

**CLARKSTOWN SANITARY LANDFILL RI/FS
FINAL REMEDIAL INVESTIGATION REPORT**

**VOLUME 2 OF 2
APPENDICES D, E, AND F**

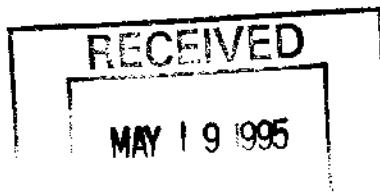
APRIL 10, 1995

Prepared For:

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**CLARKSTOWN SANITARY LANDFILL RI/FS
FINAL REMEDIAL INVESTIGATION REPORT**

VOLUME 2 OF 2

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APPENDIX D

SOIL BORING LOGS

CLARKSTOWN SANITARY LANDFILL RI/FS FINAL REMEDIAL INVESTIGATION REPORT

CONTENTS

Boring logs included herein were compiled from the following reports:

1. Velzy/WESTON - Interim Report, Clarkstown Landfill RI/FS - 1991
2. Velzy Associates - Transfer Station Site Study - 1989
3. Converse Consultants - Report of Geotechnical and Hydrogeologic Investigation, Existing Landfill, Clarkstown, NY - 1986
4. Perlmutter, Nathaniel M. - Geology and Groundwater Resources of Rockland County, New York - 1959
5. Malcolm Pirnie - Report of Site Investigations, Dexter and Old Nyack Landfills - 1986
6. Woodward-Clyde Consultants - Site Investigations, Xerox Corporation, Blauvelt, New York - 1989
7. Converse Engineering Consultants, Report of Soils and Foundation Investigation, Proposed Transfer Station, Clarkstown Landfill, Clarkstown, New York - 1988
8. Metcalf and Eddy, Sludge Compost Study, Boring Logs and Plans - 1981
9. Converse Ward Davis Dixon, Report of Geotechnical Investigation and Groundwater Monitoring Program, Existing Landfill, Clarkstown, New York - 1979
10. Brenner, Donald, P.E. - Application for Approval to Operate a Solid Waste Management Facility - 1978
11. Converse Ward Davis Dixon, Report of Soils and Foundation Investigation, Proposed Truck Scale, Clarkstown, New York - 1978
12. Garfinkel & Gerecke - Specifications for Clarkstown Transfer Station Pile Driving Contract - 1990

NOTES TO ACCOMPANY GEOLIS BOREHOLE LOGS
CLARKSTOWN LANDFILL RI\FS
SEPTEMBER, 1991

1. Top of graphic symbol, % Recovery entry and/or Blow Count entries signify the top of a sampled interval.
2. Pages including bedrock surface appear in duplicate to provide the appropriate overburden and bedrock page headings.
3. Drilling Method entries in "Comments" column mark the starting depth of the method.
4. End of borings are at the bottom of the deepest split spoon or rock core run unless noted otherwise.
5. Numerical Blows are provided in "Blow Count" column; blow counts which include refusal (i.e. - 100/3"), "Weight of Hammer" (WOH) or "Weight of Rods" (WOR), are provided in "Comments" column.
6. Classification of Shelby Tube samples based on inspection of exposed soil at bottom of tube.
7. Entries in the "Field Instrument Reading" column represent the recorded HNu response (greater than background) to soil in the split spoon sampler. No entry in this column for a spoon sample indicates no response greater than background was noted.
8. The intervals 72'-113' for exploratory boring RFW-B7 and 70'-92' for boring RFW-B9 were drilled and sampled with an HX rock coring system. The formation consisted of collapsing, cobbly, bouldery outwash in upper sections and till in lower sections which precluded use of split-spoons for sampling. Recovery was limited to coarse fraction from interval with fines generally washed from sample. The top of the graphic symbol and % recovery entry signifies the start of an HX run which varied in length based on drilling conditions. Since the recovered sample does not reflect true grain size distributions the sample was not classified by GEOLIS. However, observations are noted in the "Comments" column which suggest the sample lithology (i.e. facetting, muddy return water, or clayey silty coating on grounds indicating till).

9. The intervals drilled with the ODEX method for wells RFW-7D, 8D, and 9D were not sampled. The "Comments" column includes description of composite cuttings recovered from various depths during the drilling.

Abbreviations used in the "Comments" column and a summary of the Burmister soil classification system are provided in the following pages.

BOREHOLE LOG ABBREVIATIONS

OVERBURDEN

ANG	=	angular
BASLT or BSLT	=	basalt
BEDG	=	bedding
BENT	=	bentonite
BKD	=	background
BL	=	blue
BLBS	=	blebs
BLDR	=	boulder
BLK	=	black
BNZ	=	benzene
BRKS	=	breaks
BRN or BR	=	brown
BRNISH	=	brownish
BZ	=	breathing zone
C	=	coarse
CEL	=	cobble
CDBD	=	card board
CGI	=	gastechtor combustible gas indicator
CHEM	=	chemical
CHNGD	=	changed
CNTR PLUG	=	center plug
COMB	=	combined
CONGL	=	conglomerate
CONTORTD	=	contorted
CUT	=	drill cuttings
D&W	=	drive and wash drilling method
DEC	=	decomposed
DESC	=	description
DIA	=	diameter
DIABS	=	diabase
DIFF	=	difficult
DK	=	dark
DRGR	=	draeger tube
DRL	=	drill
F	=	fine
FAB	=	fabric
FAC	=	faceted
FORMTN	=	formation
FRAC	=	fractured
FRAGS	=	fragments
FRM	=	firm
GAL	=	gallons
GNSS	=	gneiss

BOREHOLE LOG ABBREVIATIONS

OVERBURDEN

GR	=	grained
GRN	=	green
GRVL	=	gravel
GRY	=	gray
HGHLY	=	highly
HNu	=	HNu PI-101 meter (10.2eV probe)
HS	=	headspace
HSA	=	hollow stem auger drilling method
ID	=	inside diameter
INCL	=	includes
INTRLAM	=	interlaminated
IRR	=	irregular
LAMS	=	laminations
LEL	=	lower explosive limit
LITH	=	lithologic
LSE	=	loose
LTL	=	little
M	=	medium
MED	=	medium
MICAC	=	micaceous
MOD	=	moderately
MOTL	=	mottling
MST	=	moist
MUDSTN	=	mudstone
NEWS	=	newspaper
NR	=	no response
ODEX	=	odex (tubex) drilling method
OH	=	open hole drilling method
ORG	=	organic
PART	=	partially
PEG	=	pegmatite
PLAS	=	plastic
PLN	=	plan
PLNT	=	plant remains
PRTGS	=	partings
QTZTE	=	quartzite
RAD	=	Ludlum Model 17 radiation meter
REC	=	recovery
REF	=	refusal
RMNT	=	remnant
RND	=	rounded

BOREHOLE LOG ABBREVIATIONS

OVERBURDEN

SAT	=	saturated
SDSN or SNDSN	=	sandstone
SLT	=	silt
SLTY	=	silty
SPN	=	splitspoon
STF	=	stiff
STSN or SLTSN	=	siltstone
SUB	=	subrounded to subangular
SUBANG	=	subangular
SWL	=	static water level
TOH	=	top of hole
TR	=	trace
UPWRDS	=	upwards
VC	=	vinyl chloride
VF	=	very fine
VF	=	very fine
VIS	=	visible
WEATH or WEAT	=	weathered
WLOS	=	water loss
WOH	=	weight of hammer
WOR	=	weight of rods
WTR	=	water
YEL	=	yellow

BEDROCK

DEG	=	degree (dip)
FRAC or FRACT	=	fractures
G or GAL	=	gallons
HORIZ	=	horizontal
MED	=	medium
MOT or MOTT	=	mottled
SH	=	shale
SL	=	slightly
SS	=	sandstone
WEATH or WEAT	=	weathered

Degree of Weathering

FSH or FRS	=	fresh
HGH	=	highly
MOD	=	moderately
SLT	=	slightly

	BLLS Biolithite Limestone		GRSD Gravely Sand		NORC No Recovery
	BMLS Biomicrite Limestone		GRSL Gravely Silt		ORGN Organic
	BSLS Biosparite Limestone		GRSS Gravely Sandstone		OTHR Other
	BSLT Basalt		GRVL Gravel		QTZT Quartzite
	CLAY Clay		GSCL Gravel, Silt and Clay		RHYT Rhyolite
	CLMS Argillaceous Siltstone		GSSC Gravel, Sand, Silt, Clay		SAND Sand
	CLSD Clayey Sand		GSSL Gravely Sand and Silt		SCHS Schist
	CLSL Clayey Silt		ICSD Interbedded Sand and Clay		SCMS Sandy, Argillaceous Siltstone
	CLSS Argillaceous Sandstone		ICSH Interbedded Carbonate and Shale		SCSD Silty Clayey Sand
	CNGL Conglomerate		ICSL Interbedded Carbonate and Siltstone		SCSL Sandy, Clayey, Silt
	COAL Coal		IMSH Interbedded Siltstone and Shale		SCSS Silty Argillaceous Sandstone
	DLBL Dolomitic Biolithite		IOTH Interbedded Other		SDCL Sandy Clay
	DLBM Dolomitic Biomicrite		ISCL Interbedded Silt and Clay		SDGR Sandy Gravel
	DLBS Dolomitic Biosparite		ISH Interbedded Clays/Shales		SOMS Sandy Siltstone
	DLMC Dolomitic Micrite		ISL Interbedded Silts/Siltstones		SDSH Sandy Shale
	GBRO Gabbro		ISS Interbedded Sands/Sandstones		SDSL Sandy Silt
	GNSS Gneiss		ISSD Interbedded Sand and Silt		SDST Sandstone
	GRAN Granite		ISSH Interbedded Sandstone and Shale		SHLE Shale
	GRCL Gravel and Clay		ISSL Interbedded Sandstone and Siltstone		SILT Silt
	GRMS Gravely Siltstone		MCLS Micrite Limestone		SLCL Silty Clay

Color - Always first in the description with 1st letter capitalized

Color - Always use in the description when the color component is present.

Description of Primary Component		Description of Secondary Component	Description of Tertiary Component	
P R I M A R Y C O M P O N E N T	> 50% of Sample by Weight	fine to coarse SAND, Include fine, medium, and/or coarse from Table I only if they comprise > 10% of the sand fraction	and some little trace (from Table II) Silt, Clayey Silt, Silt & Clay, Clay & Silt, Silty Clay, Clay. (from Table II) Exception: Organic Silt is called such with degree of plasticity (in parentheses) after full description	fine to coarse Gravel Include fine, medium and/or coarse from Table I only if they comprise > 10% of gravel fraction
	< 50% of Sample by Weight	fine to coarse Sand, Include fine, medium, and/or coarse from Table I only if they comprise > 10% of the sand fraction		
	> 50% of Sample by Weight	fine to coarse GRAVEL and, some, little, trace, (From Table II) Refers to all but Gravel component	fine to coarse Sand, Include fine, medium, and/or coarse from Table I only if they comprise > 10% of the sand fraction	Silt Clayey Silt Silt & Clay Clay & Silt Silty Clay Clay (from Table II) and some little trace (from Table II)
	> 50% of Sample by Weight	SILT and, some, little, trace, (from Table II) Refers to all but Silt/Clay Component CLAY & SILT Silty CLAY CLAY (from Table II) Exception: ORGANIC SILT	fine to coarse Sand, Include fine, medium, and/or coarse from Table I only if they comprise > 10% of the sand fraction	fine to coarse Gravel Include fine, medium and/or coarse from Table I only if they comprise > 10% of gravel fraction

- Notes: 1. Add descriptions of stratified soils as per Table IV at end of full description (separated from full description by a comma)
2. If no component comprises > 50% of the sample by weight, description starts with Sand component
3. Closer proportions may be used if considered significant: (+) - Nearer the upper limit of a proportion
Ex.: "little (+)" means nearer 20%
(-) - Nearer the lower limit of a proportion
Ex.: "some (-)" means nearer 20%

SUMMARY OF THE BURMISTER SYSTEM

TABLE I
Upper and Lower Grain Size Limits

Component	Fraction	Upper Limit	Lower Limit
Gravel	Coarse	76mm (3in.)	25mm (1in.)
	Medium	25mm (1in.)	19mm (3/4in.)
	Fine	19mm (3/4in.)	2mm
Sand	Coarse	2mm	0.59mm
	Medium	0.85mm	0.25mm
	Fine	0.25mm	0.074mm
	—	0.074mm	

TABLE II
Terms for Identifying Proportions

and	35% to 50%
some	20% to 35%
little	10% to 20%
trace	1% to 10%

TABLE IV
Stratified Soils Terms

Abbreviation	Term	Definition
prt	parting	- 0 to 1/16" thickness
seam	seam	- 1/16 to 1/2" thickness
lyr	layer	- 1/2 to 12" thickness
str	stratum	- greater than 12" thickness
pkt	pocket	- small, erratic deposit, usually less than 1 foot
lens	lens	- lenticular deposit
occ	occasional	- one or less per foot of thickness
freq	frequent	- more than one per foot of thickness

TABLE III
Plasticity Test for Silt and Clay Components

Degree of Plasticity	Appearance	Smallest Diameter Thread (in.)	Component
Non-Plastic		No Thread	Silt
Slight	gritty or rough	1/4	Clayey Silt
Low	rough to smooth	1/8	Silt & Clay
Medium	rough to smooth	1/16	Clay & Silt
High	smooth and dull	1/32	Silty Clay
Very High	shiny	1/64	Clay

*Smallest diameter thread to which the soil can be rolled

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	60.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW1D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/20/91
ELEVATION :	69.630	DATE COMPLETED :	11/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HSA/B*ID DRILLED THROUGH GRAVEL DRILL PAD 0'-6'
68	1									
67	2									
66	3									
65	4									
64	5									
63	6		16	SILT, LF SAND, LF GRAVEL, LF ORGANIC	BLK	LSE	WET			BLOWS 6'-8'=92-100/4" INCL PLAS (FILL) CGI/HS=100% LEL HNU/BZ=NR HNU/HS=NR
62	7									
61	8		8	SAND, LF ORGANIC FILL		LSE	WET	HNU 0.4		BLOWS 8'-10'=100/5" (FILL) INCL PLAS HNU/BZ=0.8 UNITS>BKD HNU/HS=0.8-0.8 UNITS>BKD HNU/CUT=0.8 UNITS>BKD HNU/BZ=NR CGI/HS=5% LEL
60	9									
59	10			NO RECOVERY						BLOWS 10'-12'=100/5" HNU/HS=2.0-2.0 UNITS>BKD WIRE AND RAGS ON CNTRPLUG CGI/HS=5% LEL

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 60.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW1D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 11/20/91
ELEVATION : 69.630	DATE COMPLETED : 11/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
58	11			NO RECOVERY						BLOWS 10'-12'=100/5" HNU/MS=2.0-2.0 UNITS=BKD WIRE AND RAGS ON CNTRPLUG CGI/MS=5% LEL HNU/87=0.4-0.6 UNITS=BKD DRAEGER/VC-MS=0.4 ppm
57	12		12	FILL	DK BLK		WET			PLAS-WOOD-FAB-PLNT BLOWS 12'-14'=59-100/4"
56	13									
55	14		33	ORGANIC	DK BRN-BLK					LTL PART DEC PLNT HOLE DRY @ 14'
54	15									
53	16		62	SAND, BR GRAVEL	DK ORNG BRN	LSE	SAT	18 24 30		SAND M-C/TR F SAND GRVL F-M/BKD-SUB HOLE DRY @ 16' PEAT-CLOTH ON CNTRPLUG
52	17									
51	18		25	SAND, LF GRAVEL	DK ORNG BRN	LSE	SAT	26 30 36 44		SAND M-C/TR F SAND GRVL F-M GROUTED 10" CASING TO 19' DRA/6" MLD ROTARY
50	19									
49	20		54	SAND, LF CLAY, LF GRAVEL, LF SILT	DK ORNG BRN	LSE	WET	12 28 30 33		SAND M-C/TR F SAND GRVL F-M/SUB FINE GR SIZES AS CONTORTD LAMINATIONS (FILL)

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	60.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFWD	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/20/91
ELEVATION :	69.630	DATE COMPLETED :	11/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
48	21			SAND, tr CLAY, tr GRAVEL, - tr SILT	DK ORNG BRN	LSE	WET			SAND M-C/TR F SAND GRVL F-M/SUB FINE GR SIZES AS CONTORTD LAMINATIONS (TILL)
47	22			NO RECOVERY				11 14 18 22		SWL/AUGERS=16'
46	23									
45	24		21	SAND and SILT, tr GRAVEL, - tr CLAY	DK REDDISH BRN	LSE	WET	6 11 10 12		SAND VF/GRVL F-M-SUB FLUSHED HOLE @ 24' AND - CHANGED BENT MUD (LOOSE TILL)
44	25									
43	26									
42	27		8	SAND	DK REDDISH BRN	LSE	SAT	3 08 UN3		
41	28			NO RECOVERY				6 7 11		
40	29									
39	30		41	GRAVEL and SAND, tr SILT, - tr CLAY	DK REDDISH BRN		WET	20 32 37 46	HNU 0.2	GRN BLESS-3/8"DIA D&W/6"

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	60.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFWLD	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/20/91
ELEVATION :	69.630	DATE COMPLETED :	11/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				GRAVEL and SAND, lt SILT, - tr CLAY	DK REDDISH BRN		WET		HMU 0.2	GRN BLEBS-3/8" DIA D&W/6"
				GRAVEL, sm SILT, lt SAND	REDDISH BRN	LSE	SAT		HMU 0.2	SAND VF/GRVL F-M
				GRAVEL, sm SILT, lt SAND	REDDISH BRN		MST		HMU 0.2	PALE BL GRN BLBS-1/4" DIA
				GRAVEL and SAND	REDDISH BRN	LSE	WET		HMU 0.2	SAND VF-C/GRVL F-M SUBRD
38	31									
37	32		28	GRAVEL, sm SAND	REDDISH BRN			61 84 68 0	HMU 0.2	SAND F-C GRVL-MOD WEATHERED FRAGS OF F GR SANDSTONE [SAPROLITE]
36	33									
35	34		75	GRAVEL and SAND, lt SILT, - tr CLAY	REDDISH BRN		WET	49 43 50 67	HMU 1.0	SAND F-M AS BOMB SS BEDS GRVL C AS F-M GR SDSN
				SAND, tr GRAVEL	REDDISH BRN	LSE	WET		HMU 1.0	SAND F-M/TR C SAND GRVL F-SUB
				SAND and GRAVEL	REDDISH BRN				HMU 1.0	SAND F-M/GRVL F-M GR SDSN
34	35			SAND, tr GRAVEL	REDDISH BRN	LSE			HMU 1.0	SAND F/F GR SDSN
				GRAVEL, lt SAND	REDDISH BRN					SAND F-M GRVL F-M GR SANDSTONE
33	36		37	SAND and SILT, tr CLAY, t- r GRAVEL	YEL BRN		MST	13 56 67 100		TR PALE GR BLBS 1/16" DIA GRVL F/SAND VF/TR M SAND
				SILT and SAND, tr CLAY, t- r GRAVEL	REDDISH BRN		MST			PALE GRN BLBS 3/8" DIA SAND F-M/ GRVL F
32	37									
31	38		16	SAND and SILT, tr CLAY, t- r GRAVEL	REDDISH BRN	FRM	MST			TR PALE GRN BLBS 1/2" DIA SAND F-M GRVL F BLOWS 38'-40'=100/4"
30	39									
29	40		25	STYLSTONE	REDDISH BRN	FRM	MST			DEC CLAYEY SYSN TR PALE BL GRN BLBS 1/4" BLOWS 40'-42'=26-100/3" [SAPROLITE]

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	60.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFWLD	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/20/91
ELEVATION :	69.630	DATE COMPLETED :	11/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
28	41			SILTSTONE	REDDISH BRN	FRM	MST			DEC CLAYEY SILT 1/2" PALE BL-GRN BLKS 1/4" BLOWS 40'-42'=26-100/3" (SAPROLITE)
27	42			NO RECOVERY						ROUGH DRILLING @ 42' BLOWS 22'-42'=100/3"
26	43									
25	44		23	SILTSTONE	REDDISH BRN		MST			REC 1/2" CLAYEY SILTSH BRKS ALONG BEDDING PLANES EX ROCK CORING @ 45' (SAPROLITE)
24	45		76	VERY COARSE SANDSTONE WITH SHALE LAMINAE	MOD. RED BROWN	MOD				frag:45.0-48.2, frs:48.2- 51.3, silt pit dropped 47-48 lost 110 gal/50.5
23	46									
22	47									
21	48									
20	49									
19	50		92	FINE TO COARSE SANDSTONE	MOD RED ORANGE	MOD				53-54, soft:51.3-51.6, silt: 51.7-51.7, 60%:51.7-51.7, 60%: 60%:51.7-51.7, 60%:51.7-51.7, lost 100 gal/54.55

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 60.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW1D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 11/20/91
ELEVATION : 69.630	DATE COMPLETED : 11/30/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
28	41			SILTSTONE	REDDISH BRN	FRM				DEC CLAYEY SILT IN PALE BL. BRN BLKS 1/4" BLOWS 40'-42' = 25-100/3" (SAPROLITE)
27	42			NO RECOVERY						ROUGH DRILLING @ 42' BLOWS 42'-44' = 100/3"
26	43									
25	44			SILTSTONE	REDDISH BRN					REC 1/2" CLAYEY SILT BRKS ALONG BEDDING PLANES IN ROCK CORING @ 45' (SAPROLITE)
24	45			VERY COARSE SANDSTONE WITH N SHALE LAMINAE	MOD. RED BROWN	MOD	4	0.0		frag: 45.0-48.2, frs: 48.2- 51.3, silt bit dropped 47-48 lost 110 gal/50.5
23	46									
22	47									
21	48									
20	49									
19	50			FINE TO COARSE SANDSTONE	MOD RED ORANGE	MOD	5	0.0		53-54, soft: 51.3-51.4, silt; 51.4-51.7, hgh: 51.7-53.0, hgh: lost 175 gal/53-54; lost 100 gal/54-55

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWID
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 69.630

TOTAL DEPTH : 60.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/20/91
 DATE COMPLETED : 11/30/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
18	51			FINE TO COARSE SANDSTONE	MOD RED ORANGE	MOD	5	0.0		53-54 soft; 51.3-51.6 slt; 51.2-51.7 hgh; 51.7-53.0; hgh; lost 175 gal/53-54; lost 100 gal/54-55
17	52									
16	53									
15	54									
14	55			FINE SANDSTONE WITH SHALE- L CONGLOMERATE	MOD RED BROWN	MOD	2	0.0		soft 58.7-60; 55.0-58.0; frs: 58.0-58.7 frs: 58.7- 59.0, hgh; 59.0-60.0, frs; lost 300 gal/55-60
13	56									
12	57									
11	58									
10	59									
9	60									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	28.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW1S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/10/90
ELEVATION :	70.020	DATE COMPLETED :	12/12/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						NSA/B*ID HNU/SGD=0.3 UNITS DRILLED THROUGH GRAVEL- DRILL PAD 0'-6" REFER TO LOG FOR RFW-ID FOR INTERVALS NOT SAMPLED BELOW
69	1									
68	2									
67	3									
66	4									
65	5									
64	6									
63	7									
62	8									
61	9									DIFF DRILLING 8.5'-10' CUTTINGS=100% LEL CUTTINGS=FULL
60	10			INTERVAL NOT SAMPLED						CUTTINGS=FULL

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 28.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW1S	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 12/10/90
ELEVATION	: 70.020	DATE COMPLETED	: 12/12/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						CUTTINGS= FILL
59	11									
58	12									
57	13									
56	14									
55	15									
54	16									
53	17									GROUT 8" CASING TO 16.5' 084/6"
52	18									
51	19		33	SAND, tr GRAVEL, tr SILT, - tr CLAY	REDDISH BRN	SFT	WET	7 12 8 9		TR DK RED MOTT-1/16" DIA
50	20									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	28.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW1S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/10/90
ELEVATION :	70.020	DATE COMPLETED :	12/12/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
49	21			INTERVAL NOT SAMPLED						
48	22			NO RECOVERY						
47	23									
46	24			NO RECOVERY						INSTALLED 2" WELL TO 25'
45	25									
44	26		12	SAND and SILT, sm GRAVEL, - tr CLAY	REDDISH BRN			9 16 8 6		SAND F GRVL M/TR F GRVL [TILL]
43	27									
42	28									
41	29									
40	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 35.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE
WELL ID : RFW2	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/11/90
ELEVATION : 63.490	DATE COMPLETED : 12/14/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			16	SAND, lt GRAVEL, tr ORGAN-IC	BRN-REDDISH BRN	LSE	MST	4		SAND F-M/GRVL F-M TR PLAS [FILL]
62	1									
61	2		8	SAND	DK BRN-BLK			11		INCL WOOD AND PLAS [FILL]
60	3									
59	4			NO RECOVERY				7 10 10 13		PLAS IN SPOON TIP
58	5									
57	6			INTERVAL NOT SAMPLED						REFUSAL AT 6' DRILLED THROUGH OBSTRUCT- ION TO 8'
56	7									
55	8		4	GRAVEL				7		INCLUDES PLASTIC [FILL]
54	9									
53	10			NO RECOVERY				3		CGI/BZ=NR HNU/HS=NR CGI/HS=12% LEL CUT=REFUSE AND FILL PLASTIC IN SPOON TIP

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 35.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE
WELL ID : RFW2	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/11/90
ELEVATION : 63.490	DATE COMPLETED : 12/14/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
52	11			NO RECOVERY						CGI/RZ=NR HNU/HS=NR CGI/HS=12X LEL CUT=REFUSE AND FILL PLASTIC IN SPOON TIP
51	12		2	ORGANIC	LT BRN	SFT	SAT	4		CUTTINGS=REFUSE HNU/HS=NR
50	13									
49	14		12	ORGANIC	LT BRN	SFT	SAT	2		
48	15									
47	16		33	CLAY, BR SILT	MED BRN		WET	6		THREADS 1/16"-1/64"
46	17									
45	18		100	CLAY, LF SAND, LF SILT	MED-DK BRN	SFT	SAT			BLOWS 18'-20'=4-WOM INTERLAM W/GRY CLAY-0.2M/6" TR SILT-VF SAND SEAMS GROUT 8" CASING TO 18'
44	19									
43	20		100	CLAY, LF SILT CLAY, LF SAND	DK REDISH BRN REDDISH BRN	FRM	WET	1 2		VARVED CLAY VARVED CLAY TR F-H SAND SEAMS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	35.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW2	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/11/90
ELEVATION :	63.490	DATE COMPLETED :	12/14/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
42	21			CLAY, tr SAND	REDDISH BRN	FRM	WET			VARIED CLAY TR F-M SAND SEAMS
41	22			INTERVAL NOT SAMPLED						
40	23									
39	24		50	SAND, tr GRAVEL, tr SILT	REDDISH BRN	SFT	WET	19		SAND F-M GRVL F
				SAND, tr GRAVEL	REDDISH BRN	LSE	WET	10		SAND M TR F-C SAND
								9		GRVL F
				SAND, tr GRAVEL	MED-REDDISH BRN			10		
38	25			SAND, tr GRAVEL	REDDISH BRN	LSE	SAT			SAND M-C GRVL F
										SAND F-M GRVL F (OUTWASH)
37	26		41	SAND and GRAVEL	MED BRN	LSE	SAT	29		SAND M-C TR F SAND
								13		GRVL F-M
				SAND, sm GRAVEL, lt SILT	REDDISH BRN	LSE	WET	16		SAND F-C GRVL F-M
36	27									
35	28		37	SAND and GRAVEL	REDDISH BRN		SAT	52		SAND M-C/TR F SAND
								50		GRVL F-M/SUB
				SAND and SILT, tr GRAVEL	REDDISH BRN	FRM	SAT	30		SAND VF GRVL F/SUB
								33		(TILL)
34	29									2" WELL INSTALLED TO 29'
33	30		16	GRAVEL and SAND, lt SILT, tr CLAY	REDDISH BRN	FRM	WET	30		SAND F GRVL F-M/SUB (TILL)
								74		
								12		
								20		

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	35.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW2	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/11/90
ELEVATION :	63.490	DATE COMPLETED :	12/14/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				GRAVEL and SAND, lt SILT, - tr CLAY	REDDISH BRN	FRM	WET			SAND F GRVL F-M/SUB (TILL)
32	31									
31	32			NO RECOVERY						BLOWS 32'-34' = 80/5" C GRVL IN SPOON TIP
30	33									
29	34		41	SAND sm GRAVEL, tr SILT, - tr CLAY	REDDISH BRN	FRM	MST	17 20 30 32		SAND VF-C GRVL F-M ROUGH DRILLING 30'-35'
28	35									
27	36									
26	37									
25	38									
24	39									
23	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 63.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW3D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/17/90
ELEVATION : 63.260	DATE COMPLETED : 01/02/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						DRILLED THROUGH GRAVEL - DRILL PAD 0'-4' NSA/8" HNU/BKD=0.3 UNITS RAD/BKD=5-7 NR/NR
62	1									
61	2									
60	3									
59	4		12	SAND, sm GRAVEL, sm SILT, - lt ORGANIC	DK BRN					BLOWS 4'-6' = 5-6 1/2" SAND F-C GRVL M (FILL)
58	5									
57	6		16	SAND, tp GRAVEL	DK BRNISH GRAY	LSE	SAT	25 17 3		SAND F-M GRVL F TR WOOD FRGS (FILL)
56	7									
55	8		16	SAND and SILT	DK OLIVE BRN	LSE	SAT			SAND F/ TR WOOD FRGS BLOWS 8'-10' = 1-100/50
54	9									
53	10			INTERVAL NOT SAMPLED						ROUGH DRILLING @ 10' WOOD FRGS ON CNTRPLUG BLOWS 10'-12' = REF

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 63.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW3D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/17/90
ELEVATION : 63.260	DATE COMPLETED : 01/02/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
52	11			INTERVAL NOT SAMPLED						ROUGH DRILLING @ 10' WOOD FRAGS ON CHTRPLUG BLOWS 10'-12'=REF
51	12		50	ORGANIC	DK BRN	SFT	MST	1		PLNT 1/2" LENGTH NMU/BZ-RS=NR RAD/CUT=NR
50	13									
49	14		87	ORGANIC	MED YEL BRN	SFT	MET	1		PLNT 3/8" LENGTH COLLECTED CHEN SAMPLES- SB-5 AND SB-30 SIL/AUGERS=91
48	15			ORGANIC, 1% SILT CLAY	DK OLIVE BRN-REDDISH BRN	SFT LSE	WET WET			PLNT 3/8" LENGTH
47	16			INTERVAL NOT SAMPLED						GROUT 10" CASING TO 16' DIA/6"
46	17									
45	18			NO RECOVERY						PUSHED SHELBY 17.5'-19.5' REDDISH BRN CLAY ON SIDE OF TUBE
44	19									
43	20		100	CLAY, 1% SILT	REDDISH BRN		WET	10 10 20 17		VARIED CLAY 1/8"-3/8" THICK LAMINATIONS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	63.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW3D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/17/90
ELEVATION :	63.260	DATE COMPLETED :	01/02/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
42	21			CLAY, lt SILT	REDDISH BRN		WET			VARVED CLAY 1/8"-3/8" THICK LAMINATIONS
41	22		12	SAND, tr GRAVEL GRAVEL and SAND, tr SILT GRAVEL, lt SAND, tr SILT	GRAYISH BRN REDDISH BRN REDDISH BRN	LSE LSE	WET SAT	10 14 24 26		SAND M/TR F-C SAND/GRVL F GRVL F-C/SAND F-C GRVL F-C/SAND F-C
40	23									ROUGH DRILLING @ 23'
39	24		25	SAND, tr GRAVEL, tr CLAY, - tr SILT	REDDISH BRN	FRM	WET	20 22 30 21		SAND VF/TR M-C SAND GRVL F-M (TILL)
38	25									
37	26			INTERVAL NOT SAMPLED						BLOWS 26'-28'=REF
36	27									
35	28		54	SAND, tr SILT, tr GRAVEL, - tr CLAY	REDDISH BRN	STF	MST	8 16 17 33		SAND VF-F/TR M-C SAND GRVL F-M (TILL)
34	29									
33	30		28	SAND, sm GRAVEL, tr SILT, - tr CLAY	REDDISH BRN	STF	MST			SAND VE-F GRVL F-M BLOWS 30'-32'=17-19- 100/3" (TILL)

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 63.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW3D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/17/90
ELEVATION : 63.260	DATE COMPLETED : 01/02/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
32	31			SAND, 80% GRAVEL, tr SILT, - tr CLAY	REDDISH BRN	STF	MST			SAND VF-F GRVL F-M BLOWS 30'-32' = 17-19- 100/3" [TILL]
31	32		28	SAND, 80% GRAVEL, tr SILT, - tr CLAY	REDDISH BRN	STF	MST	15 16 20 39		SAND VF-F GRVL F-M [TILL]
30	33									
29	34			INTERVAL NOT SAMPLED						
28	35									
27	36		28	SAND, 80% GRAVEL, tr CLAY, - tr SILT	REDDISH BRN	STF	MST	14 14 27 29		SAND VF-F GRVL F-M [TILL]
26	37									
25	38									
24	39		58	SILTSTONE	REDDISH BRN	STF	MST	13 13 22 30		50% TILL w/HGHLY FRAC. - HGHLY WEATHERED MICACEOUS SILTSTONE [TILL AND SAPROLITE]
23	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	63.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW3D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/17/90
ELEVATION :	63.260	DATE COMPLETED :	01/02/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
22	41		50	SILTSTONE	REDDISH BRN	FRM		19 62 78 100		HGLY FRAC, HGLY WEATHERED MICACEOUS SILTSTONE BECOMES MORE COMPETENT W/ DEPTH (SAPROLITE)
21	42									
20	43		62	THIN-BEDDED SILTSTONE	PALE RED BROWN	WEK				HX ROCK CORING AT 43' Bottled: 1 gal 50-72 gal rough drilling @ 46' 43.0-48.0 hgh
19	44									
18	45									
17	46									
16	47									
15	48		76	LAMINATED SHALE	PALE RED BROWN	WEK				highly weathred; 48.0-49.9- 51.3-51.9; 48.0-53.0, hgh
14	49									
13	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 63.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE/B DINEEN
WELL ID	: RFW3D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 12/17/90
ELEVATION	: 63.260	DATE COMPLETED	: 01/02/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
22	41			SILTSTONE	REDDISH BRN	FRM				HGLY FRAC, HGLY WEATHERED- MICACEOUS SILTSTONE BECOMES MORE COMPETENT W/ DEPTH [SAPROLITE]
21	42									
20	43			THIN-BEDDED SILTSTONE	PALE RED BROWN	WEK	20	0.0		HX ROCK CORING AT 43' mottled; 50-75 gal tough drilling @ 46' 43.0-48.0 hgh
19	44									
18	45									
17	46									
16	47									
15	48			LAMINATED SHALE	PALE RED BROWN	WEK	5	0.0		highly weathered; 48.0-49.9- 51.3-51.9; 48.0-53.0, hgh
14	49									
13	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 63.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW3D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/17/90
ELEVATION : 63.260	DATE COMPLETED : 01/02/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
12	51			LAMINATED SHALE	PALE RED BROWN	WEK	5	0.0		highly weathered; 48.0-49.9-51.3-51.9; 48.0-53.0, high
11	52									
10	53			CONGLOMERATIC SANDSTONE W- / SHALE	PALE RED BROWN	STR	4	0.0		grades up; soft 54.5-61.5; 55.0-55.0 high; 55.0-58.0, frs
9	54									
8	55									
7	56									
6	57									
5	58			BEDDED MEDIUM TO COARSE SANDSTONE	PALE RED BROWN	MOD	2	0.0		not 59.4-61.2; hard at 62.0; 58.0-59.4, frs; 59.4-59.6 high; 59.6-63.0 frs
4	59									
3	60									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 63.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE/B DINEEN
WELL ID	: RFW3D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 12/17/90
ELEVATION	: 63.260	DATE COMPLETED	: 01/02/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
				BEDDED MEDIUM TO COARSE S-ANDSTONE	PALE RED BROWN	MOO	2	0.0		bot: 59.4-61.2; hard at 62.0; 58.0-59.4 tan; 59.4-59.6 hgh; 59.6-63.0 frs
2	61									
1	62									
0	63									
0	64									
-1	65									
-2	66									
-3	67									
-4	68									
-5	69									
-6	70									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	36.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW3S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/09/91
ELEVATION :	63.160	DATE COMPLETED :	01/11/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HSA/B-10 SEP. REV. 30 FOR LITH DESC DRILLED THROUGH GRVL PAD 0'-2'
62	1									
61	2									
60	3									
59	4									
58	5									
57	6									
56	7									
55	8									PEAT IN CUT @ 8'
54	9									
53	10			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW3S
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.160

TOTAL DEPTH : 36.50
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/09/91
 DATE COMPLETED : 01/11/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
52	11									
51	12									
50	13									
49	14									GROUT 8" CASING TO 14' DEM/6"
48	15									
47	16									
46	17									
45	18									
44	19									
43	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 36.50
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW3S	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 01/09/91
ELEVATION	: 63.160	DATE COMPLETED	: 01/11/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
42	21									
41	22									
40	23									HOLE COLLAPSING @ 23'
39	24									WLOS=60 GAL 23'-27'
38	25									
37	26									
36	27									
35	28									
34	29									
33	30			INTERVAL NOT SAMPLED						WLOS= 40 GAL 30'-34'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	36.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW3S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/09/91
ELEVATION :	63.160	DATE COMPLETED :	01/11/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						WLOS= 40 GAL 30'-34'
32	31									
31	32									
30	33									
29	34			SANDSTONE AND TILL						WLOS=150 GAL @ 34' WLOS=200 GAL 34'-36.5' INSTALLED 2" WELL TO 34'
28	35									
27	36									END OF BORING AT 36.5'
26	37									
25	38									
24	39									
23	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	52.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW4D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/18/90
ELEVATION :	60.600	DATE COMPLETED :	01/04/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
59	1		75	SAND, tr GRAVEL, tr ORGAN- IC	MED-REDDISH BRN			9 13 9		SAND F-C GRVL F-M USA 78" ID TR BLK STREAKS 3/8" THICK
58	2		33	SAND, tr SILT, tr GRAVEL, - tr ORGANIC	OK BRN-BLK			7 9 17 12		SAND F-M GRVL F-M
57	3									
56	4		25	SAND and SILT, tr GRAVEL, - tr ORGANIC	OK-REDDISH BRN		SAT			SAND F GRVL F INCL BLK BLEBS 3/4" DIA BLOWS 47-67=13-65-100/2"
55	5									
54	6			NO RECOVERY				1 18 17		METAL DEBRIS IN CUTTINGS
53	7									
52	8		16	GRAVEL	GRAY-BLK			12 10 4 3		INCL FABRIC AND PLAS VIS OILY SHEEN ON SPOON
51	9									
50	10		83	ORGANIC	OK-REDDISH BRN		MST	1 1 2 5		VIS PLNT 3" LENGTH PEAT IN CUT @ 10"

