
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	30.00	25.00	41.7	41.7	11.37	0.0628
1.0	28.00	23.00	38.3	38.3	11.70	0.0450
2.0	27.00	22.00	36.7	36.7	11.86	0.0321
8.0	25.50	20.50	34.2	34.2	12.11	0.0162
15.0	25.00	20.00	33.3	33.3	12.19	0.0119
34.0	24.00	19.00	31.7	31.7	12.35	0.0079
60.0	23.50	18.50	30.8	30.8	12.44	0.0060
120.0	22.75	17.75	29.6	29.6	12.56	0.0043
267.0	21.00	16.00	26.7	26.7	12.85	0.0029
1440.0	20.00	15.00	25.0	25.0	13.01	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 20[illegible]-05

CLIENT/OWNER EBASCO

LOCATION 376

BORING MW00546BW1 SAMPLE ____ DEPTH 35.38'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

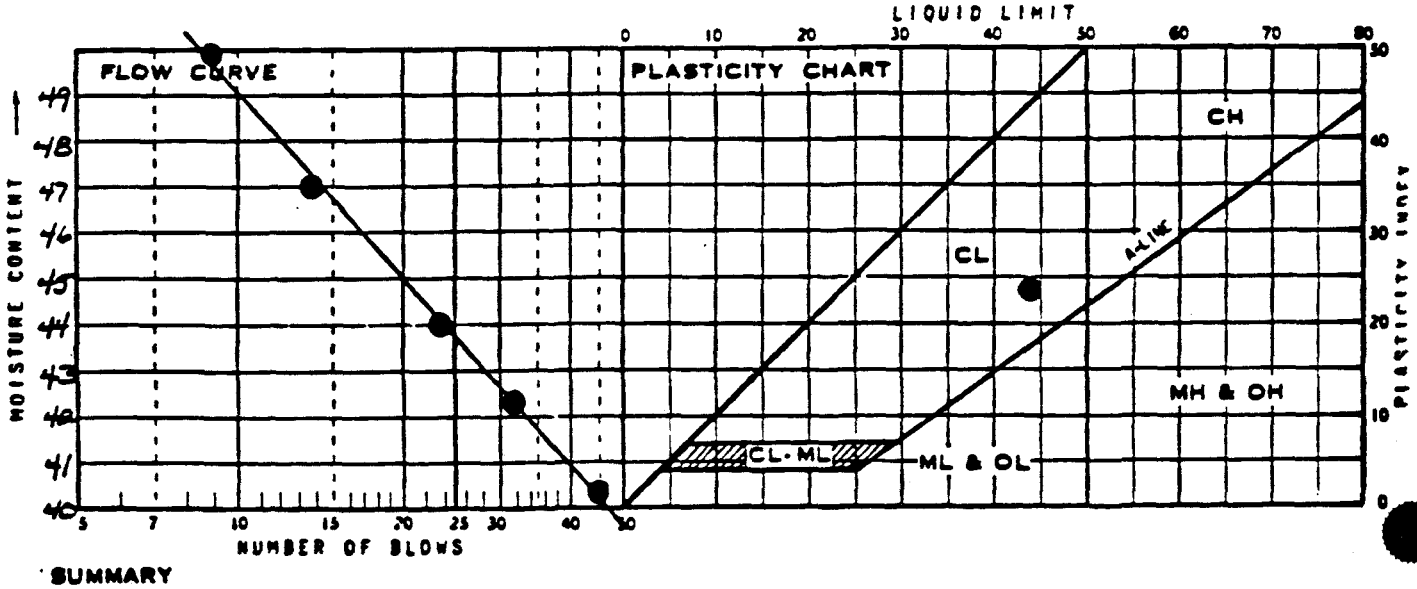
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ___/__/__

DETERMINATION	1	2	3	4	5	6
DISH	36A	134	77B			
WT OF DISH + WET SOIL g	7.15	7.57	8.29			
WT OF DISH + DRY SOIL g	6.22	6.55	7.14	—	—	—
WT OF MOISTURE g	.93	1.02	1.15			
WT OF DISH g	1.32	1.30	1.31	—	—	—
WT OF DRY SOIL g	4.90	5.25	5.83			
MOISTURE CONTENT %	19.0	19.4	19.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	89	123	112	23	62B	
NUMBER OF BLOWS	45	32[illegible]	24	14[illegible]	9	
WT OF DISH + WET SOIL g	20.70	17.74	17.53	19.84	21.27	
WT OF DISH + DRY SOIL g	15.12	12.86	12.58	13.91	14.63	—
WT OF MOISTURE g	5.58	4.88	4.95	5.93	6.64	
WT OF DISH g	1.29	1.31	1.32	1.31	1.32	—
WT OF DRY SOIL g	13.83	11.55	11.26	12.60	13.31	
MOISTURE CONTENT %	40.3	42.3	44.0	47.1	49.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		43B	1[illegible]	[illegible]	CL	

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37691**
Sample Number:	**BH00595EBU1**
Sample Depth:	**13.80-14.00 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-17-91 KM&AC
DEPTH	13.80 - 14.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00595EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	5P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	446.2	452.9
Wt. Wet Soil & Pan (g)	455.6	462.3
Wt. Dry Soil & Pan (g)	386.4	386.4
Wt. Lost Moisture (g)	69.3	75.9
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	377.0	377.0
Moisture Content %	18.4	20.1
Wet Density PCF	131.4	134.0
Dry Density PCF	111.0	111.6

Init. Diameter (in)	2.394	(cm)	6.081
Init. Area (sq in)	4.501	(sq cm)	29.042
Init. Height (in)	2.874	(cm)	7.300
Vol. Bef. Consol. (cu ft)	0.00749		
Vol. After Consol. (cu ft)	0.00745		
Effective Porosity %	35.97		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
935.0	56100	49.9	48.7	15.8	4.3E-08
1302.0	78120	48.7	47.2	17.3	4.0E-08
1442.0	86520	47.2	45.5	19.0	3.9E-08
1458.0	87480	45.5	44.0	20.7	3.6E-08
1420.0	85200	44.0	42.4	22.4	4.0E-08
1451.0	87060	42.4	41.0	24.0	3.5E-08
1569.0	94140	41.0	39.4	25.6	3.7E-08
1420.0	85200	39.4	38.0	27.3	3.7E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37691
DEPTH	13.80 - 14.00 FT
SAMPLE NO.	BH00595EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-17-91 KM&AC
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-25-91
SETUP NO.	5P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	446.220
Wt Soil & Moist at	452.850
Wt. Dry Soil & Pan	386.370
Wt. of Pan Only (g)	9.410
Consol Info:	
Init. Diameter in.	2.394
Initial Height in.	2.874
Vol. change (sat. con.) CC	11.850
Cell Exp.	10.800
Height Change in.	0.006
Test info:	
Pore pres @ begin. psi	79.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-17-91 KM&AC
DEPTH	13.80 - 14.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00595EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	5P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	6.6				
50.0	48.0	4.1	4.9	37.5	43.5	6.0	0.60
60.0	58.0	5.4	6.3	47.8	56.1	8.3	0.83
70.0	68.0	6.7	7.4	57.9	66.9	9.0	0.90
80.0	78.0	7.7	8.4	67.9	77.2	9.3	0.93
90.0		8.7	8.8	77.9	87.5	9.6	0.96

CONSOLIDATION DATA

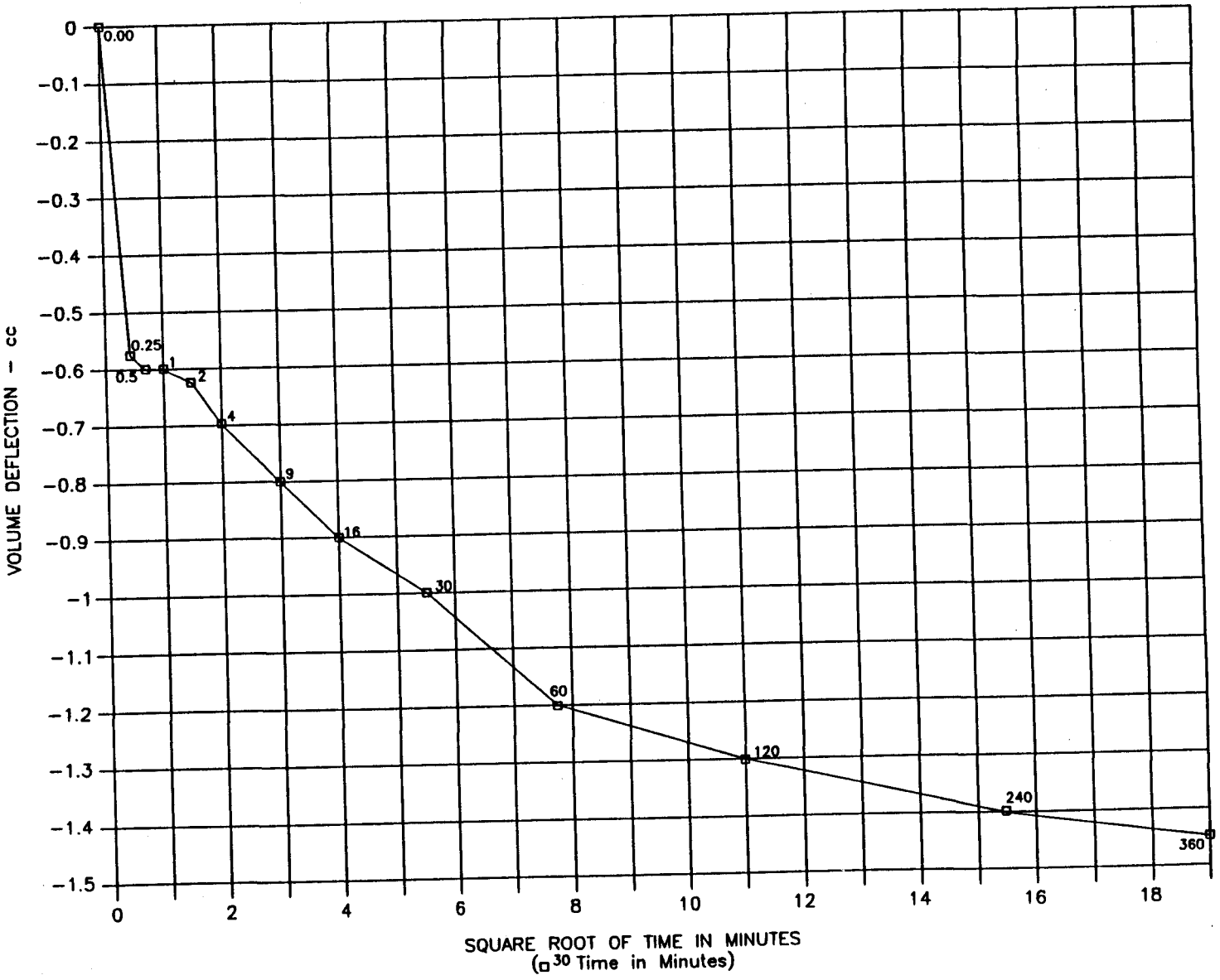
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	8.70	0.00
0.25	0.50	9.28	-0.58
0.5	0.71	9.30	-0.60
1	1.00	9.30	-0.60
2	1.41	9.33	-0.63
4	2.00	9.40	-0.70
9	3.00	9.50	-0.80
16	4.00	9.60	-0.90
30	5.48	9.70	-1.00
60	7.75	9.90	-1.20
120	10.95	10.00	-1.30
240	15.49	10.10	-1.40
360	18.97	10.15	-1.45

Initial Height (in)	2.874	Init. Vol. (CC)	212.03
Height Change (in)	0.006	Vol. Change (CC)	11.85
Ht. After Cons. (in)	2.868	Cell Exp. (CC)	10.80
Initial Area (sq in)	4.501	Net Change (CC)	1.05
Area After Cons. (sq in)	4.488	Cons. Vol. (CC)	210.98

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00595EBU1 @ 13.80–14.00', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

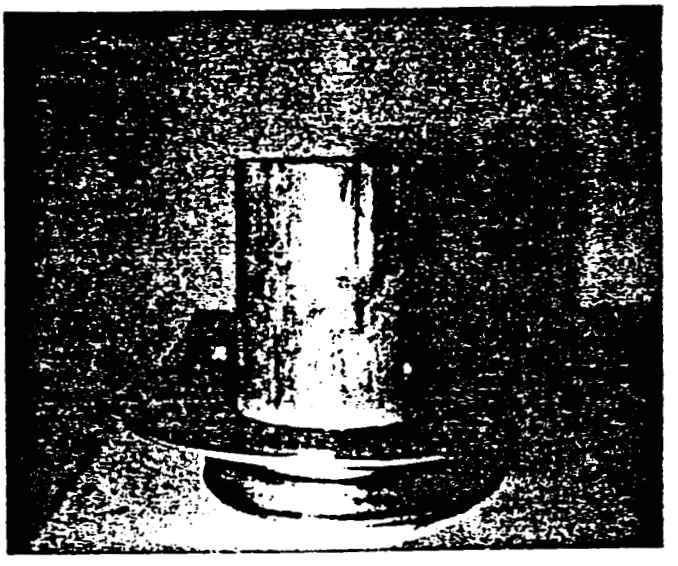
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37691	SAMPLED	10-17-91 KM&AC
DEPTH	13.80 - 14.00 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00595EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	5P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.874	Init. Area (sq in)	4.501
Consol. Ht. (in)	2.868	Consol. Area (sq in)	4.488
Back Pres. PSI	79.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.488	0	79.00	0.0	1152	0	0.00
125.0	4010	0.01	0.35	4.504	4008	49.50	-4248.0	5400	9408	1.74
165.0	5294	0.02	0.70	4.520	5272	50.00	-4176.0	5328	10600	1.99
187.0	5999	0.03	1.05	4.536	5954	51.00	-4032.0	5184	11138	2.15
193.0	6192	0.04	1.39	4.552	6123	54.50	-3528.0	4680	10803	2.31
190.0	6096	0.05	1.74	4.568	6007	56.80	-3196.8	4349	10356	2.38
185.0	5935	0.06	2.09	4.584	5828	57.00	-3168.0	4320	10148	2.35
180.0	5775	0.07	2.44	4.601	5650	57.40	-3110.4	4262	9913	2.33
176.0	5647	0.08	2.79	4.617	5505	57.60	-3081.6	4234	9738	2.30
172.0	5518	0.09	3.14	4.634	5360	57.70	-3067.2	4219	9580	2.27
167.0	5358	0.10	3.49	4.651	5186	57.80	-3052.8	4205	9391	2.23
151.0	4845	0.15	5.23	4.736	4604	57.80	-3052.8	4205	8809	2.10
140.0	4492	0.20	6.97	4.825	4190	57.80	-3052.8	4205	8395	2.00
139.0	4460	0.25	8.72	4.917	4083	57.80	-3052.8	4205	8287	1.97
150.0	4812	0.30	10.46	5.013	4321	57.80	-3052.8	4205	8526	2.03
157.5	5053	0.35	12.20	5.112	4449	58.00	-3024.0	4176	8625	2.07
164.5	5278	0.40	13.95	5.216	4555	58.40	-2966.4	4118	8673	2.11
175.0	5614	0.45	15.69	5.324	4747	58.70	-2923.2	4075	8822	2.16
149.0	4780	0.50	17.43	5.436	3958	59.20	-2851.2	4003	7962	
140.0	4492	0.55	19.18	5.553	3641	59.50	-2808.0	3960	7601	
140.0	4492	0.60	20.92	5.676	3562	59.70	-2779.2	3931	7493	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37691

MW00595EBUI

13.80–14.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00712EBU1**
Sample Depth:	**0.80-1.10 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	10-21-91 K.M.&A.P.
DEPTH	0.80 - 1.10 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00712EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	29.63
Wt. Dry Soil & Pan (g)	29.16
Wt. Lost Moisture (g)	0.47
Wt. of Pan Only (g)	3.71
Wt. of Dry Soil (g)	25.45
Moisture Content %	1.8

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.91

WASH SIEVE ANALYSIS

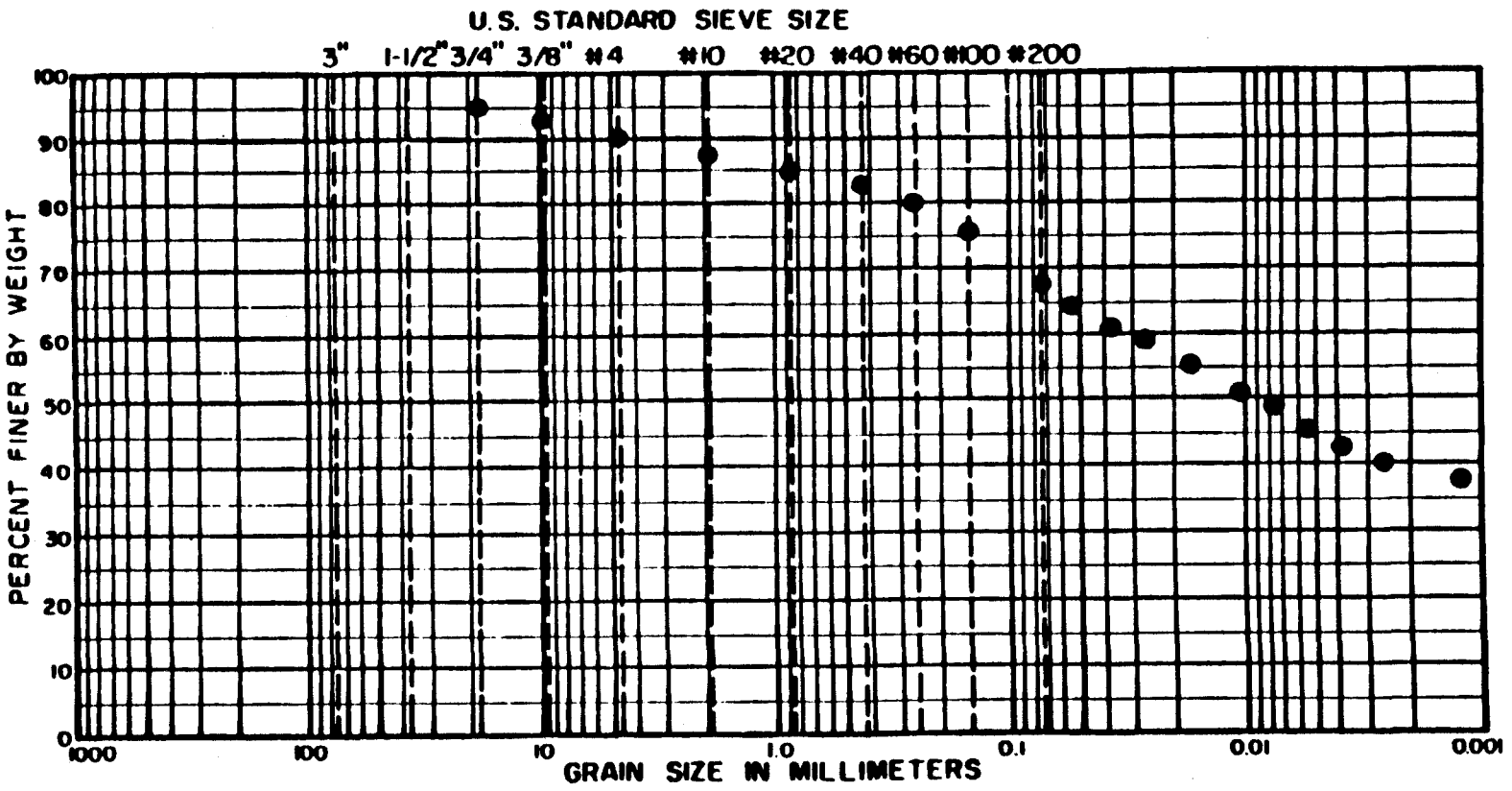
Wt. Total Sample Wet (g)	422.03
Weight of + #10 Before Washing (g)	61.12
Weight of + #10 After Washing (g)	51.97
Weight of - #10 Wet (g)	360.91
Weight of - #10 Dry (g)	363.35
Wt. Total Sample Dry (g)	415.32
Calc. Wt. "W" (g)	67.34
Calc. Mass + #10	8.43

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	19.49	19.49	19.49	4.7	95.3
3/8"	0.00	9.04	9.04	28.53	6.9	93.1
#4	0.00	11.68	11.68	40.21	9.7	90.3
#10	0.00	11.76	11.76	51.97	12.5	87.5
#20	1.34	2.78	1.44	1.44	14.7	85.3
#40	1.30	2.99	1.69	3.13	17.2	82.8
#60	1.31	3.23	1.92	5.05	20.0	80.0
#100	1.32	4.37	3.05	8.10	24.5	75.5
#200	1.33	6.49	5.16	13.26	32.2	67.8

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	0.80 - 1.10 FT
SAMPLE NO.	BH00712EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-21-91 K.M.&A.P.
DATE TESTED	11-08-91 SR
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	29.630
Wt. Dry Soil & Pan (g)	29.160
Wt. of Pan Only (g)	3.710
Sieve:	
Wt. Total Sample Wet (g)	422.03
Weight of + #10 Before Washing (g)	61.12
Weight of + #10 After Washing (g)	51.97
Weight of - #10 Wet (g)	360.91

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW00712EBUI	.8 - 1.1'	sample # 378

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	10-21-91 K.M.&A.P.
DEPTH	0.80 - 1.10 FT	DATE TESTED	11-08-91 SR
SAMPLE NO.	BH00712EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	67.338
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.00	43.00	63.9	63.9	8.42	0.0540
1.0	46.00	41.00	60.9	60.9	8.75	0.0389
2.0	45.25	40.25	59.8	59.8	8.87	0.0277
5.0	41.75	36.75	54.6	54.6	9.44	0.0181
15.0	39.50	34.50	51.2	51.2	9.81	0.0107
30.0	38.00	33.00	49.0	49.0	10.06	0.0076
60.0	36.25	31.25	46.4	46.4	10.35	0.0055
120.0	34.00	29.00	43.1	43.1	10.71	0.0039
250.0	32.00	27.00	40.1	40.1	11.04	0.0028
1440.0	30.25	25.25	37.5	37.5	11.33	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER [illegible]

LOCATION 378

BORING ____ SAMPLE ____

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

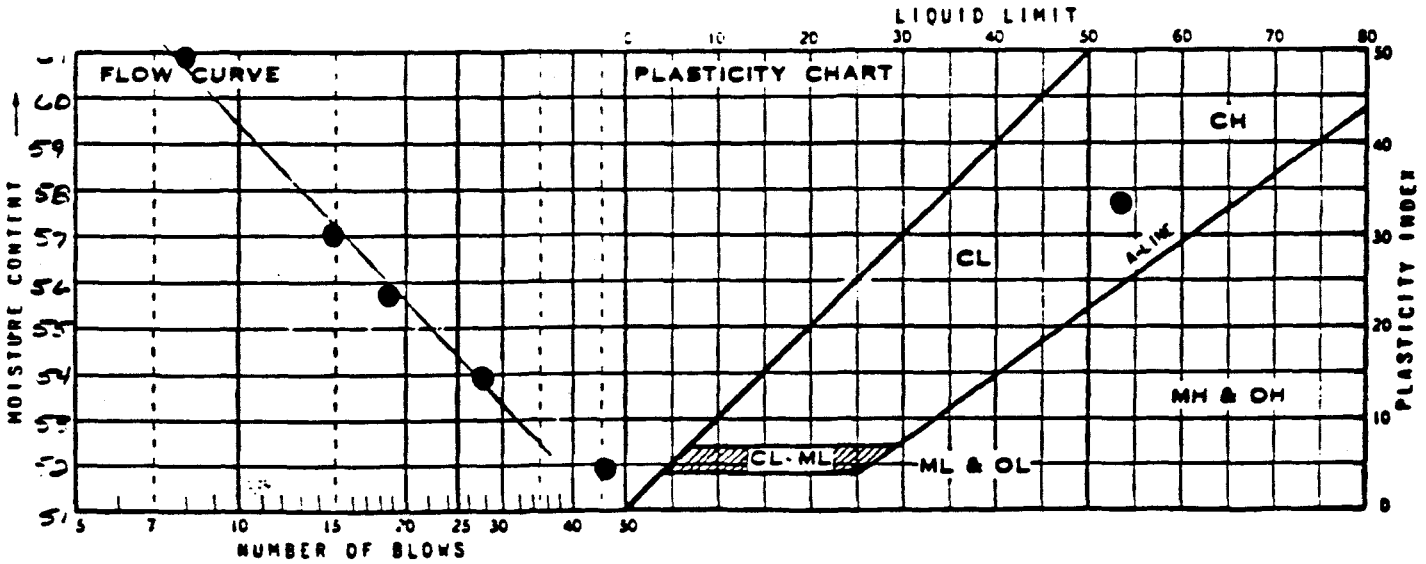
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible]

DETERMINATION	1	2	3	4	5	6
DISH	25C	22C	14			
WT OF DISH + WET SOIL g	7.90	7.36	8.99			
WT OF DISH + DRY SOIL g	6.76	6.28	7.63	—	—	—
WT OF MOISTURE g	1.14	1.08	1.36			
WT OF DISH g	1.08	1.06	1.05	—	—	—
WT OF DRY SOIL g	5.68	5.22	6.58			
MOISTURE CONTENT %	20.1	20.7	20.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	16C	17C	53C	10C	67C	
NUMBER OF BLOWS	46	28	19	15	8	
WT OF DISH + WET SOIL g	15.72	17.62	15.33	18.79	19.44	
WT OF DISH + DRY SOIL g	10.71	[illegible]	10.22	12.34	12.48	—
WT OF MOISTURE g	5.01	5.20	5.11	6.45	6.96	
WT OF DISH g	1.06	1.06	1.05	1.05	1.05	—
WT OF DRY SOIL g	9.65	10.76	9.17	11.29	11.43	
MOISTURE CONTENT %	51.9	53.9	55.7	57.1	66.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		54	20.5	33.9	CH

ADVANCED TERRA TESTING

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00711EBU1**
Sample Depth:	**1.10-1.35 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	10-21-91 AC&KM
DEPTH	1.10 - 1.35 FT	TEST STARTED	11-16-91 DCW
SAMPLE NO.	BH00711EBU1	TEST FINISHED	12-05-91
SOIL DESCR.	SS LINER	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	286.1	313.2
Wt. Wet Soil & Pan (g)	295.5	322.6
Wt. Dry Soil & Pan (g)	261.9	261.9
Wt. Lost Moisture (g)	33.6	60.7
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	252.5	252.5
Moisture Content %	13.3	24.0
Wet Density PCF	121.6	138.6
Dry Density PCF	107.4	111.7

Init. Diameter (in)	2.363	(cm)	6.002
Init. Area (sq in)	4.385	(sq cm)	28.295
Init. Height (in)	2.043	(cm)	5.189
Vol. Bef. Consol. (cu ft)	0.00518		
Vol. After Consol. (cu ft)	0.00498		
Effective Porosity %	43.01		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1200.0	72000	49.9	38.3	10.1	2.3E-07
699.0	41940	38.3	32.9	17.9	2.0E-07
834.0	50040	50.0	42.4	8.2	2.2E-07
501.0	30060	42.4	38.5	13.5	1.9E-07
1107.0	66420	38.5	31.1	18.7	1.7E-07
1147.0	68820	31.1	24.7	25.1	1.5E-07
697.0	41820	49.9	44.2	7.3	1.9E-07
718.0	43080	44.2	39.0	12.4	1.8E-07
1558.0	93480	39.0	28.0	19.9	1.8E-07

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	1.10 - 1.35 FT
SAMPLE NO.	BH00711EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-21-91 AC&KM
TEST STARTED	11-16-91 DCW
TEST FINISHED	12-05-91
SETUP NO.	10S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	286.100
Wt Soil & Moist at	313.210
Wt. Dry Soil & Pan	261.930
Wt. of Pan Only (g)	9.400
Consol Info:	
Init. Diameter in.	2.363
Initial Height in.	2.043
Vol. change (sat. con.) CC	30.000
Cell Exp.	24.250
Height Change in.	0.009
Test info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	10-21-91 AC&KM
DEPTH	1.10 - 1.35 FT	TEST STARTED	11-16-91 DCW
SAMPLE NO.	BH00711EBU1	TEST FINISHED	12-05-91
SOIL DESCR.	SS LINER	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	19.9				
50.0	48.0	16.3	18.2	38.2	45.2	7.0	0.70
60.0	58.0	18.0	19.7	48.4	55.8	7.4	0.74
70.0	68.0	19.7	21.3	58.2	66.6	8.4	0.84
80.0	78.0	21.5	23.2	68.4	77.1	8.7	0.87
90.0	88.0	23.3	25.1	78.3	87.3	9.0	0.90
100.0		25.3	25.4	88.4	97.8	9.4	0.94

CONSOLIDATION DATA

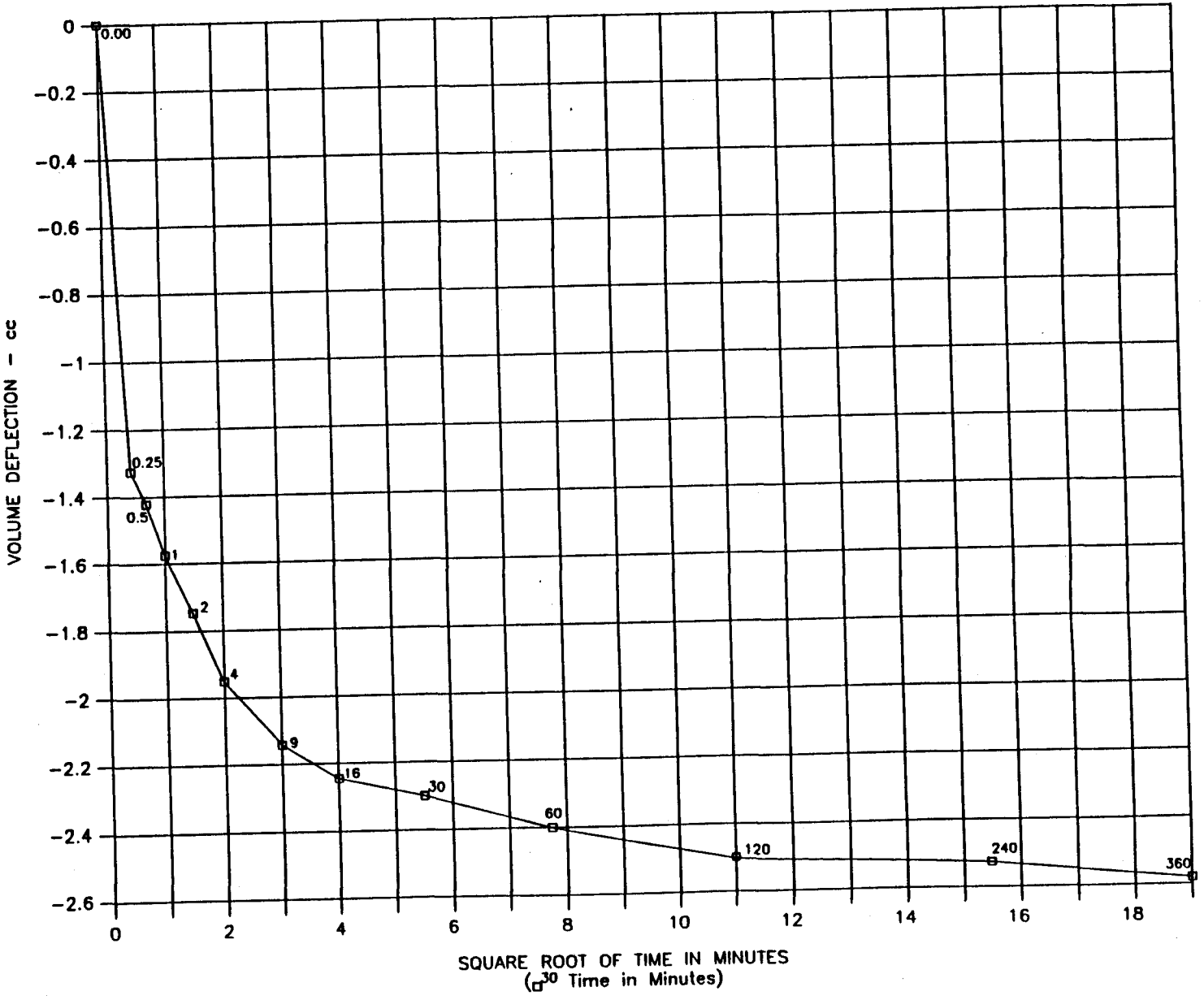
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	25.40	0.00
0.25	0.50	26.73	-1.33
0.5	0.71	26.83	-1.43
1	1.00	26.98	-1.58
2	1.41	27.15	-1.75
4	2.00	27.35	-1.95
9	3.00	27.55	-2.15
16	4.00	27.65	-2.25
30	5.48	27.70	-2.30
60	7.75	27.80	-2.40
120	10.95	27.90	-2.50
240	15.49	27.93	-2.53
360	18.97	27.98	-2.58

Initial Height (in)	2.043	Init. Vol. (CC)	146.85
Height Change (in)	0.009	Vol. Change (CC)	30.00
Ht. After Cons. (in)	2.034	Cell Exp. (CC)	24.25
Initial Area (sq in)	4.385	Net Change (CC)	5.75
Area After Cons. (sq in)	4.232	Cons. Vol. (CC)	141.10

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00711EBU1 @ 1.10-1.35', 1152 psf (confining pressure)



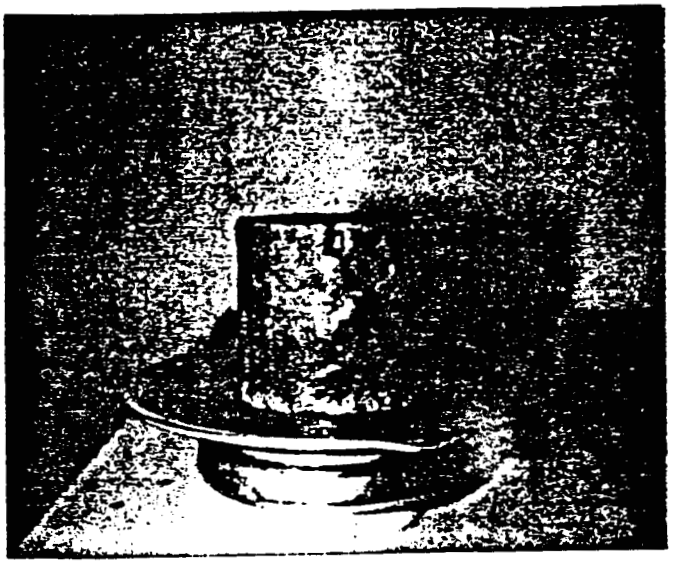
TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	10-21-91 AC&KM
DEPTH	1.10 - 1.35 FT	TEST STARTED	11-16-91 DCW
SAMPLE NO.	BH00711EBU1	TEST FINISHED	12-05-91
SOIL DESCR.	SS LINER	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No
Init. Ht. (in)	2.043	Init. Area (sq in)	4.385
Consol. Ht. (in)	2.034	Consol. Area (sq in)	4.232
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.232	0	89.00	0.0	1152	0	0.00
125.0	4253	0.01	0.49	4.253	4385	49.50	-5688.0	6840	11225	1.64
165.0	5614	0.02	0.98	4.274	5760	50.00	-5616.0	6768	12528	1.85
187.0	6362	0.03	1.47	4.296	6495	51.00	-5472.0	6624	13119	1.98
193.0	6566	0.04	1.97	4.317	6670	54.50	-4968.0	6120	12790	2.09
190.0	6464	0.05	2.46	4.339	6534	56.80	-4636.8	5789	12322	2.13
185.0	6294	0.06	2.95	4.361	6330	57.00	-4608.0	5760	12090	2.10
180.0	6124	0.07	3.44	4.383	6127	57.40	-4550.4	5702	11830	2.07
176.0	5988	0.08	3.93	4.406	5961	57.60	-4521.6	5674	11634	2.05
172.0	5852	0.09	4.42	4.428	5795	57.70	-4507.2	5659	11455	2.02
167.0	5682	0.10	4.92	4.451	5598	57.80	-4492.8	5645	11243	1.99
151.0	5138	0.15	7.37	4.569	4931	57.80	-4492.8	5645	10576	1.87
140.0	4763	0.20	9.83	4.694	4450	57.80	-4492.8	5645	10095	1.79
139.0	4729	0.25	12.29	4.826	4298	57.80	-4492.8	5645	9943	1.76
150.0	5103	0.30	14.75	4.965	4508	57.80	-4492.8	5645	10153	1.80
157.5	5359	0.35	17.21	5.112	4597	58.00	-4464.0	5616	10213	1.82
164.5	5597	0.40	19.67	5.268	4659	58.40	-4406.4	5558	10217	1.84
175.0	5954	0.45	22.12	5.435	4804	58.70	-4363.2	5515	10320	1.87
149.0	5069	0.50	24.58	5.612	3962	59.20	-4291.2	5443	9405	
140.0	4763	0.55	27.04	5.801	3601	59.50	-4248.0	5400	9001	
140.0	4763	0.60	29.50	6.003	3480	59.70	-4219.2	5371	8851	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37891

MW00711EBUI

1.10–1.35 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00716EBU1**
Sample Depth:	**7.20-7.50 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	10-17-91
DEPTH	7.20 - 7.50 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00716EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	27.17
Wt. Dry Soil & Pan (g)	26.68
Wt. Lost Moisture (g)	0.49
Wt. of Pan Only (g)	3.77
Wt. of Dry Soil (g)	22.91
Moisture Content %	2.1

Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	58.75

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	60.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.01
Weight of - #10 Dry (g)	58.75
Wt. Total Sample Dry (g)	58.75

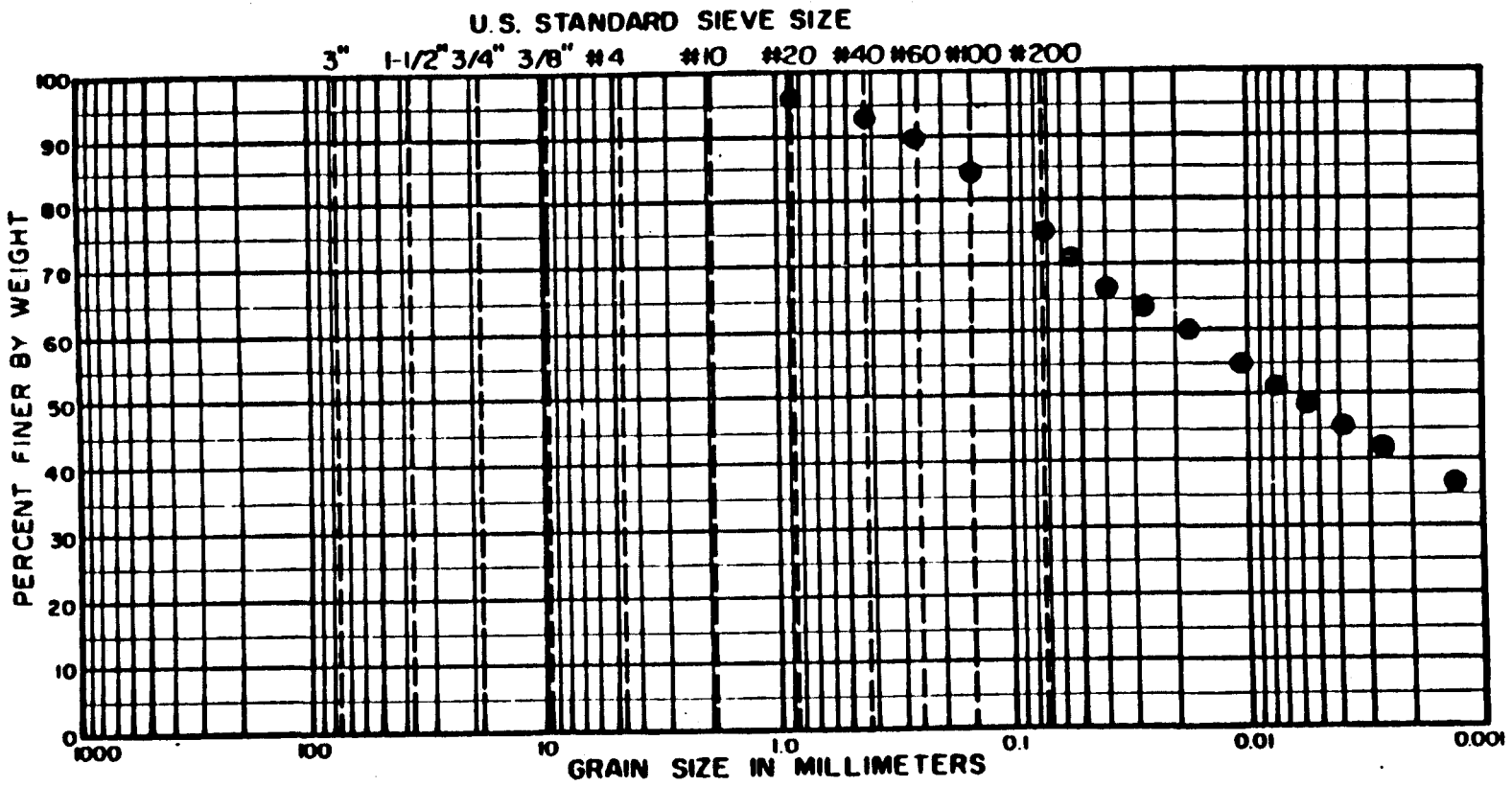
Calc. Wt. "W" (g)	58.75
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.30	3.69	2.39	2.39	4.1	95.9
#40	1.32	3.01	1.69	4.08	6.9	93.1
#60	1.32	3.10	1.78	5.86	10.0	90.0
#100	1.32	4.60	3.28	9.14	15.6	84.4
#200	1.32	6.82	5.50	14.64	24.9	75.1

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	7.20 - 7.50 FT
SAMPLE NO.	BH00716EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	10-17-91
DATE TESTED	11-11-91 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	27.170
Wt. Dry Soil & Pan (g)	26.680
Wt. of Pan Only (g)	3.770
Sieve:	
Wt. Total Sample Wet (g)	60.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.01

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.650
Value of "a"	1.000
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	23.000
Temp. Coef. K	0.01317
Wt. Wet Hydrom. Samp	60.007
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
MW00716EBUI	72 - 75'	37891 ALMW KLM 04/09/92

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	10-17-91
DEPTH	7.20 - 7.50 FT	DATE TESTED	11-11-91 TNU
SAMPLE NO.	BH00716EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01317
Value of "a"	1.00	Wt. Dry Sample "W"	58.750
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.50	42.50	72.3	72.3	8.50	0.0543
1.0	44.00	39.00	66.4	66.4	9.07	0.0397
2.0	43.00	38.00	64.7	64.7	9.24	0.0283
5.0	40.00	35.00	59.6	59.6	9.73	0.0184
15.0	37.00	32.00	54.5	54.5	10.22	0.0109
30.0	35.00	30.00	51.1	51.1	10.55	0.0078
60.0	33.50	28.50	48.5	48.5	10.80	0.0056
120.0	31.25	26.25	44.7	44.7	11.17	0.0040
250.0	30.00	25.00	42.6	42.6	11.37	0.0028
1440.0	27.00	22.00	37.4	37.4	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

JOB NO. 2021-05
CLIENT/OWNER EBASCO
LOCATION 37A
MW0071GEB01
BORING ____ SAMPLE ____ DEPTH 7.5-7.5'

FIELD CLASSIFICATION _____
LABORATORY CLASSIFICATION _____

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

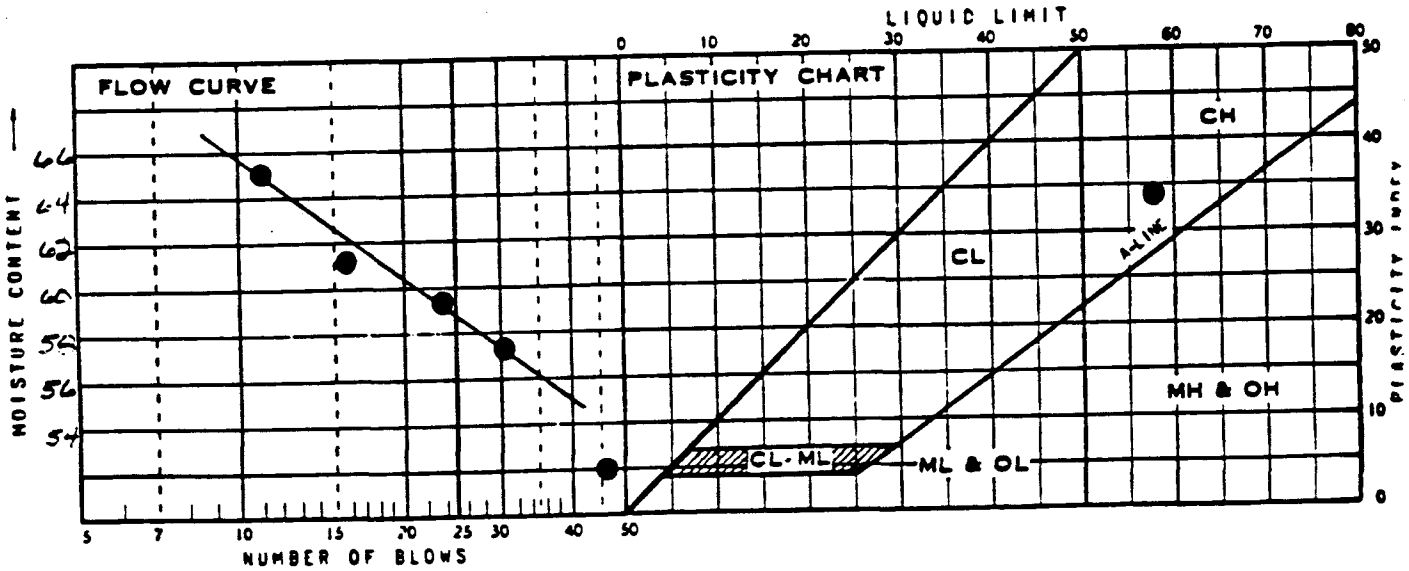
DETERMINATION	1	-
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ___/___/___

DETERMINATION	1	2	3	4	5	6
DISH	29B	28	51			
WT OF DISH + WET SOIL g	9.01	8.30	8.76			
WT OF DISH + DRY SOIL g	7.53	7.00	7.33	—	—	—
WT OF MOISTURE g	1.48	1.30	1.43			
WT OF DISH g	1.41	1.32	1.32	—	—	—
WT OF DRY SOIL g	6.12	5.68	6.01			
MOISTURE CONTENT %	24.2	22.9	23.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	69B	75B	16	121	65B	
NUMBER OF BLOWS	46	31	24	16	11	
WT OF DISH + WET SOIL g	16.09	16.46	17.96	18.70	17.85	
WT OF DISH + DRY SOIL g	10.90	10.94	11.76	12.05	11.33	—
WT OF MOISTURE g	5.19	5.54	6.20	6.65	6.52	
WT OF DISH g	1.31	1.32	1.30	1.31	1.30	—
WT OF DRY SOIL g	9.59	9.62	10.46	10.74	10.03	
MOISTURE CONTENT %	54.1	57.4	59.3	61.9	65.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.5	23.6	33.9	CH	

ADVANCED TERRA TESTING

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**37891**
Sample Number:	**BH00715EBU1**
Sample Depth:	**7.50-7.75 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	10-21-91 KM&AC
DEPTH	7.50 - 7.75 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00715EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	6P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	287.1	296.5
Wt. Wet Soil & Pan (g)	296.6	305.9
Wt. Dry Soil & Pan (g)	245.7	245.7
Wt. Lost Moisture (g)	50.9	60.3
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	236.3	236.3
Moisture Content %	21.5	25.5
Wet Density PCF	121.0	130.0
Dry Density PCF	99.5	103.6

Init. Diameter (in)	2.382	(cm)	6.050
Init. Area (sq in)	4.456	(sq cm)	28.752
Init. Height (in)	2.029	(cm)	5.154
Vol. Bef. Consol. (cu ft)	0.00523		
Vol. After Consol. (cu ft)	0.00503		
Effective Porosity %	42.30		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
929.0	55740	49.9	47.0	16.7	7.6E-08
1301.0	78060	47.0	44.1	19.9	5.6E-08
1441.0	86460	44.1	41.4	22.9	4.8E-08
1458.0	87480	41.4	38.9	25.7	4.5E-08
1421.0	85260	38.9	36.7	28.2	4.2E-08
1450.0	87000	36.7	34.6	30.5	4.0E-08
1569.0	94140	34.6	32.5	32.8	3.8E-08
1420.0	85200	32.5	30.6	34.9	3.8E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	37891
DEPTH	7.50 - 7.75 FT
SAMPLE NO.	BH00715EBU1
SOIL DESCR.	SS LINER
SAMPLED	10-21-91 KM&AC
TEST STARTED	11-12-91 DCW
TEST FINISHED	11-25-91
SETUP NO.	6P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	287.130
Wt Soil & Moist at	296.510
Wt. Dry Soil & Pan	245.680
Wt. of Pan Only (g)	9.430
Consol Info:	
Init. Diameter in.	2.382
Initial Height in.	2.029
Vol. change (sat. con.) CC	16.050
Cell Exp.	10.300
Height Change in.	0.024
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	37891	SAMPLED	10-21-91 KM&AC
DEPTH	7.50 - 7.75 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00715EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	6P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	11.0				
50.0	48.0	8.5	9.7	37.7	45.7	8.0	0.80
60.0	58.0	9.8	10.8	47.9	56.6	8.7	0.87
70.0	68.0	11.1	11.9	57.8	66.9	9.1	0.91
80.0		12.2	12.2	67.9	77.5	9.6	0.96

CONSOLIDATION DATA

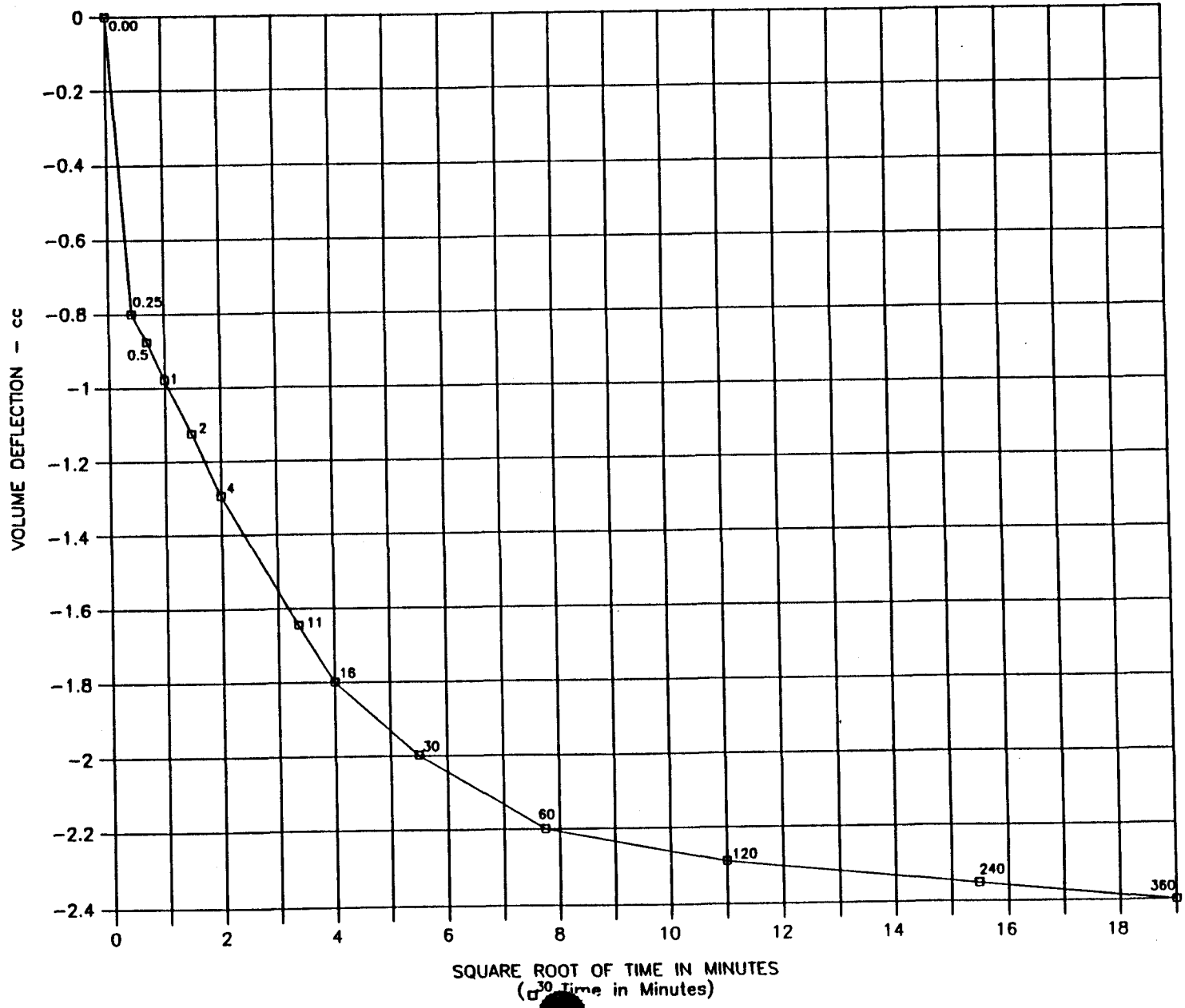
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	12.40	0.00
0.25	0.50	13.20	-0.80
0.5	0.71	13.28	-0.88
1	1.00	13.38	-0.97
2	1.41	13.53	-1.13
4	2.00	13.70	-1.30
11	3.32	14.05	-1.65
16	4.00	14.20	-1.80
30	5.48	14.40	-2.00
60	7.75	14.60	-2.20
120	10.95	14.70	-2.30
240	15.49	14.75	-2.35
360	18.97	14.80	-2.40

Initial Height (in)	2.029	Init. Vol. (CC)	148.20
Height Change (in)	0.024	Vol. Change (CC)	16.05
Ht. After Cons. (in)	2.005	Cell Exp. (CC)	10.30
Initial Area (sq in)	4.456	Net Change (CC)	5.75
Area After Cons. (sq in)	4.335	Cons. Vol. (CC)	142.45

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00715EBU1 @ 7.50-7.75', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

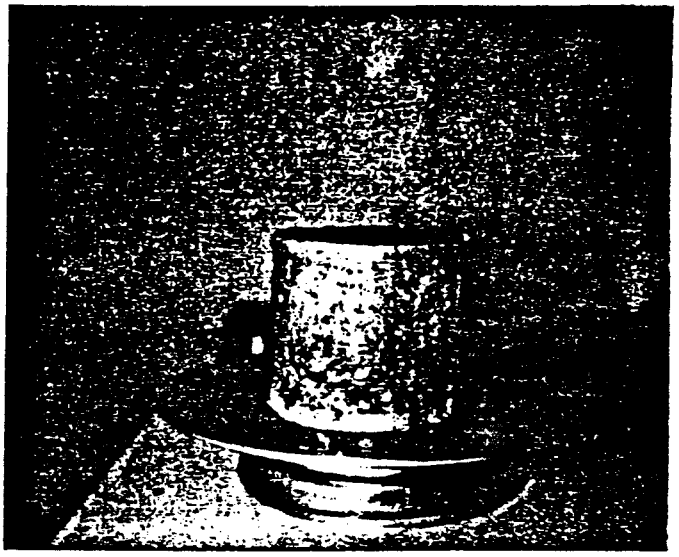
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	37891	SAMPLED	10-21-91 KM&AC
DEPTH	7.50 - 7.75 FT	TEST STARTED	11-12-91 DCW
SAMPLE NO.	BH00715EBU1	TEST FINISHED	11-25-91
SOIL DESCR.	SS LINER	SETUP NO.	6P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.029	Init. Area (sq in)	4.456
Consol. Ht. (in)	2.005	Consol. Area (sq in)	4.335
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.335	0	69.00	0.0	1152	0	0.00
125.0	4153	0.01	0.50	4.356	4248	49.50	-2808.0	3960	8208	2.07
165.0	5481	0.02	1.00	4.378	5579	50.00	-2736.0	3888	9467	2.43
187.0	6212	0.03	1.50	4.401	6291	51.00	-2592.0	3744	10035	2.68
193.0	6412	0.04	2.00	4.423	6460	54.50	-2088.0	3240	9700	2.99
190.0	6312	0.05	2.49	4.446	6327	56.80	-1756.8	2909	9236	3.18
185.0	6146	0.06	2.99	4.468	6129	57.00	-1728.0	2880	9009	3.13
180.0	5980	0.07	3.49	4.491	5933	57.40	-1670.4	2822	8755	3.10
176.0	5847	0.08	3.99	4.515	5771	57.60	-1641.6	2794	8565	3.07
172.0	5714	0.09	4.49	4.538	5611	57.70	-1627.2	2779	8390	3.02
167.0	5548	0.10	4.99	4.562	5419	57.80	-1612.8	2765	8184	2.96
151.0	5016	0.15	7.48	4.685	4771	57.80	-1612.8	2765	7536	2.73
140.0	4651	0.20	9.98	4.815	4304	57.80	-1612.8	2765	7069	2.56
139.0	4618	0.25	12.47	4.952	4155	57.80	-1612.8	2765	6920	2.50
150.0	4983	0.30	14.96	5.097	4356	57.80	-1612.8	2765	7121	2.58
157.5	5232	0.35	17.46	5.251	4440	58.00	-1584.0	2736	7176	2.62
164.5	5465	0.40	19.95	5.415	4497	58.40	-1526.4	2678	7176	2.68
175.0	5814	0.45	22.44	5.589	4635	58.70	-1483.2	2635	7271	2.76
149.0	4950	0.50	24.94	5.775	3820	59.20	-1411.2	2563	6383	
140.0	4651	0.55	27.43	5.973	3470	59.50	-1368.0	2520	5990	
140.0	4651	0.60	29.93	6.186	3351	59.70	-1339.2	2491	5842	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



37891

MW00715EBUI

7.50–7.75 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**38991**
Sample Number:	**BH00845EBU1**
Sample Depth:	**20.90-21.15 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- __ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-12-91 BP,KH
DEPTH	20.90 - 21.15 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00845EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	47.96
Wt. Dry Soil & Pan (g)	47.37
Wt. Lost Moisture (g)	0.59
Wt. of Pan Only (g)	3.73
Wt. of Dry Soil (g)	43.64
Moisture Content %	1.4

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.20

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	59.20
Wt. Total Sample Dry (g)	59.20
Calc. Wt. "W" (g)	59.20
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.32	1.36	0.04	0.04	0.1	99.9
#40	1.30	1.37	0.07	0.11	0.2	99.8
#60	1.32	1.38	0.06	0.17	0.3	99.7
#100	1.31	1.39	0.08	0.25	0.4	99.6
#200	1.32	1.53	0.21	0.46	0.8	99.2

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38991
DEPTH	20.90 - 21.15 FT
SAMPLE NO.	BH00845EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-12-91 BP,KH
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No

Moisture:

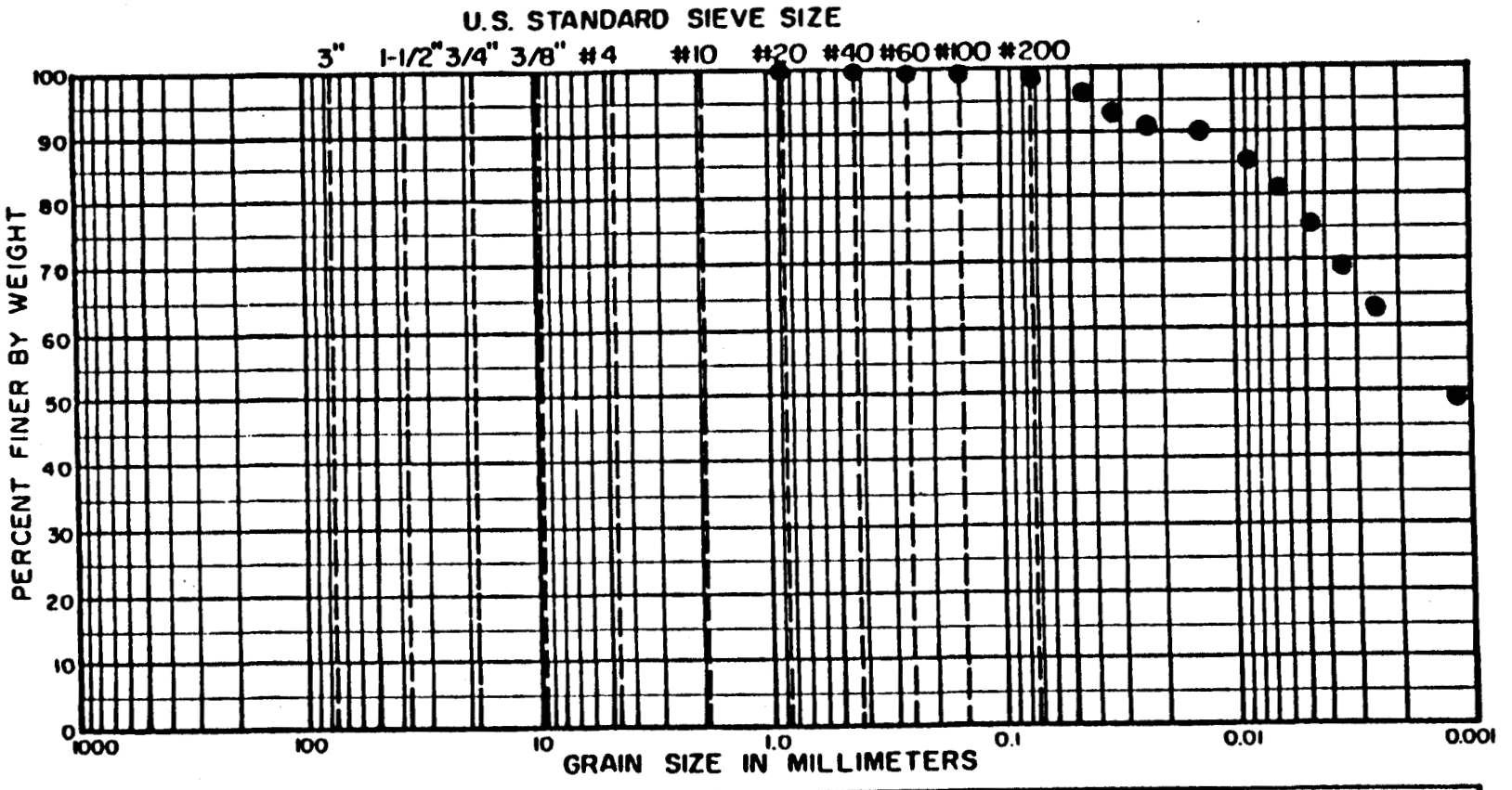
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	47.960
Wt. Dry Soil & Pan (g)	47.370
Wt. of Pan Only (g)	3.730

Sieve:

Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00

Hydrometer:

Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.760
Value of "a"	0.978
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	22.000
Temp. Coef. K	0.01290
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00845 EBUI	20.9 - 21.15'	#38991

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-12-91 BP,KH
DEPTH	20.90 - 21.15 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00845EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.000
Sp. Gr. of Soil	2.760	Temp. Coef. K	0.01290
Value of "a"	0.978	Wt. Dry Sample "W"	59.200
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	64.00	58.50	96.6	96.6	5.79	0.0439
1.0	62.00	56.50	93.3	93.3	6.12	0.0319
2.0	60.50	55.00	90.9	90.9	6.37	0.0230
5.0	60.00	54.50	90.0	90.0	6.45	0.0147
15.0	57.00	51.50	85.1	85.1	6.94	0.0088
30.0	54.50	49.00	80.9	80.9	7.35	0.0064
60.0	51.00	45.50	75.2	75.2	7.93	0.0047
120.0	47.50	42.00	69.4	69.4	8.50	0.0034
250.0	43.50	38.00	62.8	62.8	9.16	0.0025
1440.0	35.50	30.00	49.6	49.6	10.47	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 0031-05

CLIENT/OWNER EBASCO

LOCATION 38991

BORING B00945 EB01 SAMPLE ____ DEPTH 20.90-21.15'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

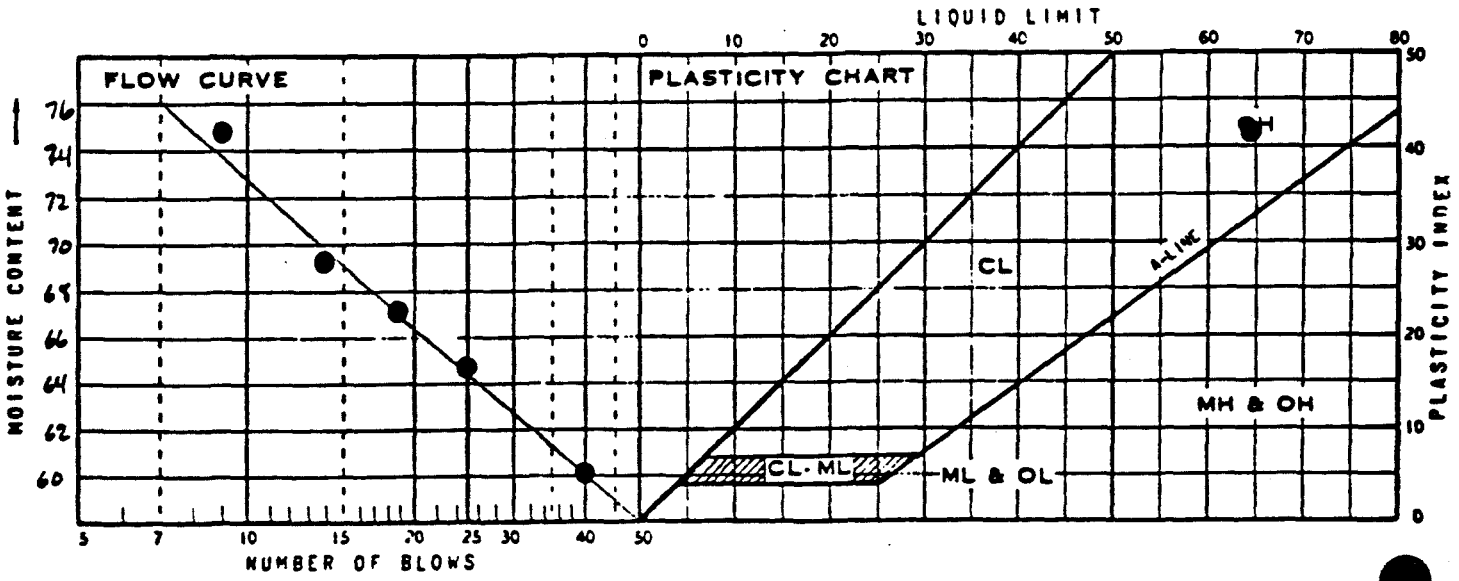
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DU 1/16/92

DETERMINATION	1	2	3	4	5	6
DISH	19C	69C	4			
WT OF DISH + WET SOIL g	6.10	7.94	8.12			
WT OF DISH + DRY SOIL g	5.12	6.64	6.81	—	—	—
WT OF MOISTURE g	.98	1.30	1.31			
WT OF DISH g	1.05	1.05	1.06	—	—	—
WT OF DRY SOIL g	4.07	5.59	5.75			
MOISTURE CONTENT %	24.1	23.3	22.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	49C	36C	59C	2	60C	
NUMBER OF BLOWS	40	25	19	14	9	
WT OF DISH + WET SOIL g	13.93	14.14	15.06	16.37	16.53	
WT OF DISH + DRY SOIL g	9.10	8.99	9.43	10.10	9.91	—
WT OF MOISTURE g	4.83	5.15	5.63	6.27	6.62	
WT OF DISH g	1.06	1.06	1.06	1.06	1.07	—
WT OF DRY SOIL g	8.04	7.93	8.37	9.04	8.84	
MOISTURE CONTENT %	60.1	64.9	67.3	69.4	74.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		64.9	23.4	41.5	CH	

ADVANCED TERRA TESTING inc

* Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

BORING NO.	BH00866EB01	BH00741EB01	BH00761EB01	BH00855EB01	BH00833EB01	BH00759EB01
DEPTH	5.0-5.25'	45.7-46.5'	3.0-3.25'	20.9-21.15'	1.5-1.75'	0.5-0.9'
Sample # SAS Tag #	39691	37891	39191	38991	38991	39091
Sampled	11-25-91	11-07-91	11-14-91	11-12-91	11-11-91	11-13-91
BY:	BP & KH	KM & MC	KM & MC	BP & KH	BP & MS	KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.86 g	177.860 g	178.070	178.010 g	177.79	177.730
Temperature °C, (T_x)	22.4	22.8	22.9	22.0	22.8	23.1
Weight of water and flask at T_x (from cal. curve) (W_a)	162.076 g	162.062 g	162.066	162.024 g	162.062	162.061
Specific Gravity = *	2.71	2.72	2.78	2.76	2.75	2.68
PAN #	2C	34+	517	34	80	31

JOB NO. 2031-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**38991**
Sample Number:	**BH00844EBU1**
Sample Depth:	**21.15-21.40 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-12-91 KH
DEPTH	21.15 - 21.40 FT	TEST STARTED	12-15-91 DCW
SAMPLE NO.	BH00844EBU1	TEST FINISHED	01-06-91
SOIL DESCR.	SS LINER	SETUP NO.	12S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	404.1	418.4
Wt. Wet Soil & Pan (g)	412.8	427.1
Wt. Dry Soil & Pan (g)	341.4	341.4
Wt. Lost Moisture (g)	71.4	85.7
Wt. of Pan Only (g)	8.7	8.7
Wt. of Dry Soil (g)	332.8	332.8
Moisture Content %	21.4	25.7
Wet Density PCF	129.2	137.1
Dry Density PCF	106.4	109.0

Init. Diameter (in)	2.396	(cm)	6.086
Init. Area (sq in)	4.509	(sq cm)	29.091
Init. Height (in)	2.643	(cm)	6.713
Vol. Bef. Consol. (cu ft)	0.00690		
Vol. After Consol. (cu ft)	0.00673		
Effective Porosity %	44.93		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1236.0	74160	50.1	49.8	15.2	8.9E-09
1426.0	85560	49.8	49.3	15.6	1.1E-08
1493.0	89580	49.3	49.0	16.0	5.3E-09
1376.0	82560	49.0	48.8	16.3	4.6E-09
1553.0	93180	48.8	48.5	16.5	6.1E-09
1384.0	83040	48.5	48.3	16.8	4.6E-09
1464.0	87840	48.3	48.1	17.0	4.3E-09
2837.0	170220	48.1	47.7	17.3	4.5E-09
1482.0	88920	47.7	47.5	17.7	4.3E-09
1454.0	87240	47.5	47.3	17.9	4.4E-09
1521.0	91260	47.3	47.1	18.1	4.2E-09

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	38991
DEPTH	21.15 - 21.40 FT
SAMPLE NO.	BH00844EBU1
SOIL DESCR.	SS LINER
SAMPLED	11-12-91 KH
TEST STARTED	12-15-91 DCW
TEST FINISHED	01-06-91
SETUP NO.	12S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	404.120
Wt Soil & Moist at	418.420
Wt. Dry Soil & Pan	341.440
Wt. of Pan Only (g)	8.670
Consol Info:	
Init. Diameter in.	2.396
Initial Height in.	2.643
Vol. change (sat. con.) CC	25.200
Cell Exp.	20.500
Height Change in.	0.001
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	38991	SAMPLED	11-12-91 KH
DEPTH	21.15 - 21.40 FT	TEST STARTED	12-15-91 DCW
SAMPLE NO.	BH00844EBU1	TEST FINISHED	01-06-91
SOIL DESCR.	SS LINER	SETUP NO.	12S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	13.4				
50.0	48.0	11.2		38.5	44.8	6.3	0.63
60.0	58.0	10.9	12.8	48.5	57.0	8.5	0.85
70.0	68.0	13.0	14.8	58.3	67.3	9.0	0.90
80.0		15.0	15.2	68.7	78.3	9.6	0.96

CONSOLIDATION DATA

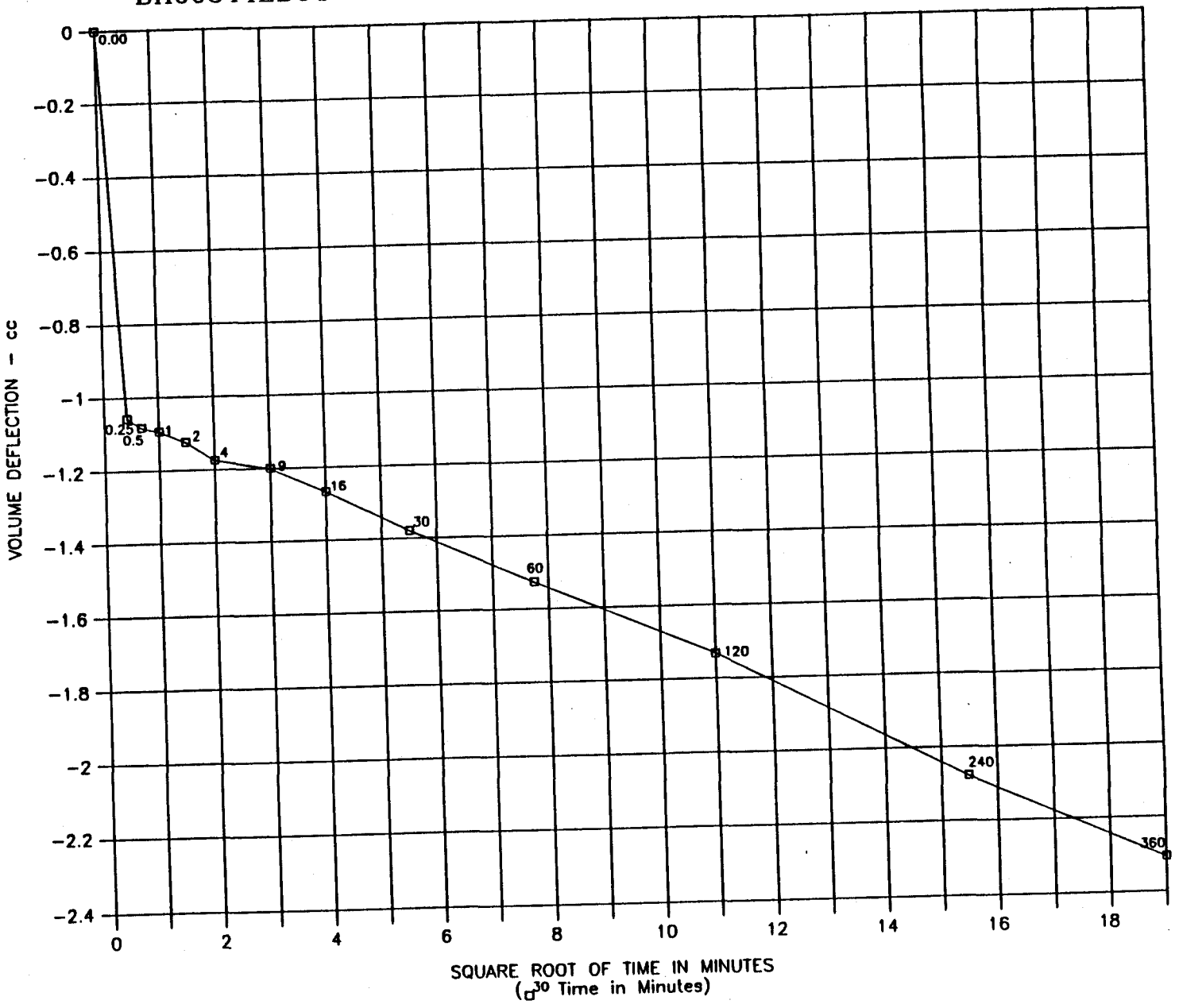
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	16.00	0.00
0.25	0.50	17.05	-1.05
0.5	0.71	17.08	-1.07
1	1.00	17.10	-1.10
2	1.41	17.13	-1.13
4	2.00	17.18	-1.18
9	3.00	17.20	-1.20
16	4.00	17.28	-1.27
30	5.48	17.38	-1.38
60	7.75	17.53	-1.52
120	10.95	17.73	-1.73
240	15.49	18.08	-2.07
360	18.97	18.30	-2.30

Initial Height (in)	2.643	Init. Vol. (CC)	195.32
Height Change (in)	0.001	Vol. Change (CC)	25.20
Ht. After Cons. (in)	2.642	Cell Exp. (CC)	20.50
Initial Area (sq in)	4.509	Net Change (CC)	4.70
Area After Cons. (sq in)	4.402	Cons. Vol. (CC)	190.62

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00844EBU1 @ 21.15-21.40', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

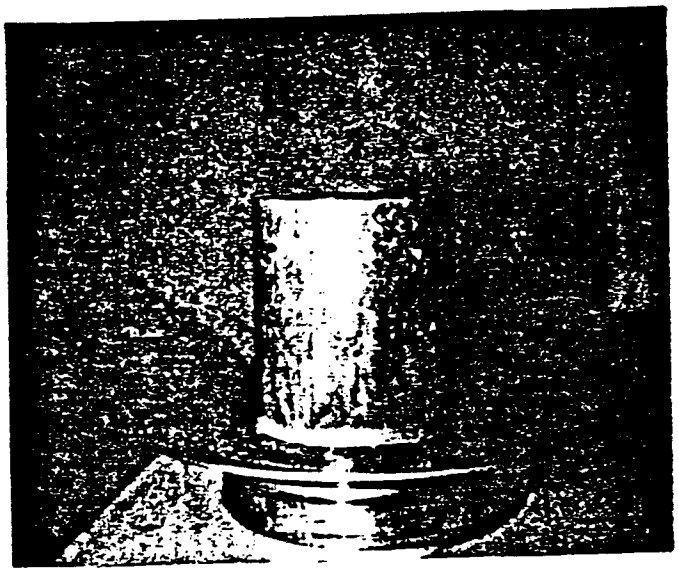
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	38991	SAMPLED	11-12-91 KH
DEPTH	21.15 - 21.40 FT	TEST STARTED	12-15-91 DCW
SAMPLE NO.	BH00844EBU1	TEST FINISHED	01-06-91
SOIL DESCR.	SS LINER	SETUP NO.	12S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.643	Init. Area (sq in)	4.509
Consol. Ht. (in)	2.642	Consol. Area (sq in)	4.402
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.402	0	69.00	0.0	1152	0	0.00
125.0	4089	0.01	0.38	4.419	4172	49.50	-2808.0	3960	8132	2.05
165.0	5398	0.02	0.76	4.436	5487	50.00	-2736.0	3888	9375	2.41
187.0	6117	0.03	1.14	4.453	6195	51.00	-2592.0	3744	9939	2.65
193.0	6314	0.04	1.51	4.470	6369	54.50	-2088.0	3240	9609	2.97
190.0	6215	0.05	1.89	4.487	6246	56.80	-1756.8	2909	9155	3.15
185.0	6052	0.06	2.27	4.504	6058	57.00	-1728.0	2880	8938	3.10
180.0	5888	0.07	2.65	4.522	5871	57.40	-1670.4	2822	8694	3.08
176.0	5757	0.08	3.03	4.539	5719	57.60	-1641.6	2794	8512	3.05
172.0	5627	0.09	3.41	4.557	5567	57.70	-1627.2	2779	8346	3.00
167.0	5463	0.10	3.79	4.575	5384	57.80	-1612.8	2765	8149	2.95
151.0	4940	0.15	5.68	4.667	4772	57.80	-1612.8	2765	7537	2.73
140.0	4580	0.20	7.57	4.763	4336	57.80	-1612.8	2765	7101	2.57
139.0	4547	0.25	9.46	4.862	4217	57.80	-1612.8	2765	6981	2.53
150.0	4907	0.30	11.36	4.966	4455	57.80	-1612.8	2765	7220	2.61
157.5	5152	0.35	13.25	5.074	4578	58.00	-1584.0	2736	7314	2.67
164.5	5381	0.40	15.14	5.187	4677	58.40	-1526.4	2678	7356	2.75
175.0	5725	0.45	17.03	5.306	4865	58.70	-1483.2	2635	7500	2.85
149.0	4874	0.50	18.93	5.430	4048	59.20	-1411.2	2563	6611	
140.0	4580	0.55	20.82	5.559	3714	59.50	-1368.0	2520	6234	
140.0	4580	0.60	22.71	5.695	3626	59.70	-1339.2	2491	6117	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



38991

BH00844EBUI

21.15-21.40 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39091**
Sample Number:	**BH00753EBU1**
Sample Depth:	**0.50-0.90 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39091	SAMPLED	11-13-91 KM,MC
DEPTH	0.50 - 0.90 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00753EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	42.31
Wt. Dry Soil & Pan (g)	42.17
Wt. Lost Moisture (g)	0.14
Wt. of Pan Only (g)	3.70
Wt. of Dry Soil (g)	38.47
Moisture Content %	0.4

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.78

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	478.85
Weight of + #10 Before Washing (g)	242.87
Weight of + #10 After Washing (g)	228.76
Weight of - #10 Wet (g)	235.98
Weight of - #10 Dry (g)	249.18
Wt. Total Sample Dry (g)	477.94

Calc. Wt. "W" (g)	114.67
Calc. Mass + #10	54.88

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	35.50	35.50	35.50	7.4	92.6
3/8"	0.00	64.67	64.67	100.17	21.0	79.0
#4	0.00	70.48	70.48	170.65	35.7	64.3
#10	0.00	58.11	58.11	228.76	47.9	52.1
#20	1.29	13.78	12.49	12.49	58.8	41.2
#40	1.29	19.41	18.12	30.61	74.6	25.4
#60	1.31	12.36	11.05	41.66	84.2	15.8
#100	1.30	7.70	6.40	48.06	89.8	10.2
#200	1.30	4.53	3.23	51.29	92.6	7.4

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39091
DEPTH	0.50 - 0.90 FT
SAMPLE NO.	BH00753EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-13-91 KM,MC
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No

Moisture:

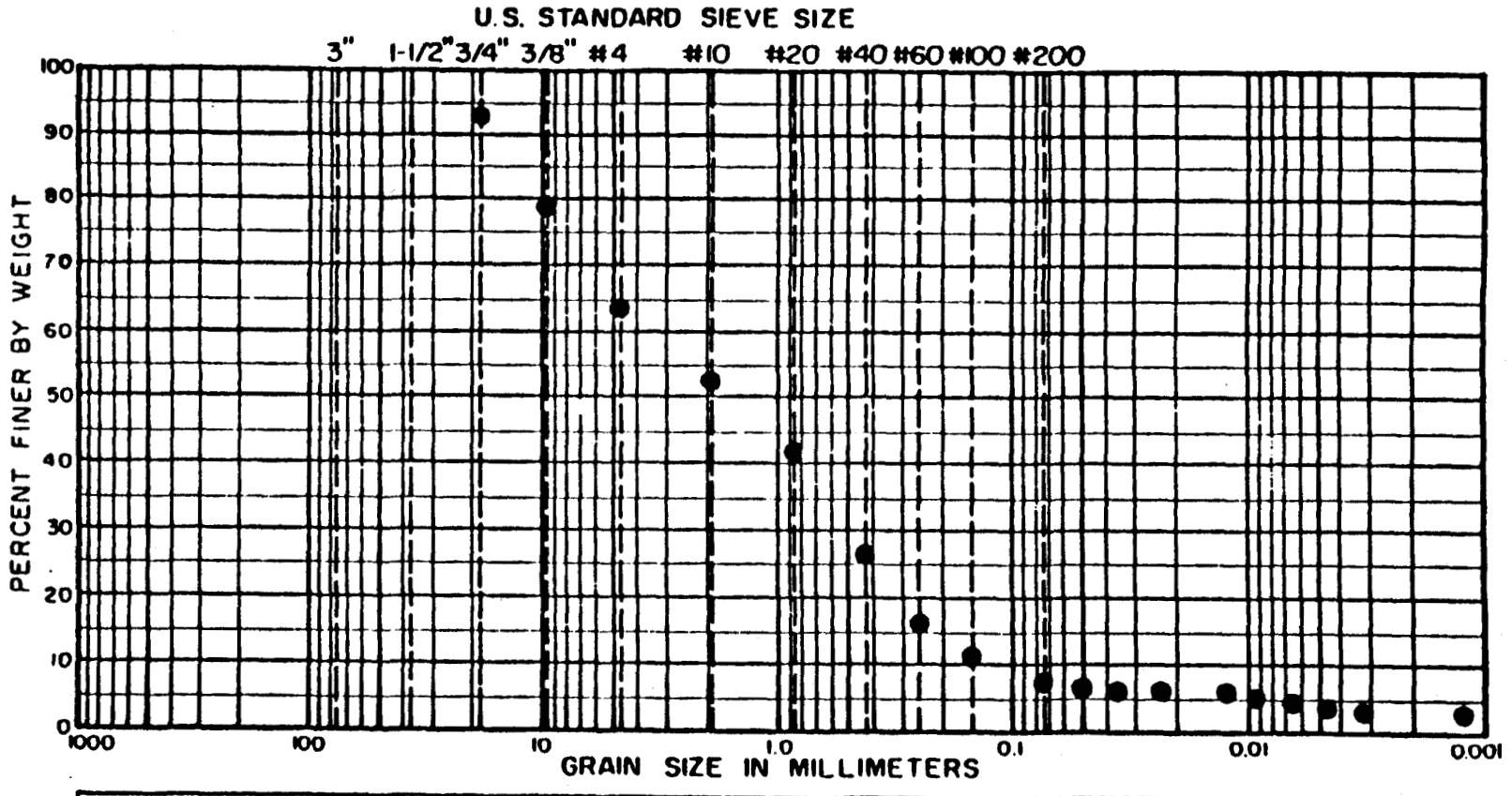
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	42.310
Wt. Dry Soil & Pan (g)	42.170
Wt. of Pan Only (g)	3.700

Sieve:

Wt. Total Sample Wet (g)	478.85
Weight of + #10 Before Washing (g)	242.87
Weight of + #10 After Washing (g)	228.76
Weight of - #10 Wet (g)	235.98

Hydrometer:

Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.680
Value of "a"	0.994
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	22.000
Temp. Coef. K	0.01320
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00753EBUI	0.5 - 0.9'	#39091

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39091	SAMPLED	11-13-91 KM,MC
DEPTH	0.50 - 0.90 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00753EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.000
Sp. Gr. of Soil	2.680	Temp. Coef. K	0.01320
Value of "a"	0.994	Wt. Dry Sample "W"	114.665
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	12.00	6.50	5.6	5.6	14.32	0.0706
1.0	11.75	6.25	5.4	5.4	14.36	0.0500
2.0	11.50	6.00	5.2	5.2	14.40	0.0354
5.0	11.50	6.00	5.2	5.2	14.40	0.0224
15.0	11.50	6.00	5.2	5.2	14.40	0.0129
30.0	11.25	5.75	5.0	5.0	14.45	0.0092
60.0	11.00	5.50	4.8	4.8	14.49	0.0065
120.0	10.00	4.50	3.9	3.9	14.65	0.0046
250.0	9.50	4.00	3.5	3.5	14.73	0.0032
1440.0	9.00	3.50	3.0	3.0	14.81	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-05

CLIENT/OWNER EBASCO

LOCATION 39091

BORING BH00753 EBUL SAMPLE ____ DEPTH 0.5-0.9'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD →

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

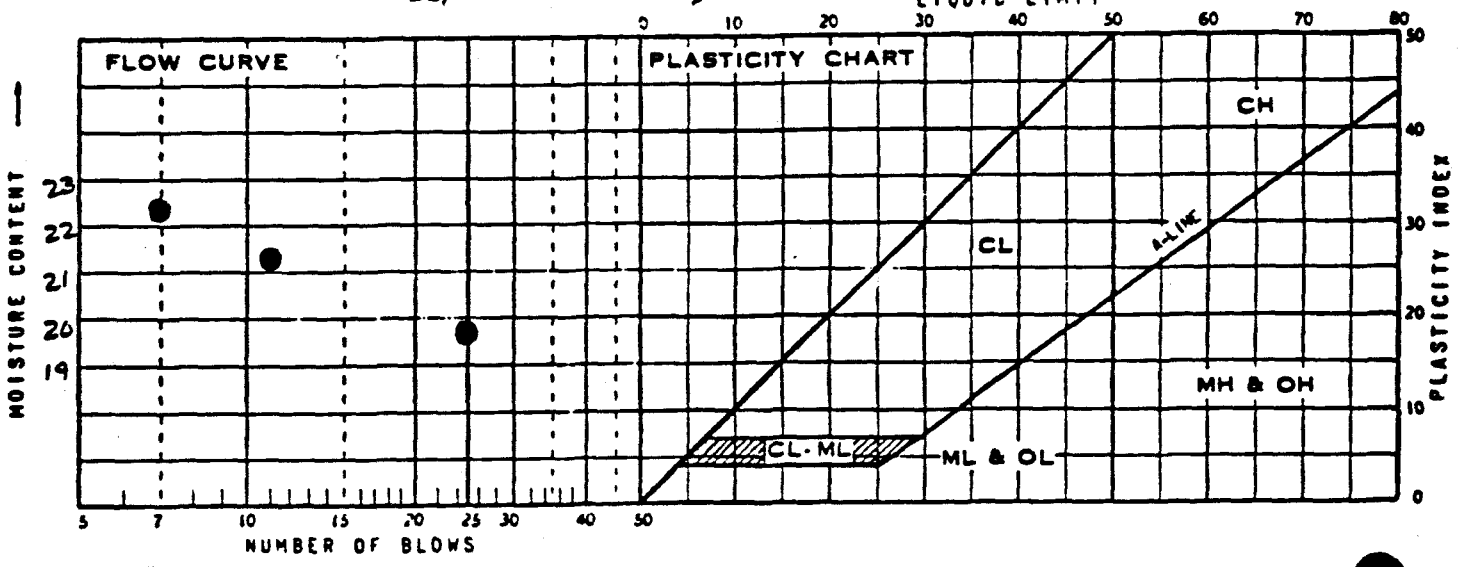
PLASTIC LIMIT BY SR 1/14/92

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL	NON-PLASTIC!					
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	90	69B	22			
NUMBER OF BLOWS	25	11	7			
WT OF DISH + WET SOIL g	15.46	19.67	21.07			
WT OF DISH + DRY SOIL g	13.13	16.46	17.46	—	—	—
WT OF MOISTURE g	2.33	3.21	3.61			
WT OF DISH g	1.32	1.32	1.33	—	—	—
WT OF DRY SOIL g	11.81	15.14	16.13			
MOISTURE CONTENT %	19.7	21.2	22.4			

SLIME IN CUP → → NOT ENOUGH MATERIAL



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	

ADVANCED TERRA TESTING inc

JOB NO. 201-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

* Specific Gravity = $W_o / [W_o \cdot (W_a - W_b)]$

BORING NO.	BH00866EBU1	BH00741EBU1	BH00761EBU1	BH00845EBU1	BH00833EBU1	BH00759EBU1
DEPTH	5.0-5.25'	45.7-46.5'	3.0-3.25'	20.9-21.15'	1.5-1.75'	0.5-0.9'
Sample # SAS Tag #	39691	37891	39191	38991	38991	39091
Sampled	11-25-91	11-07-91	11-14-91	11-12-91	11-11-91	11-13-91
BY:	BP & KH	KM & MC	KM & MC	BP & KH	BP & MS	KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.86 g	177.260 g	178.070	178.010 g	177.79	177.730
Temperature °C, (T_x)	22.4	22.8	22.9	22.0	22.8	23.1
Weight of water and flask at T_x (from cal. curve) (W_a)	162.076 g	162.062 g	162.066	162.024 g	162.062	162.061
Specific Gravity = *	2.71	2.72	2.78	2.76	2.75	2.68
PAN #	2C	34+	517	34	80	31

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39091**
Sample Number:	**BH00752EBU1**
Sample Depth:	**0.90-1.15 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

__ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39091	SAMPLED	11-13-91 KM
DEPTH	0.90 - 1.15 FT	TEST STARTED	02-03-92 DCW
SAMPLE NO.	BH00752EBU1	TEST FINISHED	02-13-92
SOIL DESCR.	SS LINER	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	253.1	283.4
Wt. Wet Soil & Pan (g)	262.5	292.8
Wt. Dry Soil & Pan (g)	243.3	243.3
Wt. Lost Moisture (g)	19.2	49.5
Wt. of Pan Only (g)	9.4	9.4
Wt. of Dry Soil (g)	233.9	233.9
Moisture Content %	8.2	21.2
Wet Density PCF	105.9	129.8
Dry Density PCF	97.9	107.1

Init. Diameter (in)	2.399	(cm)	6.093
Init. Area (sq in)	4.520	(sq cm)	29.164
Init. Height (in)	2.014	(cm)	5.116
Vol. Bef. Consol. (cu ft)	0.00527		
Vol. After Consol. (cu ft)	0.00481		
Effective Porosity %	36.31		
Constant Head (PSI)	1.00	(cm)	70.39

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
4.0	240	49.8	1.1	41.5	1.3E-03
4.0	240	50.0	3.9	39.9	1.1E-03
4.0	240	50.0	3.1	40.3	1.2E-03
4.0	240	49.9	3.0	40.4	1.2E-03
4.0	240	50.0	2.7	40.5	1.2E-03
4.0	240	49.8	2.0	41.0	1.2E-03
4.0	240	50.0	1.6	41.1	1.2E-03
4.0	240	50.0	1.4	41.2	1.3E-03
4.0	240	50.1	3.5	40.1	1.2E-03
4.0	240	50.0	5.0	39.3	1.1E-03
4.0	240	50.0	4.5	39.6	1.1E-03
4.0	240	50.0	3.6	40.1	1.2E-03
4.0	240	49.9	3.9	40.0	1.1E-03
4.0	240	50.1	3.5	40.1	1.2E-03
4.0	240	49.8	3.5	40.2	1.2E-03

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39091
DEPTH	0.90 - 1.15 FT
SAMPLE NO.	BH00752EBU1
SOIL DESCR.	SS LINER
SAMPLED	11-13-91 KM
TEST STARTED	02-03-92 DCW
TEST FINISHED	02-13-92
SETUP NO.	4P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	253.080
Wt Soil & Moist at	283.360
Wt. Dry Soil & Pan	243.300
Wt. of Pan Only (g)	9.430
Consol Info:	
Init. Diameter in.	2.399
Initial Height in.	2.014
Vol. change (sat. con.) CC	24.200
Cell Exp.	11.300
Height Change in.	0.059
Test info:	
Pore pres @ begin. psi	88.500
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	1.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39091	SAMPLED	11-13-91 KM
DEPTH	0.90 - 1.15 FT	TEST STARTED	02-03-92 DCW
SAMPLE NO.	BH00752EBU1	TEST FINISHED	02-13-92
SOIL DESCR.	SS LINER	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	15.3				
50.0	48.0	16.4	17.5	37.9	43.5	5.6	0.56
60.0	58.0	18.0	18.7	47.6	54.1	6.5	0.65
70.0	68.0	19.0	19.7	57.6	65.3	7.7	0.77
80.0	78.0	19.9	20.6	67.7	76.3	8.6	0.86
90.0	88.0	20.8	21.5	77.6	86.7	9.1	0.91
100.0		21.8	21.8	87.5	97.0	9.5	0.95

CONSOLIDATION DATA

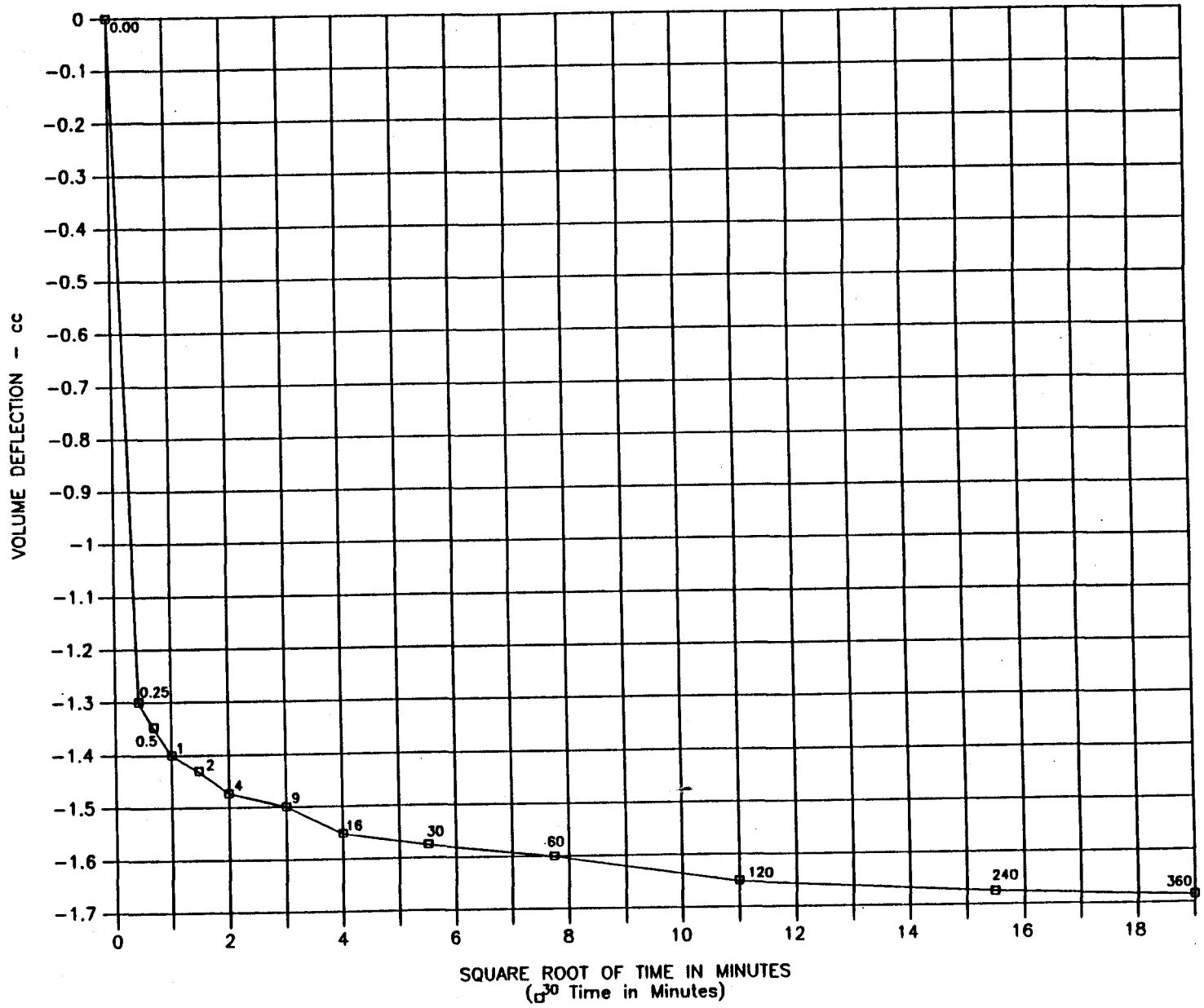
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	21.90	0.00
0.25	0.50	23.20	-1.30
0.5	0.71	23.25	-1.35
1	1.00	23.30	-1.40
2	1.41	23.33	-1.43
4	2.00	23.38	-1.48
9	3.00	23.40	-1.50
16	4.00	23.45	-1.55
30	5.48	23.48	-1.58
60	7.75	23.50	-1.60
120	10.95	23.55	-1.65
240	15.49	23.58	-1.68
360	18.97	23.59	-1.69

Initial Height (in)	2.014	Init. Vol. (CC)	149.21
Height Change (in)	0.059	Vol. Change (CC)	24.20
Ht. After Cons. (in)	1.955	Cell Exp. (CC)	11.30
Initial Area (sq in)	4.520	Net Change (CC)	12.90
Area After Cons. (sq in)	4.254	Cons. Vol. (CC)	136.31

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00752EBU1 @ 0.90–1.15', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39091	SAMPLED	11-13-91 KM
DEPTH	0.90 - 1.15 FT	TEST STARTED	02-03-92 DCW
SAMPLE NO.	BH00752EBU1	TEST FINISHED	02-13-92
SOIL DESCR.	SS LINER	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.014	Init. Area (sq in)	4.520
Consol. Ht. (in)	1.955	Consol. Area (sq in)	4.254
Back Pres. PSI	88.5	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.254	0	88.50	0.0	1152	0	0.00
125.0	4231	0.01	0.51	4.276	4473	49.50	-5616.0	6768	11241	1.66
165.0	5585	0.02	1.02	4.298	5874	50.00	-5544.0	6696	12570	1.88
187.0	6330	0.03	1.53	4.320	6623	51.00	-5400.0	6552	13175	2.01
193.0	6533	0.04	2.05	4.343	6800	54.50	-4896.0	6048	12848	2.12
190.0	6432	0.05	2.56	4.366	6659	56.80	-4564.8	5717	12376	2.16
185.0	6262	0.06	3.07	4.389	6450	57.00	-4536.0	5688	12138	2.13
180.0	6093	0.07	3.58	4.412	6243	57.40	-4478.4	5630	11873	2.11
176.0	5958	0.08	4.09	4.435	6072	57.60	-4449.6	5602	11673	2.08
172.0	5822	0.09	4.60	4.459	5902	57.70	-4435.2	5587	11489	2.06
167.0	5653	0.10	5.12	4.483	5700	57.80	-4420.8	5573	11272	2.02
151.0	5111	0.15	7.67	4.607	5015	57.80	-4420.8	5573	10587	1.90
140.0	4739	0.20	10.23	4.739	4521	57.80	-4420.8	5573	10093	1.81
139.0	4705	0.25	12.79	4.878	4360	57.80	-4420.8	5573	9933	1.78
150.0	5078	0.30	15.35	5.025	4567	57.80	-4420.8	5573	10140	1.82
157.5	5332	0.35	17.90	5.182	4651	58.00	-4392.0	5544	10195	1.84
164.5	5568	0.40	20.46	5.348	4706	58.40	-4334.4	5486	10193	1.86
175.0	5924	0.45	23.02	5.526	4846	58.70	-4291.2	5443	10289	1.89
149.0	5044	0.50	25.58	5.716	3989	59.20	-4219.2	5371	9360	
140.0	4739	0.55	28.13	5.919	3619	59.50	-4176.0	5328	8947	
140.0	4739	0.60	30.69	6.138	3490	59.70	-4147.2	5299	8789	

ADVANCED TERRA TESTING, INC.

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39191**
Sample Number:	**BH00761EBU1**
Sample Depth:	**3.00-3.25 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-14-91 KM,MC
DEPTH	3.00 - 3.25 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00761EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	32.69
Wt. Dry Soil & Pan (g)	32.24
Wt. Lost Moisture (g)	0.45
Wt. of Pan Only (g)	3.76
Wt. of Dry Soil (g)	28.48
Moisture Content %	1.6
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.07

WASH SIEVE ANALYSIS

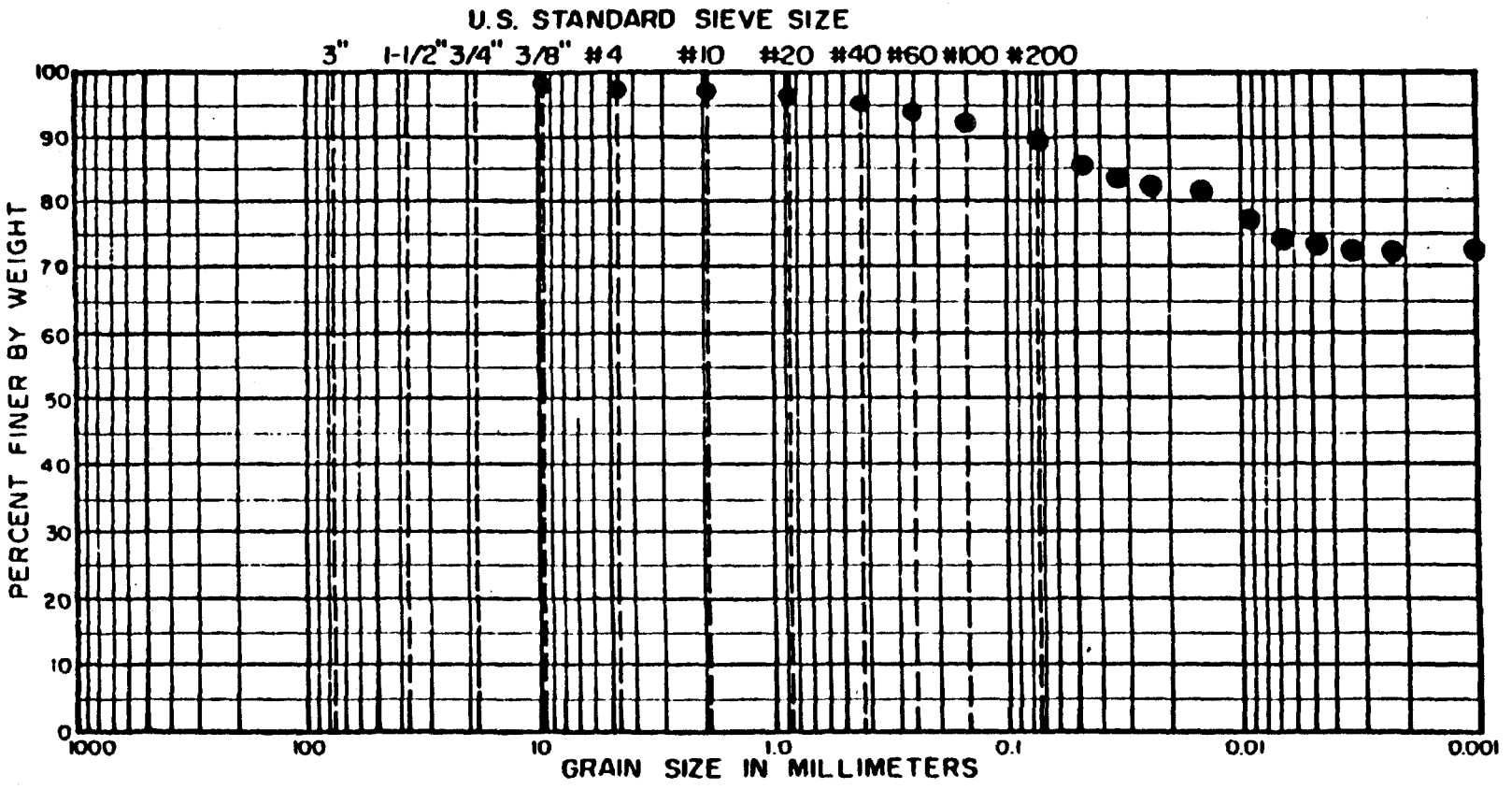
Wt. Total Sample Wet (g)	351.98
Weight of + #10 Before Washing (g)	12.31
Weight of + #10 After Washing (g)	8.79
Weight of - #10 Wet (g)	339.67
Weight of - #10 Dry (g)	337.85
Wt. Total Sample Dry (g)	346.64
Calc. Wt. "W" (g)	60.60
Calc. Mass + #10	1.54

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	5.05	5.05	5.05	1.5	98.5
#4	0.00	2.53	2.53	7.58	2.2	97.8
#10	0.00	1.21	1.21	8.79	2.5	97.5
#20	1.31	2.17	0.86	0.86	4.0	96.0
#40	1.31	1.92	0.61	1.47	5.0	95.0
#60	1.32	2.03	0.71	2.18	6.1	93.9
#100	1.31	2.28	0.97	3.15	7.7	92.3
#200	1.30	2.75	1.45	4.60	10.1	89.9

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39191
DEPTH	3.00 - 3.25 FT
SAMPLE NO.	BH00761EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-14-91 KM,MC
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	32.690
Wt. Dry Soil & Pan (g)	32.240
Wt. of Pan Only (g)	3.760
Sieve:	
Wt. Total Sample Wet (g)	351.98
Weight of + #10 Before Washing (g)	12.31
Weight of + #10 After Washing (g)	8.79
Weight of - #10 Wet (g)	339.67

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.780
Value of "a"	0.974
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	21.000
Temp. Coef. K	0.01298
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00761EBUI	3.0 - 3.25'	#39191

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-14-91 KM,MC
DEPTH	3.00 - 3.25 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00761EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	21.000
Sp. Gr. of Soil	2.780	Temp. Coef. K	0.01298
Value of "a"	0.974	Wt. Dry Sample "W"	60.603
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	58.50	53.00	85.2	85.2	6.70	0.0475
1.0	57.50	52.00	83.6	83.6	6.86	0.0340
2.0	56.50	51.00	82.0	82.0	7.02	0.0243
5.0	56.00	50.50	81.2	81.2	7.11	0.0155
15.0	53.50	48.00	77.1	77.1	7.52	0.0092
30.0	52.00	46.50	74.7	74.7	7.76	0.0066
60.0	51.50	46.00	73.9	73.9	7.84	0.0047
120.0	51.00	45.50	73.1	73.1	7.93	0.0033
250.0	51.00	45.50	73.1	73.1	7.93	0.0023
1440.0	51.00	45.50	73.1	73.1	7.93	0.0010

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 20[illegible]-05

CLIENT/OWNER ERASCO

LOCATION 39191

BORING BH00741 EB01 SAMPLE ____ DEPTH 3.0-3.25'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

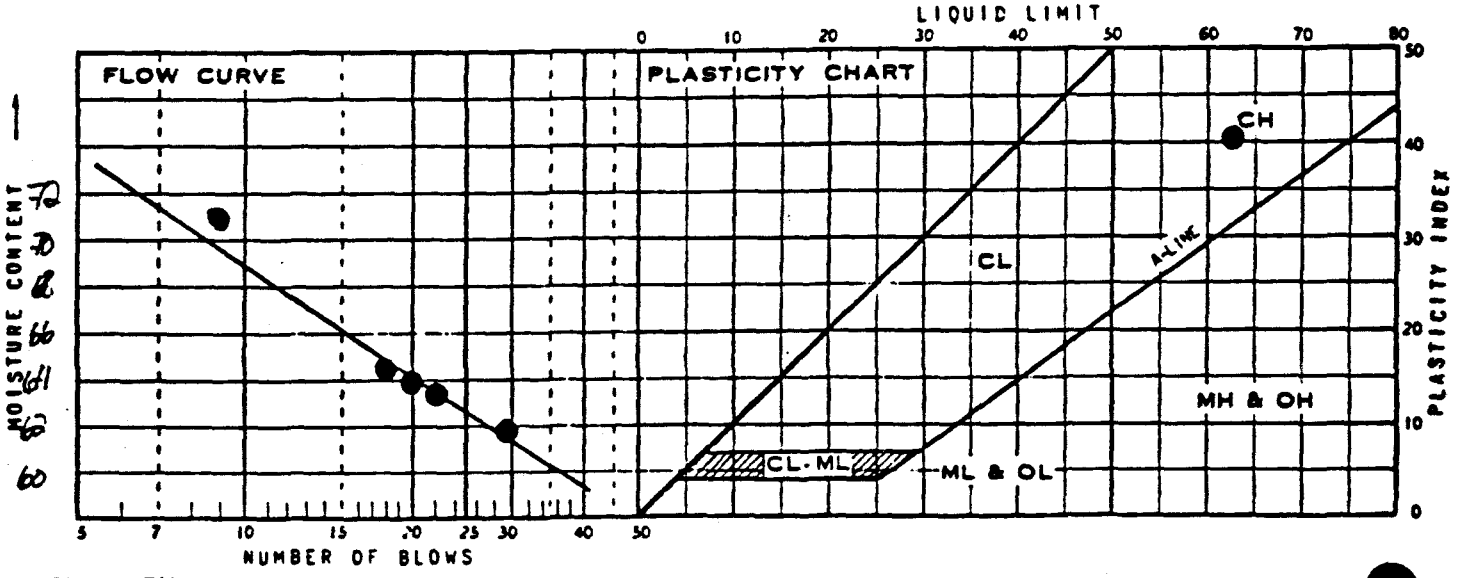
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ____/__/__

DETERMINATION	1	2	3	4	5	6
DISH	37	20C	33			
WT OF DISH + WET SOIL	10.10g	8.[illegible]g	7.60g			
WT OF DISH + DRY SOIL	8.47g	7.31g	6.38g	—	—	—
WT OF MOISTURE	1.63g	1.35g	1.22g			
WT OF DISH	1.08g	1.07g	1.06g	—	—	—
WT OF DRY SOIL	7.39g	6.24g	5.32g			
MOISTURE CONTENT	22.1%	21.6%	22.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	1	21	20	66C	35C	
NUMBER OF BLOWS	29	23	20	18	9	
WT OF DISH + WET SOIL	16.79g	15.07g	17.45g	15.60g	17.15g	
WT OF DISH + DRY SOIL	10.77g	9.63g	11.05g	9.92g	10.19g	—
WT OF MOISTURE	6.02g	5.43g	6.40g	5.68g	6.60g	
WT OF DISH	1.05g	1.00g	1.03g	1.06g	1.08g	—
WT OF DRY SOIL	9.72g	8.57g	10.02g	8.86g	9.41g	
MOISTURE CONTENT	61.9%	63.4%	63.9%	64.1%	70.8%	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		62.6	22.2	40.4	CH

ADVANCED TERRA TESTING inc

* Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

BORING NO.	BH00866EBU1	BH00741EBU1	BH00761EBU1	BH00845EBU1	BH00833EBU1	BH00759EBU1
DEPTH	5.0-5.25'	45.7-46.5'	3.0-3.25'	20.9-21.15'	1.5-1.75'	0.5-0.9'
Sample # SAS Tag #	39691	37891	39191	38991	38991	39091
Sampled	11-25-91	11-07-91	11-14-91	11-12-91	11-11-91	11-13-91
BY:	BP & KH	KM & MC	KM & MC	BP & KH	BB & MS	KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.86 g	177.860 g	178.070	178.010 g	177.79	177.730
Temperature °C, (T_x)	22.4	22.8	22.9	22.0	22.8	23.1
Weight of water and flask at T_x (from cal. curve) (W_a)	162.076 g	162.062 g	162.066	162.074 g	162.062	162.061
Specific Gravity = *	2.71	2.72	2.78	2.76	2.75	2.68
PAN #	2C	34+	517	34	80	31

JOB NO. 203-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39191**
Sample Number:	**BH00760EBU1**
Sample Depth:	**3.25-3.50 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✔ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✔ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39191	SAMPLED	11-14-91 BP
DEPTH	3.25 - 3.50 FT	TEST STARTED	01-13-92 DCW
SAMPLE NO.	BH00760EBU1	TEST FINISHED	01-25-92
SOIL DESCR.	--	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	344.9	360.9
Wt. Wet Soil & Pan (g)	353.8	369.8
Wt. Dry Soil & Pan (g)	293.8	293.8
Wt. Lost Moisture (g)	59.9	75.9
Wt. of Pan Only (g)	8.9	8.9
Wt. of Dry Soil (g)	285.0	285.0
Moisture Content %	21.0	26.6
Wet Density PCF	123.6	133.9
Dry Density PCF	102.1	105.7

Init. Diameter (in)	2.370	(cm)	6.020
Init. Area (sq in)	4.412	(sq cm)	28.463
Init. Height (in)	2.410	(cm)	6.121
Vol. Bef. Consol. (cu ft)	0.00615		
Vol. After Consol. (cu ft)	0.00594		
Effective Porosity %	45.13		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
992.0	59520	50.0	48.9	5.1	3.0E-08
1397.0	83820	48.9	47.8	6.1	2.1E-08
1473.0	88380	47.8	46.7	7.2	2.1E-08
1408.0	84480	46.7	45.7	8.1	2.0E-08
1458.0	87480	45.7	44.6	9.1	2.1E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39191
DEPTH	3.25 - 3.50 FT
SAMPLE NO.	BH00760EBU1
SOIL DESCR.	--
SAMPLED	11-14-91 BP
TEST STARTED	01-13-92 DCW
TEST FINISHED	01-25-92
SETUP NO.	10S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	344.890
Wt Soil & Moist at	360.900
Wt. Dry Soil & Pan	293.820
Wt. of Pan Only (g)	8.860
Consol Info:	
Init. Diameter in.	2.370
Initial Height in.	2.410
Vol. change (sat. con.) CC	30.000
Cell Exp.	24.000
Height Change in.	0.014
Test info:	
Pore pres @ begin. psi	89.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39191	SAMPLED	11-14-91 BP
DEPTH	3.25 - 3.50 FT	TEST STARTED	01-13-92 DCW
SAMPLE NO.	BH00760EBU1	TEST FINISHED	01-25-92
SOIL DESCR.	–	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	19.9				
50.0	48.0	15.2	17.4	38.3	46.0	7.7	0.77
60.0	58.0	17.4	19.2	48.6	56.9	8.3	0.83
70.0	68.0	19.4	21.2	58.4	67.1	8.7	0.87
80.0	78.0	21.3	23.0	68.5	77.5	9.0	0.90
90.0	88.0	23.4	25.2	78.5	87.9	9.4	0.94
100.0		25.4	25.5	88.7	98.3	9.6	0.96

CONSOLIDATION DATA

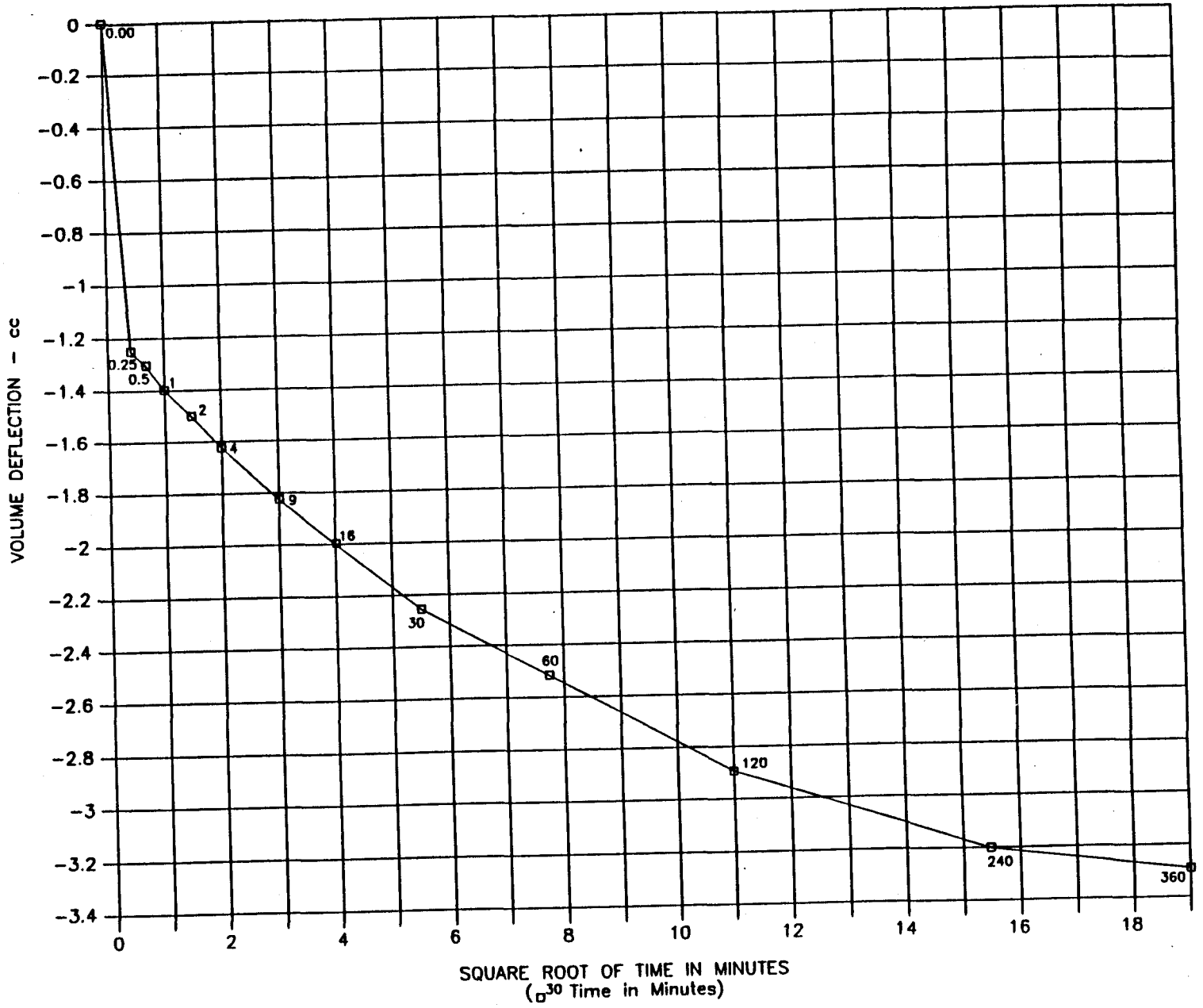
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	25.50	0.00
0.25	0.50	26.75	-1.25
0.5	0.71	26.80	-1.30
1	1.00	26.90	-1.40
2	1.41	27.00	-1.50
4	2.00	27.13	-1.63
9	3.00	27.33	-1.82
16	4.00	27.50	-2.00
30	5.48	27.75	-2.25
60	7.75	28.03	-2.52
120	10.95	28.40	-2.90
240	15.49	28.70	-3.20
360	18.97	28.80	-3.30

Initial Height (in)	2.410	Init. Vol. (CC)	174.25
Height Change (in)	0.014	Vol. Change (CC)	30.00
Ht. After Cons. (in)	2.396	Cell Exp. (CC)	24.00
Initial Area (sq in)	4.412	Net Change (CC)	6.00
Area After Cons. (sq in)	4.284	Cons. Vol. (CC)	168.25

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00760EBU1 @ 3.25-3.50', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

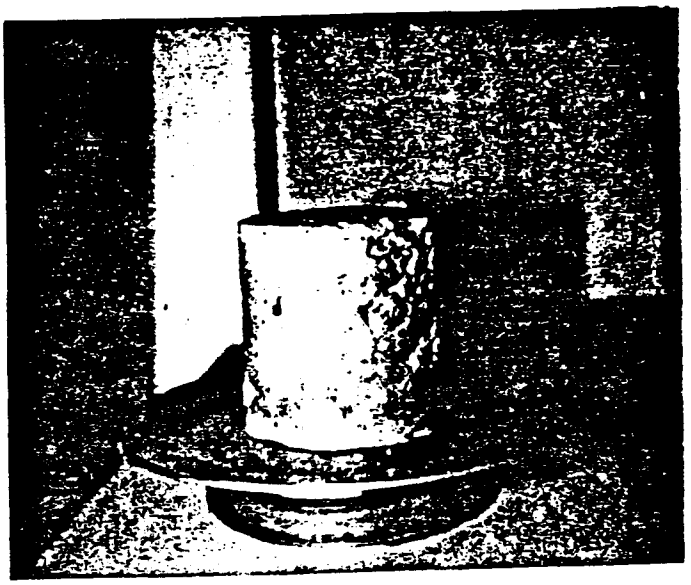
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-14-91 BP
DEPTH	3.25 - 3.50 FT	TEST STARTED	01-13-92 DCW
SAMPLE NO.	BH00760EBU1	TEST FINISHED	01-25-92
SOIL DESCR.	--	SETUP NO.	10S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.410	Init. Area (sq in)	4.412
Consol. Ht. (in)	2.396	Consol. Area (sq in)	4.284
Back Pres. PSI	89.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.284	0	89.00	0.0	1152	0	0.00
125.0	4201	0.01	0.42	4.302	4308	49.50	-5688.0	6840	11148	1.63
165.0	5546	0.02	0.83	4.321	5662	50.00	-5616.0	6768	12430	1.84
187.0	6285	0.03	1.25	4.339	6390	51.00	-5472.0	6624	13014	1.96
193.0	6487	0.04	1.67	4.357	6567	54.50	-4968.0	6120	12687	2.07
190.0	6386	0.05	2.09	4.376	6438	56.80	-4636.8	5789	12227	2.11
185.0	6218	0.06	2.50	4.395	6242	57.00	-4608.0	5760	12002	2.08
180.0	6050	0.07	2.92	4.413	6047	57.40	-4550.4	5702	11749	2.06
176.0	5915	0.08	3.34	4.432	5887	57.60	-4521.6	5674	11561	2.04
172.0	5781	0.09	3.76	4.452	5729	57.70	-4507.2	5659	11388	2.01
167.0	5613	0.10	4.17	4.471	5538	57.80	-4492.8	5645	11183	1.98
151.0	5075	0.15	6.26	4.571	4898	57.80	-4492.8	5645	10543	1.87
140.0	4705	0.20	8.35	4.675	4440	57.80	-4492.8	5645	10085	1.79
139.0	4672	0.25	10.43	4.784	4308	57.80	-4492.8	5645	9953	1.76
150.0	5041	0.30	12.52	4.898	4541	57.80	-4492.8	5645	10186	1.80
157.5	5294	0.35	14.61	5.017	4654	58.00	-4464.0	5616	10270	1.83
164.5	5529	0.40	16.69	5.143	4742	58.40	-4406.4	5558	10301	1.85
175.0	5882	0.45	18.78	5.275	4919	58.70	-4363.2	5515	10434	1.89
149.0	5008	0.50	20.87	5.414	4080	59.20	-4291.2	5443	9523	
140.0	4705	0.55	22.95	5.561	3733	59.50	-4248.0	5400	9133	
140.0	4705	0.60	25.04	5.716	3632	59.70	-4219.2	5371	9003	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



39191

BH00760EBUI

3.25-3.50 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39191**
Sample Number:	**BH00766EBU1**
Sample Depth:	**11.50-11.75 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-14-91 KM,MC
DEPTH	11.50 - 11.75 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00766EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	57.66
Wt. Dry Soil & Pan (g)	57.21
Wt. Lost Moisture (g)	0.45
Wt. of Pan Only (g)	3.73
Wt. of Dry Soil (g)	53.48
Moisture Content %	0.8
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.50

WASH SIEVE ANALYSIS

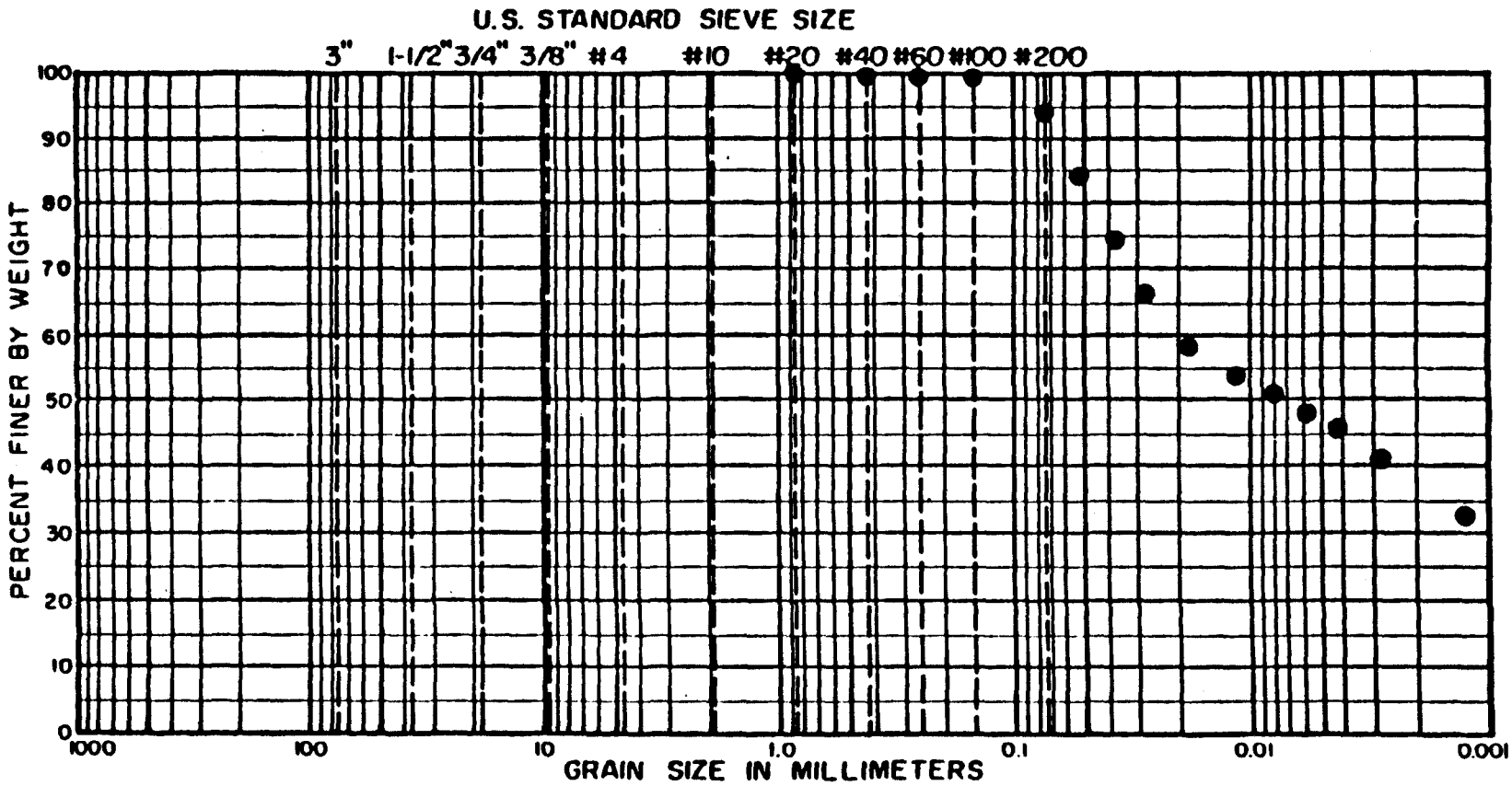
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	59.50
Wt. Total Sample Dry (g)	59.50
Calc. Wt. "W" (g)	59.50
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	1.33	0.02	0.02	0.0	100.0
#40	1.43	1.44	0.01	0.03	0.1	99.9
#60	1.31	1.33	0.02	0.05	0.1	99.9
#100	1.30	1.31	0.01	0.06	0.1	99.9
#200	1.29	4.37	3.08	3.14	5.3	94.7

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39191
DEPTH	11.50 - 11.75 FT
SAMPLE NO.	BH00766EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-14-91 KM,MC
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	57.660
Wt. Dry Soil & Pan (g)	57.210
Wt. of Pan Only (g)	3.730
Sieve:	
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.640
Value of "a"	1.002
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	21.000
Temp. Coef. K	0.01352
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00766 E BUI	11.5 - 11.75'	#39191

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-14-91 KM,MC
DEPTH	11.50 - 11.75 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00766EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	21.000
Sp. Gr. of Soil	2.640	Temp. Coef. K	0.01352
Value of "a"	1.002	Wt. Dry Sample "W"	59.499
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.000		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	55.00	50.00	84.2	84.2	7.27	0.0516
1.0	49.50	44.50	74.9	74.9	8.17	0.0387
2.0	44.50	39.50	66.5	66.5	8.99	0.0287
5.0	40.00	35.00	58.9	58.9	9.73	0.0189
15.0	37.50	32.50	54.7	54.7	10.14	0.0111
30.0	35.00	30.00	50.5	50.5	10.55	0.0080
60.0	33.50	28.50	48.0	48.0	10.80	0.0057
120.0	32.00	27.00	45.5	45.5	11.04	0.0041
250.0	29.00	24.00	40.4	40.4	11.53	0.0029
1440.0	24.50	19.50	32.8	32.8	12.27	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 203-005

CLIENT/OWNER EMASCO

LOCATION 39191

BORING BHL0766 EM01 SAMPLE ____ DEPTH 11.5-11.75'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

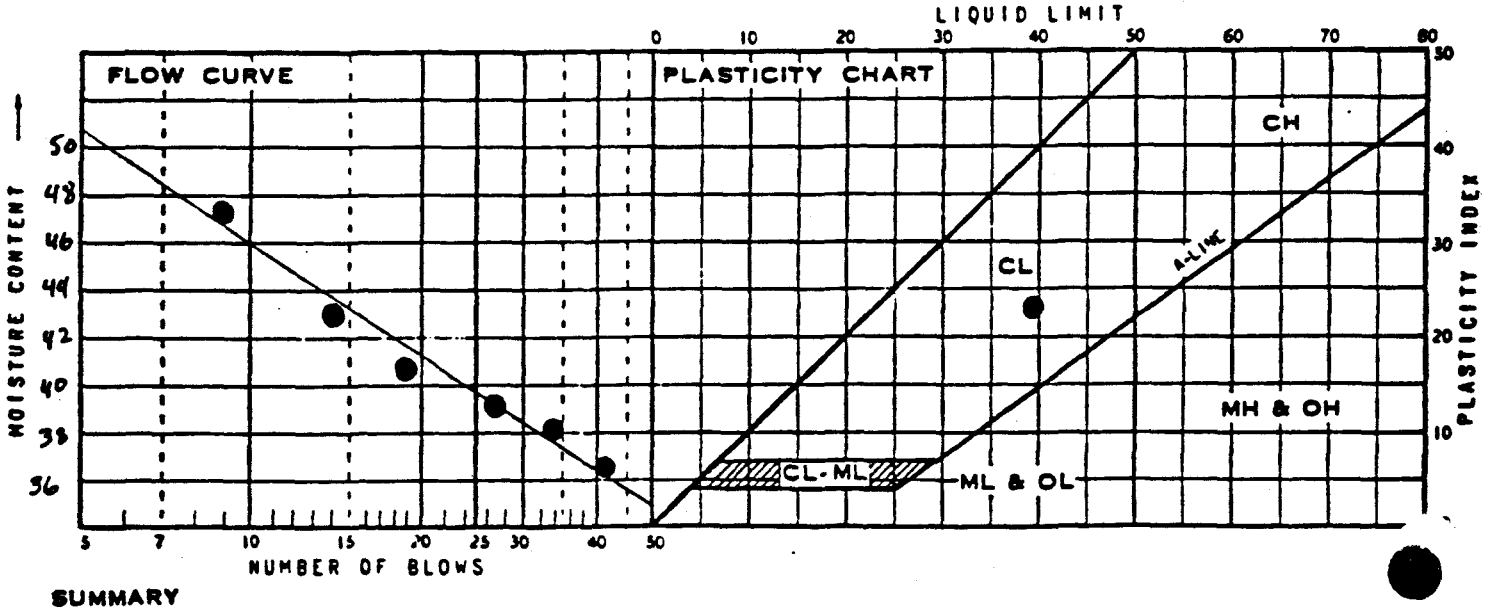
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DY 1/15/92

DETERMINATION	1	2	3	4	5	6
DISH	14	46C	49C			
WT OF DISH + WET SOIL g	7.78	7.98	9.23			
WT OF DISH + DRY SOIL g	6.98	7.03	8.11	—	—	—
WT OF MOISTURE g	.90	.95	1.12			
WT OF DISH g	1.07	1.07	1.07	—	—	—
WT OF DRY SOIL g	5.81	5.96	7.04			
MOISTURE CONTENT %	15.5	15.9	15.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	20	54C	17C	11	45C	6C
NUMBER OF BLOWS	41	34	27	19	14	9
WT OF DISH + WET SOIL g	15.10	14.50	13.91	13.60	15.08	18.05
WT OF DISH + DRY SOIL g	11.34	10.79	10.30	9.90	10.87	12.60
WT OF MOISTURE g	3.76	3.71	3.61	3.70	4.21	5.45
WT OF DISH g	1.07	1.08	1.07	1.06	1.07	1.09
WT OF DRY SOIL g	10.27	9.71	9.23	8.84	9.80	11.51
MOISTURE CONTENT %	36.6	38.2	39.1	41.9	43.0	47.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		34.7	15.8	23.9	CL	

ADVANCED TERRA TESTING INC

* Specific Gravity = $W_o / [W_o + (W_a - W_b$

BORING NO.	BH00734EBU1	BH00840EBU1	BH00812EBU1	BH00738EBU1	BH00775EBU1	BH00766EBU1
DEPTH	46'	11.50-11.75'	4.8-5.05'	10.0-10.2'	41.75-42.25'	11.5-11.75'
Sample # SAS Tag #	37991	38991	38591	37891	39191	39191
Sampled	10-29-91	11-12-91	11-05-91	1-6-91	11-20-91	11-14-91
BY:	KM & MC	BP & KH	KH & MC	KM & JN	KM & NELSON	KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.82g	177.840g	177.89g	177.790g	177.960g	177.690g
Temperature °C, (T_x)	20.7	21.5	22.0	21.6	18.2	19.0
Weight of water and flask at T_x (from cal. curve) (W_a)	162.101g	162.095g	162.084g	162.094g	162.175	162.153
Specific Gravity = *	2.69	2.70	2.72	2.69	2.76	2.64
Pan #	13	21B	27	6C	32	26B

JOB NO. 2031-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39191**
Sample Number:	**BH00765EBU1**
Sample Depth:	**11.75-12.00 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39191	SAMPLED	11-14-91 KM
DEPTH	11.75 - 12.00 FT	TEST STARTED	01-09-92 DCW
SAMPLE NO.	BH00765EBU1	TEST FINISHED	01-24-92
SOIL DESCR.	--	SETUP NO.	11S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	443.4	453.6
Wt. Wet Soil & Pan (g)	452.9	463.1
Wt. Dry Soil & Pan (g)	405.3	405.3
Wt. Lost Moisture (g)	47.5	57.7
Wt. of Pan Only (g)	9.5	9.5
Wt. of Dry Soil (g)	395.9	395.9
Moisture Content %	12.0	14.6
Wet Density PCF	138.9	156.1
Dry Density PCF	124.0	136.3

Init. Diameter (in)	2.388	(cm)	6.066
Init. Area (sq in)	4.479	(sq cm)	28.897
Init. Height (in)	2.715	(cm)	6.896
Vol. Bef. Consol. (cu ft)	0.00704		
Vol. After Consol. (cu ft)	0.00640		
Effective Porosity %	31.82		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
934.0	56040	49.8	47.0	16.8	1.1E-07
1446.0	86760	47.0	41.8	21.1	1.3E-07
1454.0	87240	41.8	37.3	26.3	1.2E-07
1504.0	90240	37.3	33.1	31.0	1.1E-07
1443.0	86580	33.1	29.3	35.3	1.1E-07
1369.0	82140	49.9	45.2	17.7	1.2E-07
1396.0	83760	45.2	41.2	22.4	1.1E-07
1464.0	87840	41.2	37.3	26.7	1.0E-07
1408.0	84480	37.3	33.9	30.6	9.5E-08
1457.0	87420	33.9	30.5	34.2	9.5E-08

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39191
DEPTH	11.75 - 12.00 FT
SAMPLE NO.	BH00765EBU1
SOIL DESCR.	--
SAMPLED	11-14-91 KM
TEST STARTED	01-09-92 DCW
TEST FINISHED	01-24-92
SETUP NO.	11S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	443.410
Wt Soil & Moist at	453.600
Wt. Dry Soil & Pan	405.320
Wt. of Pan Only (g)	9.450
Consol Info:	
Init. Diameter in.	2.388
Initial Height in.	2.715
Vol. change (sat. con.) CC	36.900
Cell Exp.	21.000
Height Change in.	0.006
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39191	SAMPLED	11-14-91 KM
DEPTH	11.75 - 12.00 FT	TEST STARTED	01-09-92 DCW
SAMPLE NO.	BH00765EBU1	TEST FINISHED	01-24-92
SOIL DESCR.	–	SETUP NO.	11S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.1	13.5				
50.0	48.0	14.9	16.9	38.6	47.5	8.9	0.89
60.0	58.0	19.8	21.7	48.5	57.7	9.2	0.92
70.0	68.0	24.7	26.5	58.7	68.0	9.3	0.93
80.0		27.8	27.9	68.6	78.1	9.5	0.95

CONSOLIDATION DATA

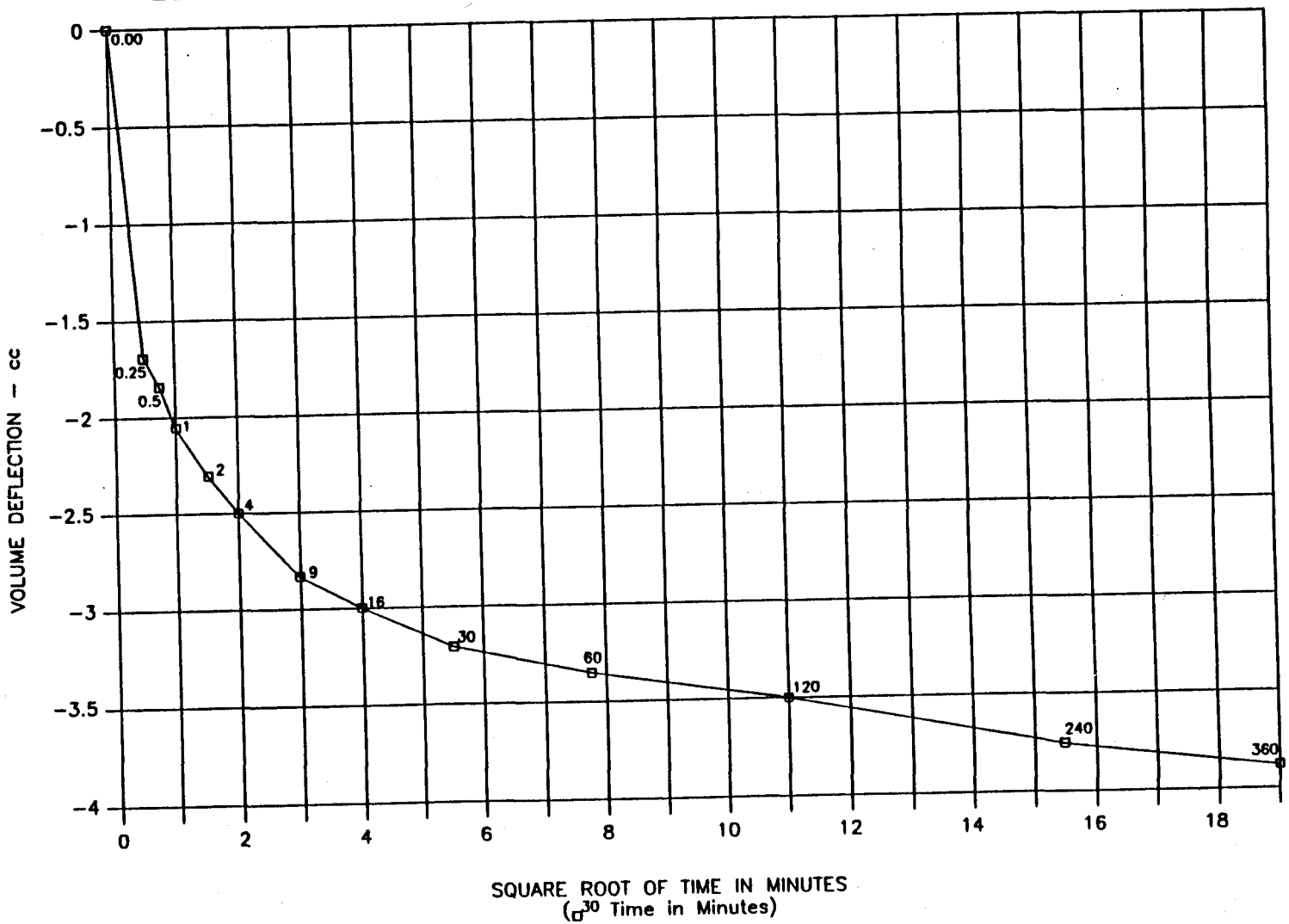
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	27.80	0.00
0.25	0.50	29.50	-1.70
0.5	0.71	29.65	-1.85
1	1.00	29.85	-2.05
2	1.41	30.10	-2.30
4	2.00	30.30	-2.50
9	3.00	30.63	-2.82
16	4.00	30.80	-3.00
30	5.48	31.00	-3.20
60	7.75	31.15	-3.35
120	10.95	31.30	-3.50
240	15.49	31.55	-3.75
360	18.97	31.70	-3.90

Initial Height (in)	2.715	Init. Vol. (CC)	199.30
Height Change (in)	0.006	Vol. Change (CC)	38.90
Ht. After Cons. (in)	2.709	Cell Exp. (CC)	21.00
Initial Area (sq in)	4.479	Net Change (CC)	17.90
Area After Cons. (sq in)	4.086	Cons. Vol. (CC)	181.40

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00765EBU1 @ 11.75–12.00', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

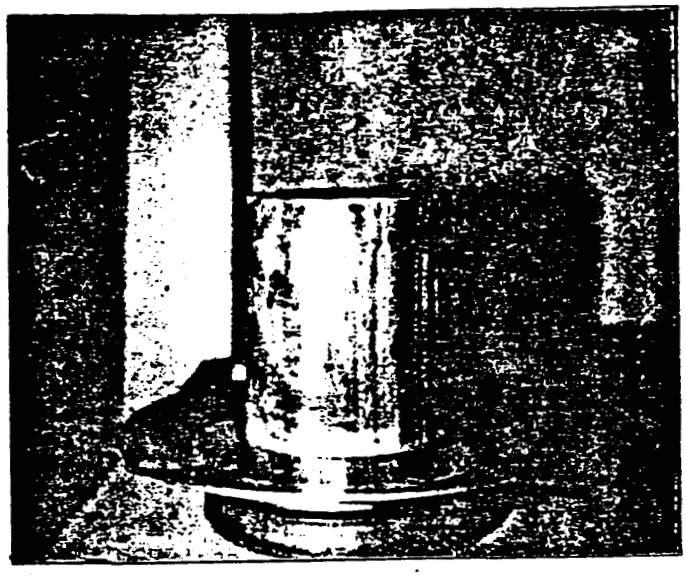
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-14-91 KM
DEPTH	11.75 - 12.00 FT	TEST STARTED	01-09-92 DCW
SAMPLE NO.	BH00765EBU1	TEST FINISHED	01-24-92
SOIL DESCR.	--	SETUP NO.	11S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.715	Init. Area (sq in)	4.479
Consol. Ht. (in)	2.709	Consol. Area (sq in)	4.086
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.086	0	69.00	0.0	1152	0	0.00
125.0	4406	0.01	0.37	4.101	4812	49.50	-2808.0	3960	8772	2.22
165.0	5816	0.02	0.74	4.116	6328	50.00	-2736.0	3888	10216	2.63
187.0	6591	0.03	1.11	4.131	7145	51.00	-2592.0	3744	10889	2.91
193.0	6803	0.04	1.48	4.147	7347	54.50	-2088.0	3240	10587	3.27
190.0	6697	0.05	1.85	4.162	7206	56.80	-1756.8	2909	10115	3.48
185.0	6521	0.06	2.21	4.178	6990	57.00	-1728.0	2880	9870	3.43
180.0	6344	0.07	2.58	4.194	6775	57.40	-1670.4	2822	9598	3.40
176.0	6203	0.08	2.95	4.210	6600	57.60	-1641.6	2794	9393	3.36
172.0	6062	0.09	3.32	4.226	6425	57.70	-1627.2	2779	9204	3.31
167.0	5886	0.10	3.69	4.242	6214	57.80	-1612.8	2765	8979	3.25
151.0	5322	0.15	5.54	4.325	5511	57.80	-1612.8	2765	8276	2.99
140.0	4934	0.20	7.38	4.411	5010	57.80	-1612.8	2765	7775	2.81
139.0	4899	0.25	9.23	4.501	4875	57.80	-1612.8	2765	7640	2.76
150.0	5287	0.30	11.07	4.594	5154	57.80	-1612.8	2765	7919	2.86
157.5	5551	0.35	12.92	4.692	5299	58.00	-1584.0	2736	8035	2.94
164.5	5798	0.40	14.77	4.793	5418	58.40	-1526.4	2678	8096	3.02
175.0	6168	0.45	16.61	4.899	5639	58.70	-1483.2	2635	8274	3.14
149.0	5252	0.50	18.46	5.010	4695	59.20	-1411.2	2563	7258	
140.0	4934	0.55	20.30	5.126	4311	59.50	-1368.0	2520	6831	
140.0	4934	0.60	22.15	5.248	4211	59.70	-1339.2	2491	6703	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



39191

BH00765EBUI

11.75–12.00 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39191**
Sample Number:	**BH00775EBU1**
Sample Depth:	**42.00-42.25 feet (Bedrock)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-20-91 KM,N
DEPTH	42.00 - 42.25 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00775EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	52.17
Wt. Dry Soil & Pan (g)	51.78
Wt. Lost Moisture (g)	0.39
Wt. of Pan Only (g)	3.60
Wt. of Dry Soil (g)	48.18
Moisture Content %	0.8
Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.52

WASH SIEVE ANALYSIS

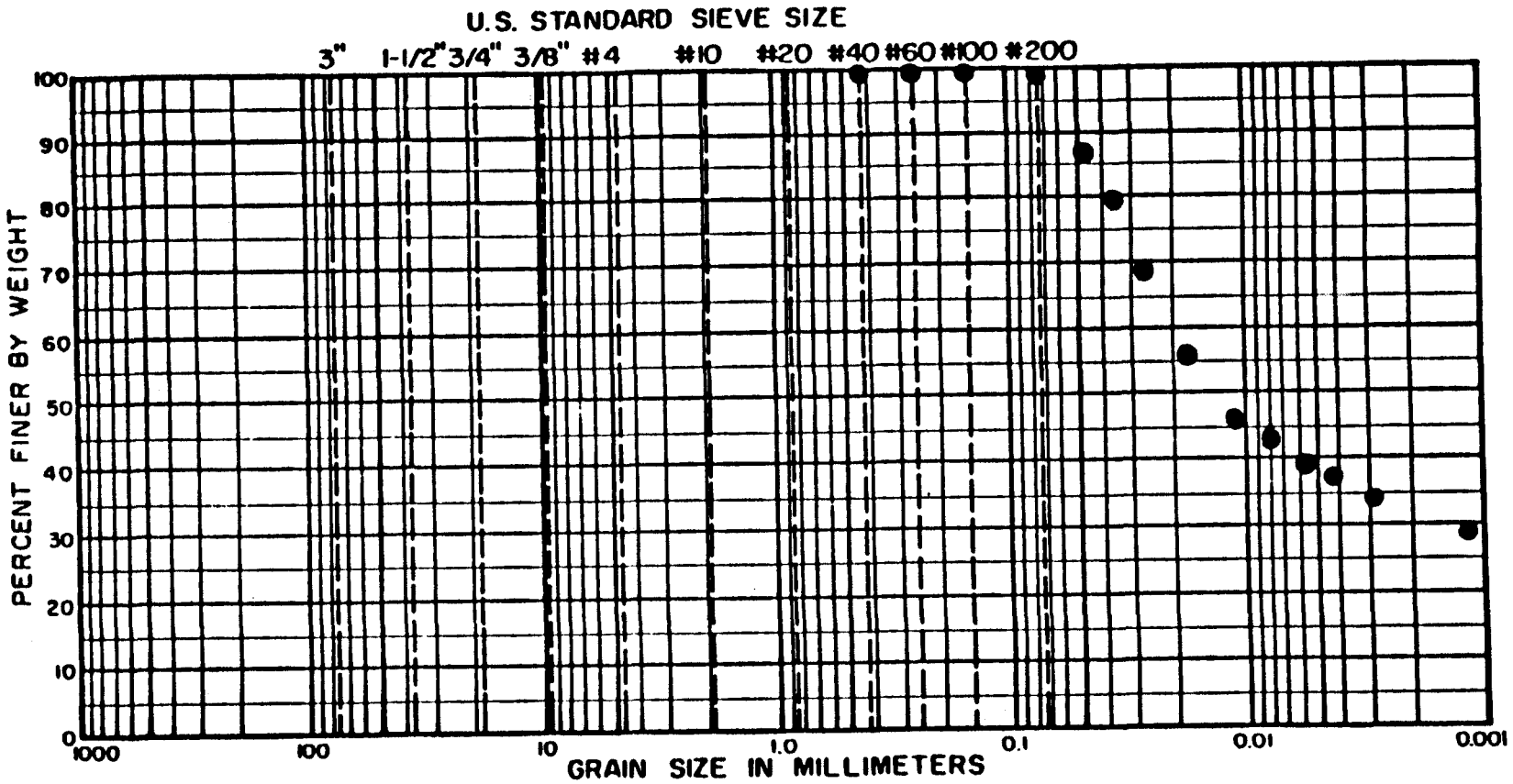
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	59.52
Wt. Total Sample Dry (g)	59.52
Calc. Wt. "W" (g)	59.52
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	1.32	0.01	0.01	0.0	100.0
#40	1.31	1.33	0.02	0.03	0.1	99.9
#60	1.31	1.33	0.02	0.05	0.1	99.9
#100	1.31	1.33	0.02	0.07	0.1	99.9
#200	1.32	2.18	0.86	0.93	1.6	98.4

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39191
DEPTH	42.00 - 42.25 FT
SAMPLE NO.	BH00775EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-20-91 KM,N
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No
Moisture:	
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	52.170
Wt. Dry Soil & Pan (g)	51.780
Wt. of Pan Only (g)	3.600
Sieve:	
Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00

Hydrometer:	
Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.760
Value of "a"	0.978
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.000
Meniscus Corr'n	-1.000
Temp., Deg. C	21.000
Temp. Coef. K	0.01305
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00775EBUI	41.75 - 42.25'	#39191

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-20-91 KM,N
DEPTH	42.00 - 42.25 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00775EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	21.000
Sp. Gr. of Soil	2.760	Temp. Coef. K	0.01305
Value of "a"	0.978	Wt. Dry Sample "W"	59.518
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.000		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	58.00	53.00	87.1	87.1	6.78	0.0481
1.0	53.00	48.00	78.9	78.9	7.60	0.0360
2.0	46.50	41.50	68.2	68.2	8.66	0.0272
5.0	39.00	34.00	55.9	55.9	9.89	0.0184
15.0	33.00	28.00	46.0	46.0	10.88	0.0111
30.0	31.50	26.50	43.5	43.5	11.12	0.0079
60.0	29.00	24.00	39.4	39.4	11.53	0.0057
120.0	27.50	22.50	37.0	37.0	11.78	0.0041
250.0	25.75	20.75	34.1	34.1	12.07	0.0029
1440.0	22.00	17.00	27.9	27.9	12.68	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2031-05

CLIENT/OWNER EBASCO

LOCATION 39191

BORING BH00775 EBDL SAMPLE ____ DEPTH 41.75-42.25

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD → [redacted]

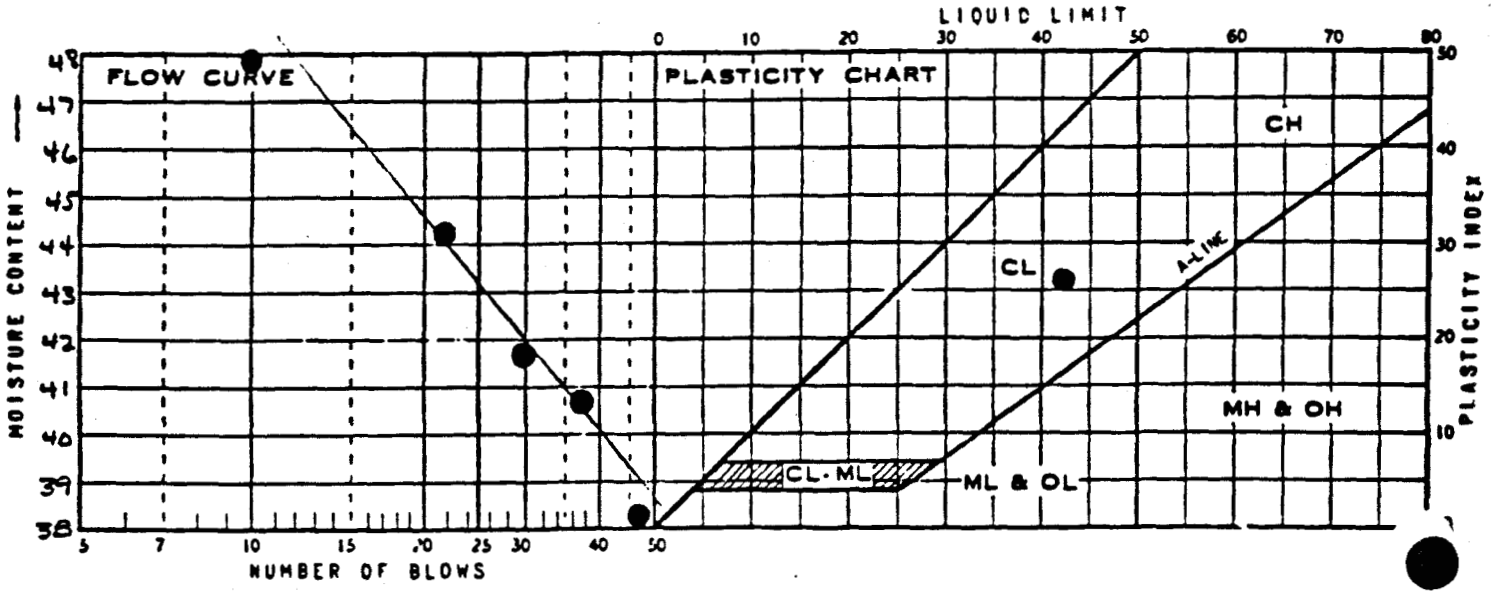
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 1/15/92

DETERMINATION	1	2	3	4	5	6
DISH	10	6				
WT OF DISH + WET SOIL g	9.59	8.11				
WT OF DISH + DRY SOIL g	8.26	7.08	—	—	—	—
WT OF MOISTURE g	1.27	1.03				
WT OF DISH g	1.05	1.07	—	—	—	—
WT OF DRY SOIL g	7.21	6.01				
MOISTURE CONTENT %	17.6	17.1				

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	28C	67C	50C	25C	22C	
NUMBER OF BLOWS	49	35	30	22	10±	
WT OF DISH + WET SOIL g	16.41	15.23	12.38	13.65	15.94	
WT OF DISH + DRY SOIL g	12.17	11.14	9.06	9.80	11.16	—
WT OF MOISTURE g	4.24	4.09	3.32	3.85	4.83	
WT OF DISH g	1.07	1.02	1.11	1.09	1.08	—
WT OF DRY SOIL g	11.10	10.06	7.95	8.71	10.08	
MOISTURE CONTENT %	38.2	40.7	41.8	44.2	47.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		43.2	17.4	25.8	CL	

ADVANCED TERRA TESTING inc

* Specific Gravity = $W_o / [W_o + (W_a - W$

BORING NO.	BH00734EBU1	BH00840EBU1	BH00812EBU1	BH00738EBU1	BH00775EBU1	BH00766EBU1
DEPTH	46'	11.50-11.75'	4.8-5.05'	10.0-10.2'	41.75-42.25'	11.5-11.75'
Sample # SAS Tag #	37991	38991	38591	37891	39191	39191
Sampled BY:	10-29-91 KM & MC	11-12-91 BP & KH	11-05-91 KH & MC	1-6-91 KM & JN	11-20-91 KM & NELSON	11-14-91 KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry)(W_o)g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.82g	177.840g	177.89g	177.790g	177.960g	177.690g
Temperature °C, (T_x)	20.7	21.5	22.0	21.6	18.2	19.0
Weight of water and flask at T_x (from cal. curve) (W_a)	162.101g	162.095g	162.084g	162.094g	162.175	162.153
Specific Gravity = *	2.69	2.70	2.72	2.69	2.76	2.64
Pan #	13	21B	27	6C	32	26B

JOB NO. 2031-05 NAME EBASCO

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39191**
Sample Number:	**BH00774EBU1**
Sample Depth:	**42.25-42.50 feet (Bedrock)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39191	SAMPLED	11-20-91 KM
DEPTH	42.25 - 42.50 FT	TEST STARTED	01-09-92 DCW
SAMPLE NO.	BH00774EBU1	TEST FINISHED	01-25-92
SOIL DESCR.	–	SETUP NO.	12S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	356.7	379.0
Wt. Wet Soil & Pan (g)	365.2	387.5
Wt. Dry Soil & Pan (g)	317.1	317.1
Wt. Lost Moisture (g)	48.1	70.4
Wt. of Pan Only (g)	8.6	8.6
Wt. of Dry Soil (g)	308.5	308.5
Moisture Content %	15.6	22.8
Wet Density PCF	126.9	138.0
Dry Density PCF	109.8	112.4

Init. Diameter (in)	2.397	(cm)	6.088
Init. Area (sq in)	4.513	(sq cm)	29.115
Init. Height (in)	2.373	(cm)	6.027
Vol. Bef. Consol. (cu ft)	0.00620		
Vol. After Consol. (cu ft)	0.00605		
Effective Porosity %	41.09		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
308.0	18480	49.9	24.5	28.9	2.5E-06
357.0	21420	49.8	22.0	30.3	2.4E-06
591.0	35460	49.6	11.9	35.8	2.1E-06
838.0	50280	49.8	4.8	39.5	1.8E-06
416.0	24960	50.0	23.1	29.6	2.0E-06
474.0	28440	49.9	21.5	30.5	1.9E-06
615.0	36900	49.9	16.9	33.0	1.7E-06
648.0	38880	48.9	16.8	33.5	1.6E-06
498.0	29880	49.8	24.0	29.2	1.6E-06
507.0	30420	49.6	23.3	29.7	1.6E-06

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39191
DEPTH	42.25 - 42.50 FT
SAMPLE NO.	BH00774EBU1
SOIL DESCR.	–
SAMPLED	11-20-91 KM
TEST STARTED	01-09-92 DCW
TEST FINISHED	01-25-92
SETUP NO.	12S
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	356.650
Wt Soil & Moist at	378.950
Wt. Dry Soil & Pan	317.090
Wt. of Pan Only (g)	8.570
Consol Info:	
Init. Diameter in.	2.397
Initial Height in.	2.373
Vol. change (sat. con.) CC	24.600
Cell Exp.	20.500
Height Change in.	0.039
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-20-91 KM
DEPTH	42.25 - 42.50 FT	TEST STARTED	01-09-92 DCW
SAMPLE NO.	BH00774EBU1	TEST FINISHED	01-25-92
SOIL DESCR.	--	SETUP NO.	12S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	-0.2	14.4				
50.0	48.0	8.3	10.4	38.6	47.4	8.8	0.88
60.0	58.0	10.7	12.7	48.3	57.5	9.2	0.92
70.0	68.0	13.2	15.0	58.5	67.9	9.4	0.94
80.0		15.2	15.3	68.5	78.2	9.7	0.97

CONSOLIDATION DATA

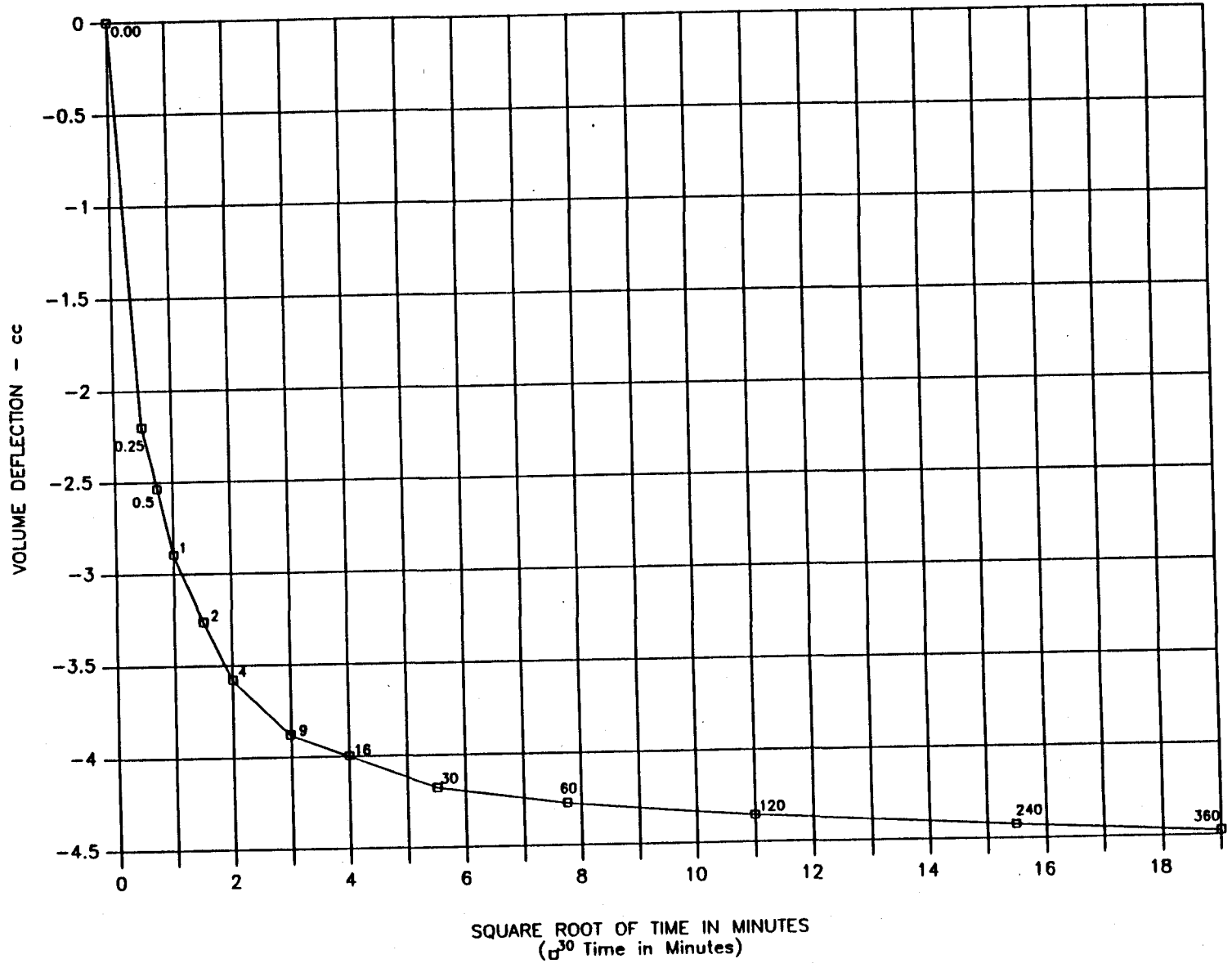
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	15.20	0.00
0.25	0.50	17.40	-2.20
0.5	0.71	17.75	-2.55
1	1.00	18.10	-2.90
2	1.41	18.48	-3.28
4	2.00	18.78	-3.57
9	3.00	19.08	-3.88
16	4.00	19.20	-4.00
30	5.48	19.38	-4.18
60	7.75	19.48	-4.28
120	10.95	19.58	-4.38
240	15.49	19.63	-4.43
360	18.97	19.68	-4.48

Initial Height (in)	2.373	Init. Vol. (CC)	175.51
Height Change (in)	0.039	Vol. Change (CC)	24.60
Ht. After Cons. (in)	2.334	Cell Exp. (CC)	20.50
Initial Area (sq in)	4.513	Net Change (CC)	4.10
Area After Cons. (sq in)	4.481	Cons. Vol. (CC)	171.41

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00774EBU1 @ 42.25-42.50', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

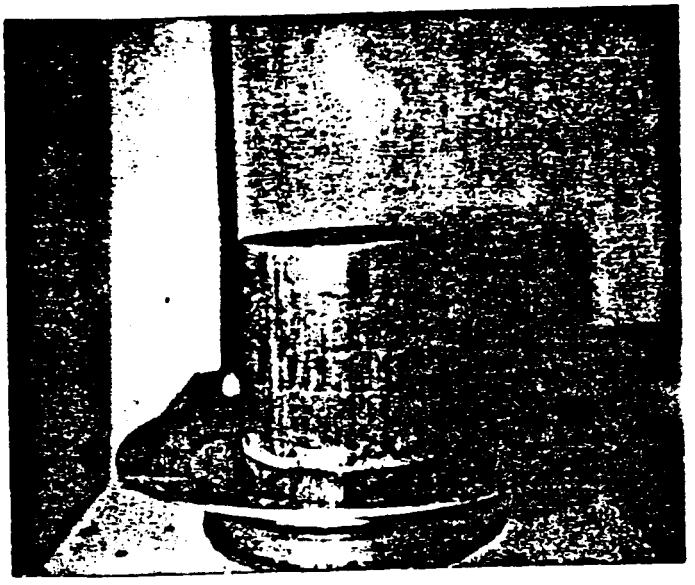
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39191	SAMPLED	11-20-91 KM
DEPTH	42.25 - 42.50 FT	TEST STARTED	01-09-92 DCW
SAMPLE NO.	BH00774EBU1	TEST FINISHED	01-25-92
SOIL DESCR.	--	SETUP NO.	12S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.373	Init. Area (sq in)	4.513
Consol. Ht. (in)	2.334	Consol. Area (sq in)	4.481
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.481	0	69.00	0.0	1152	0	0.00
125.0	4017	0.01	0.43	4.500	4028	49.50	-2808.0	3960	7988	2.02
165.0	5303	0.02	0.86	4.520	5294	50.00	-2736.0	3888	9182	2.36
187.0	6010	0.03	1.29	4.539	5974	51.00	-2592.0	3744	9718	2.60
193.0	6202	0.04	1.71	4.559	6139	54.50	-2088.0	3240	9379	2.89
190.0	6106	0.05	2.14	4.579	6018	56.80	-1756.8	2909	8926	3.07
185.0	5945	0.06	2.57	4.599	5834	57.00	-1728.0	2880	8714	3.03
180.0	5785	0.07	3.00	4.619	5651	57.40	-1670.4	2822	8473	3.00
176.0	5656	0.08	3.43	4.640	5501	57.60	-1641.6	2794	8295	2.97
172.0	5528	0.09	3.86	4.661	5352	57.70	-1627.2	2779	8131	2.93
167.0	5367	0.10	4.28	4.681	5173	57.80	-1612.8	2765	7938	2.87
151.0	4853	0.15	6.43	4.789	4573	57.80	-1612.8	2765	7338	2.65
140.0	4499	0.20	8.57	4.901	4143	57.80	-1612.8	2765	6908	2.50
139.0	4467	0.25	10.71	5.018	4017	57.80	-1612.8	2765	6782	2.45
150.0	4821	0.30	12.85	5.142	4231	57.80	-1612.8	2765	6996	2.53
157.5	5062	0.35	15.00	5.271	4333	58.00	-1584.0	2736	7069	2.58
164.5	5287	0.40	17.14	5.408	4412	58.40	-1526.4	2678	7090	2.65
175.0	5624	0.45	19.28	5.551	4572	58.70	-1483.2	2635	7207	2.73
149.0	4788	0.50	21.42	5.702	3789	59.20	-1411.2	2563	6352	
140.0	4499	0.55	23.56	5.862	3463	59.50	-1368.0	2520	5983	
140.0	4499	0.60	25.71	6.031	3366	59.70	-1339.2	2491	5857	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



39191

BH00774EBUI

42.25-42.50 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39691**
Sample Number:	**BH00866EBU1**
Sample Depth:	**5.00-5.25 feet (Alluvium)**

Data Available:

- ✔ Grain Size Analysis (Sieve and Hydrometer Test) Data
- ✔ Atterberg Limits Test Data
- ✔ Specific Gravity Test Data
- __ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data
- __ Core Sample Photograph

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39691	SAMPLED	11-25-91 BP,KH
DEPTH	5.00 - 5.25 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00866EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan (g)	32.42
Wt. Dry Soil & Pan (g)	32.21
Wt. Lost Moisture (g)	0.21
Wt. of Pan Only (g)	3.80
Wt. of Dry Soil (g)	28.41
Moisture Content %	0.7

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.56

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	452.11
Weight of + #10 Before Washing (g)	3.19
Weight of + #10 After Washing (g)	1.67
Weight of - #10 Wet (g)	448.92
Weight of - #10 Dry (g)	447.13
Wt. Total Sample Dry (g)	448.80
Calc. Wt. "W" (g)	59.78
Calc. Mass + #10	0.22

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	1.67	1.67	1.67	0.4	99.6
#20	1.31	1.96	0.65	0.65	1.5	98.5
#40	1.29	2.32	1.03	1.68	3.2	96.8
#60	1.31	2.39	1.08	2.76	5.0	95.0
#100	1.31	6.12	4.81	7.57	13.0	87.0
#200	1.32	10.30	8.98	16.55	28.1	71.9

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39691
DEPTH	5.00 - 5.25 FT
SAMPLE NO.	BH00866EBU1
SOIL DESCR.	EG&G/ROCKY FLATS
SAMPLED	11-25-91 BP,KH
DATE TESTED	1-16-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No

Moisture:

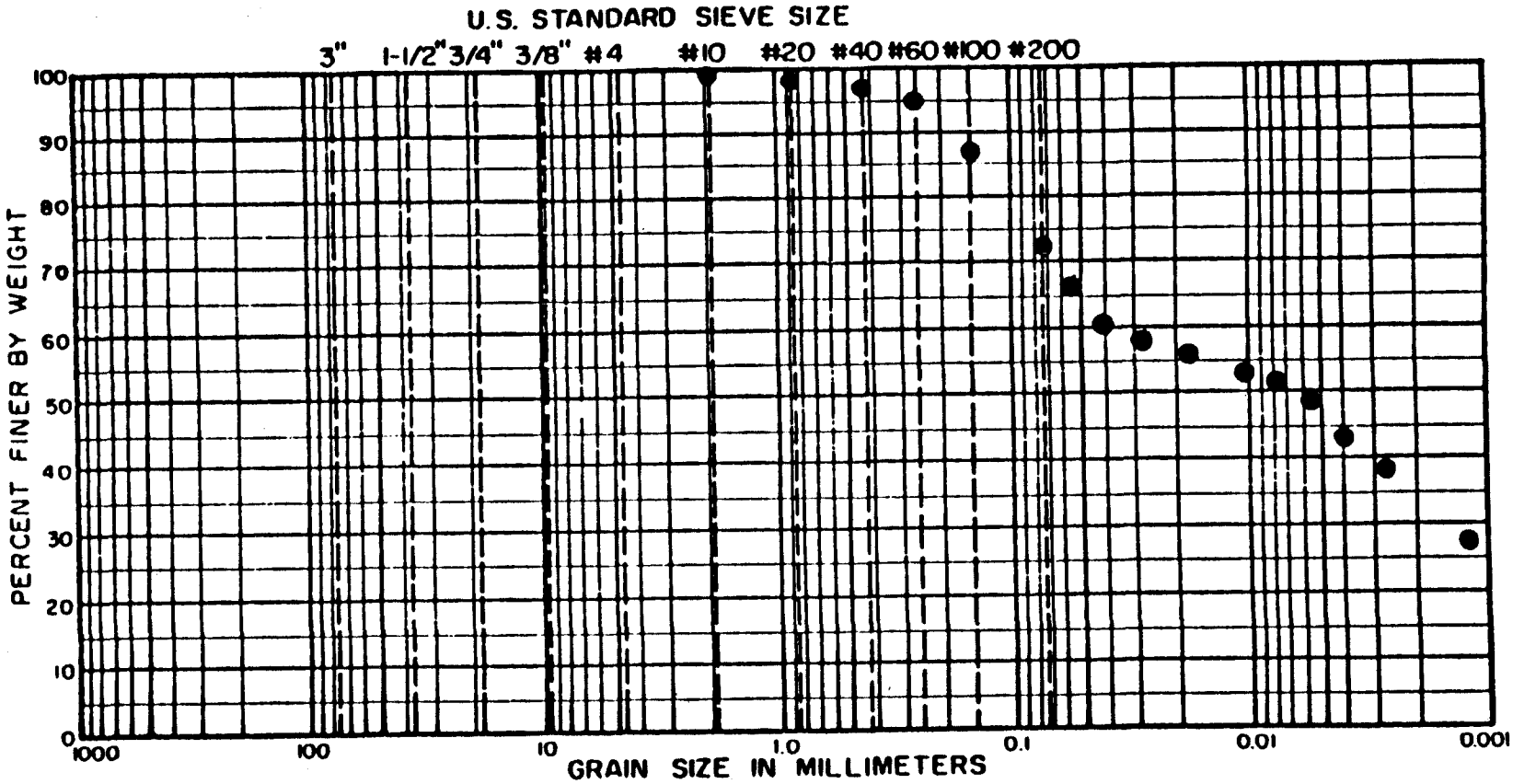
HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	32.420
Wt. Dry Soil & Pan (g)	32.210
Wt. of Pan Only (g)	3.800

Sieve:

Wt. Total Sample Wet (g)	452.11
Weight of + #10 Before Washing (g)	3.19
Weight of + #10 After Washing (g)	1.67
Weight of - #10 Wet (g)	448.92

Hydrometer:

Hydrometer #	ASTM 152 H
Sp. Gr. of Soil	2.710
Value of "a"	0.988
Deflocculant	Sodium Hexametaphosphate
Defloc. Corr'n	4.500
Meniscus Corr'n	-1.000
Temp., Deg. C	22.000
Temp. Coef. K	0.01308
Wt. Wet Hydrom. Samp	60.000
% of Total Sample	100.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
BH00866EBUI	5.0 - 5.25'	#39691

ADVANCED TERRA TESTING

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39691	SAMPLED	11-25-91 BP,KH
DEPTH	5.00 - 5.25 FT	DATE TESTED	1-16-92 TNU
SAMPLE NO.	BH00866EBU1	WASH SIEVE	Yes
SOIL DESCR.	EG&G/ROCKY FLATS	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.000
Sp. Gr. of Soil	2.710	Temp. Coef. K	0.01308
Value of "a"	0.988	Wt. Dry Sample "W"	59.782
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.500		
Meniscus Corr'n	-1.000		

T Elapsed Time (min)	ometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	–	–	–	–	–	–
0.5	45.50	40.00	66.1	66.1	8.83	0.0550
1.0	42.00	36.50	60.3	60.3	9.40	0.0401
2.0	40.50	35.00	57.8	57.8	9.65	0.0287
5.0	39.00	33.50	55.4	55.4	9.89	0.0184
15.0	38.00	32.50	53.7	53.7	10.06	0.0107
30.0	36.50	31.00	51.2	51.2	10.30	0.0077
60.0	34.50	29.00	47.9	47.9	10.63	0.0055
120.0	31.50	26.00	43.0	43.0	11.12	0.0040
250.0	28.50	23.00	38.0	38.0	11.62	0.0028
1440.0	22.00	16.50	27.3	27.3	12.68	0.0012

Grain Diameter = K*(SQRT(L/T))

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER EMPSCO

LOCATION 39671

BORING MH00866 ER01 SAMPLE ____ DEPTH 5.0-5.25'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD → [redacted]

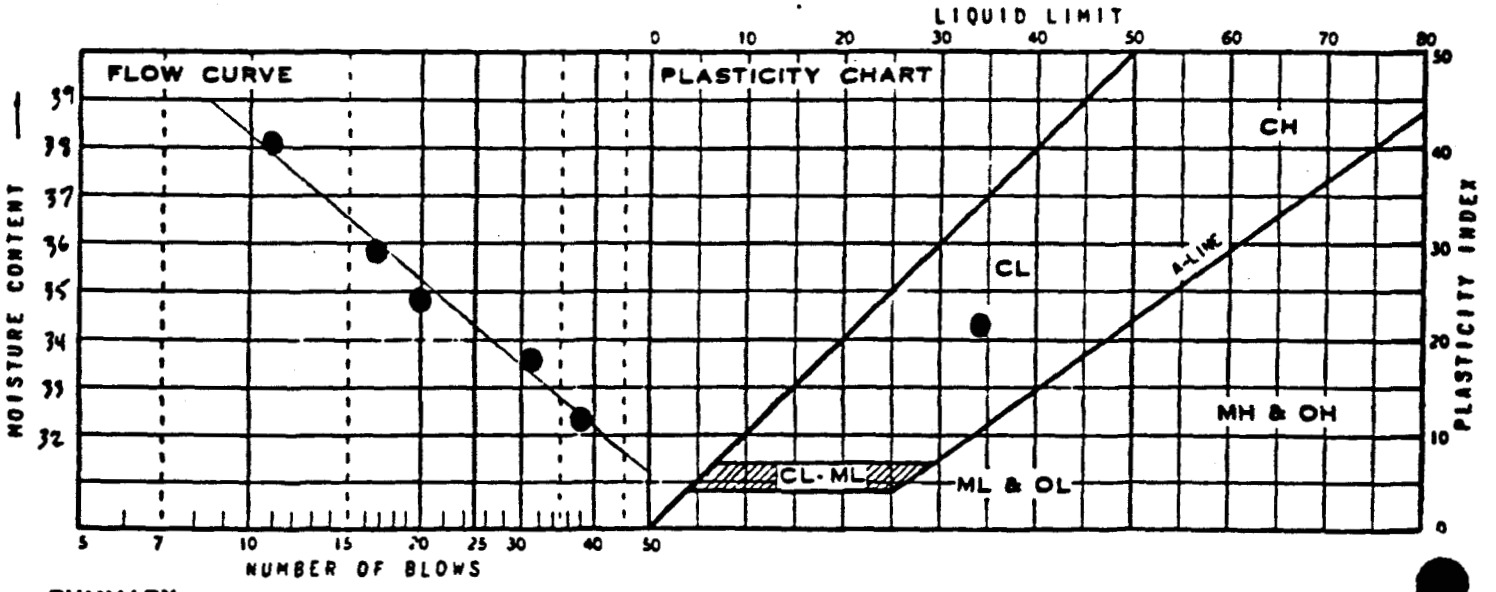
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 1/16/92

DETERMINATION	1	2	3	4	5	6
DISH	22C	25C	64C			
WT OF DISH + WET SOIL g	9.22	9.97	10.18			
WT OF DISH + DRY SOIL g	8.35	8.87	9.10	—	—	—
WT OF MOISTURE g	.87	1.00	1.03			
WT OF DISH g	1.07	1.07	1.07	—	—	—
WT OF DRY SOIL g	7.28	7.80	8.03			
MOISTURE CONTENT %	12.0	12.8	12.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	28C	1D	67C	6	50C	
NUMBER OF BLOWS	39	31	20	17±	11	
WT OF DISH + WET SOIL g	11.49	13.25	14.47	14.08	16.09	
WT OF DISH + DRY SOIL g	8.95	10.18	11.01	10.61	11.95	—
WT OF MOISTURE g	2.54	3.07	3.46	3.42	4.14	
WT OF DISH g	1.09	1.05	1.07	1.06	1.07	—
WT OF DRY SOIL g	7.86	9.13	9.94	9.55	10.88	
MOISTURE CONTENT %	32.3	33.6	34.8	35.8	38.1	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		34.3	12.5	21.8	CL	

ADVANCED TERRA TESTING inc

* Specific Gravity = $W_o / [W_o + (W_a - W_b)]$

BORING NO.	BH00866EB01	BH00741EB01	BH00761EB01	BH00845EB01	BH00833EB01	BH00759EB01
DEPTH	5.0-5.25'	45.7-46.5'	3.0-3.25'	20.9-21.15'	1.5-1.75'	0.5-0.9'
Sample # SAS Tag #	39691	37891	39191	38991	38991	39091
Sampled BY:	11-25-91 BP & KH	11-07-91 KM & MC	11-14-91 KM & MC	11-12-91 BP & KH	11-11-91 PB & MS	11-15-91 KM & MC
Tested BY:						
Checked BY:						
Specific Gravity Flask #	2	2	2	2	2	2
Weight of Specific Gravity Flask (g)	62.4465	62.4465	62.4465	62.4465	62.4465	62.4465
Weight of soil (Oven dry) (W_o) g	25.000	25.000	25.000	25.000	25.000	25.000
Weight of flask 1, soil, and water (W_b)	177.86g	177.860g	178.070	178.010g	177.99	177.730
Temperature °C, (T_x)	22.4	22.8	22.9	22.0	22.8	23.1
Weight of water and flask at T_x (from cal. curve) (W_a)	162.076g	162.062g	162.066	162.074g	162.068	162.061
Specific Gravity = *	2.71	2.72	2.78	2.76	2.75	2.68
PAN #	2C	34+	517	34	80	31

JOB NO. 2021-05 NAME EB4560

ADVANCED TERRA TESTING
SPECIFIC GRAVITY TESTS

Page No. ___ of ___

INDEX OF GEOTECHNICAL DATA

Borehole Number:	**39691**
Sample Number:	**BH00865EBU1**
Sample Depth:	**5.25-5.50 feet (Alluvium)**

Data Available:

__ Grain Size Analysis (Sieve and Hydrometer Test) Data

__ Atterberg Limits Test Data

__ Specific Gravity Test Data

✓ Moisture/Density and Back-pressure Permeability (Triaxial Compression Test) Data

✓ Core Sample Photograph

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT EBASCO

JOB NO. 2031-05

BORING NO.	39691	SAMPLED	11-25-91 BP
DEPTH	5.25 - 5.50 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00865EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	3P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	372.3	379.6
Wt. Wet Soil & Pan (g)	381.6	388.8
Wt. Dry Soil & Pan (g)	326.4	326.4
Wt. Lost Moisture (g)	55.1	62.4
Wt. of Pan Only (g)	9.3	9.3
Wt. of Dry Soil (g)	317.2	317.2
Moisture Content %	17.4	19.7
Wet Density PCF	128.6	137.9
Dry Density PCF	109.5	115.3

Init. Diameter (in)	2.368	(cm)	6.015
Init. Area (sq in)	4.404	(sq cm)	28.415
Init. Height (in)	2.505	(cm)	6.363
Vol. Bef. Consol. (cu ft)	0.00638		
Vol. After Consol. (cu ft)	0.00607		
Effective Porosity %	36.32		
Constant Head (PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
875.0	52500	49.9	28.0	27.0	8.3E-07
673.0	40380	50.2	32.3	24.5	8.7E-07
788.0	47280	49.7	29.5	26.3	8.5E-07
679.0	40740	49.8	32.2	24.8	8.5E-07
783.0	46980	49.9	31.2	25.3	7.8E-07
1319.0	79140	49.9	20.9	30.8	7.6E-07
601.0	36060	49.6	35.2	23.3	7.7E-07
851.0	51060	50.2	30.8	25.3	7.5E-07
586.0	35160	49.6	35.3	23.2	7.9E-07
742.0	44520	50.1	32.8	24.3	7.6E-07

ADVANCED TERRA TESTING, INC.

CLIENT	EBASCO
JOB NO.	2031-05
BORING NO.	39691
DEPTH	5.25 - 5.50 FT
SAMPLE NO.	BH00865EBU1
SOIL DESCR.	SS LINER
SAMPLED	11-25-91 BP
TEST STARTED	12-06-91 DCW
TEST FINISHED	12-25-91
SETUP NO.	3P
TEST TYPE	TX/Pbp
CONF. PRES. PSF	1152
SATURATED TEST	Yes
AT FIELD MOIST.	No
Wt Soil & Moist bt	372.310
Wt Soil & Moist at	379.590
Wt. Dry Soil & Pan	326.440
Wt. of Pan Only (g)	9.260
Consol Info:	
Init. Diameter in.	2.368
Initial Height in.	2.505
Vol. change (sat. con.) CC	22.800
Cell Exp.	13.800
Height Change in.	0.047
Test info:	
Pore pres @ begin. psi	69.000
Strain Rate	0.003
Piston Corr. cc/in	0.000
Constant Head (PSI)	2.000

TRIAXAL COMPRESSION TEST DATA

CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39691	SAMPLED	11-25-91 BP
DEPTH	5.25 - 5.50 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00865EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	3P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.0	11.3				
50.0	48.0	11.2	12.5	38.5	47.6	9.1	0.91
60.0	58.0	[illegible]	14.3	48.6	57.9	9.3	0.93
70.0	68.0	[illegible]	15.9	58.7	68.2	9.5	0.95

CONSOLIDATION DATA

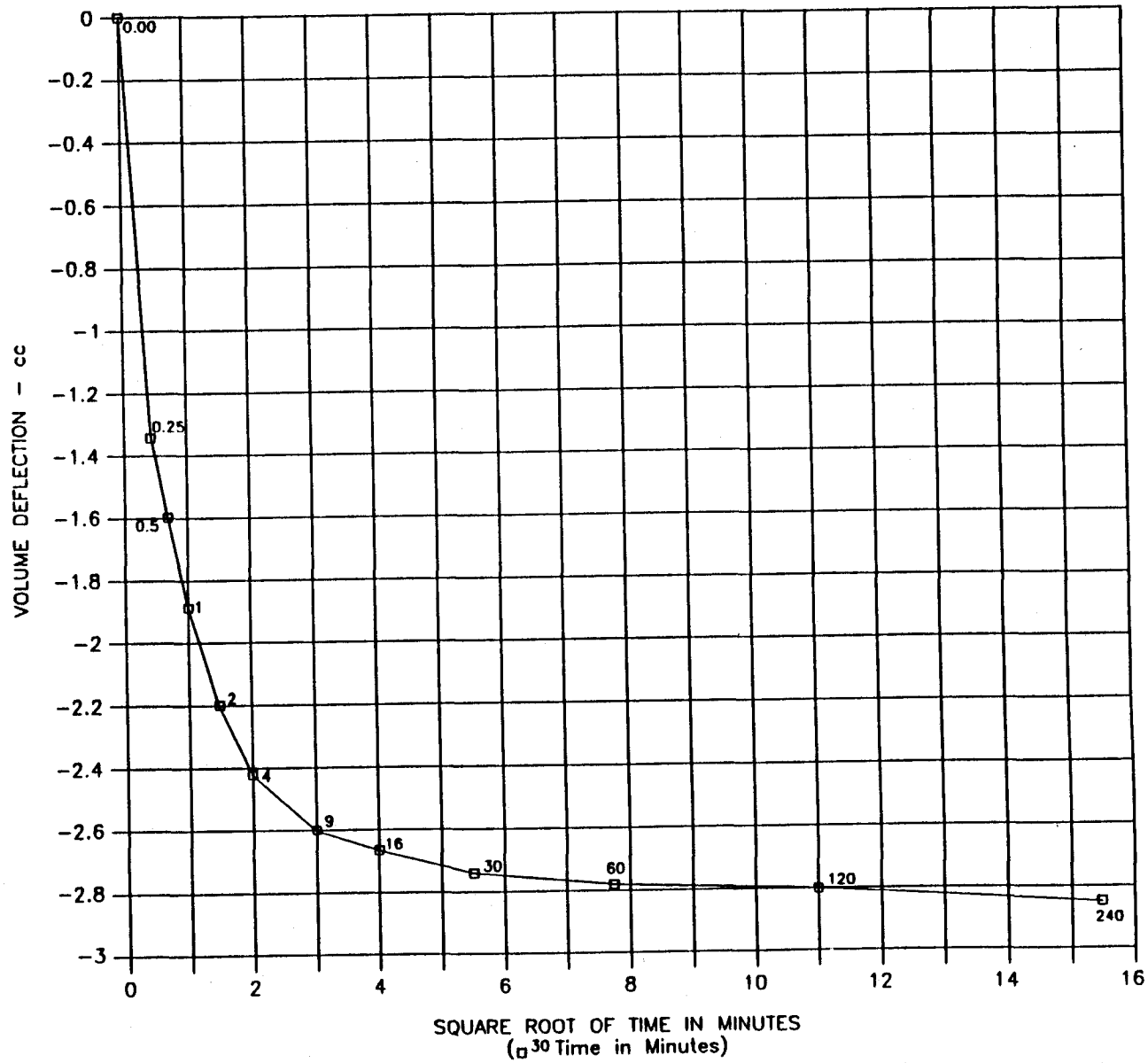
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	16.30	0.00
0.25	0.50	17.65	-1.35
0.5	0.71	17.90	-1.60
1	1.00	18.20	-1.90
2	1.41	18.50	-2.20
4	2.00	18.73	-2.43
9	3.00	18.90	-2.60
16	4.00	18.98	-2.68
30	5.48	19.03	-2.72
60	7.75	19.08	-2.77
120	10.95	19.10	-2.80
240	15.49	19.15	-2.85

Initial Height (in)	2.505	Init. Vol. (CC)	180.82
Height Change (in)	0.047	Vol. Change (CC)	22.80
Ht. After Cons. (in)	2.458	Cell Exp. (CC)	13.80
Initial Area (sq in)	4.404	Net Change (CC)	9.00
Area After Cons. (sq in)	4.265	Cons. Vol. (CC)	171.82

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

BH00865EBU1 @ 5.25-5.50', 1152 psf (confining pressure)



TRIAXAL COMPRESSION TEST DATA

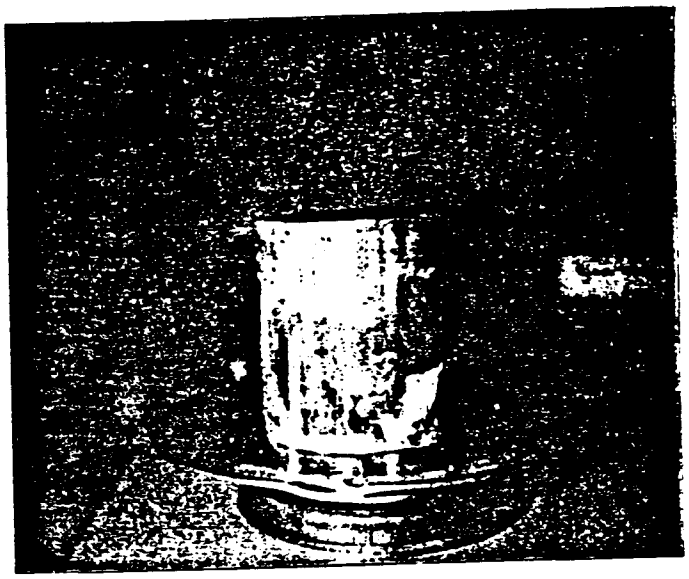
CLIENT	EBASCO	JOB NO.	2031-05
BORING NO.	39691	SAMPLED	11-25-91 BP
DEPTH	5.25 - 5.50 FT	TEST STARTED	12-06-91 DCW
SAMPLE NO.	BH00865EBU1	TEST FINISHED	12-25-91
SOIL DESCR.	SS LINER	SETUP NO.	3P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1152	AT FIELD MOIST.	No

Init. Ht. (in)	2.505	Init. Area (sq in)	4.404
Consol. Ht. (in)	2.458	Consol. Area (sq in)	4.265
Back Pres. PSI	69.0	Strain Rate (in/min)	0.003

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Eff. Stress Ratio
0.0	0	0.00	0.00	4.265	0	69.00	0.0	1152	0	0.00
125.0	4221	0.01	0.41	4.282	4341	49.50	-2808.0	3960	8301	2.10
165.0	5571	0.02	0.81	4.300	5706	50.00	-2736.0	3888	9594	2.47
187.0	6314	0.03	1.22	4.318	6440	51.00	-2592.0	3744	10184	2.72
193.0	6516	0.04	1.63	4.335	6620	54.50	-2088.0	3240	9860	3.04
190.0	6415	0.05	2.03	4.353	6490	56.80	-1756.8	2909	9399	3.23
185.0	6246	0.06	2.44	4.372	6293	57.00	-1728.0	2880	9173	3.18
180.0	6078	0.07	2.85	4.390	6097	57.40	-1670.4	2822	8920	3.16
176.0	5942	0.08	3.25	4.408	5937	57.60	-1641.6	2794	8730	3.13
172.0	5807	0.09	3.66	4.427	5777	57.70	-1627.2	2779	8557	3.08
167.0	5639	0.10	4.07	4.446	5586	57.80	-1612.8	2765	8351	3.02
151.0	5098	0.15	6.10	4.542	4944	57.80	-1612.8	2765	7708	2.79
140.0	4727	0.20	8.14	4.643	4484	57.80	-1612.8	2765	7249	2.62
139.0	4693	0.25	10.17	4.748	4353	57.80	-1612.8	2765	7118	2.57
150.0	5065	0.30	12.21	4.858	4592	57.80	-1612.8	2765	7356	2.66
157.5	5318	0.35	14.24	4.973	4709	58.00	-1584.0	2736	7445	2.72
164.5	5554	0.40	16.27	5.094	4802	58.40	-1526.4	2678	7481	2.79
175.0	5909	0.45	18.31	5.221	4985	58.70	-1483.2	2635	7620	2.89
149.0	5031	0.50	20.34	5.354	4138	59.20	-1411.2	2563	6701	
140.0	4727	0.55	22.38	5.494	3789	59.50	-1368.0	2520	6309	
140.0	4727	0.60	24.41	5.642	3690	59.70	-1339.2	2491	6181	

ADVANCED TERRA TESTING, INC.

CORE PHOTOGRAPH



39691

BH00865EBUI

5.25-5.50 foot depth interval

Confining Pressure (σ_3)=1152 pounds per square foot

A3
SURVEYING DATA

All boreholes and wells, and several other key locations, were surveyed at the conclusion of the Phase III RFI/RI field investigation. This appendix includes a brief summary of the surveying program, tabulations of well/borehole coordinates and elevations, and a location map, as well as field notes, and daily crew reports.

A3.1 SURVEYING PROGRAM SUMMARY

In June 1991, Merrick & Company was contracted by EBASCO to survey locations of the 157 test wells and boreholes planned for the OU1 area at RFP. The field surveying activities took place from November 18 to 26 and December 16 to 18, 1991. The final number of wells and boreholes surveyed was 121. All well locations were surveyed from control points included in the plant-wide survey control verification done by Merrick & Company as Task 9 of the Phase II Geologic Characterization Data Acquisition (EG&G 1992).

A quality assurance check was performed on the surveying data in December 1991. Errors found were corrected and the data were reprocessed and resubmitted in January 1992.

Coordinates for well and borehole locations in state planar, modified state planar, and RFP coordinate systems are presented in Tables A3-1, A3-2, and A3-3, respectively. Plate A-1 shows the locations of surveyed wells and boreholes at OU1. The field notes and daily crew reports prepared during the course of this work are included in Attachments A3-1 and A3-2.

A3.2 REFERENCES

EG&G, 1992. Well Resurvey Report, Phase II Geologic Characterization Data Acquisition, Prepared by Merrick & Company for EG&G Rocky Flats, Inc., February 1992.

Table A3-1

Survey Data For Surface Water Media

Location	Northing	Easting	Ground Elevation
SW029	747825	2086355	5814.80
SW031	747666	2084196	5907.60
SW032	747231	2084061	5872.70
SW033	747226	2083858	5876.40
SW034	747129	2083864	5884.40
SW035	747787	2083253	5956.30
SW036	747762	2082579	5963.70
SW038	747720	2081390	5985.30
SW039	746995	2080255	5980.50
SW066	747692	2084513	5894.30
SW067	747707	2084750	5884.40
SW068	747727	2084903	5873.80
SW069	747786	2085197	5863.80
SW070	747839	2085477	5854.30

Table A3-2

Survey Data for Seep Media

Location	Northing	Easting	Ground Elevation
SW044	747664	2083950	5923.70
SW045	747865	2084019	5934.80
SW046	747885	2083927	5945.80
SW071	748167	2084991	5933.90
SW072	748161	2085096	5928.80
SW126	747711	2084169	5920.00
SW125	748222	2084226	5967.10

Table A3-3

Survey Data For Surface Soil Media

Location	Northing	Easting
RA010	748270	2083616
RA011	748370	2085016
RA012	747470	2083716
RA013	748270	2084916
RA014	748020	2084016
RA015	747470	2084316
RA016	748170	2084616
RA017	748370	2084916
RA018	748220	2085116
RA019	748120	2085616
RA020	748020	2085416
RA021	747570	2084716
RA022	748220	2085516
RA023	748220	2085716
RA024	748270	2085816
RA025	748320	2085816
RA026	747920	2086116
RA027	748070	2085916
RA028	747470	2083816
RA029	748320	2085116
RA030	748520	2085516
RA031	748420	2085416
RA032	748220	2084916
RA033	748120	2084716
RA034	748220	2084416
RA035	748120	2084316
RA036	748020	2083816
RA037	747970	2083816

Table A3-4

Survey Data For Sediment Media

Location	Northing	Easting	Ground Elevation
SED014	747000	2080400	5980.00
SED028	747985	2086241	5837.30
SED037	747787	2083253	5956.30
SED038	748623	2086091	5937.20
SED039	747839	2085477	5854.30
SED040	747229 *	2084036 *	.00
SED041	747546 *	2084988 *	.00
SED042	747673 *	2085496 *	.00

* = Not Surveyed, Approximate Points

Table A3-5

Survey Data For Borehole Media

Location	Northing	Easting	Ground Elevation
0787	748053	2084799	5928.21
0987	749068	2085348	5980.22
1087	748946	2085290	5981.95
1187	748409	2086100	5913.60
1287	748581	2086066	5934.81
1387	748230	2086645	5855.02
1487	748228	2086616	5854.98
1587	749011	2086249	5971.27
1687	749130	2086249	5969.49
1787	749415	2086308	5968.01
30091	747691	2085362	5843.56
30191	747541	2084662	5872.51
30291	747574	2084245	5902.74
30391	747534	2083892	5910.79
30491	747529	2083900	5909.74
30591	747683	2083558	5942.18
30691	747403	2084301	5873.56
30791	747414	2084267	5876.48
30891	747450	2084285	5879.04
31091	747622	2084217	5907.01
31191	747967	2085733	5878.37
31291	747616	2084146	5907.54
31391	747821	2085130	5884.52
31591	747720	2084238	5915.07
31691	747620	2084198	5906.76
31991	748181	2083666	5993.91
32091	748141	2084048	5967.14
32191	748108	2084149	5965.04
32291	747252	2083795	5887.99
32391	748247	2083678	5997.96
32491	748053	2083800	5968.19
32691	748456	2085466	5962.42
32791	747918	2084757	5915.34
32891	748363	2085363	5960.63
32991	748273	2085382	5949.07
33091	748010	2084928	5916.29
33191	748526	2085642	5958.55
33291	748539	2085561	5966.85
33391	748078	2084926	5924.42
33591	748395	2085494	5988.48
33791	748626	2085624	5974.99
33991	748184	2085081	5934.23
34091	748090	2084959	5924.86
34191	748089	2084708	5935.82
34291	748118	2084882	5932.03
34391	748166	2085116	5930.29
34491	748184	2084857	5939.73
34691	748057	2084846	5925.03
34891	748057	2084789	5927.67
34991	748002	2084742	5924.78
35091	747918	2084495	5936.97
35191	747845	2083816	5951.10
35291	747985	2084692	5926.30
35491	748013	2084644	5932.85
35591	748138	2084682	5944.04
35791	748207	2084586	5958.97
35891	748265	2084433	5975.90
36091	748164	2084408	5969.82
36291	748203	2084367	5971.91
36491	747740	2084094	5929.83
36591	748334	2084368	5987.86
36891	748147	2084151	5970.09
37091	748284	2084367	5977.18
37291	747804	2083817	5947.41
37391	747744	2084194	5922.50

Table A3-5 (Continued)

Survey Data For Borehole Media

Location	Northing	Easting	Ground Elevation
37491	748190	2084274	5964.99
38091	748343	2083629	6003.71
38391	747347	2084371	5870.76
38491	747365	2084350	5871.49
38691	747488	2084888	5856.98
38791	747506	2084880	5857.60
39091	747695	2085461	5839.79
39391	747865	2086969	5801.64
39491	747849	2083935	5838.11
39591	747799	2083933	5838.00
39791	747351	2089761	5730.37
5787	748030	2084788	5924.92
5887	752234	2082531	5995.46
5987	752313	2082563	5992.90
6187	752860	2083072	5984.42
6287	752800	2083097	5984.54
6387	752717	2083138	5985.63
B300190	748063	2085428	5916.24
B300290	748019	2085340	5909.44
B300390	747978	2085247	5904.60
B300490	747926	2085165	5891.30
B300590	747879	2085078	5895.90
B300690	747834	2084990	5896.35
B300790	747818	2084893	5890.55
B300890	747807	2084793	5897.35
B300990	747795	2084695	5905.35
B301090	747783	2084596	5910.75
B301190	747771	2084500	5912.94
B301290	747761	2084400	5916.54
B301390	747749	2084301	5918.54
B301490	747737	2084196	5922.54
B301590	747725	2084104	5926.60
B301690	747716	2084006	5930.40
B301790	747716	2083907	5932.10
B301890	747715	2083807	5934.10
B301990	747744	2083764	5933.10
B302090	747806	2083705	5954.20
B302190	747905	2083606	5974.80
B302290	747960	2083559	5977.30
B302990	747960	2084072	5952.30
B303090	747921	2084002	5951.20
B303190	747827	2084000	5937.90
B303290	747778	2084004	5937.00
B303390	748111	2085518	5916.40
B303490	748157	2085604	5913.60
B303590	748202	2085691	5911.90
B303690	748249	2085780	5912.20
B303790	748013	2085289	5913.30
B303890	747917	2085131	5894.20
B303990	747815	2084841	5893.30
B304090	747757	2084349	5918.00
B304190	747757	2083863	5933.80
B304290	747930	2083583	5976.30
36791	748155	2084171	5969.84

Table A3-6

Survey Data For Groundwater Media

Location	Northing	Easting	Ground Elevation(ft)	Elevation Top of Casing(ft)
0974	748028	2084783	5925.10	5926.25
1074	747988	2084705	5925.80	5925.91
5886	747084	2083435	5895.21	5897.65
5986	747754	2084267	5920.30	5915.30
5986R	747753	2084260	5919.88	5921.66
6286	748143	2085725	5902.01	5903.18
6386	748145	2085753	5901.09	5902.01
6486	747672	2085610	5839.06	5841.05
6886	747154	2083582	5887.97	5890.49
6986	747770	2084282	5921.46	5922.52
0187	748127	2083653	5992.49	5994.08
0287	747708	2083934	5930.99	5932.53
0387	747706	2083962	5930.58	5932.44
0487	747943	2084887	5910.12	5911.58
0587	748081	2084849	5927.85	5929.99
0687	748003	2085134	5904.76	5906.32
0887	747758	2084294	5919.95	5921.55
4387	748030	2084788	5925.06	5926.41
4487	748306	2085435	5949.63	5951.10
4587	748313	2085451	5949.32	5950.91
4787	747779	2084903	5882.76	5884.64
4887	747829	2084691	5909.67	5911.41
4987	747991	2085004	5912.66	5914.27
5087	748123	2085334	5933.14	5934.78
5187	748103	2083850	5963.27	5965.22
5287	748145	2084067	5967.85	5969.57
5387	747985	2083912	5959.99	5961.81
5487	747985	2084032	5955.85	5957.62
5587	747619	2084919	5858.39	5860.09
B301889	747310	2085322	5866.80	5868.83
B302089	746786	2083490	5907.60	5909.55
00791	748303	2086023	5907.11	5908.27
07391	748547	2085827	5949.14	5950.61
30991	747745	2085295	5849.77	5851.82
31491	747749	2084649	5902.58	5905.03
31791	747425	2084276	5877.06	5879.80
31891	747661	2084142	5916.91	5919.52
32591	747976	2084852	5914.86	5917.41
33491	748080	2084883	5926.06	5928.59
33691	748112	2084994	5926.99	5929.24
33891	747961	2084641	5927.54	5929.94
34591	748462	2085621	5952.19	5954.63
34791	748377	2085521	5951.39	5953.91
35391	748011	2083907	5960.73	5963.03
35691	747797	2084005	5938.76	5941.36
35991	748057	2083756	5973.25	5976.45
36191	748091	2084198	5962.89	5965.17

*Report based on survey data from RFEDs. Some discrepancies between this data and survey data recorded on borehole logs.

Table A3-6 (continued)

Survey Data For Groundwater Media

Location	Northing	Easting	Ground Elevation(ft)	Elevation Top of Casing(ft)
36391	748042	2084294	5964.57	5967.01
36691	748027	2084421	5949.76	5951.52
36991	748180	2084177	5969.48	5972.31
37191	748036	2084533	5945.91	5948.29
37591	748580	2084610	5991.42	5993.45
37691	748692	2085217	5984.46	5985.24
37791	748592	2083753	6002.16	6004.18
37891	748075	2084915	5925.22	5926.29
37991	748063	2084731	5931.45	5933.55
38191	748014	2084765	5924.47	5926.40
38291	748032	2084801	5924.49	5926.71
38591	747408	2084659	5864.72	5866.62
38891	747830	2085051	5891.26	5893.24
38991	747820	2085024	5893.08	5895.45
39191	748009	2084921	5918.16	5918.32
39291	747949	2084974	5908.38	5910.24
39691	748357	2083634	6006.26	6008.37
39991	747689	2083972	5929.9	5932.36
45391	747791	2084847	5891.17	5894.24
891COLWELL	748015	2084773	5927.5	
10092	747942	2085296	5898.42	5900.47
10192	747687	2084096	5922.66	5924.30
10292	747692	2084106	5923.79	5925.46
10392	747677	2083820	5930.23	5932.05
10492	747678	2083812	5930.83	5932.81
10592	747716	2083725	5936.14	5937.93
10692	747745	2083638	5941.50	5943.60
10792	747723	2084363	5915.02	5917.10
10892	747671	2083928	5928.10	5929.20
10992	747775	2084780	5896.85	5898.56
11092	747842	2085079	5893.33	5895.31

*Report based on survey data from RFEDs. Some discrepancies between this data and survey data recorded on borehole logs.

NOTICE

This document (or documents) is oversized for 16mm microfilming, but is available in its entirety on the 35mm fiche card referenced below:

Document # 0001647

Titled: Elasco Environmental Plot of wells, located

Fiche location: A-0401-M3

Attachment A3-1
Survey Crew Daily Notes

Phase III
RFI/RI Report

1849/M

ROCKY FLATS (EBASCO)
WELL + BORING LOCATIONS
282-7590

11/18/91
CLOUDY / 35°

RICH BATEMAN
DAN DOHERTY

T @ 4 5997.15 HI = 4 70

BS @ 202 W/ 00°00'00"

FS (30391)
1) 283 33 15
2) 207 06 13
M) 283 33 07

T @ 4
ZEN. ∡ TO 30391 D 92 57 12
SLOPE TO 30391 R 267 03 00
1652.88 FT. T 360 00 12
503.798 M. M 92 57 06
HI = 4 70 HT = 6 00
5910.79

FS (30291)
1) 293 49 02
2) 227 37 48
M) 293 48 54

T @ 4
ZEN. ∡ TO 30291 D 93 44 35
SLOPE TO 30291 R 266 15 48
1428.15 FT. T 360 00 23
435.298 M. M 93 44 23
HI = 4 70 HT = 6 00

FS (31091)
1) 294 13 51
2) 228 27 19
M) 294 13 39

T @ 4
ZEN. ∡ TO 31091 D 93 26 25
SLOPE TO 31091 R 266 33 58
1482.66 FT. T 360 00 23
451.920 M. M 93 26 13
HI = 4 70 HT = 6 00

ROCKY FLATS (EBASCO)
WELL + BORING LOCATIONS
282.7590

11.18.91
CLOUDY 35°

20/1849

R.B.
D.D.