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 52.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE
WELL ID : RFW4D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 12/18/90
ELEVATION : 60.600	DATE COMPLETED : 01/04/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
69	11			ORGANIC	DK-REDDISH BRN		MST			VIS PLNT 3" LENGTH PEAT IN CUT @ 10'
68	12		41	ORGANIC	DK-REDDISH BRN		WET			VIS PLNT 3" LENGTH GROUT 10" CASTING TO 14' BLOWS 12'-12"=1-1-2-2
47	13									
46	14									
45	15		41	ORGANIC	DK OLIVE	SFT	SAT	2 1 2		VIS PLNT 1/8" DIA COLLECTED CHEM SAMPLE SB-6 COMBINED WITH NEXT SPOON
44	16									
43	17		71	ORGANIC	DK OLIVE	SFT	SAT	2 2 2		VIS PLNT 3/8" DIA COMB W/ ABOVE SPOON FOR CHEM SAMPLE SB-6
42	18									
41	19			NO RECOVERY						PUSHED SHELBY RFW-4D-SH1 19'-21'
40	20									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	52.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW4D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/18/90
ELEVATION :	60.600	DATE COMPLETED :	01/04/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				NO RECOVERY						PUSHED, SHELBY RFW-4D-SH1 19'-21'
39	21		75	SILT, LF ORGANIC	MED-GRY BRN	SFT	SAT			PUSHED, SHELBY RFW-4D-SH2 21'-23', BLK ORG BLEBS 1/16"-1/32"
38	22									
37	23		100	CLAY, LF ORGANIC	MED BRN	SFT	SAT			PUSHED, SHELBY RFW-4D-SH3 23'-25', DRILL MTR CHGD TO DK GRAY TR BLK PARTINGS
36	24									
35	25									
34	26		100	CLAY, sm SILT	REDDISH BRN	SFT	WET			PUSHED, SHELBY RFW-4D-SH4 26'-28', VARIED CLAY
33	27									
32	28		100	SILT	REDDISH BRN		SAT			PUSHED, SHELBY RFW-4D-SH5 28'-30'
31	29									
30	30		12	SILT	REDDISH BRN		SAT			BLOWS 30'-32' = MCR/24"

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW4D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 60.600

TOTAL DEPTH : 52.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 12/18/90
 DATE COMPLETED : 01/04/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
29 - 31				SILT	REDDISH BRN		SAT			BLOWS 30'-32' = 40R/24"
28 - 32				NO RECOVERY						BLOWS 32-34' = 40H-17-19-17
27 - 33										
26 - 34			41	GRAVEL, 1/2 SAND	GRAYISH BRN	LSE	SAT	0		GRVL F-M
				SAND, 1/2 SILT	REDDISH BRN					SAND C
				SAND, 1/2 GRAVEL	GRAYISH BRN	LSE	SAT			SAND F-M
				SAND, 1/2 SILT	REDDISH BRN	LSE	SAT			SAND F-C/TR F GRVL
25 - 35										SAND VF-F TR M SAND
24 - 36			50	SAND and GRAVEL	GRAYISH BRN		SAT	12		SAND C
				SILT	REDDISH BRN		WET	12		SAND M-C
				SAND	REDDISH GRAY					SAND M-C
23 - 37				SILT, 1/2 SAND	REDDISH BRN					
22 - 38			16	GRAVEL, 1/2 SILT			SAT	13		GRVL F-M
21 - 39										
20 - 40			21	SILT and SAND, and GRAVEL	REDDISH BRN		WET	10		SAND M-C
										GRVL F

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	52.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW4D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	12/18/90
ELEVATION :	60.600	DATE COMPLETED :	01/04/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SILT and SAND, sm GRAVEL	REDDISH BRN		WET			SAND M-C GRVL F
19	41									
18	42		50	SAND, tr SILT	REDDISH BRN	LSE	SAT	15		SAND M
				GRAVEL		LSE	WET	16		GRVL F-M
17	43			SAND, tr SILT	REDDISH BRN	LSE	SAT			SAND F-M
16	44		37	SAND, lt SILT, tr CLAY	REDDISH BRN		MST	10		SAND F-M
								36		
15	45							10		
								5		
14	46		37	SAND, tr SILT			SAT	13		SAND F-M
				GRAVEL, sm SAND			SAT	13		GRVL F-M
								10		SAND M-C
13	47									
12	48		28	SAND, sm COBBLES	REDDISH BRN			30		SAND M-C
				SAND and GRAVEL	PINKISH TAN	LSE	SAT	30		GRVL F-M SAND C
								30		
11	49							37		
10	50		37	SAND and GRAVEL, tr SILT, tr CLAY	REDDISH BRN		WET	16		SAND M-C
								30		GRVL M
								20		
								12		

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW4D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 60.600

TOTAL DEPTH : 52.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 12/18/90
 DATE COMPLETED : 01/04/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SAND and GRAVEL, tr SILT, - tr CLAY	REDDISH BRN		WET			SAND M-C GRVL M
9	51									
8	52									END OF BORING AT 52'
7	53									
6	54									
5	55									
4	56									
3	57									
2	58									
1	59									
0	60									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	22.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW4S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/07/91
ELEVATION :	60.560	DATE COMPLETED :	01/08/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						NSA/DM10 REFER TO LOG FOR RFW-4S FOR INTERVALS NOT SAMPLED BELOW
59	1									
58	2									
57	3									
56	4									
55	5									
54	6									
53	7									
52	8									
51	9									PEAT 1N CUT 9'-10'
50	10			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 22.50
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW4S	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 01/07/91
ELEVATION	: 60.560	DATE COMPLETED	: 01/08/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
49	11									
48	12									GROUT 8" CASING TO 12' OPEN HOLE ROTARY/6"
47	13			NO RECOVERY						PUSHED SHELBY RFW-4S-SH1 12.5'-15'
46	14									
45	15		53	ORGANIC	DK OLIVE BRN	SFT	WET			PUSHED SHELBY RFW-4S-SH2 15'-17.5' VIS PLNT 1/4" LENGTH
44	16									
43	17									
42	18		60	ORGANIC	DK OLIVE BRN	SFT	WET			PUSHED SHELBY RFW-4S-SH3 17.5'-20' VIS PLNT 1/32" LENGTH
41	19									
40	20		6	ORGANIC	DK BRN					PUSHED SHELBY RFW-4S-SH4 20'-22.5' INSTALLED 2" WELL TO 20'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	22.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW4S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/07/91
ELEVATION :	60.560	DATE COMPLETED :	01/08/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				ORGANIC	DK BRN					PUSHED SHELBY RFW-4S-SH4 20-22' 2"
39	21									
38	22									END OF BORING AT 22'
37	23									
36	24									
35	25									
34	26									
33	27									
32	28									
31	29									
30	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW5D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/25/90
ELEVATION :	58.290	DATE COMPLETED :	02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
57.1	1		41	SAND, lt SILT, tr GRAVEL, - tr ORGANIC	REDDISH BRN	LSE	WET	5 4 6		SAND VF-M GRVL F-C TR PLAS HSA/B=TD [FILL]
56.2	2		8	SAND, tr GRAVEL	BLACK	LSE	SAT	2 4 10 8		GRVL M INCL PLAS AND WOOD FRAGS [FILL]
55.3	3									
54.4	4		4	SAND	BLACK	LSE				BLOWS 4'-6'=100/3" INCL WOOD AND PLAS FRAGS HNU/HS=0.3>BKD HNU/BZ=0.2>BKD [FILL]
53.5	5									
52.6	6		75	ORGANIC	BRN-REDDISH BRN		SAT			VIS ORG 2" LENGTH BLOWS 6'-8'=1/12"-1-1
51.7	7									
50.8	8			NO RECOVERY						PUSHED SHELBY RFW-5D-SH1 8'-10.5'
49.9	9									
48.10	10									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 98.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW5D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 01/25/90
ELEVATION : 58.290	DATE COMPLETED : 02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				NO RECOVERY						PUSHED SHELBY RFW-5D-SH1 8'-10.5'
47	11									GROUT 10" CASING TO 10.5' D&W/6"
46	12		21	ORGANIC, LF SILT	DK BRN-BLK	LSE	SAT			PUSHED SHELBY RFW-5D-SH2 11.5'-13' TR M BROWN ORG SILT
45	13		66	CLAY	GRAY-BRN					PUSHED SHELBY RFW-5D-SH3 13'-15.5'
44	14									
43	15									
42	16		16	CLAY	GRAY-BRN	LSE	SAT			PUSHED SHELBY RFW-5D-SH4 15.5'-18'
41	17									
40	18		66	CLAY	REDDISH BRN	LSE	SAT			BLOWS 18'-21' = WCH/36"
39	19									
38	20									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW5D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 58.290

TOTAL DEPTH : 98.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/25/90
 DATE COMPLETED : 02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
37	21		25	CLAY	REDDISH BRN	LSE	SAT			BLOWS 21'-23' = WOR/12" - 1-1
36	22									
35	23		75	CLAY, LF GRAVEL, LF SILT	REDDISH BRN	LSE	SAT			BLOWS 23'-25' = WOR/24" GRV LF TR SILT PARTINGS
34	24									
33	25		83	CLAY, LF SILT	REDDISH BRN	LSE	SAT			BLOWS 25'-27' = WOR/24"
32	26			SILT, LF CLAY	REDDISH BRN	LSE	SAT			
31	27		91	CLAY and SILT	REDDISH BRN	LSE	SAT			BLOWS 27'-29' = WOR/24" VARVED CLAY 27.5'-27.58'
30	28			SILT, LF CLAY	REDDISH BRN	LSE	SAT			
29	29		50	SILT, LF SAND, LF CLAY	REDDISH BRN	LSE	SAT			SAND VF TR CLAY PRGTS 1/8" APART
				SAND, LF SILT	REDDISH BRN	LSE	SAT			
28	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW5D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 58.290

TOTAL DEPTH : 98.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/25/90
 DATE COMPLETED : 02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
27	31		25	SAND, sm SILT, tr CLAY	REDDISH BRN	LSE	SAT	4		SAND VF TR CLAY PRYGS
26	32									
25	33		25	SAND, tr SILT	REDDISH BRN	LSE	SAT	4		SAND VF-F
24	34									
23	35		83	SAND, tr GRAVEL, tr SILT	REDDISH BRN	LSE	SAT	5		SAND VF-F GRVL F/SUBANG
22	36									
21	37		54	SAND, tr CLAY, tr SILT	REDDISH BRN	LSE	SAT	6		SAND VF-F CLAY SEAM @ 37.58'
20	38									
19	39		25	SAND	MED BRN	LSE	SAT	5		SAND F LTL-SM M SAND
18	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW5D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 58.290

TOTAL DEPTH : 98.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/25/90
 DATE COMPLETED : 02/01/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
17	41		58	SAND	REDDISH BRN	LSE	SAT	8		SAND F TR M SAND
16	42									
15	43		41	SAND, LF CLAY	REDDISH BRN	LSE	SAT	3		SAND VF-F TR M SAND TR CLAY PRGS
14	44									
13	45		50	SAND, sm SILT, LF CLAY	REDDISH BRN	LSE	SAT	7		SAND F TR M SAND TR CLAY PRGS
12	46									
11	47		66	SAND, LF SILT, LF GRAVEL	REDDISH BRN	LSE	SAT	2		SAND VF-F GRVL F/SUB-ANG
				SAND, LF SILT	REDDISH BRN					SAND F-C
10	48			SAND, LF SILT, LF CLAY, LF GRAVEL	REDDISH BRN	LSE	WET			SAND F GRVL F-M
9	49		83	SAND and SILT, LF CLAY, LF GRAVEL	REDDISH BRN	LSE	SAT	10		WLOS=20 GAL @ 50' GRVL F-M SAND F C SAND SEAM @ 49.5' [LOOSE TILL]
8	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 98.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE/B DINEEN
WELL ID	: RFW5D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 01/25/90
ELEVATION	: 58.290	DATE COMPLETED	: 02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
7	51			SAND and SILT, tr CLAY, t- r GRAVEL	REDDISH BRN	LSE	SAT			WLOS=20 GAL @ 50' GRVL F-M SAND F C SAND SEAM @ 48.5' [LOOSE TILL]
				NO RECOVERY				5 10 17		PUSHED GRVL OR COBBLE 2'
6	52									
5	53		28	SAND sm SILT, tr GRAVEL, - tr CLAY	REDDISH BRN	LSE	SAT	20 20 27		SAND F GRVL F-M/DIABS & CONGL
4	54									
3	55		16	SAND tr GRAVEL, tr SILT, - tr CLAY	REDDISH BRN	FRM	WET	15 16 15		SAND F GRVL F-M/SUBANG [TILL]
2	56									
1	57		46	SAND sm SILT, tr CLAY, t- r GRAVEL	REDDISH BRN	FRM	MST	10 12 11		SAND VF-F GRVL F M-C SAND LENS @ 57.25' [TILL]
0	58									
0	59		62	SAND tr SILT, tr CLAY, t- r GRAVEL	REDDISH BRN	FRM	MST	20 40 70 100		SAND F GRVL F-M FINAL BLOW=100/5" [TILL]
-1	60									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 98.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW5D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 01/25/90
ELEVATION : 58.290	DATE COMPLETED : 02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SAND, lt SILT, tr CLAY, t- r GRAVEL	REDDISH BRN	FRM	MST			SAND F- GRVL F-M FINAL BLOW=100/5" (TILL)
-2	61		50	SAND, lt GRAVEL, lt SILT, - tr CLAY	REDDISH BRN	STF	DRY	20 34 30 50		SAND VF-F GRVL F-C DIFFICULT DRILLING @ 61' DIABS & CONGL ROCK FRGS (TILL)
-3	62									
-4	63		50	SAND and SILT, tr CLAY, t- r GRAVEL	REDDISH BRN		DRY	10 20 20 51		SAND F- GRVL F-M/SUBANG SLTSH TR PALE GRN SLTSH (SAPROLITE)
-5	64									
-6	65		37	SILT	REDDISH BRN	FRM	DRY			BLOWS 65'-67'=20-100/5" RELIC BEDDING VISIBLE INCL PALE GRN TR LENSES (SAPROLITE)
-7	66									
-8	67		28	SILT	REDDISH BRN	FRM	DRY			BLOWS 67'-69'=20-100/5" INCL DEC STSN FRGS BREAKS ALONG BEDDING PLNS (SAPROLITE)
-9	68									
-10	69		58	SILT, tr SAND, tr CLAY	REDDISH BRN	FRM	DRY			BLOWS 69-71'=20-20-100/4" TR SANDY SILT LENSES TR CLAYEY SILT LENSES (SAPROLITE)
-11	70									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 98.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE/B DINEEN
WELL ID	: RFW5D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 01/25/90
ELEVATION	: 58.290	DATE COMPLETED	: 02/01/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SILT, tr SAND, tr CLAY	REDDISH BRN	FRM	DRY			BLOWS 69-71'=20-20-100/4" tr SANDY SILT LENSES tr CLAYEY SILT LENSES (SAPROLITE)
-12	71		94	MEDIUM TO FINE SANDSTONE - WITH SHALE	PALE RED	STR				INSTALLED 5" CASING AND FLUSHED HOLE W/ FRESH WTR START HX ROCK CORING 271' mott 73.5-74.2; 71.0-74.2- hrs: 74.2-74.7 mod: 74.7 -75.0 hgh; 75.0-81.0 hgh
-13	72									
-14	73									
-15	74									
-16	75									
-17	76									
-18	77									
-19	78									
-20	79									
-21	80									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 98.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW5D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 01/25/90
ELEVATION : 58.290	DATE COMPLETED : 02/01/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
				SILT, tr SAND, tr CLAY	REDDISH BRN	FRM				BLOWS 69-71' = 20-20-100/4"- TR SANDY SILT LENSES TR CLAYEY SILT LENSES [SAPROCLITE]
-12	71			MEDIUM TO FINE SANDSTONE - WITH SHALE	PALE RED	STR	2	0.0		INSTALLED 5" CASING AND FLUSHED HOLE W/ FRESH WTR START HX ROCK CORING @ 71' mott 73.5-74.2: 71.0-74.2- trs: 74.2-74.7 med: 74.7 -75.0 hgh; 75.0-81.0 hgh
-13	72									
-14	73									
-15	74									
-16	75									
-17	76									
-18	77									
-19	78									
-20	79									
-21	80									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 98.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE/B DINEEN
WELL ID	: RFW5D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 01/25/90
ELEVATION	: 58.290	DATE COMPLETED	: 02/01/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
				MEDIUM TO FINE SANDSTONE - WITH SHALE	PALE RED	STR	2	0.0		Mott 73.5-74.2; 71.0-74.2- ish; 74.2-74.7 mod; 74.7- 75.0 hgh; 75.0-81.0 hgh
-22	81			BEDDED SANDSTONE AND SILT- STONE	PALE RED BROWN	MOD	8	0.0		silt highly weathered; 81.0- 81.7 hgh; 81.7-84.3 ish 84.3-87.8 silt; 87.8-88.5- hgh
-23	82									
-24	83									
-25	84									
-26	85									
-27	86									
-28	87									
-29	88									
-30	89			MOTTLED MEDIUM TO FINE SA- NDSTONE	PALE RED BROWN	MOD	2	0.0		Mott 93.0-98.0; 88.5-92.5- ish; 92.5-93.0 ish; 93.0- 93.1 hgh; 93.1-98.0 ish
-31	90									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW5D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/25/90
ELEVATION :	58.290	DATE COMPLETED :	02/01/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
				MOTTLED MEDIUM TO FINE SANDSTONE	PALE RED BROWN	MOD	2	0.0		Mott 93.0-98.0- 88.5-92.5- ish: 92.5-93.0 ish: 93.0- -93.1 hgh: 93.1-98.0 ish
-32	91									
-33	92									
-34	93									
-35	94									
-36	95									
-37	96									
-38	97									
-39	98									REAM HOLE TO 4 7/8" AND INSTALL 2" WELL TO 95'
-40	99									
-41	100									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	44.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW55	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	02/04/91
ELEVATION :	58.370	DATE COMPLETED :	02/05/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						NSA/8" ID REFER TO LOGS FOR RFLSD FOR INTERVALS NOT SAMPLED BELOW
57	1									
56	2									
55	3									
54	4									
53	5									
52	6									HMU/TOP OF HOLE=NR
51	7		25	ORGANIC	DK BRNISH BLK					PART DEC FIBROUS PEAT INCL TR PLNT
50	8									
49	9			NO RECOVERY						PUSHED SHELBY RFW-55-SM1 57-111 GROUT 8" CASING TO 10' D&W/6"
48	10									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	44.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW5S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	02/04/91
ELEVATION :	58.370	DATE COMPLETED :	02/05/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				NO RECOVERY						PUSHED SHELBY RFW-5S-SH1 BY-11 GROUT 8" CASING TO 10' DLG/6"
47	11			INTERVAL NOT SAMPLED						
46	12									
45	13									
44	14									
43	15									
42	16									
41	17									
40	18									
39	19									
38	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	44.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW55	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	02/04/91
ELEVATION :	58.370	DATE COMPLETED :	02/05/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
37	21									
36	22									
35	23									
34	24									
33	25									
32	26									
31	27									
30	28									
29	29									CHNGD DRILL WATER @ 29'
28	30			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 44.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW5S	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 02/04/91
ELEVATION	: 58.370	DATE COMPLETED	: 02/05/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
27	31									
26	32									
25	33									
24	34									
23	35									
22	36									
21	37									
20	38									
19	39									
18	40			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW55
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 58.370

TOTAL DEPTH : 44.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 02/04/91
 DATE COMPLETED : 02/05/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
17	41									
16	42									
15	43									INSTALLED 2" WELL TO 43'
14	44			END OF BORING AT 44'						FLUSHED HOLE WITH FRESH WATER @ 44'
13	45									
12	46									
11	47									
10	48									
9	49									
8	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	51.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW6D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/02/90
ELEVATION :	67.430	DATE COMPLETED :	11/09/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/BKD=0.2 UNITS HSA/BKD ID REFER TO LOG FOR RFW-6S FOR INTERVALS NOT SAMPLED
66	1									
65	2									
64	3									
63	4									
62	5									HMU/HS=0.6>BKD HMU/B2=NR CGI/HS=15% LEL CGI/B2=NR
61	6									
60	7									
59	8									
58	9									CGI/HS=1X LEL
57	10			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW6D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 67.430

TOTAL DEPTH : 51.00
 LOGGER : R. SANSONE/J. RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/02/90
 DATE COMPLETED : 11/09/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
56	11									
55	12									
54	13									
53	14									
52	15									
51	16									
50	17									
49	18									
48	19									
47	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	51.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER
WELL ID :	RFW6D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/02/90
ELEVATION :	67.430	DATE COMPLETED :	11/09/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
46	21			INTERVAL NOT SAMPLED						
45	22		87	ORGANIC, LF SILT	DK BROWN					SILTY PEAT IN CUT 222' PUSHED SHELBY RFW-60-SH1 227-24'
44	23									
43	24			INTERVAL NOT SAMPLED						GROUT 10" CASING TO 24' DEM/6"
42	25									
41	26									
40	27		100	CLAY	DK REDDISH BRN		WET	4 4 5		VARVED CLAY TR BLK ORG SILT-1/32" DIA ORG PRTO # 28.17 TR BL-GRY CLAY SEAMS
39	28									
38	29			NO RECOVERY						PUSHED SHELBY RFW-60-SH2 297-311' REDDISH BRN CLAY ON TUBE
37	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW6D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 67.430

TOTAL DEPTH : 51.00
 LOGGER : R. SANSONE/J. RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/02/90
 DATE COMPLETED : 11/09/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				NO RECOVERY						PUSHED, SHELBY RFW-60-SK2 297-311, REDDISH BRN CLAY ON TUBE
36	31		62	CLAY	DK REDDISH BRN	LSE	SAT			PUSHED, SHELBY RFW-60-SK3 317-333,
35	32									
34	33		28	CLAY	REDDISH BRN	FRM				PUSHED, SHELBY RFW-60-SK4 337-353,
33	34									
32	35		16	GRAVEL and SILT, fr CLAY	REDDISH BRN			47 22 19 19		GRVL F-C FR DEC RED-BRN STN WLOS=700 GAL @ 30' DRILL WATER CHANGED
31	36									
30	37		12	SAND and GRAVEL	DK BRN					GRVL F-C SAND F-C BLOWS 37'-39' = 100/4"
29	38									
28	39		16	SILT, fr SAND, fr CLAY, fr GRAVEL	DK REDDISH BRN			72 23 26 24		SAND F-M GRVL M F SAND SEAMS WLOS=350 GAL @ 40'
27	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	51.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER
WELL ID :	RFW6D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/02/90
ELEVATION :	67.430	DATE COMPLETED :	11/09/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
26	41		75	SILT, sm SAND	DK REDDISH BRN	LSE	SAT	13 11		
25	42			SILT, lt SAND, tr GRAVEL	DK REDDISH BRN		SAT			SAND F GRVL F-M INSTALLED 2" WELL TO 42'
24	43		46	SAND, lt GRAVEL, lt SILT, - tr CLAY	DK REDDISH BRN			7 15 25		SAND F-M BLOS=100 GAL 43'-45'
23	44									
22	45			NO RECOVERY				9 56 55		
21	46									
20	47		50	SAND and SILT	DK REDDISH BRN	FRM	MST			INCL F SAND SEAMS BLOS 47'-49' = MCN-30-76- 53
19	48									
18	49		71	SILT, sm SAND, lt CLAY, t- F GRAVEL	DK REDDISH BRN	FRM	MST	27 47 65 60		SAND F GRVL F-M
17	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	51.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW6D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/02/90
ELEVATION :	67.430	DATE COMPLETED :	11/09/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SILT, ss SAND, lt CLAY, 1-7 GRAVEL	DK REDDISH BRN	FRM	MST			SAND F GRVL F-M
16	51			END OF BORING AT 51'						
15	52									
14	53									
13	54									
12	55									
11	56									
10	57									
9	58									
8	59									
7	60									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	30.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW6S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/01/90
ELEVATION :	66.670	DATE COMPLETED :	11/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
65	1		8	SAND and GRAVEL, lt ORGANI- C	DK BRN-BLK		SAT			SPOON PUSHED 0-2' [FILL] NSA/B*ID HNU/BKD=0.2 UNITS CGI/BKD=NR RAD/BKD=7.0 NR/HR
64	2		16	SAND	BLACK		SAT	16 12 4 6		CONTAINS ASPHALT FRAGS [FILL]
63	3									
62	4		21	SAND, tr SILT	BLACK		WET	11 14 16 18		SAND F-C TR WOOD AND PLAS [FILL] CUT 0-6'=BLK WOOD & FILL RAD/BZ-CUT=NR HNU/BZ-CUT=NR CGI/BZ-CUT=NR
61	5									
60	6		8	SAND	BLACK		WET	2 4 6		SAND F-C W/ WOOD FRAGS [FILL] HNU/NS=8.0 UNITS>BKD CGI/NS=34% LEI DRGR/VC=NR @ NS DRGR/BZ=0.5 ppm @ NS
59	7									
58	8		28	SAND, tr GRAVEL	BLACK		WET		HNU 0.5	SAND F-C W/ WOOD FRAGS [FILL] GRVL M BLOWS 8'-10'=3-4-100/0 HNU/BZ=0.4>BKD-CGI/BZ=NR
57	9									
56	10		21	SILT, lt SAND	BLACK		WET			SAND F V/TR WOOD FRAGS [FILL] BLOWS 10'-12'=40H-24-7-4 HNU/BZ=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	30.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER
WELL ID :	RFW6S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/01/90
ELEVATION :	66.670	DATE COMPLETED :	11/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
55	11			SILT, lt SAND	BLACK		WET			SAND F. W/ TR WOOD FRAGS BLOWS 10'-12' = MOH-24-1-4 HNU/BZ=NR [FILL]
54	12		12	CLAY and SILT, LF GRAVEL	BLACK		WET	1.0		GRVL F TR WOOD FRAGS [FILL]
53	13									
52	14		33	SAND, sm ORGANIC	REDDISH BRN-GRY			5 10	HNU 1.0	SAND F-M W/ WOOD FRAGS HNU/BZ=NR CGI/BZ=NR [FILL]
51	15									
50	16		41	SAND	BLACK				HNU 0.2	SAND F-M W/ WOOD FRAGS BLOWS 16'-18' = MOH-7-12-14
				SILT	REDDISH BRN				HNU 0.2	FRAC SHALE IN SPOON TIP
49	17									
48	18			NO RECOVERY						SHELBY TUBE 18'-20'
47	19									
46	20		58	ORGANIC, sm SILT	BROWN					PUSHED SHELBY RFW-6S-SH1 20'-22'

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW6S
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 66.670

TOTAL DEPTH : 30.00
 LOGGER : R.SANSONE/J.RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/01/90
 DATE COMPLETED : 11/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
45	21			ORGANIC, sm SILT	BROWN					PUSHED SHELBY RFW-6S-SH1 20'-22'
44	22		37	FILL	DK BRN-BLK					REFUSE DRIED GROUT AND WOOD FRAGS
43	23			ORGANIC	DK BROWN		WET			
42	24		54	SILT, sm ORGANIC SILT, ff ORGANIC, ff CLAY, ff GRAVEL	DK OLIVE GRN DK BROWN					GRVL F COLLECTED CHEM SMPL SH-2
41	25									
40	26		100	SILT, ff CLAY, ff ORGANIC	DK BRN-DK ROBRN					TR GRAY CLAY PARTINGS
39	27									
38	28		75	CLAY CLAY	DK REDDISH BRN DK REDDISH BRN		WET WET			SOME DK GRAY CLAY SEAMS 2" WELL INSTALLED TO 27.5 VARVED CLAY 1/16"-1/4" SEAMS
37	29									
36	30			END OF BORING AT 30'						

Borehole Log

ROY F. WESTON, Inc.

```
CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFW7D
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 62.980
```

TOTAL DEPTH : 98.00
 LOGGER : R.SANSONE/J.RHYNER/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 10/30/90
 DATE COMPLETED : 12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HSA/SHD REFER TO LOG FOR BEVTS AND RFBVT FOR INTERVALS NOT SAMPLED BELOW
61	1									
60	2									
59	3									
58	4									
57	5									HNU/BKD=0.2 UNITS CGI/BKD=NR RAD/BKD=7-11 NR/NR
56	6									
55	7									
54	8									
53	9									
52	10			INTERVAL NOT SAMPLED						HNU/HS=0.6>BKD CGI/HS=2% LEL HNU/B2=NR CGI/B2=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW7D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/30/90
ELEVATION :	62.980	DATE COMPLETED :	12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=0.6>8KD CGI/HS=2% LEL HMU/B2=NR CGI/B2=NR
51	11									
50	12									
49	13									REFUSE IN CUTTINGS
48	14									
47	15									
46	16		71	ORGANIC						PEAT IN CUTTINGS @ 16' PUSHED SHELBY RFW-7A-SH1 16'-18'
45	17									
44	18			NO RECOVERY						PUSHED SHELBY RFW-7A-SH2 18'-20.3'
43	19									
42	20			NO RECOVERY						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 98.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER/B DINEEN
WELL ID : RFW7D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 10/30/90
ELEVATION : 62.980	DATE COMPLETED : 12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				NO RECOVERY						
41	21		83	SAND, tr GRAVEL, tr ORGANIC	MED REDDISH BRN			6 10 6		SAND M-C GRV M 1.5" LYR PEAT @ 10" 1.5" LYR PEAT @ 18.5"
40	22									
39	23		75	SAND				6 6 6		SAND M-C
38	24			ORGANIC	DK BRN-BLK					
37	25		73	ORGANIC	DK BROWN		SAT	4 4 5 6		VISIBLE PLNT 1/8" DIA. HNU/HS=NR CGI/HS=NR COLLECTED CHEM SMPL S8-1
36	26									
35	27		16	ORGANIC						PUSHED SHELBY RFW-7A-SK3 5' - 5' 2" GROUT 10" CASING TO 28' DEW/8"
34	28									
33	29									
				INTERVAL NOT SAMPLED						
32	30		40	SILT, sm ORGANIC, tr SAND	BROWN	SFT				PUSHED SHELBY RFW-7D-SK4 5' - 5' 2" 18" PLNT DEW/8"

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW7D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/30/90
ELEVATION :	62.980	DATE COMPLETED :	12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
31	31			SILT, sm ORGANIC, tr SAND	BROWN	SFT				PUSHED SHELBY RFW-7D-SM4 30.7-32.5' TO PEN D&W/B
30	32									
29	33		93	SILT, sm ORGANIC, tr SAND	BROWN	SFT				PUSHED SHELBY RFW-7D-SM5 32.57-35'
28	34									
27	35			CLAY, sm SILT	BROWN	SFT				PUSHED SHELBY RFW-7D-SM6 35.7-37.5' GRADES FROM ORIG SILT @35' TO SILTY CLAY @ 37.5'
26	36									
25	37									
24	38			INTERVAL NOT SAMPLED						
23	39									
22	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 98.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER/B DINEEN
WELL ID : RFW7D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 10/30/90
ELEVATION : 62.980	DATE COMPLETED : 12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
21	41									
20	42									
19	43									
18	44									
17	45									
16	46		100	CLAY and SILT, fr SAND	REDDISH BRN	SFT		10 6 10		SOME BRN CLAY LYRS SAND F-M AS OCC PRGS
15	47									
14	48		100	CLAY and SILT, fr SAND	REDDISH BRN	SFT	HST	9 10 11 7		SOME BRN CLAY LYRS SAND F-M AS OCC PRGS STICKY CLAY
13	49									
12	50			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

```
CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFW7D
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 62.980
```

TOTAL DEPTH : 98.00
 LOGGER : R.SANSONE/J.RHYNER/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 10/30/90
 DATE COMPLETED : 12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
11	51									
10	52									
9	53									
8	54									
7	55									
6	56		100	SAND and SILT	REDDISH BRN		SAT	7 7 6		SILT W/OCC PRGS VF SAND 250' TO VF SAND W/TR-LYL SILT @ 58'
5	57									
4	58		100	SAND, tr SILT	REDDISH BRN		SAT	4 4 6		SAND VF TR 1/4 LYRS F SAND W/TRACE C SAND AND F-M GRVL WITH TR SILT
3	59									
2	60		100	GRAVEL and SILT, tr CLAY	REDDISH BRN			5 5 6		GRVL M-C/CLAST SUPPORTED

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 98.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER/B DINEEN
WELL ID : RFW7D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 10/30/90
ELEVATION : 62.980	DATE COMPLETED : 12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				GRAVEL and SILT, IF CLAY	REDDISH BRN					GRVL M-C/CLAST SUPPORTED
				SILT, IF CLAY, IF GRAVEL	REDDISH BRN		SAT			GRVL F FAINT BEDDING (OUTWASH) ROUGH DRILLING @ 60'
1	61			SAND, IF GRAVEL	REDDISH BRN		SAT			SAND M-C GRVL F HOLE COLLAPSING @ 61'
				SILT, IF CLAY, IF GRAVEL	REDDISH BRN		SAT			FAINT BEDDING
0	62		62	GRAVEL, and CLAY, IF SILT	REDDISH BRN		SAT			GRVL F GRVL F-M SAND YF-F (OUTWASH) GRVL F (DIABASE)
				SAND and SILT, IF CLAY, IF GRAVEL	REDDISH BRN		WET	4		
				GRAVEL and SAND	REDDISH BRN		SAT			GRVL F-C SAND C
0	63			SILT	REDDISH BRN					1" LTR CONTORTED BEDDING
-1	64			INTERVAL NOT SAMPLED						CODEX/6" WLOS=50 GAL @ 64'
-2	65									
-3	66									
-4	67									
-5	68									
-6	69									
-7	70			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW7D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/30/90
ELEVATION :	62.980	DATE COMPLETED :	12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
-8	71									
-9	72									DRILL BIT CHATTER 72'-83'
-10	73									WLOS=25 GAL 72'-83'
-11	74									
-12	75									
-13	76									
-14	77									
-15	78									
-16	79									
-17	80			INTERVAL NOT SAMPLED						DIFFICULT DRILLING

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW7D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/30/90
ELEVATION :	62.980	DATE COMPLETED :	12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						DIFFICULT DRILLING
-18	81									
-19	82									
-20	83									
-21	84									COLLAPSING COBBLES @ 84'
-22	85									DRILLING BECOMES SMOOTHER STEADY DRILL RATE 85'-97'
-23	86									
-24	87									INSTALLED 2" WELL TO 87'
-25	88									
-26	89									
-27	90			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	98.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER/B DINEEN
WELL ID :	RFW7D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/30/90
ELEVATION :	62.980	DATE COMPLETED :	12/18/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
-28	91									
-29	92									
-30	93									
-31	94									
-32	95									
-33	96									
-34	97		63	SAND, LF GRAVEL, LF SILT	BROWN		MET			
			63	SAND, LF GRAVEL, LF SILT	BROWN		MET			
-35	98			SILT, sm GRAVEL, sm SAND	REDDISH BROWN		MST			
-36	99									
-37	100									

SAND VF-F
BLOWS 97'-99' = 6-100/2"
100/2"
GRVL F
SAND F-M
SAND VF-F
GRVL F-C
INCL CBL FRAGS(ANG DIAB)
RND RED SDSN

ROY F. WESTON, Inc.