TC 4
BS 202 W/00°
HI = 4.70

FS (31691)
OFFSET #2
1) 293.36.21
2) 227.12.21
M) 293.36.10

TC 4
ZEN. ∡ TO 31691
SLOPE TO 31691
1492.99 FT.
455.072 M.
HI = 4.70

D 93.25.30
R 266.34.45
T 360.00.15
M 93.25.22
HT = 6.00

FS (31291)
OFFSET #1
1) 292.01.37
2) 224.03.04
M) 292.01.32

TC 4
ZEN. ∡ TO 31291
SLOPE TO 31291
1524.87
464.768
HI = 4.70

D 93.19.27
R 266.40.48
T 360.00.15
M 93.19.19
HT = 6.00

FS (31891)
1) 293.03.12
2) 226.06.06
M) 293.03.03

TC 4
ZEN. ∡ TO 31891
SLOPE TO 31891
1560.18 FT.
475.545 M.

D 93.00.18
R 266.59.45
T 360.00.03
M 93.00.17

	H.T.
(31891) OUTSIDE CASING (TOP)	03
TOP OF P.V.C.	06
TOP OF CONC.	241

21/1849

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·18·91
35° CLOUDY

R.B.
D.D.,

TC 4
BS 202 W/00°
HI = 4 70

FS (32291)
1) 273·18·53
2) 186·37·44
M) 273·18·52

TC 4
ZEN. ∡ TO 32291
SLOPE TO 32291
1577.22 FT.
480.735 M.
HI = 4 70

D 93·55·19
R 266·04·30
T 359·59·49
M 93·55·24
HT = 6 00

FS (30891)
1) 291·37·01
2) 223·13·49
M) 291·36·54

TC 4
ZEN. ∡ TO 30891
SLOPE TO 30891
1311.30 FT.
399.685 M.
HI = 4 70

D 95·06·57
R 264·53·28
T 360·00·25
M 95·06·44
HT = 6 00

FS (30191)
1) 308·29·32
2) 256·58·41
M) 308·29·20

TC 4
ZEN. ∡ TO 30191
SLOPE TO 30191
1173.06 FT
357.540 M.
HI = 4 70

D 96·02·12
R 263·57·48
T 360·00·00
M 96·02·12
HT = 6 00

22/1849

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.18.91
35° CLOUDY

R.B.
D.D.

TC 4
BS 202 W/00°
HI = 4 70

FS (38591)
D) 305.09.38
2) 250.19.04
M) 305.09.32

H.T.
(38591) OUTSIDE CASING (TOP) 0 3
TOP OF P.V.C. 1 1
TOP OF CONC. 2 64

TC 4
ZEN. ∡ TO 38591 D 97.17.00
SLOPE TO 38591 R 262.43.10
1058.39 FT. T 360.00.10
322.599 M. M 97.16.55
HI = 4 70

FS (30991)
1) 340.01.09
2) 320.02.03
M) 340.01.01

H.T.
(30991) OUTSIDE CASING (TOP) 0 3
TOP OF P.V.C. 0 85
TOP CONC. 2 90

TC 4
ZEN. ∡ TO 30991 D 96.45.44
SLOPE TO 30991 R 263.14.30
1267.56 FT. T 360.00.14
386.353 M. M 96.45.37
HI = 4 70

FS (30091)
1) 343.26.26
2) 326.52.45
M) 343.26.22

TC 4
ZEN. ∡ TO 30091 D 97.09.00
SLOPE TO 30091 R 262.51.05
1223.88 FT. T 360.00.05
373.042 M. M [illegible] 38.53

1849/23

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.20.91
CLEAR 30°

R.B.
D.D.

T@ 4
BS 202 W/00°
HI = 4 69

FS 31791
1) 290.34.21
2) 221.08.09
M) 290.34.05 ✓

(H.T.)
03
056
268

31791 TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

T@ 4
ZEN. ∡ TO 31791 D 95.22.08
SLOPE TO 31791 R 264.38.08
1299.20 FT T 360.00.16 ✓
395.998 M. M 95.22.00
HI = 4 69

FS 30691
1) 290.42.55
2) 221.25.15
M) 290.42.38 ✓

T@ 4
ZEN. ∡ TO 30691 D 95.32.42
SLOPE TO 30691 R 264.27.25
1266.08 FT T 360.00.07 ✓
385.912 M. M 95.32.38 ✓
HI = 4 69
HT = 6 00

FS 38491
1) 291.07.42
2) 222.15.04
M) 291.07.32 ✓

T@ 4
ZEN. ∡ TO 38491 D 95.55.18
SLOPE TO 38491 R 264.04.37
1205.47 FT T 359.59.55
367.422 M M 95.55.20 ✓
HI = 4 69
HT = 6 00

ROCKY FLATS EBASCO
WELL & BORING LOCATIONS

11·20·91
CLEAR 50°

1849/24
R.B.
D.D.

T@ 4
BS 202 W/00°
FS 38791

HI = 4.69

1) 318·20·45
2) 276·41·10
M) 318·20·35

T@ 4
ZEN. ∡ TO 38791
SLOPE TO 38791
1064.59 FT.
324.483 M.
HI = 4.69

D 97·27·40
R 262·32·12
T 359·59·52
M 97·27·44
HT = 6.00

FS 31191

1) 355·15·03
2) 350·29·54
M) 355·14·57

T@ 4
ZEN. ∡ TO 31191
SLOPE TO 31191
1582.70 FT
482.405 M.
HI = 4.69

D 94·15·24
R 265·44·24
T 359·59·48
M 94·15·30
HT = 6.00

FS 30591

1) 280·50·39
2) 201·41·02
M) 280·50·31

T@ 4
ZEN. ∡ TO 30591
SLOPE TO 30591
2007.15 FT.
611.778 M.
HI = 4.69

D 91·31·54
R 268·27·45
T 359·59·39
M 91·32·04
HT = 6.00

1849/25

R. B.
D. D.

ROCKY FLATS LEASCO
WELL & BORING LOCATIONS

11·20·91
CLEAR 50°

HI = 4 69

π @ 4
BS 202 W/00°
FS 31991
1) 292·41·26
2) 225·22·25
M) 292·41·13

π @ 4
ZEN. ∡ TO 31991
SLOPE TO 31991
2263.29 FT.
689.855 M.
HI = 4 69

D 90·02·56
R 269·56·45
T 359·59·41
M 90·03·06
HT = 6 00

FS 36191
1) 303·05·15
2) 246·10·21
M) 303·05·11

H.T.
0 30
0 82
2 70

36191 TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

π @ 4
ZEN. ∡ TO 36191
SLOPE TO 36191
1872.56 FT.
570.754 M.
HI = 4 69

D 91·05·48
R 268·53·54
T 359·59·42
M 91·05·57
HT = ——

FS 37691
1) 335·36·15
2) 311·12·17
M) 335·36·09

H.T.
7 89
9 81
10 60

37691 TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

π @ 4
ZEN. ∡ TO 37691
SLOPE TO 37691
2200.64 FT.
670.756 M.
HI = 4 69

D 90·10·36
R 269·49·05
T 359·59·41
M 90·10·46
HT = ——

1849/26

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.20.91
50° CLEAR

R.B.
D.D.

π@ 4 ES 202 FS 33291	HI = 4 69 W/00" 1) 345.11.36 2) 330.23.09 M) 345.11.35	π@ 4 ZEN. ∡ TO 33291 SLOPE TO 33291 2084.26 FT 635.288 M HI = 4 69	D 90.47.54 R 269.11.58 T 359.59.52 M. 90.47.58 HT = 6 00
FS 33191	1) 347.25.45 2) 334.51.24 M) 347.25.42	π@ 4 ZEN. ∡ TO 33191 SLOPE TO 33191 2088.50 FT 636.577 M. HI = 4 69	D 91.01.24 R 268.58.20 T 359.59.44 M 91.01.32 HT = 6 00
FS 32691	1) 342.56.13 2) 325.52.12 M) 342.56.06	π@ 4 ZEN. ∡ TO 32691 SLOPE TO 32691 1986.66 FT 605.546 M. HI = 4 69	D 90.57.54 R 269.01.55 T 359.59.49 M 90.57.59 HT = 6 00

ROCKY FLATS (BASCO)
WELL & BORING LOCATIONS

11.20.91
50° ~~CLEAR~~ P. CLOUDY

R.B.
D.D.

π @ 4
BS 302 W/000
HI = 4 69

FS 32891
1) 340.15.30
2) 320.30.53
M) 340.15.27

π @ 4
ZEN. ∡ TO 32891
SLOPE TO 32891
1880.75 FT.
573.249 M.
HI = 4 69

D 91.04.24
R 268.55.24
T 359.59.48
M 91.04.30
HT = 6 00

FS 32991
1) 341.09.00
2) 322.17.57
M) 341.08.59

π @ 4
ZEN. ∡ TO 32991
SLOPE TO 32991
1793.97 FT.
546.807 M.
HI = 4 69

D 91.29.42
R 268.30.10
T 359.59.52
M 91.29.46
HT = 6 00

FS 33591
1) 344.02.00
2) 328.03.48
M) 344.01.54

π @ 4
ZEN. ∡ TO 33591
SLOPE TO 33591
1930.68 FT.
588.471 M.
HI = 4 69

D 91.11.58
R 268.47.35
T 359.59.53
M 91.12.01
HT = 6 00

1849/28

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·20·91
45° CLOUDY

R.B.
D.D.

π @ 4
BS 202 W/00°
HI = 4 69

π @ 4
ZEN. ∡ TO 34791
SLOPE TO 34791
1917.35 FT.
584.411 M.
HI = 4 69

D 91·24·38
R 268·35·15
T 359·59·53
M 91·24·41
HT: ——

FS 34791
1) 344·55·36
2) 329·51·00
M) 344·55·30 (H.T.)

34791 TOP OUTSIDE CASING 0 3
TOP P.V.C. 0 13
TOP CONC. Z 85

FS 34591
1) 347·15·23
2) 334·30·37
M) 347·15·19 (H.T.)

34591 TOP OUTSIDE CASING 0 3
TOP P.V.C. 0 86
TOP CONC. Z 70

π @ 4
ZEN. ∡ TO 34591
SLOPE TO 34591
2021.30 FT
616.095 M.
HI = 4 69

D 91·19·00
R 268·41·02
T 359·00·02
M 91·18·59
HT: ——

FS
1)
2)
M)

π @ 4
ZEN. ∡ TO
SLOPE TO
FT.
M.
HI =

D
R
T
M
HT

1849/29

R.B.
D.D.

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·21·91
50° P. CLOUDY

T@ 4
BS 202 W/ 00°

FS 34391
1) 332·30·33
2) 305·00·36
M) 332·30·18

T@ 4
ZEN. ∡ TO 34391
SLOPE TO 34391
1675.85 FT.
510.801 M.
HI = 4 63

D 92·14·35
R 267·45·36
T 360·00·11
M 92·14·30
HT = 6 00

FS 33991
1) 331·20·36
2) 302·41·00
M) 331·20·30

T@ 4
ZEN. ∡ TO 33991
SLOPE TO 33991
1695.36 FT.
516.753 M.
HI = 4 63

D 92·05·00
R 267·55·06
T 360·00·06
M 92·04·57
HT = 6 00

FS 33691
1) 328·10·18
2) 296·20·30
M) 328·10·15

T@ 4
ZEN. ∡ TO 33691
SLOPE TO 33691
1631.07 FT.
497.152 M.
HI = 4 63

D 92·31·06
R 267·29·00
T 360·00·06
M 92·31·03

33691 TOP OUTSIDE CASING H.T. 0 3
TOP P.V.C. 0 95
TOP CONC. 2 89

1849/30

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.21.91
50° P. CLOUDY

R.B.
D.D.

π @ 4 BS 202	W/00°		π @ 4 ZEN. ∡ TO 34091 SLOPE TO 34091 1613.44 FT. 491.764 M. HI = 4 63	D 92.31.24 R 267.28.50 T 360.00.14 M 92.31.17 HT = 6 00
FS 34091	1) 326.50.02 2) 293.39.55 M) 326.49.58			
FS 37891	1) 325.13.08 2) 290.26.15 M) 325.13.08 TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	H.T. 0 3 1 03 2 34	π @ 4 ZEN. ∡ TO 37891 SLOPE TO 37891 1605.52 FT. 489.364 M. HI = 4 63	D 92.39.42 R 267.20.30 T 360.00.12 M 92.39.36
FS 33491	1) 324.06.27 2) 288.12.34 M) 324.06.17 TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	H.T. 0 3 0 87 2 89	π @ 4 ZEN. ∡ TO 33491 SLOPE TO 33491 1615.61 FT. 492.438 M. HI = 4 63	D 92.34.07 R 267.26.00 T 360.00.07 M 92.34.03 HT [illegible]

1849/31

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.21.91
50° P.CLOUDY

R.B.
D.D.

π @ 4 BS 202	W/00°		π @ 4 ZEN. ∡ TO 34291 SLOPE TO 34291 1652.53 FT. 503.704 M. HI = 4 63	D 92.12.48 R 267.47.15 T 360.00.03 M 92.12.46 HT = 6 00
FS 34291	1) 324.19.00 2) 288.37.48 M) 324.18.54			
FS 38291	1) 320.52.44 2) 281.45.18 M) 320.52.39	H.T.	π @ 4 ZEN. ∡ TO 38291 SLOPE TO 38291 1585.42 FT. 483.235 M. HI = 4 63	D 92.41.21 R 267.18.36 T 359.57.57 M 92.41.22 ~~HT =~~
38291	TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	0 3 0 73 2 65		
FS 34891	1) 320.40.40 2) 281.21.06 M) 320.40.33		π @ 4 ZEN. ∡ TO 34891 SLOPE TO 34891 1613.00 FT. 491.638 M. HI = 4 63	D 92.25.12 R 267.34.34 T 359.59.46 M 92.25.19 HT = 6 00

1849/32

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.21.91
50° P. CLOUDY

R.B.
D.D.

T@ 4
BS 202 11/00°

FS 38191
1) 319.27.33
2) 279.54.57
M) 319.27.29 (H.T.)

38191 TOP OUTSIDE CASING 0.3
TOP P.V.C. 0.87
TOP CONC. 2.54

T@ 4
ZEN ∡ TO 38191 D 92.42.25
SLOPE TO 38191 R 267.17.16
1577.10 FT T 359.59.41
480.699 M. M 92.42.35
HI = 4.63 HT =

FS 34991
1) 318.32.36
2) 277.05.09
M) 318.32.35

T@ 4
ZEN. ∡ TO 34991 D 92.35.30
SLOPE TO 34991 R 267.24.37
1572.07 FT T 360.00.07
479.165 M M 92.35.26
HI = 4.63 HT 6.00

1847
FS 34991 OFFSET
1) 318.38.03
2) 277.15.50
M) 318.37.55

T@ 4
ZEN. ∡ TO D 92.36.54
SLOPE TO R 267.24.00
1571.91 FT T 359.59.54
479.125 M. M 92.35.47
HI = 4.63 HT 6.00

1849/33

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·21·91
50° P. CLOUDY

R.B.
D.D.,

π @ 4
BS 202 w/00°

FS 35291
1) 316·35·39
2) 273·10·58
M) 316·35·29

π @ 4
ZEN. ∡ TO 35291
SLOPE TO 35291
1570.35 FT
478.643 M.
HI = 4 63

D 92·32·14
R 267·27·42
T 359·59·56
M 92·32·16
HT = 6 00

FS 33891
1) 314·32·07
2) 269·03·53
M) 314·31·57

33891
TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

H.T.
0 3
0 90
2 91

π @ 4
ZEN. ∡ TO 33891
SLOPE TO 33891
1563.52 FT.
476.562 M.
HI = 4 63

D 92·36·08
R 267·23·51
T 359·59·59
M 92·36·08
~~HT~~

FS 35491
1) 315·15·55
2) 270·31·27
M) 315·15·44

π @ 4
ZEN. ∡ TO 35491
SLOPE TO 35491
1611.67 FT
491.234 M.
HI = 4 63

D 92·14·18
R 267·45·33
T 359·59·51
M 92·14·23
HT = 1.[illegible]

1849/34

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·21·91
50° P. CLOUDY

R.B.
D.D.

AT @ 4
BS 202 W/00°

FS 37991
1) 318·44·52
2) 277·29·22
M) 318·44·41

37991 TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

H.T.
0 3
0 90
2 87

AT @ 4
ZEN. ∠ TO 37991
SLOPE TO 37991
1633.30 FT.
497.831 M.
HI = 4 63

D 92·21·56
R 267·38·10
T 360·00·06
M 92·21·53
~~HT =~~

FS 34191
1) 318·12·33
2) 276·24·50
M) 318·12·25

AT @ 4
ZEN. ∠ TO 34191
SLOPE TO 34191
1664.65 FT.
507.382 M.
HI = 4 63

D 92·03·55
R 267·55·58
T 359·59·53
M 92·03·58
HT 6 00

FS 35591
1) 317·51·54
2) 275·43·31
M) 317·51·46

AT @ 4
ZEN. ∠ TO 35591
SLOPE TO 35591
1718.48 FT.
523.805 M.
HI = 4 63

D 91·43·42
R 268·16·26
T 360·00·08
M 91·43·38
HT 6 00

1849/35

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.21.91
50° P. CLOUDY

R.B.
D.D.

T@ 4
BS 202 W/00°

FS 34491
1) 323.53.20
2) 287.46.30
M) 323.53.15

T@ 4
ZEN. ∡ TO 34491
SLOPE TO 34491
1721.61 FT.
524.728 M.
HI = 4.63

D 91.52.02
R 268.07.54
T 359.59.56
M 91.52.04
HT = 6.00

FS 37291
1) 288.29.24
2) 216.58.33
M) 288.29.17

T@ 4
ZEN. ∡ TO 37291
SLOPE TO 37291
1886.56 FT.
575.040 M.
HI = 4.63

D 91.28.22
R 268.31.48
T 360.00.10
M 91.28.17
HT = 6.00

FS 35391
BORING
1) 294.42.53
2) 229.25.26
M) 294.42.43

T@ 4
ZEN. ∡ TO 35391
SLOPE TO 35391
1974.78 FT
601.913 M
HI = 4.63

D 91.01.32
R 268.58.27
T 359.57.59
M 91.01.32
HT = 6.00

1849/36

R.B.
D.D.

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11.21.91
50° P. CLOUDY

AT @ 4
BS 202 W/00°

FS (35391 WELL) 1) 294.38.01
2) 229.15.31
M) 294.37.46 (H.T.)

(35391 WELL) TOP OUTSIDE CASING 0 30
TOP P.V.C. 1 10
TOP CONC. 3 40

AT @ 4
ZEN. ∡ TO 35391 D 91.05.42
SLOPE TO 35391 R 268.54.28
1977.20 FT. T 360.00.10
602.652 M. M 91.05.37
HI = 4 63 HT = ____

FS 1)
2)
M)

FS 1)
2)
M)

1849/37

ROCKY FLATS (EPASCO)
WELL & BORING LOCATIONS

11·22·91
P. CLOUDY 35°

R.P.
D.D.

π@ 4 BS 202 W/00°		π@ 4 ZEN. ∡ TO 37491 SLOPE TO 37491 1921.70 FT. 585.735 M. HI = 4.70	D 90·55·06 R 269·04·25 T 359·59·31 M 90·55·21 HT 6.00
FS 37491	1) 306·32·55 2) 253·05·37 M) 306·32·47		
FS 36291	1) 309·13·08 2) 258·26·10 M) 309·13·05	π@ 4 ZEN. ∡ TO 36291 SLOPE TO 36291 1890.89 FT 576.347 M. HI = 4.70	D 90·43·36 R 269·16·13 T 359·59·49 M 90·43·41 HT = 6.00
FS 35891	1) 311·48·19 2) 263·36·29 M) 311·48·15	π@ 4 ZEN. ∡ TO 35891 SLOPE TO 35891 1920.92 FT. 585.476 M. HI = 4.70	D 90·35·4[illegible] R 269·24·02 T 359·59·45 M 90·35·5[illegible] HT = 6.[illegible]

1849/38

ROCKY FLATS (ERASCO)
WELL & BORING LOCATIONS

11·22·91
35° WINDY, CLOUDY

R.B.
L.L.

π @ 4
BS 202 w/00'

IS 37091
1) 310·13·00
2) 260·25·53
M) 310·12·57

π @ 4
ZEN. ∡ TO 37091
SLOPE TO 37091
1964.71 FT
598.834 M.
HI = 4 70

D 90·32·44
R 269·27·07
T [illegible]
M 90·32·49
HT = 6 00

FS 36591
1) 310·49·45
2) 261·39·24
M) 310·49·42

π @ 4
ZEN. ∡ TO 36591
SLOPE TO 36591
2009.98 FT.
612.638 M.
HI = 4 70

D 90·13·4[illegible]
R 269·46·07
T 359·59·53
M 90·13·4[illegible]
HT = 6 00

FS 36091
1) 309·51·29
2) 259·42·53
M) 309·51·27

π @ 4
ZEN. ∡ TO 36091
SLOPE TO 36091
1838.36 FT.
560.361 M.
HI = 4 70

D 90·48·37
R 269·11·0[illegible]
T 359·59·40
M 90·48·47
H[illegible] 6 00

1849/39

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

7·22·91
35° WINDY, CLOUDY

R.B.
D.D.

π @ 4
BS 202 W/00'

FS 35791
1) 315·33·11
2) 271·06·10
M) 315·33·05

π @ 4
ZEN ∡ TO 35791
SLOPE TO 35791
1813.25 FT
552.281 M.
HI = 4 70

D 91·09·54
R 268·49·48
T [illegible]
M [illegible]
HT = 6 00

FS 36391
1) 304·53·36
2) 249·47·09
M) 304·53·35

H.T.
0 3
0 86
2 87

36391 TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

π @ 4
ZEN. ∡ TO 36391
SLOPE TO 36391
1782.04 FT.
543.167 M.
HI = 4 70

D 91·05·40
R 268·54·18
T 359·59·58
M 91·05·41
~~HT~~

FS 36691
1) 308·21·09
2) 256·42·02
M) 308·21·01

H.T.
0 3
1 04
2 50

36691 TOP OUTSIDE CASING
TOP P.V.C.
TOP CONC.

π @ 4
ZEN. ∡ TO 36691
SLOPE TO 36691
1709.51 FT
521.059 M
HI = 4 70

D 91·39·21
R 268·20·51
T 360·00·12
M 91·39·15
~~HT~~

1849/40

ROCKY FLATS (EPICON)
WELL BORING LOCATIONS

11.22.91
35° CLOUDY

R.B.
D.L.

T@ 4 BS 202 W/00°		T@ 4 ZEN. ∡ TO 37191 SLOPE TO 37191 1672.20 FT. 509.690 M. HI = 4 70	D 91.48.57 R 268.11.12 T 300.00.09 M 91.48.52 ~~HT~~
FS 37191	1) 311.57.43 2) 263.55.12 M) 311-57-36 TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	H.T. 03 067 295	
FS 30491	1) 283.36.37 2) 207.13.03 M) 283.36.31	T@ 4 ZEN. ∡ TO 30491 SLOPE TO 30491 1643.41 FT. 500.918 M. HI = 4 70	D 93.00.04 R 266.59.23 T 359.59.27 M 93.00.20 HT 6 00
FS 35691	1) 292.37.33 2) 225.14.43 M) 292.37.24 35691 TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	HT 03 080 295	T@ 4 ZEN. ∡ TO 35691 SLOPE TO 35691 1751.67 FT. 533.908 M HI = 4 70	D 91.57.09 R 268.[illegible] T 359.59.42 M 91.57.18 ~~HT~~

1849/41

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·25·91
CLEAR 45°

R.B.
[illegible]

π @ 4 BS 202 W/00'		π @ 4 ZEN. ∡ TO 36991 SLOPE TO 36991 1959.48 FT 597.251 M. HI = 4 71	D 90·50·33 R 269·09·36 T 360·00·09 M 90·50·28 HT =
FS 36991	1) 303·54·42 2) 247·49·13 M) 303·54·37		
36991 TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	H.T. 0 3 0 87 2 45		
FS 36791	1) 303·23·01 2) 246·45·51 M) 303·22·56	π @ 4 ZEN. ∡ TO 36791 SLOPE TO 36791 1941.37 FT. 591.732 M. HI = 4 71	D 90·46·13 R 269·13·48 T 360·00·01 M 90·46·13 HT = 6[illegible]
FS 36891	1) 302·44·07 2) 245·28·11 M) 302·44·06	π @ 4 ZEN. ∡ TO 36891 SLOPE TO 36891 1944.94 FT 592.814 M. HI = 4 71	D 90·45·41 R 269·14·18 T 359·59·59 M 90·45·41 HT = [illegible]

1849/42

ROCKY FLATS (CRAFTS)
WELL & BORING LOCATIONS

11.25.91
CLEAR 45°.

R.B
D.D.

π @ 4 BS 202 W/00°		π @ 4 ZEN ∡ TO 32191 SLOPE TO 32191 1913.11 FT. 583.112 M. HI = 4 71	D 90.55.28 R 269.44.25 T 359.59.53 M 90.55.31 HT = 6 00
FS 32191	D 302.05.47 2) 244.11.30 M) 302.05.45		
FS 32091	D 300.08.35 2) 240.17.14 M) 300.08.37	π @ 4 ZEN ∡ TO 32091 SLOPE TO 32091 1996.65 FT. 608.583 M. HI = 4 71	D 90.49.36 R 269.10.23 T 359.59.59 M 90 49 36 HT = 6 00
FS 37791	D 300.22.57 2) 240.45.40 M) 300.22.50	π @ 4 ZEN ∡ TO 37791 SLOPE TO 37791 2534.57 FT. 772.513 M. HI = 4 71	D 89.27.[illegible] R 270.33.09 T 360.00.11 M 89.26.56 HT
37791	TOP OUTSIDE CASING TOP P.V.C. TOP CONC.	21 71 2.74 22 19 [illegible] 24 45	

1849/43

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·25·91
CLEAR 45°

R.E.
D.L.

π @ 4
BS 202 W/00°

FS 32391
1) 294·00·42
2) 228·01·04
M) 294·00·32

π @ 4
ZEN. ∡ TO 32391
SLOPE TO 32391
2305.38 FT.
702.673 M.
HT = 4 71

D 89·57·03
R 270·[illegible]
T 360·[illegible]
M 89·57·02
HT 6 00

FS 32491
1) 293·06·45
2) 226·13·12
M) 293·06·26

π @ 4
ZEN. ∡ TO 32491
SLOPE TO 32491
2079.07 FT.
633.695 M.
HT = 4 71

D 90·30·4[illegible]
R 269·29·12
T 359·[illegible]
M 90·[illegible]
HT = 15 15

FS 35991
1) 292·16·27
2) 224·32·42
M) 292·16·24

TOP OUTSIDE CASING 03
TOP P.V.C. 0 67
TOP CONC. 2 97

π @ 4
ZEN. ∡ TO 35991
SLOPE TO 35991
2110.84 FT.
643.325 M.
HT = 4 71

D 90·40·30
R 269·19·36
T 360·00·06
M 90·40·27
~~HT~~

1849/44

ROCKY FLATS (BASED)
WELL & BORING LOCATIONS

11.25.91
CLEAR 45°

"WINDY"

R.B.
C.L.

AC 4
BS 202 W/[illegible]

FS 34691

1) 322.40.[illegible]
2) 225.20.[illegible]
M) 322.40.13

AC 4
ZEN. ∡ TO 34691
SLOPE TO 34691
1600.26 FT
487.783 M
HI = 4.71

D 92.32.14
R 267.27.36
T ~~[illegible]~~.39.50
M 92.32.19
HT 6.00

PT# 1841

FS TOP OF A 10' METAL PIPE MS-1

1) 293.08.07
2) 226.15.32
M) 293.07.46

AC 4
ZEN ∡ TO MS-1
SLOPE TO MS-1
1457.12 FT
444.122 M
HI = 4.71

D 93.37.06
R 266.[illegible]
T 3[illegible]
M [illegible]
HT = 6.00

1842

FS ~~[illegible]~~ MS-5

1) [illegible].13.[illegible]7
2) 218.27.18
M) 297.13.39

AC 4
ZEN. ∡ TO MS-5
SLOPE TO MS-5
1335.56 FT
407.162 M
HI = 4.71

D 94.57.26
R 265.02.17
T 3[illegible]
M 94.[illegible]34
HT [illegible].00

ROCKY FLATS [illegible]
WELL & BORING [illegible]

1849/45

R.B.
L.I.

"[illegible]"
"[illegible]"

π @ 4 [illegible]		π @ 4 ZEN. ∡ TO MS-4 SLOPE TO MS-4 1269.23 FT 386.828 M HI = 4.71	D 95·18·05 R 264·41·56 T 360·00·01 M 95·18·05 HT = 6.00
FS MS-4 1843	1) 287·13·24 2) 214·26·18 M) 287·13·09		
FS MS-3 1844	1) 290·24·27 2) 220·48·25 M) 290·24·13	π @ 4 ZEN. ∡ TO MS-3 SLOPE TO MS-3 1223.06 FT. 372.791 M. HI = 4.71	D 95·36·19 R 264·23·47 T 360·00·06 M 95·36·16 HT = 6.00
FS TOP OF 1.0' METAL PIPE MS-2 1845	1) 291·17·30 2) 222·34·39 M) 291·17·20	π @ 4 ZEN ∡ TO MS-2 SLOPE TO MS-2 1239.92 FT. 377.927 M HI = 4.71	D 95·35·32 R 264·24·21 T 359·59·53 M 95·35·~~29~~ 35 HT = 6.00

1849/46

ROCKY FLATS [illegible]
WELL & BORING [illegible]

[illegible]25.91
WINLY

R.B.
D.L.

π @ 4
BS 202 W/00

FS 38391
1) 291.17.02
2) 222.33.48
M) 291.16.54

π @ 4
ZEN. ∡ TO 38391
SLOPE TO 38391
1177.81 FT.
358.989 M.
HI = 4 71

D 96.05.54
R 263.54.06
T 360.00.00
M 96.05.54
HT 6.00

FS 33791
1) 346.23.17
2) 332.46.20
M) 346.23.10

π @ 4
ZEN. ∡ TO 33791
SLOPE TO 33791
2181.60 FT
664.957 M
HI = 4 71

D 90.33.06
R 269.27.02
T 360.00.08
M 90.33.02
HT 6.00

FS
1)
2)
M)

π @ 4
ZEN. ∡ TO
SLOPE TO
FT
M
HI = 4 71

1849/47

ROCKY FLATS (EBASCO)
WELL & BORING LOCATIONS

11·26·91
"WINDY 45°

R.B.
D.D.

π@4 BS 202	W/00°			π@4 ZEN. ∡ TO 38891 SLOPE TO 38891 1348.26 FT. 410.952 M. HI = 4 68	D 94·35·24 R 265·24·15 T 359·5[illegible] m 94·35·34 ~~HT=~~
FS 38891		1) 329·15·58 2) 298·31·46 m) 329·15·53	H.T. 0 3		
38891	TOP OUTSIDE CASING TOP P.V.C. TOP CONC.		0 [illegible] 2 19		
FS 32591		1) 322·16·28 2) 284·32·36 m) 322·16·18	H.T. 0 3	π@4 ZEN. ∡ TO 32591 SLOPE TO 32591 1520.79 FT 463.537 m HI = 4 68	D 93·07·4[illegible] R 266·49·54 T 359·5[illegible] m 93·07·[illegible]
	TOP OUTSIDE CASING TOP P.V.C. TOP CONC.		0 50 2 61		
FS 32791		1) 318·11·24 2) 276·22·35 m) 318·11·18		π@4 ZEN ∡ TO 32791 SLOPE TO 32791 1487.27 FT 453.310 M. HI = 4 68	D 93·06·12 R 266·[illegible]·42 T 359·59·[illegible] m 93·0[illegible] HT= [illegible]

1849/48.

ROCKY FLATS (EBASCO)
WELL & PORTAL LOCATIONS

11.26.91
"WINDY"

R.B.
D.D.

π @ 4 BS 202 W/00				π @ 4 ZEN ∡ TO 31491 SLOPE TO 31491 1365.31 FT 416.148 M. HI = 4 68	D 94.02.18 R 265.57.30 T 359.59.48 M 94.02.24 ~~HI~~
FS 31491		1) 311.49.09 2) 263.37.54 M) 311.48.57	HI		
	TOP OUTSIDE CASING		0 3		
	TOP P.V.C.		0 65		
	TOP CONC.		2 53		
FS 37391		1) 296.25.14 2) 232.50.07 M) 296.25.04		π @ 4 ZEN ∡ TO 37391 SLOPE TO 37391 1590.76 FT 484.970 M. HI = 4 68	D 92.38.37 R 267.21.18 T 359.59.55 M 92.33.[illegible] HI 6 00
FS 37591		1) 319.22.18 2) 278.44.18 M) 319.22.09		π @ 4 ZEN ∡ TO 37591 SLOPE TO 37591 2162.19 FT 659.023 M. HI = 4.68	D 89.52.21 R 270.07.37 T 359.59.[illegible] M 89.52.27 ~~HI~~
37591	TOP OUTSIDE CASING		12 91 2.0		
	TOP P.V.C.		13 28 0.[illegible]		
	TOP CONC.		15 10		

1849/49

R.B.
D.D.

Rocky Flats (Eastern)
West Boring Location

1-26-91
"Windy" 45°

π@ 4 BS 202 W/00°		π@ 4 ZEN. ∡ TO 35091 SLOPE TO 35091 1579.92 FT. 481.561 M. HI = 4.68	D 92.08.07 R 267.51.40 T 359.59.47 M 92.08.13 HT = 6.00
FS 35091	1) 307.01.07 2) 258.[illegible].08 M) 307.01.04		
FS BORE HOLE #21 1846	1) 292.04.24 2) 224.08.26 M) 292.04.13	π@ 4 ZEN. ∡ TO B.H. #21 SLOPE TO B.H. #21 1837.15 FT. 559.981 M. HI = 4.68	D 71.[illegible] R 262.11.42 T 359.59.44 M 91.49.10 HT = 6.00
FS 39591	1) 290.56.21 2) 221.52.18 M) 290.56.09	π@ 4 ZEN. ∡ TO 39591 SLOPE TO 39591 1802.30 FT. 549.330 M. HI = 4.68	D 91.50.16 R 268.09.21 T 359.59.37 M 91.50.37 HT = 6.00

1849/50

[illegible]
[illegible]

11·26·91
"WINDY" 40°

R.B.
D.D.

π@ 4		π@ 4	
BS 202 [illegible]		ZEN. ∡ TO 31591	D 92·59·42
FS 31591	1) 297·[illegible]·19	SLOPE TO 31591	R 266·59·58
	2) 234·22·10	1545.20 FT.	T 359·59·40
	M) 297·11·05	470.967 M.	M 92·59·[illegible]
		HI = 4.[illegible]	HT = 6.[illegible]
FS 36491	1) 293·37·24	π@ 4	
	2) 227·13·51	ZEN. ∡ TO 36491	D 92·17·36
"WINDY" & THRU TREES	M) 293·36·56	SLOPE TO 36491	R 267·42·[illegible]
		1650.77 FT	T 360·00·00
		503.173 M.	M 92·17·36
		HI = 4.[illegible]	HT = 6.00
FS	1	π@ 4	
	2	ZEN ∡ [illegible]	D
	M	[illegible]	R
		FT	T
		M	M
		HI = 4.[illegible]	

1851/11

R.F.P. (EBASCO) LOCATE WELLS & BORE HOLES

12·16·91
50° CLEAR, "WINDY"
T-1 WILD = π

R. B.
D. D.

π #4
BS 202 W/0°00'00"

FS I-1
1) 348·31·38
2) 337·02·48
M) 348·31·24 (H.T.)
TOP OF PIPE 0 20
TOP OF GROUND 1 02

π @ 4
ZEN ∡ TO I-1 D 97·26·02
SLOPE TO I-1 R 262·33·24
1243.77 FT. T 359·59·26
379.099 M. M 97·26·19
HI = 4 75
~~HT=~~

FS I-2
1) 348·29·25
2) 336·59·40
M) 348·29·50 (H.T.)
TOP OF PIPE 0 20
TOP OF GROUND 1 12

π @ 4
ZEN. ∡ TO I-2 D 97·24·54
SLOPE TO I-2 R 262·34·52
1246.40 FT. T 359·59·46
379.903 M. M 97·25·01
HI = 4 75
~~HT=~~

FS I-3
1) 348·29·03
2) 336·57·37
M) 348·28·49 (H.T.)
TOP OF PIPE 0 20
TOP OF GROUND 1 25

π @ 4
ZEN. ∡ TO I-3 D 97·23·53
SLOPE TO I-3 R 262·35·51
1248.58 FT. T 359·59·44
380.568 M. M 97·24·01
HI = 4 75
~~HT=~~

1851/12

R.F.P. (EBASCO) LOCATE WELLS & BOREHOLES

12.16.91
50°

R.B.
D.D.

π @ 4
BS 202 W/00°

FS I-4
1) 348.29.12
2) 336.58.00
M) 348.29.00
TOP OF PIPE
GROUND
H.T.
0 20
1 26

π @ 4
ZEN. ∡ TO I-4
SLOPE TO I-4
1250.83 FT
381.254 M
HI = 4 75
D 97.22.42
R 262.36.48
T 359.59.30
M 97.22.57
~~HT =~~

FS I-5
1) 348.28.54
2) 336.57.25
M) 348.28.43
TOP OF PIPE
GROUND
H.T.
0 20
1 23

π @ 4
ZEN. ∡ TO I-5
SLOPE TO I-5
1253.36 FT.
382.026 M.
HI = 4 75
D 97.21.38
R 262.37.51
T 359.59.29
M 97.21.53
~~HT =~~

FS O-1
1) 348.37.45
2) 337.15.06
M) 348.37.33
TOP OF PIPE
GROUND
H.T.
0 20
1 00

π @ 4
ZEN ∡ TO O-1
SLOPE TO O-1
1244.26
379.251
HI = 4 75
D 97.26.14
R 262.33.19
T 359.59.33
M 97.26.27
~~HT =~~

1851/13

R.F.P. (EBASCO) LOCATE WELLS & BORE HOLES

12.16.91
50°

R.B.
D.D.

Π@ 4
BS 202 W/00°

FS O-2
1) 348.38.10
2) 337.16.03
M) 348.38.02 H.T
TOP OF PIPE 0 20
GROUND 1 00

Π@ 4
ZEN. & TO O-2 D 97.25.33
SLOPE TO O-2 R 262.34.05
1246.64 FT T 359.59.38
379.976 M. M 97.25.44
HI = 4 75 HT =

FS E-1
1) 348.44.48
2) 337.29.07
M) 348.44.34 H.T.
TOP OF PIPE 0 20
GROUND 1 30

Π@ 4
ZEN. & TO E-1 D 97.25.48
SLOPE TO E-1 R 262.33.34
1244.47 FT T 359.59.22
379.313 M M 97.26.07
HI = 4 75 HT =

FS E-2
1) 348.43.58
2) 337.27.36
M) 348.43.48 H.T.
TOP OF PIPE 0 20
GROUND 1 20

Π@ 4
ZEN. & TO E-2 D 97.25.39
SLOPE TO E-2 R 262.33.46
1246.93 FT T 359.59.25
380.068 M M 97.25.56
HI = 4 75 HT =

1851/14

R.F.P. (EBASCO) LOCATE WELLS & BORE HOLES

12.16.91
50°

P.B.
D.D.

Te 4
BS 202 N/00°

FS E-3
1) 348.45.09
2) 337.29.57
M) 348.44.59
TOP OF PIPE 0 20
GROUND 1 10
H.T.

Te 4
ZEN. ∡ TO E-3 D 97.24.08
SLOPE TO E-3 R 262.35.15
1249.16 FT T 359.59.23
380.745 M M 97.24.26
HI = 4 75
~~HT =~~

FS E-4
1) 348.43.00
2) 337.25.47
M) 348.42.54
TOP OF PIPE 0 20
GROUND 1 18
H.T.

Te 4
ZEN. ∡ TO E-4 D 97.22.54
SLOPE TO E-4 R 262.36.43
1251.39 FT T 359.59.37
381.426 M M 97.23.05
HI = 4 75
~~HT =~~

FS E-5
1) 348.42.00
2) 337.23.42
M) 348.41.51
TOP OF PIPE 0 20
GROUND D 95
H.T.

Te 4
ZEN. ∡ TO E-5 D 97.22.22
SLOPE TO E-5 R 262.36.51
1253.64 FT T 359.59.13
382.112 M M 97.22.45
HI = 4 75
~~HT =~~

1851/15

R.F.P. (EBASCO) LOCATE WELLS & BORE HOLES

12.16.91
50°

R.B.
D.D.

Te 4
BS 202 W/00°

Te 4
ZEN. & TO 0-5
SLOPE TO 0-5
1253.58 FT
382.094 M
HI = 4 75

D 97.22.22
R 262.37.10
T 359.59.32
M 97.22.36
~~HI=~~

FS 0-5
1) 348.34.30
2) 337.08.48
M) 348.34.24
TOP OF PIPE
GROUND

H.T.
0 20
1 10

FS 0-4
1) 348.37.48
2) 337.15.12
M) 348.37.36
TOP OF PIPE
GROUND

H.T.
0 20
1 20

Te 4
ZEN. & TO 0-4
SLOPE TO 0-4
1251.05 FT
381.321 M
HI = 4 75

D 97.23.12
R 262.36.12
T 359.59.24
M 97.23.30
~~HI=~~

FS 0-3
1) 348.35.45
2) 337.11.03
M) 348.35.32
TOP OF PIPE
GROUND

H.T.
0 20
1 17

Te 4
ZEN. & TO 0-3
SLOPE TO 0-3
1248.66 FT
380.592 M
HI = 4 75

D 97.24.17
R 262.35.12
T 359.59.29
M 97.24.32
~~HI=~~

1851/16

R.F.P. (EBASCO) LOCATE WELLS & BOREHOLES

12.16.91
50° "WINDY"

R.B.
D.D.

T@ 4
BS 202 W/00°

T@ 4
ZEN. ∡ TO 39891 D 97.22.45
SLOPE TO 39891 R 262.36.46
1254.27 FT T 359.59.31
382.300 M M 97.23.00
HI = 4 75 ~~HT=~~

FS 39891
1) 349.14.51
2) 338.29.32
M) 349.14.46 H.T.

TOP OF PIPE 0 20
GROUND 1 15

FS 39091
BORE HOLE
1) 347.56.02
2) 335.51.27 H.T.
M) 347.55.44

GROUND 5 75

T@ 4
ZEN. ∡ TO 39091 D 97.12.04
SLOPE TO 39091 R 262.47.30
1246.98 FT T 359.59.34
380.073 M M 97.12.17
HI = 4 75 ~~HT=~~

FS 39391
1) 27.03.07
2) 54.05.54
M) 27.02.57

T@ 4
ZEN. ∡ TO 39391 D 94.54.14
SLOPE TO 39391 R 265.05.06
2270.84 FT T 359.59.20
692.185 M M 94.54.34
HI = 4 75 HT = 6 03

R.F.P. (EBASCO) LOCATE WELLS & BOREHOLES

12.16.91
"WINDY" 50° F.

1851/17
R.B.
D.D.

TC 4
BS 202 W/00°

FS 38691
1) 318.29.36
2) 276.58.43
M) 318.29.22

TC 4
ZEN. ∡ TO 38691 D 97.37.57
SLOPE TO 38691 R 262.21.21
1045.09 FT T 359.59.18
318.545 M M 97.38.18
HI = 4.75 HT = 6.03

FS 30791
1) 289.57.54
2) 219.55.33
M) 289.57.47

TC 4
ZEN. ∡ TO 30791 D 95.16.32
SLOPE TO 30791 R 264.42.48
1297.52 FT T 359.59.20
395.494 M M 95.16.52
HI = 4.75 HT = 6.03

FS 35191
1) 289.21.24
2) 218.42.15
M) 289.21.08

TC 4
ZEN. ∡ TO 35191 D 91.20.19
SLOPE TO 35191 R 268.39.24
1916.43 FT T 359.59.43
584.130 M M 91.20.27
HI = 4.75 HT = 6.03

R.F.P. (EBASCO) LOCATE WELLS & BOREHOLES

12-17-91
35° "WIND"
π = G.T.'s T-2

1851/18
R.B.
D.D.

π @ 4
BS 202
1) 00°00'23" > 12.5
4) 180·00·02
FS 38991
2) 328·04·40 > 26
3) 148·04·12
M)

H.T.
0 30
0 74
2 87

Top OUTSIDE CASING
TOP P.V.C.
TOP CONC.

π @ 4
ZEN. ∡ TO 38991
SLOPE TO 38991
1340.84 FT
408.688 M
HI = 4 67

D 94·30·36
R 265·28·24
T 359·59·00
M 94-31-06 KM
HT = ---

FS 31391
2) 332·36·20 > 09
3) 152·35·58
M)

π @ 4
ZEN ∡ TO 31391
SLOPE TO 31391
1334.47 FT
406.766 M
HI = 4 67

D 94·46·31
R 265·12·22
T 359·58·53
M 94-47-04.5 KM
HT = 6 03

FS 38091
2) 294·36·48 > 34
3) 114·36·20
M)

π @ 4
ZEN. ∡ TO 38091
SLOPE TO 38091
2410.78 FT
734.812 M
HI = 4.67

D 89·48·17
R 270·10·33
T 359·58·50
M 89-48-51.9 KM
HT = 6

1851/19

R.B.

R.F.I. (BASCO) LOCATE WELLS & BORESHOLES

12·17·91
35°

TC 4
BS 202
FS 39691

1) 00·00·23
4) 180·00·02 } 12.5
2) 294·55·32
3) 114·55·09 } 20.5
M)

H.T.

TOP OUTSIDE CASING 0 30
TOP P.V.C. 0 70
TOP CONC. 2 41

TC 4
ZEN. ∡ TO 39691
SLOPE TO 39691
2417.45 FT
736.842 M
HI = 4 67

D 89·49·21
R 270·09·37
T 359·58·58
M 89-49-52
~~HT=~~

6006.60

FS 33391

2) 325·36·28
3) 145·36·02 } 15
M)

TC 4
ZEN. ∡ TO 33391
SLOPE TO 33391
1607.10 FT
489.845 M
HI = 4 67

D 92·32·15
R 267·26·36
T 359·58·51
M
HT = 6 03

FS 39291

2) 326·40·45
3) 146·40·25 } 35
M)

H.T.

TOP OUTSIDE CASING 0 30
TOP P.V.C. 0 77
TOP CONC. 2 24

TC 4
ZEN. ∡ TO 39291
SLOPE TO 39291
1472.82 FT
448.917 M
HI = 4.67

D 93·31·42
R 266·27·09
T 359·58·51
M 93-32-16
~~HT=~~

1851/20

R.F.P. (EBASCO) LOCATE WELLS & BORE HOLES

12·17·91
35° "WINDY"

R.B.
D.D.

TC 4 5997.15 (T)
BS 202
1) 00·00·23
4) 180·00·02 } 12.5
FS 39191
2) 325·02·00
3) 145·01·46 } 53
M)

H.T.

TOP OUTSIDE CASING 030
TOP P.V.C. 134
TOP CONC. 272

TC 4
ZEN. ∡ TO 39191
SLOPE TO 39191
1540.10 FT
469.425 M
HI = 4 67

D 93·03·01
R 266·55·50
T 359·58·51
M ~~93·03·06~~ 93·03·36
~~HT~~

5916.94

FS 33091
2) 325·16·55
3) 145·16·30 } 42.5
M)

TC 4
ZEN. ∡ TO 33091
SLOPE TO 33091
1539.71 FT
469.309 M
HI = 4 67

D 92·57·00
R 267·01·50
T 359·58·50
M 92·57·41
HT = 6 03 5916.29

FS
2)
3)
M)

TC 4
ZEN. ∡ TO
SLOPE TO
FT
M

D
R
T
M

HI = 4 67
HT =

1851/21

R.B.
D.L.

TRIG ROCKY [illegible] ELEV. TO #567

(VERTICLE CONTROL FOR #567)

12·17·91
40° WINDY

π @ 303
ZEN. ∡ TO 567
SLOPE TO 567
4523.38 FT.
1378.727 M.
HI = 4 67
HD = 4520.363

D 92·05·06
R 267·53·57
T 359·59·03
M 92·05·34
HT = 4 33
ΔEl = −164.414

RECIPS

π @ 567
ZEN. ∡ TO 303

HI = 5 03

D 87·55·33
R 272·03·11
T 359·58·49
M 87·56·13
HT = 3 97
ΔEl = +164.328
MΔEl = −164.371

ROCKY FLATS
CHECK INTO 302 FOR ELEV. CK.

12·17·91

1851/22
R.B.
D.D.

(VERTICLE CONTROL FOR #567)

AT @ 567
ZEN. ∡ TO 302 — D 87·37·37
SLOPE TO 302 — R 272·21·16
4037.21 FT. — T 359·58·53
1230.543 M. — M 87·38·10
HI = 5.03 — HT = 3.83
HD = 4033.7744 — ΔEl = +168.060

RECIPS

AT @ 302
ZEN. ∡ TO 567 — D 92·23·07
R 267·35·45
T 359·58·52
M 92·23·41
HI = 4.52 — HT = 4.34
ΔEl = −168.[illegible]
MΔEl = +168.1[illegible]

R.F.P. (EBASCO) LOCATE WELL OR BOREHOLE

12·17·91

1351/23

R.B.

D.D.

π@	303	5912/30			
BS	303		1) 00·00·18	> 05	
			4) 179·59·52		
FS	39791		2) 45·00·58	> 47.5	
			3) 225·00·37		
			M) 45·00·42.5		

π@ 303

REM. ∡ TO 39791 D 95·17·00

SLOPE TO 39791 R 264·41 55

1958.56 FT T 359·58·55

596.976 M M 95·17·32

HI = 4 67 HT = 6 03

5730.37

A4
FRENCH DRAIN GEOLOGIC DATA

This appendix characterizes the geology and hydrogeology along the French Drain alignment at the Rocky Flats Plant (RFP) 881 Hillside Area Operable Unit No. 1 (OU1). The report includes the following: 11-by 17-inch geologic cross-sections of 50-foot intervals of the French Drain excavation, geologic descriptions of each lithologic unit for each cross-section, geotechnical data on grain-size distribution and plasticity of selected lithologic units, and an assessment of the geology and hydrogeology. Data from the French Drain geotechnical investigation report (EG&G, 1990a) were used to support geologic and hydrogeologic interpretations related to design and function of the French Drain.

A4.1 INTRODUCTION

The French Drain has been constructed as part of the Interim Measure/Interim Remedial Action (IM/IRA) for OU1 (EG&G, 1990b). The IM/IRA is part of a comprehensive, phased program of site characterization, remedial investigations, feasibility studies, and remedial/corrective actions currently in progress at RFP. These investigations are pursuant to the Department of Energy (DOE) Environmental Restoration Program, and the Federal Facility Agreement and Consent Order (known as the Interagency Agreement). In accordance with the Interagency Agreement, RFP has identified 16 operable units for prioritized implementation of remedial investigations, feasibility studies, and remedial actions. OU1 has been given the highest priority because of the presence of high concentrations of volatile organic compounds (VOCs) in alluvial groundwater and the proximity to Woman Creek, which drains the southern part of RFP. A remedial investigation and feasibility study, which is currently in progress, will determine the full nature and extent of contamination and propose a plan for final remediation of OU1. The French Drain is designed to capture contaminated alluvial groundwater from OU1 and prevent further downgradient contaminant migration, which may pose a long-term threat to public health and the environment.

A4.1.1 Purpose

The purpose of the geologic characterization of the French Drain alignment is to provide detailed lithologic descriptions and geologic cross-sections of the stratigraphic units uncovered along the French Drain excavation at the 881 Hillside Area, Operable Unit No. 1 (OU1). Structural features are described and observations pertaining to the local hydrogeology are presented. Supporting data include laboratory results of grain-size distribution and plasticity for each lithologic unit and in situ bedrock hydraulic conductivity measurements. This information was used to supplement the OU1 Phase III field investigation. Also, documentation of geological features and hydrogeological conditions along the trench of the French Drain gives important three-dimensional confirmation data for the French Drain geotechnical investigation. Collectively, these data are used to refine the OU1 site geological and hydrogeological conceptual models and provide a comprehensive characterization of the site. The most important information gathered during this study concerns the size and morphology of slumps and their affect on the occurrence of groundwater.

A4.1.2 Background

The French Drain is designed to capture contaminated alluvial groundwater from OU1 and prevent further downgradient contaminant migration, which may pose a long-term threat to public health and the environment. As part of the IM/IRA, a geotechnical investigation was performed prior to construction of the French Drain to evaluate site characteristics along the proposed French Drain alignment and to support the geotechnical design (EG&G, 1990a). Forty-two borings were drilled on approximately 100-foot centers along the entire length of the proposed French Drain and the influent/effluent lines. The borings were lithologically logged and the information was recorded on borehole log forms. In addition, geotechnical testing was conducted on 42 soil and bedrock samples taken from selected borings. Packer tests and back-pressure permeability tests were performed to identify bedrock locations with a hydraulic conductivity of 1×10^{-6} centimeters per second (cm/sec) or less.

Construction of the French Drain began in November 1991 and was completed in April 1992. It was constructed by excavating a trench approximately 1,435 feet in length along the downgradient boundary of OU1 (Figure A4-1). Construction control points were established at 50-foot intervals and given a station identification number (0 + 00 at the west end with 50-foot increments to the east, i.e., 0 + 50, 1 + 00, 1 + 50, etc.). The drain was not continued west of station 5 + 00 for the following reasons:

- The additional 500-foot segment of the drain would be likely to capture clean groundwater, which would significantly dilute contaminated waters collected by the drain and result in less effective removal of contaminants by the treatment plant.

- Further construction would jeopardize the stability of the hillside and place stresses on the gas transmission line in this area. Test pits dug at 100-foot intervals west of the present western terminus of the French Drain encountered saturated alluvium, including artesian conditions at one location. It was felt that continued construction would undermine the foundation of the hillside and promote conditions favorable for slumping.

Data from French Drain monitoring wells 10562 and 10692 will be used to determine whether contaminants exist in the groundwater west of the current terminus. The western end of the French Drain collection pipe was capped; however, should there be a need to extend the French Drain to the west, the cap can be easily removed for the expansion. The IM/IRA plan (EG&G, 1990b) also specified that the eastern end of the French Drain be constructed 150 feet further to the east; however, the drain was shortened because wells east of this point have historically been dry, and continued construction to the east would have required crossing a gas line.

The French Drain is installed approximately 2 feet into bedrock to fully penetrate material exhibiting a hydraulic conductivity of 1×10^{-6} cm/sec or less (Figure A4-2) (EG&G, 1990b). In general, the bedrock has a hydraulic conductivity two orders of magnitude lower than the alluvium, which prohibits underflow in the shallow bedrock (EG&,G 1990b). A permeable geotextile membrane was placed on the north wall of the excavation to allow for capture of the alluvial groundwater. An impermeable polyvinyl chloride membrane was placed on the south wall of the French Drain to prevent captured groundwater from migrating downgradient of the system. Perforated pipe was installed in the keyway for collection of

groundwater. The keyway was then backfilled with gravel and covered with a geotextile membrane. Class I soil was placed on top of the geotextile membrane to a depth of approximately 1 foot and the entire excavation was backfilled with material excavated during the French Drain construction.

The inclusion of the downstream polyvinyl chloride membrane combined with the continuity of the drain provides positive cutoff of the alluvial groundwater. A polyvinyl chloride (PVC) collection pipe inside the drain directs flow under gravity to a 6-foot-wide collection gallery sump (Figure A4-3). Groundwater is also collected from a collection well at the base of individual hazardous substance site (IHSS) 119.1 (source well), where it is pumped to the sump (Figure A4-3). The sump, equipped with a submersible pump, delivers the water from the drain to the treatment plant. In addition, contaminated groundwater discharged from the Building 881 footing drain is piped directly into the French Drain (Figure A4-3). The source well and footing drain flows commingle with alluvial groundwater collected by the French Drain.

The collected groundwater is treated using an ultraviolet/hydrogen peroxide system (for organics removal) and an ion exchange system (for inorganics removal). The water treatment system is enclosed in Building 891 to protect weather- or temperature-sensitive components. Following treatment, the water is directed to an effluent storage tank for sampling and analysis prior to being discharged to the South Interceptor Ditch. Water from the South Interceptor Ditch then goes to the C-series ponds.

A4.1.3 Report Organization

This report describes the geology along the French Drain. Section A4.2 provides a description of specific field methods used for data collection; a discussion of the geology, hydrogeology, and structure in the area of the French Drain; and a comparison between the results of the geotechnical investigation and this geologic characterization. Section A4.3 discusses uncertainties and sources of error for the geologic characterization, and Section A4.4 provides a list of references.

Pertinent information supporting the geologic characterization are presented in the attachments. Attachment A4-1 contains the lithologic descriptions for the units displayed on the geologic cross-sections, and Attachment A4-2 contains the geologic cross-sections. Included in the preface for Attachment A4-1 is a guide for the use of the attachment. Attachment A4-3 contains the laboratory data packets for the geotechnical samples, and Attachment A4-4 the tables summarizing the geotechnical results for alluvial and bedrock materials (Attachments A4-4-1 and A4-4-2, respectively).

A4.2 GEOLOGIC CHARACTERIZATION ALONG THE FRENCH DRAIN

This section presents a description of the field methods used to obtain geologic data in the French Drain excavation; a description of lithologic units, geologic structures, and ground-water-bearing zones; and a comparison of geologic units and hydraulic conductivities from the French Drain geotechnical investigation with results from this investigation. All field methods were performed in accordance with applicable *Environmental Management Department Standard Operating Procedures* (SOPs).

A4.2.1 Methods

The French Drain geologic characterization was conducted in accordance with the field sampling plan presented in the French Drain geologic characterization work plan (EG&G, 1992a) and Geotechnical SOP GT.7, *Logging Pits and Trenches in Construction Excavations* (EG&G, 1991a). Only the north slope of the French Drain excavation was characterized because the staging and preparation of construction materials (geotextile membrane, impermeable membrane, pipe, etc.) on the south slope prevented visual observation of geologic relationships. The geologic characterization activities were conducted while the French Drain was under construction.

A4.2.1.1 Mapping and Logging of Soil and Bedrock Units

Soil and bedrock contacts were mapped at 25-foot transect intervals whenever construction activities of the French Drain permitted. Transect intervals coincided with control points

established along the drain alignment as specified in the engineering design for the French Drain (Engineering-Science, 1991). These control points were surveyed in the field by Merrick and Company and marked with wooden stakes at 50-foot intervals. Each stake was identified with a station number. Transect intervals were projected to the north slope of the excavation from the surveyed control points. Transect intervals mapped between control points were measured by tape from a surveyed station. Measuring tapes were placed at transect intervals and draped vertically along the excavation to determine unit thickness, depth to sample locations, and depth to soil and bedrock contacts.

Prior to logging, a hand pick was used to dig a shallow vertical trench in the excavation wall to expose fresh, in-place soils and bedrock. Soils were described using the Unified Soil Classification System (USCS). Soil descriptions include classification, color, grain size, grading, angularity, plasticity, composition, bedding, and moisture content. Bedrock materials were described according to the *Manual of Field Geology* (Compton, 1962), and were classified according to the Wentworth grain-size scale. Bedrock descriptions include rock type, color, grain size, degree of sorting, porosity, cementation, friability, composition, bedding and internal structure, degree of weathering, fractures, slickensides, and moisture content. The distribution and orientation of structural features (e.g., faults, fractures, shear planes, and structures formed by creep and drag or sliding), geomorphologic features (e.g., slumps associated with these movement patterns), and hydrogeologic features (e.g., seeps, zones of saturation, and zones of high permeability) were noted. The apparent thickness of lithologic units and location of structural and other features were measured to the nearest tenth of a foot. The slope angle at each transect interval was measured using a Brunton compass. All measurements, including apparent unit thicknesses, depth to sample locations and structural features, seeps, depth of excavation, were corrected to true vertical depth and transferred to a geologic cross-section (scale of 1 inch equals 2 feet). Attachment A4-1 provides the lithologic descriptions corresponding to the cross-sections and Attachment A4-2 the geologic cross-sections.

A4.2.1.2 Sampling Soil and Bedrock Materials

During the French Drain excavation activities, a total of 207 soil and bedrock samples were collected for laboratory testing, which included grain-size/hydrometer analysis and Atterberg limits. Atterberg limits were run on each sample collected that contained an appropriate percentage of silt or clay-size particles. The geotechnical laboratory made this determination based on the results of the grain-size analysis. To the extent possible, samples were collected from fresh surfaces representative of the lithologic unit using a rock hammer and stainless-steel spoon. Sample material was usually collected in 8-ounce glass jars; however, 32-ounce, self-sealing plastic bags were used for samples with high percentages of gravels and cobbles. Soil and bedrock samples were collected from each unit along the transect intervals when construction activities for the French Drain permitted. Sample locations were measured and recorded on the field maps. Each sample was numbered by station number and distance from the top of the slope. Sample locations were corrected to true vertical depth on the final geologic cross-sections (scale of 1 inch equals 2 feet).

A.4.2.1.3 Classification of Soil and Bedrock Samples

All field classifications were corrected to reflect laboratory grain-size analysis results prior to their inclusion on the geologic cross-sections. The components of each sample were recorded as percent by weight and the results were plotted on a U.S. Standard sieve size chart (Figure A4-4). Soils were classified according to the USCS and bedrock materials were classified according to the Wentworth grain-size scale (Geotechnical SOP GT.1, Logging of Alluvial and Bedrock Materials; EG&G, 1991a). Table A4-1 is a comparison between the two systems. Each soil classification was given a USCS symbol; Figure A4-3 illustrates the major divisions of the USCS along with the letter, symbol, and description for each classification. The use of modifiers and the terms "with some" or "trace" were based on percentages of the material and criteria set forth in Geotechnical SOP GT.1 (EG&G, 1991a).

Attachment A4-4 contains the geotechnical analysis results. In deviation from the SOP guidelines, a #230 mesh sieve was used to determine the percentage of silt and clay in all laboratory grain-size analyses. The grain-size distribution curves (see Figure A4-4 for example) display the percentage of material that passes through each standard sieve. In order to classify the unconsolidated materials according to the USCS system, which requires the use of a #200 standard sieve, the percentage of materials passing through a #200 standard sieve was interpolated from the grain-size distribution curves.

Attachment A4-3 provides the analytical data packets from which these classifications are based, and Attachment A4-4 presents tables summarizing these data.

A.4.2.1.4 Collecting In Situ Hydraulic Conductivities of Bedrock

In situ hydraulic conductivities in bedrock were measured by drilling a 6-inch hole at grade level and filling the hole with water to measure the rate of infiltration. Hydraulic conductivities of bedrock were measured at 100-foot intervals unless prevented by construction or excavation activities. Methods for measuring in situ hydraulic conductivity of bedrock are detailed in Geotechnical SOP GT.23, In Situ Hydraulic Conductivity Tests (EG&G, 1991b).

A4.2.2 Lithologic Units

A4.2.2.1 Top Soil

Top soil encountered in the French Drain excavation generally consisted of clay with varying amounts of silt and sand. USCS classifications ranged from silty clay (CH) to sandy clay (CL/CH) with some sandy silty clay (CL) observed from station 8 + 15 east to station 8 + 42. The top soil was generally grayish brown to dusky yellowish brown. Grain-size distribution varied greatly, ranging from a clay matrix to gravels with some cobble constituents. Plasticity was low to medium. Top soil was also characterized by high organic content, traces of vegetation roots, and a trace to some powdery caliche occurring as blebs or as filling in partings and fissures.

A4.2.2.2 Artificial Fill

Artificial fill encountered in the French Drain excavation generally consisted of sandy silty clay (CL) with varying amounts of gravel. The fill was generally grayish brown to dark yellowish brown and contained varying amounts of roots and construction debris such as nails, bricks, and wood chips. Grain-size distribution varied greatly, ranging from a clay matrix to gravels with traces of cobble constituents. Artificial fill was generally encountered from station 8 + 95 west to station 5 + 00.

A4.2.2.3 Alluvium

The alluvium encountered during the construction of the French Drain is derived from the Rocky Flats Alluvium (Scott, 1965). Based on field observations and geotechnical analytical results, the alluvium was composed of clay and sand with varying amounts of silt and gravel. The color range was typically restricted to reddish brown or brown. The alluvium was poorly sorted with subangular to subrounded clasts of sedimentary, igneous, and metasedimentary rocks. Locally, the alluvium contained abundant clasts of underlying bedrock. The alluvium was generally poorly cemented, but some of the alluvial material was moderately cemented with caliche.

During the construction of the French Drain, lenticular, tabular, and wedge-shaped units in the alluvium were encountered and mapped. Wedge-shaped units with local facies changes dominated the western portion of the drain, whereas the eastern section was generally characterized by tabular and lenticular units. These types of bedding features are the result of fluvial depositional processes. Attachment A4-1 provides specific lithologic descriptions for each alluvial unit.

A4.2.2.4 Colluvium

Colluvial material encountered during the construction of the French Drain was a mixture of reworked alluvial and bedrock materials. Slumping plays a major role in colluvial

deposition at 881 Hillside Area. Typically, the colluvium was nonstratified, poorly sorted, and generally poorly cemented.

Slumped blocks consisting of alluvial and displaced bedrock materials were the most prominent types of colluvial material found at the French Drain excavation. Other colluvium may be related to frost heaving and undercutting. Slump blocks are illustrated on several of the panels (cross-sections 25 and 26, Attachments A4-2). The claystone portion of the slump blocks, unless severely weathered, often exhibited characteristics similar to those in the underlying bedrock, i.e., blocky texture, manganese oxide staining, and limonite concretions. In addition, slump blocks were found to contain or to be bounded by shear planes with slickensides. Section A4.2.3 discusses slump mechanics in more detail.

Erosional processes have also resulted in the incorporation of both bedrock and slumped bedrock material into the colluvium, and have also truncated the limbs of some slump blocks. Attachment A4-1 provides specific lithologic descriptions of the colluvial units.

A4.2.2.5 Bedrock

Bedrock encountered during the construction of the French Drain is thought to be the upper portion of the Cretaceous Laramie Formation. The upper Laramie Formation consists of gray claystone, sandy claystone, and fine- to medium-grained buff-colored sandstone (EG&G, 1992b). The material observed in the field was consistent with this description of the Laramie Formation and the results of the geotechnical analyses. The bedrock logged and analyzed during the French Drain geologic characterization also corroborated data from the surface geologic mapping study (EG&G, 1992b). The surface geologic mapping report geologic characterization describes the upper part of the Laramie Formation as consisting of primarily olive-gray and yellowish orange claystone with iron nodules with lenticular beds of light olive-gray, fine-grained, and friable sandstones.

Typically, the bedrock at the French Drain consisted of claystone that was medium to dark gray and highly plastic, and at times moderately fractured with limonite staining along the fractures. Subunits within the claystone consisted of tan siltstone and sandstone with varying

amounts of clay that generally displayed fracture patterns similar to the claystone. Sandstones consisted mainly of very fine- to medium-grained, subangular to subrounded quartz sand, with local millimeter thick limonite staining. Generally the bedrock was poorly indurated and highly friable; however, at station 12 + 30, well-cemented sandstone was observed and mapped.

Constituents found in the bedrock units included traces of gravel; locally abundant, subrounded gravel-sized limonite concretions; dendritic manganese oxide staining; carbonaceous material; and fossils such as limonite-replaced stems and leaf structures. Locally, the sandstones and siltstones displayed poorly developed cross-bedding. According to visual observations, primary porosity in the mapped portion of the exposed bedrock in the French Drain excavation was low. Pore spaces, even in sandstone, appeared to be filled with clay, silt, or cement; however, secondary fracture porosity exists throughout the bedrock. Attachment A4-1 provides specific lithologic descriptions for the bedrock units.

A4.2.3 Geologic Structures

Geologic structures at the 881 Hillside Area include slumps and faults.

A4.2.3.1 Slumps

The lithologic units encountered during excavation of the French Drain consist of alluvium, colluvium, and bedrock. These units have been subjected to multiple episodes of complex slumping. The following paragraphs describe the generic process of how slump blocks form and move as well as the specific occurrences of slumping in the area of the French Drain excavation.

Description

The slump blocks observed at the 881 Hillside Area exemplify the characteristics of rotational sliding or slumping (with earth flow occurring at the foot of the slump block)

(Shuster and Krizek, 1978). Figure A4-6 presents a block diagram of a typical slump, and Figure A4-7 a plan view.

A rotational slide or slump is a slide along a shear plane that is curved upward; in most instances, the shear plane is spoon-shaped (Figure A4-6), and the movement is rotational about an axis parallel to the slope. The slump is typically composed of three areas: the head, the body, and the foot, with each exhibiting different characteristics of movement. The direction of movement at the head area is predominantly downward with the top surface tilting backward towards the slope. The main body of the slump moves downslope along the curvature of the shear plane. This shear plane is rarely uniform and is influenced by pre-existing features of the ruptured material (e.g., fractures and bedding planes). The toe area of the main body of the slump exhibits upward thrusting movement at the distal end or toe of the shear plane, which causes a slight uplift of material. The foot area of the slump has movement typical of earth flow, due to the material behaving as a plastic solid, and results in a hummocky surface topography.

Water from surface runoff and precipitation (i.e., snow and rain) typically ponds at the backward tilt of the slump head. This water can wet the shear plane and cause areas of instability that may cause the slump to continue to move until a stable slope is attained.

The main body of the slump tends to develop transverse cracks, longitudinal cracks, and pressure ridges due to differential tension and varying rates of internal movement as the mass glides over the concave shear plane. These transverse cracks may extend downward and contact the underlying shear plane surface (Shuster and Krizek, 1978). Transverse cracks that laterally dissect the entire main body or intersect other transverse cracks may develop into minor scarps. When this happens, multiple slump blocks are created, each with a curved shear plane tangential to the primary shear plane. Each individual shear plane from the multiple slump blocks intersects at depth to form a common basal shear plane surface (Harding, 1991). The top surface of each slump block may develop pressure ridges due to the backward tilting of the slump block as the downslope movement occurs. Figure A4-8 depicts the complexity of this situation.

Occurrences and Observations

The slumps observed during construction of the French Drain ranged in height from approximately 10 to 30 feet and in width from approximately 30 to 200 feet (Figure A4-7), and exhibited many of the features described above. The head of the slumps exhibited scarps containing slickensides with striations and furrows trending generally north-south, indicating downslope movement. Ponding of surface water was observed between the scarp and the top head surface at areas near stations 5 + 00 to 6 + 00. Ponding was also noticed in secondary minor scarps of blocks within the main body of slumps from stations 6 + 00 to 8 + 00. Crown cracks developed during construction of the French Drain in the area north of the perimeter road north of stations 9 + 00 and 10 + 00.

The slump identified at station 14 + 50 to 15 + 00 did not have the typical U-shaped cross-section. It is interpreted that the French Drain in this area cuts very close to the main scarp. If the trench had intersected the flanks of the slump, the cross-sectional view of the slump at the main scarp would have been convex instead of concave.

Flanks of the slump blocks were observed during construction and mapping of the French Drain. Typically, the scarp plane on the flanks extended from the bedrock upward and could not be traced through the alluvium. Occasionally, the flank scarp planes were truncated by subsequent erosion and deposition of alluvial materials. The angles of the flanks ranged from 5 to 80 degrees and are displayed on cross-sections at stations 11 + 35 and 13 + 50 to 14 + 00 (Attachments A4-2 and A4-3). Subsequent erosion has removed the upper portion of some flanks and some lateral edges of some slump blocks observed at stations 13 + 40 and 16 + 80.

Diagonal en echelon tension cracks were observed at station 2 + 00 during construction. This area was 300 feet beyond the west end of the French Drain at station 5 + 00. This area is interpreted to be the right flank of a slump in which the left flank begins at station 11 + 35. The cracking observed at station 2 + 00 was perhaps due to remobilization of the slump block during construction activities.

Tangential and reverse angle shear planes at the toe of a slump block were observed at stations 6 + 50 to 4 + 50 on the south slope of the excavation. In this interval, the slump block at station 5 + 50 was lithologically similar to claystone bedrock; however, excavation revealed a thin veneer of claystone overlying alluvium. This alluvium contained a high percentage of claystone inclusions in the matrix. It appears that when the tangential shearing occurred, the claystone inclusions smeared along the shear surface forming a thin veneer over the alluvium.

Transverse cracking was observed in slump blocks remobilized during construction activities. As these blocks moved downslope, the main body developed transverse cracks that were open and exposed to the surface. With continued slumping, the alluvial material became entrained beneath the slump block along the shear plane (cross-sections 26 to 28, Attachment A4-2). Additional slump movement would have forced the material into the lower surface of the slump block and reformed the shear plane.

The topography between the French Drain and Woman Creek has a hummocky appearance and many north-south trending lobate ridges. This topography may be due to slumping or to cut-and-fill construction activities. The toe areas of slumps typically exhibit hummocky topography.

Discontinuous shear planes and small concave fracture blocks were observed in the competent bedrock in areas adjacent to the prominent slump blocks. These are interpreted as being related to tensile and compressive stresses, i.e., the initial increased tension and shearing from initial movement and subsequent lateral and vertical release of restraining/confining stress after the mass moved downslope.

A4.2.3.2 Faults

During construction of the French Drain, a structure was encountered in the bedrock at station 11 + 80 that was planar and flanked by silty claystone on one side and sandy clayey siltstone on the other. Caliche was present along with the contact between these units. Only a 2- to 3-foot vertical section of the structure was exposed at the base of the trench.

The structure exhibited a north-south strike with a dip of 45 degrees east. Neither gouge nor breccia was visible on either side of the structure. The shear plane was not visible due to the high degree of caliche cementation. The upper portion of the structure appeared to be truncated by an erosional surface overlain by gravelly clay.

The origin of the structure may be interpreted as a normal fault or a back thrust associated with thrust faulting. There is currently no compelling evidence to accept either interpretation. For example, the siltstone strata, located in the hanging wall east of the structure, had a bedding dip of 10 to 20 degrees to the west with a north-south strike. As the siltstone strata approached the fault plane from the east, the bedding angle changed to a dip of 10 degrees to the east. This indicated drag in the hanging wall resulting from movement along the fault. This drag folding is characteristic of a normal fault; with the east hanging wall moving down relative to the west foot wall (Billings, 1972) in an extensional regime. Claystone west of the fault was massive and did not exhibit apparent bedding in the exposed excavation. A sequence of sandy clayey siltstone and silty sandstone overlying silty claystone was observed at station 11 + 30 west of the fault. This siltstone and sandstone sequence was similar to the stratigraphic sequence immediately east of the feature at station 11 + 85, supporting the interpretation that the down-thrown block is the hanging wall of a normal fault. Conversely, a previous report (EG&G, 1992b) suggested the structure is the result of a compressional regime, which supports a possible back thrust origin. A thorough investigation of the structural regimes is needed to determine the origin of the structure, which is beyond the scope of work of this project.

A4.2.4 Hydrogeology

During the construction of the French Drain, groundwater was encountered infrequently in both the alluvial and colluvial deposits and in the bedrock. Groundwater in alluvial and colluvial deposits generally resides in bedrock lows. Although the geologic characterization task did not include a technical hydrogeological investigation at the French Drain, the occurrence of groundwater and water-bearing properties of the unit were characterized from visual observations and geotechnical analysis of soils and bedrock samples. Given the complex array of sedimentary material exhibiting a wide range of particle sizes (clay to

cobbles) and varying degrees of compaction, the groundwater regimes appear to be heterogeneous and anisotropic in both alluvial and in bedrock material.

A4.2.4.1 Alluvial Groundwater

Most of the alluvial groundwater appears to occur in distinct lithologic zones bounded by lower permeability clays. Slump glide planes typically occur in the clays beneath the isolated groundwater zones. Excavation of the slope for the French Drain across these groundwater zones resulted in slope failure.

In the alluvium, groundwater appears to be largely confined to two units: a sandy to clayey silt unit and a silty sand and gravel unit. The laterally continuous sandy to clayey silt units are underlain by impermeable clay layers and overlain by very moist clay (cross-sections 5, 6, 7, 8, 10, and 11; Table A4-2). On cross-section 5 at station 6 + 75, three seeps were mapped in a lenticular clayey silt unit bounded by silty clay. Although hydraulic conductivity tests were not performed, the high percentage of sand- and silt-sized grains would appear to give this unit a higher porosity than the surrounding silty clay. These seeps may have been due to gravity-induced flow across the excavation wall, since excavation activities revealed open fractures from which water appeared to be seeping.

Groundwater occurs in silty sand and gravel units, which pinch out laterally and vertically on exposed slopes. These units are the result of mass wasting of the Rocky Flats Alluvium down the hillside. On cross-section 6, 7, and 8 from station 7 + 15 to station 8 + 15, a series of seeps originated in moist to wet silty clayey gravel, gravelly sand, and clayey sand, which restricts water to the sands. These units are bounded by silty clay, which restricts water to the sands. The wet gravelly sand, silty clayey gravel, and clayey sand, unstable due to saturated conditions and the release of geostatic pressure along the excavation, flowed into the keyway in the French Drain from both sides of the trench, necessitating the construction of de-watering wells. These units produced the highest volume of water encountered during the French Drain excavation. Hydraulic conductivity tests were not performed on these units; therefore, flow rates cannot be quantified.

Groundwater also seeped from a lithologic zone at stations 9 + 50 at 18.65 feet below ground level (cross-sections 10 and 11). This seep originated at the base of a gravelly sand unit that is underlain by silty clay. Although hydraulic conductivity tests were not performed in this lithologic zone, the silty clay appears to be sufficiently impervious to act as an aquitard or aquiclude, restricting groundwater to the gravelly sand unit. Most of the groundwater in slump blocks was observed in these zones.

Small amounts of groundwater were also observed intermittently along shear planes and in clay molds of gravels or cobbles. Along shear planes, water was observed as isolated traces of moisture along shear planes typically found in silty clay and clay slump blocks. One such occurrence was encountered along a shear plane at station 7 + 60 at 20.2 feet below ground level (cross-section 7). Water likely entered shear planes due to the release of geostatic pressure along the excavation wall.

Traces of groundwater in clay molds of gravels or cobbles were typically found in highly weathered caliche zones. When the gravels or cobbles were removed from the surrounding clays, moisture was observed on the gravels or cobbles and along the clay matrix. Similar to the water found along the shear planes, this moisture was not flowing and occurred as isolated droplets. One such weathered zone containing moisture in gravel or cobble molds was found overlying silty claystone zone from stations 18 + 00 to 19 + 35 (cross-sections 28 to 30).

A4.2.4.2 Bedrock Groundwater

The only occurrence of groundwater in the bedrock noted during construction of the French Drain was found in a fractured silty sandstone/clayey siltstone zone from Stations 10 + 50 to 11 + 00 at 37 to 41 feet below the ground surface (cross-sections 12 to 14). Water was observed to be seeping at intermittent locations from fractures near the contact with underlying dry silty claystone. These fractures may have experienced dilation due to the removal of overburden. This water-bearing unit was overlain by at least 4 feet of damp, dense, silty claystone. The exposed thickness of the water-bearing zone did not exceed 4

feet. Hydraulic conductivity of the silty claystone was measured in situ at 7.084 x 10^{-7} cm/sec.

A4.2.4.3 Evidence of Previously Existing Water

Surface water may pond in low areas at the top of slump blocks, and preferential surface water flow occurs along the margins of the slumps. Water may enter slumps either through surface or groundwater infiltration. Figure A4-9 illustrates potential routes of water infiltration, conduits within a slump body, and resulting seeps. Once water has infiltrated the slump, clay smearing along the shear planes can prevent water from migrating past the shear plane, which results in perched groundwater conditions. Subsequent continued slumping and/or internal settling can seal the shear plane, locally isolating water or forcing it from the slump in the form of seeps. The subsequent evaporation of groundwater in the vadose zone causes the precipitation of minerals such as caliche.

Although actual groundwater occurred only infrequently along the French Drain excavation, there was abundant evidence of previously existing water throughout the alluvium, colluvium, and bedrock. This evidence appeared as limonite and manganese oxide staining and caliche deposits. Limonite, a yellowish orange iron oxide, was frequently found as mottling in the alluvium, and also occurred as staining along fractures in bedrock and in slumped bedrock. Occasionally, limonite was noted in the bedrock as a replacement mineral in plant fossils and as subrounded, gravel-sized concretions. Black, dendritic manganese oxide staining was observed and logged frequently in both bedrock and slumped bedrock. Caliche, a calcium carbonate precipitate commonly forming at the water table, was prevalent throughout the alluvium; it occurred as a powdery to well-cemented, buff-colored precipitate in fissures or voids. The pattern and occurrence of caliche zones do not visibly appear to be the result of anything resembling a regional or local water table, but are probably the result of intermittent water moving through the various conduits within individual slump blocks. Intermittent groundwater, which has periods of recharge and evaporation dependent on climatic conditions, would explain the deposition of the caliche. No caliche was found in undisturbed bedrock.

At station 11 + 80 at 37 feet below ground level (cross-section 15), a possible fault was logged between a silty claystone and sandy clayey siltstone. The observable fault zone was noted to be completely filled with dense, well-cemented caliche. The caliche may act as a seal, preventing the fault zone from acting as a groundwater conduit. During construction, no moisture was observed at or near the fault plane.

Caliche had also been deposited in old shear planes at several locations along the French Drain excavation. From station 13 + 45 to 13 + 95 (cross-sections 18 and 19), a truncated shear zone with abundant caliche was observed and logged. No moisture was observed in this zone.

A4.2.5 Comparison of Geotechnical Investigation and the Geologic Characterization Data

A4.2.5.1 Geologic Correlation

Greater subsurface exposure during the construction of the French Drain allowed for a more accurate identification of geologic units than during the geotechnical investigation. The extent of slumping at the hillside was not as apparent during the geotechnical investigation because geologic interpretation was restricted to samples collected during drilling.

Table A4-3 lists the sample data obtained from the geotechnical investigation. In addition to the tested interval, resulting grain-size analyses, and subsequent classification, Table A4-3 also displays the approximate location of the boreholes to stations along the French Drain alignment. The columns appearing under the heading Geologic Characterization in Table A4-3 represent the revised classification, test intervals, and grain-size analyses of samples obtained during the French Drain construction that correspond to test intervals in the geologic characterization borings. For example, the following three samples, collected during borehole testing and logged during the geotechnical investigation, were incorrectly identified as bedrock. These samples are listed in Table A4-3 as follows:

- B301190 Test Interval 23.60–24.00
- B301090 Test Interval 31.10–31.50
- B300590 Test Interval 10.60–11.30

A4.2.5.2 Hydraulic Conductivities

As stated in the IM/IRA plan and decision document (EG&G, 1990b), the French Drain was to be extended 2 feet into bedrock exhibiting a hydraulic conductivity of 1×10^{-6} cm/sec or less. Tests conducted during the construction of the French Drain and during the prior geotechnical investigation confirm that the bedrock material is appropriate and meets the requirement of the IM/IRA plan and decision document.

Three different permeability tests were performed on the shallow bedrock along the French Drain; in situ packer tests, back-pressure permeability tests, and in situ falling head permeability tests. In situ packer tests, conducted at approximately 5-foot intervals, and back-pressure permeability tests conducted on core samples were performed in association with the drilling during the geotechnical investigation. In situ falling-head permeability tests were conducted at 100-foot intervals, where possible, on the exposed bedrock in the bottom of the excavated trench for the French Drain. The falling-head permeability tests were performed to confirm that the bedrock material had hydraulic conductivities equal to or less than 1×10^{-6} cm/sec. In situ packer tests measure horizontal hydraulic conductivity, whereas laboratory back-pressure permeability tests and in situ falling-head permeability tests measure vertical hydraulic conductivity. In general, the geologic formations were anisotropic. Most commonly, hydraulic conductivity is greater in the horizontal direction than in the vertical. Vertical conductivity is of foremost concern regarding the function of the French Drain because of the potential for contaminated groundwater to migrate beneath the French Drain. Both techniques used to measure vertical conductivities produced results that were less than 1×10^{-6} cm/sec. Table A4-4 presents the results of all three tests.

In situ falling-head permeability tests were conducted in the base of the French Drain excavation between stations 19 + 28 and 10 + 45. These tests were conducted approximately every 100 feet in order to confirm that bedrock was hydraulically competent. The results of these tests (Table A4-4) indicate that all of the bedrock material tested was hydraulically competent. These tests were not performed west of station 10 + 45 due to unstable slope conditions that required rapid construction and backfilling techniques. Test

data collected from boreholes during the geotechnical investigation can substantiate hydraulic competency in materials west of station 10 + 45.

Between stations 5 + 25 and 7 + 55, in situ permeability tests were not performed in the French Drain excavation due to construction activities. However, previously collected data on permeabilities from the geotechnical investigation indicate that the displaced bedrock materials were generally regarded as hydraulically competent. This displaced bedrock material was interpreted as in place during the geotechnical investigation and was subjected to in situ packer testing. The results of the in situ packer testing (Table A4-4) indicate that the displaced bedrock is able to maintain a hydraulic conductivity of 1×10^{-6} cm/sec (or less) and is therefore suitable material in which to key the bottom of the drain. Given this criteria, the base of the French Drain is always below the top of bedrock.

Some of the packer tests and back-pressure permeability tests conducted during the geotechnical investigation were performed on lithologies below the excavated grade of the French Drain. Data from these tests confirm that bedrock lithologies in areas where in situ falling-head tests were not conducted have hydraulic conductivities of 1×10^{-6} cm/sec or less. These packer test results are indicative of materials confirmed as in-place bedrock. In addition, back-pressure permeability tests from these lithologies are comparable to the falling-head tests conducted during excavation in the exposed bedrock at the bottom of the trench.

The permeability tests conducted during the geotechnical investigation correlate well with the in situ falling-head tests conducted during the French Drain construction. Intervals tested within the colluvial slump blocks exhibit characteristics similar to those of bedrock materials. This is primarily due to the predominance of bedrock material within these slumps. The subscripts in Table A4-4 identify the characteristics of each tested interval.

A4.2.6 Conclusions

A simplified sequence of the lithologic units exposed during the excavation of the French Drain is summarized as follows:

- Top soil - The surficial soils grading from a brown sandy clay to a silty clay
- Alluvium - A lateral and vertical gradational sequence of a reddish/brown clayey sand to silty clay with lenses of gravels to cobbles in a clayey sand matrix containing caliche and scattered inclusions of claystone blocks
- Colluvium - The alluvial and/or bedrock lithologies disturbed or displaced due to slumping and downslope movement
- Bedrock - The competent claystone, siltstone, and sandstone typifying the upper Laramie Formation

The geologic structures encountered during excavation activities included several slump features and a possible fault. The axis of the slump features encountered consistently trended east-west. The movement of the slumps was downslope based on north-south trending slickensides on the shear planes. The possible fault was northwest trending and had a northeast dip.

The alluvial/colluvial groundwater flow system is interpreted as being anisotropic and heterogeneous. Slumps in the alluvium/colluvium influence groundwater flow patterns. It is theorized that as the slumps move downslope any permeable strata within the slump block may become juxtaposed with the claystone bedrock, thereby forming complex flow paths. The shear plane surfaces could intermittently conduct groundwater flow during periods of slope movement, although an inspection of exposed surfaces revealed no visible evidence of groundwater flowing through the shear planes. Examination of the possible fault plane encountered in the excavation revealed a dense caliche cement, which is indicative of previous groundwater movement. The fault plane appeared to be sealed, which prohibits further groundwater flow. Therefore, the possible fault is interpreted as having little or no influence on the present alluvial groundwater flow system. In the well-defined areas between slump scarps and the backward rotated tops of the slump block, depressions form where water from precipitation and alluvial seeps pond. Ponding of water was also noted at the base of the slump block upslope of the toe area.

Groundwater flow within the alluvium/colluvium along the French Drain alignment appears to be largely confined to the following lithologic units:

- Sandy to clayey silt - These laterally continuous units are underlain by impermeable clay layers and are overlain by very moist clay. The seeps may be due to gravity-induced flow across the excavation wall, since excavation activities revealed open fractures from which water appeared to be seeping.

- Silty sand and gravel - These materials are interpreted as channel deposits because they pinch out laterally and vertically on the exposed slopes. Groundwater in the silty sand and gravel deposits appears to be perched above a layer of silty clay. The highest rate of alluvial groundwater seepage was observed in these sands. Areas where these saturated sands occurred typically exhibited in-slope creep and earth flows during construction activities, possibly due to the release of geostatic pressure along the excavation.

In summary, the anisotropy and heterogeneity of the alluvial groundwater flow system is due to the amount of lower permeability clay bounding water-bearing units in the alluvial material and the presence of discontinuous alluvial sand channels and silt layers within slump blocks. The slump blocks likely create closed systems and, therefore, inhibit lateral continuous flow through the hillside. Groundwater within a slump system is typically stagnant, but may flow to the surface and discharge as hillside seeps or may undergo evapotranspiration, leaving behind deposits of caliche.

A4.3 UNCERTAINTIES AND SOURCES OF ERROR

This section identifies all uncertainties and sources of error encountered during the French Drain geologic characterization. Standardized procedures and techniques for collecting data were always used to reduce the number of errors and the degree of uncertainty involved with the French Drain geologic characterization. However, construction activities took precedence and often hindered attempts to perform detailed logging in many areas. Varying excavation slope angles necessary to ensure slope stability during construction and errors in determining top of slope influenced apparent unit thicknesses and depth of excavation when corrected to true vertical depth. These conditions also made lateral correlation between units difficult. In addition, grain-size distribution analysis could be biased when coarse-grained materials were sampled.

A4.3.1 Construction Activities

The quantity of data collected during the French Drain characterization was a reflection of the time available for logging and sampling. Construction activities would often limit data collection activities, introducing a degree of uncertainty to the mapped geologic interpretations presented in this report. Between stations 15 + 50 and 19 + 35, trenching activities were already underway before the geologic investigation was begun. In order to maintain schedule, the trench was mapped with 50-foot transect intervals (instead of 25-foot intervals). Samples to provide supporting laboratory data were collected only when major lateral and vertical lithological changes were noted; therefore, uncertainties with respect to visual interpretations of grain-size analysis are greater in this portion of the excavation.

West of station 15 + 50, health and safety protocols due to excavation activities and slope stability problems limited logging and sampling activities to the end of the day, after excavation activities were completed. The time available to log at the end of each day was even further limited by the early sunsets during December and January. Through the addition of another geologist to assist in logging and sample collection, the vertical sampling frequency was increased, which provided better supporting laboratory data; however, time constraints still limited transect intervals to a 50-foot spacing. Because of limited time and the spacing of transect intervals, lateral correlation of the complex geology between stations 13 + 00 and 13 + 50 required considerable inference.

West of station 10 + 50 to the end of the excavation at station 5 + 00, transect intervals were mapped every 25 feet. Vertical and lateral sampling frequency provided the best coverage during this section of the excavation. However, poor slope stability in this area of the drain proved to be the greatest factor limiting data acquisition. When active slumping occurred, all personnel were required to leave the keyway and slope for health and safety reasons. The slumped material would be removed to restabilize the slope, and construction and backfilling operations would immediately resume to further stabilize the area. This periodically prevented the geologist from completing the logging and sampling. Lack of samples in the bedrock unit of transect 6 + 00 was due to restricted trench access caused by slumping. When trench access was restricted, information was inferred from the

nearest logged transect interval. Because of large-scale slumping in this area, shorter sections of the excavation were opened in an attempt to control slumping. When sections of open trench were reduced to 25 or 30 feet, the time between the end of excavation activities and the start of construction activities would limit the time available for data collection. Because of these time constraints, the transect interval at stations 7 + 50, 9 + 25, and 5 + 75 were logged but not sampled. Additionally, transects at stations 8 + 50 and 5 + 00 were not sampled in bedrock.

The ability to trace units or structural features laterally from each transect interval was occasionally limited by construction activities. Units that did not correlate between transect intervals were assumed to pinch or grade into each other, but actual boundaries were not always possible to establish. Construction activities and unstable slope conditions did not permit the collection of samples from every unit along each transect. Although construction activities often placed limits on the ability of the geologist to provide detailed descriptions and consistent sampling, an attempt was made to sample and describe each new lithology when encountered.

A4.3.2 Lateral Correlation Uncertainties

Lateral correlation between transect intervals was often difficult due to construction activities and varying slope angles. In addition, varying slope angles between stations 11 + 20 and 10 + 90 and at station 13 + 40 added uncertainty to lateral correlations. Figure A4-10 demonstrates how the exposures of the geologic features may change due to varying slope angles. At station 11 + 00, excavation activities would often smear alluvial materials across the slope faces, thereby obscuring unit contacts and structural features. At station 11 + 00, excavated soil debris placed on the slope, sometimes in excess of 2 feet thick, prohibited logging of in-place soils. Geologic interpretation in such areas was inferred from the nearest logged transect interval. Shear planes encountered during initial excavation activities were often removed prior to logging in order to better stabilize the slope, altering the appearance of the lithologic and structural features and making them appear to be discontinuous.

A4.3.3 Thickness and Vertical Correction Errors

The apparent thickness of soil and bedrock units and the mapped depth of excavation is greatly influenced by the estimated top of slope elevation and by varying slope angles. Placement of the measuring tape at the top of slope for each transect interval was by the best judgement of the geologist. Surface elevations presented on the geologic maps were estimated using the design specification for the French Drain (Engineering-Science, 1991). Errors in estimating top of slope are reflected down the entire transect interval, including the depth of excavation.

Errors affecting vertical corrections and apparent thicknesses can also be attributed to minor variations in slope angles. The slopes of the excavation were laid back at various angles as a means to control unstable slope conditions. Slope angles were measured by placing a Brunton compass on a long, flat object laying on the slope. Each obvious change in slope was measured; however, variances of 5 degrees or less were generally not recorded. The cumulative effect of many unrecorded minor slope changes could change apparent thicknesses and depth of excavation when correcting field data to true vertical depth. It should be noted that the mapped approximate depth of excavation reflects these inherent errors and does not reflect the actual constructed grade of the French Drain.

A4.3.4 Uncertainties Associated With Comparing Laboratory Analyses With Field Observations

Laboratory grain-size analyses were given in units of percent by weight. Data from samples collected with coarse-grained materials such as gravels and cobbles were biased high (i.e., the analytical sample results reported percentages of coarse-grained materials that were higher than the actual material found in the field). Therefore, the results of these samples had to be compared to field observations and categorized according to the best judgment of the geologist.

A4.4 REFERENCES

Billings M.P., 1972. *Structural Geology*, Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Cleaves, A.B., 1961. *Landslide Investigations*, U.S. Government Printing Office, Washington, D.C.

Compton, R., 1962. *Manual of Field Geology*. John Wiley & Sons, Inc., New York.

EG&G. 1990a. *French Drain Geotechnical Investigation Report*, U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado. 5 October 1990.

EG&G, 1990b. *Interim Measures/Interim Remedial Action Plan and Decision Document for the 881 Hillside Area Operable Unit 1*, Rocky Flats Plant, Golden, Colorado. January 1990.

EG&G, 1991a. Environmental Management Division Operating Procedures, Volume III: Geotechnical, *Logging Pits and Trenches in Construction Excavation*, GT.7

EG&G, 1991b. Environmental Management Division Operating Procedures, Volume III Geotechnical *In Situ Hydraulic Conductivity Test*, GT.23.

EG&G, 1992a. *French Drain Geologic Characterization Work Plan*, U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, April 1992.

EG&G, 1992b. *Phase II Geologic Characterization Data Acquisition, Surface Geologic Mapping of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Colorado*, U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, March 1992.

Engineering-Science, 1991. *The Specifications and Drawings for the Phase II B construction (Collection and Discharge System) Remedial Action*, 881 Hillside, July 1991.

Harding, T.P., 1991. *Identification of Wrench Faults Using Subsurface Structural Data: Criteria and Pitfalls*: Reply, AAPG Bulletin, Vol. 75/11, p. 1786-1788.

Reading, H.G., 1978. *Sedimentary Environments and Facies*. Blackwell Scientific Publications. Oxford, England.

Schuster, R.L., and R.J. Krizek (Editors), 1978. *Landslides Analysis and Control*. In: Special Report 176, Transportation Research Board, Commission on Sociotechnical System, National Research Council; National Academy of Sciences, Washington, D.C., 1978.

Scott, G.R., 1965. *Nonglacial Quaternary Geology of the Southern and Middle Rocky Mountains*. In: *The Quaternary of the United States*, pp. 243-254, Princeton University Press.

Skempton, A.W., and J.N. Hutchinson, 1969. *Stability of Natural Slopes and Embankment Foundations*. Proc., 7th International Conference on Soil Mechanics and Foundation Engineering, Mexico City, State-of-the-Art Vol., pp. 291-340.

Table A4-1

Grain Size Scales (millimeters)

U.S.C.S. (unconsolidated material)	Wentworth (Bedrock)	Component
>76.2	256—64	Cobbles
—	64—32*	Very Coarse Gravel
76.2—19	32—16*	Coarse Gravel
—	16—8	Medium Gravel
19—4.76	8—4*	Fine Gravel
—	4—2	Granule
—	2—1	Very Coarse Sand
4.76—2	1—0.5	Coarse Sand
2—0.42	0.5—0.25	Medium Sand
0.42—0.074	0.25—0.125	Fine Sand
—	0.125—0.0625	Very Fine Sand
0.074	0.0625—0.0039	Silt
—	<0.0039	Clay

* Pebbles

Table A4-2

Alluvial Ground-Water Seep Occurrences Along the French Drain Alignment

Station	Depth in Feet	Lithology
6 + 75	13.40	Clayey Silt
6 + 75	16.00	Clayey Silt
6 + 75	16.45	Clayey Silt
7 + 15	23.80	Clayey Sand
7 + 25	10.25	Silty Clayey Gravel
7 + 50	12.00	Silty Clayey Gravel
9 + 50	18.65	Gravelly Sand
8 + 15	23.80	Clayey Sand

Table A4-3

Comparison Between Grain Size Distribution (1) of the
Geotechnical Investigation (EG&G, 1990b) and the Geologic Characterization

Borehole Number	Approximate Corresponding Station Number	Test Interval (feet)	Geotechnical Investigation: Grain Size (percent) Sand	Silt	Clay	Classification	Geologic Characterization: Sample Number/ Corrected Depth (2)	Grain Size (percent) Sand	Silt	Clay	Classification
B301890	05+00	28.90 - 29.30	19	56	25	Clayey Siltstone	ND	ND	ND	ND	
		33.30 - 33.70	12	53	35	Clayey Siltstone (3)	ND	ND	ND	ND	
B304190	05+50	04.00 - 4.50	21	31	48	Silty Clay (CH)	ND	ND	ND	ND	
B301690	07+00	29.60 - 30.00	10	58	32	Clayey Siltstone (3)	ND	ND	ND	ND	
		32.40 - 32.70	36	47	17	Sandy Clayey Siltstone (3)	ND	ND	ND	ND	
		37.00 - 37.30	2	42	56	Silty Claystone (3)	ND	ND	ND	ND	
B301590	08+00	26.75 - 27.10	42	40	18	Silty Sandstone (3)	ND	ND	ND	ND	
B301390	10+00	23.80 - 24.40	13	62	25	Clayey Silt	10+00-43.00/20.23	.8	8.2	91	Clay (CH)
B304090	10+50	04.50 - 5.50	3	28	69	Silty Clay	10+50-4.50/2.89	8.3	25.7	60	Silty Clay (CH)
B301190	12+00	23.60 - 24.00	16	43	41	Clayey Siltstone (4)	ND	ND	ND	ND	
		23.60 - 24.00	41	44	15	Sandy Siltstone (4)	12+00-41.00/26.35	28.4	37	27	Sandy Clayey Silt (CL)
		31.10 - 32.00	32	38	30	Sandy Clayey Siltstone	12+00-49.00/31.50	22.9	53	24	Sandy Clayey Siltstone
		35.00 - 35.50	21	50	29	Sandy Clayey Siltstone	ND	ND	ND	ND	
B301090	13+00	31.10 - 31.50	0	20	80	Silty Claystone (4)	ND	ND	ND	ND	
B303990	15+50	10.70 - 11.20	19	56	25	Clayey Silt	15+40-27.50/13.20	30	48	22	Sandy Clayey Siltstone
B300790	16+00	16.00 - 16.80	0	45	55	Silty Claystone	15+58-26.50/17.03	1.1	42.9	56	Silty Claystone
		20.80 - 21.50	1	56	43	Clayey Siltstone (3)	ND	ND	ND	ND	
B300690	17+00	19.00 - 19.50	16	59	25	Clayey Siltstone	ND	ND	ND	ND	
B300590	18+00	10.60 - 11.30	25	20	55	Silty Sandy Claystone (4)	18+00-17.00/11.00	2.3	30.4	67.3	Silty Clay
		21.20 - 21.90	1	34	65	Silty Claystone (3)	ND	ND	ND	ND	

(1) Comparison between grain size distribution is from a composite interval in the Geotechnical Investigation and a proximal point source sampled during the geologic characterization of the French Drain.
(2) Sample Number corresponds to the Station Number (Engineering Science, 1991) and the sample depth during excavation. Corrected depth corresponds to the sine of the slope angle.
(3) Below grade of French Drain excavation
(4) Displaced bedrock from slumping

ND - No Data

Table A4-4

Permeabilities of Alluvial and Bedrock Materials
Geotechnical Investigation (EG&G, 1990b) and the Geologic Characterization

		Geotechnical Investigation					Geologic Characterization					
Borehole Number	Approximate Corresponding Station Number	Depth to Bedrock (feet)	Test Interval (feet)		In Situ Packer Test Permeability (cm/sec)	Back Pressure Permeability (cm/sec)	Approximate Test Station	Approximate Depth of Excavation (feet)	Approximate Depth to Bedrock (feet)	Approximate Depth to Acceptable Material (1) (feet)	Hydraulic Conductivity Results K(cm/s) Doty/Assoc.	Hydraulic Conductivity Results K(cm/s) EG&G
B301890	05+00	20.0	23.50 - 26.90	(2)	<8.3 E-7			31	29	20		
		20.0	26.90 - 31.90	(3)	3.9 E-6							
		20.0	31.90 - 36.90	(4)	<4.5 E-7							
		20.0	37.90 - 41.90	(4)	<4.5 E-7							
B301790	06+00	17.0	22.76 - 24.60	(3)	<1.3 E-6			26	25	23		
		17.0	24.60 - 29.60	(2,5)	<5.8 E-7							
		17.0	29.60 - 34.60	(4)	<4.8 E-7							
		17.0	34.60 - 39.60	(4)	<4.1 E-7							
B301690	07+00	20.5	22.80 - 27.60	(2,5)	<6.6 E-7			25.5	25	23.5		
		20.5	24.75 - 32.90	(5)	<4.3 E-7							
		20.5	29.60 - 30.00	(4)		2.4 E-8						
		20.5	32.40 - 32.70	(4)		7.1 E-8						
		20.5	32.90 - 37.80	(4)	4.4 E-7							
B301590	08+00	13.5	16.50 - 20.30	(3)	8.5 E-4			24	22	16		
		13.5	20.30 - 25.30	(3)	4.2 E-5							
		13.5	25.30 - 30.30	(4)	2.3 E-6							
		13.5	26.30 - 30.30	(4)	8.0 E-6							
		13.5	26.75 - 27.10	(4)		1.5 E-6						
B301490	09+00	16.1	18.00 - 23.27	(2,3,5)	<4.9 E-6			22	20	15		
		16.1	22.70 - 27.97	(4)	<6.0 E-6							
		16.1	27.50 - 32.77	(4)	<2.3 E-6							
		16.1	28.30 - 28.60	(4)		3.1 E-8						
B301390	10+00	13.0	14.80 - 18.80	(3,6)	3.5 E-6			26	24	16		

(1) Acceptable material is the disturbed bedrock at times utilized to attain a two-foot vertical extension of the trench grade into material representing a hydraulic conductivity of 1 E-6 cm/sec.
(2) The test interval is supportive of acceptable material having a hydraulic conductivity of 1 E-6 cm/sec.
(3) The test interval is within an identified shear plane.
(4) The test interval is below trench grade.
(5) The test interval is supportive of bedrock with a hydraulic conductivity of 1 E-6 cm/sec.
(6) The test interval is within a colluvial slump block.

Table A4-4

Permeabilities of Alluvial and Bedrock Materials
Geotechnical Investigation (EG&G, 1990b) and the Geologic Characterization

		Geotechnical Investigation					Geologic Characterization					
Borehole Number	Approximate Corresponding Station Number	Depth to Bedrock (feet)	Test Interval (feet)		In Situ Packer Test Permeability (cm/sec)	Back Pressure Permeability (cm/sec)	Approximate Test Station	Approximate Depth of Excavation (feet)	Approximate Depth to Bedrock (feet)	Approximate Depth to Acceptable Material (1) (feet)	Hydraulic Conductivity Results K(cm/s) Doty/Assoc.	Hydraulic Conductivity Results K(cm/s) EG&G
		13.0	18.80 - 23.80	(3)	1.7 E-6							
		13.0	23.80 - 24.40	(5)		1.9 E-7						
		13.0	24.80 - 28.80		3.5 E-6							
		13.0	28.80 - 33.80	(4)	<5.0 E-7							
		13.0	N/A		N/A							
							10+45	36	32		7.08 E-07	
B301290	11+00	9.5	09.50 - 14.50	(2)	<1.5 E-6			44	29	8		
		9.5	14.50 - 19.50	(2)	<1.0 E-6							
		9.5	19.50 - 24.50	(3)	1.1 E-4							
							11+35	36	30		3.64 E-08	
B301190	12+00	18.6	23.00 - 28.00	(6)	<6.6 E-6			35	30	21		
		18.6	23.60 - 24.00	(2)		2.4 E-8						
		18.6	28.00 - 33.00	(3)	<5.3 E-6							
		18.6	34.00 - 39.00	(4,5)	<3.5 E-6							
		18.6	35.00 - 35.50	(5)		1.1 E-8						
							12+35	34	27		1.36 E-07	1.36 E-07
B301090	13+00	21.0	22.07 - 27.34	(3,6)	6.4 E-5			36	34	26		
		21.0	31.10 - 31.50	(5)		3.1 E-8						
							13+50	30	28	25	5.50 E-08	5.48 E-08
B300990	14+00	12.1	14.30 - 19.30	(2,6)	<2.6 E-6			26	17	6		
		12.1	19.30 - 24.30	(5)	<1.3 E-6							
		12.1	24.30 - 29.30	(4,5)	<2.0 E-6							
							14+30	25	17		4.86 E-08	4.84 E-08

(1) Acceptable material is the disturbed bedrock at times utilized to attain a two-foot vertical extension of the trench grade into material representing a hydraulic conductivity of 1 E-6 cm/sec.
(2) The test interval is supportive of acceptable material having a hydraulic conductivity of 1 E-6 cm/sec.
(3) The test interval is within an identified shear plane.
(4) The test interval is below trench grade.
(5) The test interval is supportive of bedrock with a hydraulic conductivity of 1 E-6 cm/sec.
(6) The test interval is within a colluvial slump block.

Table A4-4

Permeabilities of Alluvial and Bedrock Materials
Geotechnical Investigation (EG&G, 1990b) and the Geologic Characterization

		Geotechnical Investigation					Geologic Characterization					
Borehole Number	Approximate Corresponding Station Number	Depth to Bedrock (feet)	Test Interval (feet)		In Situ Packer Test Permeability (cm/sec)	Back Pressure Permeability (cm/sec)	Approximate Test Station	Approximate Depth of Excavation (feet)	Approximate Depth to Bedrock (feet)	Approximate Depth to Acceptable Material (1) (feet)	Hydraulic Conductivity Results K(cm/s) Doty/Assoc.	Hydraulic Conductivity Results K(cm/s) EG&G
B300890	15+00	12.0	16.26 - 19.50	(5)	<5.9 E-6			22	15			
		12.0	19.50 - 25.00	(4,5)	<3.4 E-6							
		12.0	24.30 - 29.30	(4)	<2.0 E-6							
							15+40	18	16	12	2.77 E-08	3.42 E-08
							15+70	17	6		2.56 E-08	2.55 E-08
B300790	16+00	3.7	10.12 - 13.00	(5)	<5.0 E-6			18	8			
		3.7	13.00 - 17.00	(5)	<8.4 E-6							
		3.7	17.00 - 23.00	(4,5)	<4.8 E-6							
		3.7	18.60 - 18.80	(4,5)		6.0 E-9						
							16+50	21	17		9.6 E-8	
							16+70	23.5	18	16	1.07 E-07	1.07 E-07
B300690	17+00	12.5	10.10 - 15.37	(2,6)	<3.3 E-6			21	17	2		
		12.5	14.98 - 20.25	(2,3,5)	<3.7 E-6							
		12.5	18.50 - 19.00	(5)		1.6 E-7						
		12.5	19.00 - 19.50	(5)								
		12.5	20.10 - 25.37	(4,5)	8.4 E-7							
B300590	18+00	11.5	09.71 - 14.98	(6)	<2.8 E-6			18	16.5	16		
		11.5	10.60 - 11.30									
		11.5	14.76 - 20.03	(2,5)	<3.7 E-6							
		11.5	17.13 - 22.40	(4,5)	<4.5 E-6							
		11.5	21.20 - 21.90									
B303890	18+50	10.4	14.00 - 18.00	(2,5)	<1.2 E-6		18+50	17	15	11	2.56 E-08	2.55 E-08
		10.4	20.00 - 23.00	(4)	<1.0 E-6							

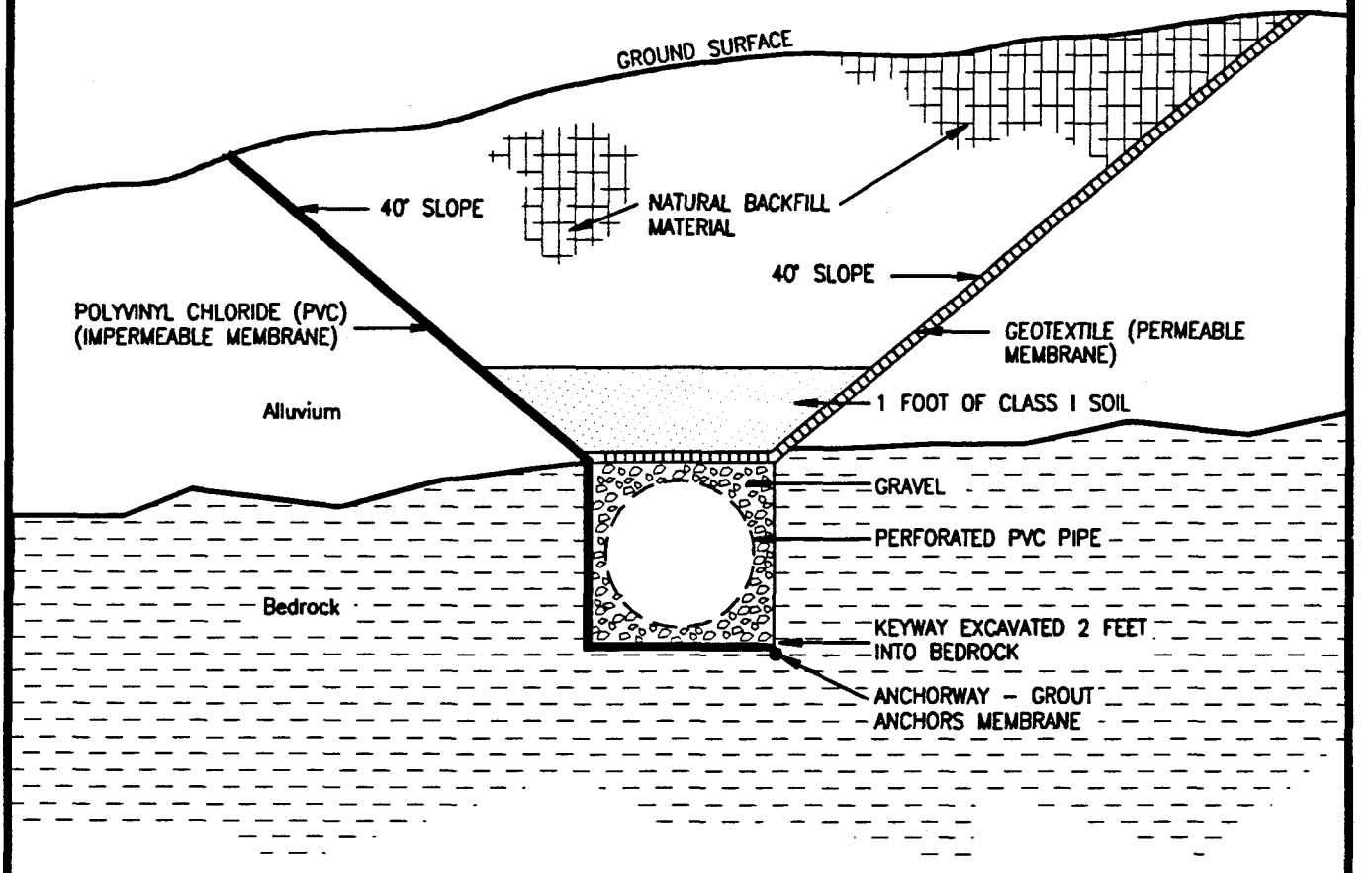
(1) Acceptable material is the disturbed bedrock at times utilized to attain a two-foot vertical extension of the trench grade into material representing a hydraulic conductivity of 1 E-6 cm/sec.
(2) The test interval is supportive of acceptable material having a hydraulic conductivity of 1 E-6 cm/sec.
(3) The test interval is within an identified shear plane.
(4) The test interval is below trench grade.
(5) The test interval is supportive of bedrock with a hydraulic conductivity of 1 E-6 cm/sec.
(6) The test interval is within a colluvial slump block.

Table A4-4

Permeabilities of Alluvial and Bedrock Materials
Geotechnical Investigation (EG&G, 1990b) and the Geologic Characterization

		Geotechnical Investigation				Geologic Characterization					
										Hydraulic Conductivity Results K(cm/s)	
Borehole Number	Approximate Corresponding Station Number	Depth to Bedrock (feet)	Test Interval (feet)	In Situ Packer Test Permeability (cm/sec)	Back Pressure Permeability (cm/sec)	Approximate Test Station	Approximate Depth of Excavation (feet)	Approximate Depth to Bedrock (feet)	Approximate Depth to Acceptable Material (1) (feet)	Doty/Assoc.	EG&G
		10.4	23.00 - 28.00 (4)	<6.2 E-7							
						18+60	14	12	11	8.7 E-08	8.73 E-08
						19+28	12	9	8	1.34 E-07	1.3 E-07

(1) Acceptable material is the disturbed bedrock at times utilized to attain a two-foot vertical extension of the trench grade into material representing a hydraulic conductivity of 1 E-6 cm/sec.
(2) The test interval is supportive of acceptable material having a hydraulic conductivity of 1 E-6 cm/sec.
(3) The test interval is within an identified shear plane.
(4) The test interval is below trench grade.
(5) The test interval is supportive of bedrock with a hydraulic conductivity of 1 E-6 cm/sec.
(6) The test interval is within a colluvial slump block.



U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

881 HILLSIDE AREA
OPERABLE UNIT NO. 1
PHASE III RFI/RI REPORT

French Drain Construction Profile

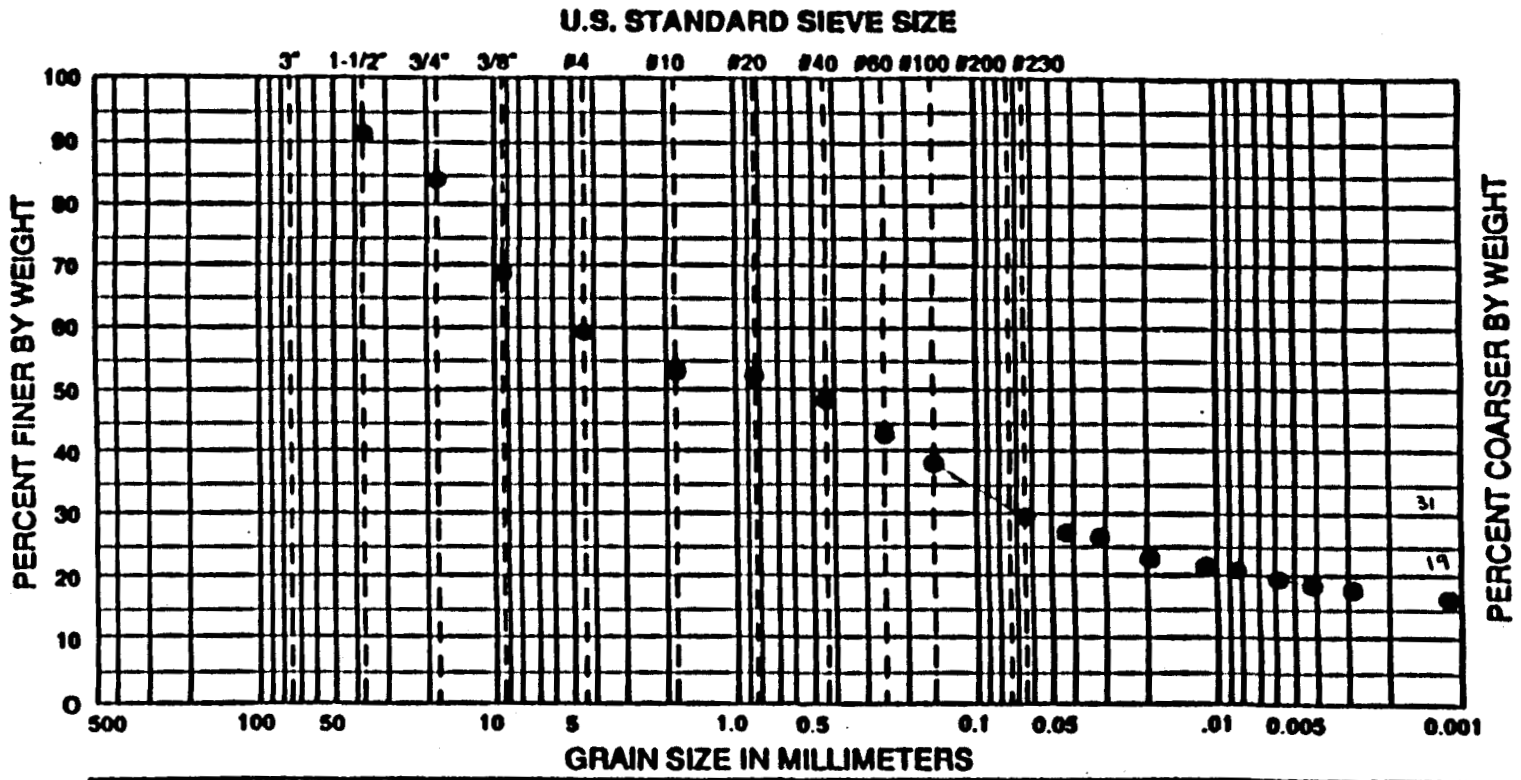
Figure A4-2

JUNE 1993

R74028.MB061793

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

U.S. STANDARD SIEVE SIZE



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 1075 SAMPLE NO.: C11 #12 DATE: 3/26/92 PROJECT NO.:

AREA	DEPTH		CLASSIFICATION					
			sandy gravel					
		Cobbles	GW - 30.4		S 28.9		SC	CL
Rocky Flats	23.0'	9.2	6.1	21.8	6.2	5.3	12	19

FIGURE A4-4

SOIL TYPES

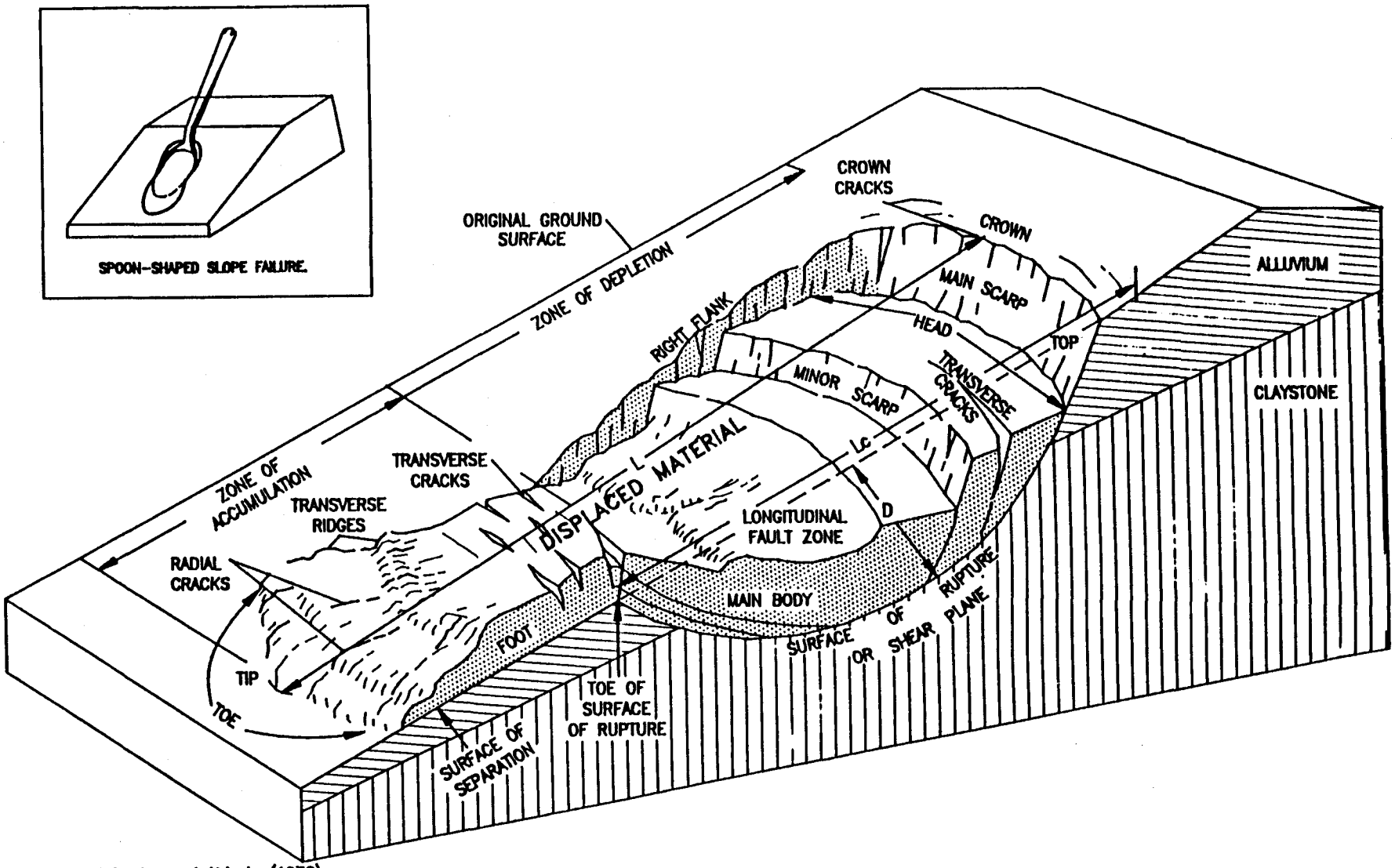
MAJOR DIVISIONS			LETTER	SYMBOL	DESCRIPTION
Coarse Grained Soils More than 50% of material is larger than No.200 sieve size	Gravel and Gravelly Soils More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels (<5% fines)	GW		Well-graded gravels or gravel-sand mixtures, little or no fines. Uc>4 (lab only)
			GP		Poorly graded gravels or gravel-sand mixtures, little or no fines.
		Gravels with (>12% fines)	GM		Silty gravels, gravel-sand-silt mixtures.
			GC		Clayey gravels, gravel-sand-clay mixtures.
	Sand and Sandy Soils More than 50% of coarse fraction passed No. 4 sieve	Clean Sand (<5% fines)	SW		Well-graded sands or gravelly sands, little or no fines. Uc>6 (lab only)
			SP		Poorly-graded sands or gravelly sands, little or no fines.
		Sands with Fines (>12% fines)	SM		Silty sands, sand-silt mixtures.
			SC		Clayey sands, sand-clay mixtures.
Fine Grained Soils More than 50% of material is smaller than No.200 sieve size	Silts and Clays	Low Plasticity	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity.
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL		Organic silts and organic silty clays of low plasticity.
		High Plasticity	MH		Inorganic silts, micaceous or diatomaceous fine sands or silty soils.
			CH		Inorganic clays of high plasticity, fat clays.
			OH		Organic clays of medium to high plasticity, organic silts.
Highly Organic Soils			PT		Peat, humus, swamp soils with high organic contents.

Note: Dual Symbols are used to indicate borderline soil classifications whose fines range from 5 to 12%.

U.S. DEPARTMENT OF ENERGY Rocky Flats Plant Golden, Colorado	UNIFIED SOIL CLASSIFICATION SYSTEM	FIGURE A4-5

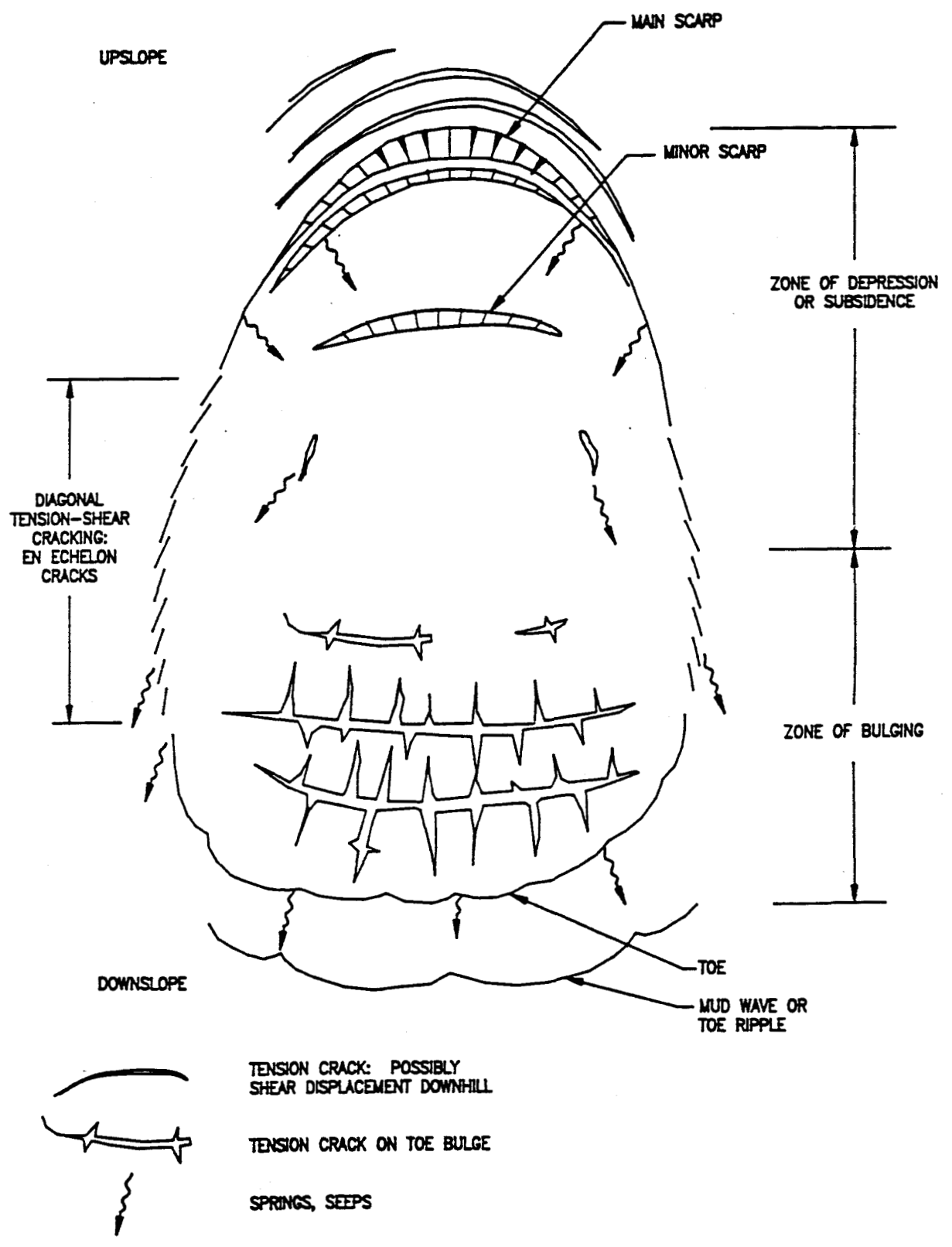
R33190.MB052292

R33183.CWCW-051492



Adapted from Schuster and Krizek, (1978).

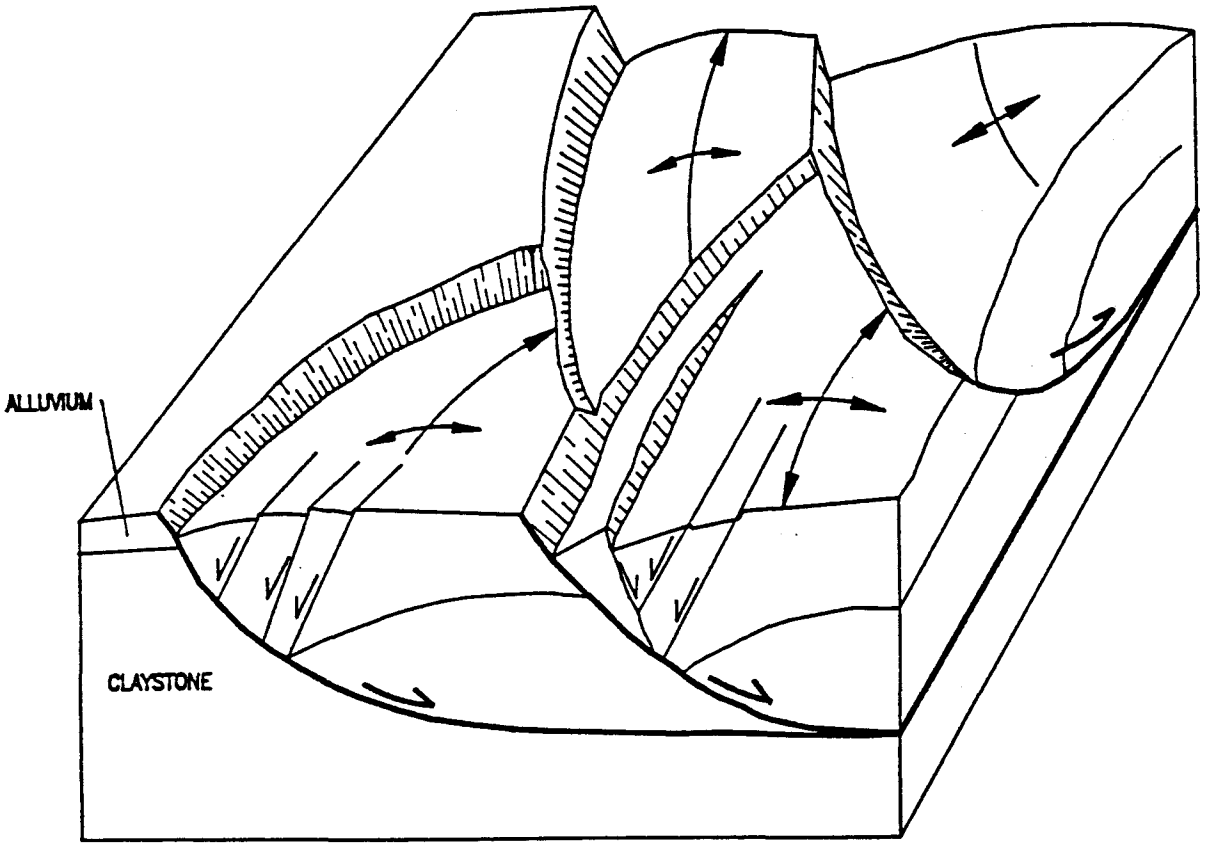
U.S. DEPARTMENT OF ENERGY Rocky Flats Plant Golden, Colorado	BLOCK DIAGRAM OF TYPICAL SLUMP	FIGURE A4-6



Adapted from Schuster and Krizek, (1978).

U.S. DEPARTMENT OF ENERGY Rocky Flats Plant Golden, Colorado	PLANAR DIAGRAM OF TYPICAL SLUMP	FIGURE A4-7

R33184.CWCW-051492

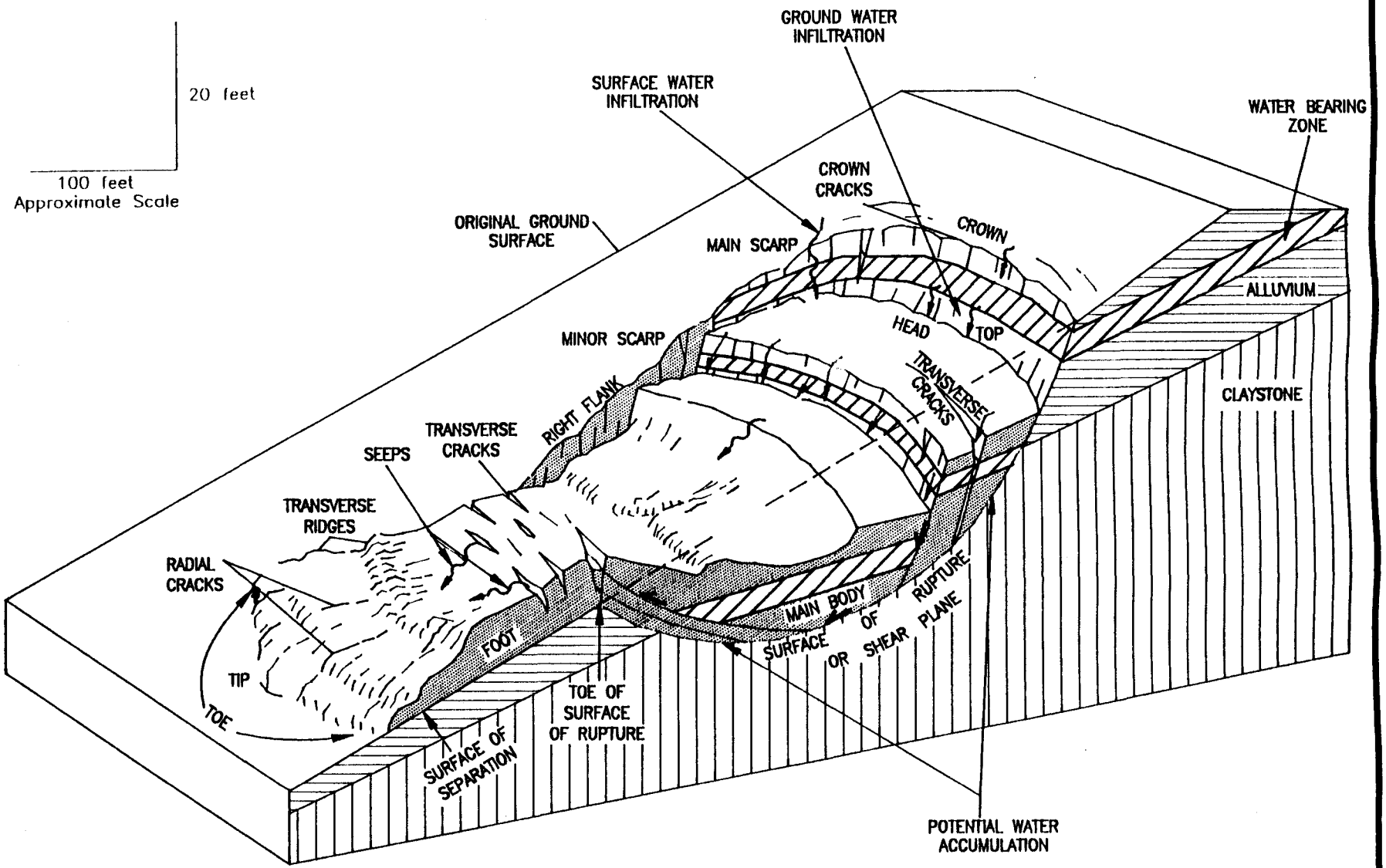


Adapted from Harding, T.P., (1991).

U.S. DEPARTMENT OF ENERGY Rocky Flats Plant Golden, Colorado	TYPICAL COMPLEX SLUMPING	FIGURE A4-8

R33186.MBCW-051492

R33189.CWCW-051492

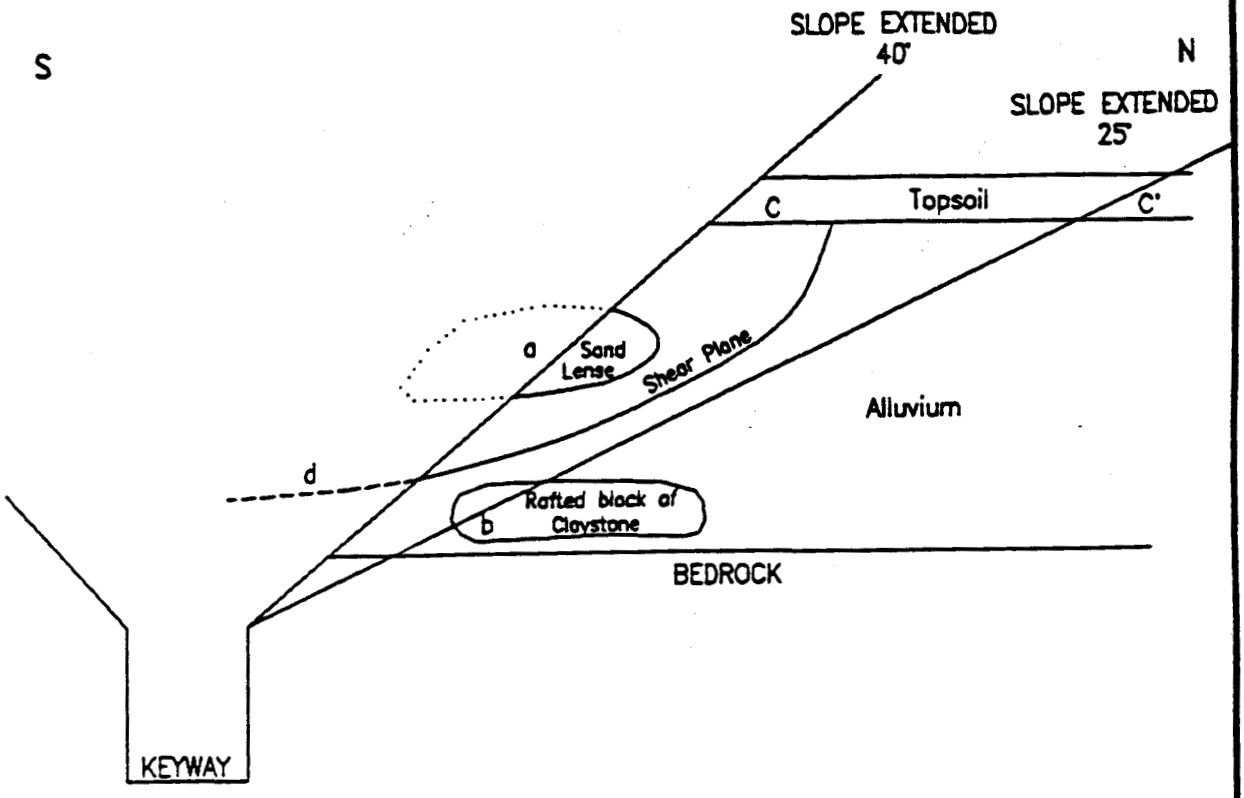


Adapted from Schuster and Krizek, see references.

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

POTENTIAL HYDROGEOLOGIC CONDITIONS OF A TYPICAL SLUMP

FIGURE A4-9



LATERAL CROSS SECTION OF EXCAVATION LOOKING WEST

a: Lenticular sand exposed when slope is 40°, absent with slope of 25°.

b: Rafted block of claystone exposed when slope is 25°, absent when slope is 40°.

C vs C': Change in apparent thicknesses between a 40° slope, and 25° slope.

d: Shear Plane removed by resloping.

R33188.PJCW-052092

U.S. DEPARTMENT OF ENERGY Rocky Flats Plant Golden, Colorado	CONCEPTUAL UNCERTAINTIES RESULTING FROM VARYING EXCAVATION SLOPE ANGLES	FIGURE A4-10

Attachment A4-1
Lithologic Descriptions

Phase III
RFI/RI Report

PREFACE

The geology of the north slope of the french drain is shown on the 30 cross sections presented in Attachment A4-2. Each cross section represents a 50-foot east to west segment of the french drain excavation (scale of 1 inch equals 2 feet). Sheet 1 of 30 (Attachment A4-2) provides a location map for reference. Surface elevations recorded on the cross sections were estimated from the design specifications (Engineering Science, 1990). The approximate depth of excavation contains inherent errors discussed in Section A4-3 of the text and does not reflect the actual constructed grade of the drain.

This attachment contains the lithologic descriptions of all units identified on each of the 30 individual geologic cross sections. The U.S.C.S. classification for each overburden unit based on the laboratory grain size analysis is presented in parenthesis behind the unit name. The results of the laboratory grain size analyses are presented in Attachment A4-4. As discussed in Section A.4.2.1.3 (Classification of Soil and Bedrock Samples) in the text, the grain size graphs presented in Attachment A4-4 display the percent of material which passes through sieve number 230 for determination of silt and clay content. In order to classify the unconsolidated materials according to the U.S.C.S. system, the percentage of materials passing through sieve size number 200 was interpolated from the grain size distribution graph.

Lithologic descriptions are furnished with superscripts to facilitate cross-referencing between the descriptions and their occurrence on the individual cross sections. The superscripts are specific to each cross section and do not necessarily correlate to superscripts found on adjoining cross sections.

Each cross section contains a key of symbols to identify the general geologic and hydrogeologic data. Additional information describing specific geologic, hydrogeologic or mapping data may be found on some of the cross sections. For instance; the "break in section" shown on cross sections 12 and 13 refer to the necessary shortening of the sections in order to fit the data on the figure.

SANDY SILTY CLAY (FILL) (CL)[1]: with some gravel; pale yellowish brown (10 YR 6/4) to dark yellowish brown (10 YR 4/2); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

CLAY (CH)[2]: with some sand and silt, trace gravel; possible top soil horizon and wetlands deposits; dusky yellowish brown (10 YR 2/2) to brownish black (5 YR 2/1); fine gravel, poorly graded, rounded, quartzose and metasediment; predominantly fine- to medium-grained sand, poorly to moderately graded, rounded, quartzose; high plasticity; noncalecreous; very organic; damp; grades to Clayey Sand (SC)[3], west of 5 + 34.

CLAYEY SAND (SC)[3]: with some silt and gravel; brownish black (5 YR 2/1) to grayish brown (5 YR 3/2); fine gravel, poorly graded; fine- to coarse-grained sand, well graded, rounded, quartzose; low plasticity; sand forms 5 centimeter thick lenses; damp; grades to Clay (CH)[2] west of 5 + 16.

SILTY CLAY (CL)[4]: with some sand, trace gravel; moderate brown (5 YR 3/4) to moderate yellowish brown (10 YR 5/4) with trace of medium light gray (N 6/0); fine gravel, poorly graded, rounded; fine- to medium-grained sand, poorly to moderately graded, rounded, quartzose; low to medium plasticity; non to slightly calcareous; gravel amounts increase with depth near bottom contact; damp.

SILTY CLAY (CH)[5]: with trace sand and gravel; reworked weathered claystone; light gray (N 7/0) to light olive gray (5 Y 6/1); fine gravel, poorly graded; fine- to medium-grained sand, poorly to moderately graded; medium to high plasticity clay; some clasts of the overlying silty clay were mottled near the upper contact, trace limonite concentrations, trace caliche mottled in; damp.

SILTY CLAY (CL)[6]: with trace sand and gravel; slightly weathered reworked claystone; medium gray (N 5/0); fine gravel, poorly graded; fine-grained sand, poorly graded; low plasticity; weak subblocky texture starting to develop; trace limonite staining mottled in; trace very pale orange (10 YR 8/2), 2 to 4 centimeter, rounded, caliche nodules near upper contact; damp; grades to Clay (CH)[7] west of 5 + 14.

CLAY (CH)[7]: with some silt, trace sand; reworked weathered claystone; medium gray (N 5/0); fine-grained sand, poorly graded; high plasticity clay; trace small (2 to 5 millimeter) rounded, waxy claystone clasts; some caliche mottled in; damp.

CLAYSTONE[8]: with some silt, trace sand; medium gray (N 5/0); fine- to medium-grained sand, moderately sorted, subblocky to blocky texture, slightly weathered with limonite staining along contact with shear plane, weathering decreasing with depth; damp, grades to Silty Claystone[9] west of 5 + 44.

SILTY CLAYSTONE[9]: with trace sand; medium gray (N 5/0); fine-grained sand, well sorted; subblocky to blocky texture; slightly weathered with limonite staining along contact with shear plane; weathering decreasing with depth; damp.

SANDY SILTY CLAY (FILL) (CL)[1]: with some gravel; pale yellowish brown (10 YR 6/2) to dark yellowish brown (10 YR 4/2); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

CLAY (CH)[2]: with some sand and silt, trace gravel; possible top soil horizon or deposits in wetlands; dusky yellowish brown (10 YR 2/2) to brownish black (5 YR 2/1); fine gravel, poorly graded, rounded, quartzose and metasediment; predominently fine- to medium-grained sand, poorly to moderately graded, rounded, quartzose; high plasticity; noncalecreous; very organic; damp.

SILTY CLAY (CL)[3]: with some sand, trace gravel; moderate brown (5 YR 3/4) to moderate yellowish brown (10 YR 5/4) with trace of medium light gray (N 6/0); partings of possible reworked claystone at 6 + 25; fine gravel, poorly graded, rounded; fine- to medium-grained sand, poorly to moderately graded, rounded, quartzose; low to medium plasticity; non to slightly calcareous; gravel increase with depth near bottom contact; damp; grades to Clay (CH)[5] with depth.

CLAY (CH)[4]: with some silt, trace sand and clay; reworked rafted block of claystone; light olive gray (5 Y 6/1); fine gravel, poorly graded; fine- to medium-grained sand; poorly to moderately graded; medium to high plasticity; homogenous; some white caliche mottled in; trace to 1 centimeter rounded claystone clasts; possible shear plane near bottom contact, unable to determine slickensides; damp to moist.

CLAY (CH)[5]: with some silt, trace sand and gravel; pale yellowish brown (10 YR 6/2) to light brownish gray (5 YR 6/1); fine gravels (0.4 to 1 centimeters) grading to cobbles (15 to 20 centimeters) moderate to well graded; rounded to subangular, quartzose and metasediment; fine- to coarse-grained sand, well graded, subrounded, quartzose; medium to high plasticity; percentages of coarse materials (>200 sieve size) increases slightly to the west; caliche found as finds around gravels and cobbles; very weak subblocky texture starting to develop; damp to moist; grades to Silty Clay (CL)[3] west of 5 + 90.

CLAYEY SAND (SC)[6]: with some silt and gravel; moderate reddish brown (10 R 4/6); fine to coarse gravel, well graded; rounded to subrounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, rounded to subrounded, quartzose; caliche at upper contact, some caliche mottled in; trace cobbles at upper contact; damp.

SILTY CLAY (CL/CH)[7]: with trace sand and gravel; reworked weathered claystone; olive gray (5 Y 4/1) to medium gray (N 5/0); gravels and cobbles, well graded; predominantly fine-grained sand, poorly graded; medium plasticity; highly weathered claystone with limonite staining; trace caliche mottled in; many discontinuous randomly oriented slide and glide planes; trace gravels and cobbles at lower contact near Station 6 + 00; well graded gravels and cobbles grade to poorly graded fine gravels to the west; damp.

SILTY CLAY (CL)[8]: with trace sand and gravel; slightly weathered reworked claystone; medium gray (N 5/0); fine gravel, poorly graded; fine-grained sand, poorly graded; low plasticity; weak subblocky texture starting to develop; trace limonite staining mottled in; trace very pale orange (10 YR 8/2), 2 to 4 centimeter, rounded, caliche nodules near upper contact; damp.

CLAYSTONE[9]: with some silt, trace sand; medium gray (N 5/0); fine- to medium-grained sand, moderately sorted, subblocky to blocky texture, slightly weathered with limonite staining along contact with shear plan, weathering decreasing with depth; damp.

SANDY SILTY CLAY (FILL) (CL)[1]: with some gravel; mottled grayish brown (5 YR 3/2), grayish red (10 R 4/2), dark yellowish brown (10 YR 4/2) and medium gray (N 5/0); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

SILTY CLAY (CL)[2]: with some sand, trace gravel; moderate brown (10 YR 3/4) to moderate yellowish brown (10 YR 5/4) with trace of medium light gray (N 6/0) partings of possible reworked claystone at 6 + 25; fine gravel; poorly graded, rounded, fine- to medium-grained sand, poorly to moderately graded, rounded, quartzose; low to medium plasticity; non to slightly calcareous; gravels increase with depth near bottom contact; damp; grades to Clay (CH)[4] with depth west of 6 + 30; locally grades to Clayey Silt (ML)[3] at 6 + 25.

CLAYEY SILT (ML)[3]: with some sand, trace gravel; moderate brown (5 YR 3/4) to moderate yellowish brown (10 Y 5/4); fine gravel, poorly graded; subrounded; fine-grained sand, poorly graded, rounded, quartzose; low plasticity; well developed blocky texture; trace carbonaceous material, trace to some root casts; damp.

CLAY (CH)[4]: with some silt, trace sand and gravel; pale yellowish brown (10 YR 6/2) to light brownish gray (5 YR 6/1); fine gravels (0.4 to 1 centimeters) grading to cobbles (15 to 20 centimeters), moderate to well graded; rounded to subangular, quartzose and metasediment; fine- to coarse-grained sand, well graded, subrounded, quartzose; medium to high plasticity; percentages of coarse materials (>200 sieve size) increases slightly to the west; caliche found as rinds around gravels and cobbles; very weak subblocky texture starting to develop; damp to moist.

CLAY (CH)[5]: with some sand and silt, trace gravel; possible top soil horizon or deposits from wetlands; dusky yellowish brown (10 YR 2/2) to brownish black (5 YR 2/1); fine gravel, poorly graded, rounded, quartzose and metasediment; predominently fine- to medium-grained sand, poorly to moderately graded, rounded, quartzose; high plasticity; noncalecreous; very organic; damp.

CLAY (CH)[6]: with some silt, trace sand and clay; reworked rafted block of claystone; light olive gray (5 Y 6/1); fine gravel, poorly graded; fine- to medium-grained sand, poorly to moderately graded; medium to high plasticity; homogenous; some white caliche mottled in; trace 1 centimeter rounded claystone clasts; possible shear plane near bottom contact, unable to determine slickensides; damp to moist.

SILTY CLAY (CL/CH)[7]: with trace sand; reworked weathered claystone; olive gray (5 Y 4/1) to medium gray (N 5/0); predominantly fine-grained sand, poorly graded; medium plasticity; highly weathered claystone with limonite staining; trace caliche mottled in; many discontinuous randomly oriented slide and shear planes; trace gravels and cobbles at lower contact near Station 6 + 00, damp.

CLAYEY SAND (SC)[8]: with some silt and gravel; moderate reddish brown (10 R 4/6); fine to coarse gravel, well graded, rounded to subrounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, rounded to subrounded, quartzose; caliche at upper contact, some caliche mottled in; trace cobbles at upper contact; damp.

CLAY (CH)[9]: with some silt, trace sand; reworked weathered claystone; medium gray (N 5/0) to olive gray (5 Y 4/1); fine- to medium-grained sand, moderately graded; high plasticity; becoming subblocky with depth; highly weathered and limonite stained; abundant caliche mottled in; damp to moist.

CLAYSTONE[10]: with some silt, trace sand; fine-grained sand, well sorted, dense, hard, blocky, slightly weathered damp.

SANDY SILTY CLAY (FILL) (CL)[1]: with some gravel; mottled grayish brown (5 YR 3/2), grayish red (10 R 4/2), dark yellowish brown (10 YR 4/2) and medium gray (N 5/0); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

SILTY CLAY (CL)[2]: with some sand, trace gravel; moderate yellowish brown (10 YR 5/4); trace mottled with medium gray (N 5/0); fine gravel; poorly graded, rounded, quartzose and metasediment; predominantly fine-grained sand, poorly graded, rounded, quartzose; low to medium plasticity; highly weathered with mottled limonite staining; damp.

CLAYEY SILT (ML/CL)[3]: with some sand; pale yellowish brown (10 YR 6/2) to light olive gray (5 Y 6/1) to medium gray (N 5/0); fine-grained sand, poorly graded; rounded quartzose; low to medium plasticity; fairly homogeneous; banded with iron staining; trace mica; fractures are not healed and locally contain seeps; moist to wet.

CLAYEY SAND (SC)[4]: with some gravel, trace silt; moderate reddish orange (10 R 6/6) to moderate reddish brown (10 R 4/6); fine to coarse gravels and cobbles from 0.5 to 25 centimeters, well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, predominantly medium-grained sand, moderately to well graded, subangular to rounded, quartzose and arkosic; medium plasticity; non to very slight calcareous with traces of caliche grading in; some limonite staining; moist.

SILTY CLAY (CH)[5]: with trace sand; reworked weathered claystone; medium gray (N 5/0) to light olive gray (5 Y 6/1); predominantly fine-grained sand, poorly graded; medium to high plasticity; subblocky texture; trace claystone clasts; highly weathered claystone with limonite staining mottled in; trace caliche mottled in; damp. Grades to Clay (CH), west of 6 + 85.

CLAY (CH)[6]: with some silt, trace sand; disturbed claystone; medium gray (N 5/0) to medium dark gray (N 4/0); fine- to medium-grained sand, moderately graded; high plasticity; becoming subblocky with depth; highly weathered and limonite stained; abundant caliche mottled in; damp to moist.

SILTY CLAY (CL/CH)[7]: with trace sand; reworked weathered claystone; light olive gray (5 Y 6/1) to medium gray (N 5/0); predominantly fine-grained sand, poorly graded; medium plasticity; highly weathered claystone with limonite staining; trace caliche mottled in; moist.

SILTY CLAYSTONE[8]: with trace sand; medium dark gray (N 4/0) to dark gray (N 3/0); fine-grained sand, well sorted; dense; blocky to subblocky; fractures healed or partially healed with limonite; heavily weathered at contact with shear plane; weathering decreases with depth; damp. Grades to Claystone, at 6 + 90.

CLAYSTONE[9]: with some silt, trace sand; medium gray (N 5/0) to medium dark gray (N 4/0); fine-grained sand, well sorted; dense; subblocky to blocky texture; develops better with depth and to the west; damp.

SANDY SILTY CLAY (FILL) (CL)[1]: with some gravel; mottled grayish brown (5 YR 3/2), grayish red (10 R 4/2), dark yellowish brown (10 YR 4/2) and medium gray (N 5/0); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

SILTY CLAY (CL)[2]: with some sand, trace gravel; moderate yellowish brown (10 YR 5/4) grading to pale brown (5 YR 5/2) mottled with medium gray (N 5/0) to the west; fine gravel, poorly graded, rounded, quartzose and metasediment; predominantly fine-grained sand, poorly graded, rounded, quartzose; low to medium plasticity; abundant limonite staining mottled in; grades to Gravelly Clay (CL) with depth; damp.

GRAVELLY CLAY (CL)[3]: with some silt and sand; moderate yellowish brown (10 YR 5/4); fine to coarse gravel (1.5 to 5 centimeters), poorly to moderately graded, rounded, quartzose and metasediment; fine- to medium-grained sand, moderately graded, rounded, quartzose; low to medium plasticity; abundant limonite staining mottled in; damp to moist.

CLAYEY SAND (SC)[4]: with some gravel and silt; moderate reddish orange (10 R 6/6) to moderate reddish brown (10 R 4/6); fine to coarse gravels and cobbles (0.5 to 25 centimeters); well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, subangular to rounded, quartzose and arkosic; medium plasticity; non to very slightly calcareous with traces of caliche grading in to the west; some limonite staining; moist. Grades to Silty Clay (CL/CH) to the west.

SILTY CLAY (CL/CH)[5]: with some sand and gravel; light brown (5 YR 5/6) to moderate reddish brown (10 R 4/6); fine to coarse gravel, well graded, rounded to subangular, quartzose; fine- to coarse-grained sand, well graded, angular to subrounded, quartzose grading to arkosic; medium to high plasticity; active seep at upper contact; wet. Grades to Clayey Sand at 7 + 10.

CLAY (CL)[6]: with some sand, trace gravel; mottled light gray (N 5/0) and light brown (5 YR 5/6); fine gravel, poorly graded, rounded, quartzose; fine- to medium-grained, poor to moderately graded, round, quartzose; low to medium plasticity; abundant limonite staining mottled throughout, moist. Grades to Clay (CH) to the west.

CLAY (CH)[7]: with some silt, trace sand and gravel; light olive gray (5 Y 5/2) mottled with light olive brown (5 Y 5/6); fine gravel, poorly graded; fine- to medium-grained sand; poorly to moderately graded; subangular to subrounded; quartzose; medium to high plasticity; wet.

SILTY CLAYEY GRAVEL (GM/GC)[8]: with some sand; moderate brown (5 YR 4/4); fine to coarse gravel and cobbles (0.5 to 20 centimeters), well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, quartzose; medium plasticity; moist to wet.

CLAYEY SAND (SC)[9]: with some gravel and silt; moderate reddish orange (10 R 6/6) to moderate reddish brown (10 R 4/6); fine to coarse gravel and cobbles (0.5 to 25 centimeters), well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, subangular to rounded quartzose and arkosic; medium plasticity, damp. Grades to Silty Clay (CL/CH) at 7 + 40.

CLAY (CH)[10]: with trace silt and sand; reworked weathered claystone; medium gray (N 5/0); fine-grained sand, poorly graded; high plasticity; subblocky texture decreasing to west; trace claystone clasts; trace limonite staining; trace 8 to 10 centimeters cobbles; moist. Grades to Silty Clay (CH) at 7 + 40.

SILTY CLAY (CH)[11]: with trace sand; reworked weathered claystone; medium gray (N 5/0) to light olive gray (5 Y 6/1); predominantly fine-grained sand, poorly graded; medium to high plasticity; subblocky texture; trace claystone clasts; highly weathered with limonite staining mottled in; trace caliche mottled in; damp.

SILTY CLAY (CH)[12]: with trace sand; disturbed claystone: medium dark gray (N 4/0); medium to high plasticity; dense; blocky; highly fractured and limonite stained; fractures are partially healed with limonite; damp.

SILTY CLAYSTONE[13]: with trace sand; medium dark gray (N 4/0) to dark gray (N 3/0); fine-grained sand, well sorted; dense; blocky to subblocky; fractures healed or partially healed with limonite; heavily weathered at contact with shear plane; weathering decreases with depth; damp.

CLAYEY SILT (CL)[1]: with some sand, trace gravel; moderate yellowish brown (10 YR 5/4); fine gravel, poorly graded, subangular, quartzose and metasediment; fine-grained sand, poorly graded, subangular to subrounded, quartzose; low to medium plasticity; slightly to moderately calcareous with trace of fine-grained caliche nodules; mottled with dark yellowish brown (10 YR 2/2) limonite staining; becomes more sandy with depth; damp.

CLAYEY SAND (SC)[2]: with some silt and gravel; moderate reddish brown (10 R 4/6) mottled with light brown (5 YR 6/6); fine to coarse gravel (1 to 5 centimeter), well graded, rounded, quartzose; medium- to upper coarse-grained sand, moderately graded, angular to rounded, quartzose; medium plasticity; trace cobbles, damp. Grades to Gravelly Sand (SW), with depth.

SANDY SILTY CLAY (FILL) (CL)[3]: with some gravels; mottled grayish brown (5 YR 3/2), grayish red (10 R 4/2), dark yellowish brown (10 YR 4/2) and medium gray (N 5/0); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

GRAVELLY SAND (SC)[4]: with some clay, trace silt; moderate brown (5 YR 4/4) to moderate reddish brown (10 R 4/6); gravel and cobbles (3 to 18 centimeter), well graded, rounded, quartzose and metasediment; fine- to very coarse-grained sand, well graded, angular to rounded, quartzose; low plasticity, moist to wet. Grade to Clayey Sand (SC), to the west.

CLAYEY SAND (SC)[5]: with some gravel and silt; moderate reddish orange (10 R 6/6) to moderate reddish brown (10 R 4/6); fine to coarse gravels and cobbles from 0.5 to 25 centimeters, well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, subangular to rounded, quartzose and arkosic; medium plasticity; non to slightly calcareous with trace of caliche grading in to the west; some limonite staining; moist to wet.

SILTY CLAY (CL)[6]: with some sand, trace gravel; mottled light gray (N 5/0) and light brown (5 YR 5/6); fine gravel; poorly graded; rounded; quartzose; fine- to medium-grained sand; poor to moderately graded; rounded; quartzose; low to medium plasticity; very weathered with limonite staining mottled throughout; moist.

SILTY CLAYEY GRAVEL (GM/GC)[7]: with some sand; moderate brown (5 YR 4/4); fine to coarse gravel and cobbles (0.5 to 20 centimeters), well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, quartzose; medium plasticity; moist to wet.

SILTY CLAY (CH)[8]: with trace sand and gravel; reworked claystone; light gray (N 5/0) to light olive gray (5 Y 6/1); fine gravel, poorly graded; predominantly fine-grained sand, poorly graded, rounded, quartzose; high plasticity; looks like reworked claystone; damp. Weathers out to Clay (CH), west of 7 + 90.

SILTY CLAY (CL)[9]: with trace sand; light olive gray (5 Y 5/2) to light olive brown (5 Y 5/6); fine-grained, poorly graded sand; high plasticity; moderately calcareous; dense with poorly developed blocky texture; very mottled with dark yellowish orange (10 YR 6/6) limonite staining; waxy at times; damp to moist.

CLAY (CH)[10]: with trace silt and sand; medium gray (N 5/0); fine-grained sand, poorly graded; high plasticity; weathered reworked claystone; subblocky texture decreasing to west; trace claystone clasts; trace limonite staining; trace 8 to 10 centimeter cobbles; moist; overlies bedrock.

SILTY CLAY (CH)[11]: medium dark gray (N 4/0); medium to high plasticity; dense; blocky, highly fractured and limonite stained; fractures are partially healed with limonite; damp.

CLAYSTONE[12]: with some silt, trace sand; medium gray (N 5/0) to dark olive gray (5 Y 3/1); fine-grained sand, well sorted; dense; poorly developed bedding; heavy limonite staining healing or partially healing fractures; damp.

SILTY CLAYSTONE[13]: medium dark gray (N 4/0); medium to high plasticity; dense; blocky, highly fractured and limonite stained; fractures are partially healed with limonite; damp.

SILTY CLAY (TOP SOIL) (CH)[1]: with some sand, trace gravel; dusky brown (5 YR 2/2) to brownish black (5 YR 2/1); fine (1 to 2 centimeter) gravel, poorly graded, angular, lithic; medium- to coarse-grained sand, poorly graded, angular, quartzose; medium to high plasticity; very organic; trace roots; damp. Grades to Sandy Silty Clay at 8 + 43.

SANDY SILTY CLAY (TOP SOIL) (CL)[2]: with some gravel, brownish black (5 YR 2/1); fine to coarse gravel, well graded; predominantly fine-grained sand, moderately graded, subrounded, quartzose; low to medium plasticity; very organic rich; abundant roots; damp.

SILTY CLAY (CH)[3]: with some sand and gravel; mottled dark yellowish brown (10 YR 5/2) with yellowish brown (10 YR 5/4), medium gray (N 5/0) and light olive gray (5 Y 6/1); fine to coarse gravels, well graded, rounded, quartzose and metasediment; fine- to medium-grained sand, moderately graded, subrounded, quartzose; medium to high plasticity; slightly platy texture in part; slightly calcareous; very limonite stained; trace small (1 millimeter) caliche nodules; damp. Grades to Clayey Silt at 8 + 12.

CLAYEY SILT (CL)[4]: with some sand, trace gravel; moderate yellowish brown (10 YR 5/4); fine gravel, poorly graded, subangular, quartzose and metasediment; fine-grained sand, poorly graded, subangular to subrounded, quartzose; low to medium plasticity; slightly to moderately calcareous with trace of fine grained caliche nodules; mottled with dark yellowish brown (10 YR 2/2) limonite staining; becomes more sandy with depth; damp.

CLAYEY SAND (SC)[5]: with some gravel and silt; moderate brown (5 YR 3/4); gravel and cobbles (3 to 24 centimeters), well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, angular to rounded, quartzose; low to medium plasticity; damp. Grades to Silty Clay, at 8 + 42.

SILTY CLAY (CH)[6]: with some sand, trace gravel; grayish brown (5 YR 2/2) to dusky brown (5 YR 3/4); fine gravel, poorly graded; predominantly very fine- to fine-grained sand, poorly graded, subangular quartzose; medium to high plasticity; trace mica; trace roots; damp.

CLAYEY SAND (SC)[7]: with some silt, trace gravel; moderate yellowish brown (10 YR 5/4) to moderate brown (5 YR 4/4); fine gravel, poorly graded; fine- to medium-grained sand, moderately graded, subangular, quartzose; low to medium plasticity; non-calcareous; damp.

CLAYEY SAND (SC)[8]: with some silt and gravel; moderate reddish brown (10 R 4/6) mottled with light brown (5 YR 6/6); fine to coarse gravel (1 to 5 centimeter), well graded, rounded fine- to medium-grained sand, poorly graded, quartzose; medium plasticity, sand decreasing with depth, trace white granular caliche increasing with depth, damp. Grades to Gravelly Sand with depth.

GRAVELLY SAND (SC)[9]: with some clay, trace silt; light brown (5 YR 6/4) to moderate reddish brown (10 R 4/6) to pale reddish brown (10 R 5/4); gravel and cobbles (3 to 18 centimeters), well graded, rounded, quartzose and metasediment; fine- to very coarse-grained sand, well graded, angular to rounded, quartzose; low plasticity; caliche rinds around gravels; damp to moist, locally moist to wet.

CLAYEY SILT (CL/ML)[10]: with trace sand; light gray (N 5/0); very fine- to fine-grained sand, poorly graded; low to medium plasticity; generally slightly calcareous with traces of caliche mottled in; damp.

SILTY CLAY (FILL) (CL)[11]: with some sand and gravel; mottled grayish brown (5 YR 3/2), grayish red (10 R 4/2), dark yellowish brown (10 YR 4/2) and medium gray (N 5/0); gravel (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

SILTY CLAY (CH)[12]: with trace sand; mottled light gray (N 7/0) and light olive gray (5 Y 6/1); very fine- to fine-grained sand, poorly graded, rounded, quartzose; high plasticity; generally slightly calcareous; some white caliche mottled in; trace limonite staining mottled in; damp.

CLAYEY SILT (CL)[13]: with some sand, trace gravel; mottled pale yellowish brown (10 YR 6/2) and moderate yellowish brown (10 YR 5/4), very fine to fine gravel, poorly graded; predominantly very fine- to fine-grained sand, poorly graded; low to medium plasticity; highly weathered, very limonite stained; damp.

SILTY CLAY (CH)[14]: with some sand and gravel; disturbed silty claystone; olive gray (5 Y 4/1); fine to coarse gravels, well graded; very fine- to coarse-grained sand, well graded; moderate to high plasticity; blocky; waxy; moderately weathered; mottled with limonite staining; damp. Grades to Clay (CH) from 8 + 30 to 8 + 20.

CLAY (CH)[15]: with some silt, trace sand; disturbed claystone; olive gray (5 Y 4/1), some mottled with olive black (5 Y 2/1); fine- to medium-grained sand, moderately graded; high plasticity, blocky texture developing with depth; waxy to subwaxy; highly weathered with limonite staining and limonite concretions, damp to dry. Grades to Silty Clay, at 8 + 20.

SILTY CLAY (CL)[16]: with trace sand; disturbed silty claystone; light olive gray (5 Y 5/2) to light olive brown (5 Y 5/6); fine-grained sand, poorly graded; high plasticity; moderately calcareous; dense with poorly developed blocky texture; very mottled with dark yellowish orange (10 YR 6/6) limonite staining; waxy at times; damp to moist.

SILTY CLAY (CH)[17]: with some sand, trace gravel; reworked weathered claystone; brownish gray (5 YR 4/1) to olive gray (5 Y 4/1); fine gravels, poorly graded; fine- to medium-grained sand, moderately graded; medium plasticity, reworked claystone with clasts of blocky claystone; damp; overlies bedrock.

CLAY (CH)[18]: with some sand and gravel; disturbed claystone; olive gray (5 Y 4/1); fine to coarse gravels, well graded; very fine- to coarse-grained sand, well graded; moderate to high plasticity; blocky; waxy; moderately weathered, mottled with limonite staining, damp.

SILTY CLAYSTONE[19]: with some sand; dark gray (N 3/0) to brownish black (5 YR 2/1); very fine- to fine-grained sand, well sorted; dense; slightly weathered; limonite staining along fracture features partially healing fractures; trace black carbonaceous nodules; dry. Grades to Claystone at 8 + 32.

CLAYSTONE[20]: with some silt, trace sand; medium gray (N 5/0) to dark gray (N 3/0); fine-grained sand, well sorted; dense; well developed blocky texture, at times conchoidal with manganese oxide dendritic staining; subwaxy to waxy; trace carbonaceous material; damp to moist.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
8 + 50 to 9 + 00
(Sheet 9 of 30)

CLAY (CH)[1]: with some sand, silt and gravel; grayish brown (5 YR 3/2) grading to pale brown (5 YR 2/2) and dark yellowish brown (10 YR 4/2) with depth; fine to coarse (0.5 to 5 centimeter) gravel, well graded, rounded, quartzose and lithic, with (15 to 30 centimeter) cobbles increasing with depth; fine- to very coarse-grained sand, well graded, angular, quartzose and feldspathic; medium to high plasticity; slightly calcareous, damp becoming moist with depth.

SILTY CLAY (TOP SOIL) (CH)[2]: with some sand, trace gravel; dusky brown (5 YR 2/2) to brownish black (5 YR 2/1); fine (1 to 2 centimeter) gravel, poorly graded, angular, lithic; medium- to coarse-grained sand, poorly graded, angular, quartzose; medium to high plasticity, very organic, trace roots, damp.

CLAYEY SAND (SC)[3]: with some gravel and silt; moderate brown (5 YR 3/4); gravel and cobbles (3 to 24 centimeters), well graded, rounded, quartzose and metasediment; fine- to coarse-grained sand, well graded, angular to rounded, quartzose; low to medium plasticity; damp.

GRAVELLY SAND (SM)[4]: with trace silt and clay; light brown (5 YR 6/4) to pale reddish brown (10 R 5/4); gravel and cobbles (3 to 18 centimeters), well graded, rounded, quartzose and metasediment; fine- to very coarse-grained sand, well graded, angular to rounded, quartzose; low plasticity, damp.

SILTY CLAY (FILL) (CL)[5]: with some sand and gravel; mottled grayish brown (5 YR 3/2), grayish red (10 R 4/2), dark yellowish brown (10 YR 4/2) and medium gray (N 5/0); gravel and cobbles (3 to 25 centimeters), well graded, rounded, quartzose and granitic; fine- to coarse-grained sand, well graded, angular, quartzose; low to medium plasticity; trace roots; trace nails, wood chips, etc.; damp.

SILTY CLAY (CH)[6]: with trace sand and gravel; light olive gray (5 Y 6/1) to light brownish gray (5 YR 6/1); fine to coarse gravels (0.5 to 5 centimeters), well graded; fine- to coarse-grained sand, moderate to well graded; high plasticity; trace caliche mottled in; trace very thin (1 millimeter) gypsum laminations; damp.

GRAVELLY SAND (SM/SC)[7]: with some clay and silt; moderate reddish brown (10 R 4/6); fine to coarse gravels, grading to cobbles, well graded, rounded, quartzose; lower coarse- to upper very coarse-grained sand, poorly graded, angular to rounded, quartzose; low to medium plasticity; damp.

GRAVELLY SAND (SM/SC)[8]: with some silt and clay; medium gray (N 5/0); fill from old gas line that was removed.

SILTY CLAY (CH)[9]: with trace sand and gravel; light olive gray (5 Y 6/1) to light brownish gray (5 YR 6/1); fine to coarse gravels (0.5 to 5 centimeters), well graded; fine- to coarse-grained sand, moderate to well graded; high plasticity; trace caliche mottled in; damp.

GRAVELLY SAND (SM/SC)[10]: with some clay and silt; moderate reddish brown (10 R 4/6); fine to coarse gravels, grading to cobbles, well graded, rounded, quartzose; lower coarse- to upper very coarse-grained sand, poorly graded, angular to rounded, quartzose; low to medium plasticity; damp.

SILTY CLAY (CH)[11]: with some sand, trace gravel; medium gray (N 5/0); very fine to fine (0.5 to 1.5 centimeters) gravel, poorly graded, rounded, quartzose; very fine- to fine-grained sand, poorly graded, subangular; medium plasticity, mottled with dark yellowish orange (10 YR 6/6) limonite staining; limonite staining decreases to the west; trace caliche nodules; damp to moist; grades to Sandy Clayey Silt.

SANDY CLAYEY SILT (CL)[12]: with trace gravel; mottled moderate yellowish brown (10 YR 5/4), dark yellowish brown (10 YR 4/2) and light olive gray (5 Y 6/1); fine gravel, poorly graded, rounded, quartzose and metasediment; predominantly fine- to very fine-grained sand, poorly graded; low to medium plasticity, trace cobbles, trace caliche found as rinds around gravels; mottled with limonite staining; damp; grades to Clayey Silt at 8 + 67.

CLAYEY SILT (CL)[13]: with some sand, trace gravel; mottled pale yellowish brown (10 YR 6/2) and moderate yellowish brown (10 YR 5/4), very fine to fine gravel, poorly graded; predominantly very fine- to fine-grained sand, poorly graded; low to medium plasticity; very limonite stained, caliche zone along undulating shear plane at bottom contact; damp.

CLAY (CH)[14]: with some silt, trace sand; reworked weathered claystone; light olive gray (5 Y 6/1) to medium gray (N 5/0); very fine- to fine-grained sand, poorly graded, subrounded, quartzose; high plasticity; weathered claystone with some limonite staining; trace limonite nodules, subblocky texture; grades to Silty Clay at 8 + 65, material has been weathered out to a clay east of 8 + 65.

SILTY CLAY (CH)[15]: with some sand and gravel; disturbed silty claystone; olive gray (5 Y 4/1); fine to coarse gravels, well graded; very fine- to coarse-grained sand, well graded; moderate to high plasticity; blocky; waxy; moderately weathered, mottled with limonite staining, damp.

CLAY (CH)[16]: with some silt, trace sand; disturbed claystone; medium gray (N 5/0); very fine-grained sand, poorly graded; high plasticity; blocky; waxy; very weathered with heavy limonite staining along fractures and bedding; damp; overlies bedrock.

CLAYSTONE[17]: with some silt, trace sand; medium gray (N 5/0); very fine-grained sand, well sorted; subblocky to blocky; poorly developed bedding; moderately weathered; limonite staining along fractures and bedding, damp.

SILTY CLAYSTONE[18]: with some sand; dark gray (N 3/0) to brownish black (5 YR 2/1); very fine- to fine-grained sand; well sorted; dense; slightly weathered; limonite staining along fracture features; partially healed fractures; trace black carbonaceous nodules; dry.

SILTY CLAY (CL)[1]: with some sand, trace gravel; dusky brown (5 YR 2/2) to moderate yellowish brown (10 YR 5/4) to pale brown (5 YR 2/2); fine to coarse gravel, well graded, subrounded to rounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose and feldspathic; medium to high plasticity; slightly calcareous; some platy texture, some poorly developed blocky texture decreasing with depth; gravels increase in size with depth and to the west grading to cobbles at 9 + 25; sand increases in size to the west, grades to Clay with some silt, sand and gravel at 9 + 15; damp.

CLAY (CH)[2]: with some sand, silt and gravel; grayish brown (5 YR 3/2) grading to pale brown (5 YR 2/2) and dark yellowish brown (10 YR 4/2) with depth; fine to coarse (0.5 to 5 centimeter) gravel, well graded, rounded, quartzose and lithic, with (15 to 30 centimeter) cobbles increasing with depth; fine- to very coarse-grained sand, well graded, angular, quartzose and feldspathic; medium to high plasticity; slightly calcareous; damp, becoming moist with depth.

GRAVELLY CLAY (CL)[3]: with some silt, trace sand; moderate yellowish brown (10 YR 5/4) grading to dark yellowish brown (10 YR 4/2) with depth; fine to medium gravel, moderately graded, rounded, quartzose; fine- to medium-grained sand, poorly graded, quartzose; medium plasticity, sand decreasing with depth, trace white granular caliche increasing with depth, damp.

CLAYEY SAND (SC)[4]: with some silt and gravel; moderate reddish brown (10 R 4/6) mottled with light brown (5 YR 6/6); fine to coarse (1 to 5 centimeter) gravel, well graded, rounded, quartzose; medium- to upper coarse-grained sand, moderately graded, angular to rounded, quartzose; medium plasticity; trace cobbles; damp.

GRAVELLY SAND (SW)[5]: with trace silt and clay; moderate reddish brown (10 R 4/6); fine to coarse gravels, grading to cobbles, well graded, rounded, quartzose; lower coarse- to upper very coarse-grained sand, poorly graded, angular to rounded, quartzose; pinches out at 9 + 30 and continues to the west from 9 + 18 with a lense of gravelly sand (SM/SC) with some silt and clay; medium gray (N 5/0); which looks like fill from old natural gas line that was removed; moist to wet.

GRAVELLY SAND (SM/SC)[6]: with trace clay; dark yellowish brown (10 YR 4/2) with some grayish brown (5 R 3/2), fine gravel, poorly graded, rounded, quartzose; fine- to coarse-grained sand, well graded, subrounded to subangular, quartzose; with some white (N 9/0) caliche nodules, trace limonite staining; slight to moderately calcareous, damp.

SILTY CLAY (CH)[7]: with some sand, trace gravel; medium gray (N 5/0); very fine to fine (0.5 to 1.5 centimeter) gravel, poorly graded, rounded, quartzose; very fine- to fine-grained sand, poorly graded, subangular; medium plasticity; mottled with dark yellowish orange (10 YR 6/6) limonite staining; limonite staining decreases to the west; trace caliche nodules; trace black carbonaceous material at 9 + 25; damp to moist.

CLAY (CH)[8]: with some silt, trace sand and gravel; reworked weathered claystone; medium dark gray (N 4/0) grading to medium gray (N 5/0) to the west; very fine- to fine-grained sand, poorly graded, subrounded, quartzose; high plasticity; moderately weathered with some limonite staining; trace limonite nodules; subblocky texture; trace waxy at 9 + 25, damp to moist; overlays bedrock.

SILTY CLAYSTONE[9]: with trace sand; medium dark gray (N 4/0); very fine- to fine-grained sand, well sorted, quartzose; no visible porosity; well indurated, blocky, poorly developed bedding, limonite staining along fractures; trace black carbonaceous material, grades to Claystone with some silt, trace sand at 9 + 20, damp to moist.

CLAYSTONE[10]: with some silt, trace sand; medium gray (N 5/0); very fine-grained sand, well sorted; subblocky to blocky; poorly developed bedding; moderately weathered; limonite staining along fractures and bedding, damp.

CLAYEY SILTSTONE[11]: with some sand; medium light gray (N 6/0); very fine- to fine-grained sand, well sorted; no visible porosity; well indurated; trace limonite staining; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
9 + 50 to 10 + 00
(Sheet 11 of 30)

SILTY CLAY (TOP SOIL) (CH)[1]: with some sand, trace gravel; dusky brown (5 YR 2/2) to brownish black (5 YR 2/1); fine (1 to 2 centimeter) gravel, poorly graded, angular, lithic; medium- to coarse-grained sand, poorly graded, angular, quartzose; medium to high plasticity; very organic; trace roots; damp.

SILTY CLAY (CH)[2]: with some sand, trace gravel; dusky brown (5 YR 2/2) to moderate yellowish brown (10 R 5/4) to pale brown (5 YR 2/2); fine to coarse gravel, well graded, subrounded to rounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose and feldspathic; medium to high plasticity; slightly calcareous; some platy texture; some poorly developed blocky texture decreasing with depth; gravels increasing in size with depth; damp.

SILTY CLAY (CL)[3]: with some sand, trace gravel; light brown (5 YR 5/6) to moderate reddish brown (10 R 4/6), grades to grayish red (5 YR 4/2) to the west; fine to coarse gravel, well graded, rounded to subangular, quartzose; fine- to coarse-grained sand, well graded, angular to subrounded, quartzose; low to medium plasticity.

SILTY CLAY (CL)[4]: with some sand, trace gravel; grayish red (5 YR 4/2) grading to dusky red (5 R 3/4) with depth; fine gravel, poorly graded, rounded quartzose; fine- to medium-grained sand, moderately graded, angular to subrounded, quartzose; low to medium plasticity; slightly fissile in part; locally grades to Sandy Gravelly Clay (CL); grades to Clayey Sand (SC), with depth; damp.

SANDY GRAVELLY CLAY (CL)[5]: some silt; grayish red (5 YR 4/2) grading to dusky red (5 R 3/4) with depth; fine gravel; poorly graded, rounded; fine- to medium-grained sand; moderately graded; angular to subrounded; quartzose; low to medium plasticity; slightly fissile locally; grades clayey sand (SC), with depth; damp.

SANDY SILTY CLAY (CL)[6]: light brown (5 YR 5/6); fine- to medium-grained sand, moderate to poorly graded, subangular to subrounded, quartzose; low plasticity; slightly calcareous; trace carbonaceous material; moist.

SILTY CLAYEY SAND (SM/SC)[7]: with some gravel; light brown (5 YR 5/6) to moderate reddish brown (10 R 4/6); fine to coarse gravel grading to cobbles, well graded, rounded, quartzose; fine- to coarse-grained sand, moderate to well graded, subangular to subrounded, quartzose; low plasticity; some caliche increasing with depth, occurs as rinds around gravels; grades to Clayey Sand (SC) to the west; moist.

CLAYEY SAND (SC)[8]: with some silt and gravel; dusky red (5 R 3/4) to medium red (5 R 4/6) to moderate reddish brown (10 R 4/6), mottled with light brown (5 YR 6/6); fine to coarse (1 to 5 centimeter) gravel, well graded, rounded, quartzose; medium- to upper coarse-grained sand, moderately graded, angular to rounded, quartzose; medium plasticity; trace cobbles, damp, grades to Gravelly Sand (SW), with depth west of 9 + 60.

GRAVELLY SAND (SW)[9]: with trace silt and clay; moderate reddish brown (10 R 4/6); fine to coarse gravel, grading to cobbles, well graded, rounded, quartzose; lower coarse- to upper very coarse-grained sand, poorly graded, angular to rounded, quartzose; moist.

SILTY CLAY (CL)[10]: with some silt and sand, trace gravel; mottled white (N 9/0), light gray (N 7/0) and medium gray (N 5/0); fine gravel, poorly graded, rounded; fine- to medium-grained sand, moderately graded, angular, quartzose; low plasticity; some caliche mottling; gravel decreasing with depth; trace claystone clasts; moist.

SANDY CLAYEY SILT (ML)[11]: reworked weathered siltstone; light gray (N 5/0); fine-grained sand, poorly graded, subangular, quartzose; low plasticity; highly weathered siltstone; mottled with dark yellowish orange (10 YR 6/6) limonite staining; has thin (2 centimeter) sandy laminations; damp.

CLAY (CH)[12]: with trace silt and sand; reworked claystone; light gray (N 5/0); fine-grained sand, poorly graded; low plasticity; poorly developed subblocky texture; slightly calcareous; trace black carbonaceous material; grades to Silty Clay (CH) to the west; moist.

SILTY CLAY (CH)[13]: with trace sand; reworked weathered claystone; medium gray (N 5/0); fine- to coarse-grained sand, moderate to well graded, subangular, quartzose; medium plasticity; subblocky; highly weathered silty claystone with dark yellowish orange (10 YR 6/0) limonite staining mottled in; trace black carbonaceous material; trace gravels grading in to the west; trace caliche mottled in to the west; damp to moist.

CLAY (CH)[14]: with some silt, trace sand and gravel; reworked weathered claystone; medium dark gray (N 4/0) grading to medium gray (N 5/0) to the west; very fine- to fine-grained sand, poorly graded, subrounded, quartzose; high plasticity; moderately weathered with some limonite staining; trace limonite nodules; subblocky texture; damp to moist; overlays bedrock.

CLAYSTONE[15]: with some silt, trace sand; brownish gray (5 YR 4/1) to dark gray (N 3/0); fine-grained sand, well sorted; dense; blocky grading to subblocky to the west; some waxy; white caliche, limonite and manganese oxide staining on partings; fractures healed with limonite; damp grades to Silty Claystone west of 9 + 65.

SILTY CLAYSTONE[16]: with trace sand; medium dark gray (N 4/0); very fine- to fine-grained sand, well sorted, quartzose; well indurated; blocky; poorly developed bedding; limonite staining along fractures; trace black carbonaceous material; damp to moist.

CLAYEY SILTSTONE[17]: with some sand; light gray (N 7/0); fine-grained sand, well sorted, quartzose; dense; fractures healed with limonite; bedding planes stained with limonite; damp to moist; pinches out at 9 + 80.

CLAYEY SILTSTONE[18]: with some sand; medium light gray (N 6/0); very fine- to fine-grained sand, well sorted; no visible porosity; well indurated; trace limonite staining; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
10 + 00 to 10 + 50
(Sheet 12 of 30)

SANDY CLAY (TOP SOIL) (CL/CH)[1]: with some silt, trace gravel; moderate yellowish brown (10 YR 5/4), moderate reddish brown (10 R 4/6); fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose and metasediment; predominantly fine with trace medium- and coarse-grained sand, moderately graded, subangular to subrounded, quartzose; medium plasticity; slightly calcareous; moist; grades to Silty Clay (CL) to the west.

SILTY CLAY (TOP SOIL) (CH)[2]: with some sand, trace gravel; dusky brown (5 YR 2/2) to brownish black (5 YR 2/1); fine (1 to 2 centimeter) gravel, poorly graded, angular, lithic; medium- to coarse-grained sand, poorly graded, angular, quartzose; medium to high plasticity; very organic; trace roots; damp.

SILTY CLAY (CH)[3]: with some sand, trace gravel; light brown (5 YR 5/6) to moderate brown (5 YR 4/4), mottled with grayish orange (10 YR 7/4); fine gravel, poorly graded, subrounded, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; low to medium plasticity; some limonite staining; slightly calcareous; trace caliche blebs; damp to moist.

CLAYEY SILT (CL)[4]: with some sand, trace gravel; moderate reddish brown (10 R 4/6) to dark yellowish brown (10 YR 5/4) and dusky brown (5 YR 2/2); fine gravel, poorly graded, subrounded, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; low to medium plasticity; mottled with abundant limonite staining; damp to moist. Grades to Sandy Silty Clay to the west.

SANDY SILTY CLAY (CL)[5]: light brown (5 YR 5/6); fine- to medium-grained sand, moderate to poorly graded, subangular to subrounded, quartzose; low plasticity; slightly calcareous; trace carbonaceous material; moist.

SILTY CLAYEY SAND (SM/SC)[6]: with some gravel; light brown (5 YR 5/6) to moderate reddish brown (10 R 4/6); fine to coarse gravel grading to cobbles, well graded, rounded, quartzose; fine- to coarse-grained sand, moderate to well graded, subangular to subrounded, quartzose; low plasticity; some caliche increasing with depth; occurs as rinds around gravels; damp to moist.

SILTY CLAY (CH)[7]: trace sand; disturbed claystone; dark gray (N 3/0), olive gray (5 Y 4/1); fine-grained sand, poorly graded, subangular to subrounded, quartzose; medium to high plasticity; limonite mottling; trace caliche deposits; 5 centimeter iron nodules; carbonaceous lenses up to 3 meters thick; predominantly rafted bedrock; randomly oriented shear plains with slickensides; moist.

SILTY CLAY (CH)[8]: with trace sand and gravel; grayish orange (10 YR 7/4) to moderate yellowish brown (10 YR 4/2); fine gravel, poorly graded, subangular, quartzose and metasediment; fine- to medium-grained sand, moderately graded, quartzose; medium plasticity; slightly calcareous with trace granular caliche; damp. Grades to Clay (CH), to the west.

CLAY (CH)[9]: with some silt, trace sand and gravel; medium dark gray (N 4/0) grading to medium gray (N 5/0) to the west; very fine- to fine-grained sand, poorly graded, subrounded, quartzose; high plasticity, some limonite staining, trace limonite nodules, subblocky texture, trace waxy at 9 + 25, damp to moist, overlays bedrock.

SILTY CLAYSTONE[10]: with some sand; brownish gray (5 YR 4/1) to dark gray (N 3/0); fine- to medium-grained sand, well sorted, subangular to subrounded, quartzose; dense; well developed blocky texture; with dendritic manganese oxide staining; some limonite staining on partings; slightly calcareous; damp, locally moist along fractures at lower contact.

CLAYSTONE[11]: with some silt, trace sand; brownish gray (5 YR 4/1) to dark gray (N 3/0); fine-grained sand, well sorted; dense; blocky grading to subblocky to the west; some waxy; white caliche, limonite and manganese oxide staining on partings; fractures healed with limonite; damp.

CLAYEY SILTSTONE[12]: with some sand; grayish orange (10 YR 7/4) to light brown (5 YR 6/4); fine- to coarse-grained sand, well sorted, subangular to subrounded, quartzose; argillaceous with 1 to 3 millimeter limonitic laminations; poorly developed cross laminations; moderate blocky texture; moderately fractured; poorly cemented with argillaceous material; locally seeping water near lower contact; locally grading to silty sandstone.

SILTY SANDSTONE[13]: with some clay; grayish orange (10 YR 7/4) to light brown (5 YR 6/4) some mottling; fine- to coarse-grained sand, well sorted, subangular to subrounded, quartzose, locally with 1 to 3 millimeter limonitic laminations; poorly developed cross lamination; moderate blocky texture; moderately fractured; poorly cemented with argillaceous material; friable; locally seeping water near lower contact; locally grading to clayey siltstone.

SILTY CLAYSTONE[14]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture; with limonite staining, grayish orange (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp, locally moist along fractures at lower contact.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
10 + 50 to 11 + 00
(Sheet 13 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times partly to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

SANDY CLAY (CH)[2]: with trace gravel and trace silt; pale reddish brown (10 R 5/4) to dark reddish brown (10 R 3/4); fine to coarse gravels and cobbles, well graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose and lithic; medium to high plasticity; trace mica, partially cemented with caliche; slightly to moderately calcareous; dry; locally grading to clay.

SILTY CLAY (CH)[3]: with some sand, trace gravel; light brown (5 YR 5/6) to moderate brown (5 YR 4/4), mottled with grayish orange (10 YR 7/4); fine gravel, poorly graded, subrounded, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; low to medium plasticity; some limonite staining; slightly calcareous; trace caliche blebs; damp to moist.

SILTY CLAY (CH)[4]: with trace of sand; disturbed claystone; grayish orange (10 YR 7/4) with light brown (5 YR 5/6); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity; poorly developed blocky texture; highly weathered at upper contact becoming less weathered at depth; some iron oxide staining; trace slickensided shear planes; slightly calcareous; dry to damp; disturbed silty claystone; locally grading to clay; locally highly mottled with limonite staining; at times abundant carbonaceous material; with subrounded gravel sized iron concretions; locally containing well developed slickensided shear planes.

CLAY (CH)[5]: with some sand, silt and gravel; moderate reddish brown (10 R 4/6) to light brown (5 YR 5/6); fine gravel, poorly graded subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; moderate to high plasticity; locally caliche encrusting gravel; scattered caliche blebs; slightly to moderately calcareous; dry.

SILTY CLAYSTONE[6]: with some sand; brownish gray (5 YR 4/1) to dark gray (N 3/0); fine- to medium-grained sand, subangular to subrounded, well sorted, quartzose; dense; well developed blocky texture; with dendritic manganese oxide staining; some limonite staining on partings; slightly calcareous; damp.

CLAYEY SILTSTONE[7]: with some sand, grayish orange (10 YR 7/4) to light brown (5 YR 6/4); fine- to coarse-grained sand, well sorted, subangular to subrounded, quartzose; locally with 1 to 3 millimeter limonite laminations; poorly developed cross laminations; moderate blocky texture; moderately fractured; poorly cemented with argillaceous material; locally seeping water near lower contact; locally grading to silty sandstone.

SILTY SANDSTONE[8]: with some clay, grayish orange (10 YR 7/4) to light brown (5 YR 6/5), some mottling; fine- to coarse-grained sand, well sorted, subangular to subrounded, quartzose; locally with 1 to 3 millimeter limonite laminations; poorly developed cross lamination; moderate, blocky texture; moderately fractured; poorly cemented with argillaceous material; friable; locally seeping water near lower contact; locally grading to clayey siltstone.

SILTY CLAYSTONE[9]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture; with limonite staining, grayish orange (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp, locally moist along fractures at lower contact.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
11 + 00 to 11 + 50
(Sheet 14 of 50)

SANDY CLAY (TOP SOIL) (CL/CH)[1]: with some silt, trace gravel; moderate yellowish brown (10 YR 5/4), moderate reddish brown (10 R 4/6); fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose and lithic; predominantly fine with trace medium- and coarse-grained sand, moderately graded, subangular to subrounded, quartzose; medium plasticity; slightly calcareous; moist.

SANDY SILTY CLAY (CL/CH)[2]: with some to trace gravel; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6), light gray (N 7/0); fine to coarse gravel, well graded, subangular, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded; quartzose; medium plasticity; abundant caliche; some claystone inclusions; slightly to moderately calcareous; damp.

CALICHE ZONE[3]: sandy clay and gravel to clayey sand and gravel (GC/GW); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subrounded quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and caliched clays; damp to wet.

SILTY CLAY (CH)[4]: disturbed claystone; trace sand; dark gray (N 3/0), olive gray (5 Y 4/1); fine-grained sand, poorly graded, subangular to subrounded, quartzose; medium to high plasticity; limonite mottling, trace caliche deposits; 5 centimeters iron nodules; carbonaceous lenses up to 1 meter thick; predominant rafted bedrock; randomly oriented shear planes with slickensides and 3 prominent shear plans with south dipping slickensides; moist.

SANDY CLAY (CH)[5]: with some silt; moderately reddish brown (10 R 4/6); predominantly fine with a trace of medium- and coarse-grained sand, moderately graded, subangular to subrounded, quartzose; medium plasticity; inclusions of claystone; caliche veining; small slickensided shear planes randomly oriented; slight blocky texture; dry to moist.

SANDY CLAYEY SILT (ML)[6]: with some to trace gravel; moderate reddish brown (10 R 4/6); fine to coarse gravel to cobbles, well graded, subrounded to subangular, quartzose, trace arkose, random orientation; predominantly fine-grained sand, poorly graded, subangular

to subround, quartzose; medium to low plasticity; abundant limonite staining; abundant caliche; slightly to very calcareous; damp; wet to moist around gravels and cobbles.

GRAVELLY SANDY CLAY (CL)[7]: with trace silt; dark reddish brown (10 R 3/4) to grayish brown (5 YR 3/2), at times mottled; fine to coarse gravel, well graded, subangular to angular, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to angular, quartzose and lithic; medium plasticity; inclusions mixed with claystone; moist.

SILTY CLAY (CH)[8]: with trace sand and gravel; mixed medium gray (N 5/0), moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, subangular to subrounded, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; medium plasticity; abundant limonite staining; caliche deposits; predominantly reworked silty claystone in alluvium matrix; discontinuous small shear planes, random orientation; moist.

SANDY CLAYEY SILTSTONE[9]: varicolored light gray (N 7/0), medium dark gray (N 4/0), greenish gray (5 GY 6/1), light bluish gray (5 B 7/1), grayish red purple (5 RP 4/2), grading with depth to yellowish gray (5 Y 8/1), light olive gray (5 Y 6/1); fine-grained sand, well sorted, subangular to subrounded, quartzose; no visible porosity; noncemented to thin iron cemented laminations; slightly to moderately friable; carbonaceous in upper varicolored zone; limonite staining in bands; calcareous in part; thinly bedded; thin lenses of silty sandy claystone; low plasticity; moist.

CLAYEY SILTSTONE[10]: with some sand; dark yellowish orange (10 YR 6/6), moderate brown (5 YR 3/4), yellowish gray (5 Y 7/2); fine-grained sand, well sorted, subangular to subrounded; quartzose; no visible porosity; noncemented; friable; weathered; abundant limonite stain and iron nodules; manganese oxide deposits; low plasticity; 2 centimeter laminations of silty claystone; moist.

CLAYSTONE[11]: some to trace silt; dark yellowish orange (10 YR 6/6), olive gray (5 Y 4/1); no visible porosity; noncemented; nonfriable; limonite staining; caliche veins and pockets; medium to high plasticity; weathered; discontinuous shear planes from 11 + 65 to 11 + 35; slickensides dipping south; moist.

SILTY SANDSTONE[12]: with some clay; light olive gray (5 Y 5/2), yellowish gray (5 Y 7/2), medium gray (N 5/0); very fine- to fine-grained sand, well sorted, subangular to subrounded; quartzose; low estimated porosity; weakly cemented; friable; calcareous; laminations of limonite staining; caliche deposits; manganese oxide staining and dendrites; thin to moderate bedding; fractures filled with limonite, caliche and/or manganese oxide; moist.

SILTY CLAYSTONE[13]: with trace to some sand; olive gray (5 Y 3/2); medium gray (N 5/0), grayish red purple (5 RP 4/2); very fine- to fine-grained sand, well sorted, subangular to subrounded, quartzose; no visible porosity; noncemented; nonfriable; limonite mottling and staining; iron concentrations; manganese oxide dendritic staining; medium to low plasticity; blocky texture; moist.

SILTY SANDSTONE[14]: with some clay; grayish orange (10 YR 7/4) to light brown (5 YR 6/4); some mottling; fine- to coarse-grained sand, well sorted, subangular to subrounded, quartzose; locally with 1 to 3 millimeters limonite laminations; poorly developed cross lamination; moderate, blocky texture; moderately fractured; poorly cemented with argillaceous material; friable; locally seeping water near lower contact; locally grading to clayey siltstone.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
11 + 50 to 12 + 00
(Sheet 15 of 30)

SANDY CLAY (FILL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine- to coarse-grained sand, well graded; subangular to subrounded, quartzose; fine gravel, poorly graded, subangular to subrounded, quartzose; non to low plasticity; nonlaminated; at times platy to poorly developed blocky texture; with roots; trace caliche; slightly to moderately calcareous; primarily dry; locally damp.

CLAYEY SAND (SC)[2]: with some silt and gravel, trace cobbles; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, angular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium to high plasticity; abundant roots and organics; slightly to moderately calcareous; abundant caliche; moist.

SILTY CLAY (CH)[3]: disturbed silty claystone, with trace of sand; olive gray (5 Y 4/1) to medium gray (N 2/0); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity; poorly developed blocky texture; highly weathered at surface becoming less weathered with depth; some iron oxide staining; trace slickensided slip planes; slightly calcareous; dry to damp; reworked silty claystone; locally grading to clay.

SANDY SILTY CLAY (CL/CH)[4]: with some to trace gravel; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6), light gray (N 7/0); fine to coarse gravel, well graded, subangular, quartzose; fine-to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; abundant caliche; some claystone inclusions; slightly to moderately calcareous; damp.

CALICHE ZONE[5]: sandy clay and gravel to clayey sand and gravel (GC/GW); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and caliche clays; damp to wet.

SANDY CLAYEY SILT (ML)[6]: with some to trace gravel; moderate reddish brown (10 R 4/6); fine to coarse gravel to cobbles, well graded, subrounded to subangular, quartzose, trace arkose; random orientation; predominantly fine-grained sand, poorly graded, subangular to subround, quartzose; medium to low plasticity; abundant limonite staining; abundant caliche; slightly to very calcareous; damp; wet to moist around gravel and cobbles.

GRAVELLY SAND (SW/SC)[7]: moderate reddish brown (10 R 4/6); at times mottled; poorly graded; subangular to angular; quartzose and lithic; fine- to coarse-grained sand, medium plasticity; moist; grades into gravelly sandy clay at approximately 11 + 90.

SILTY CLAY (CL)[8]: disturbed silty claystone, trace to some sand, moderate yellowish brown (10 YR 5/4); very fine- to fine-grained sand; poorly graded, subrounded; medium plasticity; convoluted blocky texture; slight bedding to laminations; discontinuous shear planes; caliche deposits; reworked claystone; iron stained; moist.

GRAVELLY SANDY CLAY (CL)[9]: with some sand; coarse to fine gravel; cobbles, well graded, subangular to subrounded, quartzose and metamorphics; fine- to coarse-grained sand, well graded, subrounded to subangular; quartzose; medium to low plasticity; abundant caliche deposits; reworked claystone; moist.

GRAVELLY CLAY (CL)[10]: disturbed claystone; with some sand; coarse to fine gravel, cobbles, well graded, subangular to subrounded, quartzose and metamorphics; fine- to coarse-grained sand, well graded, subrounded to subangular; quartzose; medium to low plasticity; abundant caliche deposits; reworked claystone; moist.

CALICHE ZONE:[11]: 4.5 centimeter thick zone of well cemented white (N 9/0), powdery caliche, dry.

SANDY CLAYEY SILTSTONE[12]: pale yellowish brown (10 YR 6/2), moderate olive brown (5 Y 4/4); very fine- to fine-grained with trace medium-grained sand, moderately well sorted, subangular to subround, quartzose; no visible porosity; low cemented; slightly friable; scattered iron concretions; millimeter-banding limonite staining; some cross bedding; from 11 + 90 to

11 + 78 interbedded with 6 to 9 centimeter lenses of silty claystone; 2 from 11 + 90 to 11 + 80; discontinuous small shear planes; moist.

SANDY SILTY CLAYSTONE[13]: olive gray (5 Y 4/1), moderate brown (5 YR 4/4), medium gray (N 5/0); very fine- to fine-grained sand, moderately well sorted; subrounded to subangular, quartzose; no visible porosity; noncemented; nonfriable; medium plasticity; limonite staining; dendrite manganese oxide; discontinuous small interbedded shear planes; slickensides dipping south; fractures filled with limonite and manganese oxide; moist.

SILTY SANDSTONE[14]: light gray (N 7/0) with some clay; very fine to fine grained with trace medium-grained sand; moderately well sorted; subangular to subrounded, quartzose; no visible porosity; noncemented; friable; iron staining, minor cross bedding; moist.

SILTY CLAYSTONE[15]: medium gray (N 5/0), grayish red purple (5 RP 4/2); no visible porosity; noncemented; nonfriable; medium plasticity; limonite staining to veining; blocky texture; laminated bedding; limonite filled fractures, moist.

CLAYSTONE[16]: some to trace silt; dark yellowish orange (10 YR 6/6), olive gray (5 Y 4/1); no visible porosity; noncemented; nonfriable; limonite staining; caliche veins and pockets; medium to high plasticity; weathered; discontinuous shear planes from 11 + 65 to 11 + 35; slickensides dipping south; moist.

CLAYEY SILTSTONE[17]: with some sand; dark yellowish orange (10 YR 6/6), moderate brown (5 YR 3/4), yellowish gray (5 Y 7/2); fine-grained sand, well sorted, subangular to subrounded, quartzose; no visible porosity; noncemented; friable; weathered; abundant limonite stain and iron nodules; manganese oxide deposits; low plasticity; 2 centimeter laminations at silty claystone; moist.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
12 + 00 to 12 + 50
(Sheet 16 of 30)

SILTY CLAY (TOPSOIL) (CH)[1]: with trace of sand and gravels; dusky yellowish brown (10 YR 2/2) to dark yellowish brown (10 YR 4/2); fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; with roots; damp to moist; grades to sandy clay at Station 12 + 30.

SANDY CLAY (TOP SOIL) (CL)[2]: with some gravel and trace silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; non to low plasticity; at times partly to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SAND (SC)[3]: with some silt and gravel, trace cobbles; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, angular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium to high plasticity; abundant roots and organics; slightly to moderately calcareous; abundant caliche; moist.

SILTY CLAY (CH)[4]: disturbed silty claystone, light gray (N 7/0); "rafted" block of silty claystone; medium plasticity; blocky texture; some caliche; weathered; dry to moist.

CALICHE ZONE[5]: sandy clay and gravel to clayey sand and gravel (GC/GW); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and caliched clays; damp to wet.

CLAYEY SAND (SC)[6]: with some silt and gravel; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6); fine to coarse gravel, scattered cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; abundant roots; claystone inclusions and rafted blocks; slightly to moderately calcareous; abundant caliche; damp.

GRAVELLY CLAY (CH)[7]: disturbed claystone, pale olive (10 Y 6/2), medium gray (N 5/0); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; medium plasticity; caliche cemented matrix; clay is reworked claystone block; abundant limonite staining; caliche zones up to 30 centimeter thick; gravels oriented 45 degrees to 70 degrees; moist.

SANDY CLAYEY SILT (ML)[8]: with some to trace gravel; moderate reddish brown (10 R 4/6); fine to coarse gravel to cobbles, well graded, subrounded to subangular, quartzose, trace arkose, random orientation; predominantly fine-grained sand, poorly graded, subangular to subrounded, quartzose; medium to low plasticity; abundant limonite staining; abundant caliche; slightly to very calcareous; damp; wet to moist around gravels and cobbles.

GRAVELLY SAND (SW/SC)[9]: moderate reddish brown (10 R 4/6); at times mottled; poorly graded; subangular to angular; quartzose and lithic; fine- to coarse-grained sand, medium plasticity; moist; grades into gravelly sandy clay at approximately 11 + 90.

SILTY CLAY (CH)[10]: disturbed silty claystone, with trace sand and gravels; pale reddish brown (10 R 5/4) grayish red (5 R 4/2); light brown (5 YR 5/6), moderate yellowish brown (10 YR 5/4), mottled; fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; abundant roots; slightly to moderately calcareous; abundant caliche; damp.

CLAYEY SILTY SANDSTONE[11]: yellowish gray (5 Y 7/2), with light olive (10 Y 5/4) to moderate yellow (5 Y 7/6) banding; predominant fine-grained sand, moderately well sorted, subangular to subrounded, quartzose; no visible porosity; weakly to noncemented; friable; millimeter banded limonite staining, very thinly bedded; poorly developed cross bedding; blocky texture; fractures filled with caliche and limonite; moist.

SANDSTONE[12]: light gray (N 7/0); very fine- to fine-grained sand; well sorted, subangular, quartzose; low estimated porosity, well cemented; nonfriable; calcareous cement; noncemented from 12 + 35 eastward; anticlinal structure at 12 + 36; fractures stained with manganese oxide; dry to moist.

SANDY SILTY CLAYSTONE[13]: olive gray (5 Y 4/1), moderate brown (5 YR 4/4), medium gray (N 5/0); very fine- to fine-grained sand, moderately well sorted, subrounded to subangular; quartzose; no visible porosity; noncemented; nonfriable; medium plasticity; limonite staining; dendrite manganese oxide; discontinuous small interbedded shear planes; slickensides dipping south; fractures filled with limonite and manganese oxide; moist.

SILTY SANDSTONE[14]: with some clay; light gray (N 7/0); very fine- to fine-grained with trace medium-grained sand; moderately well sorted; subangular to subrounded; quartzose; no visible porosity; noncemented; friable, iron staining; minor cross bedding; moist.

SANDY CLAYEY SILTSTONE[15]: pale yellowish brown (10 YR 6/2), moderate olive brown (5 Y 4/4); very fine- to fine-grained with trace medium-grained sand, moderately well sorted, subangular to subround, quartzose; no visible porosity; noncemented; slightly friable; scattered iron concretions; millimeter banding limonite staining; some cross bedding; discontinuous small shear plans; moist.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
12 + 50 to 13 + 00
(Sheet 17 of 30)

SILTY CLAY (TOPSOIL) (CH)[1]: with a trace sand and gravels; dark yellowish brown (10 YR 4/2) to dusky yellowish brown (10 YR 2/2) fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; low to medium plasticity; trace roots; damp to moist.

CLAYEY SAND (SC)[2]: with some silt and gravel, trace cobbles and boulders; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, angular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; abundant roots; slightly to moderately calcareous; inclusions of claystone up to small 2 to 3 meter "rafted" blocks; abundant caliche; moist.

CALICHE ZONE[3]: sandy clay and gravel to clayey sand and gravel (GC/GW); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and caliched clays; damp to wet.

GRAVELLY CLAY (CH)[4]: disturbed claystone, pale olive (10 Y 6/2), medium gray (N 5/0); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; medium plasticity; caliche cemented matrix; clay is reworked claystone block; abundant limonite staining; caliche zones up to 30 centimeter thick; gravels oriented 45 degrees to 70 degrees; moist.

GRAVELLY CLAY (CH)[5]: disturbed claystone, (lower unit) with some sand; light olive gray (5 Y 5/2), light olive brown (5 Y 5/6); fine to coarse gravels up to small boulders 45 centimeters; well graded, subangular to subrounded; quartzose; low plasticity; clay is reworked claystone; abundant pockets and lenses of caliche; moist.

SILTY SANDSTONE[6]: with some clay; medium light gray (N 6/0); predominantly fine-grained sand, moderately well sorted, subrounded, quartzose; no visible porosity; weakly to noncemented; friable; millimeter banding of limonite staining; fractures filled with caliche; moist.

CLAYEY SILTY SANDSTONE[7]: grayish orange (10 YR 7/4), light olive brown (5 Y 5/6); predominantly fine-grained sand, moderately well sorted, subangular to subrounded, quartzose; no visible porosity; weakly to noncemented; friable; very thinly bedded; poorly developed cross bedding; blocky texture; fractures filled with caliche and limonite; moist.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
13 + 00 to 13 + 50
(Sheet 18 of 30)

SILTY CLAY (TOPSOIL) (CH)[1]: with a trace of sand and gravels; dusky yellowish brown (10 YR 2/2) to dark yellowish brown (10 YR 4/2); fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded quartzose; medium plasticity; trace roots; damp to moist.

CLAYEY SAND (SC)[2]: with some silt and gravel; trace cobbles; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, angular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium to high plasticity; abundant roots and organics; slightly to moderately calcareous; abundant caliche; moist.

SILTY CLAY (CH)[3]: disturbed silty claystone, light gray (N 7/0); "rafted" block of silty claystone; medium plasticity; blocky texture; some caliche; weathered; dry to moist.

SANDY SILTY CLAY (CL/CH)[4]: with some to trace gravel; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6), light gray (N 7/0); fine to coarse gravel, well graded; subangular, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; abundant caliche; some claystone inclusions; slightly to moderately calcareous; damp.

SANDY CLAYEY SILT (ML)[5]: with some to trace gravel; brownish gray (5 YR 4/1), light olive brown (5 Y 5/6), mottled; fine to coarse gravel, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium to low plasticity; abundant limonite staining; abundant caliche; slightly to very calcareous; claystone blocks and inclusions; damp.

CLAY (CH)[6]: disturbed claystone, with some sand and silt, trace gravel; yellowish gray (5 Y 7/2); fine to coarse gravels, well graded, subangular, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; reworked and weathered claystone; moist.

GRAVELLY CLAY (CH)[7]: disturbed claystone, olive gray (5 Y 4/1), brownish gray (5 YR 4/1), moderate yellowish brown (10 YR 5/4); varicolored; fine to coarse gravels up to 30 centimeters, cobbles, well graded, subangular to subrounded, quartzose and lithic; low plasticity; up to 30 percent of clay is reworked claystone; caliche deposits surround gravel and cobbles; gravels with variable imbrications in upper zone to 5 degrees dip west orientation at lower contact; moist.

CALICHE ZONE[8]: sandy clay and gravel to clayey sand and gravel (GC/GW); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and caliched clays; damp to wet.

SANDSTONE[9]: with some silt and trace clay; moderate yellowish brown (10 YR 5/4), light brown (5 YR 5/6); fine- to very fine-grained sand; well sorted; subangular, quartzose; no visible porosity; weakly cemented with limonite and caliche; moderately friable; limonite staining to concretions; caliche mottling to concretions; 3 to 6 centimeter iron cemented lenses; thinly bedded; interbeds of sandy claystone; moist.

SANDY CLAYSTONE[10]: with some silt; yellowish brown (10 YR 5/4), light brown (5 YR 5/6); fine to very fine-grained sand, well sorted, subangular, quartzose; no visible porosity; nonfriable; abundant limonite staining; caliche mottling; lenses of clayey silty sandstone, 0.2 to 0.8 inches thick, light gray (N 7/0); fractures filled with limonite; moist.

SILTY SANDSTONE[11]: with some clay; medium light gray (N 6/0); predominantly fine-grained sand, moderately well sorted, subround, quartzose; no visible porosity; weakly to noncemented; friable; millimeter banding of limonite staining; fractures filled with caliche; moist.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
13 + 50 to 14 + 00
(Sheet 19 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; non to low plasticity; at times partly to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

SILTY CLAY (TOPSOIL) (CH)[2]: with trace sand and gravels; dark yellowish brown (10 YR 4/2), grayish brown (5 YR 3/2); fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded quartzose; medium plasticity; with roots; damp to moist.

CLAYEY SAND (SC)[3]: with some silt and gravel; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6); fine to coarse gravel, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; abundant roots; slightly to moderately calcareous; abundant caliche; damp.

SILTY CLAY (CH)[4]: with trace sand and gravels; pale reddish brown (10 R 5/4) grayish red (5 R 4/2); light brown (5 YR 5/6), moderate yellowish brown (10 YR 5/4), mottled; fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; 2 to 3 millimeter caliche veining; slightly to moderately calcareous; damp to moist.

SANDY SILTY CLAY (CL/CH)[5]: with some to trace gravel; dark reddish brown (10 R 3/4), moderate reddish brown (10 R 4/6), light gray (N 7/0); fine to coarse gravel, well graded, subangular, quartzose; fine- to coarse-grained sand, well graded subangular to subrounded; quartzose; medium plasticity; abundant caliche; some claystone inclusions; slightly to moderately calcareous; damp.

SANDY CLAYEY SILT (ML)[6]: with some to trace gravel; brownish gray (5 YR 4/1), light olive brown (5 Y 5/6) mottled; fine to coarse gravel, well graded; subangular to subrounded quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded quartzose; low

to medium plasticity; abundant limonite staining; abundant caliche; slightly to very calcareous; claystone blocks and inclusions; damp.

CALICHE ZONE[7]: sandy clay and gravel to clayey sand and gravel (GC/GW); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subrounded quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; predominant matrix is caliche and calcareous clays; damp to wet.

SILT (ML)[8]: disturbed siltstone, with some clay and sand; grayish brown (5 YR 3/2), moderate brown (5 YR 4/4), olive gray (5 Y 4/1), medium light gray (N 6/0), varicolored; fine to coarse gravels, well graded, subangular, quartzose; reworked siltstone; slightly to locally weathered, with some to abundant caliche; medium to low plasticity; moist to very moist.

CLAY (CH)[9]: disturbed claystone, with some sand and silt; trace gravels; yellowish gray (5 Y 7/2); fine to coarse gravels, well graded, subangular; quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; reworked and weathered claystone; moist.

CLAYEY SAND (SC)[10]: with some to trace silt and gravel; moderate reddish brown (10 R 4/6), moderate reddish brown (10 R 6/6); fine to coarse gravels up to 30 centimeter cobbles, well graded, subangular to subrounded, quartzose; fine- to medium-grained sand, moderately graded, quartzose; medium plasticity; caliche veining and encrusting around claystone inclusions; moist.

GRAVELLY CLAY (CH)[11]: disturbed claystone, olive gray (5 Y 4/1), brownish gray (5 YR 4/1) varicolored; fine to coarse gravels up to 30 centimeter cobbles, well graded, subangular to subrounded, quartzose; low plasticity; up to 30 percent of clay is reworked claystone; caliche deposits surrounding gravel and cobbles; gravels with variable imbrications in upper zone dipping 5 degrees dip west at lower contact; moist to very moist.

SILTY CLAY (CH)[12]: disturbed silty claystone, trace to some sand; moderate yellowish brow (10 YR 5/4), light brown (5 YR 5/6); very fine-grained sand, well sorted, subangular, quartzose; medium plasticity; abundant limonite staining to iron concreted lenses of less than 3 centimeters thick; caliche mottling, veining, and concretions; weathered rafted block of silty claystone; interbedded with 12 centimeter discontinuous lenses of sandy siltstone; moist.

CLAYEY SILTSTONE[13]: trace to some sand; grayish orange (10 YR 7/4), light gray (N 7/0); very fine-grained sand, subangular, well sorted, quartzose; low to medium plasticity; moderately cemented; slightly calcareous; trace iron concretions; damp.

SILTY CLAYSTONE[14]: some sand; olive gray (5 Y 3/2); predominantly fine-grained sand, moderately well sorted, subangular, quartzose; no visible porosity; noncemented; nonfriable; limonite staining; medium to high plasticity; massive; moist.

SANDSTONE[15]: with some silt and trace clay; moderate yellowish brown (10 YR 5/4), light brown (5 YR 5/6); fine- to very fine-grained sand; well sorted; subangular, quartzose; no visible porosity; weakly cemented with limonite and caliche; moderately friable; limonite staining to concretions; caliche mottling to concretions; 3 to 6 centimeter iron cemented lenses; thinly bedded; interbeds of sandy claystone; moist.

SANDY CLAYSTONE[16]: with some silt; yellowish brown (10 YR 5/4), light brown (5 YR 5/6); fine- to very fine-grained sand, well sorted, subangular, quartzose; no visible porosity; noncemented; nonfriable; limonite staining; caliche mottling; interbedded with clayey silty sandstone; fractures filled with limonite; moist.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
14 + 00 to 14 + 50
(Sheet 20 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; non to low plasticity; at times partly to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

SILTY CLAY (CH)[2]: with trace sand and gravels; pale reddish brown (10 R 5/4) grayish red (5 R 4/2); light brown (5 YR 5/6), moderate yellowish brown (10 YR 5/4), mottled; fine to coarse gravels up to cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium plasticity; 2 to 3 millimeter caliche veining; slightly to moderately calcareous; damp to moist.

CLAY (CH)[3]: with some silt, trace sand and gravels; moderate reddish brown (10 R 4/6); fine to coarse gravels and up to 30 centimeter cobbles, well graded, subangular to subrounded, quartzose; low to high plasticity; caliche encrusting gravel and cobbles; moist.

SILT (ML)[4]: disturbed siltstone, with some clay and sand, grayish brown (5 YR 3/2), moderate brown (5 YR 4/4), olive gray (5 Y 4/1), medium light gray (N 6/0), varicolored; fine to coarse gravels, well graded, subangular, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; reworked siltstone; slightly to locally lightly weathered, with some to abundant caliche; medium to low plasticity; moist to very moist.

CLAYEY SILT (ML)[5]: with trace to some sand and trace gravels; grayish brown (5 YR 3/2), moderate brown (5 YR 4/4), olive gray (5 Y 4/1), medium light gray (N 6/0), varicolored; fine to coarse gravels, well graded, subangular, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; medium to low plasticity; abundant inclusion of reworked claystone; limonite staining; some caliche deposits; some organic debris near upper contact; poorly developed blocky texture; moist to very moist.

CLAYEY SILTSTONE[6]: trace to some sand; grayish orange (10 YR 7/4); some light gray (N 7/0); very fine-grained sand, subangular, well sorted, quartzose; low to medium plasticity; moderately cemented; slightly calcareous; trace iron concentrations, damp.

SILTY CLAYSTONE[7]**:** some sand; olive gray (5 Y 3/2) to light olive brown (5 Y 5/6); with dark yellowish orange (10 YR 6/6) mottling and staining/filling along partings; predominantly fine-grained sand, moderately well sorted, subangular, quartzose; medium to high plasticity; dense; homogeneous; waxy; blocky; slightly calcareous, trace dendritic manganese oxide staining; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
14 + 50 to 15 + 00
(Sheet 21 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; non to low plasticity; at times partly to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SILT (ML)[2]: with trace to some sand and gravels; moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sands, well graded, subangular to subrounded, quartzose; medium to low plasticity; caliche encrusting gravels; limonite staining; trace roots; damp.

CLAYEY SILT (ML)[3]: with trace to some sand and trace gravels; grayish brown (5 YR 3/2), moderate brown (5 YR 4/4), olive gray (5 Y 4/1), medium light gray (N 6/0), varicolored; fine to coarse gravels, well graded, subangular, quartzose; fine- to medium-grained sand, moderately graded; subangular to subrounded, quartzose; medium to low plasticity; abundant inclusions of claystone; limonite staining; some caliche deposits; some organic debris near upper contact; poorly developed blocky texture; moist to very moist.

CLAY (CH)[4]: with some silt, trace sand and gravels; moderate reddish brown (10 R 4/6); fine to coarse gravels, up to 30 centimeter cobbles, well graded, subangular to subrounded, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; low to high plasticity; caliche encrusting gravel and cobbles; moist.

CLAY (CH)[5]: disturbed claystone, with trace gravels to cobbles; brownish gray (5 Y 4/1), moderate brown (5 YR 3/4); fine to coarse gravels, up to 30 centimeter cobbles, well graded, subrounded to rounded, quartzose; medium plasticity; disturbed to reworked claystone; slightly calcareous; dry to slightly damp.

SANDY CLAYEY SILTSTONE[6]: olive gray (5 Y 4/1), moderate brown (5 YR 4/4), brownish gray (5 YR 4/1), very fine- to trace medium-grained sand, occasional trace coarse-grained sand, medium gray (N 5/0), moderately poorly sorted, subangular to subrounded, quartzose; no visible porosity; some thin (3 to 6 centimeters) limonite cemented lenses; moderately friable; scattered iron concentrations; 3 to 30 centimeter interbeds of silty claystone; limonite filling in fractures; damp.

SILTY CLAYSTONE[7]: light olive gray (5 Y 6/1), brownish gray (5 Y 4/1); no visible porosity; noncemented; nonfriable; medium plasticity; limonite filling in blocky texture; fractures filled with limonite and manganese oxide; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
15 + 00 to 15 + 50
(Sheet 22 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; non to low plasticity; at times partly to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SILT (ML)[2]: with trace to some sand and gravels; moderate reddish brown (10 R 4/6); fine to coarse gravels, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; medium to low plasticity; caliche encrusting gravels; limonite staining; trace roots; damp.

CLAYEY SAND (SC)[3]: with some silt and gravel; dark reddish brown (10 R 3/4) to moderate reddish brown (10 R 4/6); fine gravel, poorly graded, subrounded to subangular, quartzose and lithic; fine- to coarse-grained sand, well graded, quartzose; high plasticity; trace roots; dry.

CLAYEY SILT (ML)[4]: with trace to some sand and trace gravels; grayish brown (5 YR 3/2), moderate brown (5 YR 4/4); olive gray (5 Y 4/1), medium light gray (N 6/0), varicolored; fine to coarse gravels, well graded, subangular, quartzose; fine- to medium-grained sand, moderately graded, subangular to subrounded, quartzose; medium to low plasticity; abundant inclusions of claystone; limonite staining; some caliche deposits; some organic debris near upper contact; poorly developed blocky texture; moist to very moist.

SILTY CLAY (CH)[5]: with trace sand; light brown (5 YR 6/4) to moderate brown (5 YR 4/4); fine- to medium-grained sand, moderately well graded, subangular to subrounded, quartzose and caliche; high plasticity, moderately calcareous; damp.

SILTY SANDSTONE[6]: with some clay; light gray (N 7/0) to light olive gray (5 Y 6/1); very fine-grained sand, well sorted, poorly graded, subangular, quartzose; calcareous; blocky to poorly developed blocky texture; damp.

SILTY CLAYSTONE[7]: interbedded with silty clayey sandstone; light gray (N 7/0) to light grayish orange (10 YR 7/4); mottled; very fine- to fine-grained sand, subangular to subrounded, quartzose; medium to low plasticity; slightly calcareous; fractures filled with manganese oxide and limonite; damp.

SANDY CLAYEY SILTSTONE[8]: olive gray (5 Y 4/1), moderate brown (5 YR 4/4), brownish gray (5 YR 4/1), medium gray (N 5/0); very fine to trace medium, occasional trace coarse-grained sand, moderately poorly sorted, subangular to subrounded, limonite cemented lenses; moderately friable; scattered iron concentrations; 3 to 30 centimeter intervals of silty claystone; limonite filling in fractures; damp.

SILTY CLAYSTONE[9]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; with some fine-grained sand, trace medium- to coarse-grained, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining, grayish range (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace roots; some to abundant, noncontinuous slickensided shear planes up to 3.2 meters in length; trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
15 + 50 to 16 + 00
(Sheet 23 of 30)

SANDY CLAY (TOPSOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SAND (SC)[2]: with some silt and gravel; dark reddish brown (10 R 3/4) to moderate reddish brown (10 R 4/6); fine gravel, poorly graded, subrounded to subangular, quartzose and lithic; fine- to coarse-grained sand, well graded, quartzose; high plasticity; trace roots; dry; locally grading to gravel with some sand and trace clay.

SILTY CLAY (CL/CH)[3]: with trace to some sand, pale brown (5 YR 2/2) to light olive gray (5 Y 5/2), fine- to medium-grained sand, moderately well graded, subangular to subrounded, quartzose and caliche; high plasticity; moderately calcareous; damp.

SILTY CLAYSTONE[4]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; with some fine-grained sand, trace medium- to coarse-grained, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining, grayish orange (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace roots; trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp.

SANDY CLAYEY SILTSTONE[5]: olive gray (5 Y 4/1), moderate brown (5 YR 4/4), brownish gray (5 YR 4/1), medium gray (N 5/0); very fine- to trace medium-grained sand, occasional trace coarse-grained sand, moderately poorly sorted, subangular to subrounded, limonite cemented lenses; moderately friable; scattered iron concentrations; 3 to 30 centimeter intervals of silty claystone; limonite filling in fractures; damp.

SILTY CLAYSTONE[6]**:** with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining, grayish range (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace roots; trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
16 + 00 to 16 + 50
(Sheet 24 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SAND (SC)[2]: with some silt and gravel; dark reddish brown (10 R 3/4) to moderate reddish brown (10 R 4/6); fine gravel, poorly graded, subrounded to subangular, quartzose and lithic; fine- to coarse-grained sand, well graded, quartzose; high plasticity; trace roots; dry.

CLAY (CH)[3]: with some silt and trace sand; pale brown (5 YR 5/2) to light olive gray (5 Y 5/2); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity; with randomly oriented, 2 to 5 millimeter caliche veins and blebs, very pale orange (10 YR 8/2) dry.

SILTY CLAY (CL)[4]: with trace to some sand, pale brown (5 YR 2/2) to light olive gray (5 Y 5/2), fine- to medium-grained sand, moderately well graded, subangular to subrounded, quartzose and caliche; high plastic; moderately calcareous; damp.

SILTY CLAYSTONE[5]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining, grayish range (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp.

SANDY CLAYEY SILTSTONE[6]: olive gray (5 Y 4/1), moderate brown (5 YR 4/4), brownish gray (5 YR 4/1), medium gray (N 5/0); very fine- to trace medium-grained sand, occasional trace coarse-grained sand, moderately poorly sorted, subangular to subrounded, limonite cemented lenses; moderately friable; scattered iron concentrations; 3 to 30 centimeter intervals of silty claystone; limonite filling in fractures; damp.

SANDY SILTSTONE[7]**:** with trace to some clay; pale yellowish brown (10 YR 6/2) to grayish orange (10 YR 7/4); fine- to medium-grained sand, moderately well sorted; subangular to subrounded; quartzose, with blocky texture; well developed iron laminations; 1 to 2 millimeters, with well developed monoclincal folding to the west at 22 degrees to 34 degrees; limonite staining on partings, with 6 centimeter limonite band at bottom of unit.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
16 + 50 to 17 + 00
(Sheet of 25 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SAND (SC)[2]: with some silt and gravel; dark reddish brown (10 R 3/4) to moderate reddish brown (10 R 4/6); fine gravel, poorly graded, subrounded to subangular, quartzose and lithic; fine- to coarse-grained sand, well graded, quartzose; high plasticity; trace roots; dry.

SILTY CLAY (CH)[3]: with trace sand; disturbed silty claystone; olive gray (5 Y 4/1) to medium gray (N 2/0); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity clays; dense, poorly developed blocky texture; highly weathered at upper contact becoming less weathered with depth; some iron oxide staining; trace slickensided shear planes; slightly calcareous; dry to damp; locally grading to clay.

CLAY (CH)[4]: with some silt and trace sand; pale brown (5 YR 5/2) to light olive gray (5 Y 5/2); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity; randomly oriented, 2 to 5 millimeter caliche veins and blebs, very pale orange (10 YR 8/2) dry.

CLAYEY SANDY SILTSTONE[5]: olive gray (5 Y 4/1); fine- to medium-grained sand, moderately well sorted, subangular to subrounded, quartzose; well developed blocky texture; trace to some limonite along partings; poorly cemented with argillaceous material; friable; damp.

SILTY SANDSTONE[6]: olive gray (5 Y 4/1) to grayish orange (10 YR 7/4); mottled; fine- to medium-grained sand, moderately well sorted, subangular to subrounded, quartzose; trace to some clay; poorly cemented with argillaceous material; friable; well developed blocky texture; trace to some limonite along partings; trace of subrounded iron concretions up to 8 centimeters in length; damp.

SANDY SILTSTONE[7]: with trace to some clay; pale yellowish brown (10 YR 6/2) to grayish orange (10 YR 7/4); fine- to medium-grained sand, moderately well sorted; subangular to subrounded; quartzose, with blocky texture; well developed iron laminations; 1 to 2 millimeters, with well developed monoclincal folding to the west at 22 degrees to 34 degrees; limonite staining on partings, with 6 centimeter limonite band at bottom of unit.

SILTY CLAYSTONE[8]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining, grayish range (10 YR 7/4) along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace roots; trace 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
17 + 00 to 17 + 50
(Sheet 26 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; with roots; traces caliche; slightly to moderately calcareous; primarily dry, locally damp.

CLAYEY SAND (CH)[2]: with some silt and gravel; dark reddish brown (10 R 3/4) to moderate reddish brown (10 R 4/6); fine gravel, poorly graded, subrounded to subangular, quartzose and lithic; fine- to coarse-grained sand, well graded, quartzose; high plasticity; trace roots; dry.

SILTY CLAY (CH)[3]: with trace sand; disturbed silty claystone; olive gray (5 Y 4/1) to medium gray (N 2/0); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity; dense, poorly developed blocky texture; highly weathered at upper contact becoming less weathered with depth; some iron oxide staining; trace slickensided shear planes; slightly calcareous; dry to damp; locally grading to clay.

CALICHE ZONE[4]: sandy clay and gravel (CL/GW); white (N 9/0); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and clay; dry.

SANDY CLAY (CL/CH)[5]: with trace gravel and trace silt, pale reddish brown (10 R 5/54) to dark reddish brown (10 R 3/4); fine to coarse gravels and cobbles, well graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose and lithic; medium to high plastic clays; trace mica, partially cemented with caliche; slightly to moderately calcareous; dry; locally grading to clay, grading to gravelly sandy clay locally and at borders, with some 3 to 6 millimeter randomly oriented caliche filled fractures.

CLAYEY SANDY SILTSTONE[6]: olive gray (5 Y 4/1); fine- to medium-grained sand, moderately well sorted, subangular to subrounded, quartzose; homogeneous; poorly cemented with argillaceous material; well developed blocky texture; trace to some limonite along partings; friable; damp.

SILTY SANDSTONE[7]: olive gray (5 Y 4/1) to grayish orange (10 YR 7/4); mottled; fine- to medium-grained sand, moderately well sorted, subangular to subrounded, quartzose; trace to some clay; poorly cemented with argillaceous material; friable; well developed blocky texture; trace to some limonite along partings; trace subrounded iron concretions up to 8 centimeters in length; damp.

SILTY CLAYSTONE[8]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining along partings; dendritic manganese oxide staining; trace 3 to 8 millimeter subrounded iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
17 + 50 to 18 + 00
(Sheet 27 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; trace roots; traces caliche; slightly to moderately calcareous; primarily dry, locally damp.

GRAVELLY SANDY CLAY (CH)[2]: with trace silt; grayish brown (5 YR 3/2) to dark reddish brown (10 R 3/4), at times dusky yellowish brown (10 YR 4/2); mottled; fine gravel, subangular to angular, poorly graded, quartzose and lithic gravel; fine- to coarse-grained sand, well graded, subangular to angular, quartzose and lithic; high plasticity; 1 to 3 millimeters, randomly oriented, white (N 9/0), caliche filled veins, white caliche also occurs in up to 6 centimeter ellipsoid scattered blebs, caliche is poorly cemented, powdery; trace roots; slightly to moderately calcareous; dry to damp.

SILTY CLAY (CH)[3]: with trace sand; reworked silty claystone; olive gray (5 Y 4/1) to medium gray (N 2/0); mottled; fine- to coarse-grained sand; well graded, subangular to subrounded, quartzose; high plasticity; poorly developed blocky texture; highly weathered at upper contact becoming less weathered with depth; some iron oxide staining; trace slickensided shear planes; slightly calcareous; dry to damp; locally grading to clay.

CALICHE ZONE[4]: sandy clay and gravel (CL/GW); white (N 9/0); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and clay; dry.

SANDY CLAY (CL/CH)[5]: with trace gravel and trace silt, pale reddish brown (10 R 5/4) to dark reddish brown (10 R 3/4); fine to course gravels and cobbles, well graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose and lithic; medium to high plasticity; trace mica, partially cemented with caliche; slightly to moderately calcareous; dry; locally grading to clay, grading to gravelly sandy clay locally and at borders of unit, with some 3 to 6 millimeter randomly oriented caliche filled fractures.

CLAYEY SANDY SILTSTONE[6]: olive gray (5 Y 4/1); fine- to medium-grained sand, moderately well sorted, subangular to subrounded, quartzose; homogenous, well developed blocky texture; trace to some limonite along partings; poorly cemented with argillaceous material; friable; damp.

SILTY CLAYSTONE[7]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining along partings; dendritic manganese oxide staining; some to abundant noncontinuous slickensided shear planes up to 3.2 meters in length; trace 3 to 8 millimeter subrounded iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
18 + 00 to 18 + 50
(Sheet 28 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

GRAVELLY SANDY CLAY (CH)[2]: with trace silt; grayish brown (5 YR 3/2) to dark reddish brown (10 R 3/4), at times dusky yellowish brown (10 YR 4/2); mottled; fine gravel, subangular to angular, poorly graded, quartzose and lithic gravel; fine- to coarse-grained sand, well graded, subangular to angular, quartzose and lithic; high plasticity; white (N 9/0), caliche filled veins, 1 to 3 millimeters, randomly oriented, white caliche also occurs in up to 6 centimeter ellipsoid scattered blebs, caliche is poorly cemented, powdery; trace roots; slightly to moderately calcareous; dry to damp.

SILTY CLAY (CH)[3]: with trace sand; disturbed silty claystone; olive gray (5 Y 4/1) to medium gray (N 2/0); mottled; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; high plasticity; dense; poorly developed blocky texture; highly weathered at upper contact becoming less weathered with depth; some iron oxide staining; trace slickensided shear planes; slightly calcareous; dry to damp; locally grading to clay.

CALICHE ZONE[4]: sandy clay and gravel (CL/GW); white (N 9/0); fine to coarse gravel to 30 centimeter cobbles, well graded, subangular to subround, quartzose; fine- to coarse-grained sand, well graded, subangular to subround, quartzose; non to low plasticity; predominant matrix is caliche and clay; dry.

SANDY CLAY (CL/CH)[5]: with trace gravel and trace silt; pale reddish brown (10 R 5/4) to dark reddish brown (10 R 3/4); fine to coarse gravels and cobbles, well graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose and lithic; medium to high plasticity; trace mica, partially cemented with caliche; slightly to moderately calcareous; dry; locally grading to clay; grading to gravelly sandy clay locally and at borders of unit, with some 3 to 6 millimeter, randomly oriented, caliche filled fractures.

SILTY CLAY (CH)[6]: with trace sand; light brown (5 YR 6/4) to moderate brown (5 YR 4/4); fine- to medium-grained sand, moderately well graded, subangular to subrounded, quartzose and caliche; high plasticity; moderately calcareous, damp.

CLAY (CH)[7]: with trace to some silt, trace gravels and cobbles; clay is disturbed claystone; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine to coarse gravels to cobbles, well graded, subangular to subrounded, lithic and quartzose; high plasticity, poorly developed blocky texture; limonite staining, grayish orange (10 YR 7/4), along partings, some dendritic manganese oxide staining; trace roots; 1 to 4 millimeters, randomly oriented caliche filled veins, pinkish gray (5 YR 8/1) to bluish white (5 B 9/1), trace up to 9 centimeters; caliche blebs, 1 to 3 millimeter caliche borders around gravels and cobbles; predominantly damp to dry; locally moist around gravels and cobbles; abundant stacked slickensided shear planes near upper contact diminishing towards bottom contact; highly weathered.

SILTY CLAYSTONE[8]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining along partings; dendritic manganese oxide staining; some to abundant, noncontinuous slickensided shear planes up to 3.2 meters in length; trace, 3 to 8 millimeter subrounded iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
18 + 50 to 19 + 00
(Sheet 29 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose, non to low plasticity, at times platy to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

GRAVELLY SANDY CLAY (CH)[2]: with trace silt; grayish brown (5 YR 3/2) to dark reddish brown (10 R 3/4), at times dusky yellowish brown (10 YR 4/2); mottled; fine gravel, subangular to angular, poorly graded, quartzose and lithic gravel; fine- to coarse-grained sand, well graded, subangular to angular, quartzose and lithic; high plasticity; white (N 9/0) caliche filled veins, 1 to 3 millimeters, randomly oriented, white caliche also occurs in up to 6 centimeter ellipsoid scattered blebs, caliche is poorly cemented, powdery; trace roots; slightly to moderately calcareous; dry to damp.

CLAY (CH)[3]: with trace to some silt, trace gravels and cobbles, clay is disturbed claystone; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine to coarse gravels to cobbles, well graded, subangular to subrounded, lithic and quartzose; high plasticity, poorly developed blocky texture; limonite staining, grayish orange (10 YR 7/4), along partings, some dendritic manganese oxide staining; trace roots; 1 to 4 millimeters randomly oriented caliche filled veins, pinkish gray (5 YR 8/1) to bluish white (5 B 9/1), trace up to 9 centimeter caliche blebs with 1 to 3 millimeter caliche borders around gravels and cobbles, predominantly damp to dry, locally moist around gravels and cobbles; abundant stacked slickensided shear planes near upper contact, diminishing towards bottom contact, highly weathered.

SILTY CLAY (CH)[4]: with trace sand, light brown (5 YR 6/4) to moderate brown (5 YR 4/4); fine- to medium-grained sand, moderately well graded, subangular to subrounded, quartzose and caliche; high plasticity; moderately calcareous; damp.

SILTY CLAYSTONE[5]**:** olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining along partings; dendritic manganese oxide staining dark gray (N 3/0); some to abundant, noncontinuous slickensided shear planes up to 3.2 meters in length; trace, 3 to 8 millimeter, subrounded iron concretions; trace to some carbonaceous material; damp.

881 HILLSIDE AREA
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

STATIONS
19 + 00 to 19 + 35
(Sheet 30 of 30)

SANDY CLAY (TOP SOIL) (CL)[1]: with some gravel and trace of silt; grayish brown (5 YR 3/2) to dusky yellowish brown (10 YR 2/2); fine gravel, poorly graded, subangular to subrounded, quartzose and lithic; fine- to coarse-grained sand, well graded, subangular to subrounded, quartzose; non to low plasticity; at times platy to poorly developed blocky texture; trace roots; trace caliche; slightly to moderately calcareous; primarily dry, locally damp.

GRAVELLY SANDY CLAY (CH)[2]: with trace silt; grayish brown (5 YR 3/2) to dark reddish brown (10 R 3/4), at times dusky yellowish brown (10 YR 4/2); mottled; fine gravel, subangular to angular, poorly graded, quartzose and lithic gravel; fine- to coarse-grained sand, well graded, subangular to angular, quartzose and lithic; high plasticity; 1 to 3 millimeters, randomly oriented, white (N 9/0), caliche filled veins, white caliche also occurs in up to 0.3 feet ellipsoid scattered blebs, caliche is poorly cemented, powdery; trace roots; slightly to moderately calcareous; dry to damp.

CLAY (CH)[3]: with trace to some silt, trace gravels and cobbles; disturbed claystone, olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine to coarse gravels to cobbles, well graded, subangular to subrounded, lithic and quartzose; high plasticity, poorly developed blocky texture; limonite staining, grayish orange (10 YR 7/4), along partings, some dendritic manganese oxide staining, dark gray (N 2/0); trace roots; 1 to 4 millimeters randomly oriented caliche filled veins, pinkish gray (5 YR 8/1) to bluish white (5 B 9/1), trace up to 9 centimeter caliche blebs with 1 to 3 millimeter caliche encrustations around gravels and cobbles; predominantly damp to dry, locally moist around gravels and cobbles; abundant stacked slickensided shear planes near upper contact; diminishing towards bottom contact, highly weathered; clay is disturbed claystone.

SILTY CLAYSTONE[4]: with trace sand; olive gray (5 Y 4/1) to greenish black (5 GY 2/1); mottled; fine- to coarse-grained sand, poorly sorted, subangular to subrounded, quartzose; no visible porosity; moderately well indurated; well developed blocky texture with limonite staining along partings; dendritic manganese oxide staining, dark gray (N 3/0); trace roots; some to abundant, noncontinuous slickensided shear planes up to 3.2 meters in length; trace, 3 to 8 millimeter, subrounded, iron concretions; trace to some carbonaceous material; damp.

Attachment A4-2
Geologic Cross Sections

Phase III
RFI/RI Report

Attachment A4-3
Geotechnical Analyses
Laboratory Reports

Phase III
RFI/RI Report

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+00	SAMPLED	Rocky Flats
DEPTH	43'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	35.05
Wt. Dry Soil & Pan	(g)	34.19
Wt. Lost Moisture	(g)	0.86
Wt. of Pan Only	(g)	3.66
Wt. of Dry Soil	(g)	30.53
Moisture Content	%	2.8
Wt. Hydrom. Sample Wet	(g)	55.07
Wt. Hydrom. Sample Dry	(g)	53.56

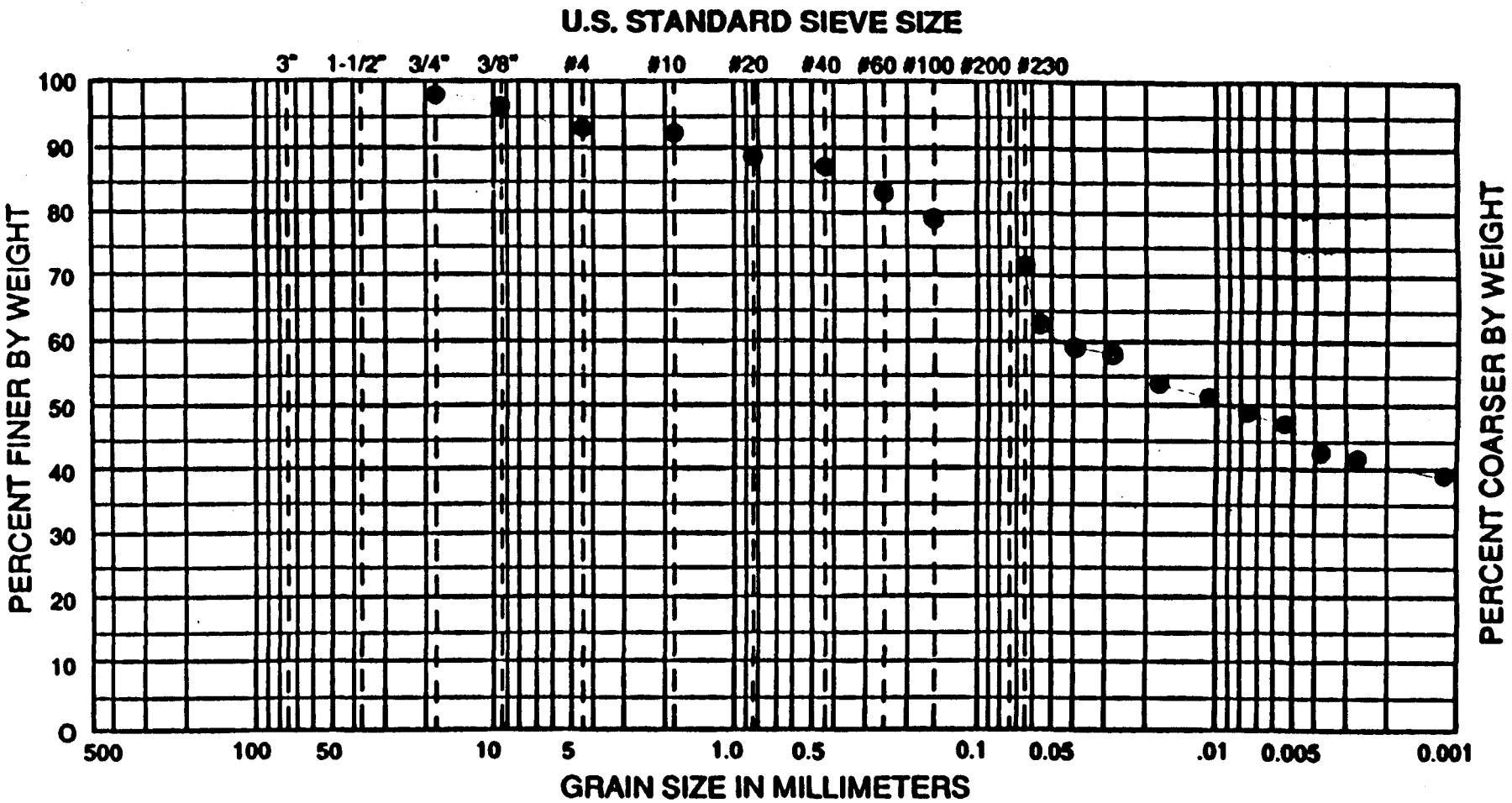
WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	466.22
Weight of + #10 Before Washing (g)	50.35
Weight of + #10 After Washing (g)	36.58
Weight of - #10 Wet (g)	415.87
Weight of - #10 Dry (g)	417.87
Wt. Total Sample Dry (g)	454.45
Calc. Wt. "W" (g)	58.25
Calc. Mass + #10	4.69

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	8.39	8.39	8.39	1.8	98.2
3/8"	0.00	10.22	10.22	18.61	4.1	95.9
#4	0.00	9.22	9.22	27.83	6.1	93.9
#10	0.00	8.75	8.75	36.58	8.0	92.0
#20	1.55	3.21	1.66	1.66	10.9	89.1
#40	1.55	3.15	1.60	3.26	13.6	86.4
#60	1.56	3.21	1.65	4.91	16.5	83.5
#100	1.56	4.04	2.48	7.39	20.7	79.3
#230	1.57	6.56	4.99	12.38	29.3	70.7

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+00 SAMPLE NO.: CH# 18 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	43.0'	Clay (CH) w/some silt and sand, trace gravel 1.8% c. sd 4.3% f. sd / 1.9% c. sd .56% med sd. 13.9% f. sd / 25.5% c. sd 47% clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER [illegible]

LOCATION Rocky Flats / EG&G

BORING 5700 SAMPLE CH #18 DEPTH 43.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

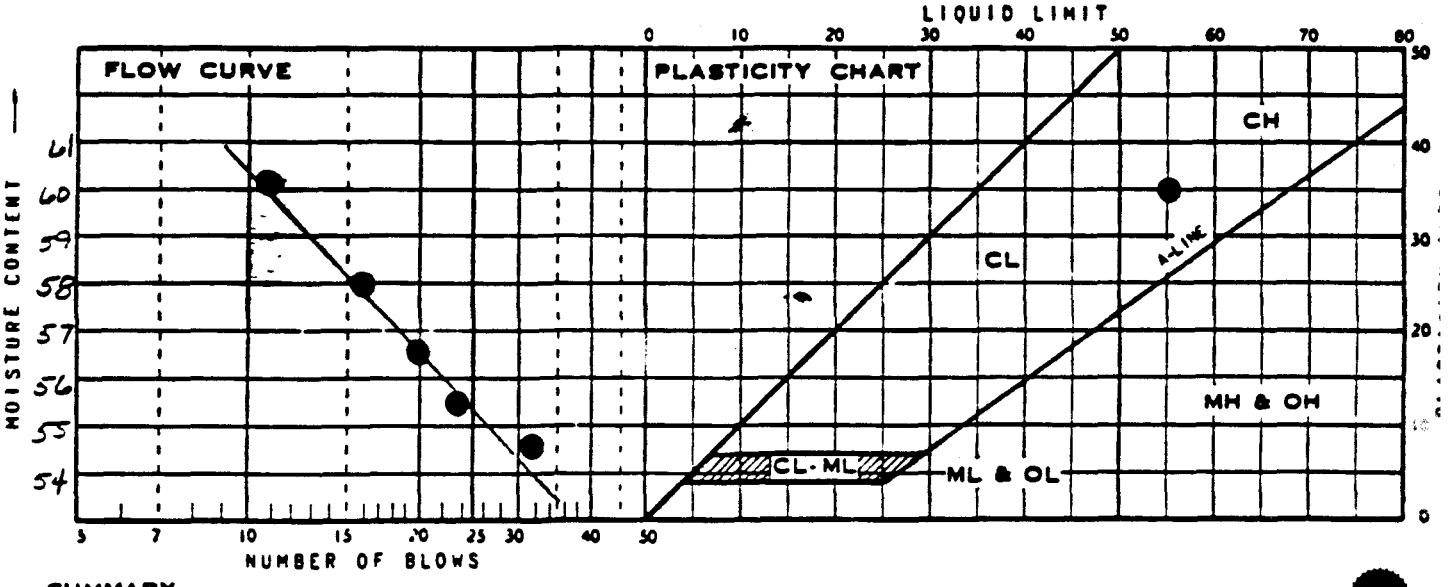
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB..4/14/92.

DETERMINATION	1	2	3	4	5	6
DISH	B 32	32 C	2072			
WT OF DISH + WET SOIL	4.55	4.31	3.91			
WT OF DISH + DRY SOIL	3.97	3.77	3.42	—	—	—
WT OF MOISTURE	.58	.54	.49			
WT OF DISH	1.04	1.06	1.05	—	—	—
WT OF DRY SOIL	2.93	2.71	2.37			
MOISTURE CONTENT	19.8	19.9	20.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B 13	2046	19C	B 31	B 3	
NUMBER OF BLOWS	32	24	20	16	11	
WT OF DISH + WET SOIL	13.28	11.48	12.58	11.64	15.29	
WT OF DISH + DRY SOIL	8.96	7.76	8.41	7.75	9.93	—
WT OF MOISTURE	4.32	3.72	4.17	3.89	5.36	
WT OF DISH	1.05	1.06	1.04	1.04	1.03	—
WT OF DRY SOIL	7.91	6.70	7.37	6.71	8.90	
MOISTURE CONTENT	54.6	55.5	56.6	58.0	60.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		55.3	20.1	35.2	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+00	SAMPLED	Rocky Flats
DEPTH	57'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	39.86
Wt. Dry Soil & Pan	(g)	38.98
Wt. Lost Moisture	(g)	0.88
Wt. of Pan Only	(g)	3.83
Wt. of Dry Soil	(g)	35.15
Moisture Content	%	2.5
Wt. Hydrom. Sample Wet	(g)	55.01
Wt. Hydrom. Sample Dry	(g)	53.67

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	611.13
Weight of + #10 Before Washing (g)	5.20
Weight of + #10 After Washing (g)	3.05
Weight of - #10 Wet (g)	605.93
Weight of - #10 Dry (g)	593.23
Wt. Total Sample Dry (g)	596.28
Calc. Wt. "W" (g)	53.94
Calc. Mass + #10	0.28

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.49	0.49	0.49	0.1	99.9
#10	0.00	2.56	2.56	3.05	0.5	99.5
#20	1.55	1.94	0.39	0.39	1.2	98.8
#40	1.55	1.91	0.36	0.75	1.9	98.1
#60	1.56	1.97	0.41	1.16	2.7	97.3
#100	1.56	2.77	1.21	2.37	4.9	95.1
#230	1.58	4.91	3.33	5.70	11.1	88.9

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	5+00	SAMPLED	Rocky Flats
DEPTH	57'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

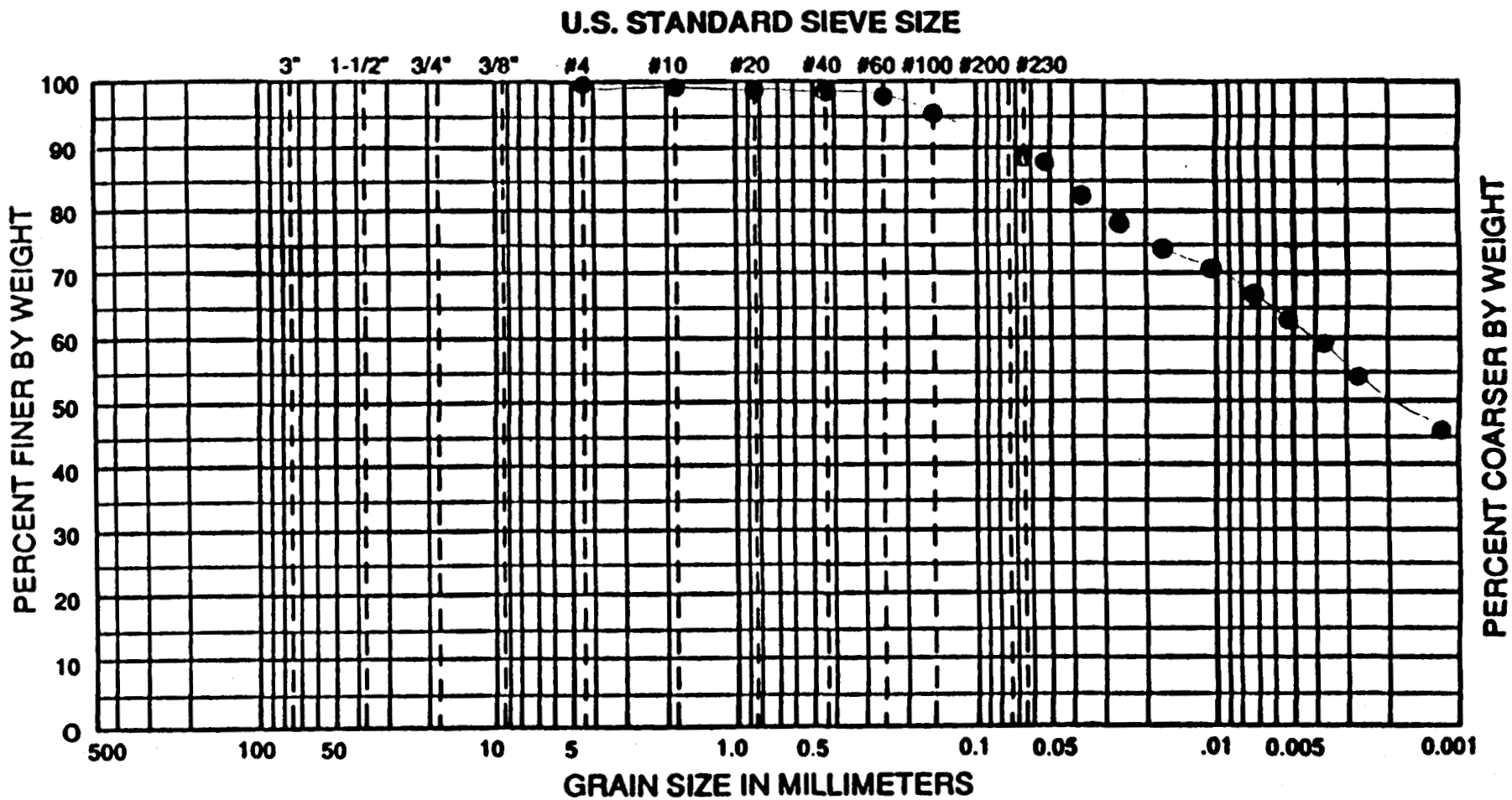
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	53.944
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	53.00	48.00	87.6	87.6	7.60	0.0507
1.0	50.00	45.00	82.1	82.1	8.09	0.0370
2.0	48.00	43.00	78.4	78.4	8.42	0.0267
5.0	46.00	41.00	74.8	74.8	8.75	0.0172
15.0	43.50	38.50	70.2	70.2	9.16	0.0102
30.0	41.50	36.50	66.6	66.6	9.48	0.0073
60.0	39.50	34.50	62.9	62.9	9.81	0.0053
120.0	37.50	32.50	59.3	59.3	10.14	0.0038
250.0	35.00	30.00	54.7	54.7	10.55	0.0027
1440.0	30.00	25.00	45.6	45.6	11.37	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+00 SAMPLE NO.: CH # 18 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	57.0'	Silty Clay (CH) with some silt trace gravel. .1% fine gravel / .4% coarse sand, 1.4% med sand, 9.1% f sand / 24.5% silt (0.5% clay)

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 5+00 SAMPLE #18 DEPTH @ 57.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

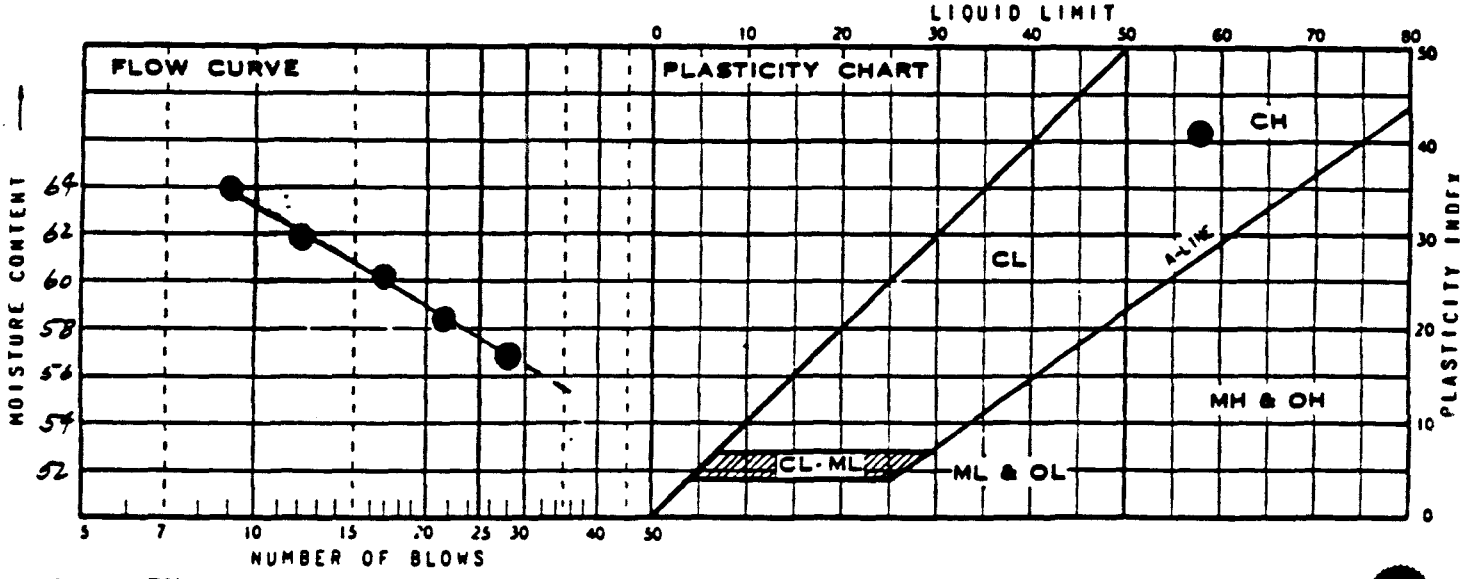
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/15/92

DETERMINATION	1	2	3	4	5	6
DISH	15G	B6	28C			
WT OF DISH + WET SOIL g	6.06	6.74	5.78			
WT OF DISH + DRY SOIL g	5.36	5.94	5.08	—	—	—
WT OF MOISTURE g	0.70	0.80	0.70			
WT OF DISH g	1.05	1.03	1.06	—	—	—
WT OF DRY SOIL g	4.31	4.91	4.02			
MOISTURE CONTENT %	16.2	16.3	17.4	= 49.9/3 =	16.6	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	42C	43C	B12	21C	2053	2024
NUMBER OF BLOWS	36+	28	21	17	12	9-
WT OF DISH + WET SOIL g	14.45	18.35	16.41	16.03	17.55	14.4[illegible]
WT OF DISH + DRY SOIL g	9.79	12.07	10.74	10.40	11.24	9.21
WT OF MOISTURE g	4.66	6.28	5.67	5.63	6.31	5.21
WT OF DISH g	1.05	1.04	1.04	1.05	1.05	1.06
WT OF DRY SOIL g	8.74	11.03	9.70	9.35	10.19	8.15
MOISTURE CONTENT %	53.3	56.9	58.5	60.2	61.9	63.9



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.6	16.6	41.0	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Western

JOB NO. 2066-03

BORING NO.	5+00	SAMPLED	Rocky Flats
DEPTH	62.5'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	57.90
Wt. Dry Soil & Pan	(g)	56.38
Wt. Lost Moisture	(g)	1.52
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	52.60
Moisture Content	%	2.9

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	53.46

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.01
Weight of - #10 Dry (g)	53.46
Wt. Total Sample Dry (g)	53.46
Calc. Wt. "W" (g)	53.46
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.59	0.03	0.03	0.1	99.9
#40	1.56	1.61	0.05	0.08	0.1	99.9
#60	1.56	1.60	0.04	0.12	0.2	99.8
#100	1.31	1.38	0.07	0.19	0.4	99.6
#230	1.58	1.81	0.23	0.42	0.8	99.2

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	5+00	SAMPLED	Rocky Flats
DEPTH	62.5'	DATE TESTED	04-14-92 TN
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

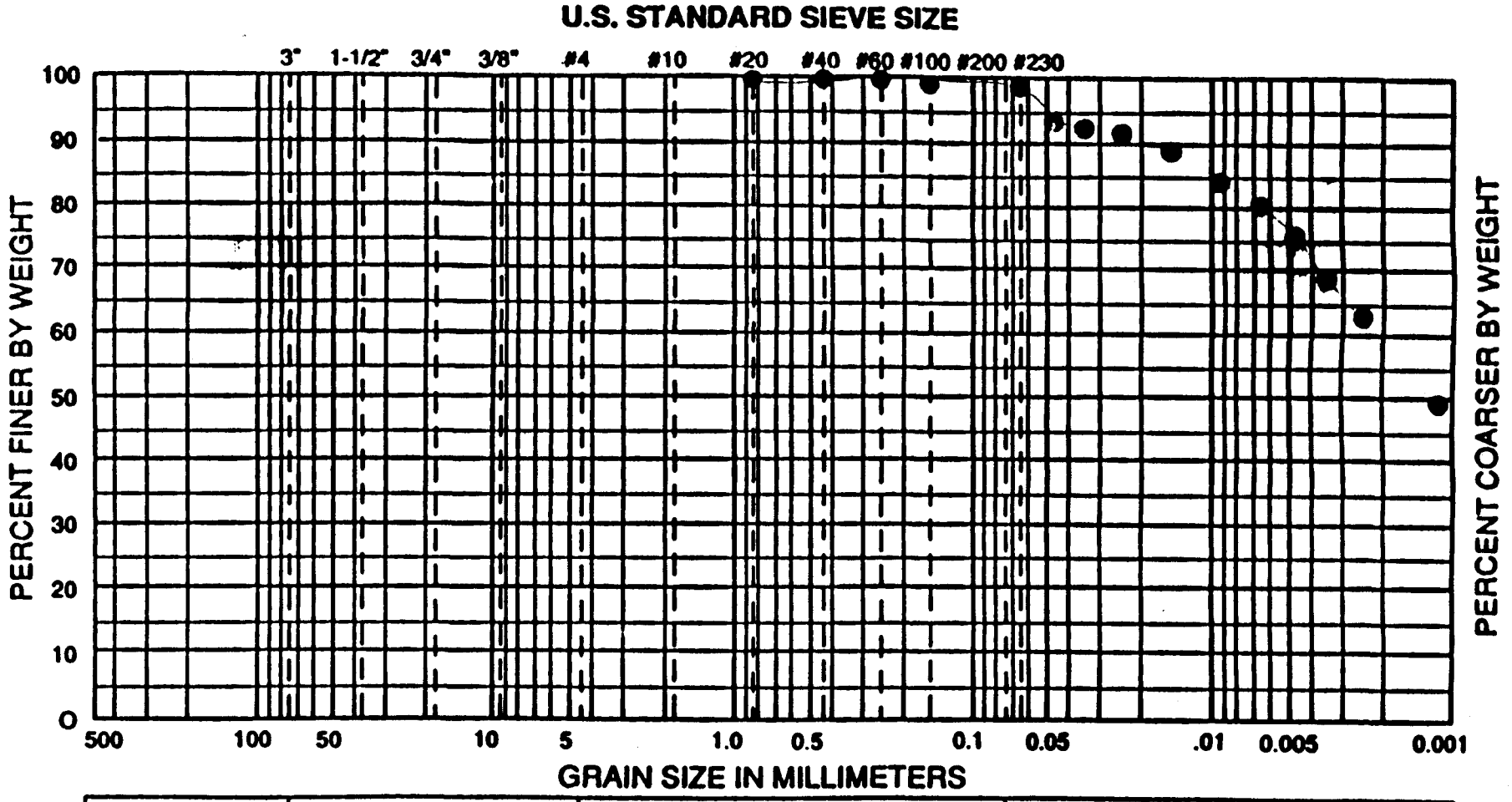
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01286
Value of "a"	0.98	Wt. Dry Sample "W"	53.462
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	57.00	51.00	93.9	93.9	6.94	0.0479
1.0	56.00	50.00	92.0	92.0	7.11	0.0343
2.0	55.75	49.75	91.6	91.6	7.15	0.0243
5.0	54.50	48.50	89.3	89.3	7.35	0.0156
15.0	52.00	46.00	84.7	84.7	7.76	0.0093
30.0	49.50	43.50	80.1	80.1	8.17	0.0067
60.0	47.00	41.00	75.5	75.5	8.58	0.0049
120.0	43.50	37.50	69.0	69.0	9.16	0.0036
250.0	40.00	34.00	62.6	62.6	9.73	0.0025
1440.0	33.00	27.00	49.7	49.7	10.88	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+00 SAMPLE NO.: CH #18 DATE: 4-17-98 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	62.5'	CH Clay w/ some silt and trace sand. 6% med. sand, 0.7% fine sand / 23.2% silt, 76% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 5-00 SAMPLE CH #18 DEPTH 62.5'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

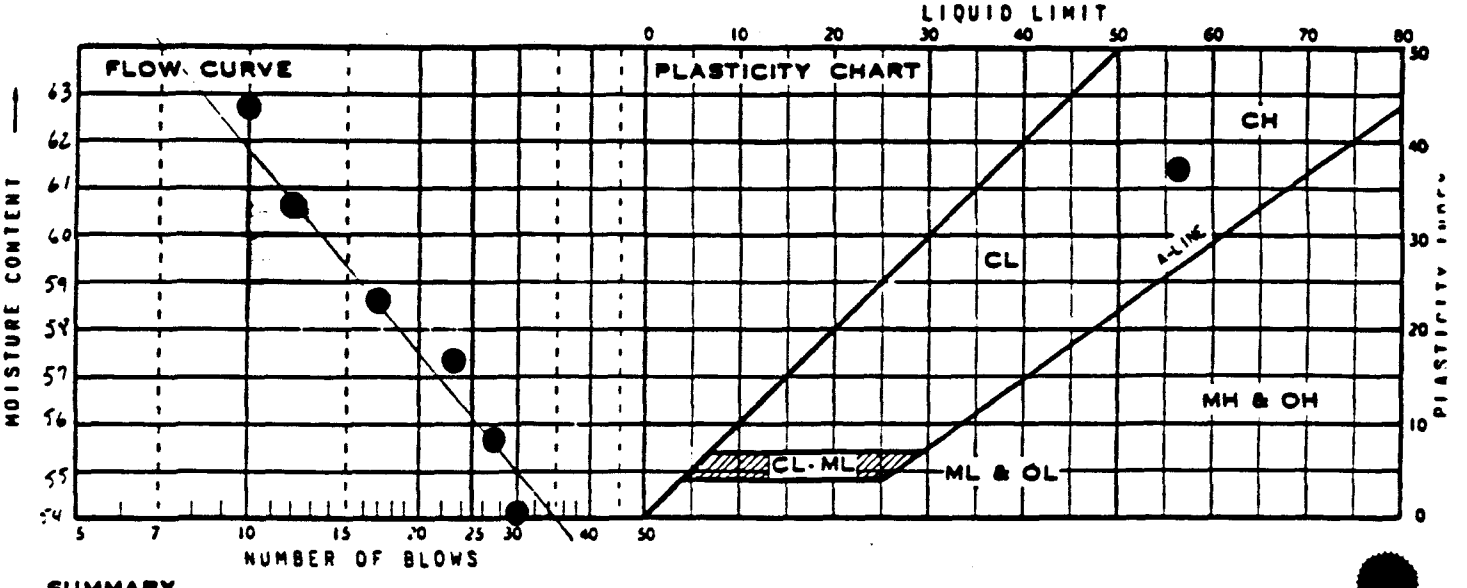
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY AM 4/15/92

DETERMINATION	1	2	3	4	5	6
DISH	2008	2023	9C			
WT OF DISH + WET SOIL g	6.50	7.23	5.25			
WT OF DISH + DRY SOIL g	5.64	6.23	4.58	—	—	—
WT OF MOISTURE g	.86	1.00	.67			
WT OF DISH g	1.07	1.06	1.09	—	—	—
WT OF DRY SOIL g	4.57	5.17	3.50			
MOISTURE CONTENT %	18.8	19.3	19.1			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	44C	2037	8C	B24	2002	B47
NUMBER OF BLOWS	30	27	23	17	12	10
WT OF DISH + WET SOIL g	12.52	11.74	11.46	11.46	12.37	10.93
WT OF DISH + DRY SOIL g	8.49	7.92	7.66	7.60	8.10	7.13
WT OF MOISTURE g	4.03	3.82	3.80	3.86	4.27	3.82
WT OF DISH g	1.04	1.06	1.04	1.02	1.06	1.05
WT OF DRY SOIL g	7.45	6.86	6.62	6.58	7.04	6.08
MOISTURE CONTENT %	54.1	55.7	57.4	58.7	60.7	62.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		56.1	19.1	37.0	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	32'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	43.71
Wt. Dry Soil & Pan	(g)	43.24
Wt. Lost Moisture	(g)	0.47
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	39.50
Moisture Content	%	1.2
Wt. Hydrom. Sample Wet	(g)	55.01
Wt. Hydrom. Sample Dry	(g)	54.36

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	729.39
Weight of + #10 Before Washing (g)	154.87
Weight of + #10 After Washing (g)	146.00
Weight of - #10 Wet (g)	574.52
Weight of - #10 Dry (g)	576.53
Wt. Total Sample Dry (g)	722.53
Calc. Wt. "W" (g)	68.13
Calc. Mass + #10	13.77

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	64.19	64.19	64.19	8.9	91.1
#4	0.00	38.10	38.10	102.29	14.2	85.8
#10	0.00	43.71	43.71	146.00	20.2	79.8
#20	1.31	4.10	2.79	2.79	24.3	75.7
#40	1.55	5.63	4.08	6.87	30.3	69.7
#60	1.57	5.34	3.77	10.64	35.8	64.2
#100	1.56	6.52	4.96	15.60	43.1	56.9
#230	1.55	9.34	7.79	23.39	54.5	45.5

CLAYEY SAND (SC)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	32'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

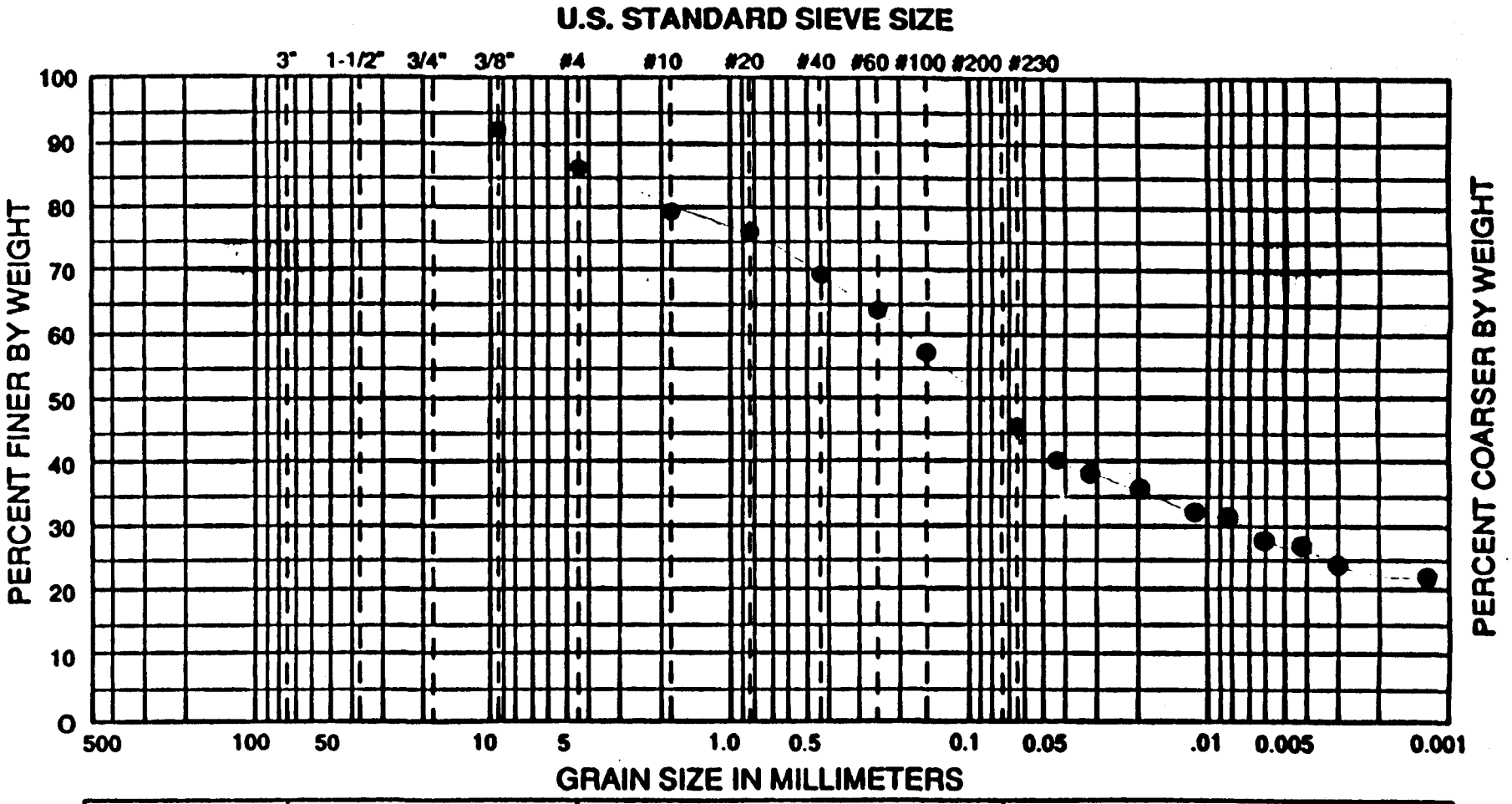
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01316
Value of "a"	0.99	Wt. Dry Sample "W"	68.131
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	35.00	30.00	43.7	43.7	10.55	0.0605
1.0	32.50	27.50	40.0	40.0	10.96	0.0436
2.0	31.50	26.50	38.6	38.6	11.12	0.0310
5.0	29.50	24.50	35.7	35.7	11.45	0.0199
15.0	27.00	22.00	32.0	32.0	11.86	0.0117
30.0	26.50	21.50	31.3	31.3	11.94	0.0083
60.0	24.00	19.00	27.7	27.7	12.35	0.0060
120.0	23.50	18.50	26.9	26.9	12.44	0.0042
250.0	22.00	17.00	24.8	24.8	12.68	0.0030
1440.0	20.00	15.00	21.8	21.8	13.01	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+25 SAMPLE NO.: CH #18 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	32.0'	Clayey sand (SC) with some silt and gravel. 14.2% fine gravel, 6.6% c. sand, 10.1% medium sand, 23.7% fine sand, 18.2% silt, 27.3% clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 5725 SAMPLE #18 DEPTH @32

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

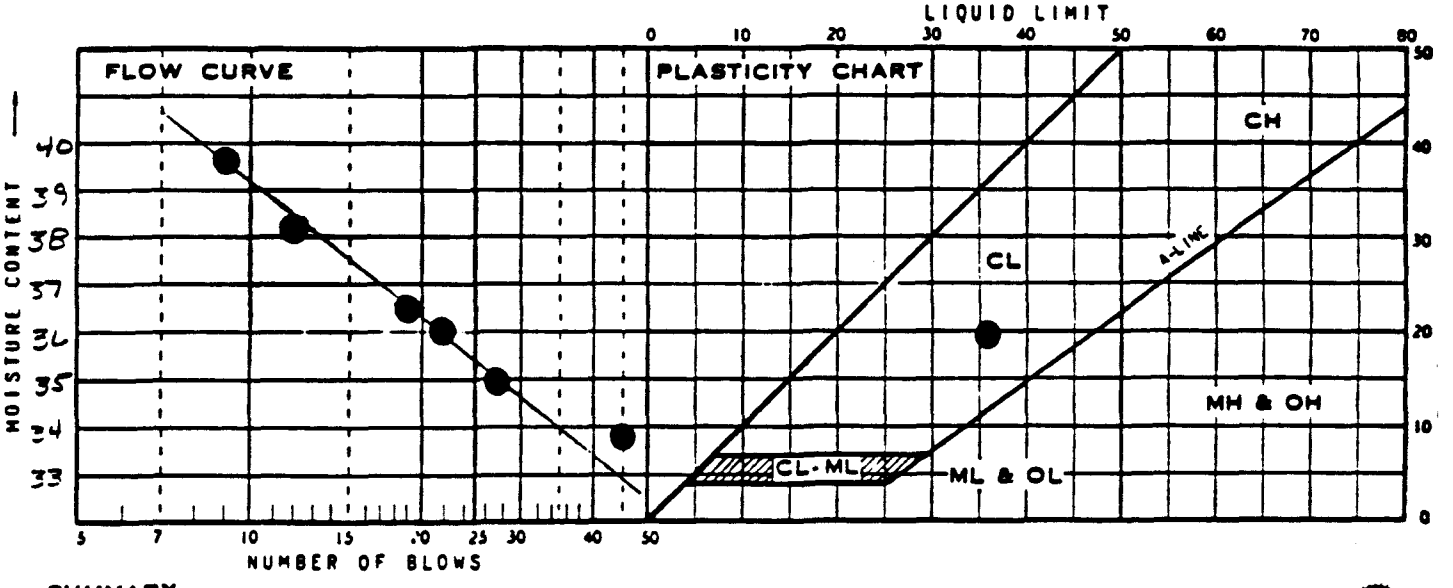
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/16/92

DETERMINATION	1	2	3	4	5	6
DISH	B30	B13	6C			
WT OF DISH + WET SOIL g	8.67	7.62	6.23			
WT OF DISH + DRY SOIL g	7.63	6.77	5.54	—	—	—
WT OF MOISTURE g	1.04	.85	.69			
WT OF DISH g	1.03	1.05	1.04	—	—	—
WT OF DRY SOIL g	6.60	5.72	4.50			
MOISTURE CONTENT %	15.8	14.9	15.3			

LIQUID LIMIT (48?) 13?

DETERMINATION	1	2	3	4	5	6
DISH	B52	58C	2012	2005	2060	2046
NUMBER OF BLOWS	45+	27	22	19	12+	9
WT OF DISH + WET SOIL g	18.62	20.11	17.68	17.99	17.28	19.5
WT OF DISH + DRY SOIL g	14.23	15.17	13.27	13.46	12.79	14.3
WT OF MOISTURE g	4.39	4.94	4.41	4.53	4.49	5.26
WT OF DISH g	1.04	1.05	1.04	1.06	1.03	1.05
WT OF DRY SOIL g	13.19	14.12	12.23	12.40	11.76	13.27
MOISTURE CONTENT %	33.8	35.0	36.1	36.5	38.2	39.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		55.4	15.3	20.1	CL	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	42'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	36.35
Wt. Dry Soil & Pan	(g)	35.14
Wt. Lost Moisture	(g)	1.21
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	31.36
Moisture Content	%	3.9
Wt. Hydrom. Sample Wet	(g)	55.01
Wt. Hydrom. Sample Dry	(g)	52.96

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	711.52
Weight of + #10 Before Washing (g)	67.80
Weight of + #10 After Washing (g)	62.60
Weight of - #10 Wet (g)	643.72
Weight of - #10 Dry (g)	624.81
Wt. Total Sample Dry (g)	687.41
Calc. Wt. "W" (g)	58.27
Calc. Mass + #10	5.31

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	25.83	25.83	25.83	3.8	96.2
3/8"	0.00	15.74	15.74	41.57	6.0	94.0
#4	0.00	8.07	8.07	49.64	7.2	92.8
#10	0.00	12.96	12.96	62.60	9.1	90.9
#20	1.57	2.42	0.85	0.85	10.6	89.4
#40	1.55	2.69	1.14	1.99	12.5	87.5
#60	1.55	3.03	1.48	3.47	15.1	84.9
#100	1.31	3.66	2.35	5.82	19.1	80.9
#230	1.57	6.15	4.58	10.40	27.0	73.0

Silty Clay (u.c.-)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	42'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

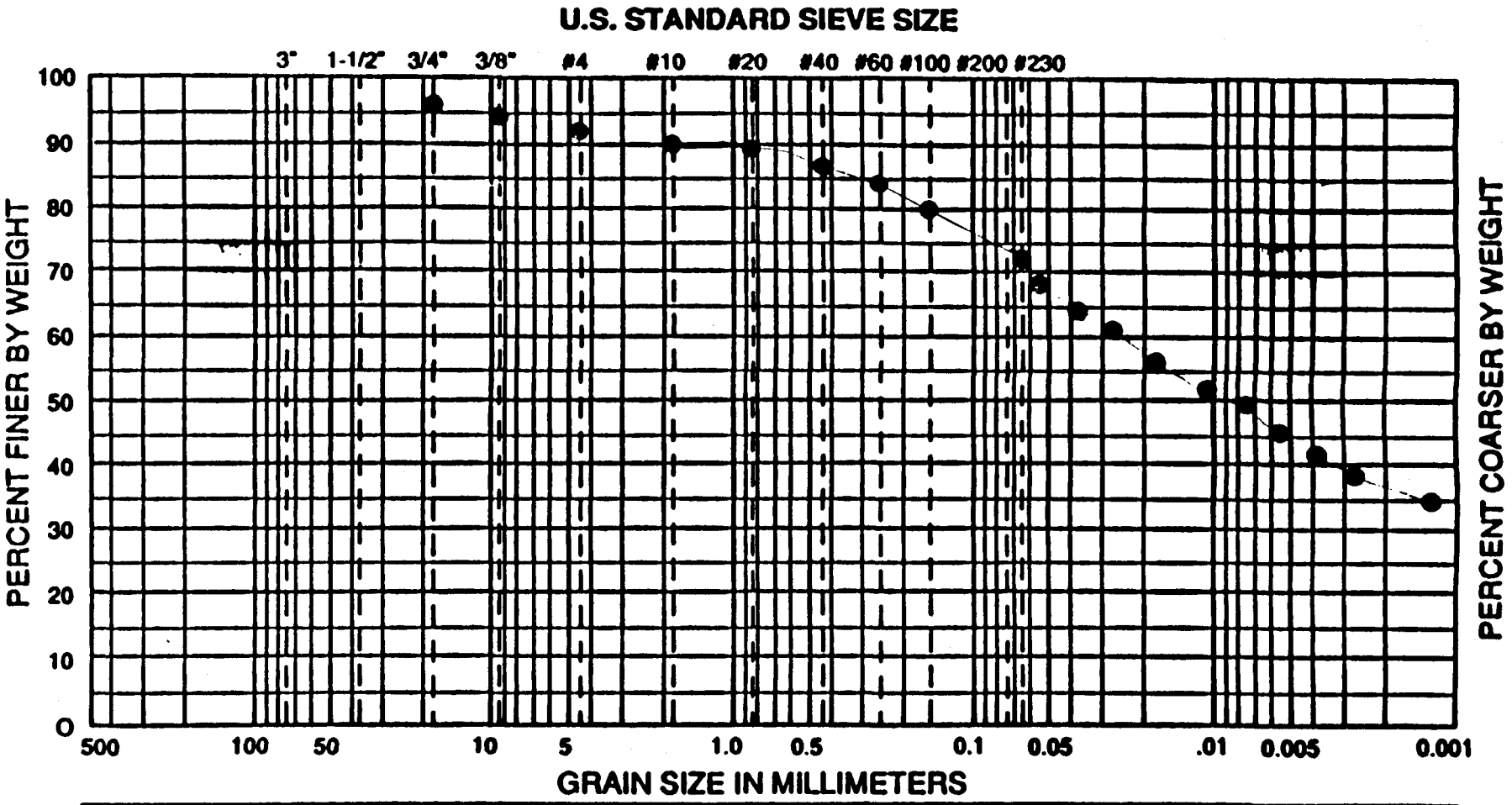
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01290
Value of "a"	0.98	Wt. Dry Sample "W"	58.271
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.50	40.50	68.4	68.4	8.66	0.0537
1.0	44.00	38.00	64.2	64.2	9.07	0.0389
2.0	42.50	36.50	61.6	61.6	9.32	0.0278
5.0	40.00	34.00	57.4	57.4	9.73	0.0180
15.0	37.50	31.50	53.2	53.2	10.14	0.0106
30.0	35.00	29.00	49.0	49.0	10.55	0.0077
60.0	33.00	27.00	45.6	45.6	10.88	0.0055
120.0	31.00	25.00	42.2	42.2	11.21	0.0039
250.0	29.00	23.00	38.8	38.8	11.53	0.0028
1440.0	27.00	21.00	35.5	35.5	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+25 SAMPLE NO.: CH #18 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	420'	Silty Clay (CL/CH) with some sand, trace gravel. Rocky Flat / EG+G 3.8% cgl, 3.4% fgl / 1.9% csd, 3.4% msd, 13.5% fsd, 29.5% silt, 44.5% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Wilston

LOCATION Rocky Flats / EG&G

BORING S425 SAMPLE #18 DEPTH 42.0'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

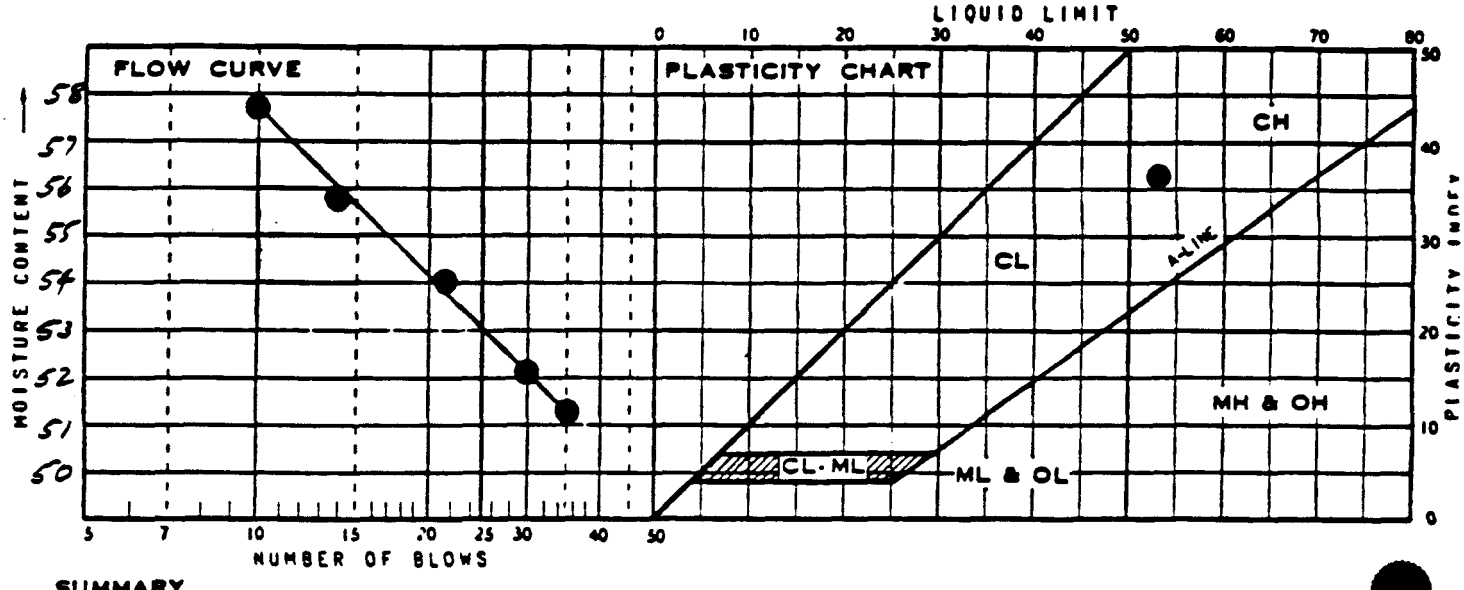
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/13/92

DETERMINATION	1	2	3	4	5	6
DISH	2066	35C	2067			
WT OF DISH + WET SOIL g	7.67	6.54	7.87			
WT OF DISH + DRY SOIL g	6.73	5.79	6.88	—	—	—
WT OF MOISTURE g	0.94	0.75	0.99			
WT OF DISH g	1.06	1.06	1.04	—	—	—
WT OF DRY SOIL g	5.67	4.73	5.84			
MOISTURE CONTENT %	16.6	15.9	16.9	= 49.4/3 =	16.5	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	44C	BC	2037	2023	9C	
NUMBER OF BLOWS	35	30	21	14	10	
WT OF DISH + WET SOIL g	11.05	12.28	11.97	9.23	10.62	
WT OF DISH + DRY SOIL g	7.66	8.42	8.14	6.30	7.12	—
WT OF MOISTURE g	3.39	3.86	3.83	2.93	3.50	
WT OF DISH g	1.04	1.03	1.05	1.05	1.07	—
WT OF DRY SOIL g	6.62	7.39	7.09	5.25	6.05	
MOISTURE CONTENT %	51.2	52.2	54.0	55.8	57.8	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		53.1	16.5	36.6	CH

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	50.4'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	41.47
Wt. Dry Soil & Pan	(g)	40.26
Wt. Lost Moisture	(g)	1.21
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	36.52
Moisture Content	%	3.3
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	53.25

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	53.25
Wt. Total Sample Dry (g)	53.25
Calc. Wt. "W" (g)	53.25
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	1.68	0.11	0.11	0.2	99.8
#40	1.56	1.65	0.09	0.20	0.4	99.6
#60	1.32	1.39	0.07	0.27	0.5	99.5
#100	1.57	1.66	0.09	0.36	0.7	99.3
#230	1.57	1.75	0.18	0.54	1.0	99.0

Silty Clay

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	50.4'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

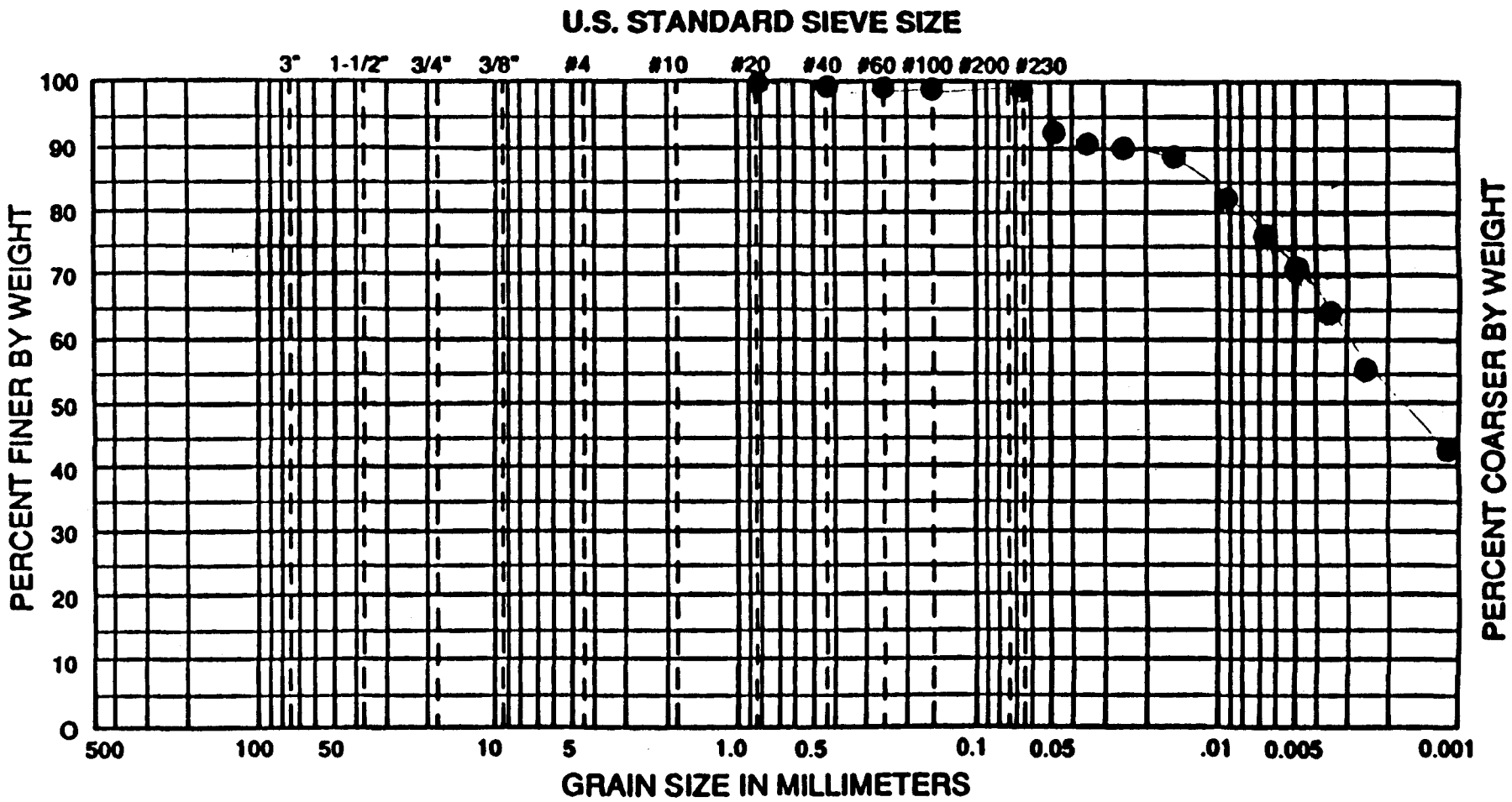
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01286
Value of "a"	0.98	Wt. Dry Sample "W"	53.253
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.00	50.00	92.4	92.4	7.11	0.0485
1.0	55.00	49.00	90.5	90.5	7.27	0.0347
2.0	54.75	48.75	90.1	90.1	7.31	0.0246
5.0	54.00	48.00	88.7	88.7	7.43	0.0157
15.0	50.50	44.50	82.2	82.2	8.01	0.0094
30.0	47.50	41.50	76.7	76.7	8.50	0.0068
60.0	44.50	38.50	71.1	71.1	8.99	0.0050
120.0	40.50	34.50	63.7	63.7	9.65	0.0036
250.0	36.50	30.50	56.4	56.4	10.30	0.0026
1440.0	29.00	23.00	42.5	42.5	11.53	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+25 SAMPLE NO.: CH #18 DATE: 4/17/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	50.4'	silty clay (CH) w/ trace sand. .4% Med sand, .6% fine sand / 27.9% silt, 71.1% Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-07

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / EG&G

BORING 5+25 SAMPLE CH #18 DEPTH 50.4'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

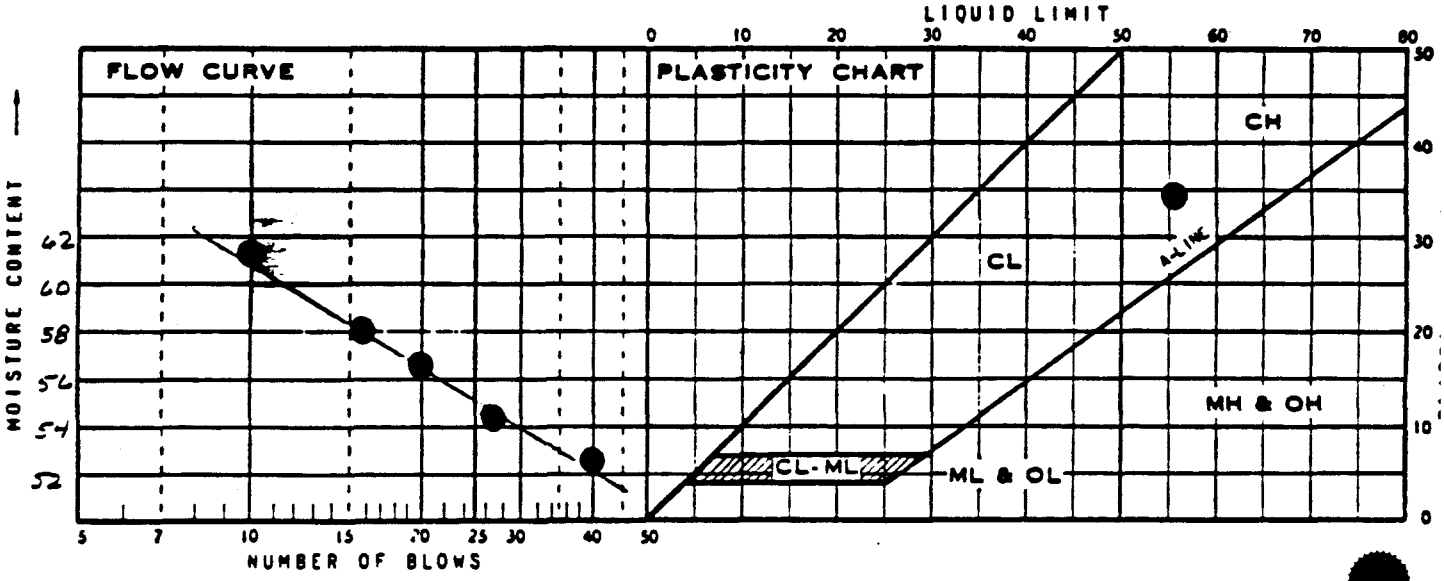
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. 4/13/92.

DETERMINATION	1	2	3	4	5	6
DISH	2041	B23	6C			
WT OF DISH + WET SOIL	4.72	5.65	5.66			
WT OF DISH + DRY SOIL	4.13	4.87	4.85	—	—	—
WT OF MOISTURE	.59	.78	.81			
WT OF DISH	1.06	1.04	1.05	—	—	—
WT OF DRY SOIL	3.07	3.83	3.80			
MOISTURE CONTENT	19.2	20.4	21.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2016	B11	B1	2064	27C	
NUMBER OF BLOWS	40	27	20	16	10	
WT OF DISH + WET SOIL	13.79	15.84	15.22	12.42	15.00	
WT OF DISH + DRY SOIL	9.39	10.62	10.09	8.24	9.69	—
WT OF MOISTURE	4.40	5.22	5.13	4.18	5.31	
WT OF DISH	1.04	1.04	1.04	1.05	1.06	—
WT OF DRY SOIL	8.35	9.58	9.05	7.19	8.63	
MOISTURE CONTENT	52.7	54.5	56.7	58.1	61.5	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		55.1	20.3	34.8	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

✓

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	63.2'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	81.64
Wt. Dry Soil & Pan	(g)	78.06
Wt. Lost Moisture	(g)	3.58
Wt. of Pan Only	(g)	3.70
Wt. of Dry Soil	(g)	74.36
Moisture Content	%	4.8

Wt. Hydrom. Sample Wet (g)	55.12
Wt. Hydrom. Sample Dry (g)	52.59

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.12
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.12
Weight of - #10 Dry (g)	52.59
Wt. Total Sample Dry (g)	52.59
Calc. Wt. "W" (g)	52.59
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.56	0.01	0.01	0.0	100.0
#40	1.56	1.57	0.01	0.02	0.0	100.0
#60	1.58	1.59	0.01	0.03	0.1	99.9
#100	1.57	1.58	0.01	0.04	0.1	99.9
#230	1.56	1.62	0.06	0.10	0.2	99.8

Silty Claystone

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+25	SAMPLED	Rocky Flats
DEPTH	63.2'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#18	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

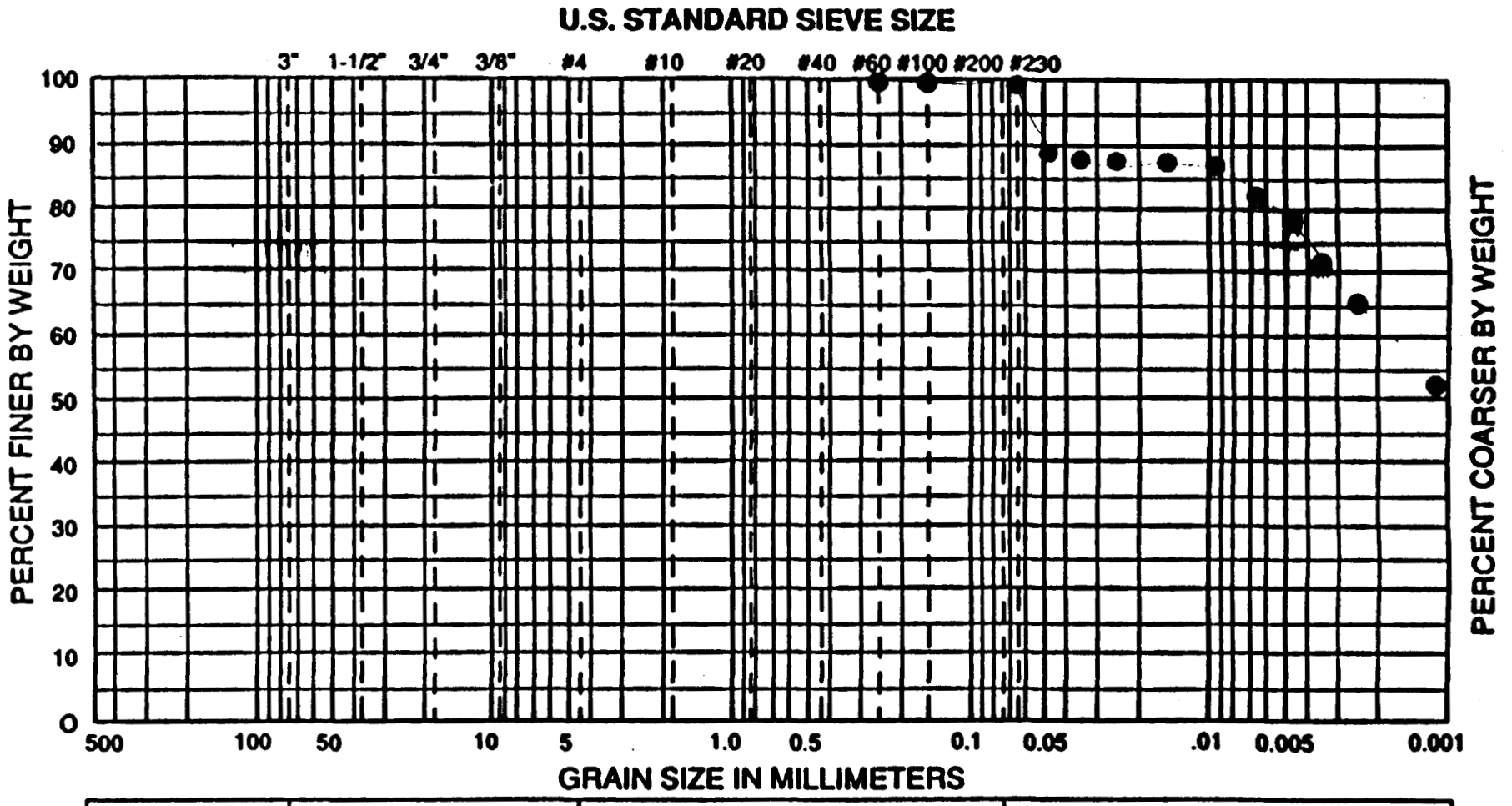
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01275
Value of "a"	0.98	Wt. Dry Sample "W"	52.589
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	54.00	48.00	89.3	89.3	7.43	0.0492
1.0	53.75	47.75	88.8	88.8	7.48	0.0349
2.0	53.50	47.50	88.3	88.3	7.52	0.0247
5.0	53.25	47.25	87.9	87.9	7.56	0.0157
15.0	52.50	46.50	86.5	86.5	7.68	0.0091
30.0	50.00	44.00	81.8	81.8	8.09	0.0066
60.0	48.50	42.50	79.0	79.0	8.34	0.0048
120.0	44.00	38.00	70.7	70.7	9.07	0.0035
250.0	41.00	35.00	65.1	65.1	9.57	0.0025
1440.0	34.00	28.00	52.1	52.1	10.71	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+25 SAMPLE NO.: CH # 18 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	63.2'	Silty Claystone w/ trace sand. .2% fine sand 20.3% silt, 79.5% clay

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 5t25 SAMPLE #18 DEPTH 63.2'

FIELD DENSITY BY - - - - - / - / - -

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

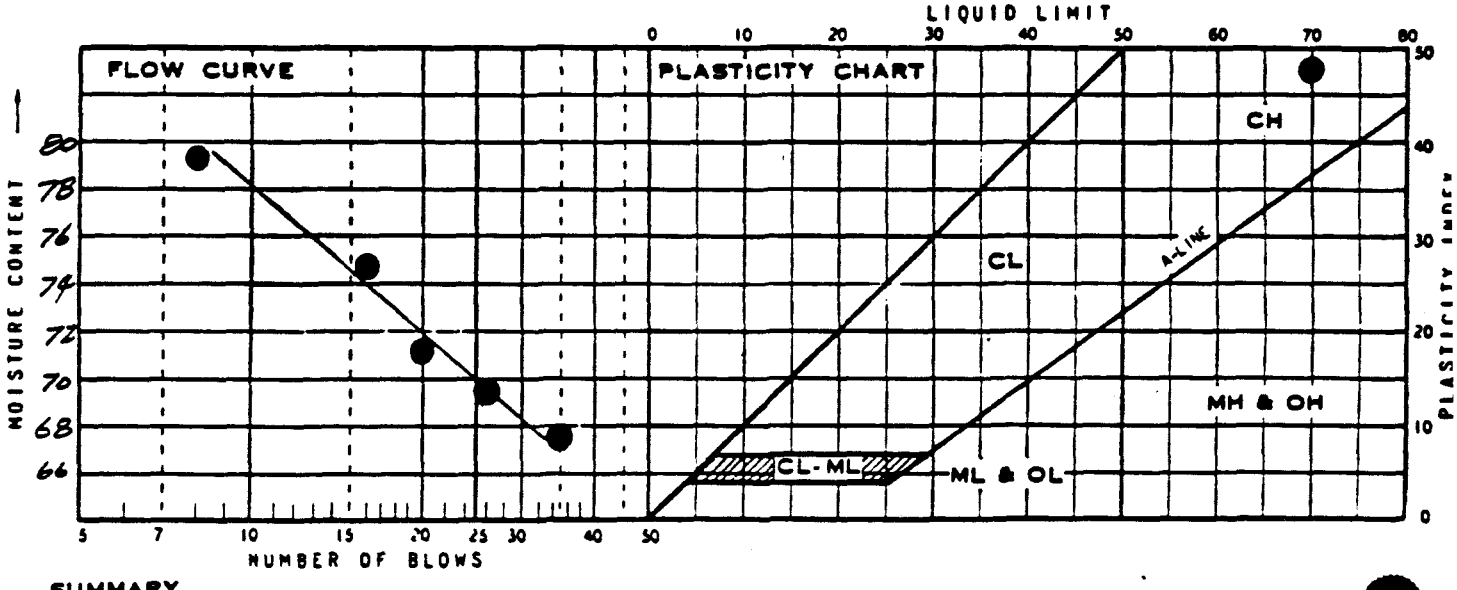
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ~~LB~~ 4/15/92

DETERMINATION	1	2	3	4	5	6
DISH	B50	2066	B56			
WT OF DISH + WET SOIL g	6.34	5.97	6.48			
WT OF DISH + DRY SOIL g	5.35	5.09	5.48	—	—	—
WT OF MOISTURE g	0.99	0.88	1.00			
WT OF DISH g	1.03	1.05	1.04	—	—	—
WT OF DRY SOIL g	4.32	4.04	4.44			
MOISTURE CONTENT %	22.9	21.8	22.5	= 67.2/3 =	22.4	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B8	2014	B21	35C	2068	B38
NUMBER OF BLOWS	35	26	20	16	13	8
WT OF DISH + WET SOIL g	9.67	11.69	13.52	11.70	9.32	10.0[illegible]
WT OF DISH + DRY SOIL g	6.18	7.33	8.33	7.15	5.71	6.07
WT OF MOISTURE g	3.49	4.36	5.19	4.55	3.61	3.99
WT OF DISH g	1.02	1.06	1.04	1.06	1.05	1.04
WT OF DRY SOIL g	5.16	6.27	7.29	6.09	4.66	5.03
MOISTURE CONTENT %	67.6	69.5	71.2	74.7	77.5	79.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		70.0	22.4	47.6	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	24'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	47.98
Wt. Dry Soil & Pan	(g)	46.24
Wt. Lost Moisture	(g)	1.74
Wt. of Pan Only	(g)	3.67
Wt. of Dry Soil	(g)	42.57
Moisture Content	%	4.1
Wt. Hydrom. Sample Wet	(g)	55.13
Wt. Hydrom. Sample Dry	(g)	52.96

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	503.88
Weight of + #10 Before Washing (g)	28.78
Weight of + #10 After Washing (g)	26.33
Weight of - #10 Wet (g)	475.10
Weight of - #10 Dry (g)	458.80
Wt. Total Sample Dry (g)	485.13
Calc. Wt. "W" (g)	56.00
Calc. Mass + #10	3.04

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	20.47	20.47	20.47	4.2	95.8
#4	0.00	3.23	3.23	23.70	4.9	95.1
#10	0.00	2.63	2.63	26.33	5.4	94.6
#20	1.57	2.33	0.76	0.76	6.8	93.2
#40	1.57	2.76	1.19	1.95	8.9	91.1
#60	1.57	3.03	1.46	3.41	11.5	88.5
#100	1.56	3.75	2.19	5.60	15.4	84.6
#230	1.55	5.72	4.17	9.77	22.9	77.1

Clay (cH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	24'	DATE TESTED	04-15-92 TN
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

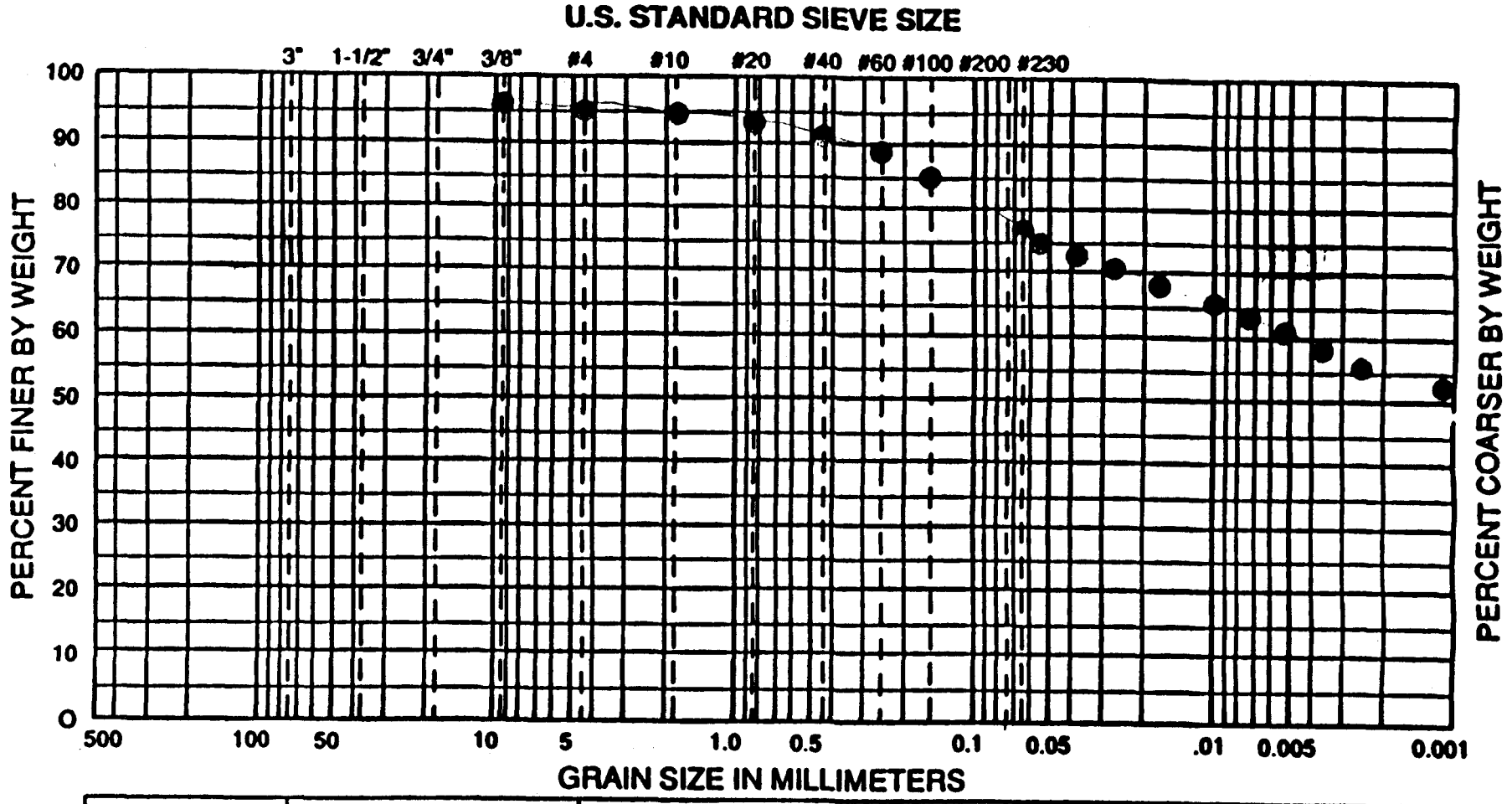
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01294
Value of "a"	0.98	Wt. Dry Sample "W"	56.000
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.50	43.50	76.1	76.1	8.34	0.0528
1.0	46.50	41.50	72.6	72.6	8.66	0.0381
2.0	45.50	40.50	70.9	70.9	8.83	0.0272
5.0	44.00	39.00	68.3	68.3	9.07	0.0174
15.0	42.50	37.50	65.6	65.6	9.32	0.0102
30.0	41.50	36.50	63.9	63.9	9.48	0.0073
60.0	40.00	35.00	61.3	61.3	9.73	0.0052
120.0	38.00	33.00	57.8	57.8	10.06	0.0037
250.0	37.00	32.00	56.0	56.0	10.22	0.0026
1440.0	35.50	30.50	53.4	53.4	10.47	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+50 SAMPLE NO.: CH #19 DATE: 4/17/91 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	24'	Clay (CH) with some sand and silt, trace gravel 4.9% fine gvl / .5% c sd, 3.5% med sd, 13.1% fine sd / 7% silt, 61% clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER WESTON

LOCATION Rocky Flats / SGA

BORING 5150 SAMPLE #19 DEPTH @ 24.0

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

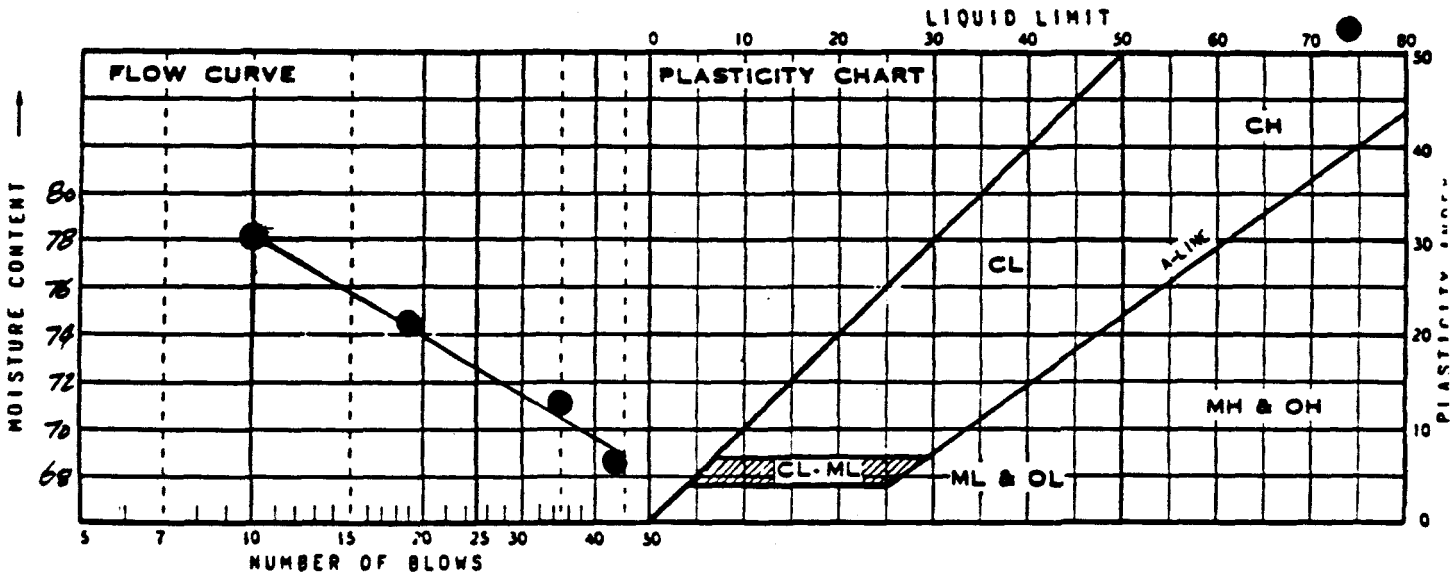
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DJ 4/13/92

DETERMINATION	1	2	3	4	5	6
DISH	B43	2026	B33			
WT OF DISH + WET SOIL g	3.33	3.92	3.95			
WT OF DISH + DRY SOIL g	2.93	3.43	3.46	—	—	—
WT OF MOISTURE g	0.40	0.49	0.49			
WT OF DISH g	1.04	1.03	1.04	—	—	—
WT OF DRY SOIL g	1.89	2.40	2.42			
MOISTURE CONTENT %	21.2	20.4	20.2	= 61.8/3	= 20.6	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B58	2056	B29	B45	B56	B57
NUMBER OF BLOWS	44	35	19	17	11	10
WT OF DISH + WET SOIL g	11.10	10.57	15.45	10.75	16.20	14.6
WT OF DISH + DRY SOIL g	7.01	6.61	9.40	6.65	9.66	8.6
WT OF MOISTURE g	4.09	3.96	6.05	4.10	6.54	5.96
WT OF DISH g	1.05	1.04	1.05	1.04	1.03	1.04
WT OF DRY SOIL g	5.96	5.57	8.35	5.61	8.63	7.63
MOISTURE CONTENT %	68.6	71.1	74.5	73.1	75.8	78.1



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		72.6	20.6	52.0	CH

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50
DEPTH	31.5'
SAMPLE NO.	#19
SOIL DESCR.	Bulk (Jar)

SAMPLED	Rocky Flats
DATE TESTED	04-15-92 TNU
WASH SIEVE	Yes
DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	36.64
Wt. Dry Soil & Pan	(g)	35.82
Wt. Lost Moisture	(g)	0.82
Wt. of Pan Only	(g)	3.76
Wt. of Dry Soil	(g)	32.06
Moisture Content	%	2.6

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.65

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	663.80
Weight of + #10 Before Washing (g)	2.13
Weight of + #10 After Washing (g)	1.67
Weight of - #10 Wet (g)	661.67
Weight of - #10 Dry (g)	645.62
Wt. Total Sample Dry (g)	647.29
Calc. Wt. "W" (g)	53.79
Calc. Mass + #10	0.14

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.56	0.56	0.56	0.1	99.9
#10	0.00	1.11	1.11	1.67	0.3	99.7
#20	1.56	1.78	0.22	0.22	0.7	99.3
#40	1.55	2.26	0.71	0.93	2.0	98.0
#60	1.55	2.95	1.40	2.33	4.6	95.4
#100	1.56	4.47	2.91	5.24	10.0	90.0
#230	1.56	7.59	6.03	11.27	21.2	78.8

Silty CLAY (CL)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	31.5'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

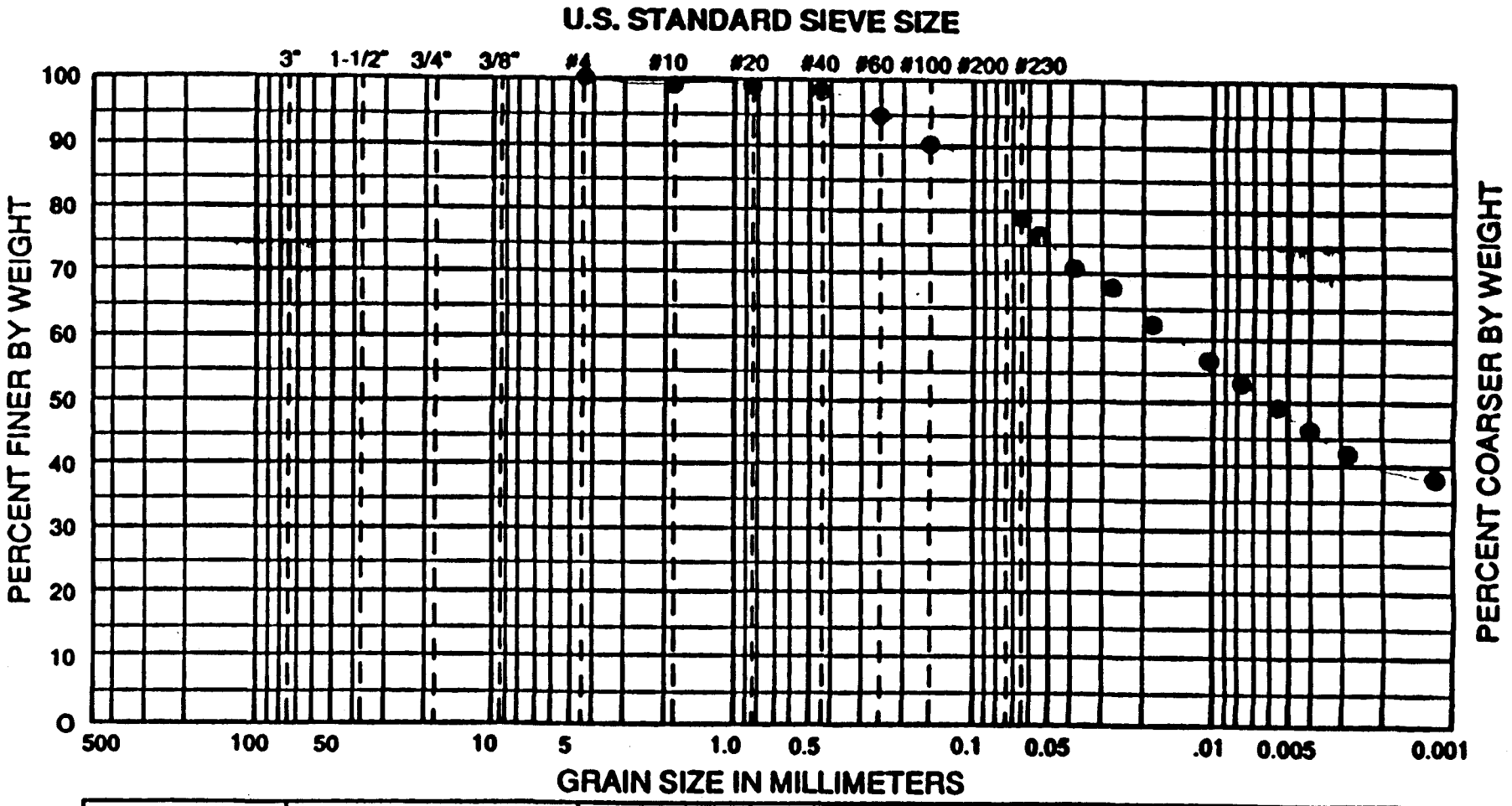
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	53.786
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	42.00	76.7	76.7	8.58	0.0538
1.0	44.00	39.00	71.2	71.2	9.07	0.0391
2.0	42.00	37.00	67.6	67.6	9.40	0.0281
5.0	39.00	34.00	62.1	62.1	9.89	0.0183
15.0	36.00	31.00	56.6	56.6	10.39	0.0108
30.0	34.00	29.00	52.9	52.9	10.71	0.0078
60.0	32.00	27.00	49.3	49.3	11.04	0.0056
120.0	30.00	25.00	45.6	45.6	11.37	0.0040
250.0	28.00	23.00	42.0	42.0	11.70	0.0028
1440.0	26.00	21.00	38.3	38.3	12.03	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+50 SAMPLE NO.: CH # 19 DATE: 4/17/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	31.5'	silty Clay (CL), w/ some sand, trace gravel .1% fine gvl / .2% c. sand, 1.7% med sd, 17% fine sand / 32.5% silt, 48.5% clay

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS/EG-16

BORING 5150 SAMPLE CH #19 DEPTH 31.5'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL g		
WT OF RINGS g	—	—
WT OF WET SOIL g		
FIELD DENSITY PCF		
DRY DENSITY PCF		

THIS IS AN 1/8-INCH THREAD

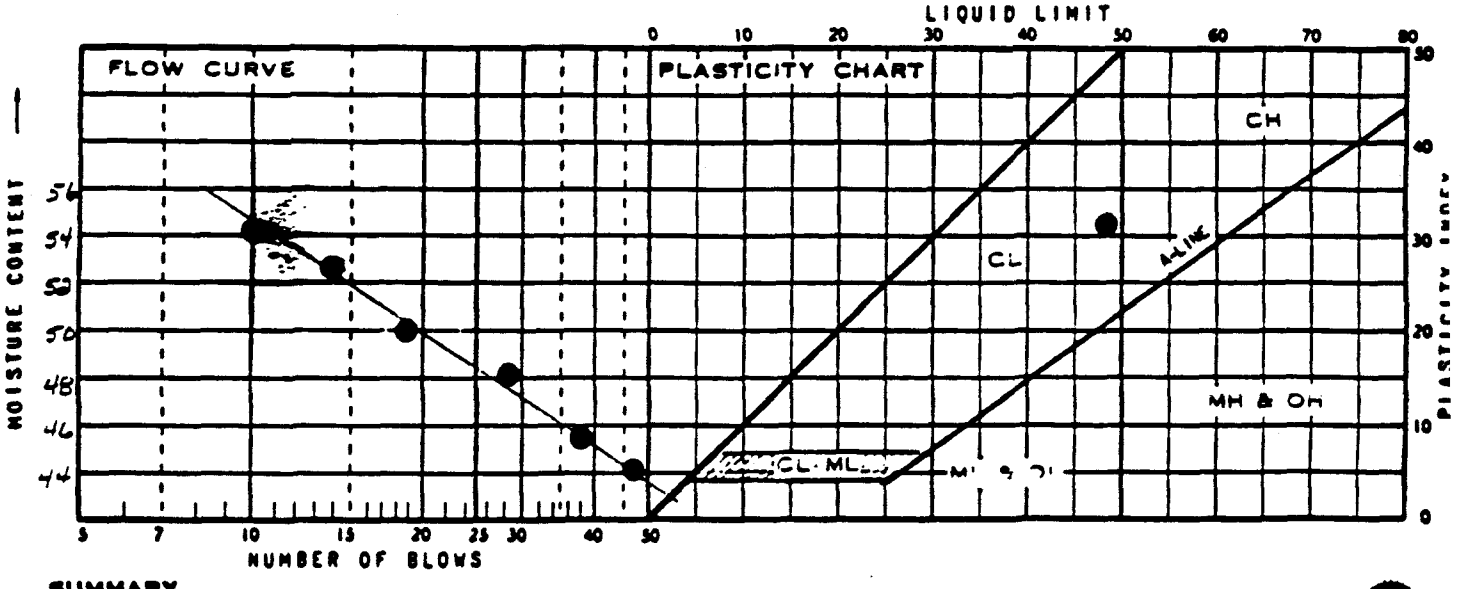
DETERMINATION	1	2
DISH g		
WT OF DISH + WET SOIL g		
WT OF DISH + DRY SOIL g	—	—
WT OF MOISTURE g		
WT OF DISH g	—	—
WT OF DRY SOIL g		
FIELD MOISTURE CONTENT %		

PLASTIC LIMIT BY SR 4/16/92

DETERMINATION	1	2	3	4	5	6
DISH	2039	P18	131			
WT OF DISH + WET SOIL g	4.72	5.58	6.21			
WT OF DISH + DRY SOIL g	4.21	4.94	5.47	—	—	—
WT OF MOISTURE g	.51	.64	.74			
WT OF DISH g	1.07	1.05	1.06	—	—	—
WT OF DRY SOIL g	3.14	3.89	4.41			
MOISTURE CONTENT %	16.2	16.5	16.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B3	46 C	2064	2034	32 C	2067
NUMBER OF BLOWS	47	38	29	19	14	10
WT OF DISH + WET SOIL g	14.25	13.55	14.34	14.88	13.92	15.15
WT OF DISH + DRY SOIL g	10.20	9.64	10.03	10.27	9.48	10.18
WT OF MOISTURE g	4.05	3.91	4.31	4.61	4.44	4.97
WT OF DISH g	1.04	1.06	1.08	1.06	1.06	1.04
WT OF DRY SOIL g	9.16	8.58	8.95	9.21	8.42	9.14
MOISTURE CONTENT %	44.2	45.6	48.2	50.1	52.7	54.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		48.5	16.5	32.0	CL	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	39'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	44.25
Wt. Dry Soil & Pan	(g)	43.35
Wt. Lost Moisture	(g)	0.90
Wt. of Pan Only	(g)	3.80
Wt. of Dry Soil	(g)	39.55
Moisture Content	%	2.3

Wt. Hydrom. Sample Wet (g)	55.10
Wt. Hydrom. Sample Dry (g)	53.87

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	675.64
Weight of + #10 Before Washing (g)	5.47
Weight of + #10 After Washing (g)	4.50
Weight of - #10 Wet (g)	670.17
Weight of - #10 Dry (g)	656.21
Wt. Total Sample Dry (g)	660.71
Calc. Wt. "W" (g)	54.24
Calc. Mass + #10	0.37

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.64	2.64	2.64	0.4	99.6
#4	0.00	0.21	0.21	2.85	0.4	99.6
#10	0.00	1.65	1.65	4.50	0.7	99.3
#20	1.55	1.86	0.31	0.31	1.3	98.7
#40	1.57	2.04	0.47	0.78	2.1	97.9
#60	1.56	2.12	0.56	1.34	3.2	96.8
#100	1.55	2.43	0.88	2.22	4.8	95.2
#230	1.31	3.46	2.15	4.37	8.7	91.3

Silty Clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	39'	DATE TESTED	04-15-92 TN
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

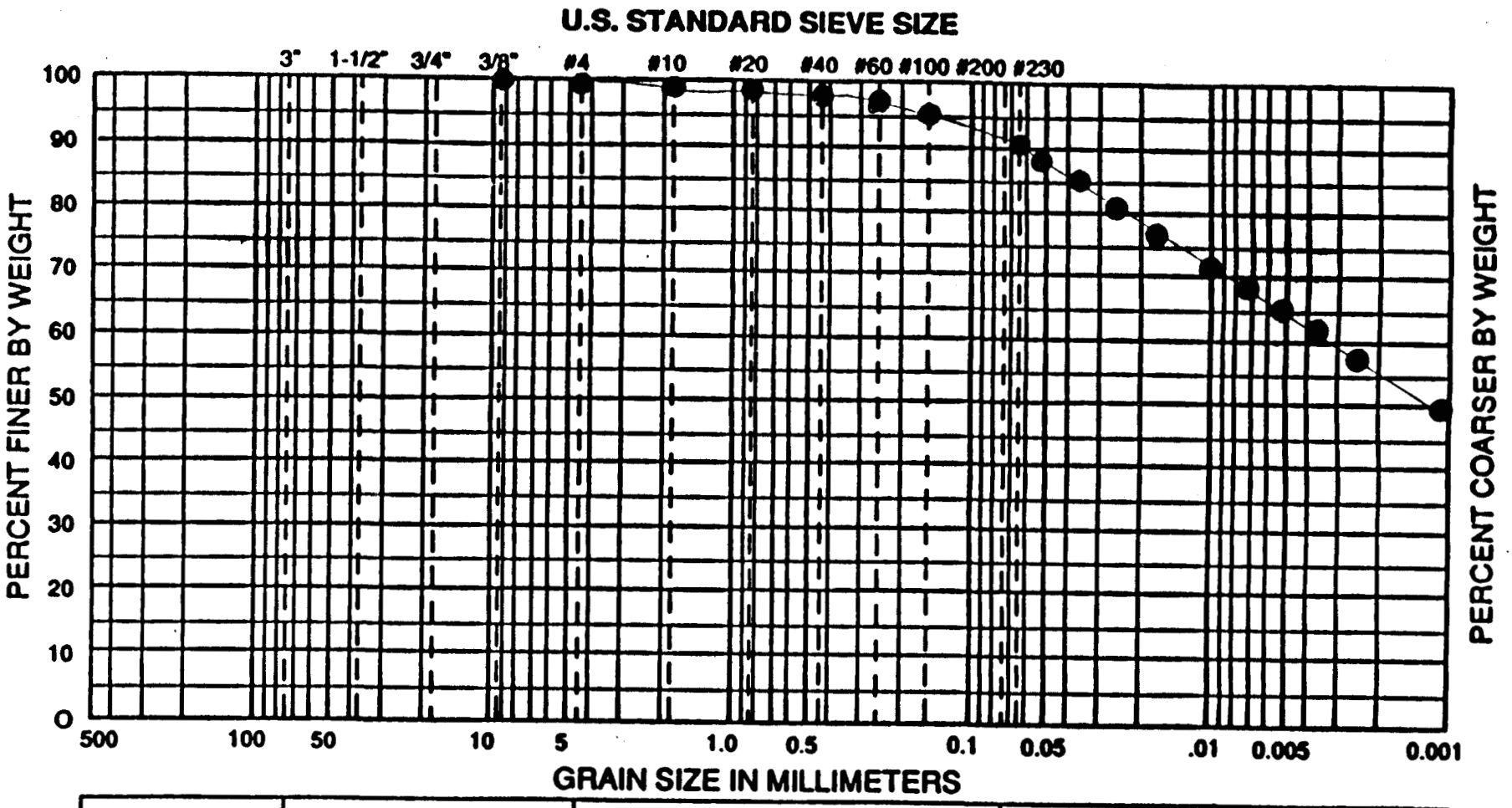
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	54.242
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	53.50	48.50	88.2	88.2	7.52	0.0506
1.0	51.50	46.50	84.5	84.5	7.84	0.0366
2.0	49.50	44.50	80.9	80.9	8.17	0.0264
5.0	47.50	42.50	77.3	77.3	8.50	0.0170
15.0	44.50	39.50	71.8	71.8	8.99	0.0101
30.0	42.50	37.50	68.2	68.2	9.32	0.0073
60.0	41.00	36.00	65.4	65.4	9.57	0.0052
120.0	39.00	34.00	61.8	61.8	9.89	0.0037
250.0	36.50	31.50	57.3	57.3	10.30	0.0026
1440.0	32.00	27.00	49.1	49.1	11.04	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+50 SAMPLE NO.: CH #19 DATE: 4/17/91 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	39'	Silty Clay (CH) with trace sand & gravel. .4% fine gvl / .3% c. sd, 1.4% med. sd, 5.9% fine sd / 27.1% silt, 64.9% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 5-50 SAMPLE CM #19 DEPTH 39'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

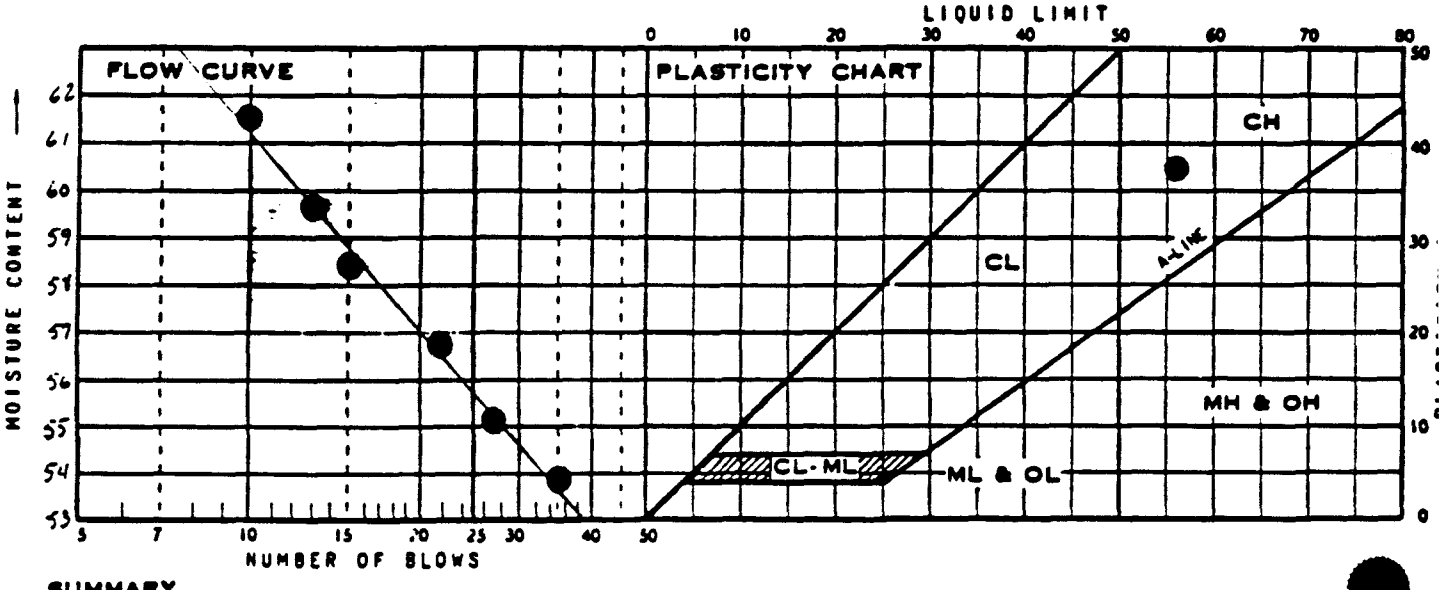
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DH 4/15/92

DETERMINATION	1	2	3	4	5	6
DISH	B58	2056	30C			
WT OF DISH + WET SOIL g	5.64g	5.82g	6.04g			
WT OF DISH + DRY SOIL g	4.95	5.04	5.27	—	—	—
WT OF MOISTURE g	.69	.78	.77			
WT OF DISH g	1.05	1.04	1.06	—	—	—
WT OF DRY SOIL g	3.90	4.00	4.21			
MOISTURE CONTENT %	17.7	19.5	18.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B57	18C	35CC	17C	4	B33
NUMBER OF BLOWS	35	27	22	15	13	10
WT OF DISH + WET SOIL g	12.15	11.55	11.32	11.65	11.48	12.2[illegible]
WT OF DISH + DRY SOIL g	8.26	7.82	7.60	7.74	7.58	7.97
WT OF MOISTURE g	3.89	3.73	3.72	3.91	3.90	4.27
WT OF DISH g	1.04	1.05	1.05	1.04	1.05	1.04
WT OF DRY SOIL g	7.22	6.77	6.55	6.70	6.53	6.93
MOISTURE CONTENT %	53.9	55.1	56.8	58.4	59.8	61.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		55.7	18.5	37.2	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	47'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	60.99
Wt. Dry Soil & Pan	(g)	59.53
Wt. Lost Moisture	(g)	1.46
Wt. of Pan Only	(g)	3.84
Wt. of Dry Soil	(g)	55.69
Moisture Content	%	2.6
Wt. Hydrom. Sample Wet	(g)	55.17
Wt. Hydrom. Sample Dry	(g)	53.76

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.17
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.17
Weight of - #10 Dry (g)	53.76
Wt. Total Sample Dry (g)	53.76
Calc. Wt. "W" (g)	53.76
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.84	0.28	0.28	0.5	99.5
#40	1.56	1.75	0.19	0.47	0.9	99.1
#60	1.56	1.72	0.16	0.63	1.2	98.8
#100	1.57	1.74	0.17	0.80	1.5	98.5
#230	1.57	3.96	2.39	3.19	5.9	94.1

Silty Clay (CL)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	47'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

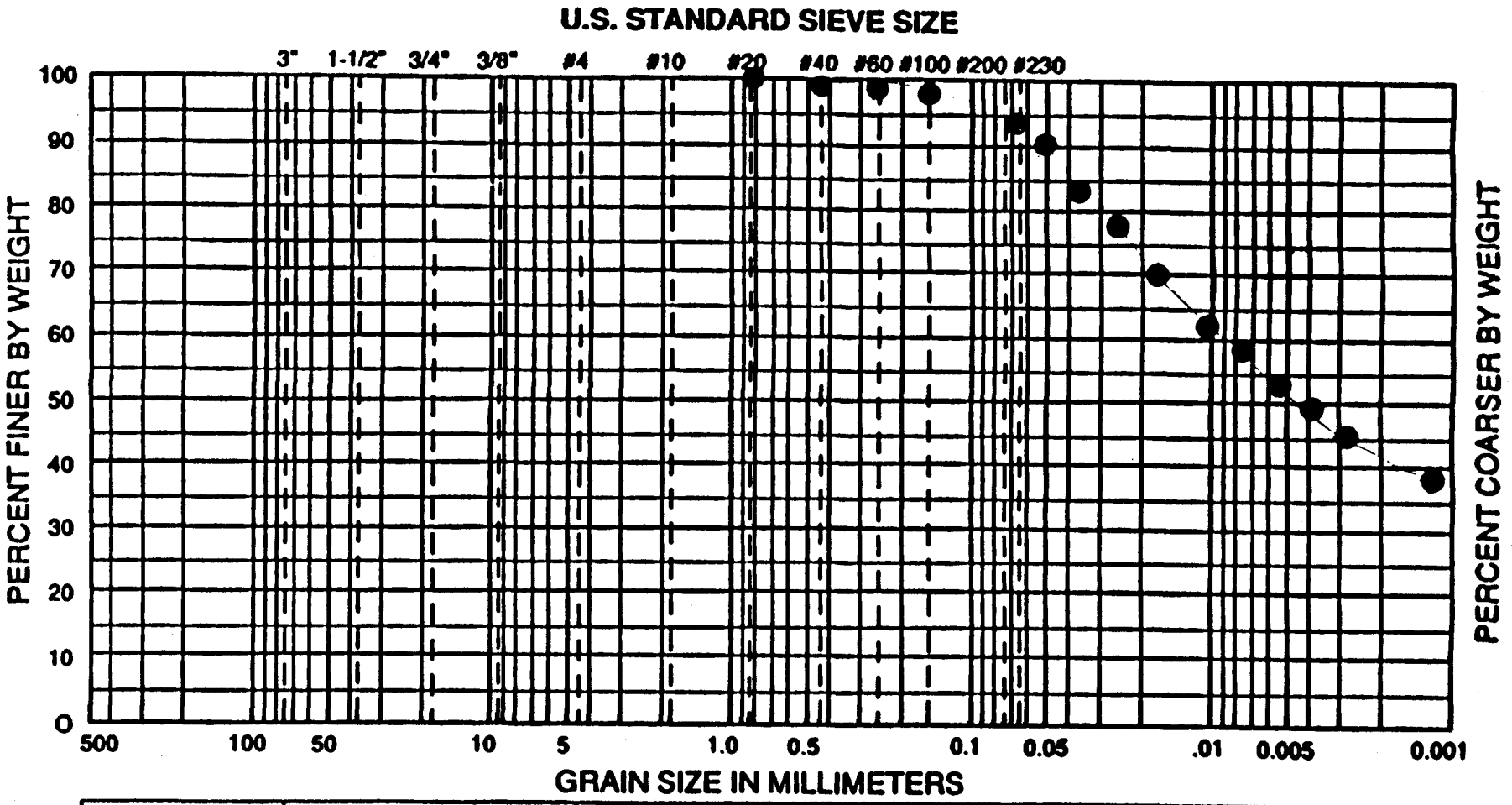
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	53.758
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	54.50	49.50	90.8	90.8	7.35	0.0500
1.0	50.00	45.00	82.5	82.5	8.09	0.0371
2.0	47.50	42.50	78.0	78.0	8.50	0.0269
5.0	43.00	38.00	69.7	69.7	9.24	0.0177
15.0	39.00	34.00	62.4	62.4	9.89	0.0106
30.0	37.00	32.00	58.7	58.7	10.22	0.0076
60.0	34.00	29.00	53.2	53.2	10.71	0.0055
120.0	32.50	27.50	50.4	50.4	10.96	0.0039
250.0	30.00	25.00	45.9	45.9	11.37	0.0028
1440.0	25.50	20.50	37.6	37.6	12.11	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+50 SAMPLE NO.: CH #19 DATE: 11/17.92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	47'	Silty Clay w/ trace sand .9% Medium sand, 4.1% fine sand 44% silt, 51% clay

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

CLIENT/OWNER Weston

LOCATION Rocky Flats / 20 & G

BORING 5t50 SAMPLE # 19 DEPTH 47.0

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

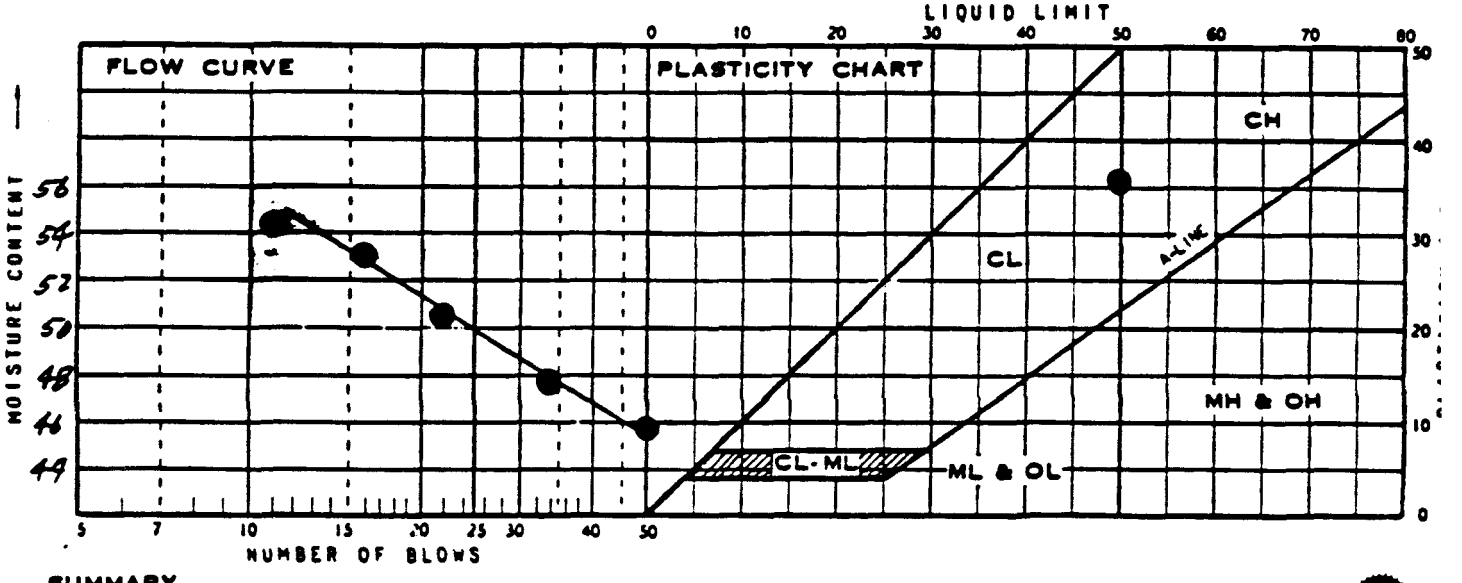
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ~~AA~~ 4/13/92

DETERMINATION	1	2	3	4	5	6
DISH	24C	B47	B21			
WT OF DISH + WET SOIL g	6.14	8.73	6.91			
WT OF DISH + DRY SOIL g	5.47	7.77	6.17	—	—	—
WT OF MOISTURE g	0.67	0.96	0.74			
WT OF DISH g	1.04	1.05	1.04	—	—	—
WT OF DRY SOIL g	4.43	6.72	5.13			
MOISTURE CONTENT %	15.1	14.3	14.4	= 28.7/2 = 14.4		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B24	2002	B50	31C	28C	
NUMBER OF BLOWS	50 -	34	22	16	11	
WT OF DISH + WET SOIL g	10.38	10.67	11.68	12.27	14.43	
WT OF DISH + DRY SOIL g	7.45	7.56	8.10	8.38	9.72	—
WT OF MOISTURE g	2.93	3.11	3.58	3.89	4.71	
WT OF DISH g	1.02	1.06	1.03	1.05	1.05	—
WT OF DRY SOIL g	6.43	6.50	7.07	7.33	8.67	
MOISTURE CONTENT %	45.6	47.8	50.6	53.1	54.3	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		49.9	14.4	35.5	CL	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	56.3'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	37.08
Wt. Dry Soil & Pan	(g)	35.84
Wt. Lost Moisture	(g)	1.24
Wt. of Pan Only	(g)	3.66
Wt. of Dry Soil	(g)	32.18
Moisture Content	%	3.9
Wt. Hydrom. Sample Wet	(g)	54.98
Wt. Hydrom. Sample Dry	(g)	52.94

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	54.98
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	54.98
Weight of - #10 Dry (g)	52.94
Wt. Total Sample Dry (g)	52.94
Calc. Wt. "W" (g)	52.94
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.60	0.05	0.05	0.1	99.9
#40	1.56	1.68	0.12	0.17	0.3	99.7
#60	1.55	1.64	0.09	0.26	0.5	99.5
#100	1.55	1.67	0.12	0.38	0.7	99.3
#230	1.56	1.75	0.19	0.57	1.1	98.9

Clayey

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	5+50	SAMPLED	Rocky Flats
DEPTH	56.3'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

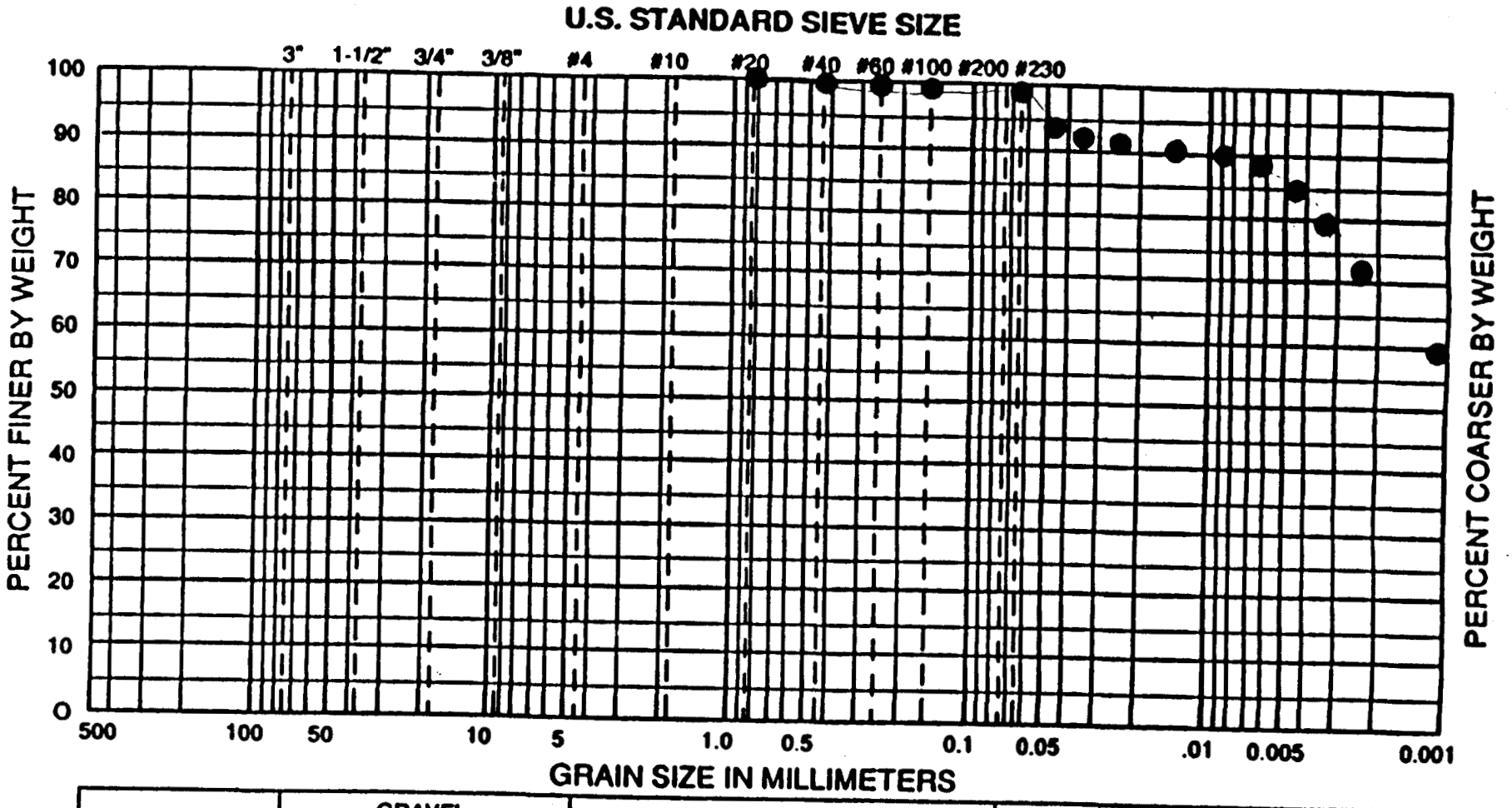
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01275
Value of "a"	0.98	Wt. Dry Sample "W"	52.941
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.50	50.50	93.3	93.3	7.02	0.0478
1.0	56.00	50.00	92.4	92.4	7.11	0.0340
2.0	56.00	50.00	92.4	92.4	7.11	0.0240
5.0	55.75	49.75	91.9	91.9	7.15	0.0152
15.0	54.50	48.50	89.6	89.6	7.35	0.0089
30.0	54.00	48.00	88.7	88.7	7.43	0.0063
60.0	52.00	46.00	85.0	85.0	7.76	0.0046
120.0	48.50	42.50	78.5	78.5	8.34	0.0034
250.0	45.00	39.00	72.0	72.0	8.91	0.0024
1440.0	38.00	32.00	59.1	59.1	10.06	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 5+50 SAMPLE NO.: CH #19 DATE: 4/17/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	56.3'	Claystone with some silt trace sand .3% medium sand, .8% fine sand 12.6% silt, 86% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 5-50 SAMPLE CU #19 DEPTH 56.3'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

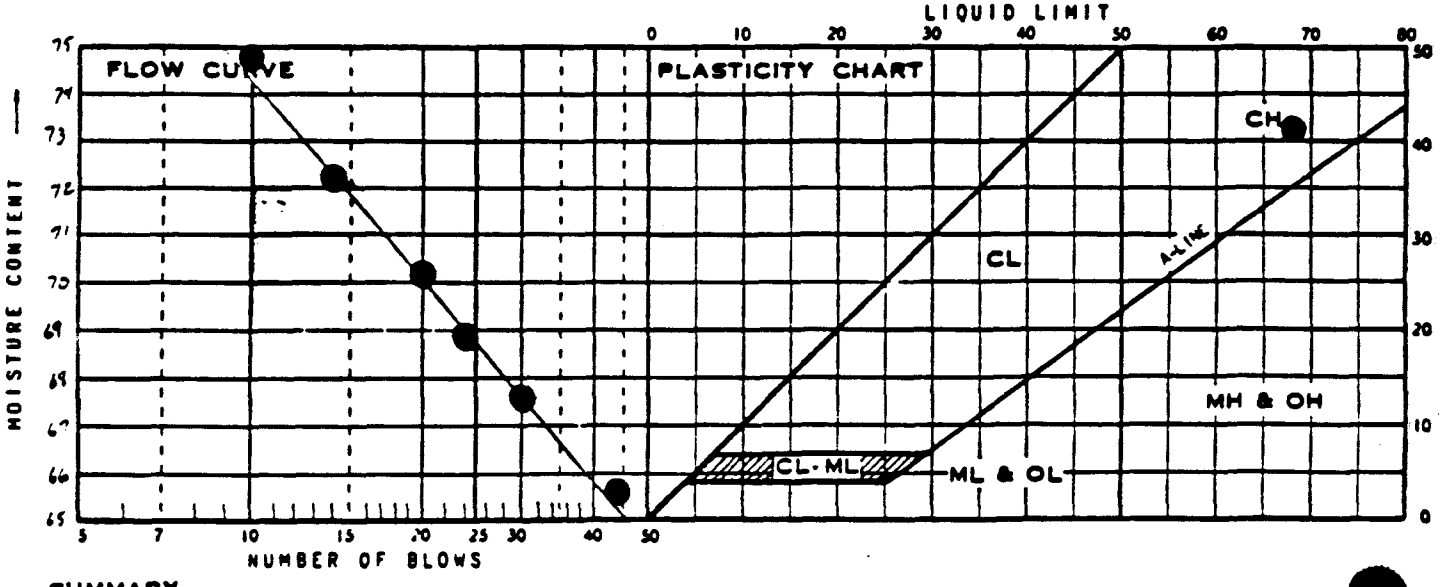
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/15/92

DETERMINATION	1	2	3	4	5	6
DISH	2057	376	2004			
WT OF DISH + WET SOIL g	5.55	5.48	4.75			
WT OF DISH + DRY SOIL g	4.72	4.65	4.08	—	—	—
WT OF MOISTURE g	.83	.83	.67			
WT OF DISH g	1.06	1.07	1.05	—	—	—
WT OF DRY SOIL g	3.66	3.58	3.03			
MOISTURE CONTENT %	22.7	23.2	22.1			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2021	B4	2001	34C*	815	22
NUMBER OF BLOWS	44	30	24	20	14	10
WT OF DISH + WET SOIL g	11.94	10.92	11.83	11.88	11.33	11.12
WT OF DISH + DRY SOIL g	7.63	6.94	7.44	7.41	7.01	6.81
WT OF MOISTURE g	4.31	3.98	4.39	4.47	4.32	4.31
WT OF DISH g	1.06	1.05	1.06	1.04	1.03	1.05
WT OF DRY SOIL g	6.57	5.89	6.38	6.37	5.98	5.76
MOISTURE CONTENT %	65.6	67.6	68.9	70.2	72.2	74.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		68.7	22.7	46.0	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	18'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	33.38
Wt. Dry Soil & Pan	(g)	32.67
Wt. Lost Moisture	(g)	0.71
Wt. of Pan Only	(g)	3.71
Wt. of Dry Soil	(g)	28.96
Moisture Content	%	2.5

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.70

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	376.11
Weight of + #10 Before Washing (g)	2.74
Weight of + #10 After Washing (g)	2.10
Weight of - #10 Wet (g)	373.37
Weight of - #10 Dry (g)	365.06
Wt. Total Sample Dry (g)	367.16
Calc. Wt. "W" (g)	54.01
Calc. Mass + #10	0.31

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.61	0.61	0.61	0.2	99.8
#10	0.00	1.49	1.49	2.10	0.6	99.4
#20	1.56	2.38	0.82	0.82	2.1	97.9
#40	1.55	2.96	1.41	2.23	4.7	95.3
#60	1.55	3.24	1.69	3.92	7.8	92.2
#100	1.56	4.02	2.46	6.38	12.4	87.6
#230	1.56	5.96	4.40	10.78	20.5	79.5

CLAY (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	18'	DATE TESTED	04-14-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

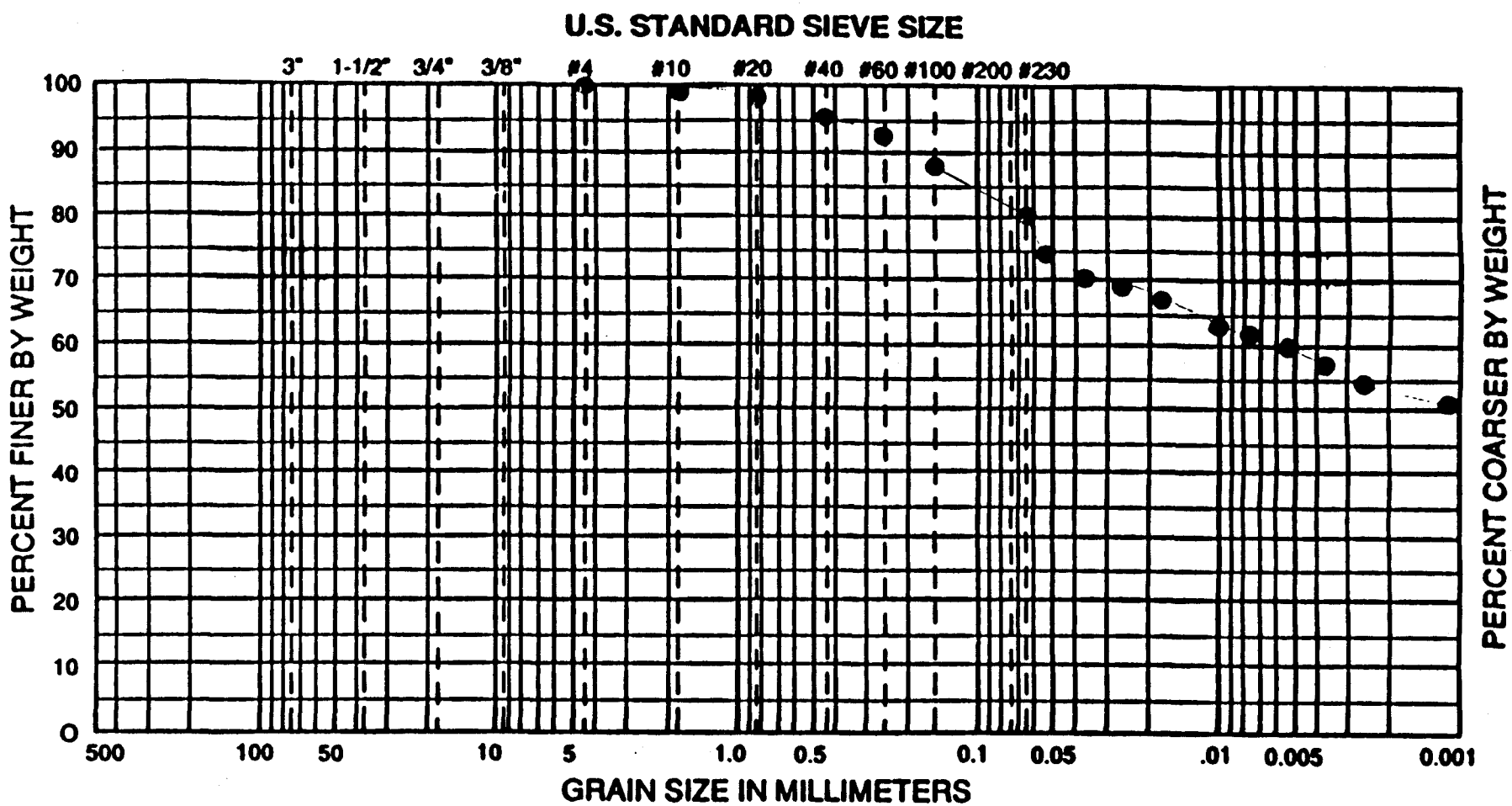
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01293
Value of "a"	0.99	Wt. Dry Sample "W"	54.010
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.50	40.50	74.1	74.1	8.66	0.0538
1.0	44.50	38.50	70.4	70.4	8.99	0.0388
2.0	44.00	38.00	69.5	69.5	9.07	0.0275
5.0	42.50	36.50	66.8	66.8	9.32	0.0177
15.0	40.25	34.25	62.7	62.7	9.69	0.0104
30.0	40.00	34.00	62.2	62.2	9.73	0.0074
60.0	39.00	33.00	60.4	60.4	9.89	0.0053
120.0	37.00	31.00	56.7	56.7	10.22	0.0038
250.0	35.50	29.50	54.0	54.0	10.47	0.0026
1440.0	34.00	28.00	51.2	51.2	10.71	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+00 SAMPLE NO.: CH #19 DATE: 4/17/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	18'	Clay (CH) w/ [illegible] sand & silt, trace gravel .2% fine gravel / .4% c. sand 4.1% [illegible] / 13.[illegible] fine sand / 23.[illegible] silt, [illegible] clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 6400 SAMPLE CH #19 DEPTH 18.0'

FIELD DENSITY BY - - - - - / - / - -

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

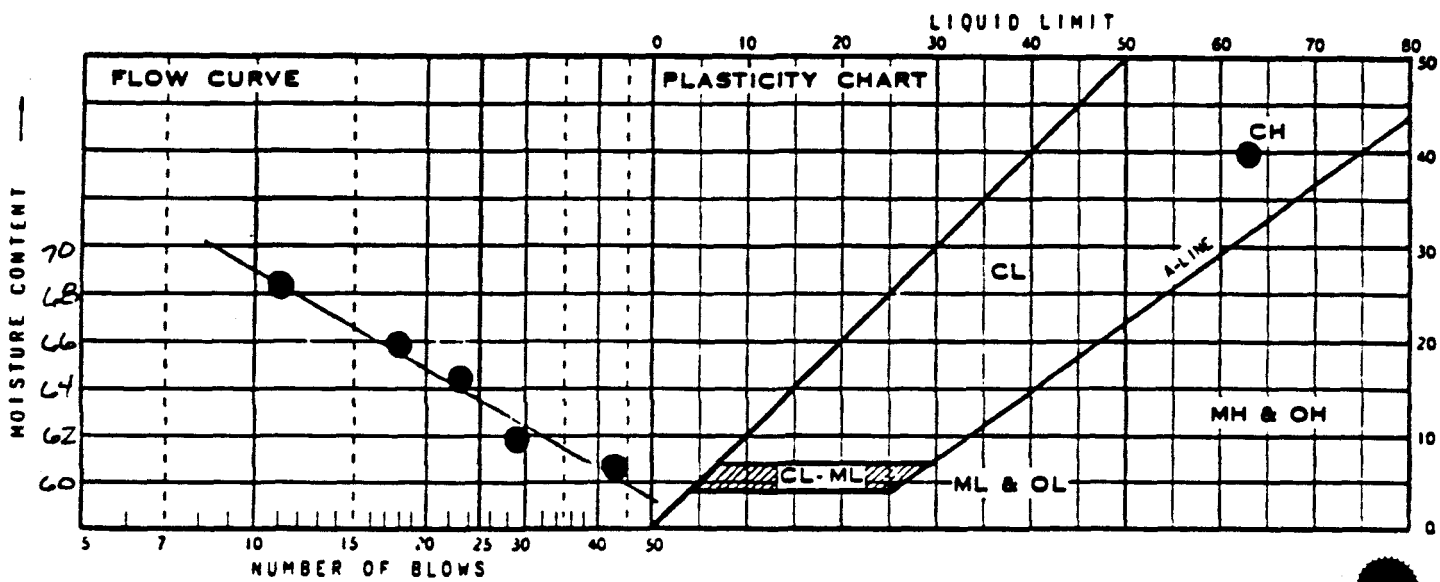
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 4/13/92

DETERMINATION	1	2	3	4	5	6
DISH	2015	2006	36 C			
WT OF DISH + WET SOIL g	4.46	5.02	5.31			
WT OF DISH + DRY SOIL g	3.80	4.26	4.52	—	—	—
WT OF MOISTURE g	.66	.76	.79			
WT OF DISH g	1.03	1.05	1.08	—	—	—
WT OF DRY SOIL g	2.77	3.21	3.44			
MOISTURE CONTENT %	23.8	23.7	23.0	Ave 2		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2054	R18	46C	37C	30C	
NUMBER OF BLOWS	43	29	23	18	11	
WT OF DISH + WET SOIL g	13.64	12.79	12.08	14.45	11.21	
WT OF DISH + DRY SOIL g	8.87	8.30	7.77	9.12	7.09	—
WT OF MOISTURE g	4.75	4.49	4.31	5.33	4.12	
WT OF DISH g	1.05	1.04	1.06	1.03	1.06	—
WT OF DRY SOIL g	7.84	7.26	6.71	8.09	6.03	
MOISTURE CONTENT %	60.6	61.9	64.2	65.9	68.3	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		63.7	23.5	40.0	CH	

ADVANCED TERRA TESTING

RDM

V

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	24'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	33.70
Wt. Dry Soil & Pan	(g)	33.11
Wt. Lost Moisture	(g)	0.59
Wt. of Pan Only	(g)	3.57
Wt. of Dry Soil	(g)	29.54
Moisture Content	%	2.0
Wt. Hydrom. Sample Wet	(g)	55.01
Wt. Hydrom. Sample Dry	(g)	53.93

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	459.09
Weight of + #10 Before Washing (g)	4.20
Weight of + #10 After Washing (g)	3.73
Weight of - #10 Wet (g)	454.89
Weight of - #10 Dry (g)	446.44
Wt. Total Sample Dry (g)	450.17
Calc. Wt. "W" (g)	54.39
Calc. Mass + #10	0.45

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.97	0.97	0.97	0.2	99.8
#10	0.00	2.76	2.76	3.73	0.8	99.2
#20	1.56	1.82	0.26	0.26	1.3	98.7
#40	1.57	2.71	1.14	1.40	3.4	96.6
#60	1.55	3.53	1.98	3.38	7.0	93.0
#100	1.57	5.44	3.87	7.25	14.2	85.8
#230	1.31	8.69	7.38	14.63	27.7	72.3

Silty Clay (CL)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	24'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

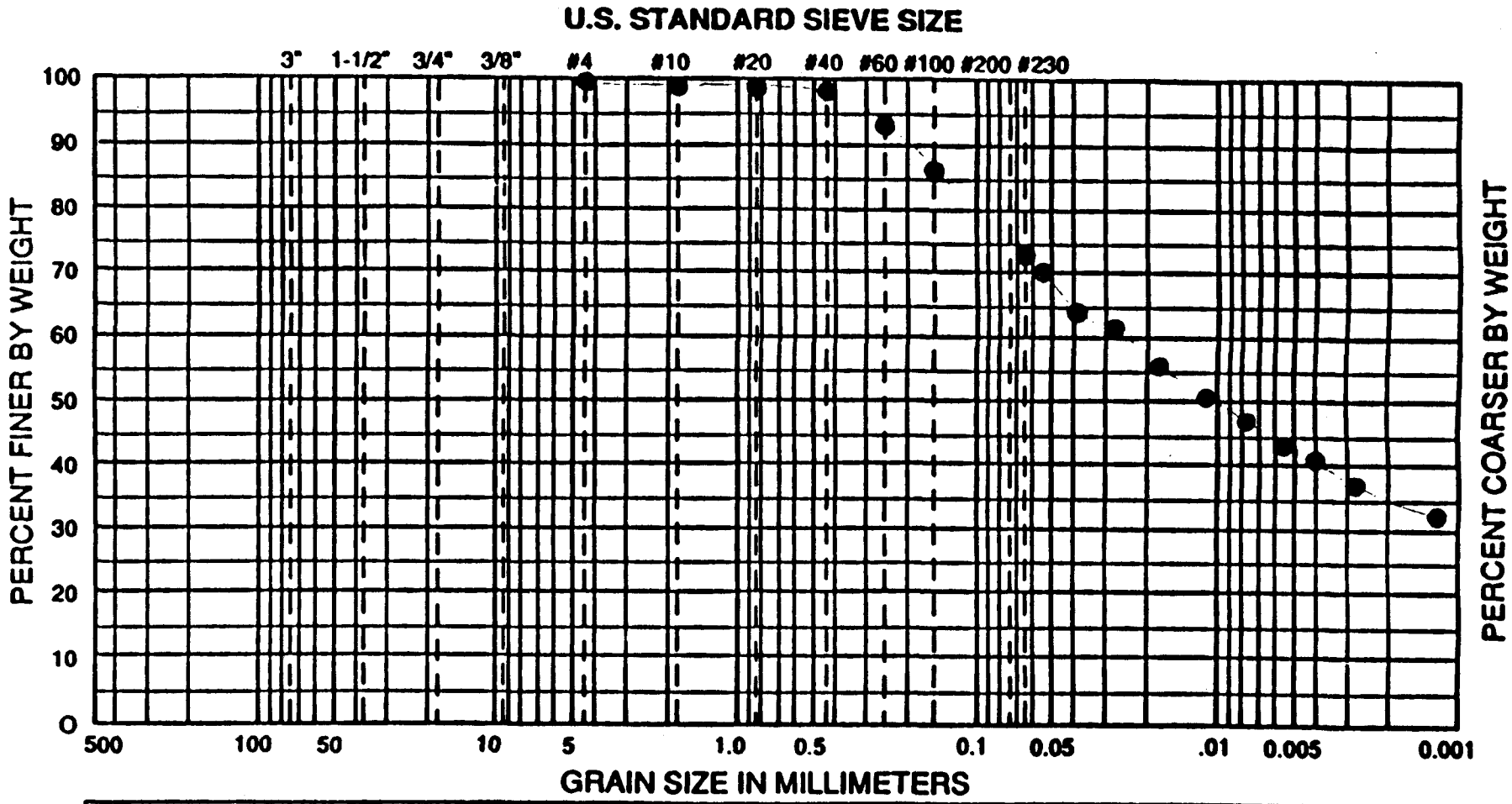
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	54.385
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.00	39.00	70.0	70.0	9.07	0.0548
1.0	41.00	36.00	64.6	64.6	9.57	0.0398
2.0	39.00	34.00	61.0	61.0	9.89	0.0286
5.0	36.00	31.00	55.6	55.6	10.39	0.0185
15.0	33.00	28.00	50.2	50.2	10.88	0.0110
30.0	31.00	26.00	46.7	46.7	11.21	0.0079
60.0	29.50	24.50	44.0	44.0	11.45	0.0056
120.0	27.50	22.50	40.4	40.4	11.78	0.0040
250.0	25.50	20.50	36.8	36.8	12.11	0.0028
1440.0	23.50	18.50	33.2	33.2	12.44	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+00 SAMPLE NO.: CH #19 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	24.0'	SILTY CLAY (CL) w/ some sand, trace gravel. .2% fine gvl, .6% C sd, 2.6% med sd, 21.6 fine sd / 32.5% silt, 42.5 [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 6+00 SAMPLE #19 DEPTH @ 24.6

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

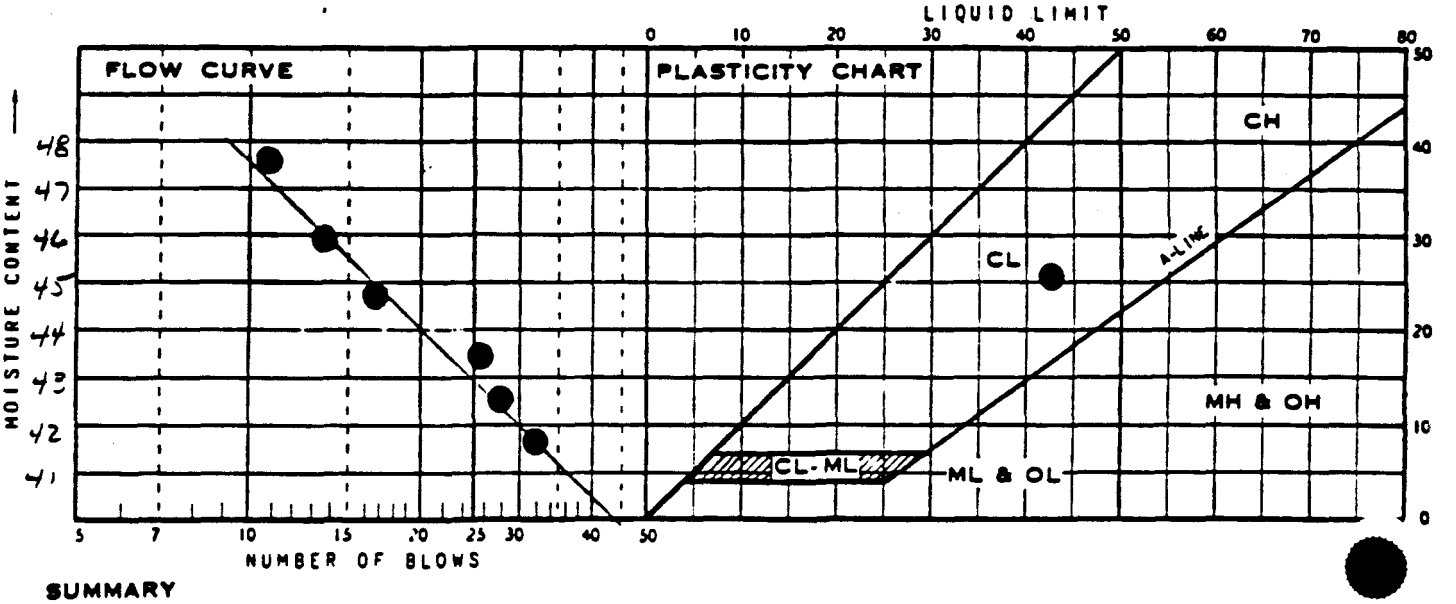
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/16/92

DETERMINATION	1	2	3	4	5	6
DISH	2006	25C	B32			
WT OF DISH + WET SOIL g	6.15	6.63	5.76			
WT OF DISH + DRY SOIL g	5.41	5.83	5.09	—	—	—
WT OF MOISTURE g	.74	.80	.67			
WT OF DISH g	1.05	1.06	1.03	—	—	—
WT OF DRY SOIL g	4.36	4.77	4.06			
MOISTURE CONTENT %	17.0	16.8	16.5			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	10C	27C	37C	B36	2072	36C
NUMBER OF BLOWS	32	28	26	17	14	11[illegible]
WT OF DISH + WET SOIL g	17.42	18.95	17.03	16.51	16.24	20.6[illegible]
WT OF DISH + DRY SOIL g	12.61	13.61	12.19	11.73	11.46	14.32
WT OF MOISTURE g	4.81	5.34	4.84	4.78	4.78	6.34
WT OF DISH g	1.06	1.06	1.05	1.05	1.04	1.04
WT OF DRY SOIL g	11.55	12.55	11.14	10.68	10.42	13.28
MOISTURE CONTENT %	41.7	42.6	43.5	44.8	45.9	47.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		42.9	16.8	26.1	CL	

ADVANCED TERRA TESTING

R.N.

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	26'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	37.55
Wt. Dry Soil & Pan	(g)	36.49
Wt. Lost Moisture	(g)	1.06
Wt. of Pan Only	(g)	3.79
Wt. of Dry Soil	(g)	32.70
Moisture Content	%	3.2

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	53.28

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	445.65
Weight of + #10 Before Washing (g)	13.98
Weight of + #10 After Washing (g)	8.71
Weight of - #10 Wet (g)	431.67
Weight of - #10 Dry (g)	423.22
Wt. Total Sample Dry (g)	431.93
Calc. Wt. "W" (g)	54.38
Calc. Mass + #10	1.10

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	3.26	3.26	3.26	0.8	99.2
#4	0.00	2.60	2.60	5.86	1.4	98.6
#10	0.00	2.85	2.85	8.71	2.0	98.0
#20	1.57	2.24	0.67	0.67	3.2	96.8
#40	1.56	2.20	0.64	1.31	4.4	95.6
#60	1.56	2.22	0.66	1.97	5.6	94.4
#100	1.56	2.45	0.89	2.86	7.3	92.7
#230	1.56	3.28	1.72	4.58	10.4	89.6

Clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	26'	DATE TESTED	04-15-92 TN
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

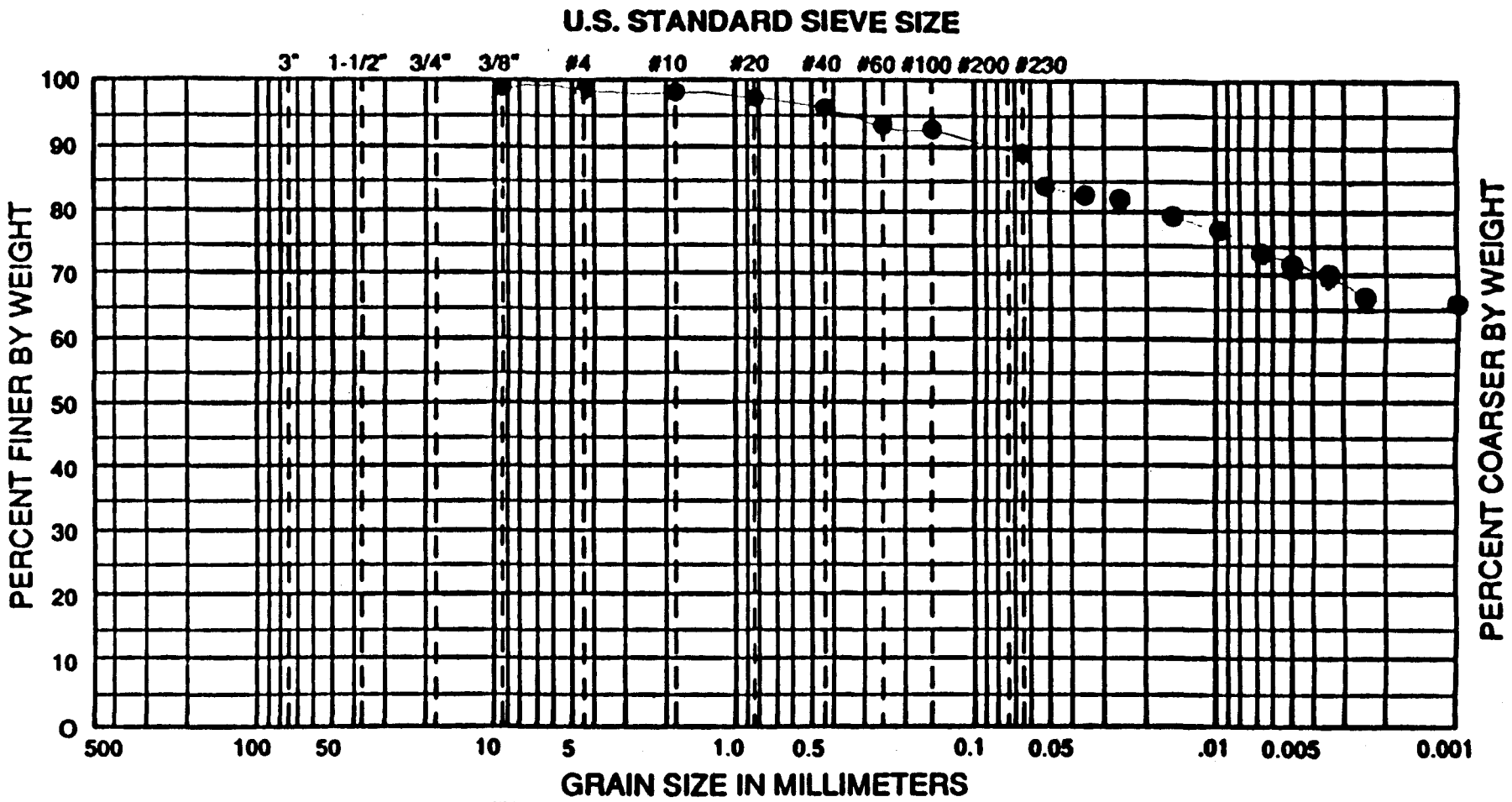
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	54.380
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	52.00	47.00	84.4	84.4	7.76	0.0507
1.0	51.00	46.00	82.6	82.6	7.93	0.0362
2.0	50.50	45.50	81.7	81.7	8.01	0.0258
5.0	49.50	44.50	79.9	79.9	8.17	0.0165
15.0	48.00	43.00	77.2	77.2	8.42	0.0096
30.0	46.50	41.50	74.5	74.5	8.66	0.0069
60.0	45.00	40.00	71.8	71.8	8.91	0.0050
120.0	44.00	39.00	70.0	70.0	9.07	0.0035
250.0	42.00	37.00	66.4	66.4	9.40	0.0025
1440.0	41.50	36.50	65.5	65.5	9.48	0.0010

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+00 SAMPLE NO.: CH #19 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	26.0'	Clay with some silt, trace sand & gvl. 1.4% fine gvl / .6% c. sd, 2.4% med sd, 5.6% f sd / 17% silt, 73% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats / E646

BORING 6406 SAMPLE E19 DEPTH 26.0'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

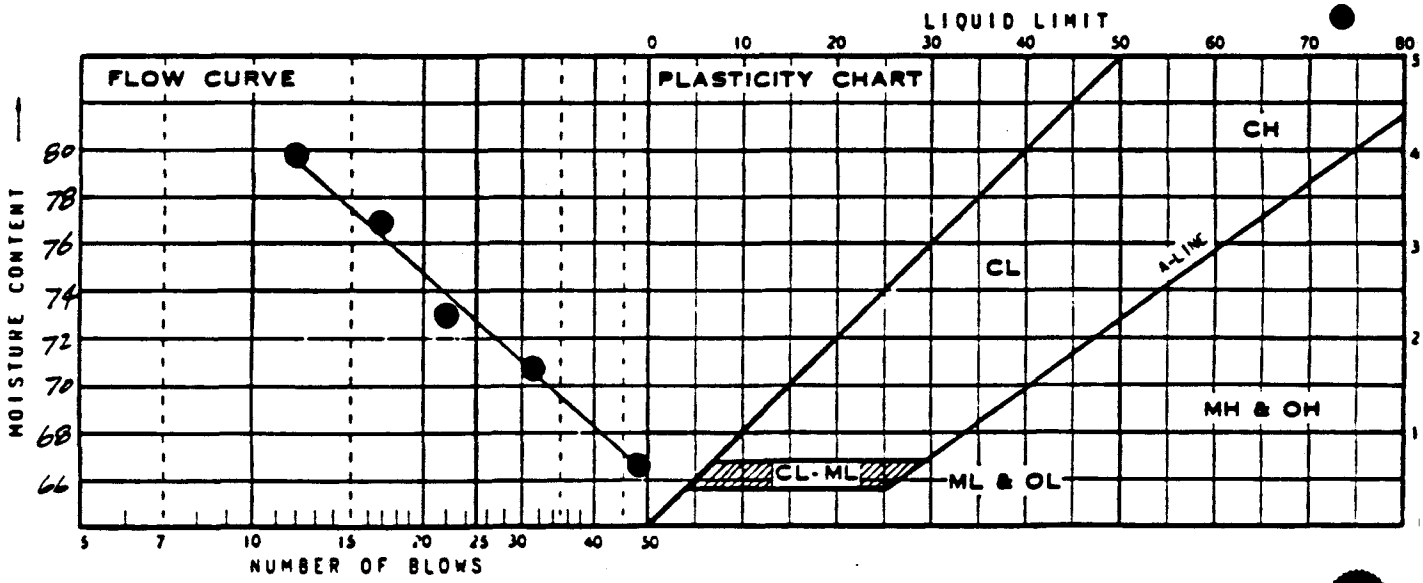
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/13/92

DETERMINATION	1	2	3	4	5	6
DISH	20C	2027	B38+			
WT OF DISH + WET SOIL g	7.87	4.67	5.98			
WT OF DISH + DRY SOIL g	6.83	4.02	5.20	—	—	—
WT OF MOISTURE g	1.04	0.55	0.78			
WT OF DISH g	1.06	1.05	1.05	—	—	—
WT OF DRY SOIL g	5.77	3.02	4.15			
MOISTURE CONTENT %	18.0	18.2	18.8	= 55.0/3 =	18.3	

LIQUID LIMIT ?

DETERMINATION	1	2	3	4	5	6
DISH	2033	1338	3068	2029	2032	
NUMBER OF BLOWS	48	31	22	17	12	
WT OF DISH + WET SOIL g	12.45+	11.83	10.49	8.25	9.14	
WT OF DISH + DRY SOIL g	7.89	7.36	6.51	5.12	5.55	—
WT OF MOISTURE g	4.56	4.47	3.98	3.13	3.59	
WT OF DISH g	1.04	1.04	1.06	1.05	1.05	—
WT OF DRY SOIL g	6.85	6.32	5.45	4.07	4.50	
MOISTURE CONTENT %	66.6	70.7	73.0	76.9	79.8	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		72.7	18.3	54.4	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	41'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	31.52
Wt. Dry Soil & Pan	(g)	30.89
Wt. Lost Moisture	(g)	0.63
Wt. of Pan Only	(g)	3.59
Wt. of Dry Soil	(g)	27.30
Moisture Content	%	2.3

Wt. Hydrom. Sample Wet (g)	55.00
Wt. Hydrom. Sample Dry (g)	53.76

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	480.42
Weight of + #10 Before Washing (g)	21.53
Weight of + #10 After Washing (g)	16.20
Weight of - #10 Wet (g)	458.89
Weight of - #10 Dry (g)	453.75
Wt. Total Sample Dry (g)	469.95
Calc. Wt. "W" (g)	55.68
Calc. Mass + #10	1.92

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.56	2.56	2.56	0.5	99.5
#4	0.00	6.81	6.81	9.37	2.0	98.0
#10	0.00	6.83	6.83	16.20	3.4	96.6
#20	1.54	2.41	0.87	0.87	5.0	95.0
#40	1.57	2.79	1.22	2.09	7.2	92.8
#60	1.56	3.02	1.46	3.55	9.8	90.2
#100	1.30	3.47	2.17	5.72	13.7	86.3
#230	1.56	5.65	4.09	9.81	21.1	78.9

Clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	6+00	SAMPLED	Rocky Flats
DEPTH	41'	DATE TESTED	04-15-92 TNU
SAMPLE NO.	#19	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

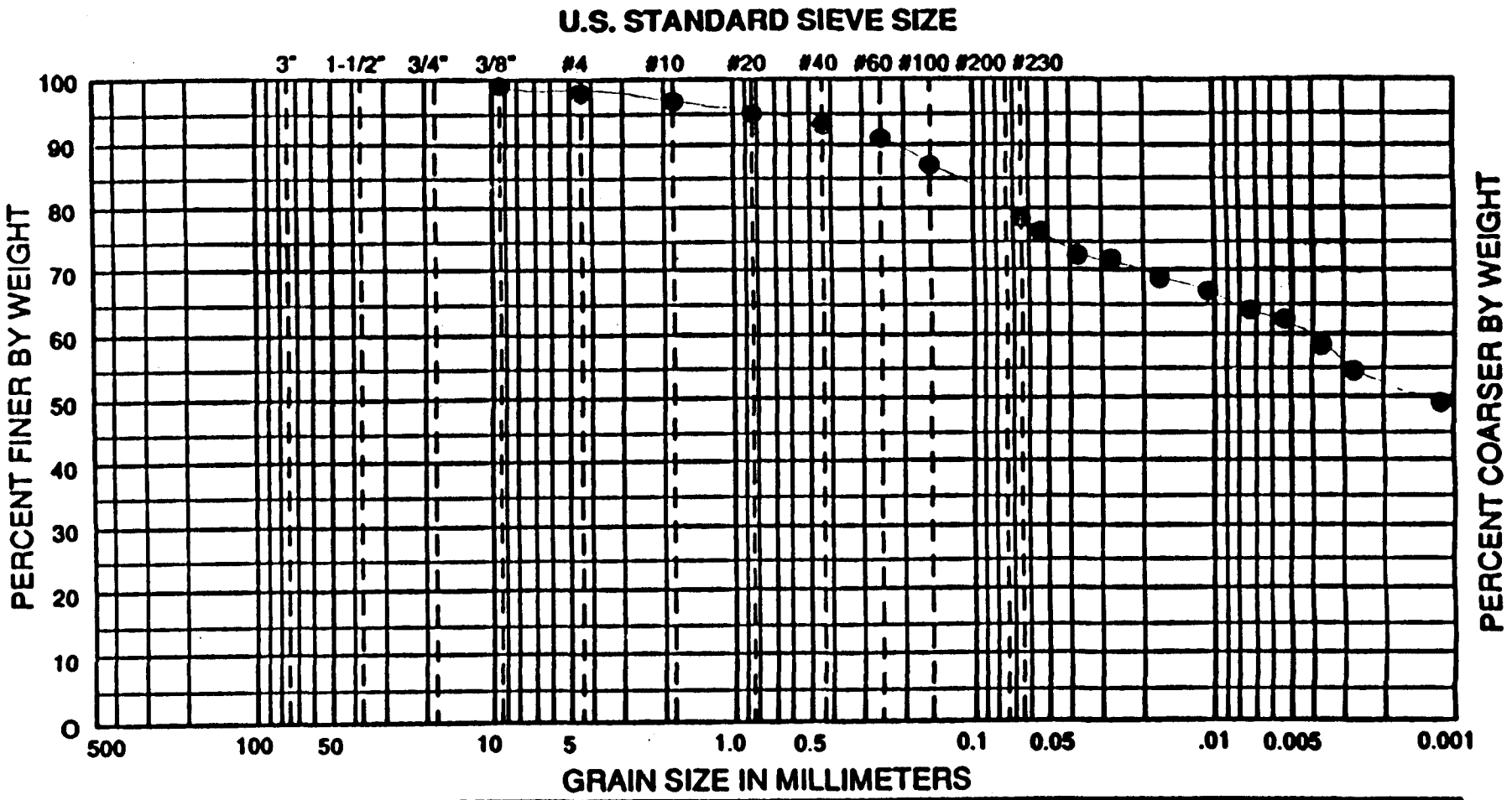
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	55.680
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.00	43.00	76.1	76.1	8.42	0.0535
1.0	46.00	41.00	72.6	72.6	8.75	0.0386
2.0	45.50	40.50	71.7	71.7	8.83	0.0274
5.0	44.00	39.00	69.1	69.1	9.07	0.0176
15.0	42.50	37.50	66.4	66.4	9.32	0.0103
30.0	41.50	36.50	64.6	64.6	9.48	0.0073
60.0	40.00	35.00	62.0	62.0	9.73	0.0053
120.0	38.00	33.00	58.4	58.4	10.06	0.0038
250.0	36.00	31.00	54.9	54.9	10.39	0.0027
1440.0	33.00	28.00	49.6	49.6	10.88	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+00 SAMPLE NO.: CH # 17 DATE: 4-17-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	41.0'	Clay (CH) with some sand and silt, tr gravel [illegible] fine gravel/1.4% C sd, 3.8% med sd, 12.6% fine sd/17.5% silt, 62.5% Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats / EG&G
BORING 6108 SAMPLE #19 DEPTH @ 40'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

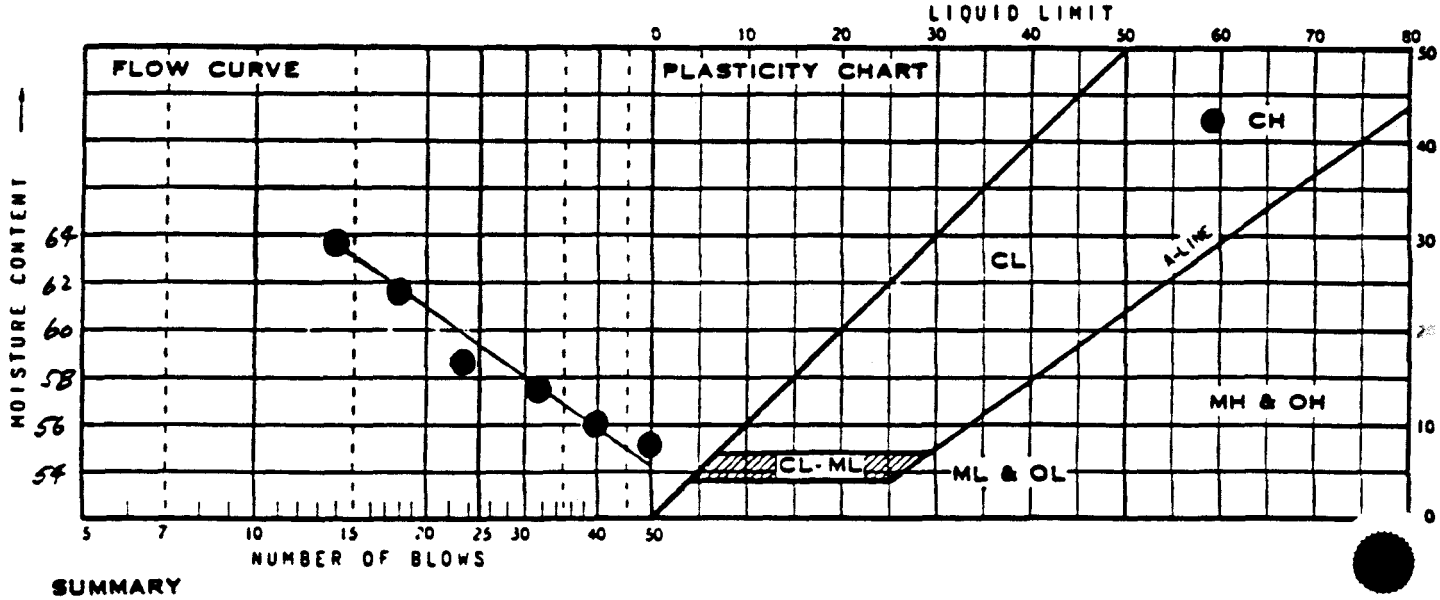
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 4/15/92

DETERMINATION	1	2	3	4	5	6
DISH	B30	2042	32CX			
WT OF DISH + WET SOIL g	6.64	6.70	6.57			
WT OF DISH + DRY SOIL g	5.81	5.86	5.78	—	—	—
WT OF MOISTURE g	0.83	0.84	0.79			
WT OF DISH g	1.03	1.06	1.03	—	—	—
WT OF DRY SOIL g	4.78	4.80	4.75			
MOISTURE CONTENT %	17.4	17.5	16.6	51.5/3 =	17.2	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B42	2032	2029	2033	2027	B38
NUMBER OF BLOWS	50	40	32	23	18	1[illegible]
WT OF DISH + WET SOIL g	10.37	11.55	10.61	10.44	9.88	11.46
WT OF DISH + DRY SOIL g	7.05	7.78	7.12	6.97	6.51	7.42
WT OF MOISTURE g	3.32	3.77	3.49	3.47	3.37	4.06
WT OF DISH g	1.03	1.05	1.05	1.04	1.05	1.05
WT OF DRY SOIL g	6.02	6.73	6.07	5.93	5.46	6.37
MOISTURE CONTENT %	55.2	56.0	57.5	58.5	61.7	63.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		59.4	17.2	42.2	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	6+25	SAMPLED	Rocky Flats
DEPTH	24.0'	DATE TESTED	03-24-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	63.54
Wt. Dry Soil & Pan	(g)	62.40
Wt. Lost Moisture	(g)	1.14
Wt. of Pan Only	(g)	3.70
Wt. of Dry Soil	(g)	58.70
Moisture Content	%	1.9
Wt. Hydrom. Sample Wet	(g)	55.05
Wt. Hydrom. Sample Dry	(g)	54.00

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.05
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.05
Weight of - #10 Dry (g)	54.00
Wt. Total Sample Dry (g)	54.00
Calc. Wt. "W" (g)	54.00
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.80	0.25	0.25	0.5	99.5
#40	1.56	2.38	0.82	1.07	2.0	98.0
#60	1.57	3.03	1.46	2.53	4.7	95.3
#100	1.56	4.66	3.10	5.63	10.4	89.6
#230	1.55	8.06	6.51	12.14	22.5	77.5

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	6+25	SAMPLED	Rocky Flats
DEPTH	24.0'	DATE TESTED	03-24-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

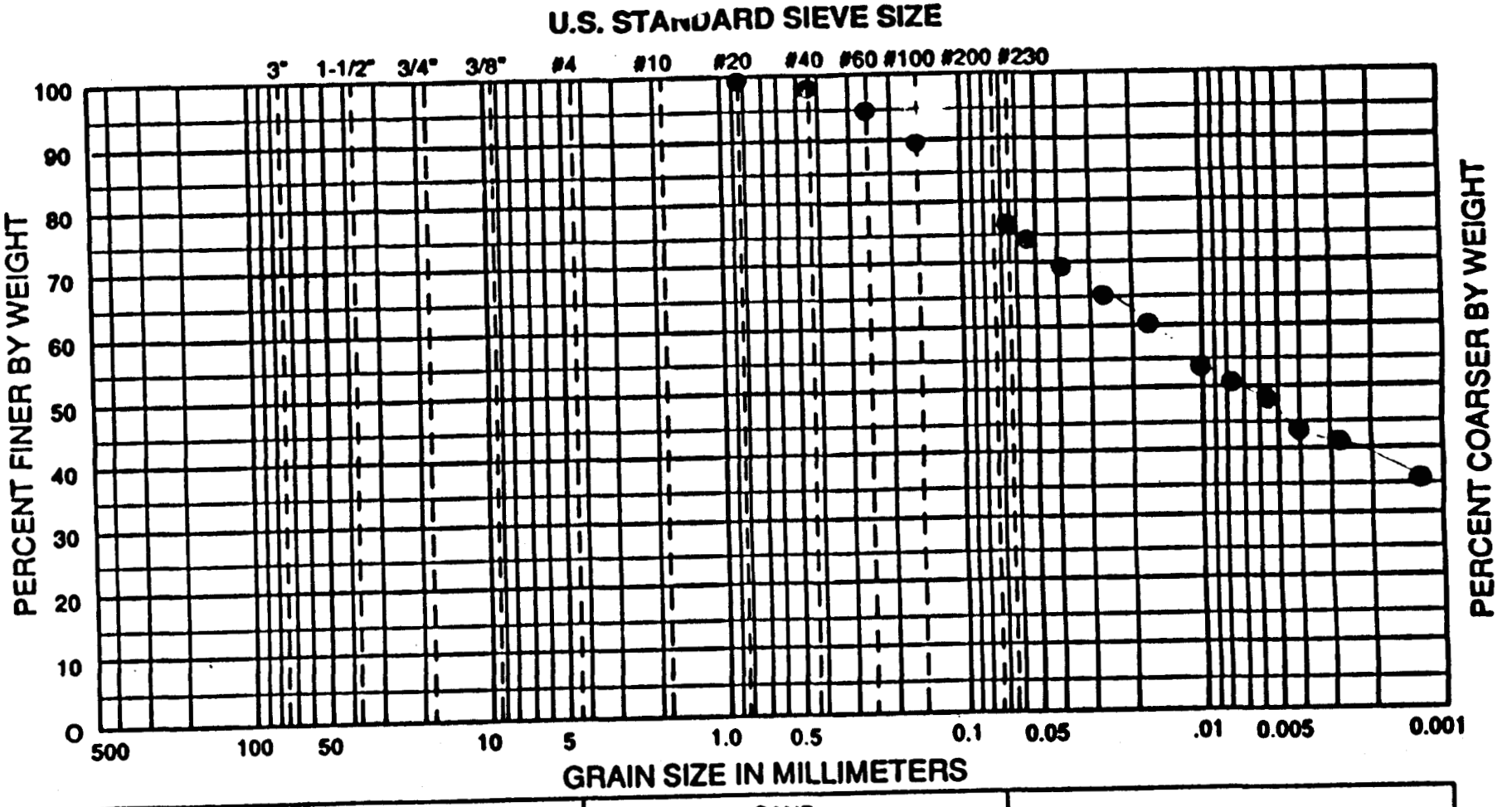
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	54.000
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.00	41.00	74.6	74.6	8.75	0.0543
1.0	43.00	38.00	69.1	69.1	9.24	0.0395
2.0	41.00	36.00	65.5	65.5	9.57	0.0284
5.0	38.50	33.50	60.9	60.9	9.98	0.0183
15.0	35.00	30.00	54.6	54.6	10.55	0.0109
30.0	33.50	28.50	51.8	51.8	10.80	0.0078
60.0	31.50	26.50	48.2	48.2	11.12	0.0056
120.0	29.50	24.50	44.6	44.6	11.45	0.0040
250.0	28.00	23.00	41.8	41.8	11.70	0.0028
1440.0	25.00	20.00	36.4	36.4	12.19	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+25 SAMPLE NO.: CH #17 DATE: 4-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	24.0'	1.0 [illegible] ROCKY FLATS/EG&G [illegible] 33.5 [illegible] 47% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS/EDMC

BORING 6+25 SAMPLE CH#17 DEPTH 24.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

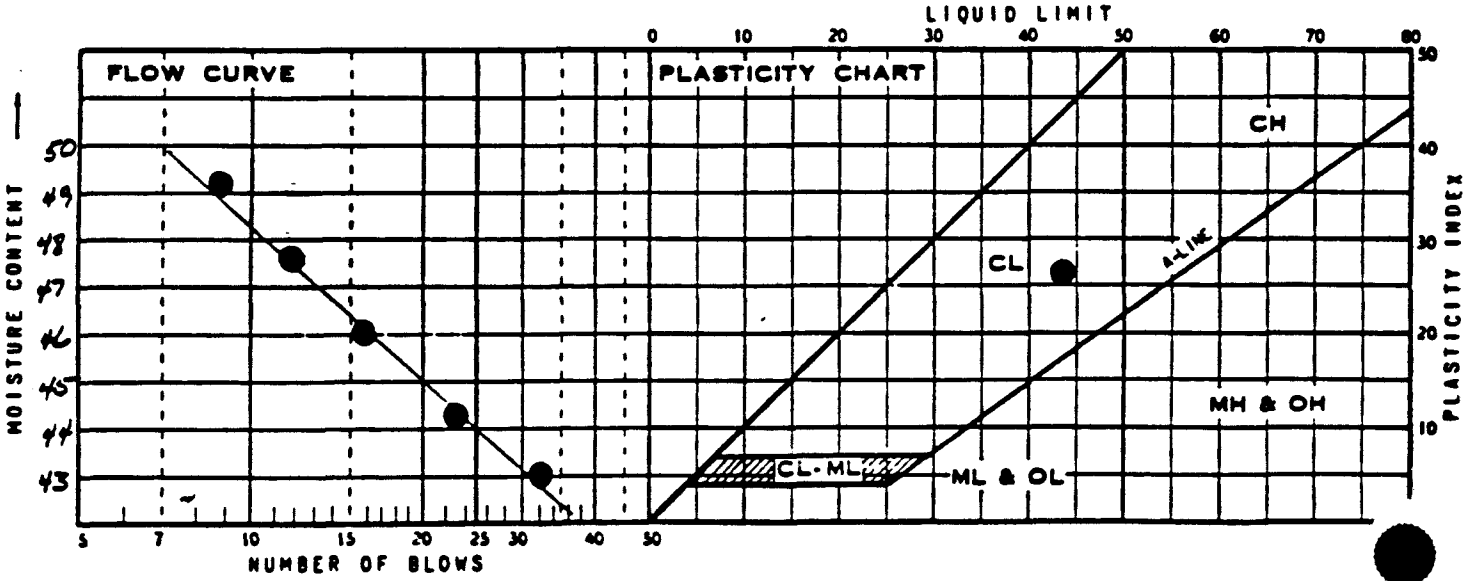
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR..3/30/92.