TOTAL DEPTH : 59.00
 LOGGER : R.SANSONE/J. RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN INC
 DRILLING RIG : B-57
 DATE STARTED : 10/31/90
 DATE COMPLETED : 12/20/90

Page: 1 of 6

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 59.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R.SANSONE/J.RHYNER
WELL ID	: RFW7S	DRILLING COMPANY	: MOORETRENCH AMERICAN INC
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 10/31/90
ELEVATION	: 62.970	DATE COMPLETED	: 12/20/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
51	11									
50	12									
49	13									REFUSE IN CUT 13'-14'
48	14									
47	15									HNU-CGI/BZ=NR HNU/HS=0.2 UNITS CGI/HS=24 LEI RAD/HS-BZ=8-10 NR/HR
46	16									
45	17									HNU/BZ-HS-CUT=NR CGI/BZ-CUT=NR CGI/HS=24 LEI PEAT IN CUT @ 16.5'
44	18									
43	19									
42	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	59.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER
WELL ID :	RFW7S	DRILLING COMPANY :	MOORETRENCH AMERICAN INC
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	10/31/90
ELEVATION :	62.970	DATE COMPLETED :	12/20/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
41	21			INTERVAL NOT SAMPLED						
40	22									
39	23									
38	24		91	ORGANIC						PUSHED SHELBY RFW-7B-SH1 24'-26'
37	25									
36	26		83	ORGANIC						PUSHED SHELBY RFW-7B-SH2 26'-28'
35	27									
34	28			INTERVAL NOT SAMPLED						GROUT 10" CASING TO 28.5' DEM/5"
33	29									
32	30		100	ORGANIC and SILT, fr SAND	DK BROWN	SFT	MST			PUSHED SHELBY RFW-7S-SH3 30'-32.5' TR F SAND SEAMS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW7S
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 62.970

TOTAL DEPTH : 59.00
 LOGGER : R. SANSONE/J. RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN INC
 DRILLING RIG : B-57
 DATE STARTED : 10/31/90
 DATE COMPLETED : 12/20/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
31	31			ORGANIC and SILT, tr SAND	DK BROWN	SFT	WST			PUSHED SHELBY RFW-7S-SH3 307-35-57 TR F SAND SEAMS
30	32									
29	33		26	ORGANIC and SILT, tr SAND	BROWN	SFT	WET			PUSHED SHELBY RFW-7S-SH4 32-57-35 TR F SAND SEAMS
28	34									
27	35			INTERVAL NOT SAMPLED						
26	36									
25	37									DRILL WATER COLOR CHANGE DK BROWN TO LT BROWN
24	38									
23	39									
22	40			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	59.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW7S	DRILLING COMPANY :	MOORETRENCH AMERICAN INC
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	10/31/90
ELEVATION :	62.970	DATE COMPLETED :	12/20/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
21	41									
20	42									
19	43									
18	44									
17	45									
16	46		80	CLAY, sm SILT, fr SAND	REDDISH BRN	SFT	WET			PUSHED SHELBY RFW-7S-SH5 46'-48.5' SAND H-C DRILL WATER CHANGE TO REDDISH BROWN @ 46'
15	47									
14	48									
				INTERVAL NOT SAMPLED						
13	49									
12	50			NO RECOVERY						BLOWS 50'-52'+3-2-WON-WON REDDISH BRN CLAY ON NOSE OF SPOON

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	59.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW7S	DRILLING COMPANY :	MOORETRENCH AMERICAN INC
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	10/31/90
ELEVATION :	62.970	DATE COMPLETED :	12/20/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
11	51			NO RECOVERY						BLOWS 50'-52'=3-2-WOH-WOH REDDISH BRN CLAY ON NOSE OF SPOON
10	52		75	SAND, sm CLAY, sm SILT	REDDISH BRN	SFT	SAT			BLOWS 52'-54'=2-2-WOH-WOH INTRLYRD SAND, SILT, & CLAY SAND F/ TR SEARS N SAND
9	53									
8	54		25	SILT, LF CLAY				10 6 7		
7	55									
6	56			INTERVAL NOT SAMPLED						
5	57									
4	58		75	SILT, LF CLAY						INSTALLED 2" WELL TO 58'
3	59									
2	60			END OF BORING AT 60'						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 153.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER/B DINEEN
WELL ID : RFW8D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 10/26/90
ELEVATION : 62.490	DATE COMPLETED : 12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
61	1		4	SAND and GRAVEL	BROWN			5		HSA/RMD HNU/BKD=0.2 UNITS RAD/BKD=10-15 MR/HR
60	2		41	SILT, LF SAND, LF GRAVEL	DK REDDISH BRN		WET	4 6 6		GRVL (DEC GNEISS) PAPER-PLAS IN SPOON TIP (FILL)
59	3									
58	4		41	SAND and SILT	DK REDDISH BRN		WET	3 8 6		
				SAND, LF ORGANIC	DK BLACK		WET	12 6		TR ROCK FRAGS
57	5									
56	6		8	SAND	BLACK			7 27 11 13		HNU/BZ=NR HNU/HS=NR CGI/HS-BZ=NR RAD/HS=5-7 MR/HR
55	7									
54	8		50	SAND, LF GRAVEL, LF SILT, LF ORGANIC	BLACK		SAT	4 7 9		
53	9									
52	10		28	SAND	BLACK	LSE	SAT	3 1 2 100	HNU 0.2	INCL BK FRAGS-WOOD-PLAS HNU/HS=2 U>BKD HNU/BZ=NR CGI/HS=2A LEL (FILL)

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 153.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R. SANSONE/J. RHYNER/B DINEEN
WELL ID	: RFW8D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57/D-90
EASTING	: 0.0000	DATE STARTED	: 10/26/90
ELEVATION	: 62.490	DATE COMPLETED	: 12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SAND	BLACK	LSE	SAT		HMU 0.2	INCL BK FRAGS-WOOD-PLAS HMU/MS=2.0>BKD HMU/BZ=NR CGI/MS=2X LEL (FILL)
51	11									
50	12			NO RECOVERY						HMU/MS=0.5>BKD HMU/BZ=NR CGI/MS=17X LEL BLOWS 12'-14'=100/1"
49	13									
48	14			NO RECOVERY						WOOD FRAG 1" IN SPOON TIP HMU/BKD=0.2>BKD CGI/BKD=NR RAD/BKD=5-8 NR/NR BLOWS 14'-16'=100/0"
47	15									HMU/MS=0.1>BKD CGI/MS=3X LEL HMU/BZ=NR CGI/BZ=NR
46	16		83	ORGANIC	DK BRN-BLK	LSE	WET		HMU 0.1	VISIBLE PLNT BLOWS-WOH-2-WOH-2
45	17									
44	18		50	ORGANIC	DK BRN-BLK	LSE	WET		HMU 1.1	BLOWS=2-2-WOH-2 VISIBLE LT BRN PLNT
43	19									
42	20			INTERVAL NOT SAMPLED						BLOWS 20'-22'=100/0" HMU/CUT=NR 10" CASING GROUTED TO 21' DEW/B"

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 153.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R.SANSONE/J.RHYNER/B DINEEN
WELL ID	: RFW8D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57/D-90
EASTING	: 0.0000	DATE STARTED	: 10/26/90
ELEVATION	: 62.490	DATE COMPLETED	: 12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						BLOWS 20'-22'=100/0" DRU/CUT=NR 10' CASING GROUTED TO 21' 02W/8"
41	21									
40	22									
39	23									
38	24		50	ORGANIC, lt SILT, tr SAND	DK BROWN					INCL PART DEC PLNT SAND VF
37	25			SAND SAND			WET WET			SAND F-C/RND-SUBANG SAND VF
36	26		50	ORGANIC and SAND, tr GRAY- EL, tr SILT	PINKISH-BRN		SAT			SAND VF/ RND-SUBANG tr FRESH PLNT INTRLYRD PEAT AND SAND
35	27									
34	28		100	ORGANIC and SAND	GRAYISH BRN		SAT			SAND VF/ RND-SUBANG tr WOOD INTRLYRD SAND AND PEAT
33	29									
32	30		75	ORGANIC and SAND	GRAYISH BRN		SAT			SAND VF/ RND-SUBANG F-M SAND, W/ tr C SAND FRM 31.17'-31.5' INTRLYRD SAND AND PEAT

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
31	31			ORGANIC and SAND	GRAYISH BRN		SAT			SAND VF/ RND-SUBANG F-M SAND W/ TR C SAND FRM 31-31.5, INTRLYRD SAND AND PEAT
30	32		100	SILT, 1% ORGANIC, 1% SAND	DK BROWNISH BLK	SFT	MST	1		TR VF SAND SEAMS TR LYRS PART DEC PLNT COLLECTED CHEM SMP 58-4
29	33									
28	34		75	SILT, 1% ORGANIC, 1% SAND	DK BROWNISH BLK	SFT	MST			TR F SAND SEAMS TR LYRS PART DEC PLNT PUSHED SHELBY RFW-80-SH1 34'-35'
27	35									
26	36		50	SILT, 1% ORGANIC, 1% SAND	DK BROWNISH BLK	SFT	MST			TR F SAND SEAMS TR LYRS PART DEC PLNT PUSHED SHELBY RFW-80-SH2 36'-38'
25	37									
24	38		100	SILT, 1% ORGANIC	DK BROWN	SFT	MST	1		TRACE PLNT
23	39									
22	40		100	SILT, 1% ORGANIC	DK BROWN	SFT	MST			TRACE PLNT SOME SECTIONS WET

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
21	41			SILT, lt ORGANIC	DK BROWN	SFT	MST			TRACE PLNT SOME SECTIONS MET
20	42		100	SILT, lt ORGANIC	DK BROWN	SFT	MST	2		TRACE PLNT SOME SECTIONS MET HOLE PINCHING @ 42'
19	43									
18	44		100	CLAY and SILT	MED-GRNISH GRAY	SFT	MST	2		
17	45									
16	46		90	CLAY	GREENISH GRAY		MST			PUSHED SHELBY RFW-8D-SK3 46'-48.5'
15	47									
14	48									
13	49		93	CLAY and SILT	GREENISH GRAY		MST			PUSHED SHELBY RFW-8D-SK4 48.5'-51'
12	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW8D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 62.490

TOTAL DEPTH : 153.00
 LOGGER : R.SANSONE/J.RHYNER/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 10/26/90
 DATE COMPLETED : 12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
11	51		76	CLAY and SILT	GREENISH GRAY		WET			PUSHED SHELBY RFW-8D-SH4 48.5'-51'
10	52			CLAY and SILT	BROWN		WET			PUSHED SHELBY RFW-8D-SH5 51'-53.5'
9	53			INTERVAL NOT SAMPLED						
8	54		100	CLAY and SILT, EF ORGANIC	BROWN		MST			BLOWS 54'-56' = 1-WOH-1-1-1 INCL VE SILT AND DEC BLK ORGANIC LYRS
7	55									
6	56		100	CLAY and SILT, EF ORGANIC	BROWN	SFT	MST			BLOWS 56'-58' = 1-WOH-1-WOH EF SILT/DEC BLK ORG LYRS STICKY SAMPLE
5	57			CLAY	GRAY	SFT	MST			VERY STICKY SAMPLE
4	58		100	CLAY, EF SILT	GRY-REDDISH BRN					ALT LYRS RED/BRN-GRY CLAY
3	59			CLAY, EF SILT	GRY/REDDISH BRN					ALT LYRS GRY/RED-BRN CLAY BLOWS 58'-60' = 1-WOH-1-WOH-1
2	60		100	CLAY, EF SILT	GRY/REDDISH BRN					ALT LYRS GRY/RED BRN CLAY BLOWS 60'-62' = 1-WOH-1-WOH-1

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
1	61			CLAY, tr SILT	GRY/REDDISH BRN					ALT LYRS GRY/RED BRN CLAY BLOWS 60'-62' = MOH-MOH-MOH
				CLAY, tr SILT, tr SAND	REDDISH BRN					1 F-M SAND PARTING
0	62		100	CLAY, tr SILT	GRY-REDDISH BRN			2		ALT LYRS GRY/RED BRN CLAY OPEN HOLE ROTARY @ 62'
0	63			CLAY and SILT, tr SAND	BRNISH RED	SFT	MST	2		VARVED CLAY AND SILT TR VF SAND PARTINGS
-1	64		100	CLAY and SILT, tr SAND	BROWNISH RED	SFT	MST	2		VARVED CLAY AND SILT TR VF SAND PARTINGS
-2	65									
-3	66		100	CLAY and SILT, tr SAND	BROWNISH RED	SFT	MST			VARVED CLAY AND SILT TR VF SAND PARTINGS BLOWS 66'-68' = MOH-MOH-2-2
-4	67									
-5	68		75	SILT, tr CLAY, tr SAND	BROWNISH RED		SAT			TR VF SAND SEAMS LAYER VF SAND LTL CLAY SEAMS BLOWS 68'-70' = MOH-2-3-4
-6	69									
-7	70		75	SILT, tr SAND	REDDISH BRN		SAT			TR VF SAND LAYERS

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 153.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R.SANSONE/J.RHYNER/B DINEEN
WELL ID	: RFW8D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57/D-90
EASTING	: 0.0000	DATE STARTED	: 10/26/90
ELEVATION	: 62.490	DATE COMPLETED	: 12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-8	71			SILT, tr SAND	REDDISH BRN		SAT			TR VF SAND LAYERS
-9	72		100	SAND, tr CLAY, tr SILT	REDDISH BRN					TR CLAY SEAMS
-10	73			SILT, tr CLAY	REDDISH BRN	SFT	SAT	3		CHANGED DRILLWATER @ 72'
				CLAY	REDDISH BRN	SFT	SAT	6		STICKY CLAY
				SILT, tr CLAY	REDDISH BRN		SAT			STICKY CLAY
				CLAY	REDDISH BRN		SAT			SAND VF
				SAND, tr SILT	REDDISH BRN		SAT			
				SILT	REDDISH BRN		SAT			
-11	74		75	SILT, tr SAND	REDDISH BRN		SAT	UN-LOG		SAND VF
-12	75			SILT, tr SAND	REDDISH BRN		SAT			SAND VF
-13	76		75	SILT, tr SAND	REDDISH BRN		SAT	UN-LOG		SAND VF
-14	77			SAND, tr SILT	REDDISH BRN					SAND VF
				SAND	REDDISH BRN					SAND VF
				SAND, tr SILT, tr GRAVEL	REDDISH BRN					SAND VF GRVL M
-15	78		58	SAND, tr SILT, tr CLAY	REDDISH BRN			UN-LOG		INTRLYRD VF/F SAND STICKY CLAY LAYER
-16	79									
-17	80		12	SAND, tr SILT, tr GRAVEL	REDDISH BRN		SAT	UN-LOG		SAND F-M GRVL F CUT=F-M SAND

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-18	81			SAND, lt SILT, tr GRAVEL	REDDISH BRN		SAT			SAND F-M GRVL F CUT=F-M SAND
-19	82		62	SAND, lt SILT, tr GRAVEL	REDDISH BRN		SAT	4 2 5		SAND F-M GRVL F
-20	83			SAND, lt SILT	REDDISH BRN		SAT			SAND VF
-21	84		50	SAND, tr SILT	REDDISH BRN		SAT	8 0 0 0		SAND VF-F TR M SAND
-22	85									
-23	86		100	SAND, lt SILT	REDDISH BRN		SAT	4 2 2		SAND VF-F TR M-C SAND DRILL BIT CHATTERS @ 86' SWL/CAS=4'
-24	87									
-25	88		25	SILT, lt CLAY, tr GRAVEL	REDDISH BRN		MST	11 2 0 0		GRVL F-M/FAC HOLE COLLAPSING 80'-90'
-26	89									
-27	90		41	SAND				6 0 0 0		SAND F-M TR C SAND

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-28	91	SAND SILT, lt CLAY, tr GRAVEL SAND, tr SILT			REDDISH BRN					SAND F-M TR C SAND GRVL F-M/FAC SAND F-M TR C SAND DRILL BIT CHATTERS 88-92'
-29	92	SAND, tr SILT SILT, lt CLAY SAND and GRAVEL, tr CLAY, - tr SILT	33		REDDISH BRN REDDISH BRN REDDISH BRN			400		SAND VF SAND M-C GRVL F-M
-30	93									
-31	94	SAND, tr SILT	100		REDDISH BRN			0-100		SAND VF-F LTL M SAND COBBLES
-32	95	SAND, tr GRAVEL GRAVEL, lt SAND			BROWN					SAND M-C GRVL F GRVL F-M SAND C
-33	96	SAND, tr SILT SAND and GRAVEL, lt CLAY, - lt SILT	50		REDDISH BRN REDDISH BRN			100-150		SAND F-M SAND M-C GRVL F-M SOFT CLAY LYS @ 96.33'
-34	97									
-35	98	GRAVEL, tr SAND	21					0-100		GRVL F-M SAND C
-36	99									
-37	100			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 153.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER/B DINEEN
WELL ID : RFW8D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 10/26/90
ELEVATION : 62.490	DATE COMPLETED : 12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
-38	101									
-39	102									COLLECT CUT AT 102' SAND H-C/ANG-SUB GRVL F/ANG-SUB
-40	103									
-41	104									
-42	105									
-43	106									
-44	107									
-45	108									
-46	109									
-47	110			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER/B. DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
-48	111									
-49	112									
-50	113									
-51	114									COLLECT CUT AT 114' SAND M-C/SUB GRVL F-M/SUB MUDDY WATER
-52	115									
-53	116									COLLECT CUT AT 116' SAND M-C/ANG-SUBRND GRVL F/ANG-SUBRND TR ROCK FRAGS
-54	117									
-55	118									INSTALLED 2" WELL TO 118' COLLECT CUT AT 118' SAND M-C/SUBANG-RND TR F GRVL MUDDY WATER BT CHATTERS 118'-122'
-56	119									
-57	120			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
-58	121									COLLECT CUT AT 121' SAND M-C/ANG-SUBRND GRVL F-H/ANG POSSIBLE BROKEN ROCK FRAGS
-59	122									FORMATION PRODUCING WATER AT 122' DRILL WATER DK REDDISH BRN 122'-129' COLLECT CUT AT 122' SAND VF-F TR F GRVL TR SILT
-60	123									
-61	124									COLLECT CUT AT 124' SAND C/RND-SUBRND GRVL F-H/ANG POSSIBLE BROKEN ROCK FRAGS SLOW AND SMOOTH DRILLING 124'-128' FORMATION PRODUCING WATER
-62	125									
-63	126									
-64	127									
-65	128									
-66	129									DRILL WATER GRAYISH BRN 129'-130'
-67	130			INTERVAL NOT SAMPLED						DRILL WATER DK RED 130'- 133'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						DRILL WATER DK RED 130'-133'
-68	131									COLLECT CUT AT 130'
-69	132									MOSTLY BROKEN ANGULAR SILTSTONE FRAGS
-70	133		88	BEDDED FINE SANDSTONE AND-SILTSTONE	PALE RED BROWN	MOD				NOTE: 133.0-143.0 used 750 g- 816 133-139 g- used 950 g- 139.2-151.1 133.0-137.5 1 sh- 137.2-138.4 hgh; 138.4- -143 fsh
-71	134									
-72	135									
-73	136									
-74	137									
-75	138									
-76	139									
-77	140									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						DRILL WATER DK RED 130'-133'
-68	131									COLLECT CUT AT 130'
-69	132									MOSTLY BROKEN ANGULAR SILTSTONE FRAGS
-70	133			BEDDED FINE SANDSTONE AND SILTSTONE	PALE RED BROWN	MCD	4	0.0		note: 133.0-143.0 used 750 g- 81/125-139.5 used 250 gal 139.5-151.1 133.0-137.4 fsh 137.4-138.4 hgh; 138.4- 143 fsh
-71	134									
-72	135									
-73	136									
-74	137									
-75	138									
-76	139									
-77	140									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	153.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW8D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	10/26/90
ELEVATION :	62.490	DATE COMPLETED :	12/06/90

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-78	141									
-79	142									
-80	143			SILTY FINE SANDSTONE WITH-SHALE	PALE RED	MOD	5	0.0		High West. frags 143.0-143.8 143.0-147.8: mott-145-147.8 153: lost 550 gal; 143-143.8 mod; 143.8-147 fsh; 147-153' mod
-81	144									
-82	145									
-83	146									
-84	147									
-85	148									
-86	149									
-87	150									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW8D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 62.490

TOTAL DEPTH : 153.00
 LOGGER : R.SANSONE/J.RHYNER/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 10/26/90
 DATE COMPLETED : 12/06/90

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT. /FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-88	151									
-89	152									
-90	153									
-91	154									
-92	155									
-93	156									
-94	157									
-95	158									
-96	159									
-97	160									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 32.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R. SANSONE/J. RHYNER
WELL ID : RFW8S	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 10/29/90
ELEVATION : 62.690	DATE COMPLETED : 12/07/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
61	1			INTERVAL NOT SAMPLED						HNU/BKD=0.2 UNITS RAD/BKD=5.8 MB/NR REFER TO LOG FOR REFLSD FOR INTERVALS NOT SAMPLED
60	2									
59	3									
58	4									
57	5									
56	6									
55	7									
54	8									
53	9									
52	10			INTERVAL NOT SAMPLED						HNU/HS=0.1>BKD CGI/HS=5% LEL HNU/BZ=NR CGI/BZ=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	32.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW8S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	10/29/90
ELEVATION :	62.690	DATE COMPLETED :	12/07/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=0.17BD CGI/HS=0.5 LEL HMU/HS=NR CGI/HS=NR
51	11									
50	12									
49	13									
48	14									HMU/HS=NR CGI/HS=1.2 LEL
47	15									
46	16									
45	17									
44	18		100	ORGANIC	DK BROWN					BLOWS=HOM-2-HOM-2 VISIBLE LT BARN PLNT
43	19									
42	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 32.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R. SANSONE/J. RHYNER
WELL ID : RFW8S	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 10/29/90
ELEVATION : 62.690	DATE COMPLETED : 12/07/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
41	21									
40	22									GROUT 8" CASING TO 21.5'
39	23									0.64/6"
38	24									
37	25									
36	26									
35	27									
34	28									
33	29									
32	30			INTERVAL NOT SAMPLED						INSTALLED 2" WELL TO 30'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	32.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFW8S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	10/29/90
ELEVATION :	62.690	DATE COMPLETED :	12/07/90

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						INSTALLED 2" WELL TO 30'
31	31									
30	32									
29	33									
28	34									
27	35									
26	36									
25	37									
24	38									
23	39									
22	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	62.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW9D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/B-90
EASTING :	0.0000	DATE STARTED :	10/24/90
ELEVATION :	65.060	DATE COMPLETED :	11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						NSA/R#ID CUT#F-C SAND AND F GRVL HNU/BKD=0.2 UNITS REFER TO LOG FOR RFW9D FOR INTERVALS NOT SAMPLED BELOW
64	1									
63	2									
62	3									
61	4									
60	5									HNU/NS=NR PLAS-CLOTH-METL-CANS
59	6									
58	7									
57	8									
56	9									
55	10									HNU/NS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 62.50
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER/B DINEEN
WELL ID : RFW9D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/B-90
EASTING : 0.0000	DATE STARTED : 10/24/90
ELEVATION : 65.060	DATE COMPLETED : 11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=NR
54	11									
53	12									
52	13									
51	14									
50	15									RAD/BKD = .06 MR/HR RAD/CUT = .02 MR/HR HMU/HS=NR CGI/HS=15% LEL
49	16									HMU/CUT=NR HMU/HS=NR
48	17									
47	18									
46	19									
45	20			INTERVAL NOT SAMPLED						HMU/HS=NR HMU/CUT=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	62.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW9D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/B-90
EASTING :	0.0000	DATE STARTED :	10/24/90
ELEVATION :	65.060	DATE COMPLETED :	11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=NR HMU/CUT=NR
44	21									
43	22									
42	23									
41	24									HMU/HS=NR SML/AUGERS=6.5'
40	25		40	ORGANIC, LF SAND, LF SILT	DK BRN-BLK	MST		1 1 1		HMU/HS(JAR)=350>BKD PART DEC PEAT SAND F
39	26									
38	27			INTERVAL NOT SAMPLED						GROUT 10" CASING TO 27' D&W/B
37	28									
36	29									
35	30			INTERVAL NOT SAMPLED						PEAT ON ROLLER BIT HMU/BKD=0.2 UNITS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 62.50
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R. SANSONE/J. RHYNER/B DINEEN
WELL ID : RFW9D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/B-90
EASTING : 0.0000	DATE STARTED : 10/24/90
ELEVATION : 65.060	DATE COMPLETED : 11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
34	31		50	ORGANIC, LF GRAVEL	DK BROWN	SFT	WET		HMU 0.4	TR. PART DEC PLNT BLOWS 31'-33' = 1-.5-.5-.5 GRVL F
33	32									
32	33		58	ORGANIC, LF GRAVEL	DK BROWN	SFT	WET	2 1 2	HMU 0.4	TR. PART DEC PLNT GRVL F
31	34									
30	35			INTERVAL NOT SAMPLED						
29	36									
28	37									
27	38									
26	39									
25	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	62.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW9D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/B-90
EASTING :	0.0000	DATE STARTED :	10/24/90
ELEVATION :	65.060	DATE COMPLETED :	11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
24	41									
23	42									
22	43									
21	44									
20	45									
19	46									
18	47		100	SAND, tr GRAVEL	REDDISH BRN		WET	3		GRVL F SAND F-C CUTTINGS 47'-49'=F-M ANG- SUBANG GRVL
17	48			SAND and GRAVEL	REDDISH BRN		WET	3		SAND F GRVL F-M
				SAND, tr GRAVEL						SAND F-M GRVL F
16	49		25	SAND, tr CLAY, tr SILT	REDDISH BRN		WET	7		SAND F
				SAND, tr GRAVEL	REDDISH BRN		WET	7		SAND M-C GRVL F-M/FAC
				SAND, tr GRAVEL, tr SILT	REDDISH BRN		WET	11		SAND F GRVL F-M/FAC
15	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	62.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER/B DINEEN
WELL ID :	RFW9D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/B-90
EASTING :	0.0000	DATE STARTED :	10/24/90
ELEVATION :	65.060	DATE COMPLETED :	11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
14	51		41	SILT, LF GRAVEL, LF SAND	REDDISH BRN		WET	2		TR M-C SAND AND CLAY LYRS
13	52									
12	53			INTERVAL NOT SAMPLED						ODEX/6"
11	54									
10	55									
9	56									
8	57									
7	58									COLLECT CUTTINGS AT 58' GRVL F-M/ANG-SUB/FAC SAND M-C
6	59									
5	60			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	62.50
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER/B DINEEN
WELL ID :	RFW9D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/B-90
EASTING :	0.0000	DATE STARTED :	10/24/90
ELEVATION :	65.060	DATE COMPLETED :	11/08/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
4	61									COLLECT CUTTINGS AT 61'
3	62		21	SAND, LT SILT, LF GRAVEL, LF-CLAY	REDDISH BRN		MST			GRVL F-M/ANG-SUB/FAC SAND M-C BLOWS 62'-64'=100/5" CLAYEY TILL W/SLTSM GRVL CLASTS
2	63									
1	64									
0	65									
0	66									
-1	67									
-2	68									
-3	69									
-4	70									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW9S
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 64.900

TOTAL DEPTH : 18.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/16/90
 DATE COMPLETED : 11/16/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HNU/8KD=0.2 UNITS HSA/4=10
63	1									
62	2									
61	3									CUT=WOOD-FILL-PAPR-PLAS HNU/HS=NR CGI/HS-BZ=NR
60	4									
59	5									
58	6									
57	7									
56	8									
55	9									
54	10			INTERVAL NOT SAMPLED		SAT				CUT=WOOD-FILL-PLAS FILL=OK BRN F SAND & SILT WITH TR ORG

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW9S
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 64.900

TOTAL DEPTH : 18.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/16/90
 DATE COMPLETED : 11/16/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED			SAT			CUT=HILL-WOOD-PLAS FILL-OK BRN F SAND & SILT WITH YR ORG
53	11									
52	12									
51	13									
50	14									CUT=WIRE-MTL-ALUM SUL/AUGER=13" WIDENED HOLE W/ HSA/8"ID INSTALLED 2" WELL TO 17"
49	15									
48	16									
47	17									
46	18									
45	19									
44	20									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HSA/B*ID REFER TO LOG FOR RFW10S FOR INTERVALS NOT SAMPLED BELOW
58	1									
57	2									
56	3									
55	4									
54	5									
53	6									
52	7									
51	8									
50	9									
49	10			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

```
CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFW10D
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 59.100
```

TOTAL DEPTH : 125.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 12/05/90
 DATE COMPLETED : 01/16/91

[illegible]

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
38	21			INTERVAL NOT SAMPLED						
37	22		100	CLAY, sm SILT	REDDISH BRN		WET	2684		
36	23			CLAY and SILT, sm GRAVEL	REDDISH BRN					PARTS ALONG BEDDING PLANES
35	24			INTERVAL NOT SAMPLED						
34	25		12	GRAVEL	REDDISH BRN		SAT	14108		
33	26									
32	27			INTERVAL NOT SAMPLED						GRVL IN CUT @ 27' DIFFICULT DRILLING 25'-30'
31	28									
30	29									
29	30			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WILSON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 125.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW10D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 12/05/90
ELEVATION : 59.100	DATE COMPLETED : 01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
28	31			NO RECOVERY				13 20 18 15		
27	32									
26	33			INTERVAL NOT SAMPLED						
25	34									
24	35									
23	36									GRVL/COBBLES IN CASING
22	37									SLIGHT WLOS @ 37' BEGAN USING MUD
21	38									
20	39									
19	40		16	SAND and GRAVEL, LF SILT	REDDISH BRN		WET	3 13 21 23		GRVL F-M/ANG SAND M-C BEGIN SAMPLING AT 5 FOOT INTERVALS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
18	41			SAND and GRAVEL, tr SILT	REDDISH BRN		WET			GRVL F-M/ANG SAND M-C BEGIN SAMPLING AT 5 FOOT INTERVALS
17	42			INTERVAL NOT SAMPLED						
16	43									
15	44									
14	45		33	GRAVEL, sm SAND, lt SILT	BROWN			23 16 25		GRVL F-M/ANG-SUB SAND F WLOS 37'-45'=1000 GAL
13	46									
12	47			INTERVAL NOT SAMPLED						
11	48									
10	49									
9	50		4	SAND sm GRAVEL, lt SILT, tr CLAY	BROWN					BLOWS 50'-52'=12-31-27- 100/4 = SAND HEAVING TO 39' SAND M GRVL F-M 1111

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW10D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 59.100

TOTAL DEPTH : 125.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 12/05/90
 DATE COMPLETED : 01/16/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SAND, 8% GRAVEL, lt SILT, - lt CLAY	BROWN					BLOWS 50'-52'=12-31-27- 100/4" SAND HEAVING TO 39' SAND M GRVL F-M [TILL]
8	51									
7	52			INTERVAL NOT SAMPLED						
6	53									
5	54									
4	55		25	GRAVEL and SAND, lt SILT	BROWN					BLOWS 55'-57'=46-100/5" DIFFICULT DRLLNG 50'-55' GRVL F-M SAND F-M [TILL]
3	56									
2	57			INTERVAL NOT SAMPLED						
1	58									
0	59									
0	60		33	GRAVEL and SAND, lt SILT	DK BROWN					BLOWS 60'-62'=34-100/5" GRVL M SAND F-M [TILL]

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				SAND & GRAVEL, lt SILT, - lt CLAY	BROWN					BLOWS 50'-52'=12-31-27- 100/4" SAND HEAVING TO 39' SAND M GRVL F-M [TILL]
8	51									
7	52			INTERVAL NOT SAMPLED						
6	53									
5	54									
4	55		25	GRAVEL and SAND, lt SILT	BROWN					BLOWS 55'-57'=46-100/5" DIFFICULT DRLLNG 50'-55' GRVL F-M SAND F-M [TILL]
3	56									
2	57			INTERVAL NOT SAMPLED						
1	58									
0	59									
0	60		33	GRAVEL and SAND, lt SILT	DK BROWN					BLOWS 60'-62'=34-100/5" GRVL M SAND F-M [TILL]

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				GRAVEL and SAND, lt SILT	DK BROWN					BLOWS 60'-62'=34-100/5" GRVL M SAND F-M (TILL)
-1	61									
-2	62			INTERVAL NOT SAMPLED						
-3	63									
-4	64									
-5	65		58	SAND sm GRAVEL, sm SILT, - tr CLAY	BROWN			25 32 38 100		SAND F GRVL F LAST BLOW=100/3" (TILL)
-6	66									
-7	67			INTERVAL NOT SAMPLED						
-8	68									
-9	69									
-10	70		41	GRAVEL and SAND, lt SILT	BROWN					BLOWS 70'-72'=32-100/4" SAND F-M GRVL M (TILL)

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW10D
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 59.100

TOTAL DEPTH : 125.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/D-90
 DATE STARTED : 12/05/90
 DATE COMPLETED : 01/16/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-11	71			GRAVEL and SAND, lt SILT	BROWN					BLOWS 70'-72'=32-100/4" SAND F-M GRVL M [TILL]
-12	72			INTERVAL NOT SAMPLED						
-13	73									
-14	74									
-15	75		33	SILT, sm GRAVEL, lt SAND SAND, lt SILT, lf GRAVEL	DK PRPLISH BRN MED BRN		MST 25 MST 30	25 30		INCL F GR SDGM FRAGS TR RND QTZ GRVL GRVL F-M/ANG INCL DK PRPL-BRN SHALE- FRAG/FRIABLE
-16	76									
-17	77			INTERVAL NOT SAMPLED						HARD, BUT SMOOTH DRILLING @ 77'
-18	78									
-19	79									
-20	80		16	SAND, lf GRAVEL, lf SILT	DK PRPLISH BRN					BLOWS 80'-82'=150/5" REC FRAC SHALE & VF SAND, SILT, AND GRVL 80'-80.33', SET 6" CASING @ 79.5' BOTT: 80-83 fsh; 83-86.5 fs- h; 86.5-90 no
-20	80		93	FINE SANDSTONE AND SILTSTONE	PALE RED	MOD				

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRAC./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-11	71			GRAVEL and SAND, lt SILT	BROWN					BLOWS 70'-72' = 32-100/4" - SAND F-M GRVL M (TILL)
-12	72			INTERVAL NOT SAMPLED						
-13	73									
-14	74									
-15	75			SILT, sm GRAVEL, lt SAND SAND, lt SILT, tr GRAVEL	DK PRPLISH BRN MED BRN					INCL F GR SDSH FRAGS TR RND QTZ GRVL GRVL F-M/ANG INCL DK PRPL-BRN SHALE- FRAG/FRIABLE
-16	76									
-17	77			INTERVAL NOT SAMPLED						HARD, BUT SMOOTH DRILLING - @ 77'
-18	78									
-19	79									
-20	80		SLT	SAND, tr GRAVEL, tr SILT FINE SANDSTONE AND SILTST- ONE	DK PRPLISH BRN PALE RED	MOO	1	0.0		BLOWS 80'-82' = 150/5" - REC FRAC SHALE & VF SAND - SILT AND GRVL 80'-80.33' - SET 6" CASTING @ 79.5' NOTES: 80-83 fsh; 83-86.5 fs- n; 86.5-90 nm

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	125.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW10D	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/D-90
EASTING :	0.0000	DATE STARTED :	12/05/90
ELEVATION :	59.100	DATE COMPLETED :	01/16/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-21	81			FINE SANDSTONE AND SILTSTONE	PALE RED	MOO	1	0.0		note: 80-83 fsh; 83-86.5 fsh; 86.5-90 na
-22	82									
-23	83									
-24	84									
-25	85									
-26	86									
-27	87									
-28	88									
-29	89									
-30	90			CROSS-BEDDED FINE SANDSTONE WITH SILTSTONE	PALE RED	WEK	2	0.0		note: cross-bedded; 90-95.9 fsh; 95.9-96.1 fsh; 96.1-99 fsh

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 125.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW10D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 12/05/90
ELEVATION : 59.100	DATE COMPLETED : 01/16/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-31	91			CROSS-BEDDED FINE SANDSTONE WITH SILTSTONE	PALE RED	WEK	2	0.0		mott: cross-bedded; 90-95.9- 95.9-96.1 hgh; 96.1- 99-15h
-32	92									
-33	93									
-34	94									
-35	95									
-36	96									
-37	97									
-38	98									
-39	99			FINE SILTY SANDSTONE WITH SILTSTONE	PALE RED	WEK	2	0.0		mott: lost 130 gal; 99-99.2- 102.2-102.4 hgh; 102.4- 102.4-104.5 15h
-40	100									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 125.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE/B DINEEN
WELL ID	: RFW10D	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57/D-90
EASTING	: 0.0000	DATE STARTED	: 12/05/90
ELEVATION	: 59.100	DATE COMPLETED	: 01/16/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-41	101			FINE SILTY SANDSTONE WITH SILTSTONE	PALE RED	WEK	2	0.0		mott; loss 130 gal; 99-99.2- fsh; 99.2-102.4 hgh; 99.2- 102.4 fsh; 102.4-102.4 hgh; 102.4-104.5 fsh
-42	102									
-43	103									
-44	104									
-45	105			FINE SANDSTONE WITH SILTSTONE	PALE RED	WEK	1	0.0		mott; filled 60 deg frac- lost 50 gal; 104.5-108 fsh
-46	106									
-47	107									
-48	108			FINE SANDSTONE WITH SILTSTONE	PALE RED	WEK	1	0.0		mott; filled 60 deg frac- lost 50 gal; 108-115 fsh; 112.2-115 fsh; 115.2- 118 fsh
-49	109									
-50	110									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 125.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW10D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 12/05/90
ELEVATION : 59.100	DATE COMPLETED : 01/16/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-51	111			FINE SANDSTONE WITH SILTS-TONE	PALE RED	MEK	1	0.0		mott: filled 60 deg f- lost 250 gal; 108-112- fsh; 112-112.2 fsh; 112.2- -118 fsh
-52	112									
-53	113									
-54	114									
-55	115									
-56	116									
-57	117									
-58	118			FINE-UP SANDSTONE WITH - SILSTONE	PALE RED	MOD	1	0.0		fines-up: filled 60 deg f- rec: mott: lost circ at 120 all fracs fsh
-59	119									
-60	120									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 125.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW10D	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57/D-90
EASTING : 0.0000	DATE STARTED : 12/05/90
ELEVATION : 59.100	DATE COMPLETED : 01/16/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
-61	121			FINING-UP SANDSTONE WITH - SILTSTONE	PALE RED	MOD	1	0.0		finer-up; filled 60 deg. f- rec; bott; lost circ at 120 all frags fish
-62	122									
-63	123									
-64	124									
-65	125									
-66	126									
-67	127									
-68	128									
-69	129									
-70	130									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 40.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW10S	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 11/19/90
ELEVATION	: 59.090	DATE COMPLETED	: 12/05/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
58	1		21	SAND, tr GRAVEL, tr SILT, - tr ORGANIC	DK REDDISH BRN					SPOON PUSHED 0-2' HNU/BKO=0.2 UNITS CGI/BKO=NR
57	2		12	SAND, tr GRAVEL	DK BRN	LSE	WET	12		GLASS-NEWS IN SPOON TIP
56	3									
55	4		16	SAND	DK BRN-BLK	LSE	WET			TR NEWS
54	5									HNU/HS-B7=NR CGI/HS-B7=NR SWL/AUGER=1.5'
53	6		58	ORGANIC	DK BRN		WET			BLOWS 6'-8'-WOH-WOH-WOH-3 PLNT 1 st -3 rd LENGTH PEAT ON CNTR PLUG @ 6'
52	7									
51	8		62	ORGANIC	DK BRN		WET			BLOWS 8-10'-WOH-WOH-WOH-3 PLNT 1 st -3 rd LENGTH
50	9									
49	10		75	ORGANIC	DK BRN		WET			BLOWS 10'-12'-WOH-WOH-2-1

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	40.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFWIOS	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/19/90
ELEVATION :	59.090	DATE COMPLETED :	12/05/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
48	11			ORGANIC	DK BRN		WET			BLOWS 10'-12' = WOH-WOH-2-1
47	12		4	ORGANIC	BRN		SAT	4		PLNT 1/2" LGTH GROUT 16" CASING TO 12'
46	13									
45	14		75	ORGANIC	LT BRN	SFT	SAT	3		PLNT 3/8" LGTH
44	15			ORGANIC	DUSK YEL GRN	SFT	SAT			PLNT 3/8" LGTH
43	16		75	ORGANIC, LF SILT	DUSK YEL GRN	SFT	SAT	1		PLNT 3/8"-1/2" LGTH
42	17			ORGANIC, LF SILT ORGANIC, LF SILT	LT BRN DUSK YEL GRN	SFT SFT	SAT SAT			BLK WHEN EXP TO AIR PLNT 3/8"-1/2" LGTH 3" METL FRAG IN SPOON TIP
41	18		100	ORGANIC, LF SILT		SFT	SAT			PLNT 3/4" LGTH COLOR DUSK YEL GRN TO LT BRN-BLK BLOWS 18'-20' = 1-WOH-1-WOH
40	19			CLAY and SILT, LF ORGANIC	PALE RED	SFT	WET			PLNT 3/8" LGTH TO 19.5' GRADES TO CLAY W/DK BRN- BLK ORG PRGTS 1" GRAY CLAY PRGTS
39	20		100	CLAY and SILT, LF ORGANIC	PALE BRN	SFT	SAT			TR BLK ORG PRGTS GRAY CLAY SEAM @ 21.25' CLAY CONTENT WITH DEPTH BLOWS-WOH-WOH-WOH-WOH

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW10S
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 59.090

TOTAL DEPTH : 40.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/19/90
 DATE COMPLETED : 12/05/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
38	21			CLAY and SILT, lt ORGANIC	PALE BRN	SFT	SAT			TR BLK ORG PRGTS GRY CLAY SEAM @ 21-25' CLAY CONTENT WITH DEPTH BLOWS-UON-UON-UON-UON
37	22			CLAY, lt SILT	REDDISH BRN	SFT	WET			TR SILT PRGTS TR GRY CLAY SEAMS VARVED CLAY PUSHED SHELBY RFW-10S-SH1 22'-25', REDDISH BRN CLAY ON SIDES OF TUBE
36	23			NO RECOVERY						
35	24									
34	25			NO RECOVERY						PUSHED SHELBY RFW-10S-SH2 25'-27', REDDISH BRN CLAY ON SIDES OF TUBE USED PISTON SAMPLER
33	26									
32	27		33	GRAVEL, lt SAND, lt CLAY, - lt SILT	REDDISH BRN	LSE	SAT	4000-4000		GRVL F-C SAND F-C GRVL STUCK IN SPOON TIP
31	28									
30	29			INTERVAL NOT SAMPLED						D&W/6"
29	30			NO RECOVERY				24 25 17		REC PIECES OF GROUT

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	40.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFW10S	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/19/90
ELEVATION :	59.090	DATE COMPLETED :	12/05/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
28	31			NO RECOVERY						REC PIECES OF GROUT
27	32			NO RECOVERY						BLOWS 32'-34'=30-100/5"
26	33									
25	34		41	GRAVEL, sm SAND, sm SILT, - lt CLAY	REDDISH BRN		MST	46 56 64 72		SOME C GRVL/LTL F-M GRVL SAND F-M ROUGH DRILLING 34'-36'
24	35									2" WELL INSTALLED TO 35'
23	36		37	GRAVEL and SAND, tr SILT, - tr CLAY	REDDISH BRN		MST			GRVL F-C SAND F-C BLOWS 36'-38'=9-50-100/5" -34
22	37									
21	38		21	GRAVEL and SAND, tr SILT, - tr CLAY	REDDISH BRN		MET	5 20 50 27		GRVL F-C SAND F-M
20	39									
19	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	41.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE/B DINEEN
WELL ID :	RFW11	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/14/91
ELEVATION :	68.210	DATE COMPLETED :	01/24/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
67	1		50	SAND, lt GRAVEL, tr SILT	MED BRN		MST	13		SAND F-M GRVL F-M TR WOOD AND PLAS HSA/B=10
66	2		41	SAND, tr GRAVEL	MED-ORANGE BRN	LSE	MST			BLOWS 2'-4'=7-41-100/4" SAND F-M/ TR C SAND GRVL M BOULDER @ 3.5'
65	3									
64	4		66	SAND, sm GRAVEL, tr SILT	DK REDDISH BRN	LSE	MST	25 20 20 10		SAND F-M GRVL F-M/ TR C GRVL
63	5			SAND and GRAVEL	BROWN	LSE	MST			SAND M-C GRVL F-C
62	6		12	SAND and GRAVEL	DK BRN	LSE	WET			BLOWS 6'-8'=100/4" SAND M-C GRVL M-C BOULDERS 5.5'-8'
61	7									
60	8		21	GRAVEL and SAND, tr SILT	MED BRN	LSE				BLOWS 8'-10'=100/5" SAND F-C GRVL F-M TR WOOD FRAGS
59	9									
58	10			INTERVAL NOT SAMPLED						DIFFICULT DRILLING @ 10'