DETERMINATION	1	2	3	4	5	6
DISH	26C	2053	37C			
WT OF DISH + WET SOIL g	8.66	7.67	6.50			
WT OF DISH + DRY SOIL g	7.54	6.68	5.71	—	—	—
WT OF MOISTURE g	1.12	.99	.79			
WT OF DISH g	1.06	1.06	1.04	—	—	—
WT OF DRY SOIL g	6.48	5.62	4.67			
MOISTURE CONTENT %	17.3	17.6	16.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B6	B16	2062	2027	2028	
NUMBER OF BLOWS	32	23	16±	12	9±	
WT OF DISH + WET SOIL g	14.25	14.74	17.31	14.41	13.71	
WT OF DISH + DRY SOIL g	10.27	10.54	12.18	10.10	9.54	—
WT OF MOISTURE g	3.98	4.20	5.13	4.31	4.17	
WT OF DISH g	1.04	1.05	1.04	1.06	1.06	—
WT OF DRY SOIL g	9.23	9.49	11.14	9.04	8.48	
MOISTURE CONTENT %	43.1	44.3	46.1	47.7	49.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		44.0	17.3	26.7	CL	

ADVANCED TERRA TESTING inc

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+75	SAMPLED	Rocky Flats
DEPTH	26'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

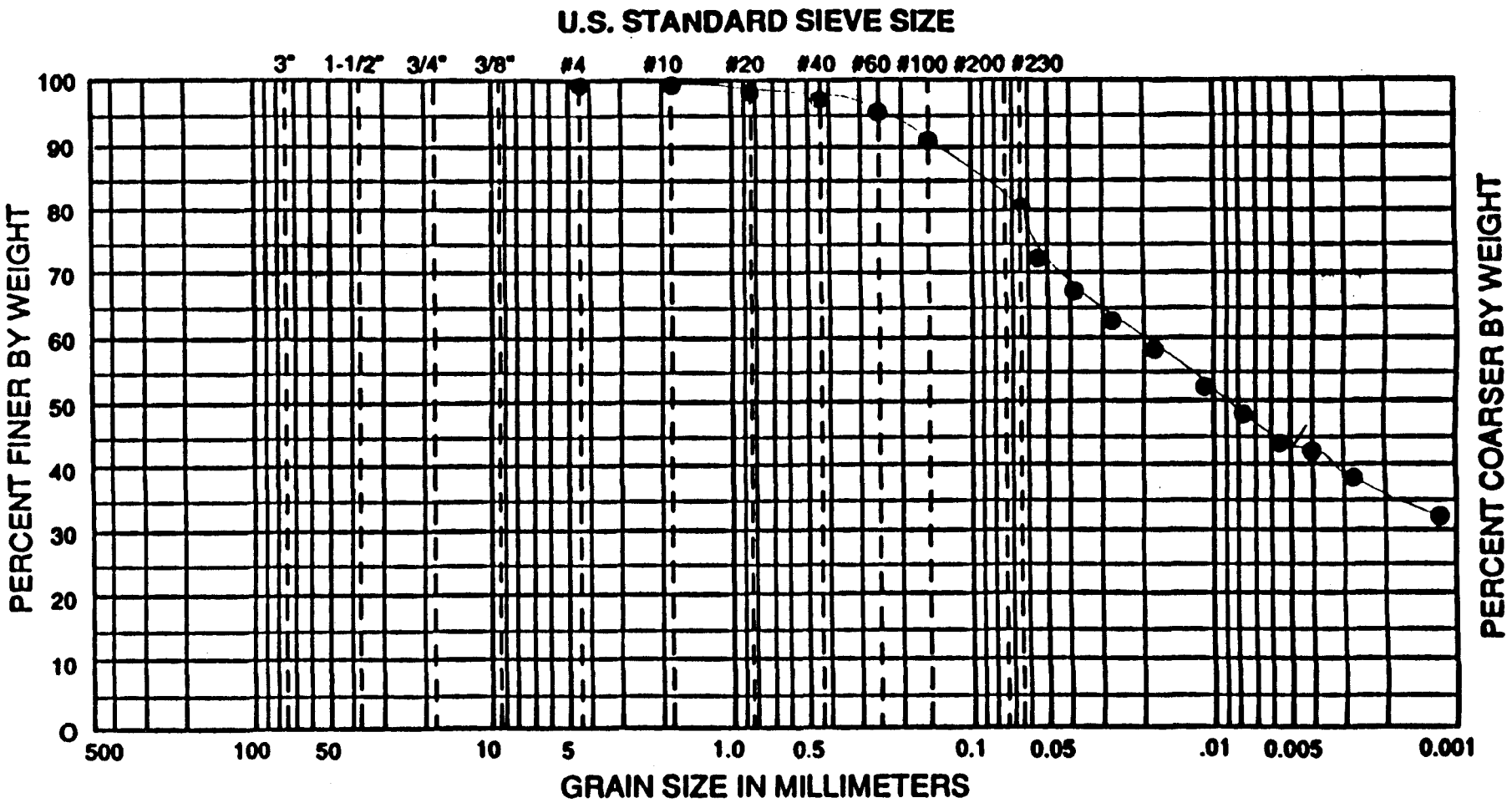
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	54.036
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.00	40.00	72.7	72.7	8.75	0.0543
1.0	43.00	37.00	67.2	67.2	9.24	0.0395
2.0	41.00	35.00	63.6	63.6	9.57	0.0284
5.0	38.00	32.00	58.2	58.2	10.06	0.0184
15.0	35.00	29.00	52.7	52.7	10.55	0.0109
30.0	32.50	26.50	48.2	48.2	10.96	0.0078
60.0	30.50	24.50	44.5	44.5	11.29	0.0056
120.0	29.00	23.00	41.8	41.8	11.53	0.0040
250.0	27.25	21.25	38.6	38.6	11.82	0.0028
1440.0	23.50	17.50	31.8	31.8	12.44	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+75 SAMPLE NO.: CH# 17 DATE: 4-3-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Fluts	26.0'	Silty Clay .1% [illegible], 2.7% [illegible], 14.2% fine sand, 39.5% silt [illegible] % clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 6+25 SAMPLE # 17 DEPTH 26.0'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

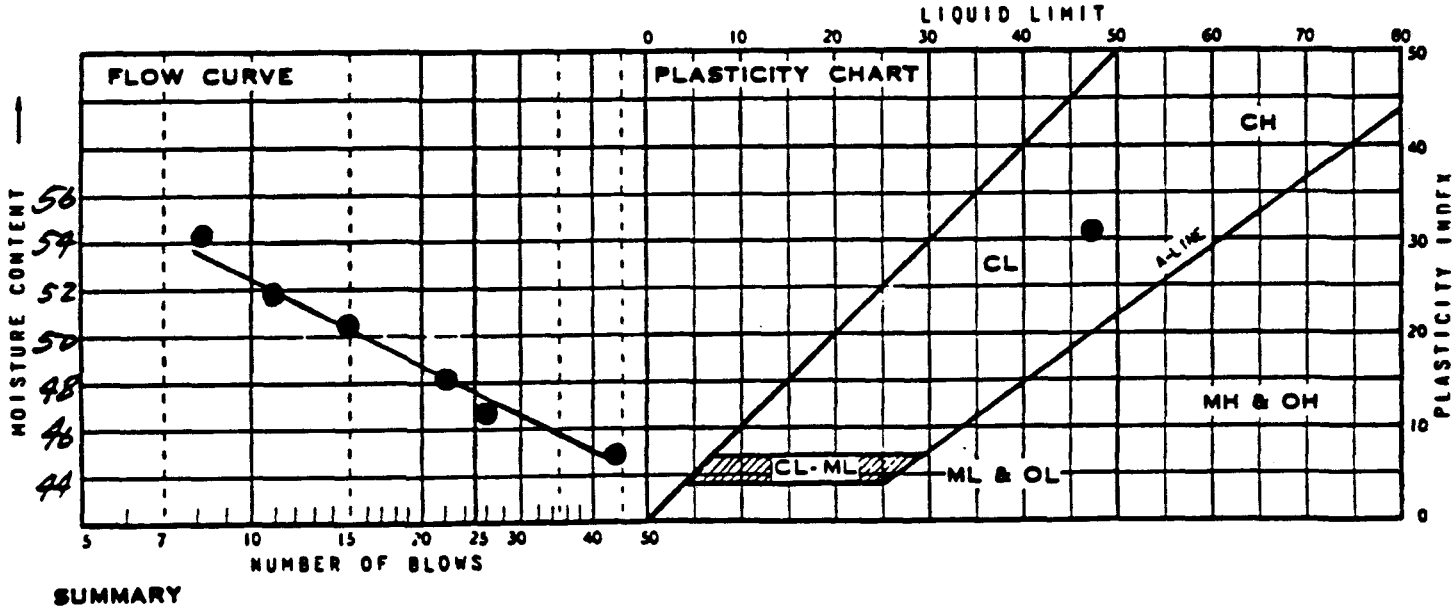
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3.125792

DETERMINATION	1	2	3	4	5	6
DISH	2042	22C	2010			
WT OF DISH + WET SOIL g	6.26	6.77	6.66			
WT OF DISH + DRY SOIL	5.50	5.95	5.87	—	—	—
WT OF MOISTURE	0.76	0.82	0.79			
WT OF DISH	1.06	1.04	1.05	—	—	—
WT OF DRY SOIL	4.44	4.91	4.82			
MOISTURE CONTENT %	17.1	16.7	16.4	= 50.2/3	16.7	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2059	28C	2007	B2	11C	B4
NUMBER OF BLOWS	26	44-	22	15	11	B+
WT OF DISH + WET SOIL g	10.65	11.05	9.58	11.44	10.96	9.34
WT OF DISH + DRY SOIL	7.60	7.95	6.81	7.95	7.57	6.42
WT OF MOISTURE	3.05	3.10	2.77	3.49	3.39	2.92
WT OF DISH	1.05	1.05	1.05	1.04	1.03	1.04
WT OF DRY SOIL	6.55	6.90	5.76	6.91	6.54	5.38
MOISTURE CONTENT %	46.6	44.9	48.1	50.5	51.8	54.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		47.6	16.7	30.9	CL	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	6+75	SAMPLED	Rocky Flats
DEPTH	38.3'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	45.91
Wt. Dry Soil & Pan	(g)	44.96
Wt. Lost Moisture	(g)	0.95
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	41.22
Moisture Content	%	2.3
Wt. Hydrom. Sample Wet	(g)	55.10
Wt. Hydrom. Sample Dry	(g)	53.86

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	460.73
Weight of + #10 Before Washing (g)	0.42
Weight of + #10 After Washing (g)	0.02
Weight of - #10 Wet (g)	460.31
Weight of - #10 Dry (g)	450.33
Wt. Total Sample Dry (g)	450.35
Calc. Wt. "W" (g)	53.86
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.02	0.02	0.02	0.0	100.0
#20	1.32	1.51	0.19	0.19	0.4	99.6
#40	1.30	1.75	0.45	0.64	1.2	98.8
#60	1.31	2.56	1.25	1.89	3.5	96.5
#100	1.56	4.75	3.19	5.08	9.4	90.6
#230	1.56	9.22	7.66	12.74	23.7	76.3

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+75	SAMPLED	Rocky Flats
DEPTH	38.3'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

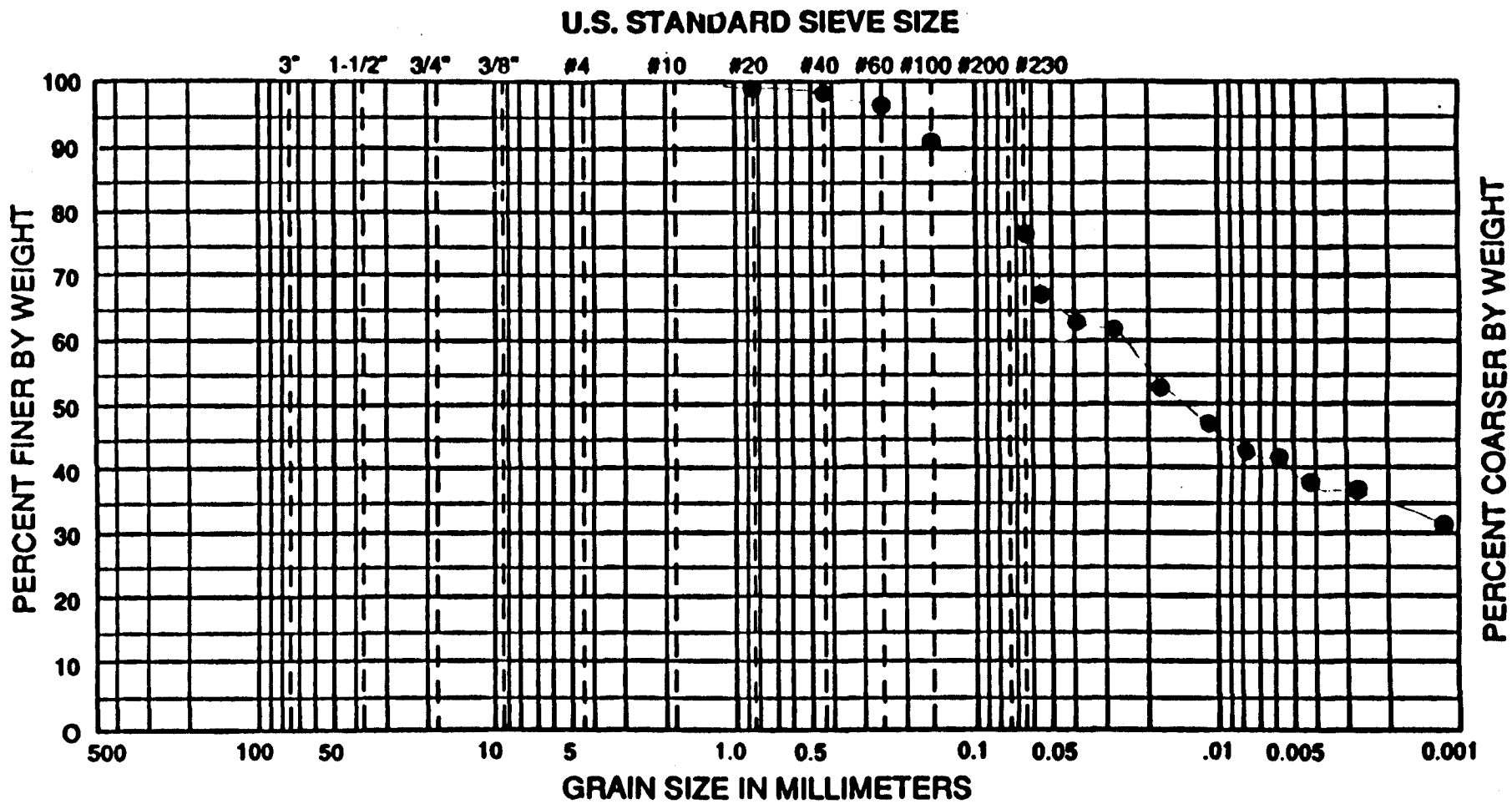
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01290
Value of "a"	0.98	Wt. Dry Sample "W"	53.863
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	43.00	37.00	67.2	67.2	9.24	0.0555
1.0	41.00	35.00	63.6	63.6	9.57	0.0399
2.0	40.00	34.00	61.7	61.7	9.73	0.0285
5.0	35.50	29.50	53.6	53.6	10.47	0.0187
15.0	32.00	26.00	47.2	47.2	11.04	0.0111
30.0	30.00	24.00	43.6	43.6	11.37	0.0079
60.0	29.00	23.00	41.8	41.8	11.53	0.0057
120.0	27.00	21.00	38.1	38.1	11.86	0.0041
250.0	26.00	20.00	36.3	36.3	12.03	0.0028
1440.0	23.00	17.00	30.9	30.9	12.52	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6-75 SAMPLE NO.: CH# 17 DATE: 4-3-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	38.3'	Clayey Silt w/ some Sand % Med Sand 20.8% [illegible] 40.5% silt, clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 6+75 SAMPLE #17 DEPTH @38.3'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

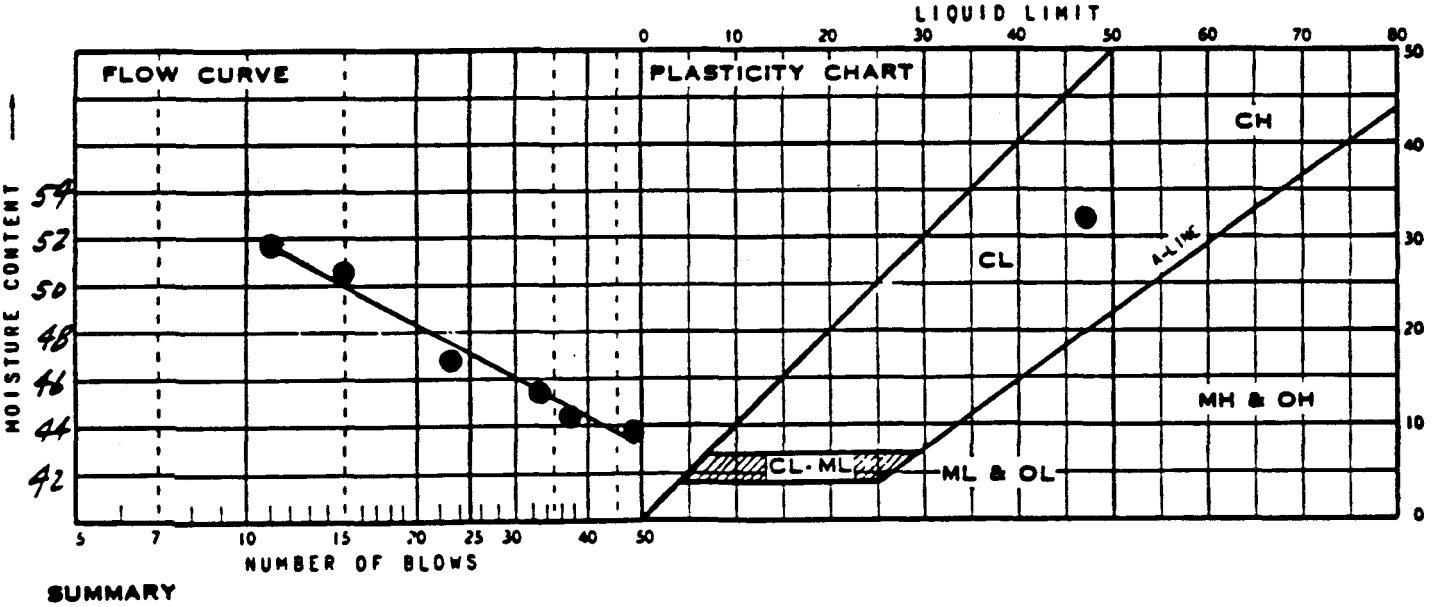
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/30/92

DETERMINATION	1	2	3	4	5	6
DISH	31C	B14	2010			
WT OF DISH + WET SOIL g	6.80	6.40	5.99			
WT OF DISH + DRY SOIL	6.01	5.69	5.33	—	—	—
WT OF MOISTURE	0.79	0.71	0.66			
WT OF DISH	1.06	1.03	1.05	—	—	—
WT OF DRY SOIL	4.95	4.66	4.28			
MOISTURE CONTENT %	16.0	15.2	15.4	= 46.6/3 =	15.5	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2060	2059	11C	2042	B3	7C
NUMBER OF BLOWS	49	38	33+	23	15	11
WT OF DISH + WET SOIL g	8.05	9.06	9.30	9.89	10.39	10.34
WT OF DISH + DRY SOIL	5.91	6.60	6.72	7.08	7.25	7.17
WT OF MOISTURE	2.14	2.46	2.58	2.81	3.14	3.17
WT OF DISH	1.03	1.05	1.04	1.06	1.03	1.05
WT OF DRY SOIL	4.88	5.55	5.68	6.02	6.22	6.12
MOISTURE CONTENT %	43.8	44.3	45.4	46.7	50.5	51.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		47.2	15.5	31.7	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+75	SAMPLED	Rocky Flats
DEPTH	51.0'	DATE TESTED	03-24-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	40.40
Wt. Dry Soil & Pan	(g)	39.68
Wt. Lost Moisture	(g)	0.72
Wt. of Pan Only	(g)	3.81
Wt. of Dry Soil	(g)	35.87
Moisture Content	%	2.0
Wt. Hydrom. Sample Wet	(g)	55.06
Wt. Hydrom. Sample Dry	(g)	53.98

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	682.10
Weight of + #10 Before Washing (g)	256.09
Weight of + #10 After Washing (g)	221.62
Weight of - #10 Wet (g)	426.01
Weight of - #10 Dry (g)	451.42
Wt. Total Sample Dry (g)	673.04
Calc. Wt. "W" (g)	80.48
Calc. Mass + #10	26.50

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	57.67	57.67	57.67	8.6	91.4
3/8"	0.00	36.26	36.26	93.93	14.0	86.0
#4	0.00	65.53	65.53	159.46	23.7	76.3
#10	0.00	62.16	62.16	221.62	32.9	67.1
#20	1.57	15.62	14.05	14.05	50.4	49.6
#40	1.55	7.84	6.29	20.34	58.2	41.8
#60	1.55	3.95	2.40	22.74	61.2	38.8
#100	1.57	3.81	2.24	24.98	64.0	36.0
#230	1.56	4.79	3.23	28.21	68.0	32.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+75	SAMPLED	Rocky Flats
DEPTH	51.0'	DATE TESTED	03-24-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

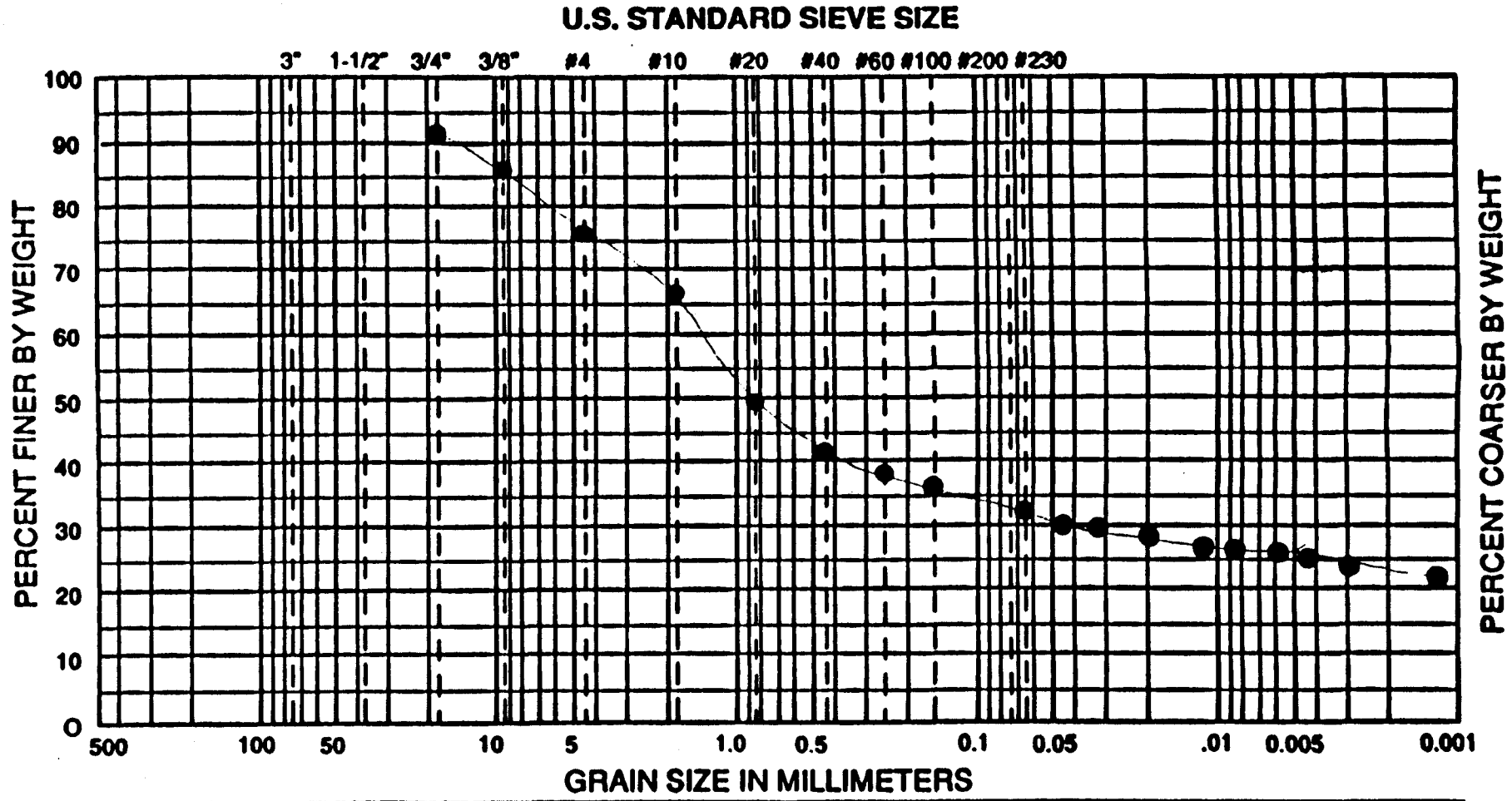
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	80.477
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	31.00	26.00	31.9	31.9	11.21	0.0618
1.0	29.50	24.50	30.0	30.0	11.45	0.0442
2.0	29.00	24.00	29.4	29.4	11.53	0.0313
5.0	28.50	23.50	28.8	28.8	11.62	0.0199
15.0	27.50	22.50	27.6	27.6	11.78	0.0116
30.0	27.00	22.00	27.0	27.0	11.86	0.0082
60.0	26.75	21.75	26.6	26.6	11.90	0.0058
120.0	25.75	20.75	25.4	25.4	12.07	0.0041
250.0	25.00	20.00	24.5	24.5	12.19	0.0029
1440.0	24.00	19.00	23.3	23.3	12.35	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND				SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+75 SAMPLE NO.: CH #17 DATE: 4-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	51.0'	8.6% [illegible] 15.1% f gl / 9.7% c sd, 25.5% med sd, 9.8% f sd / Roc[illegible] FLATS // SG&G / 5.5% silt, 26.[illegible] clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03
CLIENT/OWNER WESTON
LOCATION ROCKY FLATS/EG&G
BORING 6+75 SAMPLE CH#17 DEPTH 51.0'

FIELD DENSITY BY...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

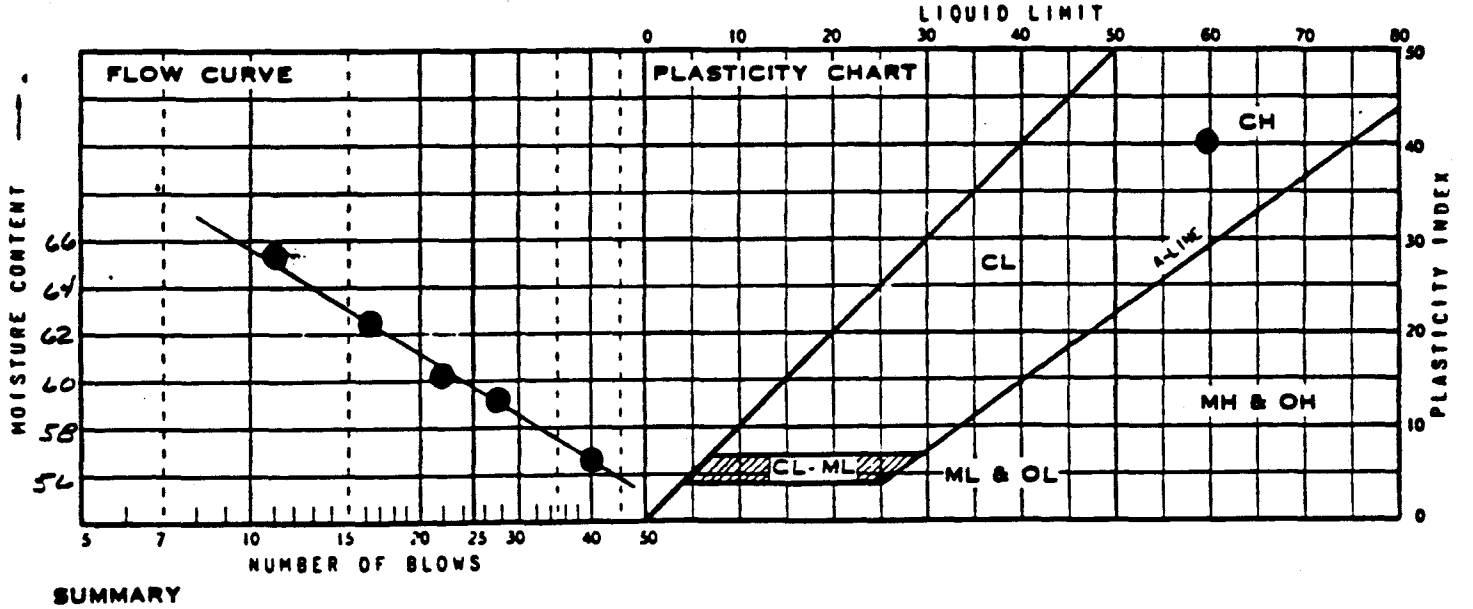
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB.3/21/92.

DETERMINATION	1	2	3	4	5	6
DISH	B15	2069	20C			
WT OF DISH + WET SOIL g	5.75	5.76	6.62			
WT OF DISH + DRY SOIL g	4.97	4.99	5.71	—	—	—
WT OF MOISTURE g	.78	.77	.91			
WT OF DISH g	1.03	1.04	1.03	—	—	—
WT OF DRY SOIL g	3.94	3.45	4.68			
MOISTURE CONTENT %	19.8	19.5	19.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	35 CC	10C	37 C	27 C	3	
NUMBER OF BLOWS	40	27	22	16	11	
WT OF DISH + WET SOIL g	15.70	13.90	13.97	13.81	11.77	
WT OF DISH + DRY SOIL g	10.40	9.12	9.10	8.90	7.53	—
WT OF MOISTURE g	5.30	4.78	4.87	4.91	4.24	
WT OF DISH g	1.05	1.05	1.08	1.04	1.06	—
WT OF DRY SOIL g	9.35	8.07	8.02	7.86	6.47	
MOISTURE CONTENT %	56.7	59.2	60.7	62.5	65.5	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		59.9	19.6	40.3	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	6+75
DEPTH	58.9'
SAMPLE NO.	#17
SOIL DESCR.	Bulk (Jar)

SAMPLED	Rocky Flats
DATE TESTED	03-31-92 DU
WASH SIEVE	Yes
DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	46.43
Wt. Dry Soil & Pan	(g)	44.89
Wt. Lost Moisture	(g)	1.54
Wt. of Pan Only	(g)	3.60
Wt. of Dry Soil	(g)	41.29
Moisture Content	%	3.7

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	53.03

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	354.27
Weight of + #10 Before Washing (g)	0.65
Weight of + #10 After Washing (g)	0.43
Weight of - #10 Wet (g)	353.62
Weight of - #10 Dry (g)	341.12
Wt. Total Sample Dry (g)	341.55
Calc. Wt. "W" (g)	53.10
Calc. Mass + #10	0.07

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.13	0.13	0.13	0.0	100.0
#10	0.00	0.30	0.30	0.43	0.1	99.9
#20	1.56	2.05	0.49	0.49	1.0	99.0
#40	1.56	1.98	0.42	0.91	1.8	98.2
#60	1.55	1.88	0.33	1.24	2.5	97.5
#100	1.55	1.95	0.40	1.64	3.2	96.8
#230	1.55	2.35	0.80	2.44	4.7	95.3

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	6+75	SAMPLED	Rocky Flats
DEPTH	58.9'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

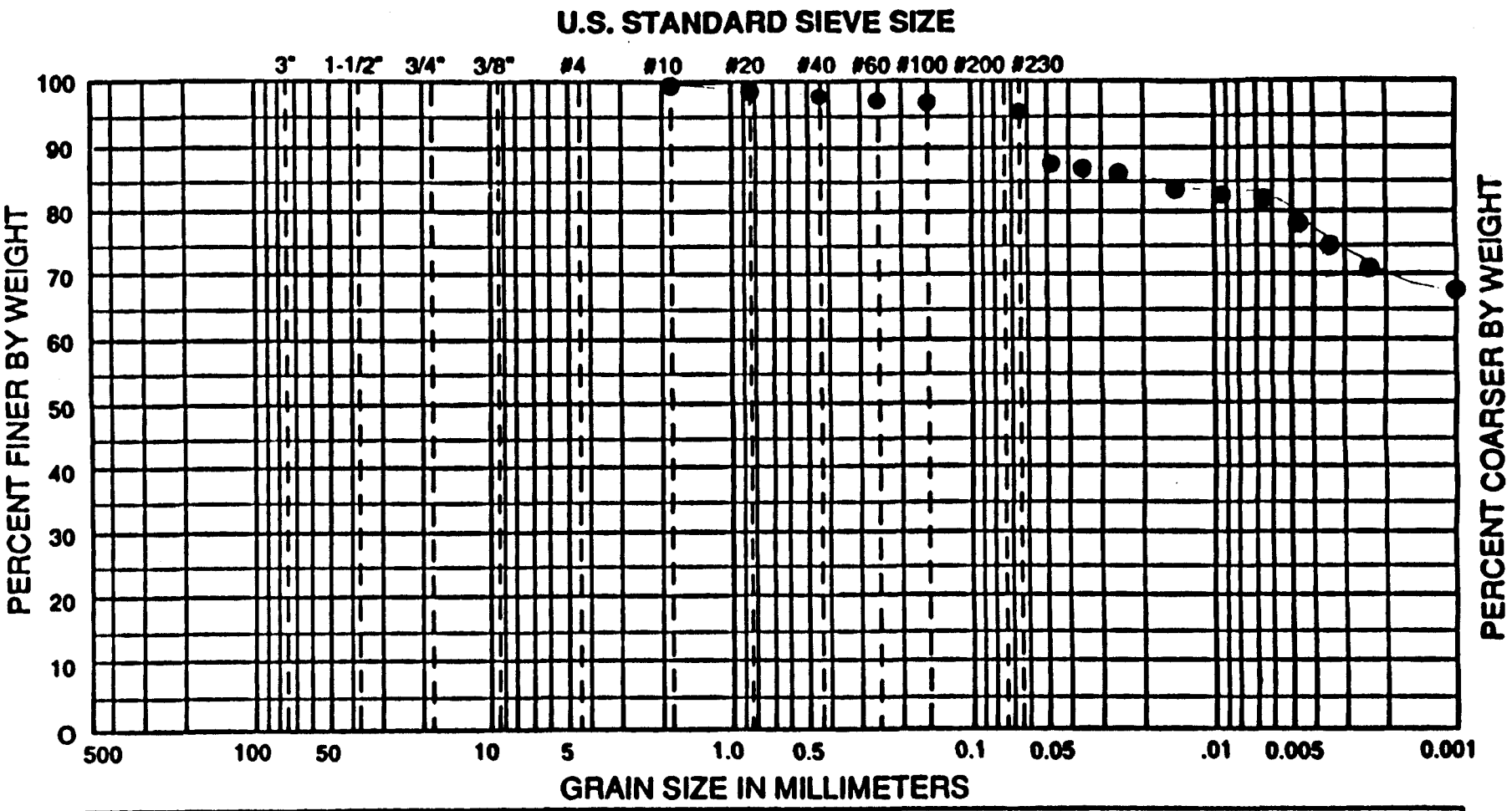
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01280
Value of "a"	0.97	Wt. Dry Sample "W"	53.102
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	54.00	48.00	87.9	87.9	7.43	0.0494
1.0	53.50	47.50	86.9	86.9	7.52	0.0351
2.0	53.00	47.00	86.0	86.0	7.60	0.0249
5.0	52.00	46.00	84.2	84.2	7.76	0.0159
15.0	51.00	45.00	82.4	82.4	7.93	0.0093
30.0	50.50	44.50	81.5	81.5	8.01	0.0066
60.0	48.75	42.75	78.3	78.3	8.30	0.0048
120.0	47.00	41.00	75.0	75.0	8.58	0.0034
250.0	44.75	38.75	70.9	70.9	8.95	0.0024
1440.0	43.00	37.00	67.7	67.7	9.24	0.0010

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 6+75 SAMPLE NO.: CH # 17 DATE: 4-3-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	58.9'	Clay sand, 1.7% med sd, 2.[illegible]% fine sand, 16.3% silt, 79[illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / EG&G

BORING 6+75 SAMPLE CH#17 DEPTH 58.9'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

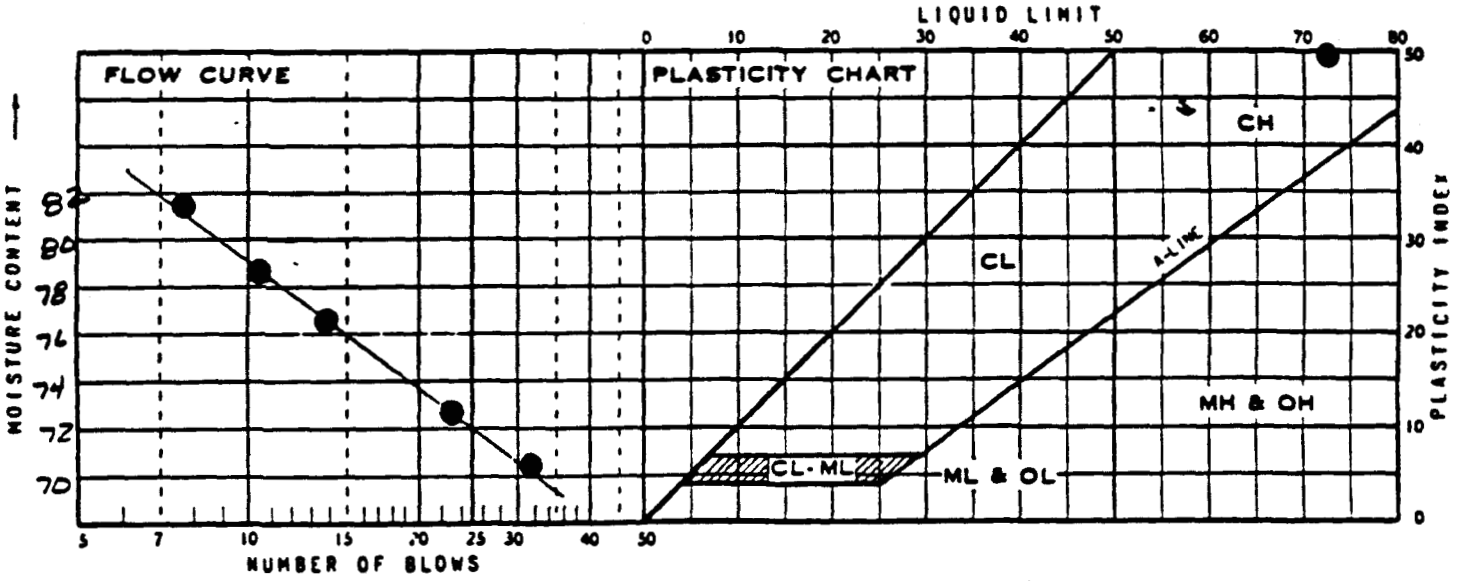
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR..312792.

DETERMINATION	1	2	3	4	5	6
DISH	2051	36C	2015			
WT OF DISH + WET SOIL g	5.23	5.03	4.38			
WT OF DISH + DRY SOIL g	4.48	4.31	3.77	—	—	—
WT OF MOISTURE g	.75	.72	.61			
WT OF DISH g	1.03	1.04	1.06	—	—	—
WT OF DRY SOIL g	3.45	3.27	2.71			
MOISTURE CONTENT %	21.7	22.0	22.5			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	21C	6C	66C	2067	2008	
NUMBER OF BLOWS	32	23	14	11	8±	
WT OF DISH + WET SOIL g	12.28	12.24	12.16	13.21	12.20g	
WT OF DISH + DRY SOIL g	7.64	7.53	7.34	7.85	7.19	—
WT OF MOISTURE g	4.64	4.71	4.82	5.36	5.01	
WT OF DISH g	1.07	1.05	1.05	1.04	1.06	—
WT OF DRY SOIL g	6.57	6.48	6.29	6.81	6.13	
MOISTURE CONTENT %	70.6	72.7	76.6	78.7	81.7	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		72.0	22.1	49.9	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	34'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	43.92
Wt. Dry Soil & Pan	(g)	43.18
Wt. Lost Moisture	(g)	0.74
Wt. of Pan Only	(g)	3.56
Wt. of Dry Soil	(g)	39.62
Moisture Content	%	1.9
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	54.01

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	572.37
Weight of + #10 Before Washing (g)	50.81
Weight of + #10 After Washing (g)	22.96
Weight of - #10 Wet (g)	522.19
Weight of - #10 Dry (g)	539.96
Wt. Total Sample Dry (g)	562.92
Calc. Wt. "W" (g)	56.31
Calc. Mass + #10	2.30

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	8.42	8.42	8.42	1.5	98.5
#4	0.00	6.36	6.36	14.78	2.6	97.4
#10	0.00	8.18	8.18	22.96	4.1	95.9
#20	1.55	2.25	0.70	0.70	5.3	94.7
#40	1.55	2.73	1.18	1.88	7.4	92.6
#60	1.57	3.53	1.96	3.84	10.9	89.1
#100	1.55	5.23	3.68	7.52	17.4	82.6
#230	1.31	8.39	7.08	14.60	30.0	70.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	34'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

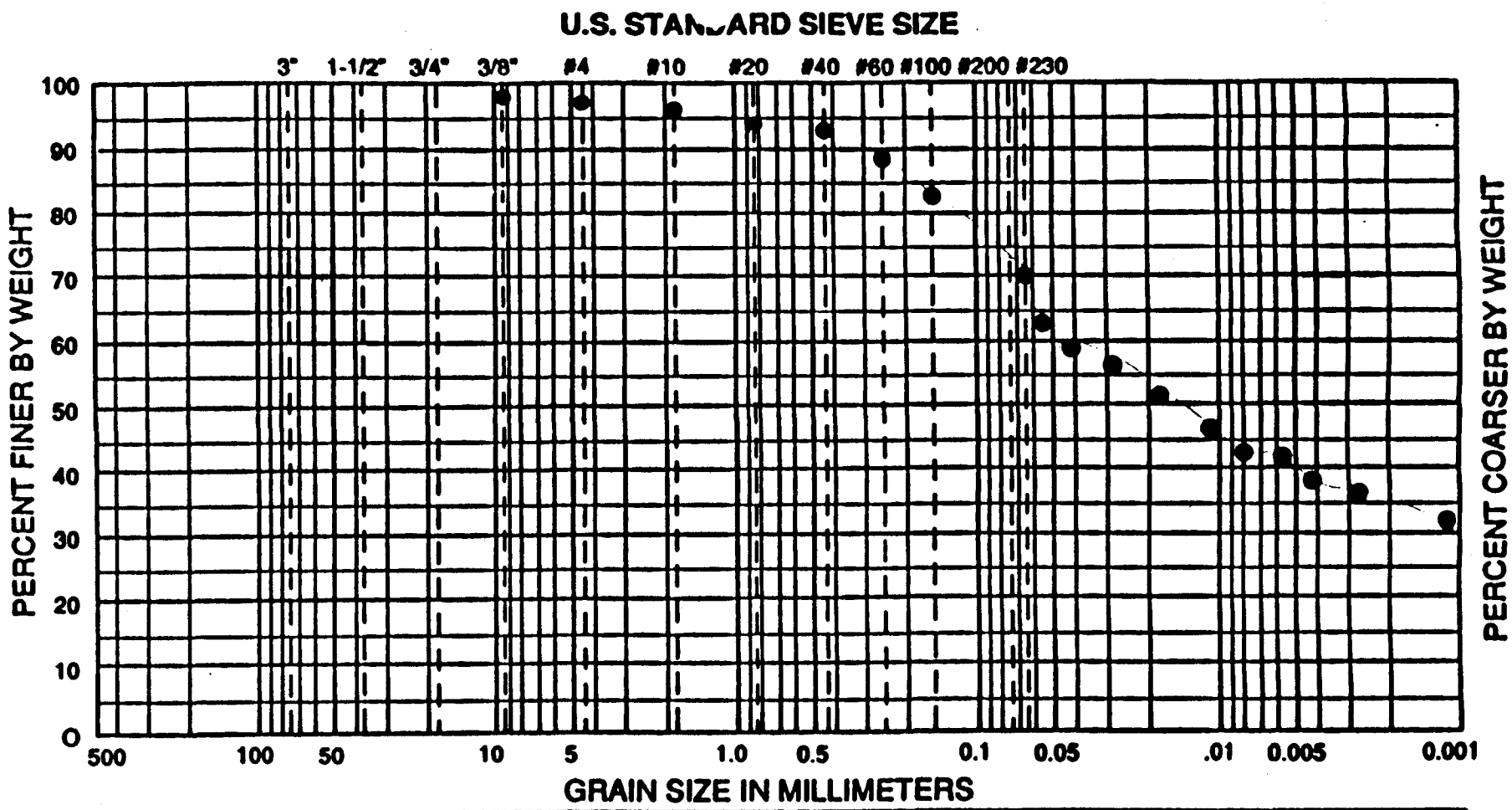
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	56.306
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	42.00	36.00	62.9	62.9	9.40	0.0564
1.0	40.00	34.00	59.4	59.4	9.73	0.0406
2.0	38.00	32.00	55.9	55.9	10.06	0.0292
5.0	35.00	29.00	50.7	50.7	10.55	0.0189
15.0	32.50	26.50	46.3	46.3	10.96	0.0111
30.0	30.50	24.50	42.8	42.8	11.29	0.0080
60.0	29.50	23.50	41.1	41.1	11.45	0.0057
120.0	28.00	22.00	38.4	38.4	11.70	0.0041
250.0	26.50	20.50	35.8	35.8	11.94	0.0028
1440.0	24.00	18.00	31.5	31.5	12.35	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+00 SAMPLE NO.: CH #17 DATE: 4-3-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	34.0'	Silty Clay w/ some sand to gravel 2.6% f[illegible] el / 1.5% c. sand, 3.3% med sd, 20.1% fine sand / 32.5% silt, [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / EG&G

BORING 7+00 SAMPLE CH#17 DEPTH 34.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

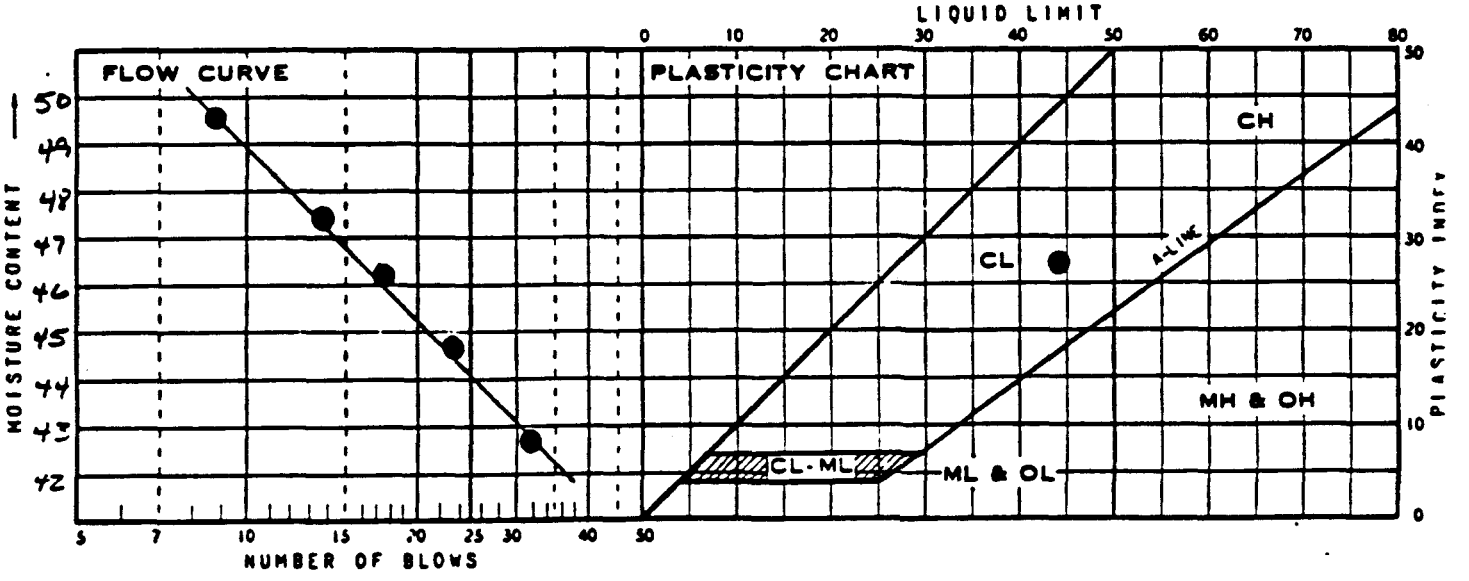
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. 3/06/92

DETERMINATION	1	2	3	4	5	6
DISH	B10	66C	2015			
WT OF DISH + WET SOIL	7.62	5.58	6.96			
WT OF DISH + DRY SOIL	6.64	4.94	6.11	—	—	—
WT OF MOISTURE	.98	.64	.85			
WT OF DISH	1.02	1.05	1.06	—	—	—
WT OF DRY SOIL	5.62	3.89	5.05			
MOISTURE CONTENT	17.4	16.5	16.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B18	17C	2005	18C	36C	
NUMBER OF BLOWS	32	24	18	14	9	
WT OF DISH + WET SOIL	14.55	13.68	16.43	11.09	14.28	
WT OF DISH + DRY SOIL	10.50	9.77	11.57	7.86	9.89	—
WT OF MOISTURE	4.05	3.91	4.86	3.23	4.39	
WT OF DISH	1.04	1.05	1.06	1.04	1.04	—
WT OF DRY SOIL	9.46	8.72	10.51	6.82	8.85	
MOISTURE CONTENT	42.8	44.8	46.2	47.4	49.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		44.1	16.9	27.2		

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	43'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	39.50
Wt. Dry Soil & Pan	(g)	38.78
Wt. Lost Moisture	(g)	0.72
Wt. of Pan Only	(g)	3.64
Wt. of Dry Soil	(g)	35.14
Moisture Content	%	2.0
Wt. Hydrom. Sample Wet	(g)	60.02
Wt. Hydrom. Sample Dry	(g)	58.81

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	584.85
Weight of + #10 Before Washing (g)	189.07
Weight of + #10 After Washing (g)	165.57
Weight of - #10 Wet (g)	395.78
Weight of - #10 Dry (g)	410.86
Wt. Total Sample Dry (g)	576.43
Calc. Wt. "W" (g)	82.51
Calc. Mass + #10	23.70

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	45.30	45.30	45.30	7.9	92.1
3/8"	0.00	44.47	44.47	89.77	15.6	84.4
#4	0.00	44.72	44.72	134.49	23.3	76.7
#10	0.00	31.08	31.08	165.57	28.7	71.3
#20	1.57	7.80	6.23	6.23	36.3	63.7
#40	1.56	8.53	6.97	13.20	44.7	55.3
#60	1.55	5.93	4.38	17.58	50.0	50.0
#100	1.55	4.97	3.42	21.00	54.2	45.8
#230	1.58	5.89	4.31	25.31	59.4	40.6

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	43'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

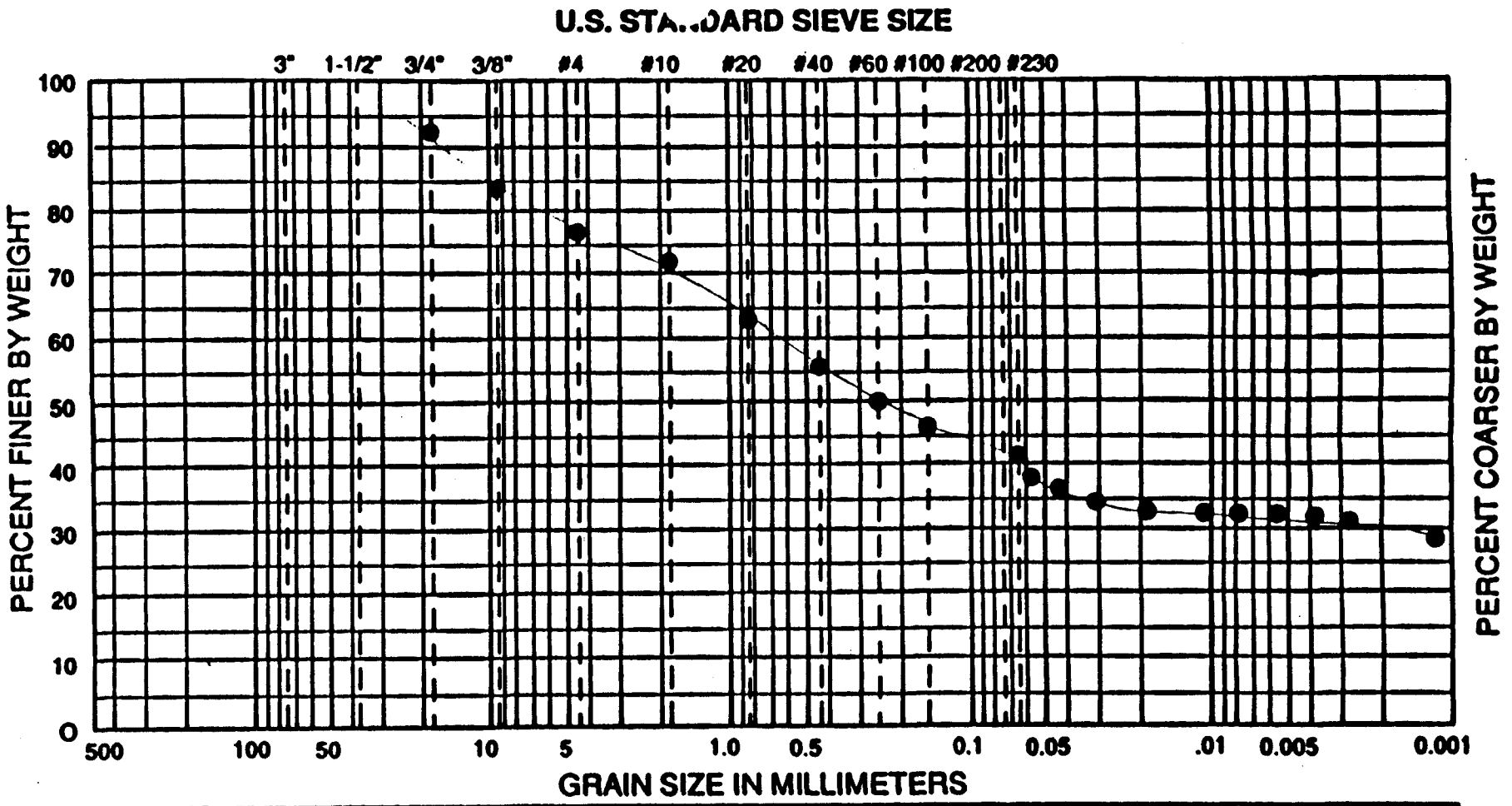
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01316
Value of "a"	0.99	Wt. Dry Sample "W"	82.515
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	38.00	32.00	38.5	38.5	10.06	0.0590
1.0	36.00	30.00	36.1	36.1	10.39	0.0424
2.0	35.00	29.00	34.9	34.9	10.55	0.0302
5.0	34.00	28.00	33.7	33.7	10.71	0.0193
15.0	33.50	27.50	33.1	33.1	10.80	0.0112
30.0	33.00	27.00	32.5	32.5	10.88	0.0079
60.0	33.00	27.00	32.5	32.5	10.88	0.0056
128.0	32.00	26.00	31.3	31.3	11.04	0.0039
250.0	31.50	25.50	30.7	30.7	11.12	0.0028
1440.0	30.00	24.00	28.9	28.9	11.37	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+00 SAMPLE NO.: CH# 17 DATE: 4-3-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	43.0'	CLAYEY SAND 7.9% C 1.5.4% f. gravel / 5.4% c sd, 16% md sd, 14.3% f sd / 7% silt, [illegible] 35.7% sand

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 7+00 SAMPLE CH#17 DEPTH 43'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

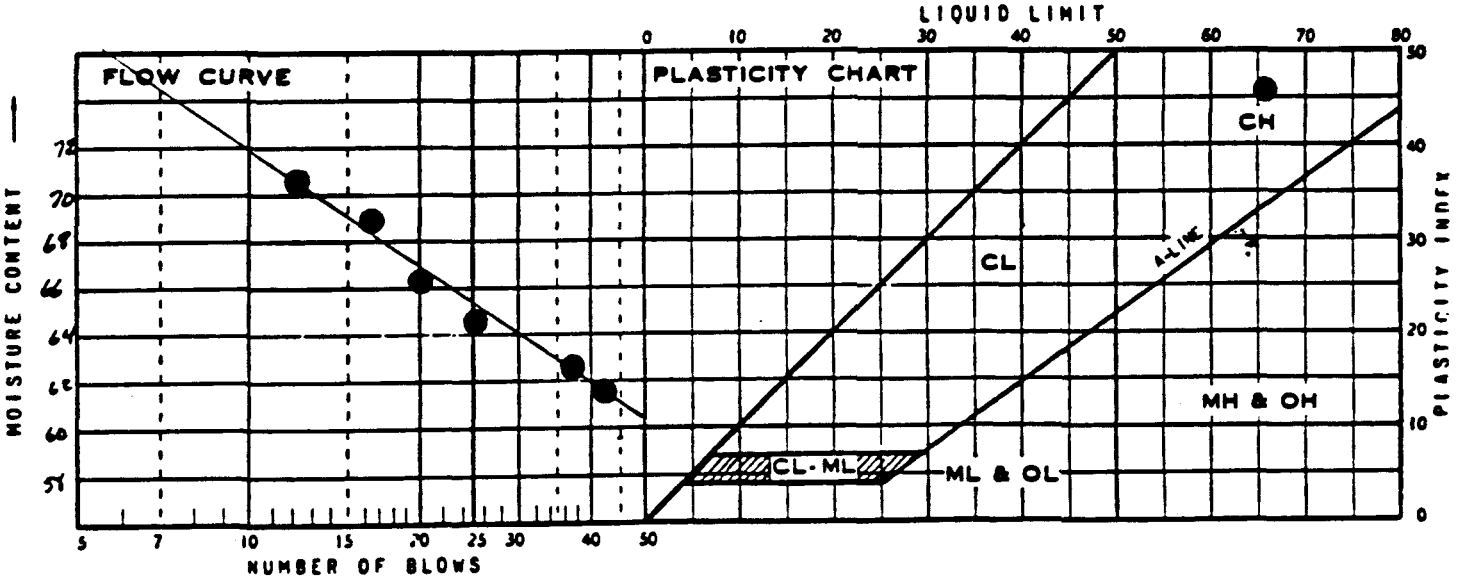
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY Del. 3/27/92

DETERMINATION	1	2	3	4	5	6
DISH	B15	B5	2028			
WT OF DISH + WET SOIL g	4.92	6.27	6.05			
WT OF DISH + DRY SOIL g	4.29	5.43	5.23	—	—	—
WT OF MOISTURE g	.63	.84	.82			
WT OF DISH g	1.03	1.04	1.06	—	—	—
WT OF DRY SOIL g	3.26	4.39	4.17			
MOISTURE CONTENT %	19.3	19.1	19.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6	
DISH	2053	B6	2069	37C	20C	B16	20
NUMBER OF BLOWS	46±	42	39	25	20	16	18
WT OF DISH + WET SOIL g	11.57	11.93	10.78	11.34	11.19	10.75	10.
WT OF DISH + DRY SOIL g	7.64	7.77	7.03	7.29	7.13	6.79	6.8
WT OF MOISTURE g	3.93	4.16	3.75	4.05	4.06	3.96	4.0
WT OF DISH g	1.06	1.03	1.05	1.03	1.02	1.05	1.
WT OF DRY SOIL g	6.58	6.74	5.98	6.26	6.11	5.74	5.
MOISTURE CONTENT %	59.7	61.7	68.7	64.7	66.4	69.0	70.



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		65.4	19.4	46.0	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	46'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	50.39
Wt. Dry Soil & Pan	(g)	48.92
Wt. Lost Moisture	(g)	1.47
Wt. of Pan Only	(g)	3.69
Wt. of Dry Soil	(g)	45.23
Moisture Content	%	3.3
Wt. Hydrom. Sample Wet	(g)	55.04
Wt. Hydrom. Sample Dry	(g)	53.31

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.04
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.04
Weight of - #10 Dry (g)	53.31
Wt. Total Sample Dry (g)	53.31
Calc. Wt. "W" (g)	53.31
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.72	0.16	0.16	0.3	99.7
#40	1.55	1.79	0.24	0.40	0.8	99.2
#60	1.55	1.72	0.17	0.57	1.1	98.9
#100	1.55	1.74	0.19	0.76	1.4	98.6
#230	1.55	2.13	0.58	1.34	2.5	97.5

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	46'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

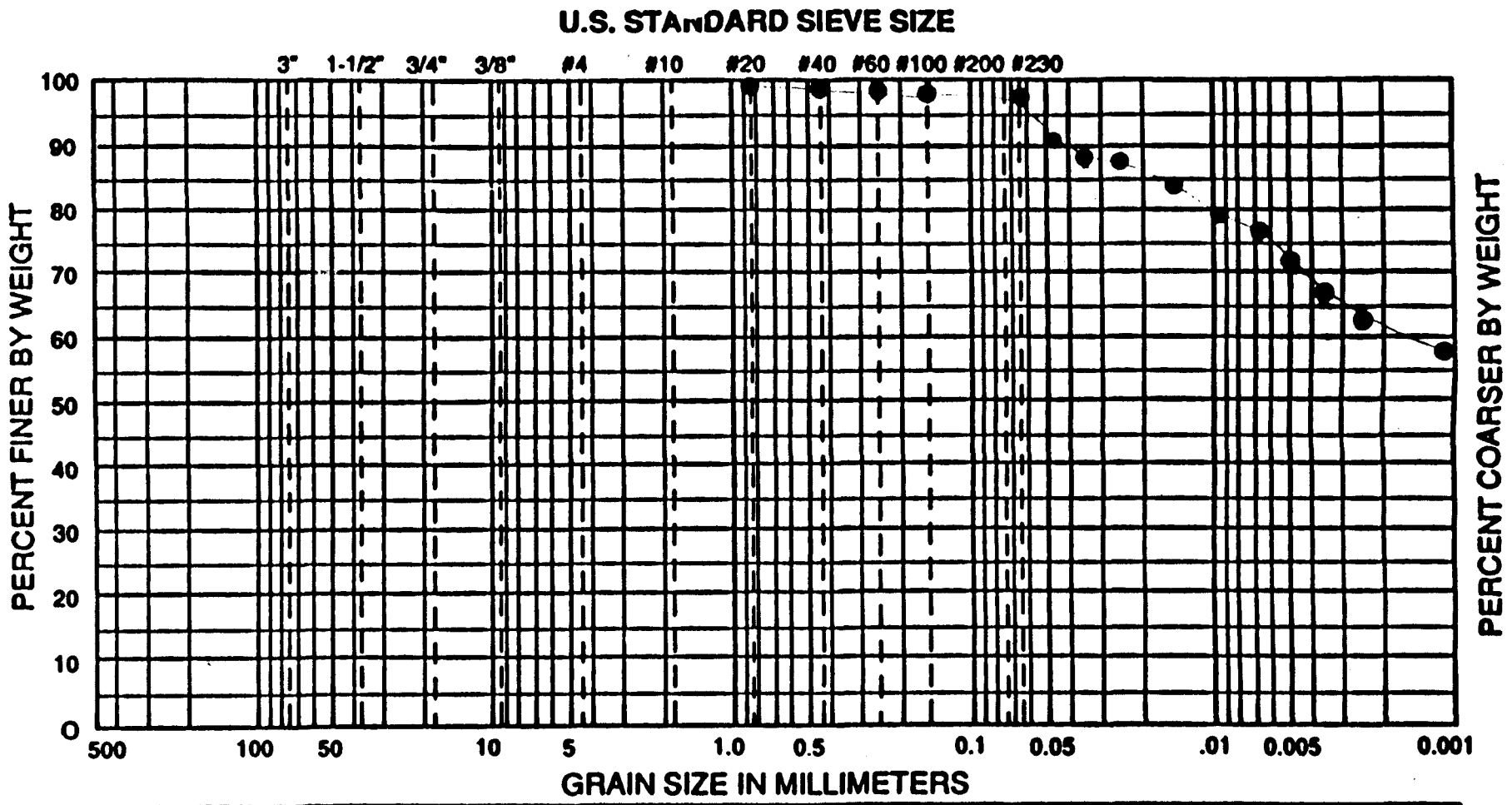
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	53.310
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.50	49.50	90.6	90.6	7.19	0.0488
1.0	54.50	48.50	88.8	88.8	7.35	0.0349
2.0	54.00	48.00	87.9	87.9	7.43	0.0248
5.0	52.00	46.00	84.2	84.2	7.76	0.0160
15.0	49.50	43.50	79.6	79.6	8.17	0.0095
30.0	47.75	41.75	76.4	76.4	8.46	0.0068
60.0	45.00	39.00	71.4	71.4	8.91	0.0050
120.0	42.50	36.50	66.8	66.8	9.32	0.0036
250.0	40.50	34.50	63.2	63.2	9.65	0.0025
1440.0	37.50	31.50	57.7	57.7	10.14	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7·00 SAMPLE NO.: CH #17 DATE: 4·3·92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	46.0'	[illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG & G

BORING 2+08 - SAMPLE #12 - DEPTH @ 46'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

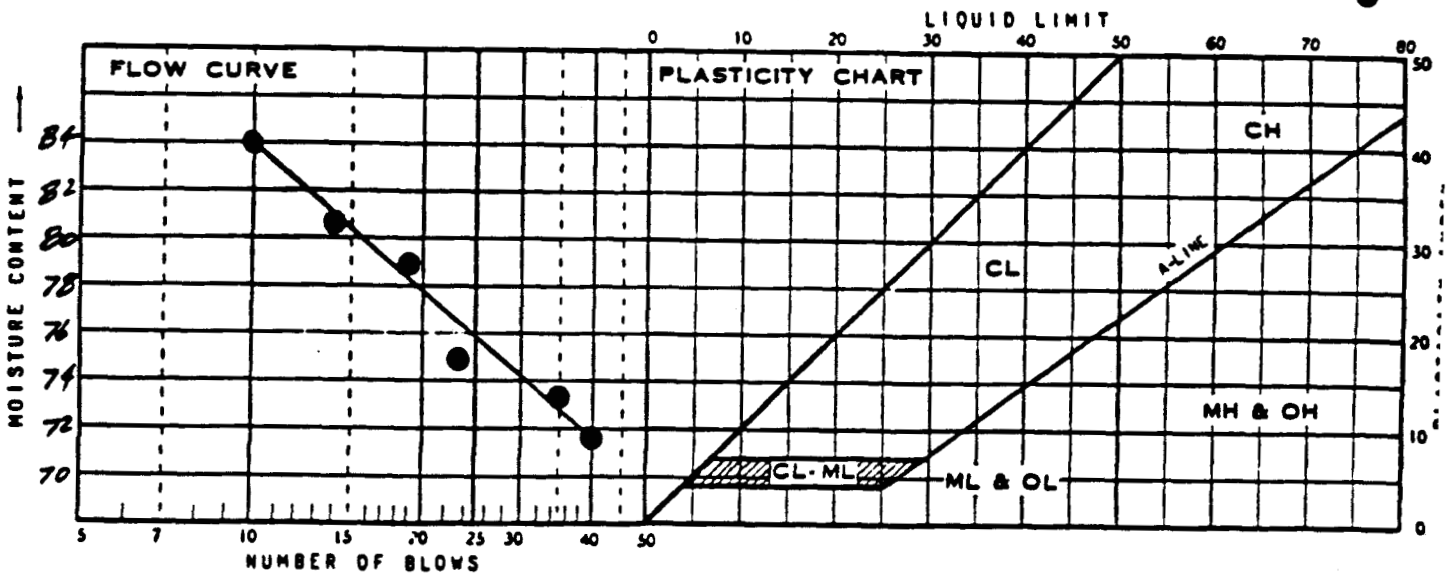
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible].3.125192

DETERMINATION	1	2	3	4	5	6
DISH	27C	29C	43C			
WT OF DISH + WET SOIL g	5.49	5.48	5.00			
WT OF DISH + DRY SOIL g	4.79	4.76	4.38	—	—	—
WT OF MOISTURE	0.70	0.72	0.62			
WT OF DISH	1.03	1.05	1.04	—	—	—
WT OF DRY SOIL	3.76	3.71	3.34			
MOISTURE CONTENT %	18.6	19.4	18.6	= 56.6/3 =	18.9	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2035	2036	2019	3	5C	2060
NUMBER OF BLOWS	40	35	23	19	14	10-
WT OF DISH + WET SOIL g	9.61	9.31	9.67	9.38	9.60	9.58
WT OF DISH + DRY SOIL g	6.04	5.82	5.99	5.71	5.79	5.68
WT OF MOISTURE	3.57	3.49	3.68	3.61	3.81	3.90
WT OF DISH	1.05	1.06	1.07	1.06	1.06	1.03
WT OF DRY SOIL	4.99	4.76	4.92	4.65	4.73	4.65
MOISTURE CONTENT %	71.5	73.3	74.8	78.9	80.6	83.9



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		75.8	18.9	56.9	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	56.0'	DATE TESTED	03-24-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	60.40
Wt. Dry Soil & Pan	(g)	58.95
Wt. Lost Moisture	(g)	1.45
Wt. of Pan Only	(g)	3.64
Wt. of Dry Soil	(g)	55.31
Moisture Content	%	2.6

Wt. Hydrom. Sample Wet (g)	55.06
Wt. Hydrom. Sample Dry (g)	53.65

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.06
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.06
Weight of - #10 Dry (g)	53.65
Wt. Total Sample Dry (g)	53.65
Calc. Wt. "W" (g)	53.65
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	2.28	0.71	0.71	1.3	98.7
#40	1.36	1.78	0.42	1.13	2.1	97.9
#60	1.57	1.73	0.16	1.29	2.4	97.6
#100	1.57	1.66	0.09	1.38	2.6	97.4
#230	1.55	1.86	0.31	1.69	3.1	96.9

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	7+00	SAMPLED	Rocky Flats
DEPTH	56.0'	DATE TESTED	03-24-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

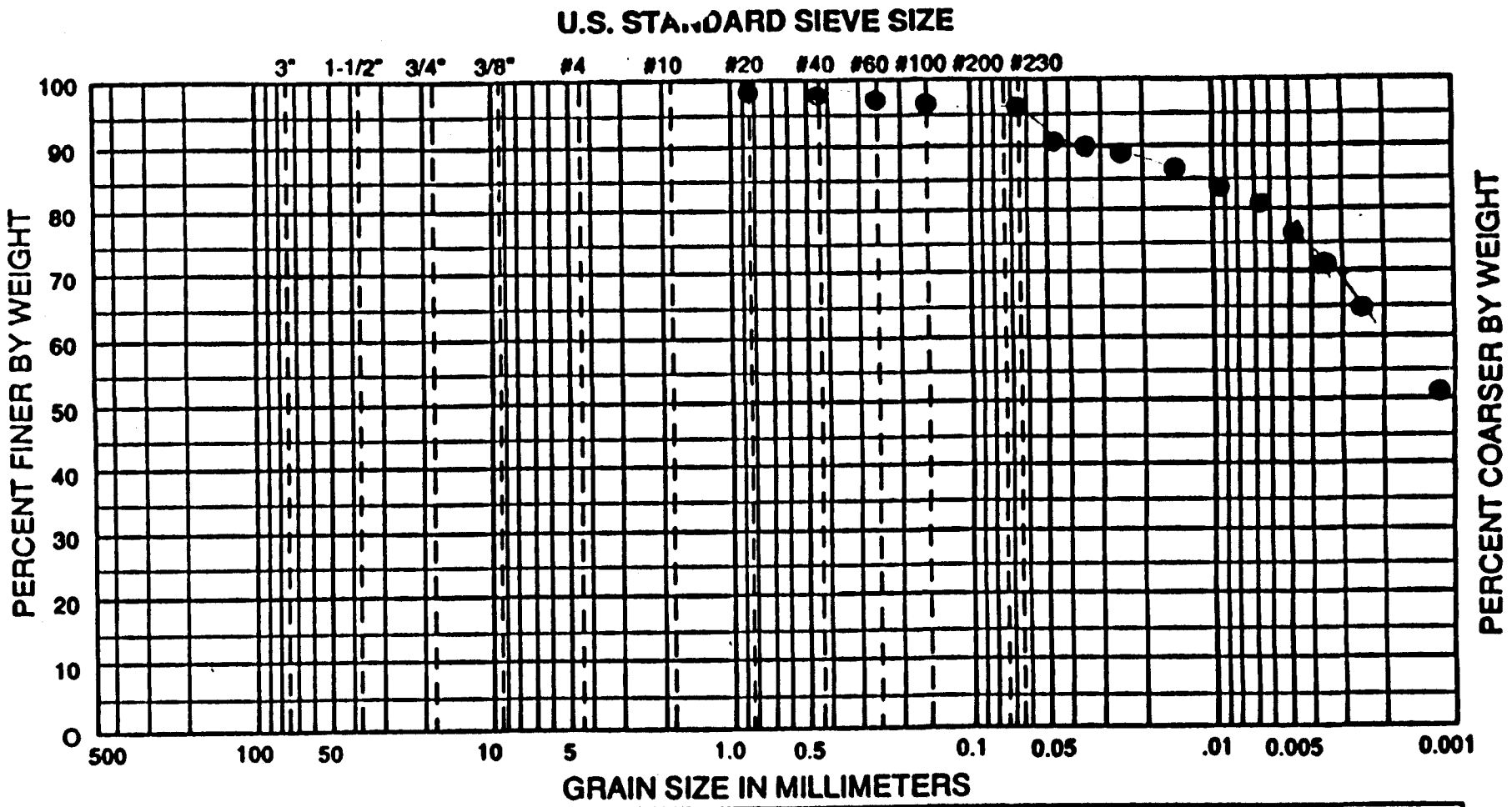
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	53.653
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.50	50.50	91.9	91.9	7.19	0.0488
1.0	54.50	49.50	90.0	90.0	7.35	0.0349
2.0	54.00	49.00	89.1	89.1	7.43	0.0248
5.0	53.00	48.00	87.3	87.3	7.60	0.0159
15.0	51.50	46.50	84.6	84.6	7.84	0.0093
30.0	49.50	44.50	80.9	80.9	8.17	0.0067
60.0	47.00	42.00	76.4	76.4	8.58	0.0049
120.0	44.00	39.00	70.9	70.9	9.07	0.0035
250.0	41.00	36.00	65.5	65.5	9.57	0.0025
1440.0	33.00	28.00	50.9	50.9	10.88	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+00 SAMPLE NO.: CH #17 DATE: 4-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION Silty Claystone
	56.0'	Bo[illegible] FLATS / EG+G [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats / E626
BORING 7tao SAMPLE #12 DEPTH @ 5.0'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

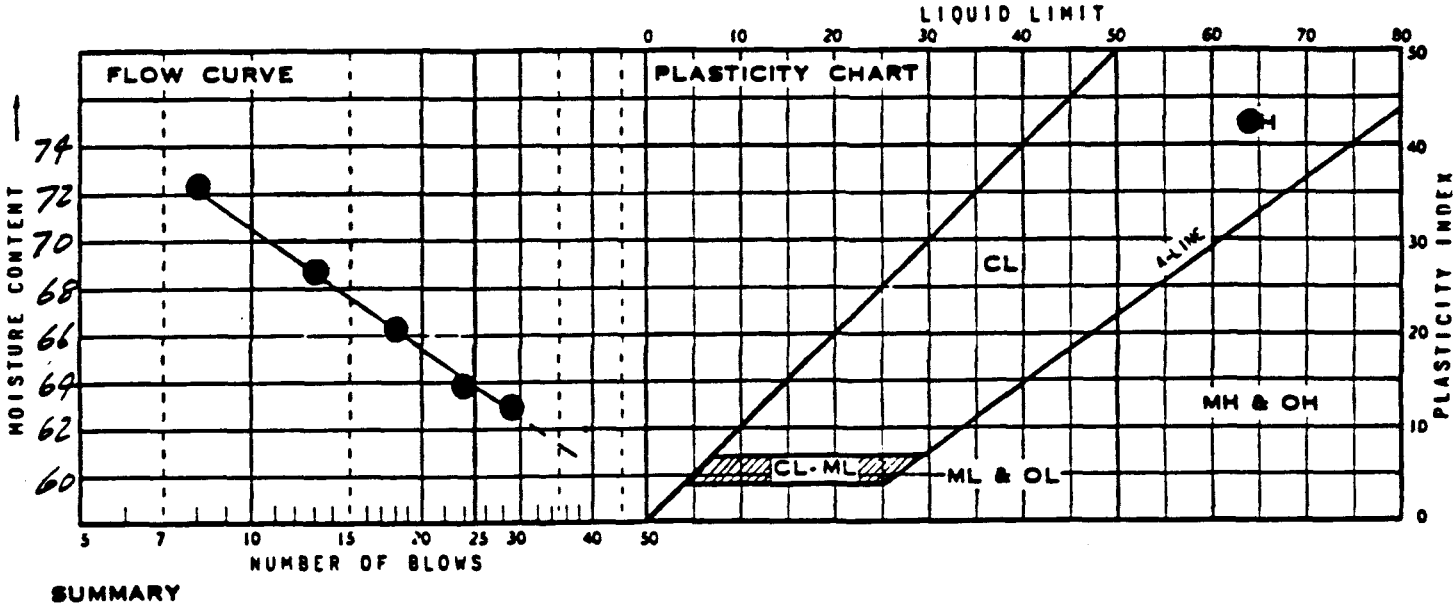
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY 3/31/92

DETERMINATION	1	2	3	4	5	6
DISH	28C	38C	2035			
WT OF DISH + WET SOIL g	7.36	6.39	5.98			
WT OF DISH + DRY SOIL g	6.25	5.44	5.11	—	—	—
WT OF MOISTURE	1.11	0.95	0.87			
WT OF DISH	1.05	1.04	1.05	—	—	—
WT OF DRY SOIL	5.20	4.40	4.06			
MOISTURE CONTENT %	21.4	21.6	21.4	= 64.4/3 = 21.5		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	43C	25C	22	2071	2007	41C
NUMBER OF BLOWS	39	29	24	18+	13	8+
WT OF DISH + WET SOIL g	8.98	11.38	9.32	12.52	9.65	11.56
WT OF DISH + DRY SOIL g	5.94	7.39	6.10	7.95	6.15	7.14
WT OF MOISTURE	3.04	3.99	3.22	4.57	3.50	4.42
WT OF DISH	1.04	1.05	1.05	1.06	1.05	1.03
WT OF DRY SOIL	4.90	6.34	5.05	6.89	5.10	6.11
MOISTURE CONTENT %	62.0	62.9	63.8	66.3	68.6	72.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		63.8	21.5	42.3	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	15'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	50.90
Wt. Dry Soil & Pan	(g)	49.18
Wt. Lost Moisture	(g)	1.72
Wt. of Pan Only	(g)	3.76
Wt. of Dry Soil	(g)	45.42
Moisture Content	%	3.8
Wt. Hydrom. Sample Wet	(g)	55.00
Wt. Hydrom. Sample Dry	(g)	53.00

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	558.43
Weight of + #10 Before Washing (g)	5.10
Weight of + #10 After Washing (g)	2.75
Weight of - #10 Wet (g)	553.33
Weight of - #10 Dry (g)	535.40
Wt. Total Sample Dry (g)	538.1[illegible]
Calc. Wt. "W" (g)	53.27
Calc. Mass + #10	0.27

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	1.36	1.36	1.36	0.3	99.7
#10	0.00	1.39	1.39	2.75	0.5	99.5
#20	1.56	1.72	0.16	0.16	0.8	99.2
#40	1.57	2.18	0.61	0.77	2.0	98.0
#60	1.55	2.97	1.42	2.19	4.6	95.4
#100	1.55	5.30	3.75	5.94	11.7	88.3
#230	1.56	9.27	7.71	13.65	26.1	73.9

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

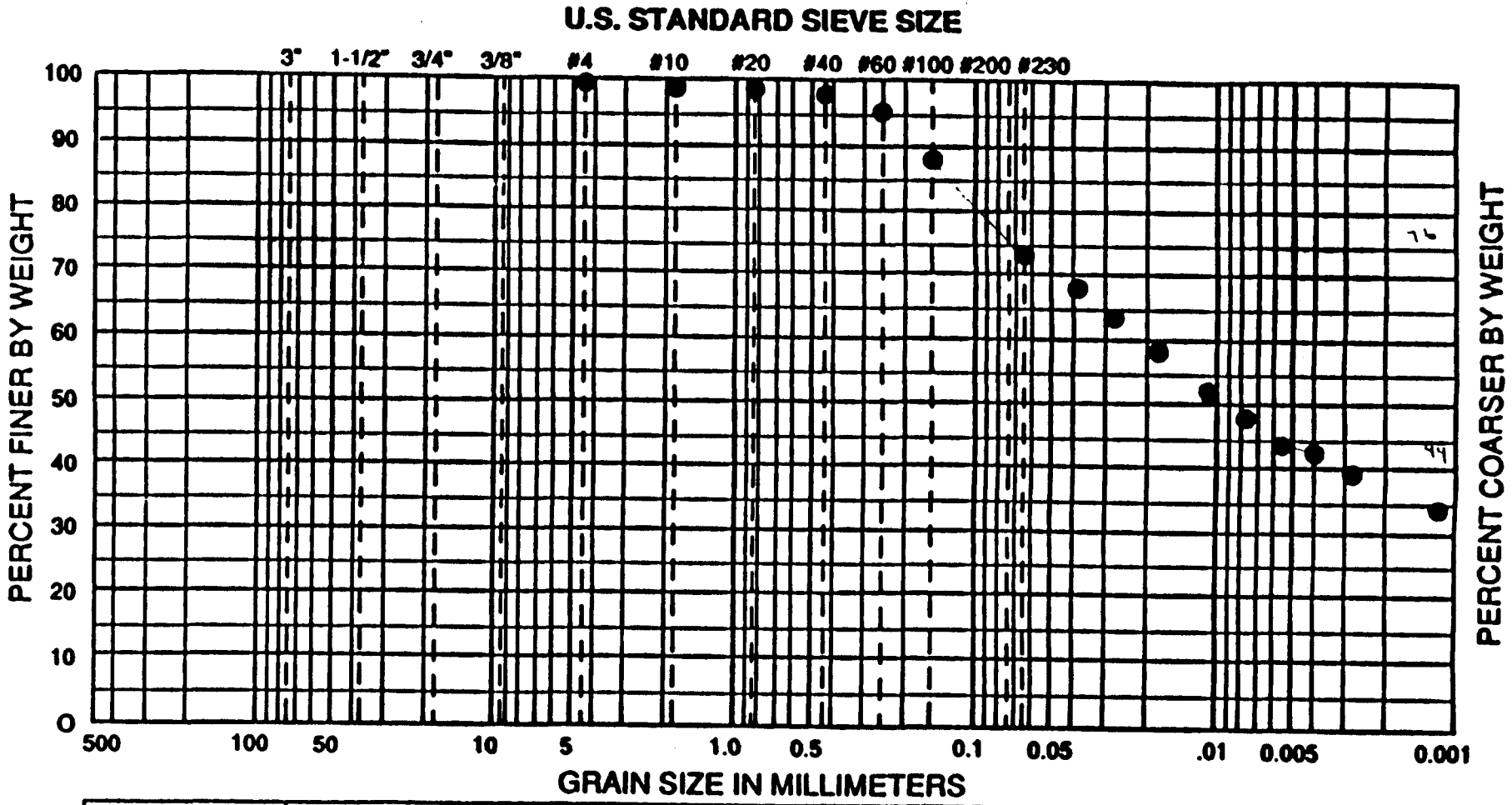
CLIENT	Weston	JOB NO.	2066-03
BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	15'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	53.268
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	45.50	40.50	74.2	74.2	8.83	0.0541
1.0	42.50	37.50	68.7	68.7	9.32	0.0393
2.0	40.00	35.00	64.1	64.1	9.73	0.0284
5.0	37.00	32.00	58.6	58.6	10.22	0.0184
15.0	33.00	28.00	51.3	51.3	10.88	0.0110
30.0	31.50	26.50	48.6	48.6	11.12	0.0078
60.0	29.50	24.50	44.9	44.9	11.45	0.0056
120.0	28.00	23.00	42.1	42.1	11.70	0.0040
250.0	26.50	21.50	39.4	39.4	11.94	0.0028
1440.0	24.00	19.00	34.8	34.8	12.35	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+25 SAMPLE NO.: CH #12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION		
Rocky Flats	15.0'	Silty clay with some sand + gravel		
		0 .3	.2 1.5 22	32 1

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-09

CLIENT/OWNER WESTON

LOCATION _____

BORING 7+25 SAMPLE C-#12 DEPTH 15.0'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

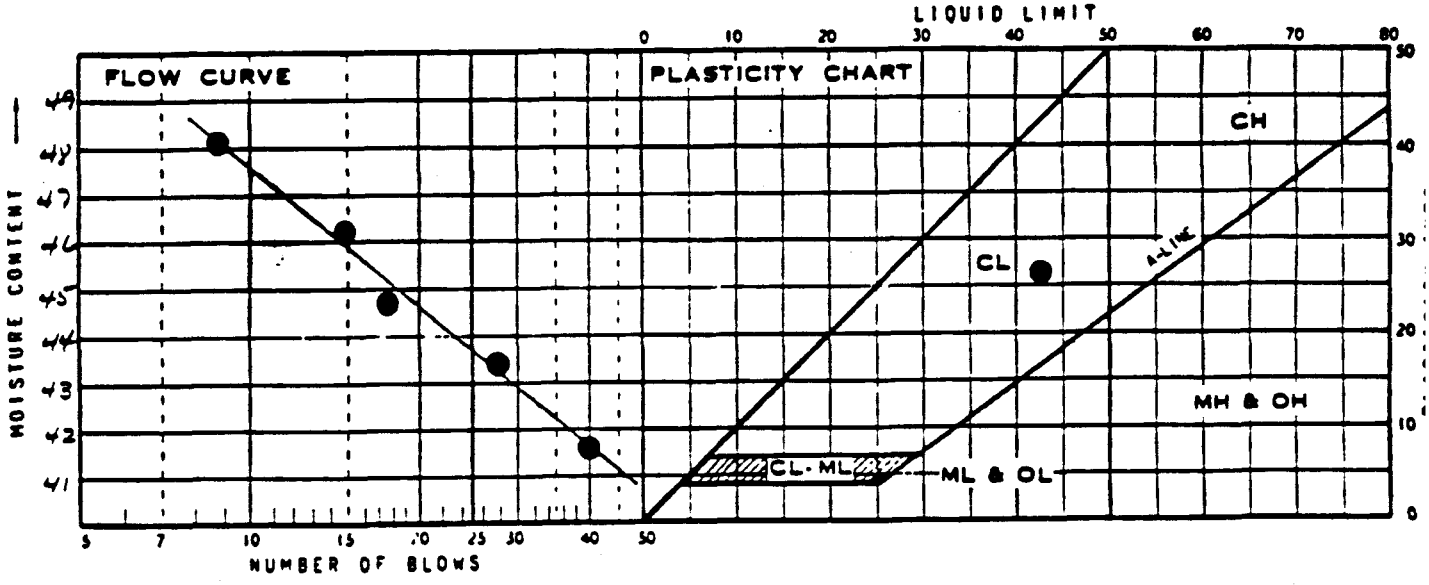
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/19/92

DETERMINATION	1	2	3	4	5	6
DISH	2008	2011	44 CL			
WT OF DISH + WET SOIL g	7.22	7.11	6.84			
WT OF DISH + DRY SOIL g	6.31	6.19	6.00	—	—	—
WT OF MOISTURE g	.91	.92	.84			
WT OF DISH g	1.06	1.05	1.07	—	—	—
WT OF DRY SOIL g	5.25	5.14	4.93			
MOISTURE CONTENT %	17.3	17.9	17.0			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	23 C	36 C	2046	34 CL	2056	
NUMBER OF BLOWS	40	28	18	15	9±	
WT OF DISH + WET SOIL g	13.86	12.17	16.68	15.34	16.02	
WT OF DISH + DRY SOIL g	10.10	8.80	11.85	10.82	11.16	—
WT OF MOISTURE g	3.76	3.37	4.83	4.52	4.86	
WT OF DISH g	1.07	1.04	1.06	1.03	1.05	—
WT OF DRY SOIL g	9.03	7.76	10.79	9.79	10.11	
MOISTURE CONTENT %	41.6	43.4	44.8	46.2	48.1	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		43.8	17.4	26.4	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	25'	DATE TESTED	03-17-92 TN
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

D 3

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	37.57
Wt. Dry Soil & Pan	(g)	36.63
Wt. Lost Moisture	(g)	0.94
Wt. of Pan Only	(g)	3.76
Wt. of Dry Soil	(g)	32.87
Moisture Content	%	2.9
Wt. Hydrom. Sample Wet	(g)	55.01
Wt. Hydrom. Sample Dry	(g)	53.48

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	940.89
Weight of + #10 Before Washing (g)	439.25
Weight of + #10 After Washing (g)	402.74
Weight of - #10 Wet (g)	501.64
Weight of - #10 Dry (g)	523.19
Wt. Total Sample Dry (g)	925.9
Calc. Wt. "W" (g)	94.65
Calc. Mass + #10	41.17

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	315.17	315.17	315.17	34.0	66.0
3/8"	0.00	53.28	53.28	368.45	39.8	60.2
#4	0.00	19.64	19.64	388.09	41.9	58.1
#10	0.00	14.65	14.65	402.74	43.5	56.5
#20	1.57	3.06	1.49	1.49	45.1	54.9
#40	1.55	3.41	1.86	3.35	47.0	53.0
#60	1.56	3.29	1.73	5.08	48.9	51.1
#100	1.57	4.42	2.85	7.93	51.9	48.1
#230	1.32	7.71	6.39	14.32	58.6	41.4 — 43

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	25'	DATE TESTED	03-17-92 TNC
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

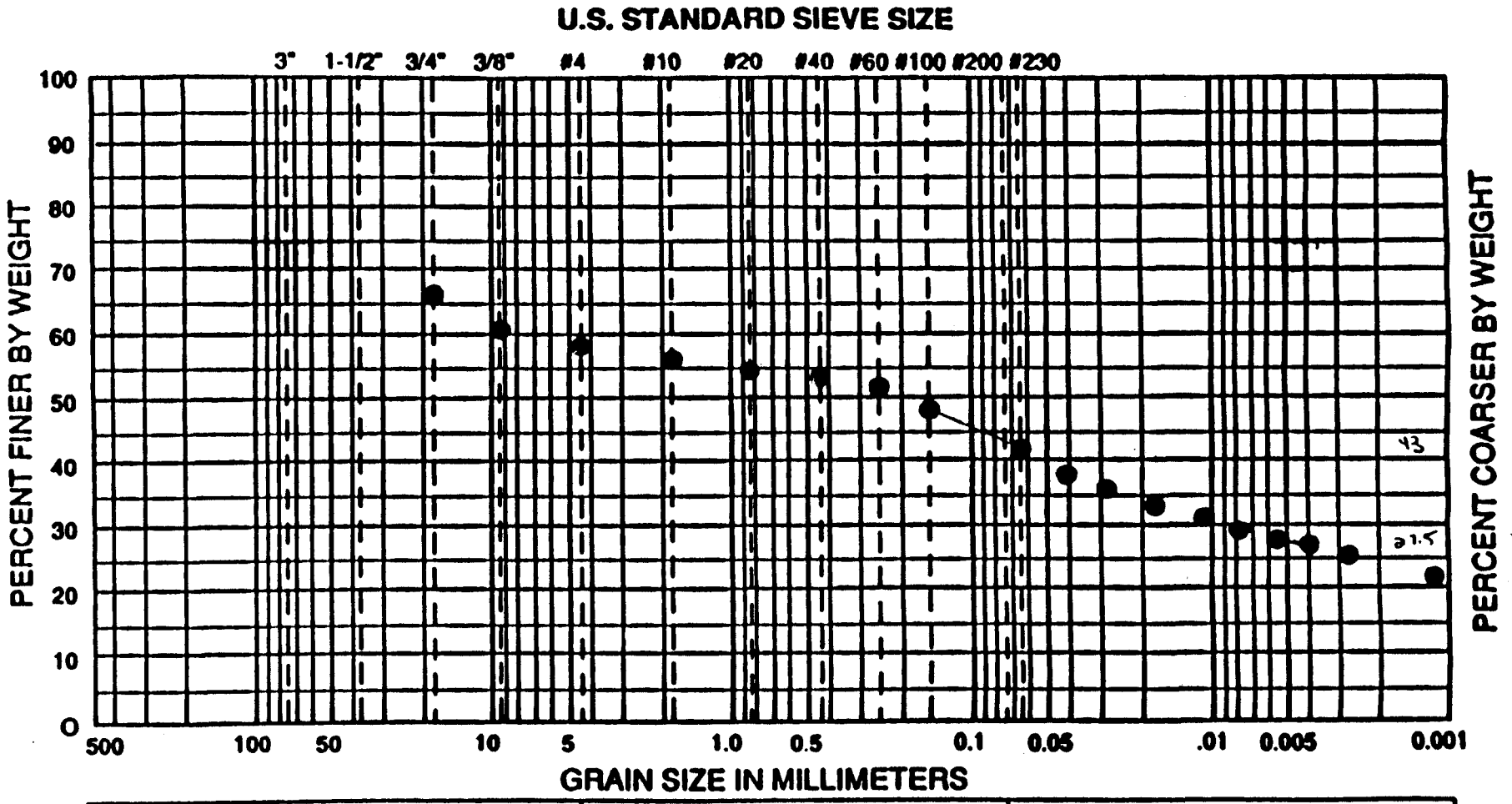
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	94.645
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Deptn L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.50	39.50	41.2	41.2	8.99	0.0555
1.0	41.50	36.50	38.1	38.1	9.48	0.0403
2.0	39.00	34.00	35.5	35.5	9.89	0.0291
5.0	37.50	32.50	33.9	33.9	10.14	0.0186
15.0	34.50	29.50	30.8	30.8	10.63	0.0110
30.0	33.25	28.25	29.5	29.5	10.84	0.0079
60.0	31.50	26.50	27.7	27.7	11.12	0.0056
120.0	30.50	25.50	26.6	26.6	11.29	0.0040
250.0	29.00	24.00	25.1	25.1	11.53	0.0028
1440.0	25.50	20.50	21.4	21.4	12.11	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+25 SAMPLE NO.: CH #12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION								
		clayey gravel								
			11.9			15.1				
Rocky Flats	25.0'	3.9		7.9	1.6	3.5	10	15.5		57.5

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS/ EG&G

BORING 7+25 SAMPLE CH #12 DEPTH 25.0'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

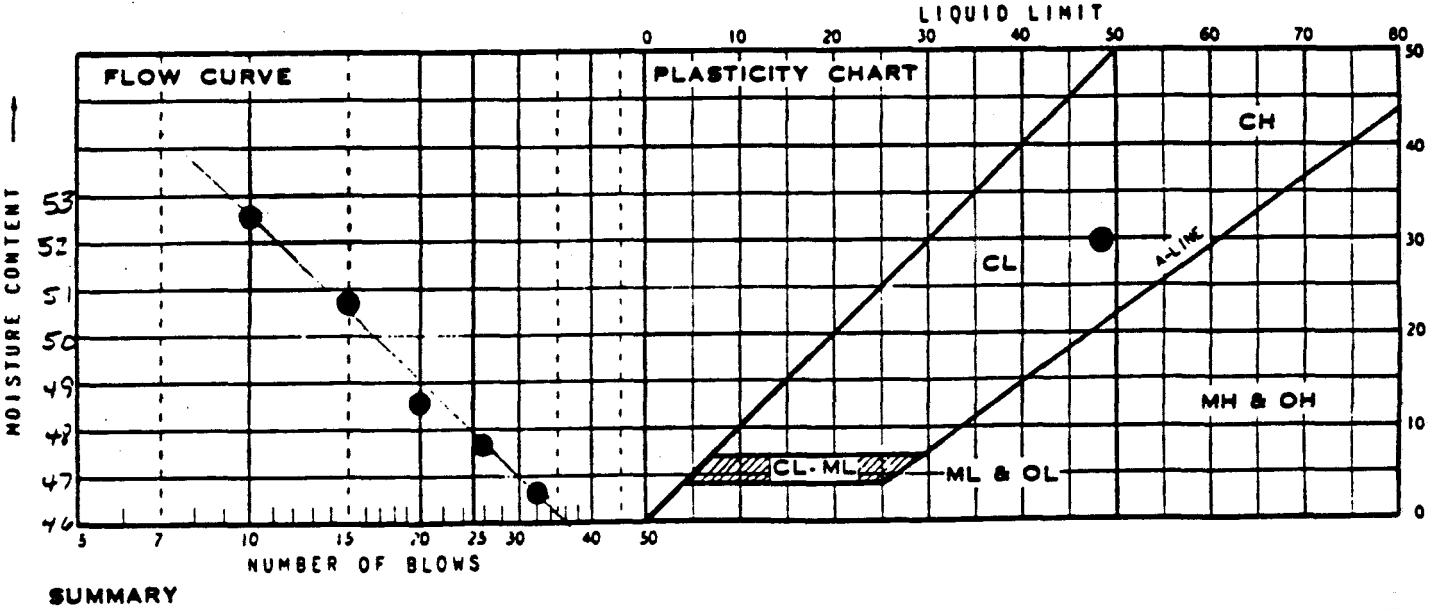
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. 3.120192.

DETERMINATION	1	2	3	4	5	6
DISH	2066	2056	2052			
WT OF DISH + WET SOIL g	8.12	6.98	6.66			
WT OF DISH + DRY SOIL g	7.03	6.07	5.77	—	—	—
WT OF MOISTURE g	1.09	.91	.89			
WT OF DISH g	1.05	1.05	1.03	—	—	—
WT OF DRY SOIL g	5.98	5.02	4.74			
MOISTURE CONTENT %	18.2	18.1	18.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2002	2009	32 C	2023	29 C	
NUMBER OF BLOWS	32	26	20	15	11±	
WT OF DISH + WET SOIL g	15.82	13.94	13.57	13.31	12.22	
WT OF DISH + DRY SOIL g	11.12	9.77	9.47	9.19	8.37	—
WT OF MOISTURE g	4.70	4.17	4.10	4.12	3.85	
WT OF DISH g	1.06	1.05	1.04	1.06	1.05	—
WT OF DRY SOIL g	10.06	8.72	8.43	8.13	7.32	
MOISTURE CONTENT %	46.7	47.8	48.6	50.7	52.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		47.9	[illegible]	29.5	CL	

ADVANCED TERRA TESTING Inc

jlm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	33'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

oB

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	46.90
Wt. Dry Soil & Pan	(g)	45.54
Wt. Lost Moisture	(g)	1.36
Wt. of Pan Only	(g)	3.70
Wt. of Dry Soil	(g)	41.84
Moisture Content	%	3.3

Wt. Hydrom. Sample Wet (g)	54.96
Wt. Hydrom. Sample Dry (g)	53.23

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	697.04
Weight of + #10 Before Washing (g)	225.10
Weight of + #10 After Washing (g)	185.72
Weight of - #10 Wet (g)	471.94
Weight of - #10 Dry (g)	495.22
Wt. Total Sample Dry (g)	680.9
Calc. Wt. "W" (g)	73.19
Calc. Mass + #10	19.96

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	72.85	72.85	72.85	10.7	89.3
3/8"	0.00	41.96	41.96	114.81	16.9	83.1
#4	0.00	36.50	36.50	151.31	22.2	77.8
#10	0.00	34.41	34.41	185.72	27.3	72.7
#20	1.56	2.12	0.56	0.56	28.0	72.0
#40	1.55	2.66	1.11	1.67	29.6	70.4
#60	1.57	3.03	1.46	3.13	31.6	68.4
#100	1.57	4.03	2.46	5.59	34.9	65.1
#230	1.56	6.64	5.08	10.67	41.9	58.1 — 64

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	33'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

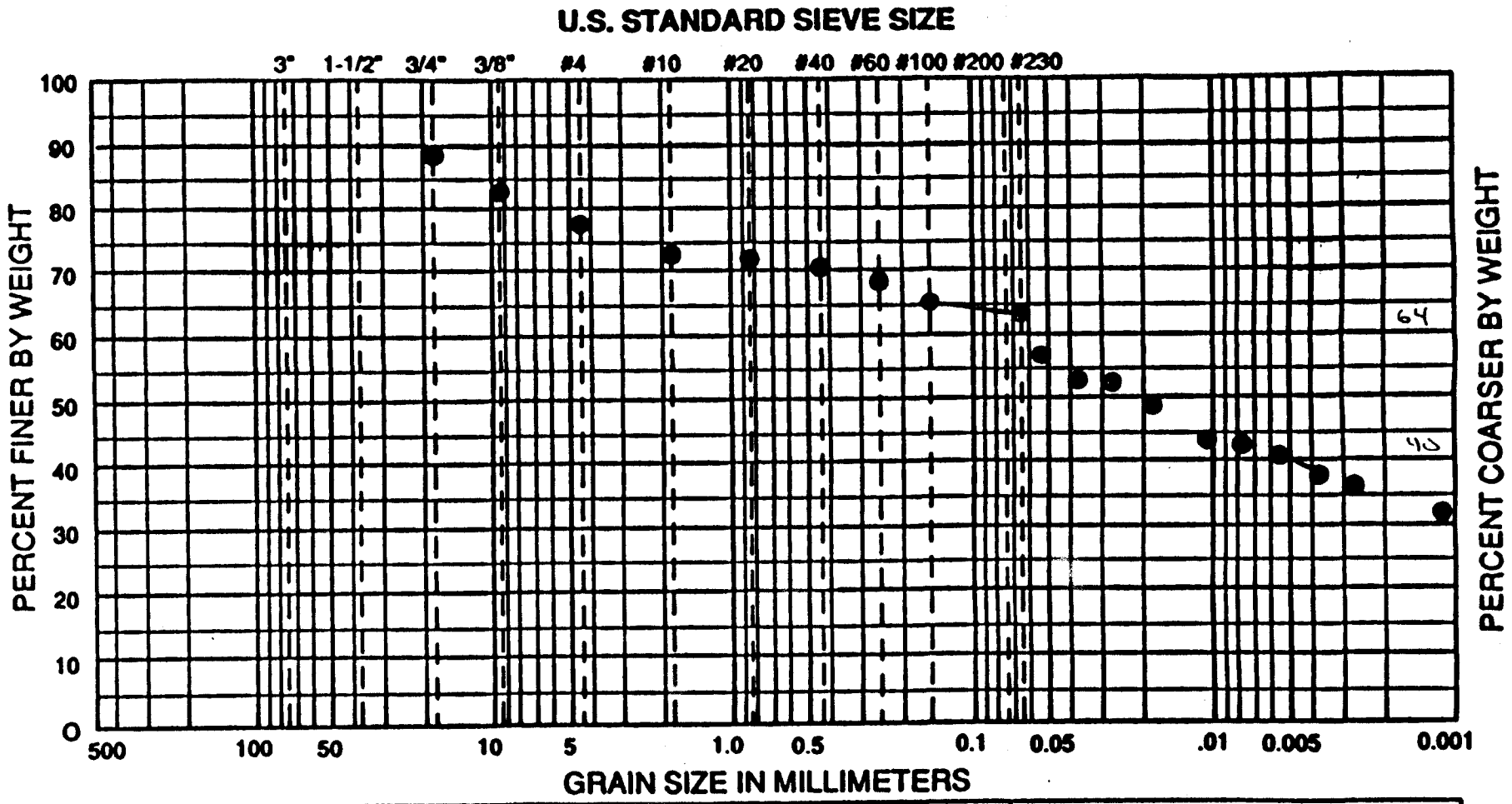
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	73.192
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	42.00	56.7	56.7	8.58	0.0542
1.0	45.00	40.00	54.0	54.0	8.91	0.0390
2.0	44.00	39.00	52.6	52.6	9.07	0.0279
5.0	41.50	36.50	49.3	49.3	9.48	0.0180
15.0	38.00	33.00	44.5	44.5	10.06	0.0107
30.0	36.75	31.75	42.9	42.9	10.26	0.0077
60.0	35.00	30.00	40.5	40.5	10.55	0.0055
120.0	33.00	28.00	37.8	37.8	10.88	0.0039
250.0	31.75	26.75	36.1	36.1	11.08	0.0028
1440.0	29.00	24.00	32.4	32.4	11.53	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7-25 SAMPLE NO.: CH #12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		clay					
Rocky Flats	33.0'	10.7	2.2 11.5	5.1	13.8 2.3	6.4	24 10

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 7+25 SAMPLE #12 DEPTH @33'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

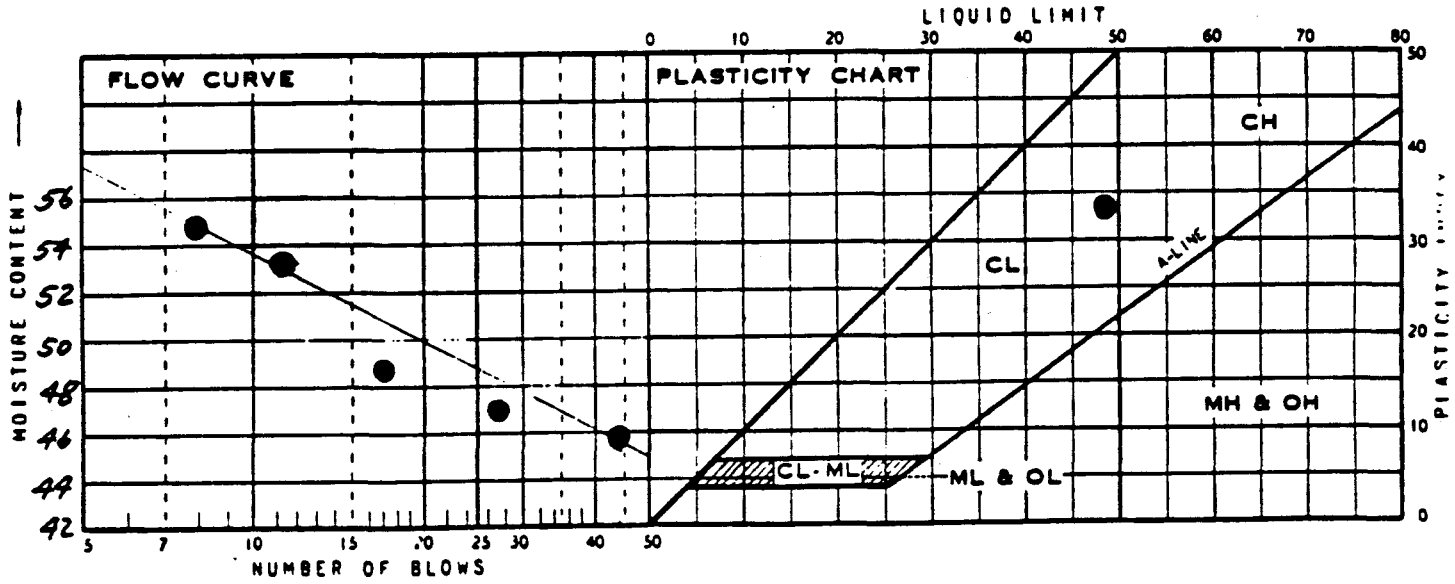
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible].3.120192

DETERMINATION	1	2	3	4	5	6
DISH	2046	2075	2011			
WT OF DISH + WET SOIL	7.86	6.92	7.06			
WT OF DISH + DRY SOIL	6.94	6.14	6.25	—	—	—
WT OF MOISTURE	0.92	0.78	0.81			
WT OF DISH	1.05	1.04	1.05	—	—	—
WT OF DRY SOIL	5.89	5.10	5.20			
MOISTURE CONTENT %	15.6	15.3	15.6	= 46.50/3 = 15.5		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	18C	36C	819	44CX	2022	
NUMBER OF BLOWS	44	27	17	11	8+	
WT OF DISH + WET SOIL	7.82	7.70	7.50	9.23	8.07	
WT OF DISH + DRY SOIL	5.69	5.57	5.39	6.39	5.59	—
WT OF MOISTURE	2.13	2.13	2.11	2.84	2.48	
WT OF DISH	1.04	1.04	1.05	1.06	1.06	—
WT OF DRY SOIL	4.65	4.53	4.34	5.33	4.53	
MOISTURE CONTENT %	45.8	47.0	48.6	53.3	54.8	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		48.7	15.5	33.2	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	44.3'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	37.91
Wt. Dry Soil & Pan	(g)	36.51
Wt. Lost Moisture	(g)	1.40
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	32.83
Moisture Content	%	4.3

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	52.76

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	468.35
Weight of + #10 Before Washing (g)	5.40
Weight of + #10 After Washing (g)	5.09
Weight of - #10 Wet (g)	462.95
Weight of - #10 Dry (g)	444.31
Wt. Total Sample Dry (g)	449.40
Calc. Wt. "W" (g)	53.37
Calc. Mass + #10	0.60

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	3.82	3.82	3.82	0.9	99.1
#10	0.00	1.27	1.27	5.09	1.1	98.9
#20	1.56	1.96	0.40	0.40	1.9	98.1
#40	1.56	2.38	0.82	1.22	3.4	96.6
#60	1.55	2.21	0.66	1.88	4.7	95.3
#100	1.56	2.22	0.66	2.54	5.9	94.1
#230	1.56	2.72	1.16	3.70	8.1	91.9 — 92

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	44.3'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

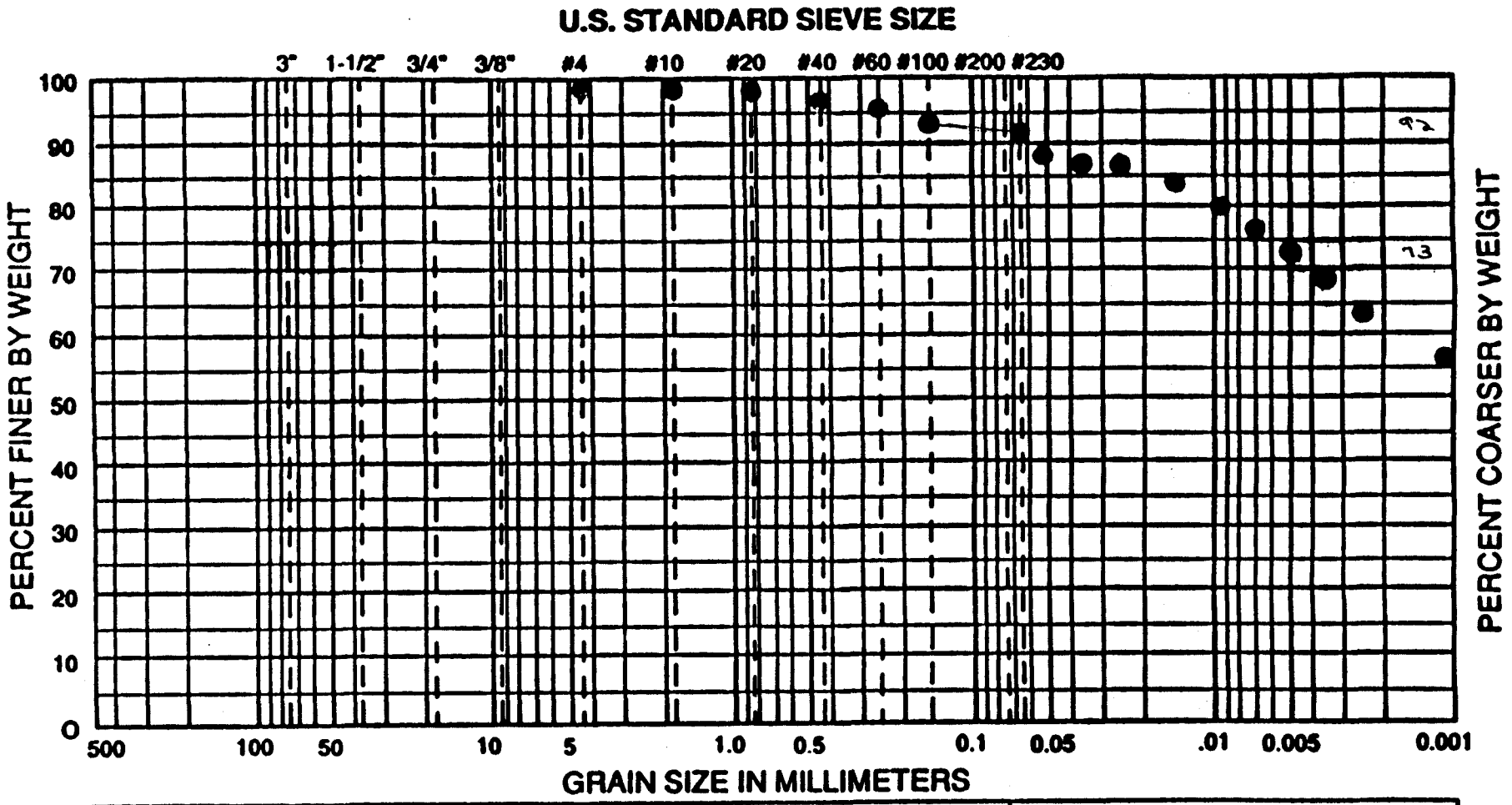
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	53.365
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	53.00	48.00	88.3	88.3	7.60	0.0506
1.0	52.00	47.00	86.5	86.5	7.76	0.0362
2.0	51.75	46.75	86.0	86.0	7.80	0.0256
5.0	51.00	46.00	84.6	84.6	7.93	0.0163
15.0	48.50	43.50	80.0	80.0	8.34	0.0097
30.0	46.50	41.50	76.4	76.4	8.66	0.0070
60.0	45.00	40.00	73.6	73.6	8.91	0.0050
120.0	42.50	37.50	69.0	69.0	9.32	0.0036
250.0	39.75	34.75	63.9	63.9	9.77	0.0026
1440.0	35.50	30.50	56.1	56.1	10.47	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+25 SAMPLE NO.: EH #12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
		clay			7.1			
Rocky Flats	44.3'	0	.9	.1	.2	2.3	4.6	19

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-62

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS/RFO+G

BORING 7325 SAMPLE 6C4-12 DEPTH 44.3'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

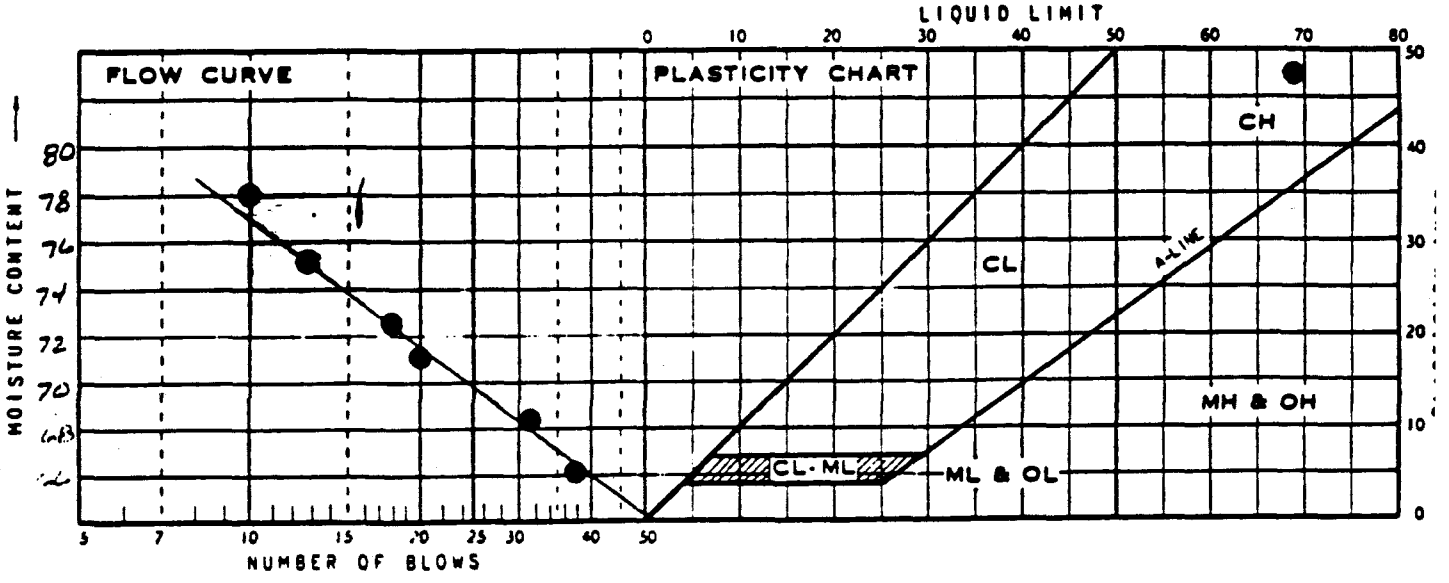
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/21/92

DETERMINATION	1	2	3	4	5	6
DISH	35 C	35 CC	4 C			
WT OF DISH + WET SOIL g	6.10	5.37	6.16			
WT OF DISH + DRY SOIL g	5.24	4.62	5.24	—	—	—
WT OF MOISTURE g	.86	.75	.92			
WT OF DISH g	1.07	1.06	1.06	—	—	—
WT OF DRY SOIL g	4.17	3.56	4.18			
MOISTURE CONTENT %	20.6	21.1	22.0			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2062	5C	43 C	2026	203B	2024
NUMBER OF BLOWS	39	32	21±	18	13±	10
WT OF DISH + WET SOIL g	14.72	11.86	11.85	12.03	10.91	10.56
WT OF DISH + DRY SOIL g	9.26	7.47	7.35	7.41	6.16	6.39
WT OF MOISTURE g	5.46	4.39	4.50	4.62	3.85	4.17
WT OF DISH g	1.04	1.06	1.04	1.05	1.05	1.06
WT OF DRY SOIL g	8.22	6.41	6.31	6.36	5.11	5.33
MOISTURE CONTENT %	66.4	68.5	71.3	72.6	75.3	78.2



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		39	22	17	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	63.5'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#16	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	89.85
Wt. Dry Soil & Pan	(g)	88.30
Wt. Lost Moisture	(g)	1.55
Wt. of Pan Only	(g)	3.54
Wt. of Dry Soil	(g)	84.76
Moisture Content	%	1.8
Wt. Hydrom. Sample Wet	(g)	55.04
Wt. Hydrom. Sample Dry	(g)	54.05

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.04
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.04
Weight of - #10 Dry (g)	54.05
Wt. Total Sample Dry (g)	54.05
Calc. Wt. "W" (g)	54.05
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.78	0.22	0.22	0.4	99.6
#40	1.58	1.67	0.09	0.31	0.6	99.4
#60	1.57	1.62	0.05	0.36	0.7	99.3
#100	1.56	1.65	0.09	0.45	0.8	99.2
#230	1.56	2.18	0.62	1.07	2.0	98.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	63.5'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#16	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

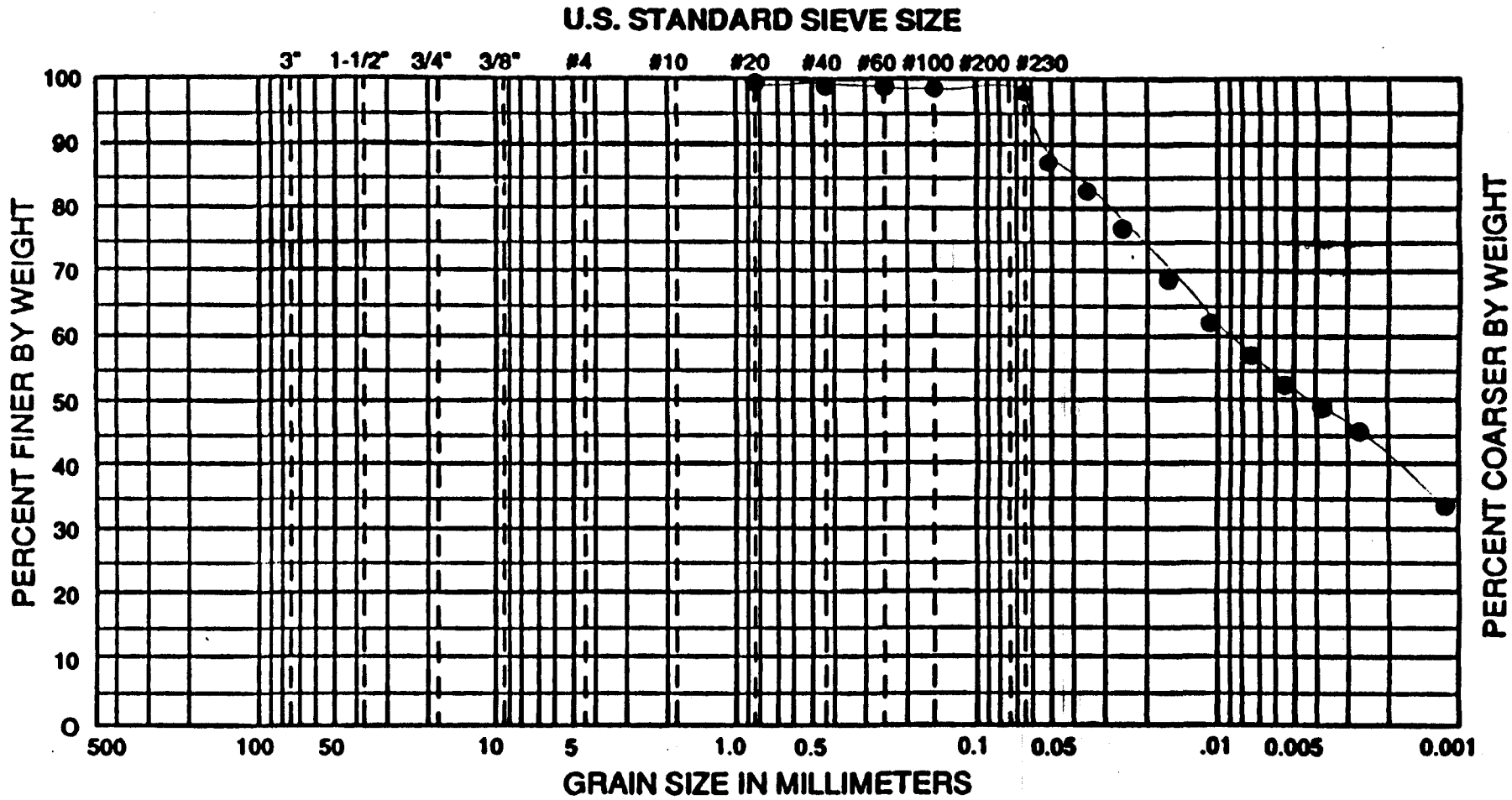
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	54.052
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	54.00	48.00	87.2	87.2	7.43	0.0501
1.0	51.50	45.50	82.7	82.7	7.84	0.0364
2.0	48.00	42.00	76.3	76.3	8.42	0.0266
5.0	44.00	38.00	69.0	69.0	9.07	0.0175
15.0	40.00	34.00	61.8	61.8	9.73	0.0105
30.0	37.50	31.50	57.2	57.2	10.14	0.0075
60.0	35.00	29.00	52.7	52.7	10.55	0.0054
120.0	33.25	27.25	49.5	49.5	10.84	0.0039
250.0	31.00	25.00	45.4	45.4	11.21	0.0027
1440.0	25.00	19.00	34.5	34.5	12.19	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+25 SAMPLE NO.: CH #16 DATE: 4-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION Silty Clay
Rocky Flats	63.5'	.6% [illegible] 1.4% F. Sand, 41.6% Silt, 57.6 [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 7E25 SAMPLE #16 DEPTH @63.5'

FIELD DENSITY BY - - - - - - / - / - -

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

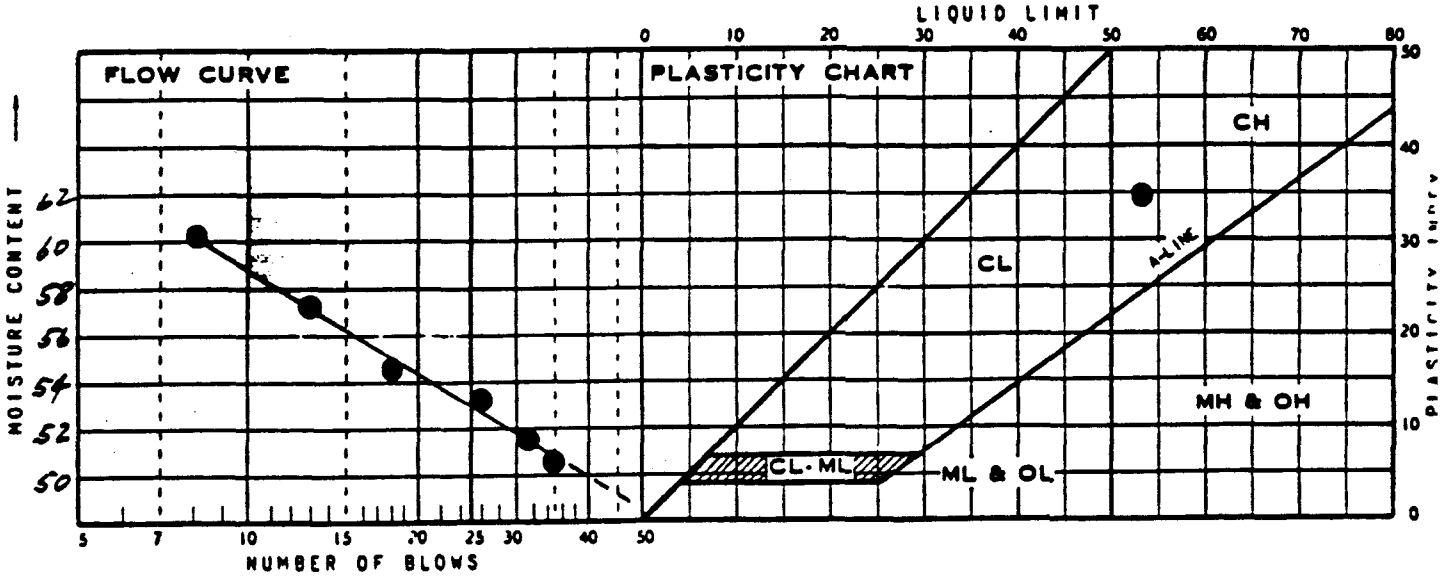
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3.15.92

DETERMINATION	1	2	3	4	5	6
DISH	38C	10C	2018			
WT OF DISH + WET SOIL	6.93	6.45	6.28			
WT OF DISH + DRY SOIL	6.04	5.59	5.48	—	—	—
WT OF MOISTURE	0.89	0.86	0.80			
WT OF DISH	1.04	1.05	1.05	—	—	—
WT OF DRY SOIL	5.00	4.54	4.43			
MOISTURE CONTENT %	17.8	18.9	18.1	= 54.8/3 =	18.3	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	0C	37C	25C	22	2071	41C
NUMBER OF BLOWS	31	35	26+	18-	13	8+
WT OF DISH + WET SOIL	10.51	9.96	9.78	11.01	10.39	9.85
WT OF DISH + DRY SOIL	7.29	6.98	6.75	7.50	6.99	6.54
WT OF MOISTURE	3.22	2.98	3.03	3.51	3.44	3.31
WT OF DISH	1.04	1.07	1.05	1.05	1.05	1.03
WT OF DRY SOIL	6.25	5.91	5.70	6.45	5.94	5.51
MOISTURE CONTENT %	51.5	50.4	53.2	54.4	57.2	60.1



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		53.0	18.3	34.7	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	66.5'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#16	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	66.43
Wt. Dry Soil & Pan	(g)	65.19
Wt. Lost Moisture	(g)	1.24
Wt. of Pan Only	(g)	3.59
Wt. of Dry Soil	(g)	61.60
Moisture Content	%	2.0

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.94

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	53.94
Wt. Total Sample Dry (g)	53.94
Calc. Wt. "W" (g)	53.94
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.54	1.57	0.03	0.03	0.1	99.9
#40	1.56	1.57	0.01	0.04	0.1	99.9
#60	1.57	1.58	0.01	0.05	0.1	99.9
#100	1.57	1.59	0.02	0.07	0.1	99.9
#230	1.57	2.19	0.62	0.69	1.3	98.7

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	66.5'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#16	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

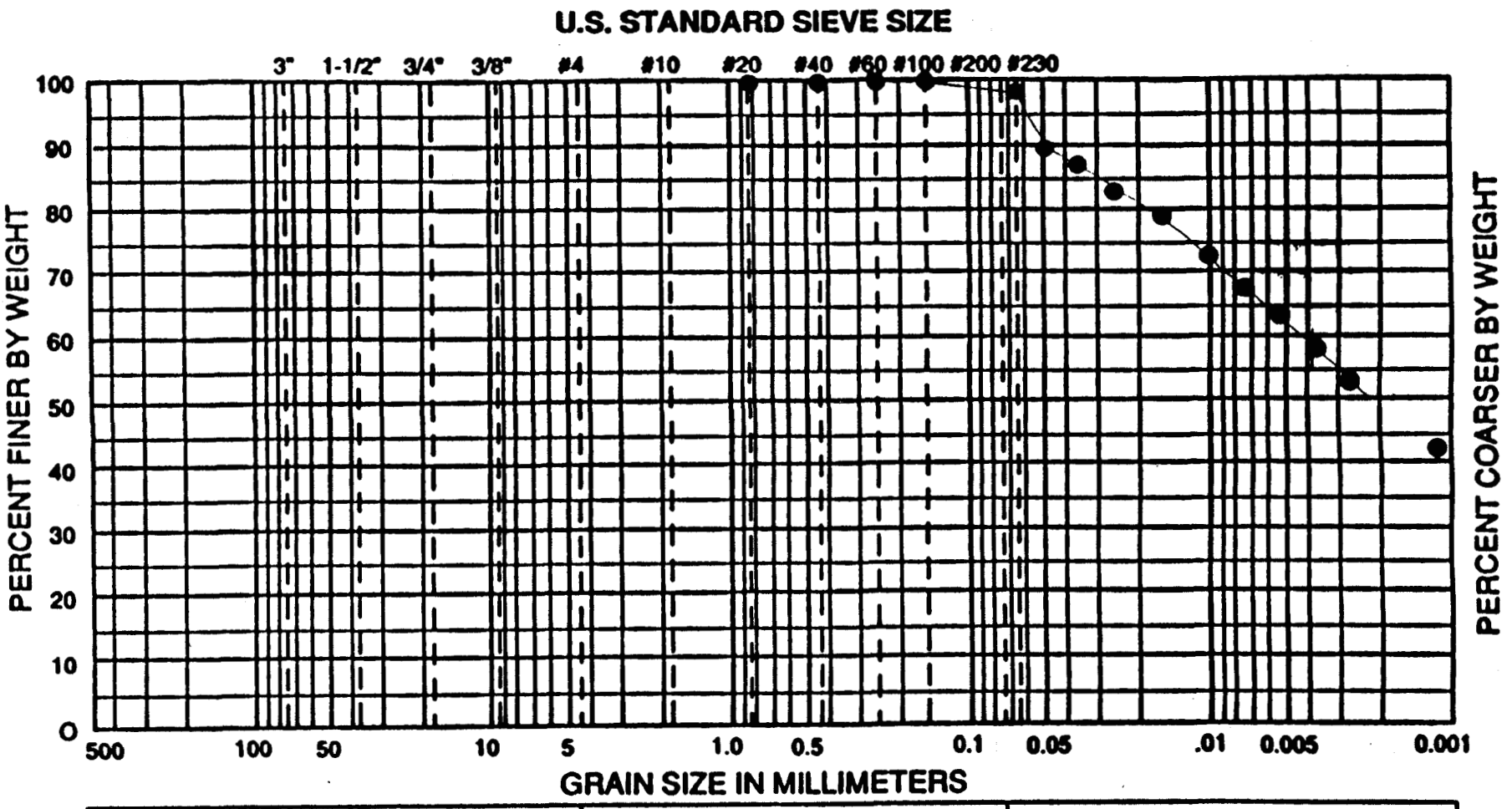
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	53.935
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.00	49.00	89.8	89.8	7.27	0.0499
1.0	53.50	47.50	87.0	87.0	7.52	0.0359
2.0	51.50	45.50	83.3	83.3	7.84	0.0259
5.0	49.50	43.50	79.7	79.7	8.17	0.0167
15.0	46.00	40.00	73.3	73.3	8.75	0.0100
30.0	43.00	37.00	67.8	67.8	9.24	0.0073
60.0	41.00	35.00	64.1	64.1	9.57	0.0052
120.0	38.00	32.00	58.6	58.6	10.06	0.0038
250.0	35.00	29.00	53.1	53.1	10.55	0.0027
1440.0	29.00	23.00	42.1	42.1	11.53	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+25 SAMPLE NO.: CH# 16 DATE: 4-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	66.5'	Silty Claystone .1% [illegible] 1.9% f sand, 40% silt, [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 7-25 SAMPLE CH #16 DEPTH 66.5'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

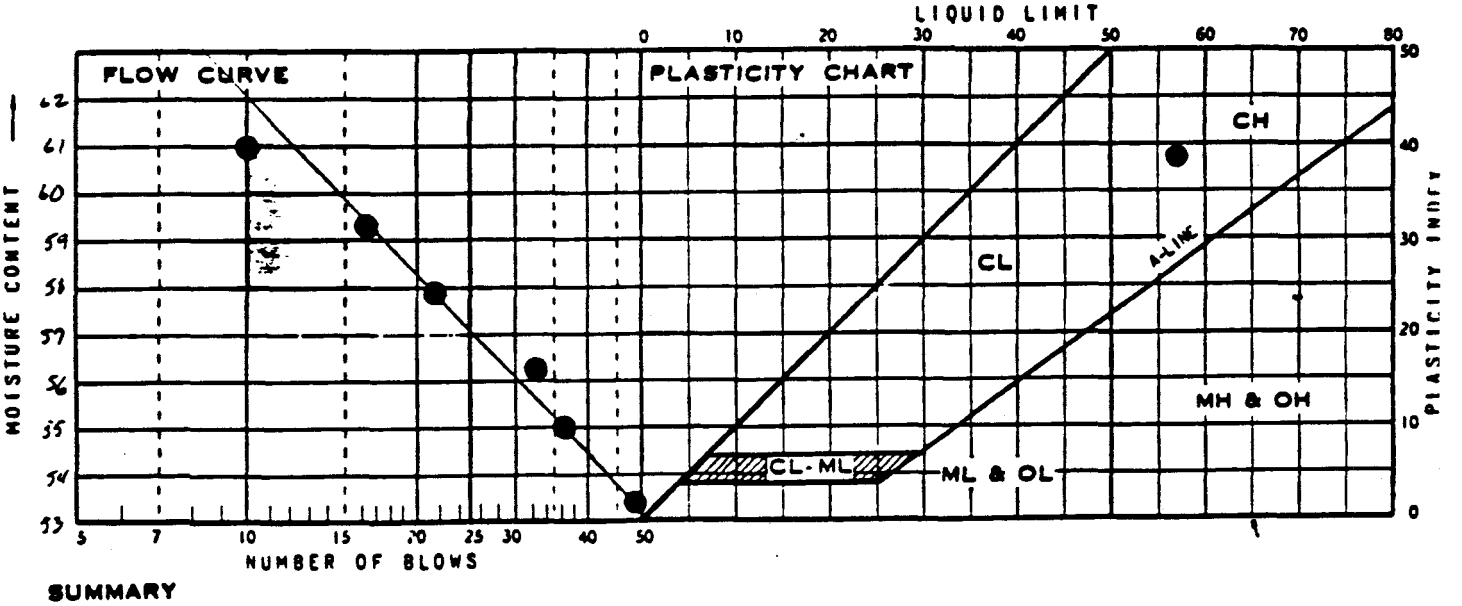
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DA 3/26/93

DETERMINATION	1	2	3	4	5	6
DISH	2020	1C	30C			
WT OF DISH + WET SOIL g	5.86	6.18	6.72			
WT OF DISH + DRY SOIL g	5.11	5.36	5.85	—	—	—
WT OF MOISTURE g	.75	.82	.87			
WT OF DISH g	1.05	1.07	1.05	—	—	—
WT OF DRY SOIL g	4.06	4.29	4.80			
MOISTURE CONTENT %	18.5	19.1	18.1			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B20	B9	2095	9C	2070	48C
NUMBER OF BLOWS	49	36	32	21	16	10
WT OF DISH + WET SOIL g	11.32	12.92	11.25	11.51	13.11	11.33
WT OF DISH + DRY SOIL g	7.74	8.70	7.58	7.68	8.62	7.43
WT OF MOISTURE g	3.58	4.22	3.67	3.83	4.49	3.90
WT OF DISH g	1.04	1.03	1.06	1.07	1.05	1.04
WT OF DRY SOIL g	6.70	7.67	6.52	6.61	7.57	6.39
MOISTURE CONTENT %	53.4	55.0	56.3	57.9	59.3	61.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.0	18.6	38.4	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	67.5'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	52.90
Wt. Dry Soil & Pan	(g)	51.45
Wt. Lost Moisture	(g)	1.45
Wt. of Pan Only	(g)	3.65
Wt. of Dry Soil	(g)	47.80
Moisture Content	%	3.0

Wt. Hydrom. Sample Wet (g)	55.04
Wt. Hydrom. Sample Dry (g)	53.41

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.04
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.04
Weight of - #10 Dry (g)	53.41
Wt. Total Sample Dry (g)	53.41
Calc. Wt. "W" (g)	53.41
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.94	0.38	0.38	0.7	99.3
#40	1.54	1.81	0.27	0.65	1.2	98.8
#60	1.56	1.74	0.18	0.83	1.6	98.4
#100	1.56	1.69	0.13	0.96	1.8	98.2
#230	1.55	1.91	0.36	1.32	2.5	97.5

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weste[illegible] JOB NO. 2066-03

BORING NO.	7+25	SAMPLED	Rocky Flats
DEPTH	67.5'	DATE TESTED	03-31-92 DU
SAMPLE NO.	#17	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

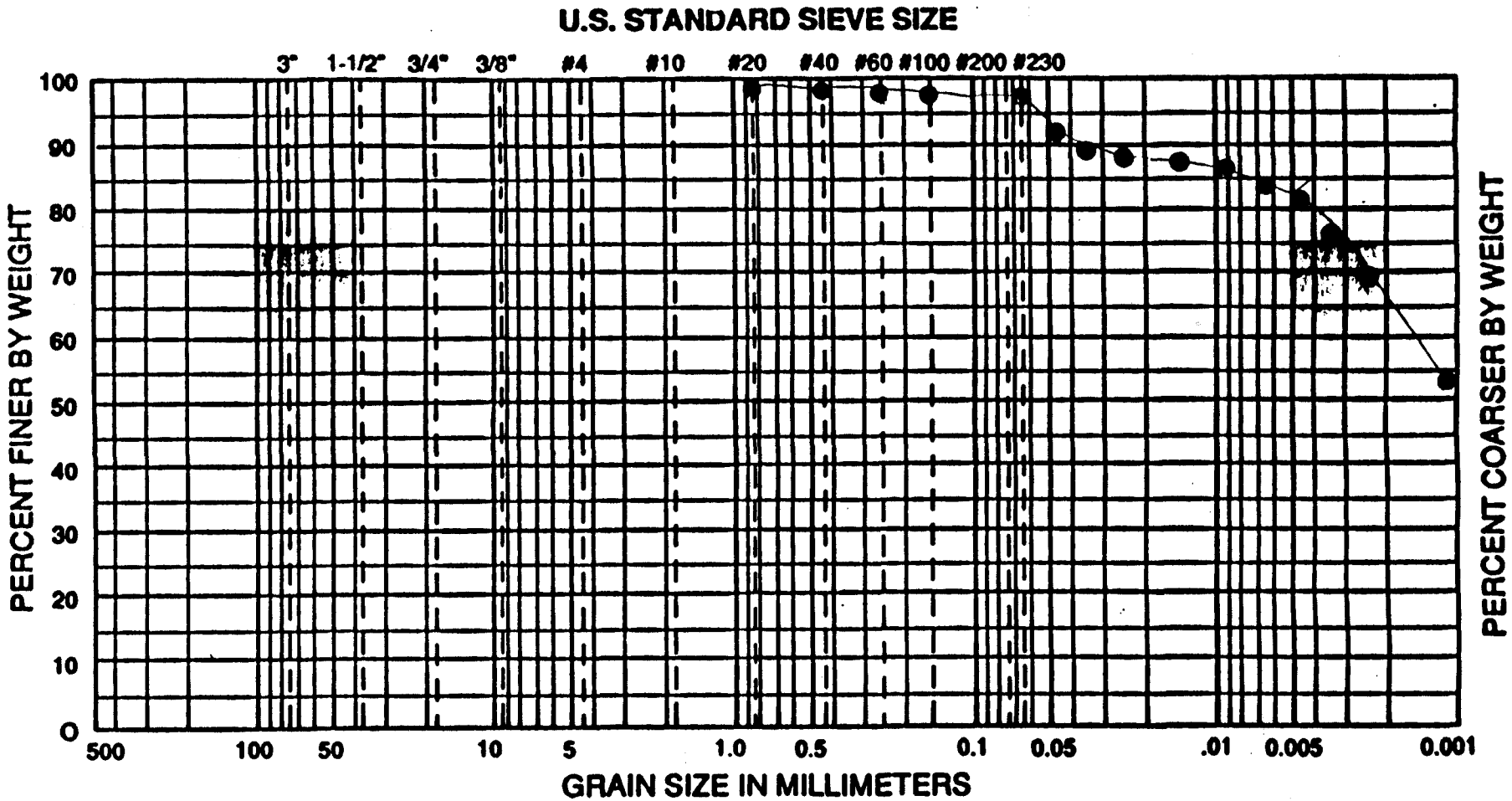
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	53.415
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.00	50.00	91.4	91.4	7.11	0.0485
1.0	55.00	49.00	89.5	89.5	7.27	0.0347
2.0	54.50	48.50	88.6	88.6	7.35	0.0247
5.0	54.00	48.00	87.7	87.7	7.43	0.0157
15.0	53.00	47.00	85.9	85.9	7.60	0.0092
30.0	52.00	46.00	84.1	84.1	7.76	0.0065
60.0	50.25	44.25	80.9	80.9	8.05	0.0047
120.0	47.50	41.50	75.8	75.8	8.50	0.0034
250.0	44.25	38.25	69.9	69.9	9.03	0.0024
1440.0	35.50	29.50	53.9	53.9	10.47	0.0011

Grain Diamet[illegible] = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS.	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 1+25 SAMPLE NO.: CH#17 DATE: 4-3-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	67.5'	0.2 0.4 0.9 17.5 20 15% 82.5%

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats
BORING 7-25 SAMPLE CM #17 DEPTH 67.5'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

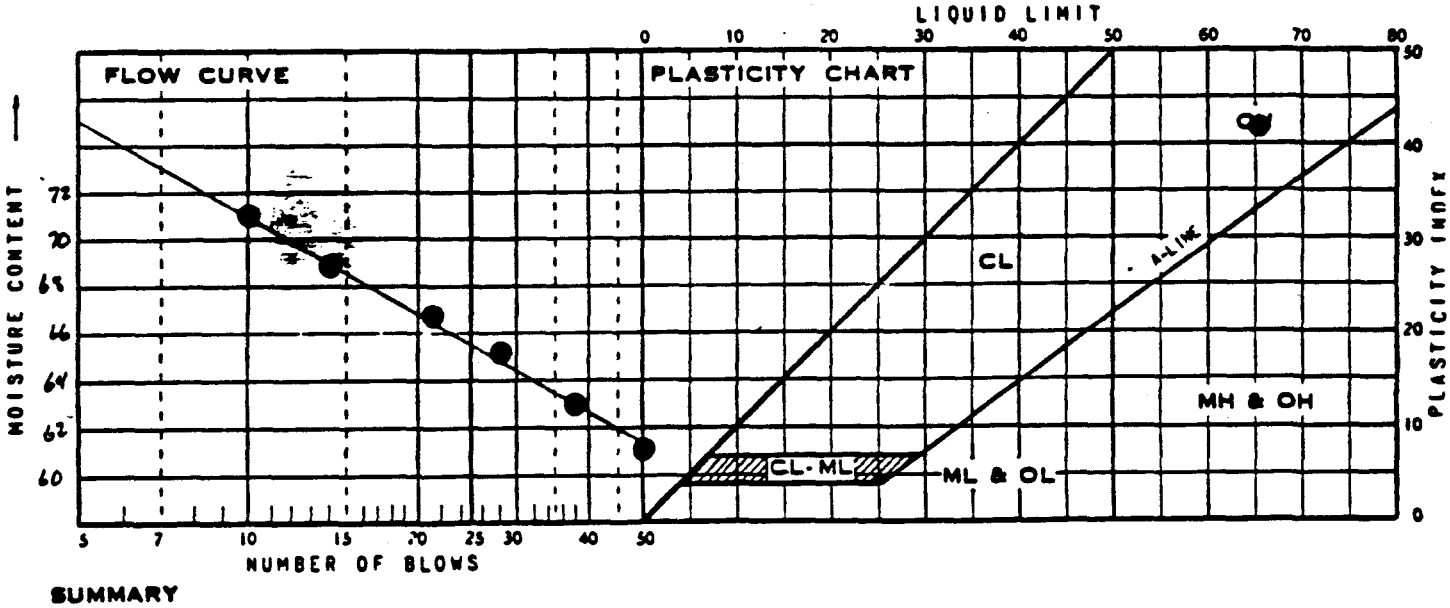
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DM 3/27/93

DETERMINATION	? 1??	2	3	4	5	6
DISH	35CC	2023	2062			
WT OF DISH + WET SOIL g	6.63	6.09	6.345			
WT OF DISH + DRY SOIL g	5.49	5.15	5.32	—	—	—
WT OF MOISTURE g	1.14	.94	1.025			
WT OF DISH g	1.05	1.06	1.04	—	—	—
WT OF DRY SOIL g	4.44	4.09	4.28			
MOISTURE CONTENT %	25.7	23.0	23.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	35C	34CX	4C	81	2024	2038
NUMBER OF BLOWS	50	39	28	21	14	10
WT OF DISH + WET SOIL g	10.97	10.54	13.71	11.88	11.48	10.94
WT OF DISH + DRY SOIL g	7.21	6.86	8.71	7.54	7.23	6.83
WT OF MOISTURE g	3.76	3.68	5.00	4.34	4.25	4.11
WT OF DISH g	1.06	1.03	1.05	1.03	1.06	1.05
WT OF DRY SOIL g	6.15	5.83	7.66	6.51	6.17	5.78
MOISTURE CONTENT %	61.1	63.1	65.3	66.7	68.9	71.1



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		65.5	23.5	42.0	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	23.0'	DATE TESTED	03-17-92 TNC
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

GB

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	38.69
Wt. Dry Soil & Pan	(g)	37.82
Wt. Lost Moisture	(g)	0.87
Wt. of Pan Only	(g)	3.85
Wt. of Dry Soil	(g)	33.97
Moisture Content	%	2.6

Wt. Hydrom. Sample Wet (g)	55.06
Wt. Hydrom. Sample Dry (g)	53.69

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	829.94
Weight of + #10 Before Washing (g)	386.27
Weight of + #10 After Washing (g)	378.23
Weight of - #10 Wet (g)	442.67
Weight of - #10 Dry (g)	439.46
Wt. Total Sample Dry (g)	817.69
Calc. Wt. "W" (g)	99.90
Calc. Mass + #10	46.21

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	74.96	74.96	74.96	9.2	90.8
3/4"	0.00	49.90	49.90	124.86	15.3	84.7
3/8"	0.00	130.17	130.17	255.03	31.2	68.8
#4	0.00	72.47	72.47	327.50	40.1	59.9
#10	0.00	50.73	50.73	378.23	46.3	53.7
#20	1.57	3.09	1.52	1.52	47.8	52.2
#40	1.31	5.15	3.84	5.36	51.6	48.4
#60	1.30	5.88	4.58	9.94	56.2	43.8
#100	1.56	7.38	5.82	15.76	62.0	38.0
#230	1.57	9.63	8.06	23.82	70.1	29.9

31

Sandy Gravel (G

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

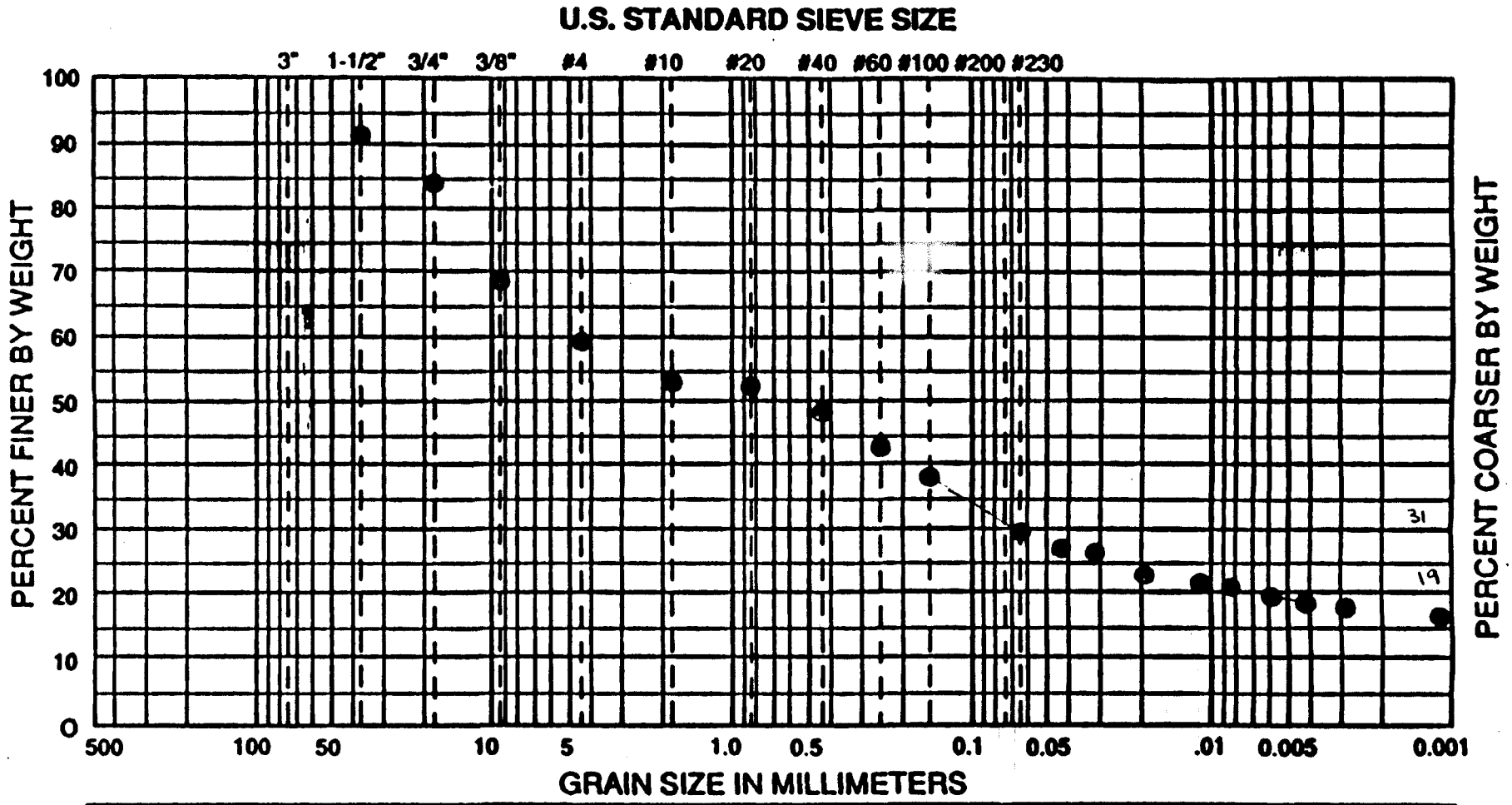
BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	23.0'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	99.898
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	35.50	30.50	30.2	30.2	10.47	0.0599
1.0	32.50	27.50	27.2	27.2	10.96	0.0433
2.0	31.50	26.50	26.2	26.2	11.12	0.0308
5.0	29.00	24.00	23.7	23.7	11.53	0.0199
15.0	26.50	21.50	21.3	21.3	11.94	0.0117
30.0	26.00	21.00	20.8	20.8	12.03	0.0083
60.0	25.00	20.00	19.8	19.8	12.19	0.0059
120.0	24.00	19.00	18.8	18.8	12.35	0.0042
250.0	23.00	18.00	17.8	17.8	12.52	0.0029
1440.0	21.50	16.50	16.3	16.3	12.76	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+75 SAMPLE NO.: C11 #12 DATE: 3/26/92 PROJECT NO.:

AREA	DEPTH		CLASSIFICATION						
			sandy gravel						
		Cobbles	GW - 30.9		S 28.9			SL	CL
Rocky Flats	23.0'	9.2	21.8	6.2	5.3	17.4		12	19

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

LOCATION Rocky Flats / EG&G

BORING 7-75 SAMPLE CH #12 DEPTH 23.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

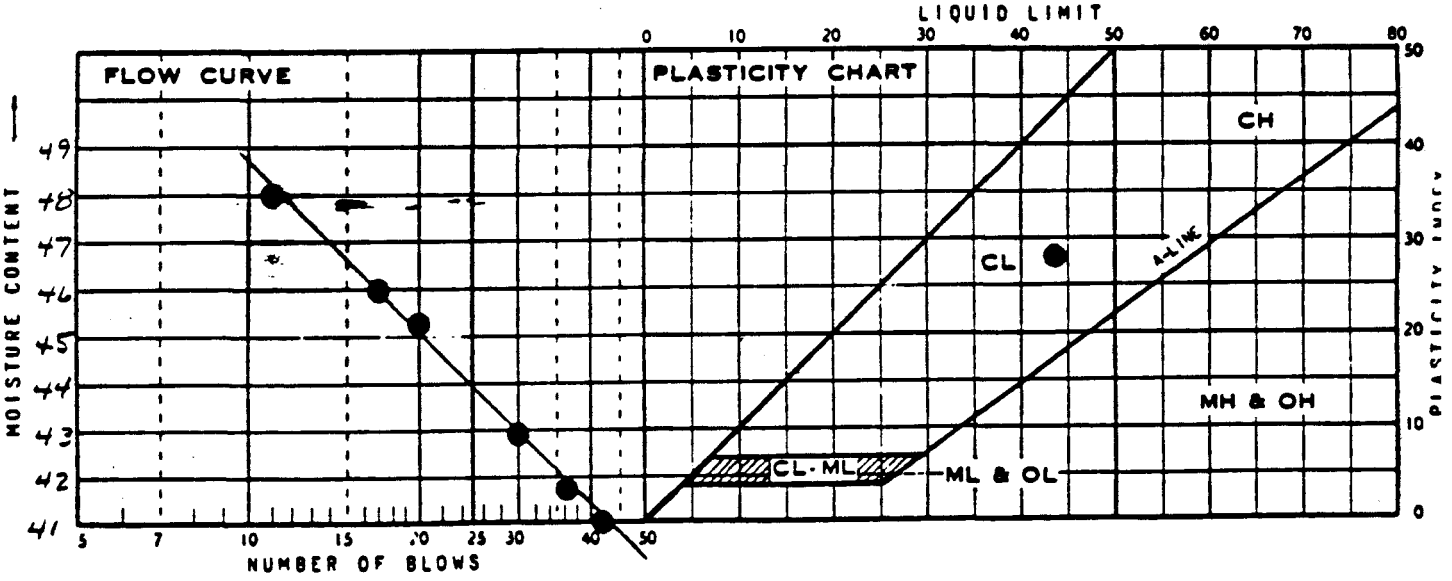
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB. 3/20/92

DETERMINATION	1	2	3	4	5	6
DISH	B10	33 C	2070			
WT OF DISH + WET SOIL	5.45	8.25	6.43			
WT OF DISH + DRY SOIL	4.86	7.20	5.66	—	—	—
WT OF MOISTURE	.59	1.05	.77			
WT OF DISH	1.02	1.07	1.06	—	—	—
WT OF DRY SOIL	3.84	6.13	4.60			
MOISTURE CONTENT	15.4	17.1	16.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2016	2 C	40 C	2031	2055	B7
NUMBER OF BLOWS	42	36	30	20	17	11
WT OF DISH + WET SOIL	14.41	16.31	12.02	15.70	13.21	12.57
WT OF DISH + DRY SOIL	10.52	11.82	8.73	11.14	9.38	8.83
WT OF MOISTURE	3.89	4.49	3.29	4.56	3.83	3.74
WT OF DISH	1.04	1.04	1.06	1.06	1.06	1.04
WT OF DRY SOIL	9.48	10.78	7.67	10.08	8.32	7.79
MOISTURE CONTENT	41.0	41.7	42.9	45.2	46.0	48.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		43.9	16.4	27.5	CL	

ADVANCED TERRA TESTING inc

JEm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	29.5'	DATE TESTED	03-17-92 TN
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

6B

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	37.30
Wt. Dry Soil & Pan	(g)	36.48
Wt. Lost Moisture	(g)	0.82
Wt. of Pan Only	(g)	3.63
Wt. of Dry Soil	(g)	32.85
Moisture Content	%	2.5
Wt. Hydrom. Sample Wet	(g)	55.05
Wt. Hydrom. Sample Dry	(g)	53.71

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	674.38
Weight of + #10 Before Washing (g)	210.00
Weight of + #10 After Washing (g)	204.31
Weight of - #10 Wet (g)	464.38
Weight of - #10 Dry (g)	458.62
Wt. Total Sample Dry (g)	662.93
Calc. Wt. "W" (g)	77.63
Calc. Mass + #10	23.93

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	117.17	117.17	117.17	17.7	82.3
3/8"	0.00	19.52	19.52	136.69	20.6	79.4
#4	0.00	34.84	34.84	171.53	25.9	74.1
#10	0.00	32.78	32.78	204.31	30.8	69.2
#20	1.55	3.83	2.28	2.28	33.8	66.2
#40	1.55	9.15	7.60	9.88	43.5	56.5
#60	1.55	7.13	5.58	15.46	50.7	49.3
#100	1.55	7.00	5.45	20.91	57.8	42.2
#230	1.55	8.12	6.57	27.48	66.2	33.8 — 34

Gravelly Sand (SC)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	29.5'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

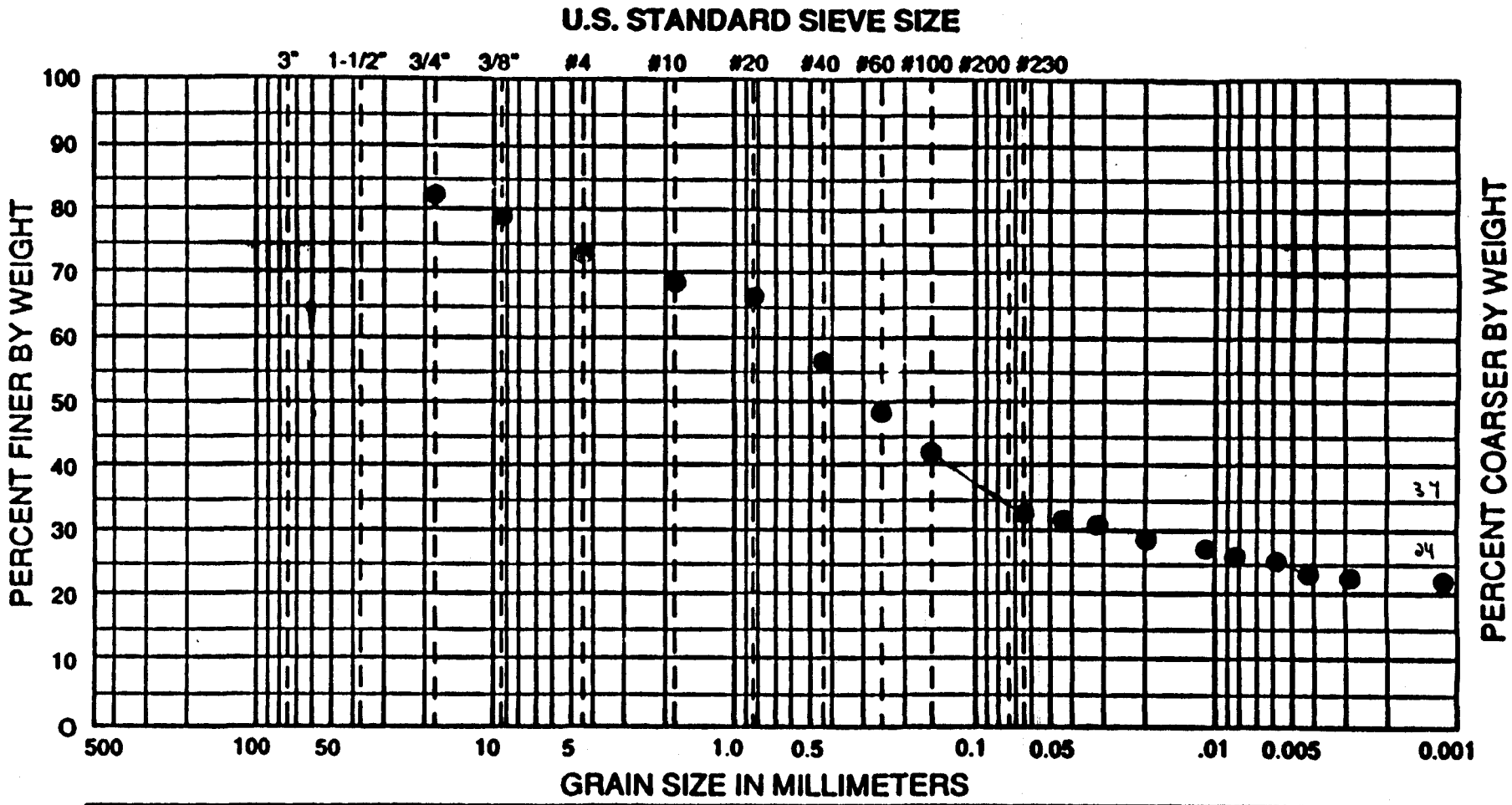
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	77.630
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	32.50	27.50	34.9	34.9	10.96	0.0611
1.0	30.00	25.00	31.8	31.8	11.37	0.0440
2.0	29.00	24.00	30.5	30.5	11.53	0.0313
5.0	28.00	23.00	29.2	29.2	11.70	0.0200
15.0	26.50	21.50	27.3	27.3	11.94	0.0116
30.0	25.50	20.50	26.0	26.0	12.11	0.0083
60.0	25.00	20.00	25.4	25.4	12.19	0.0059
120.0	24.00	19.00	24.1	24.1	12.35	0.0042
250.0	23.00	18.00	22.9	22.9	12.52	0.0029
1440.0	22.00	17.00	21.6	21.6	12.68	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+75 SAMPLE NO.: CH #12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	gravelley sand with clay CLASSIFICATION						
			G - 25.9	S 40.1			SI	CL
Rocky Flats	29.5'	17.7	8.2	4.9	12.7	20.5	10	

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION _____

BORING 7+75 SAMPLE CH#12 DEPTH 29.5'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

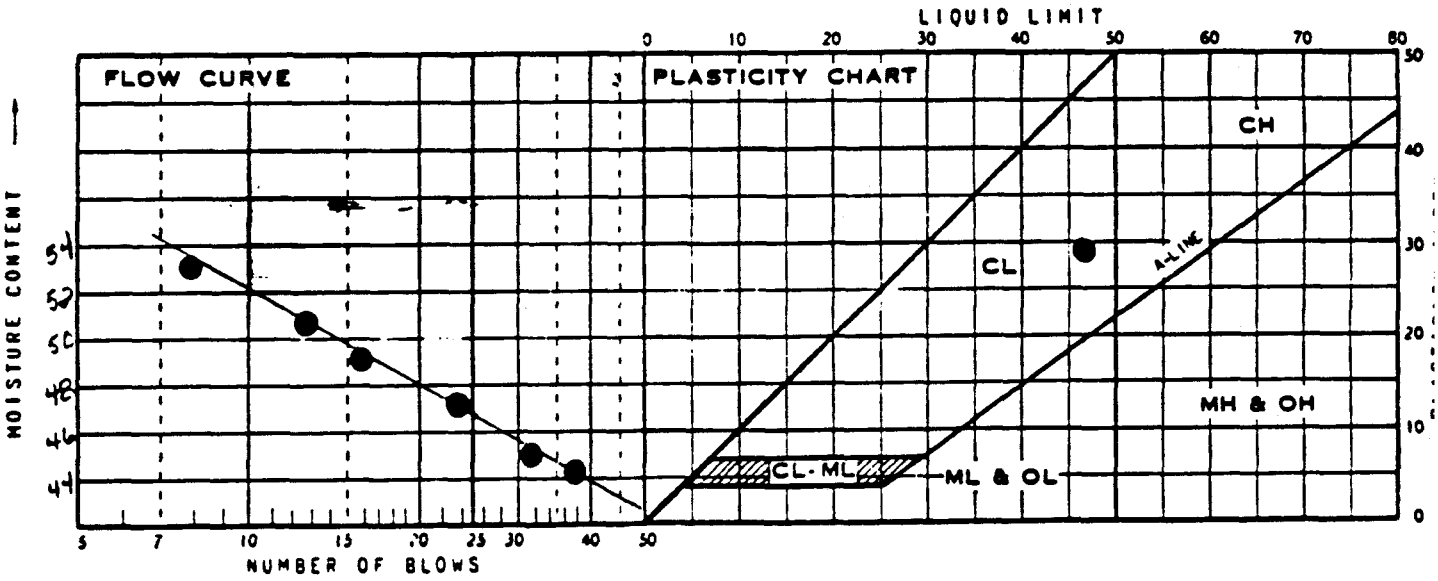
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/19/93

DETERMINATION	1	2	3	4	5	6
DISH	B9	B18	B20			
WT OF DISH + WET SOIL g	5.72	6.29	5.57			
WT OF DISH + DRY SOIL g	5.01	5.48	4.90	—	—	—
WT OF MOISTURE g	.71	.81	.67			
WT OF DISH g	1.02	1.03	1.03	—	—	—
WT OF DRY SOIL g	3.99	4.45	3.87			
MOISTURE CONTENT %	17.8	18.2	17.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B10	B19	B11	B21	B12	2024
NUMBER OF BLOWS	38	31	24	16	13±	8
WT OF DISH + WET SOIL g	14.60	14.89	15.49	15.96	17.82	16.74
WT OF DISH + DRY SOIL g	10.44	10.59	10.86	11.05	12.17	11.30
WT OF MOISTURE g	4.16	4.30	4.63	4.91	5.65	5.44
WT OF DISH g	1.02	1.04	1.03	1.04	1.04	1.06
WT OF DRY SOIL g	9.42	9.55	9.83	10.01	11.13	10.24
MOISTURE CONTENT %	44.2	45.0	47.1	49.1	50.8	53.1



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		46.8	17.8	29.0	CL	

ADVANCED TERRA TESTING

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	36'	DATE TESTED	03-17-92 TN
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

68

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	47.35
Wt. Dry Soil & Pan	(g)	46.18
Wt. Lost Moisture	(g)	1.17
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	42.50
Moisture Content	%	2.8

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	53.53

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	566.74
Weight of + #10 Before Washing (g)	15.81
Weight of + #10 After Washing (g)	10.96
Weight of - #10 Wet (g)	550.93
Weight of - #10 Dry (g)	540.89
Wt. Total Sample Dry (g)	551.85
Calc. Wt. "W" (g)	54.62
Calc. Mass + #10	1.08

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.70	2.70	2.70	0.5	99.5
#4	0.00	6.68	6.68	9.38	1.7	98.3
#10	0.00	1.58	1.58	10.96	2.0	98.0
#20	1.56	1.93	0.37	0.37	2.7	97.3
#40	1.31	2.05	0.74	1.11	4.0	96.0
#60	1.55	2.00	0.45	1.56	4.8	95.2
#100	1.55	2.09	0.54	2.10	5.8	94.2
#230	1.55	9.60	8.05	10.15	20.6	79.4

81

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	36'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

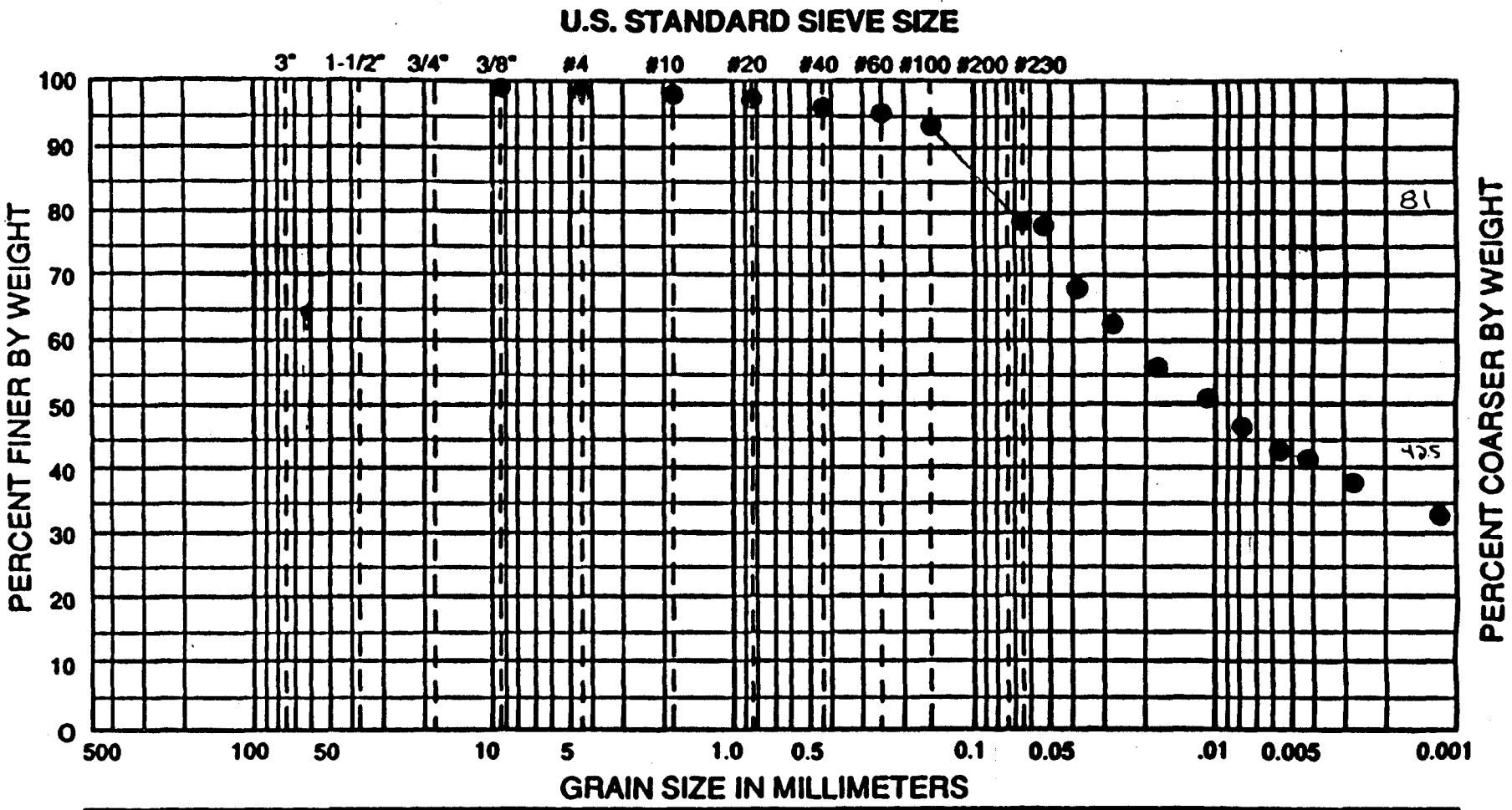
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	54.616
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.50	43.50	78.2	78.2	8.34	0.0530
1.0	43.00	38.00	68.3	68.3	9.24	0.0395
2.0	40.00	35.00	62.9	62.9	9.73	0.0286
5.0	36.00	31.00	55.7	55.7	10.39	0.0187
15.0	33.00	28.00	50.3	50.3	10.88	0.0111
30.0	31.00	26.00	46.7	46.7	11.21	0.0079
60.0	29.00	24.00	43.2	43.2	11.53	0.0057
120.0	28.00	23.00	41.4	41.4	11.70	0.0041
250.0	26.00	21.00	37.8	37.8	12.03	0.0028
1440.0	23.50	18.50	33.3	33.3	12.44	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE		
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND		SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE

WELLNAME: 7+75 SAMPLE NO.: CH #12 DATE: 3/26/92 PROJECT NO.:

AREA	DEPTH	silty clay	CLASSIFICATION		
		GW 1.7	S 17.3		SL CL
Rocky Flats	36.0'	0 1.7	.3 2.0 .5		38.5 2.5

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats / EC&G
BORING 7+25 SAMPLE #12 DEPTH @ 36'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

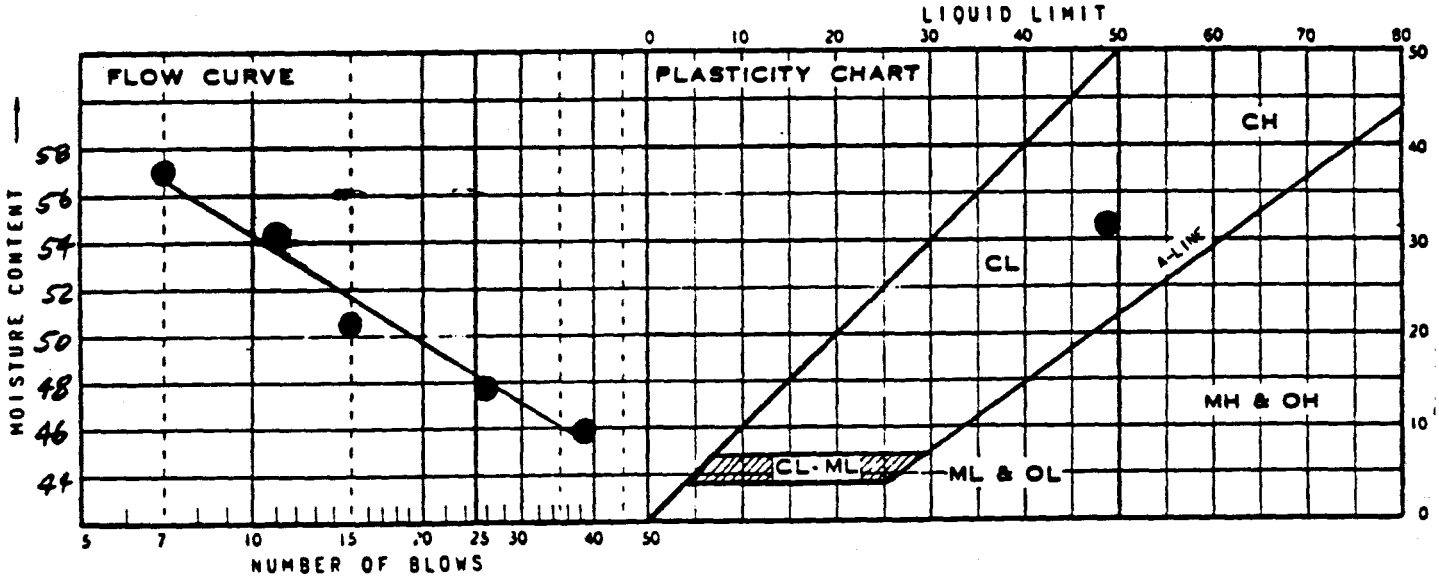
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ____/__/__

DETERMINATION	1	2	3	4	5	6
DISH	B17	B8				
WT OF DISH + WET SOIL	7.71	6.04				
WT OF DISH + DRY SOIL	6.74	5.32	—	—	—	—
WT OF MOISTURE	0.97	0.72				
WT OF DISH	1.05	1.02	—	—	—	—
WT OF DRY SOIL	5.69	4.30				
MOISTURE CONTENT	17.0	16.7	≑33.7/2 ≑16.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2044	54C	2068	15C	2012	
NUMBER OF BLOWS	39	26	15	11	7	
WT OF DISH + WET SOIL	9.87	10.59	10.41	9.84	8.87	
WT OF DISH + DRY SOIL	7.10	7.51	7.27	6.75	6.03	—
WT OF MOISTURE	2.77	3.08	3.14	3.09	2.84	
WT OF DISH	1.05	1.07	1.05	1.05	1.05	—
WT OF DRY SOIL	6.05	6.44	6.22	5.70	4.98	
MOISTURE CONTENT	45.8	47.8	50.5	54.2	57.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		48.3	16.8	31.5	CL	

ADVANCED TERRA TESTING

Fm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	45'	DATE TESTED	03-17-92 TN
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No
SB			

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	50.83
Wt. Dry Soil & Pan	(g)	49.43
Wt. Lost Moisture	(g)	1.40
Wt. of Pan Only	(g)	3.82
Wt. of Dry Soil	(g)	45.61
Moisture Content	%	3.1
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	53.38

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	548.02
Weight of + #10 Before Washing (g)	59.45
Weight of + #10 After Washing (g)	51.87
Weight of - #10 Wet (g)	488.57
Weight of - #10 Dry (g)	481.37
Wt. Total Sample Dry (g)	533.2
Calc. Wt. "W" (g)	59.14
Calc. Mass + #10	5.75

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	37.04	37.04	37.04	6.9	93.1
3/8"	0.00	11.02	11.02	48.06	9.0	91.0
#4	0.00	2.27	2.27	50.33	9.4	90.6
#10	0.00	1.54	1.54	51.87	9.7	90.3
#20	1.57	1.75	0.18	0.18	10.0	90.0
#40	1.56	1.82	0.26	0.44	10.5	89.5
#60	1.54	1.73	0.19	0.63	10.8	89.2
#100	1.56	1.79	0.23	0.86	11.2	88.8
#230	1.56	5.18	3.62	4.48	17.3	82.7 — 84

Silty Clay (CH).

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	45'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

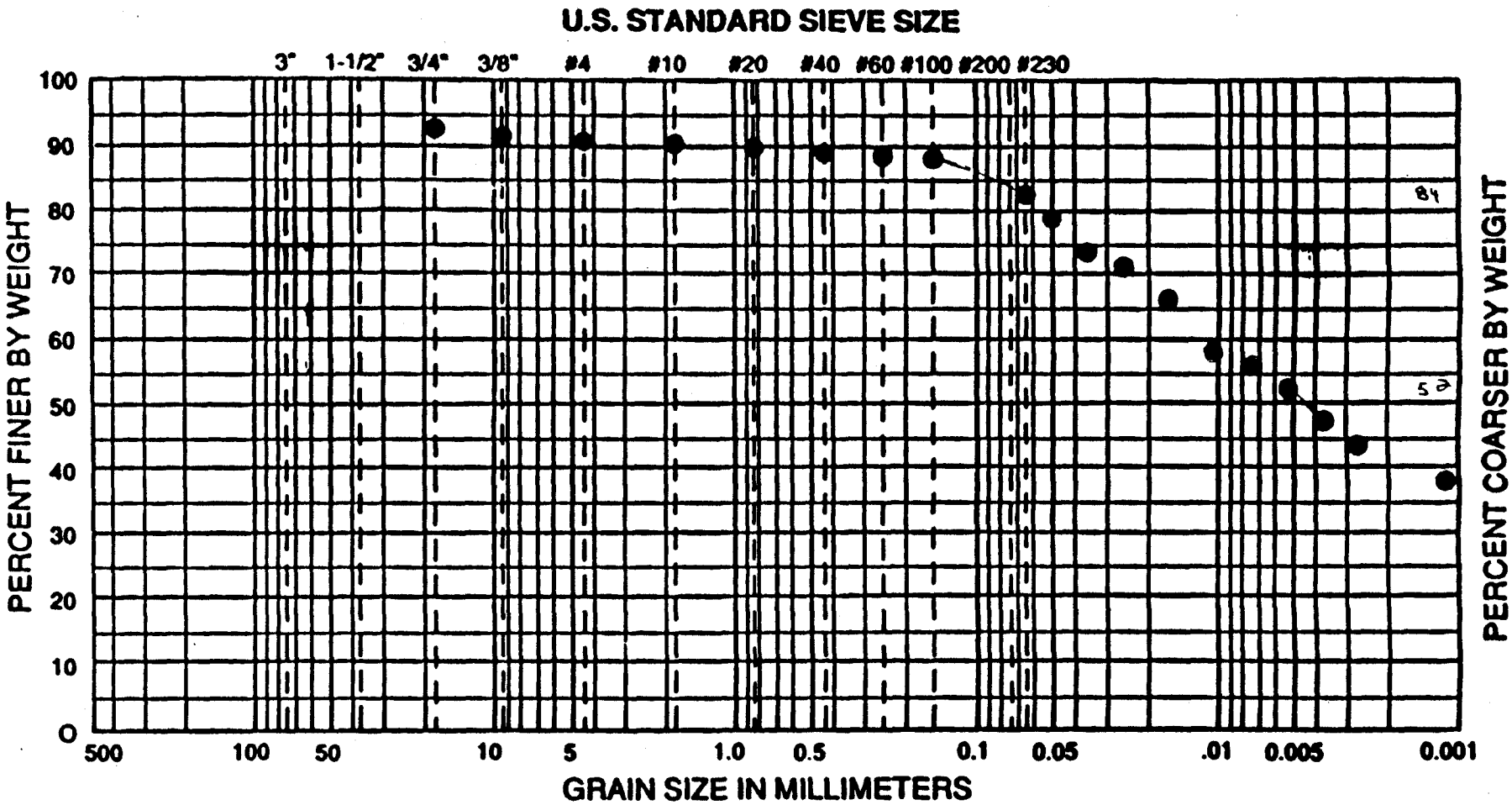
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.78	Temp. Coef. K	0.01283
Value of "a"	0.97	Wt. Dry Sample "W"	59.136
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	53.00	48.00	79.1	79.1	7.60	0.0500
1.0	50.00	45.00	74.1	74.1	8.09	0.0365
2.0	48.00	43.00	70.8	70.8	8.42	0.0263
5.0	45.00	40.00	65.9	65.9	8.91	0.0171
15.0	40.50	35.50	58.5	58.5	9.65	0.0103
30.0	39.00	34.00	56.0	56.0	9.89	0.0074
60.0	36.75	31.75	52.3	52.3	10.26	0.0053
120.0	34.00	29.00	47.8	47.8	10.71	0.0038
250.0	32.00	27.00	44.5	44.5	11.04	0.0027
1440.0	28.50	23.50	38.7	38.7	11.62	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+75 SAMPLE NO.: CH #12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	siltyclay CLASSIFICATION					
		9.4		6.6			
Rocky Flats	45.0'	6.	2.5	0.3	0.8	5.5	32 32

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats / EG&G
BORING 2+75 SAMPLE #12 DEPTH 45.0'

FIELD DENSITY BY ..../..../....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

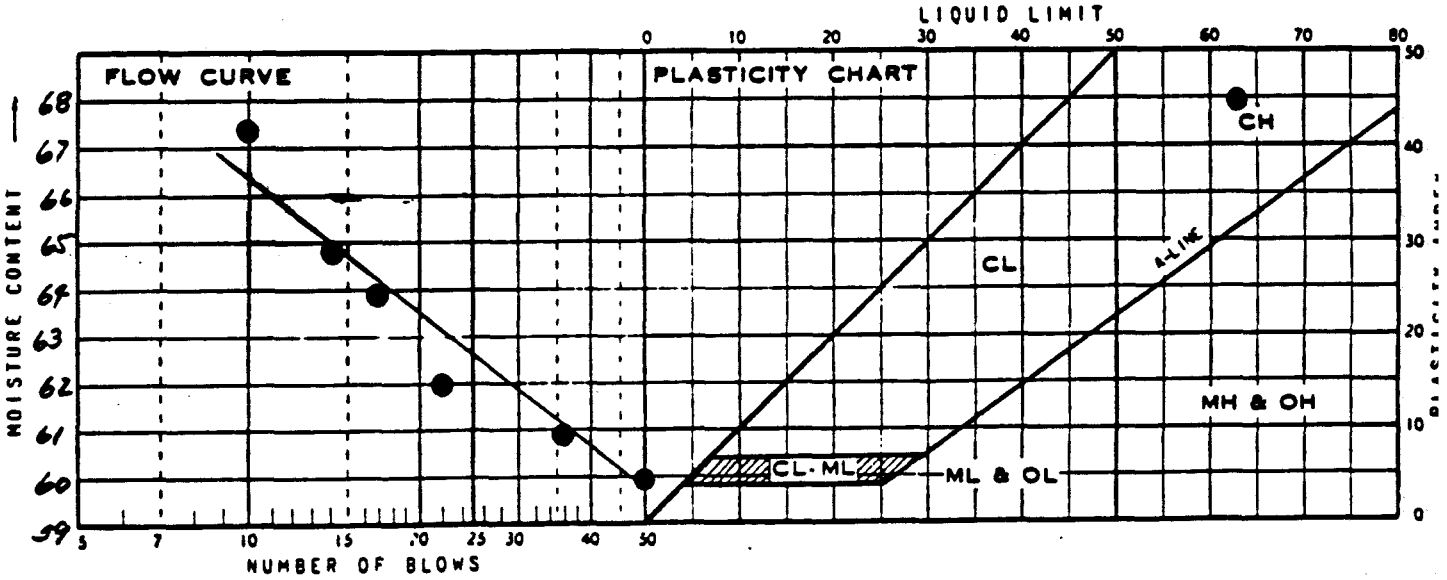
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3.12.92

DETERMINATION	1	2	3	4	5	6
DISH	B6	B5	B4			
WT OF DISH + WET SOIL g	4.85	6.78	6.01			
WT OF DISH + DRY SOIL	4.27	5.89	5.26	—	—	—
WT OF MOISTURE	0.58	0.89	0.75			
WT OF DISH	1.03	1.04	1.04	—	—	—
WT OF DRY SOIL	3.24	4.85	4.22			
MOISTURE CONTENT %	17.9	18.4	17.8	= 54.1/3 = 18.0		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B3	B2	B14	B1	B15	B16
NUMBER OF BLOWS	50	36	22	17	14	10
WT OF DISH + WET SOIL g	10.44	10.10	9.86	8.88	10.24	9.35
WT OF DISH + DRY SOIL	6.91	6.67	6.48	5.82	6.62	6.00
WT OF MOISTURE	3.53	3.43	3.38	3.06	3.62	3.35
WT OF DISH	1.02	1.04	1.03	1.03	1.03	1.03
WT OF DRY SOIL	5.89	5.63	5.45	4.79	5.59	4.97
MOISTURE CONTENT	59.9	60.9	62.0	63.9	64.8	67.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		62.7	18.0	44.7	CH	

ADVANCED TERRA TESTING

JEm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	46.5'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No
6B			

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	39.73
Wt. Dry Soil & Pan	(g)	38.32
Wt. Lost Moisture	(g)	1.41
Wt. of Pan Only	(g)	3.67
Wt. of Dry Soil	(g)	34.65
Moisture Content	%	4.1

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	52.87

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	52.87
Wt. Total Sample Dry (g)	52.87
Calc. Wt. "W" (g)	52.87
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	1.58	0.01	0.01	0.0	100.0
#40	1.58	1.60	0.02	0.03	0.1	99.9
#60	1.56	1.61	0.05	0.08	0.2	99.8
#100	1.56	1.66	0.10	0.18	0.3	99.7
#230	1.56	2.12	0.56	0.74	1.4	98.6

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	46.5'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

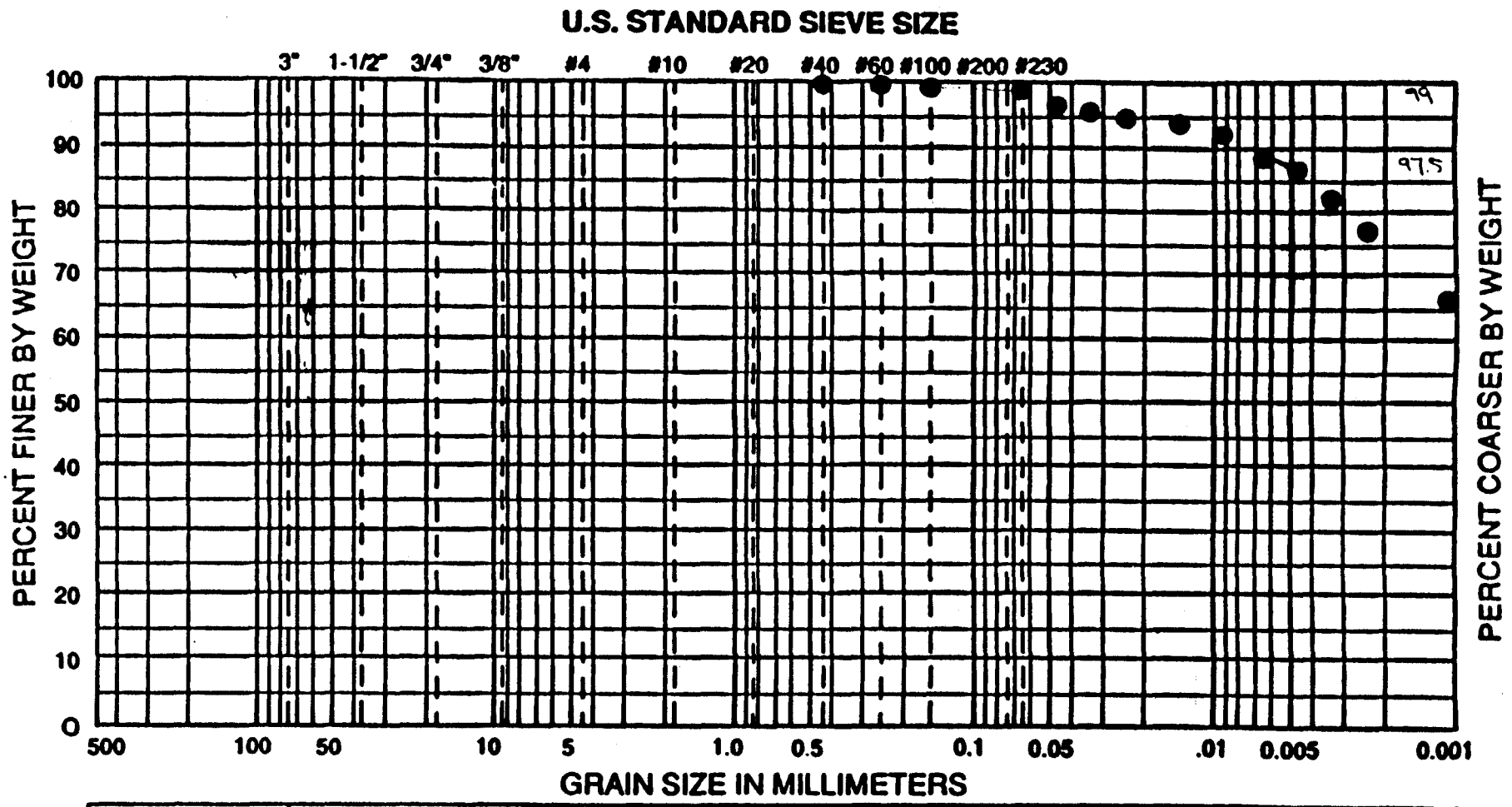
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01294
Value of "a"	0.98	Wt. Dry Sample "W"	52.87
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	57.00	52.00	96.4	96.4	6.94	0.0482
1.0	56.50	51.50	95.5	95.5	7.02	0.0343
2.0	56.25	51.25	95.0	95.0	7.07	0.0243
5.0	55.75	50.75	94.1	94.1	7.15	0.0155
15.0	54.50	49.50	91.8	91.8	7.35	0.0091
30.0	53.00	48.00	89.0	89.0	7.60	0.0065
60.0	51.75	46.75	86.7	86.7	7.80	0.0047
120.0	49.00	44.00	81.6	81.6	8.25	0.0034
250.0	46.50	41.50	76.9	76.9	8.66	0.0024
1440.0	40.50	35.50	65.8	65.8	9.65	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+75 SAMPLE NO.: CH#12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
		clay G 0	S-1		SL	CL
Rocky Flats	46.5'	0	0	0.1 .9	1.5	97.5

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS/ EG&G

BORING 7+75 SAMPLE CH#12 DEPTH 46.5'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

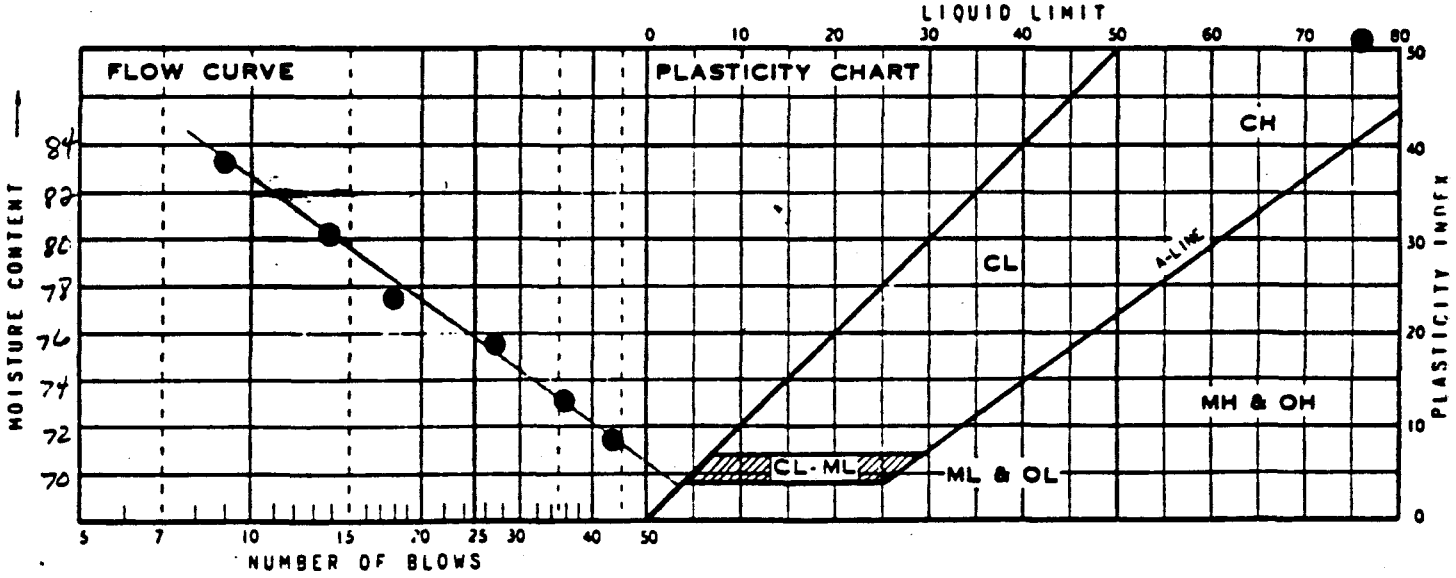
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB. 3/20/92.

DETERMINATION	1	2	3	4	5	6
DISH	54C	2008	B11			
WT OF DISH + WET SOIL g	4.78	5.60	5.50			
WT OF DISH + DRY SOIL g	4.05	4.68	4.61	—	—	—
WT OF MOISTURE g	.73	.92	.89			
WT OF DISH g	1.07	1.06	1.03	—	—	—
WT OF DRY SOIL g	2.98	3.62	3.58			
MOISTURE CONTENT %	24.5	25.4	24.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B21	23C	2033	34CX	B12	44C
NUMBER OF BLOWS	44	36	27	18	14	9
WT OF DISH + WET SOIL g	13.00	12.15	14.21	14.47	13.64	12.22
WT OF DISH + DRY SOIL g	8.00	7.47	8.53	8.59	8.03	7.13
WT OF MOISTURE g	5.00	4.68	5.68	5.88	5.61	5.09
WT OF DISH g	1.04	.07	1.04	1.03	1.04	1.04
WT OF DRY SOIL g	6.96	6.40	7.49	7.56	6.99	6.09
MOISTURE CONTENT %	71.8	73.1	75.8	77.8	80.3	83.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		75.9	24.9	51.0	CH	

ADVANCED TERRA TESTING

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

BR

CLIENT Weston

JOB NO. 2066-03

BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	52'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

BR

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	42.17
Wt. Dry Soil & Pan	(g)	40.13
Wt. Lost Moisture	(g)	2.04
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	36.35
Moisture Content	%	5.6

Wt. Hydrom. Sample Wet (g)	53.38
Wt. Hydrom. Sample Dry (g)	50.54

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	53.38
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	53.38
Weight of - #10 Dry (g)	50.54
Wt. Total Sample Dry (g)	50.54
Calc. Wt. "W" (g)	50.54
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.59	0.03	0.03	0.1	99.9
#40	1.56	1.64	0.08	0.11	0.2	99.8
#60	1.57	1.63	0.06	0.17	0.3	99.7
#100	1.57	1.62	0.05	0.22	0.4	99.6
#230	1.55	1.68	0.13	0.35	0.7	99.3

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	7+75	SAMPLED	Rocky Flats
DEPTH	52'	DATE TESTED	03-17-92 TNU
SAMPLE NO.	#12	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

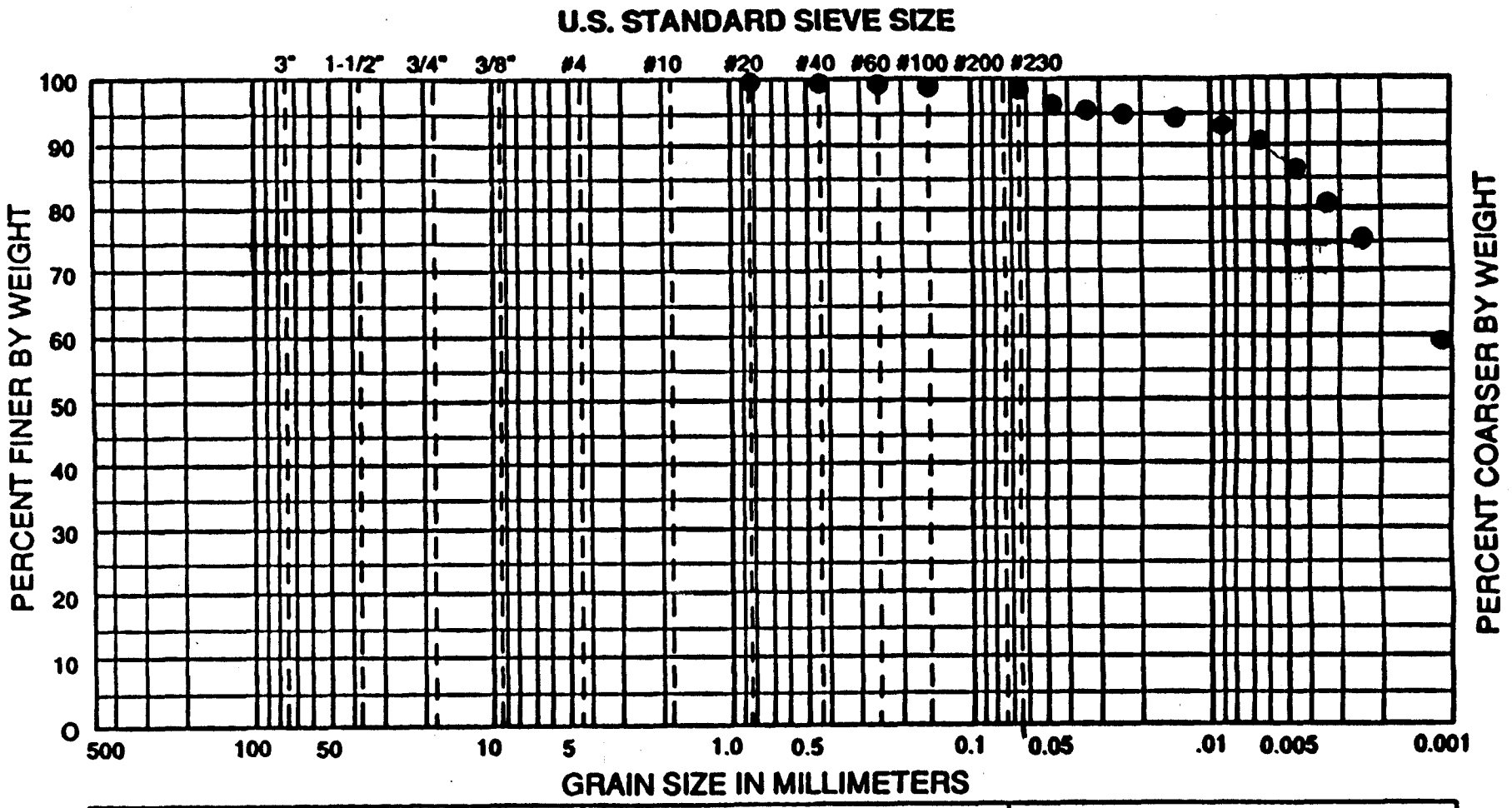
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.80	Temp. Coef. K	0.01276
Value of "a"	0.97	Wt. Dry Sample "W"	50.540
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.00	50.00	96.0	96.0	7.27	0.0487
1.0	54.75	49.75	95.5	95.5	7.31	0.0345
2.0	54.50	49.50	95.0	95.0	7.35	0.0245
5.0	54.25	49.25	94.5	94.5	7.39	0.0155
15.0	53.50	48.50	93.1	93.1	7.52	0.0090
30.0	52.00	47.00	90.2	90.2	7.76	0.0065
60.0	50.00	45.00	86.4	86.4	8.09	0.0047
120.0	47.00	42.00	80.6	80.6	8.58	0.0034
250.0	44.25	39.25	75.3	75.3	9.03	0.0024
1440.0	36.00	31.00	59.5	59.5	10.39	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 7+75 SAMPLE NO.: CH # 12 DATE: 3-26-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
		claystone				
		GV 0	S-0.7		SL	CL
Rocky Flats	52.0'	0	0	0.2 0.5	14.3	85

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats/EG&G

BORING 7ETS SAMPLE #12 DEPTH @52'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

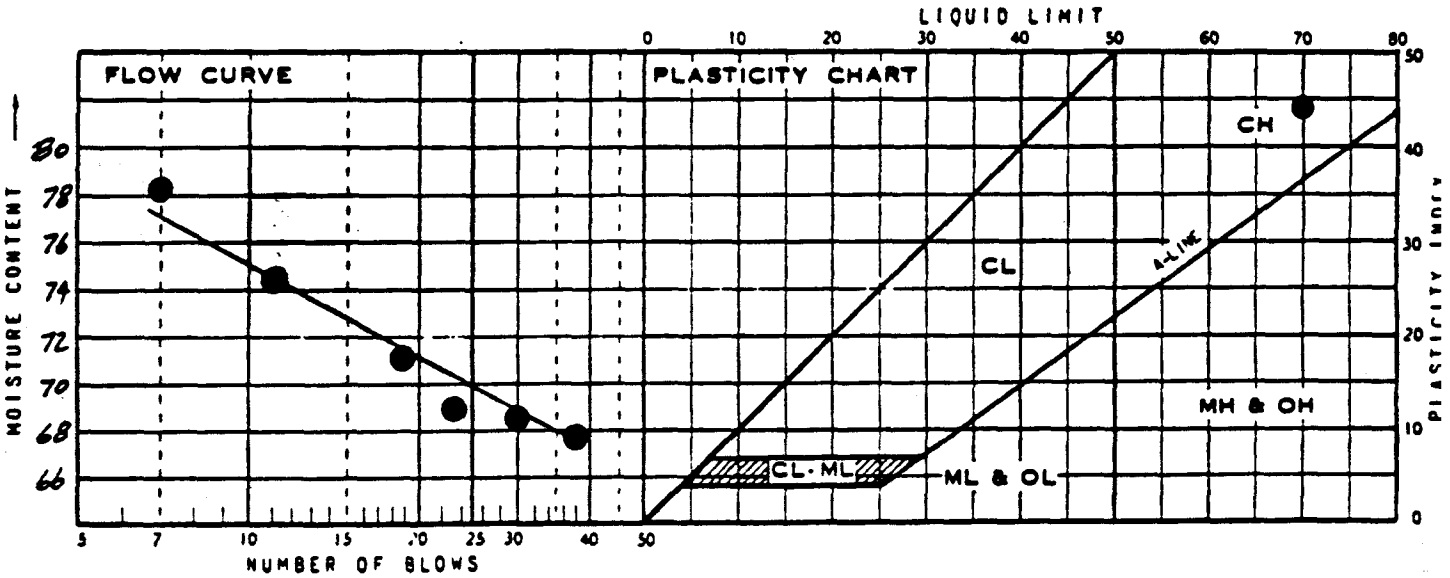
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3.1.19.92

DETERMINATION	1	2	3	4	5	6
DISH	2019	2028	2021			
WT OF DISH + WET SOIL g	4.29	5.61	5.24			
WT OF DISH + DRY SOIL g	3.65	4.61	4.38	—	—	—
WT OF MOISTURE g	0.64	1.00	0.86			
WT OF DISH g	1.06	1.07	1.05	—	—	—
WT OF DRY SOIL g	2.59	3.54	3.33			
MOISTURE CONTENT %	24.7	28.2	25.8	78.7/3	= 26.2	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	3	12C	24	44C	201B	16C
NUMBER OF BLOWS	38	30	23	19	11	7
WT OF DISH + WET SOIL g	7.68	9.11	6.95	9.27	7.62	9.58
WT OF DISH + DRY SOIL g	5.01	5.84	4.54	5.85	4.82	5.84
WT OF MOISTURE g	2.67	3.27	2.41	3.42	2.80	3.74
WT OF DISH g	1.06	1.05	1.04	1.03	1.05	1.06
WT OF DRY SOIL g	3.95	4.79	3.50	4.82	3.77	4.78
MOISTURE CONTENT %	67.6	68.3	68.9	71.0	74.3	78.2



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		69.8	26.2	43.6	CH	

ADVANCED TERRA TESTING

JEM

✓

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	6.5'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	40.50
Wt. Dry Soil & Pan	(g)	39.56
Wt. Lost Moisture	(g)	0.94
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	35.78
Moisture Content	%	2.6

Wt. Hydrom. Sample Wet (g)	55.03
Wt. Hydrom. Sample Dry (g)	53.62

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	617.97
Weight of + #10 Before Washing (g)	2.18
Weight of + #10 After Washing (g)	2.14
Weight of - #10 Wet (g)	615.79
Weight of - #10 Dry (g)	600.07
Wt. Total Sample Dry (g)	602.21
Calc. Wt. "W" (g)	53.81
Calc. Mass + #10	0.19

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	2.11	2.11	2.11	0.4	99.6
#10	0.00	0.03	0.03	2.14	0.4	99.6
#20	1.57	1.58	0.01	0.01	0.4	99.6
#40	1.59	1.69	0.10	0.11	0.6	99.4
#60	1.31	1.89	0.58	0.69	1.6	98.4
#100	1.57	3.90	2.33	3.02	6.0	94.0
#230	1.57	8.88	7.31	10.33	19.6	80.4

826

(Copy Sim[illegible])

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	6.5'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

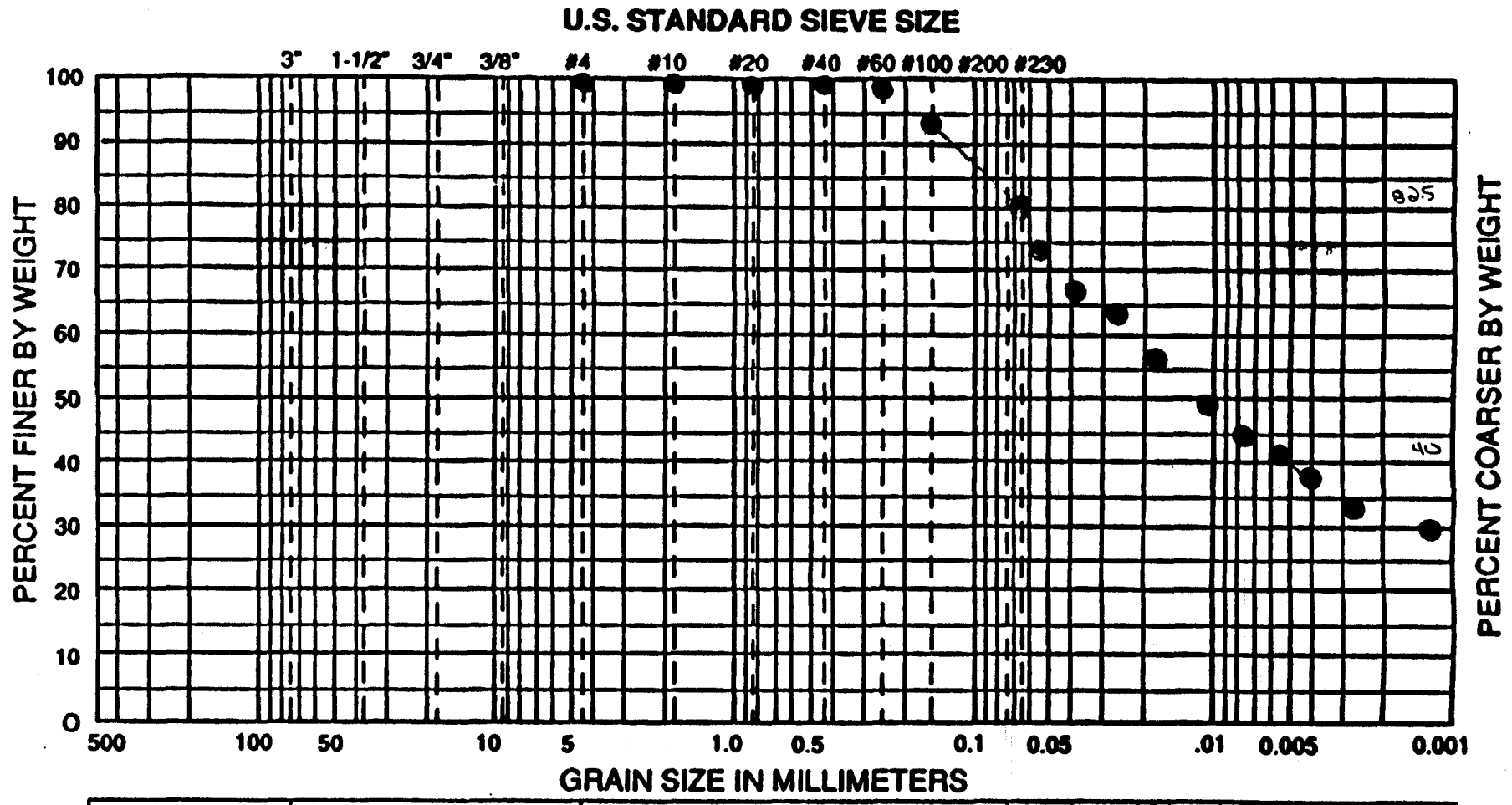
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01280
Value of "a"	0.97	Wt. Dry Sample "W"	53.812
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	41.00	74.1	74.1	8.58	0.0530
1.0	43.50	37.50	67.7	67.7	9.16	0.0387
2.0	41.50	35.50	64.1	64.1	9.48	0.0279
5.0	38.00	32.00	57.8	57.8	10.06	0.0182
15.0	33.50	27.50	49.7	49.7	10.80	0.0109
30.0	31.00	25.00	45.2	45.2	11.21	0.0078
60.0	29.00	23.00	41.5	41.5	11.53	0.0056
120.0	27.50	21.50	38.8	38.8	11.78	0.0040
250.0	25.00	19.00	34.3	34.3	12.19	0.0028
1440.0	23.00	17.00	30.7	30.7	12.52	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+00 SAMPLE NO.: CH#13 DATE: 3-27-22 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
	6.5'	clayey silt	GU .4	S 17.1			SL	CL
		0 Rock C	.4 FLATS F	0 EGG C	.2 M	16.9 F	42.50	

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING B+02 SAMPLE # 13 DEPTH @65'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

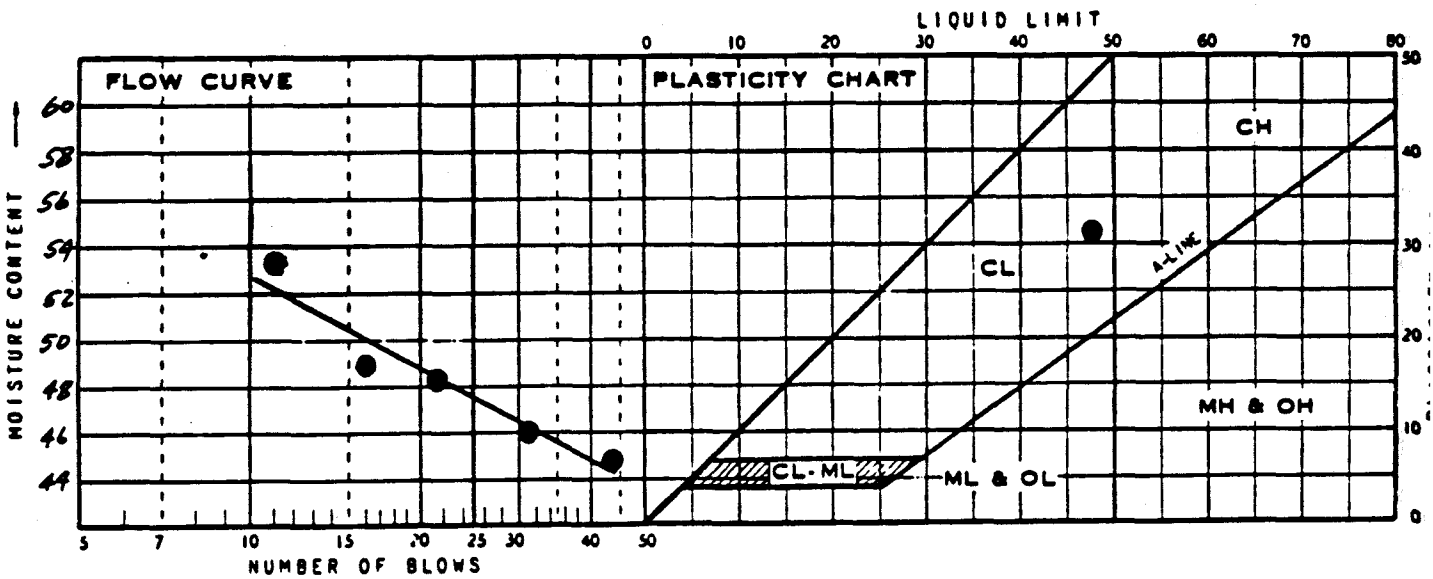
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/22/92

DETERMINATION	1	2	3	4	5	6
DISH	2020	6C	30C			
WT OF DISH + WET SOIL g	7.98	7.82	6.85			
WT OF DISH + DRY SOIL	7.00	6.82	6.02	—	—	—
WT OF MOISTURE	0.98	1.00	0.83			
WT OF DISH	1.05	1.07	1.05	—	—	—
WT OF DRY SOIL	5.95	5.75	4.97			
MOISTURE CONTENT %	16.5	17.4	16.7	= 50.5/3 = 16.9		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2095	66C	48C	17C	1C	2015
NUMBER OF BLOWS	44 -	31	21	16	11	8 +
WT OF DISH + WET SOIL g	9.93	8.50	9.29	9.30	9.17	8.58
WT OF DISH + DRY SOIL	7.19	6.15	6.61	6.59	6.35	5.98
WT OF MOISTURE	2.74	2.35	2.68	2.71	2.82	2.60
WT OF DISH	1.06	1.04	1.04	1.04	1.06	1.05
WT OF DRY SOIL	6.13	5.11	5.57	5.55	5.29	4.93
MOISTURE CONTENT %	44.7	46.0	48.1	48.8	53.3	52.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		47.5	16.9	30.6	CL	

ADVANCED TERRA TESTING

NFM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	13.5'	DATE TESTED	03-20-92 INC
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	38.00
Wt. Dry Soil & Pan	(g)	37.18
Wt. Lost Moisture	(g)	0.82
Wt. of Pan Only	(g)	3.60
Wt. of Dry Soil	(g)	33.58
Moisture Content	%	2.4
Wt. Hydrom. Sample Wet	(g)	55.04
Wt. Hydrom. Sample Dry	(g)	53.73

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	730.49
Weight of + #10 Before Washing (g)	116.61
Weight of + #10 After Washing (g)	112.99
Weight of - #10 Wet (g)	613.88
Weight of - #10 Dry (g)	602.78
Wt. Total Sample Dry (g)	715.7
Calc. Wt. "W" (g)	63.72
Calc. Mass + #10	9.99

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	49.60	49.60	49.60	6.9	93.1
3/8"	0.00	23.16	23.16	72.76	10.2	89.8
#4	0.00	19.96	19.96	92.72	13.0	87.0
#10	0.00	19.55	19.55	112.27	15.7	84.3
#20	1.32	2.57	1.25	1.25	17.6	82.4
#40	1.57	5.68	4.11	5.36	24.1	75.9
#60	1.57	7.38	5.81	11.17	33.2	66.8
#100	1.55	8.43	6.88	18.05	44.0	56.0
#230	1.57	10.05	8.48	26.53	57.3	42.7

45

Clay Sand/SC

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	13.5'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

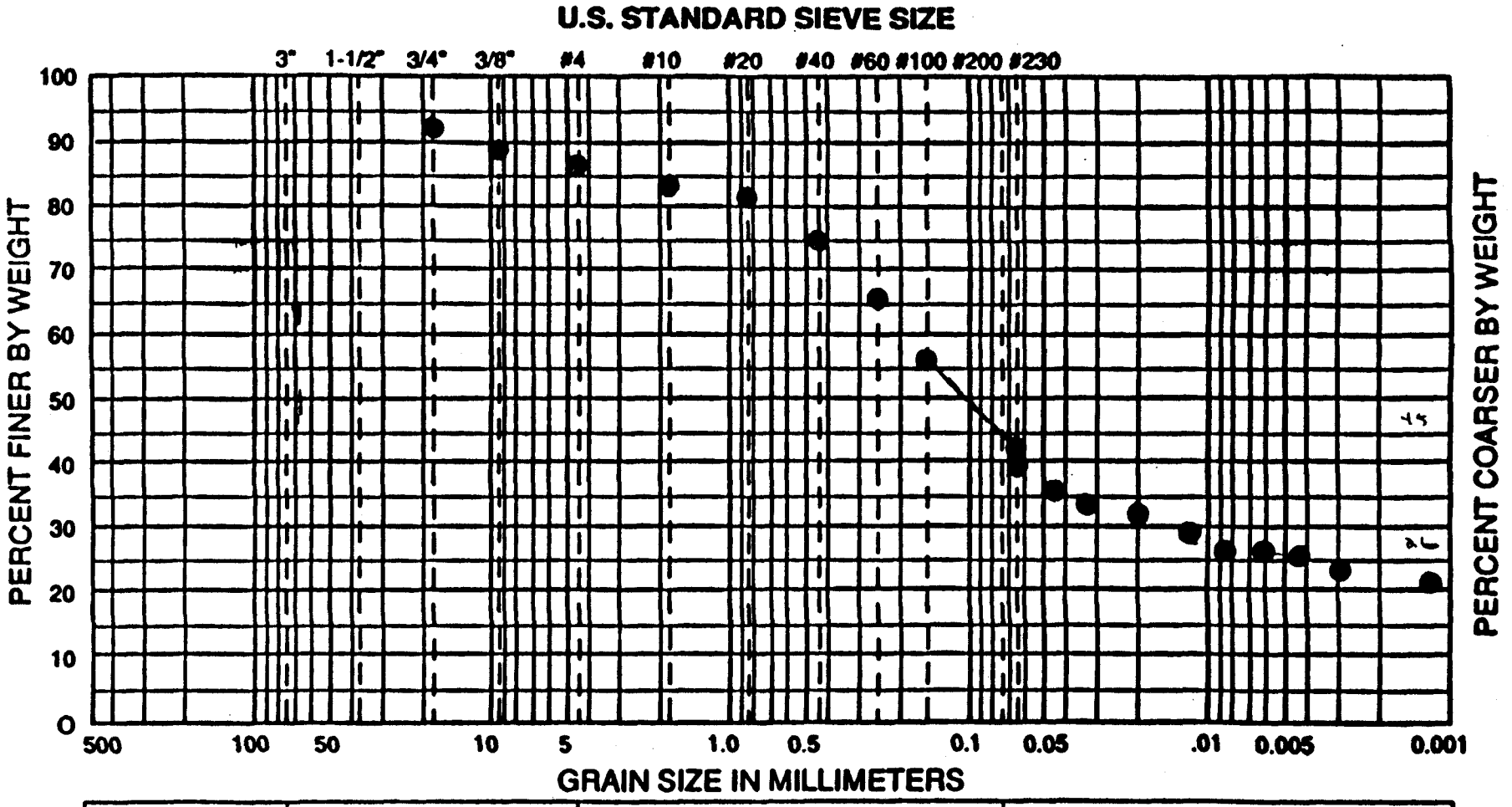
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	63.721
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	31.50	25.50	39.5	39.5	11.12	0.0617
1.0	29.50	23.50	36.4	36.4	11.45	0.0443
2.0	28.00	22.00	34.1	34.1	11.70	0.0316
5.0	27.75	21.75	33.7	33.7	11.74	0.0200
15.0	25.00	19.00	29.5	29.5	12.19	0.0118
30.0	24.00	18.00	27.9	27.9	12.35	0.0084
60.0	23.50	17.50	27.1	27.1	12.44	0.0060
120.0	23.00	17.00	26.4	26.4	12.52	0.0042
250.0	22.00	16.00	24.8	24.8	12.68	0.0029
1440.0	20.50	14.50	22.5	22.5	12.93	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+00 SAMPLE NO.: CH #13 DATE: 3-27-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
	13.5'	clayey sand						
		Coarse 6.9	Fine Gran 6.1	Coarse S 2.7	42 8.4	F Sand 30.9	Silt 19	[illegible]
		Rock	FLATS / EG&G					

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2366-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / EG&G

BORING 8+00 SAMPLE CU#13 DEPTH 13.5'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

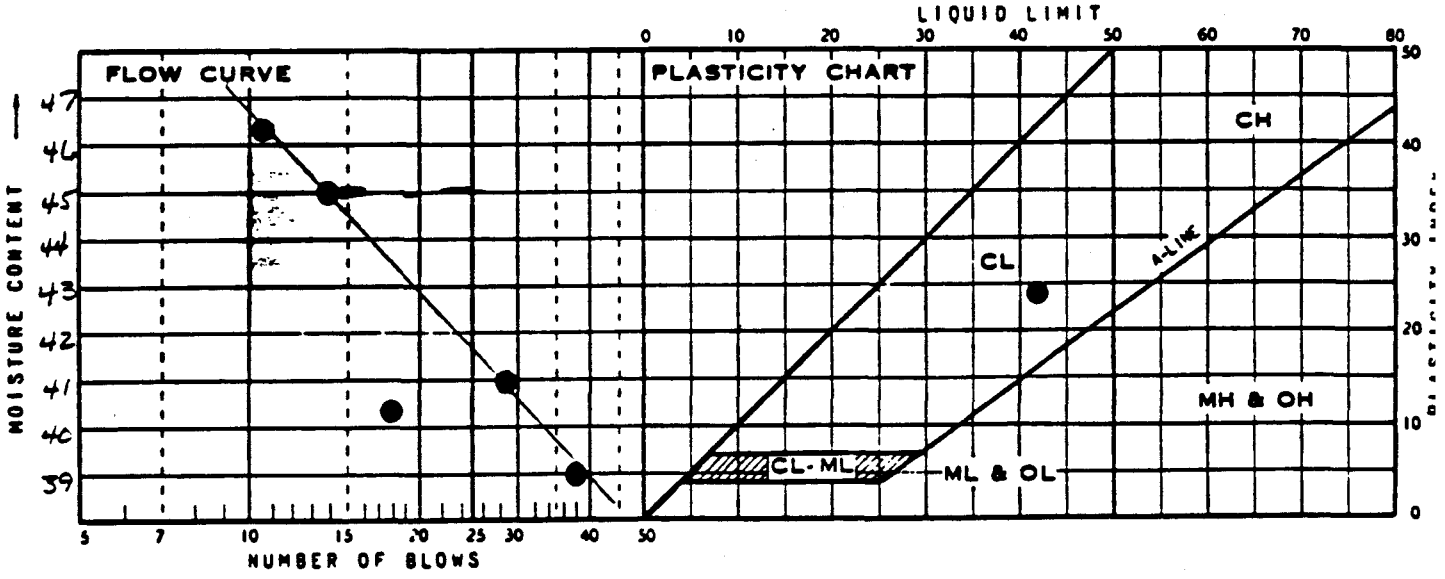
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	37C	2018	0C			
WT OF DISH + WET SOIL g	6.84	6.65	8.06			
WT OF DISH + DRY SOIL g	6.02	5.83	7.03	—	—	—
WT OF MOISTURE g	.82	.82	1.03			
WT OF DISH g	1.08	1.05	1.05	—	—	—
WT OF DRY SOIL g	4.94	4.78	5.98			
MOISTURE CONTENT %	16.6	17.2	17.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	10C	25C	22	2021	41C	
NUMBER OF BLOWS	39	29	18	14	11	
WT OF DISH + WET SOIL g	13.60	18.57	18.35	12.78	13.55	
WT OF DISH + DRY SOIL g	10.08	13.48	13.11	9.14	9.58	—
WT OF MOISTURE g	3.52	5.09	4.87	3.64	3.97	
WT OF DISH g	1.06	1.05	1.05	1.06	1.03	—
WT OF DRY SOIL g	9.02	12.43	12.06	8.08	8.55	
MOISTURE CONTENT %	39.0	41.0	40.4	45.1	46.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		41.6	17.0	24.6	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	29'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	39.04
Wt. Dry Soil & Pan	(g)	38.28
Wt. Lost Moisture	(g)	0.76
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	34.60
Moisture Content	%	2.2
Wt. Hydrom. Sample Wet	(g)	55.03
Wt. Hydrom. Sample Dry	(g)	53.85

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	965.48
Weight of + #10 Before Washing (g)	437.15
Weight of + #10 After Washing (g)	407.25
Weight of - #10 Wet (g)	528.23
Weight of - #10 Dry (g)	546.13
Wt. Total Sample Dry (g)	953.38
Calc. Wt. "W" (g)	93.87
Calc. Mass + #10	40.02

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	119.87	119.87	119.87	12.6	87.4
3/8"	0.00	114.14	114.14	234.01	24.5	75.5
#4	0.00	95.83	95.83	329.84	34.6	65.4
#10	0.00	76.64	76.64	406.48	42.6	57.4
#20	1.56	9.18	7.62	7.62	50.8	49.2
#40	1.56	12.91	11.35	18.97	62.8	37.2
#60	1.54	7.11	5.57	24.54	68.8	31.2
#100	1.56	5.44	3.88	28.42	72.9	27.1
#230	1.56	6.41	4.85	33.27	78.1	21.9

Gravelly Sand (GM)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	29'	DATE TESTED	03-20-92 INV
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

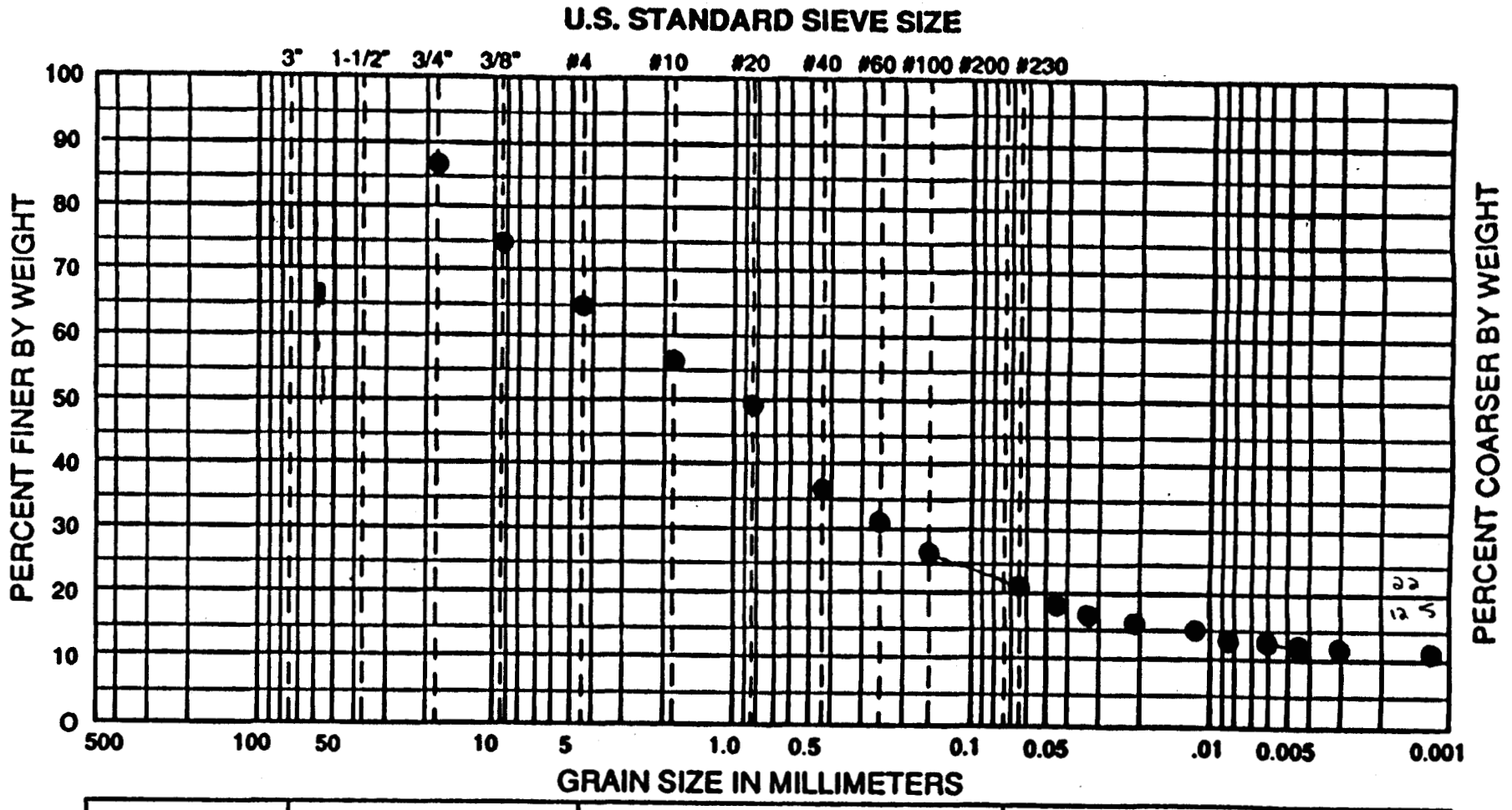
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	93.867
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	26.00	20.00	20.8	20.8	12.03	0.0631
1.0	24.00	18.00	18.7	18.7	12.35	0.0452
2.0	23.00	17.00	17.7	17.7	12.52	0.0322
5.0	21.50	15.50	16.1	16.1	12.76	0.0206
15.0	21.00	15.00	15.6	15.6	12.85	0.0119
30.0	19.50	13.50	14.0	14.0	13.09	0.0085
60.0	19.50	13.50	14.0	14.0	13.09	0.0060
120.0	19.00	13.00	13.5	13.5	13.17	0.0043
250.0	18.50	12.50	13.0	13.0	13.26	0.0030
1440.0	17.50	11.50	12.0	12.0	13.42	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+00 SAMPLE NO.: CH# 13 DATE: 3-27-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
	290'	gravelley sand 34.6 F 22.0	C 8.0	43.4 M 20.2	F 15.2	Silt 9.5	Clay 12.5

Roc FLATS/EG&G

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8+00 SAMPLE CH#13 DEPTH 29'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

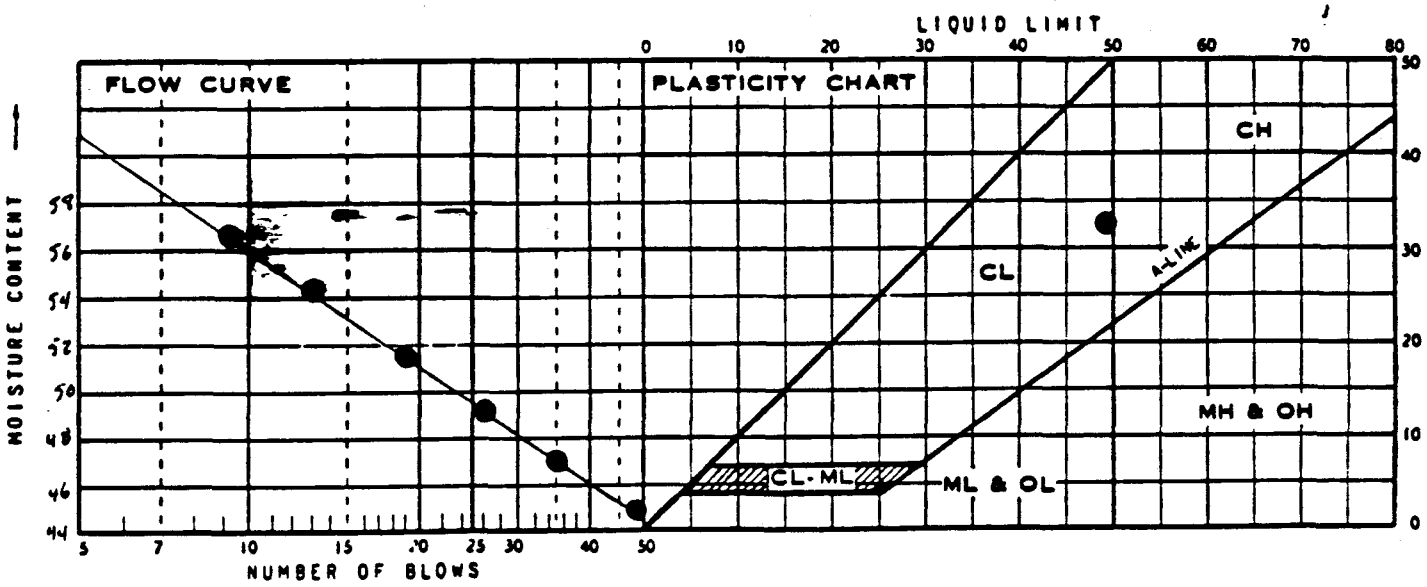
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DW 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2044	15C	2012			
WT OF DISH + WET SOIL g	5.01	6.55	5.69			
WT OF DISH + DRY SOIL g	4.45	5.77	5.01	—	—	—
WT OF MOISTURE g	.56	.78	.68			
WT OF DISH g	1.05	1.05	1.05	—	—	—
WT OF DRY SOIL g	3.40	4.72	3.96			
MOISTURE CONTENT %	16.5	16.5	17.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B17	2025	B8	2068	24	12C
NUMBER OF BLOWS	48	35	26	19	13	9
WT OF DISH + WET SOIL g	12.50	13.85	12.35	12.37	12.61	11.65
WT OF DISH + DRY SOIL g	8.95	9.76	8.61	8.52	8.54	7.32
WT OF MOISTURE g	3.55	4.09	3.74	3.85	4.07	3.83
WT OF DISH g	1.05	1.06	1.02	1.06	1.04	1.05
WT OF DRY SOIL g	7.90	8.70	7.59	7.46	7.50	6.77
MOISTURE CONTENT %	44.9	47.0	49.3	51.6	54.3	56.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		49.5	16.5	33.0	CL	

ADVANCED TERRA TESTING

JEW

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	38'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	38.23
Wt. Dry Soil & Pan	(g)	37.31
Wt. Lost Moisture	(g)	0.92
Wt. of Pan Only	(g)	3.51
Wt. of Dry Soil	(g)	33.80
Moisture Content	%	2.7

Wt. Hydrom. Sample Wet (g)	54.83
Wt. Hydrom. Sample Dry (g)	53.38

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	54.83
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	54.83
Weight of - #10 Dry (g)	53.38
Wt. Total Sample Dry (g)	53.38
Calc. Wt. "W" (g)	53.38
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	1.60	0.03	0.03	0.1	99.9
#40	1.57	1.60	0.03	0.06	0.1	99.9
#60	1.57	1.62	0.05	0.11	0.2	99.8
#100	1.57	1.76	0.19	0.30	0.6	99.4
#230	1.55	6.66	5.11	5.41	10.1	89.9 — 91

Silty Clay (CL-)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	38'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

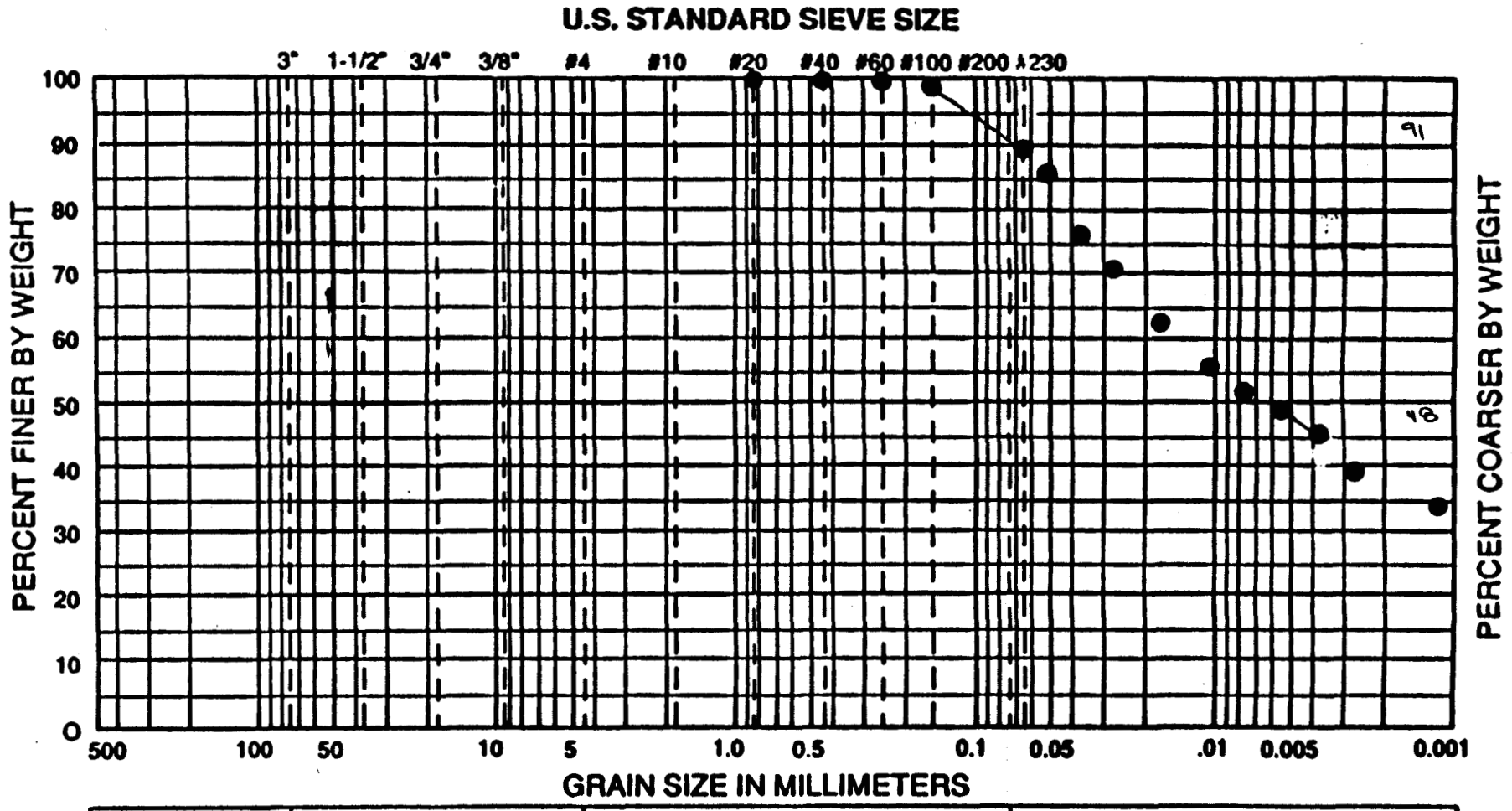
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01282
Value of "a"	0.97	Wt. Dry Sample "W"	53.360
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	52.00	47.00	85.6	85.6	7.76	0.0505
1.0	47.00	42.00	76.5	76.5	8.58	0.0376
2.0	43.50	38.50	70.1	70.1	9.16	0.0274
5.0	39.50	34.50	62.8	62.8	9.81	0.0180
15.0	35.50	30.50	55.5	55.5	10.47	0.0107
30.0	33.00	28.00	51.0	51.0	10.88	0.0077
60.0	32.00	27.00	49.2	49.2	11.04	0.0055
120.0	30.00	25.00	45.5	45.5	11.37	0.0039
250.0	26.50	21.50	39.1	39.1	11.94	0.0028
1440.0	24.00	19.00	34.6	34.6	12.35	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+00 SAMPLE NO.: CH# 13 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	Silty clay (CL) CLASSIFICATION					
Rocky Flats	38.0'	0	0	0	0.1	8.9	43

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

LOCATION _____

BORING 8+00 SAMPLE CH #13 DEPTH 38.0

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

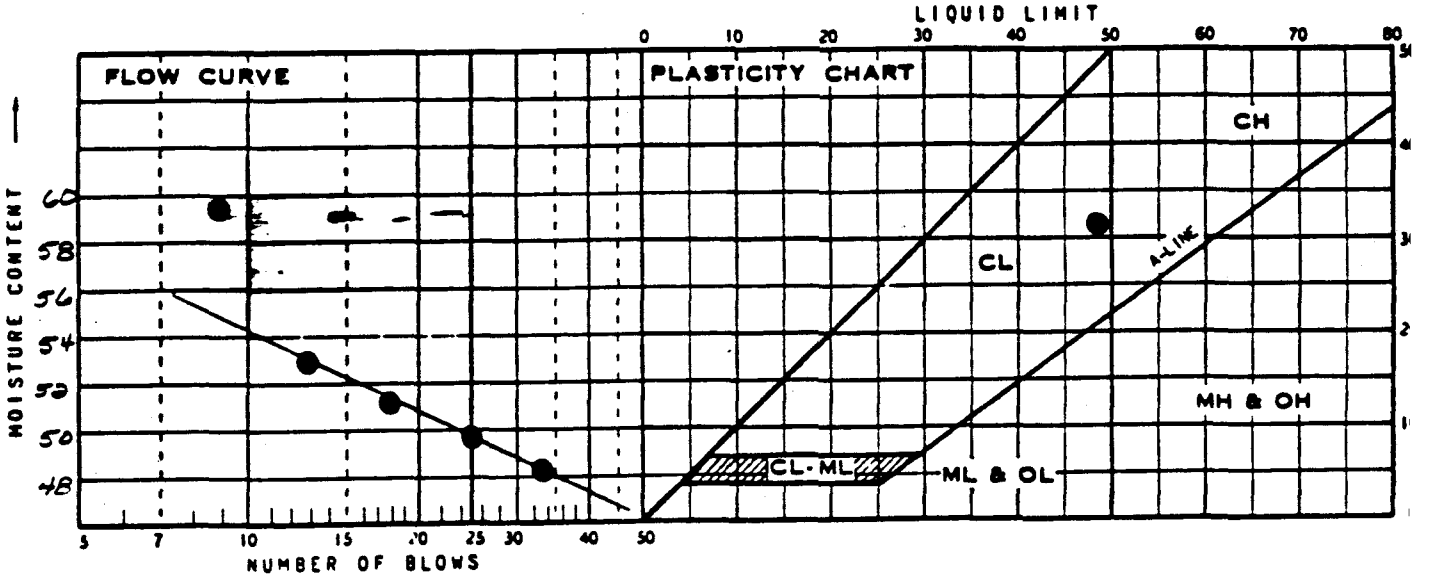
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SL 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2039	6C	11C			
WT OF DISH + WET SOIL g	8.29	6.87	7.67			
WT OF DISH + DRY SOIL g	7.17	5.96	6.63	—	—	—
WT OF MOISTURE g	1.12	.91	1.04			
WT OF DISH g	1.05	1.03	1.04	—	—	—
WT OF DRY SOIL g	6.12	4.93	5.59			
MOISTURE CONTENT %	18.3	18.5	18.6			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	28 C	2067	2008	2 C	2006	
NUMBER OF BLOWS	34	25	18	13±	9±	
WT OF DISH + WET SOIL g	13.62	18.12	17.12	14.86	13.78	
WT OF DISH + DRY SOIL g	9.52	12.45	11.68	10.07	9.08	—
WT OF MOISTURE g	4.10	5.67	5.44	4.79	4.76	
WT OF DISH g	1.05	1.0[illegible]	1.06	1.04	1.05	—
WT OF DRY SOIL g	8.47	11.42	10.62	9.03	7.97	
MOISTURE CONTENT %	48.4	49.7	51.2	53.1	59.7	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		49.8	18.5	31.3	CL	

ADVANCED TERRA TESTING INC

JEM

BR?

✓

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	52'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	42.03
Wt. Dry Soil & Pan	(g)	40.79
Wt. Lost Moisture	(g)	1.24
Wt. of Pan Only	(g)	3.77
Wt. of Dry Soil	(g)	37.02
Moisture Content	%	3.3
Wt. Hydrom. Sample Wet	(g)	55.03
Wt. Hydrom. Sample Dry	(g)	53.25

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.03
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.03
Weight of - #10 Dry (g)	53.25
Wt. Total Sample Dry (g)	53.25
Calc. Wt. "W" (g)	53.25
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.62	0.07	0.07	0.1	99.9
#40	1.57	1.79	0.22	0.29	0.5	99.5
#60	1.57	1.73	0.16	0.45	0.8	99.2
#100	1.57	1.70	0.13	0.58	1.1	98.9
#230	1.57	2.03	0.46	1.04	2.0	98.0

Chapter.

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston** JOB NO. 2066-03

BORING NO.	8+00	SAMPLED	Rocky Flats
DEPTH	52'	DATE TESTED	03-20-92 INU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

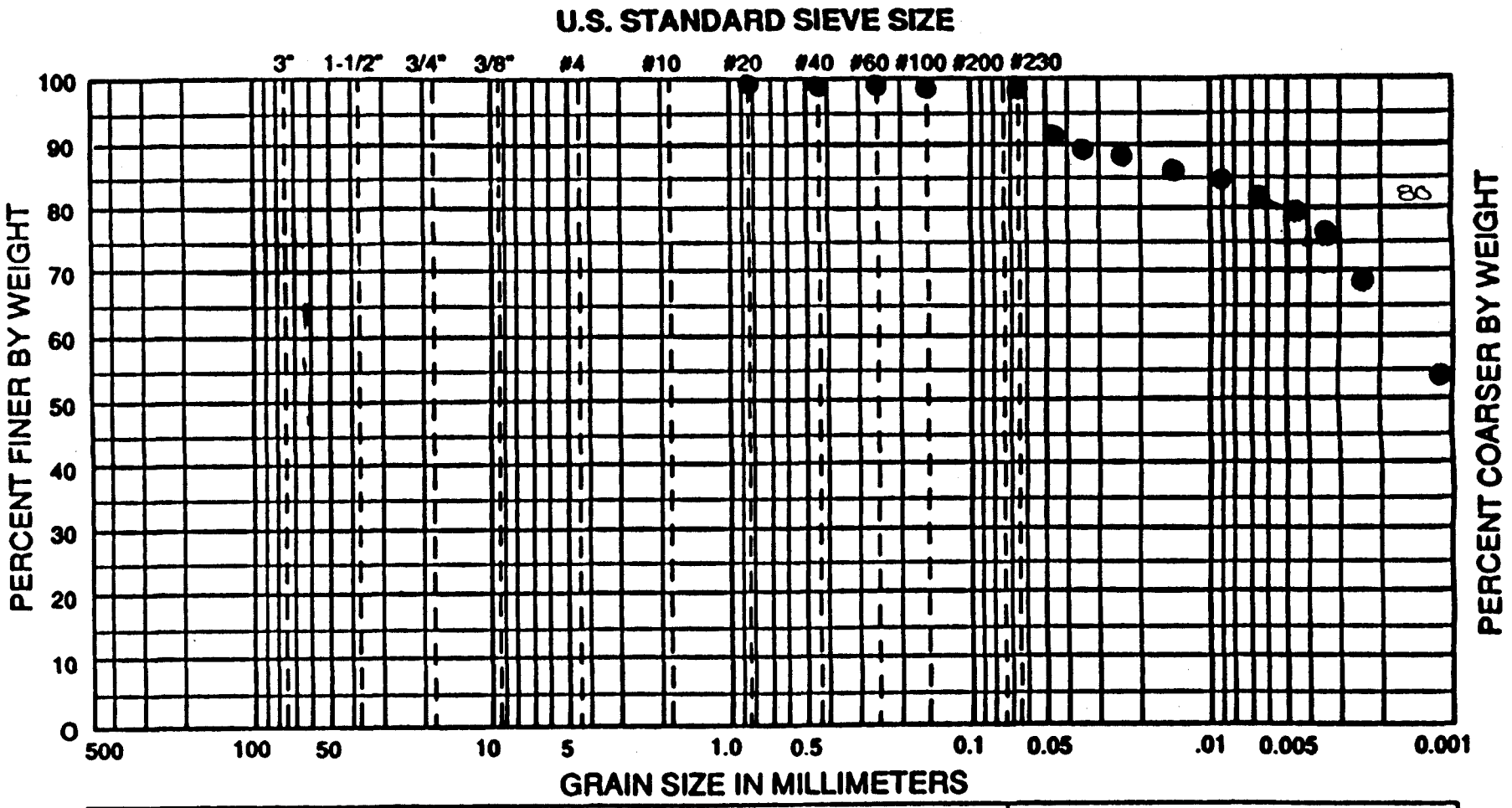
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.84	Temp. Coef. K	0.01262
Value of "a"	0.96	Wt. Dry Sample "W"	53.248
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	57.00	51.00	92.1	92.1	6.94	0.0470
1.0	55.50	49.50	89.4	89.4	7.19	0.0338
2.0	55.00	49.00	88.5	88.5	7.27	0.0241
5.0	54.00	48.00	86.7	86.7	7.43	0.0154
15.0	53.00	47.00	84.9	84.9	7.60	0.0090
30.0	52.00	46.00	83.1	83.1	7.76	0.0064
60.0	50.00	44.00	79.5	79.5	8.09	0.0046
120.0	48.00	42.00	75.9	75.9	8.42	0.0033
250.0	44.00	38.00	68.7	68.7	9.07	0.0024
1440.0	36.00	30.00	54.2	54.2	10.39	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+00 SAMPLE NO.: CH # 13 DATE: 3-27-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
	52.0'	Rc	claystone 0 0 FLAT: /	0 EG&G	2.0 0.5	1.5	18	80

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats/2066
BORING B100 SAMPLE #13 DEPTH @52'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

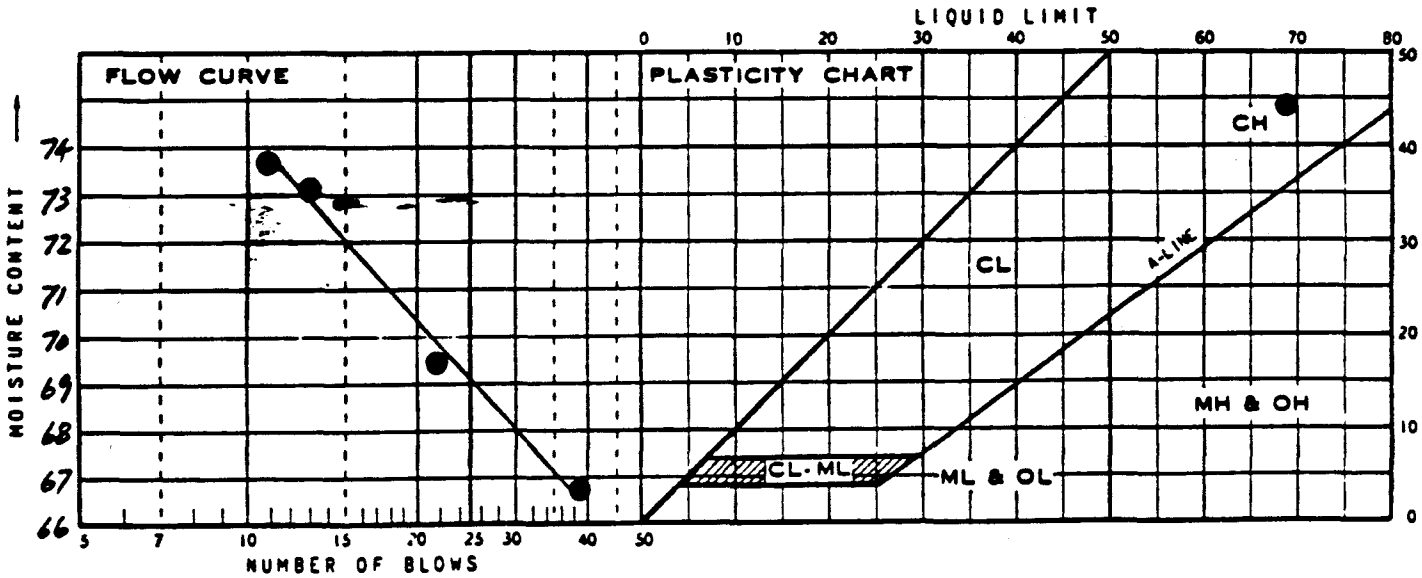
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2062	35CC	35C			
WT OF DISH + WET SOIL g	6.58	7.78	6.36			
WT OF DISH + DRY SOIL g	5.45	6.45	5.29	—	—	—
WT OF MOISTURE	1.13	1.33	1.07			
WT OF DISH	1.02	1.04	1.05	—	—	—
WT OF DRY SOIL	4.43	5.41	4.24			
MOISTURE CONTENT %	25.5	24.6	25.2	75.3/3 =	25.1	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2038	2024	4C	2036	5C	43C
NUMBER OF BLOWS	39	29	22	14	13	11
WT OF DISH + WET SOIL g	8.34	8.64	9.24	8.79	8.91	8.22
WT OF DISH + DRY SOIL g	5.42	5.51	5.88	5.57	5.59	5.17
WT OF MOISTURE	2.92	3.13	3.36	3.22	3.32	3.05
WT OF DISH	1.04	1.05	1.04	1.04	1.05	1.03
WT OF DRY SOIL	4.38	4.46	4.84	4.53	4.54	4.14
MOISTURE CONTENT %	66.7	70.2	69.4	71.1	73.1	73.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		69.2	25.1	44.1	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	1.5'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

CB

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	39.82
Wt. Dry Soil & Pan	(g)	38.83
Wt. Lost Moisture	(g)	0.99
Wt. of Pan Only	(g)	3.75
Wt. of Dry Soil	(g)	35.08
Moisture Content	%	2.8
Wt. Hydrom. Sample Wet	(g)	55.00
Wt. Hydrom. Sample Dry	(g)	53.49

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	698.76
Weight of + #10 Before Washing (g)	179.36
Weight of + #10 After Washing (g)	169.46
Weight of - #10 Wet (g)	519.40
Weight of - #10 Dry (g)	514.77
Wt. Total Sample Dry (g)	684.23
Calc. Wt. "W" (g)	71.10
Calc. Mass + #10	17.61

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	61.00	61.00	61.00	8.9	91.1
3/8"	0.00	42.38	42.38	103.38	15.1	84.9
#4	0.00	40.03	40.03	143.41	21.0	79.0
#10	0.00	26.05	26.05	169.46	24.8	75.2
#20	1.58	2.53	0.95	0.95	26.1	73.9
#40	1.31	3.58	2.27	3.22	29.3	70.7
#60	1.57	4.27	2.70	5.92	33.1	66.9
#100	1.57	4.80	3.23	9.15	37.6	62.4
#230	1.56	7.48	5.92	15.07	46.0	54.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Westex

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	1.5'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

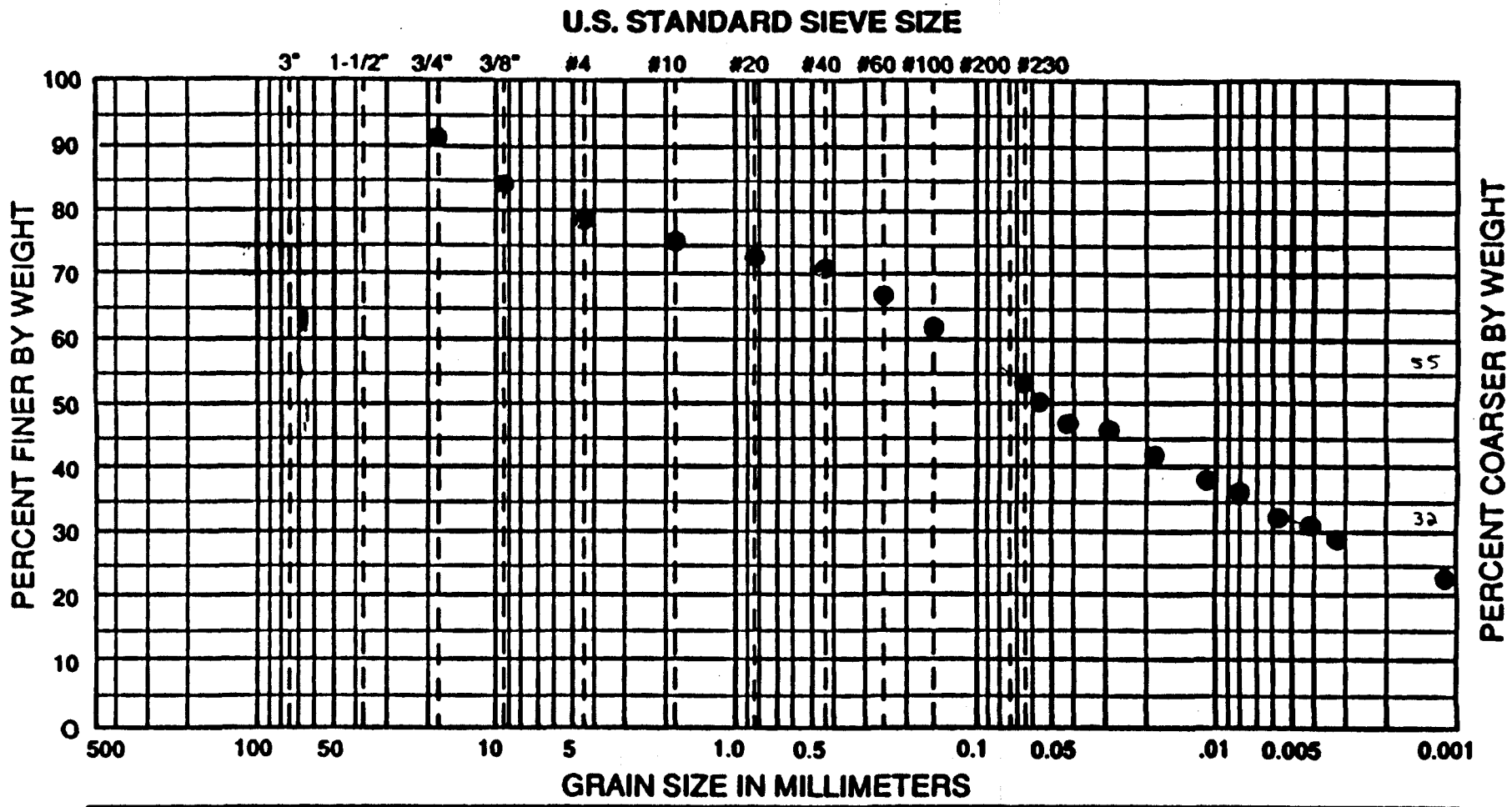
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01332
Value of "a"	0.99	Wt. Dry Sample "W"	71.104
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	43.00	36.00	50.2	50.2	9.24	0.0573
1.0	40.75	33.75	47.1	47.1	9.61	0.0413
2.0	40.00	33.00	46.0	46.0	9.73	0.0294
5.0	37.00	30.00	41.9	41.9	10.22	0.0190
15.0	34.50	27.50	38.4	38.4	10.63	0.0112
30.0	33.00	26.00	36.3	36.3	10.88	0.0080
60.0	30.50	23.50	32.8	32.8	11.29	0.0058
120.0	29.25	22.25	31.0	31.0	11.49	0.0041
190.0	28.00	21.00	29.3	29.3	11.70	0.0033
1440.0	24.00	17.00	23.7	23.7	12.35	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH #9 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION							
		Clay with sand, silt + gravel							
		GV - 21		S - 24.0			SL	CL	
Rocky Flats	1.5'	8.9	12.1	3.8	4.5	15.7	23.0		.0

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8+25 SAMPLE CH #9 DEPTH 1.5'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

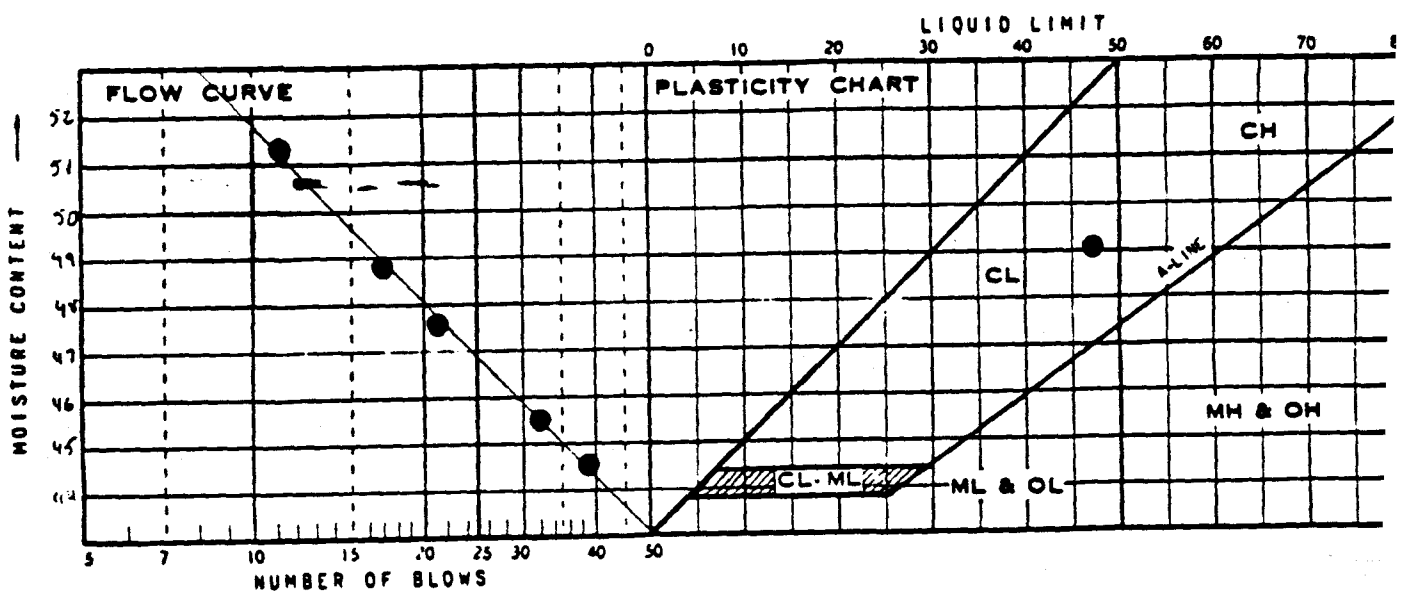
PLASTIC LIMIT BY DM 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	30C	2057	42C			
WT OF DISH + WET SOIL g	6.08	5.50	5.89			
WT OF DISH + DRY SOIL g	5.37	4.87	5.18	—	—	—
WT OF MOISTURE g	.71	.63	.71			
WT OF DISH g	1.05	1.05	1.05	—	—	—
WT OF DRY SOIL g	4.32	3.82	4.13			
MOISTURE CONTENT g	16.4	16.5	17.2			

LIQUID LIMIT

??

DETERMINATION	1	2	3	4	5	6
DISH	66C	2095	2020	39C	43C	14C
NUMBER OF BLOWS	39+	32+	18	21	17	11
WT OF DISH + WET SOIL g	11.32	12.67	11.42	12.43	11.37	10.92
WT OF DISH + DRY SOIL g	8.15	9.04	8.09	8.75	7.98	7.57
WT OF MOISTURE g	3.17	3.63	3.33	3.68	3.39	3.35
WT OF DISH g	1.05	1.06	1.05	1.03	1.04	1.04
WT OF DRY SOIL g	7.10	7.98	7.04	7.72	6.94	6.53
MOISTURE CONTENT %	44.6	45.5	47.3	47.7	48.3	51.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		46.9	16.7	30.2	CL

ADVANCED TERRA TESTING

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	4.0'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

68

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	52.01
Wt. Dry Soil & Pan	(g)	50.38
Wt. Lost Moisture	(g)	1.63
Wt. of Pan Only	(g)	3.82
Wt. of Dry Soil	(g)	46.56
Moisture Content	%	3.5

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	57.97

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	640.75
Weight of + #10 Before Washing (g)	106.33
Weight of + #10 After Washing (g)	85.06
Weight of - #10 Wet (g)	534.42
Weight of - #10 Dry (g)	536.89
Wt. Total Sample Dry (g)	621.95
Calc. Wt. "W" (g)	67.15
Calc. Mass + #10	9.18

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	31.93	31.93	31.93	5.1	94.9
3/8"	0.00	33.72	33.72	65.65	10.6	89.4
#4	0.00	~~14.18~~	14.18	79.83	12.8	87.2
#10	0.00	5.23	5.23	85.06	13.7	86.3
#20	1.54	4.08	2.54	2.54	17.5	82.5
#40	1.56	3.52	1.96	4.50	20.4	79.6
#60	1.56	3.34	1.78	6.28	23.0	77.0
#100	1.56	4.33	2.77	9.05	27.2	72.8
#230	1.55	7.17	5.62	14.67	35.5	64.5

66

Silty Clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Westen	JOB NO.	2066-03
BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	4.0'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

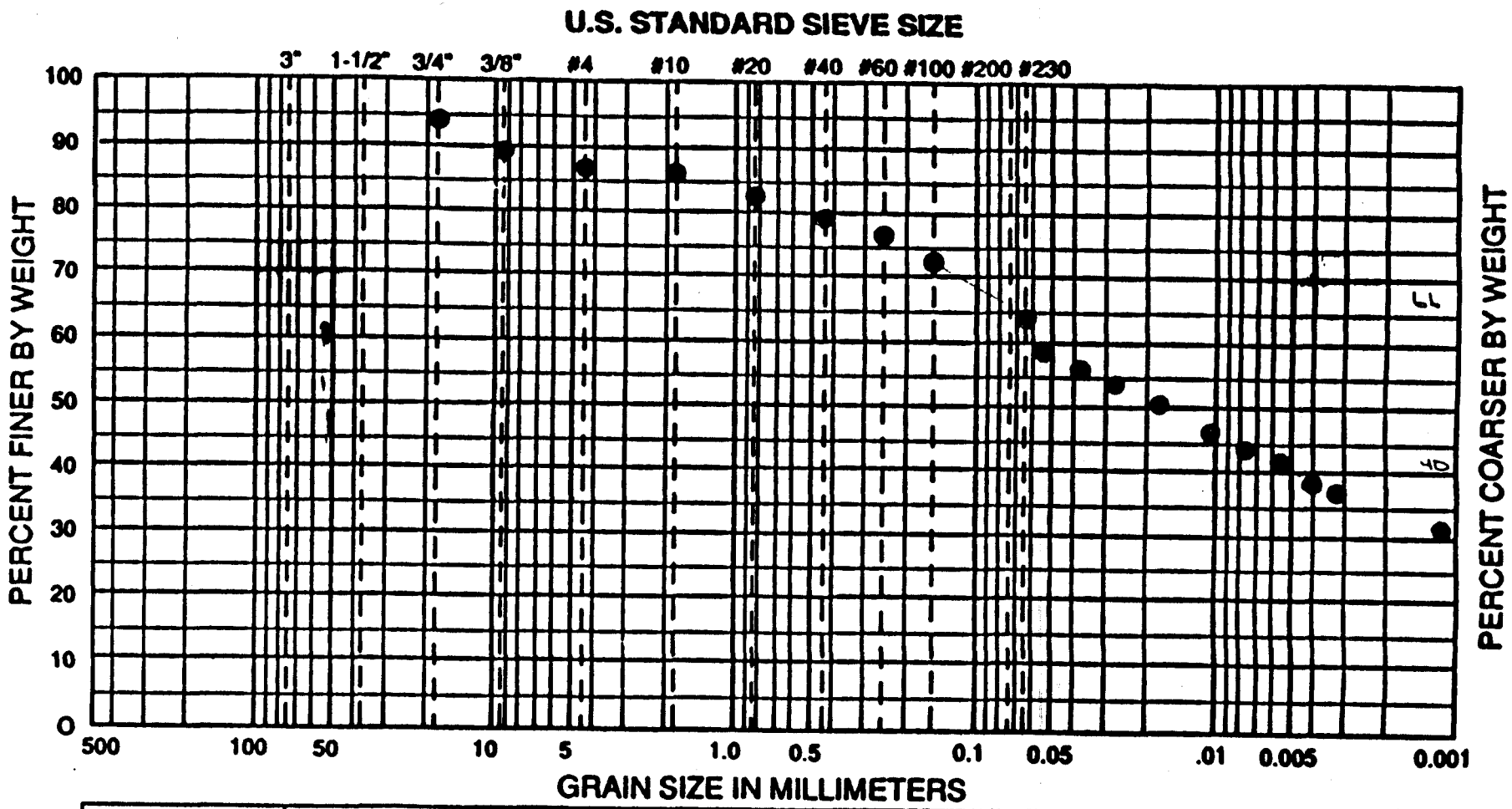
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01316
Value of "a"	0.99	Wt. Dry Sample "W"	67.155
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	40.00	59.1	59.1	8.58	0.0545
1.0	45.00	38.00	56.1	56.1	8.91	0.0393
2.0	43.75	36.75	54.3	54.3	9.12	0.0281
5.0	41.00	34.00	50.2	50.2	9.57	0.0182
15.0	38.75	31.75	46.9	46.9	9.94	0.0107
30.0	37.25	30.25	44.7	44.7	10.18	0.0077
60.0	35.00	28.00	41.4	41.4	10.55	0.0055
120.0	33.25	26.25	38.8	38.8	10.84	0.0040
190.0	32.00	25.00	36.9	36.9	11.04	0.0032
1440.0	28.00	21.00	31.0	31.0	11.70	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH #9 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION							
		silty clay with sand							
		GV-12.8			S 21.2			SL	
Rocky Flats	4.0'	5.1	[illegible]	[illegible].7	0.9	6.7	13.6	26	[illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats
BORING B-25 SAMPLE CH#9 DEPTH 4.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

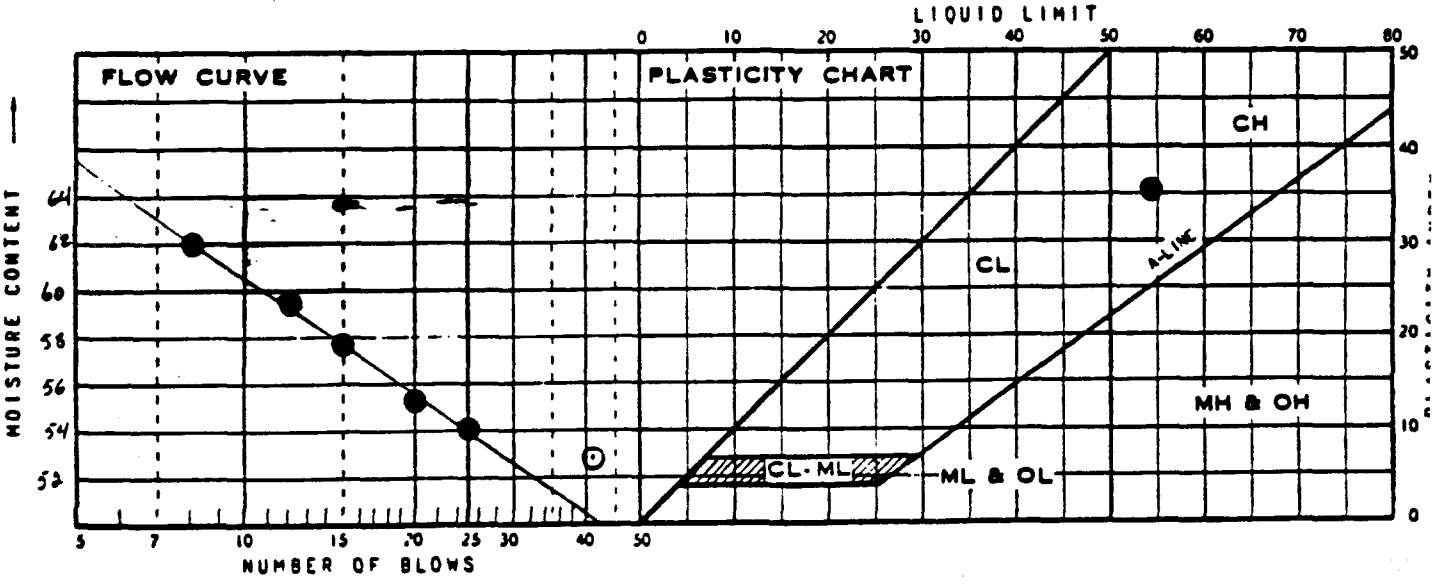
PLASTIC LIMIT BY DJA 3/10/93

DETERMINATION	1	2	3	4	5	6
DISH	2034	2039	18C			
WT OF DISH + WET SOIL g	5.36	4.69	4.75			
WT OF DISH + DRY SOIL g	4.67	4.11	4.16	—	—	—
WT OF MOISTURE g	.69	.58	.59			
WT OF DISH g	1.04	1.06	1.04	—	—	—
WT OF DRY SOIL g	3.63	3.05	3.12			
MOISTURE CONTENT %	19.0	19.0	18.9			

LIQUID LIMIT

??

DETERMINATION	1	2	3	4	5	6
DISH	2066	38C	2052	2046	2075	21C
NUMBER OF BLOWS	41	25	20	15	12	8
WT OF DISH + WET SOIL g	11.10	11.28	10.89	10.68	11.01	11.47
WT OF DISH + DRY SOIL g	7.62	7.69	7.36	7.16	7.29	7.48
WT OF MOISTURE g	3.48	3.59	3.53	3.52	3.72	3.99
WT OF DISH g	1.04	1.05	1.02	1.06	1.04	1.04
WT OF DRY SOIL g	6.58	6.64	6.34	6.10	6.25	6.44
MOISTURE CONTENT %	52.9	54.1	55.7	57.8	59.5	62.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		54.1	19.0	35.1	CH	

ADVANCED TERRA TESTING INC

JEm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	8.0'	DATE TESTED	03-13-92 TNU
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No
68			

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	40.94
Wt. Dry Soil & Pan	(g)	39.47
Wt. Lost Moisture	(g)	1.47
Wt. of Pan Only	(g)	3.80
Wt. of Dry Soil	(g)	35.67
Moisture Content	%	4.1
Wt. Hydrom. Sample Wet	(g)	55.05
Wt. Hydrom. Sample Dry	(g)	52.87

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	578.12
Weight of + #10 Before Washing (g)	5.44
Weight of + #10 After Washing (g)	4.82
Weight of - #10 Wet (g)	572.68
Weight of - #10 Dry (g)	550.61
Wt. Total Sample Dry (g)	555.43
Calc. Wt. "W" (g)	53.33
Calc. Mass + #10	0.46

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.07	2.07	2.07	0.4	99.6
#4	0.00	1.65	1.65	3.72	0.7	99.3
#10	0.00	1.10	1.10	4.82	0.9	99.1
#20	1.55	1.66	0.11	0.11	1.1	98.9
#40	1.57	2.17	0.60	0.71	2.2	97.8
#60	1.56	2.86	1.30	2.01	4.6	95.4
#100	1.56	4.15	2.59	4.60	9.5	90.5
#230	1.57	7.76	6.19	10.79	21.1	78.9

Silty Clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	8.0'	DATE TESTED	03-13-92 TNU
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

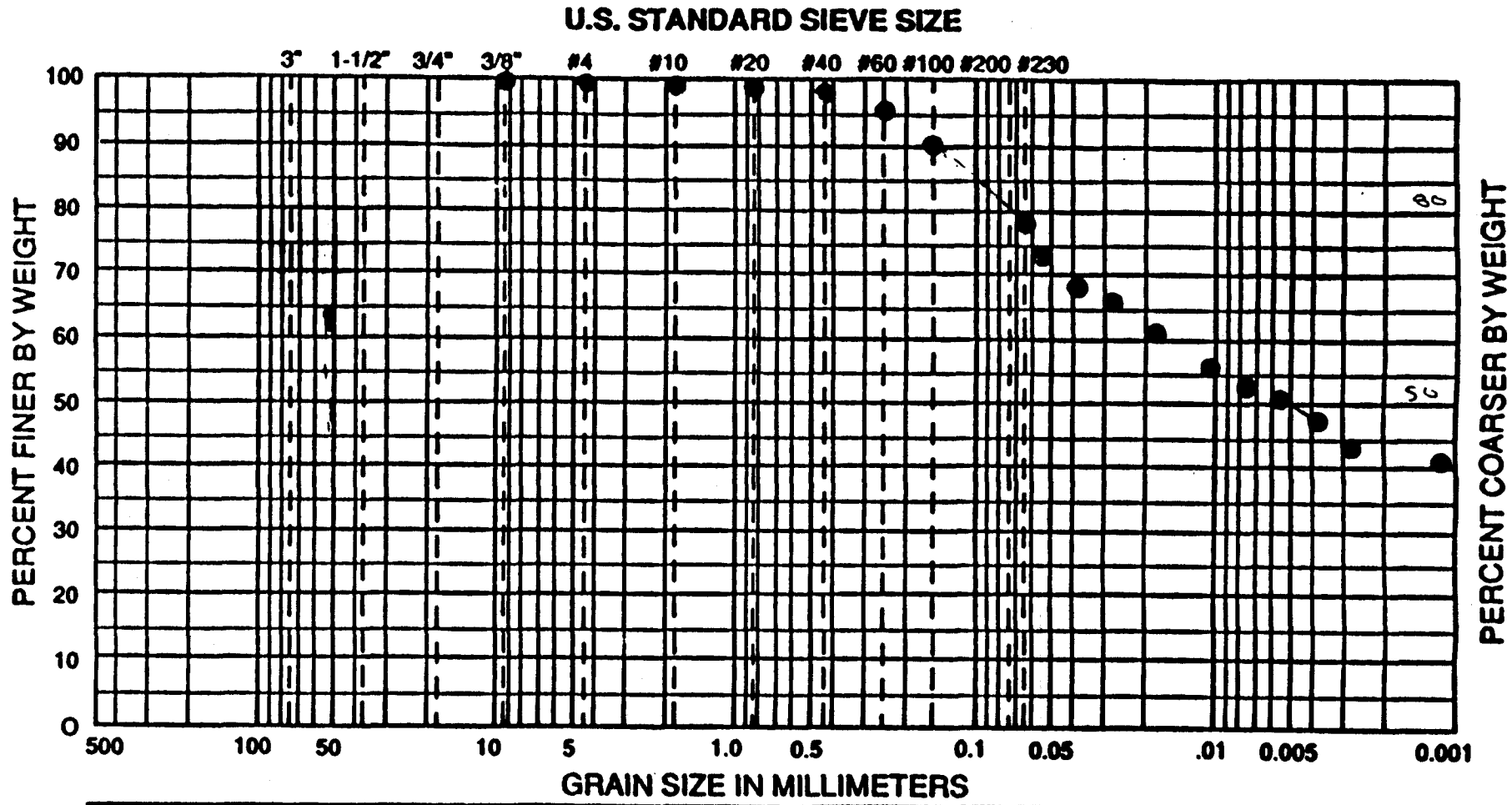
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	53.329
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.50	39.50	72.9	72.9	8.66	0.0542
1.0	44.00	37.00	68.3	68.3	9.07	0.0392
2.0	42.75	35.75	66.0	66.0	9.28	0.0280
5.0	40.00	33.00	60.9	60.9	9.73	0.0181
15.0	37.00	30.00	55.4	55.4	10.22	0.0107
30.0	36.00	29.00	53.5	53.5	10.39	0.0077
60.0	34.50	27.50	50.7	50.7	10.63	0.0055
120.0	32.75	25.75	47.5	47.5	10.92	0.0039
250.0	31.00	24.00	44.3	44.3	11.21	0.0028
1440.0	29.00	22.00	40.6	40.6	11.53	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH #9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
		silty clay				
			-0.7		S-19.3	SL
Rocky Flats	8.0'	0	0.7	.2	1.3 17.8	30

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 266-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8+25 SAMPLE CH 9 DEPTH 8.0'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

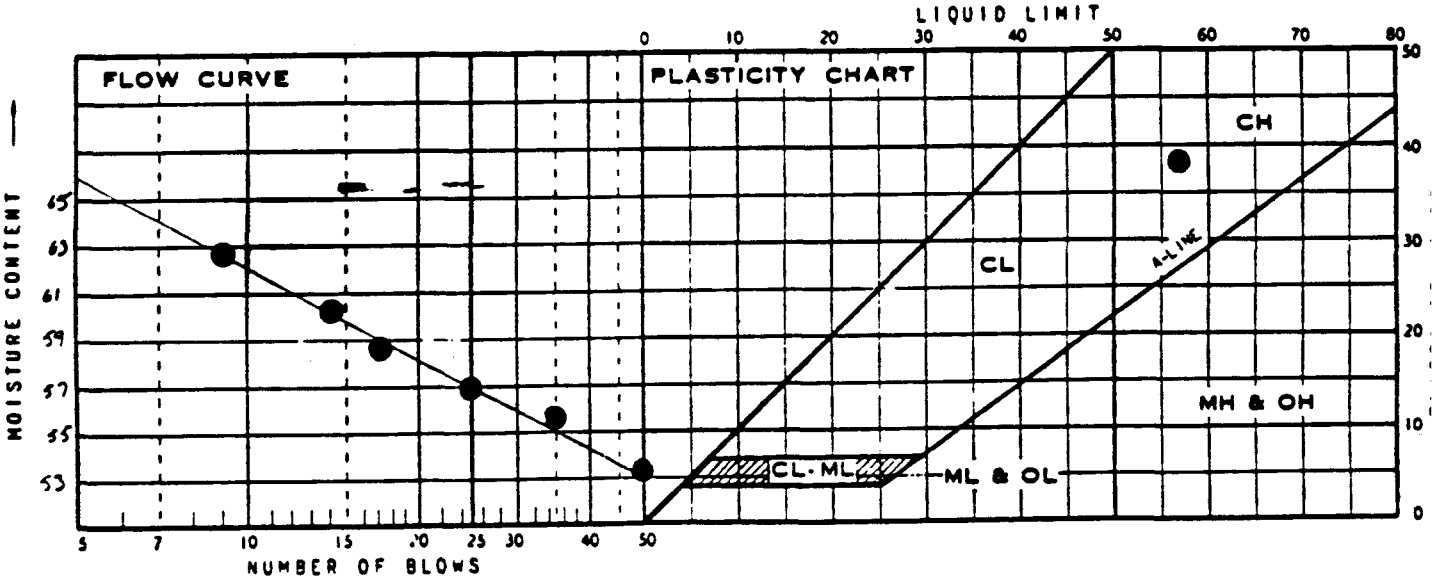
PLASTIC LIMIT BY RM 3/10/93

77

DETERMINATION	1	2	3	4	5	6
DISH	1C	14C	2057			
WT OF DISH + WET SOIL g	4.55	5.14	4.79			
WT OF DISH + DRY SOIL g	4.00	4.46	4.20	—	—	—
WT OF MOISTURE g	.55	.68	.59			
WT OF DISH g	1.08	1.04	1.06	—	—	—
WT OF DRY SOIL g	2.92	3.42	3.14			
MOISTURE CONTENT %	18.8	19.9	18.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2043	39C	2037	2010	2061	2095
NUMBER OF BLOWS	50+	35	25	17	14	9
WT OF DISH + WET SOIL g	11.51	11.61	12.22	11.69	11.05	12.04
WT OF DISH + DRY SOIL g	7.87	7.83	8.16	7.76	7.29	7.80
WT OF MOISTURE g	3.64	3.78	4.06	3.93	3.76	4.24
WT OF DISH g	1.05	1.03	1.04	1.06	1.03	1.05
WT OF DRY SOIL g	6.82	6.80	7.12	6.70	8.26	6.75
MOISTURE CONTENT %	53.4	55.6	57.0	58.7	60.1	62.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.0	18.8	38.2	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	18'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

S8

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	59.86
Wt. Dry Soil & Pan	(g)	58.20
Wt. Lost Moisture	(g)	1.66
Wt. of Pan Only	(g)	3.64
Wt. of Dry Soil	(g)	54.56
Moisture Content	%	3.0

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.23

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	652.63
Weight of + #10 Before Washing (g)	25.69
Weight of + #10 After Washing (g)	20.69
Weight of - #10 Wet (g)	626.94
Weight of - #10 Dry (g)	613.28
Wt. Total Sample Dry (g)	633.97
Calc. Wt. "W" (g)	60.19
Calc. Mass + #10	1.96

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.11	2.11	2.11	0.3	99.7
#4	0.00	7.14	7.14	9.25	1.5	98.5
#10	0.00	11.44	11.44	20.69	3.3	96.7
#20	1.57	5.40	3.83	3.83	9.6	90.4
#40	1.56	5.96	4.40	8.23	16.9	83.1
#60	1.56	5.19	3.63	11.86	23.0	77.0
#100	1.57	6.26	4.69	16.55	30.8	69.2
#230	1.57	8.84	7.27	23.82	42.8	57.2

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	18'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

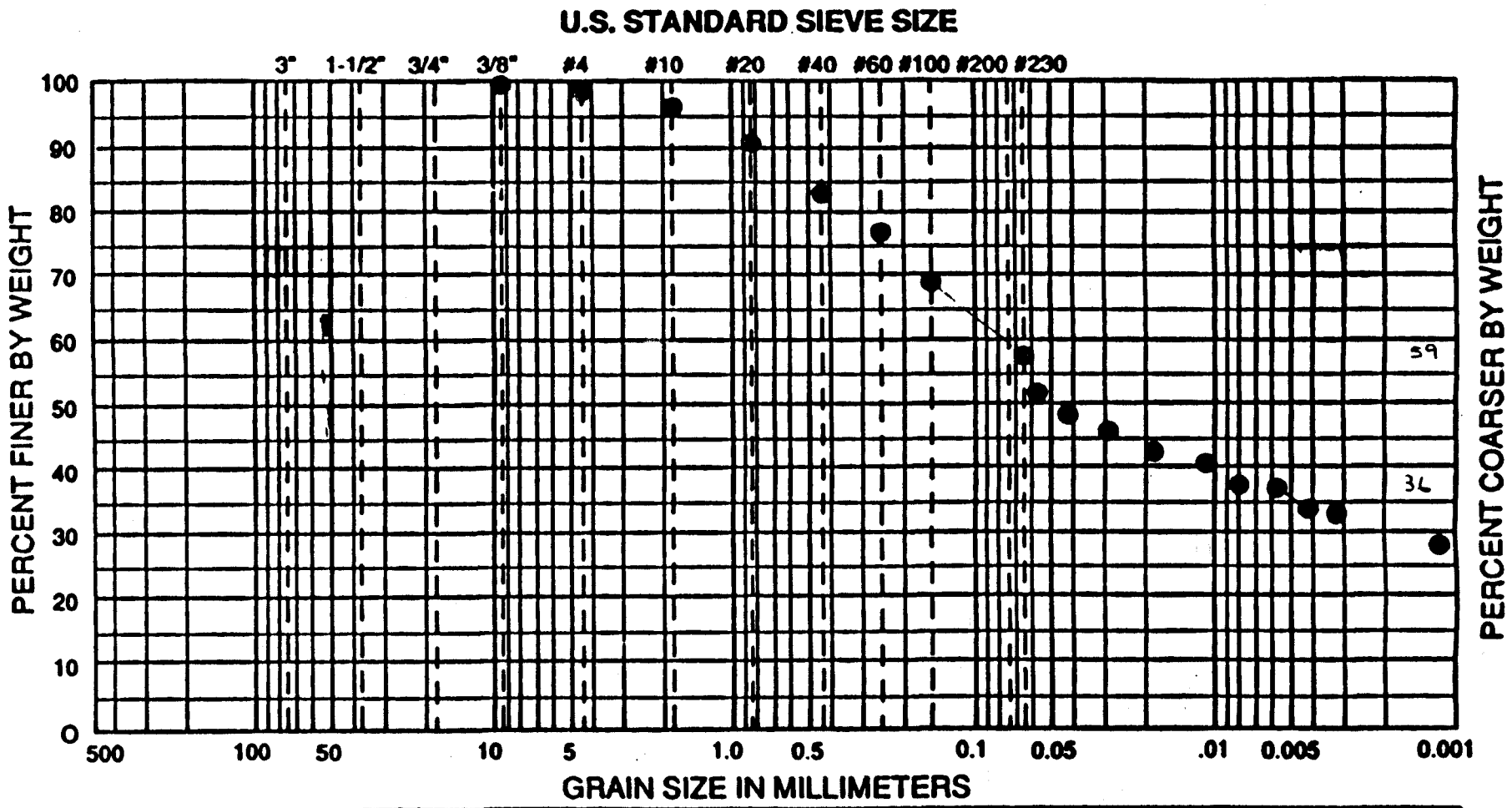
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	60.193
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	38.75	31.75	51.8	51.8	9.94	0.0579
1.0	36.75	29.75	48.5	48.5	10.26	0.0416
2.0	35.00	28.00	45.7	45.7	10.55	0.0298
5.0	33.00	26.00	42.4	42.4	10.88	0.0191
15.0	31.75	24.75	40.4	40.4	11.08	0.0112
30.0	30.00	23.00	37.5	37.5	11.37	0.0080
60.0	29.75	22.75	37.1	37.1	11.41	0.0057
120.0	27.75	20.75	33.9	33.9	11.74	0.0041
190.0	27.25	20.25	33.0	33.0	11.82	0.0032
1440.0	24.50	17.50	28.5	28.5	12.27	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH #9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		clayey sand					
		GV - 1.5		S - 39.5		SC	CL
Rocky Flats	18'	0 1.5	1.8	13.6	24.1	23	0

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8-25 SAMPLE CH #9 DEPTH 18'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

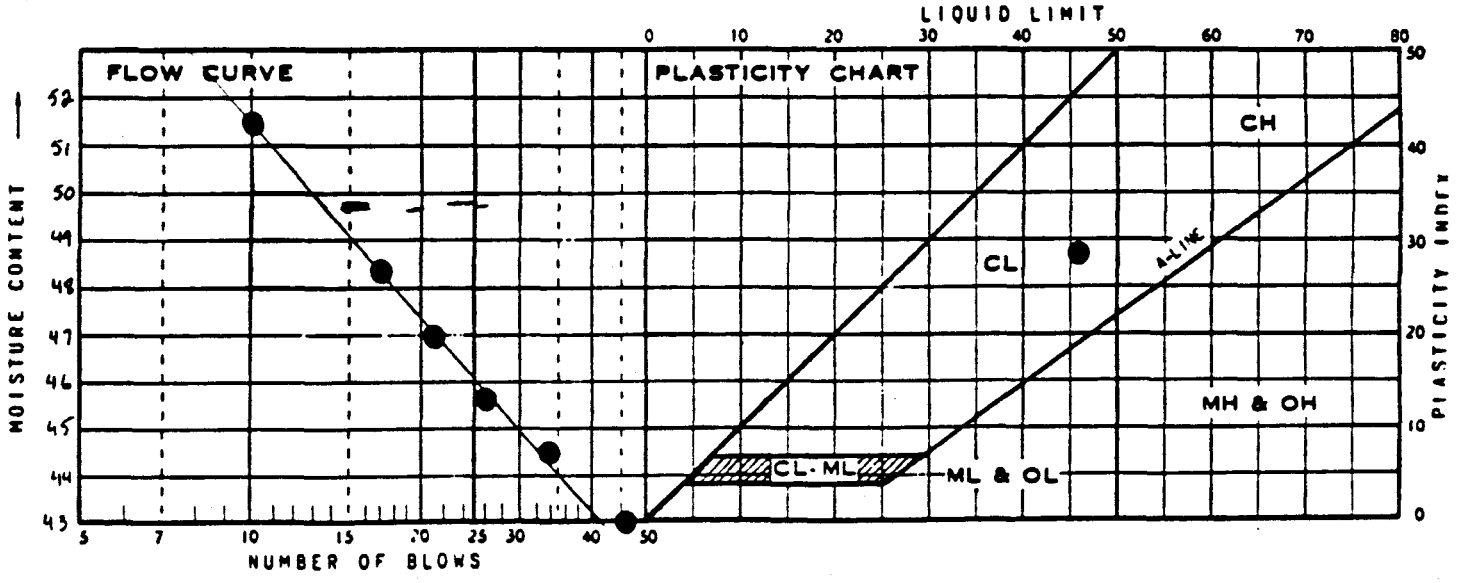
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY 2/10/92

DETERMINATION	1	2	3	4	5	6
DISH	2003	7C	22			
WT OF DISH + WET SOIL g	5.56	6.70	5.78			
WT OF DISH + DRY SOIL g	4.89	5.88	5.07	—	—	—
WT OF MOISTURE g	.67	.82	.71			
WT OF DISH g	1.03	1.04	1.06	—	—	—
WT OF DRY SOIL g	3.86	4.84	4.01			
MOISTURE CONTENT %	17.4	16.9	17.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2059	36C	2001	6C	2050	44C
NUMBER OF BLOWS	47	34	26	21	17	10
WT OF DISH + WET SOIL g	12.15	11.33	11.78	12.31	11.53	12.02
WT OF DISH + DRY SOIL g	8.81	8.16	8.42	8.72	8.11	8.30
WT OF MOISTURE g	3.34	3.17	3.36	3.59	3.42	3.72
WT OF DISH g	1.05	1.03	1.06	1.08	1.04	1.07
WT OF DRY SOIL g	7.76	7.13	7.36	7.64	7.07	7.23
MOISTURE CONTENT %	43.0	44.5	45.7	47.0	48.4	51.5



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		46.0	17.3	28.7	CL	

ADVANCED TERRA TESTING INC

JFM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	21.5'	DATE TESTED	03-13-92 TN
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

SB

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	42.05
Wt. Dry Soil & Pan	(g)	41.13
Wt. Lost Moisture	(g)	0.92
Wt. of Pan Only	(g)	3.36
Wt. of Dry Soil	(g)	37.77
Moisture Content	%	2.4
Wt. Hydrom. Sample Wet	(g)	55.03
Wt. Hydrom. Sample Dry	(g)	53.72

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	766.17
Weight of + #10 Before Washing (g)	456.03
Weight of + #10 After Washing (g)	436.28
Weight of - #10 Wet (g)	310.14
Weight of - #10 Dry (g)	322.05
Wt. Total Sample Dry (g)	758.3[illegible]
Calc. Wt. "W" (g)	126.51
Calc. Mass + #10	72.78

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	246.70	246.70	246.70	32.5	67.5
3/8"	0.00	76.71	76.71	323.41	42.6	57.4
#4	0.00	60.83	60.83	384.24	50.7	49.3
#10	0.00	52.04	52.04	436.28	57.5	42.5
#20	1.55	7.34	5.79	5.79	62.1	37.9
#40	1.57	11.29	9.72	15.51	69.8	30.2
#60	1.46	7.12	5.66	21.17	74.3	25.7
#100	1.56	6.16	4.60	25.77	77.9	22.1
#230	1.57	7.72	6.15	31.92	82.8	17.2

18

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	21.5'	DATE TESTED	03-13-92 TNU
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

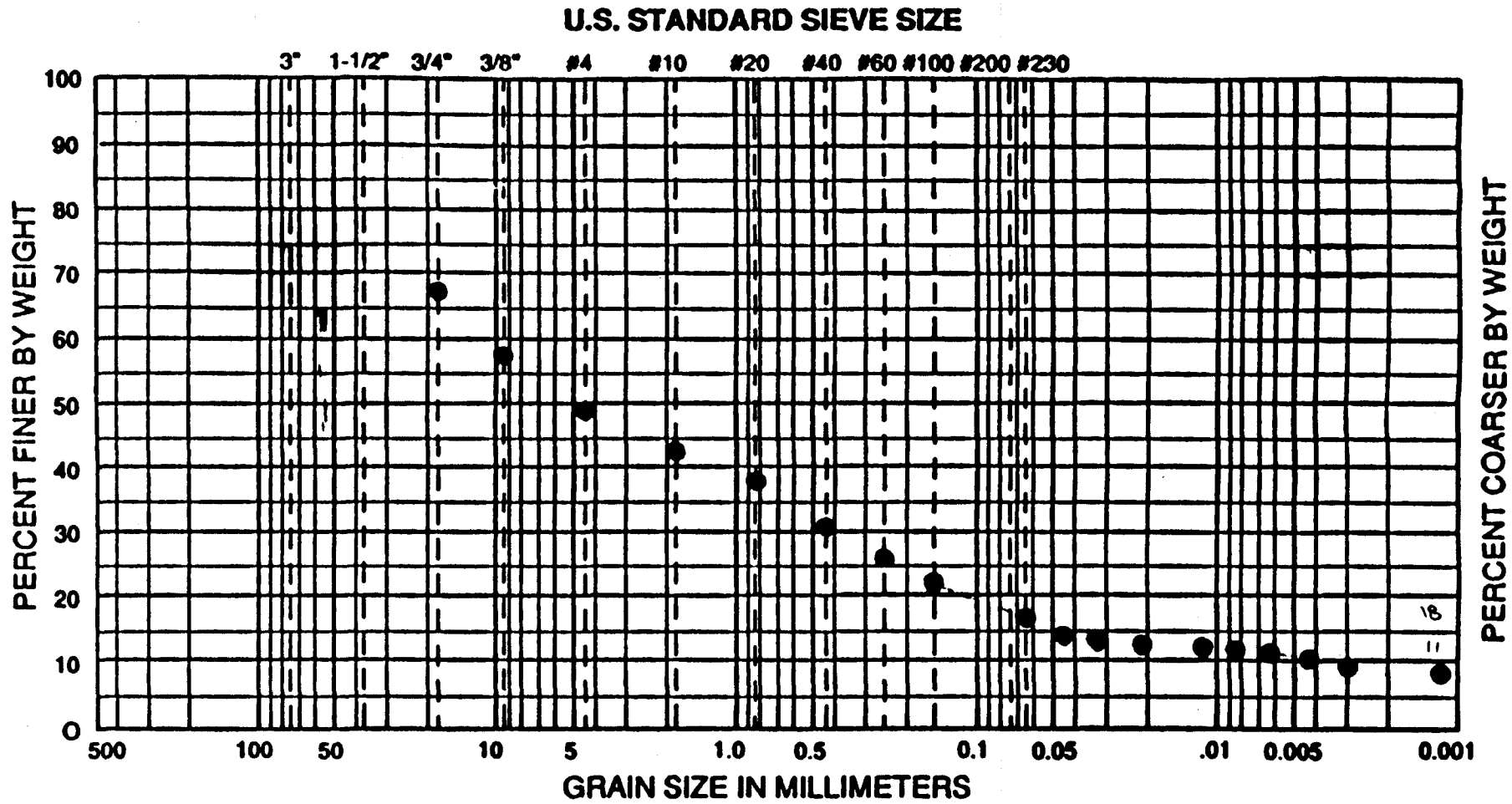
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.68	Temp. Coef. K	0.01320
Value of "a"	0.99	Wt. Dry Sample "W"	126.506
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	28.00	21.00	16.5	16.5	11.70	0.0638
1.0	26.00	19.00	14.9	14.9	12.03	0.0458
2.0	24.75	17.75	13.9	13.9	12.23	0.0326
5.0	23.00	16.00	12.6	12.6	12.52	0.0209
15.0	22.00	15.00	11.8	11.8	12.68	0.0121
30.0	21.25	14.25	11.2	11.2	12.81	0.0086
60.0	21.00	14.00	11.0	11.0	12.85	0.0061
120.0	20.00	13.00	10.2	10.2	13.01	0.0043
250.0	19.00	12.00	9.4	9.4	13.17	0.0030
1440.0	18.00	11.00	8.6	8.6	13.34	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH#9 DATE: 3-14-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
		Sandy Gravel						
		GU - 50.7		SS - 31.3			SL	CL
Rocky Flats	21.5'	32.[illegible]	18.2	6.8	12.3	12.7	7	1

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8:25 SAMPLE CH #9 DEPTH 21.5'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

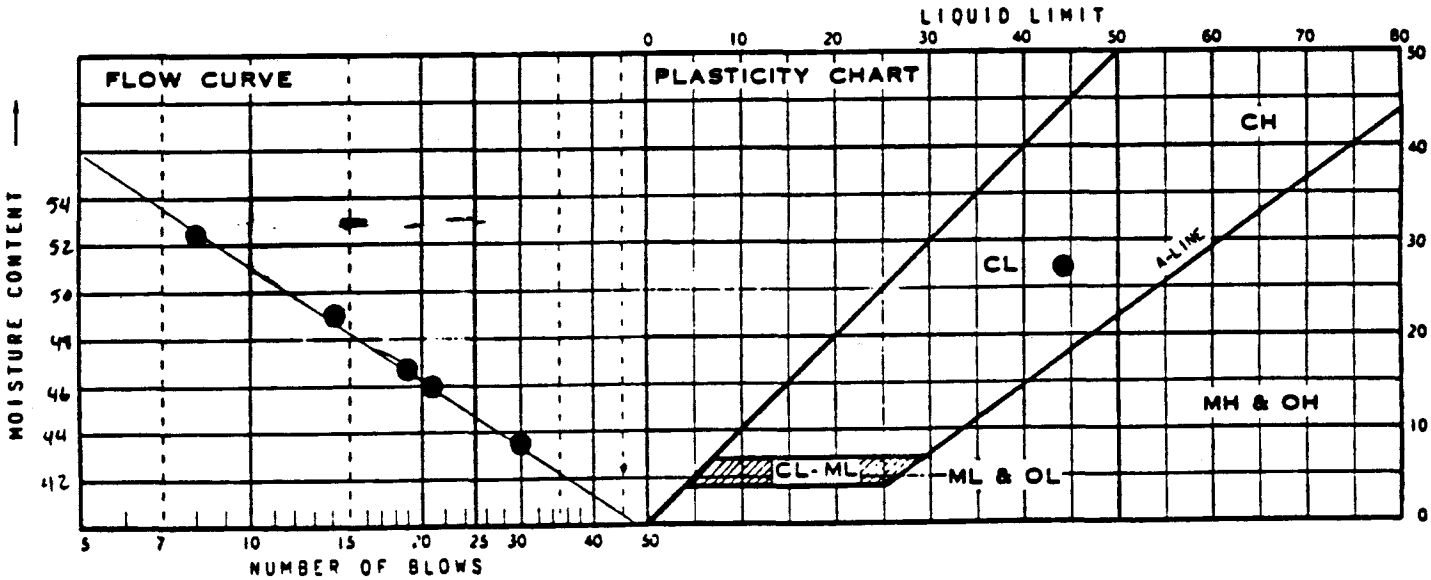
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DH 3/10/92

DETERMINATION	1	2	3	4	5	6
DISH	OC	2071	2038			
WT OF DISH + WET SOIL g	6.83	7.19	7.24			
WT OF DISH + DRY SOIL g	6.00	6.28	6.31	—	—	—
WT OF MOISTURE g	.83	.91	.93			
WT OF DISH g	1.05	1.05	1.06	—	—	—
WT OF DRY SOIL g	4.95	5.23	5.25			
MOISTURE CONTENT %	16.8	17.4	17.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	24C	2027	2040	12C	2063	31C
NUMBER OF BLOWS	46	30	21	19	14	8
WT OF DISH + WET SOIL g	10.69	9.63	10.00	11.30	11.77	11.31
WT OF DISH + DRY SOIL g	7.81	7.02	7.18	8.03	8.24	7.78
WT OF MOISTURE g	2.88	2.61	2.82	3.27	3.53	3.53
WT OF DISH g	1.04	1.05	1.05	1.05	1.06	1.05
WT OF DRY SOIL g	6.77	5.97	6.13	6.98	7.18	6.73
MOISTURE CONTENT %	42.5	43.7	46.0	46.8	49.2	52.5



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		44.7	17.3	27.4	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	25.5	DATE TESTED	03-13-92 TNU
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

53

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	41.15
Wt. Dry Soil & Pan	(g)	40.00
Wt. Lost Moisture	(g)	1.15
Wt. of Pan Only	(g)	3.75
Wt. of Dry Soil	(g)	36.25
Moisture Content	%	3.2

Wt. Hydrom. Sample Wet (g)	55.05
Wt. Hydrom. Sample Dry (g)	53.36

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.05
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.05
Weight of - #10 Dry (g)	53.36
Wt. Total Sample Dry (g)	53.36
Calc. Wt. "W" (g)	53.36
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	1.36	0.05	0.05	0.1	99.9
#40	1.29	1.60	0.31	0.36	0.7	99.3
#60	1.31	1.56	0.25	0.61	1.1	98.9
#100	1.31	1.59	0.28	0.89	1.7	98.3
#230	1.55	6.51	4.96	5.85	11.0	89.0

CLAYEY SILT

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	25.5	DATE TESTED	03-13-92 TNU
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

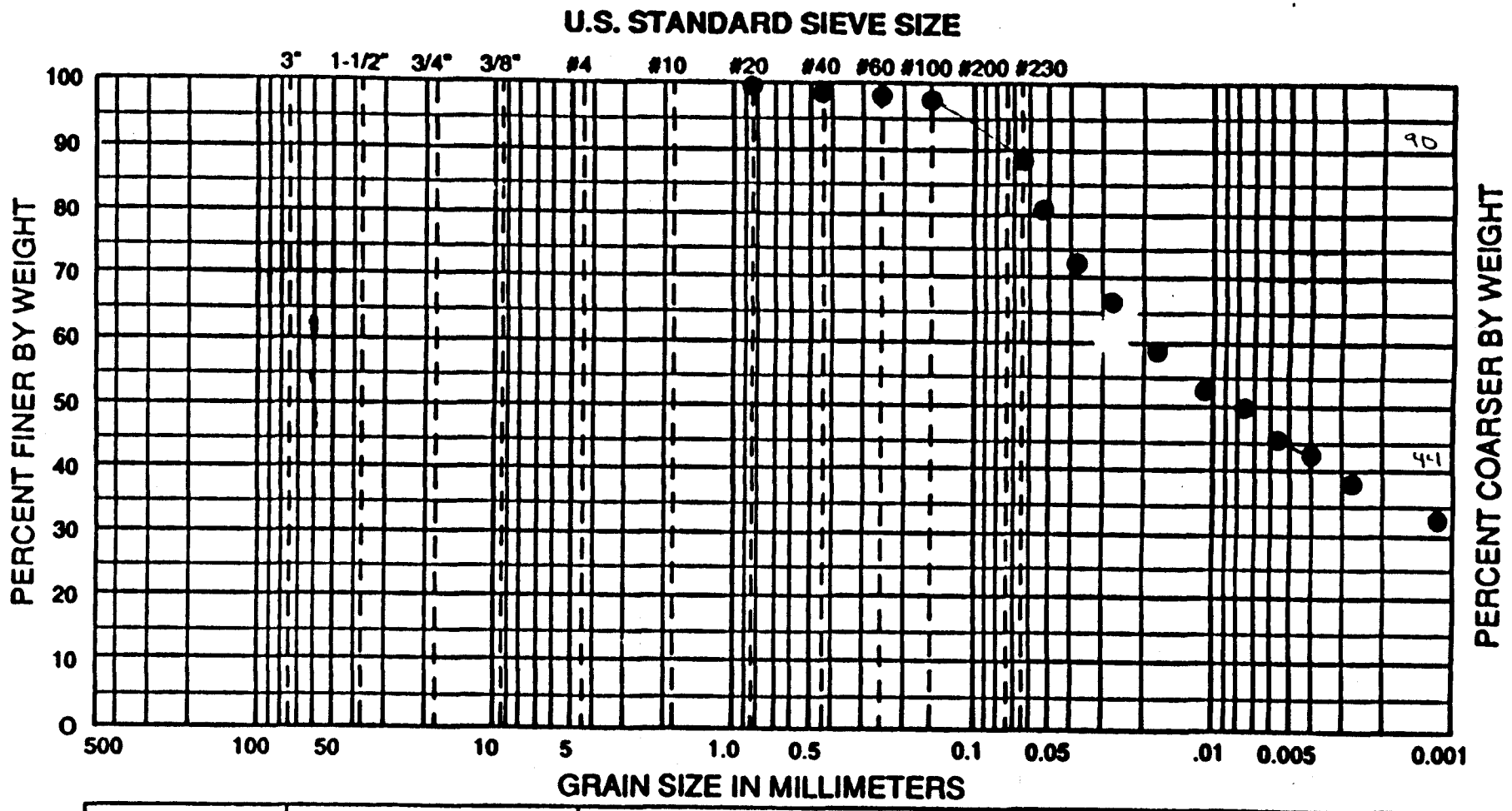
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	53.358
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	50.50	43.50	80.5	80.5	8.01	0.0523
1.0	46.00	39.00	72.2	72.2	8.75	0.0387
2.0	42.75	35.75	66.2	66.2	9.28	0.0282
5.0	39.00	32.00	59.3	59.3	9.89	0.0184
15.0	35.50	28.50	52.8	52.8	10.47	0.0109
30.0	34.00	27.00	50.0	50.0	10.71	0.0078
60.0	31.50	24.50	45.4	45.4	11.12	0.0056
120.0	30.00	23.00	42.6	42.6	11.37	0.0040
250.0	28.00	21.00	38.9	38.9	11.70	0.0028
1440.0	25.00	18.00	33.3	33.3	12.19	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH # 9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
		clayey silt						
		GV - 0			S - 10			SL
Rocky Flats	25.5'	0	0	0	0.7	7.3		46

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8+25 SAMPLE CH #9 DEPTH 25.5'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

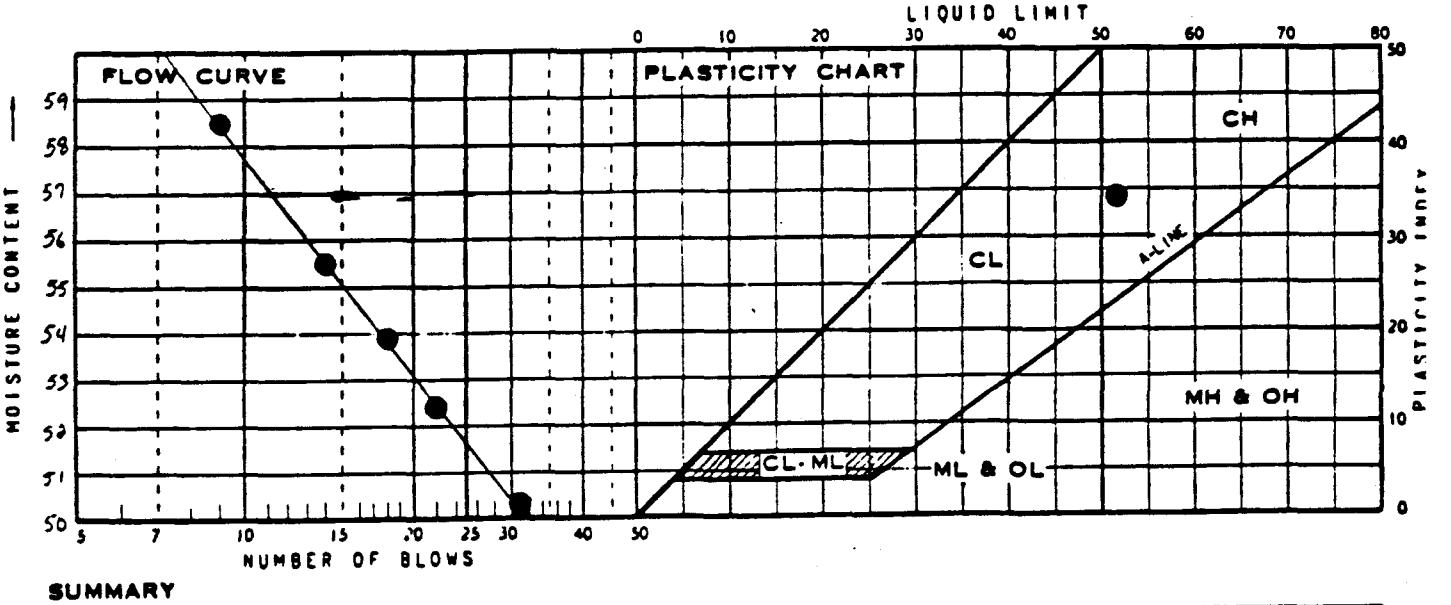
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/10/92

DETERMINATION	1	2	3	4	5	6
DISH	2004	2014	2007			
WT OF DISH + WET SOIL g	5.99	5.81	5.32			
WT OF DISH + DRY SOIL g	5.26	5.14	4.68	—	—	—
WT OF MOISTURE g	.73	.67	.64			
WT OF DISH g	1.05	1.07	1.05	—	—	—
WT OF DRY SOIL g	4.21	4.07	3.63			
MOISTURE CONTENT %	17.3	16.5	17.6			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	66C	10C	2017	37C	15g	20C
NUMBER OF BLOWS	31	22	18	14	9	
WT OF DISH + WET SOIL g	12.52	11.86	12.77	12.50	11.89	
WT OF DISH + DRY SOIL g	5.68	8.14	8.66	8.40	7.89	—
WT OF MOISTURE g	3.34	3.72	4.11	4.10	4.00	
WT OF DISH g	1.06	1.04	1.03	1.03	1.05	1.02
WT OF DRY SOIL g	7.62	7.10	7.63	7.37	6.84	
MOISTURE CONTENT %	50.4	52.4	53.9	55.6	58.5	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		51.7	17.1	34.6	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	35'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No
03			

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	39.36
Wt. Dry Soil & Pan	(g)	38.14
Wt. Lost Moisture	(g)	1.22
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	34.40
Moisture Content	%	3.5
Wt. Hydrom. Sample Wet	(g)	55.04
Wt. Hydrom. Sample Dry	(g)	53.16

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.04
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.04
Weight of - #10 Dry (g)	53.16
Wt. Total Sample Dry (g)	53.16
Calc. Wt. "W" (g)	53.16
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	1.59	0.02	0.02	0.0	100.0
#40	1.57	1.62	0.05	0.07	0.1	99.9
#60	1.55	1.58	0.03	0.10	0.2	99.8
#100	1.55	2.32	0.77	0.87	1.6	98.4
#230	1.57	7.22	5.65	6.52	12.3	87.7

Silty Clay

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	35'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

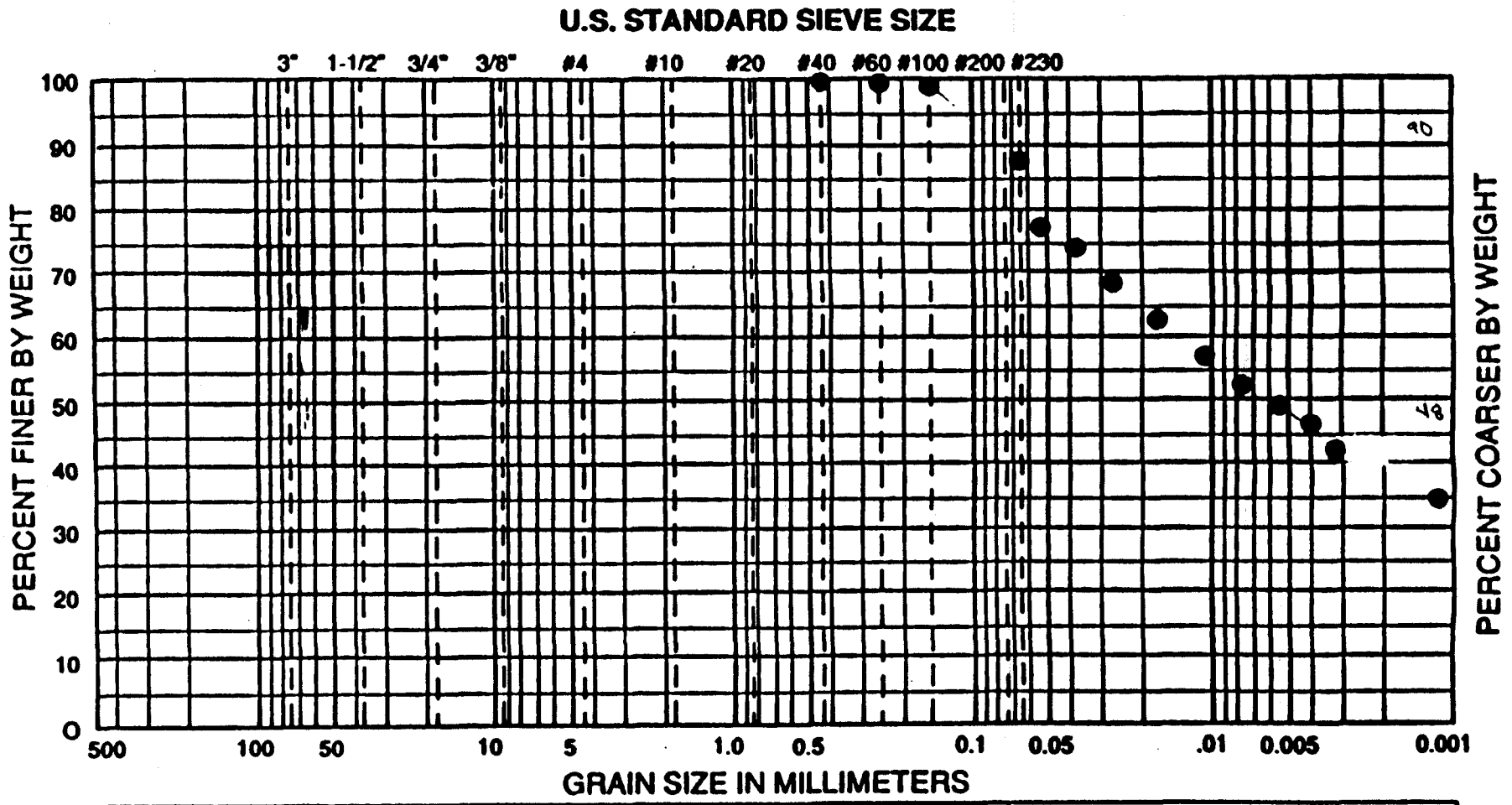
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01309
Value of "a"	0.98	Wt. Dry Sample "W"	53.158
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	49.00	42.00	77.4	77.4	8.25	0.0532
1.0	47.50	40.50	74.7	74.7	8.50	0.0382
2.0	44.00	37.00	68.2	68.2	9.07	0.0279
5.0	41.00	34.00	62.7	62.7	9.57	0.0181
15.0	38.00	31.00	57.2	57.2	10.06	0.0107
30.0	35.50	28.50	52.5	52.5	10.47	0.0077
60.0	33.75	26.75	49.3	49.3	10.76	0.0055
120.0	32.00	25.00	46.1	46.1	11.04	0.0040
190.0	30.00	23.00	42.4	42.4	11.37	0.0032
1440.0	26.00	19.00	35.0	35.0	12.03	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH # 9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION							
		silty clay							
			1-0		S-10		SL		CL
Rocky Fluts	35.0'	0	0	0	0.1	9.9	42		48

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION _____

BORING B-25 SAMPLE CH #9 DEPTH 35'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

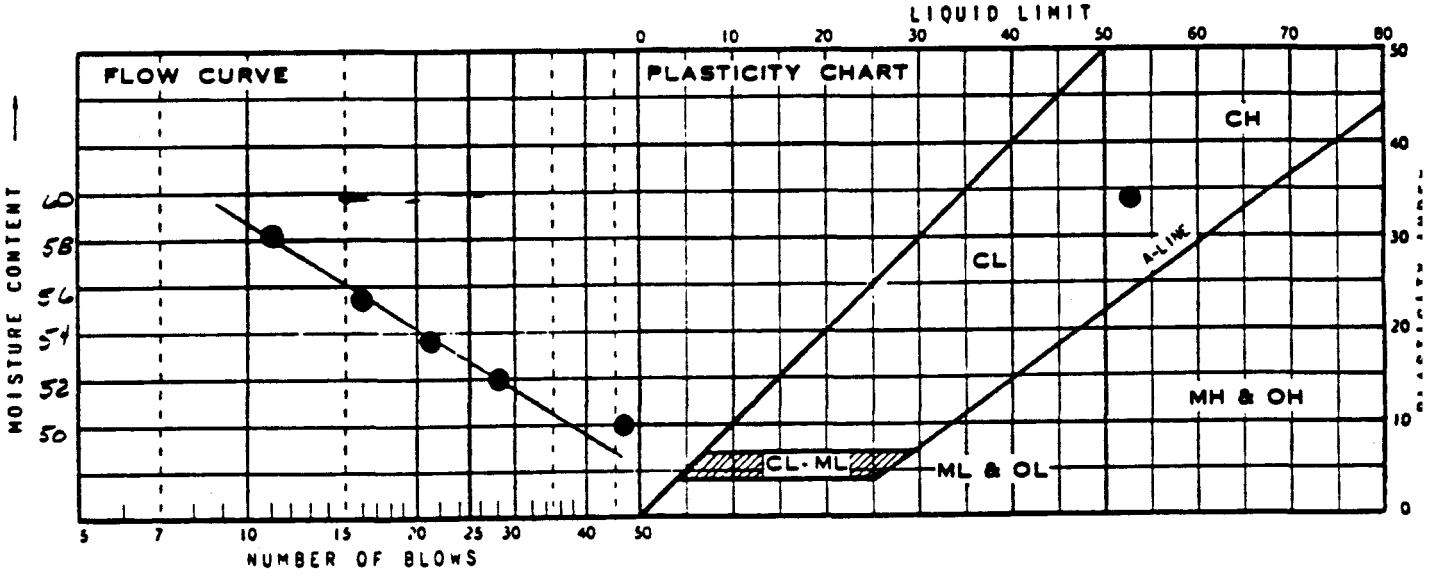
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/6/92

DETERMINATION	1	2	3	4	5	6
DISH	2011	2043	2053			
WT OF DISH + WET SOIL g	6.47	6.46	7.39			
WT OF DISH + DRY SOIL g	5.67	5.60	6.35	—	—	—
WT OF MOISTURE g	.80	.86	1.04			
WT OF DISH g	1.05	1.05	1.05	—	—	—
WT OF DRY SOIL g	4.62	4.55	5.30			
MOISTURE CONTENT %	17.3	18.9	19.6			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2057	1C	2061	2037	2095	
NUMBER OF BLOWS	46	28	21	16	11	
WT OF DISH + WET SOIL g	16.94	14.39	14.26	15.93	17.39	
WT OF DISH + DRY SOIL g	11.63	9.83	9.63	10.62	11.39	—
WT OF MOISTURE g	5.31	4.56	4.63	5.31	6.00	
WT OF DISH g	1.05	1.06	1.03	1.05	1.06	—
WT OF DRY SOIL g	10.58	8.77	8.60	9.57	10.33	
MOISTURE CONTENT %	50.2	52.0	53.8	55.5	58.1	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		52.8	4.6	34.2	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	45'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	35.29
Wt. Dry Soil & Pan	(g)	34.26
Wt. Lost Moisture	(g)	1.03
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	30.54
Moisture Content	%	3.4

Wt. Hydrom. Sample Wet (g)	55.09
Wt. Hydrom. Sample Dry (g)	53.29

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.09
Weight of + #10 Before Washing (g)	0.00
Weight of - #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.09
Weight of - #10 Dry (g)	53.29
Wt. Total Sample Dry (g)	53.29
Calc. Wt. "W" (g)	53.29
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	2.01	0.44	0.44	0.8	99.2
#40	1.56	2.95	1.39	1.83	3.4	96.6
#60	1.30	2.10	0.80	2.63	4.9	95.1
#100	1.31	1.81	0.50	3.13	5.9	94.1
#230	1.57	2.17	0.60	3.73	7.0	93.0

Clay (CLT)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	45'	DATE TESTED	03-20-92 TNC
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

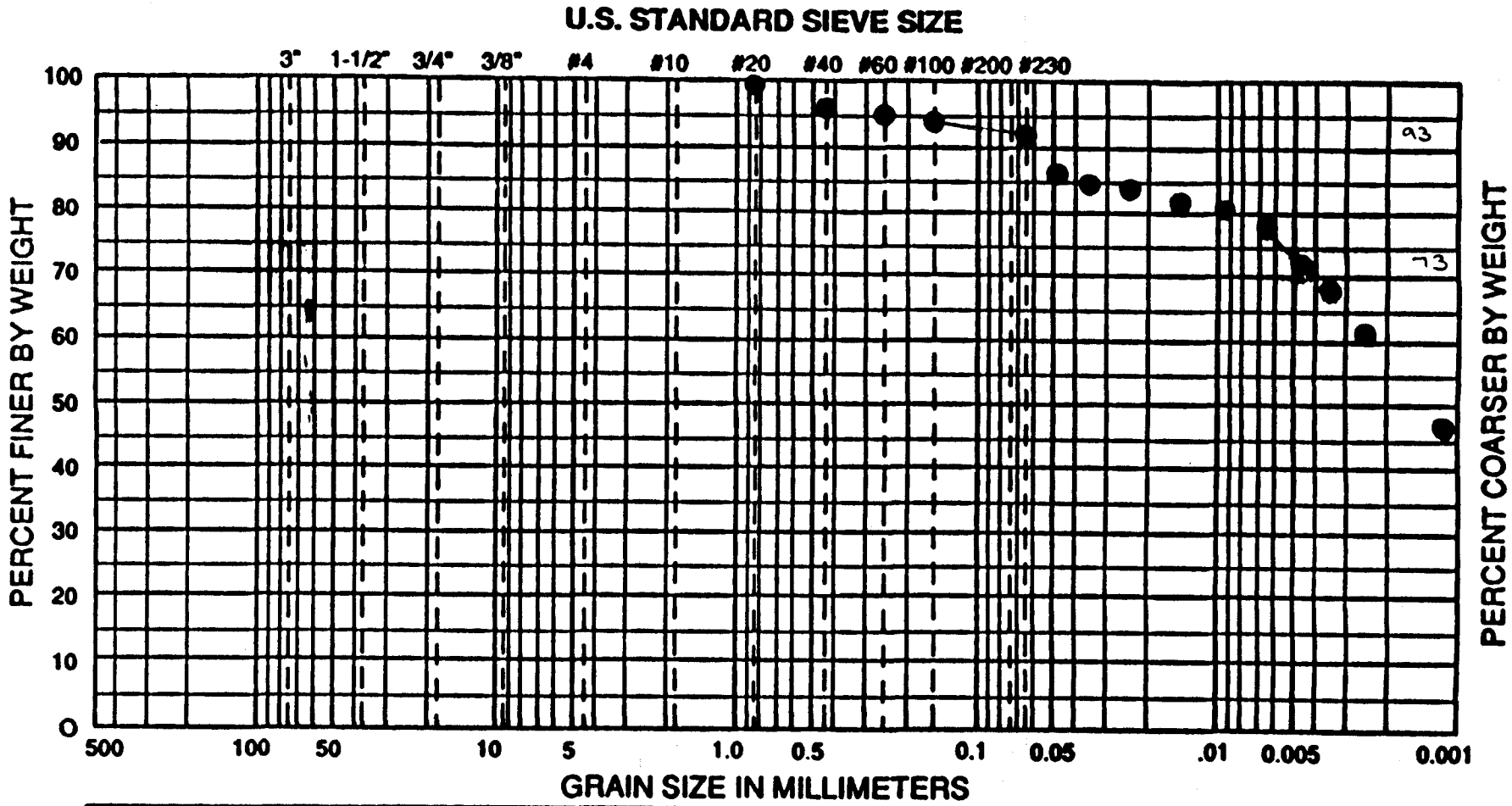
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.83	Temp. Coef. K	0.01265
Value of "a"	0.96	Wt. Dry Sample "W"	53.290
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	53.50	47.50	85.9	85.9	7.52	0.0490
1.0	53.00	47.00	85.0	85.0	7.60	0.0349
2.0	52.50	46.50	84.1	84.1	7.68	0.0248
5.0	52.00	46.00	83.2	83.2	7.76	0.0158
15.0	51.00	45.00	81.4	81.4	7.93	0.0092
30.0	49.00	43.00	77.8	77.8	8.25	0.0066
60.0	46.50	40.50	73.3	73.3	8.66	0.0048
120.0	44.00	38.00	68.7	68.7	9.07	0.0035
250.0	40.00	34.00	61.5	61.5	9.73	0.0025
1440.0	32.50	26.50	47.9	47.9	10.96	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH #13 DATE: 3-27-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION		
	45.0'	Clay Rocky, LATS/ EG&G	5-7.0 0 3.4 3.6	SL 20

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - -

JOB NO. 2606-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING B-25 SAMPLE CH #13 DEPTH 45'

FIELD DENSITY BY ...../...../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

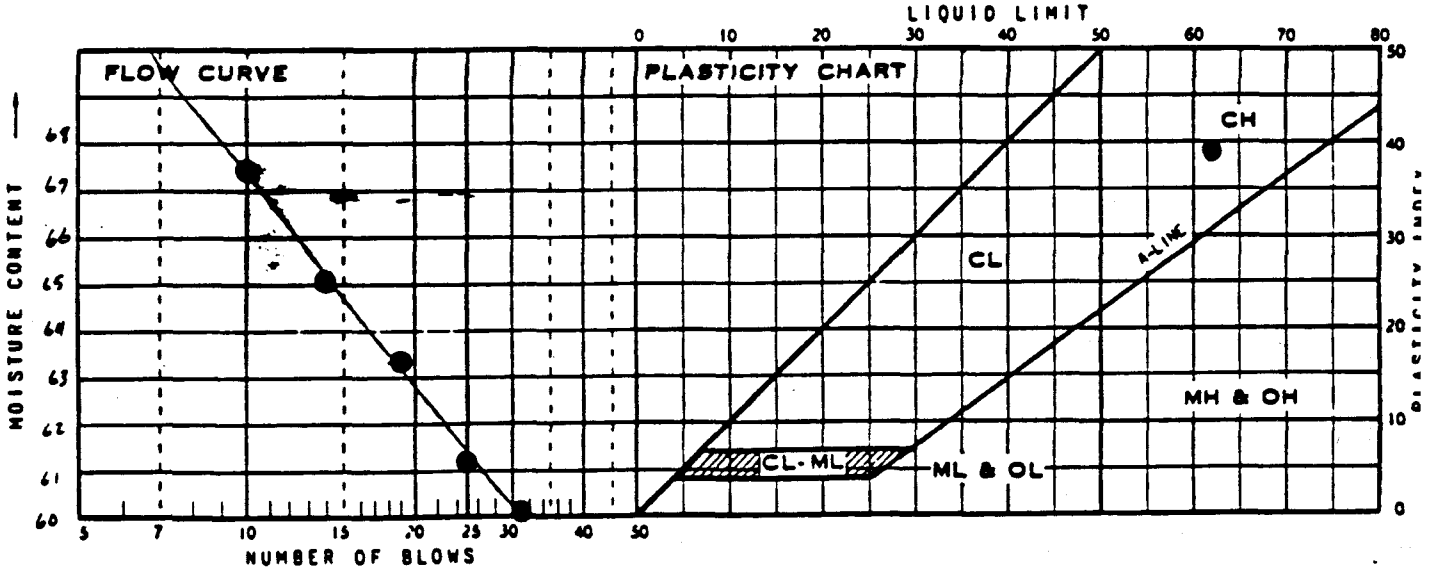
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DJH 3/23/96

DETERMINATION	? 1 ?	2	3	4	5	6
DISH	2050	2027	2032			
WT OF DISH + WET SOIL g	5.58	4.99	5.94			
WT OF DISH + DRY SOIL g	4.81	4.28	5.06	—	—	—
WT OF MOISTURE g	.77	.71	.88			
WT OF DISH g	1.04	1.05	1.05	—	—	—
WT OF DRY SOIL g	3.77	3.23	4.01			
MOISTURE CONTENT %	20.4	22.0	21.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2061	2040	15a	2072	2001	
NUMBER OF BLOWS	31	25	19	14	10	
WT OF DISH + WET SOIL g	12.30	12.39	12.32	11.97	12.14	
WT OF DISH + DRY SOIL g	8.07	8.08	7.95	7.66	7.68	—
WT OF MOISTURE g	4.23	4.31	4.37	4.31	4.46	
WT OF DISH g	1.03	1.04	1.05	1.04	1.06	—
WT OF DRY SOIL g	7.04	7.04	6.90	6.62	6.62	
MOISTURE CONTENT %	60.1	61.2	63.3	65.1	67.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		61.4	22.0	39.4	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	55'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	36.40
Wt. Dry Soil & Pan	(g)	35.34
Wt. Lost Moisture	(g)	1.06
Wt. of Pan Only	(g)	3.83
Wt. of Dry Soil	(g)	31.51
Moisture Content	%	3.4
Wt. Hydrom. Sample Wet	(g)	55.07
Wt. Hydrom. Sample Dry	(g)	53.28

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	538.74
Weight of + #10 Before Washing (g)	26.54
Weight of + #10 After Washing (g)	23.31
Weight of - #10 Wet (g)	512.20
Weight of - #10 Dry (g)	498.66
Wt. Total Sample Dry (g)	521.97
Calc. Wt. "W" (g)	55.75
Calc. Mass + #10	2.47

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	18.11	18.11	18.11	3.5	96.5
#4	0.00	0.92	0.92	19.03	3.6	96.4
#10	0.00	4.11	4.11	23.14	4.4	95.6
#20	1.56	1.96	0.40	0.40	5.2	94.8
#40	1.57	2.46	0.89	1.29	6.7	93.3
#60	1.57	2.51	0.94	2.23	8.4	91.6
#100	1.56	2.08	0.52	2.75	9.4	90.6
#230	1.56	5.14	3.58	6.33	15.8	84.2

Silt, Clay (c-f)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	55'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

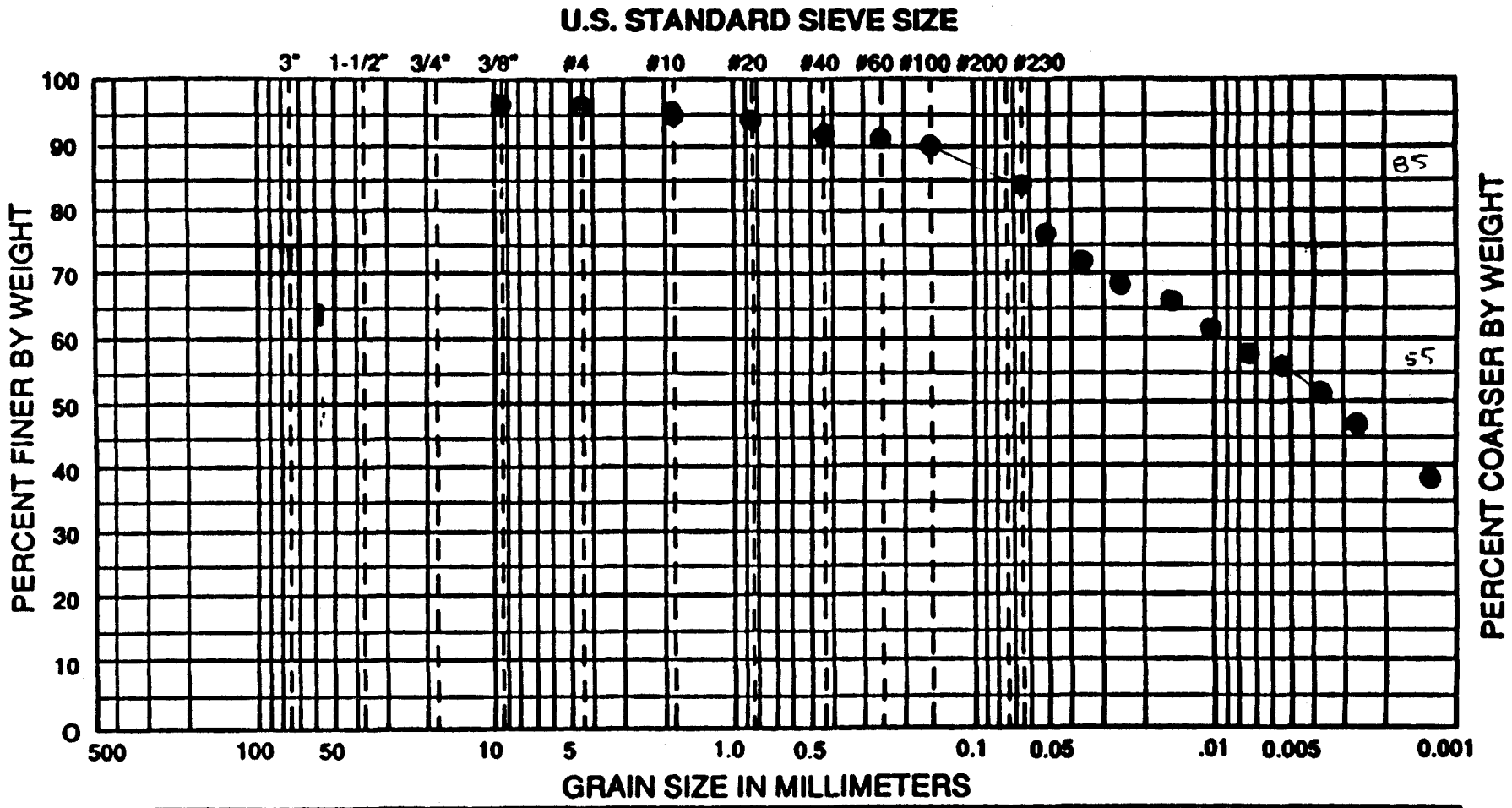
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01280
Value of "a"	0.97	Wt. Dry Sample "W"	55.750
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	50.50	44.50	77.6	77.6	8.01	0.0512
1.0	48.00	42.00	73.2	73.2	8.42	0.0371
2.0	45.50	39.50	68.9	68.9	8.83	0.0269
5.0	44.00	38.00	66.3	66.3	9.07	0.0172
15.0	41.50	35.50	61.9	61.9	9.48	0.0102
30.0	39.50	33.50	58.4	58.4	9.81	0.0073
60.0	38.00	32.00	55.8	55.8	10.06	0.0052
120.0	36.00	30.00	52.3	52.3	10.39	0.0038
250.0	33.00	27.00	47.1	47.1	10.88	0.0027
1440.0	28.00	22.00	38.4	38.4	11.70	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+25 SAMPLE NO.: CH#13 DATE: 3-27-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
	550'	silty clay 0	3.6	0.8	11.4 23	8.3	30	
		Rocky FLATS / EG&G						

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING B+25 SAMPLE #13 DEPTH @55'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

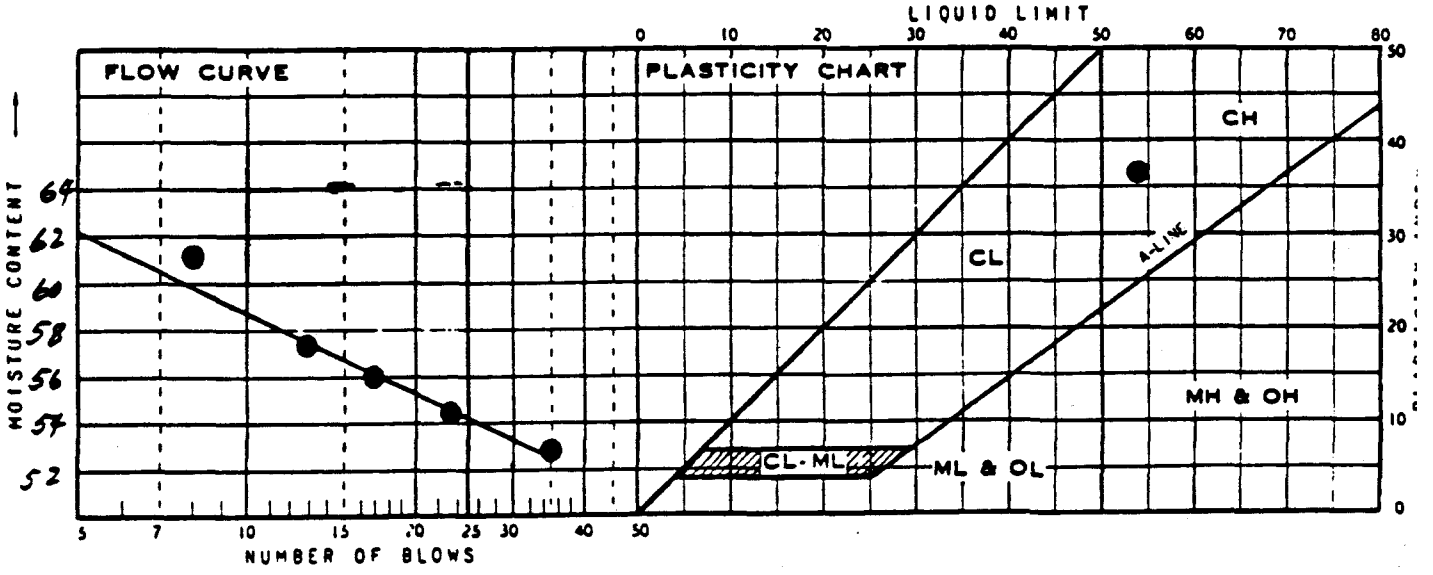
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ~~RA~~ 3.123192

DETERMINATION	1	2	3	4	5	6
DISH	44C	2052	B12			
WT OF DISH + WET SOIL g	6.68	6.20	6.84			
WT OF DISH + DRY SOIL	5.83	5.45	5.96	—	—	—
WT OF MOISTURE	0.85	0.75	0.88			
WT OF DISH	1.04	1.03	1.04	—	—	—
WT OF DRY SOIL	4.79	4.42	4.92			
MOISTURE CONTENT %	17.8	17.0	17.9	= 52.7/3 =	17.6	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2023	34CX	29C	32C	2009	2056
NUMBER OF BLOWS	30	35	23	17	13	8+
WT OF DISH + WET SOIL g	7.82	9.04	10.80	10.08	10.44	12.57
WT OF DISH + DRY SOIL	5.50	6.28	7.37	6.83	7.01	8.19
WT OF MOISTURE	2.32	2.76	3.43	3.25	3.43	4.38
WT OF DISH	1.05	1.03	1.05	1.03	1.04	1.04
WT OF DRY SOIL	4.45	5.25	6.32	5.80	5.97	7.15
MOISTURE CONTENT %	52.1	52.6	54.3	56.0	57.4	61.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		54.2	17.6	36.6	CH	

ADVANCED TERRA TESTING

JEM

BR

MECHANICAL ANALYSIS - SIEVE TEST DATA

BR

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	56.1'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	36.74
Wt. Dry Soil & Pan	(g)	35.69
Wt. Lost Moisture	(g)	1.05
Wt. of Pan Only	(g)	3.66
Wt. of Dry Soil	(g)	32.03
Moisture Content	%	3.3

Wt. Hydrom. Sample Wet (g)	55.08
Wt. Hydrom. Sample Dry (g)	53.33

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.08
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.08
Weight of - #10 Dry (g)	53.33
Wt. Total Sample Dry (g)	53.33
Calc. Wt. "W" (g)	53.33
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.57	0.01	0.01	0.0	100.0
#40	1.56	1.57	0.01	0.02	0.0	100.0
#60	1.56	1.58	0.02	0.04	0.1	99.9
#100	1.54	1.58	0.04	0.08	0.2	99.8
#230	1.56	3.22	1.66	1.74	3.3	96.7

Chapstone

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+25	SAMPLED	Rocky Flats
DEPTH	56.1'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#13	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

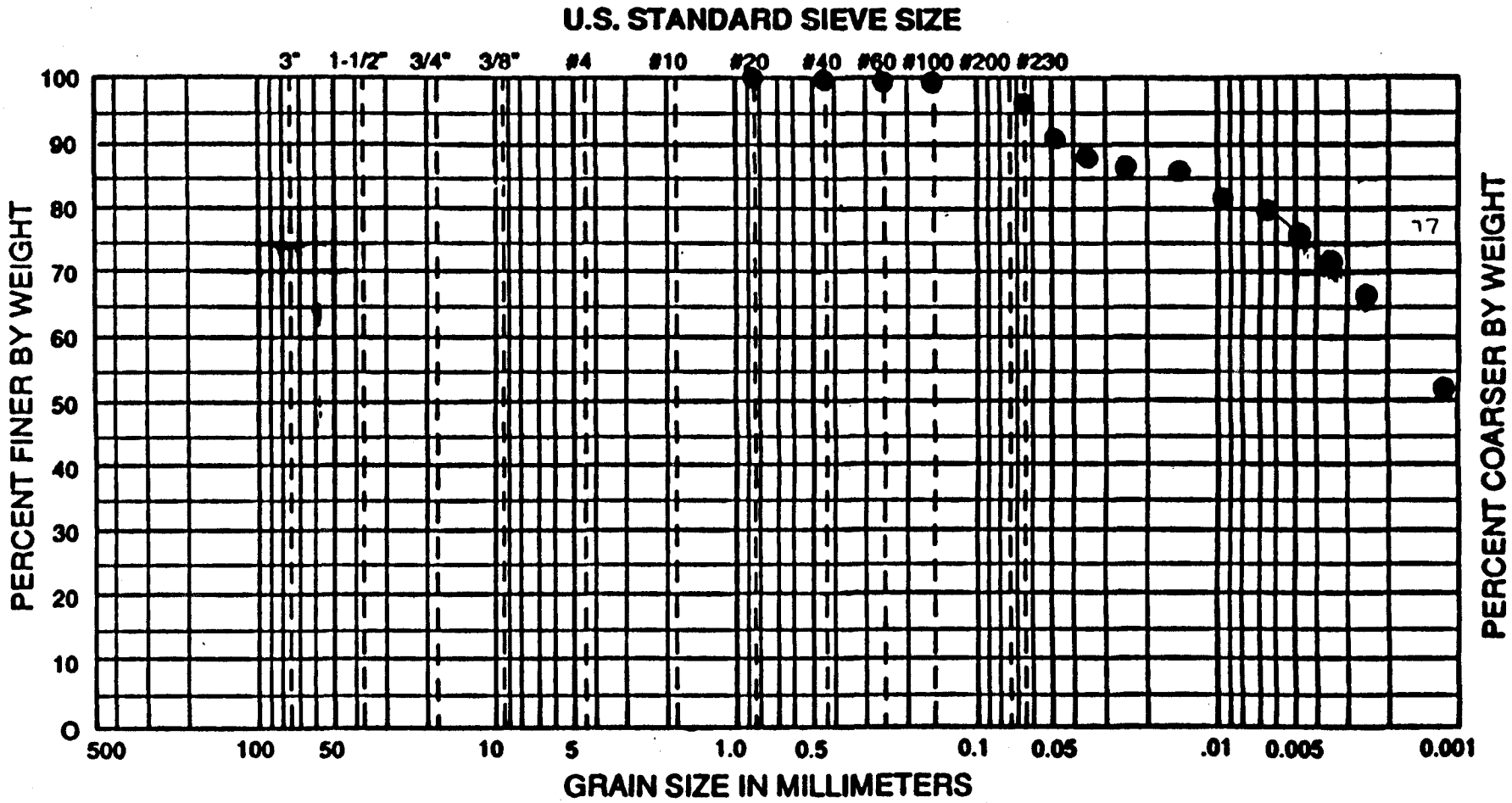
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	53.328
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.50	49.50	91.5	91.5	7.19	0.0495
1.0	53.75	47.75	88.3	88.3	7.48	0.0357
2.0	53.50	47.50	87.8	87.8	7.52	0.0253
5.0	52.50	46.50	86.0	86.0	7.68	0.0162
15.0	51.00	45.00	83.2	83.2	7.93	0.0095
30.0	49.50	43.50	80.4	80.4	8.17	0.0068
60.0	48.00	42.00	77.7	77.7	8.42	0.0049
120.0	45.50	39.50	73.0	73.0	8.83	0.0035
250.0	42.50	36.50	67.5	67.5	9.32	0.0025
1440.0	35.00	29.00	53.6	53.6	10.55	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: B+25 SAMPLE NO.: CH #13 DATE: 3-27-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
	56.1'	claystone 0 0 0 Rock Flats/EG&G	3.3 0 3.3	19.7	7	

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / EG&G

BORING B-25 SAMPLE CH #13 DEPTH 56.1'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

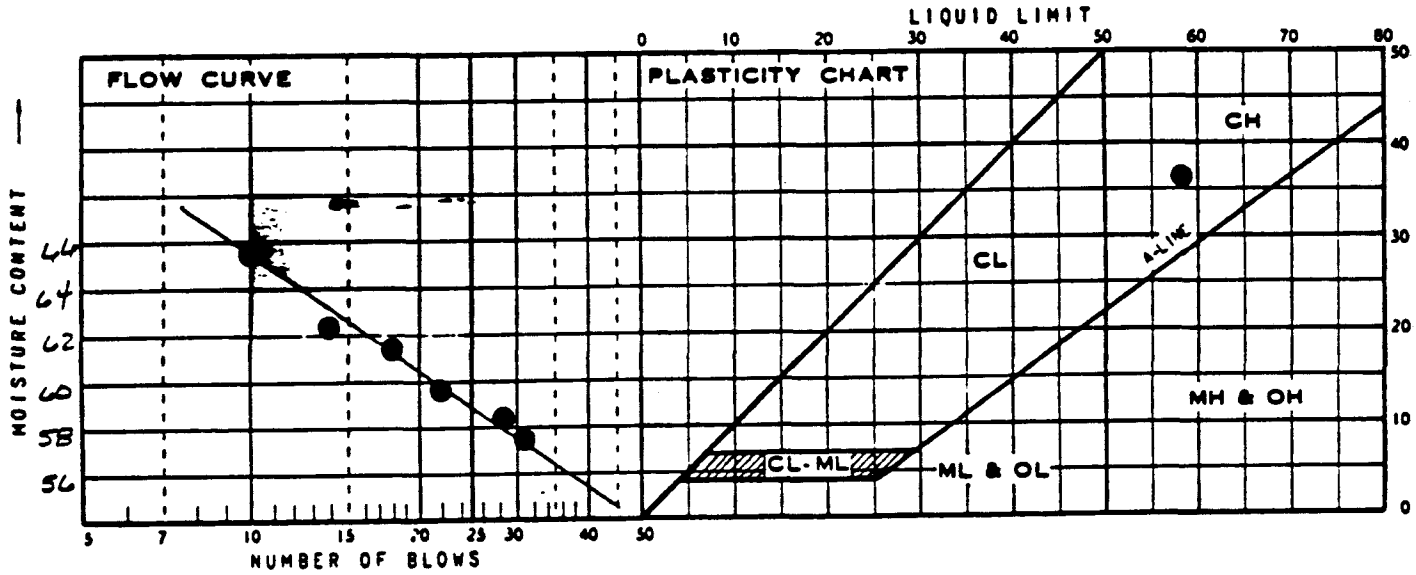
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2051	21 C	7 C			
WT OF DISH + WET SOIL g	6.46	6.28	5.73			
WT OF DISH + DRY SOIL g	5.47	5.31	4.86	—	—	—
WT OF MOISTURE g	.99	.97	.87			
WT OF DISH g	1.04	1.05	1.05	—	—	—
WT OF DRY SOIL g	4.43	4.26	3.81			
MOISTURE CONTENT %	22.4	22.8	22.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2010	38 C	24 C	22 C	2059	2042
NUMBER OF BLOWS	31	29	22	18 ±	14	10 ±
WT OF DISH + WET SOIL g	14.90	15.39	12.69	12.88	15.46	11.03
WT OF DISH + DRY SOIL g	9.85	10.11	8.33	8.37	9.91	7.08
WT OF MOISTURE g	5.05	5.28	4.36	4.51	5.55	3.95
WT OF DISH g	1.06	1.05	1.04	1.04	1.05	1.06
WT OF DRY SOIL g	8.79	9.06	7.29	7.33	8.86	6.02
MOISTURE CONTENT %	57.5	58.3	59.8	61.5	62.6	65.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		58.8	22.7	36.1	CH	

ADVANCED TERRA TESTING

Pam

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	2.6'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	40.63
Wt. Dry Soil & Pan	(g)	39.33
Wt. Lost Moisture	(g)	1.30
Wt. of Pan Only	(g)	3.64
Wt. of Dry Soil	(g)	35.69
Moisture Content	%	3.6
Wt. Hydrom. Sample Wet	(g)	55.00
Wt. Hydrom. Sample Dry	(g)	53.07

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	630.77
Weight of + #10 Before Washing (g)	78.91
Weight of + #10 After Washing (g)	47.38
Weight of - #10 Wet (g)	551.86
Weight of - #10 Dry (g)	562.89
Wt. Total Sample Dry (g)	610.27
Calc. Wt. "W" (g)	57.54
Calc. Mass + #10	4.47

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	25.29	25.29	25.29	4.1	95.9
#4	0.00	11.56	11.56	36.85	6.0	94.0
#10	0.00	10.53	10.53	47.38	7.8	92.2
#20	1.57	2.53	0.96	0.96	9.4	90.6
#40	1.57	3.13	1.56	2.52	12.1	87.9
#60	1.57	3.35	1.78	4.30	15.2	84.8
#100	1.55	4.42	2.87	7.17	20.2	79.8
#230	1.57	7.48	5.91	13.08	30.5	69.5

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Western

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	2.6'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

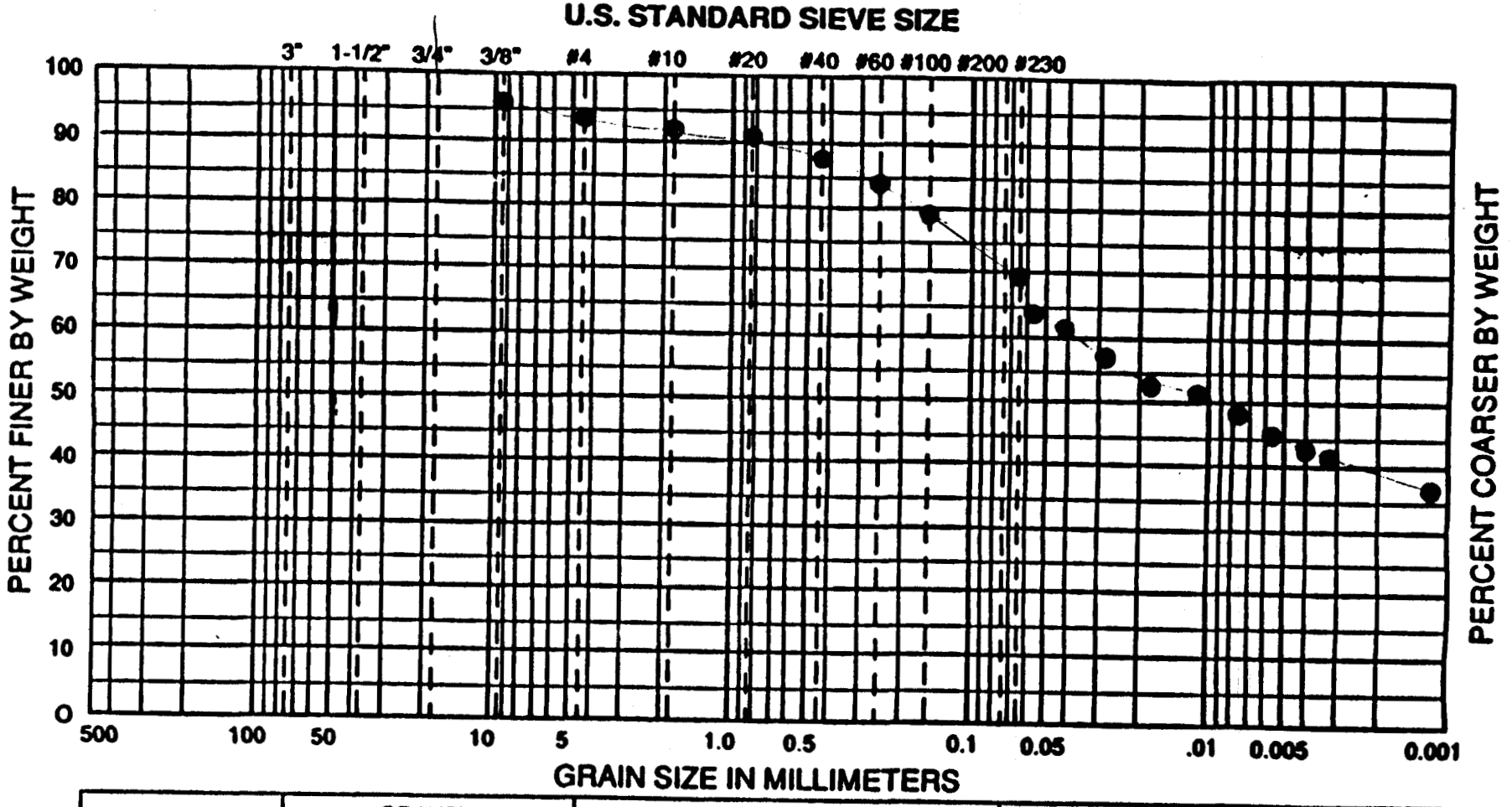
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01324
Value of "a"	0.99	Wt. Dry Sample "W"	57.538
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.50	37.50	64.4	64.4	8.99	0.0561
1.0	42.50	35.50	61.0	61.0	9.32	0.0404
2.0	40.25	33.25	57.1	57.1	9.69	0.0291
5.0	38.25	31.25	53.7	53.7	10.02	0.0187
15.0	36.50	29.50	50.7	50.7	10.30	0.0110
30.0	35.00	28.00	48.1	48.1	10.55	0.0079
60.0	33.25	26.25	45.1	45.1	10.84	0.0056
120.0	32.00	25.00	42.9	42.9	11.04	0.0040
190.0	31.00	24.00	41.2	41.2	11.21	0.0032
1440.0	28.50	21.50	36.9	36.9	11.62	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+50 SAMPLE NO.: CH # 9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	2.6'	Clay w/ some silt & sand 6% fine [illegible], [illegible] c sand, 4.3% med sand, 17.4% fine sand, 25.5% silt, [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 8-50 SAMPLE CA #9 DEPTH 26'

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

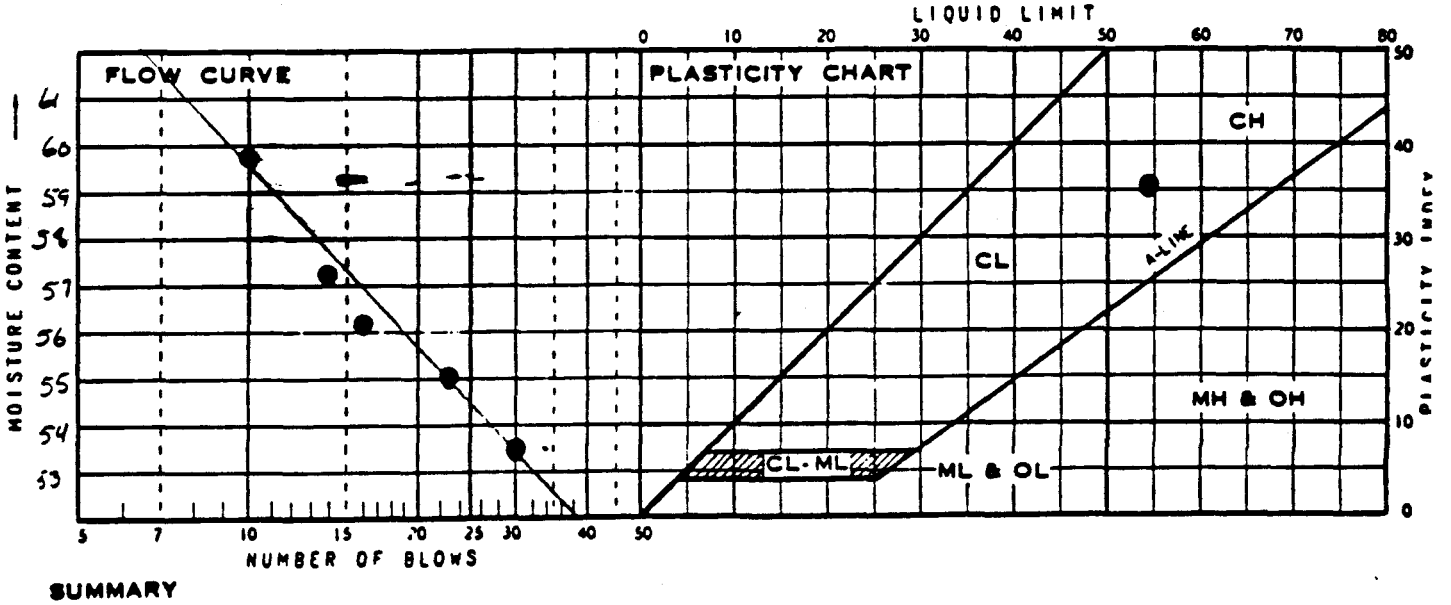
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DU 3/7/92

DETERMINATION	1	2	3	4	5	6
DISH	2069	43C	58C			
WT OF DISH + WET SOIL g	5.32	6.49	6.21			
WT OF DISH + DRY SOIL g	4.65	5.60	5.36	—	—	—
WT OF MOISTURE g	.67	.89	.85			
WT OF DISH g	1.05	1.04	1.07	—	—	—
WT OF DRY SOIL g	3.60	4.56	4.29			
MOISTURE CONTENT %	18.6	19.5	19.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	30C	2041	2067	2005	2065	2033
NUMBER OF BLOWS	34	30	23	16	14	10
WT OF DISH + WET SOIL g	12.43	11.78	11.15	10.90	11.70	11.28
WT OF DISH + DRY SOIL g	8.20	8.04	7.56	7.36	7.82	7.45
WT OF MOISTURE g	3.83	3.74	3.59	3.54	3.88	3.83
WT OF DISH g	1.05	1.06	1.04	1.06	1.05	1.04
WT OF DRY SOIL g	7.15	6.98	6.52	6.30	6.77	6.41
MOISTURE CONTENT %	53.6	53.6	55.1	56.2	57.3	59.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		54.5	19.3	35.2	CH	

ADVANCED TERRA TESTING inc

JEm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	4.2'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	40.23
Wt. Dry Soil & Pan	(g)	39.10
Wt. Lost Moisture	(g)	1.13
Wt. of Pan Only	(g)	3.69
Wt. of Dry Soil	(g)	35.41
Moisture Content	%	3.2
Wt. Hydrom. Sample Wet	(g)	55.06
Wt. Hydrom. Sample Dry	(g)	53.35

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	623.64
Weight of + #10 Before Washing (g)	323.03
Weight of + #10 After Washing (g)	312.92
Weight of - #10 Wet (g)	300.61
Weight of - #10 Dry (g)	301.11
Wt. Total Sample Dry (g)	614.03
Calc. Wt. "W" (g)	108.80
Calc. Mass + #10	55.45

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	174.53	174.53	174.53	28.4	71.6
3/8"	0.00	60.83	60.83	235.36	38.3	61.7
#4	0.00	42.31	42.31	277.67	45.2	54.8
#10	0.00	35.25	35.25	312.92	51.0	49.0
#20	1.56	5.19	3.63	3.63	54.3	45.7
#40	1.57	5.67	4.10	7.73	58.1	41.9
#60	1.56	4.87	3.31	11.04	61.1	38.9
#100	1.57	5.66	4.09	15.13	64.9	35.1
#230	1.55	7.97	6.42	21.55	70.8	29.2

Gravel (GM)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	4.2'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

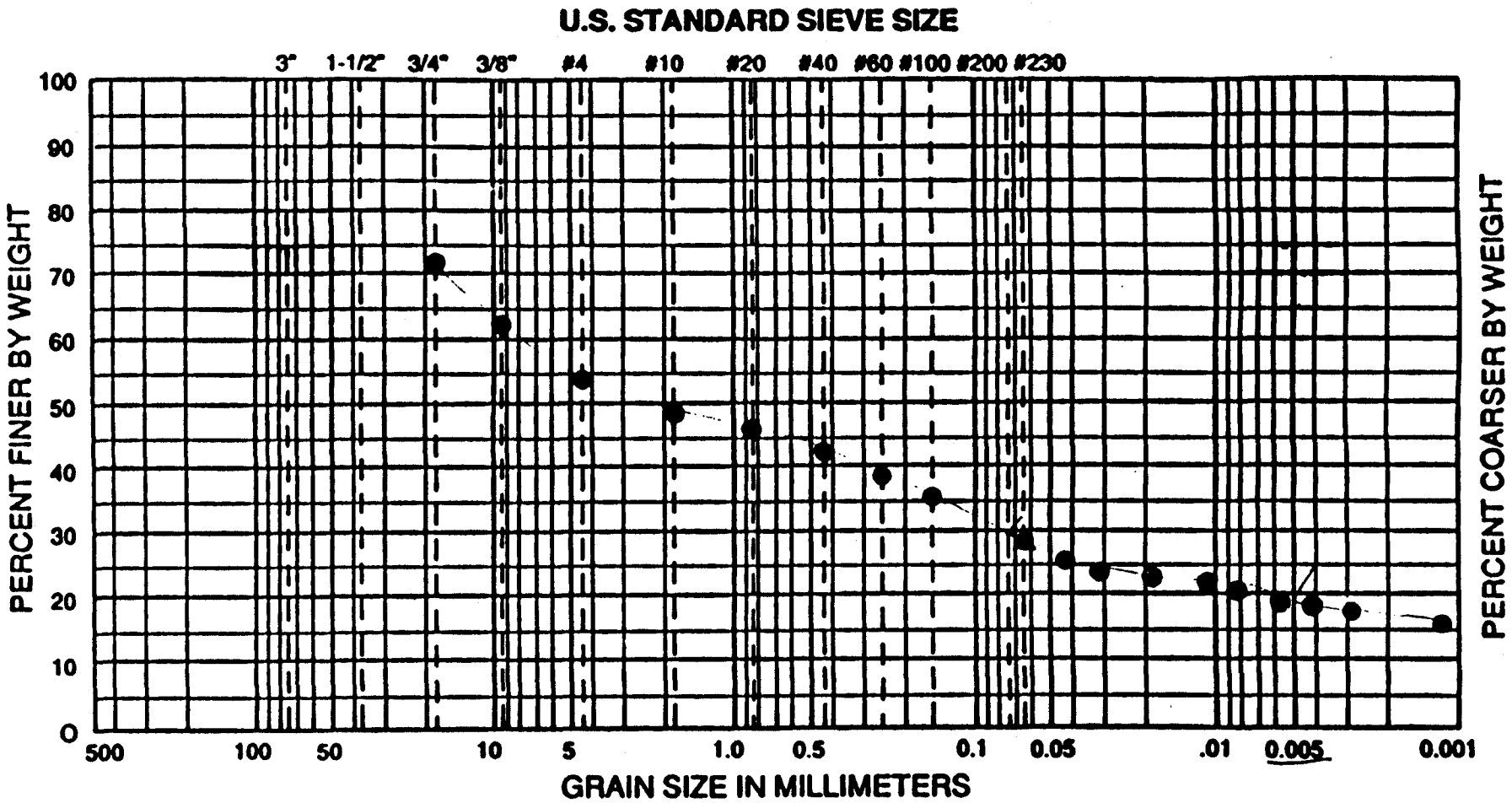
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	108.799
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	37.00	30.00	27.2	27.2	10.22	0.0591
1.0	35.00	28.00	25.4	25.4	10.55	0.0425
2.0	34.00	27.00	24.5	24.5	10.71	0.0303
5.0	32.00	25.00	22.7	22.7	11.04	0.0194
15.0	30.50	23.50	21.3	21.3	11.29	0.0113
30.0	29.50	22.50	20.4	20.4	11.45	0.0081
60.0	28.00	21.00	19.1	19.1	11.70	0.0058
120.0	27.00	20.00	18.2	18.2	11.86	0.0041
250.0	26.25	19.25	17.5	17.5	11.99	0.0029
1440.0	24.00	17.00	15.4	15.4	12.35	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+50 SAMPLE NO.: CH # 9 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	4.2'	gravel .G 16.8% F.G 5.8 CS 7.1% MS 11.9% FS 12% Silt [illegible]% Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8-50 SAMPLE CH-8 DEPTH 4.2'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

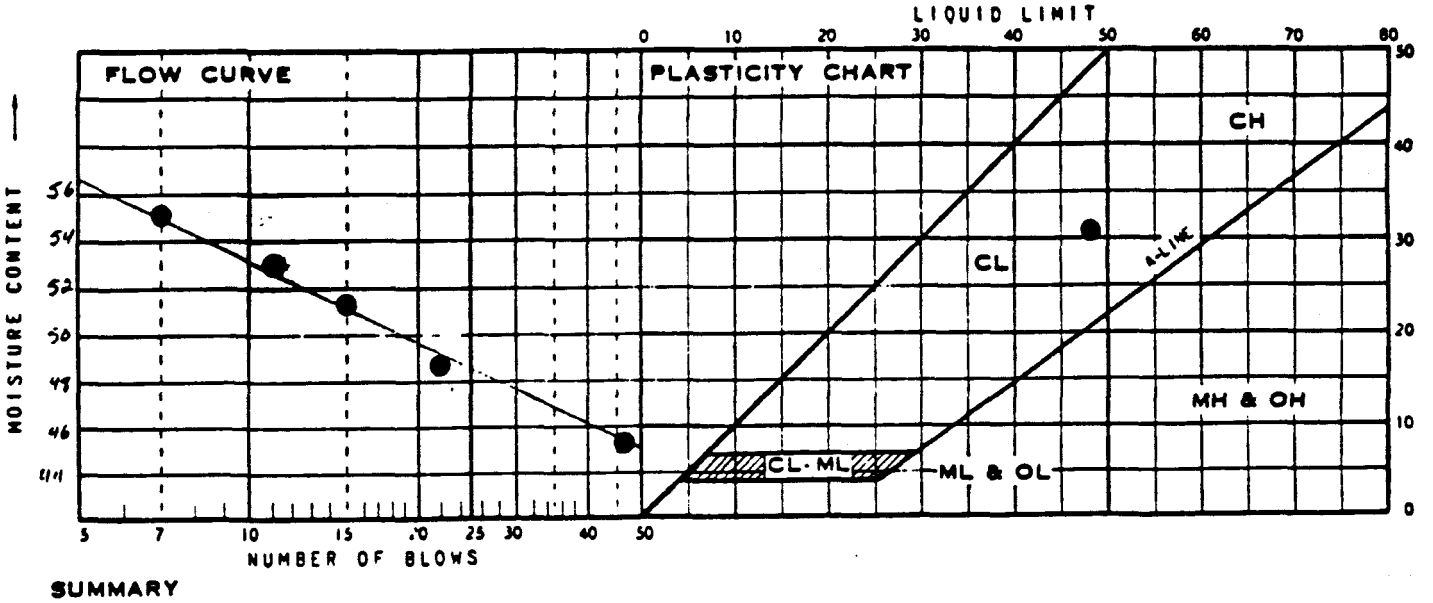
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DH 3/18/92

DETERMINATION	1	2	3	4	5	6
DISH	24	2028	22C			
WT OF DISH + WET SOIL g	6.54	6.58	6.73			
WT OF DISH + DRY SOIL g	5.72	5.73	5.87	—	—	—
WT OF MOISTURE g	.82	.85	.86			
WT OF DISH g	1.05	1.08	1.04	—	—	—
WT OF DRY SOIL g	4.67	4.65	4.83			
MOISTURE CONTENT %	17.6	18.3	17.8			

LIQUID LIMIT ??

DETERMINATION	1	2	3	4	5	6
DISH	2021	2029	10C	2030	38C	2071
NUMBER OF BLOWS	47	23	22	15	11	7
WT OF DISH + WET SOIL g	11.34	11.98	11.69	11.77	11.41	12.49
WT OF DISH + DRY SOIL g	8.13	8.45	8.21	8.14	7.82	8.41
WT OF MOISTURE g	3.21	3.53	3.48	3.63	3.59	4.08
WT OF DISH g	1.05	1.05	1.07	1.05	1.04	1.03
WT OF DRY SOIL g	7.08	7.40	7.14	7.09	6.78	7.38
MOISTURE CONTENT %	45.3	47.7	48.7	51.2	53.0	55.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		48.6	17.9	30.7	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	12.7'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	41.18
Wt. Dry Soil & Pan	(g)	40.21
Wt. Lost Moisture	(g)	0.97
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	36.43
Moisture Content	%	2.7
Wt. Hydrom. Sample Wet	(g)	55.06
Wt. Hydrom. Sample Dry	(g)	53.64

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	762.56
Weight of + #10 Before Washing (g)	475.42
Weight of + #10 After Washing (g)	466.13
Weight of - #10 Wet (g)	287.14
Weight of - #10 Dry (g)	288.74
Wt. Total Sample Dry (g)	754.87
Calc. Wt. "W" (g)	140.22
Calc. Mass + #10	86.59

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	216.66	216.66	216.66	28.7	71.3
3/8"	0.00	130.32	130.32	346.98	46.0	54.0
#4	0.00	70.96	70.96	417.94	55.4	44.6
#10	0.00	48.19	48.19	466.13	61.7	38.3
#20	1.55	10.74	9.19	9.19	68.3	31.7
#40	1.57	9.88	8.31	17.50	74.2	25.8
#60	1.56	7.01	5.45	22.95	78.1	21.9
#100	1.55	6.16	4.61	27.56	81.4	18.6
#230	1.31	7.24	5.93	33.49	85.6	14.4

Sandy Gravel (GM)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	12.7'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

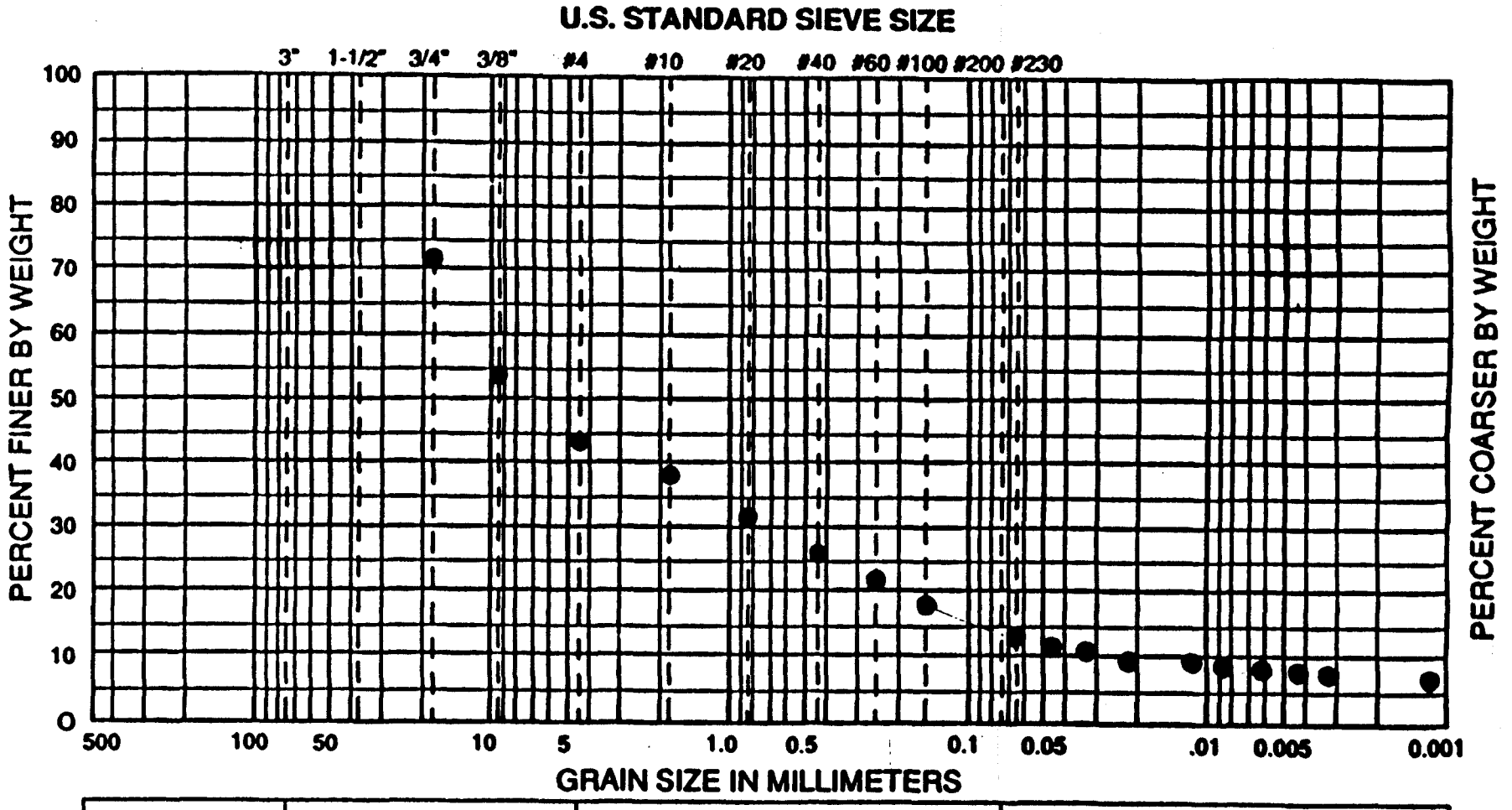
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.70	Temp. Coef. K	0.01312
Value of "a"	0.99	Wt. Dry Sample "W"	140.223
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	25.50	18.50	13.1	13.1	12.11	0.0646
1.0	23.25	16.25	11.5	11.5	12.48	0.0463
2.0	22.00	15.00	10.6	10.6	12.68	0.0330
5.0	21.00	14.00	9.9	9.9	12.85	0.0210
15.0	20.75	13.75	9.7	9.7	12.89	0.0122
30.0	20.00	13.00	9.2	9.2	13.01	0.0086
60.0	19.75	12.75	9.0	9.0	13.05	0.0061
120.0	19.00	12.00	8.5	8.5	13.17	0.0043
211.0	18.75	11.75	8.3	8.3	13.22	0.0033
1440.0	17.00	10.00	7.1	7.1	13.50	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+50 SAMPLE NO.: CH# 9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flat	12.7'	Sandy gravel C 28 F 26.7 C 6.3 M 12.5 F 11.8 Silt 6% 3%

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION _____

BORING 8+50 SAMPLE #9 DEPTH 12.7'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

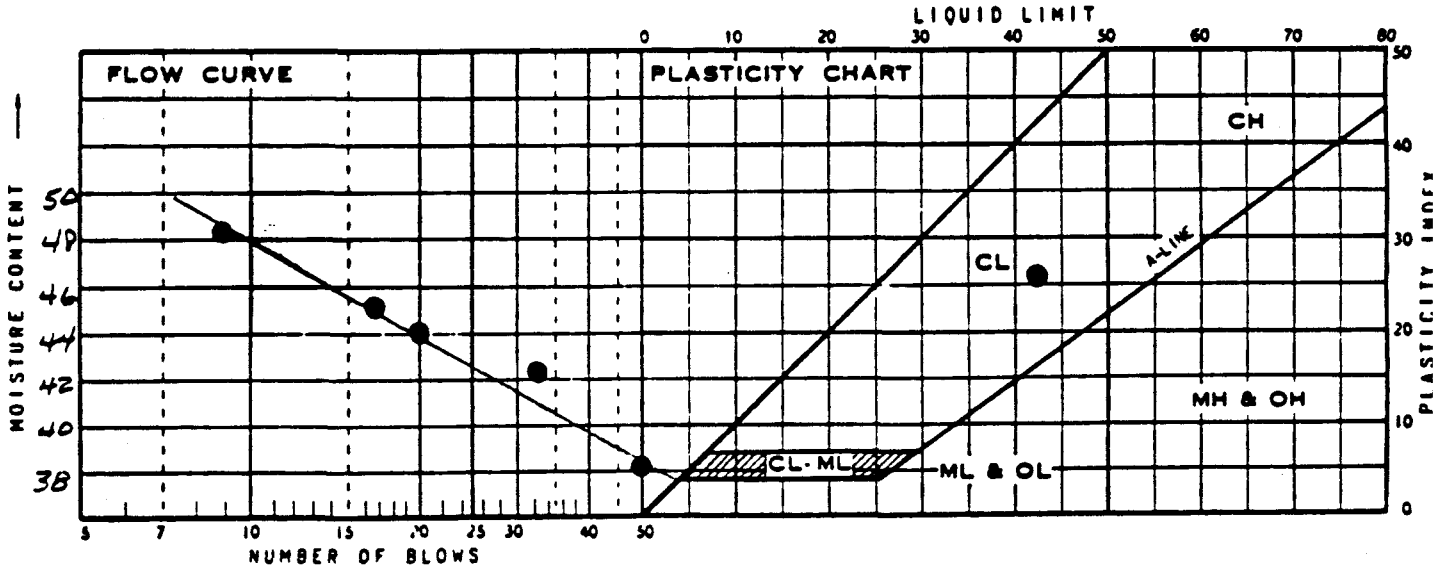
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB..3.16/92

DETERMINATION	1	2	3	4	5	6
DISH	2054	2013	2060			
WT OF DISH + WET SOIL g	5.60	5.09	5.22			
WT OF DISH + DRY SOIL g	4.94	4.53	4.63	—	—	—
WT OF MOISTURE g	.66	.56	.59			
WT OF DISH g	1.06	1.06	1.03	—	—	—
WT OF DRY SOIL g	3.88	3.47	3.60			
MOISTURE CONTENT %	17.0	16.1	16.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	29C	2019	2042	17C	2006	
NUMBER OF BLOWS	50	33	20	17±	9±	
WT OF DISH + WET SOIL g	17.92	14.89	15.02	17.14	20.06	
WT OF DISH + DRY SOIL g	13.24	10.77	10.75	12.13	13.86	—
WT OF MOISTURE g	4.68	4.12	4.27	5.01	6.20	
WT OF DISH g	1.06	1.07	1.07	1.04	1.05	—
WT OF DRY SOIL g	12.18	9.70	9.68	11.09	12.81	
MOISTURE CONTENT %	38.4	42.5	44.1	45.2	48.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		42.6	16.5	26.1	CL	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	36'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	37.12
Wt. Dry Soil & Pan	(g)	36.25
Wt. Lost Moisture	(g)	0.87
Wt. of Pan Only	(g)	3.84
Wt. of Dry Soil	(g)	32.41
Moisture Content	%	2.7

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.59

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	649.27
Weight of + #10 Before Washing (g)	12.99
Weight of + #10 After Washing (g)	8.56
Weight of - #10 Wet (g)	636.28
Weight of - #10 Dry (g)	623.96
Wt. Total Sample Dry (g)	632.52
Calc. Wt. "W" (g)	54.32
Calc. Mass + #10	0.74

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	5.87	5.87	5.87	0.9	99.1
#10	0.00	2.69	2.69	8.56	1.4	98.6
#20	1.57	1.96	0.39	0.39	2.1	97.9
#40	1.58	1.91	0.33	0.72	2.7	97.3
#60	1.55	1.84	0.29	1.01	3.2	96.8
#100	1.55	2.29	0.74	1.75	4.6	95.4
#230	1.56	8.70	7.14	8.89	17.7	82.3

Clayey Silt (ML)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	36'	DATE TESTED	03-11-92 RL
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

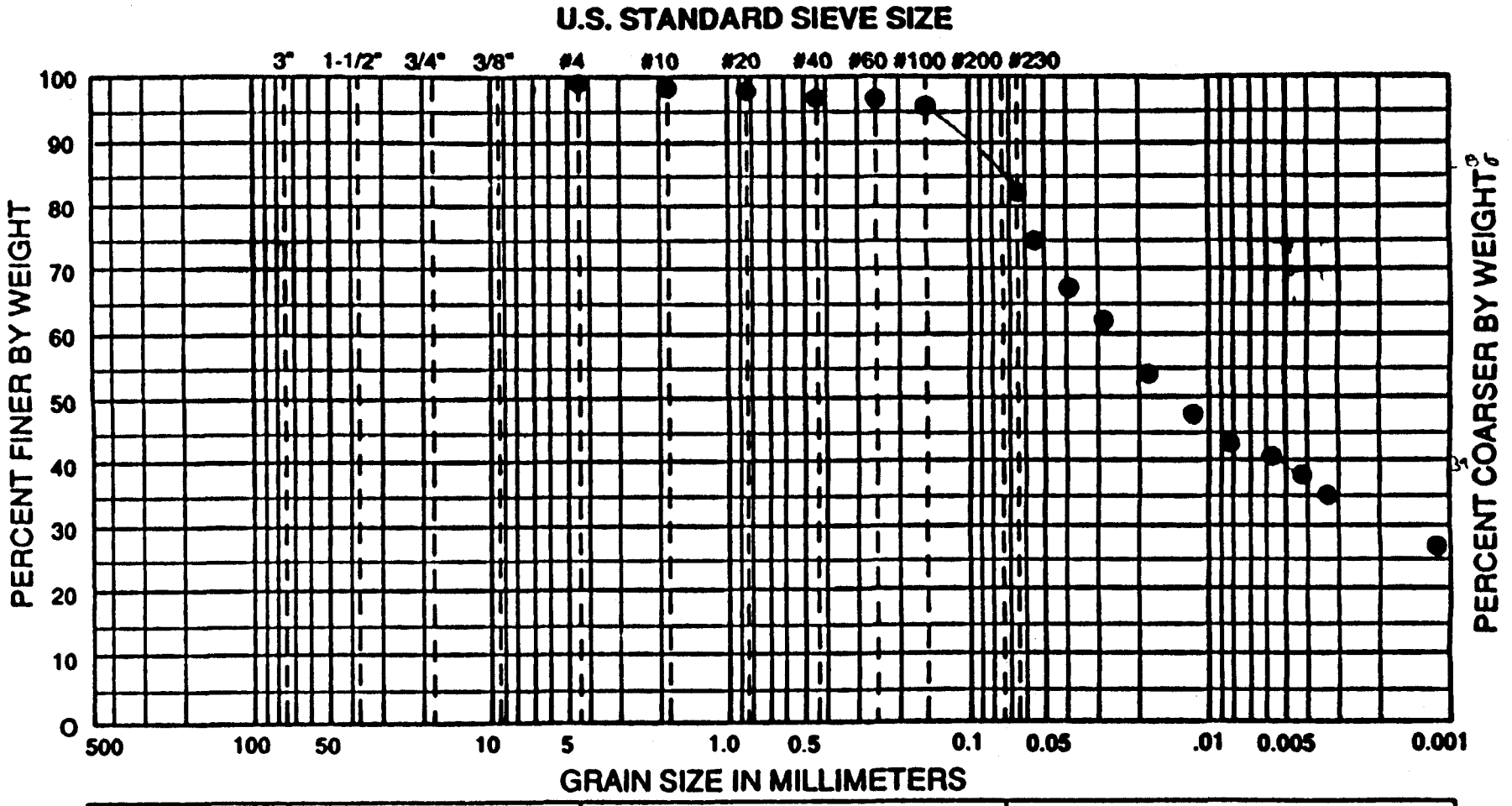
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01324
Value of "a"	0.99	Wt. Dry Sample "W"	54.321
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.25	41.25	75.0	75.0	8.38	0.0542
1.0	44.00	37.00	67.3	67.3	9.07	0.0399
2.0	41.00	34.00	61.8	61.8	9.57	0.0290
5.0	37.00	30.00	54.6	54.6	10.22	0.0189
15.0	33.00	26.00	47.3	47.3	10.88	0.0113
30.0	31.00	24.00	43.7	43.7	11.21	0.0081
60.0	29.25	22.25	40.5	40.5	11.49	0.0058
120.0	27.75	20.75	37.7	37.7	11.74	0.0041
190.0	26.25	19.25	35.0	35.0	11.99	0.0033
1440.0	21.75	14.75	26.8	26.8	12.72	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+50 SAMPLE NO.: CH #9 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		clayey silt			S - 13.1		SL
Rocky Flats	36'	0	0.9	0.5	1.3	11.3	47%

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-0[illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 8-50 SAMPLE CH #9 DEPTH 36'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DH 3/10/92

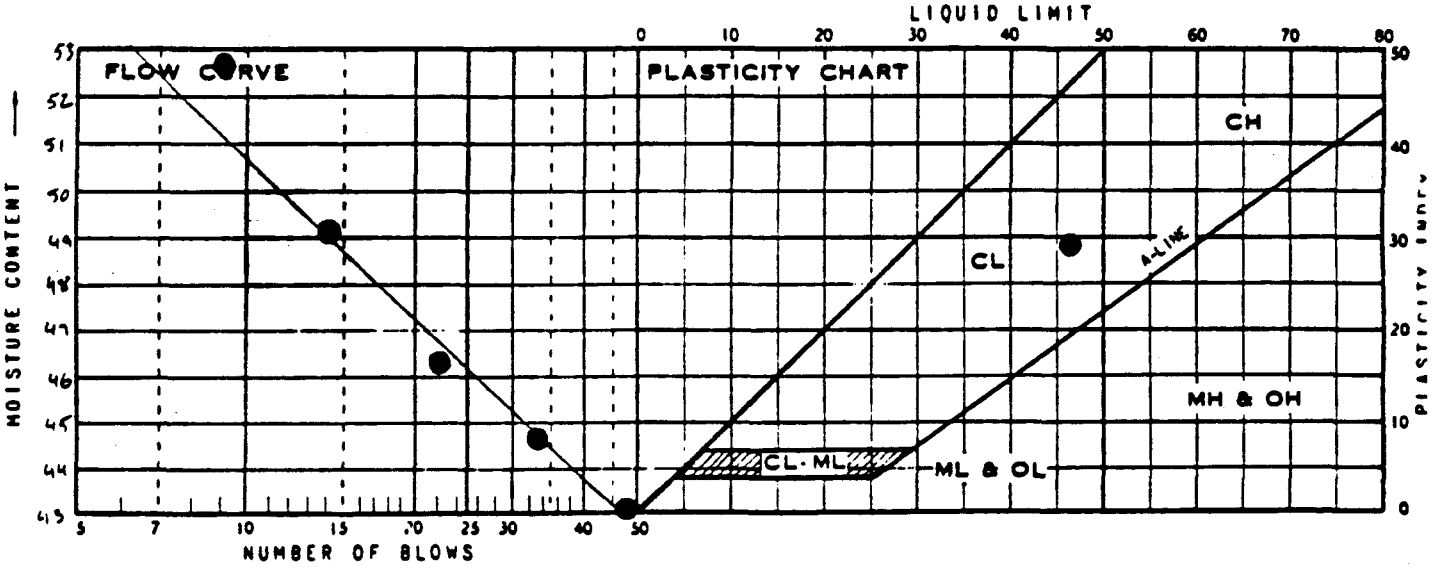
??

DETERMINATION	1	2	3	4	5	6
DISH	58C	2041	2072			
WT OF DISH + WET SOIL g	6.28	6.40	5.52			
WT OF DISH + DRY SOIL g	5.54	5.60	4.88	—	—	—
WT OF MOISTURE g	.74	.80	.64			
WT OF DISH g	1.07	1.06	1.04	—	—	—
WT OF DRY SOIL g	4.47	4.54	3.84			
MOISTURE CONTENT %	16.6	17.6	16.7			

LIQUID LIMIT

??

DETERMINATION	1	2	3	4	5	6
DISH	42C	20[illegible]	2053	2011	30C	2067
NUMBER OF BLOWS	48	33	22	14	9	
WT OF DISH + WET SOIL g	12.10	11.41	11.82	12.03	11.10	
WT OF DISH + DRY SOIL g	8.77	9.20	8.41	8.41	7.63	—
WT OF MOISTURE g	3.33	3.21	3.41	3.62	3.47	
WT OF DISH g	1.04	1.02	1.05	1.05	1.05	1.04
WT OF DRY SOIL g	7.73	7.18	7.36	7.36	6.58	
MOISTURE CONTENT %	43.1	44.7	46.3	49.2	52.7	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		46.2	16.7	29.5	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	39'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

SB

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	40.00
Wt. Dry Soil & Pan	(g)	38.74
Wt. Lost Moisture	(g)	1.26
Wt. of Pan Only	(g)	3.73
Wt. of Dry Soil	(g)	35.01
Moisture Content	%	3.6

Wt. Hydrom. Sample Wet (g)	55.05
Wt. Hydrom. Sample Dry (g)	53.14

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	611.67
Weight of + #10 Before Washing (g)	95.07
Weight of + #10 After Washing (g)	76.77
Weight of - #10 Wet (g)	516.60
Weight of - #10 Dry (g)	516.32
Wt. Total Sample Dry (g)	593.09
Calc. Wt. "W" (g)	61.04
Calc. Mass + #10	7.90

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	32.12	32.12	32.12	5.4	94.6
3/8"	0.00	13.96	13.96	46.08	7.8	92.2
#4	0.00	16.15	16.15	62.23	10.5	89.5
#10	0.00	14.54	14.54	76.77	12.9	87.1
#20	1.57	3.02	1.45	1.45	15.3	84.7
#40	1.57	3.29	1.72	3.17	18.1	81.9
#60	1.57	2.55	0.98	4.15	19.7	80.3
#100	1.57	2.31	0.74	4.89	21.0	79.0
#230	1.56	3.72	2.16	7.05	24.5	75.5

Silty Clay (CH).

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+50	SAMPLED	Rocky Flats
DEPTH	39'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#9	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

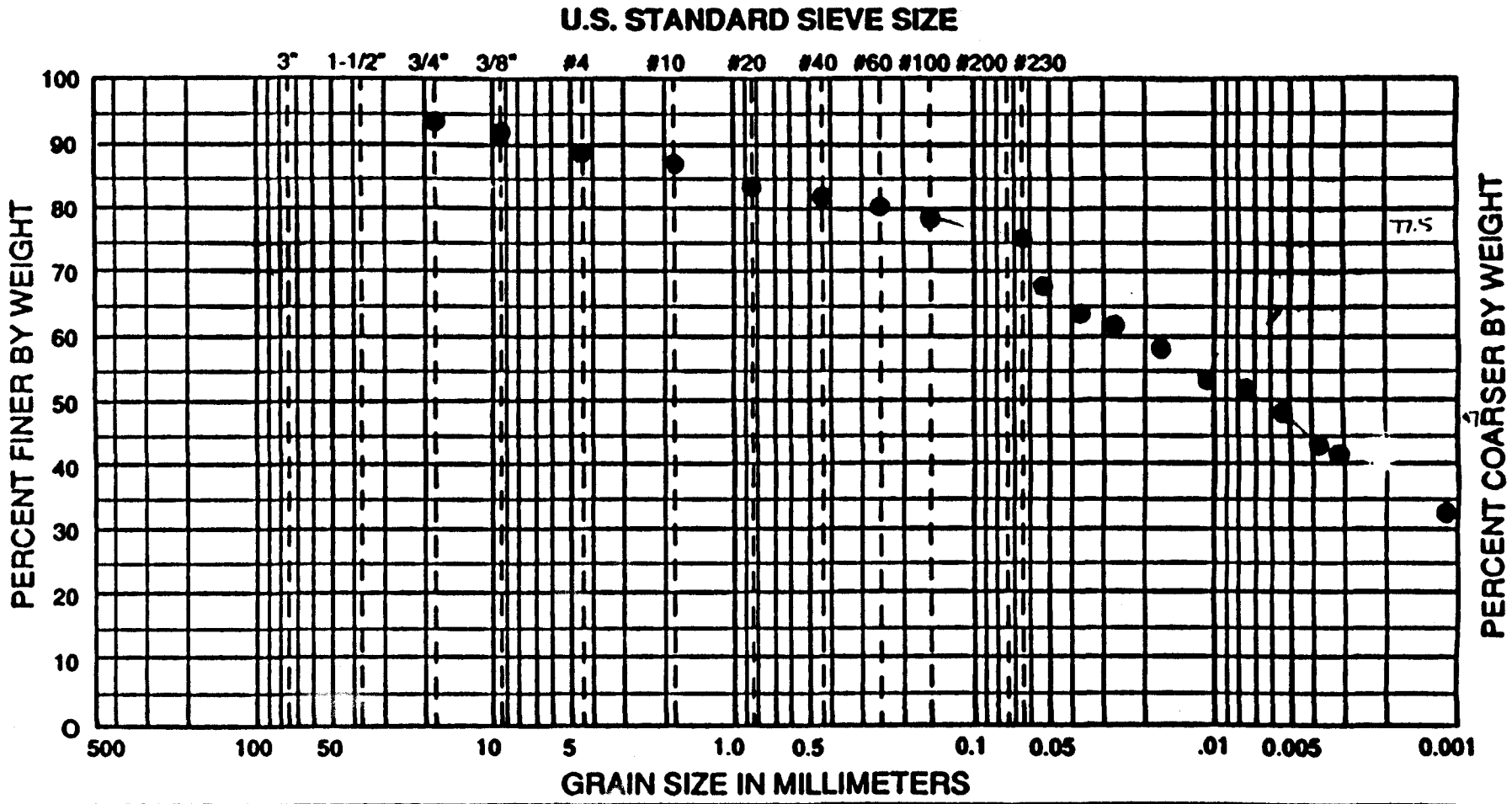
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	61.043
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	49.00	42.00	67.7	67.7	8.25	0.0529
1.0	47.00	40.00	64.5	64.5	8.58	0.0381
2.0	45.00	38.00	61.3	61.3	8.91	0.0275
5.0	43.25	36.25	58.4	58.4	9.20	0.0176
15.0	40.75	33.75	54.4	54.4	9.61	0.0104
30.0	39.00	32.00	51.6	51.6	9.89	0.0075
60.0	37.00	30.00	48.4	48.4	10.22	0.0054
120.0	34.25	27.25	43.9	43.9	10.67	0.0039
195.0	33.00	26.00	41.9	41.9	10.88	0.0031
1440.0	27.00	20.00	32.2	32.2	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+50 SAMPLE NO.: CH # 9 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		silty clay GV - 10.5		CS - 12.0		SL	CL
Rocky Flats	39'	5.[illegible]	5.1	2.4	5.2	4.4	30.5	[illegible] .17

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Waste

LOCATION Rocky Flats

BORING 8-50 SAMPLE CH #9 DEPTH 32'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

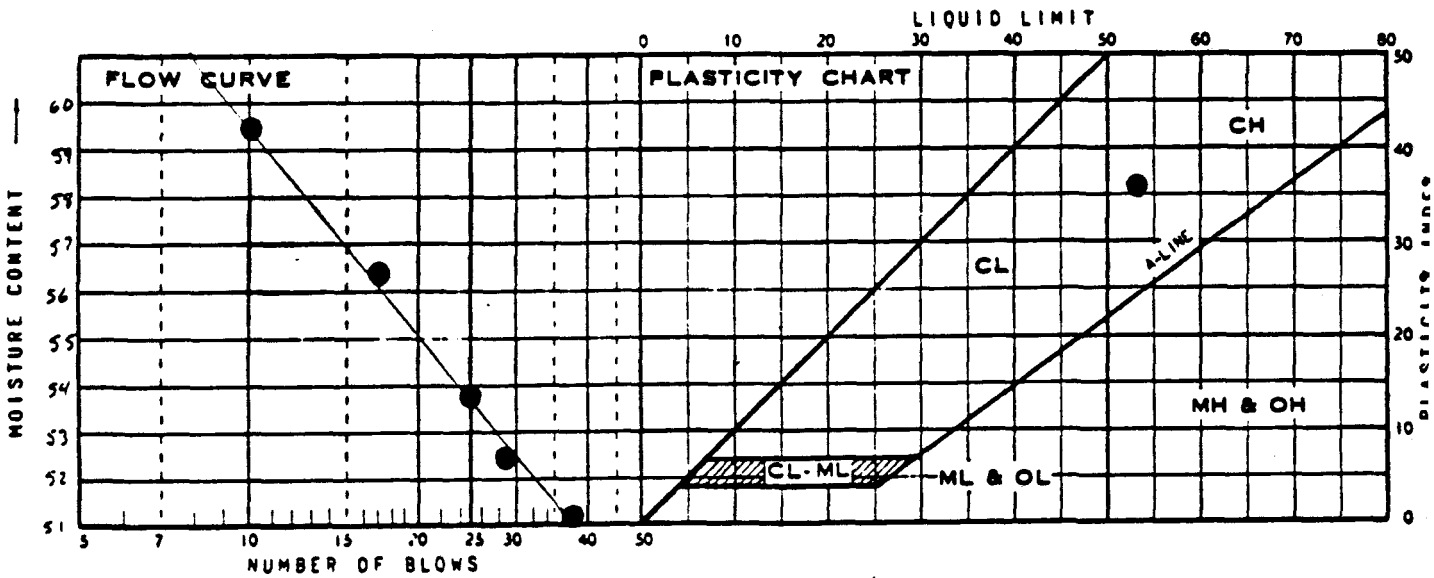
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DM 3/10/93

DETERMINATION	1	2	3	4	5	6
DISH	32C	2036	46C			
WT OF DISH + WET SOIL g	5.50	6.29	5.52			
WT OF DISH + DRY SOIL g	4.87	5.52	4.82	—	—	—
WT OF MOISTURE g	.63	.77	.70			
WT OF DISH g	1.05	1.05	1.06	—	—	—
WT OF DRY SOIL g	3.82	4.47	3.76			
MOISTURE CONTENT %	16.5	17.2	18.6			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	5C	2020	28C	43C	2074	2008
NUMBER OF BLOWS	38	28	25	17	10	
WT OF DISH + WET SOIL g	11.39	11.01	12.89	11.19	12.86	
WT OF DISH + DRY SOIL g	7.89	7.58	8.75	7.53	8.45	—
WT OF MOISTURE g	3.50	3.43	4.14	3.66	4.41	
WT OF DISH g	1.06	1.05	1.05	1.04	1.04	1.06
WT OF DRY SOIL g	6.83	6.53	7.70	6.49	7.41	
MOISTURE CONTENT %	51.2	52.5	53.8	56.4	59.5	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		53.8	17.4	36.4	CH	

ADVANCED TERRA TESTING INC

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+75	SAMPLED	Rocky Fl[illegible]
DEPTH	15.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	38.49
Wt. Dry Soil & Pan	(g)	37.46
Wt. Lost Moisture	(g)	1.03
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	33.68
Moisture Content	%	3.1
Wt. Hydrom. Sample Wet	(g)	55.03
Wt. Hydrom. Sample Dry	(g)	53.39

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	540.50
Weight of + #10 Before Washing (g)	112.34
Weight of + #10 After Washing (g)	102.95
Weight of - #10 Wet (g)	428.16
Weight of - #10 Dry (g)	424.57
Wt. Total Sample Dry (g)	527.52
Calc. Wt. "W" (g)	66.35
Calc. Mass + #10	12.96

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	53.20	53.20	53.20	10.1	89.9
3/8"	0.00	29.26	29.26	82.46	15.6	84.4
#4	0.00	11.33	11.33	93.79	17.8	82.2
#10	0.00	9.24	9.24	103.03	19.5	80.5
#20	1.56	3.39	1.83	1.83	22.3	77.7
#40	1.55	3.01	1.46	3.29	24.5	75.5
#60	1.55	2.78	1.23	4.52	26.3	73.7
#100	1.55	3.58	2.03	6.55	29.4	70.6
#230	1.55	6.61	5.06	11.61	37.0	63.0

CS

ADVANCED TERRA TESTING, IN[illegible]

Silty Clay (CH[illegible]

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	15.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

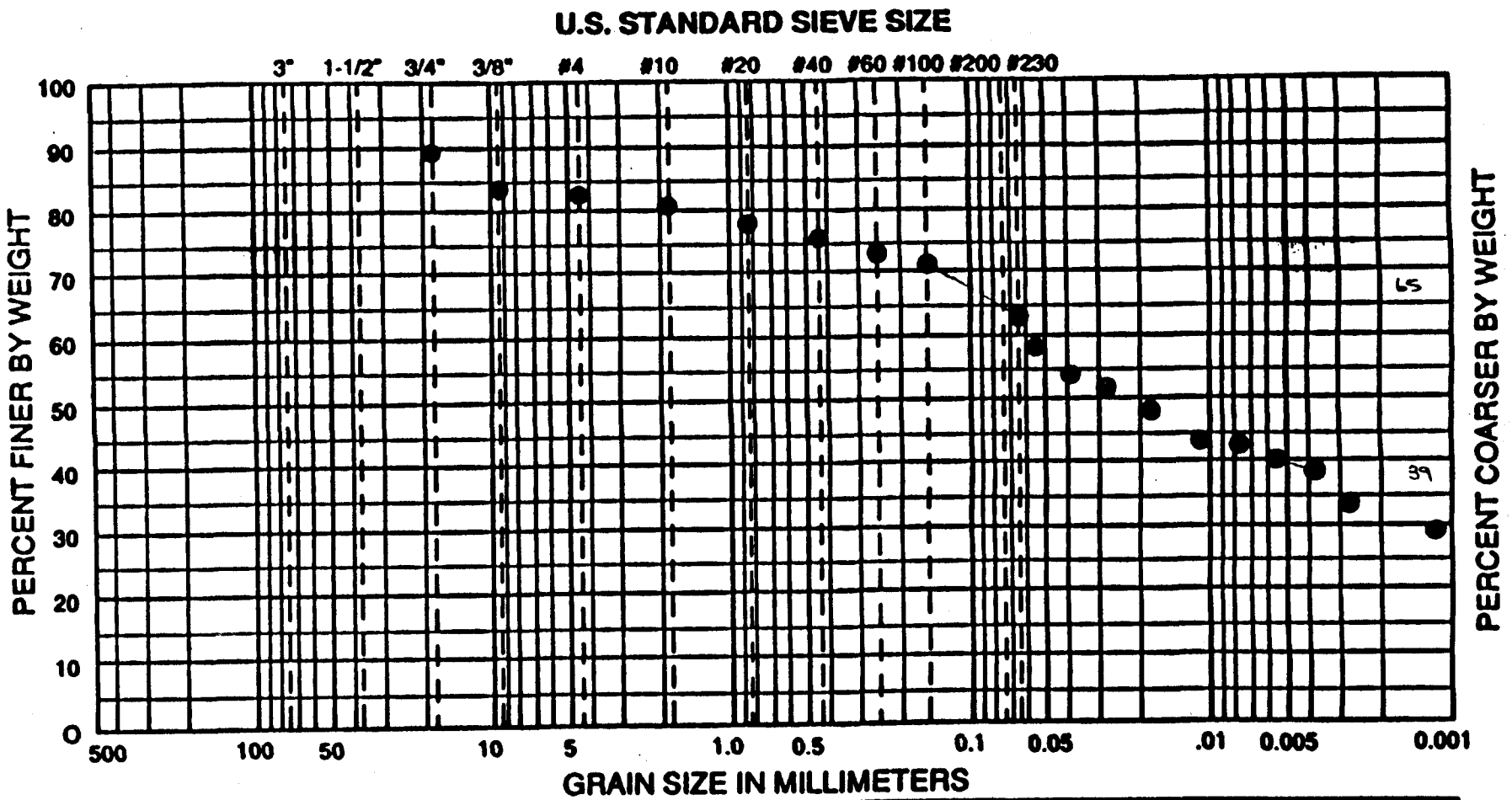
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	66.353
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	45.50	39.50	58.5	58.5	8.83	0.0545
1.0	43.00	37.00	54.8	54.8	9.24	0.0395
2.0	40.50	34.50	51.1	51.1	9.65	0.0285
5.0	39.00	33.00	48.8	48.8	9.89	0.0183
15.0	36.00	30.00	44.4	44.4	10.39	0.0108
30.0	35.00	29.00	42.9	42.9	10.55	0.0077
60.0	33.00	27.00	40.0	40.0	10.88	0.0055
120.0	32.00	26.00	38.5	38.5	11.04	0.0039
250.0	29.00	23.00	34.0	34.0	11.53	0.0028
1440.0	26.00	20.00	29.6	29.6	12.03	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+75 SAMPLE NO.: CH #14 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
		silty clay	GV-17.8		S-17.2		SL	CL
Rocky Flats	15.0'	10	7.7	1.7	5.0	10.5	26	39
		C	F	C	M	F		

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING B+75 SAMPLE 14 DEPTH @ 15.0'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

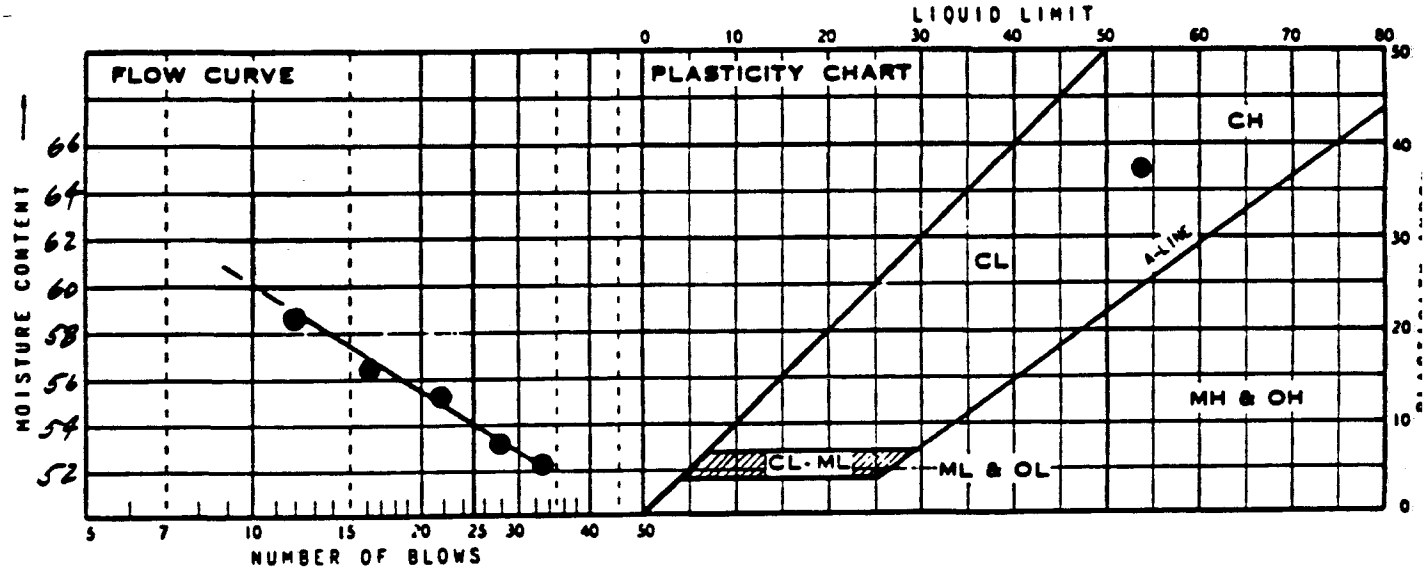
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3.122/92

DETERMINATION	1	2	3	4	5	6
DISH	2070	B10	58C			
WT OF DISH + WET SOIL	5.52	7.52	5.53			
WT OF DISH + DRY SOIL	4.87	6.56	4.89	—	—	—
WT OF MOISTURE	0.65	0.96	0.64			
WT OF DISH	1.05	1.02	1.06	—	—	—
WT OF DRY SOIL	3.82	5.54	3.83			
MOISTURE CONTENT	17.0	17.3	16.7	= 51.0/3 =	17.0	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B20	2005	2017	B18	B9	9C
NUMBER OF BLOWS	33	27	28	16	12	8+
WT OF DISH + WET SOIL	9.52	9.44	8.12	8.31	9.74	7.82
WT OF DISH + DRY SOIL	6.61	6.46	5.66	5.69	6.52	5.17
WT OF MOISTURE	2.91	2.98	2.46	2.62	3.22	2.65
WT OF DISH	1.03	1.06	1.03	1.04	1.02	1.06
WT OF DRY SOIL	5.58	5.40	4.63	4.65	5.50	4.11
MOISTURE CONTENT	52.1	55.2	53.1	56.3	58.6	64.5



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		54.0	17.0	37.0	CH	

ADVANCED TERRA TESTING

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	31.3	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	37.84
Wt. Dry Soil & Pan	(g)	36.59
Wt. Lost Moisture	(g)	1.25
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	32.87
Moisture Content	%	3.8
Wt. Hydrom. Sample Wet	(g)	55.05
Wt. Hydrom. Sample Dry	(g)	53.03

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	509.59
Weight of + #10 Before Washing (g)	28.97
Weight of + #10 After Washing (g)	27.47
Weight of - #10 Wet (g)	480.62
Weight of - #10 Dry (g)	464.46
Wt. Total Sample Dry (g)	491.93
Calc. Wt. "W" (g)	56.1
Calc. Mass + #10	3.13

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	22.12	22.12	22.12	4.5	95.5
#4	0.00	3.80	3.80	25.92	5.3	94.7
#10	0.00	1.51	1.51	27.43	5.6	94.4
#20	1.55	1.99	0.44	0.44	6.4	93.6
#40	1.57	2.51	0.94	1.38	8.0	92.0
#60	1.55	2.19	0.64	2.02	9.2	90.8
#100	1.56	2.32	0.76	2.78	10.5	89.5
#230	1.56	3.80	2.24	5.02	14.5	85.5

87

Silt, Clay (cu)

ADVANCED TERRA TESTING, I

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	31.3	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

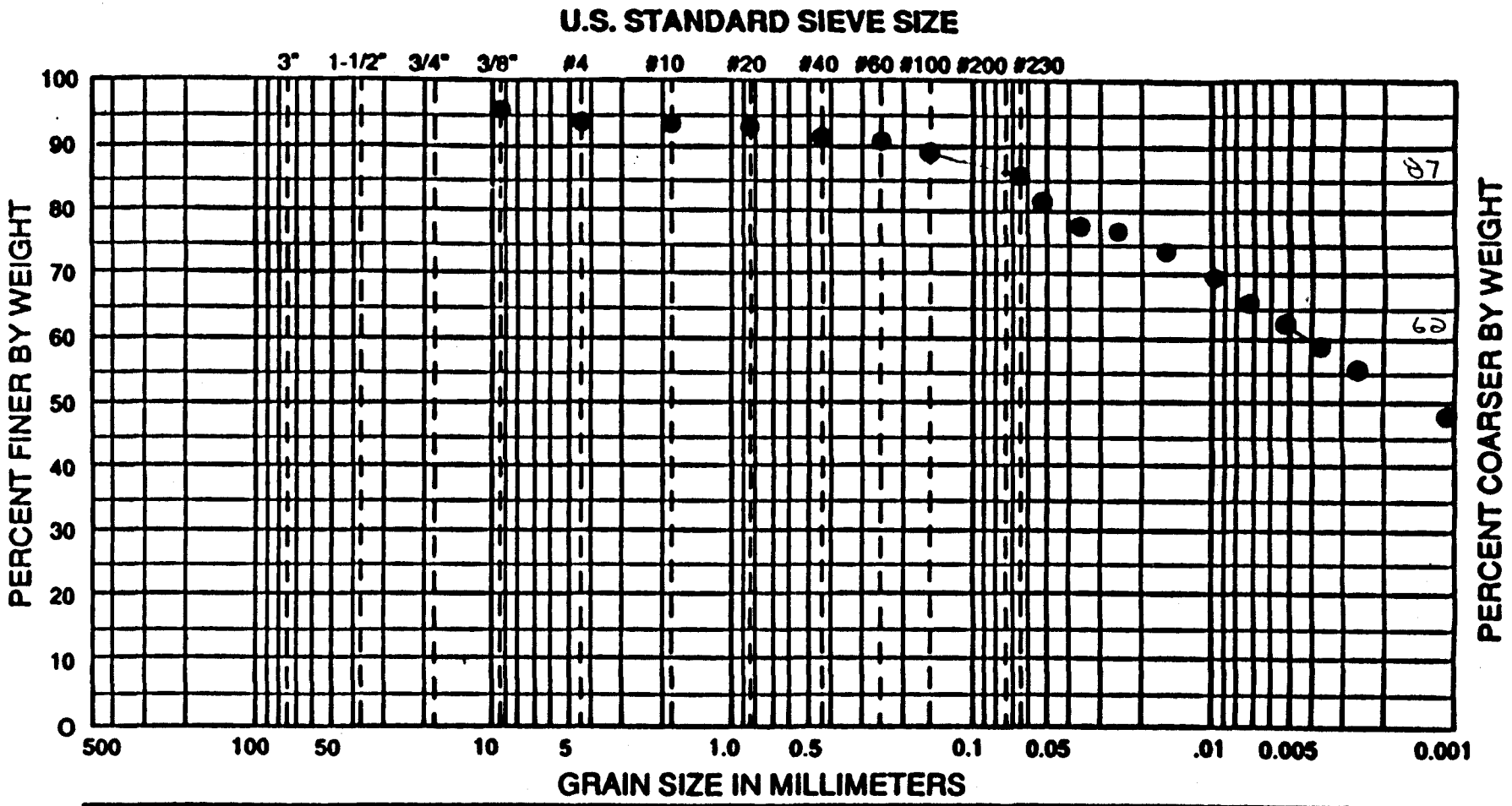
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	56.165
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	52.50	46.50	81.3	81.3	7.68	0.0509
1.0	50.50	44.50	77.8	77.8	8.01	0.0367
2.0	50.00	44.00	76.9	76.9	8.09	0.0261
5.0	48.50	42.50	74.3	74.3	8.34	0.0168
15.0	46.00	40.00	69.9	69.9	8.75	0.0099
30.0	43.50	37.50	65.6	65.6	9.16	0.0072
60.0	42.00	36.00	62.9	62.9	9.40	0.0051
120.0	40.00	34.00	59.4	59.4	9.73	0.0037
250.0	37.50	31.50	55.1	55.1	10.14	0.0026
1440.0	33.50	27.50	48.1	48.1	10.80	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8 + 75 SAMPLE NO.: CH #14 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		Silty clay					
		5.3			7.7		
Rocky Flats	31.3'	0	5.3	0.3	2.4	5.0	25	62

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION Rocky Flats / EG&G

BORING 8+75 SAMPLE CH#14 DEPTH 31.3'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

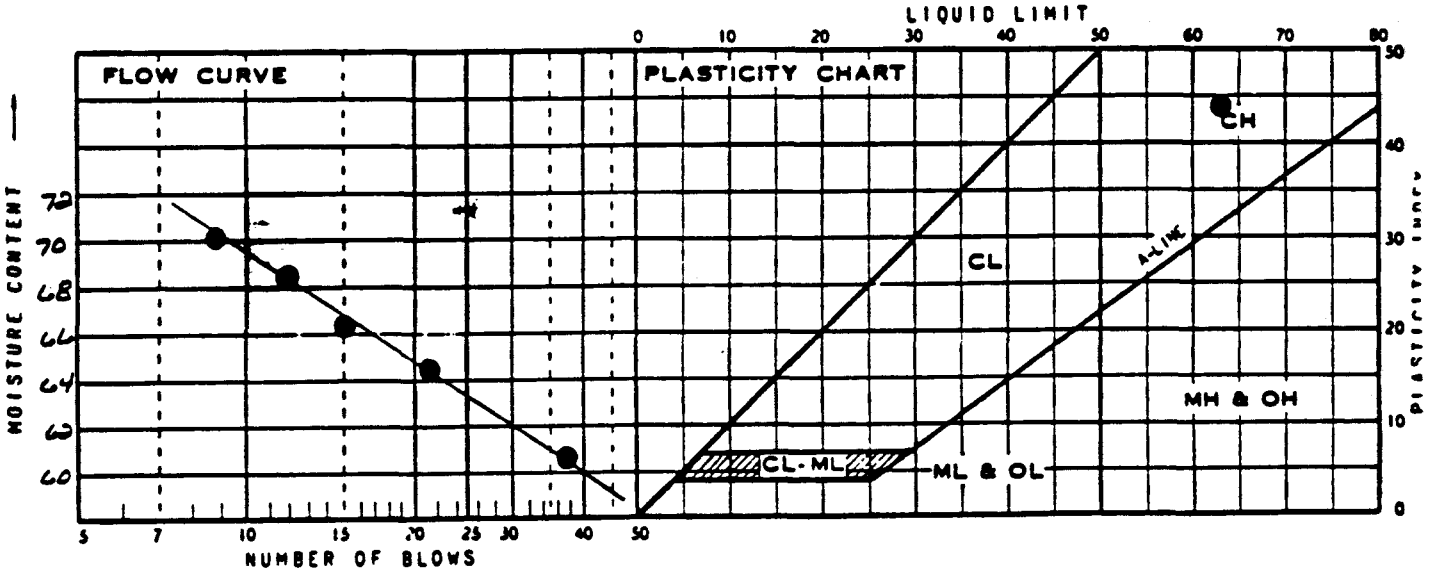
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2053	2007	20C			
WT OF DISH + WET SOIL g	5.73	5.95	5.86			
WT OF DISH + DRY SOIL g	4.98	5.16	5.08	—	—	—
WT OF MOISTURE g	.75	.79	.78			
WT OF DISH g	1.06	1.05	1.03	—	—	—
WT OF DRY SOIL g	3.92	4.11	4.05			
MOISTURE CONTENT %	19.1	19.2	19.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2063	46C	37C	2002	23C	
NUMBER OF BLOWS	38	21	15	12	9	
WT OF DISH + WET SOIL g	15.10	16.47	13.16	11.34	12.20	
WT OF DISH + DRY SOIL g	9.80	10.13	8.32	7.16	7.60	—
WT OF MOISTURE g	5.30	6.04	4.84	4.18	4.60	
WT OF DISH g	1.06	1.06	1.03	1.06	1.07	—
WT OF DRY SOIL g	8.74	9.37	7.29	6.10	6.53	
MOISTURE CONTENT %	60.6	64.5	66.4	68.5	70.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		63.4	19.2	44.2	CH	

ADVANCED TERRA TESTING

JEm

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	33.8	DATE TESTED	03-20-92
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	37.84
Wt. Dry Soil & Pan	(g)	37.04
Wt. Lost Moisture	(g)	0.80
Wt. of Pan Only	(g)	3.73
Wt. of Dry Soil	(g)	33.31
Moisture Content	%	2.4

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	53.72

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	748.01
Weight of + #10 Before Washing (g)	295.64
Weight of + #10 After Washing (g)	289.23
Weight of - #10 Wet (g)	452.37
Weight of - #10 Dry (g)	448.02
Wt. Total Sample Dry (g)	737.25
Calc. Wt. "W" (g)	88.40
Calc. Mass + #10	34.6

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	160.72	160.72	160.72	21.8	78.2
3/8"	0.00	72.65	72.65	233.37	31.7	68.3
#4	0.00	30.91	30.91	264.28	35.8	64.2
#10	0.00	24.95	24.95	289.23	39.2	60.8
#20	1.57	5.89	4.32	4.32	44.1	55.9
#40	1.56	8.20	6.64	10.96	51.6	48.4
#60	1.56	7.70	6.14	17.10	58.6	41.4
#100	1.57	7.84	6.27	23.37	65.7	34.3
#230	1.57	9.10	7.53	30.90	74.2	25.8

275

Gravelly Sand (SP)

ADVANCED TERRA TESTING, I

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	33.8	DATE TESTED	03-20-92 INC
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

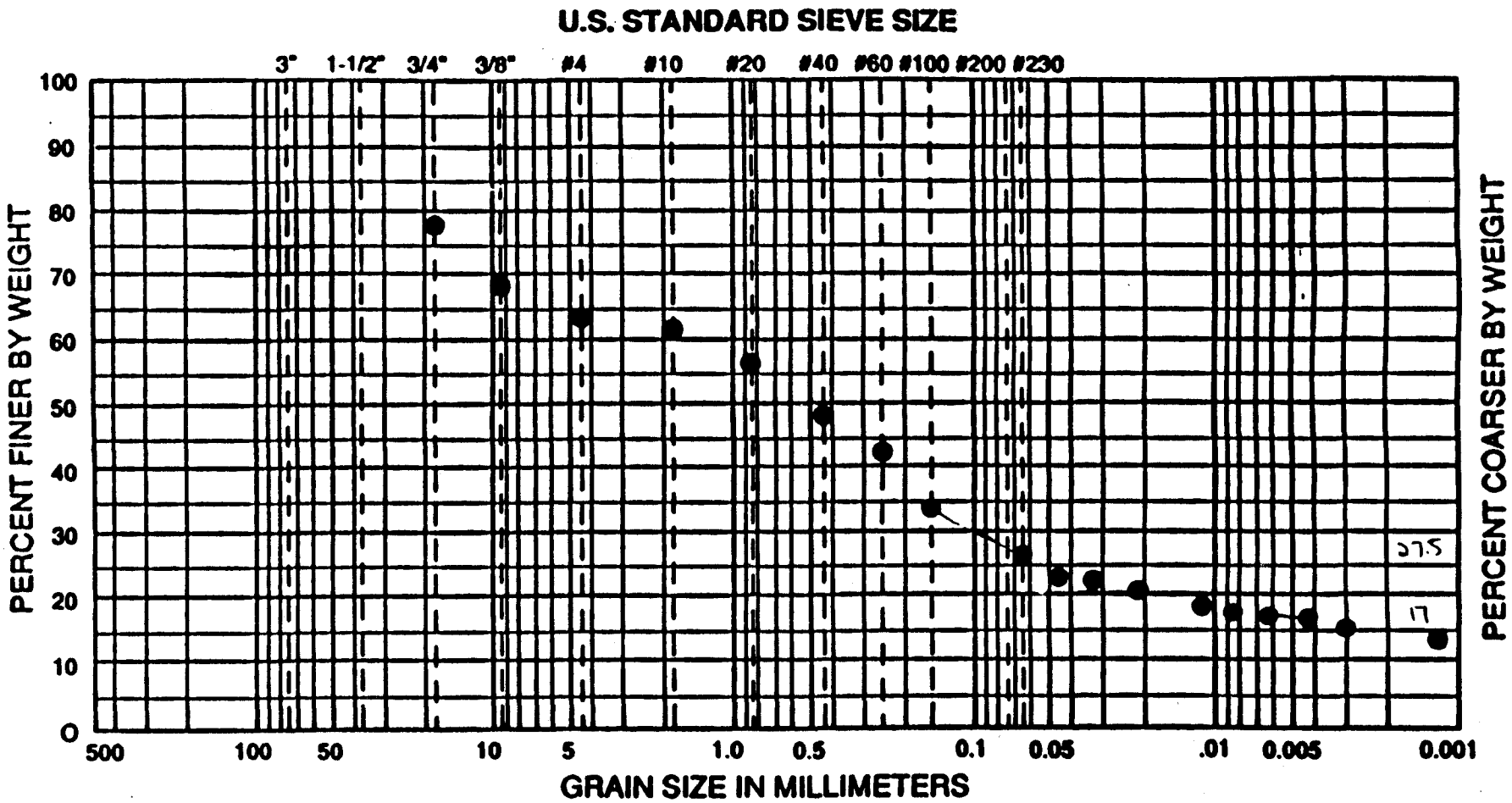
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.70	Temp. Coef. K	0.01312
Value of "a"	0.99	Wt. Dry Sample "W"	88.395
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	28.50	22.50	25.2	25.2	11.62	0.0632
1.0	26.50	20.50	23.0	23.0	11.94	0.0453
2.0	26.00	20.00	22.4	22.4	12.03	0.0322
5.0	24.00	18.00	20.2	20.2	12.35	0.0206
15.0	22.50	16.50	18.5	18.5	12.60	0.0120
30.0	21.50	15.50	17.4	17.4	12.76	0.0066
60.0	21.00	15.00	16.8	16.8	12.85	0.0061
120.0	20.75	14.75	16.5	16.5	12.89	0.0043
250.0	19.50	13.50	15.1	15.1	13.09	0.0030
1440.0	18.50	12.50	14.0	14.0	13.26	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY	
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+75 SAMPLE NO.: CH # 14 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	gravelly sand	CLASSIFICATION				
Rocky Flats	33.8'	35.8 14.0	36.7 34	10.4	20.9	10.5	17

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. [illegible]

CLIENT/OWNER WESTON

LOCATION Rocky Flats/EG&G

BORING 8+75 SAMPLE CH#L4 DEPTH 33.8'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

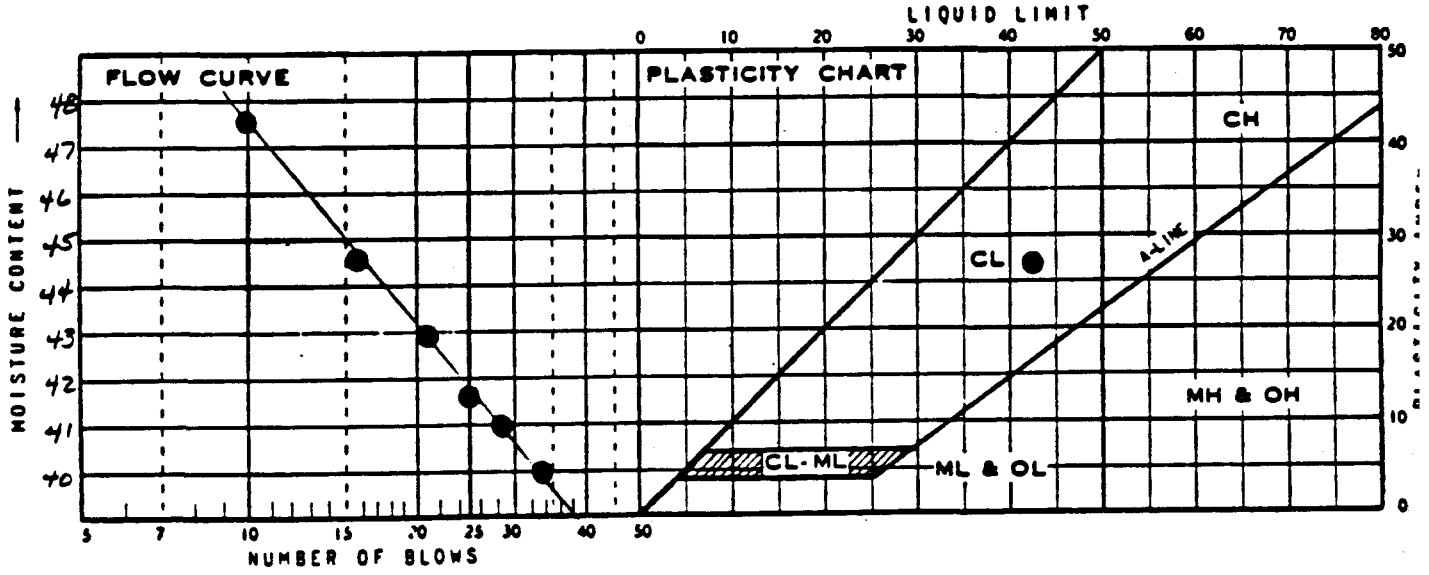
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB..312392

DETERMINATION	1	2	3	4	5	6
DISH	2033	2069	32 C			
WT OF DISH + WET SOIL g	7.57	6.14	5.95			
WT OF DISH + DRY SOIL g	6.69	5.46	5.28	—	—	—
WT OF MOISTURE g	.88	.68	.67			
WT OF DISH g	1.05	1.05	1.05	—	—	—
WT OF DRY SOIL g	5.64	4.41	4.23			
MOISTURE CONTENT %	15.6	15.4	15.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	31C	2026	26C	2030	2034	8C
NUMBER OF BLOWS	34	29±	25	21	16±	10±
WT OF DISH + WET SOIL g	15.51	16.05	16.01	16.55	14.18	16.27
WT OF DISH + DRY SOIL g	11.38	11.69	11.61	11.89	10.12	11.36
WT OF MOISTURE g	4.13	4.36	4.40	4.66	4.06	4.91
WT OF DISH g	1.05	1.04	1.05	1.06	1.04	1.04
WT OF DRY SOIL g	10.33	10.65	10.56	10.83	9.08	10.32
MOISTURE CONTENT %	40.0	40.9	41.7	43.0	44.7	47.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		41.9	15.6	26.3	CL	

ADVANCED TERRA TESTING

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky F[illegible]s
DEPTH	51.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	37.82
Wt. Dry Soil & Pan	(g)	37.09
Wt. Lost Moisture	(g)	0.73
Wt. of Pan Only	(g)	3.81
Wt. of Dry Soil	(g)	33.28
Moisture Content	%	2.2

Wt. Hydrom. Sample Wet (g)	55.08
Wt. Hydrom. Sample Dry (g)	53.90

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	695.94
Weight of + #10 Before Washing (g)	24.24
Weight of + #10 After Washing (g)	22.38
Weight of - #10 Wet (g)	671.70
Weight of - #10 Dry (g)	659.10
Wt. Total Sample Dry (g)	681.48
Calc. Wt. "W" (g)	55.71
Calc. Mass + #10	1.81

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	1.52	1.52	1.52	0.2	99.8
#4	0.00	13.24	13.24	14.76	2.2	97.8
#10	0.00	7.38	7.38	22.14	3.2	96.8
#20	1.57	2.13	0.56	0.56	4.3	95.7
#40	1.56	2.53	0.97	1.53	6.0	94.0
#60	1.55	2.99	1.44	2.97	8.6	91.4
#100	1.57	5.30	3.73	6.70	15.3	84.7
#230	1.56	12.01	10.45	17.15	34.0	66.0

68

[illegible] CMT(CL)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	51.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

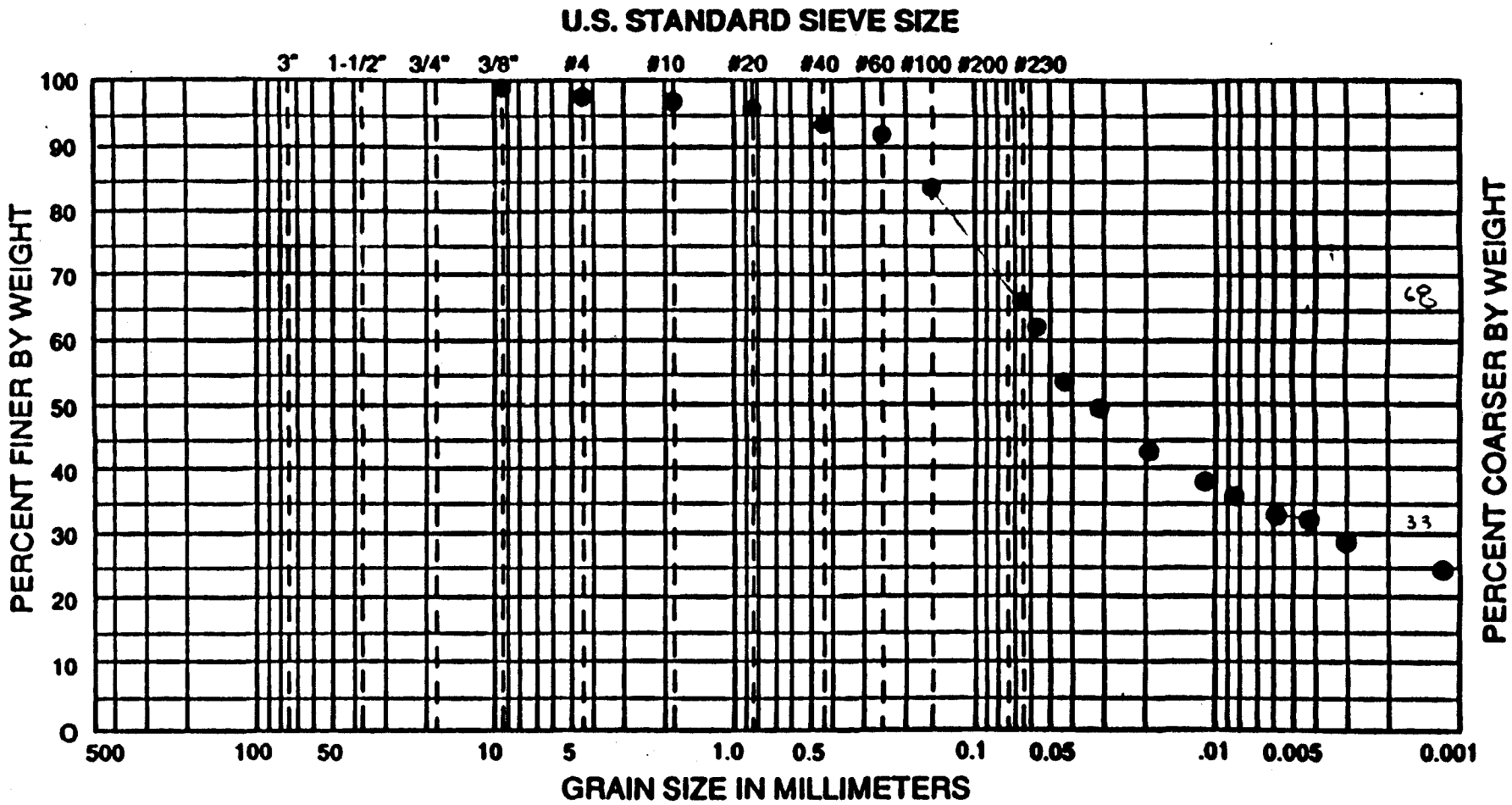
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.70	Temp. Coef. K	0.01312
Value of "a"	0.99	Wt. Dry Sample "W"	55.707
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	41.00	35.00	62.2	62.2	9.57	0.0574
1.0	36.50	30.50	54.2	54.2	10.30	0.0421
2.0	34.00	28.00	49.8	49.8	10.71	0.0304
5.0	30.00	24.00	42.7	42.7	11.37	0.0198
15.0	27.50	21.50	38.2	38.2	11.78	0.0116
30.0	26.00	20.00	35.5	35.5	12.03	0.0083
60.0	25.00	19.00	33.8	33.8	12.19	0.0059
120.0	24.00	18.00	32.0	32.0	12.35	0.0042
250.0	22.00	16.00	28.4	28.4	12.68	0.0030
1440.0	20.00	14.00	24.9	24.9	13.01	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+75 SAMPLE NO.: CH #14 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
		sandy clayey silt				
Rocky Flats	51.0'	7.2 2.2	1.0	29.8 2.8	26	35 33

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING B+75 SAMPLE #14 DEPTH @51.0'

FIELD DENSITY BY - - - - - - / - / - -

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

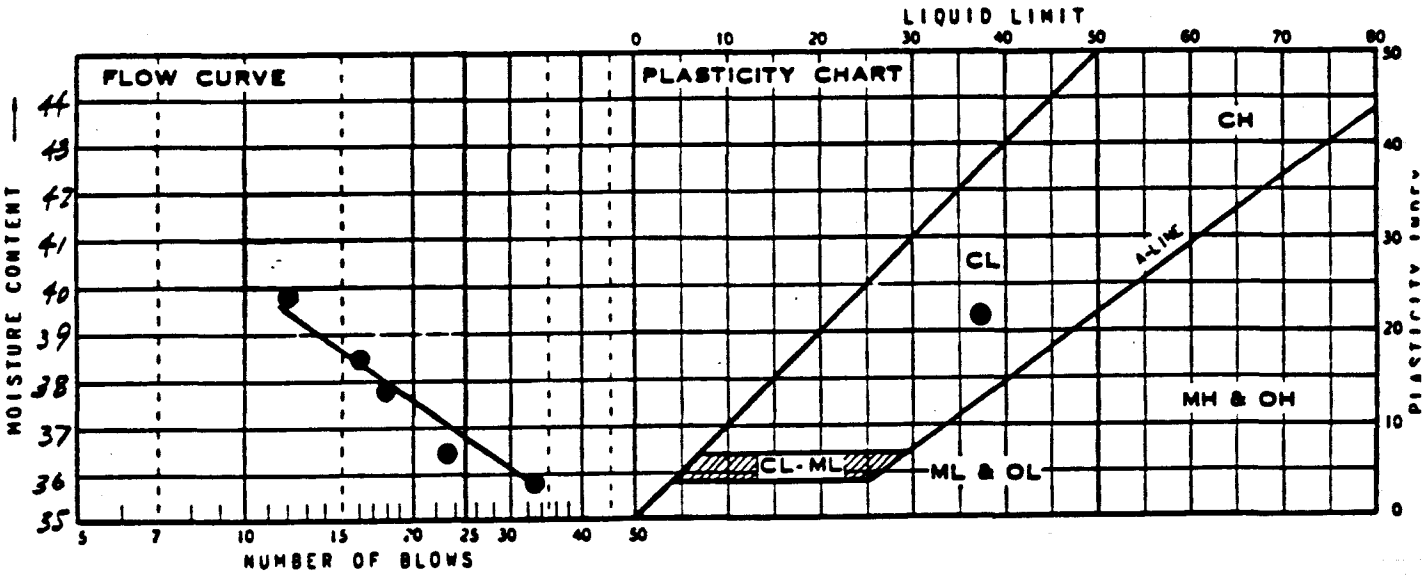
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/29/92

DETERMINATION	1	2	3	4	5	6
DISH	2067	2051	2026			
WT OF DISH + WET SOIL g	7.99	6.97	6.63			
WT OF DISH + DRY SOIL	7.07	6.21	5.89	—	—	—
WT OF MOISTURE	0.92	0.76	0.74			
WT OF DISH	1.04	1.04	1.04	—	—	—
WT OF DRY SOIL	6.03	5.17	4.85			
MOISTURE CONTENT %	15.3	14.7	15.3	= 45.3/3 =	15.1	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6 ??
DISH	46C	26C	2008	21C	2C	6C
NUMBER OF BLOWS	33	18	23	16	12	7+
WT OF DISH + WET SOIL g	9.79	10.72	9.26	10.64	10.80	9.97
WT OF DISH + DRY SOIL	7.49	8.07	7.07	7.97	8.02	7.28
WT OF MOISTURE	2.30	2.65	2.19	2.67	2.78	2.69
WT OF DISH	1.06	1.05	1.06	1.04	1.04	1.03
WT OF DRY SOIL	6.43	7.02	6.01	6.93	6.98	6.25
MOISTURE CONTENT %	35.8	37.8	36.4	38.5	39.8	43.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		36.8	15.1	21.7	CL	

ADVANCED TERRA TESTING inc

EM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	64.1	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	38.22
Wt. Dry Soil & Pan	(g)	36.77
Wt. Lost Moisture	(g)	1.45
Wt. of Pan Only	(g)	3.75
Wt. of Dry Soil	(g)	33.02
Moisture Content	%	4.4

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	52.70

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	557.15
Weight of + #10 Before Washing (g)	4.69
Weight of + #10 After Washing (g)	4.52
Weight of - #10 Wet (g)	552.46
Weight of - #10 Dry (g)	529.38
Wt. Total Sample Dry (g)	533.90
Calc. Wt. "W" (g)	53.[illegible]
Calc. Mass + #10	0.45

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.96	2.96	2.96	0.6	99.4
#4	0.00	1.40	1.40	4.36	0.8	99.2
#10	0.00	0.16	0.16	4.52	0.8	99.2
#20	1.56	1.67	0.11	0.11	1.1	98.9
#40	1.57	1.79	0.22	0.33	1.5	98.5
#60	1.57	1.74	0.17	0.50	1.8	98.2
#100	1.57	1.80	0.23	0.73	2.2	97.8 97
#230	1.56	2.05	0.49	1.22	3.1	96.9

ADVANCED TERRA TESTING, I[illegible]

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	64.1	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

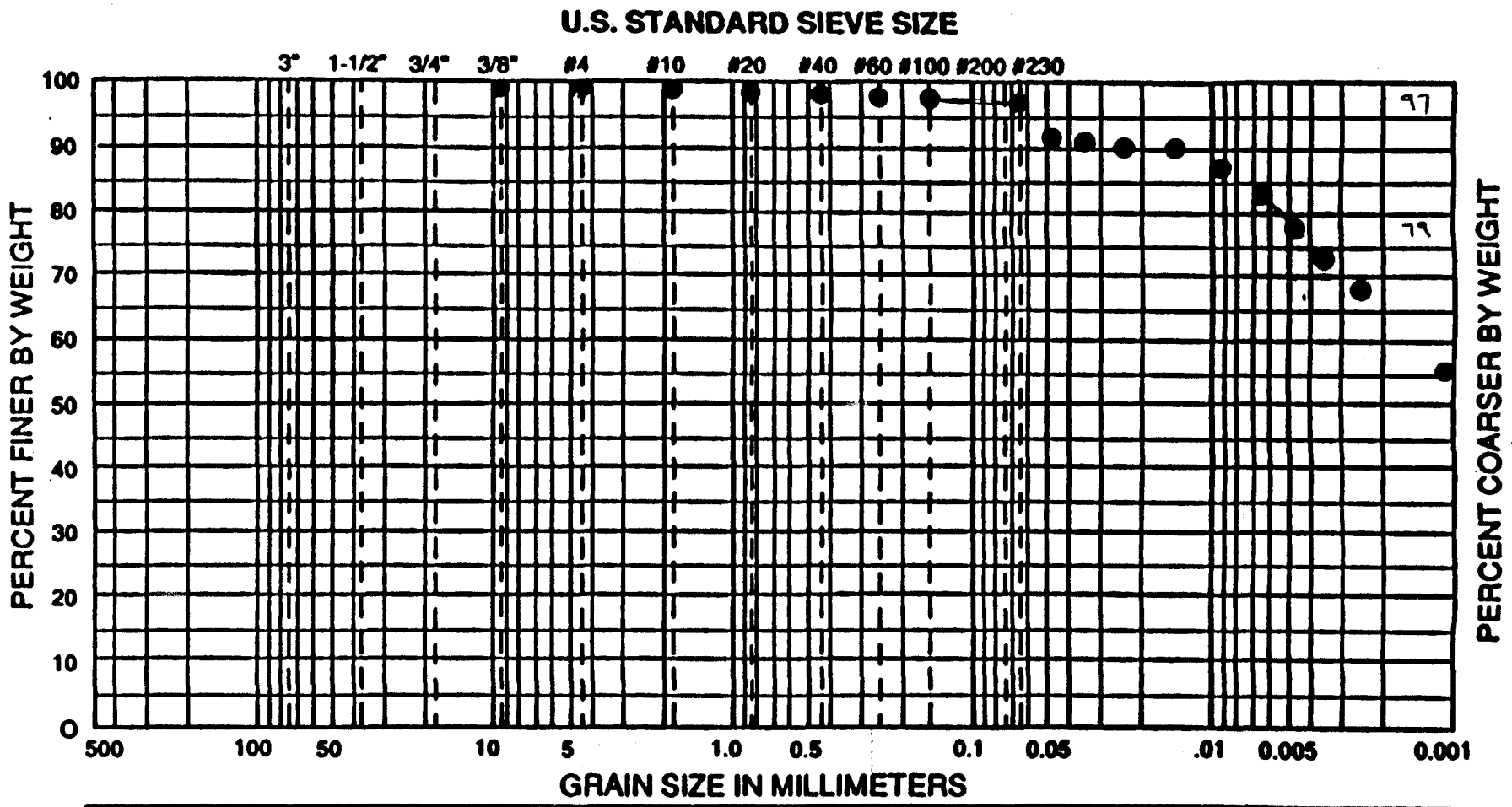
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01290
Value of "a"	0.98	Wt. Dry Sample "W"	53.15
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.50	49.50	91.1	91.1	7.19	0.0489
1.0	55.25	49.25	90.6	90.6	7.23	0.0347
2.0	55.00	49.00	90.2	90.2	7.27	0.0246
5.0	55.00	49.00	90.2	90.2	7.27	0.0156
15.0	53.50	47.50	87.4	87.4	7.52	0.0091
30.0	51.00	45.00	82.8	82.8	7.93	0.0066
60.0	48.50	42.50	78.2	78.2	8.34	0.0048
120.0	46.00	40.00	73.6	73.6	8.75	0.0035
250.0	43.00	37.00	68.1	68.1	9.24	0.0025
1440.0	36.00	30.00	55.2	55.2	10.39	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+75 SAMPLE NO.: CH #14 DATE: 3-20-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
		clay						
Rocky Flats	64.1'	0	.8 0.8	0	2.2 0.7	1.5	18	79

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 8+75 SAMPLE #14 DEPTH @ 64.1'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

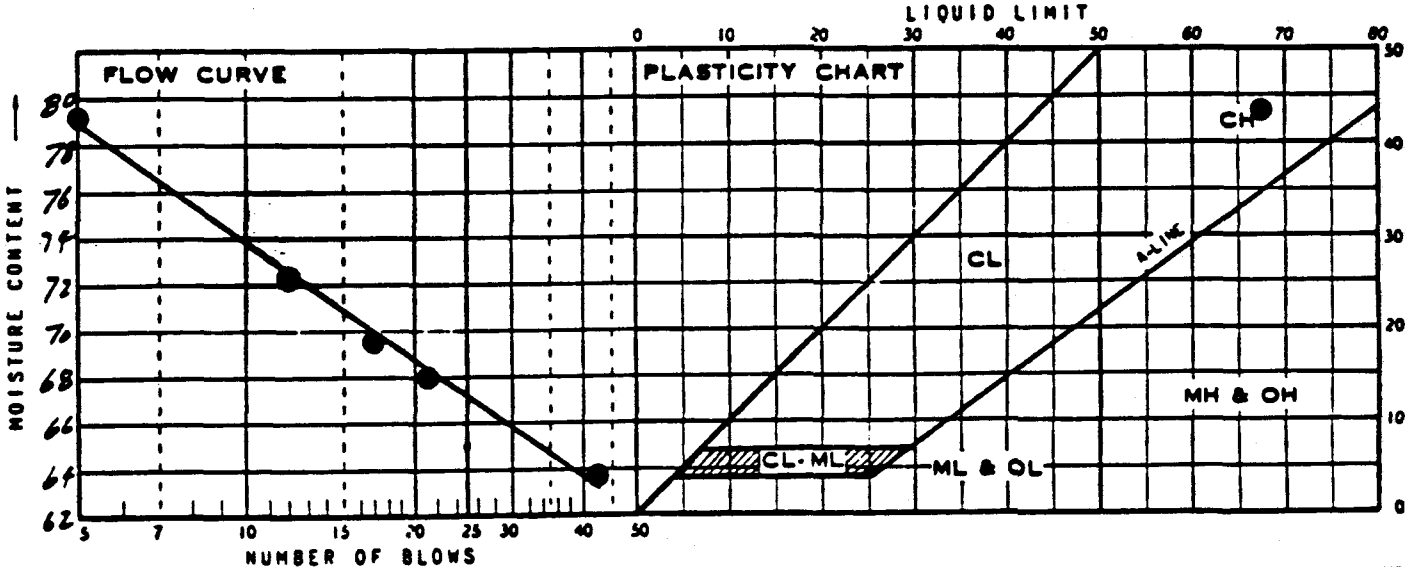
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 2/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2016	B21	54C			
WT OF DISH + WET SOIL g	6.63	6.35	7.55			
WT OF DISH + DRY SOIL	5.57	5.36	6.25	—	—	—
WT OF MOISTURE	1.06	0.99	1.30			
WT OF DISH	1.04	1.04	1.06	—	—	—
WT OF DRY SOIL	4.53	4.32	5.19			
MOISTURE CONTENT %	23.4	22.9	25.0	76.3/3	23.8	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2019	3	2028	2065	2021	16C
NUMBER OF BLOWS	42-	25	21	17	12	5
WT OF DISH + WET SOIL g	9.90	9.31	8.73	10.10	12.63	10.55
WT OF DISH + DRY SOIL	6.46	6.06	5.63	6.39	7.78	6.35
WT OF MOISTURE	3.44	3.25	3.10	3.71	4.85	4.20
WT OF DISH	1.06	1.06	1.07	1.05	1.05	1.06
WT OF DRY SOIL	5.40	5.00	4.56	5.34	6.73	5.29
MOISTURE CONTENT %	63.7	65.0	68.0	69.5	72.1	79.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		67.2	23.8	43.4	CH	

ADVANCED TERRA TESTING INC

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	72.0	DATE TESTED	03-20-92 INC
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	38.18
Wt. Dry Soil & Pan	(g)	36.86
Wt. Lost Moisture	(g)	1.32
Wt. of Pan Only	(g)	3.60
Wt. of Dry Soil	(g)	33.26
Moisture Content	%	4.0

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	52.92

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	52.92
Wt. Total Sample Dry (g)	52.92
Calc. Wt. "W" (g)	52.9
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	0.00	0.00	0.00	0.00	0.0	100.0
#40	1.56	1.57	0.01	0.01	0.0	100.0
#60	1.55	1.57	0.02	0.03	0.1	99.9
#100	1.57	1.58	0.01	0.04	0.1	99.9
#230	1.55	1.59	0.04	0.08	0.2	99.8

Chg (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	72.0	DATE TESTED	03-20-92 INC
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

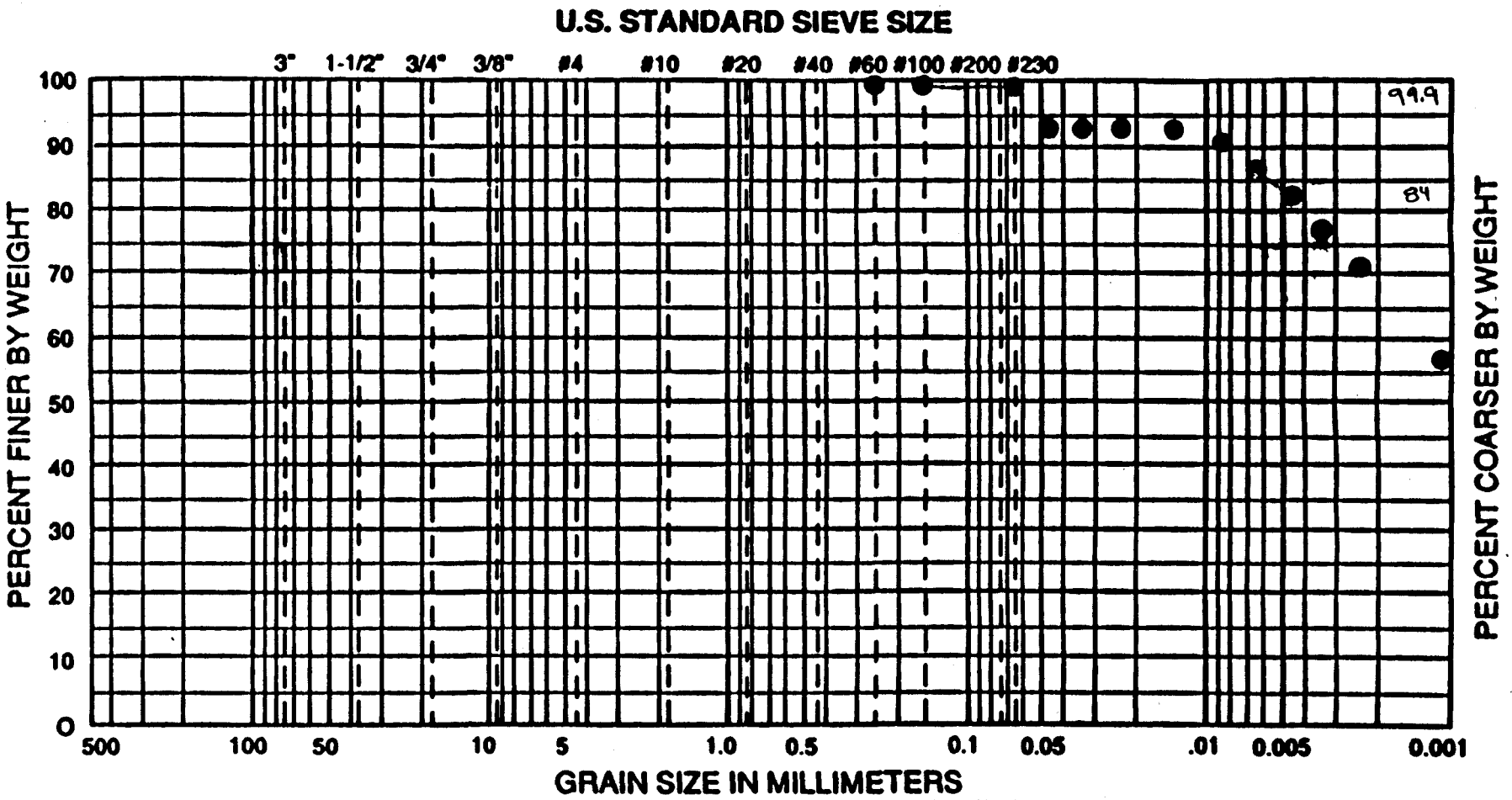
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.81	Temp. Coef. K	0.01272
Value of "a"	0.97	Wt. Dry Sample "W"	52.922
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	57.00	51.00	93.3	93.3	6.94	0.0474
1.0	57.00	51.00	93.3	93.3	6.94	0.0335
2.0	57.00	51.00	93.3	93.3	6.94	0.0237
5.0	57.00	51.00	93.3	93.3	6.94	0.0150
15.0	55.50	49.50	90.5	90.5	7.19	0.0088
30.0	53.50	47.50	86.9	86.9	7.52	0.0064
60.0	51.00	45.00	82.3	82.3	7.93	0.0046
120.0	48.00	42.00	76.8	76.8	8.42	0.0034
250.0	44.50	38.50	70.4	70.4	8.99	0.0024
1440.0	37.00	31.00	56.7	56.7	10.22	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+75 SAMPLE NO.: CH #14 DATE: 3-20-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		clay					
Rocky Flats	72.0'	0	0	0	0.1	15.9	84

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. _____

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / 3G & G

BORING B+75 SAMPLE CH #14 DEPTH 72.0

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

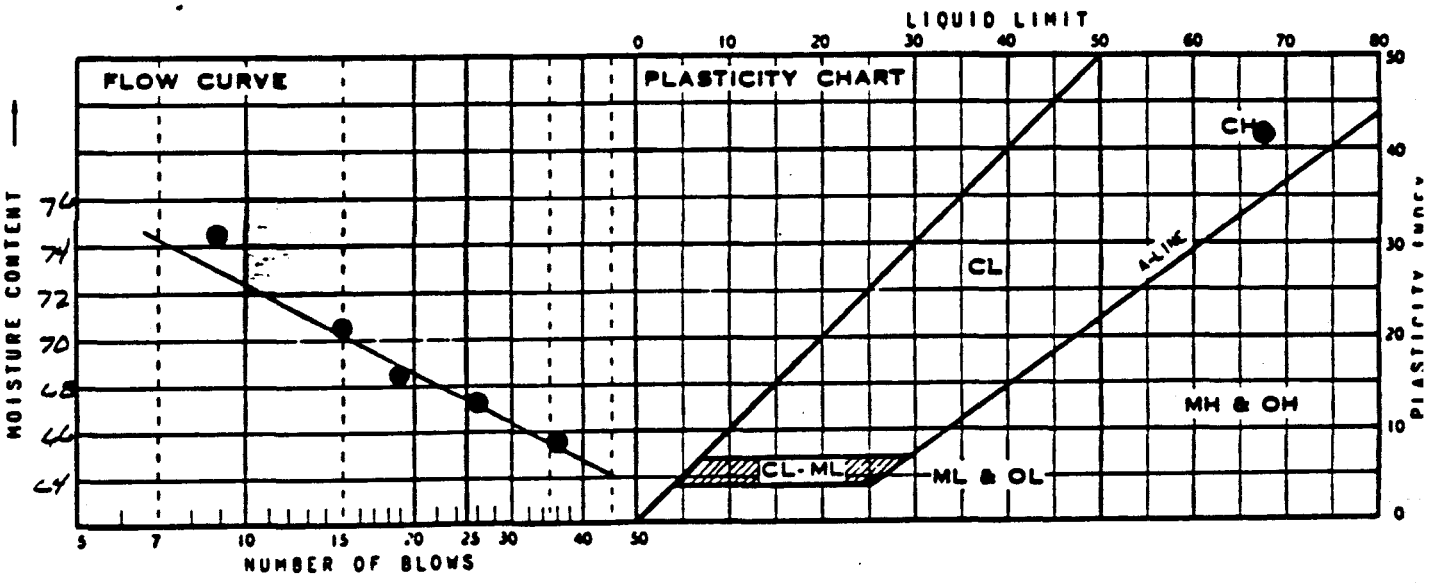
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB..3.124/82.