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW11
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 68.210

TOTAL DEPTH : 41.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/14/91
 DATE COMPLETED : 01/24/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						DIFFICULT DRILLING @ 10'
57	11		91	ORGANIC, LF SAND, LF GRAVEL	DK OLIVE BRN		SAT	11 15 25		VIS PLNT 3" LENGTH DECREASING PLNT W/ DEPTH
56	12			SAND, LF SILT, LF GRAVEL, LF ORGANIC	GRAY-OLIVE BRN		WET			SAND F-M/ TR C SAND GRVL F/ANG-SUBANG TR YEL-BRN NOT 1/4" DIA
				SAND, LF GRAVEL, LF SILT	REDDISH BRN		WET			SAND F-M/ TR C SAND GRVL F-M/ANG-SUBANG YEL-BRN 12.17'-12.33' TR BL GRN WITHRG @ 12.17'
55	13		33	SAND, LF GRAVEL, LF SILT	REDDISH BRN	LSE	WET			GROUT 10" CASING TO 13' BLOWS 13'-14'=10-63/3" SAND F-M/ TR C SAND GRVL F-M/ANG-SUBANG DEW/6"
54	14		41	SAND, LF GRAVEL, LF SILT	REDDISH BRN		MST	50 50 50		SAND F-M/ TR C SAND GRVL F/ANG-SUBANG
53	15									
52	16		46	SAND, LF GRAVEL, LF SILT	REDDISH BRN		MST	30 30 30		SAND F-M/ TR C SAND GRVL F/ANG-SUBANG
51	17									
50	18		8	SAND, LF GRAVEL	REDDISH BRN		MST	5 10 12		SAND F-M/ TR C SAND GRVL F-M/ANG-SUBANG
49	19									
48	20		50	SAND, LF GRAVEL	REDDISH BRN		WET	12 12 12		SAND F-M/ SOME C SAND GRVL F-M/ANG-SUBANG

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 41.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW11	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 01/14/91
ELEVATION : 68.210	DATE COMPLETED : 01/24/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
47	21			SAND, 1/2 GRAVEL	REDDISH BRN		WET			SAND F-M/ SOME C SAND GRVL F-M/ANG-SUBANG
46	22			NO RECOVERY				10		
45	23									
44	24		8	SAND, 1/2 GRAVEL, 1/2 SILT	REDDISH BRN		WET	7		SAND F-M GRVL F-M/ANG-SUBANG
43	25									
42	26		37	SAND, sm GRAVEL, 1/2 SILT	REDDISH BRN			17		SAND F-M GRVL F-M/ANG-SUBANG SOME SHALE FRAGS
41	27							50		
40	28		8	GRAVEL	REDDISH BRN					BLOWS 28'-30'=100/5" SAND F-M/ TR C SAND INCL GRAYISH OLIVE GREEN ROCK FRAGS
39	29			INTERVAL NOT SAMPLED						CASING FLUSHED @ 29' BEGIN NX ROCK CORING
38	30		36	FINE SANDSTONE	PALE RED	MOD				30-33 fsh

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 41.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/R SANSONE/B DINEEN
WELL ID : RFW11	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-57
EASTING : 0.0000	DATE STARTED : 01/14/91
ELEVATION : 68.210	DATE COMPLETED : 01/24/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
37	31			FINE SANDSTONE	PALE RED	MOD	5	0.0		30-33 fsh
36	32									
35	33			FINE SANDSTONE	GRAYISH RED	STR	1	0.0		33-34 alt
34	34			SILTY FINE SANDSTONE WITH SILTSTONE	PALE RED	MOD	10	0.0		mpst: 34-34.6 hgh; 34.6-36.4 fsh; 36.4-36.8 hgh; 36.8-38.5 fsh
33	35									
32	36									
31	37									
30	38									
29	39			FINE SANDSTONE	MOD RED	MOD	5	0.0		38.5-38.9 alt; 38.9-41.0 - mod REAM HOLE AND INSTALL 2" - WELL TO 36'
28	40									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW11
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 68.210

TOTAL DEPTH : 41.00
 LOGGER : J RHYNER/R SANSONE/B DINEEN
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/14/91
 DATE COMPLETED : 01/24/91

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
27	41			FINE SANDSTONE	MOD RED	MOD	5	0.0		38.5-38.9 sit; 38.9-41.0 - MOD REAM HOLE AND INSTALL 2" - WELL TO 36'
26	42									
25	43									
24	44									
23	45									
22	46									
21	47									
20	48									
19	49									
18	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 28.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW11PZ	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 02/06/91
ELEVATION	: 68.110	DATE COMPLETED	: 02/07/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						NSA/8"ID REFER TO LOG FOR RFW11 FOR INTERVALS NOT SAMPLED
67	1									
66	2									
65	3									DIFFICULT DRILLING @ 2.5'
64	4									
63	5									DIFFICULT DRILLING @ 5'
62	6									
61	7									
60	8									
59	9									
58	10			INTERVAL NOT SAMPLED						INSTALLED 2" PIEZOMETER TO LOG RFW-11PZ2

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW11PZ
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 68.110

TOTAL DEPTH : 28.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 02/06/91
 DATE COMPLETED : 02/07/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						INSTALLED 2" PIEZOMETER TO 10' RFW-11PZ2
57	11									
56	12									
55	13									
54	14									
53	15									
52	16									
51	17									
50	18									
49	19									
48	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 28.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFW11PZ	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 02/06/91
ELEVATION	: 68.110	DATE COMPLETED	: 02/07/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
47	21									
46	22									
45	23									
44	24									
43	25									
42	26									
41	27									
40	28									INSTALLED 2" PIEZOMETER 10.277 RFW-PZ1
39	29									
38	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW12
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 61.110

TOTAL DEPTH : 26.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/B-61
 DATE STARTED : 11/12/90
 DATE COMPLETED : 01/17/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
60	1		33	SILT, IF SAND, tr CLAY, IF GRAVEL	DK OLIVE DK REDDISH BRN			10 10 9		HMU/RKD=0.2-0.4 UNITS HSA/BS=10/GRVL F/SAND F 0.33'-0.67'=SLTSM FRAGS
59	2		16	SAND, IF SILT, IF CLAY, IF GRAVEL	DK BRN-BLK			10 10 9		SAND F-M GRVL F
58	3									
57	4		8	FILL	BLACK			8 1 2 11	HMU 0.1	REC 2" WOOD FRAGS CGI/HS=5% LEL HMU/HS=NR
56	5									
55	6		12	ORGANIC	DK BRN			10 1 1		VISIBLE BRN PLNT
54	7									
53	8		100	ORGANIC	DK BRN	SFT	SAT			BLOWS 8'-10'=WCH/24"
52	9									
51	10		100	ORGANIC	DK BRN-BLK	SFT	SAT			BLOWS 10'-12'=WCH/12"-2-2

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	26.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R SANSONE/J RHYNER
WELL ID :	RFW12	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57/B-61
EASTING :	0.0000	DATE STARTED :	11/12/90
ELEVATION :	61.110	DATE COMPLETED :	01/17/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
50	11			ORGANIC	DK BRN-BLK	SFT	SAT			BLOWS 10'-12' = WOH/12"-2-2
49	12		100	ORGANIC	BRN-MUSTARD BRN	SFT	SAT			BLOWS 12'-14' = WOH/12"-1-1 COLLECTED CHEM SMPL SB-3 GROUT 8" CASING TO 14.5' D&W/6"
48	13									
47	14			INTERVAL NOT SAMPLED						REFER TO LOG FOR REM12 FOR LITH DESC 14'-20'
46	15									
45	16									
44	17									
43	18									
42	19									
41	20		33	CLAY	ORANGE BRN					BLOWS 20'-22' = WOH-1/18"

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW12
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 61.110

TOTAL DEPTH : 26.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57/B-61
 DATE STARTED : 11/12/90
 DATE COMPLETED : 01/17/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				CLAY	ORANGE BRN					BLOWS 20'-22' = WOH-1/18"
				SAND, tr GRAVEL	BRN		SAT			GRVL F SAND C TR M SAND
40	21									
39	22			GRAVEL and CLAY, tr SILT	LT BRN		SAT			GRVL F-M BLOWS 22'-24' = WOH/12" WOH/12" TR BRN, SAT, M-C SAND W LTL F GRVL @ 22.25'
38	23									
37	24		21	SAND, tr GRAVEL	BRN	LSE	SAT			GRVL F/SAND M-C GRADES UP TO F-M SAND V TR F GRVL /BLOWS 24'-25' = WOH/12" - WOH/12" INSTALLED 2" WELL TO 25'
36	25									
35	26									
34	27									
33	28									
32	29									
31	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	26.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R SANSONE/J RHYNER
WELL ID :	RFW13	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/16/91
ELEVATION :	68.620	DATE COMPLETED :	01/18/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			50	SAND, sm SILT, tp CLAY, t- f GRAVEL, tp ORGANIC	REDDISH BRN		WET	15 20-25		SAND F-M GRVL F-M PLAS BAG @ .75' NSA/4" ID [FILL]
67	1			SAND, tp CLAY, tp GRAVEL, - tp SILT, tp ORGANIC	DK OLIVE BRN		MST			SAND F-M GRVL F
66	2		28	SAND, tp CLAY, tp GRAVEL, - tp SILT, tp ORGANIC	DK OLIVE BRN		MST	15 20-25		SAND F-M GRVL F-M SAND F-M/ TR-LTL C SAND GRVL F-M
65	3			SAND, tp GRAVEL, tp SILT, - tp ORGANIC	MED-RED BRN					
64	4		33	SAND				10 15-20 35		SAND F INCL WOOD, PLAS, GLASS, ALUM, AND LEAVES
63	5									
62	6		16	SAND, sm SILT, tp CLAY	REDDISH BRN		SAT	25 30-35 22		SAND F INCL PLAS/WOOD/POTTERY
61	7									
60	8		4	SAND, tp GRAVEL	DK OLIVE BRN		SAT	22 25-30 10		SAND F GRVL F-M INCL TR WOOD FRGS <1/4" DIA
59	9									
58	10		4	SAND			SAT	6 7 6		INCL PLAS/SAND/TR WOOD CUT-SAND/RAGS/WOOD

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW13
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 68.620

TOTAL DEPTH : 26.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 01/16/91
 DATE COMPLETED : 01/18/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
57	11			SAND			SAT			INCL PLAS/SAND/TR WOOD CUT=SAND/BAGS/WOOD
56	12		62	SILT, sm CLAY, tr ORGANIC	DK OLIVE	STF		150		INSTALLED 2" PIEZOMETER TO 11'
55	13									VIS PLNT 1/16"-1/8" DIA PLAS BAG @ 13'
54	14		12	CLAY ORGANIC	OLIVE DK BRN	SFT	HST	6		INCL PLAS BAGS/WOOD VIS PLNT 1/4" LENGTH
53	15									
52	16		75	ORGANIC, tr SAND, tr SILT	OLIVE	SFT	WET	5		SAND F VIS PLNT 1.5" LENGTH
51	17			ORGANIC	DK BRN	LSE	WET			VIS PLNT 1/2" LENGTH CHGES TO BLK WHEN EXP TO AIR
50	18		100	SAND, tr ORGANIC	OLIVE	LSE	SAT			BLOWS 18'-20.5'=5-6-7-17- VIS PLNT 2" LENGTH
49	19			CLAY and SILT	REDDISH BRN					VARVED SILT & CLAY SEAMS
48	20		41	SAND	MED BRN	LSE	SAT			SAND F-C
				SAND, tr GRAVEL	MED BRN	LSE	SAT	7		SAND F-C GRVL CGI/HS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	26.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R SANSONE/J RHYNER
WELL ID :	RFW13	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	01/16/91
ELEVATION :	68.620	DATE COMPLETED :	01/18/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
47	21			SAND, tr GRAVEL	MED BRN	LSE	SAT			SAND F-C GRVL F CGI/MS=NR
46	22		50	SAND, lt GRAVEL	MED-REDDISH BRN	LSE	SAT	24 25		SAND M-C/TR F SAND GRVL F-M/TR C GRVL IRON OXID 22.5'-23'
45	23									
44	24		50	SAND	REDDISH BRN	LSE	WET			SAND VF-F BLOWS 24'-26'=16-19-100/4
43	25			SAND, lt GRAVEL	TAN	FRM	WET			SAND VF-F GRVL F/TR M GRVL/ANG-SUB INSTALLED 2" WELL TO 24.5
42	26									SLOW DRILLING AT 25.7' BLOWS AT 26'=500/04
41	27									
40	28									
39	29									
38	30									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 123.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW14	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/22/91
ELEVATION : 118.870	DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
117	1			INTERVAL NOT SAMPLED						HSA/B* HNU/BKD=0.1-0.3 UNITS CGI/BKD=NR
116	2									SOUPY CUT @ 2'
115	3									
114	4									
113	5									HNU/HS=0.2 UNITS CGI/HS=2X LEL
112	6									
111	7									
110	8									HNU/CUT=NR
109	9									
108	10			INTERVAL NOT SAMPLED						HNU/HS=0.4>BKD HNU/BZ=BKD TEMP=45 DEG C HNU/CUT=BKD CGI/HS=BKD

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 123.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW14	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/22/91
ELEVATION : 118.870	DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
107	11			INTERVAL NOT SAMPLED						HMU/HS=0.4>BKD HMU/BZ=BKD TEMP=45 DEG C HMU/CUT=BKD CGI/NS=BKD
106	12									
105	13									
104	14									
103	15									
102	16									HMU/HS=6.6 UNITS>BKD HMU/BZ=0.2 UNITS>BKD CGI/HS=2% LEL DRGR(VC)/HS=NR DRGR(BTX)/HS=5 ppm DRGR(BTX)/BZ= 0.6 ppm
101	17									
100	18									
99	19									
98	20			INTERVAL NOT SAMPLED						CGI/NS=4% LEL HMU/HS=2.0 UNITS>BKD HMU/BZ=BKD HMU/CUT=BKD

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	123.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW14	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/22/91
ELEVATION :	118.870	DATE COMPLETED :	01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						CGI/HS=4% LEL HNU/HS=3.0 UNITS>BKD HNU/BZ=BKD HNU/CUT=BKD
97	21									
96	22									HNU/BZ=NR
95	23									
94	24									
93	25									HNU/HS=10.2 UNITS>BKD HNU/HS=1.2 UNITS HNU/BZ=0.4 UNITS CGI/HS=5% LEL
92	26									
91	27									HNU/CUT=0.1>BKD HNU/TON=0.2>BKD HNU/BZ=BKD
90	28									
89	29									
88	30			INTERVAL NOT SAMPLED						HNU/HS=17 UNITS>BKD HNU/GH FROM HS=2.0 UNITS HNU/1" FROM HS=0.4 UNITS HNU/BZ=0.1 UNITS>BKD

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	123.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW14	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/22/91
ELEVATION :	118.870	DATE COMPLETED :	01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HNU/HS=17 UNITS>BKD HNU/6" FROM HS=2.0 UNITS HNU/1' FROM HS=0.4 UNITS HNU/BZ=0.1 UNITS>BKD CGI/HS=16% LEL
87	31									
86	32									HNU/TON=0.4 UNITS>BKD HNU/BZ=0.1 UNITS>BKD
85	33									
84	34									
83	35									HNU/HS=1-5 UNITS>BKD HNU/BZ=0.1 UNITS>BKD CGI/HS=10% LEL CGI/HS=5% GAS
82	36									
81	37									
80	38									HNU/TON=0.4 UNITS>BKD HNU/BZ=0.2 UNITS>BKD
79	39									
78	40			INTERVAL NOT SAMPLED						HNU/HS=2.8 UNITS>BKD HNU/6" FROM HS=1 UNIT HNU/BZ=0.2 UNITS>BKD CGI/HS=26% LEL

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 123.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW14	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/22/91
ELEVATION : 118.870	DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HNU/HS=2.8 UNITS>BKD HNU/6" FROM HS=1 UNIT HNU/B2=0.2 UNITS>BKD CGI/HS=28% LEL
77	41									
76	42									
75	43									
74	44									
73	45									CGI/HS=26% LEL HNU/HS=0.5 UNITS (CAPPED) HNU/HS=2 UNITS>BKD HNU/B2=0.6 UNITS>BKD DRGR WITH CAPPED AUGER HEAD 612=4 ppm @ HS XYLENE=11 ppm @ HS VC=0.3 ppm @ HS
72	46									
71	47									HNU/TON=0.6 UNITS>BKD HNU/BKD=0.2-0.4 UNITS RAD/BKD=0-10 mS/HR RAD/TON-CUT=5-7 mS/HR
70	48									
69	49									
68	50			INTERVAL NOT SAMPLED						HNU/HS=0.6 UNITS>BKD HNU/1" ABOVE HS=0.2 UNITS CGI/HS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW14
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 118.870

TOTAL DEPTH : 123.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/22/91
 DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
67	51			INTERVAL NOT SAMPLED						HMU/HS=0.6 UNITS>BKD HMU/17 ABOVE HS=0.2 UNITS CGI/HS=NR
66	52									HMU/TOH=0.6 UNITS>BKD HMU/BZ=NR
65	53									
64	54									
63	55									HMU/HS=4.8 UNITS>BKD HMU/17 ABOVE HS=0.4 UNITS CGI/HS=75-85% LEL
62	56									
61	57									
60	58									
59	59									
58	60			INTERVAL NOT SAMPLED						HMU/HS=5.2 UNITS>BKD HMU/17 ABOVE HS=0.6 UNITS CGI/HS=40% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW14
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 118.870

TOTAL DEPTH : 123.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/22/91
 DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=5.2 UNITS>BKD HMU/17 ABOVE HS=0.6 UNITS CGI/HS=402 GAS
57	61									
56	62									HMU/TON=0.6 UNITS>BKD
55	63									DIFFICULT DRILLING 63-65'
54	64									
53	65									HMU/HS=4-15 UNITS>BKD HMU/17 ABOVE HS=0.6 UNITS CGI/HS=322 GAS
52	66									REDRILLED 65' HMU/HS=5-18 UNITS>BKD HMU/18 ABOVE HS=.6 UNITS CGI/HS=20-332 GAS
51	67									
50	68									
49	69									
48	70			INTERVAL NOT SAMPLED						HMU/HS=4-17 UNITS>BKD CGI/HS=402 GAS HMU/18 ABOVE HS=.8 UNITS DRGR/STX(HS)=5 ppm

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	123.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW14	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/22/91
ELEVATION :	118.870	DATE COMPLETED :	01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HHU/HS=4-17 UNITS>BKD CGI/HS=60% GAS HHU/18" ABOVE HS=.8 UNITS DRGR/BTX(HS)=5 ppm MCN MONOTOX=POSITIVE HHU/TON=0.2 UNITS>BKD
47	71									
46	72									
45	73									
44	74									
43	75									HHU/HS=5-19 UNITS>BKD HHU/HS 2'=.8 UNITS>BKD CGI/HS=60% LEL
42	76									HHU/HS=2-4 UNITS>BKD HHU/HS 1'=.6 UNITS>BKD INSTALLED 4" WELL TO 77' SWL/WEEL=61'
41	77									
40	78									HHU/BKD=0.4 UNITS HHU/HS=4.4 UNITS>BKD HHU/17" ABOVE HS=0.7>BKD CGI/HS=45% GAS
39	79									
38	80			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 123.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER
WELL ID	: RFW14	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-67
EASTING	: 0.0000	DATE STARTED	: 01/22/91
ELEVATION	: 118.870	DATE COMPLETED	: 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
37	81									
36	82									HMU/TOM=0.2 UNITS>BKD HMU/BZ=0.1 UNITS>BKD HMU/CUT=BKD
35	83									HMU/HS=4.6 UNITS>BKD HMU/1' ABOVE HS=0.6>BKD CGI/HS=30% GAS
34	84									AUGERS SINK EASILY @ 84' D&W/5"
33	85									
32	86									
31	87									
30	88									HMU/HS=3.0 UNITS>BKD HMU/1' ABOVE HS=0.4>BKD CGI/HS=5% GAS
29	89		100	SILT, sm ORGANIC, LF SAND	DK OLIVE		MST	6 11 13		COLLECTED CHEM SMPL SB-7 TR PLNT/TR BLK ORG PRYGS TR VF SAND SPOON OVERDRIVEN 12"
28	90									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 123.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW14	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/22/91
ELEVATION : 118.870	DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
27	91			SILT, sm ORGANIC, tr SAND	DK OLIVE		MST			COLLECTED CHEM SMPL S8-7 TR PLNT/TR BLK ORG PRGS TR V SAND SPOON OVERDRIVEN 12"
26	92		100	SILT, sm ORGANIC, tr SAND	DK OLIVE		MST			PUSHED SHELBY RFW-14-SH1 S27-02, SAND V TR PLNT/TR BLK ORG PRGS SUL/HOLE=72
25	93									
24	94		75	SILT, sm ORGANIC, tr SAND	DK OLIVE		MST	2		TR PLNT TR V SAND PRGS
23	95									ON/5" @ 95'
22	96		66	SILT, sm CLAY	DK OLIVE		MST	UNKN		TR PLNT @ 96' NO PLNT @ 98'
21	97									
20	98		66	SILT, sm ORGANIC, tr SAND	DK OLIVE		MST	UNKN		TR F SAND PRGS
19	99									
18	100		100	SILT, sm CLAY	DK GRAY		MST	UNKN		REDDISH GRAY @ 101.5'

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW14
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 118.870

TOTAL DEPTH : 123.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/22/91
 DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
17	101			SILT, sm CLAY	DK GRAY		MST			REDDISH GRAY @ 101.5'
16	102		79	SILT, sm CLAY	REDDISH GRAY		MST			
15	103									
14	104		71	SILT, sm CLAY, tr SAND	REDDISH GRAY		MST			TR M SAND LTL F DK GRAY BLEBS
13	105									
12	106		75	CLAY, sm SILT	REDDISH GRAY		MST			CONTAINS GRAY & BLK BLEBS BLOWS 106'-108'-MON/24
11	107									
10	108		66	CLAY, sm SILT	REDDISH GRAY	SFT	MST			CONT GRAY & BLK BLEBS CLAY LTR @ 108.7' BLOWS 108'-110'-MON-MON-3 -4
9	109									
8	110		80	CLAY, tr SILT	BROWN-GRAY	SFT				PUSHED SHELBY RFW-14-SH2 110'-112'

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 123.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER
WELL ID	: RFW14	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-67
EASTING	: 0.0000	DATE STARTED	: 01/22/91
ELEVATION	: 118.870	DATE COMPLETED	: 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
7	111			CLAY, tr SILT	BROWN-GRAY	SFT				PUSHED SHELBY RFW-14-SH2 110'-112'
6	112									
5	113		100	CLAY, tr SILT	BRN-RED BRN-GRY	SFT		2		INTRLYRD CLAYS
4	114			SILT, sm CLAY, tr SAND	REDDISH BRN-BRN		WET			INTRLYRD CLAY AND SILT INCL SILT LAYERS INCL CLAY SEAMS TR F SAND SEAMS
3	115		100	SILT, tr CLAY, tr SAND	REDDISH BRN-BRN		WET	2		INTRLYRD CLAY AND SILT INCL SILT LYRS INCL CLAY SEAMS TR F SAND SEAMS
2	116									
1	117		100	INTERVAL NOT SAMPLED						
0	118			SILT, tr CLAY, tr SAND	REDDISH BRN		SAT	2		TR CLAY AND VF SAND SEAMS
0	119		41	CLAY, tr SILT, tr SAND	REDDISH BRN		SAT	2		ONE 2" LYS SILTY SAND TR CLAY SEAMS
-1	120									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW14
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 118.870

TOTAL DEPTH : 123.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/22/91
 DATE COMPLETED : 01/30/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-2	121		75	SILT, lt CLAY, tr SAND	REDDISH BRN		MST	4		TR CLAY SEAMS TR F SAND SEAMS
-3	122									
-4	123									
-5	124									
-6	125									
-7	126									
-8	127									
-9	128									
-10	129									
-11	130									

ROY F. WESTON, Inc.

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CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFW15
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 133.380
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TOTAL DEPTH : 148.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/31/91
 DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						MMU/BKD=0.2 UNITS CGI/BKD=NR NSA/B=10
132	1									
131	2									
130	3									
129	4									
128	5									MMU/TON=0.6>BKD MMU/BZ=BKD CGI/IN HOLE=3% GAS TEMP/BOT OF HOLE=7 DEG C
127	6									
126	7									
125	8									
124	9									
123	10			INTERVAL NOT SAMPLED						MMU/HS=0-4 UNITS>BKD MMU/12" ABOVE HS=BKD CGI/HS=0% TEMP 210'=45 DEG C

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
122	11			INTERVAL NOT SAMPLED						HHU/HS=0-4 UNITS>BKD HHU/12" ABOVE HS=BKD CGI/HS=0% GAS TEMP @10' = 45 DEG C
121	12									
120	13									
119	14									
118	15									
117	16									
116	17									
115	18									
114	19									
113	20									
				INTERVAL NOT SAMPLED						HHU/HS=1 UNIT >BKD HHU 12" ABOVE HS=BKD CGI/HS=3% GAS TEMP @15' = 50 DEG C
				INTERVAL NOT SAMPLED						HHU/HS=4 UNITS>BKD HHU/67=BKD HHU/12" ABOVE HS=BKD CGI/HS=13% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
112	21			INTERVAL NOT SAMPLED						HHU/NS=4 UNITS>BKD HHU/B2=BKD HHU/12" ABOVE NS=BKD CGI/NS=13% GAS
111	22									
110	23									
109	24									
108	25									HHU/NS=5 UNITS>BKD HHU/B2-18" ABOVE NS=BKD HHU/STEAM=3 UNITS>BKD CGI/NS=5% GAS DRGR/VC 6" ABOVE NS=NR DRGR/BEN2 6" ABOVE NS=NR DRGR/BEN2 6" ABOVE NS - AFTER 10 PUMPS=2 ppm
107	26									
106	27									
105	28									
104	29									
103	30			INTERVAL NOT SAMPLED						HHU/NS=7 UNITS>BKD HHU/STEAM=3 UNITS>BKD HHU/B2=BKD CGI/NS=15% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
102	31			INTERVAL NOT SAMPLED						HNU/HS=7 UNITS>BKD HNU/STEAM=3 UNITS>BKD HNU/BZ=BKD CGI/HS=15% GAS AUGERS VENTING STEAM @30'
101	32									
100	33									
99	34									
98	35									
97	36									HNU/HS=1 UNIT>BKD HNU/BZ=BKD CGI/HS=35% GAS CGI/5' IN AUGERS=60% GAS
96	37									
95	38									
94	39									
93	40			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/MS=1 UNIT>BKO HMU/BZ=BKO CGI/IN AUGERS=50% GAS
92	41									
91	42									
90	43									
89	44									
88	45									HMU/MS=3 UNITS>BKO HMU/BZ=BKO SLOW DRILLING 45'-48'
87	46									
86	47									
85	48									
84	49									
83	50			INTERVAL NOT SAMPLED						DRGR/VC(BZ)=0.2 ppm DRGR(BZ)/BENZ=10L XYL=5 ppm HMU/STEAM=2.5 UNITS>BKO

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW15
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 133.380

TOTAL DEPTH : 148.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/31/91
 DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						DRGR/VG(BZ)=0.2 ppm DRGR(BZ)BENZ=10L-KYL=5ppm HMU/STEAM=2.5 UNITS>BKD
82	51									
81	52									HMU/BKD=0.3 UNITS HMU/TON=1.8 UNITS>BKD
										SAT CUTTINGS @ 52.5' RAD/CUT= 10 MR/HR
80	53									HMU/CUT=0.3 UNITS>BKD CGI/TON=10% GAS HMU/TON=4.1 UNITS>BKD HMU/3' DUNWIND=2.0>BKD
79	54									
78	55									HMU/TON=2.5 UNITS>BKD HMU/3' DUNWIND=1.5>BKD
77	56									HMU/TON=5 UNITS>BKD HMU/3' DUNWIND=0.6>BKD UPGRADE TO LEVEL C PROT.
76	57									
75	58									
74	59									
73	60			INTERVAL NOT SAMPLED						HMU/HS=15 UNITS>BKD HMU/3' DUNWIND=1.4>BKD CGI/HS= 50 % GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=15 UNITS>BKD HMU/3' DOWNWIND=1.4>BKD CGI/HS= 50 % GAS
72	61									
71	62									
70	63									HMU/TON=2.2 UNITS>BKD HMU/2' DOWNWIND=0.8>BKD DRGR/VC=0.75 ppm 8' TON DRGR/VC=0.2 ppm 1' DOWNWIND
69	64									
68	65									HMU/HS=4.4 UNITS>BKD HMU/17' DOWNWIND=1.6>BKD CGI/HS=33% GAS
67	66									
66	67									
65	68									
64	69			INTERVAL NOT SAMPLED						HMU/HS=4.2 UNITS>BKD HMU/17' DOWNWIND=0.8>BKD CGI/HS=30% GAS
63	70			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
62	71									
61	72									
60	73									SAT CUTTINGS @ 73.5'
59	74									HMU/TON=1.8 UNITS>BKD
58	75									
57	76									HMU/TON=0.6-1.7 UNITS>BKD HMU/BZ=0.3 UNITS>BKD HMU/CUT=0.3 UNITS>BKD
56	77									HMU/TON=0.6 UNITS>BKD HMU/BZ=0.2 UNITS>BKD
55	78									
54	79									HMU/HS=0.9-2.5 UNITS>BKD CGI/HS=4.5-5.8% GAS HMU/BZ=0.3-1.6 UNITS>BKD
53	80			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 148.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW15	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/31/91
ELEVATION : 133.380	DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
52	81									
51	82									
50	83									
49	84									HNH/BZ=0.4 UNITS>BKD
48	85									
47	86									HNH/TOW=2.0 UNITS>BKD HNH/BZ=BKD
46	87									
45	88									
44	89									HNH/HS=4.2 UNITS>BKD HNH/1' FROM BZ=0.2>BKD HNH/3' FROM BZ=0.7>BKD HNH/5' FROM BZ=0.1>BKD CGI/HS= 56% GAS
43	90			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
42	91									
41	92									
40	93									
39	94									HMU/HS=0.8 UNITS>BKD HMU/B2=0.2 UNITS>BKD CGI/HS=42% GAS OR/5"
38	95									
37	96									
36	97									
35	98									HMU/BKD=0.2 UNITS HMU/B2=0.2 UNITS>BKD 4" WELL INSTALLED TO 97' LOST 1000 GAL DURING INST
34	99									HMU/HS=0.8 UNITS>BKD HMU/B2=0.2 UNITS>BKD
33	100		54	FILL			WET	11 90 25 27	HMU 1.4	WOOD PLAS METAL PAPER- GLASS LITTLE COBBLES HMU/HS=0.2 UNITS>BKD CGI/HS=42% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 148.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW15	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/31/91
ELEVATION : 133.380	DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
32	101			FILL			WET		HNU 1.4	WOOD, PLAS, METAL, PAPER-GLASS, LITTLE COBBLES HNU/HS=0.4 UNITS>BKD CGI/HS=44% GAS
31	102			INTERVAL NOT SAMPLED						BOREHOLE GROUTED UP AFTER SAMPLING NATIVE SOILS TO 103'
30	103									
29	104									
28	105		58	FILL	REDDISH BRN		WET	10		WOOD, PLAS, RUBR, GLAS, METAL LTL F RED-BRN SAND LTL C GRVL
27	106			ORGANIC	OK REDDISH BRN		MST			INCL GRASS AND ROOTS HNU/HS=0.4 UNITS>BKD CGI/HS=30% GAS
26	107			INTERVAL NOT SAMPLED						
25	108			NO RECOVERY						HNU/HS=0.4 UNITS>BKD DEM/5"
24	109									
23	110		8	ORGANIC	OK BROWN					INCL METAL FRAGS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW15
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 133.380

TOTAL DEPTH : 148.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/31/91
 DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
22	111			ORGANIC	DK BROWN					INCL METAL FRAGS
21	112			NO RECOVERY						LT GREY SILT IN SPOON TIP
20	113									
19	114		100	SILT, sm ORGANIC	OLIVE BROWN		MST			COLLECTED CHEM SMPLE SB-8 114'-116'
18	115									
17	116		83	SILT, sm ORGANIC	OLIVE BROWN		MST			BLOWS 116'-118'-WON-WON-2 -2
16	117									
15	118		50	SILT, sm ORGANIC	OLIVE BROWN		MST			BLOWS 118'-120'-WON-WON-2 -3
14	119									
13	120		100	SILT, sm ORGANIC	OLIVE BROWN		MST			PUSHED SHELBY RFW-15-SH1 120'-122'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	148.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER
WELL ID :	RFW15	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	01/31/91
ELEVATION :	133.380	DATE COMPLETED :	02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
12	121			SILT, sm ORGANIC	OLIVE BROWN		MST			PUSHED SHELBY RFW-15-SH1 120'-122'
11	122		83	SILT, sm ORGANIC	OLIVE BROWN		MST			
10	123									
9	124		100	SILT, sm ORGANIC	OLIVE BROWN		MST			BLOWS 124'-126' = WOR/24"
8	125									
7	126		66	SILT, sm ORGANIC	OLIVE BROWN	SFT	MST			BLOWS 126'-128' = WOR/24"
6	127									
5	128		75	SILT, sm ORGANIC	OLIVE BROWN	SFT	MST		NMU 0.4	BLOWS 128'-130' = WOR/24"
4	129									
3	130		66	SILT, sm ORGANIC	OLIVE BROWN		MST			BLOWS 130'-132' = WOR/24" LOST 200 GAL WATER @ 130' HOLE COLLAPSING

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW15
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 133.380

TOTAL DEPTH : 148.00
 LOGGER : J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 01/31/91
 DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
2	131			SILT, sm ORGANIC	OLIVE BROWN		MST			BLOWS 130'-132' = MOR/24" LOST 200 GAL WATER @ 130' HOLE COLLAPSING
1	132		83	SILT, sm ORGANIC, lt CLAY- tr SAND	OLIVE-DK GRAY B	SFT	WET			SAND F BLOWS 132'-134' = MOR/24"
0	133									
0	134		37	SILT, sm CLAY	DARK GRAY		MST			BLOWS 134'-136' = MOR/24"
-1	135									
-2	136		41	SILT, sm CLAY, tr ORGANIC	DK GY-DK OL BRN		MST			BLOWS 136'-138' = MOR/24"
-3	137									
-4	138			INTERVAL NOT SAMPLED						
-5	139		100	CLAY, sm SILT	DK GY-LT TAN GY		MST			BLOWS 139'-141' = MOR/24" FREQ PRGS AND SEAMS HOLE COLLAPSING AT 140'
-6	140									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 148.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER
WELL ID : RFW15	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 01/31/91
ELEVATION : 133.380	DATE COMPLETED : 02/15/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-7	141		66	CLAY, sm SILT	DK GY-LT TAN GY		MST			BLOWS 139'-141' = 10R/24" FREQ PRGS AND SEAMS HOLE COLLAPSING AT 140'
-8	142			CLAY, sm SILT	DK GRY-RED GRAY		MST			BLOWS 141'-143' = 10R/24" FREQ PRGS AND SEAMS
-9	143			INTERVAL NOT SAMPLED						
-10	144		63	CLAY, sm SILT	GRAY-BRN					PUSHED SHELBY RFW-15-SH2 144'-146.5'
-11	145									
-12	146									
-13	147		100	CLAY	REDDISH GRAY		MST			INCL GRAY AND BLK BLESS BLOWS 146.5'-148' = 10R/18" ABANDON HOLE DUE TO COLLAPSING CONDITIONS
-14	148									
-15	149									
-16	150									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW16
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 137.370

TOTAL DEPTH : 114.00
 LOGGER : J RHYNER/J HAGETT
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 02/15/91
 DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HSA/BMTD HNU/BKD=0.5 UNITS
136	1									
135	2									
134	3									
133	4									
132	5									
131	6									
130	7									
129	8									HNU/TOH=14 UNITS>BKD WET CUT @ 8'
128	9									
127	10			INTERVAL NOT SAMPLED						HNU/RS=0.6 UNITS>BKD HNU/RT=SKD CGI/RS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 114.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/J HAGETT
WELL ID	: RFW16	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-67
EASTING	: 0.0000	DATE STARTED	: 02/15/91
ELEVATION	: 137.370	DATE COMPLETED	: 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=0.6 UNITS>BKD HMU/BZ=BKD CGI/HS=NR
126	11									
125	12									
124	13									
123	14									
122	15									HMU/HS=0.6>BKD HMU/BZ=BKD HMU/CUT=0.5>BKD CGI/HS=BKD
121	16									
120	17									
119	18									
118	19									
117	20			INTERVAL NOT SAMPLED						HMU/HS=2 UNITS>BKD HMU/BZ=BKD CGI/HS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	114.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/J HAGETT
WELL ID :	RFW16	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	02/15/91
ELEVATION :	137.370	DATE COMPLETED :	02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HNU/HS=2 UNITS>BKD HNU/BZ=BKD CGI/HS=NR
116	21									HARD DRILLING WITH 1200 PSI DOWNPRESSURE
115	22									
114	23									
113	24									
112	25									HNU/BKD=0.2 UNITS HNU/HS=BKD CGI/HS=NR HNU/BZ=BKD
111	26									
110	27									HNU/TON=0.2 UNITS>BKD
109	28									
108	29									
107	30			INTERVAL NOT SAMPLED						HNU/BZ=BKD HNU/HS=0.4 UNITS>BKD CGI/HS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	114.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/J HAGETT
WELL ID :	RFW16	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	02/15/91
ELEVATION :	137.370	DATE COMPLETED :	02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HNU/BZ=BKD HNU/HS=0.4 UNITS>BKD CGI/HS=NR
106	31									
105	32									
104	33									
103	34									
102	35									HNU/BZ=0.6 UNITS>BKD HNU/HS=1.2 UNITS>BKD HNU/17 FROM HS=0.8>BKD CGI/HS=5% GAS RAD/BKD=7 LB/HR RAD/CLY=7 LB/HR HNU SENSITIVE TO MOISTURE IN AIR FROM 35'-60'
101	36									
100	37									
99	38									
98	39									
97	40			INTERVAL NOT SAMPLED						HNU/HS=4.0 UNITS>BKD HNU/17 FROM HS=1.4>BKD CGI/HS=5% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW16
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 137.370

TOTAL DEPTH : 114.00
 LOGGER : J RHYNER/J HAGETT
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 02/15/91
 DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HHU/HS=4.0 UNITS>BKO HHU/17 FROM HS=1.4>BKO CGI/HS=5X GAS
96	41									
95	42									
94	43									
93	44									
92	45									CGI/HS=22X GAS
91	46									
90	47									
89	48									
88	49									
87	50			INTERVAL NOT SAMPLED						CGI/HS=35X GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW16
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 137.370