DETERMINATION	1	2	3	4	5	6
DISH	2041	20 C	2074			
WT OF DISH + WET SOIL g	5.72	6.67	7.26			
WT OF DISH + DRY SOIL g	4.78	5.53	6.01	—	—	—
WT OF MOISTURE g	.94	1.14	1.25			
WT OF DISH g	1.06	1.07	1.05	—	—	—
WT OF DRY SOIL g	3.72	4.46	4.96			
MOISTURE CONTENT %	25.3	25.6	25.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2054	42 C	2013	2006	2003	
NUMBER OF BLOWS	36	26	18±	15	9	
WT OF DISH + WET SOIL g	14.40	16.50	11.82	12.80	14.24	
WT OF DISH + DRY SOIL g	9.11	10.29	7.44	7.94	8.61	—
WT OF MOISTURE g	5.29	6.21	4.38	4.86	5.63	
WT OF DISH g	1.05	1.05	1.05	1.05	1.03	—
WT OF DRY SOIL g	8.06	9.24	6.39	6.89	7.58	
MOISTURE CONTENT %	65.6	67.2	68.5	70.5	74.3	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		67.5	25.4	42.1	CH	

ADVANCED TERRA TESTING INC

JEM
BR

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston -

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	75.0	DATE TESTED	03-20-92 TNC
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	38.83
Wt. Dry Soil & Pan	(g)	37.79
Wt. Lost Moisture	(g)	1.04
Wt. of Pan Only	(g)	3.55
Wt. of Dry Soil	(g)	34.24
Moisture Content	%	3.0

Wt. Hydrom. Sample Wet (g)	55.09
Wt. Hydrom. Sample Dry (g)	53.47

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.09
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.09
Weight of - #10 Dry (g)	53.47
Wt. Total Sample Dry (g)	53.47
Calc. Wt. "W" (g)	53.47
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	1.58	0.01	0.01	0.0	100.0
#40	1.56	1.57	0.01	0.02	0.0	100.0
#60	1.57	1.58	0.01	0.03	0.1	99.9
#100	1.55	1.58	0.03	0.06	0.1	99.9
#230	1.56	7.25	5.69	5.75	10.8	89.2

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	8+75	SAMPLED	Rocky Flats
DEPTH	75.0	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

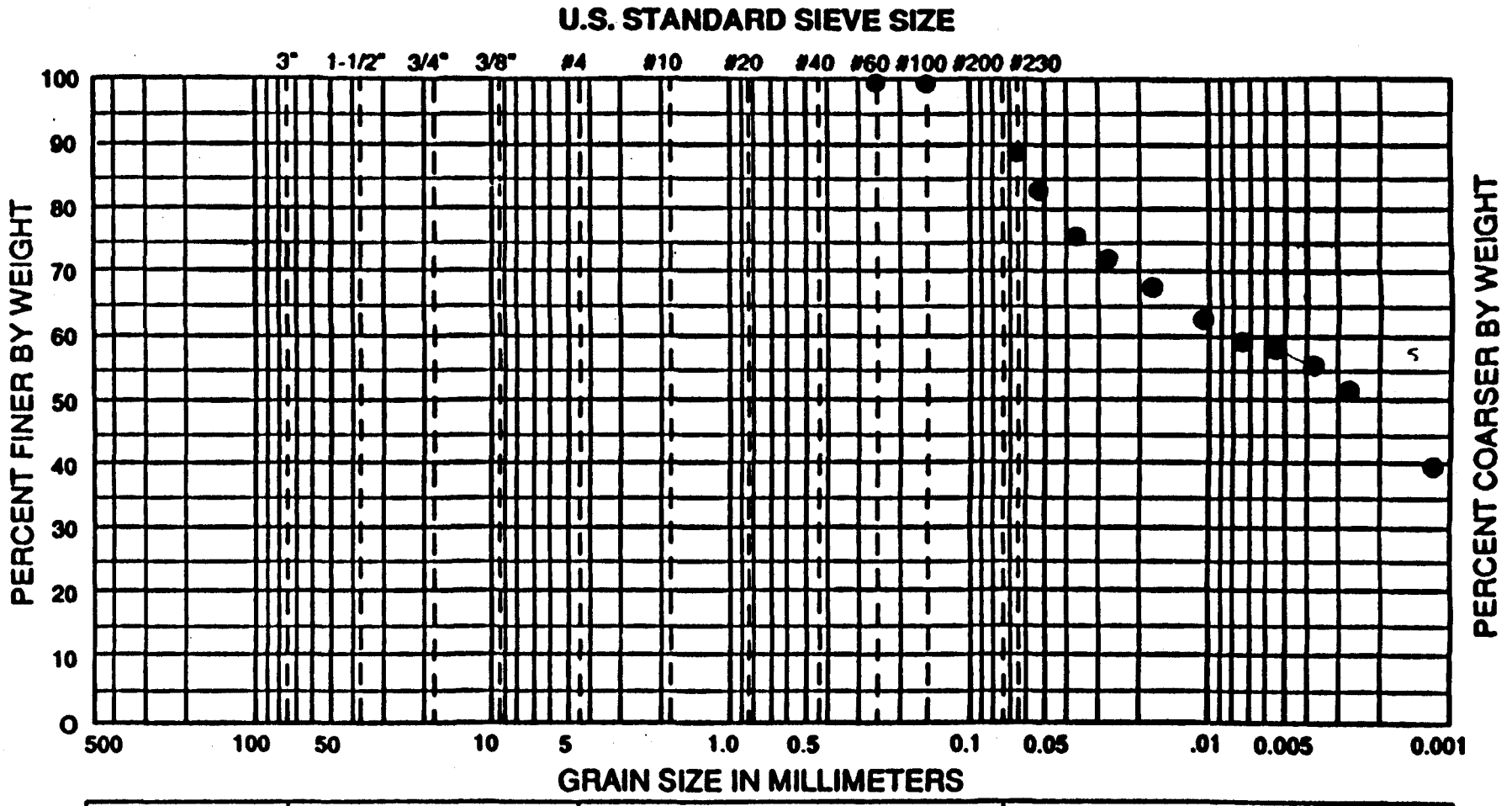
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	53.465
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	51.00	45.00	83.0	83.0	7.93	0.0520
1.0	47.00	41.00	75.6	75.6	8.58	0.0382
2.0	45.00	39.00	71.9	71.9	8.91	0.0275
5.0	42.50	36.50	67.3	67.3	9.32	0.0178
15.0	40.50	34.50	63.6	63.6	9.65	0.0105
30.0	38.50	32.50	59.9	59.9	9.98	0.0075
60.0	37.50	31.50	58.1	58.1	10.14	0.0054
120.0	36.00	30.00	55.3	55.3	10.39	0.0038
250.0	33.50	27.50	50.7	50.7	10.80	0.0027
1440.0	27.50	21.50	39.7	39.7	11.78	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 8+75 SAMPLE NO.: CH #4 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION			
		silty claystone			
Rocky Flats	75.0'	0 0 0	0 0 10.8	10.8 31.2	8

ATTERBERG LIMITS TEST DATA

JOB NO. 2066-03
CLIENT/OWNER WESTON
LOCATION ROCKY FLATS/EG&G
BORING 8+75 SAMPLE CH #14 DEPTH 75.0

FIELD CLASSIFICATION - - - - - - - - - - - - - - -
LABORATORY CLASSIFICATION - - - - - - - - - - - - -

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

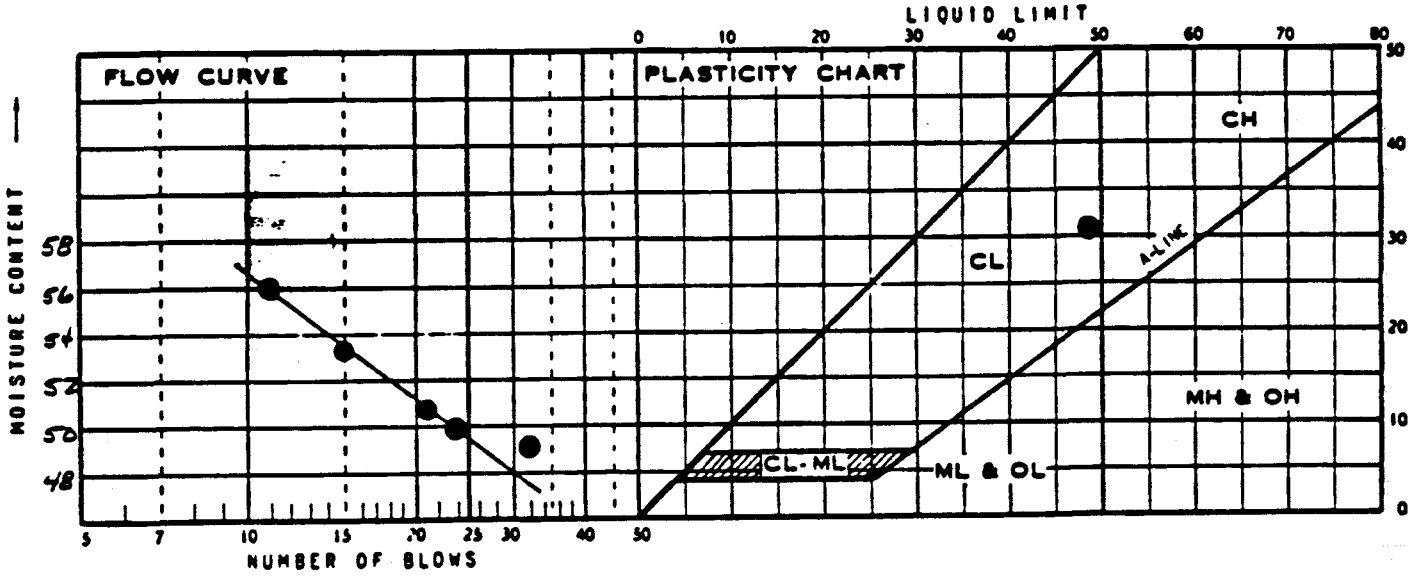
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB 3.12.4.92

DETERMINATION	1	2	3	4	5	6
DISH	2033	2002	BC			
WT OF DISH + WET SOIL g	6.67	6.46	7.49			
WT OF DISH + DRY SOIL g	5.79	5.62	6.45	—	—	—
WT OF MOISTURE g	.88	.84	1.04			
WT OF DISH g	1.04	1.06	1.04	—	—	—
WT OF DRY SOIL g	4.75	4.56	5.41			
MOISTURE CONTENT %	18.5	18.4	19.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2063	2034	2030	23C	2066	
NUMBER OF BLOWS	32	24	21	15±	11	
WT OF DISH + WET SOIL g	13.30	14.22	14.08	16.28	12.31	
WT OF DISH + DRY SOIL g	9.27	9.83	9.69	11.00	8.27	—
WT OF MOISTURE g	4.03	4.39	4.39	5.28	4.04	
WT OF DISH g	1.06	1.04	1.06	1.07	1.06	—
WT OF DRY SOIL g	8.21	8.79	8.63	9.93	7.21	
MOISTURE CONTENT %	49.1	49.9	50.9	53.2	56.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		49.5	18.7	30.8	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	7.5'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	39.53
Wt. Dry Soil & Pan	(g)	38.25
Wt. Lost Moisture	(g)	1.28
Wt. of Pan Only	(g)	3.58
Wt. of Dry Soil	(g)	34.67
Moisture Content	%	3.7
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	53.06

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	596.63
Weight of + #10 Before Washing (g)	159.56
Weight of + #10 After Washing (g)	146.93
Weight of - #10 Wet (g)	437.07
Weight of - #10 Dry (g)	433.69
Wt. Total Sample Dry (g)	580.62
Calc. Wt. "W" (g)	71.03
Calc. Mass + #10	17.98

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	63.40	63.40	63.40	10.9	89.1
3/8"	0.00	47.28	47.28	110.68	19.1	80.9
#4	0.00	19.18	19.18	129.86	22.4	77.6
#10	0.00	17.07	17.07	146.93	25.3	74.7
#20	1.57	2.39	0.82	0.82	26.5	73.5
#40	1.57	3.85	2.28	3.10	29.7	70.3
#60	1.56	3.83	2.27	5.37	32.9	67.1
#100	1.56	4.33	2.77	8.14	36.8	63.2
#230	1.57	6.94	5.37	13.51	44.3	55.7

Clay Cont

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	7.5'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

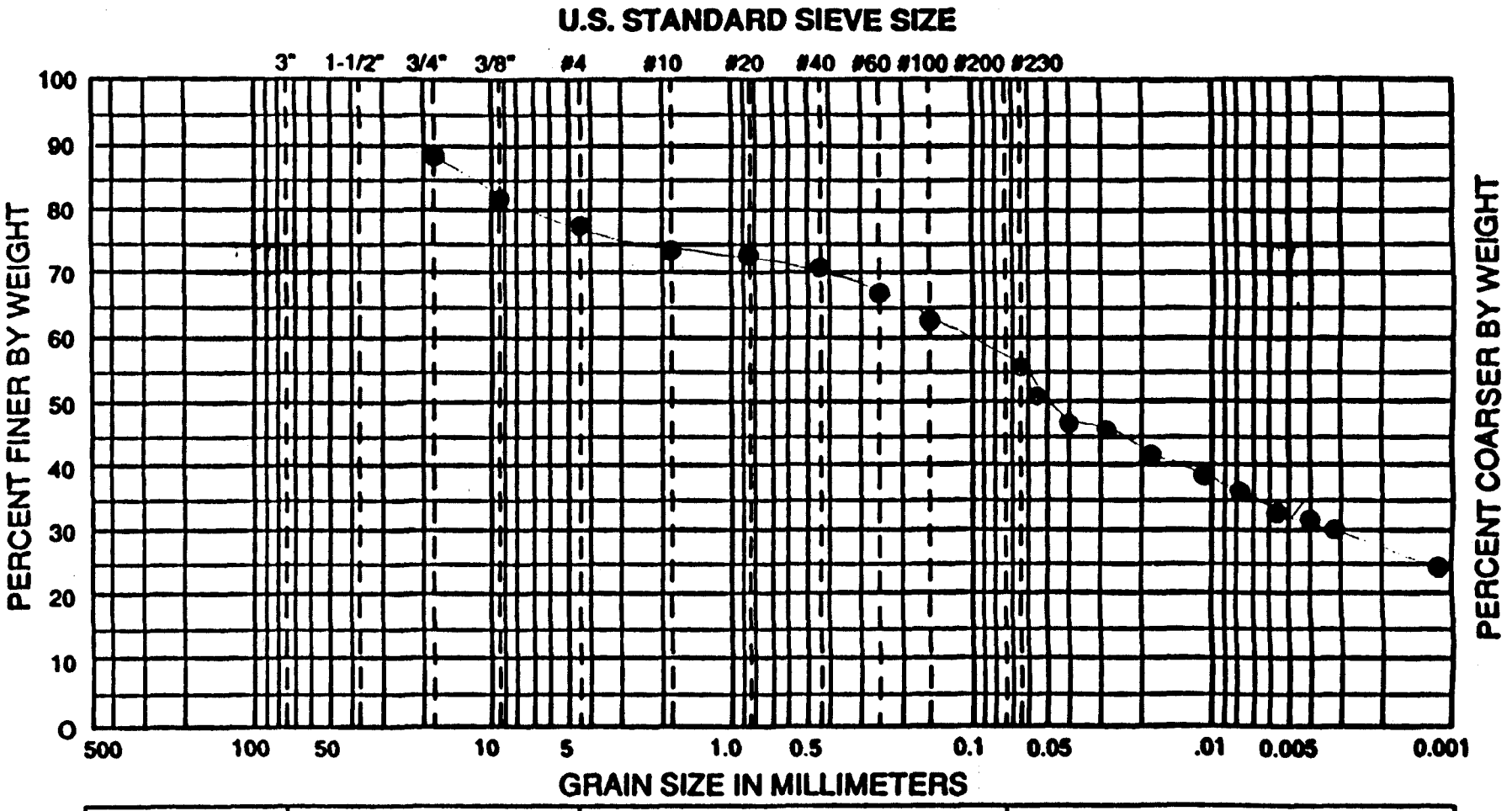
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01294
Value of "a"	0.98	Wt. Dry Sample "W"	71.032
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.00	37.00	51.0	51.0	9.07	0.0551
1.0	41.00	34.00	46.9	46.9	9.57	0.0400
2.0	40.25	33.25	45.9	45.9	9.69	0.0285
5.0	37.25	30.25	41.7	41.7	10.18	0.0185
15.0	35.25	28.25	39.0	39.0	10.51	0.0108
30.0	33.25	26.25	36.2	36.2	10.84	0.0078
60.0	31.50	24.50	33.8	33.8	11.12	0.0056
120.0	29.50	22.50	31.0	31.0	11.45	0.0040
190.0	28.75	21.75	30.0	30.0	11.58	0.0032
1440.0	25.00	18.00	24.8	24.8	12.19	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+00 SAMPLE NO.: CH #10 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	7.5'	CLAY w/ some sand, silt + gravel 10.[illegible] gravel / 11.5% f. gravel / 2.9% c. sd, 4.[illegible] med sand, 12.8% f sd / 25% silt, [illegible] clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG&G

BORING 9-00 SAMPLE CH #10 DEPTH 25'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

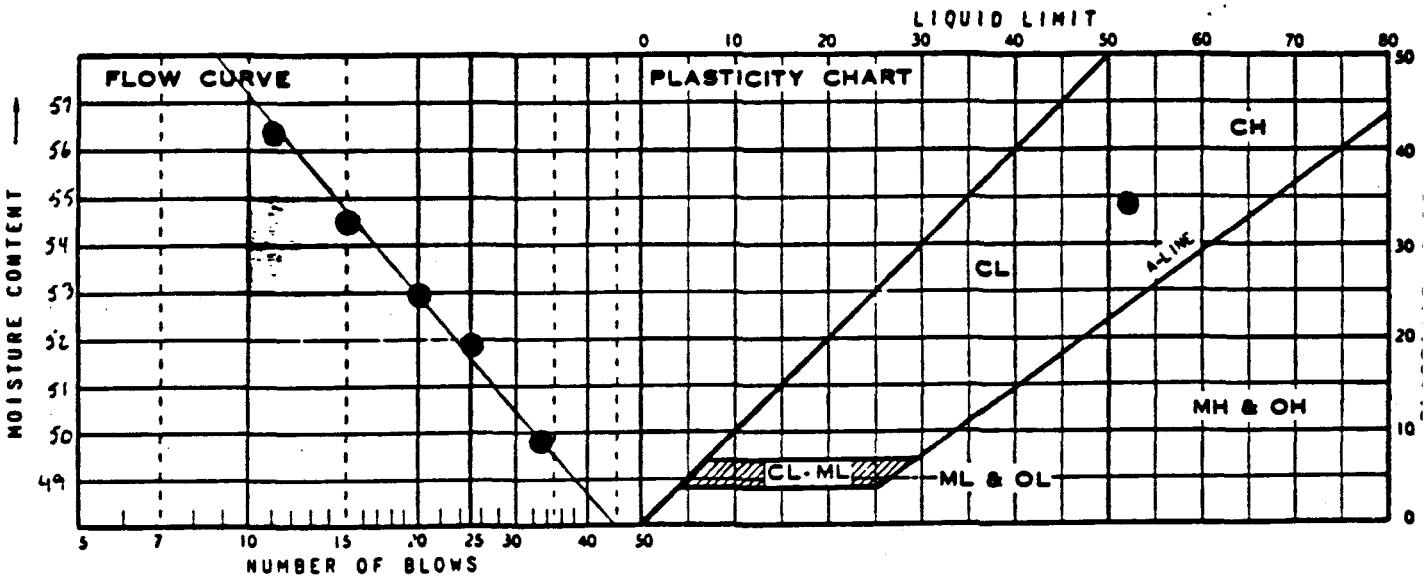
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DA 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	6C	2037	2074			
WT OF DISH + WET SOIL g	5.60	5.89	5.40			
WT OF DISH + DRY SOIL g	4.94	5.18	4.76	—	—	—
WT OF MOISTURE g	.66	.71	.64			
WT OF DISH g	1.08	1.05	1.05	—	—	—
WT OF DRY SOIL g	3.86	4.13	3.71			
MOISTURE CONTENT %	17.1	17.2	17.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2054	2001	2003	2061	1C	22
NUMBER OF BLOWS	33	25	20	15	11	
WT OF DISH + WET SOIL g	12.51	11.66	12.12	11.07	11.43	
WT OF DISH + DRY SOIL g	8.70	8.04	8.28	7.53	7.69	—
WT OF MOISTURE g	3.81	3.62	3.84	3.54	3.74	
WT OF DISH g	1.05	1.06	1.03	1.03	1.06	1.05
WT OF DRY SOIL g	7.65	6.98	7.25	6.50	6.63	
MOISTURE CONTENT %	49.8	51.9	53.0	54.5	56.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		51.6	17.2	34.4	CH	

ADVANCED TERRA TESTING inc

RDM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	19.8'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	39.46
Wt. Dry Soil & Pan	(g)	37.89
Wt. Lost Moisture	(g)	1.57
Wt. of Pan Only	(g)	3.77
Wt. of Dry Soil	(g)	34.12
Moisture Content	%	4.6

Wt. Hydrom. Sample Wet (g)	55.05
Wt. Hydrom. Sample Dry (g)	52.63

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	635.80
Weight of + #10 Before Washing (g)	204.63
Weight of + #10 After Washing (g)	129.31
Weight of - #10 Wet (g)	431.17
Weight of - #10 Dry (g)	484.21
Wt. Total Sample Dry (g)	613.52
Calc. Wt. "W" (g)	66.68
Calc. Mass + #10	14.05

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	71.05	71.05	71.05	11.6	88.4
3/8"	0.00	29.41	29.41	100.46	16.4	83.6
#4	0.00	12.68	12.68	113.14	18.4	81.6
#10	0.00	16.17	16.17	129.31	21.1	78.9
#20	1.57	3.51	1.94	1.94	24.0	76.0
#40	1.55	3.13	1.58	3.52	26.4	73.6
#60	1.57	2.66	1.09	4.61	28.0	72.0
#100	1.55	2.73	1.18	5.79	29.8	70.2
#230	1.56	3.59	2.03	7.82	32.8	67.2

Clay CCH

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	19.8'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

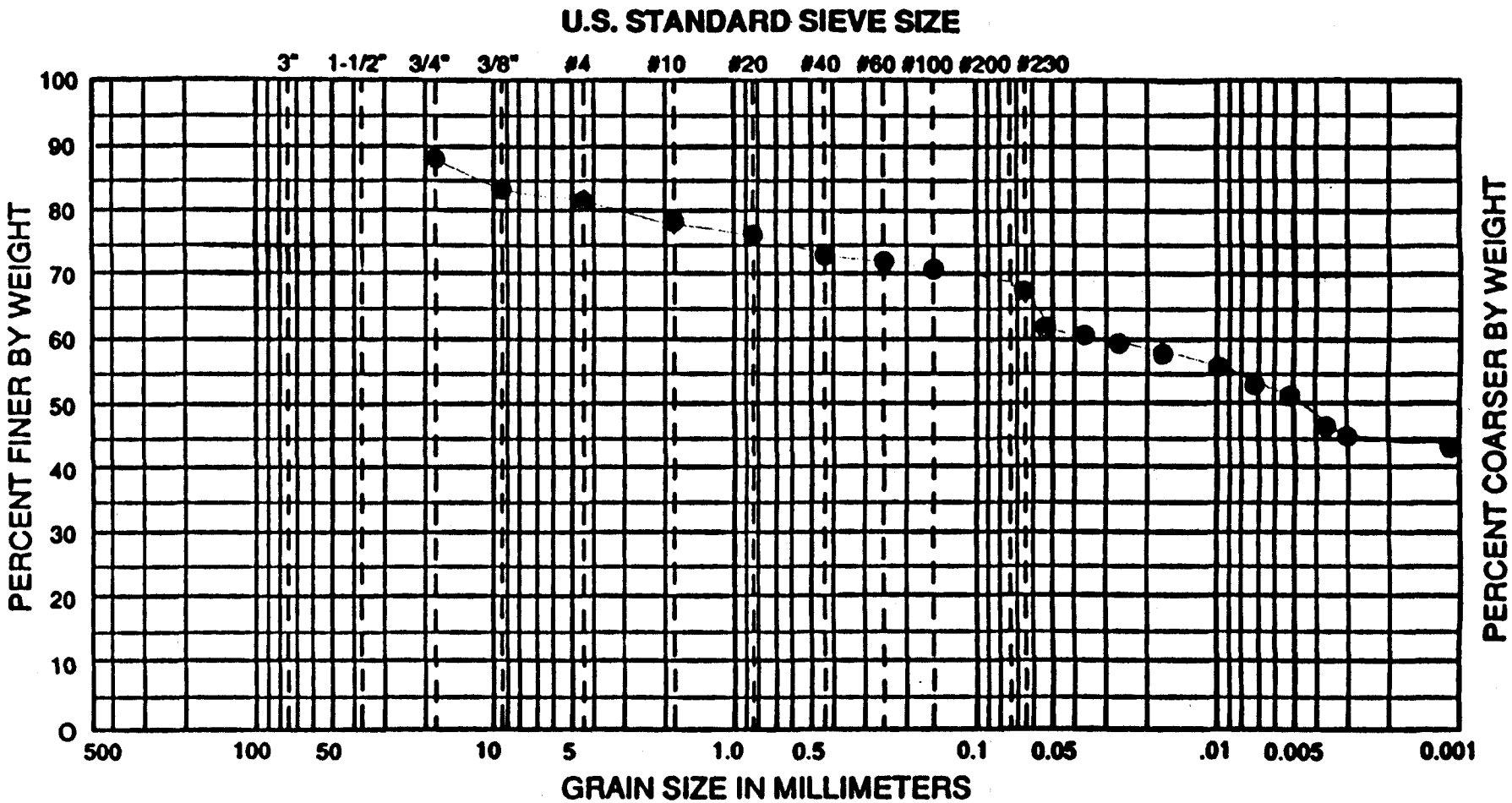
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01290
Value of "a"	0.98	Wt. Dry Sample "W"	66.681
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	49.00	42.00	61.6	61.6	8.25	0.0524
1.0	48.00	41.00	60.1	60.1	8.42	0.0374
2.0	47.75	40.75	59.8	59.8	8.46	0.0265
5.0	46.50	39.50	57.9	57.9	8.66	0.0170
15.0	45.00	38.00	55.7	55.7	8.91	0.0099
30.0	43.25	36.25	53.2	53.2	9.20	0.0071
60.0	41.50	34.50	50.6	50.6	9.48	0.0051
120.0	39.00	32.00	46.9	46.9	9.89	0.0037
190.0	38.00	31.00	45.5	45.5	10.06	0.0030
1440.0	37.00	30.00	44.0	44.0	10.22	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+00 SAMPLE NO.: CH #10 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	19.8'	Clay w/some sand, silt & gravel 11.6% [illegible], 6.8% f sul/2.7% c sd, 5.3% med sand, 5.6% f [illegible], 16.5% [illegible], [illegible] Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 9-00 SAMPLE CH#10 DEPTH 19.8'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

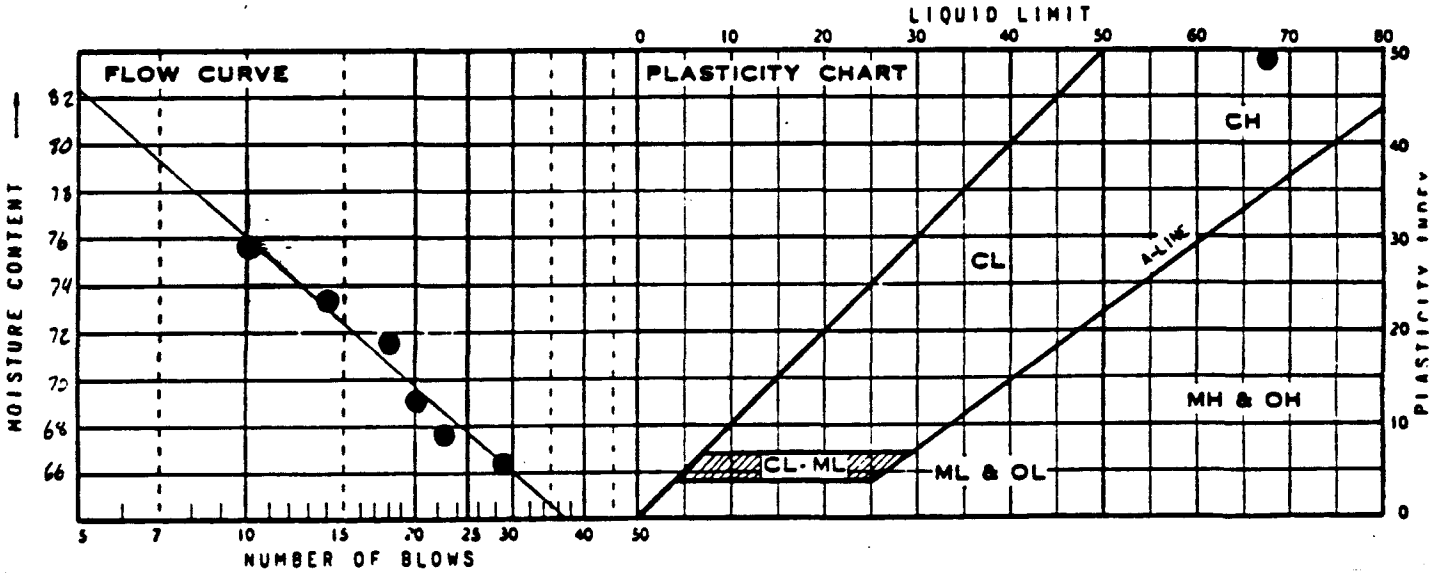
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DH 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	2039	2008				
WT OF DISH + WET SOIL	5.11	4.18				
WT OF DISH + DRY SOIL	4.46	3.70	—	—	—	—
WT OF MOISTURE	.65	.48				
WT OF DISH	1.06	1.06	—	—	—	—
WT OF DRY SOIL	3.40	2.64				
MOISTURE CONTENT	19.1	18.2				

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	23C	2046	2063	44C	2040	36C
NUMBER OF BLOWS	29	23	20	18	14	10
WT OF DISH + WET SOIL	10.54	11.46	10.40	11.70	10.57	10.84
WT OF DISH + DRY SOIL	6.76	7.26	6.58	7.26	6.54	6.61
WT OF MOISTURE	3.78	4.20	3.82	4.44	4.03	4.23
WT OF DISH	1.06	1.06	1.06	1.06	1.05	1.03
WT OF DRY SOIL	5.70	6.20	5.52	6.20	5.49	5.58
MOISTURE CONTENT	66.3	67.7	69.2	71.6	73.4	75.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		67.7	18.7	49.0	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	26.0'	DATE TESTED	03-20-92 TNC
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	38.16
Wt. Dry Soil & Pan	(g)	37.39
Wt. Lost Moisture	(g)	0.77
Wt. of Pan Only	(g)	3.73
Wt. of Dry Soil	(g)	33.66
Moisture Content	%	2.3
Wt. Hydrom. Sample Wet	(g)	55.01
Wt. Hydrom. Sample Dry	(g)	53.78

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	675.16
Weight of + #10 Before Washing (g)	344.34
Weight of + #10 After Washing (g)	335.18
Weight of - #10 Wet (g)	330.82
Weight of - #10 Dry (g)	332.38
Wt. Total Sample Dry (g)	667.56
Calc. Wt. "W" (g)	107.50
Calc. Mass + #10	53.7[illegible]

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	92.62	92.62	92.62	13.9	86.1
3/8"	0.00	129.86	129.86	222.48	33.3	66.7
#4	0.00	63.56	63.56	286.04	42.8	57.2
#10	0.00	47.55	47.55	333.59	50.0	50.0
#20	1.56	11.40	9.84	9.84	59.1	40.9
#40	1.55	11.55	10.00	19.84	68.4	31.6
#60	1.55	6.89	5.34	25.18	73.4	26.6
#100	1.31	5.02	3.71	28.89	76.8	23.2 — 19.5
#230	1.57	5.78	4.21	33.10	80.8	19.2

Sample broke (rm)

ADVANCED TERRA TESTING, I[illegible]

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	26.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

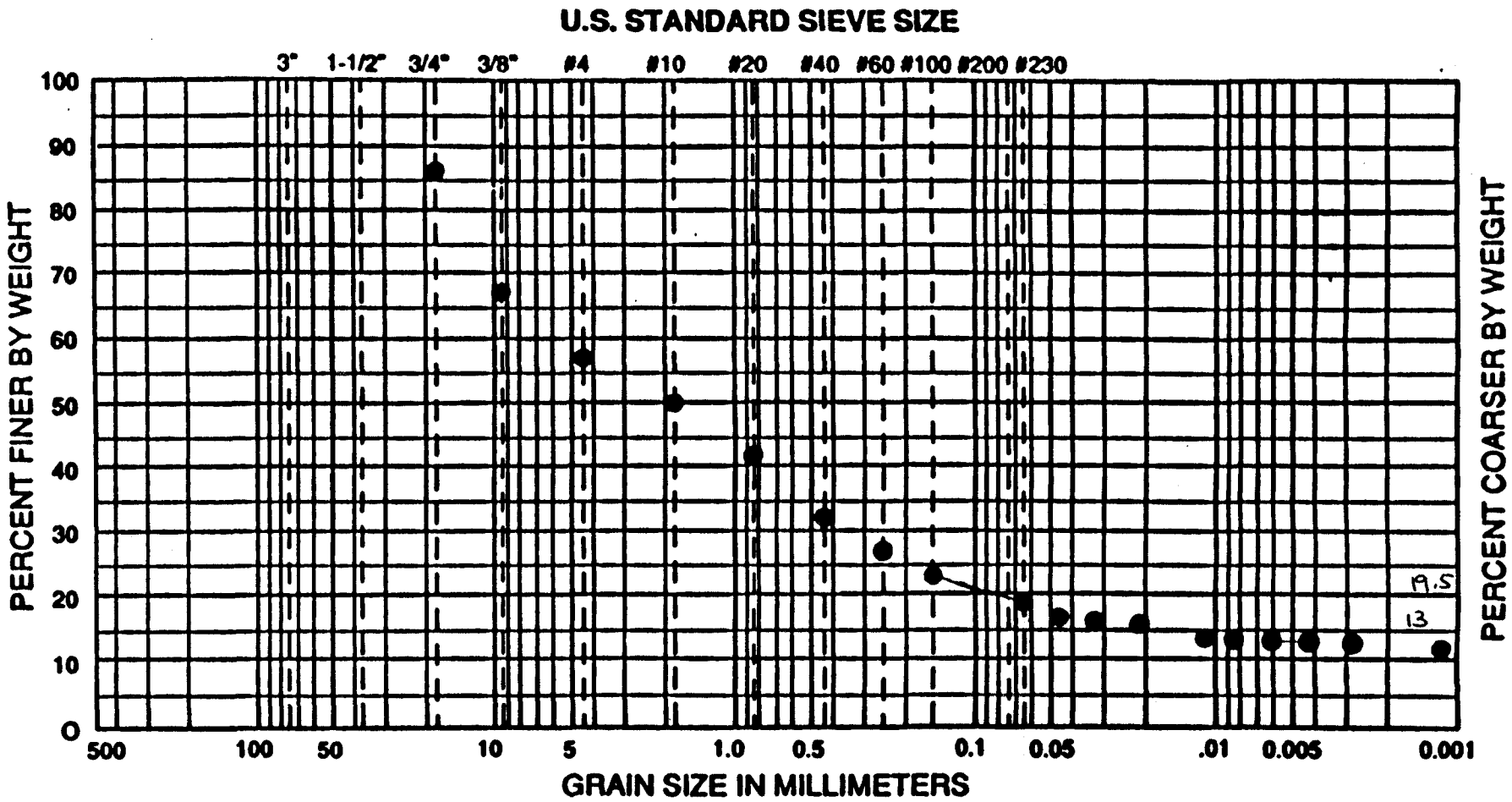
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	107.499
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

Elapsed Time (min) T	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	24.50	18.50	16.8	16.8	12.27	0.0638
1.0	24.00	18.00	16.3	16.3	12.35	0.0452
2.0	23.50	17.50	15.9	15.9	12.44	0.0321
5.0	23.00	17.00	15.4	15.4	12.52	0.0204
15.0	21.75	15.75	14.3	14.3	12.72	0.0119
30.0	21.00	15.00	13.6	13.6	12.85	0.0084
60.0	20.75	14.75	13.4	13.4	12.89	0.0060
120.0	20.75	14.75	13.4	13.4	12.89	0.0042
250.0	20.00	14.00	12.7	12.7	13.01	0.0029
1440.0	19.00	13.00	11.8	11.8	13.17	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND				SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 4+00 SAMPLE NO.: CH #14 DATE: 3-20-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
		sandy gravel				
		G 18		S-37.7		SL
Rocky Flats	26.0'	13.9	28.9	7.2	18.4	12.1	6.5

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats / EC & G

BORING 9L02 SAMPLE #14 DEPTH @26.0

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

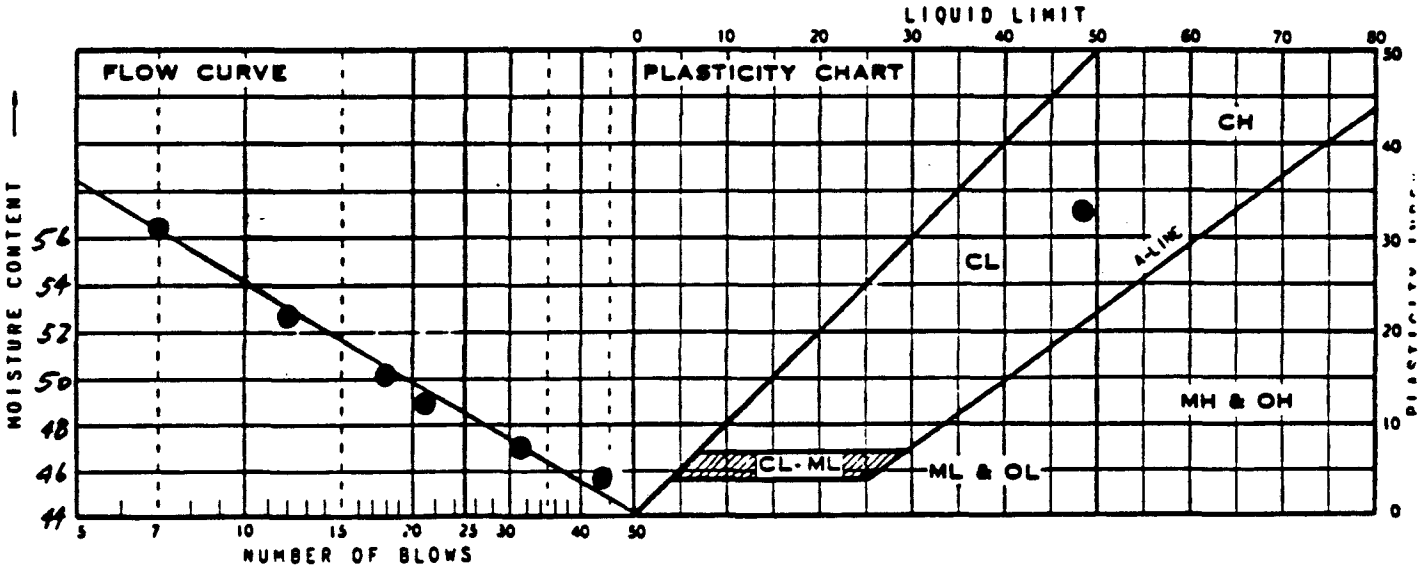
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2035	2060	2064			
WT OF DISH + WET SOIL g	4.95	6.03	5.16			
WT OF DISH + DRY SOIL	4.42	5.36	4.59	—	—	—
WT OF MOISTURE	0.53	0.67	0.57			
WT OF DISH	1.05	1.03	1.04	—	—	—
WT OF DRY SOIL	3.37	4.33	3.55			
MOISTURE CONTENT %	15.7	15.5	16.1	= 47.3/3 =	15.8	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	13C	B13	27C	3C	19C	2073
NUMBER OF BLOWS	44	31	21	18	12	7
WT OF DISH + WET SOIL g	10.19	10.15	10.52	10.31	9.88	10.06
WT OF DISH + DRY SOIL	7.32	7.24	7.41	7.22	6.83	6.81
WT OF MOISTURE	2.87	2.91	3.11	3.09	3.05	3.25
WT OF DISH	1.05	1.05	1.04	1.05	1.03	1.04
WT OF DRY SOIL	6.27	6.19	6.37	6.17	5.80	5.77
MOISTURE CONTENT %	45.8	47.0	48.9	50.1	52.6	56.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		48.6	15.8	32.8	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	31.8'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	38.82
Wt. Dry Soil & Pan	(g)	37.88
Wt. Lost Moisture	(g)	0.94
Wt. of Pan Only	(g)	3.58
Wt. of Dry Soil	(g)	34.30
Moisture Content	%	2.7
Wt. Hydrom. Sample Wet	(g)	55.03
Wt. Hydrom. Sample Dry	(g)	53.56

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	669.45
Weight of + #10 Before Washing (g)	335.21
Weight of + #10 After Washing (g)	317.63
Weight of - #10 Wet (g)	334.24
Weight of - #10 Dry (g)	342.44
Wt. Total Sample Dry (g)	660.07
Calc. Wt. "W" (g)	103.24
Calc. Mass + #10	49.6[illegible]

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	81.35	81.35	81.35	12.3	87.7
3/8"	0.00	109.80	109.80	191.15	29.0	71.0
#4	0.00	73.93	73.93	265.08	40.2	59.8
#10	0.00	52.55	52.55	317.63	48.1	51.9
#20	1.56	11.13	9.57	9.57	57.4	42.6
#40	1.55	9.11	7.56	17.13	64.7	35.3
#60	1.57	6.35	4.78	21.91	69.3	30.7
#100	1.57	5.53	3.96	25.87	73.2	26.8
#230	1.56	6.76	5.20	31.07	78.2	21.8

Sandy Gravel

ADVANCED TERRA TESTING, IN[illegible]

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	31.8'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

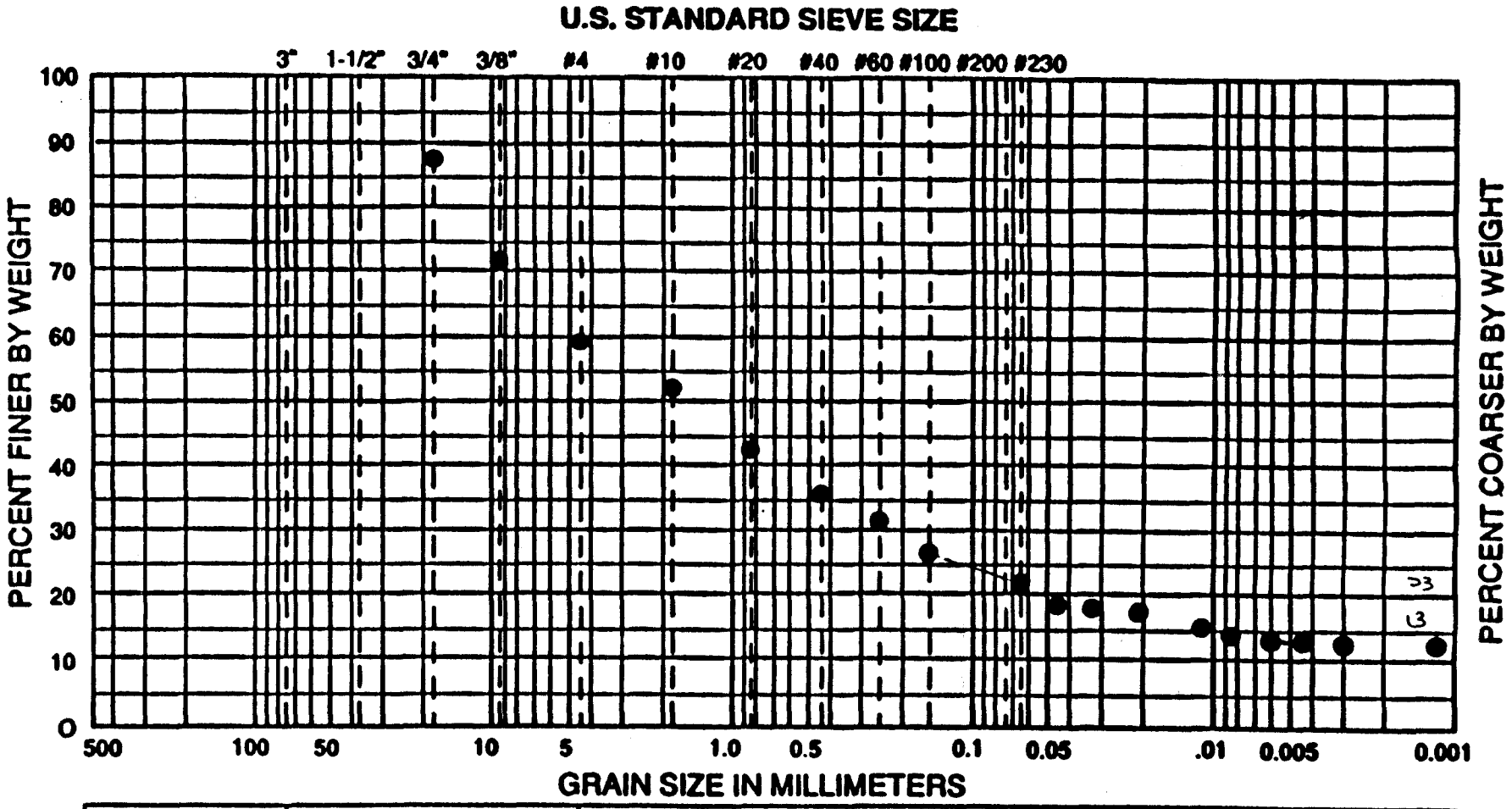
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	103.239
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	27.50	21.50	20.5	20.5	11.78	0.0632
1.0	25.75	19.75	18.8	18.8	12.07	0.0452
2.0	25.50	19.50	18.6	18.6	12.11	0.0320
5.0	24.50	18.50	17.6	17.6	12.27	0.0204
15.0	22.00	16.00	15.3	15.3	12.68	0.0120
30.0	21.50	15.50	14.8	14.8	12.76	0.0085
60.0	21.00	15.00	14.3	14.3	12.85	0.0060
120.0	21.00	15.00	14.3	14.3	12.85	0.0043
250.0	19.50	13.50	12.9	12.9	13.09	0.0030
1440.0	19.00	13.00	12.4	12.4	13.17	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+00 SAMPLE NO.: CH #14 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION						
		sandy gravel						
Rocky Flats	31.8'	1.3	40.2 27.9	7.9	36.8 16.6	12.3	10	13

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. [illegible]

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS / EG&G

BORING 9+00 SAMPLE CH#14 DEPTH 31.8'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

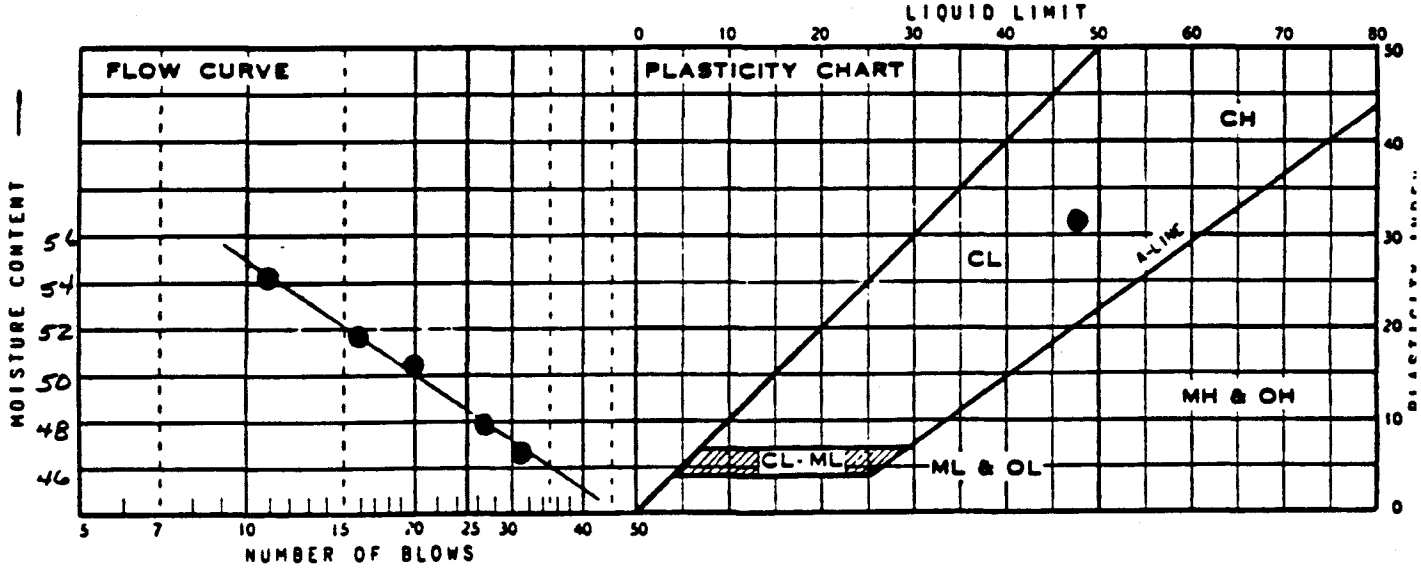
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR-3-12/4/92.

DETERMINATION	1	2	3	4	5	6
DISH	2014	4	10 C			
WT OF DISH + WET SOIL g	5.30	4.74	4.24			
WT OF DISH + DRY SOIL g	4.66	4.20	3.78	—	—	—
WT OF MOISTURE g	.64	.54	.46			
WT OF DISH g	1.07	1.06	1.04	—	—	—
WT OF DRY SOIL g	3.59	3.14	2.74			
MOISTURE CONTENT %	17.8	17.2	17.0			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	39 C	2037	14 C	2057	2004	
NUMBER OF BLOWS	31	27	20±	16	11±	
WT OF DISH + WET SOIL g	14.06	15.16	13.56	12.63	17.68	
WT OF DISH + DRY SOIL g	9.91	10.59	9.36	8.68	11.84	—
WT OF MOISTURE g	4.15	4.57	4.20	3.95	5.84	
WT OF DISH g	1.04	1.05	1.05	1.06	1.04	—
WT OF DRY SOIL g	8.87	9.54	8.31	7.62	10.80	
MOISTURE CONTENT %	46.8	47.9	50.5	51.8	54.1	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		48.5	17.3	31.2	CL	

ADVANCED TERRA TESTING INC

JEM

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston -**

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	40.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	47.90
Wt. Dry Soil & Pan	(g)	46.94
Wt. Lost Moisture	(g)	0.96
Wt. of Pan Only	(g)	3.83
Wt. of Dry Soil	(g)	43.11
Moisture Content	%	2.2

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.82

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	607.19
Weight of + #10 Before Washing (g)	38.25
Weight of + #10 After Washing (g)	32.66
Weight of - #10 Wet (g)	568.94
Weight of - #10 Dry (g)	562.01
Wt. Total Sample Dry (g)	594.67
Calc. Wt. "W" (g)	56.93
Calc. Mass + #10	3.11

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	21.05	21.05	21.05	3.5	96.5
3/8"	0.00	2.16	2.16	23.21	3.9	96.1
#4	0.00	3.88	3.88	27.09	4.6	95.4
#10	0,00	5.38	5.38	32.47	5.5	94.5
#20	1.58	2.27	0.69	0.69	6.7	93.3
#40	1.57	2.92	1.35	2.04	9.0	91.0
#60	1.56	2.58	1.02	3.06	10.8	89.2
#100	1.57	3.02	1.45	4.51	13.4	86.6
#230	1.56	6.34	4.78	9.29	21.8	78.2 — 79

Silty Clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston - JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	40.0'	DATE TESTED	03-20-92 TNJ
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

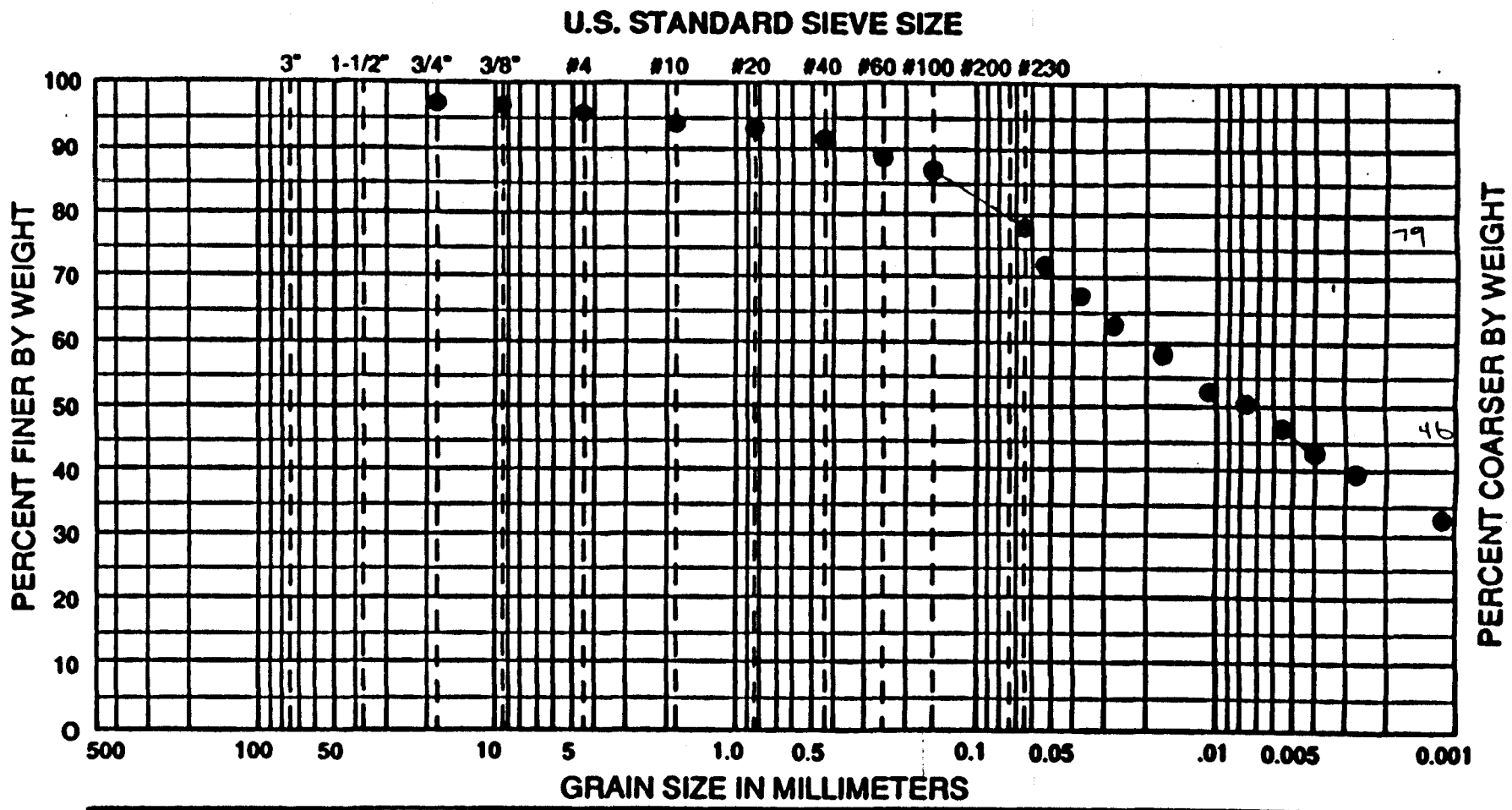
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	56.932
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.50	41.50	71.7	71.7	8.50	0.0536
1.0	45.00	39.00	67.4	67.4	8.91	0.0388
2.0	43.00	37.00	63.9	63.9	9.24	0.0280
5.0	40.00	34.00	58.8	58.8	9.73	0.0181
15.0	36.50	30.50	52.7	52.7	10.30	0.0108
30.0	35.00	29.00	50.1	50.1	10.55	0.0077
60.0	33.00	27.00	46.7	46.7	10.88	0.0055
120.0	31.00	25.00	43.2	43.2	11.21	0.0040
250.0	29.00	23.00	39.8	39.8	11.53	0.0028
1440.0	25.50	19.50	33.7	33.7	12.11	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+00 SAMPLE NO.: CH# 14 DATE: 3-20-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION					
		Silty clay					
Rocky Flats	40.0'	3.5	1.1	0.9	16.4 3.5	12	33

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 9+00 SAMPLE #14 DEPTH 40.0

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

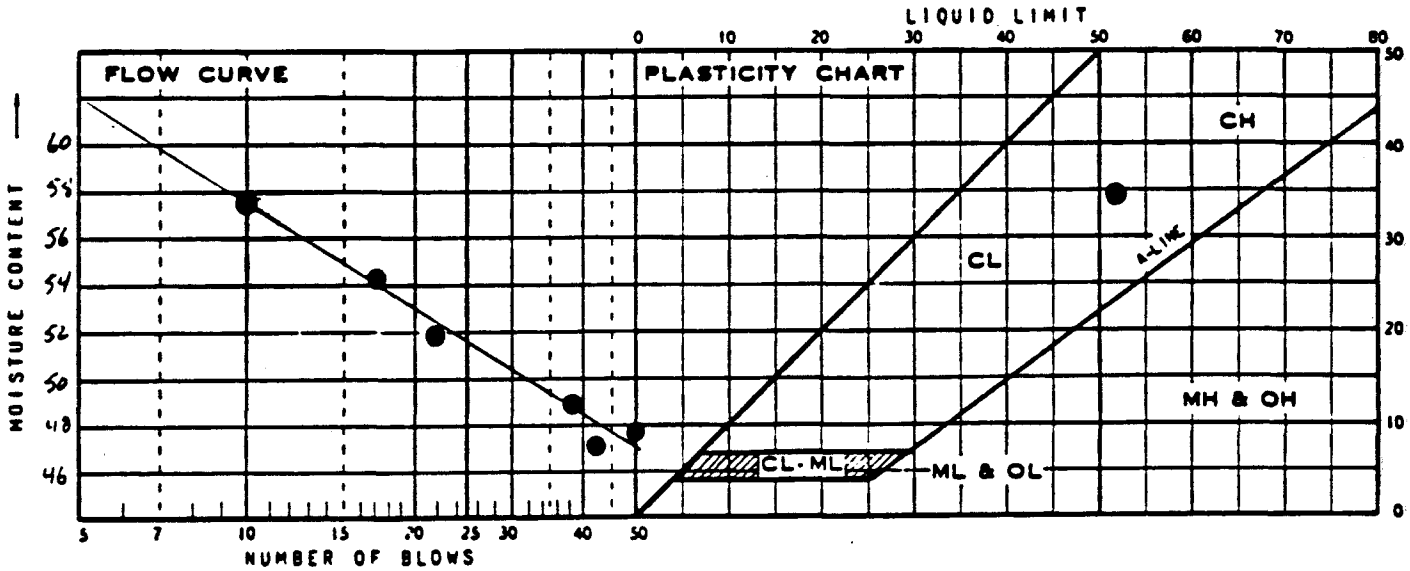
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/25/92

DETERMINATION	1	2	3	4	5	6
DISH	54C	3C	32C			
WT OF DISH + WET SOIL g	6.84	6.82	6.62			
WT OF DISH + DRY SOIL	6.04	5.97	5.78	—	—	—
WT OF MOISTURE	.80	.85	.84			
WT OF DISH	1.06	1.05	1.03	—	—	—
WT OF DRY SOIL	4.98	4.92	4.75			
MOISTURE CONTENT %	16.1	17.3	17.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	19C	2016	B21	13C	B12	2056
NUMBER OF BLOWS	43	50	38	22-	17	10
WT OF DISH + WET SOIL g	10.72	9.60	11.80	10.71	9.87	9.99
WT OF DISH + DRY SOIL	7.61	6.83	8.26	7.41	6.76	6.72
WT OF MOISTURE	3.11	2.77	3.54	3.30	3.11	3.27
WT OF DISH	1.03	1.04	1.04	1.05	1.04	1.04
WT OF DRY SOIL	6.58	5.79	7.22	6.36	5.72	5.68
MOISTURE CONTENT %	47.3	47.8	49.0	51.9	54.4	57.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		51.6	17.0	34.6	CH	

ADVANCED TERRA TESTING

JEW

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston -

JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	52.0	DATE TESTED	03-20-92
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	37.24
Wt. Dry Soil & Pan	(g)	35.88
Wt. Lost Moisture	(g)	1.36
Wt. of Pan Only	(g)	3.77
Wt. of Dry Soil	(g)	32.11
Moisture Content	%	4.2
Wt. Hydrom. Sample Wet	(g)	55.05
Wt. Hydrom. Sample Dry	(g)	52.82

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	552.06
Weight of + #10 Before Washing (g)	0.49
Weight of + #10 After Washing (g)	0.39
Weight of - #10 Wet (g)	551.57
Weight of - #10 Dry (g)	529.25
Wt. Total Sample Dry (g)	529.64
Calc. Wt. "W" (g)	52.6[illegible]
Calc. Mass + #10	0.04

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.39	0.39	0.39	0.1	99.9
#20	1.55	1.61	0.06	0.06	0.2	99.8
#40	1.58	1.92	0.34	0.40	0.8	99.2
#60	1.46	2.09	0.63	1.03	2.0	98.0
#100	1.56	2.20	0.64	1.67	3.2	96.8
#230	1.57	2.44	0.87	2.54	4.9	95.1

Clay [illegible]

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston - JOB NO. 2066-03

BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	52.0	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

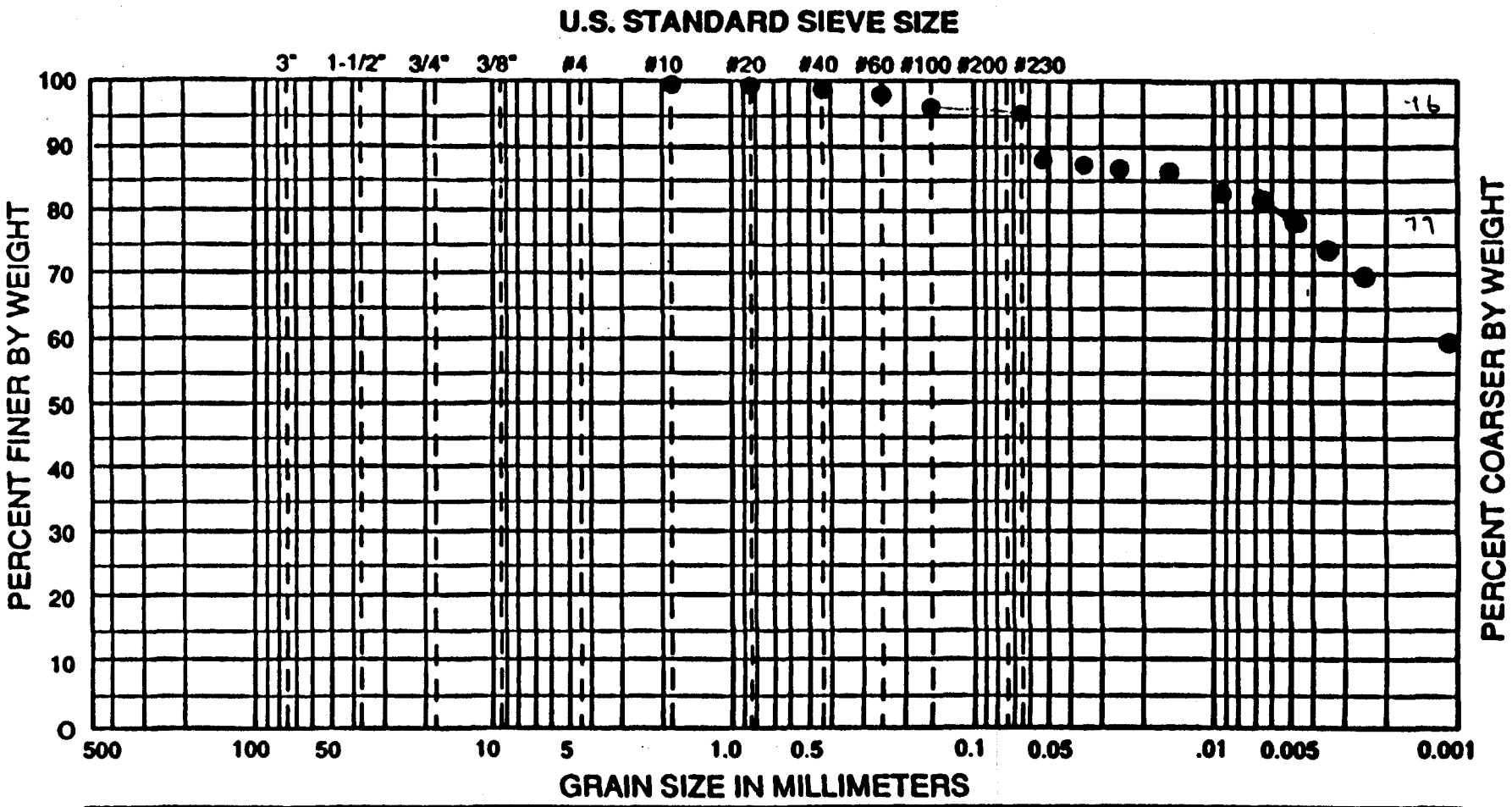
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01305
Value of "a"	0.97	Wt. Dry Sample "W"	52.856
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Deptn L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	54.00	48.00	88.3	88.3	7.43	0.0503
1.0	53.50	47.50	87.4	87.4	7.52	0.0358
2.0	53.25	47.25	86.9	86.9	7.56	0.0254
5.0	53.00	47.00	86.4	86.4	7.60	0.0161
15.0	51.50	45.50	83.7	83.7	7.84	0.0094
30.0	50.50	44.50	81.8	81.8	8.01	0.0067
60.0	48.50	42.50	78.2	78.2	8.34	0.0049
120.0	46.50	40.50	74.5	74.5	8.66	0.0035
250.0	44.00	38.00	69.9	69.9	9.07	0.0025
1440.0	38.50	32.50	59.8	59.8	9.98	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+00 SAMPLE NO.: CH #14 DATE: 3-20-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION							
		clay							
Rocky Flats	52.0'	0	0	0	0.1	4.0 0	3.2	17	9

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. -066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats

BORING 9+00 SAMPLE CH#14 DEPTH 52'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

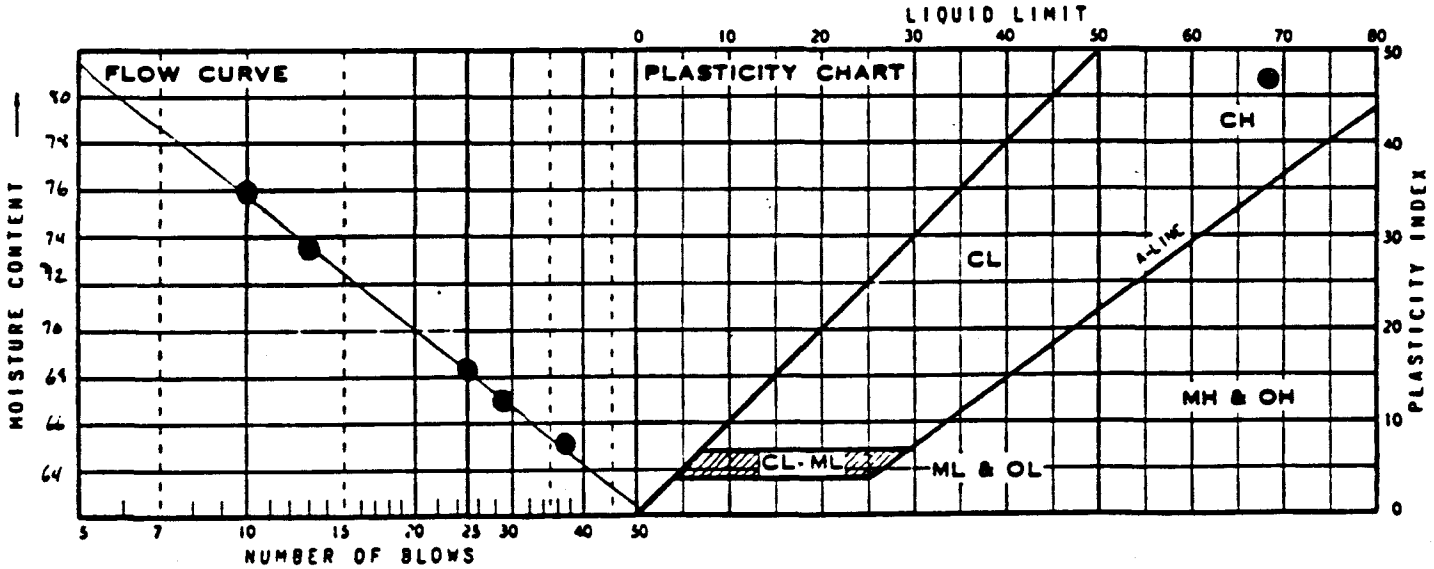
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DU 3/03/92

DETERMINATION	1	2	3	4	5	6
DISH	B23	B22	2029			
WT OF DISH + WET SOIL g	5.47	4.76	4.81			
WT OF DISH + DRY SOIL g	4.69	4.09	4.15	—	—	—
WT OF MOISTURE g	.78	.67	.66			
WT OF DISH g	1.03	1.04	1.05	—	—	—
WT OF DRY SOIL g	3.66	3.05	3.10			
MOISTURE CONTENT %	21.3	22.0	21.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2055	2031	B11	33C	B7	40C
NUMBER OF BLOWS	37=	29	25	22	13	10=
WT OF DISH + WET SOIL g	11.13	12.10	11.84	11.76	11.68	11.13
WT OF DISH + DRY SOIL g	7.15	7.67	7.45	7.30	7.17	6.78
WT OF MOISTURE g	3.48	4.43	4.39	4.46	4.51	4.35
WT OF DISH g	1.05	1.06	1.03	1.07	1.04	1.06
WT OF DRY SOIL g	6.10	6.61	6.42	6.23	6.13	5.72
MOISTURE CONTENT %	65.2	67.0	68.4	71.6	73.6	76.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		68.4	21.3	47.1	CH	

ADVANCED TERRA TESTING

JBm
ER

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	- 9+00	SAMPLED	Rocky Flats
DEPTH	60.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	38.50
Wt. Dry Soil & Pan	(g)	37.28
Wt. Lost Moisture	(g)	1.22
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	33.56
Moisture Content	%	3.6
Wt. Hydrom. Sample Wet	(g)	55.05
Wt. Hydrom. Sample Dry	(g)	53.12

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	514.11
Weight of + #10 Before Washing (g)	0.75
Weight of + #10 After Washing (g)	0.74
Weight of - #10 Wet (g)	513.36
Weight of - #10 Dry (g)	495.36
Wt. Total Sample Dry (g)	496.10
Calc. Wt. "W" (g)	53.20
Calc. Mass + #10	0.0

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.74	0.74	0.74	0.1	99.9
#20	1.56	1.60	0.04	0.04	0.2	99.8
#40	1.56	1.65	0.09	0.13	0.4	99.6
#60	1.55	1.64	0.09	0.22	0.6	99.4
#100	1.55	1.68	0.13	0.35	0.8	99.2
#230	1.56	2.04	0.48	0.83	1.7	98.3

Chapman

ADVANCED TERRA TESTING, I

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+00	SAMPLED	Rocky Flats
DEPTH	60.0'	DATE TESTED	03-20-92 TNU
SAMPLE NO.	#14	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

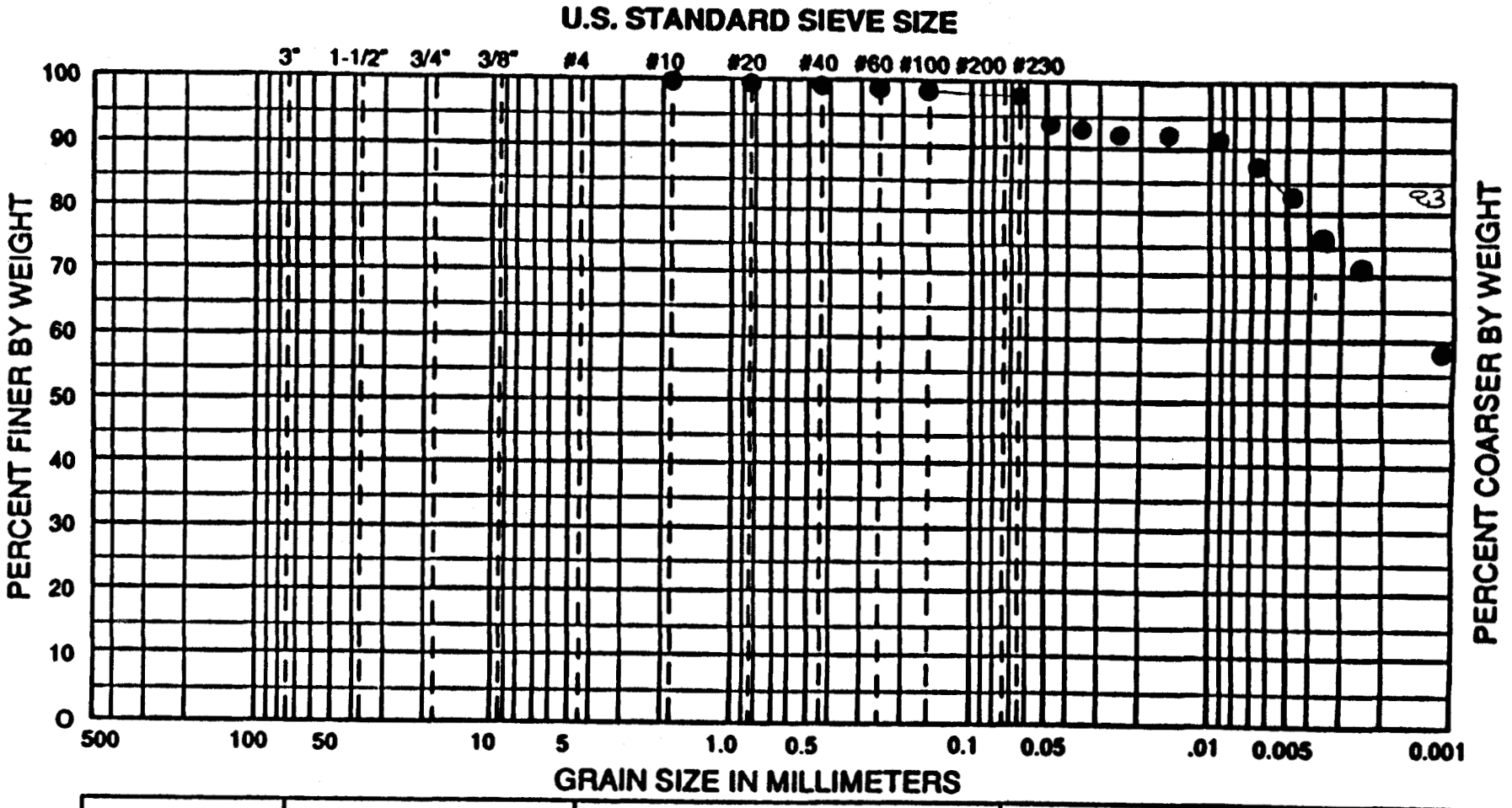
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.70	Temp. Coef. K	0.01312
Value of "a"	0.99	Wt. Dry Sample "W"	53.197
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.50	50.50	94.0	94.0	7.02	0.0492
1.0	56.00	50.00	93.0	93.0	7.11	0.0350
2.0	55.50	49.50	92.1	92.1	7.19	0.0249
5.0	55.50	49.50	92.1	92.1	7.19	0.0157
15.0	55.00	49.00	91.2	91.2	7.27	0.0091
30.0	53.00	47.00	87.5	87.5	7.60	0.0066
60.0	50.50	44.50	82.8	82.8	8.01	0.0048
120.0	48.00	42.00	78.2	78.2	8.42	0.0035
250.0	44.00	38.00	70.7	70.7	9.07	0.0025
1440.0	37.50	31.50	58.6	58.6	10.14	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+00 SAMPLE NO.: CH #14 DATE: 3-30-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION				
Rocky Flats	60.0'	0	0	0.1	1.7 0.3 1.3	15.3	3

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / EC&G

BORING 9+00 SAMPLE # 14 DEPTH @ 60'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

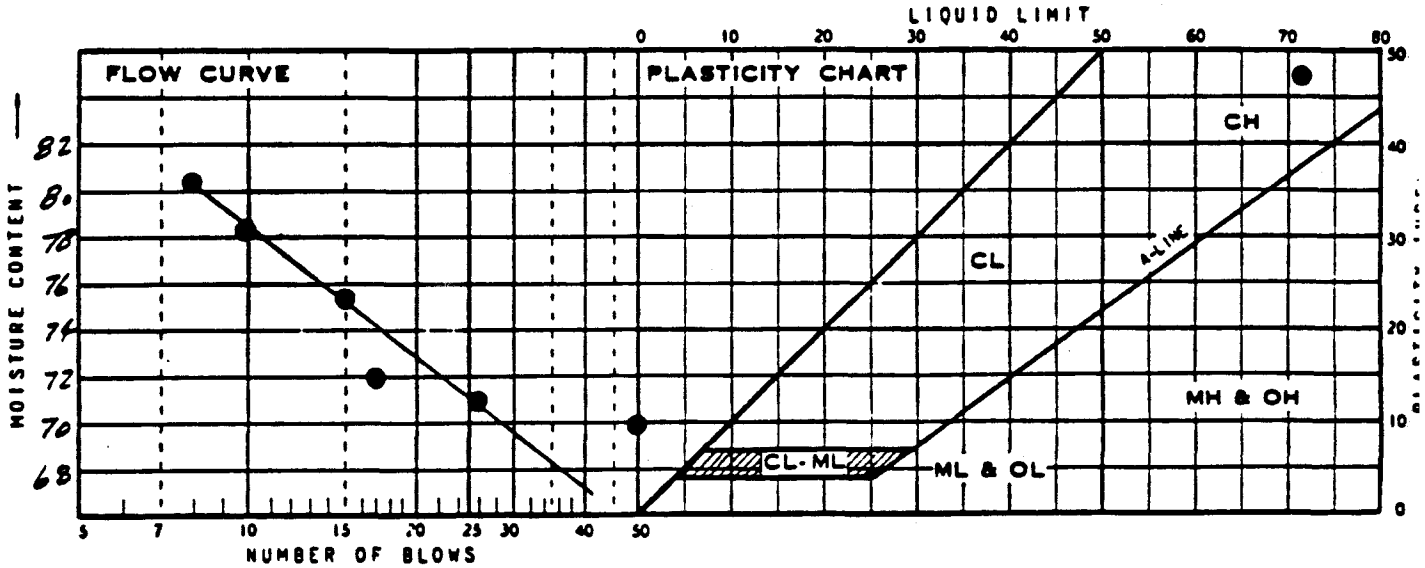
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3.124192

DETERMINATION	1	2	3	4	5	6
DISH	2052	2009	B13			
WT OF DISH + WET SOIL g	5.48	6.30	6.44			
WT OF DISH + DRY SOIL	4.59	5.30	5.41	—	—	—
WT OF MOISTURE	0.89	1.00	1.03			
WT OF DISH	1.03	1.05	1.05	—	—	—
WT OF DRY SOIL	3.56	4.25	4.36			
MOISTURE CONTENT %	25.0	23.5	23.6	72.1/3 =	24.0	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2021	44C	2064	16C	2073	2065
NUMBER OF BLOWS	50 =	26	17	15	10 -	8
WT OF DISH + WET SOIL g	9.28	9.51	9.41	10.42	8.41	8.36
WT OF DISH + DRY SOIL	5.90	6.00	5.91	6.40	5.18	5.11
WT OF MOISTURE	3.38	3.51	3.50	4.02	3.23	3.25
WT OF DISH	1.06	1.04	1.04	1.07	1.05	1.06
WT OF DRY SOIL	4.84	4.96	4.87	5.33	4.13	4.05
MOISTURE CONTENT %	69.8	70.8	71.9	75.4	78.2	80.2



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		71.2	24.0	47.2	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	36.66
Wt. Dry Soil & Pan	(g)	35.72
Wt. Lost Moisture	(g)	0.94
Wt. of Pan Only	(g)	3.76
Wt. of Dry Soil	(g)	31.96
Moisture Content	%	2.9
Wt. Hydrom. Sample Wet	(g)	55.04
Wt. Hydrom. Sample Dry	(g)	53.47

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	449.28
Weight of + #10 Before Washing (g)	2.08
Weight of + #10 After Washing (g)	1.84
Weight of - #10 Wet (g)	447.20
Weight of - #10 Dry (g)	434.66
Wt. Total Sample Dry (g)	436.50
Calc. Wt. "W" (g)	53.70
Calc. Mass + #10	0.23

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	1.19	1.19	1.19	0.3	99.7
#10	0.00	0.65	0.65	1.84	0.4	99.6
#20	1.56	2.71	1.15	1.15	2.6	97.4
#40	1.55	2.62	1.07	2.22	4.6	95.4
#60	1.55	3.05	1.50	3.72	7.3	92.7
#100	1.58	3.90	2.32	6.04	11.7	88.3
#230	1.56	6.66	5.10	11.14	21.2	78.8

SILT-Y

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

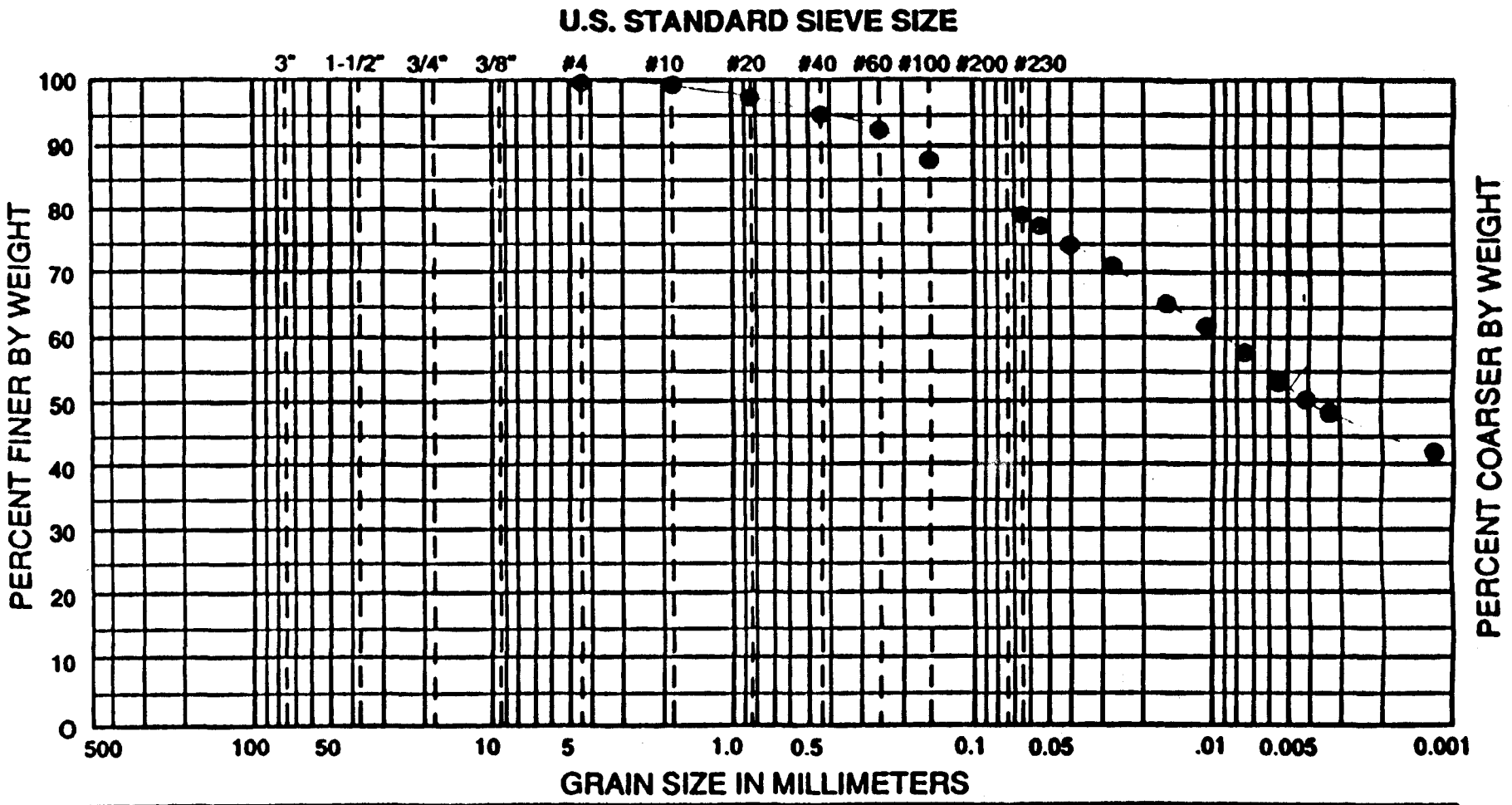
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.67	Temp. Coef. K	0.01324
Value of "a"	1.00	Wt. Dry Sample "W"	53.697
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	42.00	77.9	77.9	8.58	0.0549
1.0	45.00	40.00	74.2	74.2	8.91	0.0395
2.0	44.00	39.00	72.3	72.3	9.07	0.0282
5.0	40.75	35.75	66.3	66.3	9.61	0.0184
15.0	38.25	33.25	61.7	61.7	10.02	0.0108
30.0	36.00	31.00	57.5	57.5	10.39	0.0078
60.0	33.75	28.75	53.3	53.3	10.76	0.0056
120.0	32.25	27.25	50.5	50.5	11.00	0.0040
190.0	31.00	26.00	48.2	48.2	11.21	0.0032
1440.0	28.00	23.00	42.7	42.7	11.70	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+50 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	5'	Silty clay w/some sand + gravel .3% C gravel, .1% C sand, 4.2% med sand, 14.4% fine sand, 28% silt, [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION

LABORATORY CLASSIFICATION

JOB NO.

CLIENT/OWNER Weston

LOCATION Rocky Flats / SC&G

BORING G250 SAMPLE # U DEPTH 5.0'

FIELD DENSITY BY

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

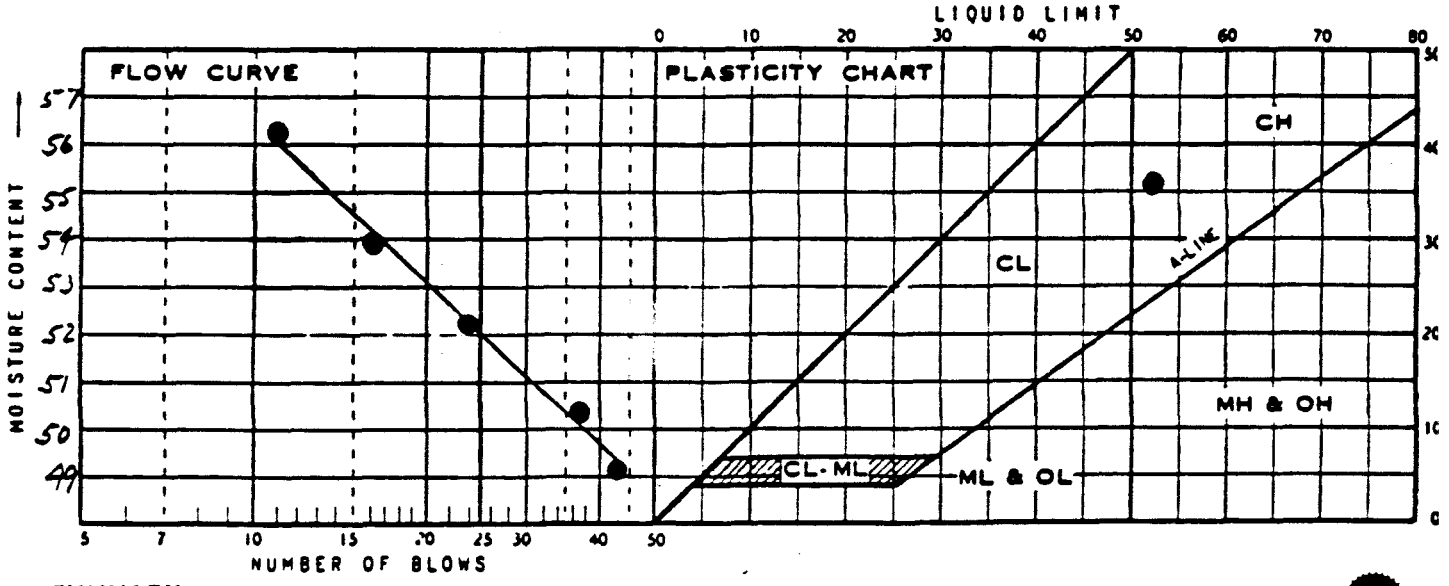
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY 3/18/92

DETERMINATION	1	2	3	4	5	6
DISH	66C	43C	30C			
WT OF DISH + WET SOIL g	6.33	6.23	6.59			
WT OF DISH + DRY SOIL g	5.58	5.46	5.81	—	—	—
WT OF MOISTURE	0.75	0.77	0.78			
WT OF DISH	1.05	1.04	1.06	—	—	—
WT OF DRY SOIL	4.53	4.42	4.75			
MOISTURE CONTENT %	16.6	17.4	16.4	50.4/3 = 16.8		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	48C	1C	2054	2074	2015	
NUMBER OF BLOWS	43	37+	24	16+	11	
WT OF DISH + WET SOIL g	9.18	10.44	12.67	11.47	9.98	
WT OF DISH + DRY SOIL g	6.50	7.30	8.68	7.82	6.77	—
WT OF MOISTURE	2.68	3.14	3.99	3.65	3.21	
WT OF DISH	1.04	1.06	1.04	1.05	1.06	—
WT OF DRY SOIL	5.46	6.24	7.64	6.77	5.71	
MOISTURE CONTENT %	49.1	50.3	52.2	53.9	56.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		52.1	16.8	35.3	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	11.5'	DATE TESTED	03-05-92 TNU
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	40.28
Wt. Dry Soil & Pan	(g)	39.00
Wt. Lost Moisture	(g)	1.28
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	35.28
Moisture Content	%	3.6

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.10

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	490.93
Weight of + #10 Before Washing (g)	16.99
Weight of + #10 After Washing (g)	16.35
Weight of - #10 Wet (g)	473.94
Weight of - #10 Dry (g)	457.96
Wt. Total Sample Dry (g)	474.31
Calc. Wt. "W" (g)	54.99
Calc. Mass + #10	1.90

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	11.59	11.59	11.59	2.4	97.6
#4	0.00	2.05	2.05	13.64	2.9	97.1
#10	0.00	2.71	2.71	16.35	3.4	96.6
#20	1.56	1.74	0.18	0.18	3.8	96.2
#40	1.31	1.92	0.61	0.79	4.9	95.1
#60	1.57	2.76	1.19	1.98	7.0	93.0
#100	1.56	3.93	2.37	4.35	11.4	88.6
#230	1.57	7.19	5.62	9.97	21.6	78.4

Silty Clay (CL)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	11.5'	DATE TESTED	03-05-92 TNU
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

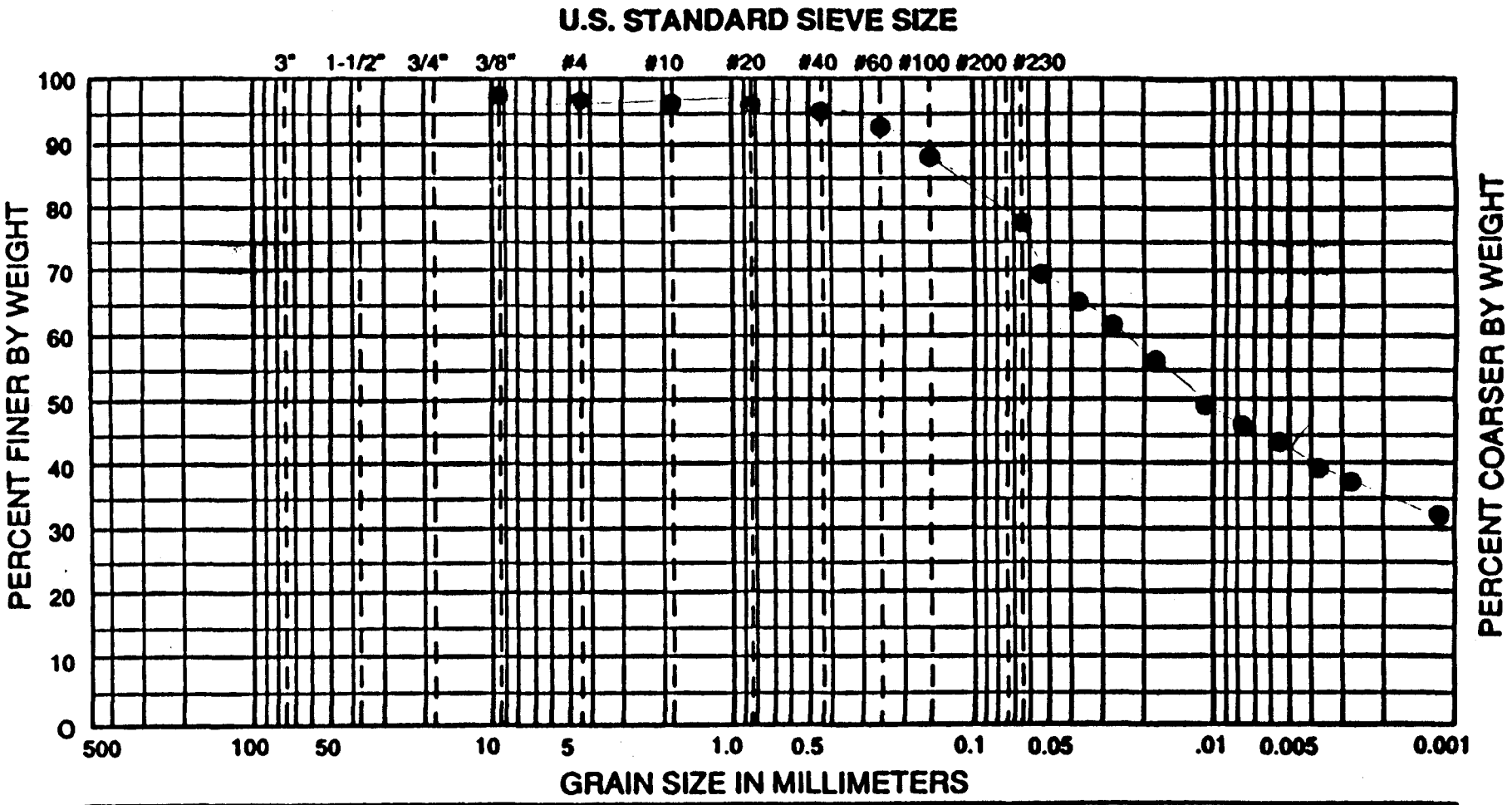
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.80	Temp. Coef. K	0.01276
Value of "a"	0.97	Wt. Dry Sample "W"	54.993
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.50	39.50	69.7	69.7	8.66	0.0531
1.0	44.00	37.00	65.3	65.3	9.07	0.0384
2.0	42.00	35.00	61.7	61.7	9.40	0.0277
5.0	39.00	32.00	56.4	56.4	9.89	0.0180
15.0	35.00	28.00	49.4	49.4	10.55	0.0107
30.0	33.00	26.00	45.9	45.9	10.88	0.0077
60.0	32.00	25.00	44.1	44.1	11.04	0.0055
120.0	29.50	22.50	39.7	39.7	11.45	0.0039
250.0	28.00	21.00	37.0	37.0	11.70	0.0028
1440.0	25.00	18.00	31.7	31.7	12.19	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+50 SAMPLE NO.: CH # 10 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	11.5'	Silty Clay w/ some sand tr gravel .9% f. gravel / .5% c sand, 1.5% med sand, 15.1% f. sand / 37.5% silt, 42.5% clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 9150 SAMPLE #10 DEPTH @ 11.5

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

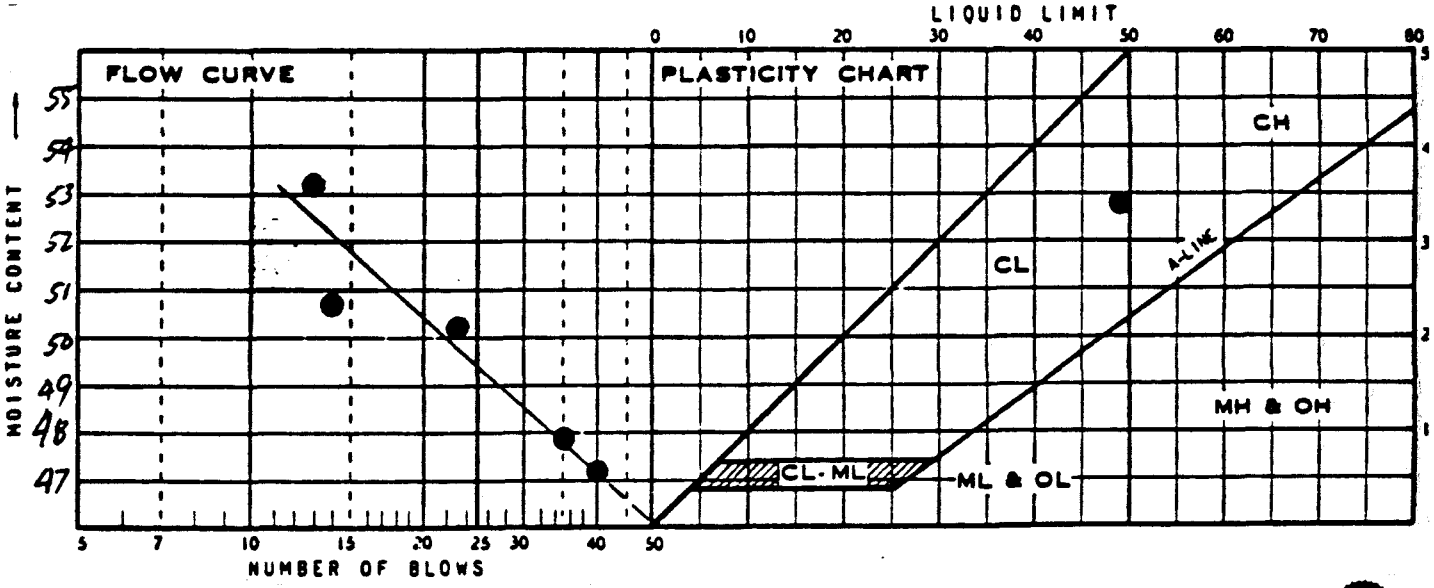
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	10C	0C	2071			
WT OF DISH + WET SOIL g	?	4.47	6.50			
WT OF DISH + DRY SOIL g	4.32	4.02	5.71	—	—	—
WT OF MOISTURE g		0.45	0.79			
WT OF DISH g	1.06	1.05	1.05	—	—	—
WT OF DRY SOIL g		2.97	4.66			
MOISTURE CONTENT %		15.15	16.95	32.1/2 =	16.0	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	9C	37C	41C	25C	22	
NUMBER OF BLOWS	40	34	23	14	13	
WT OF DISH + WET SOIL g	7.71	10.68	7.67	6.54	8.30	
WT OF DISH + DRY SOIL g	5.58	7.57	5.45	4.69	5.78	—
WT OF MOISTURE g	2.13	3.11	2.22	1.85	2.52	
WT OF DISH g	1.06	1.07	1.03	1.04	1.04	—
WT OF DRY SOIL g	4.52	6.50	4.42	3.65	4.74	
MOISTURE CONTENT %	47.1	47.8	50.2	50.7	53.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		49.4	16.0	33.4	CL

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	30'	DATE TESTED	03-21-92 DU
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	52.41
Wt. Dry Soil & Pan	(g)	50.78
Wt. Lost Moisture	(g)	1.63
Wt. of Pan Only	(g)	3.79
Wt. of Dry Soil	(g)	46.99
Moisture Content	%	3.5
Wt. Hydrom. Sample Wet	(g)	55.04
Wt. Hydrom. Sample Dry	(g)	53.19

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	203.36
Weight of + #10 Before Washing (g)	99.70
Weight of + #10 After Washing (g)	66.80
Weight of - #10 Wet (g)	103.66
Weight of - #10 Dry (g)	131.98
Wt. Total Sample Dry (g)	198.78
Calc. Wt. "W" (g)	80.11
Calc. Mass + #10	26.92

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	41.81	41.81	41.81	21.0	79.0
#4	0.00	9.89	9.89	51.70	26.0	74.0
#10	0.00	15.10	15.10	66.80	33.6	66.4
#20	1.55	7.65	6.10	6.10	41.2	58.8
#40	1.55	7.92	6.37	12.47	49.2	50.8
#60	1.56	4.52	2.96	15.43	52.9	47.1
#100	1.56	4.13	2.57	18.00	56.1	43.9
#230	1.55	5.91	4.36	22.36	61.5	38.5

Gravelly Sand (SC)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	30'	DATE TESTED	03-21-92 DU
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

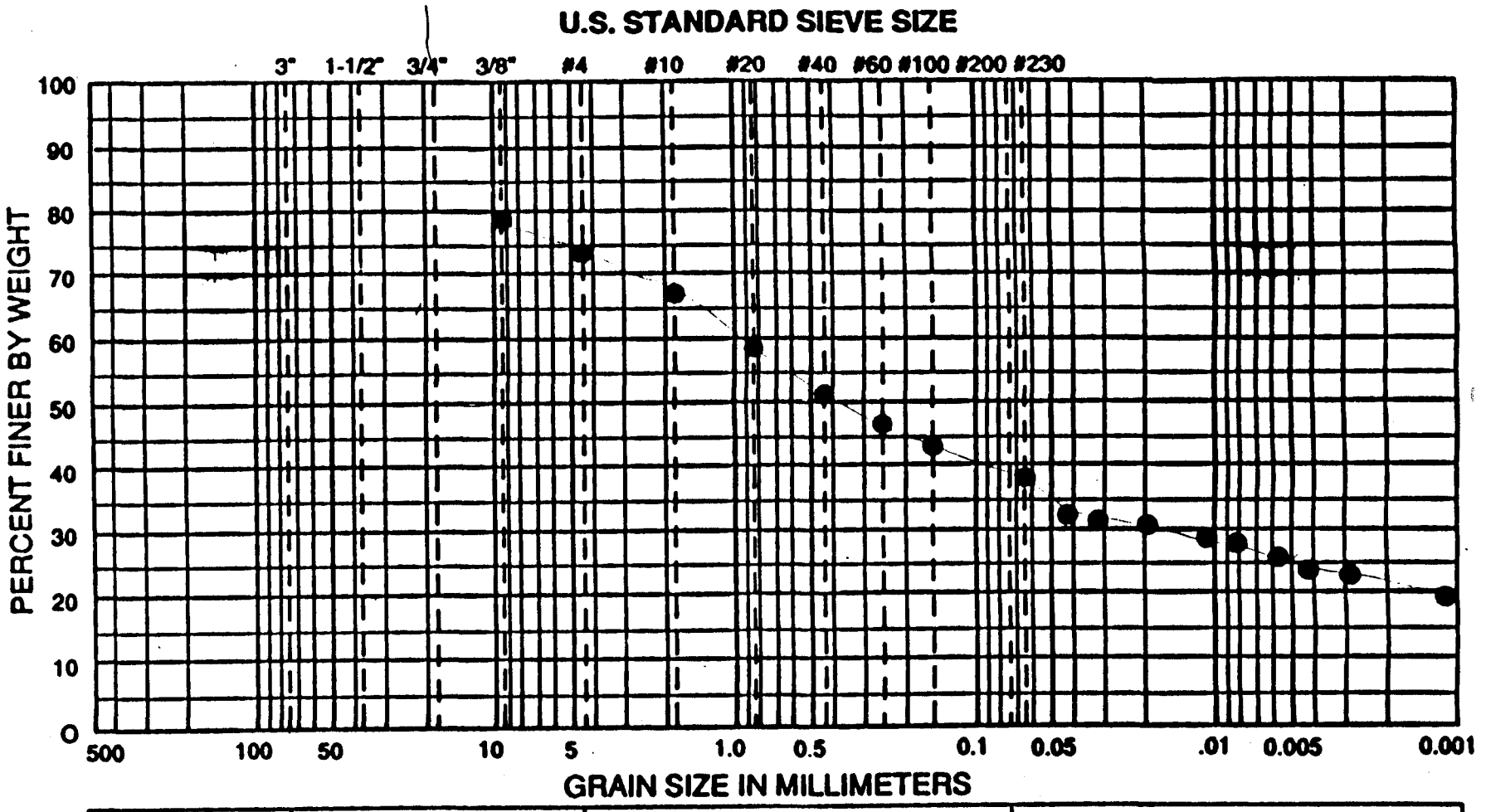
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	80.111
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	34.00	28.50	35.1	35.1	10.71	0.0604
1.0	32.00	26.50	32.6	32.6	11.04	0.0434
2.0	31.00	25.50	31.4	31.4	11.21	0.0309
5.0	30.00	24.50	30.2	30.2	11.37	0.0197
15.0	29.00	23.50	28.9	28.9	11.53	0.0114
30.0	28.00	22.50	27.7	27.7	11.70	0.0081
60.0	26.25	20.75	25.5	25.5	11.99	0.0058
120.0	25.00	19.50	24.0	24.0	12.19	0.0042
250.0	23.75	18.25	22.5	22.5	12.40	0.0029
1440.0	21.50	16.00	19.7	19.7	12.76	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9150 SAMPLE NO.: CH # 10 DATE: 3/22/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	30.0'	Gravelly Sand w/ some silt & clay (almost a clayey gravelly sand 26% f. gravel / 7.6% c sand, 15.6 med sand, 12.3% f sd / 13.5% silt, 25% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS, EG+G

BORING 9+50 SAMPLE CH 10 DEPTH 30.0

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

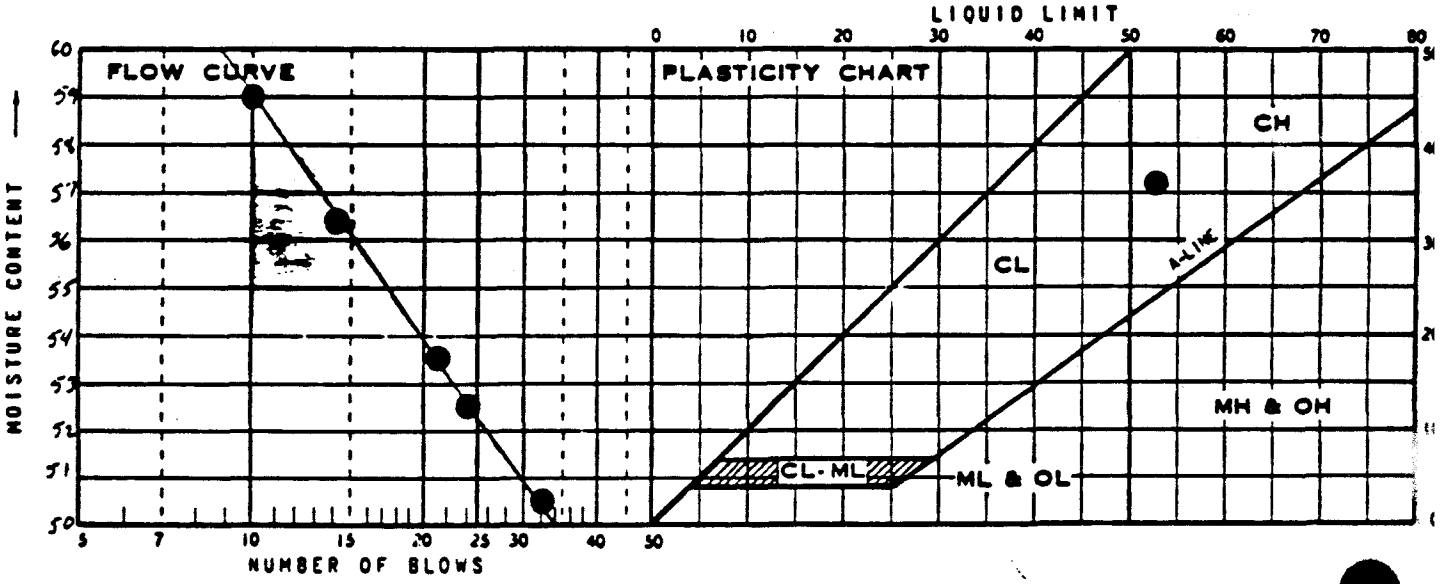
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY GW 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	44C	3	2006			
WT OF DISH + WET SOIL g	8.12g	7.29g	6.79g			
WT OF DISH + DRY SOIL g	7.09	6.41	5.97	—	—	—
WT OF MOISTURE g	1.03	.88	.81			
WT OF DISH g	1.03g	1.07g	1.05g	—	—	—
WT OF DRY SOIL g	6.06	5.34	4.92			
MOISTURE CONTENT %	17.0	16.5	16.5			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2005	2069	2C	20C	2042	
NUMBER OF BLOWS	32	24	21	14	10	
WT OF DISH + WET SOIL g	13.70g	18.51g	13.82g	16.39g	16.56g	
WT OF DISH + DRY SOIL g	9.46	12.49	9.36	10.87	10.81	—
WT OF MOISTURE g	4.24	6.02	4.46	5.58	5.75	
WT OF DISH g	1.06g	1.05g	1.04g	1.08g	1.07g	—
WT OF DRY SOIL g	8.40	11.44	8.32	9.79	9.74	
MOISTURE CONTENT %	50.5	52.6	53.6	56.4	59.0	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		52.3	16.5	35.8	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	36.5'	DATE TESTED	03-05-92 TNU
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	35.51
Wt. Dry Soil & Pan	(g)	34.64
Wt. Lost Moisture	(g)	0.87
Wt. of Pan Only	(g)	3.75
Wt. of Dry Soil	(g)	30.89
Moisture Content	%	2.8
Wt. Hydrom. Sample Wet	(g)	55.03
Wt. Hydrom. Sample Dry	(g)	53.52

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	373.91
Weight of + #10 Before Washing (g)	238.20
Weight of + #10 After Washing (g)	230.30
Weight of - #10 Wet (g)	135.71
Weight of - #10 Dry (g)	139.68
Wt. Total Sample Dry (g)	369.98
Calc. Wt. "W" (g)	141.78
Calc. Mass + #10	88.25

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	64.05	64.05	64.05	17.3	82.7
3/8"	0.00	78.59	78.59	142.64	38.6	61.4
#4	0.00	52.59	52.59	195.23	52.8	47.2
#10	0.00	35.07	35.07	230.30	62.2	37.8
#20	1.55	7.46	5.91	5.91	66.4	33.6
#40	1.55	10.38	8.83	14.74	72.6	27.4
#60	1.56	8.31	6.75	21.49	77.4	22.6
#100	1.55	6.79	5.24	26.73	81.1	18.9
#230	1.57	7.15	5.58	32.31	85.0	15.0

Sandy Gravel (GP)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	36.5'	DATE TESTED	03-05-92 TN
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

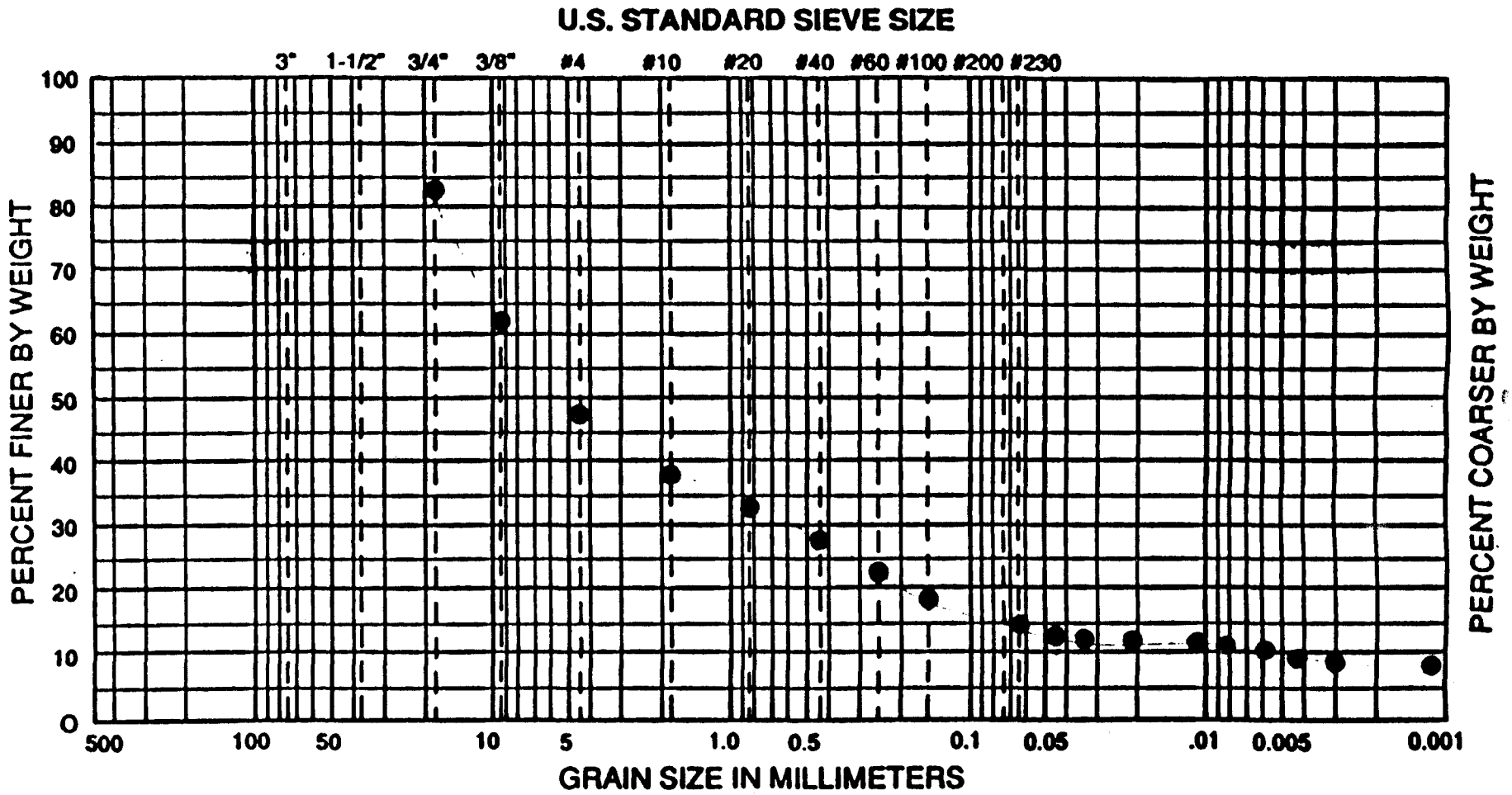
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01294
Value of "a"	0.98	Wt. Dry Sample "W"	141.777
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	27.50	20.50	14.2	14.2	11.78	0.0628
1.0	25.00	18.00	12.4	12.4	12.19	0.0452
2.0	24.50	17.50	12.1	12.1	12.27	0.0321
5.0	23.75	16.75	11.6	11.6	12.40	0.0204
15.0	23.50	16.50	11.4	11.4	12.44	0.0118
30.0	23.00	16.00	11.1	11.1	12.52	0.0084
60.0	22.00	15.00	10.4	10.4	12.68	0.0059
120.0	21.00	14.00	9.7	9.7	12.85	0.0042
250.0	20.00	13.00	9.0	9.0	13.01	0.0030
1440.0	19.00	12.00	8.3	8.3	13.17	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9-50 SAMPLE NO.: CH #10 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	36.5'	Sandy Gravel, tr silt & clay / 17.5% C. gvl, 35.5 F gravel / 9.1% C. sand, 10.1% M. sand, 12.9% F sand / 5% silt, 10% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG&G

BORING 9150 SAMPLE #10 DEPTH @ 36.5

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

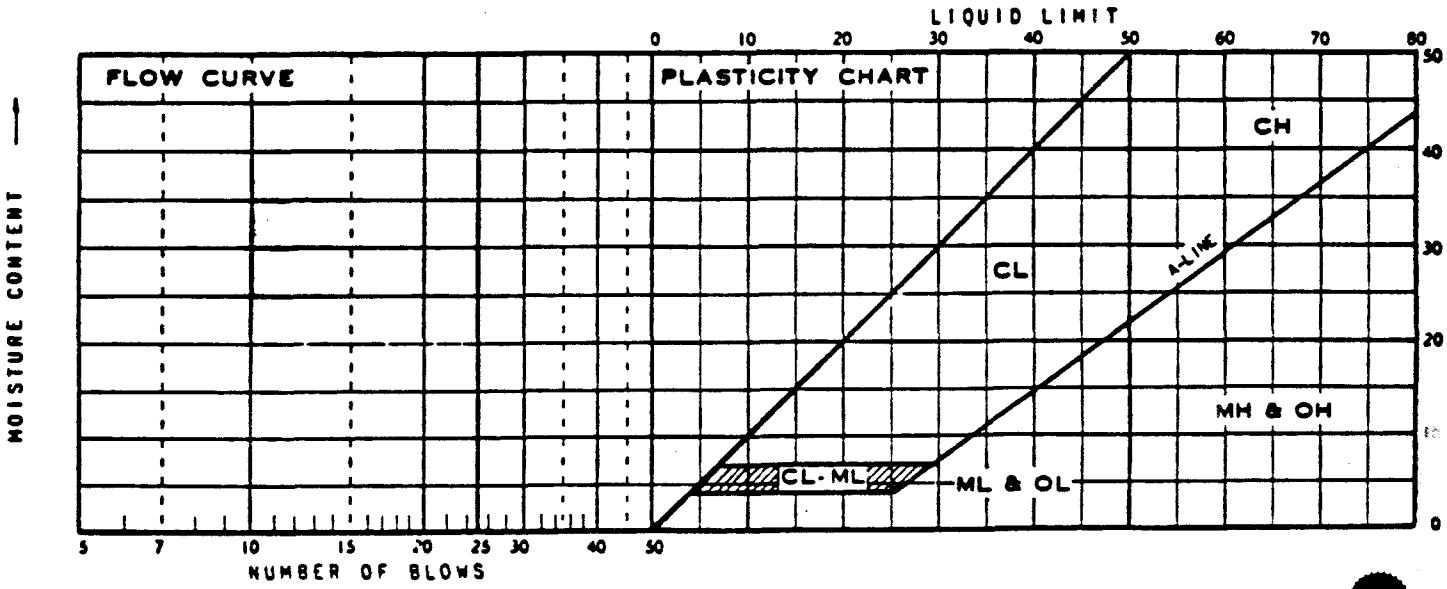
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ____/__/__

DETERMINATION	1	2	3	4	5	6
DISH						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH						
NUMBER OF BLOWS						
WT OF DISH + WET SOIL						
WT OF DISH + DRY SOIL	—	—	—	—	—	—
WT OF MOISTURE						
WT OF DISH	—	—	—	—	—	—
WT OF DRY SOIL						
MOISTURE CONTENT						



SUMMARY MATERIAL NOT TESTED → TOO SANDY NO CLAYS

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		None		NP		

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	46'	DATE TESTED	03-05-92 TNU
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	29.56
Wt. Dry Soil & Pan	(g)	28.61
Wt. Lost Moisture	(g)	0.95
Wt. of Pan Only	(g)	3.79
Wt. of Dry Soil	(g)	24.82
Moisture Content	%	3.8
Wt. Hydrom. Sample Wet	(g)	60.48
Wt. Hydrom. Sample Dry	(g)	58.25

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	284.43
Weight of + #10 Before Washing (g)	26.33
Weight of + #10 After Washing (g)	19.34
Weight of - #10 Wet (g)	258.10
Weight of - #10 Dry (g)	255.32
Wt. Total Sample Dry (g)	274.66
Calc. Wt. "W" (g)	62.66
Calc. Mass + #10	4.41

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	14.49	14.49	14.49	5.3	94.7
#4	0.00	2.46	2.46	16.95	6.2	93.8
#10	0.00	2.39	2.39	19.34	7.0	93.0
#20	1.57	2.22	0.65	0.65	8.1	91.9
#40	1.56	2.22	0.66	1.31	9.1	90.9
#60	1.56	2.07	0.51	1.82	9.9	90.1
#100	1.57	2.43	0.86	2.68	11.3	88.7
#230	1.55	5.08	3.53	6.21	17.0	83.0

Silt + Clay (<#)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	46'	DATE TESTED	03-05-92 TN
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

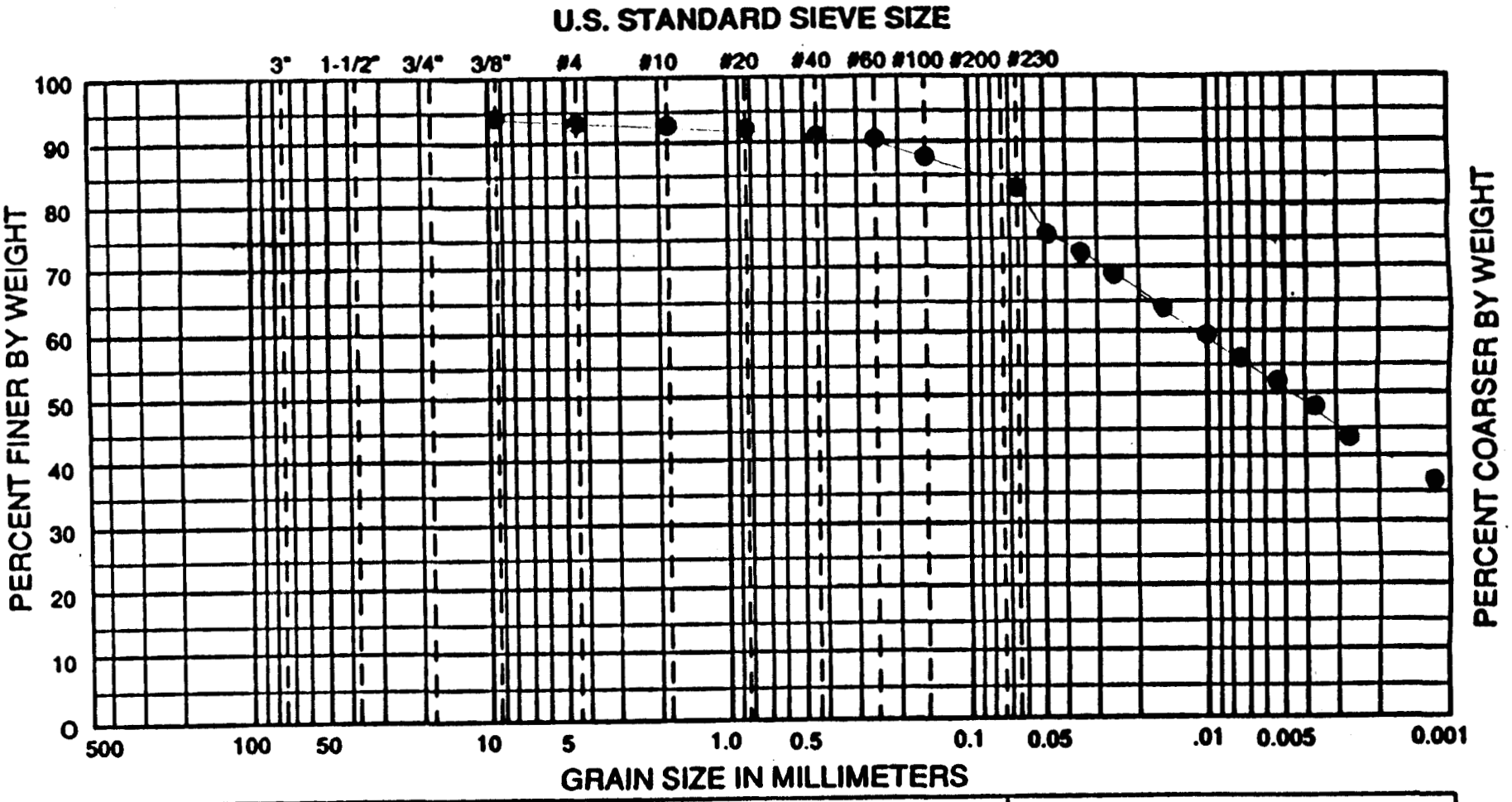
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	62.661
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.00	48.00	75.4	75.4	7.27	0.0496
1.0	53.00	46.00	72.2	72.2	7.60	0.0359
2.0	51.00	44.00	69.1	69.1	7.93	0.0259
5.0	48.00	41.00	64.4	64.4	8.42	0.0169
15.0	45.00	38.00	59.7	59.7	8.91	0.0100
30.0	42.50	35.50	55.7	55.7	9.32	0.0073
60.0	40.00	33.00	51.8	51.8	9.73	0.0052
120.0	37.50	30.50	47.9	47.9	10.14	0.0038
250.0	34.50	27.50	43.2	43.2	10.63	0.0027
1440.0	30.00	23.00	36.1	36.1	11.37	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+50 SAMPLE NO.: CH # 10 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Wash Flat	46'	Silty Clay w/ tr sd & gvl

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 950 SAMPLE CH 10 DEPTH 46'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

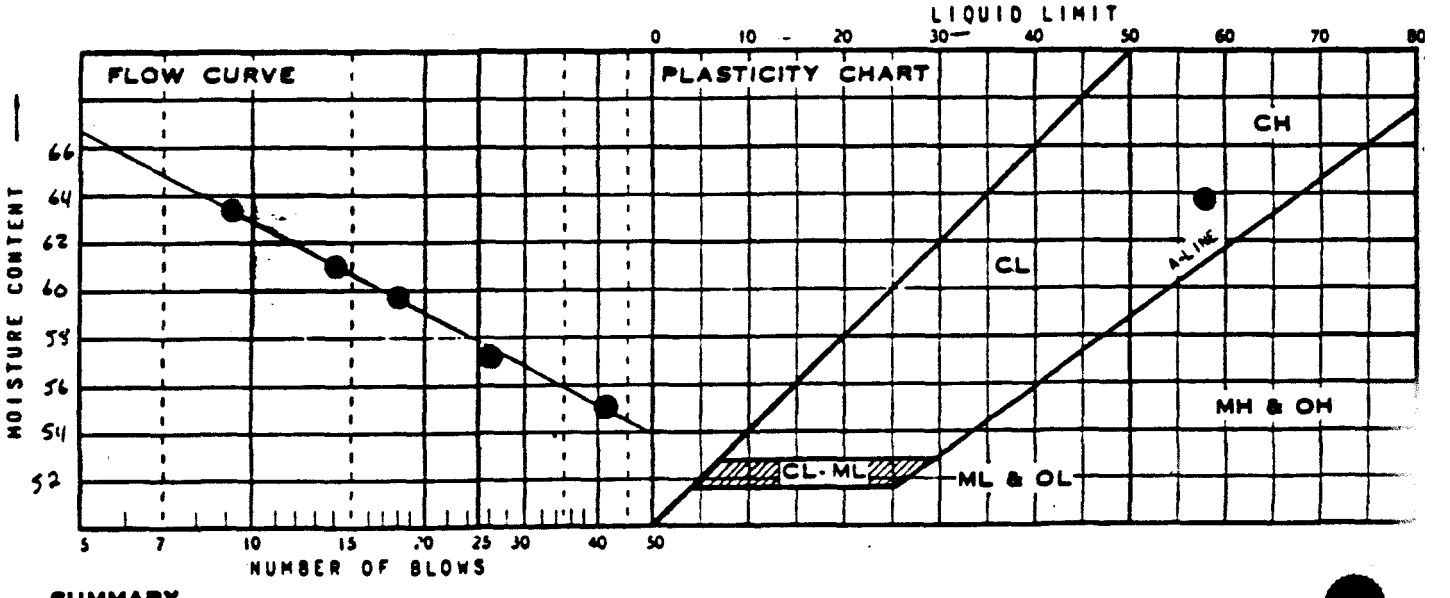
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY AA 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	2067	15g	29C			
WT OF DISH + WET SOIL g	5.89	5.98	6.02			
WT OF DISH + DRY SOIL g	4.99	5.04	5.08	—	—	—
WT OF MOISTURE g	.90	.94	.94			
WT OF DISH g	1.04	1.05	1.06	—	—	—
WT OF DRY SOIL g	3.95	3.99	4.02			
MOISTURE CONTENT %	22.8	23.6	23.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2004	10C	2011	32C	5C	2036
NUMBER OF BLOWS	34	41	26	18	14	9
WT OF DISH + WET SOIL g	11.50	11.24	10.86	10.02	10.61	10.6[illegible]
WT OF DISH + DRY SOIL g	7.84	7.62	7.29	6.67	6.99	6.[illegible]
WT OF MOISTURE g	3.66	3.62	3.57	3.35	3.62	3.71
WT OF DISH g	1.05	1.05	1.06	1.06	1.07	1.05
WT OF DRY SOIL g	6.79	6.57	6.23	5.61	5.92	5.84
MOISTURE CONTENT %	53.9	55.1	57.3	59.7	61.1	63.5



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.8	23.3	34.5	CH	

ADVANCED TERRA TESTING

Rx

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	54'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	28.32
Wt. Dry Soil & Pan	(g)	27.24
Wt. Lost Moisture	(g)	1.08
Wt. of Pan Only	(g)	3.82
Wt. of Dry Soil	(g)	23.42
Moisture Content	%	4.6
Wt. Hydrom. Sample Wet	(g)	54.09
Wt. Hydrom. Sample Dry	(g)	51.70

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	243.06
Weight of + #10 Before Washing (g)	4.46
Weight of + #10 After Washing (g)	2.53
Weight of - #10 Wet (g)	238.60
Weight of - #10 Dry (g)	229.93
Wt. Total Sample Dry (g)	232.46
Calc. Wt. "W" (g)	52.27
Calc. Mass + #10	0.57

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	2.29	2.29	2.29	1.0	99.0
#10	0.00	0.24	0.24	2.53	1.1	98.9
#20	1.56	1.62	0.06	0.06	1.2	98.8
#40	1.56	1.69	0.13	0.19	1.5	98.5
#60	1.57	1.74	0.17	0.36	1.8	98.2
#100	1.57	1.69	0.12	0.48	2.0	98.0
#230	1.32	1.55	0.23	0.71	2.4	97.6

clay (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	54'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

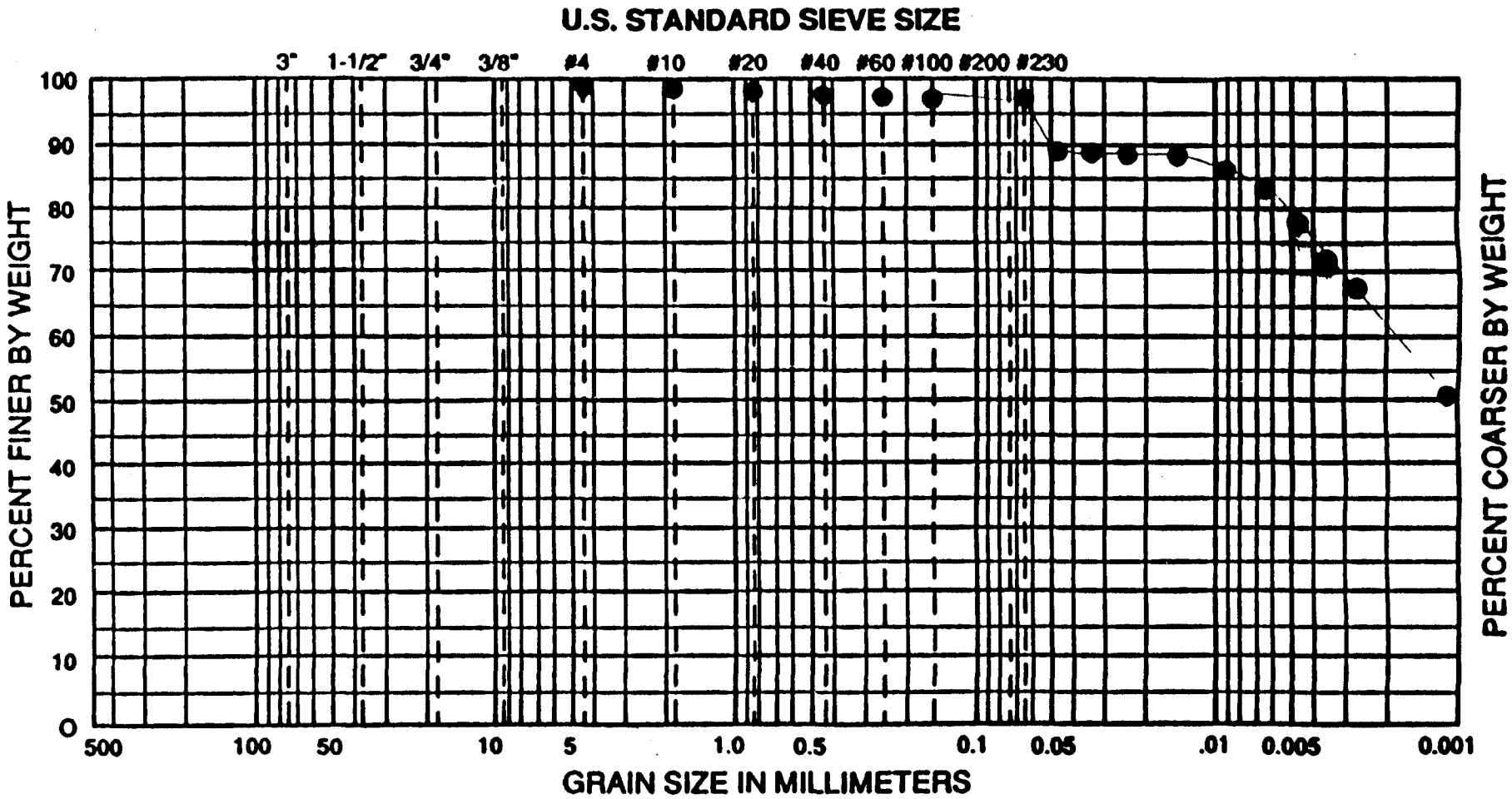
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01280
Value of "a"	0.97	Wt. Dry Sample "W"	52.270
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.25	48.25	89.7	89.7	7.23	0.0487
1.0	55.00	48.00	89.3	89.3	7.27	0.0345
2.0	54.75	47.75	88.8	88.8	7.31	0.0245
5.0	54.75	47.75	88.8	88.8	7.31	0.0155
15.0	53.25	46.25	86.0	86.0	7.56	0.0091
30.0	51.75	44.75	83.2	83.2	7.80	0.0065
60.0	48.75	41.75	77.6	77.6	8.30	0.0048
120.0	45.50	38.50	71.6	71.6	8.83	0.0035
190.0	43.50	36.50	67.9	67.9	9.16	0.0028
1440.0	34.00	27.00	50.2	50.2	10.71	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+50 SAMPLE NO.: CH #10 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	54'	Clay w/ some silt, tr sd & gvl 1% f gravel, 1% c. sand, 4% Med Sand, 9% fine sand, 18.1% silt, 79.5% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION

LABORATORY CLASSIFICATION

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats [illegible]

BORING 9+50 SAMPLE #12 DEPTH @ 54'

FIELD DENSITY BY

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

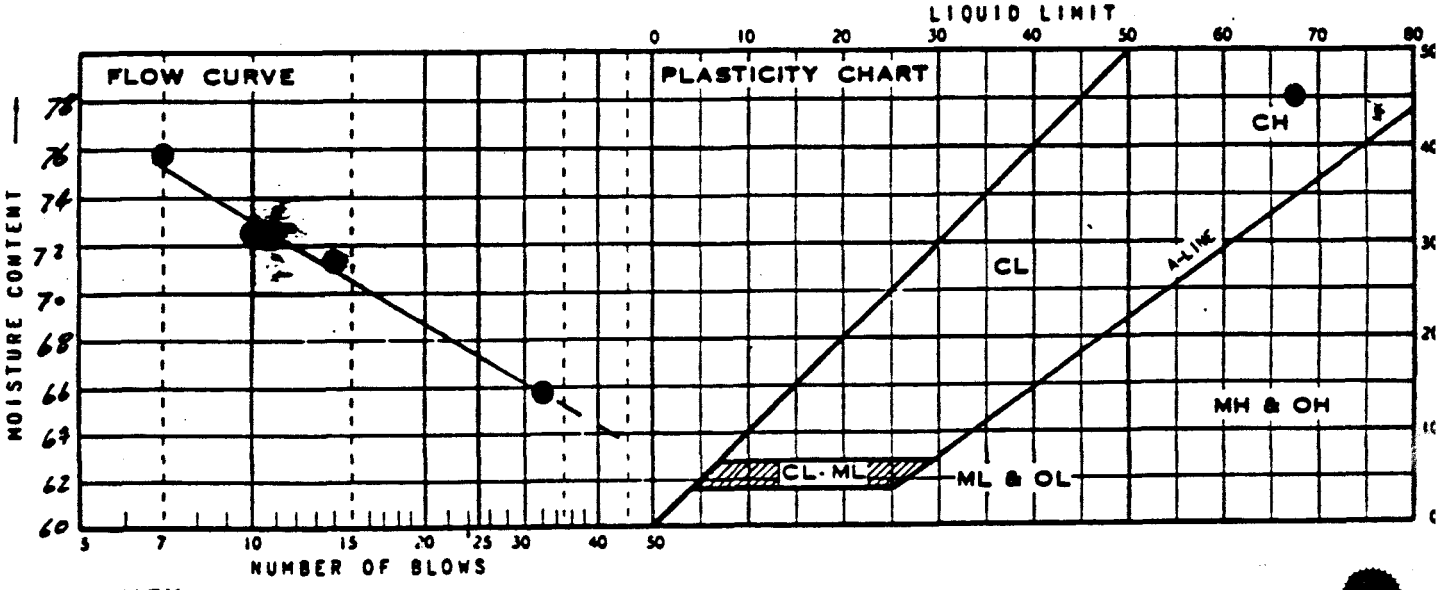
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY PBL 3/15/[illegible]

DETERMINATION	1	2	3	4	5	6
DISH		44C	2046	2011		
WT OF DISH + WET SOIL g		4.81	4.21	4.48		
WT OF DISH + DRY SOIL g	—	4.10	3.63	3.89	—	—
WT OF MOISTURE g		0.71	0.58	0.59		
WT OF DISH g	—	1.03	1.06	1.05	—	—
WT OF DRY SOIL g		3.07	2.57	2.84		
MOISTURE CONTENT %		23.1	22.6	20.8		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	23C	36C	44Cx	2008	3	
NUMBER OF BLOWS	32	24	14	10	7+	
WT OF DISH + WET SOIL g	8.94	7.83	8.24	7.63	8.65	
WT OF DISH + DRY SOIL g	5.81	5.10	5.25	4.87	5.38	—
WT OF MOISTURE g	3.13	2.43	2.99	2.76	3.27	
WT OF DISH g	1.06	1.03	1.06	1.06	1.07	—
WT OF DRY SOIL g	4.75	4.07	4.19	3.81	4.31	
MOISTURE CONTENT %	65.9	59.7	71.4	72.4	75.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		67.4	22.2	45.2	CH

ADVANCED TERRA TESTING INC

BR

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	55'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	33.89
Wt. Dry Soil & Pan	(g)	32.42
Wt. Lost Moisture	(g)	1.47
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	28.74
Moisture Content	%	5.1
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	52.34

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	52.34
Wt. Total Sample Dry (g)	52.34
Calc. Wt. "W" (g)	52.34
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.57	0.01	0.01	0.0	100.0
#40	1.56	1.60	0.04	0.05	0.1	99.9
#60	1.56	1.59	0.03	0.08	0.2	99.8
#100	1.55	1.63	0.08	0.16	0.3	99.7
#230	1.56	4.27	2.71	2.87	5.5	94.5

Silty Claystone

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	55'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

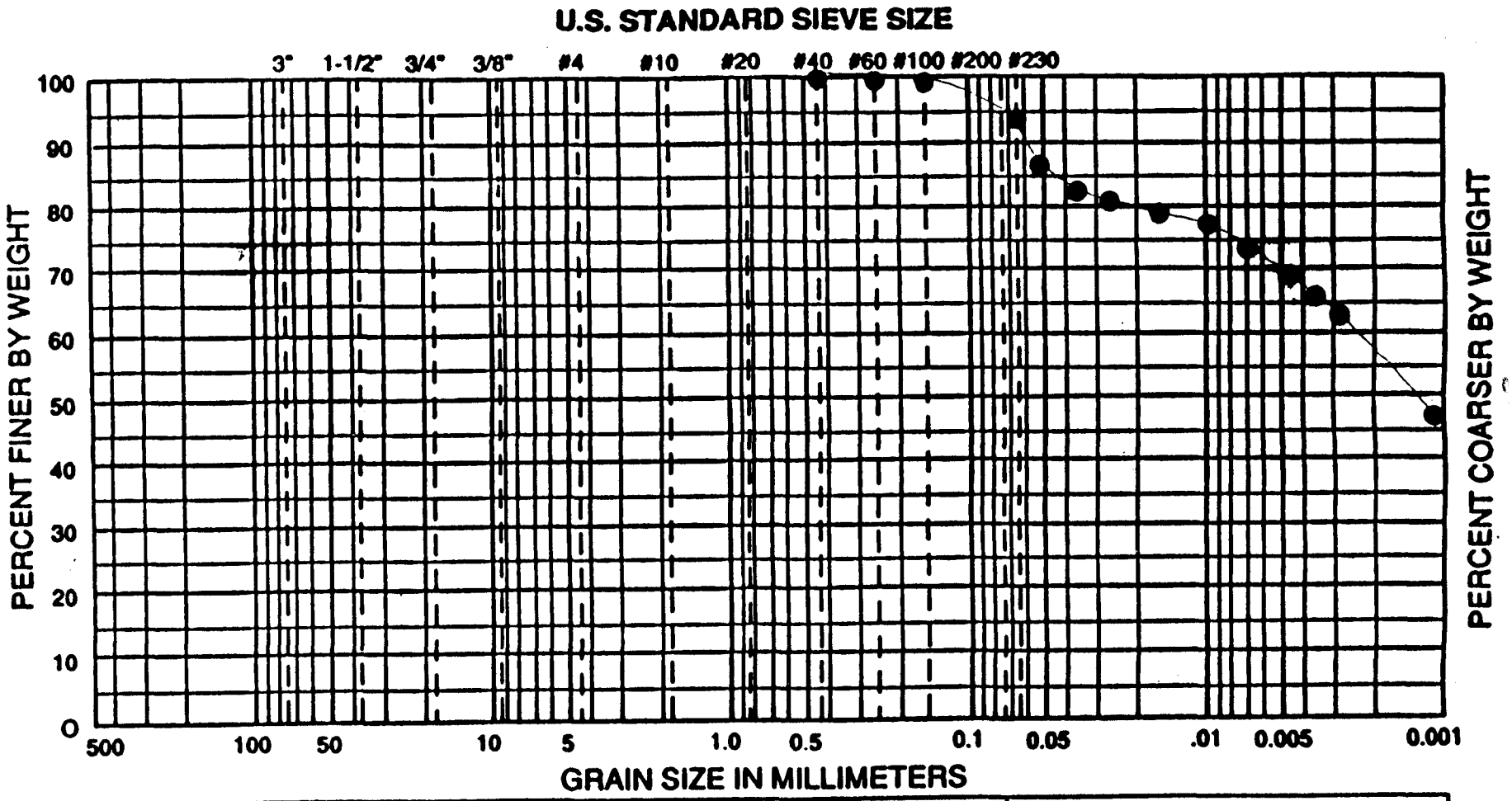
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.74	Temp. Coef. K	0.01298
Value of "a"	0.98	Wt. Dry Sample "W"	52.345
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	53.00	46.00	86.3	86.3	7.60	0.0506
1.0	51.00	44.00	82.5	82.5	7.93	0.0365
2.0	49.75	42.75	80.2	80.2	8.13	0.0262
5.0	49.25	42.25	79.3	79.3	8.21	0.0166
15.0	48.25	41.25	77.4	77.4	8.38	0.0097
30.0	46.50	39.50	74.1	74.1	8.66	0.0070
70.0	44.00	37.00	69.4	69.4	9.07	0.0047
120.0	42.00	35.00	65.7	65.7	9.40	0.0036
190.0	40.50	33.50	62.8	62.8	9.65	0.0029
1440.0	31.50	24.50	46.0	46.0	11.12	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+50 SAMPLE NO.: CH #10 DATE: 3-18-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rock Flats	55.0'	Silty Claystone w/ trace sand .1% Med sand 4.9% f sand / 25% Silt 70% Clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 9+50 SAMPLE #10 DEPTH @55.0

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

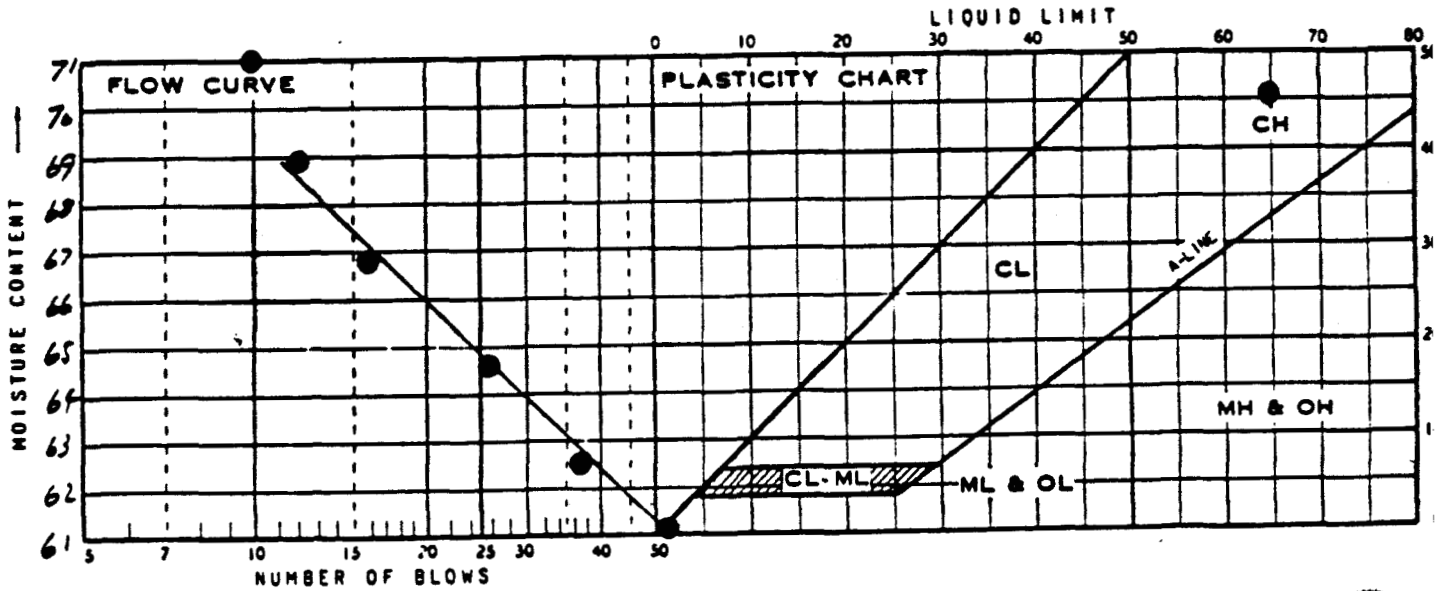
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	2069	32C	28C			
WT OF DISH + WET SOIL g	6.38	6.04	5.43			
WT OF DISH + DRY SOIL g	5.47	5.24	4.76	—	—	—
WT OF MOISTURE g	0.91	0.80	0.67			
WT OF DISH g	1.05	1.05	1.05	—	—	—
WT OF DRY SOIL g	4.42	4.19	3.71			
MOISTURE CONTENT %	20.6	19.1	18.1	= 57.8/3 =	19.3	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2052	11C	2032	2067	6C	2039
NUMBER OF BLOWS	52	37	26	16	12	10
WT OF DISH + WET SOIL g	7.87	7.01	7.57	7.67	6.79	7.7[illegible]
WT OF DISH + DRY SOIL g	5.28	4.71	5.01	5.01	4.44	4.9[illegible]
WT OF MOISTURE g	2.59	2.30	2.56	2.66	2.35	2.79
WT OF DISH g	1.04	1.03	1.05	1.03	1.03	1.05
WT OF DRY SOIL g	4.24	3.68	3.96	3.98	3.41	3.93
MOISTURE CONTENT %	61.1	62.5	64.6	66.8	68.9	71.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		64.8	19.3	45.5	CH	

ADVANCED TERRA TESTING inc

KZM

BR-yes

BR?

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	58.1'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	39.11
Wt. Dry Soil & Pan	(g)	38.25
Wt. Lost Moisture	(g)	0.86
Wt. of Pan Only	(g)	3.80
Wt. of Dry Soil	(g)	34.45
Moisture Content	%	2.5

Wt. Hydrom. Sample Wet (g)	55.38
Wt. Hydrom. Sample Dry (g)	54.03

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.38
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.38
Weight of - #10 Dry (g)	54.03
Wt. Total Sample Dry (g)	54.03
Calc. Wt. "W" (g)	54.03
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.56	0.01	0.01	0.0	100.0
#40	1.55	1.58	0.03	0.04	0.1	99.9
#60	1.55	1.56	0.01	0.05	0.1	99.9
#100	1.57	1.60	0.03	0.08	0.1	99.9
#230	1.32	13.26	11.94	12.02	22.2	77.8

Clayey Siltstone

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+50	SAMPLED	Rocky Flats
DEPTH	58.1'	DATE TESTED	03-11-92 SR
SAMPLE NO.	#10	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

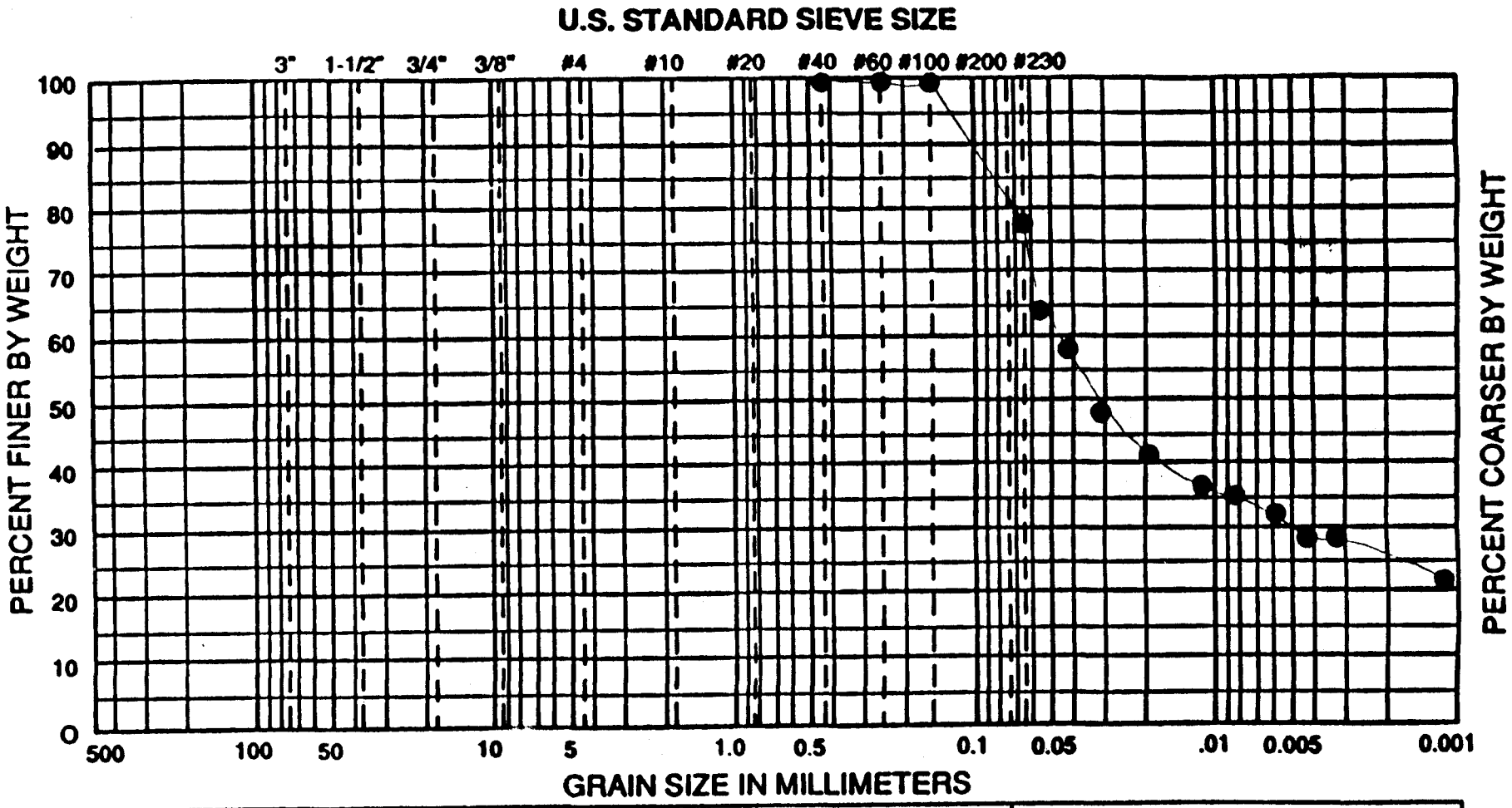
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	54.027
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	42.50	35.50	64.7	64.7	9.32	0.0562
1.0	38.75	31.75	57.8	57.8	9.94	0.0410
2.0	33.50	26.50	48.3	48.3	10.80	0.0302
5.0	29.25	22.25	40.5	40.5	11.49	0.0197
15.0	27.25	20.25	36.9	36.9	11.82	0.0115
30.0	26.25	19.25	35.1	35.1	11.99	0.0082
60.0	24.75	17.75	32.3	32.3	12.23	0.0059
120.0	23.00	16.00	29.1	29.1	12.52	0.0042
201.0	23.00	16.00	29.1	29.1	12.52	0.0032
1440.0	18.50	11.50	20.9	20.9	13.26	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+50 SAMPLE NO.: CH # 10 DATE: 3-19-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	58.1	Clayey Siltstone w/ some sand 1% med sand, 18.9% fine sand, 51% silt, 30% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-6

BORING 9-50 SAMPLE CA #10 DEPTH 58.1

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

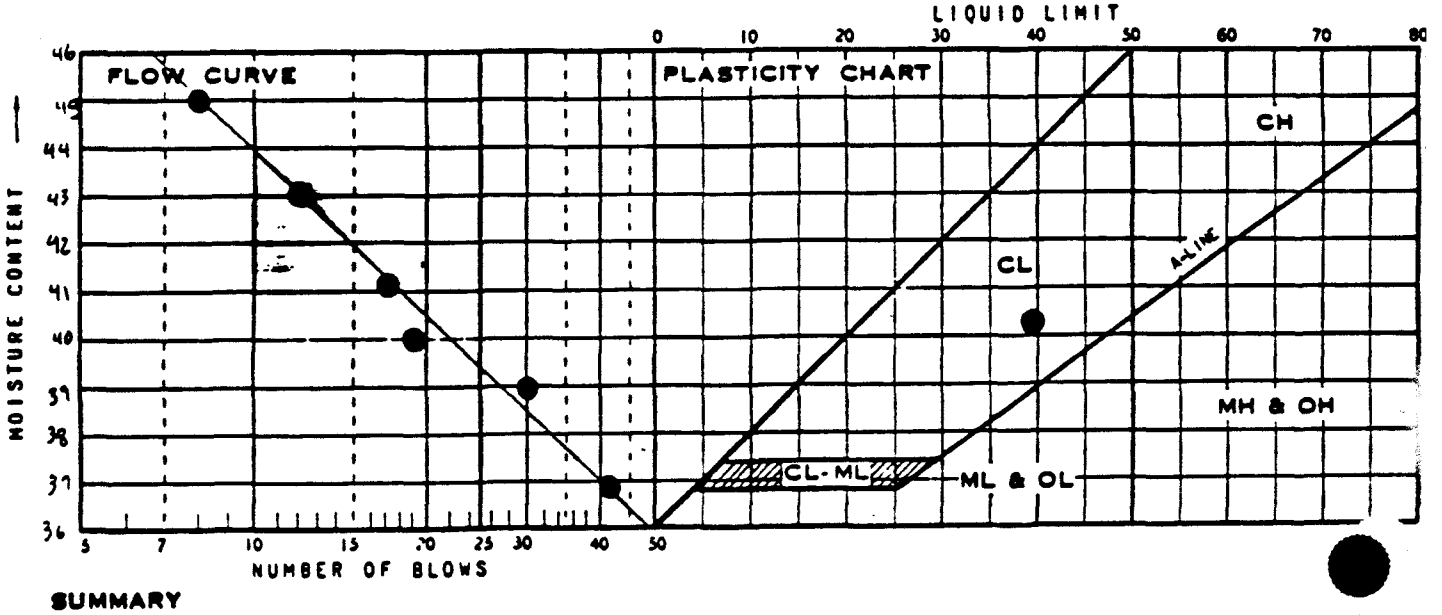
PLASTIC LIMIT BY OA 3/12/92

77

DETERMINATION	1	2	3	4	5	6
DISH	2060	17C	2013			
WT OF DISH + WET SOIL g	7.00	7.40	6.53			
WT OF DISH + DRY SOIL g	6.08	6.43	5.65	—	—	—
WT OF MOISTURE g	.92	.97	.88			
WT OF DISH g	1.03	1.04	1.05	—	—	—
WT OF DRY SOIL g	5.05	5.39	4.60			
MOISTURE CONTENT %	18.2	18.0	19.1			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	48C	2015	6C	2032	11C	4
NUMBER OF BLOWS	41	30±	19	17	12	8
WT OF DISH + WET SOIL g	12.53	11.61	13.44	13.18	12.68	11.[illegible]
WT OF DISH + DRY SOIL g	9.43	8.65	9.89	9.64	9.17	7.94
WT OF MOISTURE g	3.10	2.96	3.55	3.54	3.51	3.09
WT OF DISH g	1.04	1.06	1.03	1.05	1.03	1.07
WT OF DRY SOIL g	8.39	7.59	8.86	8.59	8.14	6.87
MOISTURE CONTENT %	36.9	39.0	40.1	41.2	43.1	45.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		39.4	18.1	21.3	CL	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	3'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	44.98
Wt. Dry Soil & Pan	(g)	43.56
Wt. Lost Moisture	(g)	1.42
Wt. of Pan Only	(g)	3.67
Wt. of Dry Soil	(g)	39.89
Moisture Content	%	3.6

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	53.12

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.01
Weight of - #10 Dry (g)	53.12
Wt. Total Sample Dry (g)	53.12
Calc. Wt. "W" (g)	53.12
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	3.03	1.48	1.48	2.8	97.2
#40	1.55	2.77	1.22	2.70	5.1	94.9
#60	1.55	2.67	1.12	3.82	7.2	92.8
#100	1.55	3.56	2.01	5.83	11.0	89.0
#230	1.54	5.93	4.39	10.22	19.2	80.8

SILTY CLAY (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	3'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

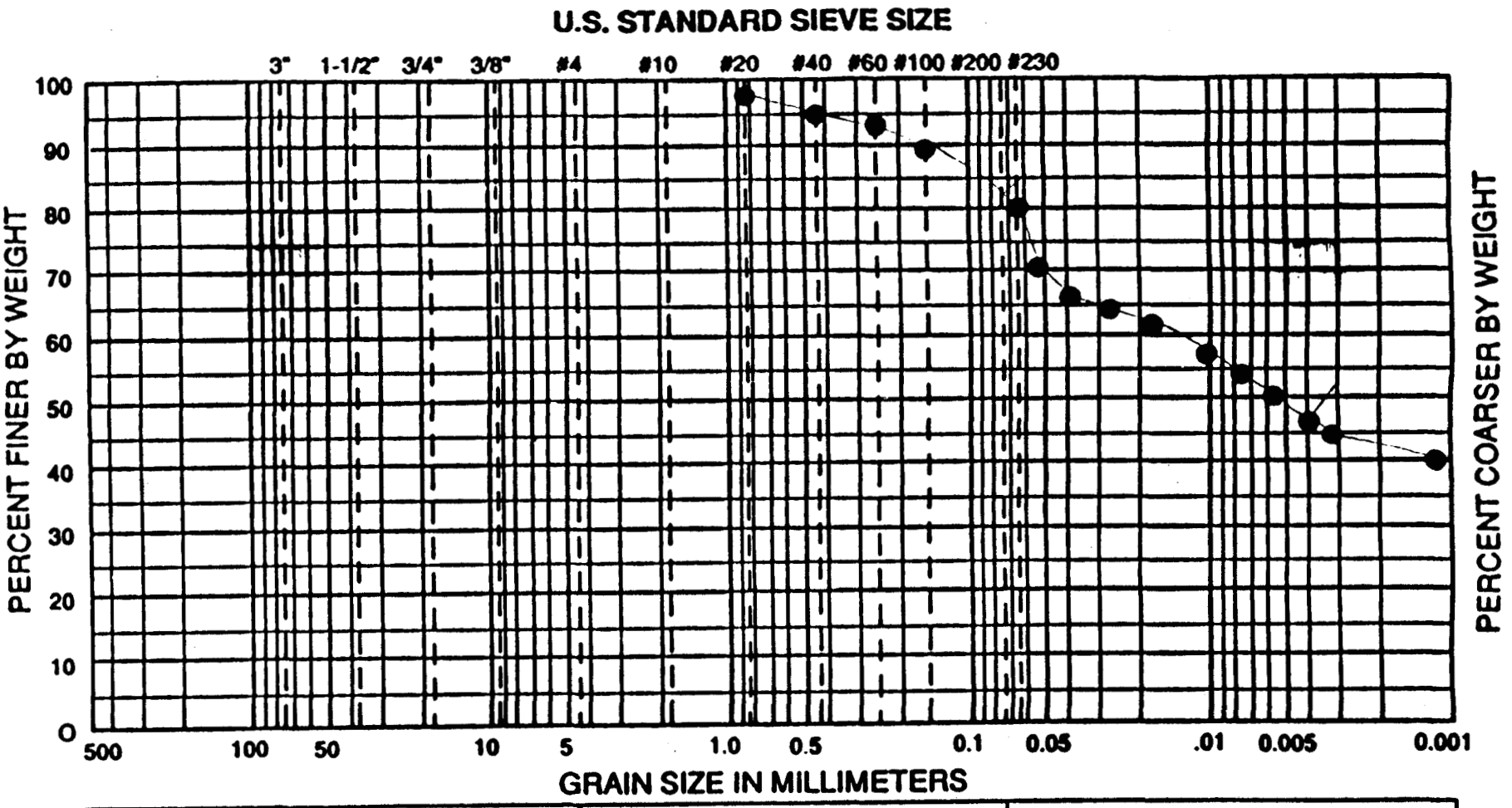
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01294
Value of "a"	0.98	Wt. Dry Sample "W"	53.120
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	43.50	38.00	70.1	70.1	9.16	0.0554
1.0	41.25	35.75	66.0	66.0	9.53	0.0399
2.0	40.50	35.00	64.6	64.6	9.65	0.0284
5.0	39.00	33.50	61.8	61.8	9.89	0.0182
15.0	36.25	30.75	56.7	56.7	10.35	0.0107
30.0	35.00	29.50	54.4	54.4	10.55	0.0077
60.0	33.00	27.50	50.7	50.7	10.88	0.0055
120.0	31.00	25.50	47.0	47.0	11.21	0.0040
190.0	30.00	24.50	45.2	45.2	11.37	0.0032
1440.0	27.00	21.50	39.7	39.7	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE		
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND		SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE

WELLNAME: 9+75 SAMPLE NO.: 11 DATE: 3/25/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION SILTY CLAY w/ some sand
Rocky Flats	3'	5.1% med sand, 11.9% f. sand, 36% silt, 47% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats / E&G

BORING 9+75 SAMPLE 11 DEPTH @ 3'

FIELD DENSITY BY - - - - - / - / - -

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

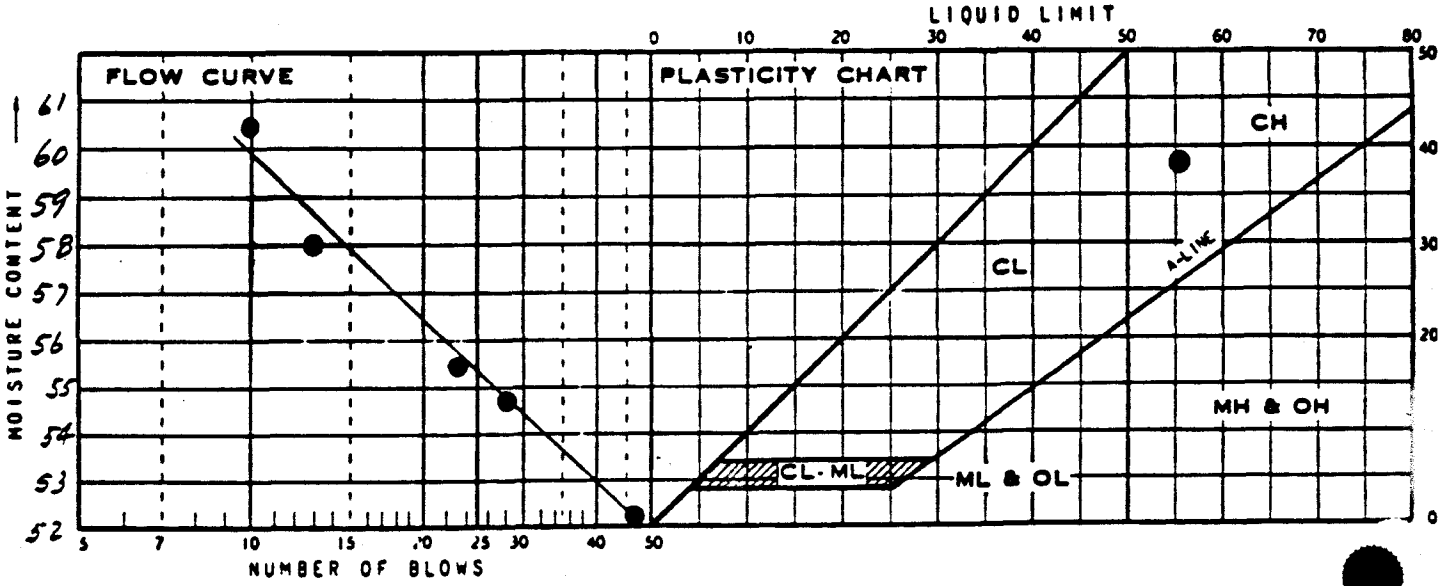
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RD 3/17/92

DETERMINATION	1	2	3	4	5	6
DISH	2017	2072	2005			
WT OF DISH + WET SOIL g	5.43	5.92	6.53			
WT OF DISH + DRY SOIL	4.81	5.19	5.71	—	—	—
WT OF MOISTURE	0.62	0.73	0.82			
WT OF DISH	1.03	1.04	1.06	—	—	—
WT OF DRY SOIL	3.78	4.15	4.65			
MOISTURE CONTENT %	16.4	17.6	17.6	= 51.6/3	17.2	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2007	58C	46C	37C	20C	2041
NUMBER OF BLOWS	47-	38++	28-	23	13	10
WT OF DISH + WET SOIL g	10.20	7.44	9.09	10.88	8.46	8.6
WT OF DISH + DRY SOIL	7.06	5.24	6.25	7.37	5.73	5.81
WT OF MOISTURE	3.14	2.20	2.84	3.51	2.73	2.87
WT OF DISH	1.05	1.06	1.06	1.03	1.02	1.06
WT OF DRY SOIL	6.01	4.18	5.19	6.34	4.71	4.75
MOISTURE CONTENT %	52.2	52.6	54.7	55.4	58.0	60.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		55.4	17.2	38.2	CH	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	12.5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	39.64
Wt. Dry Soil & Pan	(g)	38.60
Wt. Lost Moisture	(g)	1.04
Wt. of Pan Only	(g)	3.77
Wt. of Dry Soil	(g)	34.83
Moisture Content	%	3.0
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	53.42

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	582.90
Weight of + #10 Before Washing (g)	15.68
Weight of + #10 After Washing (g)	15.12
Weight of - #10 Wet (g)	567.22
Weight of - #10 Dry (g)	551.32
Wt. Total Sample Dry (g)	566.44
Calc. Wt. "W" (g)	54.89
Calc. Mass + #10	1.47

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	10.66	10.66	10.66	1.9	98.1
#4	0.00	3.11	3.11	13.77	2.4	97.6
#10	0.00	1.35	1.35	15.12	2.7	97.3
#20	1.56	1.80	0.24	0.24	3.1	96.9
#40	1.56	2.83	1.27	1.51	5.4	94.6
#60	1.57	3.67	2.10	3.61	9.2	90.8
#100	1.31	4.86	3.55	7.16	15.7	84.3
#230	1.56	8.62	7.06	14.22	28.6	71.4

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	12.5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

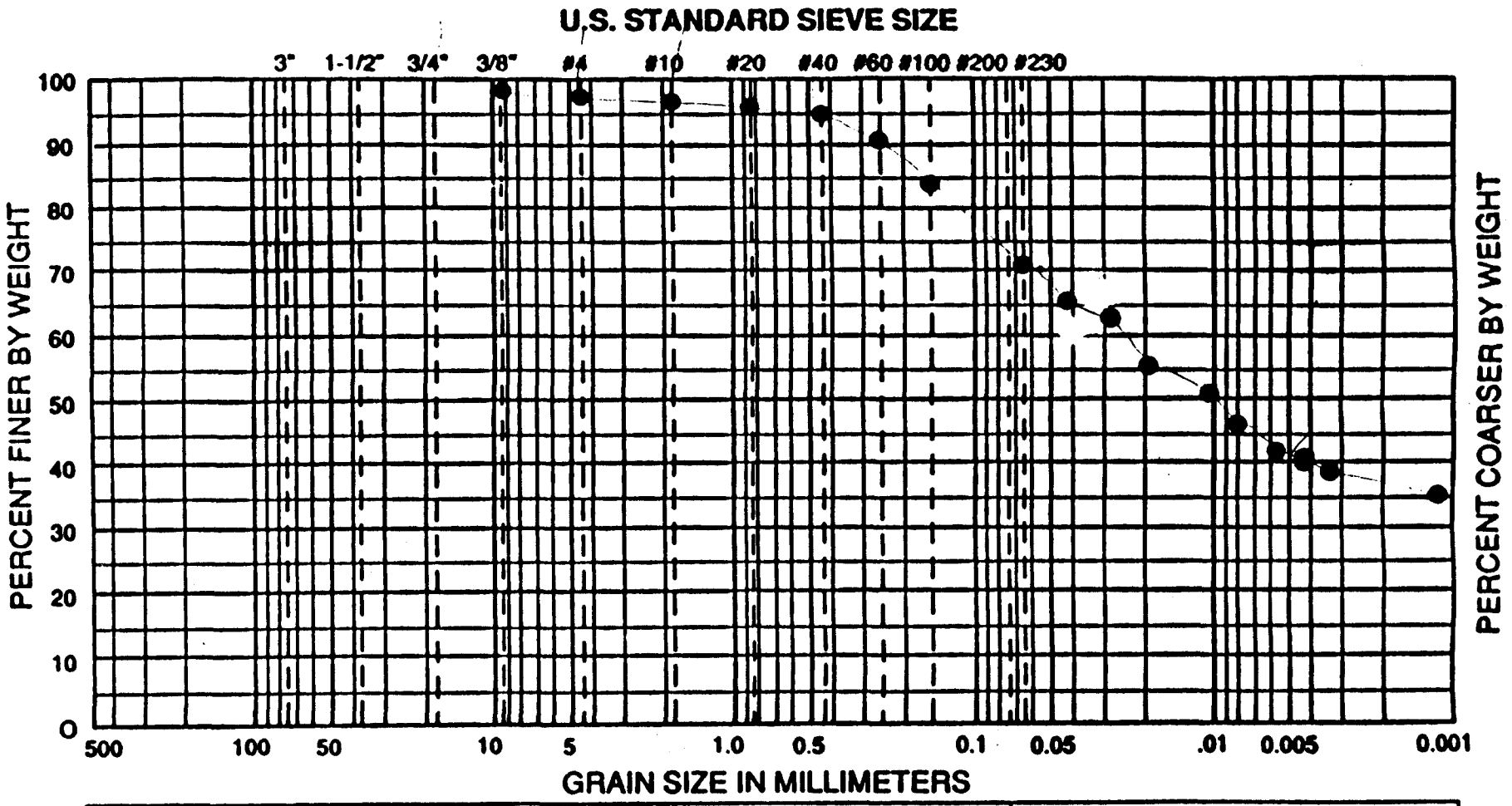
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01332
Value of "a"	1.00	Wt. Dry Sample "W"	54.890
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.25	39.25	71.5	71.5	9.03	0.0566
1.0	41.25	36.25	66.0	66.0	9.53	0.0411
2.0	40.00	35.00	63.8	63.8	9.73	0.0294
5.0	35.75	30.75	56.0	56.0	10.43	0.0192
15.0	32.75	27.75	50.6	50.6	10.92	0.0114
30.0	30.75	25.75	46.9	46.9	11.25	0.0082
60.0	28.00	23.00	41.9	41.9	11.70	0.0059
120.0	27.75	22.75	41.4	41.4	11.74	0.0042
190.0	26.00	21.00	38.3	38.3	12.03	0.0034
1440.0	24.50	19.50	35.5	35.5	12.27	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+75 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

CL

AREA	DEPTH	CLASSIFICATION
Rocky Flats	12.5'	Silty-Clay w/ some sand + r gravel 2.4% f gvl | .3% LSA, 2.7% m sand, 21.6% f sand | 32% silt, 41% clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER [illegible]

LOCATION Rocky Flats / 2686

BORING 9475 SAMPLE #11 DEPTH @12.5

FIELD DENSITY BY ...../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

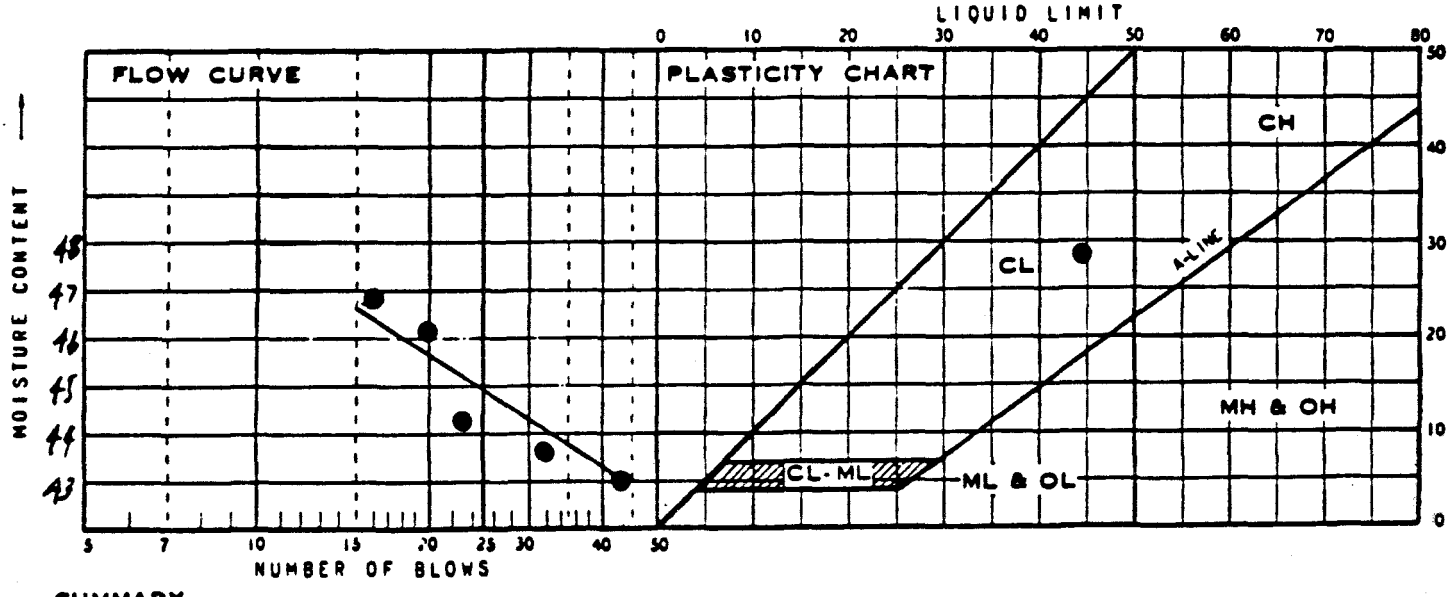
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	2042	2040	2063			
WT OF DISH + WET SOIL g	6.16	5.96	6.65			
WT OF DISH + DRY SOIL	5.43	5.25	5.87	—	—	—
WT OF MOISTURE	0.73	0.71	0.78			
WT OF DISH	1.06	1.05	1.06	—	—	—
WT OF DRY SOIL	4.37	4.20	4.81			
MOISTURE CONTENT %	16.7	16.9	16.2	= 49 8/3	16.6	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2003	2OC	2061	2001	2006	1C9
NUMBER OF BLOWS	43	32	23	20	16	10
WT OF DISH + WET SOIL g	8.21	10.88	11.67	10.07	9.65	8.35
WT OF DISH + DRY SOIL	6.06	7.90	8.41	7.23	6.91	5.7[illegible]
WT OF MOISTURE	2.16	2.98	3.26	2.84	2.74	2.56
WT OF DISH	1.03	1.07	1.03	1.06	1.05	1.05
WT OF DRY SOIL	5.02	6.83	7.83	6.17	5.86	4.74
MOISTURE CONTENT %	43.0	43.6	44.2	46.1	46.8	54.0



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		44.9	16.6	28.3	CL

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	20'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	40.21
Wt. Dry Soil & Pan	(g)	39.43
Wt. Lost Moisture	(g)	0.78
Wt. of Pan Only	(g)	3.60
Wt. of Dry Soil	(g)	35.83
Moisture Content	%	2.2
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	53.85

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	622.28
Weight of + #10 Before Washing (g)	246.93
Weight of + #10 After Washing (g)	192.70
Weight of - #10 Wet (g)	375.35
Weight of - #10 Dry (g)	420.43
Wt. Total Sample Dry (g)	613.13
Calc. Wt. "W" (g)	78.53
Calc. Mass + #10	24.68

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	157.71	157.71	157.71	25.7	74.3
3/8"	0.00	4.57	4.57	162.28	26.5	73.5
#4	0.00	14.18	14.18	176.46	28.8	71.2
#10	0.00	16.24	16.24	192.70	31.4	68.6
#20	1.56	3.87	2.31	2.31	34.4	65.6
#40	1.55	4.56	3.01	5.32	38.2	61.8
#60	1.57	4.64	3.07	8.39	42.1	57.9
#100	1.31	5.49	4.18	12.57	47.4	52.6
#230	1.56	8.64	7.08	19.65	56.5	43.5

~~SANDY~~ CLAYEY (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	20'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

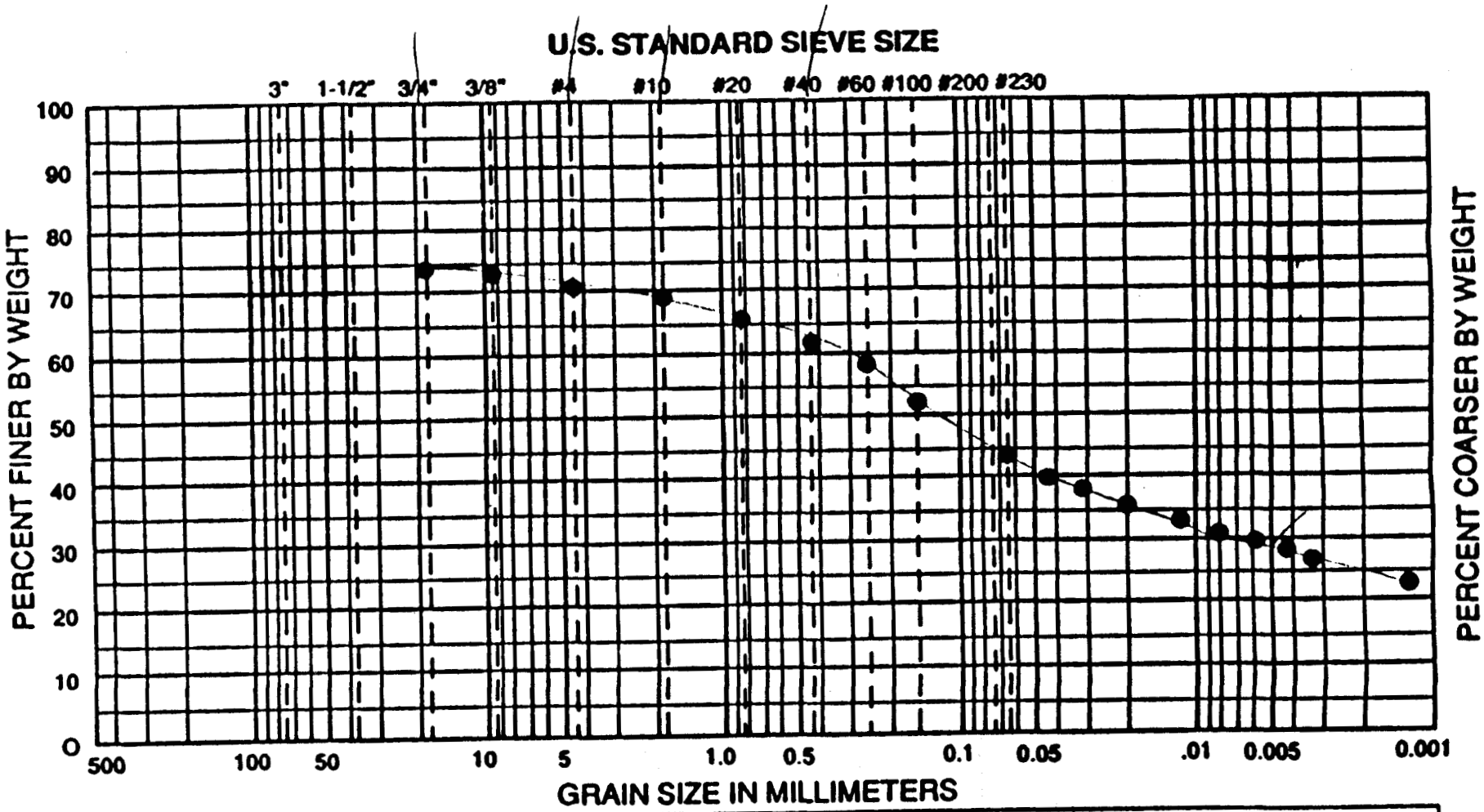
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.61	Temp. Coef. K	0.01348
Value of "a"	1.01	Wt. Dry Sample "W"	78.526
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	39.50	34.50	44.3	44.3	9.81	0.0597
1.0	36.50	31.50	40.4	40.4	10.30	0.0433
2.0	34.25	29.25	37.5	37.5	10.67	0.0311
5.0	33.00	28.00	35.9	35.9	10.88	0.0199
15.0	31.25	26.25	33.7	33.7	11.17	0.0116
30.0	29.50	24.50	31.4	31.4	11.45	0.0083
60.0	28.25	23.25	29.8	29.8	11.66	0.0059
120.0	26.75	21.75	27.9	27.9	11.90	0.0042
190.0	25.75	20.75	26.6	26.6	12.07	0.0034
1440.0	22.50	17.50	22.5	22.5	12.60	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+75 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	20'	Sandy Fine Gravel w/ Coarse Silt 25% , 3.1% f gvl / 2.8% c sd , 6.8% m sd , 16.8% f sd / 17% silt , 28% c[illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION

LABORATORY CLASSIFICATION

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS EG&G

BORING 9+75 SAMPLE CH #11 DEPTH 20'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

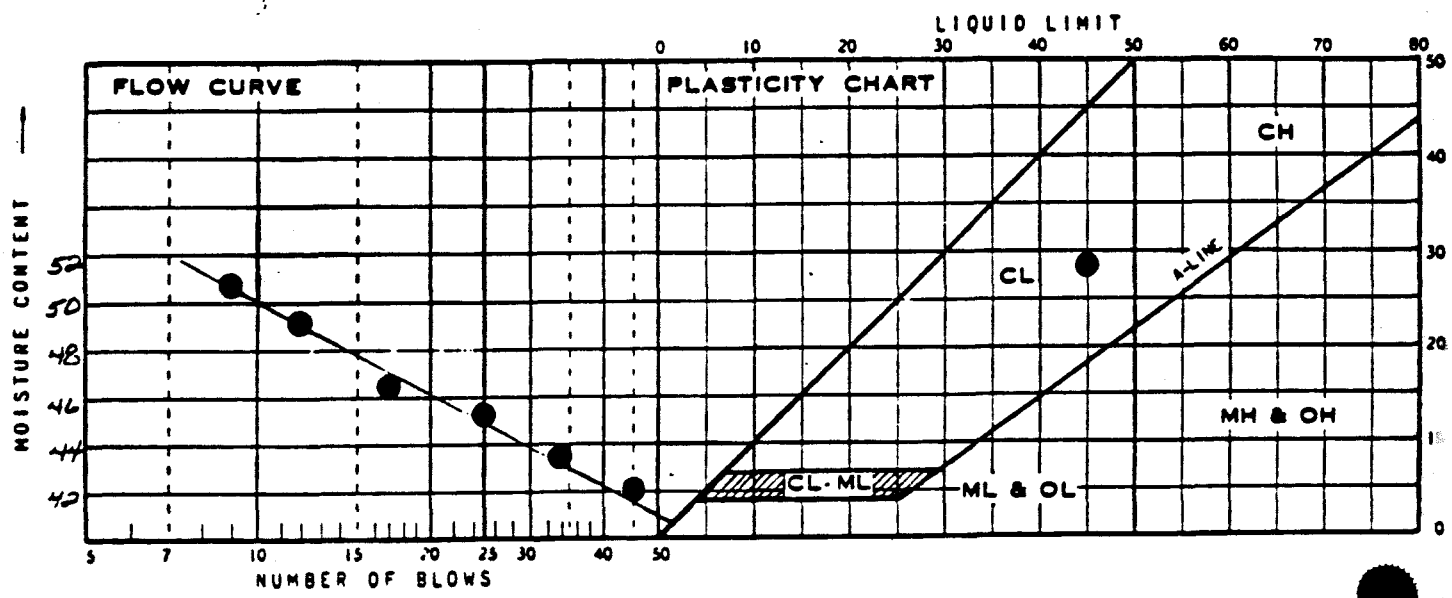
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	4	17 C	2060			
WT OF DISH + WET SOIL g	6.39	6.56	7.32			
WT OF DISH + DRY SOIL g	5.61	5.76	6.42	—	—	—
WT OF MOISTURE g	.78	.80	.90			
WT OF DISH g	1.07	1.04	1.03	—	—	—
WT OF DRY SOIL g	4.54	4.72	5.39			
MOISTURE CONTENT %	17.2	17.0	16.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	48C	2015	2054	1 C	2074	2037
NUMBER OF BLOWS	46	34±	25	17	12	9±
WT OF DISH + WET SOIL g	15.35	16.63	18.72	18.65	15.87	16.27
WT OF DISH + DRY SOIL g	11.10	11.89	13.18	13.07	10.98	11.15
WT OF MOISTURE g	4.25	4.74	5.54	5.58	4.89	5.12
WT OF DISH g	1.04	1.06	1.05	1.07	1.05	1.05
WT OF DRY SOIL g	10.06	10.83	12.13	12.00	9.93	10.10
MOISTURE CONTENT %	42.2	43.8	45.7	46.5	49.3	50.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		45.0	17.0	28.0	CL	

ADVANCED TERRA TESTING INC

RW

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	26'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	41.18
Wt. Dry Soil & Pan	(g)	40.18
Wt. Lost Moisture	(g)	1.00
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	36.50
Moisture Content	%	2.7

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.55

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	574.41
Weight of + #10 Before Washing (g)	111.96
Weight of + #10 After Washing (g)	103.23
Weight of - #10 Wet (g)	462.45
Weight of - #10 Dry (g)	458.62
Wt. Total Sample Dry (g)	561.85
Calc. Wt. "W" (g)	65.61
Calc. Mass + #10	12.05

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	21.39	21.39	21.39	3.8	96.2
3/8"	0.00	26.43	26.43	47.82	8.5	91.5
#4	0.00	30.40	30.40	78.22	13.9	86.1
#10	0.00	25.01	25.01	103.23	18.4	81.6
#20	1.57	3.77	2.20	2.20	21.7	78.3
#40	1.56	7.03	5.47	7.67	30.1	69.9
#60	1.56	5.86	4.30	11.97	36.6	63.4
#100	1.57	5.57	4.00	15.97	42.7	57.3
#230	1.56	7.40	5.84	21.81	51.6	48.4

CLAYEY SAND (SC)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	26'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

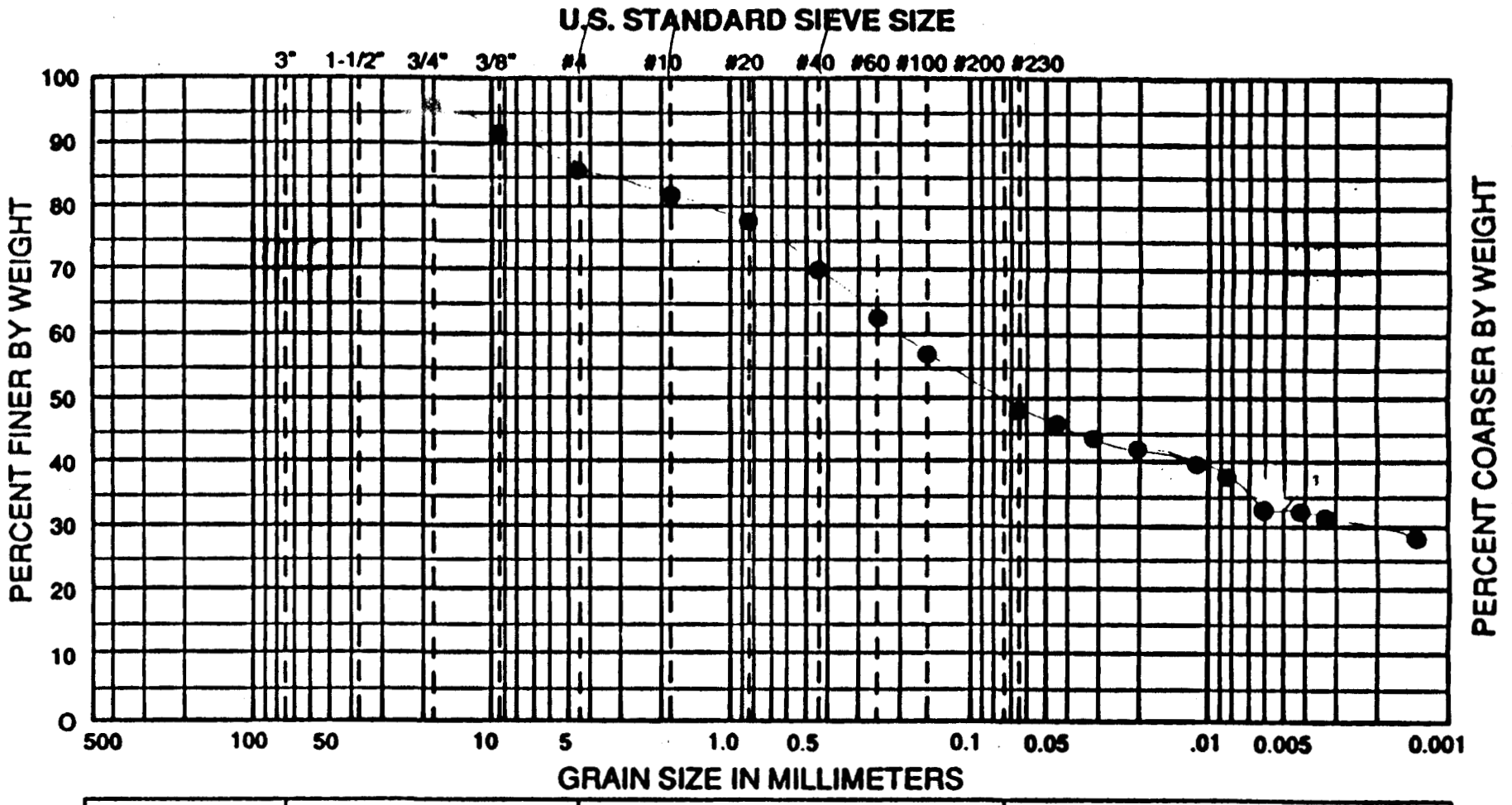
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.62	Temp. Coef. K	0.01345
Value of "a"	1.01	Wt. Dry Sample "W"	65.606
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	38.00	33.00	50.6	50.6	10.06	0.0603
1.0	35.50	30.50	46.8	46.8	10.47	0.0435
2.0	33.50	28.50	43.7	43.7	10.80	0.0313
5.0	32.25	27.25	41.8	41.8	11.00	0.0200
15.0	30.75	25.75	39.5	39.5	11.25	0.0116
30.0	29.50	24.50	37.6	37.6	11.45	0.0083
60.0	26.75	21.75	33.4	33.4	11.90	0.0060
120.0	26.75	21.75	33.4	33.4	11.90	0.0042
190.0	25.75	20.75	31.8	31.8	12.07	0.0034
1440.0	23.00	18.00	27.6	27.6	12.52	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+75 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	26'	CLAYEY SAND w/some silt & gravel (SC) 3.6% C gvl, 10.1% f gvl / 4.5% c sd, 11.7% m sd, 20.9% f sd / 16% silt, 33% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats
BORING 2+75 SAMPLE #11 DEPTH @ 26'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

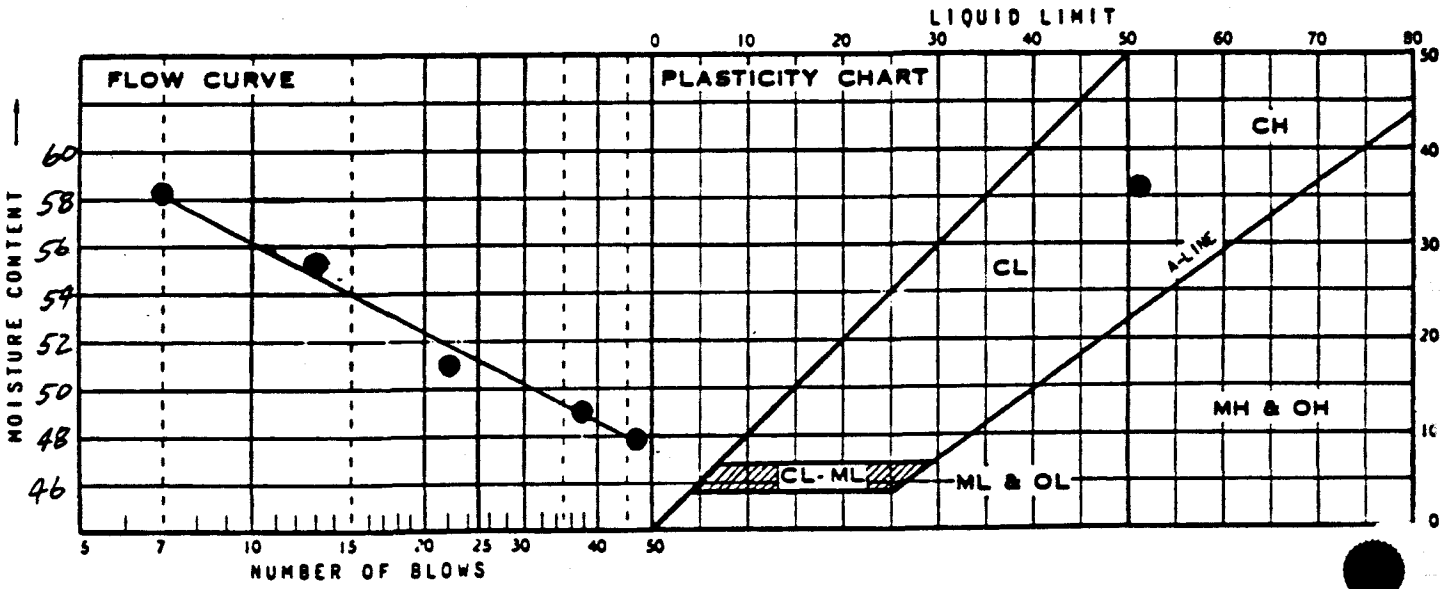
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY ____/__/__

DETERMINATION	1	2	3	4	5	6
DISH	2036	2004	2013			
WT OF DISH + WET SOIL g	6.97	7.14	7.02			
WT OF DISH + DRY SOIL	6.16	6.34	6.21	—	—	—
WT OF MOISTURE	0.81	0.80	0.81			
WT OF DISH	1.05	1.04	1.05	—	—	—
WT OF DRY SOIL	5.11	5.30	5.16			
MOISTURE CONTENT %	15.8	15.9	15.7	= 47.6/3 =	15.8	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	5C	6C	39C	42C	2020	2038
NUMBER OF BLOWS	47	38	22	13	10	7
WT OF DISH + WET SOIL g	10.49	11.35	10.21	11.22	9.08	9.7[illegible]
WT OF DISH + DRY SOIL	7.44	7.97	7.11	7.59	6.18	6.55
WT OF MOISTURE	3.05	3.38	3.10	3.63	2.90	3.20
WT OF DISH	1.06	1.07	1.03	1.04	1.05	1.05
WT OF DRY SOIL	6.38	6.90	6.08	6.55	5.13	5.50
MOISTURE CONTENT %	47.8	49.0	51.0	55.4	56.5	58.2



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		51.3	15.8	35.5	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	31'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	43.55
Wt. Dry Soil & Pan	(g)	42.62
Wt. Lost Moisture	(g)	0.93
Wt. of Pan Only	(g)	3.67
Wt. of Dry Soil	(g)	38.95
Moisture Content	%	2.4

Wt. Hydrom. Sample Wet	(g)	50.02
Wt. Hydrom. Sample Dry	(g)	48.85

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	629.87
Weight of + #10 Before Washing (g)	28.83
Weight of + #10 After Washing (g)	22.62
Weight of - #10 Wet (g)	601.04
Weight of - #10 Dry (g)	593.09
Wt. Total Sample Dry (g)	615.71
Calc. Wt. "W" (g)	50.72
Calc. Mass + #10	1.86

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	14.90	14.90	14.90	2.4	97.6
#4	0.00	2.95	2.95	17.85	2.9	97.1
#10	0.00	4.77	4.77	22.62	3.7	96.3
#20	1.57	1.99	0.42	0.42	4.5	95.5
#40	1.57	2.11	0.54	0.96	5.6	94.4
#60	1.55	2.00	0.45	1.41	6.5	93.5
#100	1.55	3.25	1.70	3.11	9.8	90.2
#230	1.57	9.86	8.29	11.40	26.2	73.8

CLAY (2

(C

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	31'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

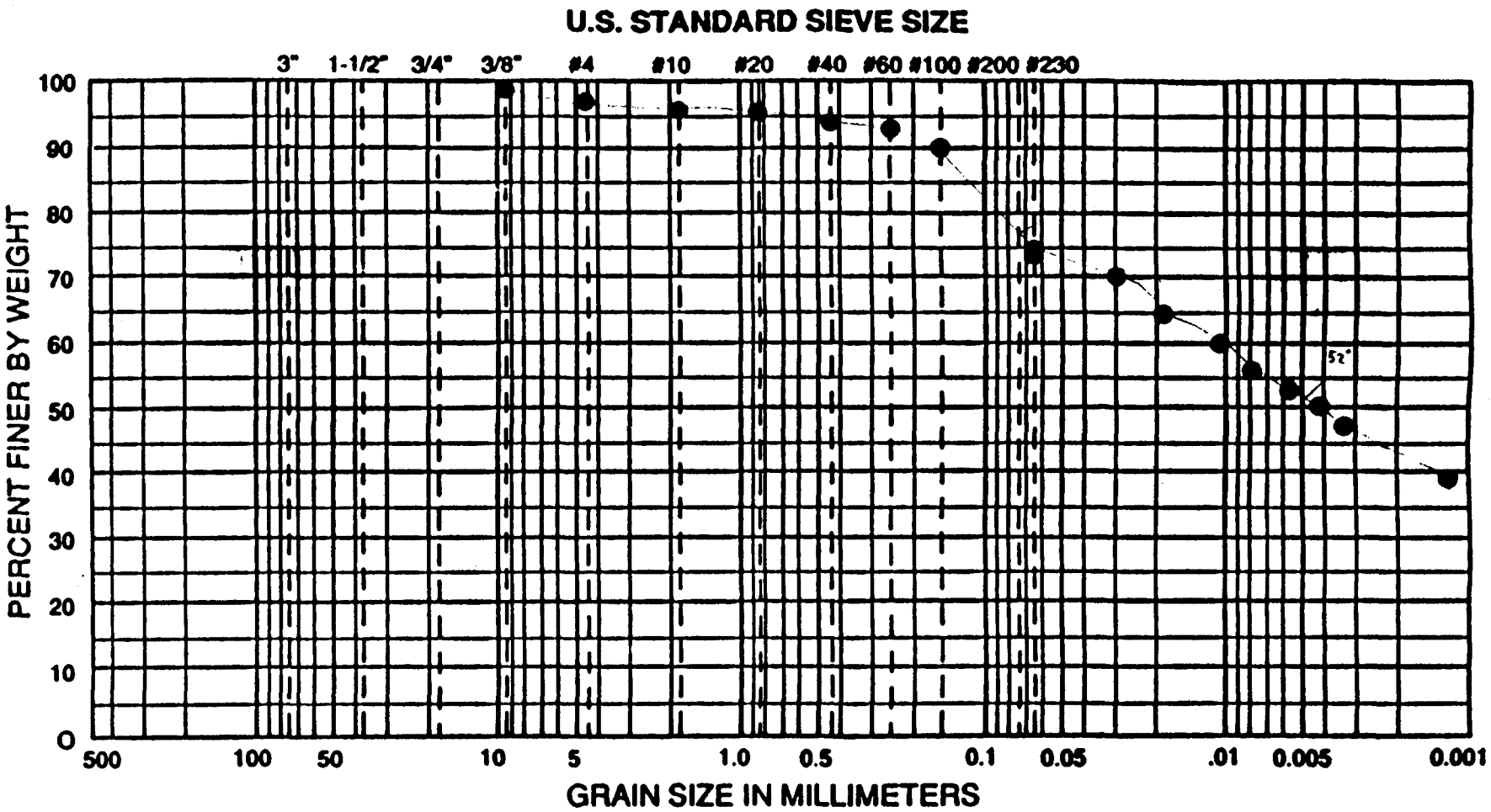
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.66	Temp. Coef. K	0.01328
Value of "a"	1.00	Wt. Dry Sample "W"	50.718
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.25	41.25	81.2	81.2	8.71	0.0554
1.0	43.00	38.00	74.8	74.8	9.24	0.0404
2.0	41.25	36.25	71.3	71.3	9.53	0.0290
5.0	37.75	32.75	64.4	64.4	10.10	0.0189
15.0	35.50	30.50	60.0	60.0	10.47	0.0111
30.0	33.25	28.25	55.6	55.6	10.84	0.0080
60.0	31.75	26.75	52.6	52.6	11.08	0.0057
120.0	30.75	25.75	50.7	50.7	11.25	0.0041
190.0	29.00	24.00	47.2	47.2	11.53	0.0033
1440.0	25.00	20.00	39.4	39.4	12.19	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9175 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	31'	CLAY w/ some silt and sand + gravel 2.9% f gvl, .8% csd, 1.9% msd, 16.9% f sd, 25.5% silt, 52% CLAY

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats / EG&G

BORING 9+75 SAMPLE #11 DEPTH @ 31'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

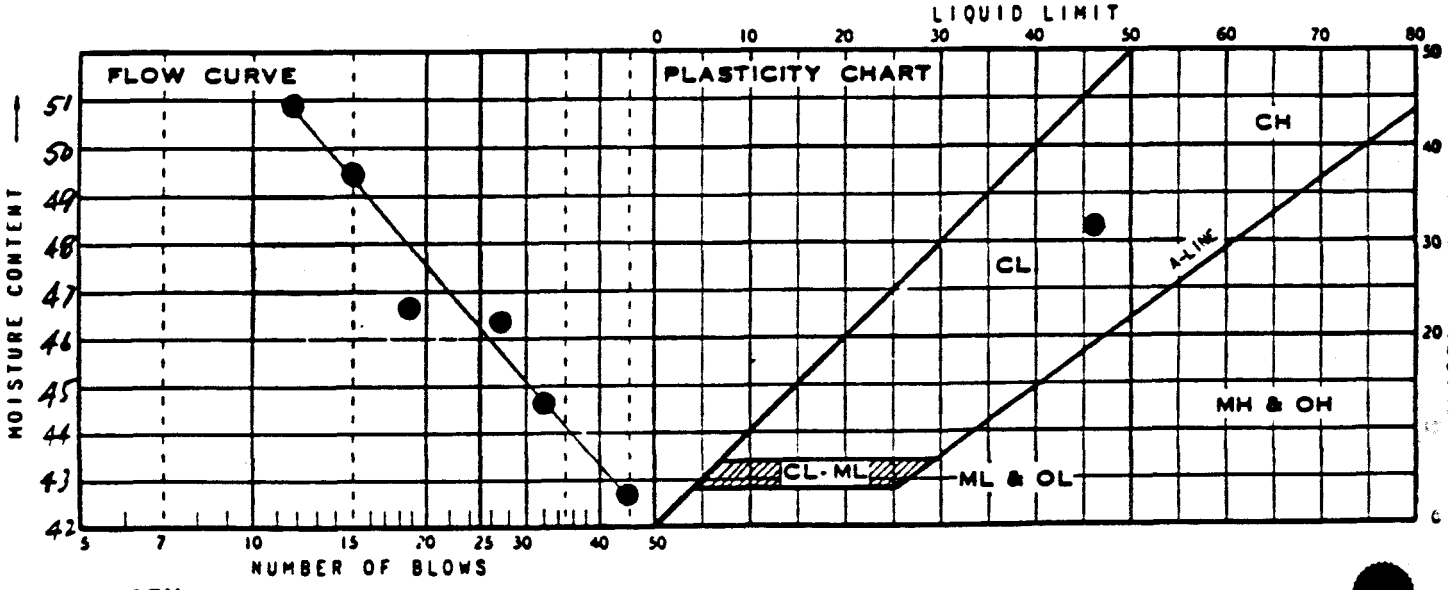
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	12C	22C	24			
WT OF DISH + WET SOIL g	5.09	5.41	5.80			
WT OF DISH + DRY SOIL g	4.54	4.82	5.16	—	—	—
WT OF MOISTURE g	0.55	0.59	0.64			
WT OF DISH g	1.05	1.04	1.04	—	—	—
WT OF DRY SOIL g	3.49	3.78	4.12			
MOISTURE CONTENT %	15.8	15.6	15.5	= 46.9/3 =	15.6	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2028	2019	24C	2021	38C	2051
NUMBER OF BLOWS	45	32	22	19	15	12
WT OF DISH + WET SOIL g	10.07	9.65	10.24	9.31	9.90	8.9
WT OF DISH + DRY SOIL g	7.38	7.00	7.33	6.68	6.97	6.26
WT OF MOISTURE g	2.69	2.65	2.91	2.63	2.93	2.66
WT OF DISH g	1.08	1.06	1.04	1.05	1.04	1.03
WT OF DRY SOIL g	6.30	5.94	6.29	5.63	5.93	5.23
MOISTURE CONTENT %	42.7	44.6	46.3	46.7	49.4	50.9



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		46.3	15.6	30.7	CL

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	34.5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	42.69
Wt. Dry Soil & Pan	(g)	42.15
Wt. Lost Moisture	(g)	0.54
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	38.41
Moisture Content	%	1.4

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	54.25

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.01
Weight of - #10 Dry (g)	54.25
Wt. Total Sample Dry (g)	54.25
Calc. Wt. "W" (g)	54.25
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.58	1.59	0.01	0.01	0.0	100.0
#40	1.55	1.58	0.03	0.04	0.1	99.9
#60	1.57	1.62	0.05	0.09	0.2	99.8
#100	1.57	4.14	2.57	2.66	4.9	95.1
#230	1.57	17.33	15.76	18.42	34.0	66.0

SANDY CLAYEY SILT

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	34.5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

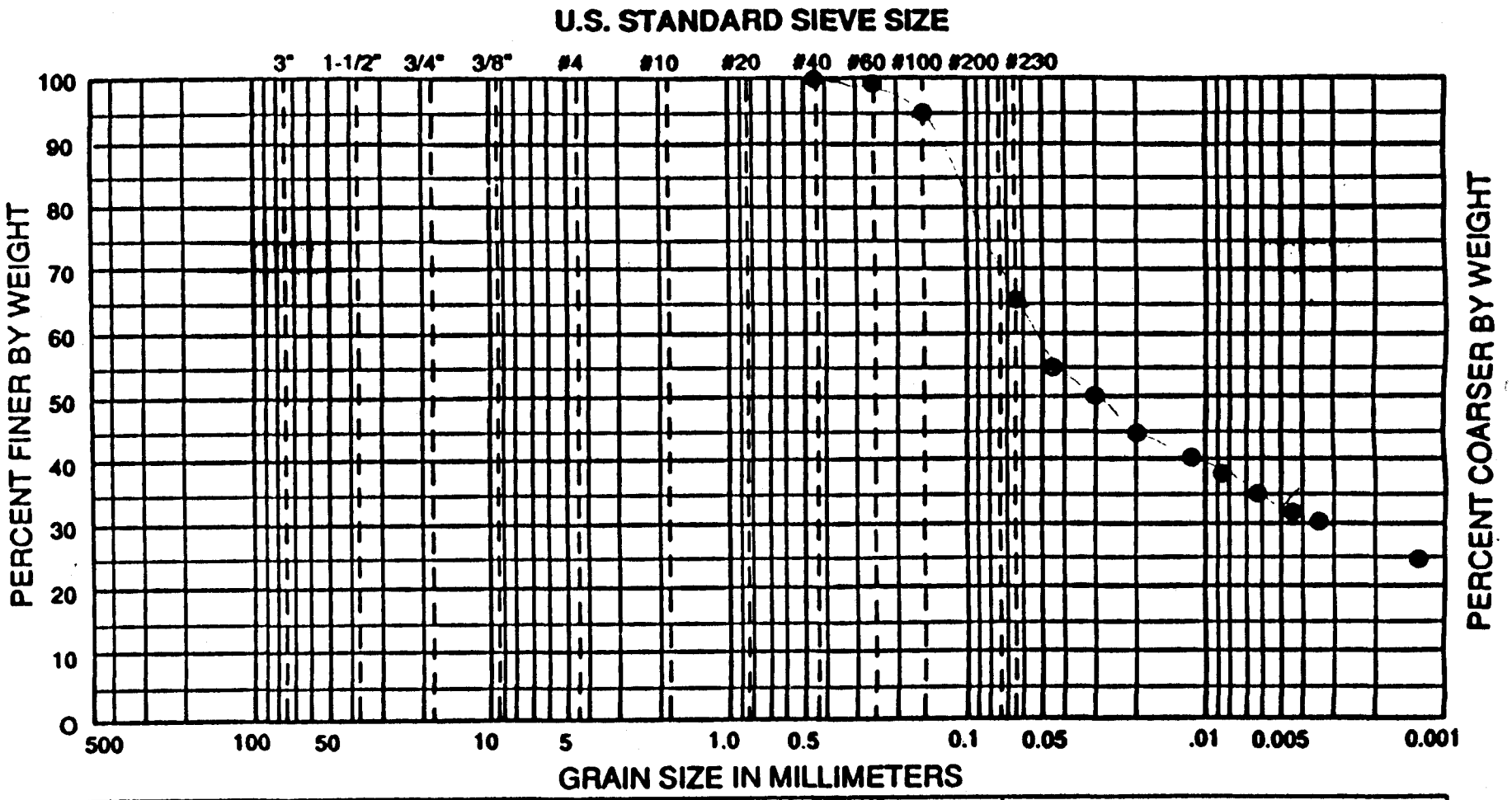
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.64	Temp. Coef. K	0.01336
Value of "a"	1.00	Wt. Dry Sample "W"	54.247
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	40.50	35.50	65.6	65.6	9.65	0.0587
1.0	34.75	29.75	55.0	55.0	10.59	0.0435
2.0	32.00	27.00	49.9	49.9	11.04	0.0314
5.0	28.75	23.75	43.9	43.9	11.58	0.0203
15.0	27.00	22.00	40.6	40.6	11.86	0.0119
30.0	25.50	20.50	37.9	37.9	12.11	0.0085
60.0	24.00	19.00	35.1	35.1	12.35	0.0061
120.0	22.50	17.50	32.3	32.3	12.60	0.0043
190.0	21.75	16.75	30.9	30.9	12.72	0.0035
1440.0	18.00	13.00	24.0	24.0	13.34	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND				SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+75 SAMPLE NO.: 11 DATE: 9/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	34.5'	Sandy Clayey Silt

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION

LABORATORY CLASSIFICATION

JOB NO.

CLIENT/OWNER Walton

LOCATION Rocky Flats EG&G

BORING 9t75 SAMPLE #1L DEPTH @34.5

FIELD DENSITY BY

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

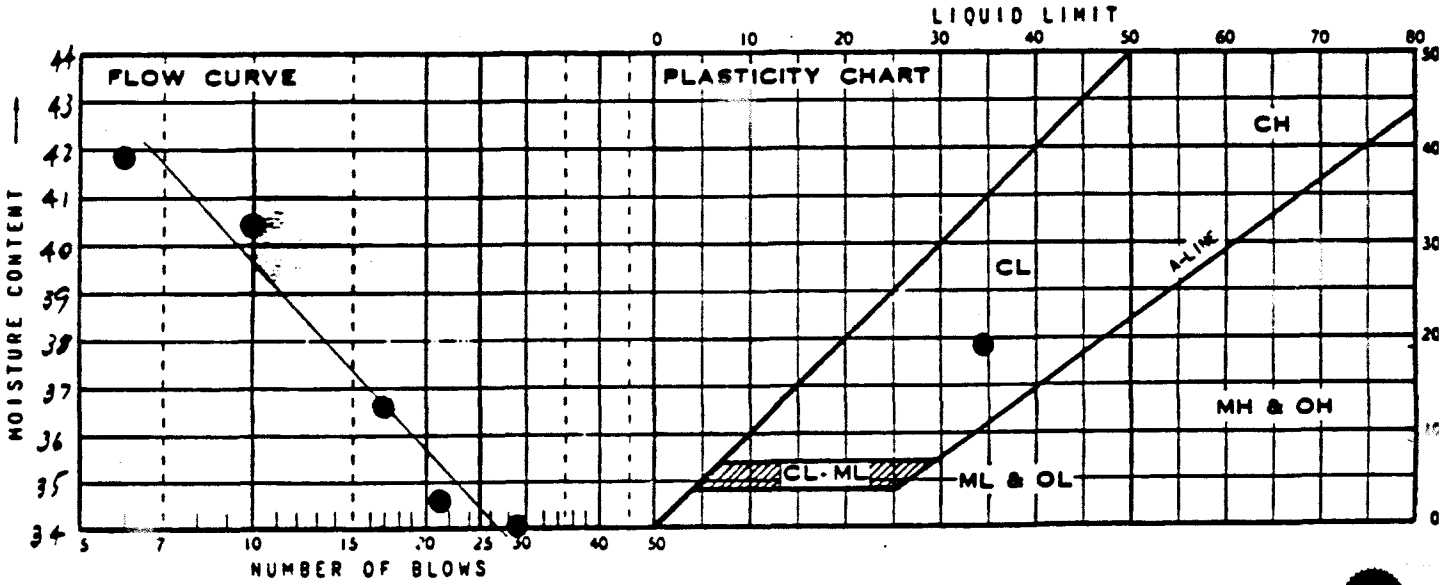
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY RBL 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	2034	31C	2029			
WT OF DISH + WET SOIL g	7.34	7.72	8.61			
WT OF DISH + DRY SOIL g	6.45	6.82	7.61	—	—	—
WT OF MOISTURE g	0.89	0.90	1.00			
WT OF DISH g	1.03	1.05	1.05	—	—	—
WT OF DRY SOIL g	5.42	5.77	6.56			
MOISTURE CONTENT %	16.4	15.6	15.2	= 47.2/3 =	15.7	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2030	2027	2026	26C	2065	
NUMBER OF BLOWS	29	21	17	10	6	
WT OF DISH + WET SOIL g	12.90	12.99	11.87	11.52	12.70	
WT OF DISH + DRY SOIL g	9.89	9.92	8.97	8.51	9.26	—
WT OF MOISTURE g	3.01	3.07	2.90	3.01	3.44	
WT OF DISH g	1.05	1.05	1.04	1.05	1.04	—
WT OF DRY SOIL g	8.84	8.87	7.93	7.46	8.22	
MOISTURE CONTENT %	34.0	34.6	36.6	40.4	41.8	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		34.5	15.7	18.8	CL

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Wes[redacted]

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	39'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	47.86
Wt. Dry Soil & Pan	(g)	46.77
Wt. Lost Moisture	(g)	1.09
Wt. of Pan Only	(g)	3.81
Wt. of Dry Soil	(g)	42.96
Moisture Content	%	2.5

Wt. Hydrom. Sample Wet (g)	55.00
Wt. Hydrom. Sample Dry (g)	53.64

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	529.21
Weight of + #10 Before Washing (g)	1.92
Weight of + #10 After Washing (g)	1.51
Weight of - #10 Wet (g)	527.29
Weight of - #10 Dry (g)	514.64
Wt. Total Sample Dry (g)	516.15
Calc. Wt. "W" (g)	53.80
Calc. Mass + #10	0.16

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	1.51	1.51	1.51	0.3	99.7
#20	1.57	1.58	0.01	0.01	0.3	99.7
#40	1.56	1.62	0.06	0.07	0.4	99.6
#60	1.46	1.53	0.07	0.14	0.6	99.4
#100	1.58	1.93	0.35	0.49	1.2	98.8
#230	1.55	3.27	1.72	2.21	4.4	95.6

SILTY CLAY (CH)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	39'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

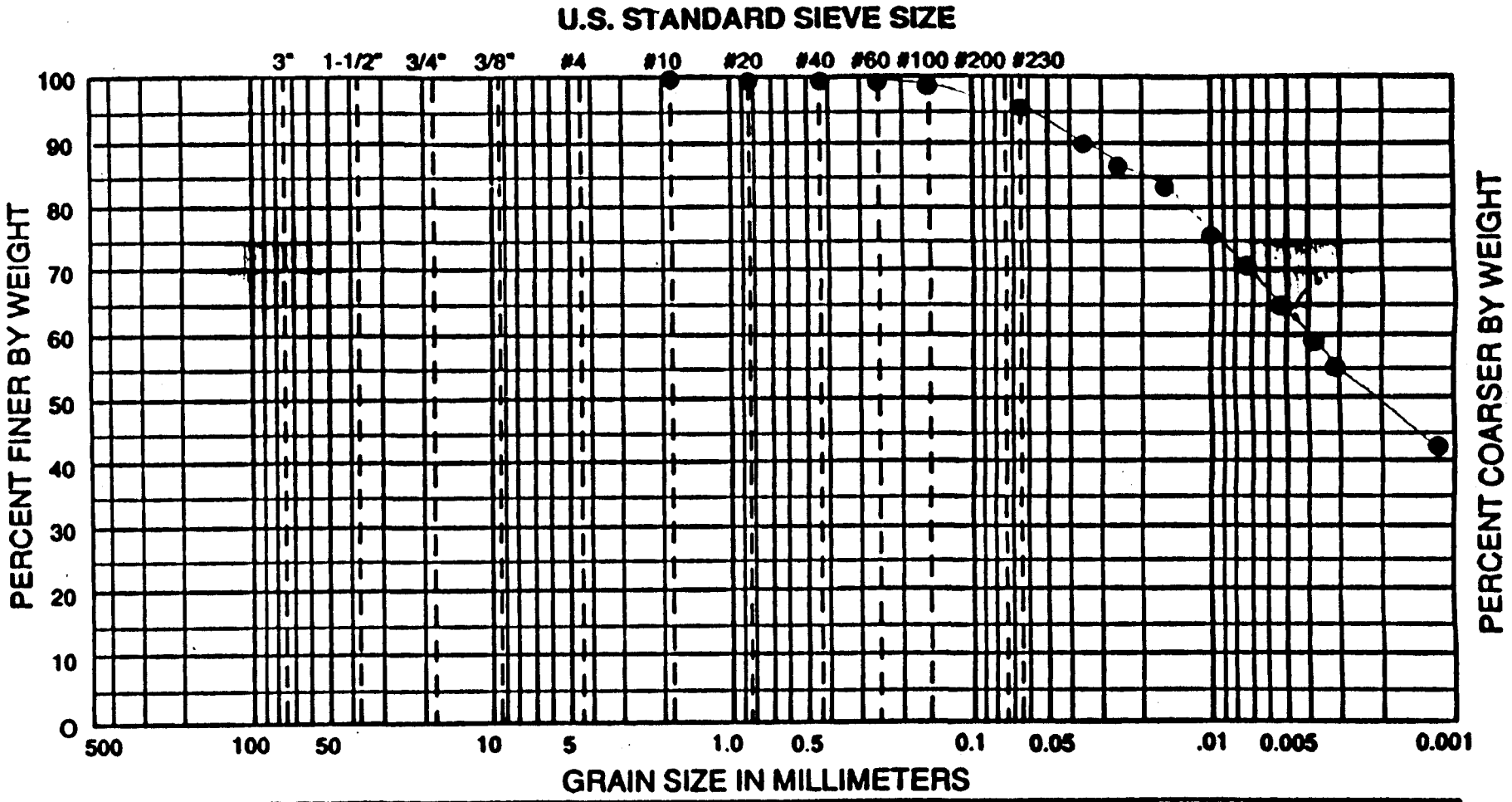
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.66	Temp. Coef. K	0.01328
Value of "a"	1.00	Wt. Dry Sample "W"	53.798
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.75	51.75	96.0	96.0	6.98	0.0496
1.0	53.75	48.75	90.4	90.4	7.48	0.0363
2.0	52.00	47.00	87.2	87.2	7.76	0.0262
5.0	50.50	45.50	84.4	84.4	8.01	0.0168
15.0	46.00	41.00	76.1	76.1	8.75	0.0101
30.0	43.00	38.00	70.5	70.5	9.24	0.0074
60.0	39.75	34.75	64.5	64.5	9.77	0.0054
120.0	36.75	31.75	58.9	58.9	10.26	0.0039
190.0	34.50	29.50	54.7	54.7	10.63	0.0031
1440.0	28.25	23.25	43.1	43.1	11.66	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9175 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	39.0'	SILTY CLAY w/ tr sand .3% C sand, .1% M sand, 4.3% F sand, 31.6% Silt, 64% Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS EG&G

BORING 9+75 SAMPLE CH#11 DEPTH 39'

FIELD DENSITY BY ...../../...

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

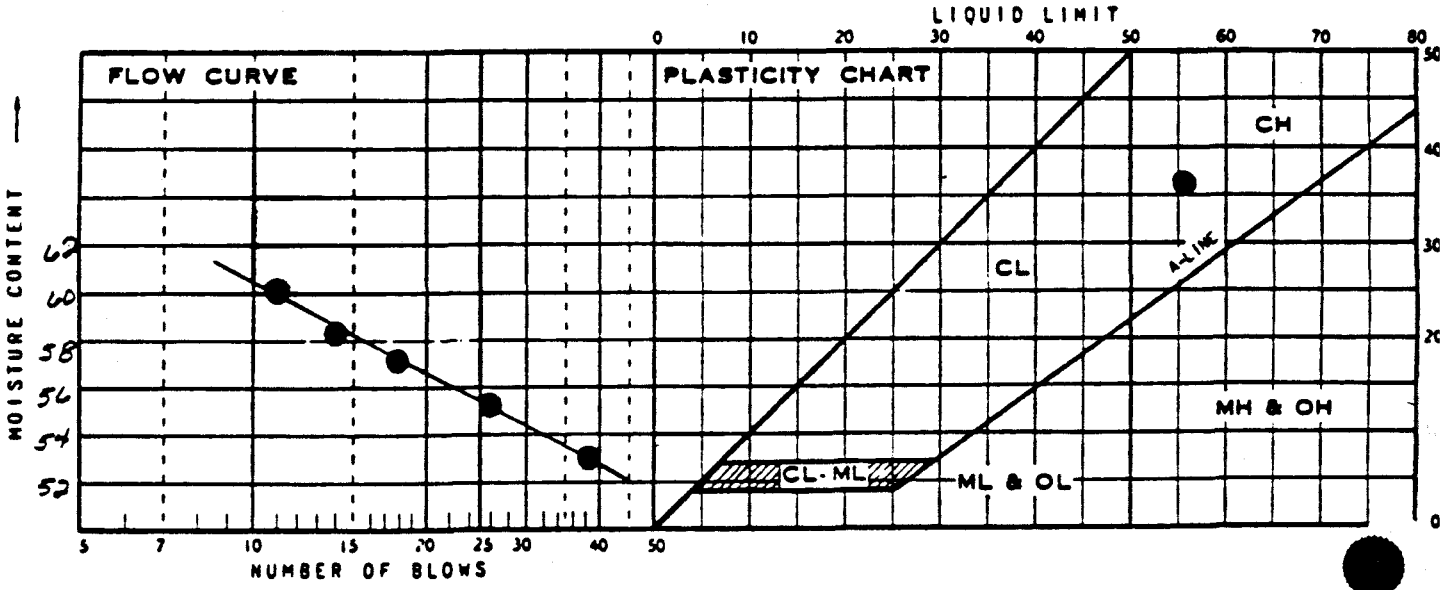
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR.3.116192

DETERMINATION	1	2	3	4	5	6
DISH	42 C	39 C	2038			
WT OF DISH + WET SOIL g	5.16	5.66	6.28			
WT OF DISH + DRY SOIL g	4.50	4.91	5.46	—	—	—
WT OF MOISTURE g	.66	.75	.82			
WT OF DISH g	1.05	1.03	1.05	—	—	—
WT OF DRY SOIL g	3.45	3.88	4.41			
MOISTURE CONTENT %	19.1	19.3	18.6			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	5 C	2013	2004	2036	6 C	
NUMBER OF BLOWS	39	26	18±	14±	11±	
WT OF DISH + WET SOIL g	16.92	16.86	16.75	13.86	18.92	
WT OF DISH + DRY SOIL g	11.42	11.23	11.04	9.14	12.21	—
WT OF MOISTURE g	5.50	5.63	5.71	4.72	6.71	
WT OF DISH g	1.06	1.05	1.05	1.06	1.08	—
WT OF DRY SOIL g	10.36	10.18	9.99	8.08	11.13	
MOISTURE CONTENT %	53.1	55.3	57.2	58.4	60.3	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		55.4	19.0	36.4	CH	

ADVANCED TERRA TESTING inc

227
BR

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	55'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	56.10
Wt. Dry Soil & Pan	(g)	54.30
Wt. Lost Moisture	(g)	1.80
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	50.58
Moisture Content	%	3.6
Wt. Hydrom. Sample Wet	(g)	54.66
Wt. Hydrom. Sample Dry	(g)	52.78

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	426.42
Weight of + #10 Before Washing (g)	2.06
Weight of + #10 After Washing (g)	0.09
Weight of - #10 Wet (g)	424.36
Weight of - #10 Dry (g)	411.68
Wt. Total Sample Dry (g)	411.77
Calc. Wt. "W" (g)	52.80
Calc. Mass + #10	0.01

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.09	0.09	0.09	0.0	100.0
#20	1.58	1.65	0.07	0.07	0.2	99.8
#40	1.57	1.64	0.07	0.14	0.3	99.7
#60	1.31	1.38	0.07	0.21	0.4	99.6
#100	1.58	1.65	0.07	0.28	0.6	99.4
#230	1.57	3.33	1.76	2.04	3.9	96.1

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	9+75	SAMPLED	Rocky Flats
DEPTH	55'	DATE TESTED	03-16-92 S
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

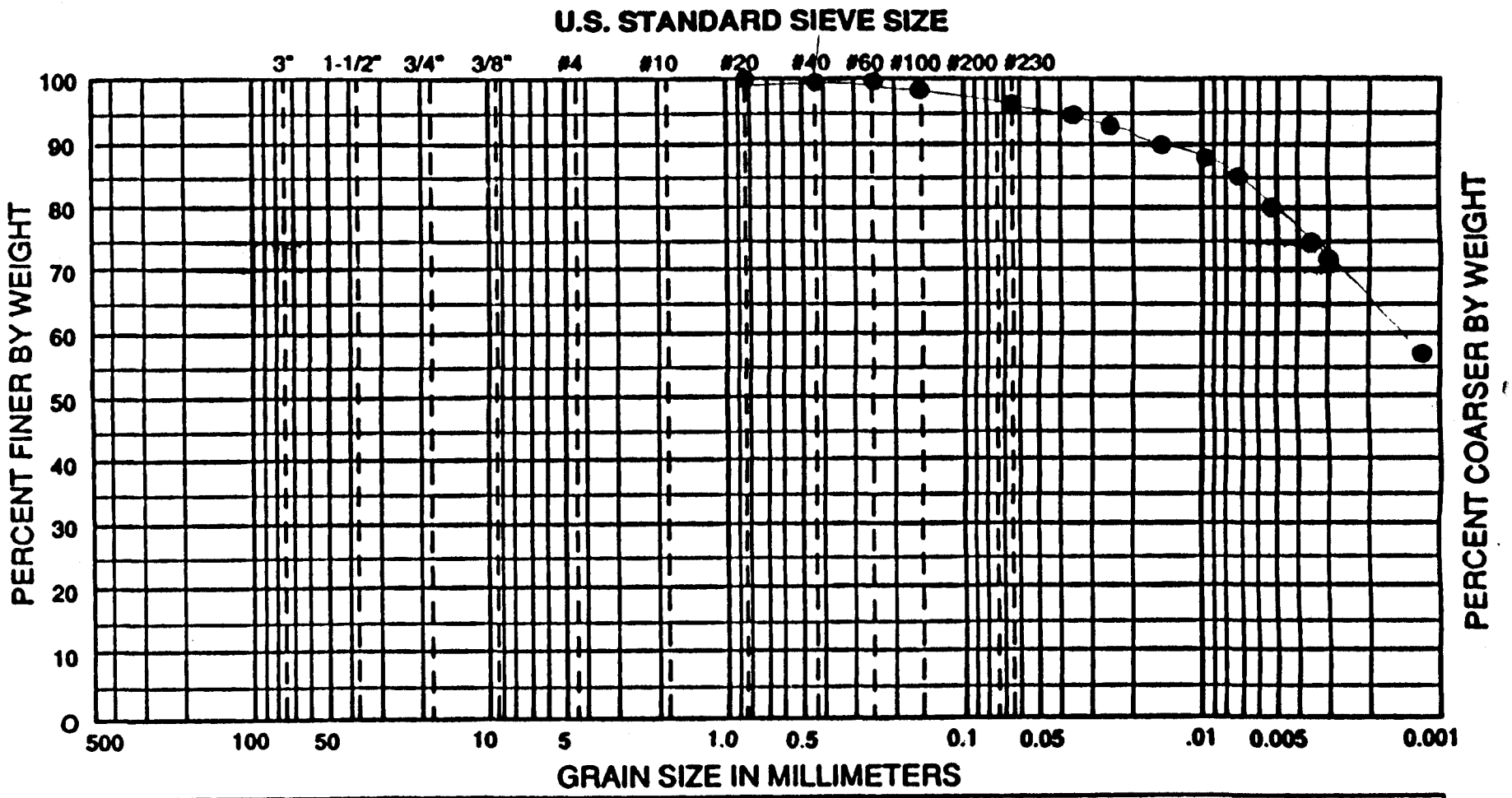
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.61	Temp. Coef. K	0.01349
Value of "a"	1.01	Wt. Dry Sample "W"	52.796
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.50	50.50	96.4	96.4	7.19	0.0512
1.0	54.75	49.75	95.0	95.0	7.31	0.0365
2.0	53.50	48.50	92.6	92.6	7.52	0.0262
5.0	52.25	47.25	90.2	90.2	7.72	0.0168
15.0	51.00	46.00	87.8	87.8	7.93	0.0098
30.0	49.25	44.25	84.5	84.5	8.21	0.0071
60.0	47.00	42.00	80.2	80.2	8.58	0.0051
120.0	44.25	39.25	74.9	74.9	9.03	0.0037
190.0	42.75	37.75	72.1	72.1	9.28	0.0030
1440.0	35.00	30.00	57.3	57.3	10.55	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 9+75 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	55'	.3% med sand, 3.6% fine sand, 16.1% silt, 80% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Roxy Flats

BORING 9+75 SAMPLE #4 DEPTH @55'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

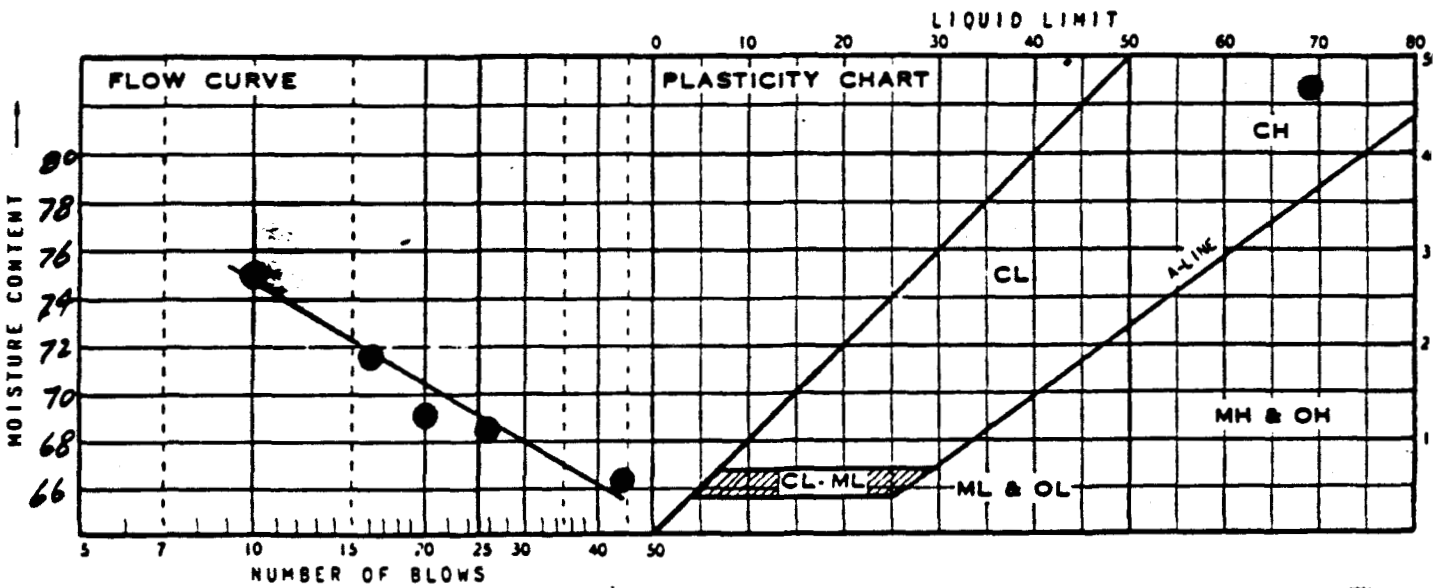
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/19/92

DETERMINATION	1	2	3	4	5	6
DISH	75C	OC	10C			
WT OF DISH + WET SOIL	8.11	6.94	6.05			
WT OF DISH + DRY SOIL	6.75	5.88	5.18	—	—	—
WT OF MOISTURE	1.36	1.06	0.87			
WT OF DISH	1.05	1.05	1.06	—	—	—
WT OF DRY SOIL	5.70	4.83	4.12			
MOISTURE CONTENT	23.9	21.9	21.1	= 66.9/3	= 22.3	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	9C	37C	41C	2073	2071	22
NUMBER OF BLOWS	44	26	20	16	10	7
WT OF DISH + WET SOIL	9.04	7.52	9.69	9.10	8.36	8.26
WT OF DISH + DRY SOIL	5.86	4.90	6.15	5.74	5.23	5.0[illegible]
WT OF MOISTURE	3.18	2.62	3.54	3.36	3.13	3.20
WT OF DISH	1.06	1.07	1.03	1.05	1.05	1.05
WT OF DRY SOIL	4.80	3.83	5.12	4.69	4.18	4.01
MOISTURE CONTENT	66.2	68.4	69.1	71.6	74.9	79.8



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		69.2	22.3	46.9	CH

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	1'	DATE TESTED	02-24-92 TNU
SAMPLE NO.	#4	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	58.67
Wt. Dry Soil & Pan	(g)	55.96
Wt. Lost Moisture	(g)	2.71
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	52.18
Moisture Content	%	5.2
Wt. Hydrom. Sample Wet	(g)	60.00
Wt. Hydrom. Sample Dry	(g)	57.04

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	580.19
Weight of + #10 Before Washing (g)	18.48
Weight of + #10 After Washing (g)	14.21
Weight of - #10 Wet (g)	561.71
Weight of - #10 Dry (g)	538.04
Wt. Total Sample Dry (g)	552.25
Calc. Wt. "W" (g)	58.54
Calc. Mass + #10	1.51

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	1.11	1.11	1.11	0.2	99.8
#4	0.00	2.94	2.94	4.05	0.7	99.3
#10	0.00	10.16	10.16	14.21	2.6	97.4
#20	1.56	2.42	0.86	0.86	4.0	96.0
#40	1.56	2.76	1.20	2.06	6.1	93.9
#60	1.57	3.06	1.49	3.55	8.6	91.4
#100	1.57	4.15	2.58	6.13	13.0	87.0
#230	1.59	6.86	5.27	11.40	22.0	78.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	1'	DATE TESTED	02-24-92 TNU
SAMPLE NO.	#4	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

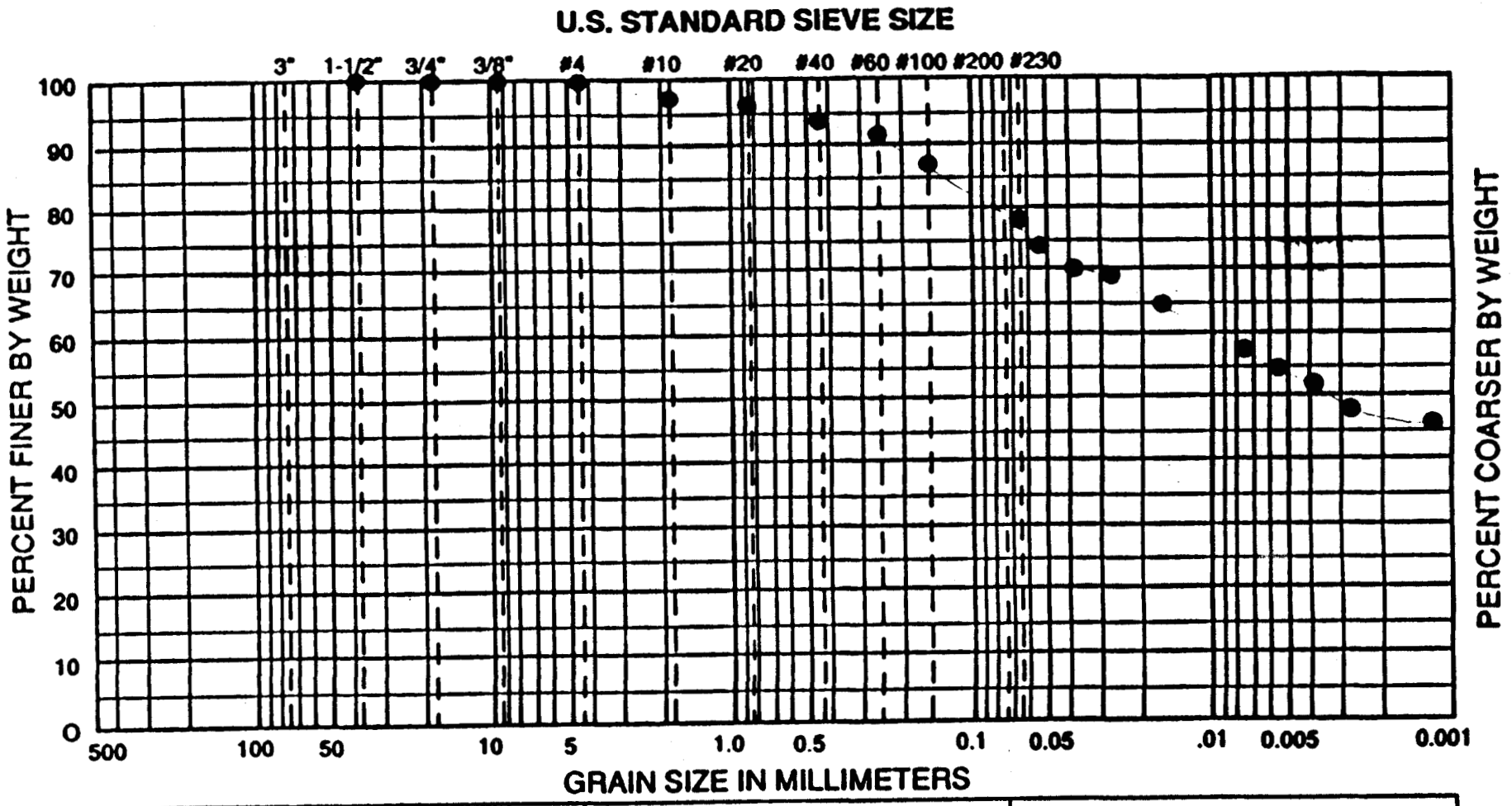
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	58.544
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.50	44.00	74.1	74.1	8.34	0.0533
1.0	46.00	41.50	69.9	69.9	8.75	0.0386
2.0	45.50	41.00	69.1	69.1	8.83	0.0274
5.0	43.00	38.50	64.8	64.8	9.24	0.0177
15.0	40.50	36.00	60.6	60.6	9.65	0.0105
30.0	38.50	34.00	57.3	57.3	9.98	0.0075
60.0	37.00	32.50	54.7	54.7	10.22	0.0054
120.0	35.00	30.50	51.4	51.4	10.55	0.0039
250.0	33.00	28.50	48.0	48.0	10.88	0.0027
1440.0	31.50	27.00	45.5	45.5	11.12	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+00 SAMPLE NO.: 4 DATE: 3 Mar 92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	@ 1 ft	[illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 7066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats EG+G
BORING 10-00 SAMPLE CH #4 DEPTH 1'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

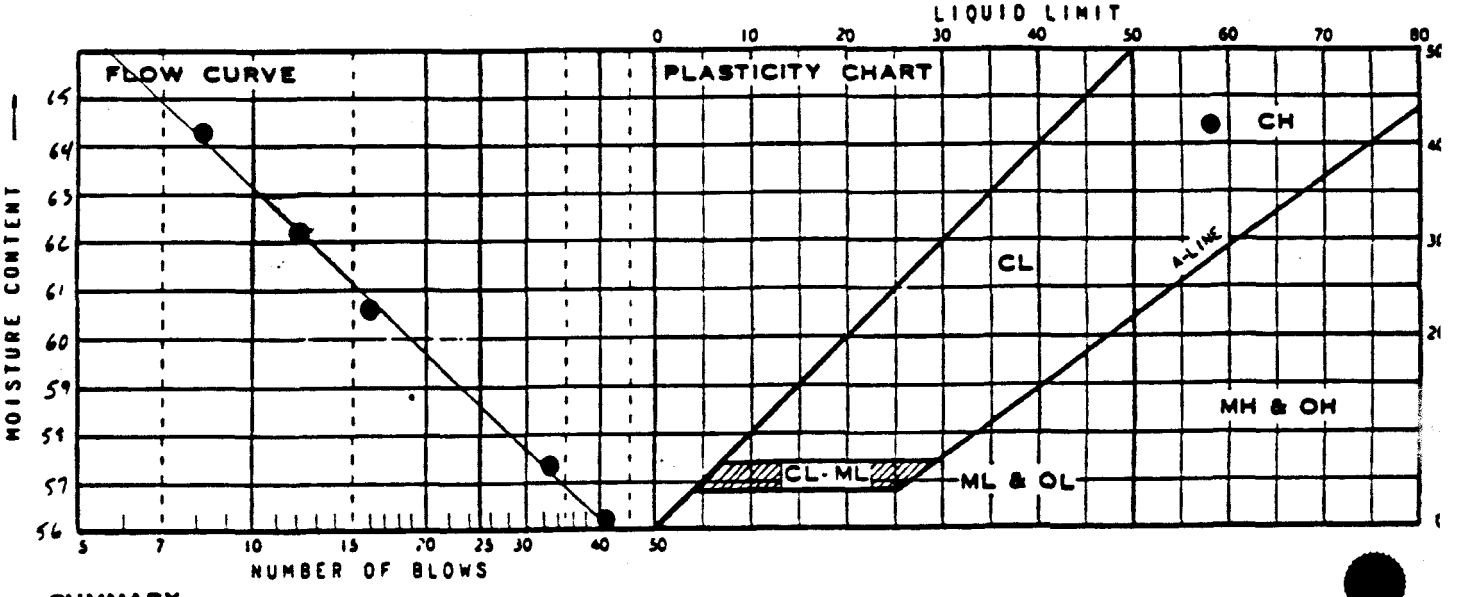
PLASTIC LIMIT BY ___/2/26/93

DETERMINATION	? 1 ?	2	3	4	5	6
DISH	2C	8C	39C			
WT OF DISH + WET SOIL g	8.96g	6.30g	6.24g			
WT OF DISH + DRY SOIL g	7.73	5.56	5.49	—	—	—
WT OF MOISTURE g	1.23	.74	.75			
WT OF DISH g	1.04	1.05	1.03	—	—	—
WT OF DRY SOIL g	6.69	4.51	4.46			
MOISTURE CONTENT %	18.4	16.4	16.8			

LIQUID LIMIT

??

DETERMINATION	1	2	3	4	5	6
DISH	6C	11C	44C	48C	2021	2051
NUMBER OF BLOWS	41	33	19	16	18	8
WT OF DISH + WET SOIL g	11.92	13.79	11.59	12.06	11.72	14.41
WT OF DISH + DRY SOIL g	8.00	8.82	7.68	7.90	7.63	9.21
WT OF MOISTURE g	3.92	4.97	3.91	4.16	4.09	5.26
WT OF DISH g	1.03	1.03	1.03	1.05	1.05	1.03
WT OF DRY SOIL g	6.97	7.79	6.65	6.85	6.58	8.18
MOISTURE CONTENT %	56.2	57.4	58.8	60.7	62.2	64.3



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		58.6	16.6	42.0	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	5'	DATE TESTED	02-24-92 TN
SAMPLE NO.	#4	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	61.61
Wt. Dry Soil & Pan	(g)	59.18
Wt. Lost Moisture	(g)	2.43
Wt. of Pan Only	(g)	3.77
Wt. of Dry Soil	(g)	55.41
Moisture Content	%	4.4
Wt. Hydrom. Sample Wet	(g)	60.00
Wt. Hydrom. Sample Dry	(g)	57.48

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	643.19
Weight of + #10 Before Washing (g)	3.85
Weight of + #10 After Washing (g)	3.36
Weight of - #10 Wet (g)	639.34
Weight of - #10 Dry (g)	612.95
Wt. Total Sample Dry (g)	616.31
Calc. Wt. "W" (g)	57.79
Calc. Mass + #10	0.32

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	2.14	2.14	2.14	0.3	99.7
#10	0.00	1.22	1.22	3.36	0.5	99.5
#20	1.56	2.02	0.46	0.46	1.3	98.7
#40	1.56	3.07	1.51	1.97	4.0	96.0
#60	1.57	3.94	2.37	4.34	8.1	91.9
#100	1.56	6.00	4.44	8.78	15.7	84.3
#230	1.56	9.26	7.70	16.48	29.1	70.9

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	5'	DATE TESTED	02-24-92 TNU
SAMPLE NO.	#4	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

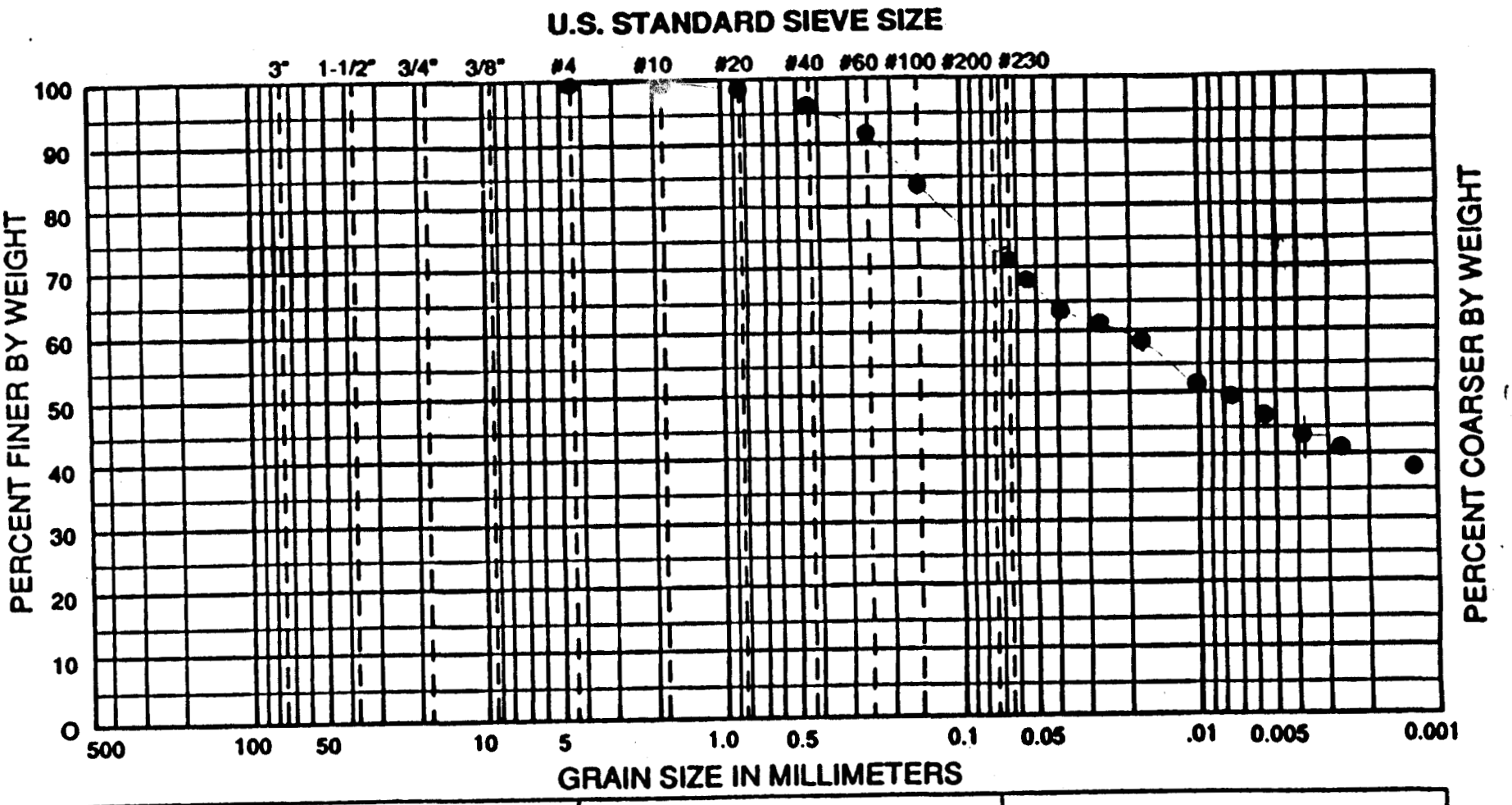
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.75	Temp. Coef. K	0.01279
Value of "a"	0.98	Wt. Dry Sample "W"	57.794
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	45.00	40.50	68.7	68.7	8.91	0.0540
1.0	42.50	38.00	64.4	64.4	9.32	0.0390
2.0	41.00	36.50	61.9	61.9	9.57	0.0280
5.0	39.00	34.50	58.5	58.5	9.89	0.0180
15.0	35.00	30.50	51.7	51.7	10.55	0.0107
30.0	33.50	29.00	49.2	49.2	10.80	0.0077
60.0	32.50	28.00	47.5	47.5	10.96	0.0055
120.0	30.50	26.00	44.1	44.1	11.29	0.0039
250.0	29.00	24.50	41.5	41.5	11.53	0.0027
1440.0	27.00	22.50	38.2	38.2	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE		
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND		SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE

WELLNAME: 10+00 SAMPLE NO.: #4 DATE: 7-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	50'	Clay (CL) 37

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER WESTON

LOCATION _____

BORING 10+00 SAMPLE ____ DEPTH 05'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

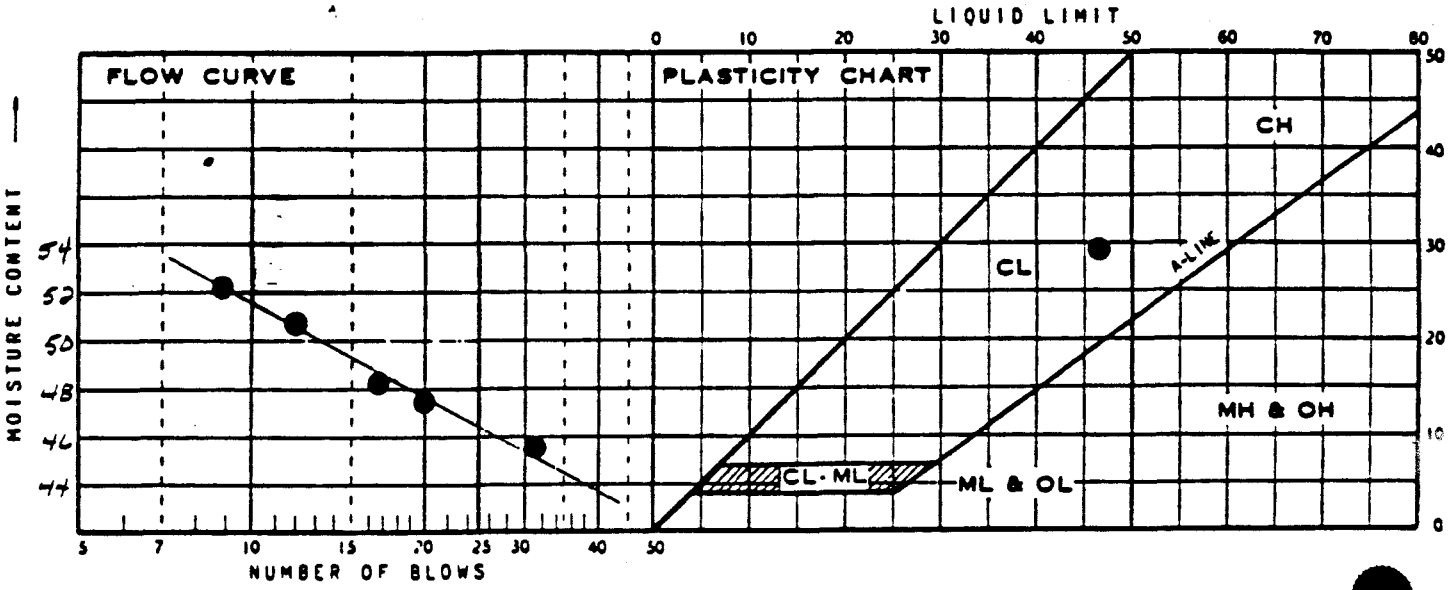
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SB_.2.125792.

DETERMINATION	1	2	3	4	5	6
DISH	2012	182	2037			
WT OF DISH + WET SOIL g	8.85	8.38	6.64			
WT OF DISH + DRY SOIL g	7.75	7.28	5.82	—	—	—
WT OF MOISTURE g	1.10	1.10	.82			
WT OF DISH g	1.04	1.03	1.04	—	—	—
WT OF DRY SOIL g	6.71	6.25	4.78			
MOISTURE CONTENT %	16.4	17.6	17.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2043	2026	2011	2044	2057	
NUMBER OF BLOWS	31	20	18 ±	12	9	
WT OF DISH + WET SOIL g	18.13	19.84	16.99	16.13	18.10	
WT OF DISH + DRY SOIL g	12.78	13.77	11.79	11.06	12.25	—
WT OF MOISTURE g	5.35	6.07	5.20	5.07	5.85	
WT OF DISH g	1.06	1.04	1.05	1.06	1.04	—
WT OF DRY SOIL g	11.72	12.73	10.74	10.00	11.21	
MOISTURE CONTENT %	45.7	47.7	48.4	50.7	52.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		46.5	17.0	29.5	CL	

ADVANCED TERRA TESTING inc

Ka'

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	13.0'	DATE TESTED	02-28-92 TN
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	88.40
Wt. Dry Soil & Pan	(g)	86.59
Wt. Lost Moisture	(g)	1.81
Wt. of Pan Only	(g)	3.77
Wt. of Dry Soil	(g)	82.82
Moisture Content	%	2.2
Wt. Hydrom. Sample Wet	(g)	60.01
Wt. Hydrom. Sample Dry	(g)	58.72

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	602.11
Weight of + #10 Before Washing (g)	4.83
Weight of + #10 After Washing (g)	2.29
Weight of - #10 Wet (g)	597.28
Weight of - #10 Dry (g)	586.99
Wt. Total Sample Dry (g)	589.28
Calc. Wt. "W" (g)	58.95
Calc. Mass + #10	0.23

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	2.29	2.29	2.29	0.4	99.6
#20	1.56	1.95	0.39	0.39	1.1	98.9
#40	1.30	2.57	1.27	1.66	3.2	96.8
#60	1.32	3.49	2.17	3.83	6.9	93.1
#100	1.31	5.81	4.50	8.33	14.5	85.5
#230	1.56	10.98	9.42	17.75	30.5	69.5

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	13.0'	DATE TESTED	02-28-92 TN
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

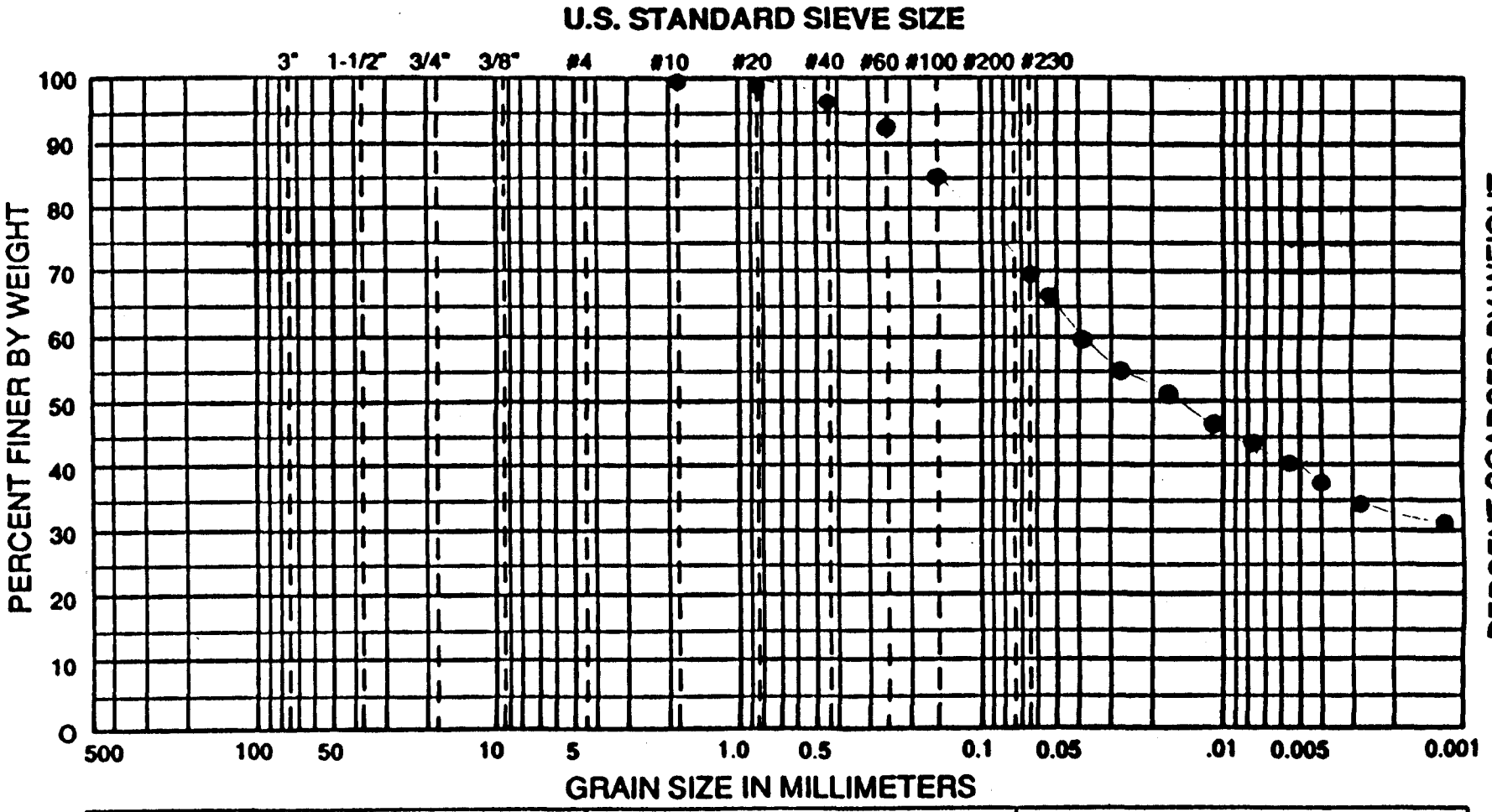
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01290
Value of "a"	0.98	Wt. Dry Sample "W"	58.954
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.75	39.75	65.9	65.9	8.95	0.0546
1.0	41.00	36.00	59.7	59.7	9.57	0.0399
2.0	38.25	33.25	55.2	55.2	10.02	0.0289
5.0	36.25	31.25	51.8	51.8	10.35	0.0186
15.0	33.50	28.50	47.3	47.3	10.80	0.0109
30.0	32.00	27.00	44.8	44.8	11.04	0.0078
60.0	29.25	24.25	40.2	40.2	11.49	0.0056
120.0	27.75	22.75	37.7	37.7	11.74	0.0040
250.0	26.00	21.00	34.8	34.8	12.03	0.0028
1440.0	23.75	18.75	31.1	31.1	12.40	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+00 SAMPLE NO.: CH#8 DATE: 3/9/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	13.0'	SANDY SILTY CLAY (CL) 4% C sd, 2.8% M sd, 24.8% f sd, 32% Silt, 40% Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 10-00 SAMPLE CH #8 DEPTH 13'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

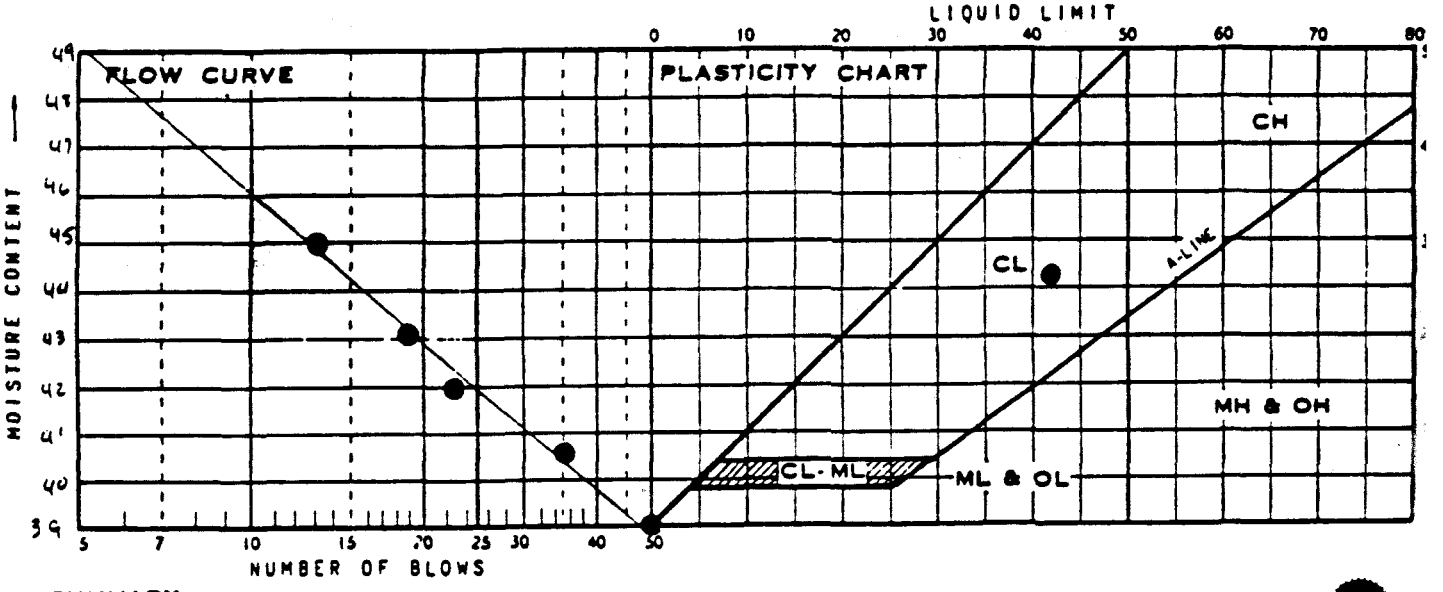
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DH 3/3/93

DETERMINATION	1	2	3	4	5	6
DISH	2004	2002	2017			
WT OF DISH + WET SOIL g	6.50	7.08	6.85			
WT OF DISH + DRY SOIL g	5.82	6.29	6.05	—	—	—
WT OF MOISTURE g	.68	.79	.80			
WT OF DISH g	1.04	1.05	1.03	—	—	—
WT OF DRY SOIL g	4.78	5.24	4.98			
MOISTURE CONTENT %	14.2	15.1	16.1			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6 ?
DISH	30C	2033	2074	66C	2014	2041
NUMBER OF BLOWS	50	35	22	19	13	9
WT OF DISH + WET SOIL g	12.05	12.07	11.96	11.75	12.02	13.2
WT OF DISH + DRY SOIL g	8.96	8.99	8.73	8.53	8.62	9.[illegible]
WT OF MOISTURE g	3.09	3.18	3.23	3.22	3.40	3.96
WT OF DISH g	1.04	1.06	1.04	1.06	1.06	1.05
WT OF DRY SOIL g	7.92	7.93	7.69	7.47	7.56	8.24
MOISTURE CONTENT %	39.0	40.6	42.0	43.1	45.0	48.1



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		41.9	15.1	26.8	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	31.0'	DATE TESTED	02-28-92 TNU
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	46.21
Wt. Dry Soil & Pan	(g)	45.34
Wt. Lost Moisture	(g)	0.87
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	41.66
Moisture Content	%	2.1

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.77

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	742.30
Weight of + #10 Before Washing (g)	100.25
Weight of + #10 After Washing (g)	95.32
Weight of - #10 Wet (g)	642.05
Weight of - #10 Dry (g)	633.75
Wt. Total Sample Dry (g)	729.07
Calc. Wt. "W" (g)	67.61
Calc. Mass + #10	8.84

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	38.63	38.63	38.63	5.3	94.7
3/8"	0.00	12.46	12.46	51.09	7.0	93.0
#4	0.00	23.16	23.16	74.25	10.2	89.8
#10	0.00	21.07	21.07	95.32	13.1	86.9
#20	1.56	4.75	3.19	3.19	17.8	82.2
#40	1.56	5.20	3.64	6.83	23.2	76.8
#60	1.31	4.70	3.39	10.22	28.2	71.8
#100	1.55	6.06	4.51	14.73	34.9	65.1
#230	1.55	9.01	7.46	22.19	45.9	54.1

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	31.0'	DATE TESTED	02-28-92 TNU
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

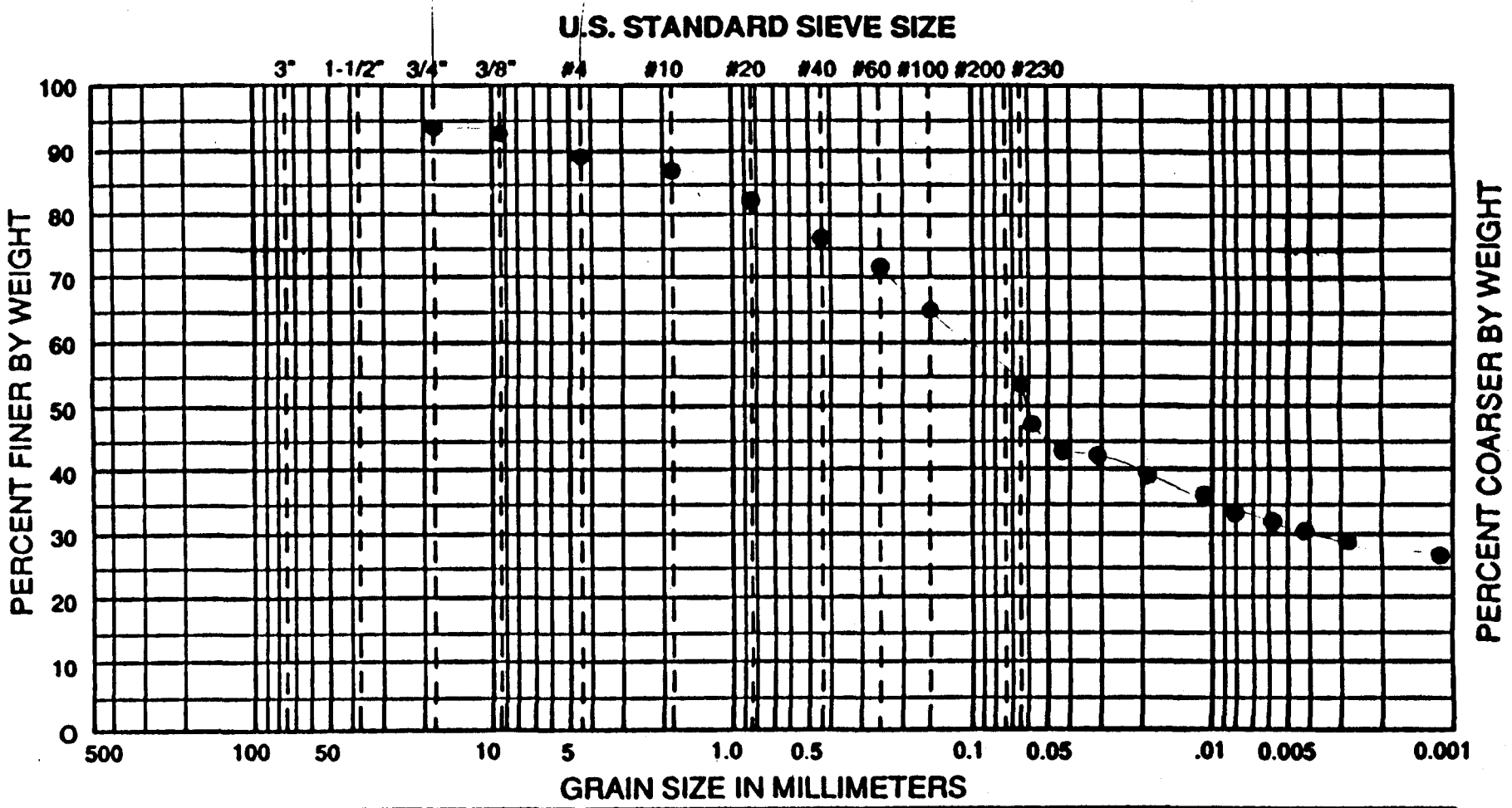
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01308
Value of "a"	0.99	Wt. Dry Sample "W"	67.612
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	37.50	32.50	47.5	47.5	10.14	0.0589
1.0	34.50	29.50	43.1	43.1	10.63	0.0427
2.0	34.00	29.00	42.4	42.4	10.71	0.0303
5.0	32.00	27.00	39.5	39.5	11.04	0.0194
15.0	30.00	25.00	36.5	36.5	11.37	0.0114
30.0	28.50	23.50	34.3	34.3	11.62	0.0081
60.0	27.00	22.00	32.1	32.1	11.86	0.0058
120.0	26.00	21.00	30.7	30.7	12.03	0.0041
250.0	25.00	20.00	29.2	29.2	12.19	0.0029
1440.0	23.00	18.00	26.3	26.3	12.52	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10 +00 SAMPLE NO.: CH # 8 DATE: 3/9/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	31.0'	Silty clayey SAND with some gravel 5.5% c. gravel, 4.9% f. gravel, 2.9% c. sd, 10.1% m. sd, 20.6% f. sd | 26% SILT 30% CLAY

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER WESTON

LOCATION Rocky FLATS EG&G

BORING 10100 SAMPLE #8 DEPTH @31'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

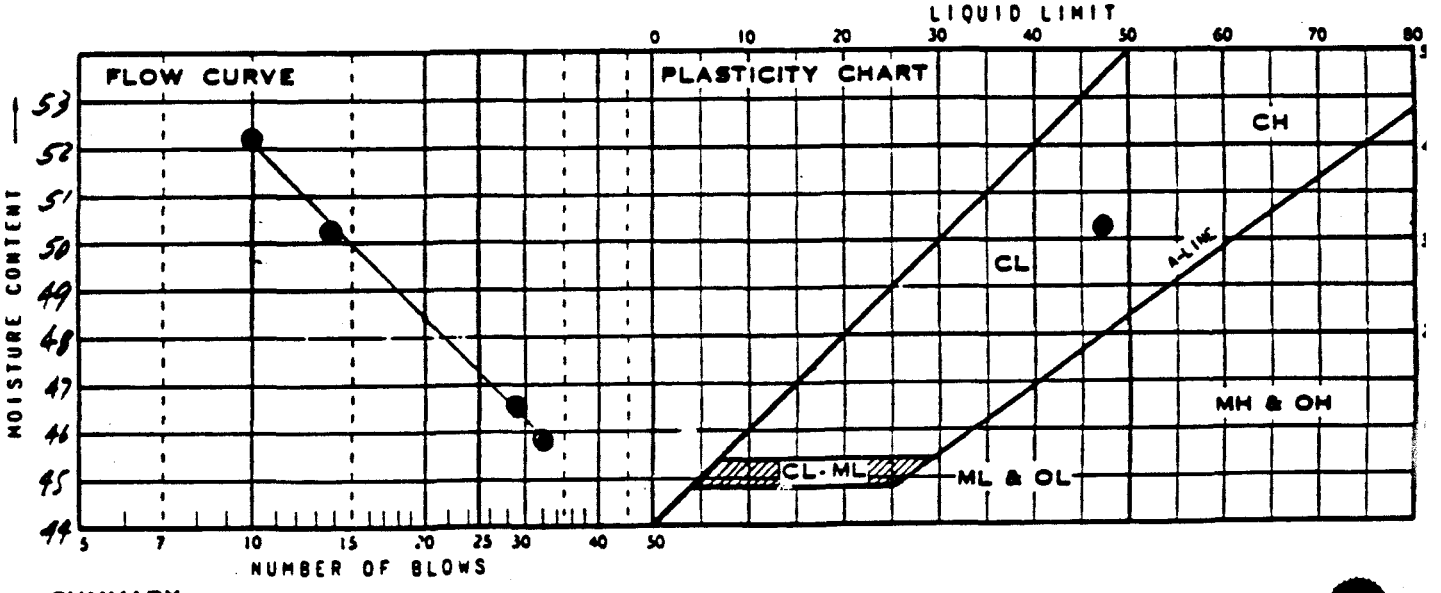
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/2/92

DETERMINATION	1	2	3	4	5	6
DISH	2055	2026	20C			
WT OF DISH + WET SOIL g	5.71	6.02	5.77			
WT OF DISH + DRY SOIL g	5.10	5.41	5.21	—	—	—
WT OF MOISTURE g	0.61	.61	.56			
WT OF DISH g	1.05	1.03	1.02	—	—	—
WT OF DRY SOIL g	4.05	4.38	4.19			
MOISTURE CONTENT %	15.1	13.9	13.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2025	2012	2044	35C	37C	2073
NUMBER OF BLOWS	29	32	37	20+	14-	10-
WT OF DISH + WET SOIL g	12.98	10.78	11.23	10.76	10.49	11.2[illegible]
WT OF DISH + DRY SOIL g	9.19	7.72	8.01	7.59	7.33	7.[illegible]
WT OF MOISTURE g	3.79	3.06	3.22	3.17	3.16	3.51
WT OF DISH g	1.05	1.04	1.05	1.04	1.03	1.04
WT OF DRY SOIL g	8.14	6.68	6.96	6.55	6.30	6.72
MOISTURE CONTENT %	46.6	45.8	46.3	48.4	50.2	52.2



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		47.3	14.1	33.2	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	43'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	47.84
Wt. Dry Soil & Pan	(g)	46.63
Wt. Lost Moisture	(g)	1.21
Wt. of Pan Only	(g)	3.62
Wt. of Dry Soil	(g)	43.01
Moisture Content	%	2.8

Wt. Hydrom. Sample Wet (g)	55.02
Wt. Hydrom. Sample Dry (g)	53.52

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	53.52
Wt. Total Sample Dry (g)	53.52
Calc. Wt. "W" (g)	53.52
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
- #10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.58	1.63	0.05	0.05	0.1	99.9
-#40	1.55	1.63	0.08	0.13	0.2	99.8
#60	1.57	1.64	0.07	0.20	0.4	99.6
#100	1.56	1.67	0.11	0.31	0.6	99.4
#230	1.55	1.74	0.19	0.50	0.9	99.1

99.2

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	43'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

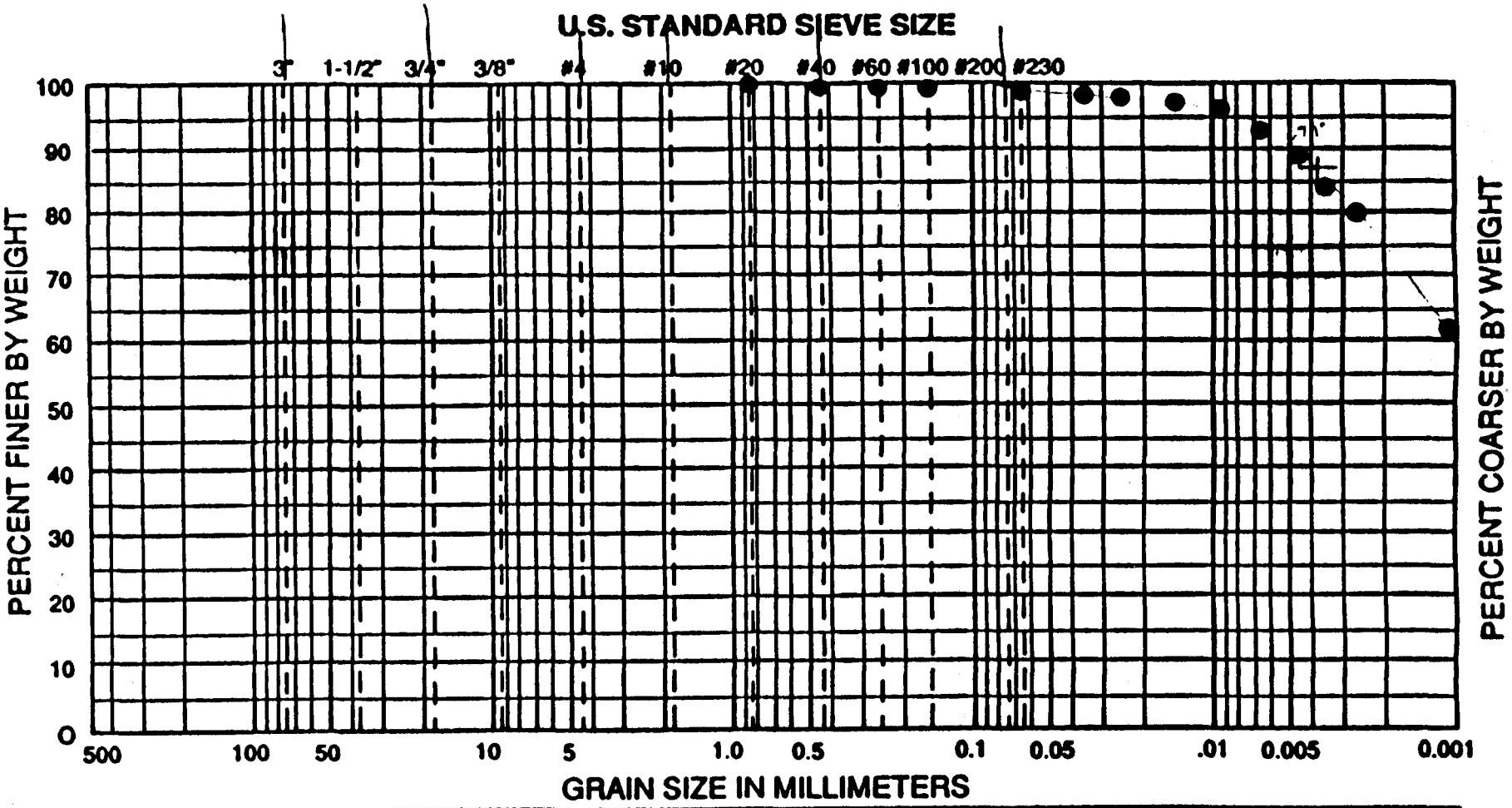
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01332
Value of "a"	1.00	Wt. Dry Sample "W"	53.515
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	58.00	53.00	99.0	99.0	6.78	0.0490
1.0	57.75	52.75	98.6	98.6	6.82	0.0348
2.0	57.50	52.50	98.1	98.1	6.86	0.0247
5.0	57.25	52.25	97.6	97.6	6.90	0.0156
15.0	56.75	51.75	96.7	96.7	6.98	0.0091
30.0	55.00	50.00	93.4	93.4	7.27	0.0066
60.0	52.75	47.75	89.2	89.2	7.64	0.0048
120.0	50.00	45.00	84.1	84.1	8.09	0.0035
190.0	48.00	43.00	80.4	80.4	8.42	0.0028
1440.0	38.25	33.25	62.1	62.1	10.02	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+00 SAMPLE NO.: 11 DATE: 5/20/92 PROJECT NO.: (CH)

AREA	DEPTH	CLASSIFICATION CLAY w/ trace Silt and Sand
Rocky Flats	43'	8% Sand, 8.1% Silt, 91% Clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Peony Energy EG&G

BORING 10+00 SAMPLE #11 DEPTH @ 43'

FIELD DENSITY BY _____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

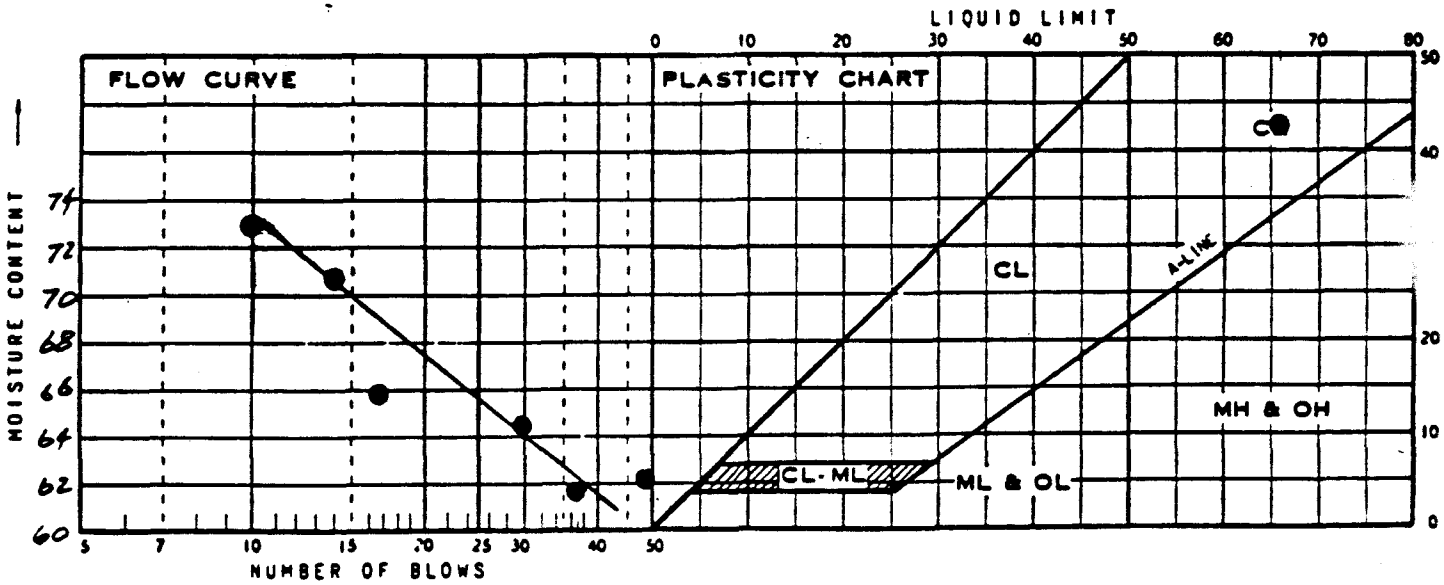
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/12/92

DETERMINATION	1	2	3	4	5	6
DISH	2095	10C	4			
WT OF DISH + WET SOIL g	5.13	4.95	5.61			
WT OF DISH + DRY SOIL	4.37	4.20	4.76	—	—	—
WT OF MOISTURE	0.76	0.75	0.85			
WT OF DISH	1.06	1.04	1.06	—	—	—
WT OF DRY SOIL	3.31	3.16	3.70			
MOISTURE CONTENT %	23.0	23.7	23.0	= 69.7/3 = 23.2		

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2057	2037	14C	2014	2053	17C
NUMBER OF BLOWS	37	49	30	17	14	10
WT OF DISH + WET SOIL g	11.60	9.81	10.06	9.58	11.68	10.1[illegible]
WT OF DISH + DRY SOIL	7.58	6.45	6.53	6.20	7.28	6.3[illegible]
WT OF MOISTURE	4.02	3.36	3.53	3.38	4.40	3.84
WT OF DISH	1.05	1.04	1.04	1.06	1.05	1.04
WT OF DRY SOIL	6.53	5.41	5.49	5.14	6.23	5.27
MOISTURE CONTENT %	61.6	62.1	64.3	65.8	70.6	72.9



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		65.7	23.2	42.5	CH

ADVANCED TERRA TESTING inc

BR

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	53.4'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	51.22
Wt. Dry Soil & Pan	(g)	49.23
Wt. Lost Moisture	(g)	1.99
Wt. of Pan Only	(g)	3.65
Wt. of Dry Soil	(g)	45.58
Moisture Content	%	4.4
Wt. Hydrom. Sample Wet	(g)	55.02
Wt. Hydrom. Sample Dry	(g)	52.71

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.02
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.02
Weight of - #10 Dry (g)	52.71
Wt. Total Sample Dry (g)	52.71
Calc. Wt. "W" (g)	52.71
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.56	0.01	0.01	0.0	100.0
#40	1.57	1.58	0.01	0.02	0.0	100.0
#60	1.55	1.57	0.02	0.04	0.1	99.9
#100	1.56	1.58	0.02	0.06	0.1	99.9
#230	1.55	2.14	0.59	0.65	1.2	98.8

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	53.4'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

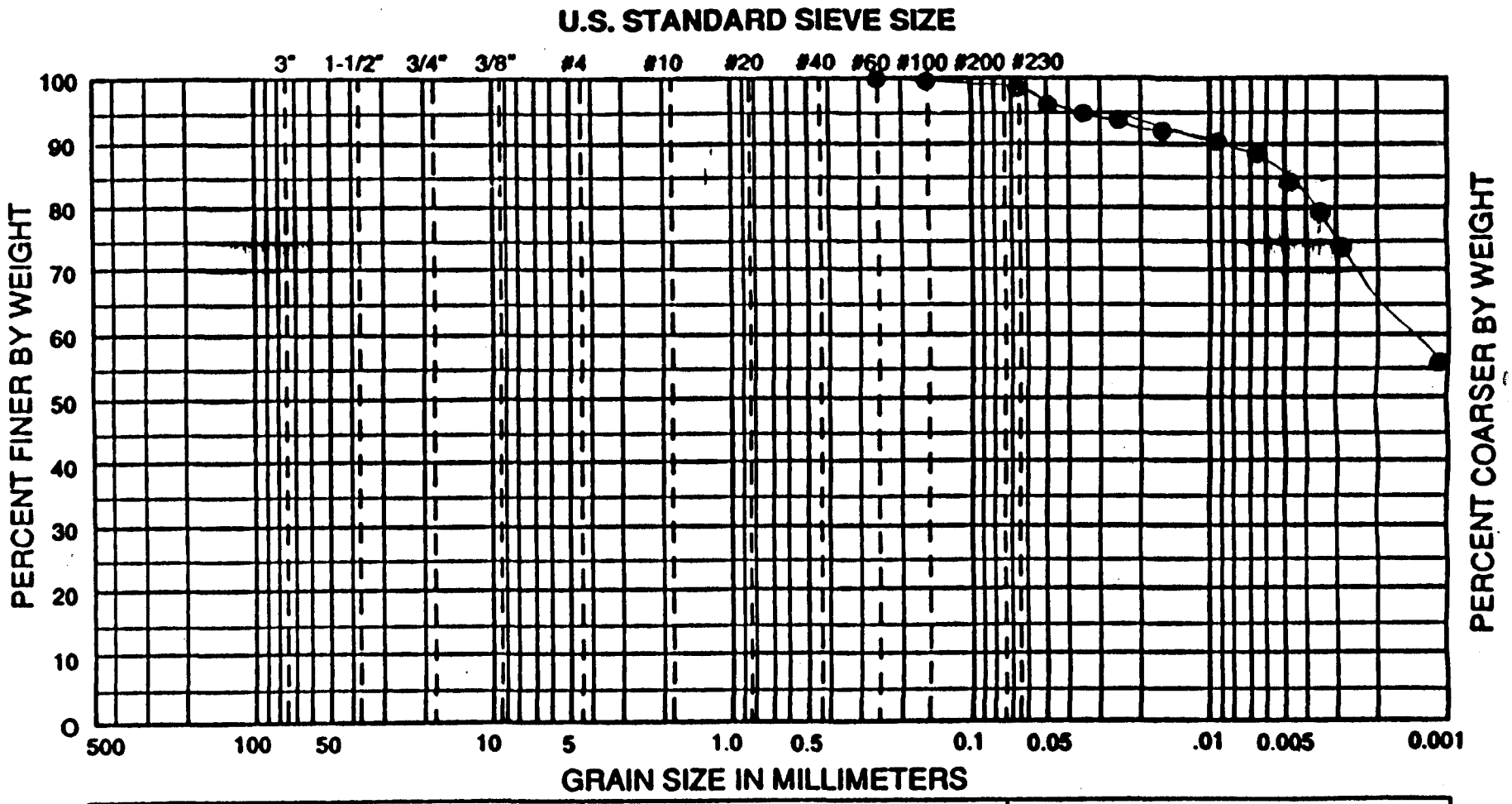
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01316
Value of "a"	0.99	Wt. Dry Sample "W"	52.715
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.00	51.00	96.0	96.0	7.11	0.0496
1.0	55.50	50.50	95.0	95.0	7.19	0.0353
2.0	55.00	50.00	94.1	94.1	7.27	0.0251
5.0	54.00	49.00	92.2	92.2	7.43	0.0160
15.0	53.50	48.50	91.3	91.3	7.52	0.0093
30.0	51.50	46.50	87.5	87.5	7.84	0.0067
60.0	49.75	44.75	84.2	84.2	8.13	0.0048
120.0	46.75	41.75	78.6	78.6	8.62	0.0035
190.0	44.25	39.25	73.9	73.9	9.03	0.0029
1440.0	34.75	29.75	56.0	56.0	10.59	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+00 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION Claystone w/ some silt
Rocky Flats	53.4'	1% f sand 13% silt 86% clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-07

CLIENT/OWNER WESTON

LOCATION ROCKY FLATS EG&G

BORING 10+00 SAMPLE CH#11 DEPTH 53.4'

FIELD DENSITY BY - - - - - - / - / - -

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

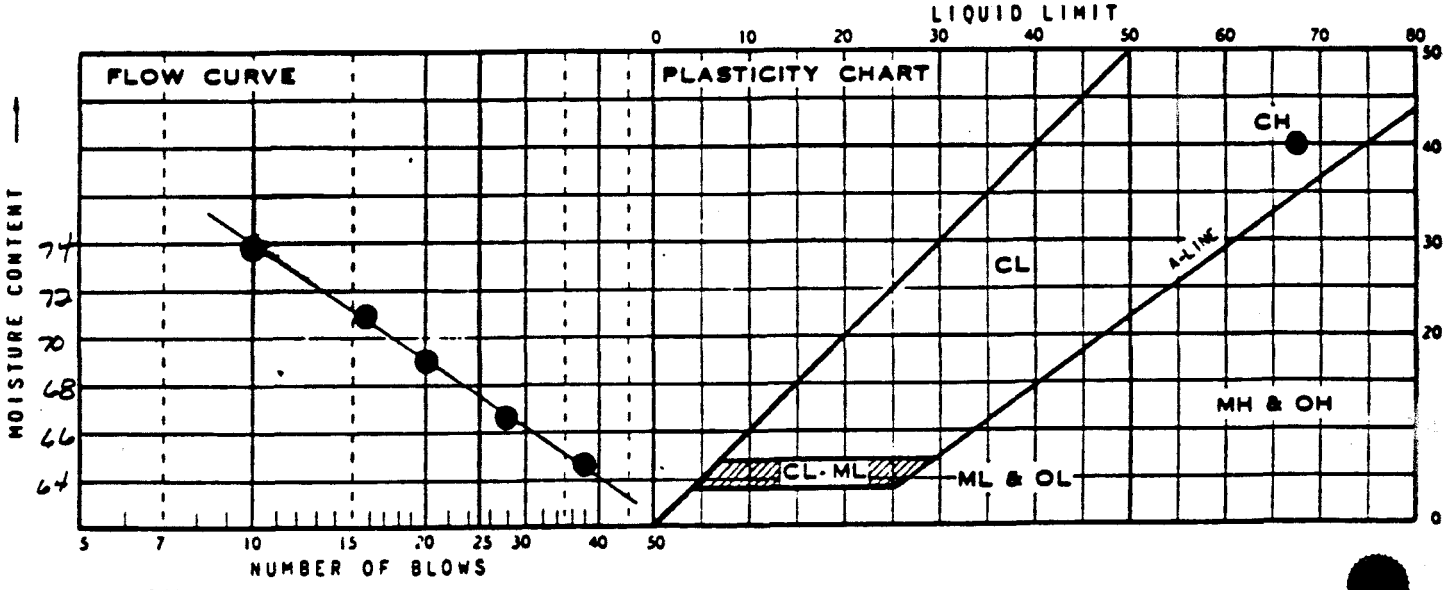
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	14C	2020	2095			
WT OF DISH + WET SOIL g	5.99	4.85	5.52			
WT OF DISH + DRY SOIL g	4.94	4.04	4.57	—	—	—
WT OF MOISTURE g	1.05	.81	.95			
WT OF DISH g	1.04	1.06	1.06	—	—	—
WT OF DRY SOIL g	3.90	2.98	3.51			
MOISTURE CONTENT %	26.9	27.2	27.1			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2057	66C	43C	10C	30C	
NUMBER OF BLOWS	38	28	20	16	10±	
WT OF DISH + WET SOIL g	14.78	17.70	15.75	15.82	17.33	
WT OF DISH + DRY SOIL g	9.39	11.03	9.75	9.69	10.41	—
WT OF MOISTURE g	5.39	6.64	6.00	6.13	6.92	
WT OF DISH g	1.05	1.06	1.05	1.06	1.05	—
WT OF DRY SOIL g	8.34	9.97	8.70	8.63	9.36	
MOISTURE CONTENT %	64.6	66.6	69.0	71.0	73.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		67.6	27.1	40.5	CH	

ADVANCED TERRA TESTING inc

BR

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	55.5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	49.27
Wt. Dry Soil & Pan	(g)	48.44
Wt. Lost Moisture	(g)	0.83
Wt. of Pan Only	(g)	3.18
Wt. of Dry Soil	(g)	45.26
Moisture Content	%	1.8

Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	54.02

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	55.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	55.01
Weight of - #10 Dry (g)	54.02
Wt. Total Sample Dry (g)	54.02
Calc. Wt. "W" (g)	54.02
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.60	0.04	0.04	0.1	99.9
#40	1.56	1.59	0.03	0.07	0.1	99.9
#60	1.56	1.60	0.04	0.11	0.2	99.8
#100	1.56	1.71	0.15	0.26	0.5	99.5
#230	1.57	11.04	9.47	9.73	18.0	82.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+00	SAMPLED	Rocky Flats
DEPTH	55.5'	DATE TESTED	03-16-92 SR
SAMPLE NO.	#11	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

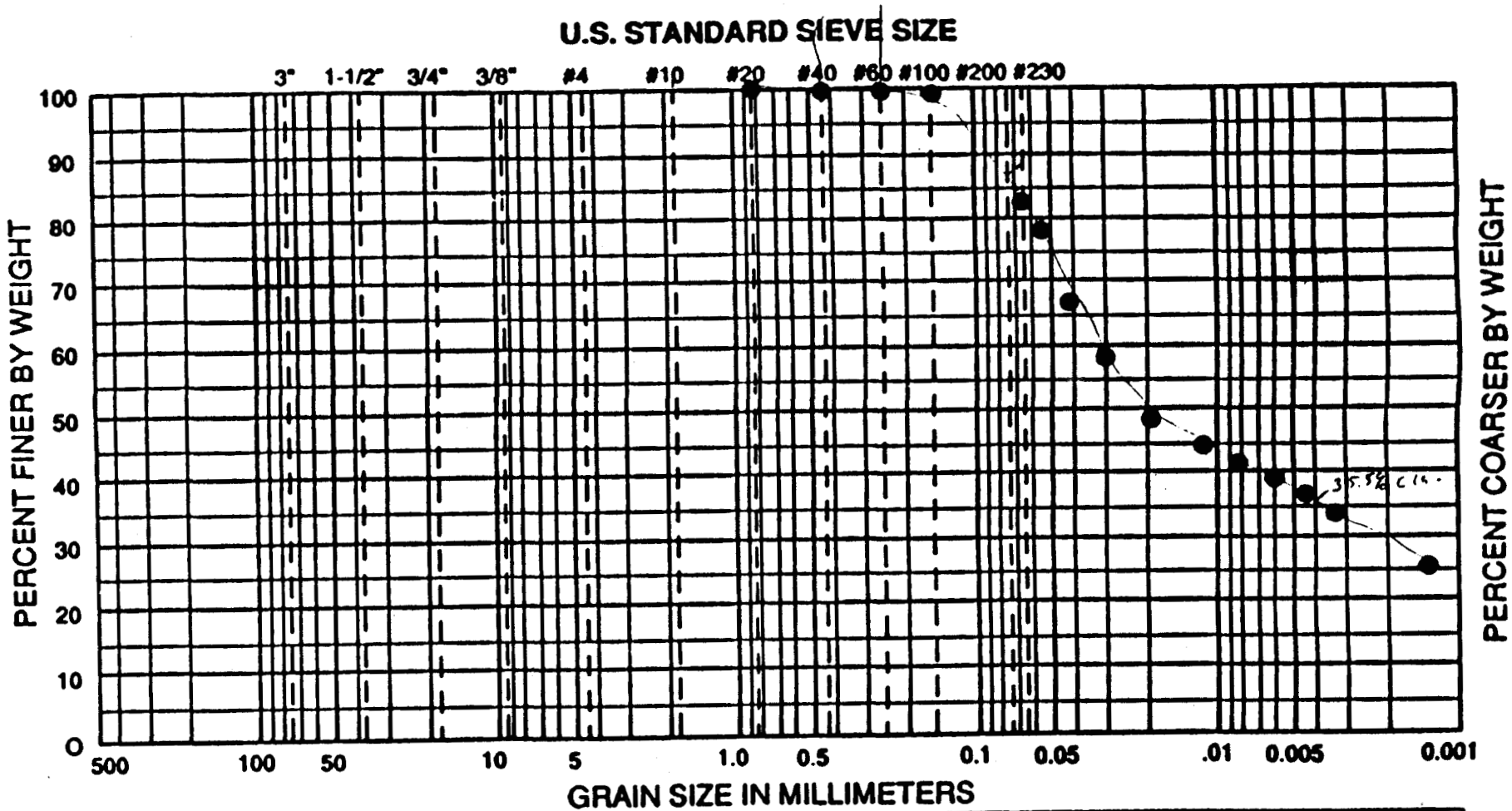
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.64	Temp. Coef. K	0.01336
Value of "a"	1.00	Wt. Dry Sample "W"	54.023
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	42.00	77.9	77.9	8.58	0.0554
1.0	41.25	36.25	67.2	67.2	9.53	0.0412
2.0	36.00	31.00	57.5	57.5	10.39	0.0304
5.0	31.00	26.00	48.2	48.2	11.21	0.0200
15.0	29.00	24.00	44.5	44.5	11.53	0.0117
30.0	27.75	22.75	42.2	42.2	11.74	0.0084
60.0	26.25	21.25	39.4	39.4	11.99	0.0060
120.0	24.75	19.75	36.6	36.6	12.23	0.0043
190.0	23.25	18.25	33.8	33.8	12.48	0.0034
1440.0	19.00	14.00	26.0	26.0	13.17	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10 400 SAMPLE NO.: 11 DATE: 3/20/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION CLAYEY SILTSTONE w/ some sand
Rocky Flats	55.5'	1% c sd, 1% m sd, 13.8% f sand, 50.5% silt, 35.5% Clay

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flat SC&G

BORING 10+00 SAMPLE #11 DEPTH 55.5

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

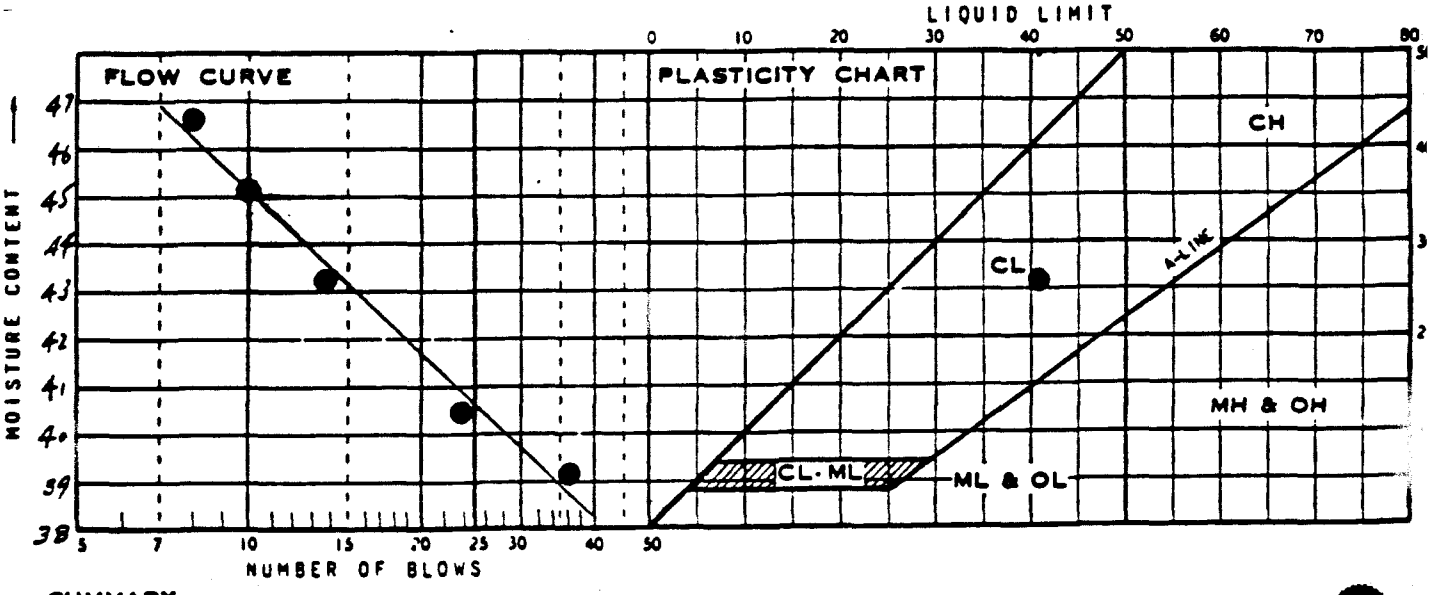
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/16/92

DETERMINATION	1	2	3	4	5	6
DISH	2033	2010	2059			
WT OF DISH + WET SOIL g	7.44	6.98	6.63			
WT OF DISH + DRY SOIL g	6.59	6.22	5.87	—	—	—
WT OF MOISTURE g	0.85	0.76	0.76			
WT OF DISH g	1.04	1.06	1.05	—	—	—
WT OF DRY SOIL g	5.55	5.16	4.82			
MOISTURE CONTENT %	15.3	14.7	15.8	= 45.8/3 =	15.3	

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2075	7C	2052	2066	21C	18C
NUMBER OF BLOWS	27	24	36	14	10	8
WT OF DISH + WET SOIL g	9.90	9.77	10.27	10.19	11.30	11.0[illegible]
WT OF DISH + DRY SOIL g	7.43	7.26	7.67	7.43	8.11	7.[illegible]
WT OF MOISTURE g	2.47	2.51	2.60	2.76	3.19	3.17
WT OF DISH g	1.04	1.04	1.02	1.04	1.04	1.04
WT OF DRY SOIL g	6.39	6.22	6.65	6.39	7.07	6.79
MOISTURE CONTENT %	38.6	40.4	39.1	43.2	45.1	46.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		40.7	15.3	25.4	CL	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	15.0'	DATE TESTED	02-18-92 TNU
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	45.01
Wt. Dry Soil & Pan	(g)	43.60
Wt. Lost Moisture	(g)	1.41
Wt. of Pan Only	(g)	3.61
Wt. of Dry Soil	(g)	39.99
Moisture Content	%	3.5
Wt. Hydrom. Sample Wet	(g)	60.64
Wt. Hydrom. Sample Dry	(g)	58.58

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	468.52
Weight of + #10 Before Washing (g)	12.22
Weight of + #10 After Washing (g)	8.68
Weight of - #10 Wet (g)	456.30
Weight of - #10 Dry (g)	444.18
Wt. Total Sample Dry (g)	452.86
Calc. Wt. "W" (g)	59.72
Calc. Mass + #10	1.14

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	4.92	4.92	4.92	1.1	98.9
#10	0.00	3.76	3.76	8.68	1.9	98.1
#20	1.57	3.03	1.46	1.46	4.4	95.6
#40	1.55	3.22	1.67	3.13	7.2	92.8
#60	1.57	3.51	1.94	5.07	10.4	89.6
#100	1.57	4.56	2.99	8.06	15.4	84.6
#230	1.56	7.30	5.74	13.80	25.0	75.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Westen	JOB NO.	2066-03
BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	15.0'	DATE TESTED	02-18-92 TNU
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

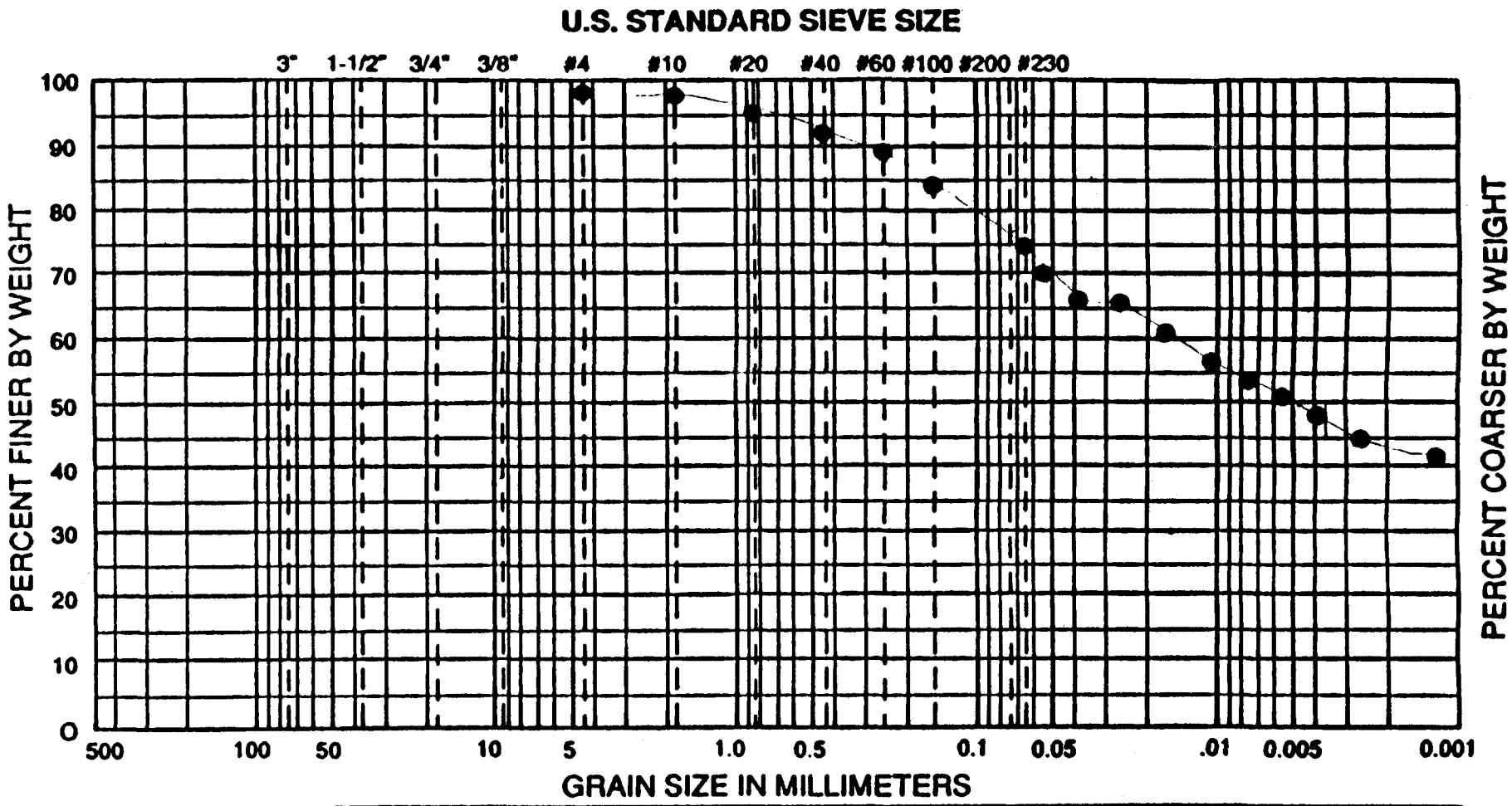
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01327
Value of "a"	0.98	Wt. Dry Sample "W"	59.721
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	49.00	43.00	70.8	70.8	8.25	0.0539
1.0	46.50	40.50	66.7	66.7	8.66	0.0391
2.0	46.00	40.00	65.9	65.9	8.75	0.0278
5.0	43.50	37.50	61.8	61.8	9.16	0.0180
15.0	41.00	35.00	57.7	57.7	9.57	0.0106
30.0	39.00	33.00	54.4	54.4	9.89	0.0076
60.0	37.00	31.00	51.1	51.1	10.22	0.0055
120.0	35.50	29.50	48.6	48.6	10.47	0.0039
250.0	33.50	27.50	45.3	45.3	10.80	0.0028
1440.0	32.00	26.00	42.8	42.8	11.04	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+25 SAMPLE NO.: #6 DATE: 2-24-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
		SILTY CLAY w/ some SAND trace gravel. (CH)
	15.0'	ROCKY FLAT: 1.1% f gvl, 6% c sd, 5.3% m sd, 16.8% f sd, 26% silt, 50'

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER WESTON

LOCATION EG&G

BORING 10-25 SAMPLE _____ DEPTH 15'

(10)

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

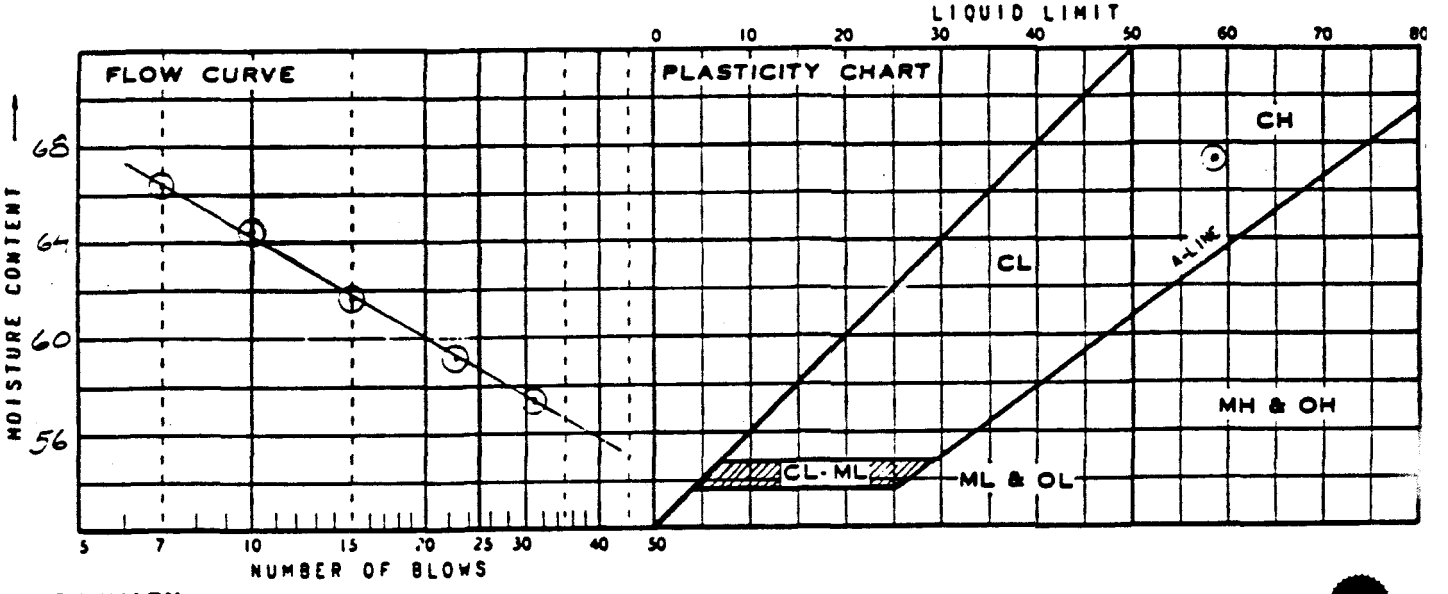
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DW. 2/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2058	2064	2072			
WT OF DISH + WET SOIL	7.26g	8.06g	7.87g			
WT OF DISH + DRY SOIL	6.21g	6.85g	6.70g	—	—	—
WT OF MOISTURE	1.05g	1.21g	1.17g			
WT OF DISH	1.03g	1.03g	1.04g	—	—	—
WT OF DRY SOIL	5.18g	5.82g	5.66g			
MOISTURE CONTENT	20.3	20.8	20.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	48C	2035	2015	43C	44C	2054
NUMBER OF BLOWS	36	31	23	15	10	7
WT OF DISH + WET SOIL	18.05g	17.29g	18.63g	17.93g	17.45g	19.0[redacted]
WT OF DISH + DRY SOIL	11.98g	11.57g	12.09g	11.48g	11.02g	11.8[redacted]
WT OF MOISTURE	6.07g	5.72g	6.54g	6.45g	6.43g	7.17g
WT OF DISH	1.04g	1.04g	1.05g	1.03g	1.03g	1.03g
WT OF DRY SOIL	10.94g	10.53g	11.04g	10.45g	9.99g	10.80g
MOISTURE CONTENT	55.5	57.3	59.2	61.7	64.4	66.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		58.7	20.6	38.1	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	22'	DATE TESTED	02-24-92 TNT
SAMPLE NO.	#5	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	48.90
Wt. Dry Soil & Pan	(g)	46.80
Wt. Lost Moisture	(g)	2.10
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	43.06
Moisture Content	%	4.9
Wt. Hydrom. Sample Wet	(g)	60.00
Wt. Hydrom. Sample Dry	(g)	57.21

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	577.94
Weight of + #10 Before Washing (g)	10.30
Weight of + #10 After Washing (g)	7.79
Weight of - #10 Wet (g)	567.64
Weight of - #10 Dry (g)	543.64
Wt. Total Sample Dry (g)	551.43
Calc. Wt. "W" (g)	58.03
Calc. Mass + #10	0.82

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	5.76	5.76	5.76	1.0	99.0
#10	0.00	2.03	2.03	7.79	1.4	98.6
#20	1.56	2.89	1.33	1.33	3.7	96.3
#40	1.55	2.89	1.34	2.67	6.0	94.0
#60	1.55	3.04	1.49	4.16	8.6	91.4
#100	1.55	4.48	2.93	7.09	13.6	86.4
#230	1.56	7.88	6.32	13.41	24.5	75.5

Silty Clay (CL)

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	22'	DATE TESTED	02-24-92 TN
SAMPLE NO.	#5	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

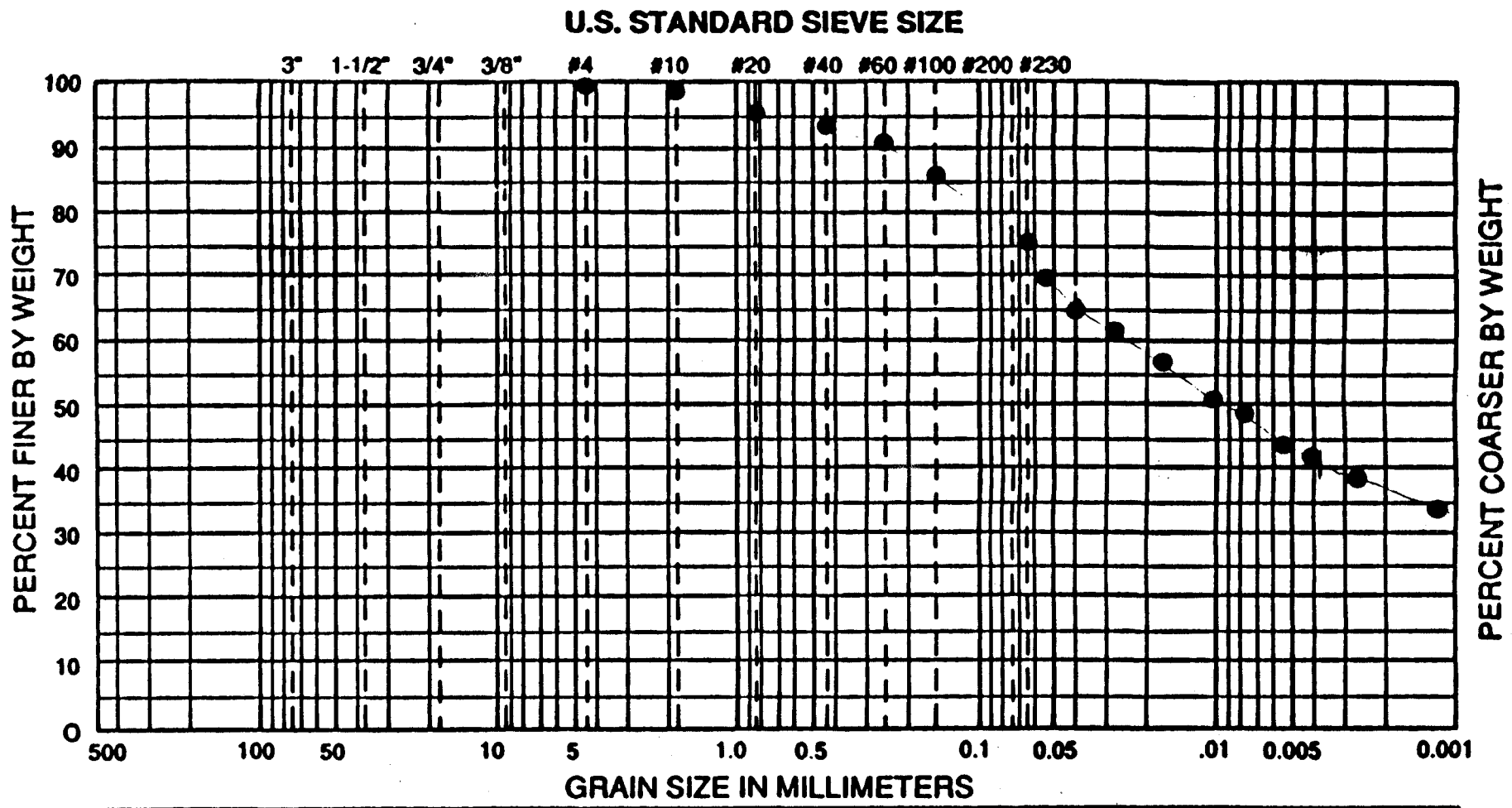
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01324
Value of "a"	0.99	Wt. Dry Sample "W"	58.030
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	6.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.50	40.50	69.0	69.0	8.50	0.0546
1.0	45.00	38.00	64.7	64.7	8.91	0.0395
2.0	43.50	36.50	62.1	62.1	9.16	0.0283
5.0	40.50	33.50	57.0	57.0	9.65	0.0184
15.0	37.00	30.00	51.1	51.1	10.22	0.0109
30.0	35.00	28.00	47.7	47.7	10.55	0.0079
60.0	33.00	26.00	44.3	44.3	10.88	0.0056
120.0	32.00	25.00	42.6	42.6	11.04	0.0040
250.0	29.00	22.00	37.5	37.5	11.53	0.0028
1440.0	27.00	20.00	34.1	34.1	11.86	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+25 SAMPLE NO.: 5 DATE: 5/4/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	22'	

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER WESTON

LOCATION Rocky Flats / EGG

BORING 10-25 SAMPLE C#5 DEPTH 22'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

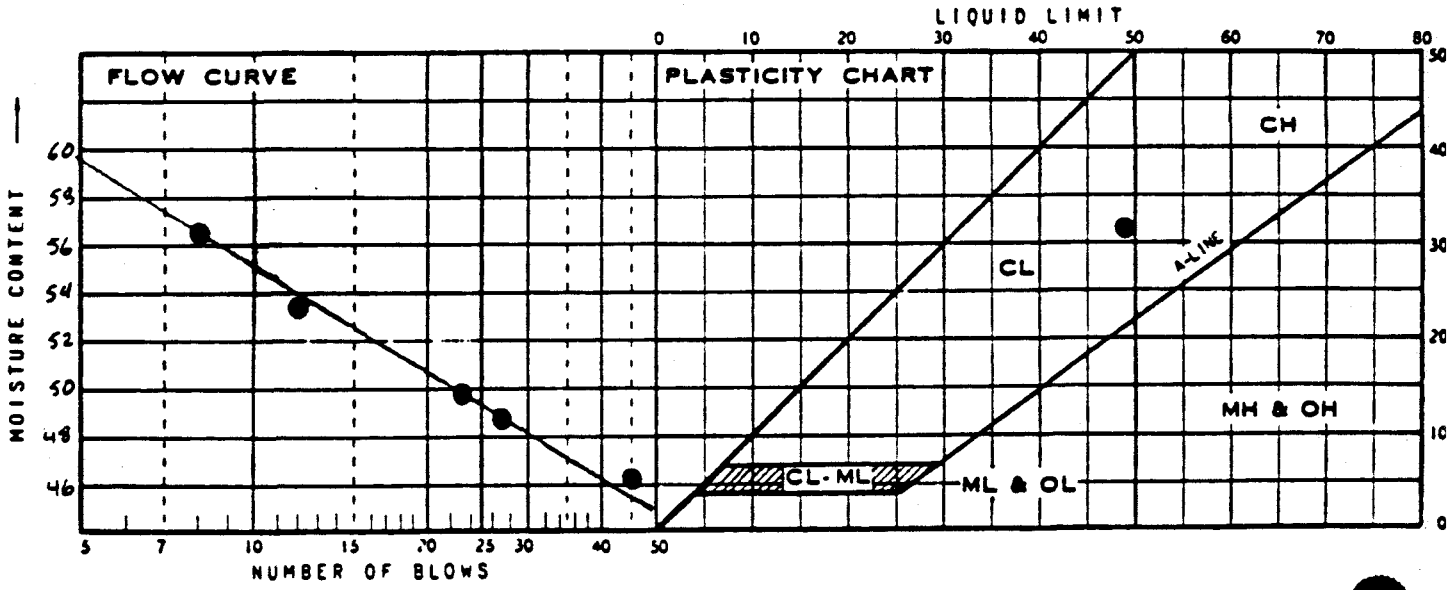
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 2/23/92.

DETERMINATION	? 1 ?	2	3	4	5	6
DISH	2022	37C	28C			
WT OF DISH + WET SOIL g	8.90g	8.87g	9.65g			
WT OF DISH + DRY SOIL g	7.83	7.71	8.39	—	—	—
WT OF MOISTURE g	1.07	1.16	1.26			
WT OF DISH g	1.05g	1.07g	1.05g	—	—	—
WT OF DRY SOIL g	6.78	6.64	7.34			
MOISTURE CONTENT %	15.8	17.5	17.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2020	29C	26C	2024	5C	2009
NUMBER OF BLOWS	46	27	23-	12	8	
WT OF DISH + WET SOIL g	16.99g	14.75g	14.70g	16.26g	15.13g	
WT OF DISH + DRY SOIL g	11.94	10.25	10.15	10.96	10.05	—
WT OF MOISTURE g	5.05	4.50	4.55	5.30	5.08	
WT OF DISH g	1.05g	1.04g	1.04g	1.06g	1.07g	1.05g
WT OF DRY SOIL g	10.89	9.21	9.11	9.90	9.98	
MOISTURE CONTENT %	46.4	48.9	49.9	53.5	56.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		49.4	17.4	32.0	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	30'	DATE TESTED	3-5-92 SR
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	78.66
Wt. Dry Soil & Pan	(g)	76.89
Wt. Lost Moisture	(g)	1.77
Wt. of Pan Only	(g)	3.69
Wt. of Dry Soil	(g)	73.20
Moisture Content	%	2.4
Wt. Hydrom. Sample Wet	(g)	60.01
Wt. Hydrom. Sample Dry	(g)	58.60

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	620.88
Weight of + #10 Before Washing (g)	29.82
Weight of + #10 After Washing (g)	4.32
Weight of - #10 Wet (g)	591.06
Weight of - #10 Dry (g)	602.00
Wt. Total Sample Dry (g)	606.32
Calc. Wt. "W" (g)	59.02
Calc. Mass + #10	0.42

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.80	0.80	0.80	0.1	99.9
#10	0.00	3.52	3.52	4.32	0.7	99.3
#20	1.56	1.84	0.28	0.28	1.2	98.8
#40	1.55	2.43	0.88	1.16	2.7	97.3
#60	1.55	3.38	1.83	2.99	5.8	94.2
#100	1.55	5.69	4.14	7.13	12.8	87.2
#230	1.56	9.50	7.94	15.07	26.2	73.8

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	30'	DATE TESTED	3-5-92 SR
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

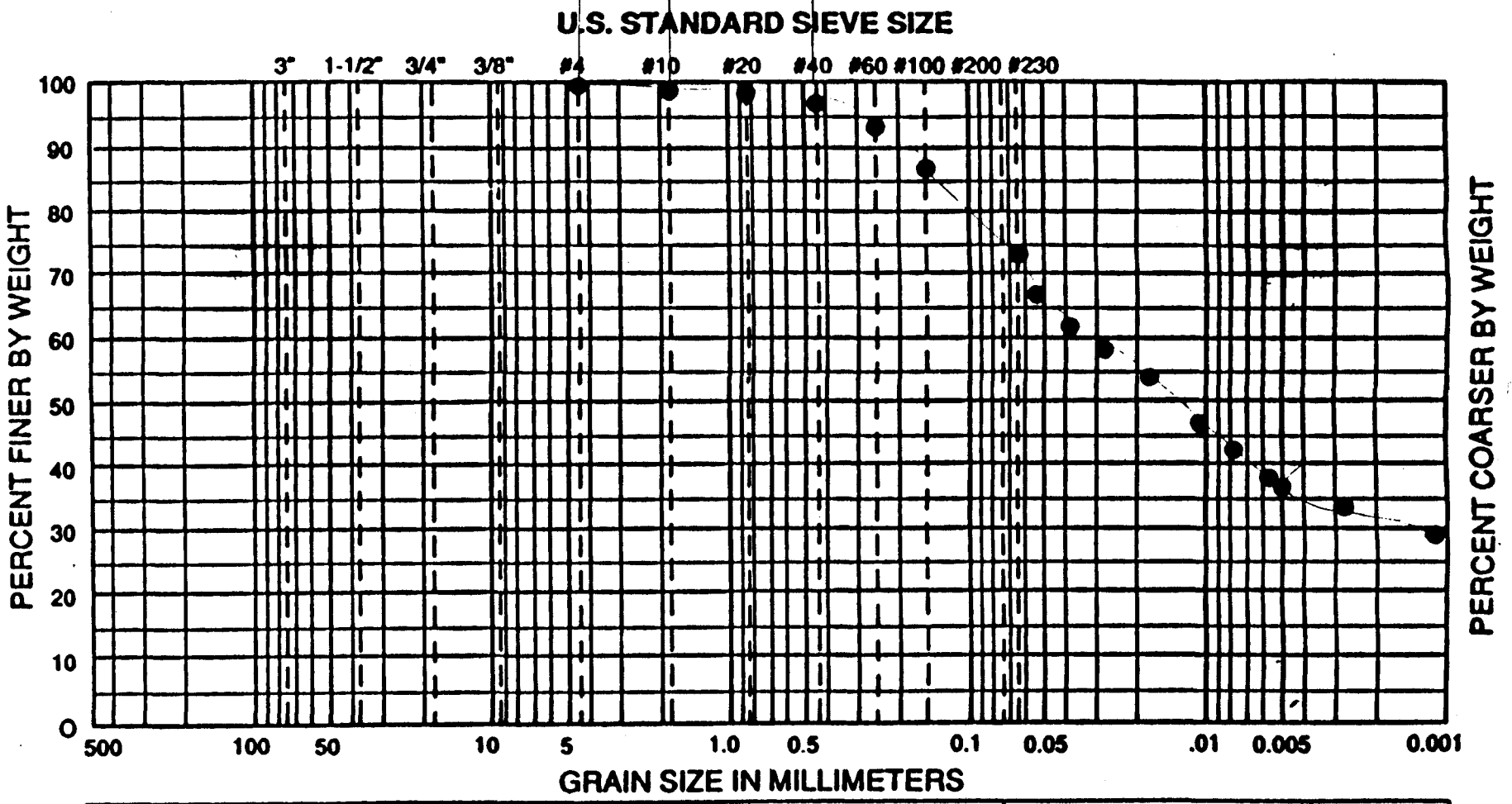
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01290
Value of "a"	0.98	Wt. Dry Sample "W"	59.017
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.00	40.00	66.3	66.3	8.75	0.0540
1.0	43.00	37.00	61.3	61.3	9.24	0.0392
2.0	41.25	35.25	58.4	58.4	9.53	0.0282
5.0	39.00	33.00	54.7	54.7	9.89	0.0181
15.0	34.25	28.25	46.8	46.8	10.67	0.0109
30.0	31.50	25.50	42.3	42.3	11.12	0.0079
60.0	29.00	23.00	38.1	38.1	11.53	0.0057
120.0	28.00	22.00	36.5	36.5	11.70	0.0040
250.0	26.50	20.50	34.0	34.0	11.94	0.0028
1440.0	23.75	17.75	29.4	29.4	12.40	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY	
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+25 SAMPLE NO.: CH # 8 DATE: 3/11/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	30'	CLAYEY SILT w/ some SAND, fr gravel. 0.1% f. gravel, 6.6% c sd, 27% m sd, 22.3% f sd, 38% SILT 37% CLAY

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION

LABORATORY CLASSIFICATION

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats EG+G

BORING D-25 SAMPLE CH #8 DEPTH 30'

FIELD DENSITY BY

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

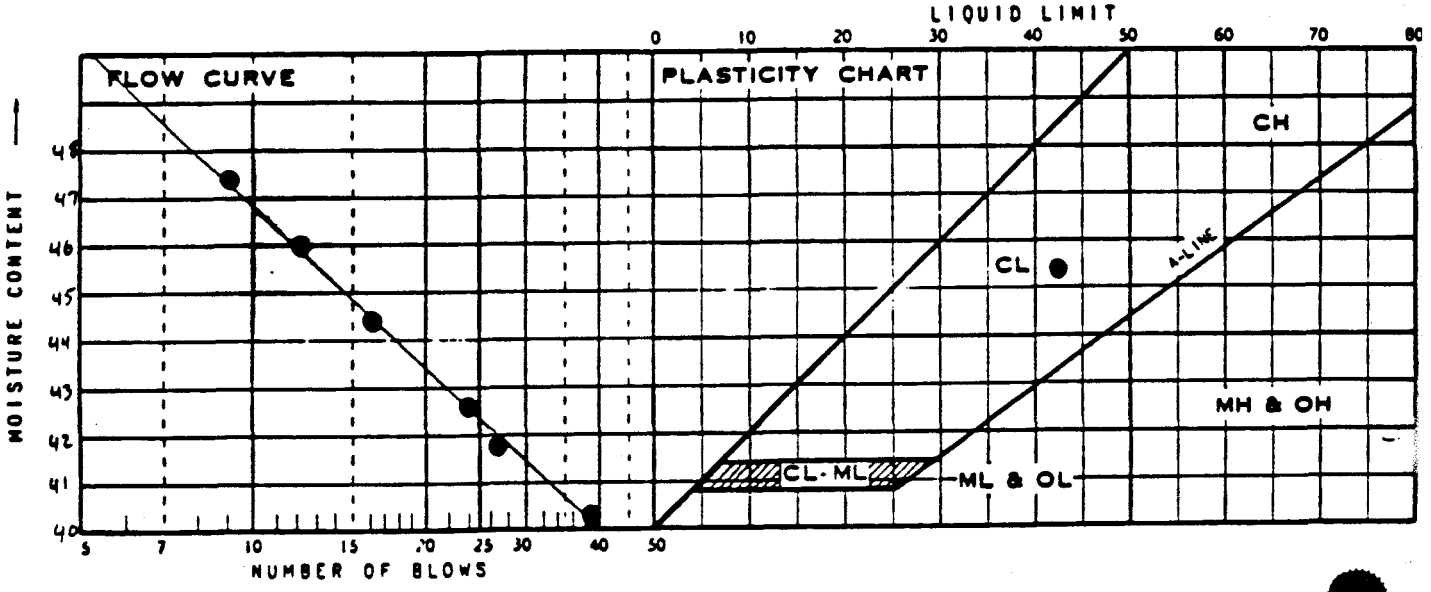
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY 3/3/92

DETERMINATION	1	2	3	4	5	6
DISH	28C	43C	2036			
WT OF DISH + WET SOIL g	7.53	6.84	7.19			
WT OF DISH + DRY SOIL g	6.70	6.09	6.37	—	—	—
WT OF MOISTURE g	.83	.75	.82			
WT OF DISH g	1.05	1.04	1.05	—	—	—
WT OF DRY SOIL g	5.65	5.05	5.32			
MOISTURE CONTENT %	14.7	14.9	15.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2020	5C	10C	26C	2067	2069
NUMBER OF BLOWS	39	27	24	16	12	9
WT OF DISH + WET SOIL g	13.20	12.56	11.17	12.48	12.76	11.7[illegible]
WT OF DISH + DRY SOIL g	9.71	9.17	8.14	8.97	9.07	8.[illegible]
WT OF MOISTURE g	3.49	3.39	3.03	3.51	3.69	3.43
WT OF DISH g	1.05	1.06	1.05	1.06	1.04	1.05
WT OF DRY SOIL g	8.66	8.11	7.09	7.91	8.03	7.23
MOISTURE CONTENT %	40.3	41.8	42.7	44.4	46.0	47.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		42.4	15.0	27.4	CL	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	40'	DATE TESTED	3-5-92 SR
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	50.50
Wt. Dry Soil & Pan	(g)	49.17
Wt. Lost Moisture	(g)	1.33
Wt. of Pan Only	(g)	3.66
Wt. of Dry Soil	(g)	45.51
Moisture Content	%	2.9

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.30

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	579.28
Weight of + #10 Before Washing (g)	21.76
Weight of + #10 After Washing (g)	13.53
Weight of - #10 Wet (g)	557.52
Weight of - #10 Dry (g)	549.69
Wt. Total Sample Dry (g)	563.22
Calc. Wt. "W" (g)	59.73
Calc. Mass + #10	1.43

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	7.65	7.65	7.65	1.4	98.6
#4	0.00	2.89	2.89	10.54	1.9	98.1
#10	0.00	2.99	2.99	13.53	2.4	97.6
#20	1.56	2.10	0.54	0.54	3.3	96.7
#40	1.56	2.26	0.70	1.24	4.5	95.5
#60	1.56	2.20	0.64	1.88	5.5	94.5
#100	1.32	2.18	0.86	2.74	7.0	93.0
#230	1.57	4.00	2.43	5.17	11.1	88.9

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	40'	DATE TESTED	3-5-92 SR
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

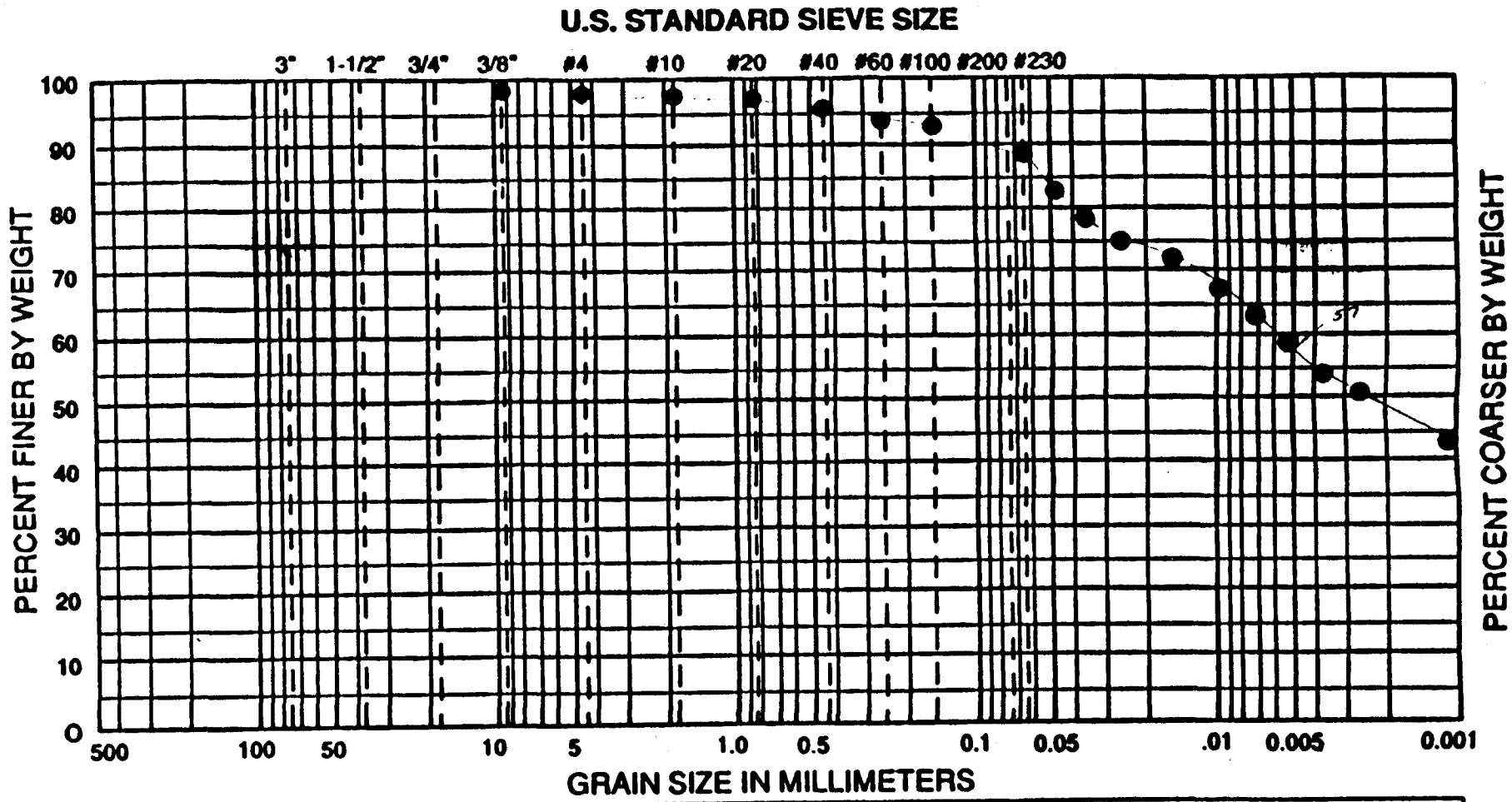
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01305
Value of "a"	0.99	Wt. Dry Sample "W"	59.731
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.00	50.00	82.5	82.5	7.11	0.0492
1.0	53.75	47.75	78.8	78.8	7.48	0.0357
2.0	51.75	45.75	75.5	75.5	7.80	0.0258
5.0	49.75	43.75	72.2	72.2	8.13	0.0166
15.0	46.75	40.75	67.3	67.3	8.62	0.0099
30.0	44.50	38.50	63.6	63.6	8.99	0.0071
60.0	41.75	35.75	59.0	59.0	9.44	0.0052
120.0	39.00	33.00	54.5	54.5	9.89	0.0037
250.0	36.75	30.75	50.8	50.8	10.26	0.0026
1440.0	32.25	26.25	43.3	43.3	11.00	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+25 SAMPLE NO.: CH #8 DATE: 3/11/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rock in Flats	40'	SILTY CLAY w/ Trace SAND and GRAVEL. 1.9% Gravel, .5% C. SAND, 2.1% M. SAND, 6.5% Fine SAND, 32% Silt, 57% Clay

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG+G

BORING 10-35 SAMPLE CH #8 DEPTH 40'

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

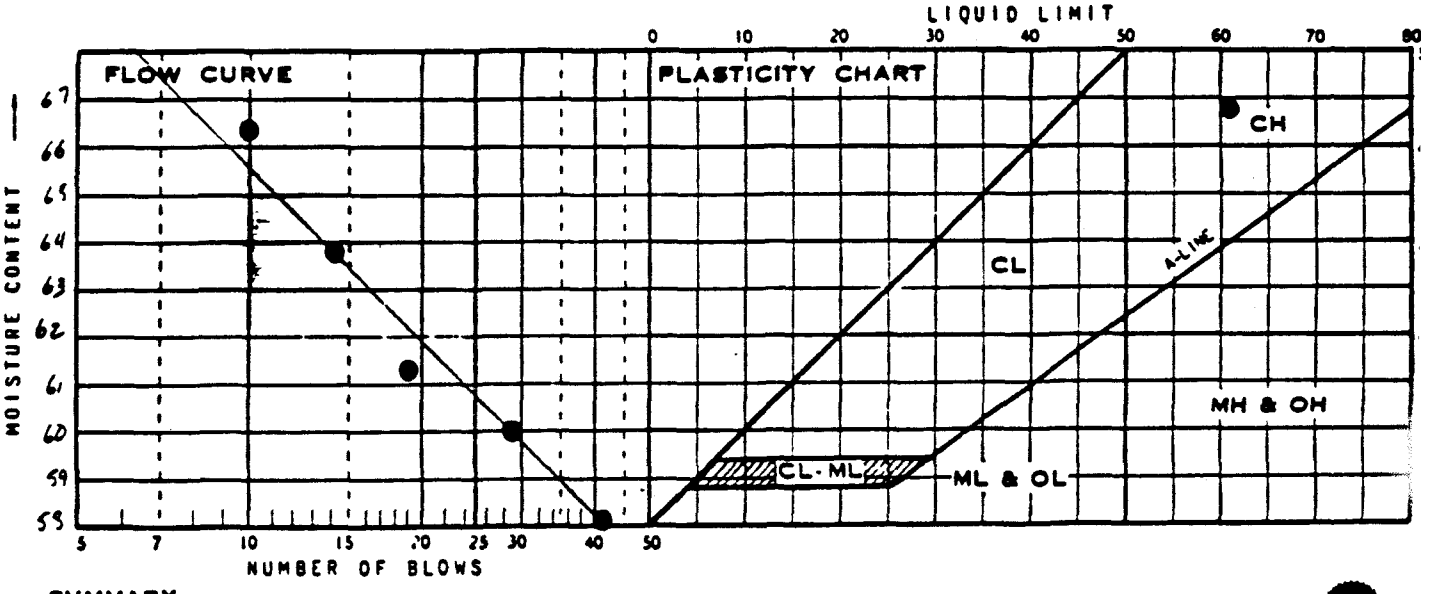
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DU 3/3/92

DETERMINATION	1	2	3	4	5	6
DISH	2055	2026	159			
WT OF DISH + WET SOIL g	4.93	5.21	5.24			
WT OF DISH + DRY SOIL g	4.87	4.62	4.64	—	—	—
WT OF MOISTURE g	.56	.59	.60			
WT OF DISH g	1.04	1.03	1.05	—	—	—
WT OF DRY SOIL g	3.33	3.59	3.59			
MOISTURE CONTENT %	16.8	16.4	16.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2008	2025	15C	2012	35C	54C
NUMBER OF BLOWS	41	29	19	14	10	
WT OF DISH + WET SOIL g	11.15	11.96	11.35	9.72	11.87	
WT OF DISH + DRY SOIL g	7.44	7.37	7.43	6.34	7.55	—
WT OF MOISTURE g	3.71	4.09	3.92	3.38	4.32	
WT OF DISH g	1.05	1.05	1.04	1.04	1.04	1.06
WT OF DRY SOIL g	6.39	6.82	6.39	5.30	6.51	
MOISTURE CONTENT %	58.1	60.0	61.3	63.8	66.4	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		60.8	16.6	44.2	CH	

ADVANCED TERRA TESTING INC

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	46.0'	DATE TESTED	02-28-92 TNU
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	34.84
Wt. Dry Soil & Pan	(g)	34.12
Wt. Lost Moisture	(g)	0.72
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	30.40
Moisture Content	%	2.4

Wt. Hydrom. Sample Wet	(g)	60.06
Wt. Hydrom. Sample Dry	(g)	58.67

WASH SIEVE ANALYSIS

Wt. Total Sample Wet	(g)	60.06
Weight of + #10 Before Washing	(g)	0.00
Weight of + #10 After Washing	(g)	0.00
Weight of - #10 Wet	(g)	60.06
Weight of - #10 Dry	(g)	58.67
Wt. Total Sample Dry	(g)	58.67
Calc. Wt. "W"	(g)	58.67
Calc. Mass + #10		0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.78	0.22	0.22	0.4	99.6
#40	1.30	1.44	0.14	0.36	0.6	99.4
#60	1.57	1.67	0.10	0.46	0.8	99.2
#100	1.56	1.66	0.10	0.56	1.0	99.0
#230	1.57	2.19	0.62	1.18	2.0	98.0

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	46.0'	DATE TESTED	02-28-92 TNT
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

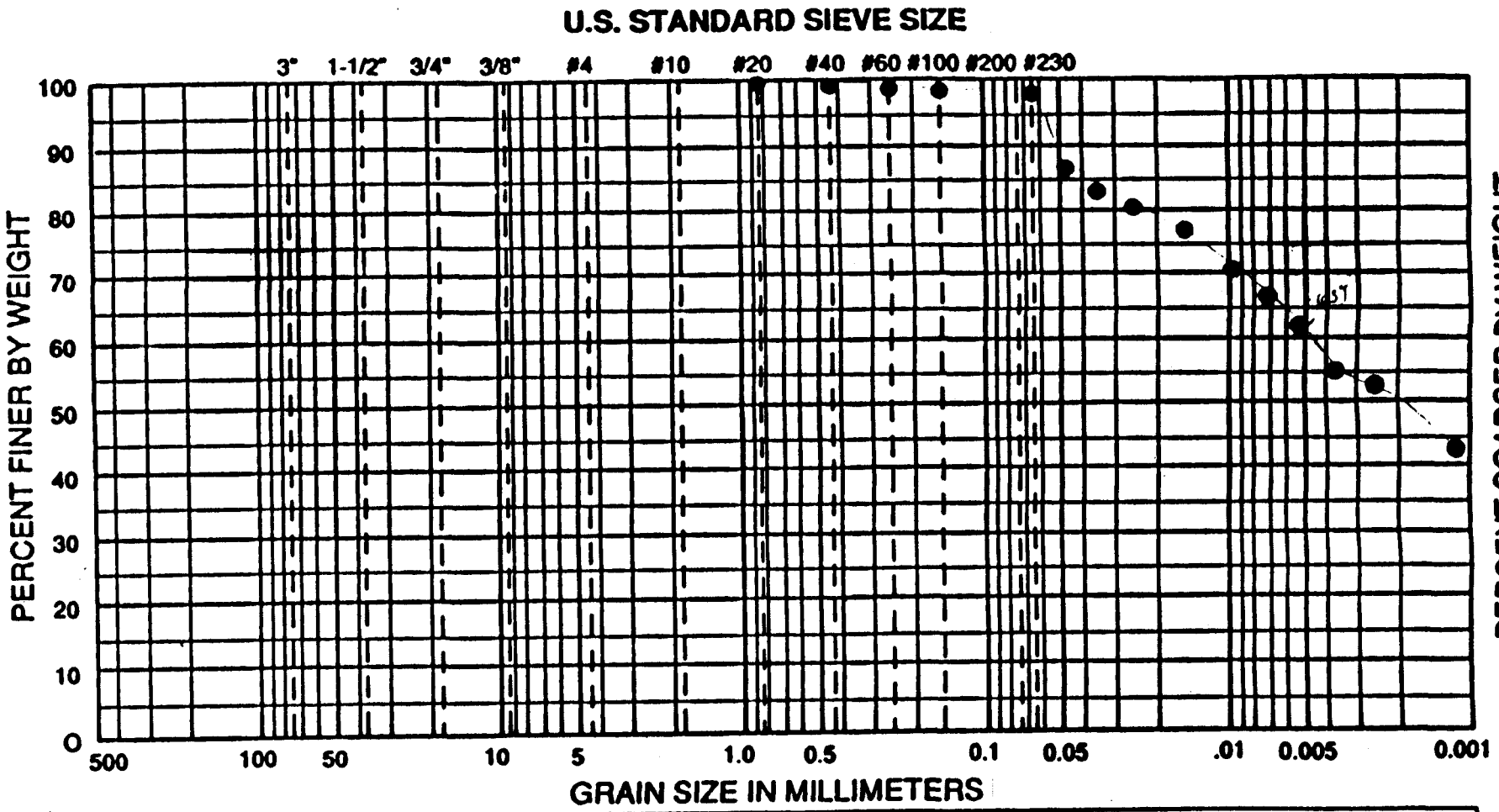
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.73	Temp. Coef. K	0.01301
Value of "a"	0.98	Wt. Dry Sample "W"	58.668
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	56.50	51.50	86.4	86.4	7.02	0.0488
1.0	55.00	50.00	83.9	83.9	7.27	0.0351
2.0	53.00	48.00	80.5	80.5	7.60	0.0254
5.0	51.00	46.00	77.2	77.2	7.93	0.0164
15.0	47.00	42.00	70.4	70.4	8.58	0.0098
30.0	44.50	39.50	66.3	66.3	8.99	0.0071
60.0	42.00	37.00	62.1	62.1	9.40	0.0052
120.0	38.00	33.00	55.3	55.3	10.06	0.0038
250.0	36.50	31.50	52.8	52.8	10.30	0.0026
1440.0	30.50	25.50	42.8	42.8	11.29	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10 + 25 SAMPLE NO.: CH # 8 DATE: 3/4/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	46.0'	SILT / CLAY / (CH) w/ trace SAND .5 .5 .4% med. 1.4% fine 35% SILT 63% CLAY

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats EG+G

BORING 10+25 SAMPLE CH #8 DEPTH 46'

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

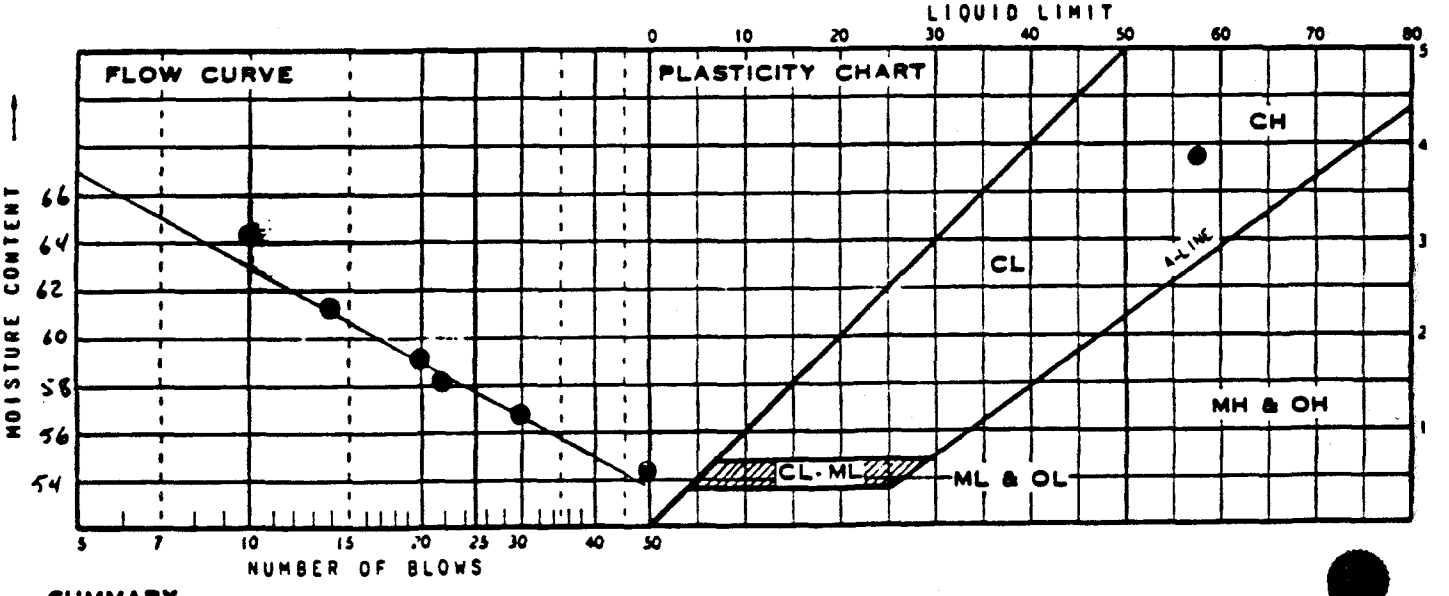
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY [illegible] 3/2/92

DETERMINATION	1	2	3 ?	4	5	6
DISH	2067	2056	2062			
WT OF DISH + WET SOIL g	4.59	6.28	4.49			
WT OF DISH + DRY SOIL g	4.02	5.46	4.02	—	—	—
WT OF MOISTURE g	.57	.82	.47			
WT OF DISH g	1.04	1.03	1.03	—	—	—
WT OF DRY SOIL g	2.98	4.43	2.99			
MOISTURE CONTENT %	19.1	18.5	15.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2068	33C	10C	34C	41C	2069
NUMBER OF BLOWS	50	30	22	20	14	10
WT OF DISH + WET SOIL g	12.93	13.08	13.21	12.28	11.97	11.6[illegible]
WT OF DISH + DRY SOIL g	8.74	8.72	8.74	8.09	7.81	7.51
WT OF MOISTURE g	4.19	4.36	4.47	4.19	4.16	4.16
WT OF DISH g	1.04	1.05	1.04	1.03	1.02	1.05
WT OF DRY SOIL g	7.70	7.67	7.70	7.06	6.79	6.46
MOISTURE CONTENT %	54.4	56.8	58.1	59.3	61.3	64.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		57.7	18.8	38.9	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

3R

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	69.0'	DATE TESTED	02-28-92 TNU
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	43.22
Wt. Dry Soil & Pan	(g)	41.90
Wt. Lost Moisture	(g)	1.32
Wt. of Pan Only	(g)	3.85
Wt. of Dry Soil	(g)	38.05
Moisture Content	%	3.5

Wt. Hydrom. Sample Wet (g)	60.01
Wt. Hydrom. Sample Dry (g)	58.00

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	60.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.01
Weight of - #10 Dry (g)	58.00
Wt. Total Sample Dry (g)	58.00
Calc. Wt. "W" (g)	58.00
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.31	3.28	1.97	1.97	3.4	96.6
#40	1.57	4.29	2.72	4.69	8.1	91.9
#60	1.37	4.81	3.44	8.13	14.0	86.0
#100	1.56	6.93	5.37	13.50	23.3	76.7
#230	1.56	9.49	7.93	21.43	36.9	63.1

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	69.0'	DATE TESTED	02-28-92 TNU
SAMPLE NO.	#8	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

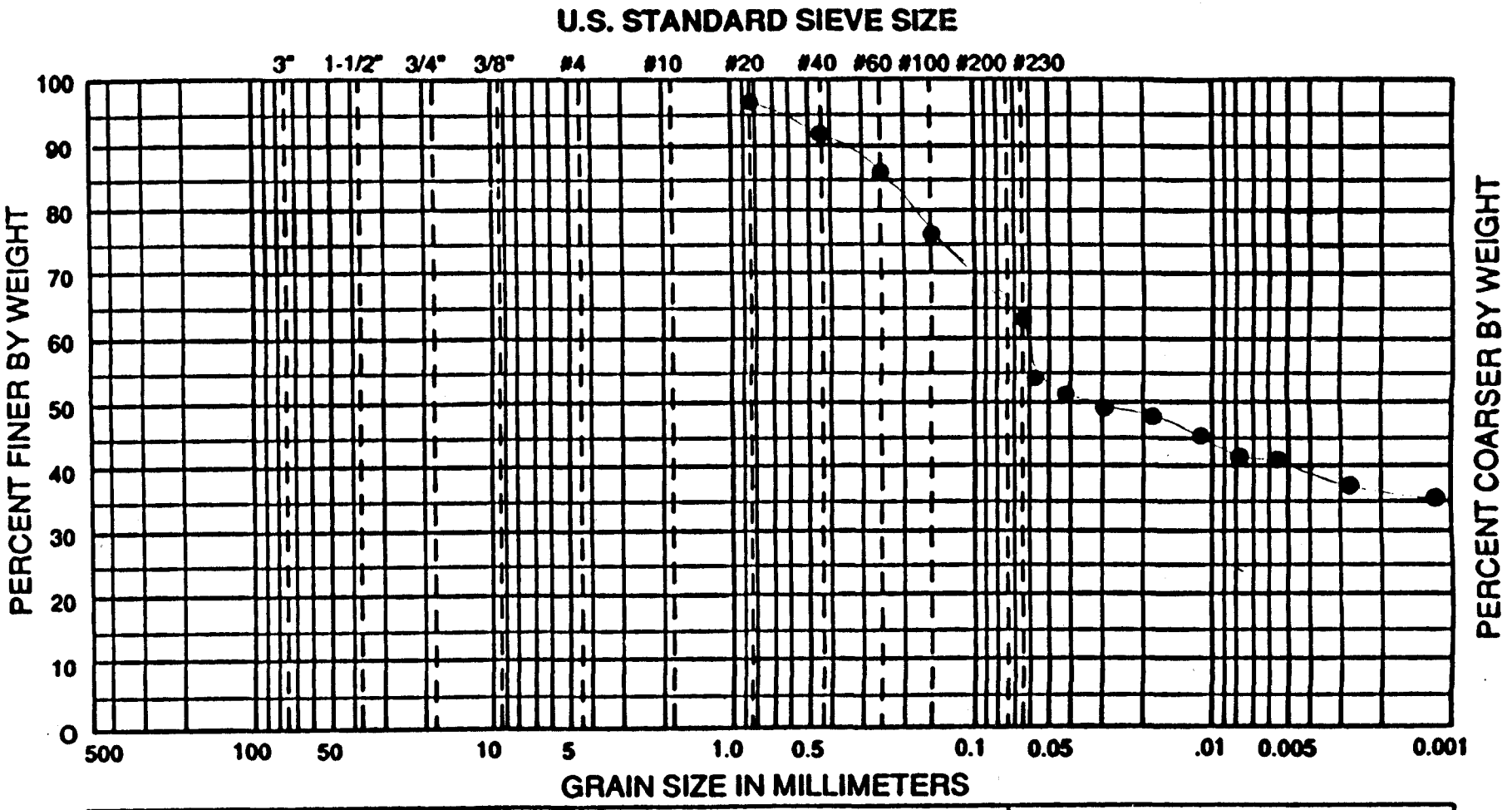
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	57.998
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	37.50	32.50	54.7	54.7	10.14	0.0580
1.0	35.50	30.50	51.3	51.3	10.47	0.0416
2.0	34.50	29.50	49.6	49.6	10.63	0.0297
5.0	33.50	28.50	48.0	48.0	10.80	0.0189
15.0	32.00	27.00	45.4	45.4	11.04	0.0110
30.0	30.00	25.00	42.1	42.1	11.37	0.0079
60.0	29.75	24.75	41.6	41.6	11.41	0.0056
120.0	28.50	23.50	39.5	39.5	11.62	0.0040
250.0	27.00	22.00	37.0	37.0	11.86	0.0028
1440.0	26.00	21.00	35.3	35.3	12.03	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10 + 25 SAMPLE NO.: CH # 8 DATE: 3/4/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	69.0'	ALLUV SILTY CLAYSTONE

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-4

BORING 10-25 SAMPLE CH# 8 DEPTH 69'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

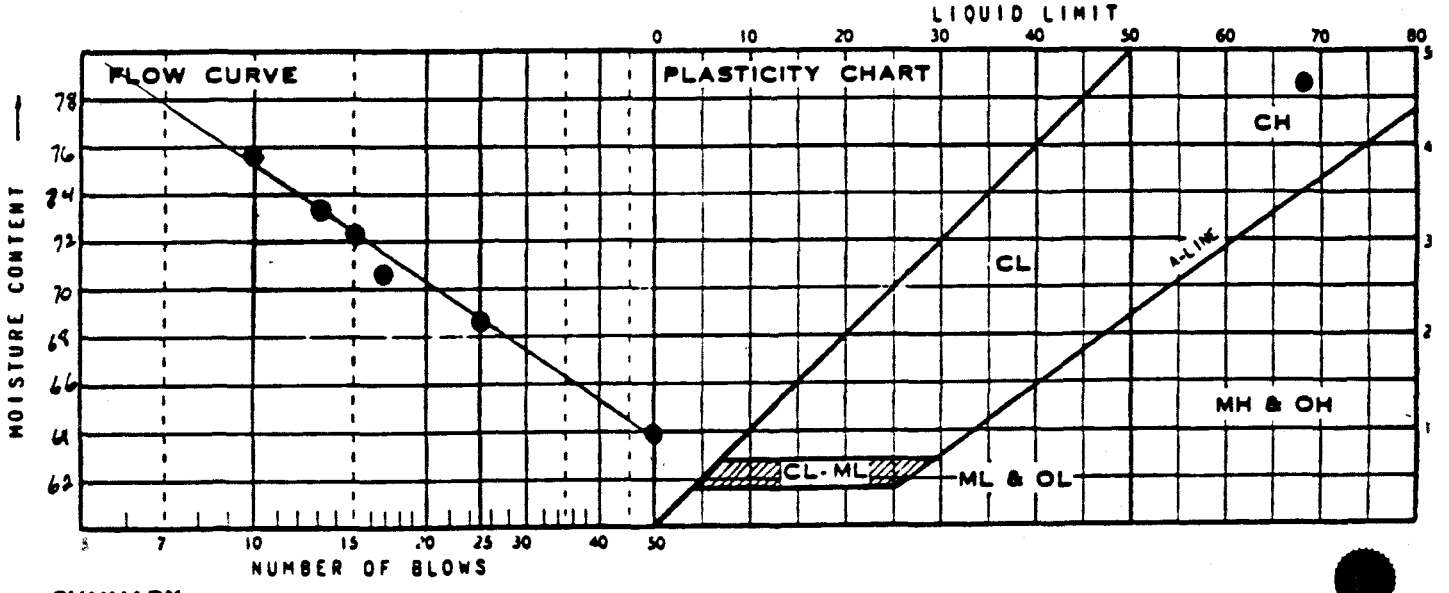
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DM 3/2/92

DETERMINATION	1	2	3	4	5	6
DISH	43C	2071	2022			
WT OF DISH + WET SOIL g	4.40	5.35	5.22			
WT OF DISH + DRY SOIL g	3.79	4.55	4.46	—	—	—
WT OF MOISTURE g	.61	.80	.76			
WT OF DISH g	1.04	1.05	1.05	—	—	—
WT OF DRY SOIL g	2.75	3.50	3.41			
MOISTURE CONTENT %	22.2	22.9	22.3			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2070	5C	28C	26C	2036	37C
NUMBER OF BLOWS	50	25	17	15	13	10
WT OF DISH + WET SOIL g	10.37	12.76	12.01	11.57	12.40	12.[illegible]
WT OF DISH + DRY SOIL g	6.74	7.49	7.47	7.16	7.59	7.43
WT OF MOISTURE g	3.63	4.77	4.54	4.41	4.81	4.81
WT OF DISH g	1.06	1.05	1.04	1.05	1.05	1.07
WT OF DRY SOIL g	5.68	6.94	6.43	6.11	6.54	6.36
MOISTURE CONTENT %	63.9	68.7	70.7	72.2	73.5	75.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		68.7	22.5	46.2	CH	

ADVANCED TERRA TESTING inc

HYDROMETER ANALYSIS - SEDIMENTATION DATA

BK

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+25	SAMPLED	Rocky Flats
DEPTH	74'	DATE TESTED	02-24-92 TN
SAMPLE NO.	#4	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

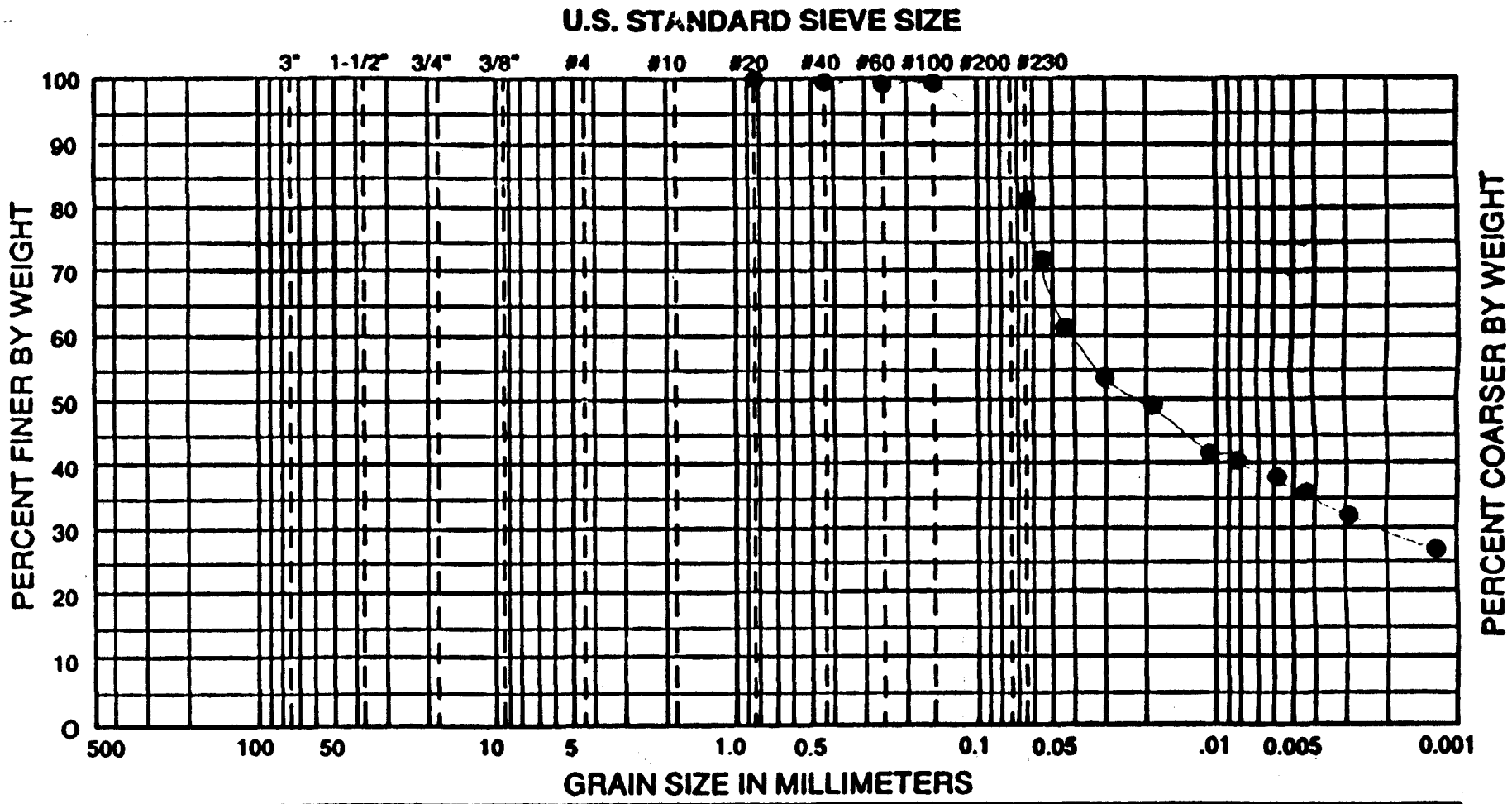
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.67	Temp. Coef. K	0.01324
Value of "a"	1.00	Wt. Dry Sample "W"	57.597
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	46.50	42.00	72.6	72.6	8.66	0.0551
1.0	40.50	36.00	62.3	62.3	9.65	0.0411
2.0	36.00	31.50	54.5	54.5	10.39	0.0302
5.0	32.50	28.00	48.4	48.4	10.96	0.0196
15.0	29.00	24.50	42.4	42.4	11.53	0.0116
30.0	28.50	24.00	41.5	41.5	11.62	0.0082
60.0	27.00	22.50	38.9	38.9	11.86	0.0059
120.0	25.50	21.00	36.3	36.3	12.11	0.0042
250.0	24.00	19.50	33.7	33.7	12.35	0.0029
1440.0	20.50	16.00	27.7	27.7	12.93	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+25 SAMPLE NO.: #4 DATE: 3-2-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	74'	

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 10-25 SAMPLE CH#4 DEPTH 74'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

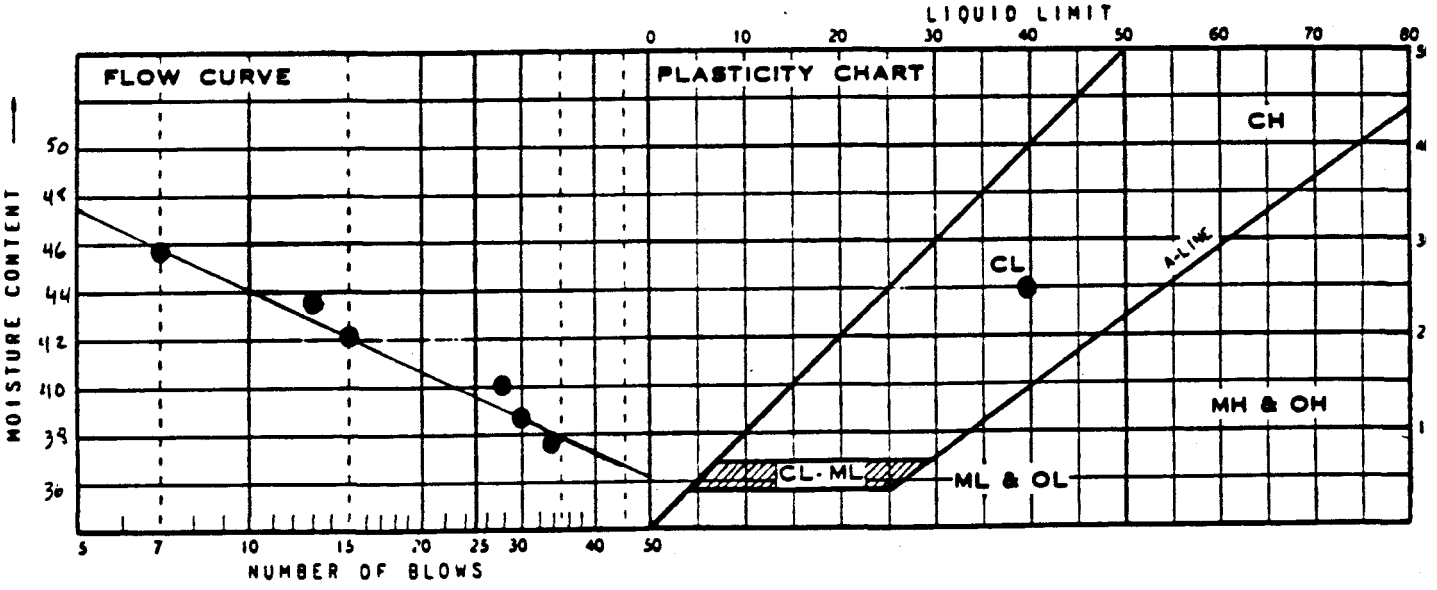
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DU 2/26/92

DETERMINATION	1	2	3	4	5	6
DISH	2075	22C	21C			
WT OF DISH + WET SOIL g	7.93	6.75	7.03			
WT OF DISH + DRY SOIL g	7.03	6.05	6.26	—	—	—
WT OF MOISTURE g	.90	.70	.77			
WT OF DISH g	1.04	1.05	1.05	—	—	—
WT OF DRY SOIL g	5.99	5.00	5.21			
MOISTURE CONTENT %	15.0	14.0	14.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	23C	2033	0C	2046	2074	38C
NUMBER OF BLOWS	34	24	30	28	15	13
WT OF DISH + WET SOIL g	13.69	12.62	11.99	13.10	11.70	13.14
WT OF DISH + DRY SOIL g	10.23	9.45	8.93	9.66	8.54	9.46
WT OF MOISTURE g	3.46	3.17	3.06	3.44	3.16	3.68
WT OF DISH g	1.06	1.06	1.06	1.08	1.05	1.04
WT OF DRY SOIL g	9.17	8.39	7.87	8.58	7.49	8.42
MOISTURE CONTENT %	37.7	37.8	38.9	40.1	42.2	43.7



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		29.6	14.6	25.0	CL	

ADVANCED TERRA TESTING inc

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	1.0-1.4'	DATE TESTED	2-28-92 TNU
SAMPLE NO.	#3	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	52.67
Wt. Dry Soil & Pan	(g)	50.39
Wt. Lost Moisture	(g)	2.28
Wt. of Pan Only	(g)	3.64
Wt. of Dry Soil	(g)	46.75
Moisture Content	%	4.9
Wt. Hydrom. Sample Wet	(g)	60.01
Wt. Hydrom. Sample Dry	(g)	57.22

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1489.17
Weight of + #10 Before Washing (g)	324.26
Weight of + #10 After Washing (g)	271.64
Weight of - #10 Wet (g)	1164.91
Weight of - #10 Dry (g)	1160.91
Wt. Total Sample Dry (g)	1432.55
Calc. Wt. "W" (g)	70.6
Calc. Mass + #10	13.3

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	115.25	115.25	115.25	8.0	92.0
3/4"	0.00	104.63	104.63	219.88	15.3	84.7
3/8"	0.00	3.58	3.58	223.46	15.6	84.4
#4	0.00	20.25	20.25	243.71	17.0	83.0
#10	0.00	27.93	27.93	271.64	19.0	81.0
#20	1.58	4.99	3.41	3.41	23.8	76.2
#40	1.56	4.90	3.34	6.75	28.5	71.5
#60	1.55	4.48	2.93	9.68	32.7	67.3
#100	1.57	5.41	3.84	13.52	38.1	61.9
#230	1.57	8.45	6.88	20.40	47.9	52.1

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT **Weston**

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	1.0-1.4'	DATE TESTED	2-28-92 TNU
SAMPLE NO.	#3	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

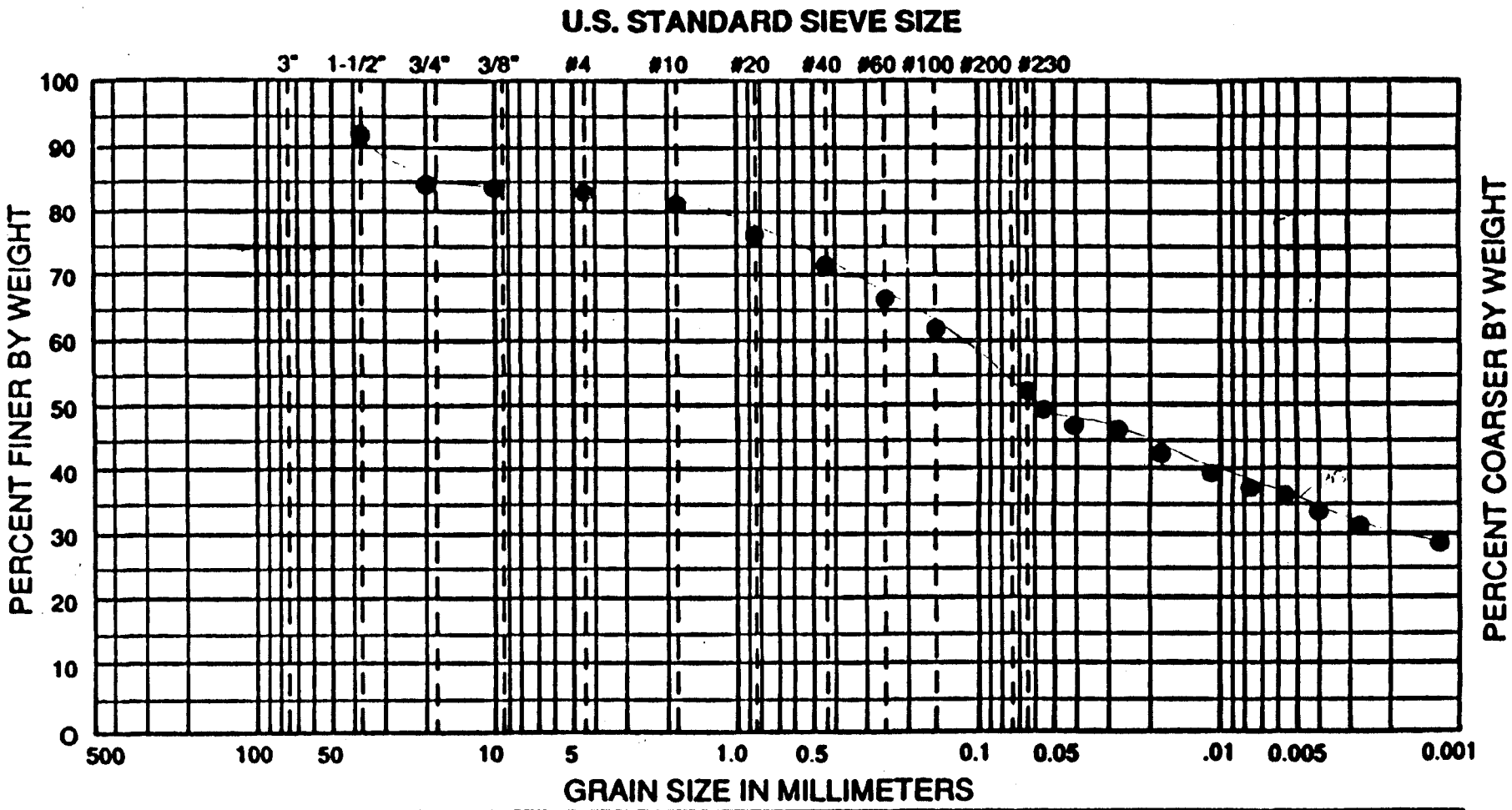
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.77	Temp. Coef. K	0.01287
Value of "a"	0.98	Wt. Dry Sample "W"	70.609
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	41.00	36.00	49.8	49.8	9.57	0.0563
1.0	39.00	34.00	47.0	47.0	9.89	0.0405
2.0	38.50	33.50	46.3	46.3	9.98	0.0287
5.0	36.00	31.00	42.8	42.8	10.39	0.0185
15.0	33.50	28.50	39.4	39.4	10.80	0.0109
30.0	32.00	27.00	37.3	37.3	11.04	0.0078
60.0	31.00	26.00	35.9	35.9	11.21	0.0056
120.0	30.00	25.00	34.6	34.6	11.37	0.0040
250.0	28.00	23.00	31.8	31.8	11.70	0.0028
1440.0	26.00	21.00	29.0	29.0	12.03	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10 + 50 SAMPLE NO.: CH #3 DATE: 3/11/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
Rocky Flats	1.0 - 1.4'	SANDY CLAY w/ some silt & gravel 15.3% c.gvl, 1.7% f.gvl, 2% c.sd, 9.5% m.sd, 14.5% f.sd, 21.5% [illegible] 35.5% Cl[illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03
CLIENT/OWNER Weston
LOCATION Rocky Flats EG-G
BORING 10-50 SAMPLE CM #3 DEPTH 1.0-1.4

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

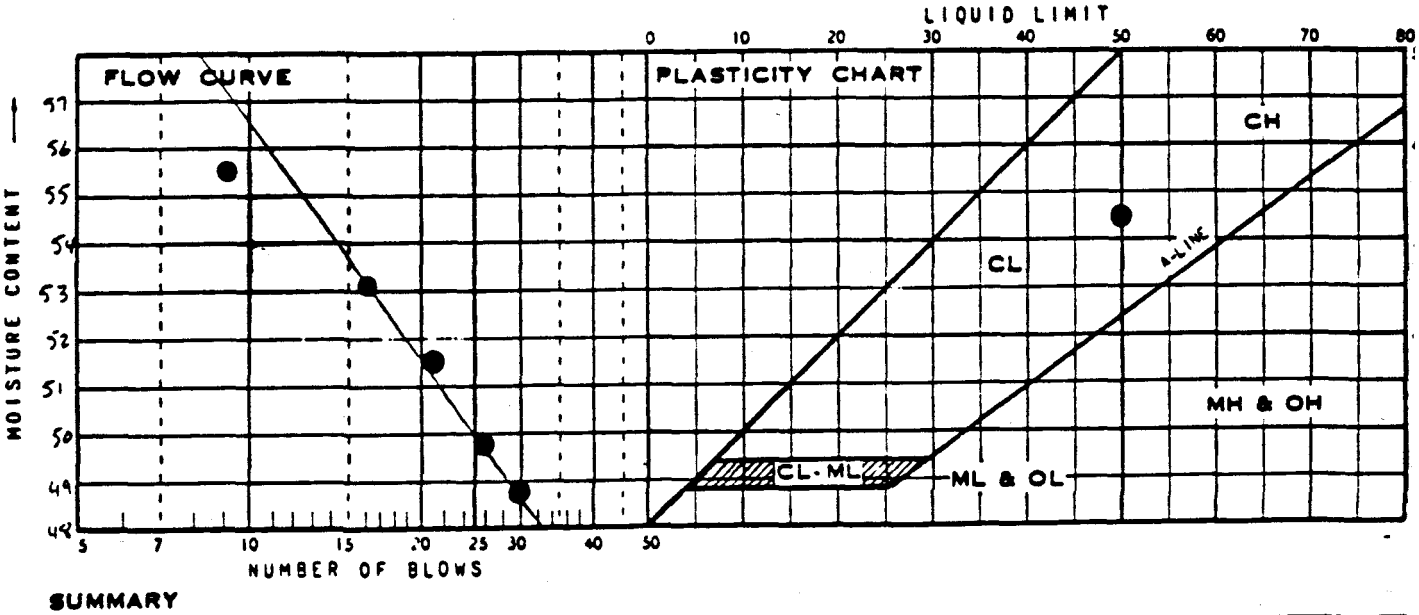
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DM 3/3/93

DETERMINATION	1	2	3	4	5	6
DISH	2027	2071	2040			
WT OF DISH + WET SOIL g	5.93	7.44	5.97			
WT OF DISH + DRY SOIL g	5.18	6.50	5.26	—	—	—
WT OF MOISTURE g	.75	.94	.71			
WT OF DISH g	1.06	1.05	1.05	—	—	—
WT OF DRY SOIL g	4.12	5.45	4.21			
MOISTURE CONTENT %	18.2	17.2	16.9			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	0C	2063	31C	12C	2038	2024
NUMBER OF BLOWS	30	26	21	16	9	
WT OF DISH + WET SOIL g	11.82	11.83	10.72	11.71	12.30	
WT OF DISH + DRY SOIL g	8.29	8.25	7.43	8.01	8.28	—
WT OF MOISTURE g	3.53	3.58	3.29	3.70	4.02	
WT OF DISH g	1.05	1.06	1.06	1.05	1.05	1.07
WT OF DRY SOIL g	7.24	7.19	6.37	6.96	7.23	
MOISTURE CONTENT %	48.8	49.8	51.6	53.2	55.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		50.0	17.4	32.6	CH

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	4.5'	DATE TESTED	03-05-92 SR
SAMPLE NO.	#3	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	67.18
Wt. Dry Soil & Pan	(g)	66.24
Wt. Lost Moisture	(g)	0.94
Wt. of Pan Only	(g)	3.35
Wt. of Dry Soil	(g)	62.89
Moisture Content	%	1.5

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	59.12

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	627.17
Weight of + #10 Before Washing (g)	70.48
Weight of + #10 After Washing (g)	44.87
Weight of - #10 Wet (g)	556.69
Weight of - #10 Dry (g)	573.72
Wt. Total Sample Dry (g)	618.59
Calc. Wt. "W" (g)	63.[illegible]
Calc. Mass + #10	4.6[illegible]

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	16.43	16.43	16.43	2.7	97.3
#4	0.00	20.87	20.87	37.30	6.0	94.0
#10	0.00	7.57	7.57	44.87	7.3	92.7
#20	1.56	2.03	0.47	0.47	8.0	92.0
#40	1.56	2.34	0.78	1.25	9.2	90.8
#60	1.55	2.26	0.71	1.96	10.3	89.7
#100	1.57	2.44	0.87	2.83	11.7	88.3
#230	1.55	3.22	1.67	4.50	14.3	85.7

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	4.5'	DATE TESTED	03-05-92 SR
SAMPLE NO.	#3	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

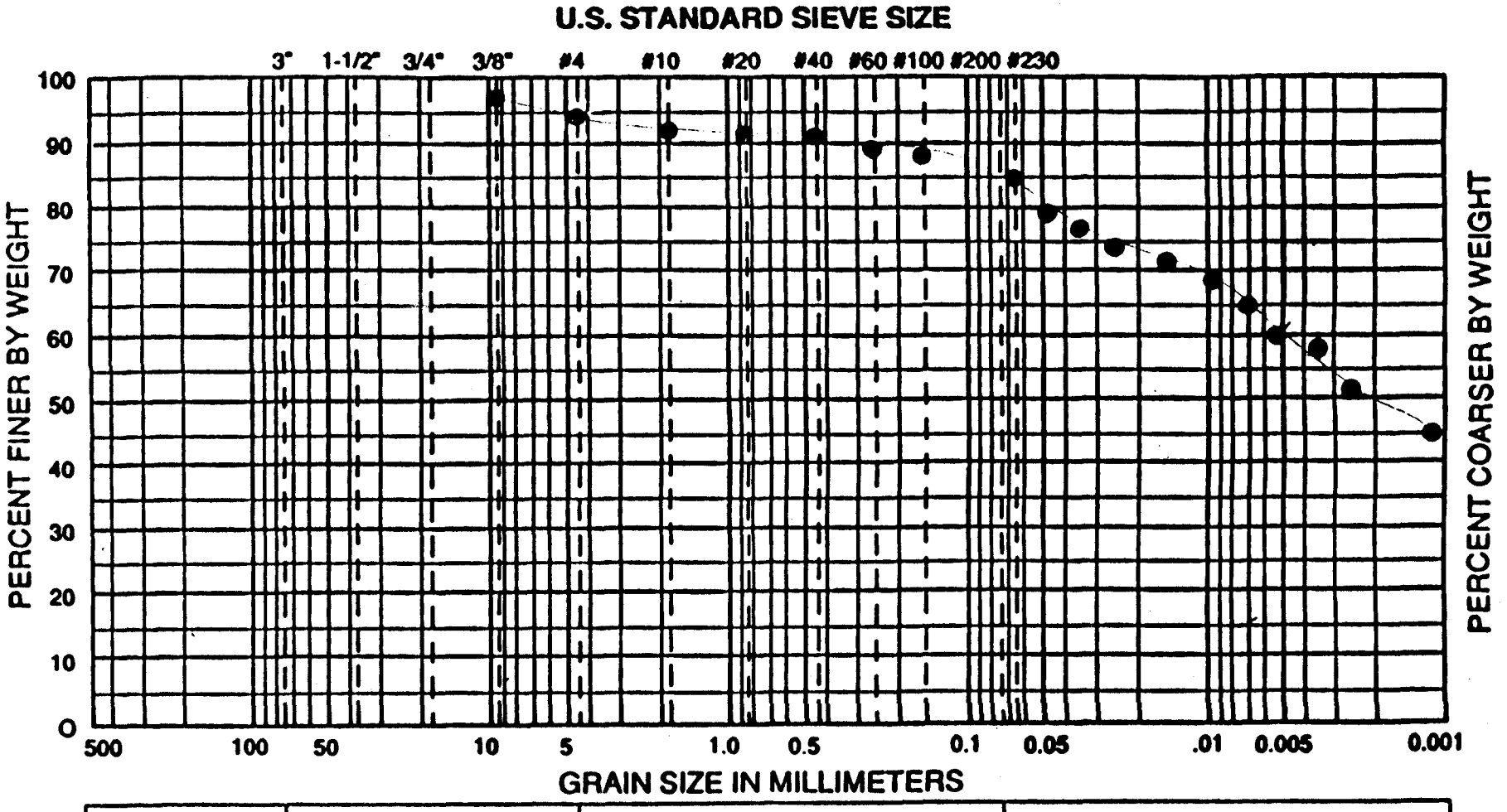
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.70	Temp. Coef. K	0.01312
Value of "a"	0.99	Wt. Dry Sample "W"	63.741
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	57.00	51.00	79.2	79.2	6.94	0.0489
1.0	55.75	49.75	77.3	77.3	7.15	0.0351
2.0	54.00	48.00	74.6	74.6	7.43	0.0253
5.0	52.75	46.75	72.6	72.6	7.64	0.0162
15.0	50.00	44.00	68.3	68.3	8.09	0.0096
30.0	48.00	42.00	65.2	65.2	8.42	0.0070
60.0	45.00	39.00	60.6	60.6	8.91	0.0051
120.0	43.75	37.75	58.6	58.6	9.12	0.0036
250.0	39.25	33.25	51.6	51.6	9.85	0.0026
1440.0	35.00	29.00	45.0	45.0	10.55	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		COARSE	FINE	COARSE	MEDIUM	FINE			

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+50 SAMPLE NO.: CH# 3 DATE: 3-7-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
[illegible] Flats	4.5'	SILTY CLAY: + gravel and SAND.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION - - - - - - - - - - - - - - -

LABORATORY CLASSIFICATION - - - - - - - - - - - - -

JOB NO. 2066-03

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 10+50 SAMPLE CH #3 DEPTH 4.5'

FIELD DENSITY BY ...../../..