TOTAL DEPTH : 114.00
 LOGGER : J RHYNER/J HAGETT
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 02/15/91
 DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						CGI/HS=35% GAS
86	51									
85	52									
84	53									
83	54									
82	55									CGI/HS=40% GAS
81	56									
80	57									
79	58									
78	59									
77	60			INTERVAL NOT SAMPLED						CGI/HS=45% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW16
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 137.370

TOTAL DEPTH : 114.00
 LOGGER : J RHYNER/J HAGETT
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 02/15/91
 DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						CGI/HS=45% GAS
76	61									
75	62									
74	63									
73	64									HMU/BKD=0.3 UNITS HMU/HS=1.2 UNITS-BKD HMU/1" FROM HS=0.6-BKD HMU/BZ=0.2 UNITS-BKD CGI/HS=30% GAS
72	65									
71	66									
70	67									
69	68									
68	69									
67	70			INTERVAL NOT SAMPLED						HMU/HS=1.0-BKD HMU/1" FROM HS=0.4-BKD CGI/HS=16% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW16
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 137.370

TOTAL DEPTH : 114.00
 LOGGER : J RHYNER/J HAGETT
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 02/15/91
 DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=1.0-BKD HMU/17 FROM HS=0.4-BKD CGI/HS=16% GAS
66	71									
65	72									
64	73									
63	74									
62	75									HMU/HS=2.5-3.5 UNITS>BKD HMU/17 FROM HS=1.4>BKD CGI/HS=58% GAS DRGR/VC=0.6 ppm @ HS K2S-HCN/AUGERS>10ppm
61	76									DRGR/VC=<0.1ppm 2' DOWNHOLE DRGR/BZ=>60ppm @ HS DRGR/BZ=15ppm 1' DOWNHOLE HMU/BZ=0.4 UNITS>BKD
60	77									
59	78									
58	79									
57	80			INTERVAL NOT SAMPLED						HMU/HS=3.0 UNITS>BKD HMU/BZ=1.2 UNITS>BKD CGI/HS=54% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFW16
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 137.370

TOTAL DEPTH : 114.00
 LOGGER : J RHYNER/J HAGETT
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-67
 DATE STARTED : 02/15/91
 DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
56	81			INTERVAL NOT SAMPLED						NNU/HS=3.0 UNITS>BKD MMU/BS=1.2 UNITS>BKD CGI/HS=54 % GAS
55	82									
54	83									
53	84									
52	85									NNU/HS=2.0 UNITS>BKD MMU/BS=1.0 UNITS>BKD CGI/HS=48% GAS
51	86									
50	87									INSTALLED 4" WELL TO 87' GROUTED HOLE UP TO 94' AFTER SAMPLING NATIVE SOIL NNU/HS=0.5-2 UNITS
49	88									
48	89									
47	90			INTERVAL NOT SAMPLED						NNU/HS=1.2 UNITS>BKD MMU/BS=0.2 UNITS>BKD CGI/HS=42% GAS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	114.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/J HAGETT
WELL ID :	RFW16	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	02/15/91
ELEVATION :	137.370	DATE COMPLETED :	02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						HMU/HS=1.2 UNITS>BKD HMU/17 FROM HS=0.2>BKD CGI/HS=42% GAS
46	91									
45	92									
44	93									
43	94		83	CLAY, LT SILT	RED-GRAY	SFT	MST	2	HMU 0.3	BLACK BLEDs PRESENT HMU/HS=0.2 UNITS>BKD CGI/HS=16% GAS
42	95									
41	96		87	CLAY, LT SILT	RED AND GRAY	SFT	MST			PUSHED SHELBY RFW-16-SH1 20'-96" DE BLEDs PRESENT 5" CASING SET TO 96' OH/4"
40	97									
39	98		100	CLAY, LT SILT	RED AND LT GRAY	SFT	MST	2		INTRLYRD RED AND LT GRAY CLAY
38	99									
37	100		66	CLAY, LT SILT	RED	SFT	MST	2		VARVED CLAY @ 101' VARIES INCL CLAY SEAMS & FINE SAND PARTINGS

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	114.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/J HAGETT
WELL ID :	RFW16	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-67
EASTING :	0.0000	DATE STARTED :	02/15/91
ELEVATION :	137.370	DATE COMPLETED :	02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
36	101			CLAY, tr SILT	RED	SFT	MST			VARVED CLAY @ 101' VARVES INCL CLAY SEAMS & FINE SAND PARTINGS
35	102		8	CLAY, tr SILT	RED	SFT	MST			BLOWS 102'-104' = WOR/24"
34	103									
33	104		21	CLAY	RED	SFT	MST			BLOWS 104'-106' = WOR/24"
32	105									
31	106		8	CLAY	RED		MST	3 2 2		VARVED CLAY W/ F SAND PARTINGS
30	107									
29	108			NO RECOVERY				9 11 13 8		
28	109									
27	110		8	SAND, lt SILT, tr CLAY	RED		SAT			SAND F-M

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 114.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : J RHYNER/J HAGETT
WELL ID : RFW16	DRILLING COMPANY : MOORETRENCH AMERICAN
NORTHING : 0.0000	DRILLING RIG : B-67
EASTING : 0.0000	DATE STARTED : 02/15/91
ELEVATION : 137.370	DATE COMPLETED : 02/26/91

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
26	111			SAND, lt SILT, tr CLAY	RED		SAT			SAND F-M
25	112		41	SAND, tr SILT	RED		SAT	16 24 22		SAND F-M HNU/MS-TOH=NR
24	113									
23	114									
22	115									
21	116									
20	117									
19	118									
18	119									
17	120									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB12
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 61.110

TOTAL DEPTH : 45.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/12/90
 DATE COMPLETED : 11/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
60	1			INTERVAL NOT SAMPLED						REFER TO LOG FOR RFW12 FOR INTERVALS NOT SAMPLED BELOW 64W/8"ID
59	2									
58	3									
57	4									
56	5									
55	6									
54	7									
53	8									
52	9									
51	10			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 45.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R SANSONE/J RHYNER
WELL ID	: RFWB12	DRILLING COMPANY	: MOORETRENCH AMERICAN
NORTHING	: 0.0000	DRILLING RIG	: B-57
EASTING	: 0.0000	DATE STARTED	: 11/12/90
ELEVATION	: 61.110	DATE COMPLETED	: 11/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
50	11									
49	12									
48	13									
47	14		83	ORGANIC	DK BRN	SFT	SAT	2		
46	15									
45	16		54	ORGANIC	DK BRN	SFT	SAT			BLOWS 16'-18' = MON/12"-1-1 18' PLNT 18' C SAND AND F GRVL FROM 16.83'-17.08'
44	17									
43	18		50	SAND and SILT, tr GRAVEL, - tr ORGANIC	DK BRN-DK PK BH		SAT			GRVL F-M/SAND F-M BLOWS 18'-20' = MON/24" FLUSHED HOLE AT 18' 024/64
42	19									
41	20			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB12
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 61.110

TOTAL DEPTH : 45.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/12/90
 DATE COMPLETED : 11/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
40	21									
39	22									
38	23									
37	24									
36	25		50	SAND and CLAY	GRY-DK RD BRN			3		SAND F-M/TR C SAND
				SAND, tr SILT	BRN	LSE	SAT	5		INTRLYRD CLAY AND SAND
35	26			GRAVEL, tr SAND		LSE	SAT			
34	27		33	GRAVEL, tr SAND, tr SILT	DK REDDISH BRN		SAT	5		GRVL F/TR M GRVL
				SAND and GRAVEL	DK REDDISH BRN		SAT	4		SAND C /TR M SAND
33	28									GRVL VF
32	29			NO RECOVERY				13		WOOD FRAG BLOCKED NOSE OF
								15		SPOON
								12		ADDED MUD TO DRILL WATER
31	30		33	SAND and GRAVEL				20		SAND C
								25		GRVL F
								12		MLOS 30'-32' = APRX 150 GAL

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	45.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R SANSONE/J RHYNER
WELL ID :	RFWB12	DRILLING COMPANY :	MOORETRENCH AMERICAN
NORTHING :	0.0000	DRILLING RIG :	B-57
EASTING :	0.0000	DATE STARTED :	11/12/90
ELEVATION :	61.110	DATE COMPLETED :	11/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
30	31			SAND and GRAVEL						SAND C GRVL F WLOS 30'-32' APRX 150 GAL
29	32			INTERVAL NOT SAMPLED						CUT=F GRVL AND C SAND ROUGH DRILLING 9" 31' 8" CASING DROPPED 9" WLOS=150 GAL 33'-33.5'
28	33									
27	34									
26	35									WLOS=APRX 40 GAL 33.5' DROVE CASING AHEAD OF ROLLER BIT THROUGH COARSE MATERIAL 35'-44'
25	36									
24	37		8	NO RECOVERY			28.0%			CUT=F GRVL AND C SAND WLOS=150 GAL 37'-41' CASING DROPPED WHEN DRILLING 39'-39.5'
23	38									
22	39			INTERVAL NOT SAMPLED						
21	40			INTERVAL NOT SAMPLED						

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB12
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 61.110

TOTAL DEPTH : 45.00
 LOGGER : R SANSONE/J RHYNER
 DRILLING COMPANY : MOORETRENCH AMERICAN
 DRILLING RIG : B-57
 DATE STARTED : 11/12/90
 DATE COMPLETED : 11/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
20	41									CASING BLOCKED @ 41'
19	42									
18	43									
17	44									BIT GRINDING ON CASING ABANDONED BORING FLUSHED MUD OUT OF CASING AND GROUTED TO SURFACE
16	45									
15	46									
14	47									
13	48									
12	49									
11	50									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
62.1	1		4	SAND, tr GRAVEL, tr SILT	DK BRN		DRY	2		HSA/2.5"ID
61.2	2		8	SAND, tr GRAVEL, tr SILT	DK BRN		DRY	6		
60.3	3							0		
59.4	4		8	SAND, tr GRAVEL, tr SILT	DK BRN		DRY	4	HNU 0.2	INCL WOOD/PLAS BAGS
58.5	5							4		
57.6	6		50	SAND, tr CLAY, tr SILT, tr GRAVEL, tr ORGANIC	DK BRN-RED BRN			6		SAND F-C GRVL F INCL GLASS/PLAS HNU/HS-BZ=NR
56.7	7			SAND and GRAVEL, tr SILT	GRAY		WET	10		SAND F-C GRVL F
55.8	8		4	SAND			WET	2		SAND C INCL EDBD/GLASS
54.9	9							10		
53.10	10		12	SAND, sm GRAVEL	BROWN		MST	29		SAND F-C/MOTTLED GRVL N/ANG HNU/HS=NR

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 134.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFWB7	DRILLING COMPANY	: R&R DRILLING
NORTHING	: 0.0000	DRILLING RIG	: D-80
EASTING	: 0.0000	DATE STARTED	: 07/25/90
ELEVATION	: 63.000	DATE COMPLETED	: 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
52	11			SAND, sm GRAVEL	BROWN		WST			SAND F-C/MOTTLED GRVL W/ANG HNU/MS=NR
51	12		8	SAND, LF GRAVEL, LF CLAY, - tr SILT	DK GRAY		WET	2	RAD	SAND C/ GRVL F/ HSA/B=ID HNU/MS-CUT=NR CGI=NR HNU/BKD=0.3 UNITS RAD/BKD=.03 RR/HR
50	13									
49	14		25	SAND	BLACK		WET	20	HNU 0.6	INCL NEWS/WOOD/GLASS
48	15									
47	16		75	ORGANIC	DK BRN					TR-LTL PART DEC PLNT
46	17									
45	18		58	ORGANIC	DK BRN					TR-LTL PART DEC PLNT
44	19									
43	20			INTERVAL NOT SAMPLED						INSTALL 6" TEMP CASING FLUSH CSNG W/150 GAL WTR DEN/4" WITH MUD SCL/ 6" CASING @ 7'

Borehole Log

ROY F. WESTON, Inc.

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CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFWB7
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 63.000
```

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

[illegible]

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
32	31		66	CLAY, LF SAND, LF ORGANIC	BROWN	SFT				BLOWS 31'-34' = WOR/18" = LOH/8" = 4-5 SAND VF 1" DEC PLNT 1" GRAY CLAY LAYER
31	32									
30	33									
29	34		66	CLAY, LF SILT	REDDISH BRN					SEAMS OF VARVED CLAY & CLAYEY SILT BLOWS 34'-37' = WOR/12" = 2-1 1-1
28	35									
27	36									
26	37			INTERVAL NOT SAMPLED						
25	38									
24	39									
23	40		55	SILT, LF CLAY, LF SAND	REDDISH BRN					VF SAND LAYER BLOWS 40-43' = 3-4-9-10-10-9

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 134.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFWB7	DRILLING COMPANY	: R&R DRILLING
NORTHING	: 0.0000	DRILLING RIG	: D-80
EASTING	: 0.0000	DATE STARTED	: 07/25/90
ELEVATION	: 63.000	DATE COMPLETED	: 08/15/90

[illegible]

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
12	51		50	SAND, lt GRAVEL	REDDISH BRN		WET	21		SAND M-C/SUB GRVL F-C/SUB FINES UPWARDS 50'-51.5'
				SAND, lt GRAVEL, lt SILT	REDDISH BRN		MST	0		VF-F SAND 51.5'-51.52' SAND F-C/SUBANG GRVL F-C/SUB WLOS=70 GAL @ 52'
11	52									
10	53			INTERVAL NOT SAMPLED						
9	54		19	SAND, lt GRAVEL	REDDISH BRN		WET	31		SAND M-C/SUB GRVL F-C/SUB FINES UPWARDS 50'-51.5'
8	55									
7	56		19	SAND and GRAVEL, lt SILT	REDDISH BRN			31		SAND F-C GRVL F-C/SUB
6	57									
5	58		4	GRAVEL, lt SAND	GRAY-BRN			25		GRVL F-C/SUB SAND F-H/SUBANG WLOS 58'-60'=30 GAL NRU B2=NR
4	59									
3	60		10	GRAVEL, lt SAND	DK RED		DRY	17		GRVL F-H/SUB SAND F-C

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
		50% 0.0		GRAVEL, lt SAND	DK RED		DRY			GRVL F-H/SUB SAND F-C
2	61									
1	62			NO RECOVERY				16.000		WLOS 60'-62'=40 GAL
0	63									
-1	64		12	SAND, tp GRAVEL	MED BRN			11.4		SAND F-C/SUB GRVL F-H/SUB WLOS 62'-64'=30 GAL
-2	65									
-3	66			NO RECOVERY				42.3		WLOS 64'-66'=30 GAL HNU/BKD=0.4 UNITS
-4	67							37		WLOS=50+ GAL @ 70'
-5	68			NO RECOVERY				45		
-6	69							50		
-7	70		6	SAND, sm GRAVEL, sm SILT	MED BRN					BLOWS 70'-70.75'=50/4"- 64/2"-50/6"-57/6"-50/3" SAND F-C/SUBANG GRVL F-C/SUBANG

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 134.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: J RHYNER/R SANSONE
WELL ID	: RFWB7	DRILLING COMPANY	: R&R DRILLING
NORTHING	: 0.0000	DRILLING RIG	: D-80
EASTING	: 0.0000	DATE STARTED	: 07/25/90
ELEVATION	: 63.000	DATE COMPLETED	: 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-8	71			SAND, sm GRAVEL, sm SILT	MED BRN					BLOWS 70'-70.75'=50/4" 67/2"-50/6"-57/6"-50/3" SAND F-C/SUBANG GRVL F-C/SUBANG
-9	72		50	INTERVAL NOT CLASSIFIED						NY ROCK CORING REC BASLT-GNEISS-QTZTE WLOS 70'-72'=40 GAL
-10	73		46	INTERVAL NOT CLASSIFIED						REC 2 BASALT FRAGS WLOS=50 GAL @ 73' WLOS=900 GAL 56'-73' SWL/CASING=3.11"
-11	74									
-12	75		16	INTERVAL NOT CLASSIFIED						REC FAC BASLT-QTZTE-GNEISS ARKOSE FORMTH CAVING @ 75'
-13	76									MMU/BKD=0.6 UNITS MMU/BZ=0.2 UNITS>BKD MMU/HS=NR CGI/HS=NR
-14	77		48	INTERVAL NOT CLASSIFIED						REC BASLT-GNEISS-QTZTE
-15	78									
-16	79		100	INTERVAL NOT CLASSIFIED						REC BASLT-MUDSTN-QTZTE MMU/BZ=NR
-17	80		100	INTERVAL NOT CLASSIFIED						REC=GRVL/SUB WLOS=750-800 GAL 75'-80'

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT CLASSIFIED						REC=GRVL/SUB WLOS=750-800 GAL 75'-80'
-18	81		86	INTERVAL NOT CLASSIFIED						REC=BASLT FRAGS WLOS=700 GAL @ 82'
-19	82									
-20	83		12	INTERVAL NOT CLASSIFIED						REC=BASALT FRAGS HNU/HS=NR CGI/HS=NR
-21	84									
-22	85			NO RECOVERY						PUSHED THROUGH LOOSE SAND AND GRAVEL AS PER DRILLER
-23	86									
-24	87		25	INTERVAL NOT CLASSIFIED						REC=BASLT-SLTSN-GTGT- GNEISS
-25	88									
-26	89			NO RECOVERY						CUT=SAND-METAL WLOS=50 GAL @ 89' MIX 50 LBS SENT TO DRILTR
-27	90			NO RECOVERY						WLOS=950 GAL 78'-80'

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				NO RECOVERY						WLOS=950 GAL 78'-80'
-28	91		22	INTERVAL NOT CLASSIFIED						REC BASLT-GNEISS-SANDW
-29	92									
-30	93									
-31	94		33	INTERVAL NOT CLASSIFIED						REC BASLT-GNEISS-GABBRO
-32	95									
-33	96		28	INTERVAL NOT CLASSIFIED						REC BASLT-SLTSW-QTZTE WLOS=850 GAL 8-96'
-34	97									
-35	98		21	INTERVAL NOT CLASSIFIED						REC SILTSTONE FRAGS HMO/BAD=1.1 UNITS
-36	99									
-37	100		16	INTERVAL NOT CLASSIFIED	GRAYISH GREEN					SUBRD BASLT IN SLTY CLAY MATRIX [FILL]

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB7
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 63.000

TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-38	101			INTERVAL NOT CLASSIFIED	GRAYISH GREEN					SUBRD BASLT IN SLTY CLAY MATRIX [FILL]
-39	102									WLOS=900 GAL @ 102' HNU/HS=NR CGI/HS=NR
-40	103									
-41	104		8	INTERVAL NOT CLASSIFIED						GNS BLD IN SLTY MATRIX HNU/BKD=1.0-1.6 UNITS HNU/HS=NR
-42	105									
-43	106									
-44	107									
-45	108		83	INTERVAL NOT CLASSIFIED						GNEISS/BASALT WITH RED SLTY MATRIX
-46	109									
-47	110		33	INTERVAL NOT CLASSIFIED						PEG FRAGS-GNEISS-BASLT IN CLAYEY SILTY MATRIX WLOS=400 GAL 108'-110' HNU/HS=NR [FILL]

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	134.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFWB7	DRILLING COMPANY :	R&R DRILLING
NORTHING :	0.0000	DRILLING RIG :	D-80
EASTING :	0.0000	DATE STARTED :	07/25/90
ELEVATION :	63.000	DATE COMPLETED :	08/15/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT CLASSIFIED						PEG FRAGS-GNEISS-BASLT IN CLAYEY SILT MATRIX VLOS=400 GAL 108'-110' HNU/HS=NR [TILL]
-48	111									
-49	112									HNU/DRLWTR 110'-112'=NR
-50	113									VLOS=750 GAL @ 113' HNU/BOD=0 UNITS HNU/HS-CUT=NR SWL/CAS=10'
-51	114									
-52	115									
-53	116									
-54	117									
-55	118		100	SILT, sm CLAY, lt SAND	RED					SAND F SWL/BOD=19' HNU/HS=NR [SAPROLITE]
-56	119									
-57	120		62	MEDIUM SANDSTONE	PALE RED	STR				120.0-124.0 slt

Borehole Log

ROY F. WESTON, Inc.

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CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFWB7
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 63.000
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TOTAL DEPTH : 134.00
 LOGGER : J RHYNER/R SANSONE
 DRILLING COMPANY : R&R DRILLING
 DRILLING RIG : D-80
 DATE STARTED : 07/25/90
 DATE COMPLETED : 08/15/90

[illegible]

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	134.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	J RHYNER/R SANSONE
WELL ID :	RFWB7	DRILLING COMPANY :	R&R DRILLING
NORTHING :	0.0000	DRILLING RIG :	D-80
EASTING :	0.0000	DATE STARTED :	07/25/90
ELEVATION :	63.000	DATE COMPLETED :	08/15/90

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
			FRS	MEDIUM TO FINE SANDSTONE	MCO RED BROWN	MEK	2	0.0		Post 125.2-134.0 high water Fract 125.2-125.5, 125.8- 126.1, 126.7-126.6, 127.1-- 127.3, 128.7-128.9
-68	131									
-69	132									
-70	133									
-71	134									
-72	135									
-73	136									
-74	137									
-75	138									
-76	139									
-77	140									

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	97.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER
WELL ID :	RFWB9	DRILLING COMPANY :	R&R DRILLING COMPANY
NORTHING :	0.0000	DRILLING RIG :	DK-5
EASTING :	0.0000	DATE STARTED :	07/24/90
ELEVATION :	65.000	DATE COMPLETED :	08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			50	SAND, lt CLAY, lt SILT, t- r GRAVEL	DK REDDISH BRN		MST	1-1		SAND M-C/GRVL F-M HNU/BKD=0.3 UNITS HSA/4=1D
64	1			SILT, sm SAND, tr CLAY	DK BROWN					
63	2		12	GRAVEL and SAND, tr SILT				19	HNU 0.1	SAND M-C/INCL ROCK FRAGS ASPHALT IN SPOON TIP SUL/AUGERS=3' CGI-HNU/HS=NR
62	3									
61	4		16	SAND, sm SILT, lt GRAVEL, - tr ORGANIC	BROWN			2-19		1/2" LAYER OF LEAVES GRVL F-M
60	5									
59	6		21	SAND, tr GRAVEL	DK BROWN		WET			SAND F-C GRVL F (BLK/ANG) BLOWS 6'-8'=6-50/2"
58	7									
57	8		8	SAND, tr SILT	GRAY		WET	21	HNU 0.2	RAGS, CONCRETE SAND F RAGS IN CUT
56	9									
55	10		16	FILL				12	HNU 300.0	GLASS-PAPER-UNDEC NEWS CLOTH-BLK STKY NAT-PLAS ODORS OF SPRAY PAINT

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB9
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 65.000

TOTAL DEPTH : 97.00
 LOGGER : R. SANSONE/J. RHYNER
 DRILLING COMPANY : R&R DRILLING COMPANY
 DRILLING RIG : DK-5
 DATE STARTED : 07/24/90
 DATE COMPLETED : 08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
54	11			FILL					HMU 300.0	GLASS-PAPER-UNDEC NEWS CLOTH-BLK STKY MAT-PLAS DOORS OF SPRAY PAINT
53	12		8	FILL				2	HMU 150.0	PLAS-GLS-PAPER-NAIR-PLAS
52	13									
51	14		12	FILL				4	HMU 0.8	PLAS-COBD-UNDEC NEWS-GLSS HMU/HS=NR
50	15							4		
49	16		8	FILL				4		PART DEC NEWS-WOOD-WIRE HMU/BZ=NR HMU/HS=7.5 UNITS>BKD BLOWS 16'-18'-19-50/5"
48	17									
47	18			INTERVAL NOT SAMPLED			MET			HMU/CUTTINGS=0.6>BKD HMU/BZ=NR 19'-HMU/HS-CUT=4.0>BKD RAD/BKD=.035=NR/NR
46	19									
45	20		58	SAND	GRAY		MET	1	HMU 3.0	SAND VF-F/INCL WOOD-PLAS HSA/B=10 HMU/HS=7.0-9.0>BKD

Borehole Log

ROY F. WESTON, Inc.

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CLIENT      : TOWN OF CLARKSTOWN
SITE NAME   : CLARKSTOWN LANDFILL
WELL ID     : RFWB9
NORTHING    : 0.0000
EASTING     : 0.0000
ELEVATION   : 65.000
```

TOTAL DEPTH : 97.00
 LOGGER : R.SANSONE/J.RHYNER
 DRILLING COMPANY : R&R DRILLING COMPANY
 DRILLING RIG : DK-5
 DATE STARTED : 07/24/90
 DATE COMPLETED : 08/17/90

[illegible]

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN
 SITE NAME : CLARKSTOWN LANDFILL
 WELL ID : RFWB9
 NORTHING : 0.0000
 EASTING : 0.0000
 ELEVATION : 65.000

TOTAL DEPTH : 97.00
 LOGGER : R.SANSONE/J.RHYNER
 DRILLING COMPANY : R&R DRILLING COMPANY
 DRILLING RIG : DK-5
 DATE STARTED : 07/24/90
 DATE COMPLETED : 08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
34	31									HMU/HS=0.4>BKD HMU/CLT=2.0-6.5>BKD HMU/82=0.2>BKD
33	32			NO RECOVERY		LSE	SAT	3		REC 1" F GRVL-CLAY-GLASS SLIGHT WATER LOSS DRILLING WATER CHANGED
32	33									
31	34		50	CLAY, LT SILT	DK REDDISH BRN					DROVE SPOON(34'-38') BLOWS=VOR/1'-VOR/1'-1/2' 1" V THIN DK GRAY CLAY LAM
30	35									
29	36									
28	37									
27	38		100	CLAY, LT SILT	DARK BROWN	LSE	SAT			DROVE 4' SPOON(38'-42') BLOWS=VOR-1-1-1-1-1-2
26	39									
25	40			CLAY	DK REDDISH BRN	LSE	SAT			V THIN LYRS OF GRAY AND DK REDDISH BRN CLAY

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	97.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R. SANSONE/J. RHYNER
WELL ID :	RFWB9	DRILLING COMPANY :	R&R DRILLING COMPANY
NORTHING :	0.0000	DRILLING RIG :	DK-5
EASTING :	0.0000	DATE STARTED :	07/24/90
ELEVATION :	65.000	DATE COMPLETED :	08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				CLAY	DK REDDISH BRN	LSE	SAT			V THIN LYRS OF GRAY AND DK REDDISH BRN CLAY
24	41			CLAY, LF SILT	DK REDDISH BRN	LSE	SAT			
23	42		75	CLAY, LF SILT	DARK BROWN					DROVE 4' SPOON (42'-46') BLS=NR/17-1-1-1-1-2 FAINT V THIN DK GRAY CLY LAMINATIONS
22	43			CLAY, LF SILT	DK REDDISH BRN					
21	44									
20	45			SAND CLAY, LF SILT	DARK BROWN					FINES UP FROM M-C TO F-M FAINT V THIN DK GRAY CLAY LAMINATIONS/TOTAL CLAY=1"
19	46		25	CLAY, LF SILT	BROWN	LSE	SAT			DROVE SPOON 4' (46'-50') BLS=NR/9-22-17-15-10-7 1/2" LAYER GRAY CLAY NRU/NS-BZ=NR
18	47									
17	48									
16	49									
15	50			NO RECOVERY						

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 97.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R. SANSONE/J. RHYNER
WELL ID	: RFWB9	DRILLING COMPANY	: R&R DRILLING COMPANY
NORTHING	: 0.0000	DRILLING RIG	: DK-5
EASTING	: 0.0000	DATE STARTED	: 07/24/90
ELEVATION	: 65.000	DATE COMPLETED	: 08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
14	51			NO RECOVERY						
13	52		21	GRAVEL, tr SAND, tr CLAY, - tr SILT				23		GRVL F-C/ANG-SUBRND SAND F-C
12	53									
11	54		8	GRAVEL, sm SAND, tr SILT	DK REDDISH BRN	LSE				GRVL F-C/SUBANG-ANG SAND F-M DROVE SPOON 3' (54'-57') BLOWS=20-11-5-16-14-6
10	55									
9	56									
8	57			INTERVAL NOT SAMPLED						
7	58		26	SAND, sm GRAVEL, tr SILT	BROWN	FRM	WET			SAND F-C/CBL-BLDR @ 59'3" GRVL F-M/SUBRND-SUBANG DROVE SPOON 57'-51'-48" BLOWS=18-19-15-20-50/4.5"
6	59									
5	60			INTERVAL NOT SAMPLED						BLDR @ 60' FLUSHED CASING w/100 GAL FRESH WTR STARTED USING MUD LOST 40 GAL MUD @ 61'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	97.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFWB9	DRILLING COMPANY :	R&R DRILLING COMPANY
NORTHING :	0.0000	DRILLING RIG :	DK-5
EASTING :	0.0000	DATE STARTED :	07/24/90
ELEVATION :	65.000	DATE COMPLETED :	08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT SAMPLED						
4	61									
3	62									
2	63									
1	64									
0	65									
-1	66		12	GRAVEL, sm SAND	OK REDDISH BRN					BLDR @ 60' FLUSHED CASING W/100 GAL FRESH WTR STARTED USING MUD LOST 40 GAL MUD @ 61'
-2	67									
-3	68			NO RECOVERY						
-4	69									
-5	70		33	INTERVAL NOT CLASSIFIED						ROCK FRGS(RD SLTSH AND GR SDSH) (TILL) FR SILT AND CLAY LOST 30 GAL MUD @ 70'

Borehole Log

ROY F. WESTON, Inc.

CLIENT :	TOWN OF CLARKSTOWN	TOTAL DEPTH :	97.00
SITE NAME :	CLARKSTOWN LANDFILL	LOGGER :	R.SANSONE/J.RHYNER
WELL ID :	RFWB9	DRILLING COMPANY :	R&R DRILLING COMPANY
NORTHING :	0.0000	DRILLING RIG :	DK-5
EASTING :	0.0000	DATE STARTED :	07/24/90
ELEVATION :	65.000	DATE COMPLETED :	08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT CLASSIFIED						ROCK FRAGS(RD SLTSH AND GR SDSH) (TILL) TR SILT AND CLAY LOST 30 GAL MUD @ 70'
-6	71									
-7	72		28	INTERVAL NOT CLASSIFIED	GRYISH GREEN					GRVL C (F GRAINED SDSH) LOST 30 GAL MUD @ 72'
-8	73									
-9	74		41	INTERVAL NOT CLASSIFIED	RD BROWN					GRVL M-C (GREEN SDSH) CLAYEY SILT BOUND TO GRVL FRAGS
-10	75									
-11	76		54	INTERVAL NOT CLASSIFIED	REDDISH BROWN					GRVL F-C (GREEN SDSH) (TILL)
-12	77									
-13	78		79	INTERVAL NOT CLASSIFIED						ROCK FRAGS(ARKOSIC SDSH) LOST 70 GAL MUD @ 78'
-14	79				GREEN					ROCK FRAGS(F-H GRD SDSH)
-15	80		16	INTERVAL NOT CLASSIFIED	PALE GRN-RED					ROCK FRAGS F GRD SDSH AND SLTSH (TILL)

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 97.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R. SANSONE/J. RHYNER
WELL ID : RFWB9	DRILLING COMPANY : R&R DRILLING COMPANY
NORTHING : 0.0000	DRILLING RIG : DK-5
EASTING : 0.0000	DATE STARTED : 07/24/90
ELEVATION : 65.000	DATE COMPLETED : 08/17/90

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
-16	81			INTERVAL NOT CLASSIFIED	PALE GRN-RED					ROCK FRAGS F GRD SDSH AND SLTSH [FILL]
-17	82									
-18	83									
-19	84									
-20	85			NO RECOVERY						
-21	86									
-22	87			NO RECOVERY						DROVE SPOON 9" (87'-87'9") [FILL]
-23	88		29	SAND and SILT	REDDISH BROWN					V THINLY INTERBEDDED
-24	89									
-25	90		12	INTERVAL NOT CLASSIFIED	REDDISH BROWN					GRVL C (SANDY SLTSH) [FILL]

Borehole Log

ROY F. WESTON, Inc.

CLIENT	: TOWN OF CLARKSTOWN	TOTAL DEPTH	: 97.00
SITE NAME	: CLARKSTOWN LANDFILL	LOGGER	: R.SANSONE/J.RHYNER
WELL ID	: RFWB9	DRILLING COMPANY	: R&R DRILLING COMPANY
NORTHING	: 0.0000	DRILLING RIG	: DK-5
EASTING	: 0.0000	DATE STARTED	: 07/24/90
ELEVATION	: 65.000	DATE COMPLETED	: 08/17/90

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT CLASSIFIED	REDDISH BROWN					GRVL C (SANDY SLTSH) (FILL)
-26	91									
-27	92		100	FINE SANDSTONE	PALE RED BROWN	MEK				pot: 95-97; lost 350 gal/9- 8-97; 92-94; 1-95; 64.1- 64.5; slt: 94.3-95.1 sh: 95-9- 5.4 hgh; 95.4-96.8 fsh; hgh
-28	93									
-29	94									
-30	95									
-31	96									
-32	97									
-33	98									
-34	99									
-35	100									

Borehole Log

ROY F. WESTON, Inc.

CLIENT : TOWN OF CLARKSTOWN	TOTAL DEPTH : 97.00
SITE NAME : CLARKSTOWN LANDFILL	LOGGER : R.SANSONE/J.RHYNER
WELL ID : RFWB9	DRILLING COMPANY : R&R DRILLING COMPANY
NORTHING : 0.0000	DRILLING RIG : DK-5
EASTING : 0.0000	DATE STARTED : 07/24/90
ELEVATION : 65.000	DATE COMPLETED : 08/17/90

ELEVATION	DEPTH	MATERIAL	WEATHERING	CLASSIFICATION	COLOR	STRENGTH	FRACT./FT.	WATER GPM	FIELD INSTRUMENT READING	COMMENTS
				INTERVAL NOT CLASSIFIED	REDDISH BROWN					GRVL C (SANDY SLTSH) [FILL]
-26	91									
-27	92		SLT	FINE SANDSTONE	PALE RED BROWN	WEK	3	0.0		lost 95-97; lost 350 gal/9-9-9; 92-94 fsh; 94 f-94.3 slt; 94.3-95 fsh; 95-9-5.4 hgh; 95.4-96.8 fsh; hgh
-28	93									
-29	94									
-30	95									
-31	96									
-32	97									
-33	98									
-34	99									
-35	100									

**TOWN OF CLARKSTOWN
ROCKLAND COUNTY, NEW YORK**

**TRANSFER STATION
SITE STUDY**

**TEST PIT LOGS
BORING LOGS
SOIL ANALYSIS
SOIL TESTS**

DEC No. 3-3920-18-2-0

Velzy ASSOCIATES

Charles R Velzy Associates, Inc.
A wholly-owned subsidiary of Roy F. Weston, Inc.
Valhalla, New York
Carle Place, Long Island, New York

DATE STARTED: 8-31-89		WESTERN		SHEET 1 OF 2 BORING NO. SB-1	
DATE FINISHED: 9-1-89		BORING REPORT		PROJECT NO. 3228-10-01	
CLIENT: Town of Clarkstown					
PROJECT NAME AND LOCATION: Clarkstown Landfill-Transfer Station					
DRILLING CONTRACTOR: CC Construction				DRILLER: V. Rotunda	
INSPECTOR: J. Rhyner				SURFACE ELEVATION: +66 ft MSL (approx)	
EQUIPMENT:	CASING	SOIL SAMPLER		AUGER	DRILLING RIG/METHOD
		SPLIT SPOON (SS)	UNDISTURBED (US)		
TYPE:	Black steel	Shelby tube		Continuous flight	CME 55 auger/rotary combination
SIZE:	4 inch	2 inch O.D.		I.D. 4.25 inch	DRILLING FLUID
HAMMER:		140 lb/30 in.	Hydraulic Push	O.D. 6 inch	
GROUNDWATER AT ± 5 FT. AFTER perched H ₂ O.				± 8 FT. AFTER in well H ₂ O.	

DEPTH BELOW SURF. (FT)	CASING BLOWS PER FT.	SAMPLE DATA			TIME/PRESSURE OR BLOWS PER 6".	STRATA CHANGE DEPTH/ ELEV.	DESCRIPTION AND REMARKS
		TYPE & NO.	DEPTH (FT) FROM TO	REQ. (IN)			
5							Perched water @ 4.5 ft
							Rough drilling
10							
15		SS-1	13	15	6 6 30 34	FILL	Dk br mcS, s. f, t. fG, t. wood (FILL)
20		SS-2	18	20	2 4 4 4		Rd br fmS, s. f, s. Cl, l. G (FILL)
25		SS-3	23	25	20 8 4 5		Convert to rotary method @ 25 ft. Piece of gravel in spoon
		SS-4	25	27	3 3 1 2	25'0"	Bk pt, s. f
		SS-5	27	29	3 4 3 4		Br pt
30		US-1	29.5	31.5	Hydraulic Push 4 2 2 3	PEAT	Br pt Collect Shelby tube of peat
		SS-6	31.5	33.5			Dk gr br pt
							Collect sample for lab analysis, SB-11, composite of SS-4, SS-5
35		SS-7	35	37	1 1 1 1	35'0"	Br o f, t. fG
						SILT	
40							

PROPORTION PERCENTAGES: TRACE: 0-10%, LITTLE: 10-20%, SOME: 20-35%, AND: 35-60%

GRANULAR SOILS (BLOWS PER FT.)

0-4 VERY LOOSE	30-60 DENSE
4-10 LOOSE	OVER 60 VERY DENSE
10-30 MEDIUM DENSE	

COHESIVE SOILS (BLOWS PER FT.)

0-2 VERY SOFT	8-16 STIFF
2-4 SOFT	16-30 VERY STIFF
4-8 MEDIUM STIFF	OVER 30 HARD

DATE STARTED:		WESTERN		SHEET 2 OF 2		BORING NO. SB-1																																																																																																																				
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DATE STARTED: 9-1-89		WESTON		SHEET 1 OF 1		BORING NO. SB-2	
DATE FINISHED: 9-5-89		BORING REPORT		PROJECT NO. 3228-10-01			
CLIENT: Town of Clarkstown							
PROJECT NAME AND LOCATION: Clarkstown Landfill - Transfer Station							
DRILLING CONTRACTOR: CC Construction				DRILLER: V. Rotunda			
INSPECTOR: J. Rhyner				SURFACE ELEVATION: +6.8 ft MSL (approx.)			
EQUIPMENT:		CASING		SOIL SAMPLER		AUGER	
				SPLIT SPOON (SS)	UNDISTURBED (US)		
TYPE:						DRILLING RIG/METHOD	
SIZE:						CME 55 Auger/rotary	
HAMMER:						DRILLING FLUID	
		2 inch O.D.				Continuous flight combination	
		140 lb/30 in.				LD. 4.25 inch	
						O.D. 6 inch	

GROUNDWATER AT 2 FT. AFTER PERCHED						FT. AFTER		HRS.	
DEPTH BELOW SURF. (FT)	CASING BLOWS PER FT.	SAMPLE DATA			TIME/PRESSURE OR BLOWS PER FT.	STRATA CHANGES DEPTH/ ELEV.	DESCRIPTION AND REMARKS		
		TYPE & NO.	DEPTH (FT) FROM TO	REQ. (IN)					
5									
10									
15									
20		SS-1	18	20	10	3 3 2 2			Perched water @ 2.0 ft
		SS-2	20	22	2	2 2 2 2	20'0"		FILL
25		SS-3	23	25	5	1 3 2 2			Dk br a. gr fcs, l. \$, t. pt (FILL)
							20'0"		Br pt.
							PEAT		Br pt
30		SS-4	28	30	20	1 1 2 2	27'0"		Dk br FS, l. o \$, t. lys \$
		SS-5	30	32	18	WOR 1 2 2	FINE SAND AND SILT		Alt lys dk br FS a. o \$ w/cl
							32'0"		Collect sample SB-2-1 for lab analysis, composite of SS-2, SS-3, SS-4, and SS-5
							END OF BORING		Sealed native deposits with Benseal.