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

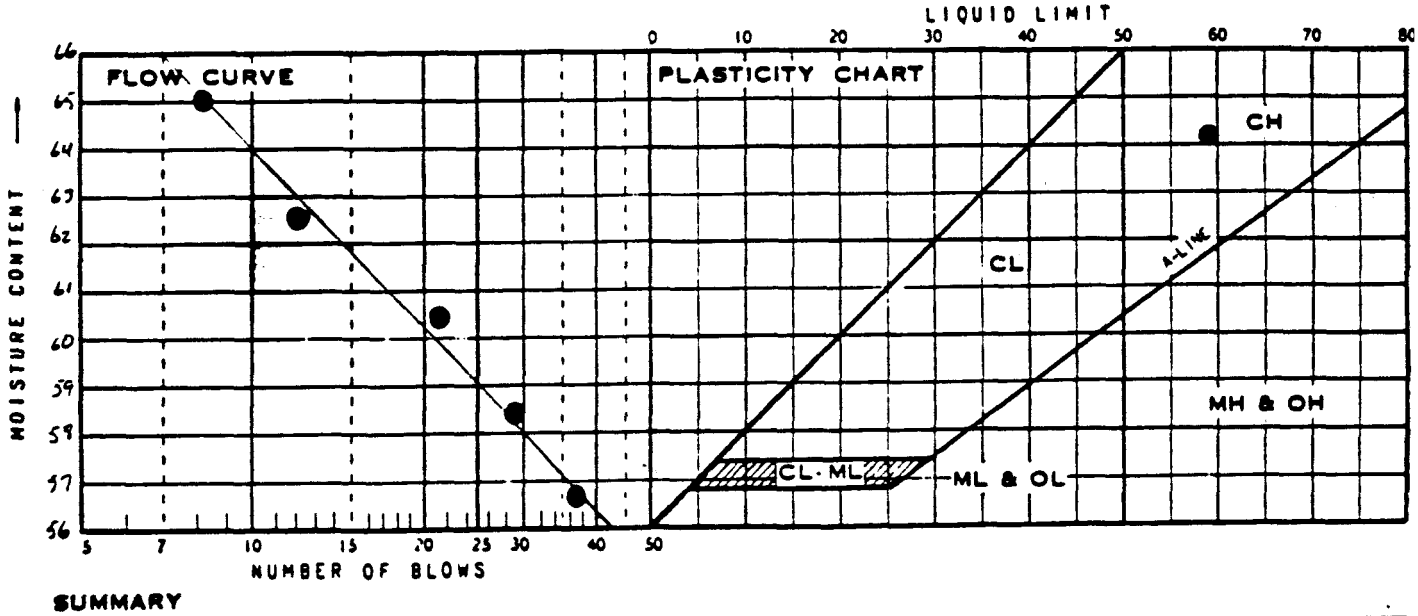
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY QL 3/4/92

DETERMINATION	1	2	3 ?	4	5	6
DISH	2017	2014	2074			
WT OF DISH + WET SOIL g	5.12	4.76	5.59			
WT OF DISH + DRY SOIL g	4.49	4.19	4.93	—	—	—
WT OF MOISTURE g	.63	.57	.66			
WT OF DISH g	1.03	1.07	1.04	—	—	—
WT OF DRY SOIL g	3.46	3.12	3.72			
MOISTURE CONTENT %	18.2	18.3	16.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	30C	2033	66C	2004	2041	2002
NUMBER OF BLOWS	37	29	21	12	8	
WT OF DISH + WET SOIL g	11.44	10.09	9.79	12.10	10.11	
WT OF DISH + DRY SOIL g	7.68	6.76	6.50	7.84	6.54	—
WT OF MOISTURE g	3.76	3.33	3.29	4.26	3.57	
WT OF DISH g	1.05	1.06	1.06	1.04	1.06	1.05
WT OF DRY SOIL g	6.63	5.70	5.44	6.80	5.48	
MOISTURE CONTENT %	56.7	58.4	60.5	62.6	65.1	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		59.0	18.3	40.7	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	20.5	DATE TESTED	03-05-92 SR
SAMPLE NO.	#3	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	56.51
Wt. Dry Soil & Pan	(g)	55.63
Wt. Lost Moisture	(g)	0.88
Wt. of Pan Only	(g)	3.70
Wt. of Dry Soil	(g)	51.93
Moisture Content	%	1.7
Wt. Hydrom. Sample Wet	(g)	60.01
Wt. Hydrom. Sample Dry	(g)	59.01

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	60.01
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.01
Weight of - #10 Dry (g)	59.01
Wt. Total Sample Dry (g)	59.01
Calc. Wt. "W" (g)	59.01
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.57	1.64	0.07	0.07	0.1	99.9
#40	1.56	1.63	0.07	0.14	0.2	99.8
#60	1.56	1.60	0.04	0.18	0.3	99.7
#100	1.56	1.61	0.05	0.23	0.4	99.6
#230	1.57	1.69	0.12	0.35	0.6	99.4

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	20.5	DATE TESTED	03-05-92 SR
SAMPLE NO.	#3	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

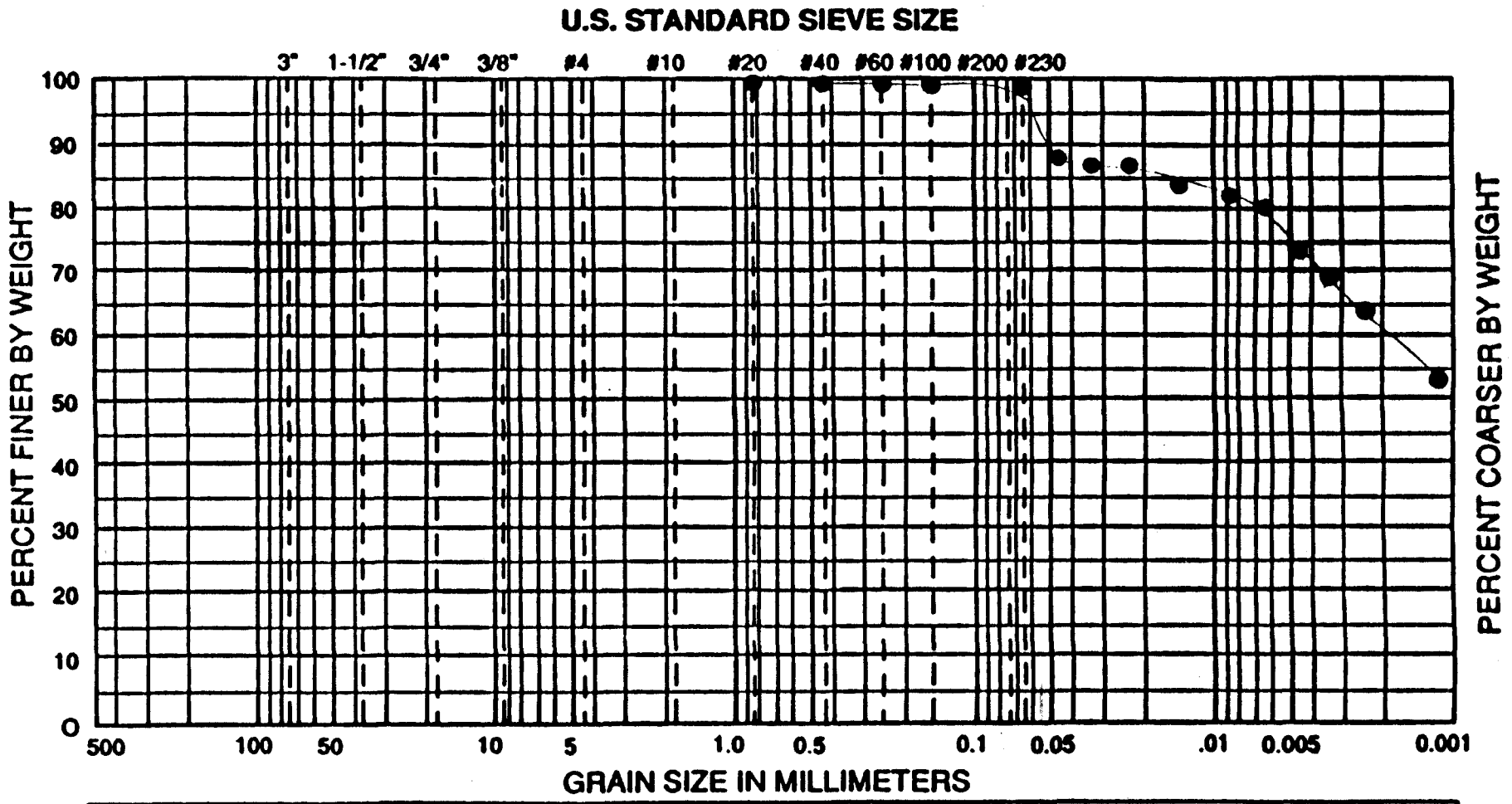
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.0
Sp. Gr. of Soil	2.79	Temp. Coef. K	0.01280
Value of "a"	0.97	Wt. Dry Sample "W"	59.013
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	59.50	53.50	88.1	88.1	6.53	0.0463
1.0	59.00	53.00	87.3	87.3	6.61	0.0329
2.0	59.00	53.00	87.3	87.3	6.61	0.0233
5.0	57.25	51.25	84.4	84.4	6.90	0.0150
15.0	56.00	50.00	82.4	82.4	7.11	0.0088
30.0	54.75	48.75	80.3	80.3	7.31	0.0063
60.0	51.00	45.00	74.1	74.1	7.93	0.0047
120.0	48.25	42.25	69.6	69.6	8.38	0.0034
250.0	45.25	39.25	64.6	64.6	8.87	0.0024
1440.0	38.25	32.25	53.1	53.1	10.02	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+50 SAMPLE NO.: CH #3 DATE: 3/9/92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
[illegible] Flats	20.5'	CLAY (CH) some silt, tr sd.

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-6

BORING 10-50 SAMPLE CH #3 DEPTH 20.5'

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

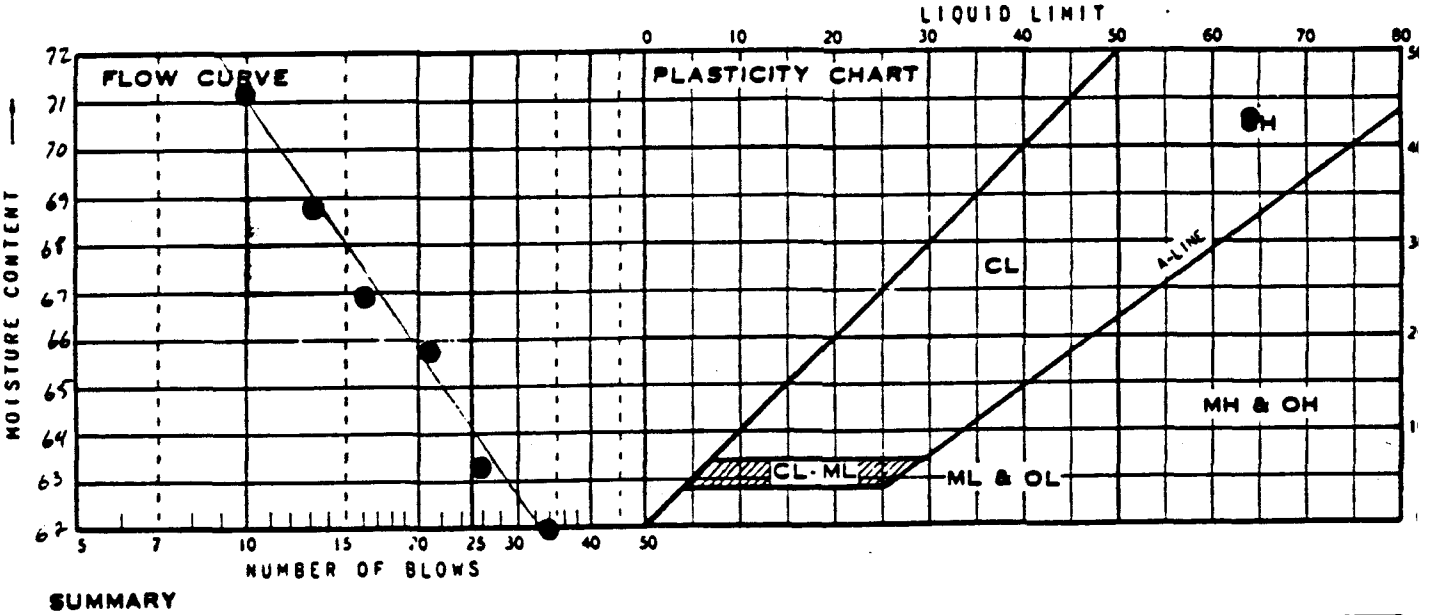
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DM 3/4/92

DETERMINATION	1	2	3	4	5	6
DISH	37C	15C	2012			
WT OF DISH + WET SOIL g	4.94	5.26	6.36			
WT OF DISH + DRY SOIL g	4.26	4.51	5.44	—	—	—
WT OF MOISTURE g	.68	.75	.92			
WT OF DISH g	1.03	1.06	1.05	—	—	—
WT OF DRY SOIL g	3.23	3.45	4.39			
MOISTURE CONTENT %	21.1	21.7	21.0			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2008	35C	2025	2002	2024	54C
NUMBER OF BLOWS	34	26	21	16	13	10
WT OF DISH + WET SOIL g	10.48	10.45	10.78	10.45	10.43	9.91
WT OF DISH + DRY SOIL g	6.87	6.81	6.94	5.44	6.68	6.23
WT OF MOISTURE g	3.61	3.64	3.84	3.77	3.82	3.68
WT OF DISH g	1.05	1.06	1.06	1.05	1.06	1.06
WT OF DRY SOIL g	5.82	5.75	5.88	5.63	5.55	5.17
MOISTURE CONTENT %	62.0	6[illegible].3	65.3	67.0	68.9	71.[illegible]



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		64.0	21.3	42.7	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	42.5'	DATE TESTED	02-12-92 TNU
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	59.84
Wt. Dry Soil & Pan	(g)	57.85
Wt. Lost Moisture	(g)	1.99
Wt. of Pan Only	(g)	3.17
Wt. of Dry Soil	(g)	54.68
Moisture Content	%	3.6
Wt. Hydrom. Sample Wet	(g)	60.09
Wt. Hydrom. Sample Dry	(g)	57.98

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	487.74
Weight of + #10 Before Washing (g)	1.34
Weight of + #10 After Washing (g)	1.25
Weight of - #10 Wet (g)	486.40
Weight of - #10 Dry (g)	469.41
Wt. Total Sample Dry (g)	470.66
Calc. Wt. "W" (g)	58.1
Calc. Mass + #10	0.15

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	1.17	1.17	1.17	0.2	99.8
#10	0.00	0.08	0.08	1.25	0.3	99.7
#20	1.57	1.59	0.02	0.02	0.3	99.7
#40	1.30	1.33	0.03	0.05	0.4	99.6
#60	1.57	1.60	0.03	0.08	0.4	99.6
#100	1.56	1.61	0.05	0.13	0.5	99.5
#230	1.57	1.82	0.25	0.38	0.9	99.1

Silty Clay -

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	42.5'	DATE TESTED	02-12-92 TNU
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

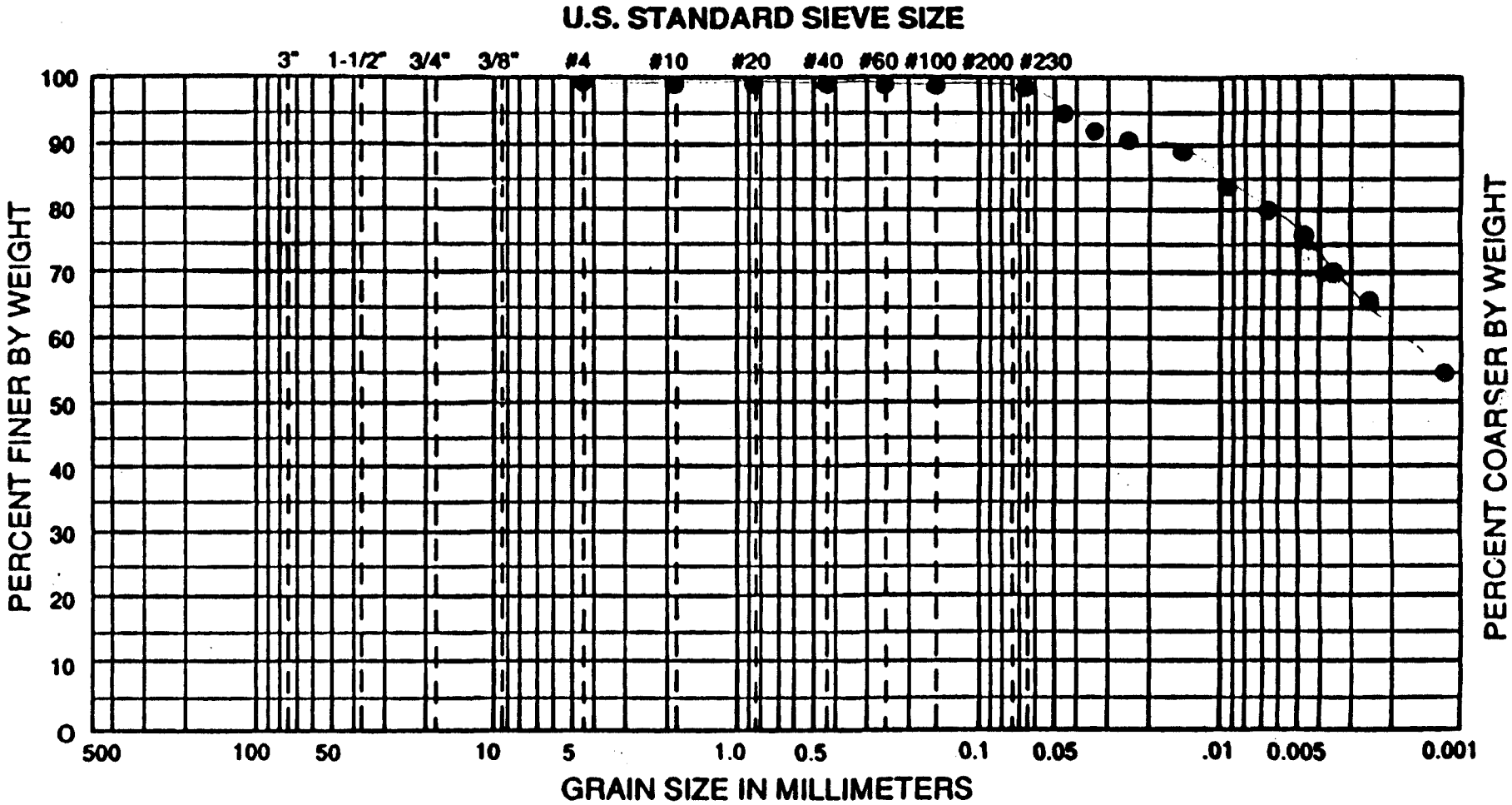
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01324
Value of "a"	0.99	Wt. Dry Sample "W"	58.133
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	62.00	56.00	95.0	95.0	6.12	0.0463
1.0	61.00	55.00	93.3	93.3	6.29	0.0332
2.0	60.00	54.00	91.6	91.6	6.45	0.0238
5.0	58.50	52.50	89.0	89.0	6.70	0.0153
15.0	55.50	49.50	84.0	84.0	7.19	0.0092
30.0	53.50	47.50	80.6	80.6	7.52	0.0066
60.0	51.00	45.00	76.3	76.3	7.93	0.0048
120.0	47.50	41.50	70.4	70.4	8.50	0.0035
250.0	45.00	39.00	66.1	66.1	8.91	0.0025
1440.0	38.50	32.50	55.1	55.1	9.98	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+50 SAMPLE NO.: #6 DATE: 2-23-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	42.5'	.2% Gravels SILTY CLAY (CH) w/ trace sand [illegible] gravels [illegible] FLATS [illegible]

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

CLIENT/OWNER WESTON

LOCATION EG&G

BORING 10-50 SAMPLE ____ DEPTH 42.5

(6)

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

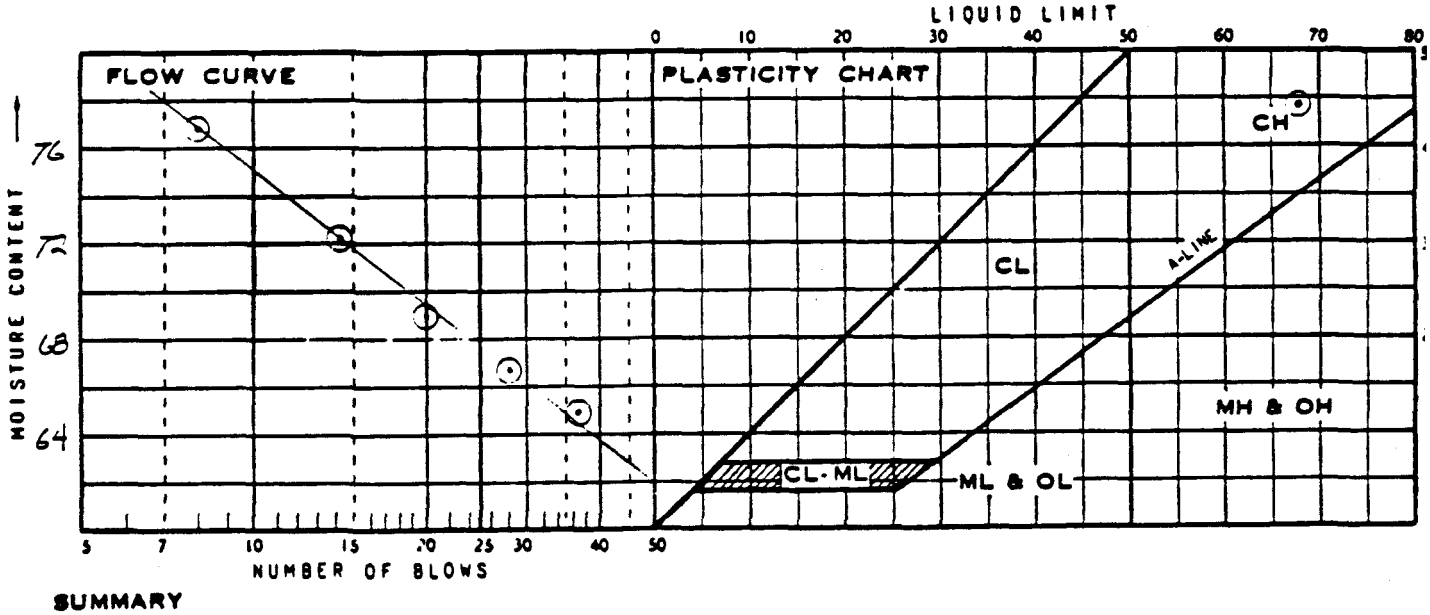
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DW 2/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2031	1902	2055			
WT OF DISH + WET SOIL	6.12g	8.18g	7.39g			
WT OF DISH + DRY SOIL	5.16g	6.81g	6.18g	—	—	—
WT OF MOISTURE	0.96g	1.37g	1.21g			
WT OF DISH	1.04g	1.01g	1.05g	—	—	—
WT OF DRY SOIL	4.12g	5.80g	5.15g			
MOISTURE CONTENT	23.3	23.6	23.5			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2018	12C	2069	2070	2053	
NUMBER OF BLOWS	37	28	20	14	8	
WT OF DISH + WET SOIL	15.68g	16.91g	17.41g	17.08g	17.88g	
WT OF DISH + DRY SOIL	9.91g	10.56g	10.72g	10.35g	10.56g	—
WT OF MOISTURE	5.77g	6.35g	6.69g	6.73g	7.32g	
WT OF DISH	1.04g	1.04g	1.03g	1.05g	1.04g	—
WT OF DRY SOIL	8.87g	9.52g	9.69g	9.32g	9.52g	
MOISTURE CONTENT	65.1	66.7	69.0	72.2	76.9	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		67.7	23.5	44.2	CH	

ADVANCED TERRA TESTING INC

Pa -

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Westem

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	46'	DATE TESTED	02-12-92
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	59.38
Wt. Dry Soil & Pan	(g)	58.34
Wt. Lost Moisture	(g)	1.04
Wt. of Pan Only	(g)	3.75
Wt. of Dry Soil	(g)	54.59
Moisture Content	%	1.9

Wt. Hydrom. Sample Wet (g)	60.00
Wt. Hydrom. Sample Dry (g)	58.88

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	58.88
Wt. Total Sample Dry (g)	58.88
Calc. Wt. "W" (g)	58.88
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.55	1.57	0.02	0.02	0.0	100.0
#40	1.55	1.57	0.02	0.04	0.1	99.9
#60	1.55	1.56	0.01	0.05	0.1	99.9
#100	1.55	1.57	0.02	0.07	0.1	99.9
#230	1.55	1.68	0.13	0.20	0.3	99.7

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+50	SAMPLED	Rocky Flats/
DEPTH	46'	DATE TESTED	02-12-92
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

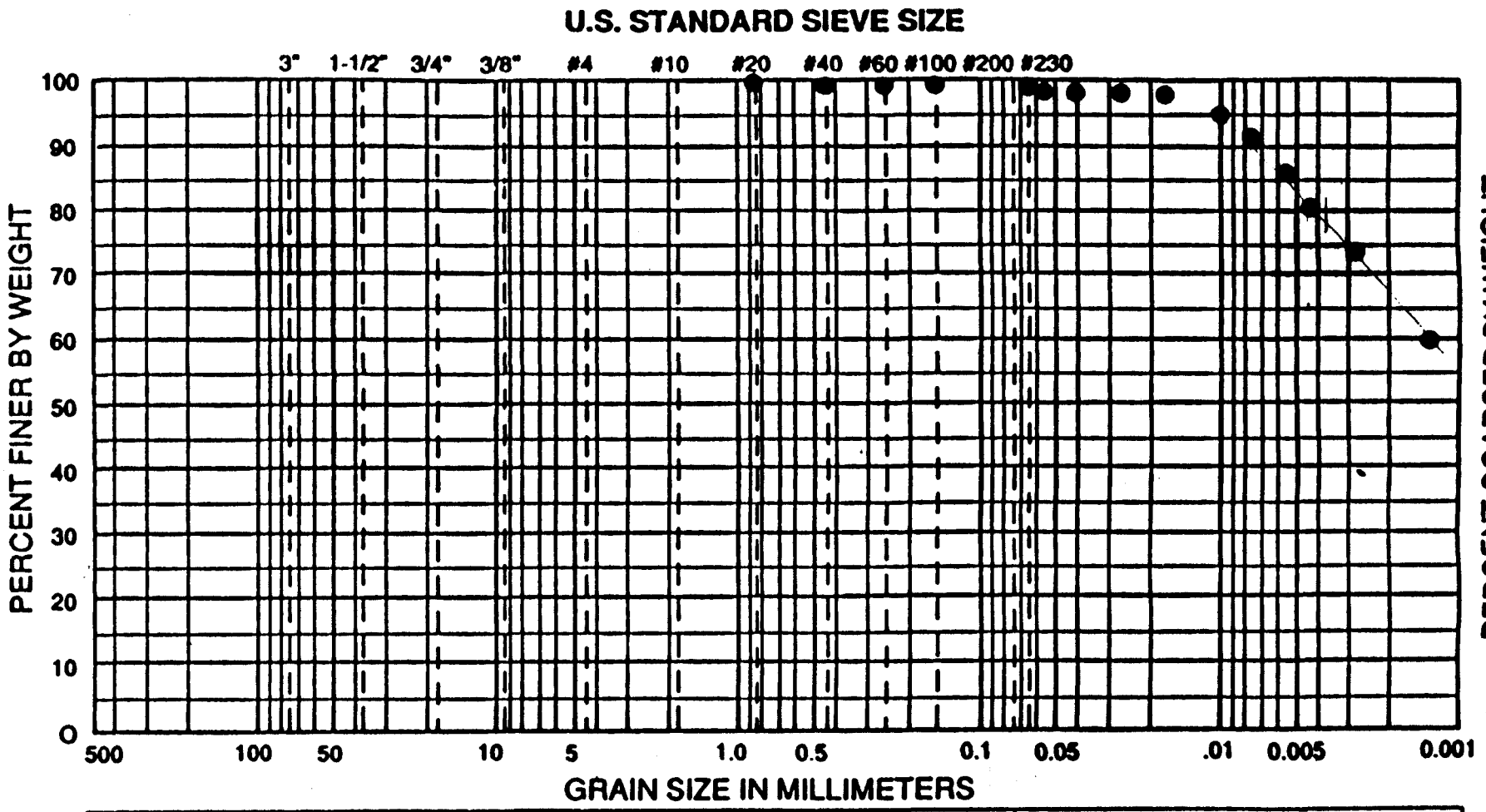
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.18	Temp. Coef. K	0.01567
Value of "a"	1.09	Wt. Dry Sample "W"	58.878
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	59.00	53.00	98.3	98.3	6.61	0.0570
1.0	59.00	53.00	98.3	98.3	6.61	0.0403
2.0	59.00	53.00	98.3	98.3	6.61	0.0285
5.0	59.00	53.00	98.3	98.3	6.61	0.0180
15.0	57.50	51.50	95.5	95.5	6.86	0.0106
30.0	56.00	50.00	92.7	92.7	7.11	0.0076
60.0	52.50	46.50	86.2	86.2	7.68	0.0056
120.0	50.00	44.00	81.6	81.6	8.09	0.0041
250.0	46.00	40.00	74.2	74.2	8.75	0.0029
1440.0	38.50	32.50	60.3	60.3	9.98	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		COARSE	FINE	COARSE	MEDIUM	FINE				
WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL			SAND			SILT	CLAY	
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+50 SAMPLE NO.: #6 DATE: 2-21-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	46'	(CH) w/ some silt trace sand Rocky Flats

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER WESTON

LOCATION _____

BORING 0+50 SAMPLE ____ DEPTH 46'

(6)

FIELD DENSITY BY ____

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

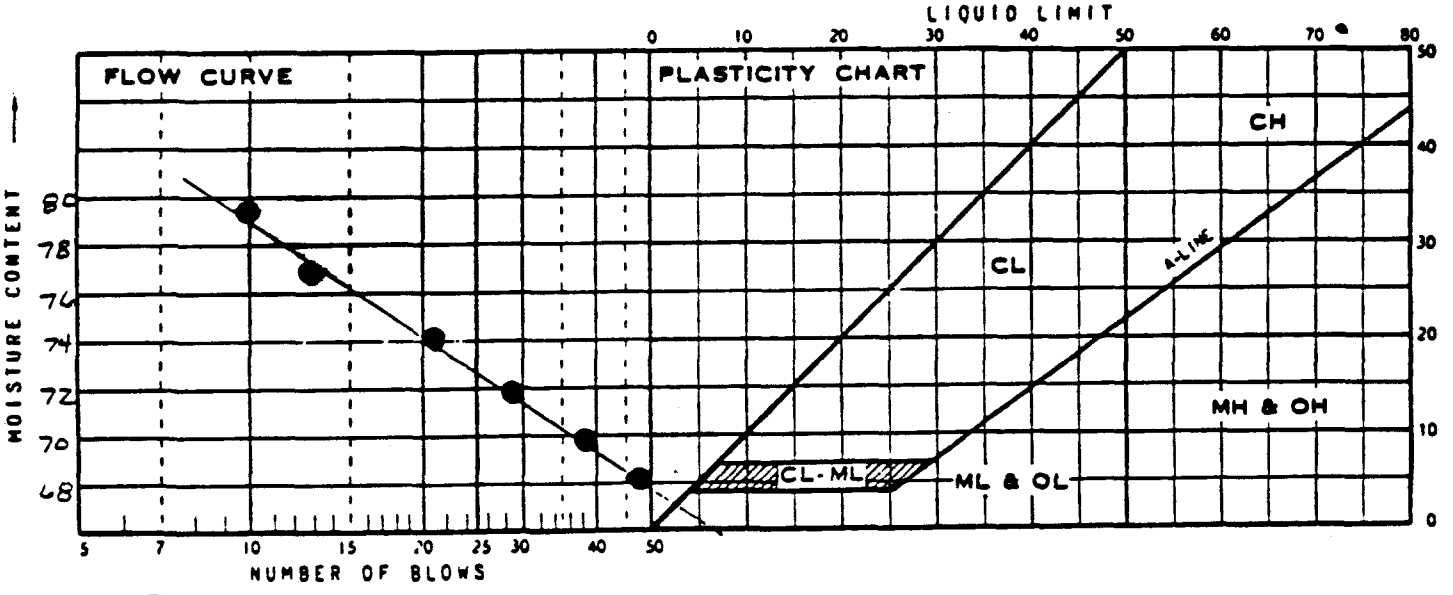
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY CW 2/22/92

DETERMINATION	1	2	3	4	5	6
DISH	2019	42C	2009			
WT OF DISH + WET SOIL	5.28 g	6.27 g	5.97 g			
WT OF DISH + DRY SOIL g	4.52	5.33	5.12	—	—	—
WT OF MOISTURE g	.76	.94	.87			
WT OF DISH g	1.06 g	1.03 g	1.05 g	—	—	—
WT OF DRY SOIL g	3.46	4.30	4.07			
MOISTURE CONTENT %	22.0	21.9	21.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2024	26C	27C	28C	29C	30C
NUMBER OF BLOWS	49	29	20	21	13	10
WT OF DISH + WET SOIL	18.52 g	16.45 g	16.23 g	19.23 g	19.54 g	18.76 g
WT OF DISH + DRY SOIL g	11.44	10.11	10.22	11.49	11.50	10.91
WT OF MOISTURE g	7.08	6.34	6.01	7.74	8.04	7.85
WT OF DISH g	1.04 g	1.04 g	1.03 g	1.04 g	1.04 g	1.05 g
WT OF DRY SOIL g	10.40	9.07	9.19	10.45	10.46	9.86
MOISTURE CONTENT %	68.1	69.9	71.9	74.1	76.9	79.6



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		72.8	21.8	51.0	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

BR

CLIENT Western

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	55.0'	DATE TESTED	02-18-92 TN
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No

Wt. Wet Soil & Pan	(g)	45.05
Wt. Dry Soil & Pan	(g)	43.46
Wt. Lost Moisture	(g)	1.59
Wt. of Pan Only	(g)	3.73
Wt. of Dry Soil	(g)	39.73
Moisture Content	%	4.0

Wt. Hydrom. Sample Wet (g)	56.03
Wt. Hydrom. Sample Dry (g)	53.87

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	56.03
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	56.03
Weight of - #10 Dry (g)	53.87
Wt. Total Sample Dry (g)	53.8
Calc. Wt. "W" (g)	53.87
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	1.56	1.64	0.08	0.08	0.1	99.9
#40	1.56	1.59	0.03	0.11	0.2	99.8
#60	1.57	1.60	0.03	0.14	0.3	99.7
#100	1.56	1.59	0.03	0.17	0.3	99.7
#230	1.56	1.66	0.10	0.27	0.5	99.5

Silty Clayey

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	55.0'	DATE TESTED	02-18-92 TNU
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

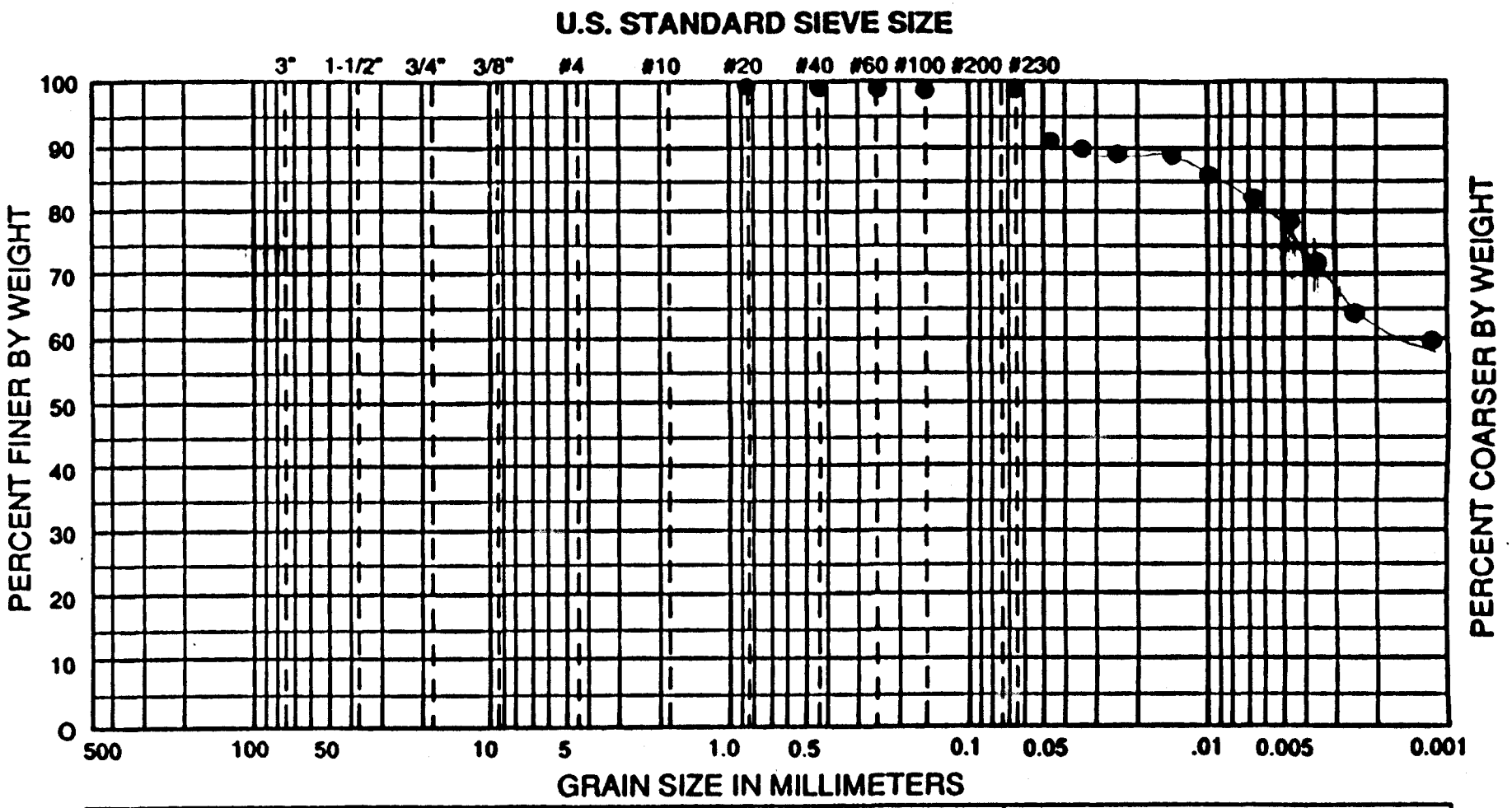
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.83	Temp. Coef. K	0.01289
Value of "a"	0.96	Wt. Dry Sample "W"	53.869
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	57.00	51.00	91.3	91.3	6.94	0.0480
1.0	56.50	50.50	90.4	90.4	7.02	0.0342
2.0	56.00	50.00	89.5	89.5	7.11	0.0243
5.0	55.75	49.75	89.0	89.0	7.15	0.0154
15.0	54.00	48.00	85.9	85.9	7.43	0.0091
30.0	52.50	46.50	83.2	83.2	7.68	0.0065
60.0	50.00	44.00	78.7	78.7	8.09	0.0047
120.0	46.50	40.50	72.5	72.5	8.66	0.0035
250.0	42.00	36.00	64.4	64.4	9.40	0.0025
1440.0	34.00	28.00	50.1	50.1	10.71	0.0011

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+50 SAMPLE NO.: #6 DATE: 2-24-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	[illegible]	[illegible] SILTY CLAYSTONE w/ trace [illegible]
	[illegible]	ROCKY FLATS [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. _____

CLIENT/OWNER WESTON

LOCATION _____

BORING 10+50 SAMPLE ____ DEPTH 55' (6)

FIELD DENSITY BY ____/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

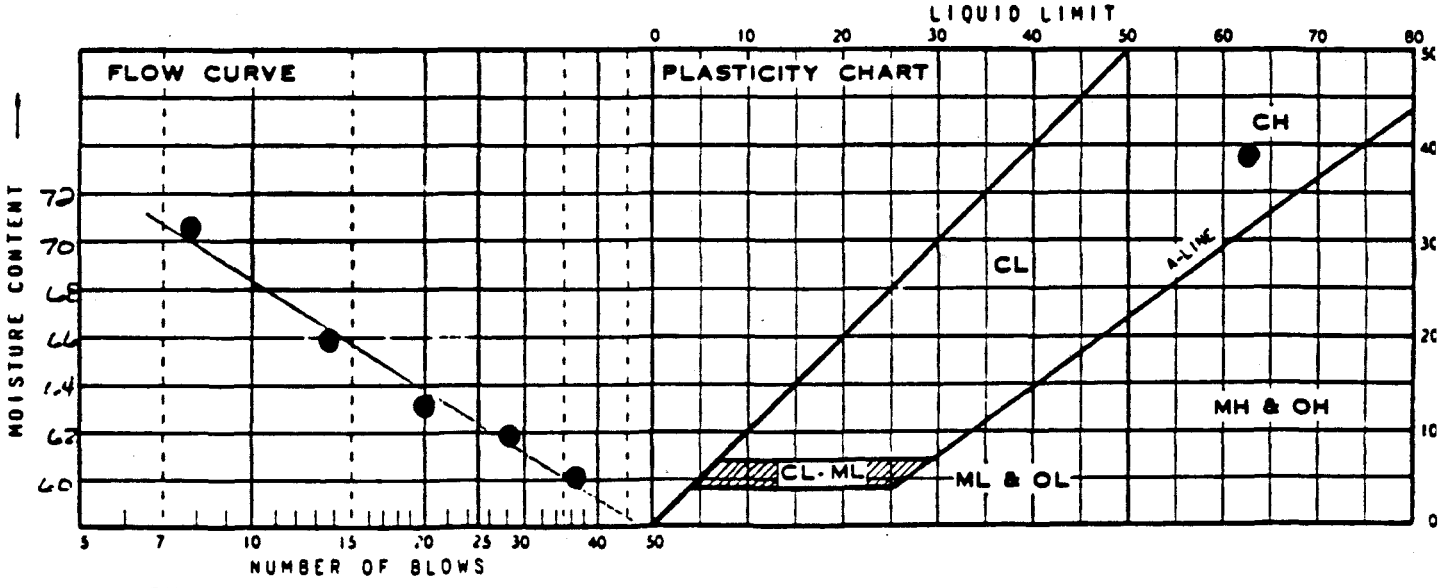
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY SR. 2/12/99

DETERMINATION	1	2	3	4	5	6
DISH	18C	19C	20C			
WT OF DISH + WET SOIL g	6.83	6.85	7.00			
WT OF DISH + DRY SOIL g	5.71	5.76	5.85	—	—	—
WT OF MOISTURE g	1.12	1.09	1.15			
WT OF DISH g	1.03	1.02	1.02	—	—	—
WT OF DRY SOIL g	4.68	4.74	4.83			
MOISTURE CONTENT %	23.9	23.0	23.8			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	21C	22C	23C	24C	25C	
NUMBER OF BLOWS	37	29	20	14	9	
WT OF DISH + WET SOIL g	18.61	16.33	14.78	15.11	15.27	
WT OF DISH + DRY SOIL g	12.61	10.48	9.47	9.51	9.38	—
WT OF MOISTURE g	7.00	5.85	5.31	5.60	5.89	
WT OF DISH g	1.03	1.03	1.05	1.03	1.04	—
WT OF DRY SOIL g	11.58	9.45	8.42	8.48	8.34	
MOISTURE CONTENT %	60.5	61.9	63.1	66.0	70.6	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		62.3	23.6	38.7	CH	

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+50	SAMPLED	Rocky Flats
DEPTH	72'	DATE TESTED	02-12-92 T
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	56.02
Wt. Dry Soil & Pan	(g)	53.95
Wt. Lost Moisture	(g)	2.07
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	50.23
Moisture Content	%	4.1
Wt. Hydrom. Sample Wet	(g)	60.00
Wt. Hydrom. Sample Dry	(g)	57.63

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	60.00
Weight of + #10 Before Washing (g)	0.00
Weight of + #10 After Washing (g)	0.00
Weight of - #10 Wet (g)	60.00
Weight of - #10 Dry (g)	57.63
Wt. Total Sample Dry (g)	57.6
Calc. Wt. "W" (g)	57.63
Calc. Mass + #10	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	0.00	0.00	0.00	0.00	0.0	100.0
#20	0.00	0.00	0.00	0.00	0.0	100.0
#40	1.56	1.57	0.01	0.01	0.0	100.0
#60	1.57	1.60	0.03	0.04	0.1	99.9
#100	1.56	1.88	0.32	0.36	0.6	99.4
#230	1.56	33.17	31.61	31.97	55.5	44.5

Silty Sandstone

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Weston	JOB NO.	2066-03
BORING NO.	10+50	SAMPLED	Rocky Flats,
DEPTH	72'	DATE TESTED	02-12-92 TN
SAMPLE NO.	#6	WASH SIEVE	Yes
SOIL DESCR.	Bulk (Jar)	DRY SIEVE	No

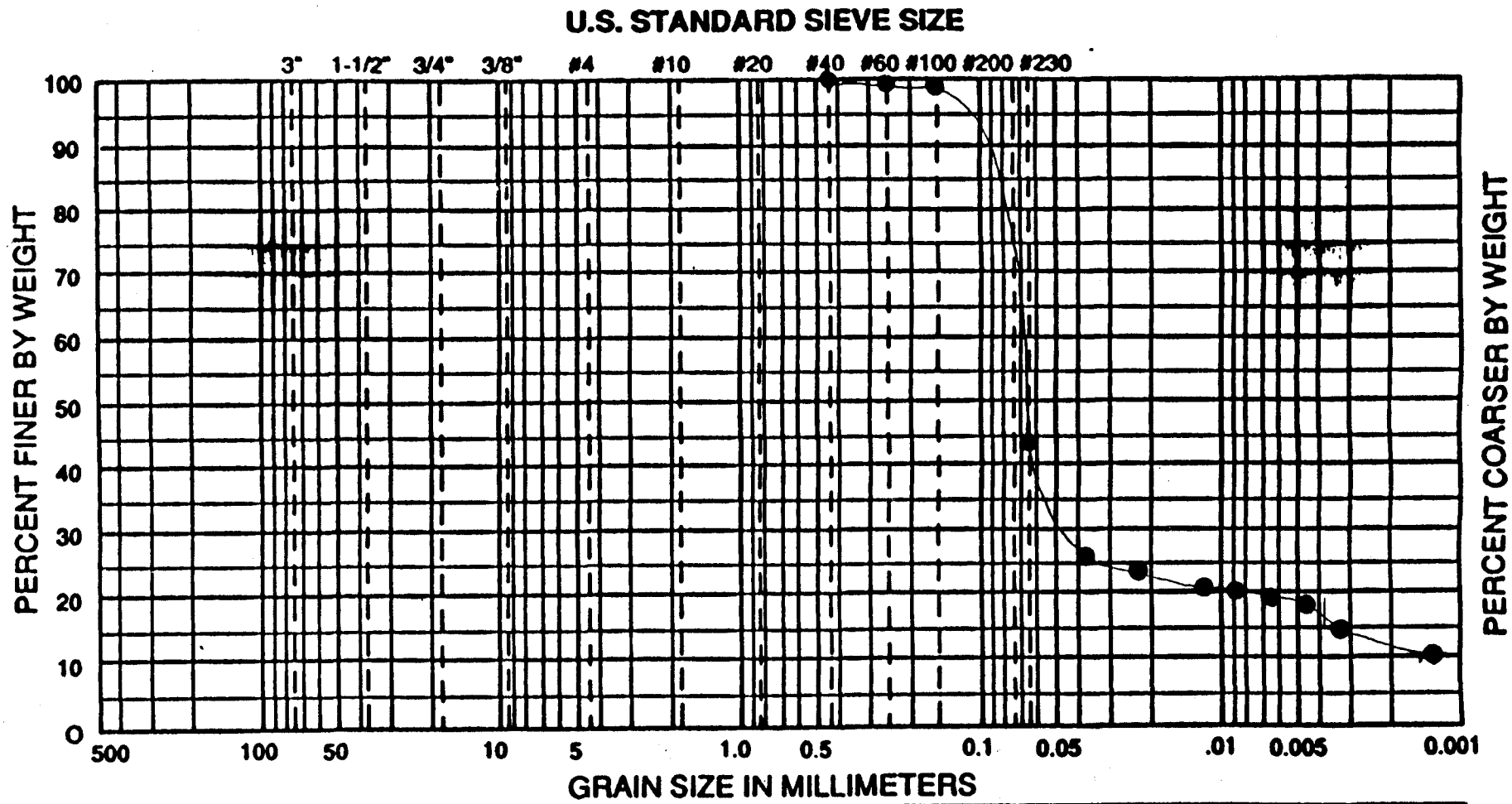
Hydrometer #	ASTM 152 H	Temp., Deg. C	21.0
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01332
Value of "a"	0.99	Wt. Dry Sample "W"	57.625
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effecitve Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	36.50	30.50	52.5	52.5	10.30	0.0605
1.0	26.50	20.50	35.3	35.3	11.94	0.0460
2.0	21.50	15.50	26.7	26.7	12.76	0.0337
5.0	20.00	14.00	24.1	24.1	13.01	0.0215
15.0	19.00	13.00	22.4	22.4	13.17	0.0125
30.0	18.50	12.50	21.5	21.5	13.26	0.0089
60.0	17.50	11.50	19.8	19.8	13.42	0.0063
120.0	16.50	10.50	18.1	18.1	13.58	0.0045
250.0	15.00	9.00	15.5	15.5	13.83	0.0031
1440.0	12.50	6.50	11.2	11.2	14.24	0.0013

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

ADVANCED TERRA TESTING



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

WENTWORTH	COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
		COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WELLNAME: 10+50 SAMPLE NO.: #6 DATE: 2-21-92 PROJECT NO.:

AREA	DEPTH	CLASSIFICATION
	72'	Roc. + FLATS Silty [illegible] w/ some [illegible] [illegible]

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2066-03

CLIENT/OWNER WESTON

LOCATION EG+G

BORING 10+50 SAMPLE ____ DEPTH 72'

(6)

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS	—	—
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD [redacted]

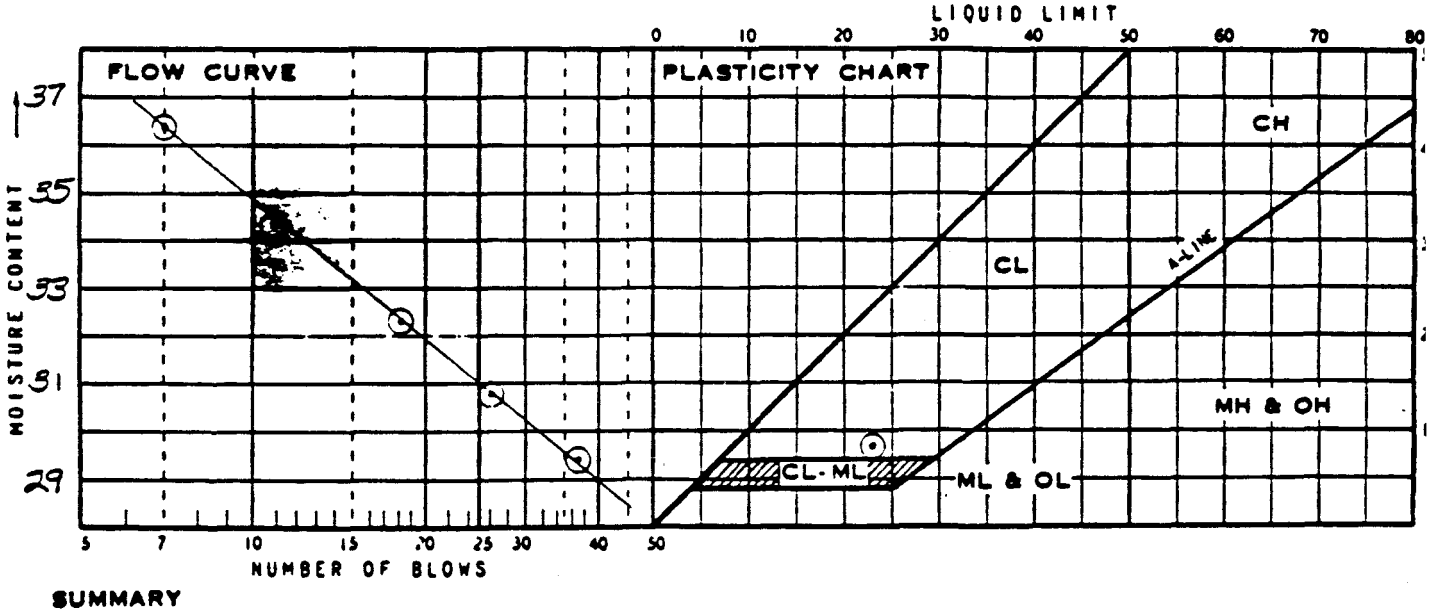
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL	—	—
WT OF MOISTURE		
WT OF DISH	—	—
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY DW 2/23/92

DETERMINATION	1	2	3	4	5	6
DISH	2050	2052	2066			
WT OF DISH + WET SOIL	8.53g	8.57g	7.14g			
WT OF DISH + DRY SOIL	7.09g	7.16g	6.03g	—	—	—
WT OF MOISTURE	1.44g	1.41g	1.11g			
WT OF DISH	1.03g	1.02g	1.04g	—	—	—
WT OF DRY SOIL	6.06g	6.14g	4.99g			
MOISTURE CONTENT	23.8	23.0	22.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2051	2042	2004	2034	2025	2014
NUMBER OF BLOWS	37	31	26	18	11	7
WT OF DISH + WET SOIL	20.51g	24.25g	22.94g	22.98g	23.94g	21.05g
WT OF DISH + DRY SOIL	16.08g	18.87g	17.78g	17.62g	18.09g	15.72g
WT OF MOISTURE	4.43g	5.38g	5.16g	5.36g	5.85g	5.53g
WT OF DISH	1.02g	1.04g	1.03g	1.04g	1.04g	1.06g
WT OF DRY SOIL	15.06g	17.83g	16.75g	16.58g	17.05g	14.66g
MOISTURE CONTENT	29.4	30.2	30.8	32.3	34.3	36.4



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		31.0	23.0	8.0	CL	

ADVANCED TERRA TESTING INC

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. [illegible]

CLIENT/OWNER Weston

LOCATION Rocky Flats EG-G

BORING 10-25 SAMPLE CH #1 DEPTH 1'

FIELD DENSITY BY ...../...../.....

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL		
WT OF RINGS		
WT OF WET SOIL		
FIELD DENSITY		
DRY DENSITY		

THIS IS AN 1/8-INCH THREAD

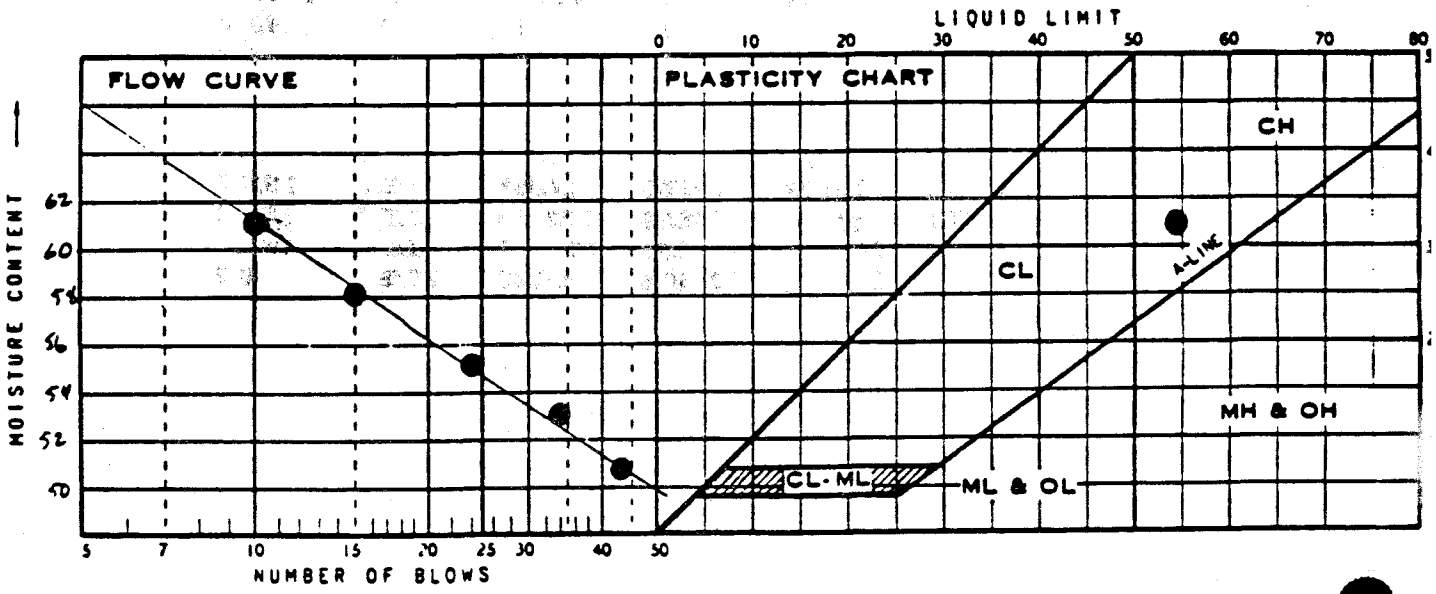
DETERMINATION	1	2
DISH		
WT OF DISH + WET SOIL		
WT OF DISH + DRY SOIL		
WT OF MOISTURE		
WT OF DISH		
WT OF DRY SOIL		
FIELD MOISTURE CONTENT		

PLASTIC LIMIT BY QU 2/15/92

DETERMINATION	1	2	3	4	5	6
DISH	2011	2012	2013			
WT OF DISH + WET SOIL g	10.46	7.76	8.10			
WT OF DISH + DRY SOIL g	8.71	6.57	6.84			
WT OF MOISTURE g	1.75	1.19	1.26			
WT OF DISH g	1.04	1.04	1.03			
WT OF DRY SOIL g	7.67	5.53	5.81			
MOISTURE CONTENT %	22.8	21.5	21.7			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2014	2015	2016	2017	2018	
NUMBER OF BLOWS	44	34	24	15	10	
WT OF DISH + WET SOIL g	13.46	12.18	13.74	12.31	14.74	
WT OF DISH + DRY SOIL g	9.28	8.31	9.22	8.16	9.54	
WT OF MOISTURE g	4.18	3.87	4.52	4.15	5.20	
WT OF DISH g	1.05	1.04	1.03	1.02	1.04	
WT OF DRY SOIL g	8.23	7.27	8.19	7.14	8.50	
MOISTURE CONTENT %	50.8	53.2	55.2	58.1	61.2	



SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION
		54.7	22.0	32.7	CH

ADVANCED TERRA TESTING

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT Weston

JOB NO. 2066-03

BORING NO.	10+75	SAMPLED	12-28-91
DEPTH	3'	DATE TESTED	02-04-92 TNU
SAMPLE NO.	—	WASH SIEVE	Yes
SOIL DESCR.	Rocky Flats/EG&G	DRY SIEVE	No

MOISTURE/DENSITY DATA

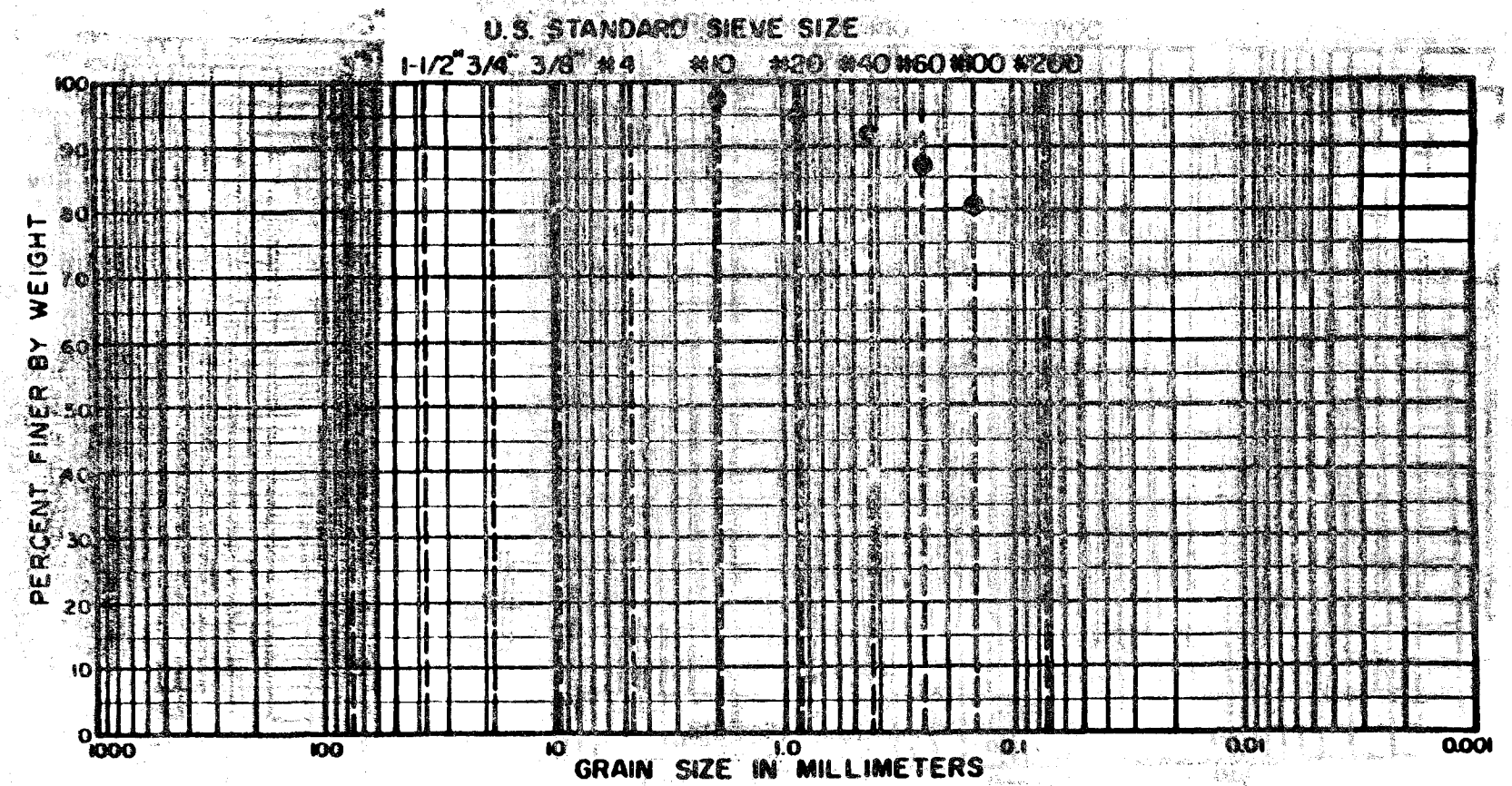
Wt. Soil & Ring(s) (g)	
Wt. Ring(s) (g)	
Wt. Soil (g)	
Wet Density PCF	
Wt. Wet Soil & Pan (g)	
Wt. Dry Soil & Pan (g)	
Wt. Lost Moisture (g)	
Wt. of Pan Only (g)	
Wt. of Dry Soil (g)	
Moisture Content %	
Dry Density PCF	

WASH SIEVE ANALYSIS

Wt. Wet Soil & Pan Before Washing (g)	
Wt. Dry Soil & Pan Before Washing (g)	189.3
Weight of Pan (g)	9.5
Wt. of Dry Soil Before Washing	179.8
Wt. Dry Soil & Pan After Washing (g)	55.8
Wt. of Dry Soil After Washing (g)	46.3
-#200 Wash. Out %	74.2

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#10	3.71	7.77	4.06	4.06	2.3	97.7
#20	3.63	7.84	4.21	8.27	4.6	95.4
#40	3.65	10.28	6.63	14.90	8.3	91.7
#60	3.72	11.61	7.89	22.79	12.7	87.3
#100	3.83	14.51	10.68	33.47	18.6	81.4
#200	3.65	16.51	12.86	46.33	25.8	74.2

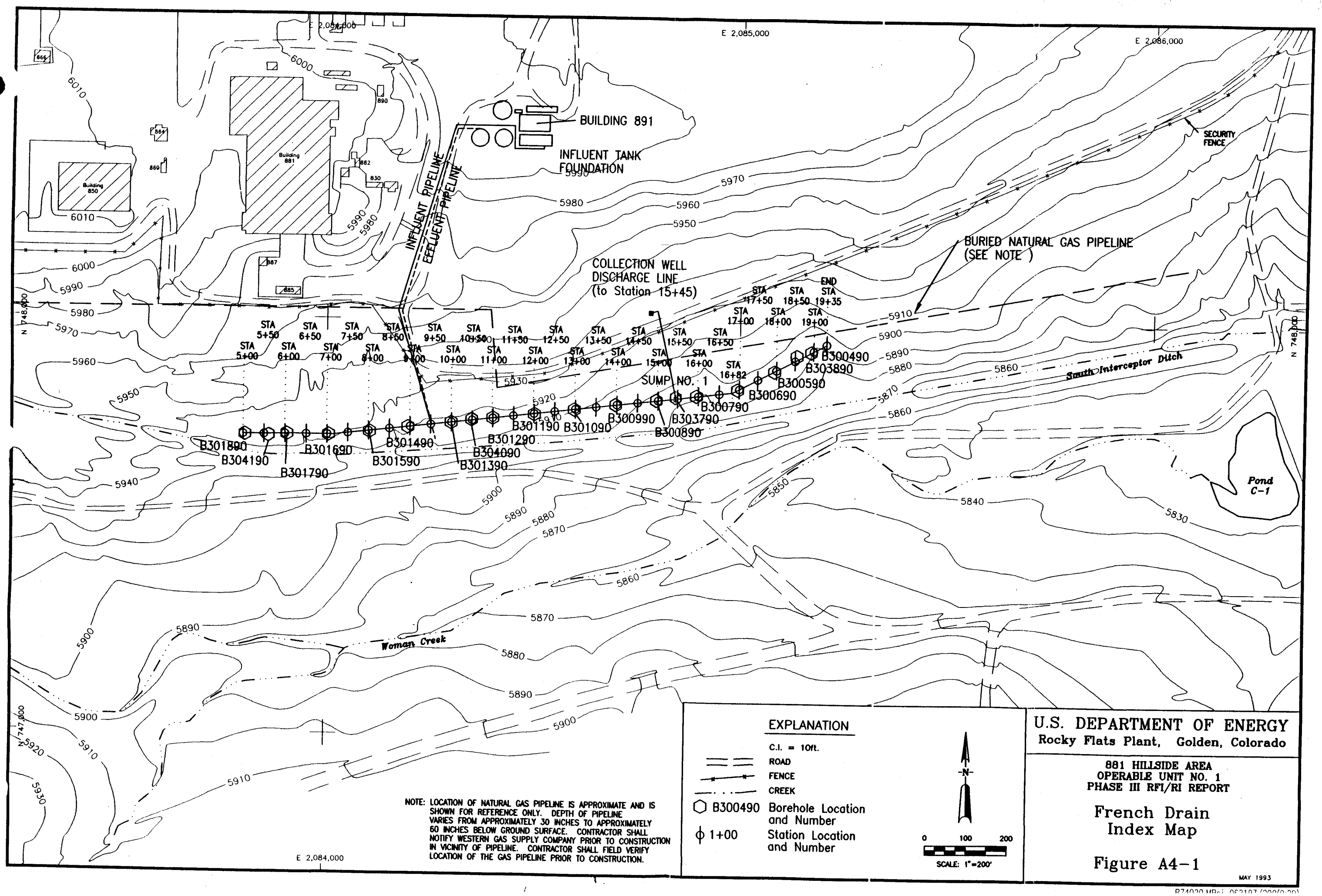
ADVANCED TERRA TESTING, INC.

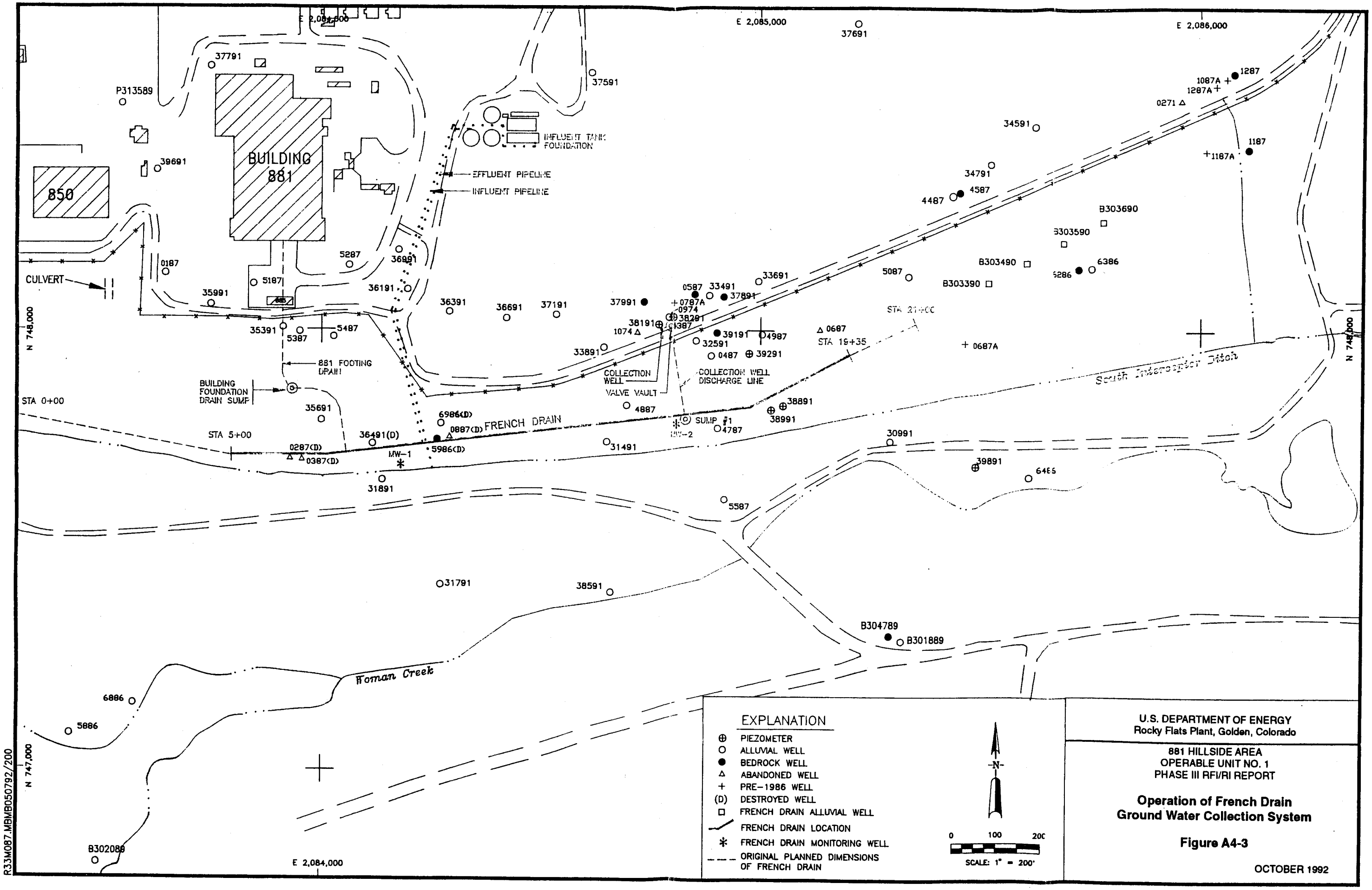


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LOCATION	DEPTH	CLASSIFICATION
10+75	3'	Rocky Fills / EGY Sandy Clay (CH) 23% Coarse, 6% Med, 17.5% [illegible] / 74.2% Silt or clay

ADVANCED TERRA TESTING


E 2,084,000
E 2,085,000
E 2,086,000
N 748,000
BUILDING 891
INFLUENT TANK FOUNDATION
INFLUENT PIPELINE
EFFLUENT PIPELINE
SECURITY FENCE
BURIED NATURAL GAS PIPELINE (SEE NOTE)
COLLECTION WELL DISCHARGE LINE (to Station 15+45)
SUMP NO. 1
Building 881
Building 850
South Interceptor Ditch
Woman Creek
Pond C-1
STA 5+00
STA 5+50
STA 6+00
STA 6+50
STA 7+00
STA 7+50
STA 8+00
STA 8+50
STA 9+00
STA 9+50
STA 10+00
STA 10+50
STA 11+00
STA 11+50
STA 12+00
STA 12+50
STA 13+00
STA 13+50
STA 14+00
STA 14+50
STA 15+00
STA 15+50
STA 16+00
STA 16+50
STA 16+82
STA 17+00
STA 17+50
STA 18+00
STA 18+50
STA 19+00
END STA 19+35
B301890
B304190
B301790
B301690
B301590
B301490
B301390
B304090
B301290
B301190
B301090
B300990
B300890
B303790
B300790
B300690
B300590
B303890
B300490
EXPLANATION
C.I. = 10ft.
ROAD
FENCE
CREEK
B300490 Borehole Location and Number
1+00 Station Location and Number
N
0 100 200
SCALE: 1"=200'
NOTE: LOCATION OF NATURAL GAS PIPELINE IS APPROXIMATE AND IS SHOWN FOR REFERENCE ONLY. DEPTH OF PIPELINE VARIES FROM APPROXIMATELY 30 INCHES TO APPROXIMATELY 60 INCHES BELOW GROUND SURFACE. CONTRACTOR SHALL NOTIFY WESTERN GAS SUPPLY COMPANY PRIOR TO CONSTRUCTION IN VICINITY OF PIPELINE. CONTRACTOR SHALL FIELD VERIFY LOCATION OF THE GAS PIPELINE PRIOR TO CONSTRUCTION.
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
881 HILLSIDE AREA
OPERABLE UNIT NO. 1
PHASE III RFI/RI REPORT
French Drain Index Map
Figure A4-1
MAY 1993



U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

881 HILLSIDE AREA
OPERABLE UNIT NO. 1
PHASE III RFI/RI REPORT

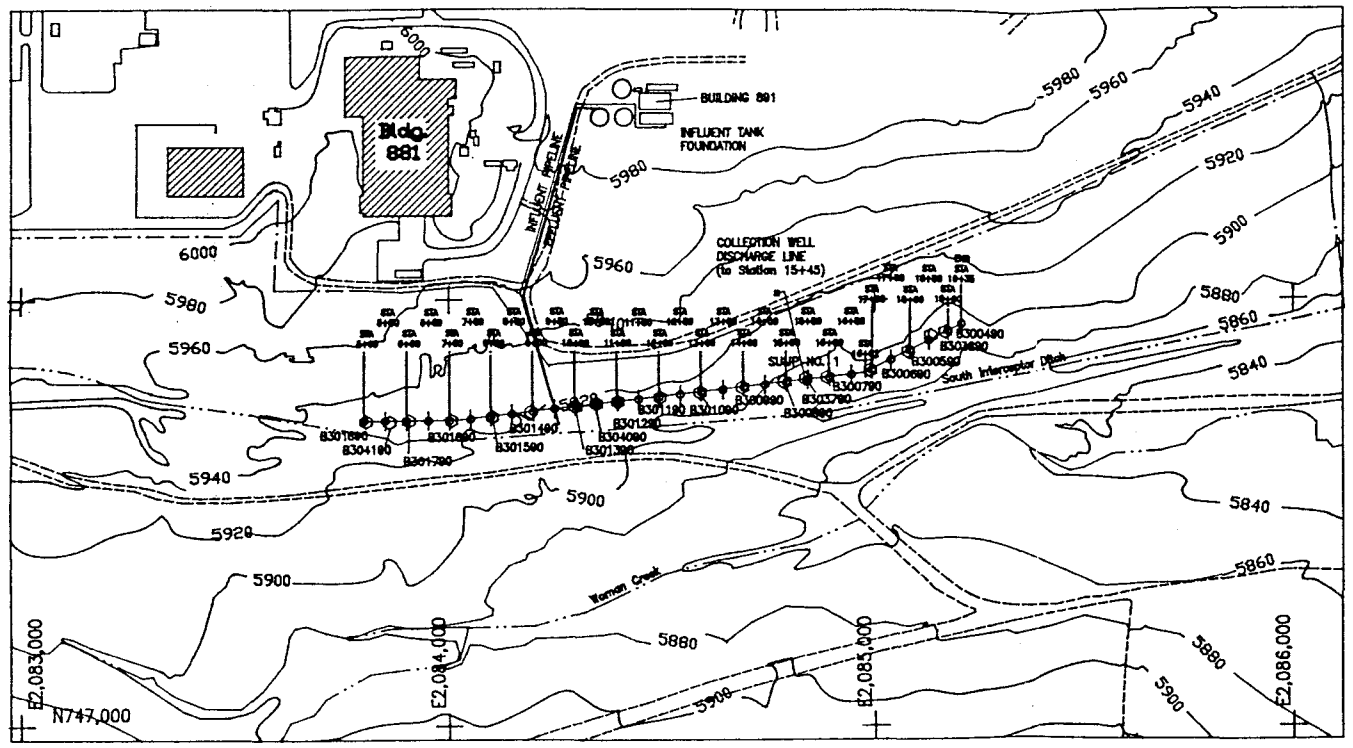
Operation of French Drain Ground Water Collection System

Figure A4-3

OCTOBER 1992

R33M087.MBMB050792/200

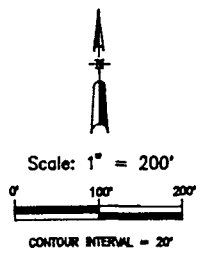
INDEX MAP
WITH STATION LOCATIONS AND BOREHOLES



EXPLANATION

B300490 Borehole Location and Number

1+00 Station Location and Number



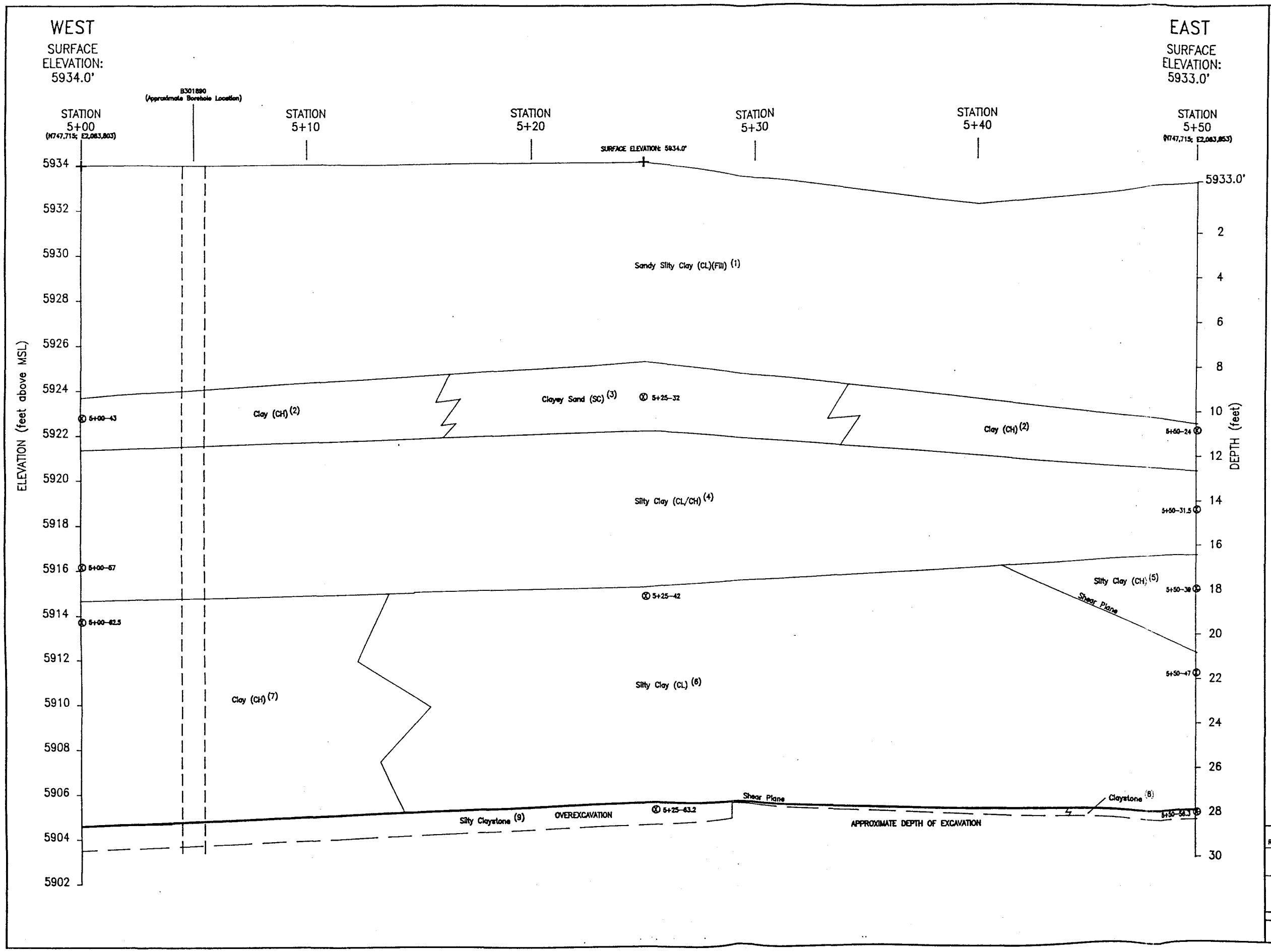
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
INDEX MAP WITH STATIONS AND
EXPLANATIONS / NOTES

SIZE	FILE NAME: INDEXMAP	DATE	SHEET
D	DRAFT	5/20/92	1 OF 30

INDEXMAP.PJ-052092/200



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (ESI&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Duty and Associates)

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

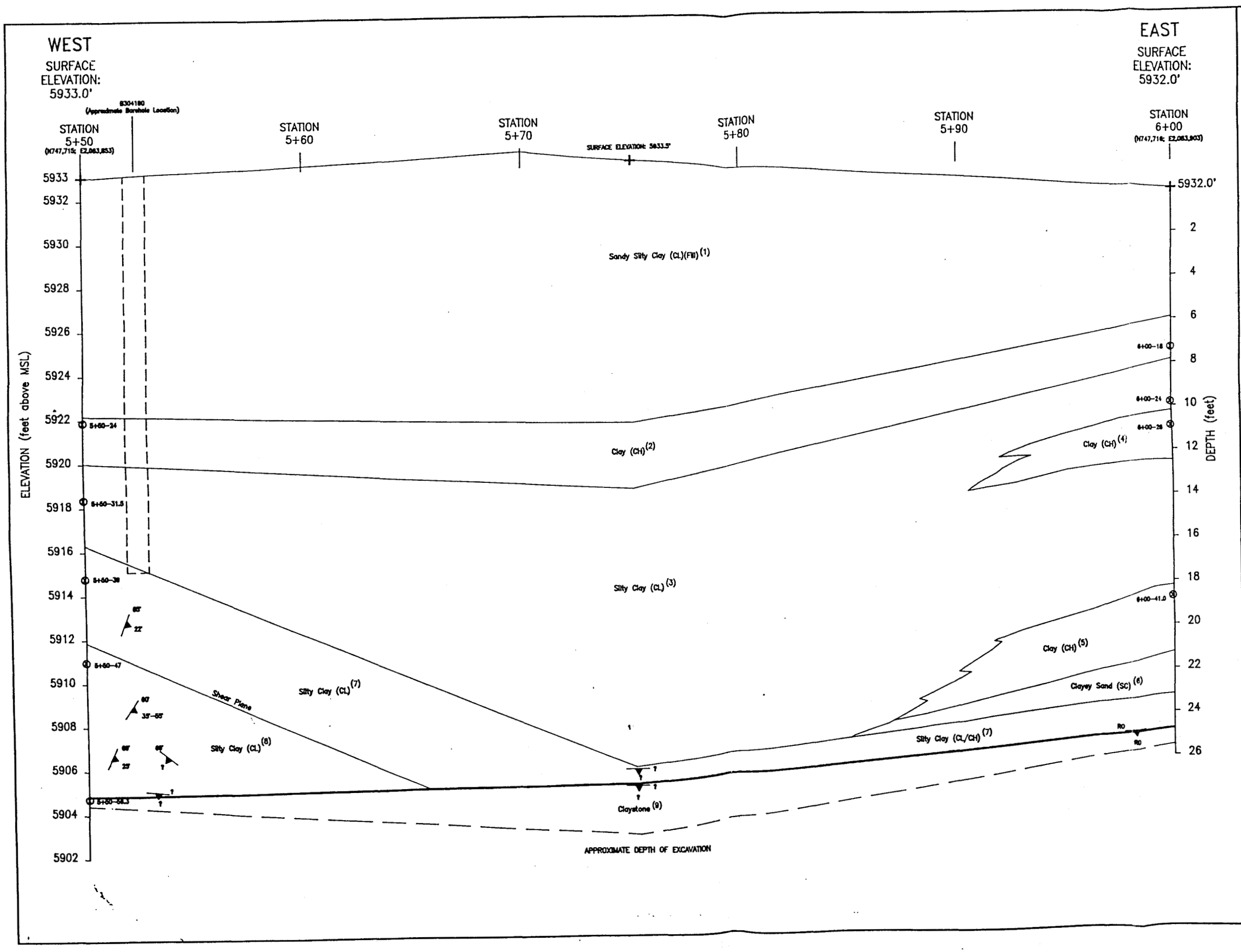
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 5+00 - 5+50

SIZE	FILE NAME: R33X500	DATE	SHEET
D	DRAFT	5/20/92	2 of 30

R33X500.CW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Environmental Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Contact Where Approximately Located Where Unknown is Uncertain

SAMPLE SECTION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

SHEAR PLANE RO = RANDOMLY ORIENTED

FRACTURES

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2'
0
2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

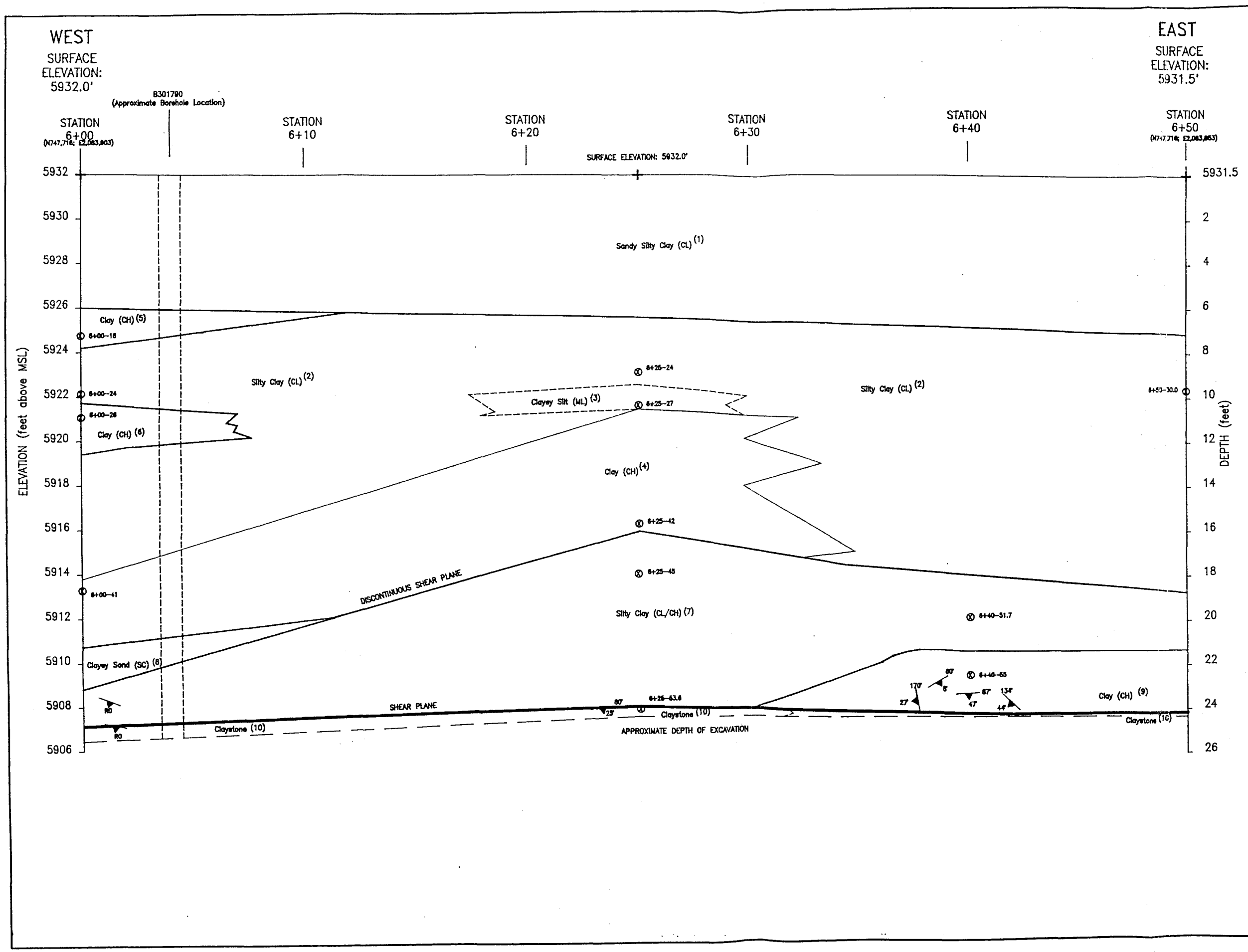
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE — GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 5+50 – 6+00

SIZE	FILE NAME: R333550	DATE	SHEET
D	DRAFT	8/20/92	3 of 38

R333550.CW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (Stone, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximating Queried Where Existence Is Uncertain

12+20-15 SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

30° / 30° BEDDING PLANES

30° / 70° FRACTURES

30° / 80 SHEAR PLANE RO = RANDOMLY ORIENTED

30° / 90° VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST

2.69×10^{-6} cm/s In Centimeters Per Second (from Daly and Associates)

2' 0 2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

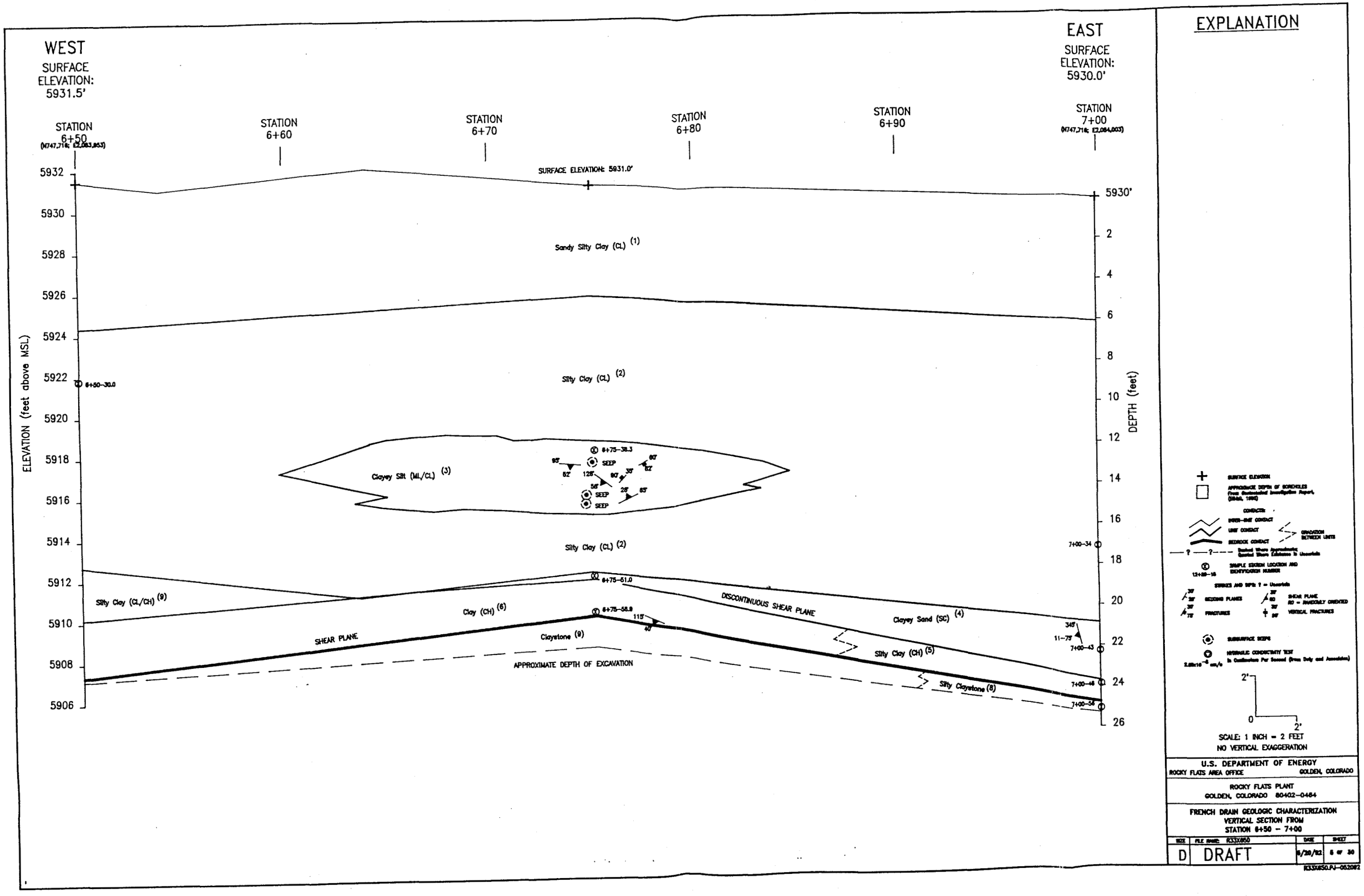
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 6+00 – 6+50

SIZE	FILE NAME: R33X800	DATE	SHEET
D	DRAFT	9/28/92	4 OF 30

R33X800.PJ-052092



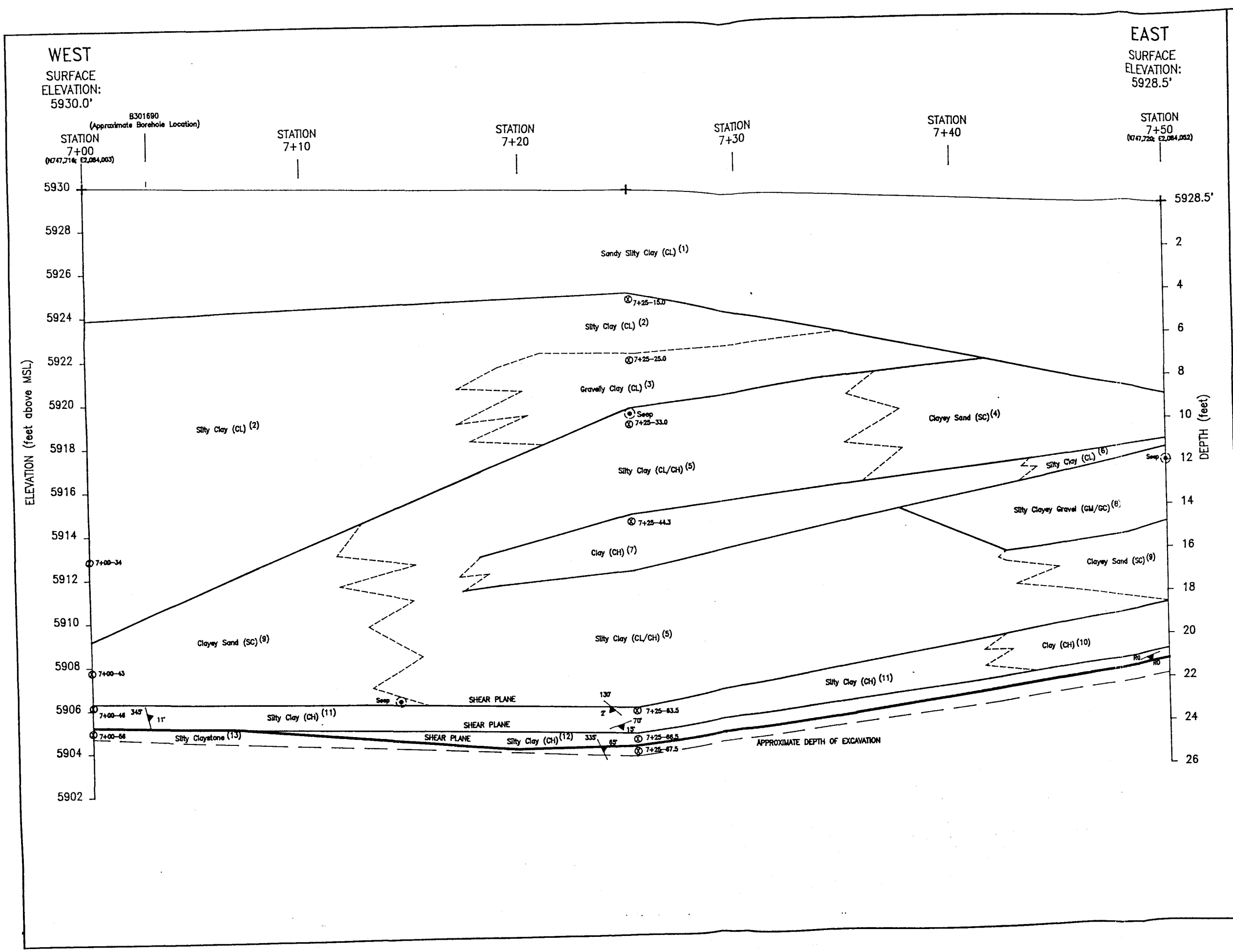
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 6+50 – 7+00

SIZE	FILE NAME: R33X650	DATE	SHEET
D	DRAFT	5/20/92	5 of 30

R33X650.PJ-052092



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (Ebasco, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+20-15

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (Were Duty and Associates)

2'

0

2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

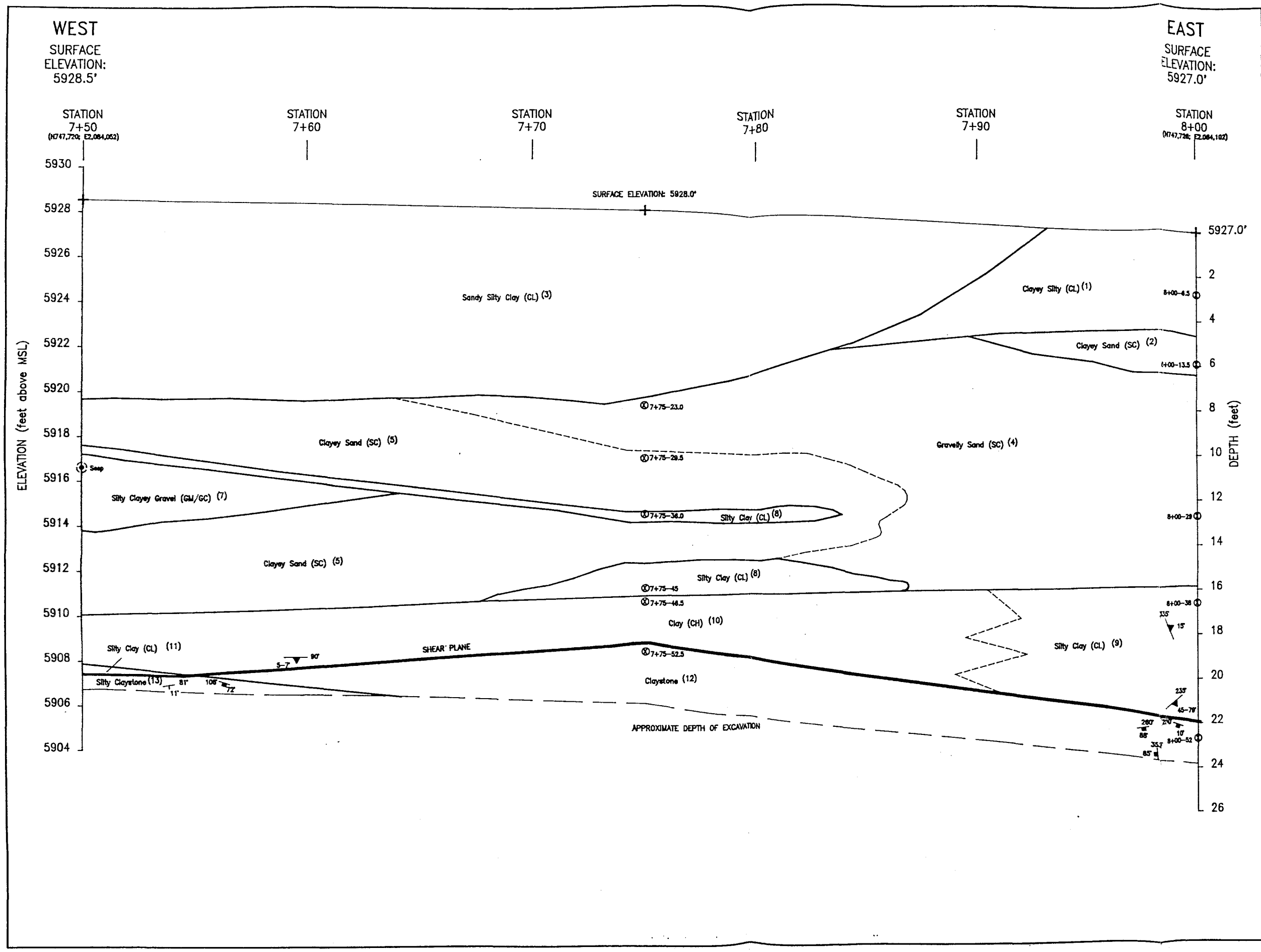
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 7+00 - 7+50

SIZE	FILE NAME: R33X700	DATE	SHEET
D	DRAFT	5/20/92	6 of 30

R33X700.FJ-052092



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1994)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximately Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER (12+29-16)

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE

RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2' 0 2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

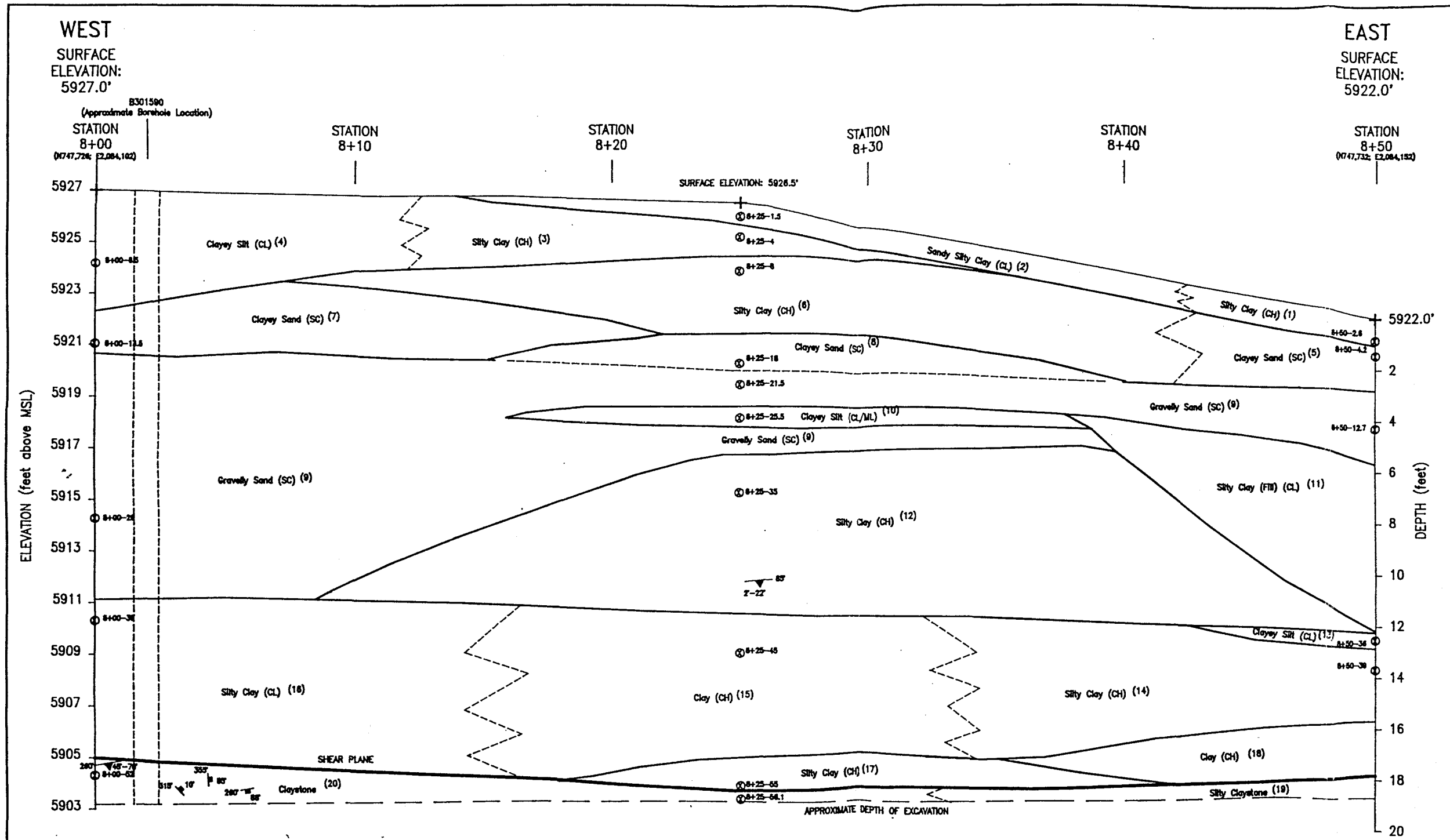
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

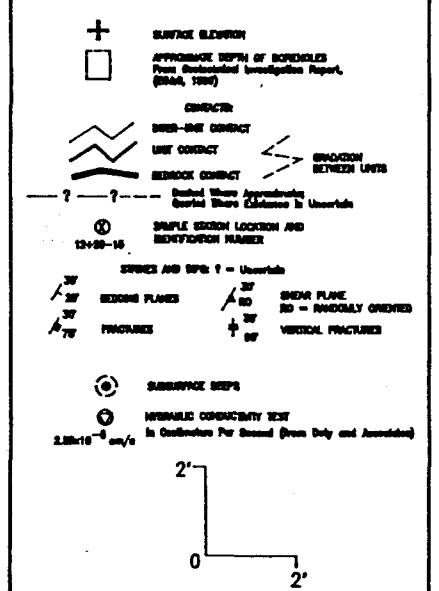
FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 7+50 – 8+00

SIZE	FILE NAME: R333750	DATE	SHEET
D	DRAFT	5/20/92	7 of 30

R333750.PJ-052092



EXPLANATION



SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

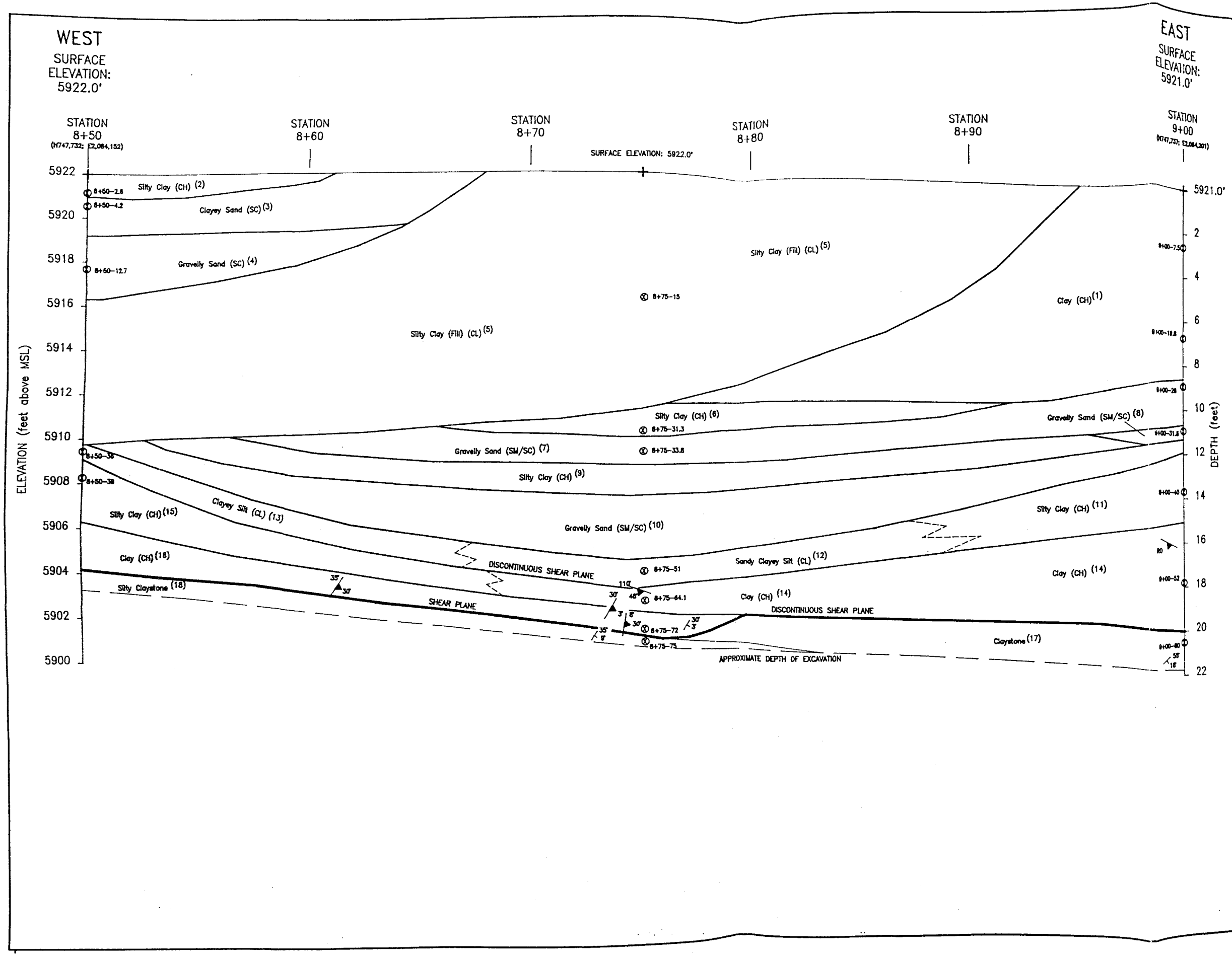
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE — GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 8+00 – 8+50

SIZE	FILE NAME R330800	DATE	SHEET
D	DRAFT	5/20/92	8 OF 30

R330800.PJ-052092



EXPLANATION

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

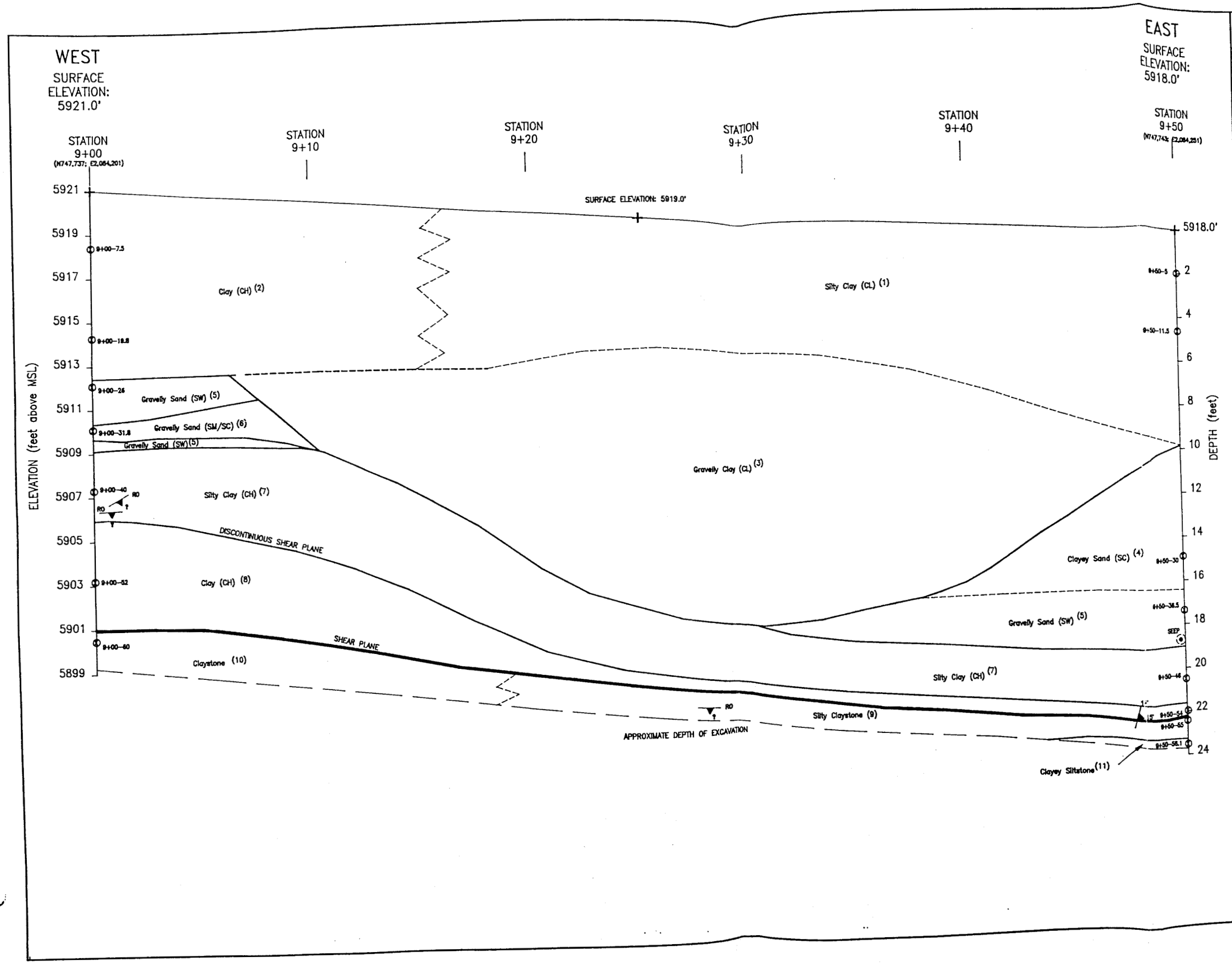
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 8+50 - 9+00

SIZE	FILE NAME: R33X850	DATE	SHEET
D	DRAFT	6/26/92	9 of 30

R33X850.PJ-052092



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1989)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximately Located Where Unknown Or Uncertain

SAMPLE SECTION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE

RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (From Daly and Associates)

2'

0 2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

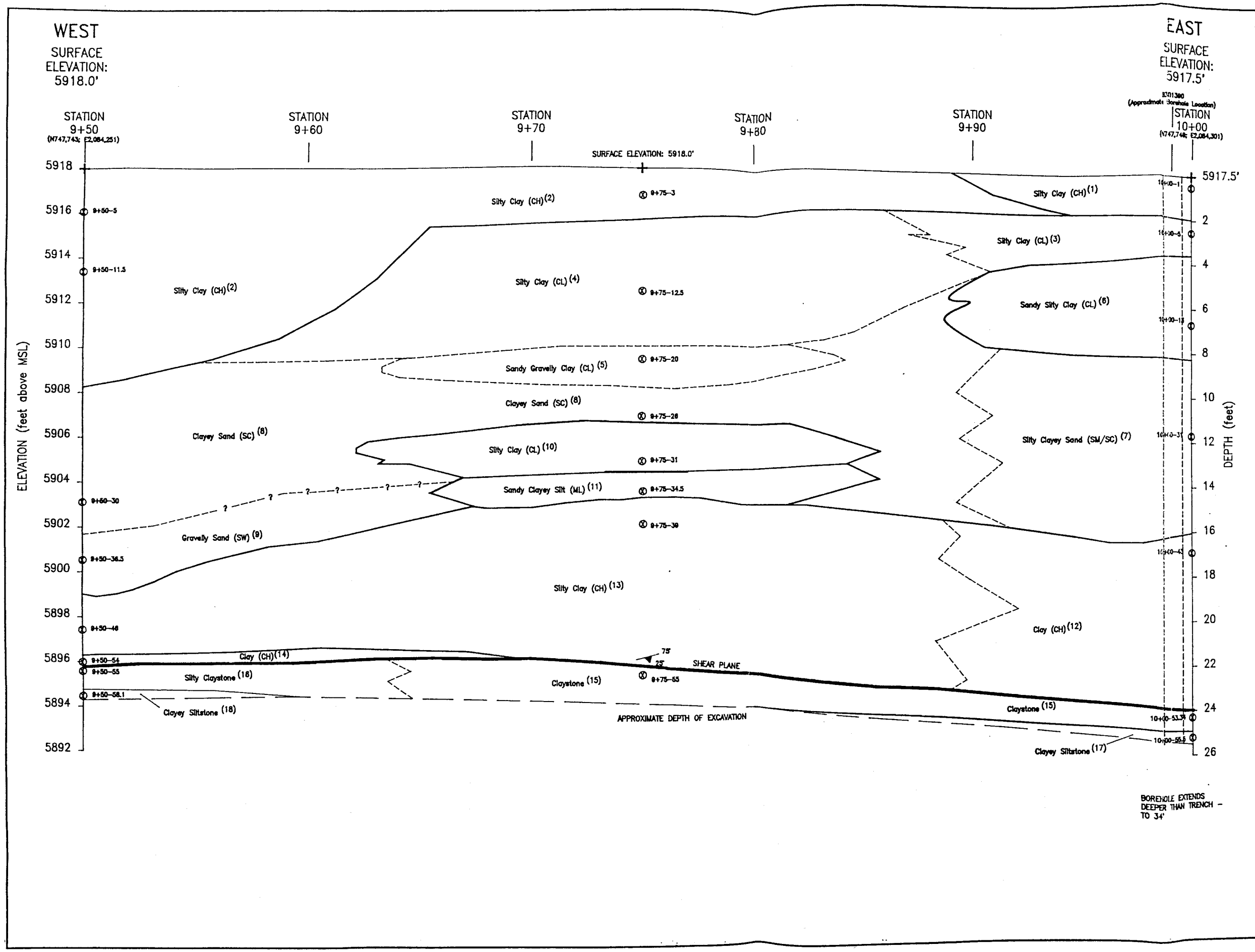
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 9+00 - 9+50

SIZE	DRAWING NUMBER	DATE	SHEET
D	DRAFT	5/20/92	10 of 30

R33X900.PJ-052092



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2'

0 2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

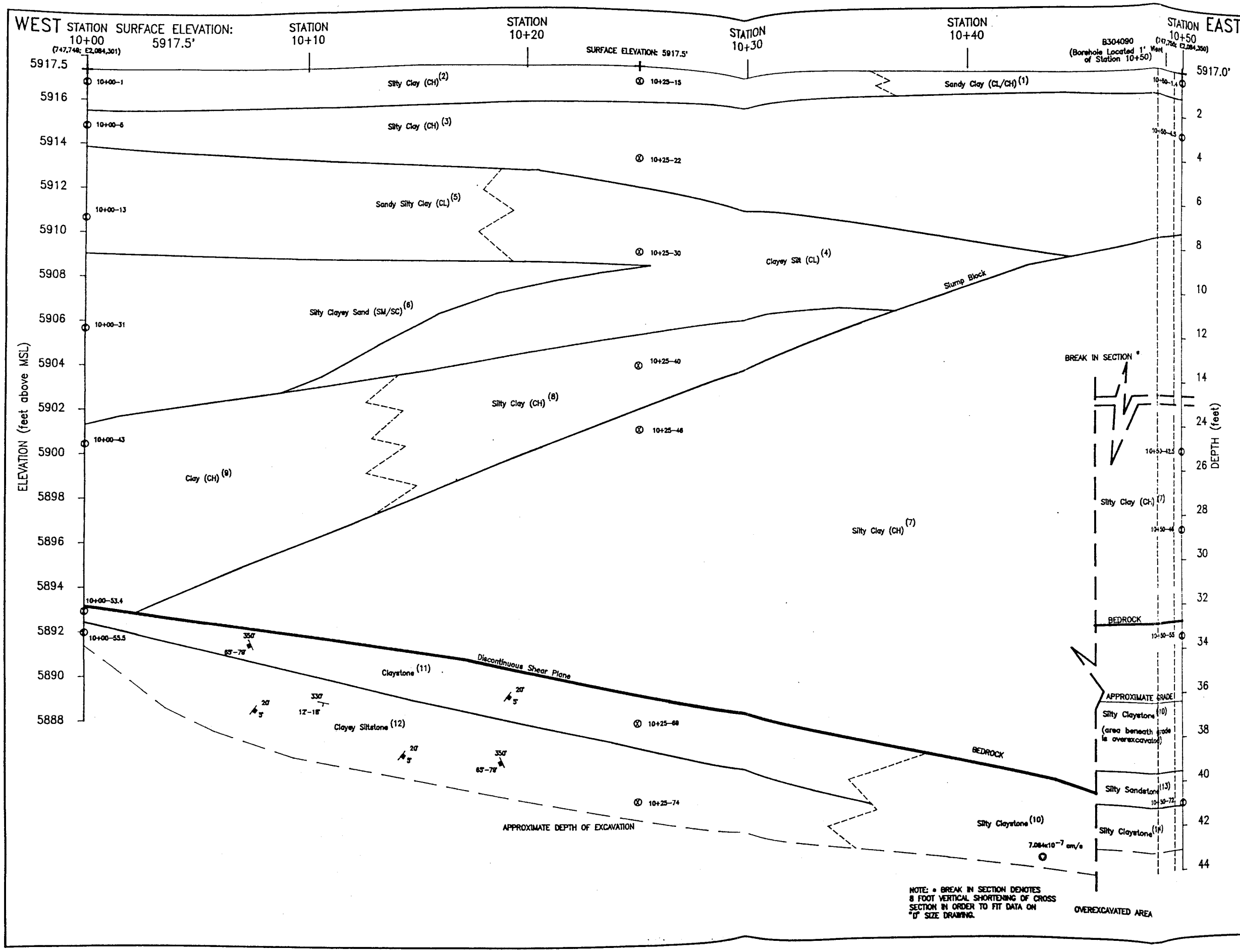
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

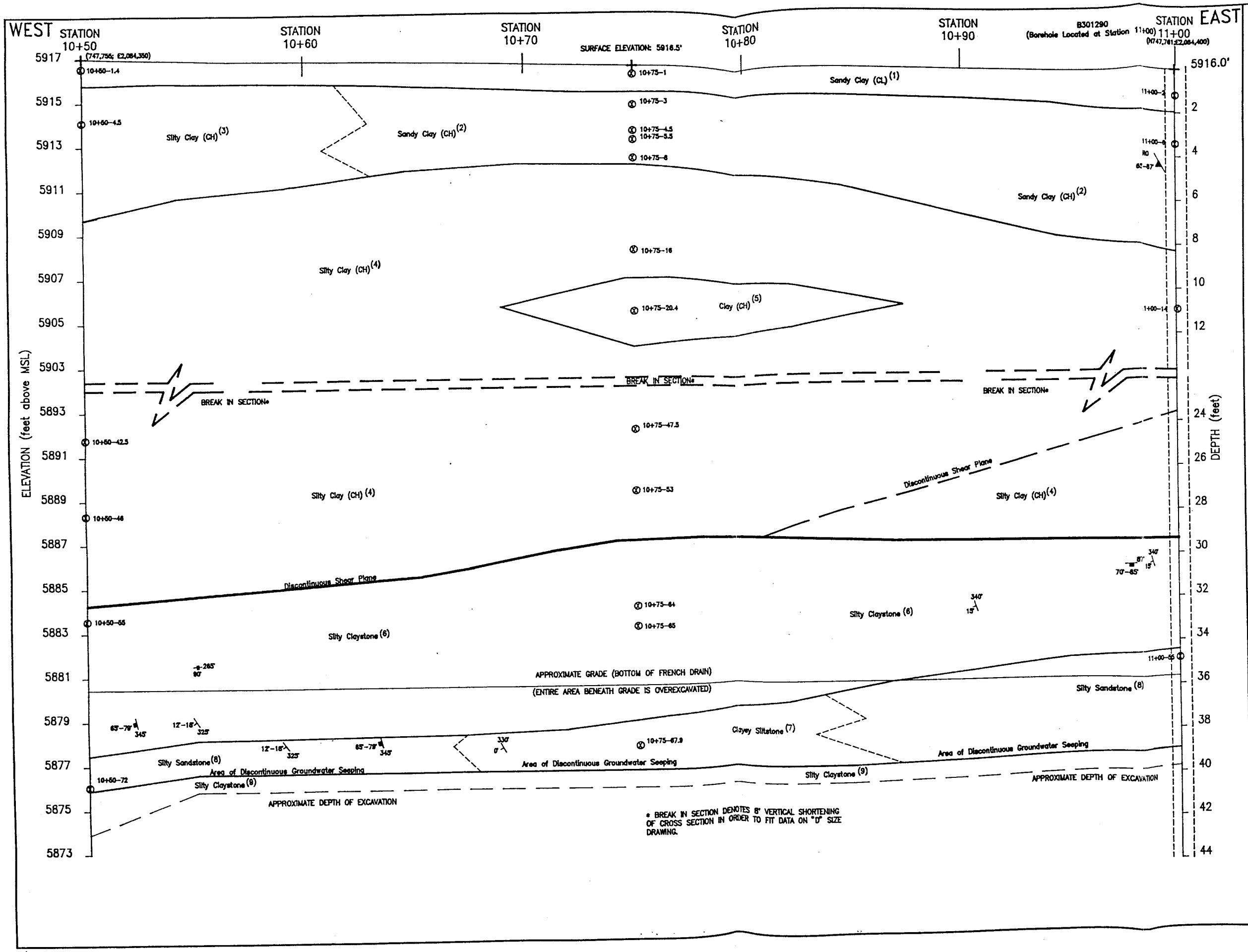
ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 9+50 - 10+00

SIZE	FILE NAME: R33X950	DATE	SHEET
D	DRAFT	5/20/92	11 of 30

R33X950.PJ-052092


WEST
STATION 10+00 (747,748; E2,084,301)
SURFACE ELEVATION: 5917.5'
STATION 10+10
STATION 10+20
SURFACE ELEVATION: 5917.5'
STATION 10+30
STATION 10+40
B304090 (Borehole Located 1' West of Station 10+50) (747,794; E2,084,350)
STATION 10+50
EAST
ELEVATION (feet above MSL)
DEPTH (feet)
5917.5
5916
5914
5912
5910
5908
5906
5904
5902
5900
5898
5896
5894
5892
5890
5888
5917.0'
10+00-1
10+00-6
10+00-13
10+00-31
10+00-43
10+00-53.4
10+00-55.5
10+25-15
10+25-22
10+25-30
10+25-40
10+25-46
10+25-68
10+25-74
10+50-1.4
10+50-4.5
10+50-42.5
10+50-44
10+50-55
10+50-72
Silty Clay (CH)(2)
Silty Clay (CH)(3)
Sandy Silty Clay (CL)(5)
Silty Clayey Sand (SM/SC)(6)
Clay (CH)(9)
Silty Clay (CH)(8)
Silty Clay (CH)(7)
Sandy Clay (CL/CH)(1)
Clayey Silt (CL)(4)
Slump Block
BREAK IN SECTION *
Silty Clay (CH)(7)
BEDROCK
APPROXIMATE GRADE
Silty Claystone(10)
(area beneath grade is overexcavated)
Silty Sandstone(13)
Silty Claystone(14)
Silty Claystone(10)
7.084x10^-7 cm/s
Claystone(11)
Discontinuous Shear Plane
Clayey Siltstone(12)
BEDROCK
APPROXIMATE DEPTH OF EXCAVATION
OVEREXCAVATED AREA
NOTE: * BREAK IN SECTION DENOTES 8 FOOT VERTICAL SHORTENING OF CROSS SECTION IN ORDER TO FIT DATA ON "D" SIZE DRAWING.
EXPLANATION
SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE
GOLDEN, COLORADO
ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464
FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 10+00 - 10+50
D
DRAFT
R33X1000.AUCB-082292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Extrapolation Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

SHEAR PLANE
RO = RANDOMLY CREDITED

FRACTURES

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST
In Centimeters Per Second (from Doty and Associates)

2' 0 2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

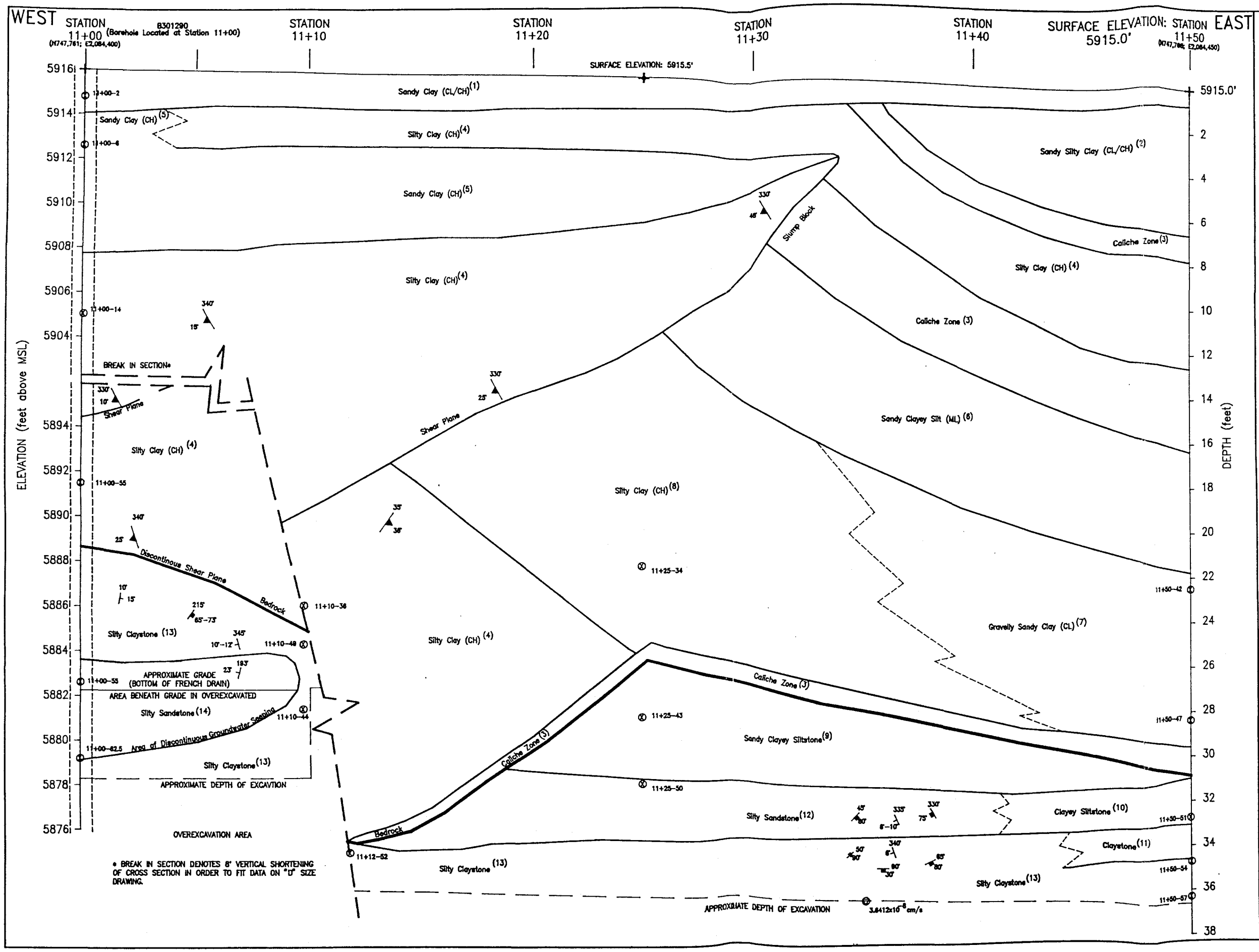
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE — GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 10+50 – 11+00

SIZE	FILE NAME: R33X1050	DATE	SHEET
D	DRAFT	6/18/92	13 of 30

R33X1050.PJCW-062292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1992)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RD = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Doty and Associates)

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

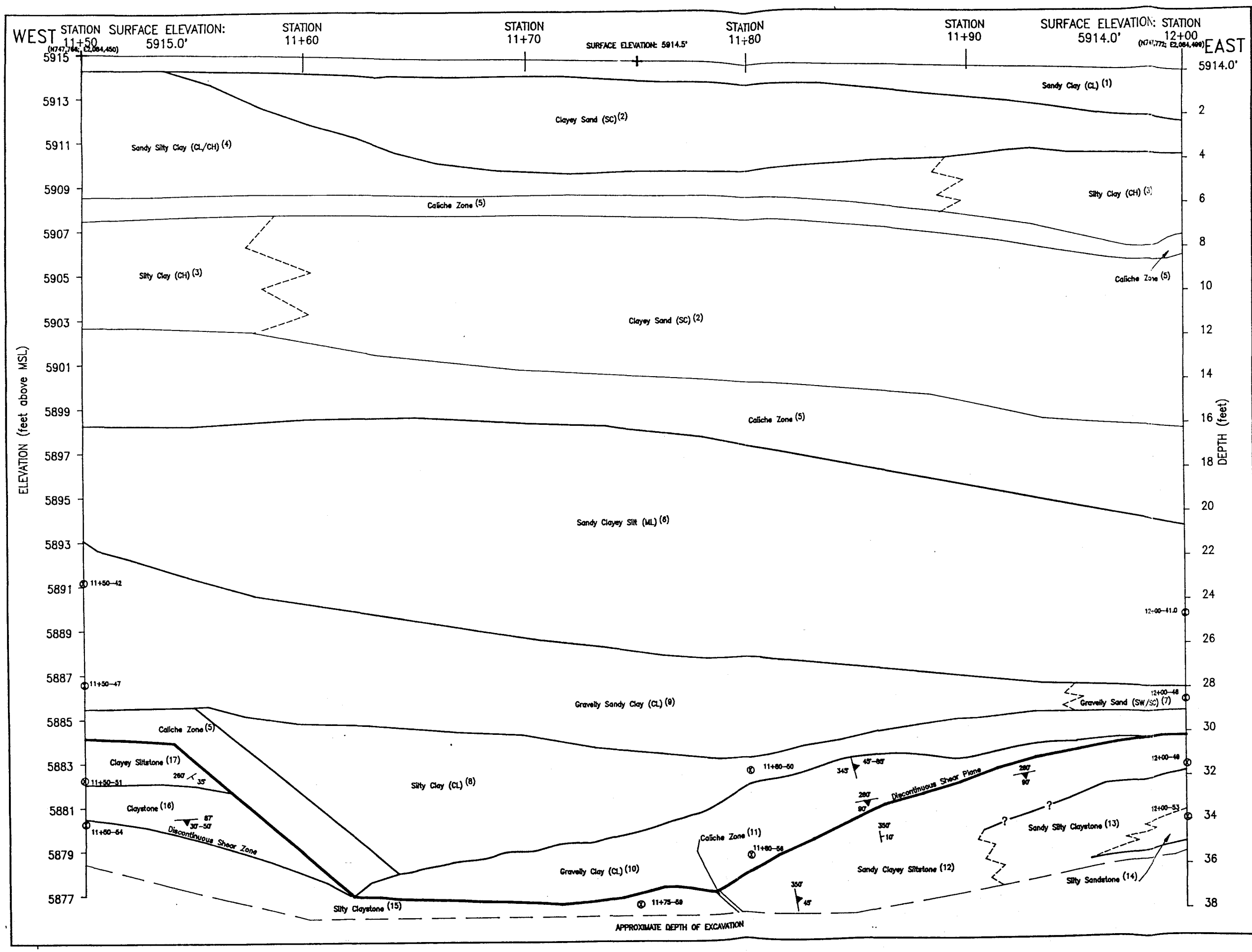
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 11+00 – 11+50

SIZE	FILE NAME: R33X1100	DATE	SHEET
D	DRAFT	5/21/92	14 OF 30

R33X1100.FJCW-052292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (Shaw, 1992)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximately Quoted Where Unknown Is Uncertain

SAMPLE EXTION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE NO = ANOMOLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

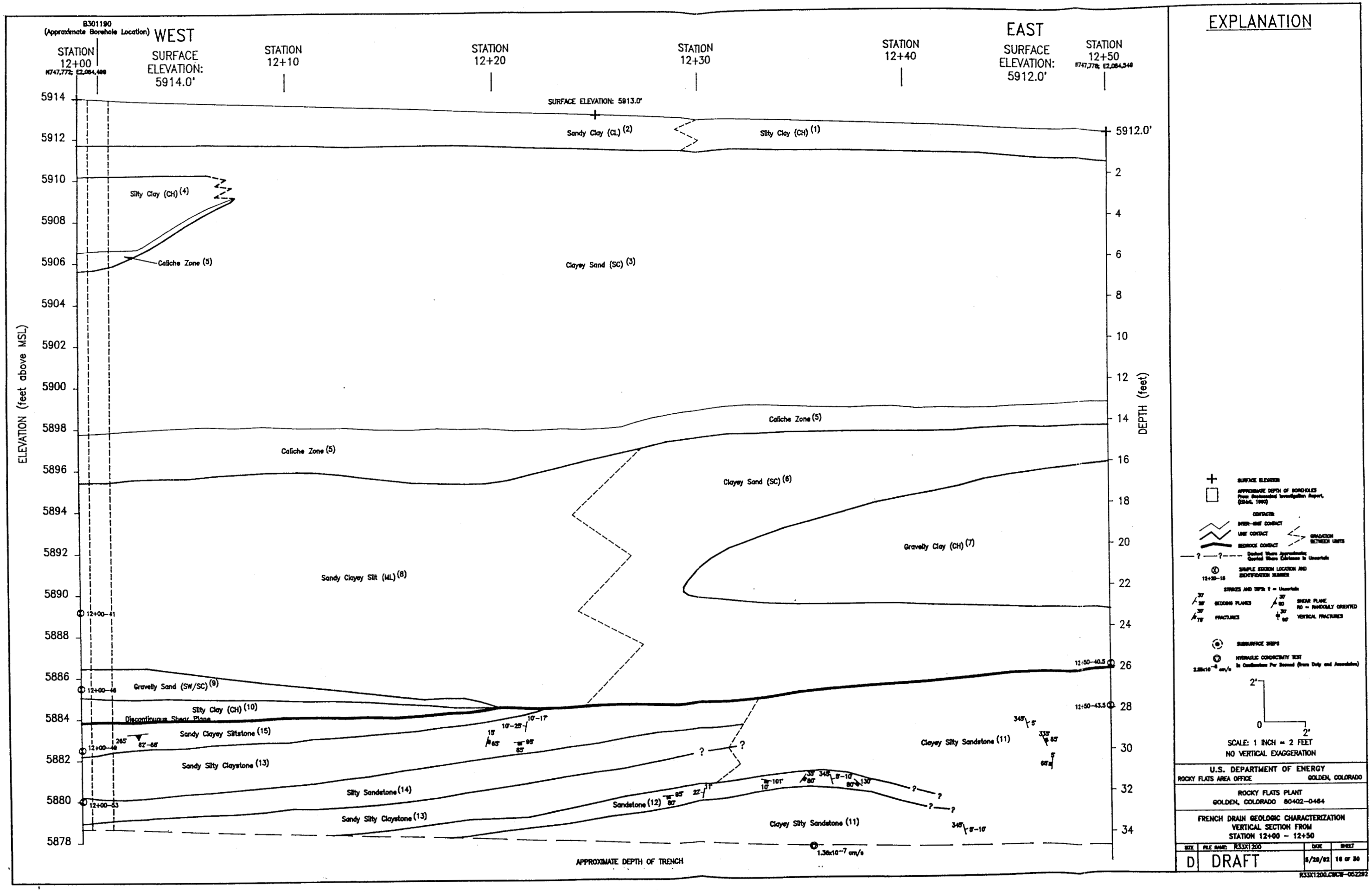
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

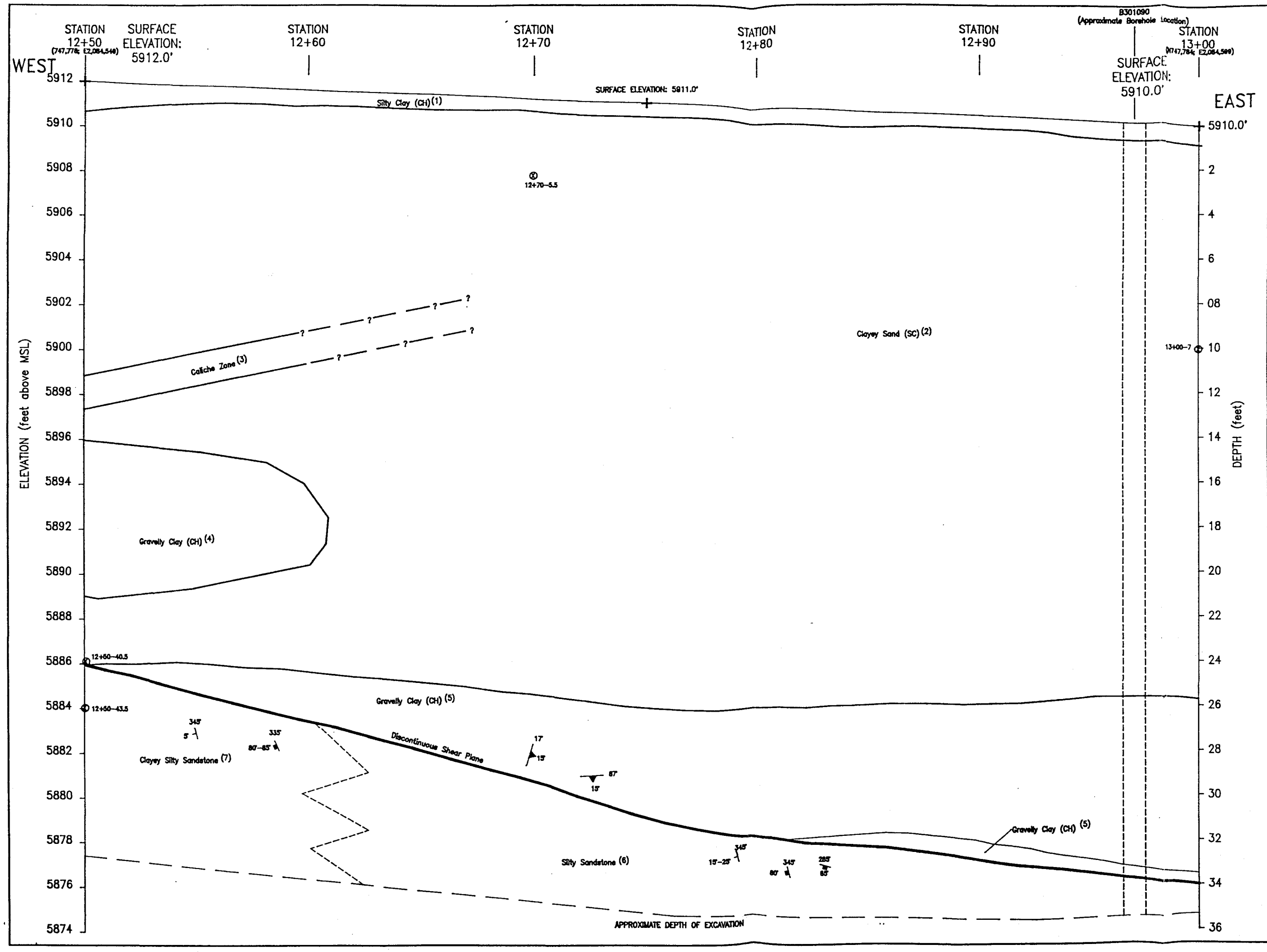
FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 11+50 - 12+00

SIZE	FILE NAME: R33X1150	DATE	SHEET
D	DRAFT	5/29/92	15 of 30

R33X1150.FJCW-052292



B301190
(Approximate Borehole Location)
WEST
STATION 12+00
N747,772; E2,084,499
SURFACE ELEVATION: 5914.0'
STATION 12+10
STATION 12+20
STATION 12+30
STATION 12+40
EAST
SURFACE ELEVATION: 5912.0'
STATION 12+50
N747,778; E2,084,549
SURFACE ELEVATION: 5913.0'
5912.0'
ELEVATION (feet above MSL)
DEPTH (feet)
Sandy Clay (CL) (2)
Silty Clay (CH) (1)
Silty Clay (CH) (4)
Caliche Zone (5)
Clayey Sand (SC) (3)
Caliche Zone (5)
Caliche Zone (5)
Clayey Sand (SC) (6)
Gravelly Clay (CH) (7)
Sandy Clayey Silt (ML) (8)
12+00-41
Gravelly Sand (SW/SC) (9)
12+00-46
Silty Clay (CH) (10)
Discontinuous Shear Plane
Sandy Clayey Siltstone (15)
12+00-49
Sandy Silty Claystone (13)
Silty Sandstone (14)
12+00-53
Sandy Silty Claystone (13)
Sandstone (12)
Clayey Silty Sandstone (11)
Clayey Silty Sandstone (11)
12+50-40.5
12+50-43.5
1.36x10^-7 cm/s
APPROXIMATE DEPTH OF TRENCH
EXPLANATION
SURFACE ELEVATION
APPROXIMATE DEPTH OF BOREHOLES
CONTACTS
INTER-UNIT CONTACT
UNIT CONTACT
BEDROCK CONTACT
GRADATION BETWEEN UNITS
SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER
STRIKES AND DIPS: ? = Uncertain
BEDDING PLANES
FRACTURES
SHEAR PLANE
RO = RANDOMLY ORIENTED
VERTICAL FRACTURES
SUBSURFACE SEEPS
HYDRAULIC CONDUCTIVITY TEST
2'
0
2'
SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE
GOLDEN, COLORADO
ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464
FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 12+00 - 12+50
SIZE
FILE NAME: R33X1200
DATE
SHEET
D
DRAFT
5/29/92
16 OF 30
R33X1200.CWCW-052292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1991)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximated Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (From Daly and Associates)

2' 0 2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

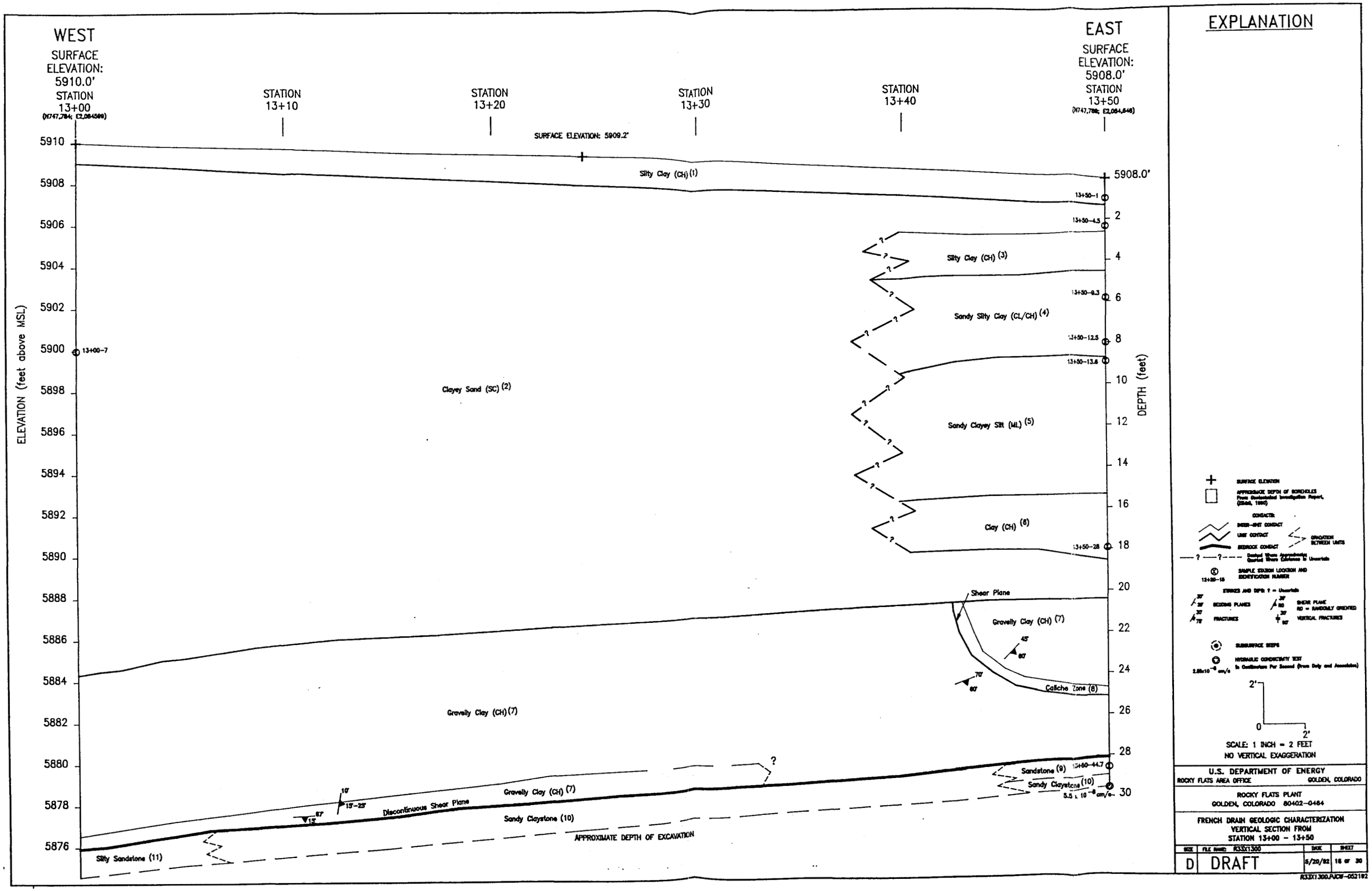
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 12+50 - 13+00

SIZE	FILE NAME: R33X1250	DATE	SHEET
D	DRAFT	8/28/92	17 OF 30

R33X1250.FJCW-052292



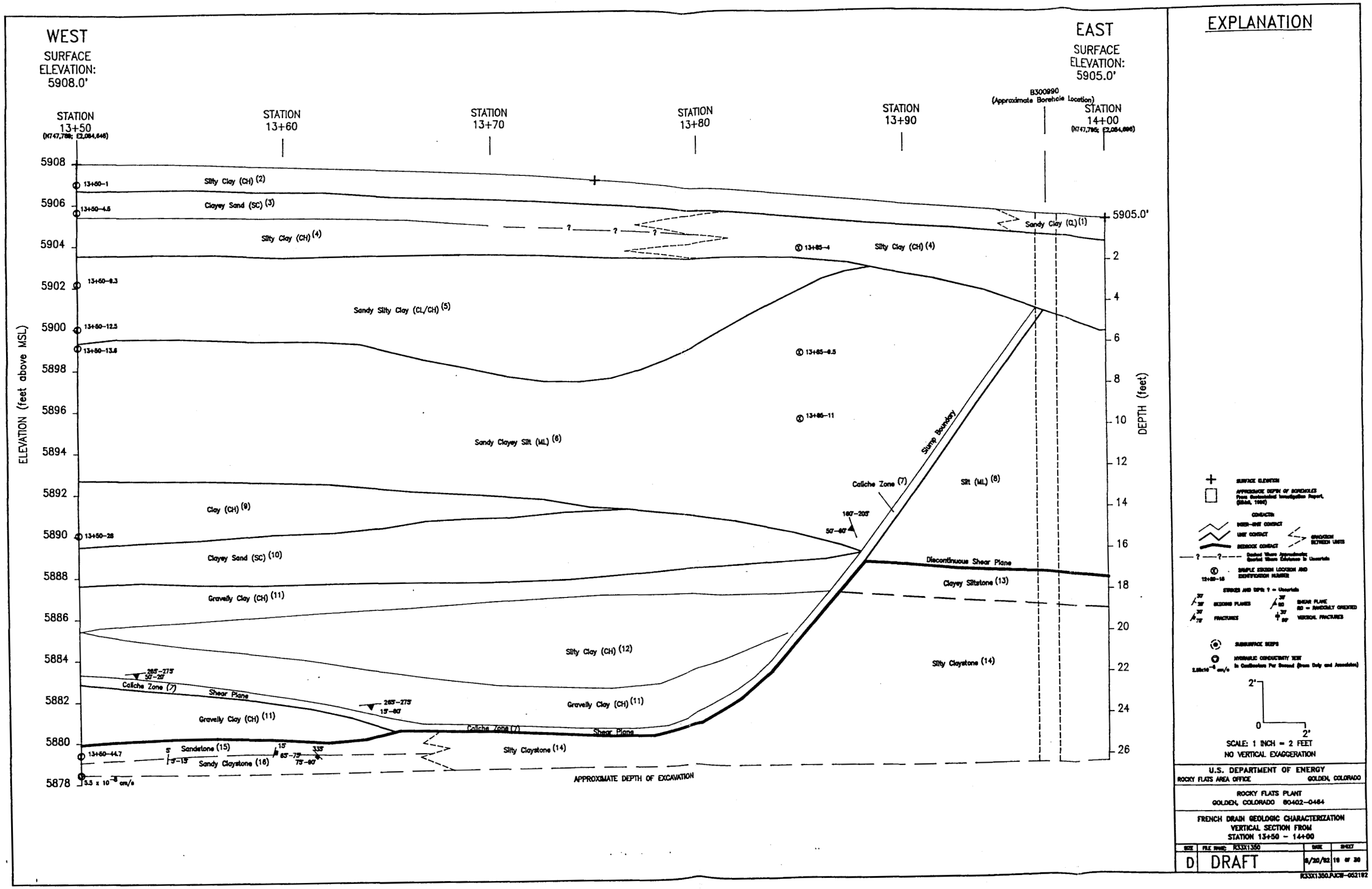
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 13+00 - 13+50

SIZE	FILE NAME: R33X1300	DATE	SHEET
D	DRAFT	5/20/92	16 OF 30

R33X1300.PJCW-052192



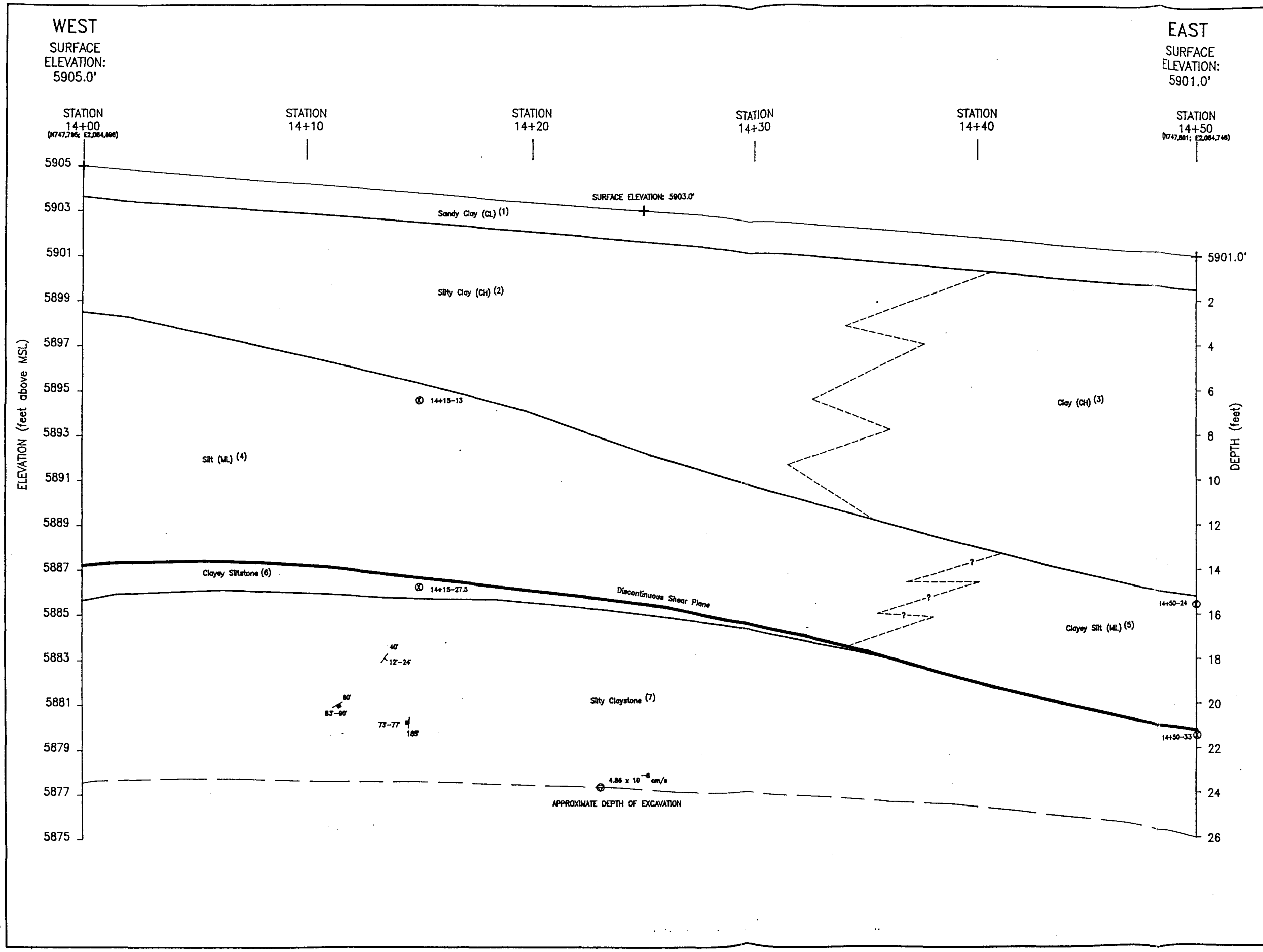
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

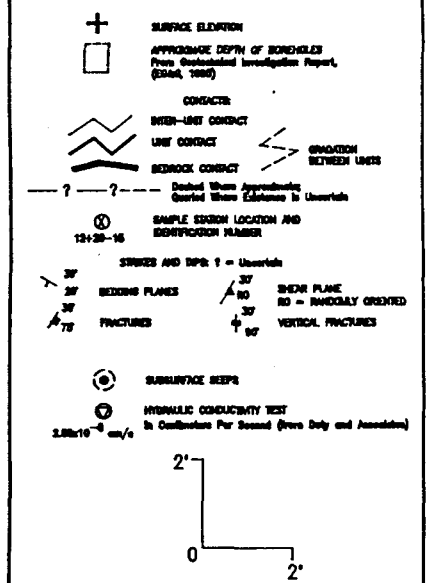
FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 13+50 - 14+00

SIZE	FILE NAME: R33X1350	DATE	SHEET
D	DRAFT	5/20/92	19 of 30

R33X1350.PJCW-052192



EXPLANATION



SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

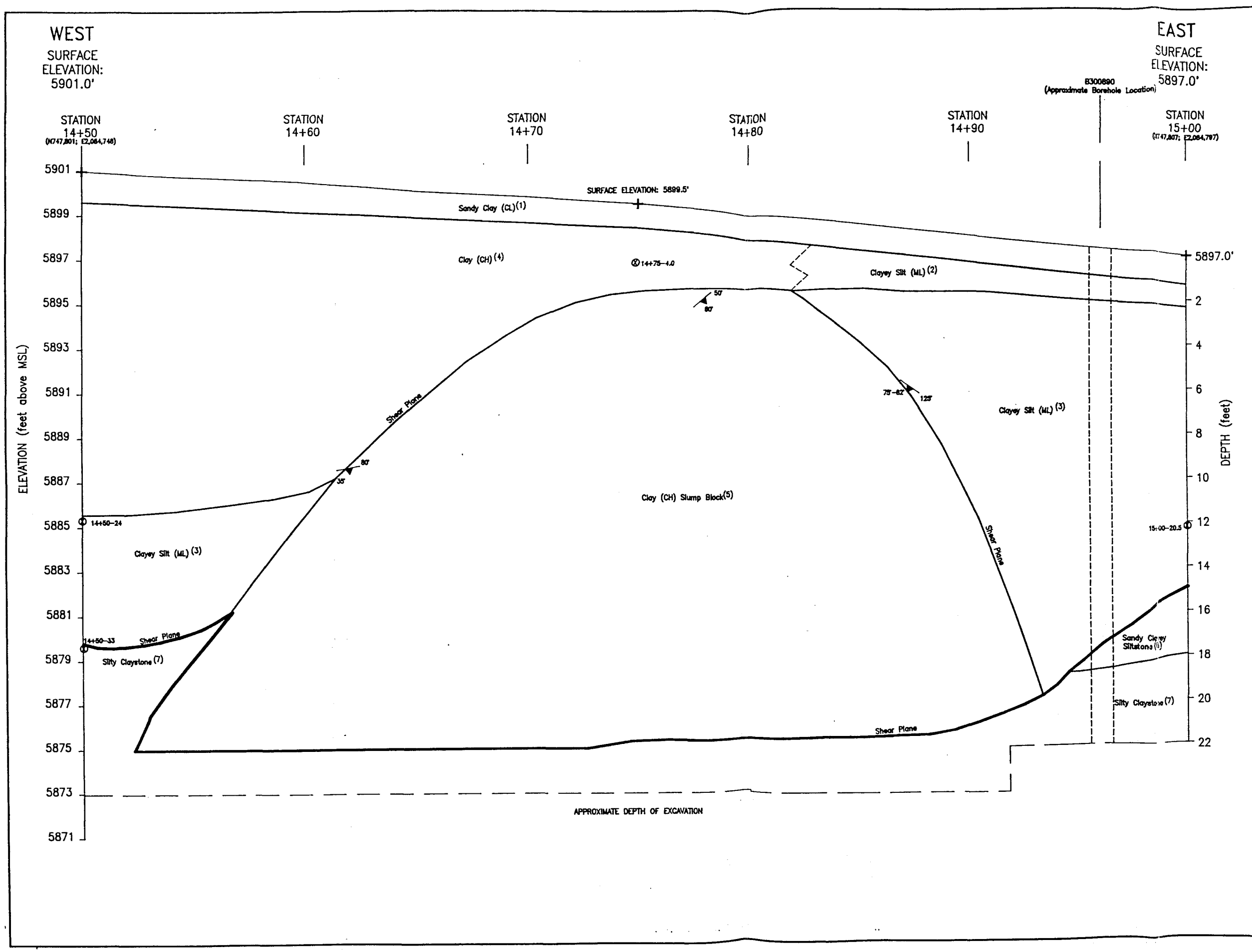
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE — GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 14+00 – 13+50

SIZE	FILE NAME: R33X1400	DATE	SHEET
D	DRAFT	6/29/92	29 of 30

R33X1400.FJCW-062292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+20-15

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE

RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST

In Centimeters Per Second (from Daly and Associates)

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

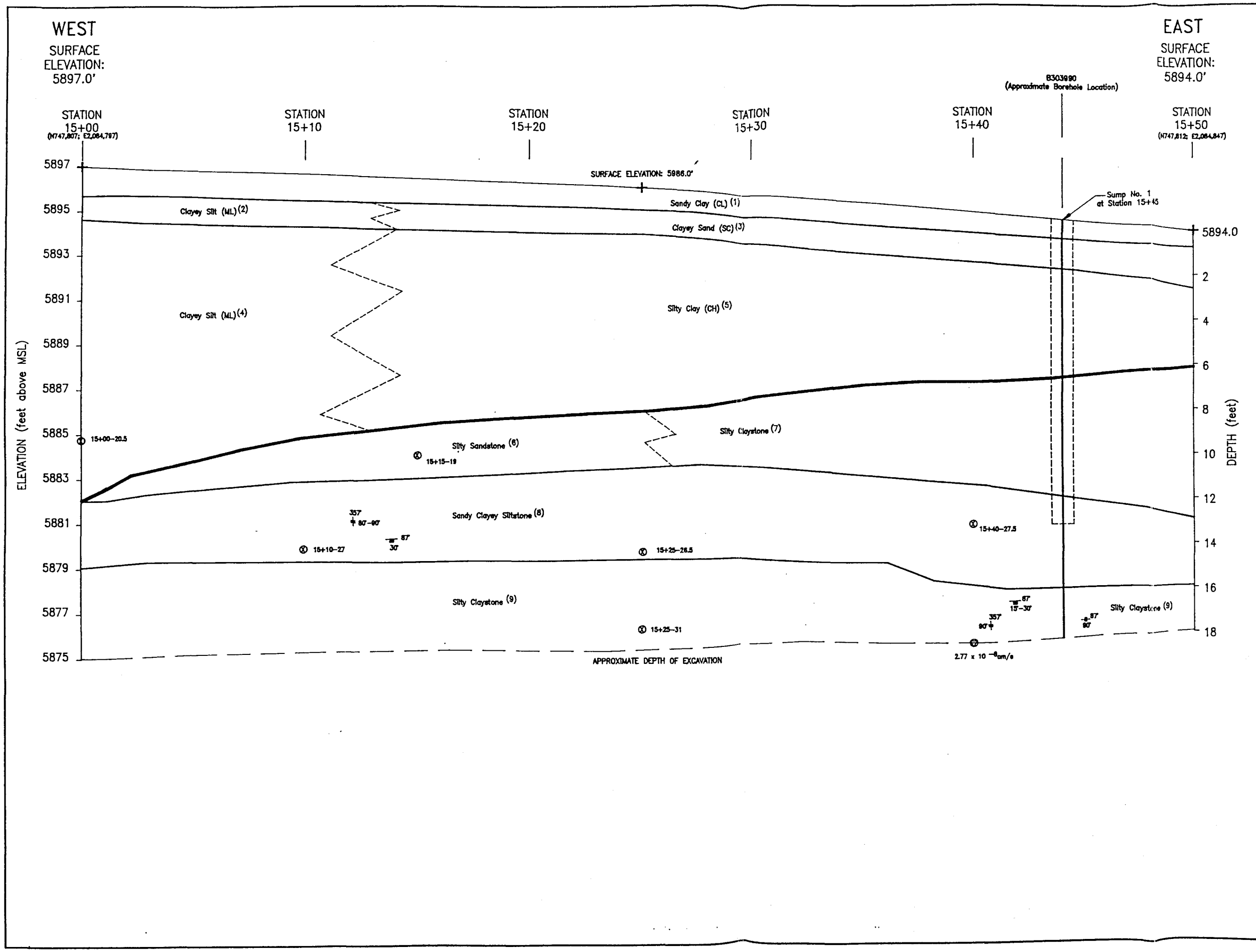
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 14+50 - 15+00

SIZE	FILE NAME: R33X1450	DATE	SHEET
D	DRAFT	6/20/92	21 OF 30

R33X1450.FJCW-052292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+20-15

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RD = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2.55x10 -8 cm/s

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

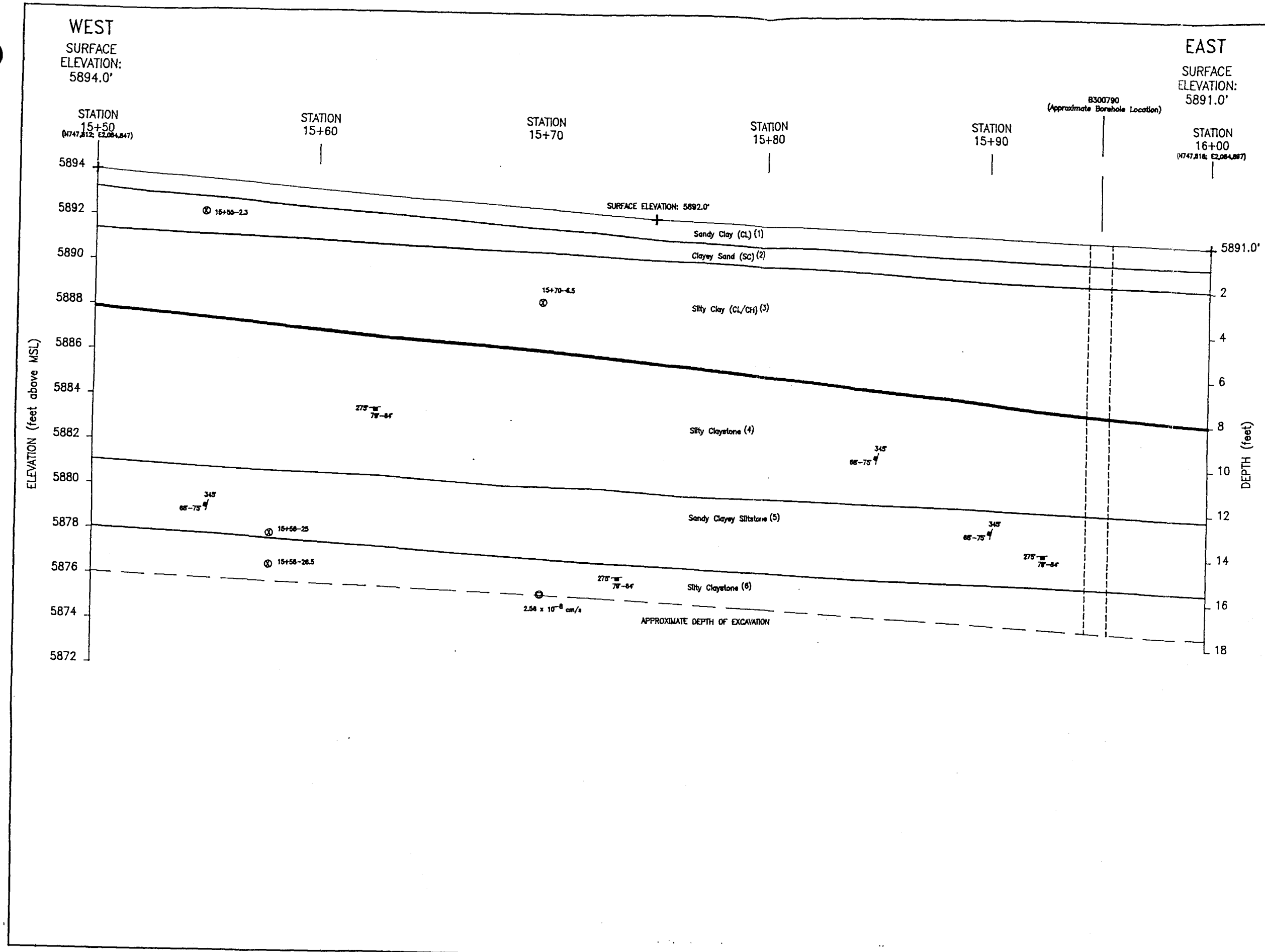
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 15+00 - 15+50

SIZE	FILE NAME: R33X1500	DATE	SHEET
D	DRAFT	5/20/92	22 of 30

R33X1500.PJCW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Contact Where Approximate; Queried Where Existence is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+30-18

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE

RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST

In Centimeters Per Second (from Duty and Associates)

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

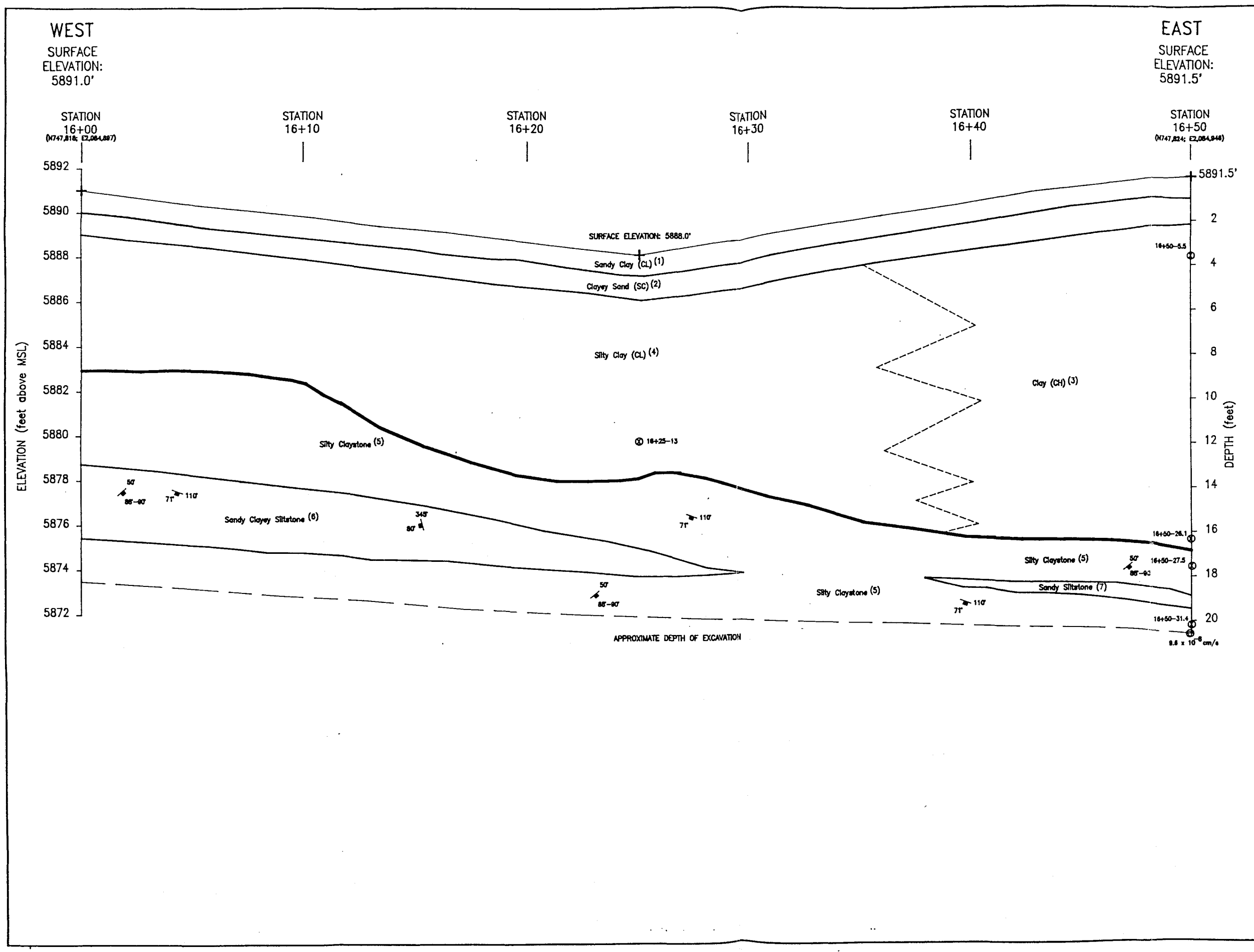
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 15+50 - 16+00

SIZE	FILE NAME: R33X1550	DATE	SHEET
D	DRAFT	5/20/92	23 OF 30

R33X1550.PJC#-052292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate
Queried Where Existence Is Uncertain

12+20-15 SAMPLE SECTION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

SHEAR PLANE
RO = RANDOMLY ORIENTED

FRACTURES

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST
In Centimeters Per Second (from Daly and Associates)

2.88x10^-6 cm/s

2' 0 2'

SCALE: 1 INCH = 2 FEET
NO VERTICAL EXAGGERATION

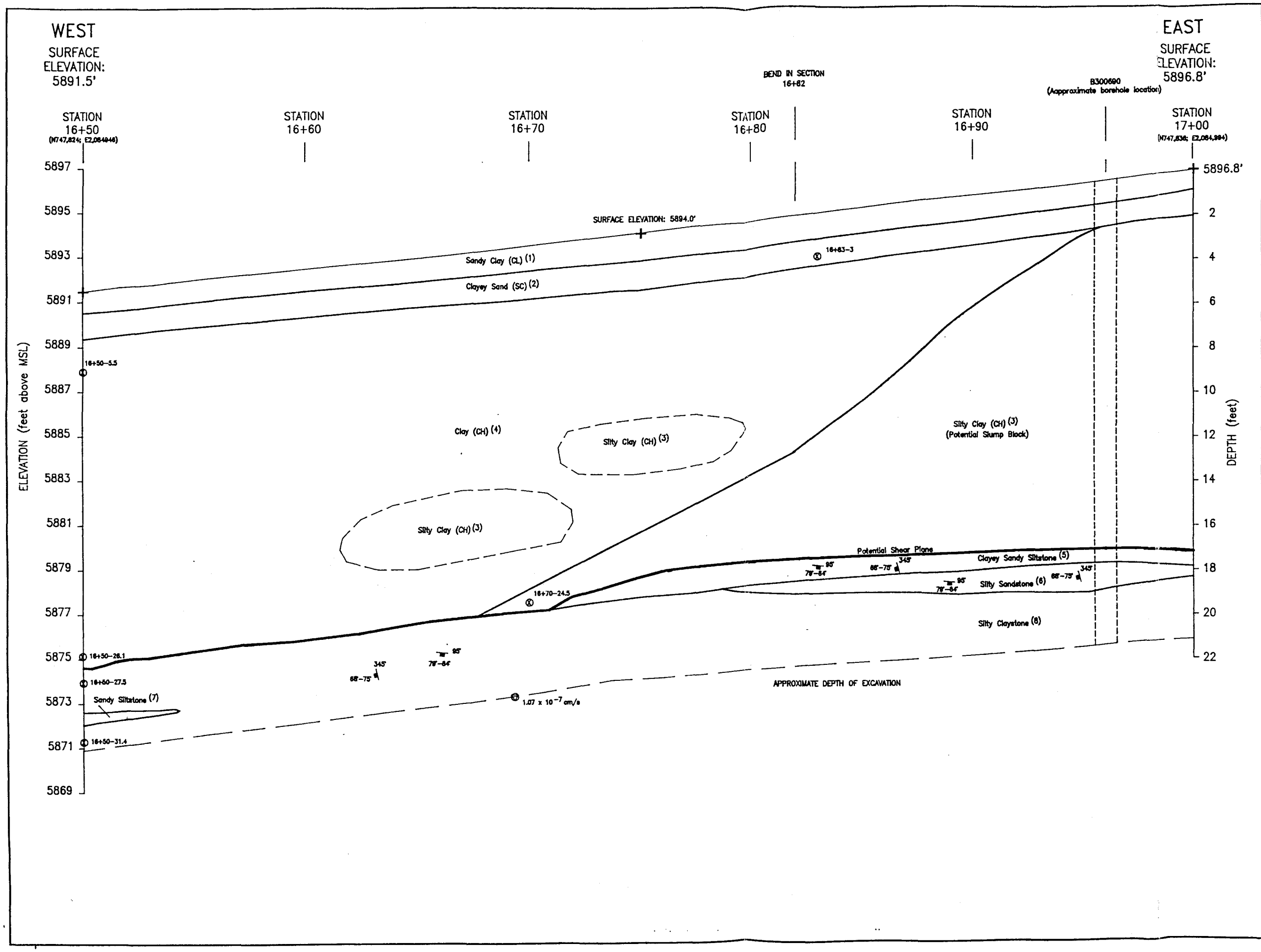
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT
GOLDEN, COLORADO 80402-0464

FRENCH DRAIN GEOLOGIC CHARACTERIZATION
VERTICAL SECTION FROM
STATION 16+00 - 16+50

SIZE	FILE NAME: R33X1600	DATE	SHEET
D	DRAFT	5/20/92	24 of 30

R33X1600.FJCW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (ISI&A, 1990)

CONTACTS:

INTER-SHIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+20-15

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2.58x10^-6 cm/s

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

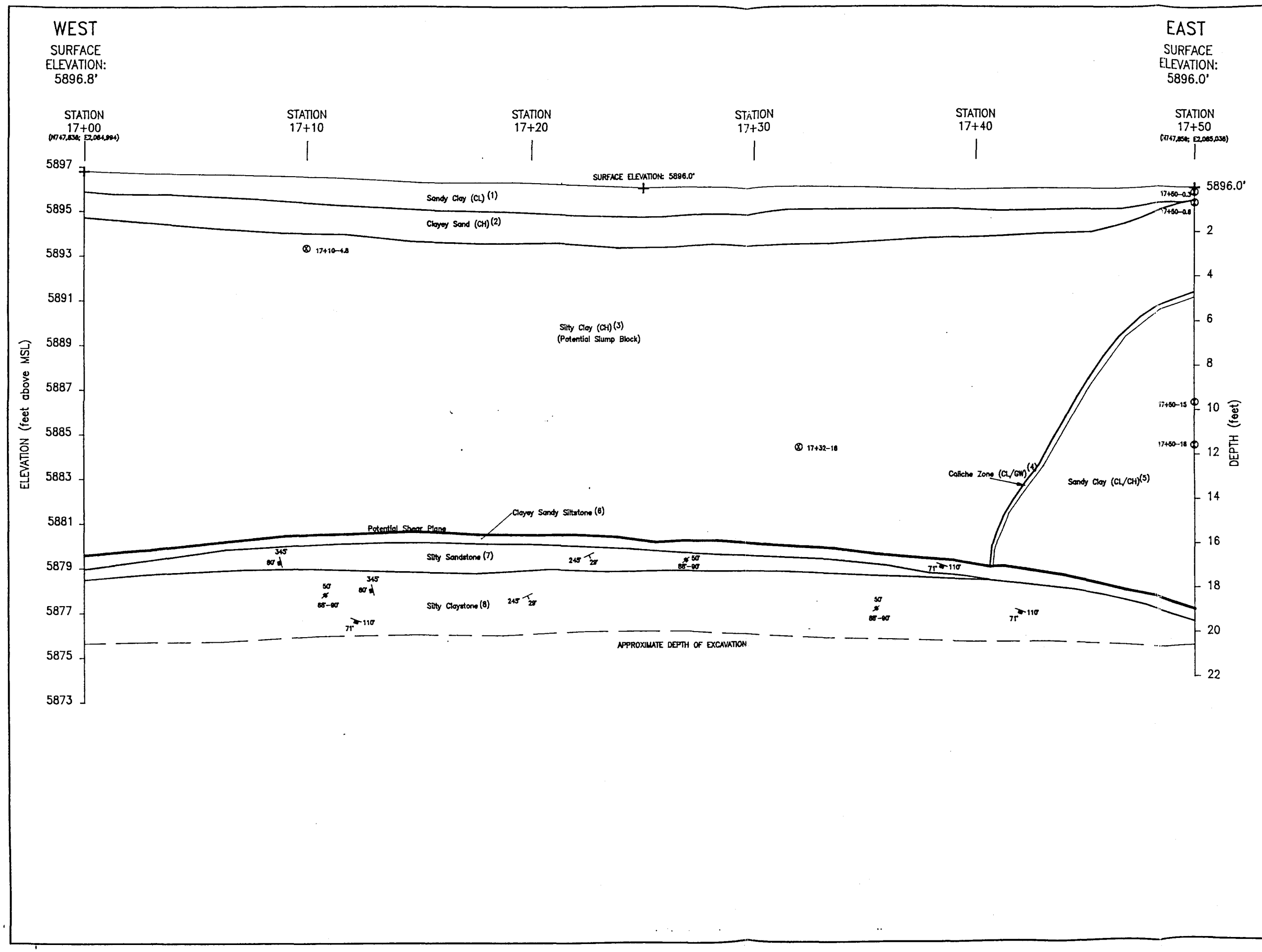
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 16+50 - 17+00

SIZE	FILE NAME: R33X1650	DATE	SHEET
D	DRAFT	6/20/92	25 OF 30

R33X1650.PJCW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

GEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (Brown Daily and Associates)

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

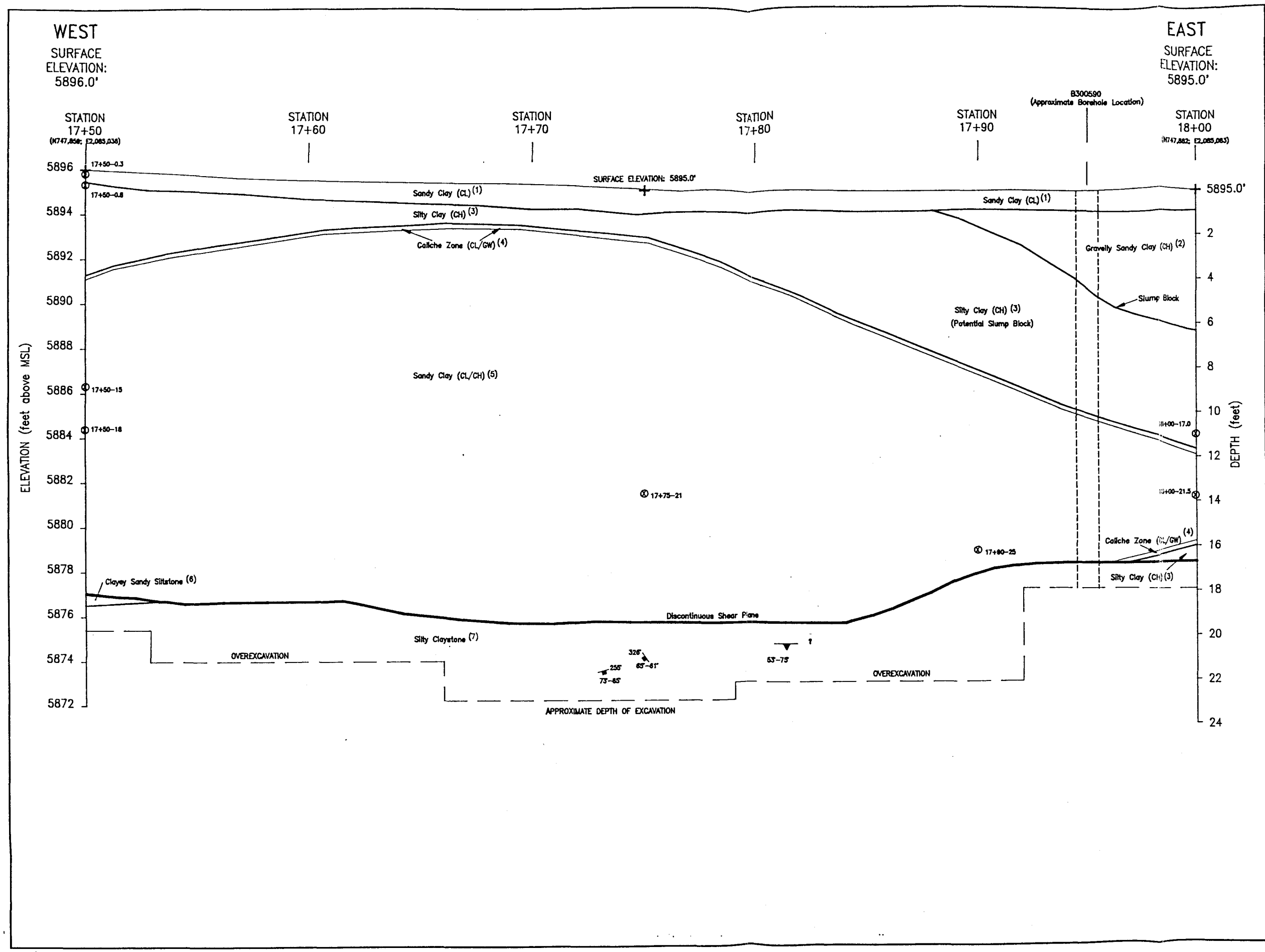
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 17+00 – 17+50

SIZE	FILE NAME: R33X1700	DATE	SHEET
D	DRAFT	5/20/92	26 of 30

R33X1700.PJCW-052292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (ESI&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE SIGNIFICANT LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

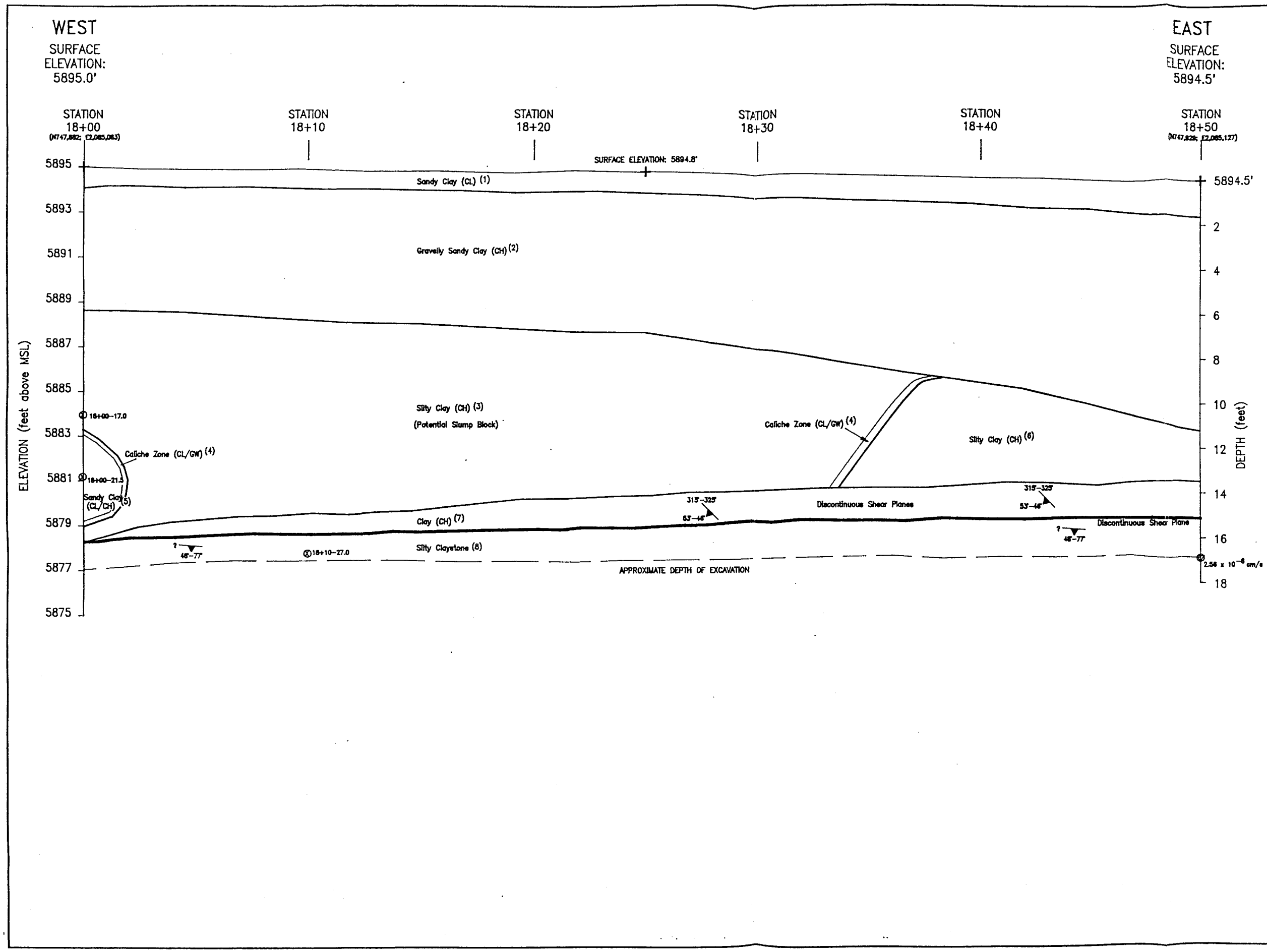
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 17+50 - 18+00

SIZE	FILE NAME: R33X1750	DATE	SHEET
D	DRAFT	5/20/92	27 OF 30

R33X1750.PJCW-052292



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+20-15

STRIKES AND DIPS: ? = Uncertain

30' 25' BEDDING PLANES

30' 75' FRACTURES

30' RO SHEAR PLANE RO = RANDOMLY ORIENTED

30' 90' VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2.56x10^-8 cm/s

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

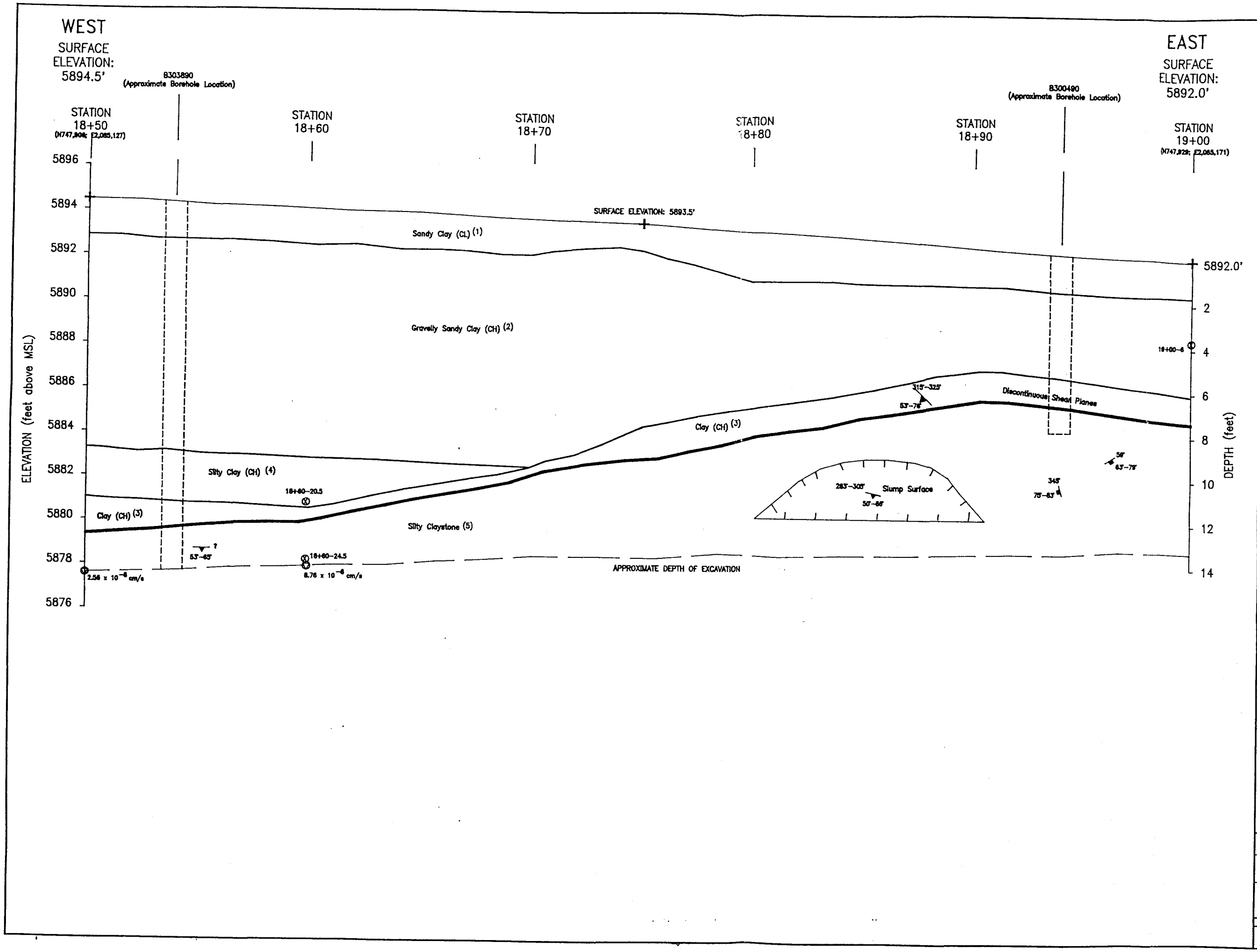
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 18+00 - 18+50

SIZE	FILE NAME: R33X1800	DATE	SHEET
D	DRAFT	5/20/92	28 OF 30

R33X1800.FJCW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (EG&G, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximate; Queried Where Existence Is Uncertain

SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

12+20-15

STRIKES AND DIPS: ? = Uncertain

BEDDING PLANES

FRACTURES

SHEAR PLANE RO = RANDOMLY ORIENTED

VERTICAL FRACTURES

SUBSURFACE SEEPS

HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (Sieve Only and Annotation)

2.56x10^-6 cm/s

2'

0

2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

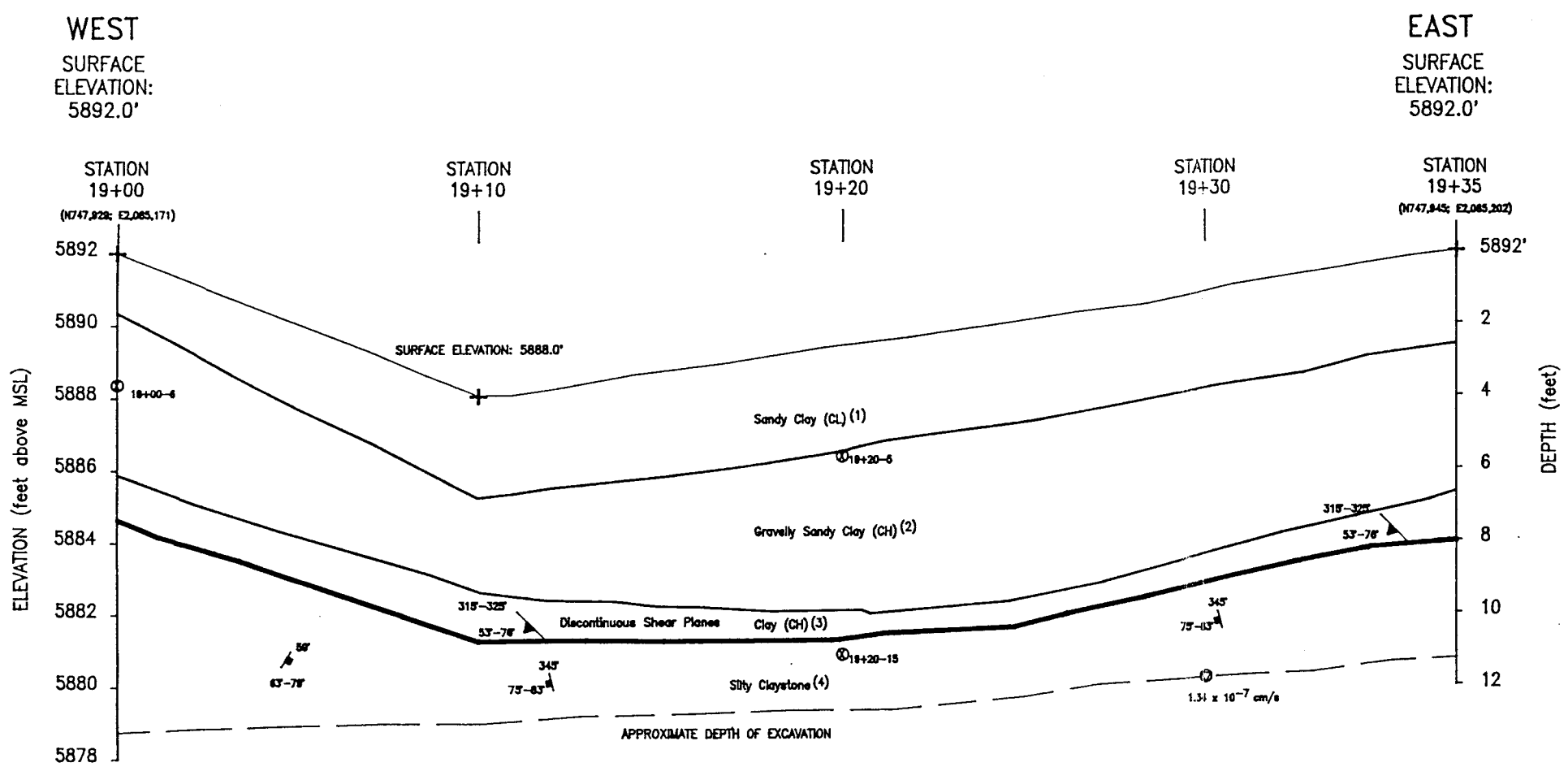
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 18+50 - 19+00

SIZE	FILE NAME: R33X1850	DATE	SHEET
D	DRAFT	5/20/92	29 OF 30

R33X1850.PJCW-052192



EXPLANATION

SURFACE ELEVATION

APPROXIMATE DEPTH OF BOREHOLES From Geotechnical Investigation Report, (ESAG, 1990)

CONTACTS:

INTER-UNIT CONTACT

UNIT CONTACT

BEDROCK CONTACT

GRADATION BETWEEN UNITS

Dashed Where Approximately Queried Where Existence Is Uncertain

12+20-15 SAMPLE STATION LOCATION AND IDENTIFICATION NUMBER

STRIKES AND DIPS: ? = Uncertain

30/20 BEDDING PLANES

30/70 FRACTURES

30/60 SHEAR PLANE RO = RANDOMLY ORIENTED

30/90 VERTICAL FRACTURES

SUBSURFACE SEEPS

2.88×10^{-6} cm/s HYDRAULIC CONDUCTIVITY TEST In Centimeters Per Second (from Daly and Associates)

2' 0 2'

SCALE: 1 INCH = 2 FEET

NO VERTICAL EXAGGERATION

U.S. DEPARTMENT OF ENERGY

ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ROCKY FLATS PLANT

GOLDEN, COLORADO 80402-0464

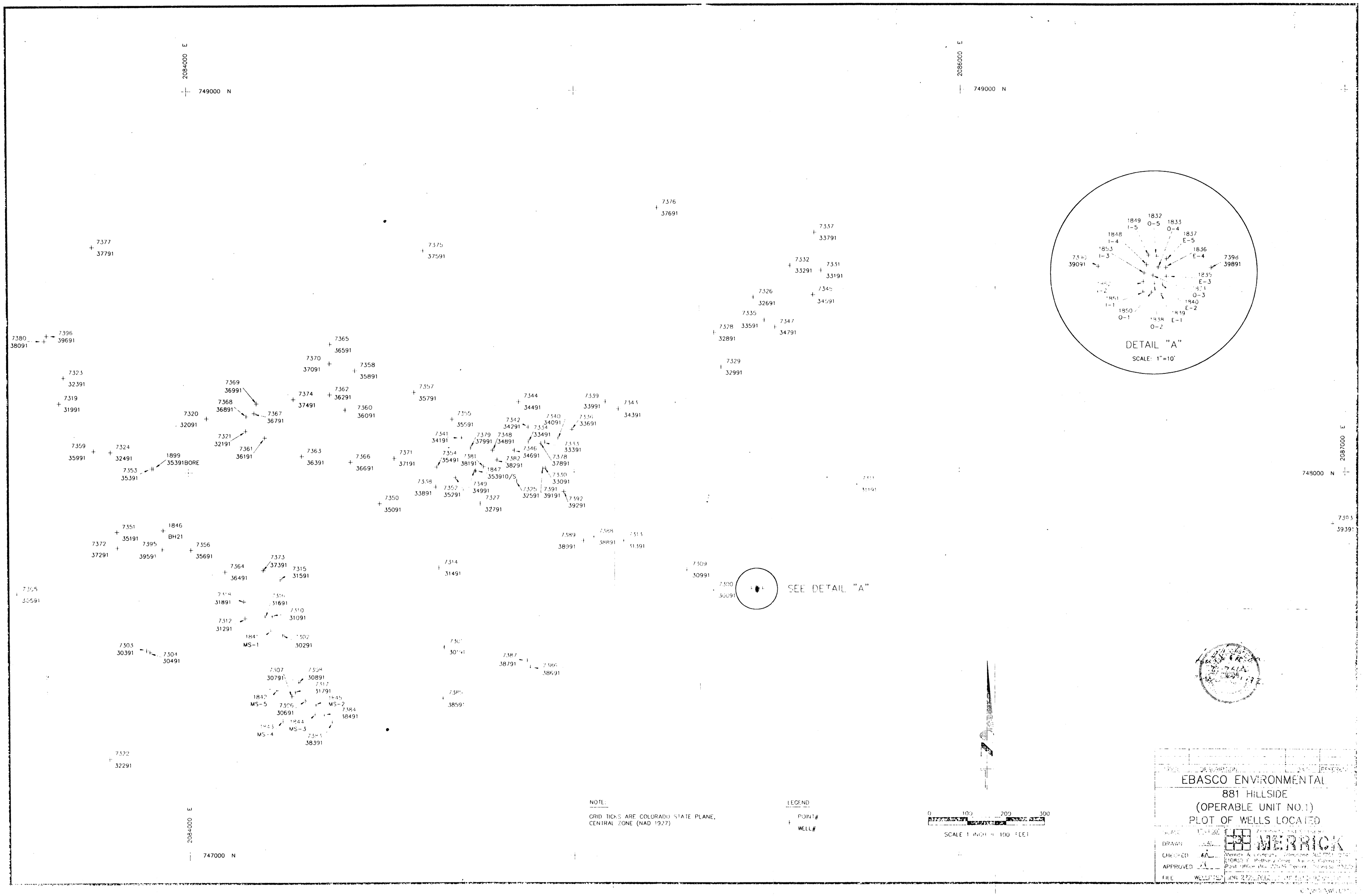
FRENCH DRAIN GEOLOGIC CHARACTERIZATION

VERTICAL SECTION FROM

STATION 19+00 – 19+35

SIZE	FILE NAME: R33X1900	DATE	SHEET
D	DRAFT	5/28/92	30OF 30

R33X1900.FJC#-052292



NOTE:

GRID TICKS ARE COLORADO STATE PLANE, CENTRAL ZONE (NAD 1927)

LEGEND

POINT#

WELL#

EBASCO ENVIRONMENTAL

881 HILLSIDE

(OPERABLE UNIT NO.1)

PLOT OF WELLS LOCATED

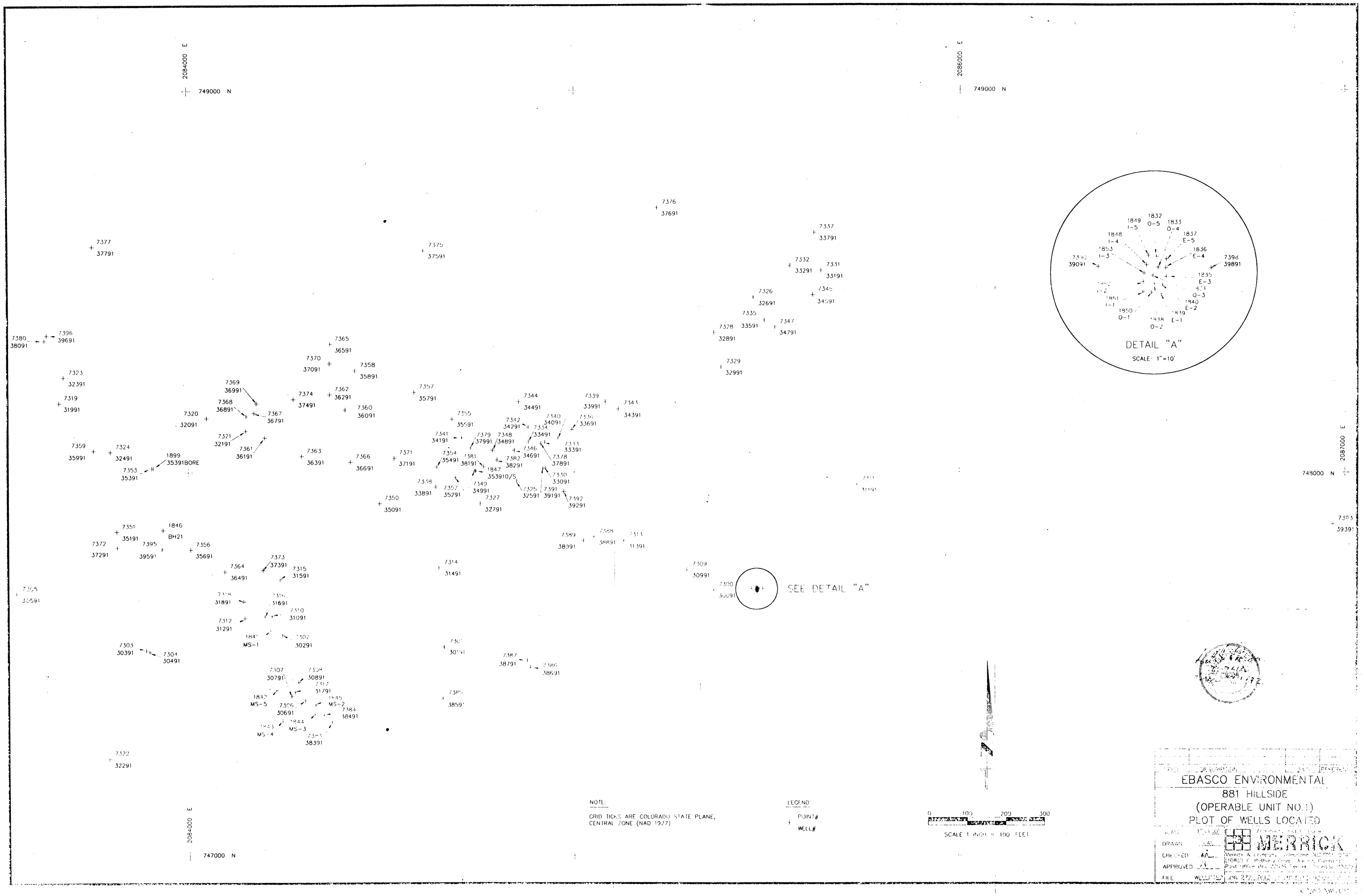
DRAWN

CHECKED

APPROVED

FILE

MERRICK



NOTE:

GRID TICKS ARE COLORADO STATE PLANE, CENTRAL ZONE (NAD 1927)

LEGEND

POINT#

WELL#

EBASCO ENVIRONMENTAL

881 HILLSIDE

(OPERABLE UNIT NO.1)

PLOT OF WELLS LOCATED

DRAWN

CHECKED

APPROVED

FILE

MERRICK