PROPORTION PERCENTAGES: TRACE: 0-10%, LITTLE: 10-20%, SOME: 20-50%, AND: 50-80%

GRANULAR SOILS (BLOWS PER FT.)

0-4 VERY LOOSE	30-50 DENSE
4-10 LOOSE	OVER 50 VERY DENSE
10-20 MEDIUM DENSE	

COHESIVE SOILS (BLOWS PER FT.)

0-2 VERY SOFT	6-15 STIFF
2-4 SOFT	15-30 VERY STIFF
4-8 MEDIUM STIFF	OVER 30 HARD

DATE STARTED: 9-5-89		WESTON		SHEET 1 OF 2 BORING NO. SB-3	
DATE FINISHED: 9-6-89		BORING REPORT		PROJECT NO. 3228-10-01	
CLIENT: Town of Clarkstown					
PROJECT NAME AND LOCATION: Clarkstown Landfill - Transfer Station					
DRILLING CONTRACTOR: CC Construction				DRILLER: V. Rotunda	
INSPECTOR: J. Rhyner				SURFACE ELEVATION: +72 ft. msl (approx.)	
EQUIPMENT:		SOIL SAMPLER		AUGER	
CASING		SPLIT SPOON (SS) UNDISTURBED (US)		DRILLING RIG/METHOD	
TYPE: Black steel		Shelby tube		CME 55 auger/rotary combination	
SIZE: 4 inch		2 inch O.D.		I.D. 4.25 inch	
HAMMER:		140 lb / 30 in. Hydraulic push		O.D. 6 inch	
GROUNDWATER AT		FT. AFTER		HRS.	
DEPTH BELOW SURF. (FT)		TYPE & NO.		DEPTH (FT) FROM TO	
CASING BLOWS PER FT.		REQ. (IN)		TIME/PRESSURE OR BLOWS PER 8".	
				STRATA CHANGE DEPTH/ ELEV.	
DESCRIPTION AND REMARKS					
5					
10					
15					
20		SS-1	18	20	3
25		SS-2	23	25	5
30		SS-3	28	30	2
		SS-4	30	32	0
35		SS-5	33	35	8
40					
5 4 4 5 11 15 50/0" 100/3" 11 14 8 25 1 1 6 8 FILL Rd br \$, l. cl, t. FG, t. wood (FILL) Rough drilling to 23 ft. Br mcS, l. cl a. \$, a. mG (FILL) Rough drilling to 28 ft. Pc of decomposed concrete (FILL) Br fmS, l. \$ a. cl, t. FG (FILL) Rough drilling @ 38 ft.					
PROPORTION PERCENTAGES: TRACE: 0-10%, LITTLE: 10-20%, SOME: 20-35%, AND: 35-60%					
GRANULAR SOILS (BLOWS PER FT.)			COHESIVE SOILS (BLOWS PER FT.)		
0-4 VERY LOOSE			0-2 VERY SOFT		
4-10 LOOSE			2-4 SOFT		
10-30 MEDIUM DENSE			4-8 MEDIUM STIFF		
30-50 DENSE			8-10 STIFF		
OVER 50 VERY DENSE			15-30 VERY STIFF		
			OVER 30 HARD		

DATE STARTED:		WESTON		SHEET 2 OF 2 BOREING NO. SB-3			
DATE FINISHED:		BORING REPORT		PROJECT NO.			
CLIENT:							
PROJECT NAME AND LOCATION:							
DRILLING CONTRACTOR:				DRILLER:			
INSPECTOR:				SURFACE ELEVATION:			
EQUIPMENT:	CASING	SOIL SAMPLER		AUGER	DRILLING RIG/METHOD		
		SPLIT SPOON (SS)	UNDISTURBED (US)				
TYPE:							
SIZE:				I.D.	DRILLING FLUID		
HAMMER:				O.D.			
GROUNDWATER AT		FT. AFTER		HRS.			
DEPTH BELOW SURF. (FT.)	CASING BLOWS PER FT.	SAMPLE DATA			TIME/PRESSURE OR BLOWS PER 6".	STRATA CHANGE DEPTH/ ELEV.	DESCRIPTION AND REMARKS
		TYPE & NO.	DEPTH (FT) FROM TO	REQ. (IN)			
						FILL	
45		SS-6	43	45	0		
		SS-7	45	47	2		Dk br pt, t. gls, t. plastic
		SS-8	47	49	1		Dk br pt
50		SS-9	50	52	8		<u>Convert to rotary method.</u>
		SS-10	52	54	0		Dk br pt a. \$
55		SS-11	54	56	12		<u>Collect sample SB-3-1 for lab analysis, composite of SS-7, SS-8, SS-9 and SS-11</u>
		HS-1	57	59	20		Dk br o\$, l. cl, t. pt
60		SS-12	59	61	16		Dk br o\$ <u>Collect Shelby tube of organic silt</u>
		SS-13	63	65	24		Dk br rd vvd o\$ a. cl, t. lysrs o matter
65		SS-14	65	67	24		do, lower 2" is lt. br mS, t. \$
		SS-15	67	69	14		Lt br mS, t. \$, fines downwards into fS, t. lysrs dk br cla. \$
						62'0" VARYED CLAY AND SILT	
						66'6" SAND	
						69'0" END OF BORING	
							Sealed native deposits with Benscal.
							<u>Collect samples SB-3-2 and SB-3-3 (duplicate) for lab. analysis, composite of SS-13 and SS-14</u>

PROPORTION PERCENTAGES: TRACE: 0-10%, LITTLE: 10-20%, SOME: 20-35%, AND: 35-50%

GRANULAR SOILS (BLOWS PER FT.)		COHESIVE SOILS (BLOWS PER FT.)	
0-4 VERY LOOSE	30-50 DENSE	0-2 VERY SOFT	8-15 STIFF
4-10 LOOSE	OVER 50 VERY DENSE	2-4 SOFT	15-30 VERY STIFF
10-30 MEDIUM DENSE		4-8 MEDIUM STIFF	OVER 30 HARD

DATE STARTED: 9-7-89		WESTON		SHEET 1 OF 1 BORING NO. SB-4		
DATE FINISHED: 9-7-89		BORING REPORT		PROJECT NO. 3228-10-01		
CLIENT: Town of Clarkstown						
PROJECT NAME AND LOCATION: Clarkstown Landfill- Transfer Station						
DRILLING CONTRACTOR: CC Construction				DRILLER: V. Rotunda		
INSPECTOR: J. Rhyner				SURFACE ELEVATION: +72 ft. MSL (approx)		
EQUIPMENT:	CASING	SOIL SAMPLER		AUGER	DRILLING RIG/METHOD	
		SPLIT SPOON (SS)	UNDISTURBED (US)		CME SS auger/rotary	
TYPE:				Continuous flight	combination	
SIZE:		2 inch O.D.		I.D. 4.25 inch	DRILLING FLUID	
HAMMER:		140 lb / 30 in.		O.D. 6 inch		
GROUNDWATER AT		FT. AFTER		HRS.		
DEPTH BELOW SURF. (FT)	CASING BLOWS PER FT.	SAMPLE DATA		TIME/PRESSURE OR BLOWS PER 8".	STRATA CHANGE DEPTH/ ELEV.	
		TYPE & NO.	DEPTH (FT) FROM TO	REQ. (IN)	DESCRIPTION AND REMARKS	
5					FILL	
10						
40						
45						
		SS-1	45	47	15	45' 0" PEAT DK br pt, t. woody matter
		SS-2	47	49	15	
50						49' 0" END OF BORING Collect sample SB-4-1 for lab. analysis, composite of SS-1 and SS-2. Collect sample of drill water from rig water tank spigot, collect for VOA. Sealed native deposits with Benseal.
PROPORTION PERCENTAGES: TRACE: 0-10%, LITTLE: 10-20%, SOME: 20-35%, AND: 35-60%						
GRANULAR SOILS (BLOWS PER FT.)			COHESIVE SOILS (BLOWS PER FT.)			
0-4 VERY LOOSE			0-2 VERY SOFT			
4-10 LOOSE			2-4 SOFT			
10-20 MEDIUM DENSE			4-8 MEDIUM STIFF			
30-60 DENSE			8-16 STIFF			
OVER 60 VERY DENSE			16-30 VERY STIFF			
			OVER 30 HARD			

VISUAL IDENTIFICATION OF SAMPLES

The samples were identified in accordance with the American Society for Engineering Education System of Definition.

I. Definition of Soil Components and Fractions

Material	Symbol	Fraction	Sieve Size	Definition
Boulders	Bldr	—	9" +	Material retained on 9" sieve.
Cobbles	Cbl	—	3" to 9"	Material passing the 9" sieve and retained on the 3" sieve.
Gravel	G	coarse (c) medium (m) fine (f)	1" to 3" $\frac{3}{8}$ " to 1" No. 10 to $\frac{3}{16}$ "	Material passing the 3" sieve and retained on the No. 10 sieve.
Sand	S	coarse (c) medium (m) fine (f)	No. 30 to No. 10 No. 60 to No. 30 No. 200 to No. 60	Material passing the No. 10 sieve and retained on the No. 200 sieve.
Silt	\$	—	Passing No. 200 (0.074 mm)	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air dried.

Organic Silt (OS)
Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content, and exhibits fine granular and organic characteristics.

		Plasticity	Plasticity Index	
Clayey SILT	OS	Slight (SL)	1 to 5	Clay-Soil Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.
SILT & CLAY	\$&C	Low (L)	5 to 10	
CLAY & SILT	C&\$	Medium (M)	10 to 20	
Silty CLAY	\$yC	High (H)	20 to 40	
CLAY	C	Very High (VH)	40 plus	

II. Definition of Component Proportions

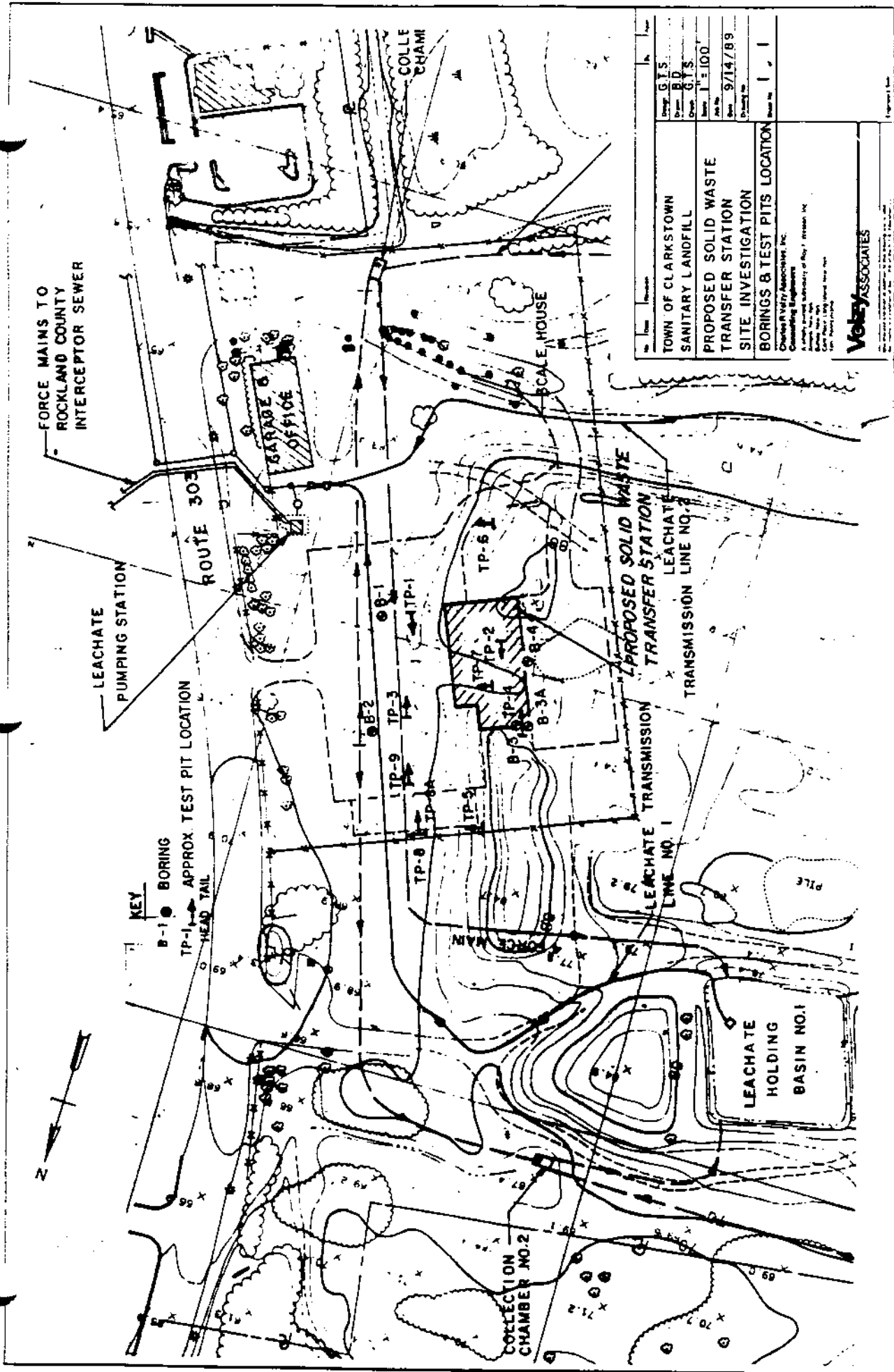
Component	Written	Proportions	Symbol	Percentage Range by Weight *
Principal	CAPITALS	—		50 or more
Minor	Lower Case	and some little trace	a. s. l. t.	35 to 50 20 to 35 10 to 20 1 to 10

* Minus sign (—) lower limit, plus sign (+) upper limit, no sign middle range.

III. Glossary of Modifying Abbreviations

Category	Symbol	Term	Symbol	Term	Symbol	Term
A. Borings	U/D	Undisturbed	B	Exploratory	A	Auger
B. Samples	C	Casing	L	Lost	U	Undisturbed
	D	Denison	S	Spoon	W	Wash
	O.E.	Open End				
C. Colors	bk	black	gn	green	wh	white
	bl	blue	or	orange	yw	yellow
	br	brown	rd	red	dk	dark
	gr	gray	tn	tan	lt	light
D. Organic Soils	dec	decayed	o	organic	veg	vegetation
	dec'g	decaying	rts	roots	pt	peat
	lig	lignite	ts	topsoil		
E. Rocks	LS	Limestone	rk	rock	Shst	Schist
	Gns	Gneiss	SS	Sandstone	Sh	Shale
F. Fill and Miscellaneous Materials	blr (s)	boulder (s)	cbl (s)	cobble(s)	gls	glass
	brk (s)	brick (s)	wd	wood	misc	miscellaneous
	cndr (s)	cinder (s)	dbr	debris	rbl	rubble
G. Miscellaneous Terms	do	ditto	pp	pocket	ref	refusal
	el, El	elevation		penetrometer	sm	small
	fgmt (s)	fragment(s)	P. I.	Plasticity Index	W. L.	water level
	frq	frequent			W. H.	weight of hammer
	lg	large	P	pushed	W. R.	weight of rods
	mtld	mottled		pressed		
	no rec	no recovery	pc (s)	piece (s)		
	pen	penetration	rec or R	recovered		
H. Stratified Soils	alt	alternating				
	thk	thick				
	thin	thin				
	w	with				
	prt	parting				
	seam	seam				
	lyr	layer				
	str	stratum				
	var c	varved Clay				
	pht	pocket				
	lms	lens				
	occ	occasional				
	freq	frequent				

- 0 to 1/16" thickness
- 1/16 to 1/2" thickness
- 1/2 to 12" thickness
- greater than 12" thickness
- alternating seams or layers of sand, silt and clay
- small, erratic deposit, usually less than 1 foot
- lenticular deposit
- one or less per foot of thickness
- more than one per foot of thickness



Project	Town of Clarkstown	Drawn	G.T.S.
Client	Sanitary Landfill	Checked	B.D.
Design	Proposed Solid Waste Transfer Station	Drawn	G.T.S.
Scale	Site Investigation	Sheet	1 of 100
Date	9/14/89	Drawn by	
Drawn by		Checked by	
Sheet No.	1	Sheet No.	1
Charles R. Votry Associates, Inc. Consulting Engineers A Limited Liability Company of Maryland, Inc. 1000 North ... Suite 100 ... Rockville, Maryland 20850			
Votry ASSOCIATES Professional Seal: State of Maryland, No. 10000, Exp. 12/31/90			

REPORT OF GEOTECHNICAL
AND HYDROGEOLOGIC INVESTIGATION
EXISTING LANDFILL
CLARKSTOWN, NEW YORK

for
CHARLES R. VELZY ASSOCIATES, INC

by
CONVERSE CONSULTANTS

9 OCTOBER 1986

PROJECT #79-07107-02

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 201S		
PROJECT Clarkstown Landfill-Clarkstown, N.Y.							SHT. NO. 1 OF 2			
CLIENT Charles R. Velzy Associates, Inc.							PROJ. NO. 79-07107-02			
CONTRACTOR C.C. Construction							ELEVATION 67.53			
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	HSA				DATE START 5/23/85	
6/17/85	-	10.47	PVC	DIA.	3 3/4				DATE FINISH 5/23/85	
				WT.					DRILLER S. Migliaccio	
				FALL					CWDD REP. S. Klapper	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 1.74'	6"	3"	
1					For strata description see Well No. 201D	Used hollow stem auger to ream hole to 18'	Installed protective locking cap			
2										
3							Used 20' of 6" casing (temporary)	Bentonite slurry seal 14' to surface		
4										
5								3" PVC riser 25'0" to (+)1.74'		
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
					Bottom of Fill Layer 18'6"	Lost water @ 18' (refuse)	Bentonite pellet seal 22' to 14'			
					Top of Peat Layer	Used revert below 20'	Top of #00 sand @ 22'0"			

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 2015	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 2	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24							3" PVC riser 25'0" to (+)1.74' Top of screen @ 25'0"
25							
26							#00 sand 22'0"-35'0"
27							
28							#10 slot 3" PVC well screen 25'0"- 35'0"
29							
30							
31							
32							
33							
34							
35							Bottom of screen @ 35'0"
36					End of monitoring well @ 35'0"		
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 202S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 2	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 61.20	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C. & G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATE START 5/15/85
6/17/85	-	4.82	PVC	DIA.	3 3/4"	2"			DATE FINISH 5/16/85
				WT.		140#			DRILLER S. Migliaccio
				FALL		30"			CWDD REP. S. Klapper
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 1.74'	6"	3"
1					For strata description see Well No. 202D				
2									
3									
4									
5									
6									
7									
8									
9									
10					Bottom of Fill Stratum 9'0"+				
11					Top of Peat Stratum				
11		S-1	WOH 1/12"		Bk & br pt w/O\$, wd				
12			1						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 202S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 2	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24							#00 sand 35'0"-17'0"
25							#10 slot PVC well screen 20'0" to 35'0"
26							
27							
28							
29							
30							
31							
32							
33							
34							Bottom of screen @ 35'
35							
36					End of Monitoring Well @ 35'0"		
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 203S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SMT. NO. 1 OF 2	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 66.51	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA				DATE START 5/8/85
6/17/85	-	4.84	PVC	DIA.	3 3/4"				DATE FINISH 5/8/85
				WT.					DRILLER S.Migliaccio
				FALL					CWDD REP. H.Koppes
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 0.85'	6"	3"
1					For strata description see Well No. 203D	Hollow stem augers advanced to 24', with- drawn and replaced with 6" casing. ▽	Installed protective locking cap Bentonite slurry seal to surface 3" PVC riser (+).85 to 33'0"		
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19					Top of Peat				
20									
21									
22									
23									

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 203S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 2	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24							Top of Benseal @ 24'
25							
26							
27							
28							Top of #00 sand @ 29'0"
29							
30					Bottom of Peat 30'0"+		
31					Top of Organic Silt		
32							Top of screen @ 33'0"
33							#10 slot PVC well screen 33'0"-43'0"
34							
35							
36							
37							
38							
39							
40							
41							
42					Bottom of Organic Silt 42'0'+		Bottom of screen @ 43'0"
43					Top of Varved Clay		
44					End of monitoring well @ 43'0"		
45							
46							
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG					WELL No. 2041	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 2		
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02		
CONTRACTOR C.C. Construction								ELEVATION 60.89		
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	HSA				DATE START 4/29/85	
6/17/85	-	2.14	PVC	DIA.	3 3/4"				DATE FINISH 4/29/85	
				WT.					DRILLER S. Migliaccio	
				FALL					CWDD REP. M. Koppes	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 1.05'	6"	3"	
1					For strata description see Well No. 204D					
2					Bottom of Fill stratum 3'0"					
3					Top of Peat stratum					
4										
5										
6										
7										
8										
9										
10					Bottom of Peat layer 11'0"					
11					Top of Sand layer					
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 204I	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 2	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24							Bottom of screen @ 25'
25					End of monitoring well @ 25'0"		
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG					WELL No. 205S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.									SHT. NO. 1 OF 1	
CLIENT Charles R. Velzy Associates, Inc.									PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction									ELEVATION 61.94	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	HSA				DATE START 5/2/85	
6/17/85	-	4.32	PVC	DIA.	3 3/4"				DATE FINISH 5/2/85	
				WT.					DRILLER S.Migliaccio	
				FALL					CWDD REP. S.Klapper	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 1.77'	6" 3"		
1					For strata description see Well No.205D	Used 3 3/4" hollow stem auger to 17' & cleaned hole with= bentonite & roller bit	Installed protective locking cap			
2										
3										
4										
5										
6										
7					Bottom of Fill Stratum 7'0"	▽	Bentonite slurry (granular) from 5'0" to surface			
8					Top of Peat Stratum		Bentonite pellet seal 9'0"-5'0"			
9										
10										
11										
12										
13										
14										
15										
16										
17					End of monitoring well @ 17'0"	3" PVC riser 12'0" to (+)1.77'	#00 sand 17'0"-9'0"			
18						#10 slot PVC wellscreen 17'0"-12'0"				
19										
20										
21										
22										
23										
							Bottom of wellscreen @ 17'0"			

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 206S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 2	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 81.77	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C. & G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATE START 5/13/85
6/17/85	-	23.42	PVC	DIA.	3 3/4	2"			DATE FINISH 5/13/85
				WT.		140#			DRILLER S.Migliaccio
				FALL		30"			CWDD REP. S.Klapper
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 1.16'	8" 3"	
1					For strata description see Well No.206D	Used hollow stem auger to 43' & roller bit to clean hole.	Installed protective locking cap.		
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 206S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.					SHT. NO. 2 OF 2		
CLIENT Charles R. Velzy Associates, Inc.					PROJ. NO. 79-07107-02		
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24						▽	3" PVC riser
25							33'0" to (+)1.16' Bentonite slurry seal
26							
27							27'0" to surface
28							#00 sand
29							43'0" to 27'0"
30							
31							
32							
33							
34							
35						Encountered Methane gas @ 35'	
36							
37							
38							
39							
40							#10 slot PVC wellscreen
41							43'0" to 33'0"
42							
43							Bottom of screen @ 43'
44					End of monitoring well @ 43'0"		
45							
46							
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 207S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.							SHT. NO. 1 OF 4		
CLIENT Charles R. Velzy Associates, Inc.							PROJ. NO. 79-07107-02		
CONTRACTOR C.C. Construction							ELEVATION 132.28		
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA				DATE START 6/6/85
6/17/85	-	66.0	PVC	DIA.	3 3/4"				DATE FINISH 6/7/85
				WT.					DRILLER S.Migliaccio
				FALL					CWDD REP. S.Klapper
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 4.35'	8"	3"
1					For strata description see Well No.207D	Used hollow stem auger to 80'	Installed protective locking cap		
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 207S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.					SMT. NO. 2 OF 4		
CLIENT Charles R. Velzy Associates, Inc.					PROJ. NO. 79-07107-02		
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							

3" PVC riser
70'0" to
(+)4.35'
Bentonite
slurry 68'
to surface

8"
3"

Converse Consultants Geotechnical Consultants			MONITORING WELL LOG		WELL No. 207S		
PROJECT Clarkstown Landfill-Clarkstown, N.Y.					SMT. NO. 3 OF 4		
CLIENT Charles R. Velzy Associates, Inc.					PROJ. NO. 79-07107-02		
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50							Bentonite Slurry 68' to surface
51							
52							
53							
54							
55							
56							
57							
58							
59							
60						3" PVC riser 70' to (+)4.35'	3"
61							
62							
63							
64							
65							
66							
67							
68						Top of #00 sand @ 68'0"	
69							
70							#10 slot PVC well- screen 70'0" to 80'0"
71							
72							
73							
74							
75							

Converse Consultants Geotechnical Consultants				WELL LOG		WELL No. 207S	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.				SHT. NO. 4 OF 4			
CLIENT Charles R. Velzy Associates, Inc.				PROJ. NO. 79-07107-02			
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
75							
76							
77							
78							
79							
80							
81							
82							
83							
84							
85							
86							
87							
88							
89							
90							

End of monitoring well @ 80'0"

#00 sand →
80'0" to
68'0"
#10 slot PVC
wellscreen →
70'0" to
80'0"
Bottom of
screen @ 80'0"

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 201D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 3	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 66.86	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS		Piston	DATE START 5/16/85
6/17/85	-	8.33	PVC	DIA.	3 3/4	2"		3"	DATE FINISH 5/21/85
				WT.		140#			DRILLER S.Migliaccio
				FALL		30"			CWDD REP. S.Klapper
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL	6"	3"
1		S-1	3		Br cfS, 1-\$, t+cfG, occ.cbl.	Reamed hole with hollow stem auger to 68'; hole col lapsed @ 65'	Bentonite slurry (granular) 56' to surface.		
2			4						
3			6		Access ramp Fill:				
4			7		Brown coarse to fine SAND, little Silt, trace coarse to fine Gravel, cobbles	Used 6" casing to 25'	3" PVC riser 58'0" to (+).97'		
5					5'0"		Installed protective locking cap		
6		S-2	2		Orbr to br cfS, 1\$, t.fG, rts				
7			6						
8					Fill: Orange brown coarse to fine SAND, little(+)				
9					Silt, trace(-) fine Gravel, w/layers organic Silt towards change				
10									
11		S-3	1		br cfS, 1+\$, t-fG, veg.	Slightly moist			
12			2						
13									
14									
15									
16		S-4	WOH		Or br cf+S, s.-\$, t.fG, occ. lyr.O\$				
17			3						
18			3						
19			7						
20					18'6"+				
21		S-5	WOH/18"		Dk.br to br pt, w/O\$, t.-cf\$	Wet			
22			-						
23			1						

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 201D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 3	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24		UD-1				UD-1 Piston tube 23'0"-25'0" Press=24" Rec.=24" (refuse in tube)	
25							
26		S-6	WOH/18"		Dk br pt, l.fS, t.veg., t.wd		
27			-				
28			-				
29			1				
30							3" PVC riser
31		S-7	WOH/24"		Br pt	Wet	
32			-				
33			-		Brown to dark brown Organic SILT, some fine Sand; (sand content increasing with depth)	Gradational change from peat to organic silt	
34							
35		S-8	WOR/18"		Br O\$ a-,fS,t.rts.	Moist	
36			-				
37			WOH				Bentonite slurry (granular) 56' to surface
38							
39							
40		S-9	WOR/24"		Br & gr vvd \$&C and \$yC, sms fS	Very soft	
41			-				
42			-		Brown red varved Clayey SILT & Silty CLAY, seams of fine Sand		
43							
44							
45		S-10	WOH/24"		Br vvd Cy\$ w/sms & lyrs. C&\$ and fS	Very soft to soft	
46			-				
47			-				
48		UD-2			Rd br vvd \$	UD-2 Piston tube 47'0"-49'0" Press=24" Rec.=15"	
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No.202D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24		UD-1			Lyrs dk. br mfS, t+\$	UD-1 Piston tube 23'0"-25'0" Press=24" Rec.=24"	
25							
26		S-6	WOH WOH		Dk br OS w/sms & lyrs fS		
27			1				
27			2		<u>Brown Organic SILT,</u> <u>occasional seams & layers</u> <u>of fine Sand</u>		3" PVC riser →
28							
29							
30							
31		S-7	WOH/24" - - -		Br OS t-,mf+S, occ.pc.fG	Firm, Slightly moist	Bentonite slurry 60' (Granular) to surface →
32							
33							
34						Losing water & no water return while drilling to 35'	
35		S-8	WOR/12" - WOR/12" -		Br OS t-,fS	S-8:soft,wet	
36							
37							
38					38'6"	Lost water @ 38'	
39							
40							
41		S-9	WOR/24" - - -		Br & lt. gr vvd Cy\$ & \$yC <u>Redbrown varved clayey</u> <u>SILT, & Silty CLAY,</u> <u>occasional seams of</u> <u>fine Sand</u>	Soft to very soft	
42							
43						UD-2 Piston tube 43'0"-45'0" Press=24" Rec.=24"	
44		UD-2			Rd br vvd \$yC		
45							
46		S-10	WOR WOH/18" - -		Rd br & gr vvd C&\$, s.\$yC, t.-fS,occ. lnsO\$		
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 202D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 3 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50		S-11			Rd br vvd Cy\$ 1-,fS, w/ sms& lyrs \$yC	Losing water while drill- ing to 50' S-11: wet, soft	3"PVC riser
			WOR/18"				
51			-				
			-				
52		S-12	WOH		do/1.fS	Wet, very soft	Bentonite slurry (granular) 60.0' to surface
53							
54							
55			WOR/24"				
56		-					
57		-					
58		-					
59		S-13			Rd br fS, s+\$	Wet,saturated	#10 slot PVC wellscreen 72.5' to 62.5'
60			1				
61			2				
			1				
62		2			<u>Red brown fine SAND, and Silt</u>		
63		S-14			Rd br \$ 1-,fS	Cobble of boulder @ 67'-68.5'	#00 sand 72.5' to 60.0'
64							
65			WOR				
66			1/12"				
67		-					
		2					
68		S-15			Glacial Till: Red brown coarse to fine SAND, little Silt, and(-) to little coarse to fine Gravel, with occasional cobbles & boulders	Wet	Bottom of screen @ 72.5' (blocked by boulder)
69							
70			6				
71			4				
		14			Rd br mfS, 1+\$, 1+mfG, occ. cbls. & bldrs	Bldrs. @ 72.5'&73.5'	
72		14					
73							
74							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG					WELL No. 203D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.									SHT. NO. 1 OF 3	
CLIENT Charles R. Velzy Associates, Inc.									PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction									ELEVATION 66.66	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	-	Piston	DATE START 5/6/85	
6/17/85	-	7.22	PVC	DIA.	3 3/4"	2"		3"	DATE FINISH 5/7/85	
				WT.		140#			DRILLER S. Migliaccio	
				FALL		30"			CWDD REP. S. Klapper	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL	6" 3"		
1		S-1	1		Br mfS, 1.Cy\$		0.47'			
			2							
			5		Wd, cndrs.					
2			20							
3										
4										
5										
6		S-2	1		Br fS, s.Cy\$, wd, paper	Wet				
			2							
7			4							
8			4							
9										
10										
11		S-3	2		Gr cfS, plastic, wd, stone	Strong odor				
			1							
12			4							
			26		<u>Refuse Fill: Brown to gray</u> <u>coarse to fine SAND, some</u> <u>clayey Silt, with plastic,</u> <u>wood, & fabric</u>					
13										
14										
15										
16		S-4	4		do.					
			6							
17			4							
			5							
18										
19										
20										
21		S-5	1		Wd, t.pt					
			1							
22			1							
			2							
23										

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 203D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 3	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24					<u>Black PEAT</u>		
25			3				
26		S-6	1		Bk pt.		3" PVC riser 50'0" to (+)0.47'
			2				
27			2				
28							
29							
30					30'0"	UD-1	
31		UD-1				30'0"-32'0" Press=24" Rec.=22" pp=0.25 tsf	
32			WOH/24"				
33		S-7	-		Gr pt		
34			-				
35			-				
36		S-8	WOH/24"		Br O\$		
37			-				
38			-				
39					<u>Brown ORGANIC SILT,</u> <u>occasional seams of</u> <u>black organic Silt</u>		
40			WOR/24"				
41		S-9	-		Br O\$, sms. bk O\$		Bentonite slurry 43'0" to surface
42			-		42'0"		
43							
44					<u>Brown varved CLAY</u> <u>and Clayey SILT</u>		Top of Benseal @
45			WOR/24"				
46		S-10	-				
47			-				
48			-				Top of sand @ 48'0"
49					48'6"		

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 203D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 3 OF 3	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50		S-11			Br mfS, s. Cy\$, 1.mfG	Loss of drilling fluid @ 53'	#10 slot PVC wellscreen 50'0" to 58'0" #00 sand 48'0" to 58'0"
51			3				
52			3				
53			4				
54		S-12	4		Br cfS, 1.\$, s.mfG	Loss of drilling fluid @ 53'	#10 slot PVC wellscreen 50'0" to 58'0" #00 sand 48'0" to 58'0"
55							
56			7				
57			5				
58		S-13	5		do.	Hole caved in 58'-62' after sampling, could not wash out.	Bottom of screen @ 58'
59			4				
60							
61			13				
62			12		End of monitoring well @ 62'0"		
63			8				
64			15				
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG					WELL No. 204D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.									SHT. NO. 1 OF 3	
CLIENT Charles R. Velzy Associates, Inc.									PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction									ELEVATION 60.89	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	NX	Ostb'g	DATE START 4/19/85	
6/17/85	-	2.12	PVC	DIA.	3 3/4"	2"		3"	DATE FINISH 4/ /85	
				WT.		140#			DRILLER S.Migliaccio	
				FALL		30"			CWDD REP. M.Koppes	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL	6" 3"		
1		S-1	1		Br cfS, 1.\$&C	10' of auger	Protective			
			1			used to	locking cap			
2			2		Fill:Brown coarse to fine	penetrate	installed.			
			2		SAND, little Silt&Clay	fill, water				
					3'0"	used to	Bentonite			
3						drill below	slurry to			
4						10'; no	surface			
5						bentonite				
						or revert	3" PVC riser			
						added	32'0"-(+)-1.08'			
6		S-2	WOH/18"		Dk br pt	Σ				
			-			(2.12)				
7			1		Dark brown PEAT					
8										
9										
10										
11		UD-1			11'0"±	UD-1				
						10'0"-12'0"				
12						Press=24"				
13		S-3	2		Rd br mfS, s.\$					
			4							
14			3							
			2							
15		S-4	2		Rd br \$ a.--,mfS					
			1							
16			3		Red brown medium to fine					
					SAND, and Silt					
17										
18										
19			2							
20		S-5	1		do					
			1							
21			2							
22										
23										

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 204D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 3	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24		S-6	1		Brown medium to fine(+) SAND, little Silt, trace fine Gravel		Benseal 24'0" to 28'0"
25			1				
26			2				
27			2				
28		S-7			27'0"	Loss of drilling fluid @ 27' to 40'	Top of #00 sand @ 28'
29			1				
30			2				
31			3				
32			7				
33		S-8			Brown coarse to fine SAND, trace Silt, little coarse to fine Gravel		Top of screen @ 32'0"
34			15				
35			13				
36			4				
37		S-9	1		Br c+fS, t.\$, 1.mfG		#10 slot wellscreen 32'0" to 42'0"
38			3				
39			6				
40		S-10 L	7		Br cfS, r.\$, 1.fG		#00 sand 28'0" to 42'0"
41							
42			6				
43		S-11	5		N.R.		Bottom of screen @ 42'
44			5				
45			7				
46							
47		S-12			42'0"	Drilling fluid changed color @ 42'	
48							
49							
50							
51		Run			Red brown varved SILT&CLAY		
52							
53							
54							
55		S-11	1		Rd br vvd \$&C		
56			2				
57			6				
58			10				
59		S-12			47'0"		
60							
61							
62							
63		Run					
64							
65							
66							
67		S-12	50/1"				
68			7 min.				
69			9				
70			min				

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 204D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 3 OF 3	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50		Run # 1	-		Red brown SANDSTONE	Run # 1 47'0"-52'0" run=60"	
			min				
			4				
51			min				
			8				
			min				
52		Run # 2	7				
			min				
53			8				
			min				
54			3				
			min				
55			3				
			min				
56			3				
			min				
57					End of monitoring well @ 57'0"		
58							
59							
60							
61							
62							
63							
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 205D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 2	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 61.94	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATE START 5/1/85
6/17/85	-	3.32	PVC	DIA.	3 3/4	2"			DATE FINISH 5/2/85
				WT.		140#			DRILLER S.Migliaccio
				FALL		30"			CWDD REP. S.Klapper
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL		
1		S-1	1		Or br& gr br mfS, s.-\$, t.-fG,w/wd	Installed 15' of 6" casing (Temporary) Used Revert to drill hole.	Bentonite pellets 4'0"-surface		
2			5						
3			6		Fill: orange brown to gray brown coarse to fine(+) SAND, some(-)Silt, trace fine Gravel, with wood		Installed protective locking cap		
4									
5									
6		S-2	1		Or br & br cf+S,s.-\$, t.fG, w/wd	Wet	Bentonite slurry 4'0" to 19'0" (pumped 40 gallons of slurry w/no return; seep into fill)		
7			2						
8			3						
9									
10					8'6"+				
11		S-3	WOH/12"		Br & dk br pt, rts		3" PVC riser 22'6" to (+)0.85'		
12			1						
13			1		Brown and dark brown PEAT				
14			1						
15									
16		S-4L	4						
17			2		NR				
18			1						
19			1						
20					18'6"+				
21		A	4		Red brown varved CLAY and clayey SILT		Bentonite pellet seal 21'0" to 19'0"		
22		S-5	7						
23		B	5		Brown coarse to fine SAND, trace Silt, trace fine Gravel		Top of screen @ 22'6"		
			3						

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 205D		
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 2		
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02		
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL	
24		S-6					#10 slot PVC wellscreen 22'6" to 27'6" #00 sand 21'0" to 27'6" Bottom of screen @ 27'6"	
25			5					
26			8		Rd br cfS, s.C&S, s.-cfG			
27			19					
27			25					
28		S-7			Glacial Till: Red brown coarse to fine SAND, and Clay&Silt to clayey Silt, some (-) medium to fine Gravel	Boulder @ 28'		
29								
30			14					
31			17		Rd br cfS, a- CyS, l+mfG			
32			17					
32		S-8	18					
33						33'6"+		
34								
35			20					
36			23		Rd br and lt.gr gn weathered, soft, SILTSTONE/SANDSTONE			
37		S-9	34					
38			100			Weathered, soft, SILTSTONE/SANDSTONE		
39								
40			33					
41			36		Rd br weathered, soft, SILTSTONE, w/ sms mica			
42			36					
43					End of monitoring well @ 42'0"			
44								
45								
46								
47								
48								
49								

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 206D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 4	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 81.33	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C. & G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS		Piston	DATE START 4/29/85
6/17/85	-	22.23	PVC	DIA.	3 3/4"	2"		3"	DATE FINISH 5/10/85
				WT.		140#			DRILLER S. Migliaccio
				FALL		30"			CWDD REP. SLK/ MK
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL 0.98'		
1		S-1	3		Br mfS, s.+\$, t.-fG, glass, brks	Used 6" casing to 50' (Temporary)	Installed protective locking cap		
2			6						
3			5						
4			8						
5									
6		S-2	2		Dk. br mfS, s.+\$, t.-fG, glass, paper	Used Revert to drill.	Bentonite slurry seal (granular) 63'0" to surface		
7			4				3" PVC riser 65'0" to (+) 0.98'		
8			4						
9			5						
10					Refuse Fill: brown coarse to fine SAND, and Silt, trace fine Gravel, with glass, paper, wood, and plastic				
11		S-3	1		Br cf+S, s.\$, t.fG, w/ bk refuse(wd, paper)	6" water @ bottom of hole @ 10'			
12			2			S-3: very moist			
13									
14									
15									
16		S-4	1/12"		Br cfS, a.-\$, w/wd, glass	Wet			
17			-						
18			9						
19			18						
20									
21		S-5	14		Br cfS, a.-\$, w/plastic	Encountered Methane gas @ 20'			
22			9						
23			8						
			16						

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 206D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24		S-6			Dk br cfS, s.s., w/wd, plastic, paper	Strong burning odor @ 25':Methane gas encount- ered	Bentonite slurry 63'0" to surface 3" PVC riser 65'0" to (+)0.98'
25			10				
26			5				
27			8				
28			10				
29							
30							
31		S-7	11		Gr syC, a.wd	Very wet	
32			10				
33			4				
34			7				
35					<u>Refuse Fill: Brown</u> <u>SILTY CLAY, wood,</u> <u>plastic</u>		
36		S-8	36		Gr wd, plastic	Sample temp. 30-32°C	
37			8				
38			9				
39			11				
40							
41		S-9	10		Br paper, plastic		
42			9				
43			6				
44			9				
45					45'0"		
46		S-10	2		Br pt. <u>Brown PEAT, becoming</u> <u>more dense with depth</u>	UD-1 47'0"-49'0" Push=24" Rec.=8"	
47			3				
48		UD-1	4				
49			5				

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 206D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 3 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50		UD-2				UD-2 49'0"-51'0" Press=24" Rec.=14" pp=0.5 tsf	3" PVC riser 65'0"-(+)0.98'
51		A	2		Br pt		
52		S-11 B	3		Dk br OS, s.pt	52'0"	Bentonite slurray seal (granular) 63'0"-surface
53			4				
54		S-12	2		Br OS, 1.pt		
55			3				
56			4				
57		S-13	WOR/12"		do		
58			-				
59			WOH/12"		<u>Brown ORGANIC SILT,</u> <u>little Peat, grading</u> <u>to clean organic silt</u> <u>with depth</u>	UD-3 59'0"- 61'0" Press=24" Rec.=20" pp=1.75 tsf	
60		UD-3					
61			1			61'6"	
62		S-14	1		Br c+fS, t.\$, 1.fG		
63			3				
64			5				
65			7				#10 slot wellscreen 65'0" to 75'0"
66		S-15	6		Rd br cfG s(+),cfS, t.\$		
67			6				
68			7		<u>Brown coarse to fine SAND,</u> <u>some medium to fine Gravel</u> <u>slightly stratified</u>		#00 sand 63'0" to 75'0"
69							
70		S-16			Rd br c+fS, t-\$, s+mfG		
71							
72							
73							
74							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG				WELL No. 207D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.								SHT. NO. 1 OF 4	
CLIENT Charles R. Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction								ELEVATION 132.28	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			DATE START 5/24/85
6/17/85	-	73.98	PVC	DIA.	3-3/4"	2"			DATE FINISH 6/4/85
				WT.		140#			DRILLER S.Migliaccio
				FALL		30"			CWDD REP. S.Klapper
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL		
1		S-1	2		Br cf+S, t.+Cy\$, t.-fG, a.paper, plastic	Very dense Slightly moist	4.16'	6"	
2			3					3'	
3			6						
4			7						
5									
6		S-2	9		Mtld, tn, or br & lt.gr mfS, 1.\$&C	Used 90' hollow stem auger Used revert below 90' Used 85' 6" casing (temporary)			
7			8						
8			7						
9			6						
10					Misc. Fill: Refuse, cloth, paper, plastic, with layers tan coarse to fine(+) Sand, little Clayey Silt to Silt, trace(-) fine Gravel				
11		S-3	2		Tn to dk. br cf(+)S, 1.Cy\$, t.-fG, w/cloth, glass,paper	Sample temp. =26°C			
12			1						
13			14						
14									
15									
16		S-4	5		Tn to br cf+S, 1.\$yC, t.-fG, w/cloth, paper	Sample temp. =35°C Refuse odor			
17			1						
18			5						
19									
20									
21		S-5	5		Tn cfS, 1Cy\$, t.mf+G	Sample temp. =36°C Refuse odor			
22			19						
23			20						
			10						

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 207D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 2 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24							6"
25							3"
26		S-6	9 4 5 8		Tn cf+S, l.\$, t.cfG, w/paper, cloth, rk fgmt	Sample temp. =35°C	
27							
28							
29							
30							
31		S-7	9 13 43 16		Gr, Br&rd paper, leaves, rubber, cloth		Bentonite slurry (granular) 88'0" to surface
32							3" PVC riser 91'6" to (+) 4.16'
33							
34							
35							
36		S-8	5 13 91 34		Br, wh paper, plastic, t.cfS, t.-\$	Methane gas @ 35' Sample temp. =35°C	
37							
38					Misc, Fill: Refse, cloth paper, plastic, with layers tan coarse to fine		
39					(+)Sand, little Clayey		
40					Silt to Silt, trace(-) fine Gravel		
41		S-9	5 18 11 12		Br,wh,gn paper, palstic, metal, l+cfS, t.\$	Methane gas @ 40' Sample temp. =25°C	
42							
43							
44							
45		S-10	100/4"		Br wd, rts,plastic, cloth	Methane gas @ 45' Sample temp. =35°C	
46							
47							
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 207D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.						SHT. NO. 3 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50		S-11	19		Gr& wh paper, palstic,glass, cloth, cinders		Bentonite slurry (granular) 88' to surface
51			27				
52			23				
53			19				
54		S-12			Rd Br & yw cf+S, l.-\$, t.-cfG, w/paper, cloth, ribber		3" PVC riser 91'6" to (+) 4.16'
55			11				
56			19				
57			27				
58		S-13	31		Misc. Fill:Refuse, cloth, paper, plastic, with layers tan coarse to fine (+) Sand, little Clayey Silt to Silt, trace(-) fine Gravel		Methane odor while drilling to 60'
59							
60			18				
61			17				
62		S-14	35		Rd br cfS, t.+\$, t.-cf+G, w/paper, glass, cloth & metal, occ. cbls.		Sample temp. = 32°C
63			36				
64							
65							
66		S-15	13		Rd br&gr br cfS, t.+\$, t.-fG, w/plastic, paper, fibers, glass		Moist Sample temp = 32°C
67			11				
68			15				
69			29				
70		S-16	6		Br cfS, l-\$, t-mfG, w/plastic, paper, rubber		Moist
71			12				
72			10				
73			15				
74		S-16	17		Br & gr paper, plastic, cloth,		Moist
75			40				

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No.207D	
PROJECT Clarkstown Landfill-Clarkstown,N.Y.						SHT. NO.4 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
75							
76		S-16	20		<u>Misc. Fill: Refuse, cloth paper, plastic, with layers tan coarse to fine (+) Sand, little Clayey Silt to Silt, trace(-) fine Gravel</u>		3" PVC riser 91'6" to(+) 4.16'
77			25				
78							
79							
80		S-17	15				
81		L	11		N.R.		Bentonite slurry (granular) 88'0" to surface
82			8				
83			10				
84		S-18	WOR		Rd br & gr cfS, l.\$, t.fG, w/plastic, fibers, glass		
85			15				
86		A	17				
87		S-19	18		84'0"± <u>Red brown coarse to fine SAND, trace Silt, little(-) fine Gravel</u> 85'6"	Dense	
88		B	21				
89			24				
90			38		<u>Glacial Till: Red brown coarse to fine SAND, some(-) Silt, trace (+) coarse to fine Gravel</u>		#00 Sand 96'6" to 88'0"
91		S-20	18				
92			20				
93			16		Rd br cfS, s.-\$, t.+cfG, w/rk fgmts	Med. dense	#10 slot PVC wellscreen 96'6" to 91'6"
94			16				
95							
96		S-21	12		Rd br cfS, t+\$, t.-cfG, w/ rk fgmts	Very moist	Bottom of screen @ 96'6"
97			11				
98			20				
99			70		96'6" Soft rock-SANDSTONE		
100					End of monitoring well @ 97'0"		

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG					WELL No. 208D	
PROJECT Clarkstown Landfill-Clarkstown, N.Y.									SHT. NO. 1 OF 3	
CLIENT Charles R. Velzy Associates, Inc.									PROJ. NO. 79-07107-02	
CONTRACTOR C.C. Construction									ELEVATION 59.50+	
GROUND WATER				Boring	CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS	NX		DATE START 4/16/85	
6/17/85	-	+2.08	PVC	DIA.	4"	2"			DATE FINISH 4/18/85	
				WT.		140#			DRILLER S. Migliaccio	
				FALL		30"			CWDO REP. M. Koppes	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY		REMARKS		WELL 3.0'	
1		S-1	2		TOPSOIL 0'6"		No Revert or bentonite used in drilling water.		Installed protective locking cap 3" PVC riser 48'0" to 3.0' Bentonite slurry 42'0" to surface	
			30		BROKEN CONCRETE 2'0"					
2			50							
3										
4					<u>Gray Organic Silt</u>					
5			WOH							
6		S-2	WOH		Gr O\$ 6'0"					
7			1							
8										
9										
10		S-3	WOH 1/18"		Br pt.					
11										
12					<u>Brown Peat and, Organic Silt, silt content increasing with depth</u>					
13										
14										
15		S-4	WOH/18"		Br pt					
16			-							
17		S-5	WOH/18"		Dk. gr br pt.					
18			-							
19			1							
20		S-6	WOH/24"		do					
21			-		<u>Brown Organic Silt, trace fine Sand</u>					
22										
23										

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 208D	
PROJECT Clarkstown Landfill, Clarkstown, N.Y.				SHT. NO. 2 OF 3			
CLIENT Charles Velzy Associates, Inc.				PROJ. NO. 79-07107-02			
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
24		S-7			do	Brown Organic Silt to CLAY & SILT Clay content increasing with depth	
			WOR				
25			WOR				
			WOR				
26		S-8	WOH		Br 0 C&\$	Spoon & Rods sank 36" under their own weight	
27							
28							
29							
30		S-9	WOR		Br vvd C&\$, occ ptg fS		
			WOR				
31			WOR				
			WOR				
32		S-10			32'6"±		3" PVC Riser 48' to 1.6'
33							
34							
35							
36		S-11	WOR		do	Brown varved CLAY & SILT occasional parting of fine Sand	
37			WOR				
38			WOR				
39			WOR				
40		S-12				Bentonite Pellet Seal 44' to 42'	
41							
42							
43							
44		S-13	WOR		do	#00 SAND 53' to 44'	
45			WOR				
46			WOH				
			1'				
47		S-14					
48							
49							

Converse Consultants Geotechnical Consultants				MONITORING WELL LOG		WELL No. 208 D	
PROJECT Clarkstown Landfill, Clarkstown, N.Y.						SHT. NO. 3 OF 3	
CLIENT Charles Velzy Associates, Inc.						PROJ. NO. 79-07107-02	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	STRATIGRAPHY	REMARKS	WELL
50		S-12	WOH		Rd br vvd C&S, freq vvds fS occ ptg fS		#10 Slot PVC well screen 53' to 48'
51			WOH				
52			1				
53			1				
54		S-13	4		Glacial Till: <u>Brown medium to fine</u> <u>GRAVEL some, coarse to</u> <u>fine Sand, little Clayey</u> <u>Silt</u>		#00 SAND 53' to 44'
55			10				
56			22				
57			12				
58		Run # 1	RUN		<u>Bedrock: Diabase</u>	Run # 1 58'0"-61'0" Run=36" Rec=36" RQD=34"	
59			=REC				
60			=36"				
			RQD=				
			34"				
					End of Boring @ 61'0"	After being left over- night, water flowed free- ly from the casing at 4 gpm. Static water level found to be 35" above ground sur- face casing pumped @70- 80 gpm for about 20 min Drawdown not recorded but less than 12'(length of suction hose) After water clear- ed, pumping was stopped and water flowed from casing @ 7 gpm	

Converse Consultants, Inc.				TEST BORING LOG				BORING NO. 209	
PROJECT Clarkstown Landfill, Clarkstown, N.Y.								SHT. NO. 1 OF 2	
CLIENT Charles Velzy Associates, Inc.								PROJ. NO. 79-07107-02	
BORING CONTRACTOR CC Construction								ELEVATION 57+	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATUM U.S.C.&G.S.	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	Piston	DATE START 6/7/85	
6/7/85	10:30	5.0'	0'	DIA.	3 3/4"	2"	3"	DATE FINISH 6/7/85	
				WT.		140#		DRILLER S. Migliaccio	
				FALL		30"		CC REP. S. Klapper	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION			REMARKS	
1		S-1	2		Br rd cf ⁺ S, l. ⁺ \$, t.fG, w/wd; paper			used revert below 14'	
2			6						
3			2						
4			10						
5		S-2	1		Br rd to gr br cf ⁺ S, l.\$, t. ⁺ mf ⁺ G, w/O\$ mixed w/refuse, glass			Sl. Moist	
6			2						
7			3						
8					<u>Misc. FILL: Brown red to gray coarse to fine SAND, little (+) Silt, little (-) medium to fine Gravel, mixed with wood, paper, glass, concrete and asphalt</u>				
9									
10		S-3	24						
11			12						
12			8		Gr, bk, br cfS, l.\$, l.-mfG, w/moist concrete, asphalt, paper			Moist to v. moist	
13			5						
14					14'0"			13' obstruction wood	
15		S-4	4						
16			1						
17			1						
18		U-1	1		<u>Black PEAT with fibers, wood, and occasional refuse</u>			U-1 Piston 17'0" - 19'0" Rec=6" Push=24"	
19									
20		S-5	2		Bk pt w/occ refuse			S-5 Wet Saturated	
21			2						
22			3						
23			3					Obstruction @ 22'	

Converse Consultants, Inc.				TEST BORING LOG		BORING NO. 209	
PROJECT Clarkstown Landfill, Clarkstown Landfill, N.Y.				SHT. NO. 2 OF 2			
CLIENT Charles Velzy Associates, Inc.				PROJ. NO. 79-07107-02			
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
24		U-2			24'0"	U-2 piston 23'0"-25'0" Push=24" Rec=18"	
25					<u>Black PEAT</u>		
26		A	WOH		Bl Pt		
27		S-6	WOH		26'0"		
28		B	WOH		Gr & rd br vvd \$yC,C&S, w/prt.fS	S-6 B: very soft	
29			WOH				
30					<u>Red brown varved SILTY CLAY to CLAY & SILT, with layers coarse to fine (+) sand</u>		
31		S-7	WOR				
32			1		Rd br vvd C&S w/lyrs cf+S	S-7: soft p.p.=0.75 TSF	
33			1				
34			2				
35					End of Boring @ 31'0"		
36						Filled hole w/dry benseal to surface upon completion	
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							

STATE OF NEW YORK
DEPARTMENT OF CONSERVATION
WATER POWER AND CONTROL COMMISSION

**Geology and Ground-Water
Resources of
Rockland County, New York**
With Special Emphasis on the Newark Group (Triassic)

By
NATHANIEL M. PERLMUTTER
Geologist, U. S. Geological Survey



Prepared by the
U. S. GEOLOGICAL SURVEY
in cooperation with the
NEW YORK WATER POWER AND CONTROL COMMISSION

BULLETIN GW-42
ALBANY, N. Y.
1959

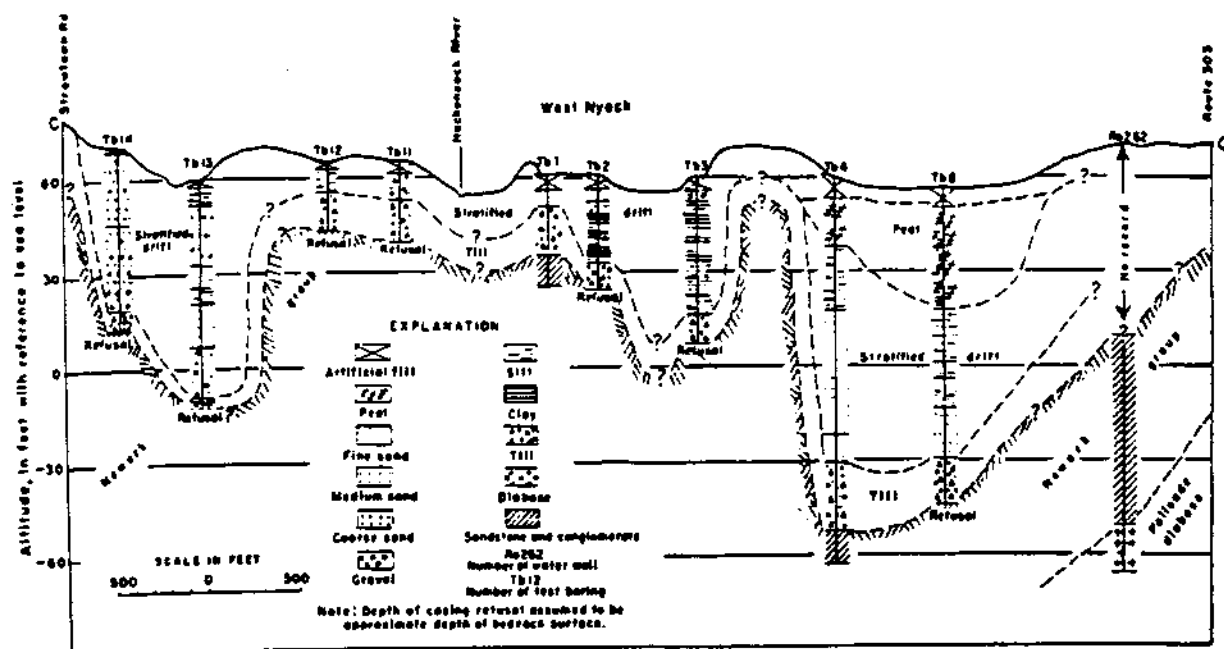


Figure 2.—Section C-C' across Hackensack River valley, near West Nyack, N. Y.

The section shows that the deepest point on the bedrock surface is about 740 feet below sea level in a buried channel near the west side of the river. The depth of the buried channel is based on seismic refraction data reported by Worzel (1951) and Worzel and Drake (1959). In seeking an explanation for the unusually great depth to bedrock at the Tappan Zee Bridge, it is useful to compare the depths there with information both upstream and downstream from the bridge. At Storm King, about 25 miles upstream, the depth to bedrock beneath the Hudson River is greater than 765 feet but less than 950 feet below sea level (Berkey and Rice, 1921, p. 96). Downstream from the Tappan Zee Bridge, as far south as The Narrows between Brooklyn and Staten Island, test borings for bridges and tunnels have penetrated bedrock at numerous places but to date none of these are reported to have penetrated bedrock at depths greater than about 350 feet below sea level. At these places there are some relatively narrow spaces between the existing test borings in which the depth to bedrock may be somewhat greater than 350 feet.

The writer has examined cores from wells drilled on Long Island which suggest that sea level was as much as 500 feet below its present level during Tertiary or Early Pleistocene time. However, the available data for the Storm King crossing and the Tappan Zee Bridge suggest that the large depths to bedrock at these sites are not entirely a result of sea-level changes and normal stream erosion. Berkey (1911, p. 91-95) describes the Hudson valley at Storm King as having the character of a gorge within a gorge and suggest that it was widened and overdeepened by a lobe of ice that was confined between Storm King Mountain on the east and Breakneck Mountain on the west. Likewise the depression at the Tappan Zee Bridge has the character of a gorge within a gorge and it is not unreasonable to suggest that glacial overdeepening of a channel cut in a relatively soft belt of rocks or possibly along a fault zone in the Newark group may account in part for the large depth of the depression. A similar conclusion was reached by Worzel and Drake (1959, p. 1104-1105).

Less prominent but nevertheless distinct depressions on the bedrock surface occur also beneath the valleys of the Ramapo River, Mahwah River, Sparkill Creek, Pascack Brook, and Cedar Pond Brook.

Water-bearing Properties

The Newark group is the principal source of ground water in the county. The formation is well-cemented generally and most of the water occurs in openings along bedding planes, joints, and irregular

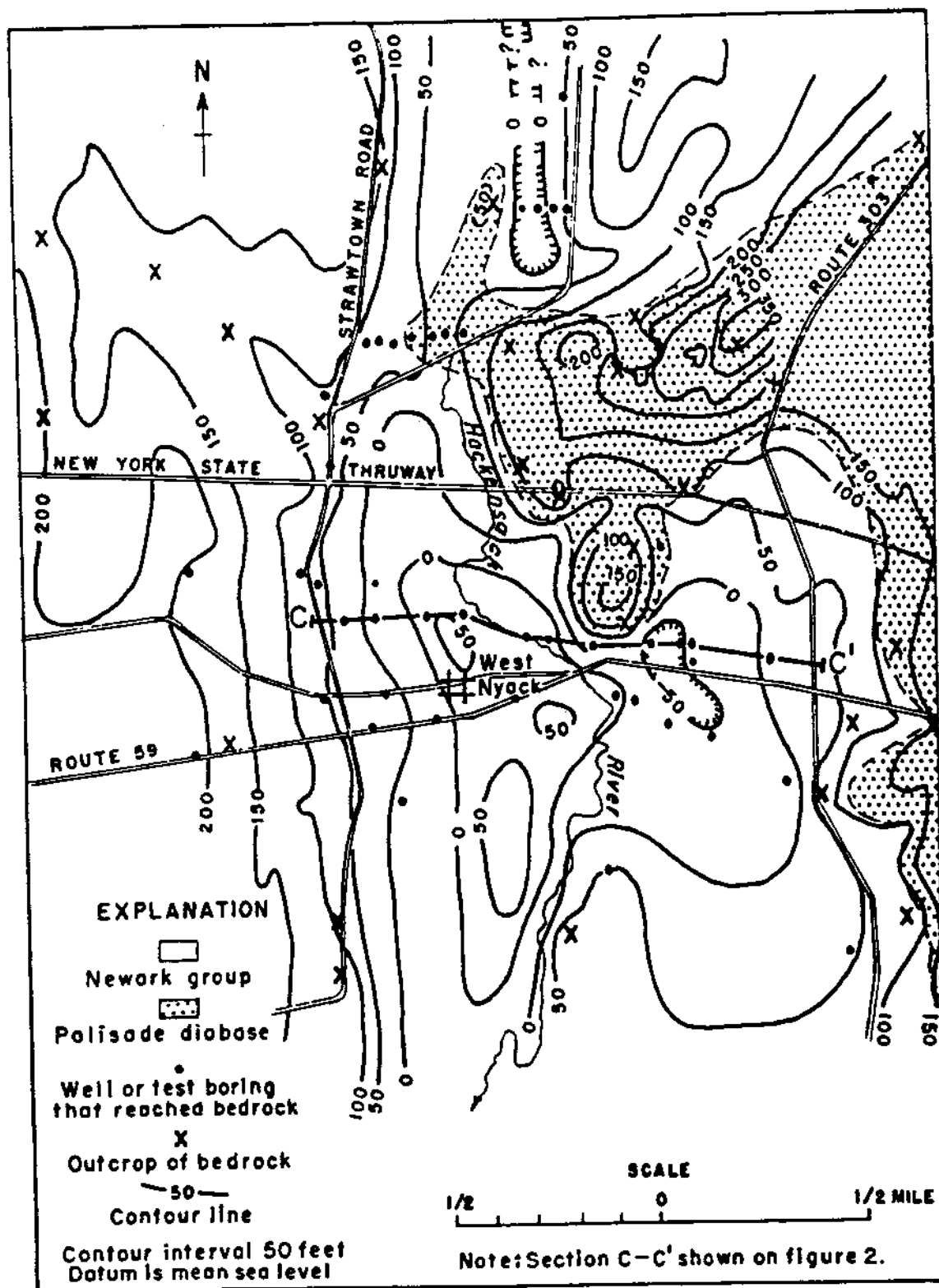


Figure 3.—Contour map of bedrock surface, vicinity of West Nyack, N. Y., showing buried valleys of the Hackensack River.

Table 16.—Logs of selected wells and test borings in Rockland County—(Continued)

	Thickness (feet)	Depth (feet)
Till:		
Hardpan, gray and brown.....	16	34
Triassic:		
Newark group:		
Sandstone, gray-brown; some clay.....	4	38
Sandstone, medium, reddish-brown; some red clay.....	17	55
Sandstone, fine, red; some red clay and shale.....	48	103
Clay seam or crevice.....	1	104
Sandstone, fine, brown.....	19	123
Clay seam.....	1	124
Sandstone, medium, brown.....	22	146
Clay, red.....	6	152
Shale, red and clay.....	9	161
Sandstone, fine to medium, gray-brown.....	13	174
Sandstone, fine to medium, brown and gray; some red shale (clay seam or crevice at 178 feet).....	19	193
Sandstone, fine to medium, brown; red shale and clay.....	20	213
Sandstone, fine to medium, reddish-brown.....	28	241
Sandstone, medium to coarse, brown; some red shale.....	10	251
Sandstone, fine, reddish-brown; some red shale; red and blue clay.....	17	268
Sandstone, fine, brown; clay; and shale (small crevice at 279 feet).....	12	280
Shale, red; some red clay; sandstone.....	5	285
Sandstone, fine, brown; some red shale; blue and red clay (crevice at 329 feet).....	84	369
Sandstone, fine to medium, grayish-brown (crevice at 381 feet).....	11	380
Sandstone, fine to medium, gray-brown; some red shale; red clay.....	19	399
Sandstone, fine, brown; red shale; clay.....	30	429
Sandstone, medium to coarse, brown; some red shale.....	12	441

Yield: 35 gpm, with drawdown of 185 feet, 1946.

Ro 258; 16X, 11.1S, 1.6E; Village of Nyack; test boring No. 16; West Nyack; drilled by P. J. Healey, Inc.; altitude of land surface about 65 feet. Geologic correlation based in part on examination of samples by N. M. Perlmutter.

	Thickness (feet)	Depth (feet)
Recent:		
Topsoil, roots.....	3	3
Pleistocene:		
Stratified drift:		
Sand, gray and yellow; clay.....	1	4
Sand, fine to medium, brown; some silt.....	5	9
Sand, medium to coarse, red, clean.....	10	19
Sand, fine, silty, red; some coarse gravel.....	7	26
Sand, fine, silty; red.....	16	42
Sand, fine, and silt, red; some coarse gravel.....	14	56
Till:		
Sand, fine, red; silt; gravel; trace of clay.....	5	61
Sand, red; clay; gravel.....	8	69

Table 16.—Logs of selected wells and test borings in Rockland County—(Continued)

	Thickness (feet)	Depth (feet)
Triassic:		
Newark group:		
Refusal (probably bedrock).....	at	69
Ro 259; 16X, 10.9S, 1.6E; Village of Nyack; test boring No. 17; West Nyack; drilled by P. J. Healey, Inc.; altitude of land surface about 65 feet.		
	Thickness (feet)	Depth (feet)
Pleistocene:		
Stratified drift (?):		
Sand and silt, red; clay; gravel; boulders.....	26	26
Sand, fine, and silt, red; coarse gravel; trace of clay.....	15	41
Pleistocene (?) or Triassic (?):		
Refusal (possibly till or bedrock).....	at	41
Ro 260; 16X, 11.3S, 2.1E; Village of Nyack; test boring No. 10; West Nyack; drilled by P. J. Healey, Inc.; altitude of land surface about 70 feet. Geologic correlation based in part on examination of samples by N. M. Perlmutter.		
	Thickness (feet)	Depth (feet)
Recent and Pleistocene:		
Clay, gray and yellow; roots.....	3	3
Pleistocene:		
Stratified drift:		
Clay, red and gray, in layers; trace of gravel.....	6	9
Till:		
Sand, red; gravel; trace of clay.....	11	20
Triassic:		
Newark group:		
Refusal (probably bedrock).....	at	20
Ro 261; 16X, 10.4S, 2.3E; Village of Nyack; test boring No. 9; West Nyack; drilled by P. J. Healey, Inc.; altitude of land surface about 70 feet. Geologic correlation based in part on examination of samples by N. M. Perlmutter.		
	Thickness (feet)	Depth (feet)
Recent:		
Topsoil; loam.....	2	2
Pleistocene:		
Stratified drift:		
Sand, brown; gravel.....	3	5
Sand, fine, silty, red.....	6	11
Clay, red.....	5	16
Sand, fine to medium, brown; coarse gravel; trace of silt.....	8	24
Triassic:		
Palisade diabase:		
Rock, soft and broken, gray.....	2	26
Rock, seamy, broken.....	3	29

Table 17.—Records of selected wells and test borings in Rockland County—(Continued)

Well number	Location coordinates	Owner or occupant	Year completed	Altitude (feet)	Depth of well (feet)	Depth to bedrock (feet)	Geologic unit	Depth to water (feet)	Type of pump	Yield (gpm)	Temperature (°F)	Time	Remarks
Re 18	10X, 3.3N, 0.3E	Palmdale Interstate Park Commission		380	81	...	Platocene till	15.9 Jan. 1937	...	...	...	O	Well cased to bottom. U.S. Geological Survey observation well.
Re 19	10X, 9.7S, 3.7E	J. L. Lorenz	1969	370	227	18	Palmdale diabase	18	DWJ	3	...	D	Casing, 0-30 ft.
Re 20	10X, 14.4S, 4.8E	R. Gair Co., Inc.	Prior to 1931	19	26	...	Stratified drift	10	G	400	...	Ind	Sixty well points on common header. Abandoned, 1917. Water in only. (a).
Re 21	10X, 11.4S, 3.0E	C. B. Chase	1931	350	770	5	Palmdale diabase and Newark group	...	...	18	...	D	Supplies 4 houses. Lower 30 ft. reportedly penetrates Newark group.
Re 22	10X, 8.5S, 3.0E	E. F. Perry	1943	300	300	18	Palmdale diabase	34	DWJ	3	...	D	Casing, 0-30 ft.
Re 23	10X, 14.1S, 3.7E	Orangetown Mfg. Co.	1929	90	200	40	Newark group	18	T	80	...	Ind	Specific capacity, 4 gpm/ft. (a).
Re 24	10X, 14.5S, 3.7E	do.	1944	90	246	40	do.	35	T	100	...	Ind	
Re 25	10X, 14.5S, 3.7E	do.	1945	80	400	40	do.	12 Sept. 1931	T	178	84	Ind	Near Re 180. Drawdown 23 ft. when pumping 178 gpm.
Re 26	10X, 14.4S, 3.7E	do.		90	812	40	do.	26	T	180	84	Ind	Near Re 23. Drawdown 128 ft. when pumping 180 gpm. Casing, 0-48 ft.
Re 27	10X, 9.0S, 4.0E	Upper Nyack Estates, Inc.	1928	260	300	20	do.	...	...	25	84	PS	Supplies about 28 houses. Casing, 0-33 ft. (a).
Re 28	10X, 14.2S, 3.4E	P. Hen	1956	120	85	18	do.	Flow	SWJ	5	...	D	Casing, 0-30 ft.
Re 29	10X, 14.2S, 3.8E	W. Outrom	1950	180	75	12	Palmdale diabase	Flow	DWJ	...	83	D	Casing, 0-18 ft.
Re 30	10X, 14.1S, 3.2E	J. Perla	1946	80	94	8	Newark group	...	DWJ	10	...	D	Near Re 28.
Re 31	10X, 14.1S, 3.4E	Mr. Crosby	1930	180	22	12	Palmdale diabase	20	DWJ	10	83	D	Drawdown 10 ft. at 10 gpm. Casing, 0-18 ft.
Re 32	10X, 10.4S, 1.1E	S. D. Schimpas	1930	240	178	80	Newark group	19	DWJ	14	...	D	Casing, 0-88 ft.
Re 33	10X, 11.1S, 0.2E	R. O. Muller	1946	200	124	8	Newark group	42	J	12	...	D	Casing, 0-24 ft.
Re 34	10X, 11.0S, 0.4E	Mrs. H. W. Gredin	1945	260	122	8	do.	50	J	25	...	D	Casing, 0-20 ft.
Re 35	10X, 12.2S, 1.2E	V. A. Eagle	1915±	128	108	5	do.	35	DWJ	10	...	D	Drawdown 13 ft. when pumping 10 gpm. Casing, 0-28 ft.
Re 36	10X, 11.0S, 1.3E	J. S. Smith	1904	180	180	8	do.	23	J	10	...	D	
Re 37	10X, 9.2S, 0.9E	F. Levitt		190	125	8	do.	18	SWJ	35	...	D	Casing, 0-30 ft.
Re 38	10X, 10.5S, 1.8E	J. Simola, Jr.	1946	120	99	25	do.	Flow	SWJ	20	84	D	Casing, 0-44 ft.
Re 39	10X, 9.4S, 2.8E	W. K. Gainer	1947	310	183	8	do.	25	DWJ	10	...	D	
Re 40	10X, 9.2S, 3.2E	G. Olander	1947	360	110	6	Palmdale diabase	12	SWJ	8	...	D	0-21 ft. mud; 21-110 ft. unspaced. Casing 0-20 ft.
Re 41	10X, 9.0S, 3.1E	R. F. Filiere	1947	210	178	6	do.	20	J	307	...	Cl	0-120 ft., mudstone; 120-170 ft., unspaced.
Re 42	10X, 9.0S, 3.3E	Vesica Restaurant	1947	300	238	8	Newark group	30	...	30	...	Cl	(a).
Re 43	10X, 10.4S, 3.2E	H. J. Miller	1950	360	251	4	Palmdale diabase	42	F	14	...	D	
Re 44	10X, 11.5S, 2.1S	H. E. Campbell	1940	70	131	8	Newark group	16	SWJ	13	...	D	
Re 45	10X, 10.3S, 3.1E	R. Van Nott	1961	35	105	5	Newark group	3	8	80	...	D	0-65 ft., sand and gravel; 65-105 ft., mudstone.
Re 46	10X, 12.0S, 1.5W	O. Sanders	1950	370	94	84	do.	18	J	8	...	D	

Table 17.—Records of selected wells and test borings in Rockland County—(Continued)

Well number	Location coordinates	Owner or occupant	Year completed	Altitude (feet)	Depth of well (feet)	Diameter of hole (inches)	Depth to bedrock (feet)	Geologic unit	Depth to water (feet)	Type of pump	Yield (gpm)	Temperature (°F)	Use	Remarks
Ro 228	16X, 12.10, 1.05	N. Y. State Dept. of Public Works	1948	169	26	2 1/4	...	Pleistocene deposits	7	...	...	...	T	Palisades Interstate Parkway at Van Wyck Rd., bridge 14, hole 1. (b).
Ro 229	16X, 12.08, 1.15	do.	1948	81	35	2 1/4	30	Newark group	...	...	...	...	T	Palisades Interstate Parkway at Hackensack Rd., bridge 18, hole 1. (b).
Ro 230	16X, 12.08, 1.05	do.	...	89	38	2 1/4	...	Pleistocene till	...	...	...	...	T	Palisades Interstate Parkway at Ricketts Rd., hole 1. (b).
Ro 231	16X, 12.05, 1.05	do.	1945	129	18	2 1/4	11	do.	1	...	...	...	T	Palisades Interstate Parkway at Erie RR., bridge 17, hole 1. (b).
Ro 232	16X, 11.03, 0.85	do.	...	232	20	2 1/4	16	Newark group	...	...	...	...	T	Palisades Interstate Parkway at Townline Rd., bridge 18, hole 1. (b).
Ro 233	16X, 11.08, 0.75	do.	1941	250	24	2 1/4	13	do.	...	...	...	...	T	Relocation of Rte. 89, hole B-1. (b).
Ro 234	16X, 10.08, 0.25	do.	1948	236	29	2 1/4	23	do.	2	...	...	...	T	Palisades Interstate Parkway at Rte. 304, bridge 30, hole 2. (b).
Ro 235	16X, 9.78, 0.15	do.	1945	316	36	2 1/4	21	do.	3	...	...	...	T	Near Ro 142. Palisades Interstate Parkway at Ludwigh Rd., bridge 21, hole 6. (b).
Ro 236	16X, 9.83, 0.4W	do.	1945	333	36	2 1/4	22	do.	7	...	...	...	T	Palisades Interstate Parkway at North Middletown Rd., bridge 22, hole 4. (b).
Ro 237	16X, 7.05, 1.0W	do.	1915	447	24	2 1/4	...	Pleistocene till(?)	1	...	...	...	T	Palisades Interstate Parkway at West Charlotte Rd., bridge 23, hole 8. (b).
Ro 238	16X, 7.05, 1.3W	do.	1945	457	27	2 1/4	20	Newark group	1	...	...	...	T	Palisades Interstate Parkway at New Hempstead Rd., bridge 24, hole 2. (b).
Ro 239	16X, 8.45, 1.7W	do.	1945	532	15	2 1/4	9	do.	5	...	...	...	T	Palisades Interstate Parkway at Rte. 48, bridge 25. (b).
Ro 241	16X, 4.45, 2.1W	do.	1945	453	31	2 1/4	...	Pleistocene deposits	...	...	...	...	T	Palisades Interstate Parkway at Erie RR. bridge, hole 1. (b).
Ro 242	16X, 2.15, 1.8W	do.	1948	380	66	2 1/4	...	do.	4	...	...	...	T	Palisades Interstate Parkway at Minerva Creek, hole 1. (b).
Ro 243	16X, 10.45, 0.8W	do.	1951	280	28	2 1/4	29	Newark group	Flows	...	...	...	...	Relocation of Rte. 89. (b).
Ro 244	16X, 11.05, 1.15	do.	1940	210	40	2 1/4	13	do.	7	...	...	...	...	Relocation of Rte. 89. (b).
Ro 247	16X, 3.35, 1.5W	do.	...	374	40	2 1/4	...	Stratified drift	1	...	...	...	T	Palisades Interstate Parkway at Minerva Creek bridge, hole 1. (b).
Ro 248	16X, 2.0N, 1.8W	do.	...	693	63	2 1/4	...	Pleistocene deposits	1	...	...	...	T	Palisades Interstate Parkway at Queensboro trail. (b).
Ro 249	16X, 8.75, 2.5E	H. Fells	1938	160	37 1/2	8	20	Newark group	30	F	20	53	PS	Well No. 1. Rte. 240 nearby. Supplies about 23 houses. (a).
Ro 250	16X, 8.95, 2.4E	do.	1948	190	900	8	90	do.	38	F	17	...	PS	Well No. 2. Near Ro 249. Supplies 36 houses. (a).
Ro 251	16X, 9.25, 2.7E	T. Birds	1939	210	122	6	17	do.	60	F	...	...	PS	(a).
Ro 252	16X, 7.15, 2.3W	R. Doors	1951	480	120	6	20	do.	28	J	30	...	D	Drawdown reported to be 8 ft. when pumping 20 gpm.
Ro 253	16X, 3.45, 0.8W	W. Wood	1949	360	192	6	110	do.	135	DWJ	8	...	D	0-125 ft. sand and gravel; 130-185 ft. red sandstone.
Ro 254	16X, 9.95, 3.0E	Mr. Taylor	1927	200	185	6	100	do.	100	J	17	...	PS	Supplies about 40 houses. (a).
Ro 255	16X, 7.05, 4.3E	Palisades Interstate Park Comm.	1948	170	329	10	23	do.	Flows May 1953	...	100	49.5	U	Hess Mt. State Park, well No. 2. Casing, 0-43 ft. (a) (b) (d).
Ro 256	16X, 7.05, 0.7E	R. Solomon	...	180	110	8	...	do.	7	C	...	...	PS	Supplies about 32 people. (a).

Table 17.—Records of selected wells and test borings in Rockland County—(Continued)

Well number	Location coordinates	Owner or occupant	Year completed	Altitude (feet)	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Geologic unit	Depth to water (feet)	Type of pump	Yield (gpm)	Temperature (°F)	Use	Remarks
Ro 237	16X, 12.08, 0.7E	Spring Valley Water Works & Supply Co.	1916	96	441	6	24	Newark group	..	...	38	..	T	Newark test well. Drawdown reported to be 168 ft. when pumping 35 gpm. (b).
Ro 238	16X, 11.18, 1.6E	Village of Nyack	1956	85	69	2½	607	do.	0	...	...	..	T	Boring No. 16. (b).
Ro 239	16X, 10.98, 1.6E	do.	1956	65	41	2½	412	do.	2	...	...	..	T	Boring No. 17. (b).
Ro 240	16X, 11.28, 2.1E	do.	1956	70	20	2½	207	do.	1	...	...	..	T	Boring No. 18. (b).
Ro 241	16X, 10.48, 2.3E	do.	1956	70	28	2½	29	Palisade diolite	1	...	...	..	T	Boring No. 9. (b).
Ro 242	16X, 10.88, 2.8E	Miller Davies	1928	70	136	6	607	Newark group	..	...	...	..	CI	0-60 ft. sand, clay, and gravel; 60-120 ft. sandstone; 120-138 ft. trap rock.
Ro 243	16X, 1.48, 0.3W	B. Anderson	1950	170	194	6	0	Ordovician shale	20 1952	...	3	..	D	(a).
Ro 244	16X, 1.88, 0.4W	I. M. Rose	1925	220	24	6	...	do.	..	...	15	..	D	...
Ro 245	16X, 4.38, 0.1E	Lake Lucille Supply	1929	126	190	8	70	Newark group	..	...	25	..	PS	Supplies 30 families in summer and 18 families in winter. (a).
Ro 246	16X, 4.48, 1.9W	N. Y. State Dept. of Public Works	1951	440	138	6	80	do.	45 1951	...	7	..	D	Pumping level reported to be 110 ft. when pumping 7 gpm.
Ro 247	16X, 18.08, 4.0E	D. Willard	1939	100	528	12-8	45	do.	..	T	...	..	U	(b).
Ro 248	16X, 11.18, 4.2E	Nyack Y. M. C. A.	1926	100	200	6	25	do.	30	...	28	..	U	...
Ro 249	16X, 9.18, 3.3E	H. Whalen	1911	240	90	6	...	do.	Flows 1 ft. above land surface.	B	3	82	D	...
Ro 270	16X, 4.28, 2.6W	D. Walker	1930	840	400	6	290	do.	60	F	9	..	D	Drawdown about 180 ft. when pumping 8 gpm.
Ro 271	16X, 3.08, 0.8W	G. Lippe	1937	360	263	6	211	do.	25	J	...	..	D	...
Ro 272	16X, 3.88, 1.9W	T. Dunlop & W. Hale	1919	525	337	6	16	do.	120	F	6	..	D	Supplies 2 houses. Tested at 25 gpm. Drawdown 0-247 ft.
Ro 273	16X, 2.68, 0.8W	Don Deoro Juniorate	1932	340	300	10	...	do.	..	F	40	..	I	(a).
Ro 274	16X, 1.28, 0.4W	A. T. Rose	1946	200	312	6	20	Cambrian and Ordovician limestone	28	J	9	..	D	...
Ro 275	16X, 12.88, 1.8W	Spring Valley Water Works & Supply Co.	1917	327	318	6	20	Newark group	..	...	95	..	T	Pearl River test well No. 3. Drawdown 100 ft. when pumping 35 gpm. (b).
Ro 276	16X, 12.88, 2.0W	do.	1942	263	409	6	2	do.	..	...	72	..	T	Pearl River test well No. 2. Drawdown 100 ft. when pumping 75 gpm. (b).
Ro 277	16X, 12.78, 2.1W	do.	1942	265	402	6	88	do.	..	...	67	..	T	Pearl River test well No. 2. (b).
Ro 278	16X, 11.88, 1.4W	Lederle Laboratories	1930	270	14	1½	...	Stratified drift	..	...	80	..	U	Driven well point system. Abandoned.
Ro 279	16X, 6.48, 7.2W	R. Richter, Jr.	1919	340	200	6	...	Precambrian gneiss	..	...	30	..	D	...
Ro 280	16X, 2.88, 6.8W	N. Tase	1937	370	166	6	607	Newark group	28.9 June 1937	Hub	20	..	D	...
Ro 281	16X, 12.48, 6.6E	N. Y. State Thruway Authority	...	0	371	2½	...	Triassic deposits	..	...	...	..	T	(b).
Ro 282	16X, 12.38, 4.5E	do.	...	0	254	2½	...	do.	..	...	...	..	T	(b).
Ro 283	16X, 12.18, 4.3E	do.	...	0	68	2½	80	Newark group	..	...	...	..	T	(b).

Project Report

REPORT OF SITE INVESTIGATIONS

**Dexter and Old Nyack Landfills
Clarkstown, New York**

April 1986

PROJECT: 852-03-1

**MALCOLM
PIRNIE**

ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

STARTED 8/29/85

FINISHED 9/5/85

SHEET 1 OF 2



SUBSURFACE LOG

HOLE NO MW-10

SURF ELEV. 267

C. W. DEPTH

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SAMPLE NO	BLOWS ON SAMPLER					BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		0-6	6-12	12-18	18-24	N			
1	1	2	5					Dry, brown-gray Silty CLAY	Temporary 8" steel casing set to 10.5'. 4" PVC monitoring well set at 55.0'; 4" PVC screen from 55'-45'; 4" PVC riser from 45' to ground surface.
		12	19			17			
2	2	21	58					Dry, brown-gray ASH, little Cobbles (FILL)	
		19	12			77			
3	3	5	6						
5		6	6			12			
4	4	5	4					Wet, ASH, wood chips, steel (FILL)	
		4	4			8			
5	5	2	1					Wet, brown PEAT	
		2	2			3			
10	6	2	3				12		Sample #9-no recovery cobble in sample spoon head
		5	10			8	21		
							51	Wet, gray, fine-medium SAND, little Gravel	
							34		
15							36		
	7	9	10				21	Wet, brown, fine-medium SAND	
		10	12			20	38		
							44		
							50		
							120		
20	8	18	12				31	Wet, brown, fine-medium SAND, some fine-medium Gravel	Sample #9-no recovery cobble in sample spoon head
		10	10			22	50		
							52		
							58		
25							62	ICSD	
	9	20	19				61	Till	
		13	13			32	62		
	10	10	12				66		
		12	13			24	67		
							80		
30	11	15	13				53	Wet, gray-reddish brown, very coarse GRAVEL, some small Cobbles, fine-coarse Sand, some Silt (WASH SAMPLE)	Sample #9-no recovery cobble in sample spoon head
		10	9			23	59		
							62		
							76		
							66		
35	12	16	15				57	Wet, fine-very coarse, GRAVEL, some fine-coarse Sand (WASH SAMPLE)	
		14	16				67		
							60		
							57		
40							59		

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow

C = No blows to drive " casing " with " lb weight falling " per blow

CLASSIFICATION Visual

METHOD OF INVESTIGATION

STARTED 9/6/85
 FINISHED 9/6/85
 SHEET 1 OF 1



SUBSURFACE LOG

HOLE NO. MW-2M
 SURF ELEV. N66
 C W DEPTH See Note

PROJECT Dexter Landfill / Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SAMPLE NO	BLOWS ON SAMPLER					BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		0-6	6-12	12-18	18-24	N			
5	1	6	9					Moist, brown Clayey SILT, some fine Gravel, incinerator ash, wood, glass (FILL)	Water recorded at 5.8' upon boring completion.
		8	8			17			
	2	4	11						
		42	39			53			
10	3	17	21					Wet, black PEAT, some Gravel, some Sand, some Silt	4" PVC monitoring well set at 30.0 feet; 4" PVC screen from 30.0' to 20.0'; 4" PVC riser pipe from 20.0' to ground surface.
		13	3			34			
	4	1	1						
		1	1			2			
15	5	1	1					Moist, gray CLAY	
		1	1			2			
	6	1	1						
		1	8			2			
20	7	1	1					Wet, brown, fine-coarse SAND, some Gravel, Sand, Silt, Cobbles	
		1	1			2			
	8	6	9						
		10	10			19			
25	9	4	4					Wet, brown-gray Clayey SAND	66 -32 34 Re
		5	7			9			
	10	32	49						
		43	100/0.2						
30								Boring Complete at Auger Refusal at 32.0 feet.	

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow
 C = No blows to drive " casing " with " lb weight falling " per blow

CLASSIFICATION Visual

METHOD OF INVESTIGATION

FINISHED 9/7/85
SHEET 1 OF 2



SUBSURFACE LOG

HOLE NO MW-31
SURF ELEV 1071
C W DEPTH _____

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SAMPLE NO	REMARKS	SOIL OR ROCK CLASSIFICATION	NOTES
5			Garbage, Wood (FILL)	4" PVC monitoring well set at 41.0'; 4" PVC screen from 41.0'-31.0'; 4" PVC riser pipe from 31.0' to ground surface.
10				71 -41 306
15				
20	1 26 13 6 6 19		Wet, black GARBAGE	
25	2 4 3 3 2 6		Wet, multi-colored Gravel, some coarse-fine Sand, some Clay	
30	3 WORWOR WORWOR		Wet, red-brown, fine SAND and SILT, trace clay	
35	4 23 27 17 15 44		Wet, brown-red CLAY with Gravel	
40	5 12 7			

N = No blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow
C = No blows to drive _____ casing _____ with _____ lb weight falling _____ per blow

CLASSIFICATION Visual

CLASSIFICATION Visual

DATE

STARTED 9/10/85

FINISHED 9/10/85

SHEET 1 OF 1



SUBSURFACE LOG

HOLE NO MW-4

SURF ELEV 71

C W DEPTH

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SAMPLE NO	REMSON SAMPLER					BLOW IN LAYING	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4	5			
	1	5	19					Moist, brown fine-medium SAND, wood, ash (FILL) Moist, black, wood, ash (FILL) Wet, wood, ash (FILL) Wet, black Garbage (FILL) Moist, brown-black PEAT <	

N = No. blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow

C = No. blows to drive casing with lb weight falling per blow

CLASSIFICATION Visual

DATE
 STARTED 9/6/85
 FINISHED 9/6/85
 SHEET 1 OF 2



SUBSURFACE LOG

HOLE NO MW-5D
 SURF ELEV 136.2
 C W DEPTH _____

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH FEET	SAMPLE NO.	BLISSON SAMPLER				SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4		
5						Mixed refuse, wood, earth fill, <u>crushed drum</u> at 2.0'± FILL	4" PVC monitoring well set at 60.0'; 4" PVC screen from 60.0'- 50.0'; 4" PVC riser pipe from 50.0' to ground surface.
10		1	1	1		Wet, brown-black Clayey PEAT	
		1	1		2		
15		2	1	1			
		1	2		2		
20		3	2	3			
		3	4		6		
25		4	3	3			
		3	3		6		
30		5	WR	WR		Wet, red-brown CLAY	
		WR	WR		-		
35		6	WR	WR			
		WR	WR		-		
40							

N = No. blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow
 C = No. blows to drive _____ casing _____ with _____ lb weight falling _____ per blow

CLASSIFICATION Visual

DATE

STARTED 9/6/85

FINISHED 9/6/85

SHEET 2 OF 2



SUBSURFACE LOG

HOLE NO. H-2

SURF ELEV.

C W DEPTH

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SOIL SAMPLE NO.	SOIL TYPE	SOIL OR ROCK CLASSIFICATION	NOTES
45	7	WH WH WH 2	Wet, red-brown CLAY	
50	8	5 5 WR WR	Wet, red-brown Silty CLAY, trace fine gravel, trace fine-coarse sand	
55	9	9 7 7 7	Wet, red-brown, fine-coarse SAND, trace silt	
60	10	30 38 15 10	Wet, brown GRAVEL, some Sand and Silt	
	11	100/0	Boring Complete at Auger Refusal at 60.0 feet.	62 8/2

N = No. blows to drive 2 spoon 12 with 140 lb pm wt falling 30 per blow
 C = No. blows to drive casing with lb weight falling per blow

CLASSIFICATION Visual

DATE	STARTED <u>9/11/85</u>	EMPIRE SOILS INVESTIGATIONS INC.	HOLE NO. <u>MW-51</u>
	FINISHED <u>9/11/85</u>		SURF ELEV. <u>N 65</u>
SHEET <u>1</u> OF <u>1</u>			C W DEPTH _____

PROJECT Dexter Landfill/Old Nyack Landfill LOCATION: Clarkstown, New York

DEPTH FEET	SAMPLE NO.	REMARKS ON SAMPLER				SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4		
5						FILL	4" PVC monitoring well set at 26.0'; 4" PVC 26.0'-16.0'; 4" PVC riser pipe from 16.0' to ground surface.
6							
7							
8							
9							
10							
11							
12							
13							
14							
15	1	WR	WR			Wet, red-brown PEAT, Organic Matter	65' 40' 25'
16		WR	WR				
17							
18							
19							
20	2	WH	WH			Wet, brown Clayey PEAT	
21		WH	WH				
22							
23							
24							
25	3	WH	WH			Wet, red-brown CLAY	
26		WH	WH				
27							
28							
29							
30	4	WH	WH				
31		WH	WH				
32							
33							
34							
35							
36							
37							
38							
39							
40							

N = No. blows to drive 2 spoon 12 with 140 lb. pin wt. falling 30 per blow CLASSIFICATION Visual
 C = No. blows to drive _____ casing with _____ lb. weight falling _____ per blow

DATE
STARTED 9/12/85
FINISHED 9/12/85
SHEET 1 OF 2



SUBSURFACE LOG

HOLE NO MW-71
SURF ELEV 763
C W DEPTH _____

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH FEET	SAMPLE NO	BLOWS ON SAMPLER						SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4	5	6		
5								Moist, brown Clayey Soil	4" PVC monitoring well set at 29.0'; 4" PVC screen from 29.0'-19.0'; 4" PVC riser pipe from 19.0' to ground surface. 63 42 31
10		1	1	1				Wet, brown-black PEAT	
			1	1			2		
15		2	1	WH					
			WH	1					
20		3	WH	WH				Wet, brown PEAT, trace clay	
			WH	WH					
25		4	WH	WH					
			WH	WH					
30		5	WH	WH				Wet, red-brown CLAY	
			WH	WH					
35		6	WH	WH					
			WH	WH					
40									

N = No blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow

C = No blows to drive _____ casing with _____ lb weight falling _____ per blow

CLASSIFICATION Visual

HOLE NO. MW-71
SURF ELEV. _____
C W DEPTH _____

LOCATION: Clarkstown, New York

[illegible]

A = No. blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow CLASSIFICATION Visual
 C = No. blows to drive _____ casing _____ with _____ lb weight falling _____ per blow

DATE

STARTED 9/12/85

FINISHED 9/12/85

SHEET 1 of 1



SUBSURFACE LOG

HOLE NO. MW-85

SURF ELEV. 136.5

C W DEPTH

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH FEET	SAMPLE NO.	BOTHAMON SAMPLER				BOTHAMON LAYING	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4			
5	1	12	2				3" TOPSOIL	4" PVC monitoring well set at 18.0 feet 4" PVC screen from 18.0'-8.0'; 4" PVC riser pipe from 8.0' to ground surface.
		3	2		5		Moist, brown, fine Sand, trace silt, mixed Garbage FILL	
	2	13	23				Wet, brown-black Sand, Silt, Garbage FILL	
		13	23		36			
	3	6	3				Wet, black Muck, Ooze FILL	
		2	3		5			
	4	2	1					
		2	2		3			
	5	2	1					
	10		1	2		2		
6		11	2					
		2	3		4			
7		6	3					
15		4	7		7			
	8	11	4					
		3	3		7			
	9	2	1					
20		1	1		2			
	10	1	1					
		1	1		2			
25							Boring Complete at 18.0 feet.	65 18 47

N = No. blows to drive 2 -poun 12

with 140 lb pin wt falling 30" per blow

C = No. blows to drive casing

with lb weight falling per blow

CLASSIFICATION Visual

SHEET 1 OF 1



SUBSURFACE LOG

HOLE NO. MW-95

SURF ELEV. 74

C. W. DEPTH

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

[illegible]

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow
C = No blows to drive _____ " casing _____ " with _____ lb weight falling _____ " per blow

CLASSIFICATION Visual

METHOD OF INVESTIGATION

DATE

STARTED 9/20/85

FINISHED 9/20/85

SHEET 1 OF 2



SUBSURFACE LOG

HOLE NO. MW-100

SURF ELEV. 260

C. W. DEPTH

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SAMPLE NO	BLOWS ON SAMPLER					SOIL OR ROCK CLASSIFICATION	NOTES
		0-6	6-12	12-18	18-24	N		
							Rock FILL	
5	1	32	32				Damp, brown FILL, medium-coarse Sandy Silt, wire, wood	2" PVC monitoring well set at 60.0'; 2" PVC screen from 60.0'-50.0'; 4" PVC riser pipe from 50.0' to ground surface.
		11	10			43		
10	2	4	4				Damp, brown Gravelly CLAY to reddish Sand and Silt, decomposed organic matter FILL	
		4	2			8		
15	3	2	2				Damp, brown-black FILL	
		WH	WH					
20	4	1	WH				Damp, brown PEAT	
		WH	WH					
25	5	2	1				Damp, brown FILL	
		1	1			2		
30	6	1	1				Damp, brown CLAY with some Silt	
		2	2			3		
35								
40								

N = No blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow

C = No blows to drive casing with lb weight falling per blow

CLASSIFICATION Visual

METHOD OF INVESTIGATION

DATE

STARTED 9/20/85

FINISHED 9/20/85

SHEET 2 OF 2



SUBSURFACE LOG

HOLE NO MW-100

SURF ELEV _____

C W DEPTH _____

PROJECT Dexter Landfill/Old Nyack Landfill

LOCATION Clarkstown, New York

DEPTH	SAMPLE NO.	REMARKS	SOIL OR ROCK CLASSIFICATION	NOTES
45	7	WH WH WH WH	Moist, reddish-brown CLAY, trace fine sand and silt	
50	8	WR WR WR WR	Damp, red CLAY with some fine Sand and Silt	
55	9	3 5 7 7 12	Wet, red-brown, fine SAND with some Silt	
60			Boring Complete at 60.0 feet.	
65				62 60

N = No. blows to drive 2 spoon 12 with 140 lb pin wt falling 30 per blow

C = No. blows to drive casing with lb weight falling per blow

CLASSIFICATION Visual

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

TRANSMITTAL SLIP

TO		
FROM	<i>Mr. Robert Dineen</i>	
RE.	<i>Norah Sturuti</i>	DATE <i>10-31-90</i>

Copy of the Xerox Blawie H. etc
will be per your request

FOR ACTION AS INDICATED:

- | | |
|---|---|
| ☐ Please Handle | ☐ Comments |
| ☐ Prepare Reply | ☐ Signature |
| ☐ Prepare Reply for _____ | ☐ File |
| ☒ Information | ☐ Return to me |
| ☐ Approval | ☐ <i>cc. etc</i> |
| ☐ Prepare final/draft in _____ | ☐ Copies |

LOG of BORING No. MW-15

DATE 12/17/86 SURFACE ELEVATION _____ LOCATION See Figure

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OVA SOILS (ppm)
2			Medium to dark brown clayey SILT and fine sand					
13			Reddish brown coarse to medium SAND with some silt, moist					< 1
5		11	-reddish brown coarse to medium sand, trace gravel, moist					4
7			-reddish brown clayey silty sand with thin medium sand lenses, moist					1
10		13	-silty medium to fine, reddish brown sand, trace gravel					< 1
15		15	-reddish brown medium to fine sand with some silt					8
10			-reddish brown coarse to medium sand, trace silt					30
15								20
20								
25								
30								
35								
40								

Completion Depth 14 Feet Water Depth _____ Feet Date 12/17/86
 Project Name Xerox Corp. - Blauvelt, NY Project Number 85C2667-9

REPORT OF
SOILS AND FOUNDATION INVESTIGATION
PROPOSED TRANSFER STATION
CLARKSTOWN LANDFILL
CLARKSTOWN, NEW YORK

For

CHARLES R. VELZY ASSOCIATES

By

CONVERSE ENGINEERING CONSULTANTS, PC

14 January 1988

Project No. 87-67160-01

CONVERSE ENGINEERING CONSULTANTS, P.C.

TEST BORING LOG

BORING NO. 3-A

PROJECT NAME Proposed Transfer Station

LOCATION Clarkstown, N.Y.

SHT. NO. 1 OF 2

CLIENT Charles R. Velzy Assoc.

PROC. NO. 97-67150-01

BIDDING CONTRACTOR CC Construction

ELEVATION 60.0 +/-

GROUND WATER MEASUREMENTS

DATE	TIME	DEPTH	CASING	TYPE	F.L.	S.S.	CORE	TUBE	DATUM	Site
2/15/87	11:00 AM	4.5'	15'	DIA.	4" &	2"			DATE START	12/15/87
2/15/87	11:30 AM	2.5'	0'	WT.	Mud	1400			DATE FINISH	12/15/87
				FALL		30"			DRILLER	S. Migliaccio
									FIELD REP.	A. Riccobono

DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLE SPOON BLOWS PER 6"	SAMPLE IDENTIFICATION AND REMARKS	STRATA DESCRIPTION
1	ERR	S-1	1 3 5 7	TS.	TOPSOIL
2	ERR		4		
3	ERR	S-2	5 9	FILL (S, S, Md, Paper, Mt1, etc) Jo	
4	ERR		6		
5	ERR	S-3L	5 4 2 3	No. Rec.	Garbage FILL (Sand, Silt, Glass, Wood, Metal, Paper, Peat, etc)
6			1		
7		S-4	2 3 3	do	
8			2		
9		S-5		do, +Pt	
10					
11		S-6	WCH WCH WCH	Bk br Pt	
12				WCH indicates weight of hammer	
13					Dark brown PEAT (Pt)
14			WCH		
15		S-7	1 1 1	do	
16	ERR			Pushed casing to 15' and used mud below this depth	
17	ERR				
18	ERR				
19					
20		S-8	WCH WCH WCH	Rd br vvd CLt, Plgs FS	Red brown varved CLAY & SILT with partings fine Sand (CL)
21					
22					

INTERPRETATION OF SOIL, ROCK, AND GROUNDWATER CONDITIONS, SEE TEXT OF CONVERSE REPORT, OF WHICH THIS LOG IS A PART.

CONVERSE ENGINEERING CONSULTANTS, P.C.				TEST BORING LOG		BORING NO. B-A	
PROJECT NAME Proposed Transfer Station				LOCATION Clarkstown, N.Y.		SHT. NO. 2 OF 2	
CLIENT Charles R. Velzy Assoc.						PROJ. NO. 87-67160-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLE SPOON BLOWS PER 6"	ft	SAMPLE IDENTIFICATION AND REMARKS	STRATA DESCRIPTION	
23							
24			WCH				
25		S-9	WCH		do	Same Red brown varved CLAY & SILT with partings fine Sand	
26			WCH				
27							
28						28'-0"	
29			6				
30		S-10	6		Rd br w/s, t.s., l. w/g	Red brown medium to fine SAND, trace Silt, little medium to fine Gravel	
31			7				
32			9				
33						33'-0"	
34			9				
35		S-11	9		Rd br c/s, s. Cyg, s. w/g		
36			10				
37			15				
38						Red brown coarse to fine Sand, some Clayey Silt, some medium to fine Gravel, Cobbles (Glacial Till) (SH-GP)	
39			10				
40		S-12	12		do		
41			17				
42			22				
43							
44			8				
45		S-13	14		do Cbls.		
46			22				
47			30			46'-0"	
48						End of Boring @ 46'0"	

FOR INTERPRETATION OF SOIL, ROCK, AND GROUNDWATER CONDITIONS, SEE TEXT OF CONVERSE REPORT, OF WHICH THIS LOG IS A PART.

CONVERSE ENGINEERING CONSULTANTS, P.C.				TEST BORING LOG				BORING NO. B-B	
PROJECT NAME Proposed Transfer Station				LOCATION Clarkstown, N.Y.				SHT. NO. 1 OF 4	
CLIENT Charles R. Vesely Assoc.								PROJ. NO. 37-67160-01	
ENGINE CONTRACTOR GC Construction								ELEVATION 60.0 +/-	
GROUND WATER MEASUREMENTS				CASING	SAMPLE	CORE	TUBE	DATUM Site	
DATE	TIME	DEPTH	CASING	TYPE	F.I.	S.S.	NI	DATE START 12/11/87	
11/15/87		2'0"	None	DIA.	4" 1/2	2"	2 1/8"	DATE FINISH 12/14/87	
11/16/87		5'0"	19'0"	WT.	Mud	140#		DRILLER S. Migliaccio	
			FALL			30"		FIELD REP. A. Riccobono	

PTH	CASING	SAMPLE	SAMPLE	SPCON	SY	SAMPLE IDENTIFICATION AND REMARKS	STRATA DESCRIPTION
T.	BLOWS	NO.	BLOWS	PEF 5"	M		
1		S-1	1	1		Ts v Veg.	TOPSOIL with Vegetation
2	ERR		2	2			1'-6"
3	ERR	S-2	3	3		FILL (S, Sils, Wd, Mtl, Paper, etc)	
4	ERR		4	4			
5		S-3L	5	5		No. Rec.	Garbage FILL (Sand, Silt, Glass, Wood, Metal, Paper, Peat, etc.)
6			6	6			
7		S-4L	7	7		No. Rec.	
8			8	8			
9		S-5	9	9		do	
10			10	10			
11		S-6	11	11		do v Pt.	
12			12	12			12'-0"
13			13	13			
14			14	14			
15		S-7	15	15		WdH WdH WdH WdH Dk br O& & Pt.	Dark brown Organic SILT & PEAT (OH-Pt)
16			16	16		WdH indicates weight of hammer	
17			17	17			
18			18	18		Pushed casing to 19' and used and below this depth	18'-0"
19			19	19			
20	ERR	S-8	20	20		WdR WdR WdR Gr br vvd C & S	Gray brown varved CLAY & SILT (CL)
21	ERR		21	21		WdR indicates weight of rods	
22	ERR		22	22			

FOR INTERPRETATION OF SOIL, ROCK, AND GROUNDWATER CONDITIONS, SEE TEXT OF CONVERSE REPORT, OF WHICH THIS LOG IS A PART.

CONVERSE ENGINEERING CONSULTANTS, P.C.					TEST BORING LOG		BORING NO. 3-3	
PROJECT NAME			PROJECTED TEST DATE		LOCATION		SHT. NO. 2 OF 4	
CLIENT			Charles E. Velby Assoc.				PROC. NO. 57-57160-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLE SPOON BLOWS PER 6"	S Y N	SAMPLE IDENTIFICATION AND REMARKS	STRATA DESCRIPTION		
20						Red brown varves CLAY & SILT (CL)		
24								
25		S-9	WOR		Rd br vvd C & s			
26			WOR					
27			WOR					
28						28'-6"		
29			4			Red brown coarse to fine SAND, trace Silt, some medium to fine Gravel (SM-GP)		
30		S-10	2		Rd br cfs, t. s, s. afG			
31			2					
32			3					
33								
34			7			34'-0"		
35		S-11	9		Rd br afS, s. CyS, s. afG, Cbls.	Red brown coarse to fine Sand, some Clayey Silt, and medium to fine Gravel, Cobbles, Boulders (Glacial Till) (SM-GP)		
36			9					
37			13					
38								
39			26					
40		S-12	37		Rd br cfs, s. CyS, a. afG, Cbls, Bldrs.			
41			35					
42			29					
43								
44			23					
45		S-13	24		do			
46			51					
47			24					
48								

FOR INTERPRETATION OF SOIL, ROCK, AND GROUNDWATER CONDITIONS, SEE TEXT OF CONVERSE REPORT, OF WHICH THIS LOG IS A PART.

CONVERSE ENGINEERING CONSULTANTS, P.C.

TEST BORING LOG

BORING NO. 8-5

PROJECT NAME Proposed Transfer Station

LOCATION Elizabethtown, N.J.

SHEET NO. 3 OF 4

CLIENT Charles R. Velzy Assoc.

PROJECT NO. 87-57160-01

DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLE SPOON BLOWS PER 6"	SAMPLE IDENTIFICATION AND REMARKS	STRATA DESCRIPTION
49			78		
50		S-14	100	do	
51					
52					
53					
54			80	do	
55		S-15	100		
56					
57					Red brown coarse to fine Sand, some Clayey Silt, and medium to fine Gravel, Cobbles, Boulders (Glacial Till) (SM-SP)
58					
59			33		
60		S-16	44	do	
61			60		
62			72		
63					
64			30		
65		S-17	100	do + Rk frgs.	
66					
67					
68					
69			22		
70		S-18	39	do	
71			70		
72			63		
73					
74					

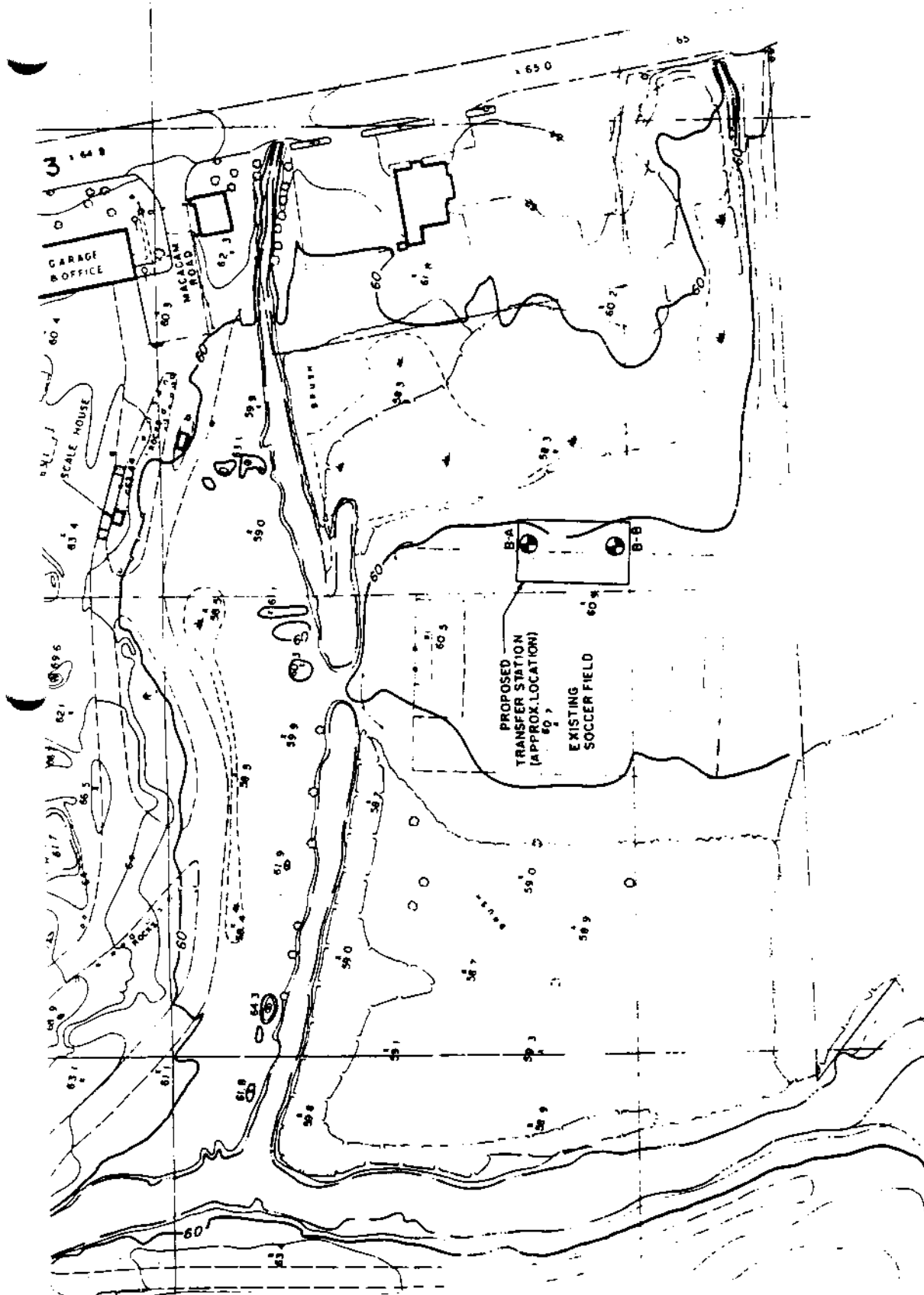
73'-0"

Weathered Rock

INTERPRETATION OF SOIL, ROCK, AND GROUNDWATER CONDITIONS, SEE TEXT OF CONVERSE REPORT, OF WHICH THIS LOG IS A PART.

CONVERSE ENGINEERING CONSULTANTS, P.C.				TEST BORING LOG		BORING NO. 8-2	
PROJECT NAME Proposed Transfer Station				LOCATION Manhattan, N.Y.		SHT. NO. 4 OF 4	
CLIENT Charles E. Veley Assoc.						PROJ. NO. 87-67180-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLE SPOON BLOWS PER 5'	S Y M	SAMPLE IDENTIFICATION AND REMARKS	STRATA DESCRIPTION	
75		S-19	100/3		Rt frgs.	Silt	
76		RUN #1					
77					Run #1	Gray DIABASE interbedded with Sandstone (Possibly Bedrock)	
78					75'0" - 79'0"		
79					Run = 48"		
					Rec = 38" = 79'		
80						End of Boring @ 79'0"	
81							
82							
83							
84							
85							
86							
87							
88							
89							
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							
100							

FOR INTERPRETATION OF SOIL, ROCK, AND GROUNDWATER CONDITIONS, SEE TEXT OF CONVERSE REPORT, OF WHICH THIS LOG IS A PART.



Project	2-25-68) Supply Material	Contract No.	7791	Page	1	of	12
Subject	Electric Equipment	Contract	or NIT 65314-02	Date	5/15/61		
Order		Order	or 6-2-2-2-0-0-0	Date	5/19/61		

24

RECEIVED 1970 APR 22



Sub 1, 200,

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094

LEADS

- ☒ During fully formed
☐ During early stages
☐ During middle stages
☐ During late stages
☐ During all stages
- E1 601
 E1 43
 E1 74
 E1 74
- Top of Sand
 Top of Sand
 Top of Sand

FIGURE 2



DEPTH _____ FT. _____ FT. CASING OUT DATE: _____	DATE, START: <u>4/13/81</u>	GROUND ELEVATION <u>66.7</u>
DEPTH _____ FT. ALL CASING OUT DATE: _____	DATE, FINISH: <u>4/13/81</u>	GROUND WATER ELEVATION _____
CASING O.D. <u>4"</u> I.D. _____	WEIGHT OF HAMMER <u>300/140</u> LBS.	HAMMER FALL _____
SAMPLER O.D. <u>2"</u> I.D. _____	INSIDE LENGTH OF SAMPLER <u>2"</u> IN.	CASING <u>24"</u> SAMPLER <u>30"</u>
DIAMOND BIT SIZE _____		

DEPTH IN FEET 0 10 20 30 40 50	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
					0-6	6-12	12-18			
		1	0' - 2'		4-7-10-14					
		2	5' - 6'		17-100/5"					
		3	10' - 12'		12-5-25-100					
		4	15' - 17'		15-14-9-10					
		5	19' - 19'0"		100/0'			0/19'		Misc. wood, garbage, fill and bedrock

Soils Engineer: _____ Driller: _____
Drilling Inspector: _____ Helper: _____

JOB LOCATION:

V. 145-143 Clarkstown

New York

WARREN GEORGE, INC.

FOOT OF JERSEY AVENUE

P. O. BOX 413

JERSEY CITY, N.J. 07303

FOR: Metcalf & Eddy, Inc.

SHEET 1 OF 2

LOCATION CLARKSTOWN, N.Y.

HOLE NO. 2

LINE & STA.

OFFSET

DEPTH _____ FT. FT. CASING OUT DATE: _____

DATE, START: 4/30/81

GROUND ELEVATION 65.1

DEPTH _____ FT. ALL CASING OUT DATE: _____

DATE, FINISH: 5/1/81

GROUND WATER ELEVATION _____

CASING O.D. NW I.D. _____

WEIGHT OF HAMMER 300-140 LBS.

HAMMER FALL

SAMPLER O.D. 2" I.D. _____

INSIDE LENGTH OF SAMPLER _____ IN.

CASING 24" SAMPLER 30"

DIAMOND BIT SIZE NX

DEPTH BL- ON SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
					0-6	6-12	12-18			
0		1	0'-2'		2	2	5-7			
		2	5'-7'		6	9	8-21			
10		3	10'-12'		3	60	8-15			
		4	14'-16'		42	34	44-16			
									0'-19'	Misc Fill
20		5	19'-21'		3	2	1-2			
		6	24'-26'		3	2	2-2		19'-26'	Brown Peat
30		7	29'-31'		2	2	2-2			
									26'-35'	Brown Silt, Trace Very Fine Sand.
		8	34'-36'		2	1	5-2			
									35'-39'	Brown Gray Fine Sand, Little Silt.
40										

Soils Engineer: _____

Drillers: K. Reid

Drilling Inspector: _____

Helper: _____

JOB LOCATION:
West New York, Clarkstown
New York

WARREN GEORGE. INC.
FOOT OF JERSEY AVENUE
P. O. BOX 413
JERSEY CITY, N.J. 07303

FOR: K Metcalf & Eddy, Inc.

SHEET 1 OF 3
LOCATION CLARKSTOWN, N.Y.
HOLE NO. 3
LINE & STA. _____
OFFSET _____

EPTH _____ FT. _____ FT. CASING OUT DATE: _____
EPTH _____ FT. ALL CASING OUT DATE: _____

DATE, START: 4/14/81
DATE, FINISH: 4/15/81

GROUND ELEVATION 72.4
GROUND WATER ELEVATION _____

ASING O.D. _____ I.D. _____
 AMPLER O.D. _____ I.D. _____
 AMONDBIT SIZE _____

WEIGHT OF HAMMER 300-140 LBS.
INSIDE LENGTH OF SAMPLER _____ IN.

NUMBER FALL
CASING 24" SAMPLER 30"

CASI NG BLOS PER FOOT	SAMP LE NUM BER	SAMP LE DEPTHS ELEV. / FEET	SAMP LE RECO VERY	BLOS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROF ILE CHANG E DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
				0-6	6-12	12-18			
	1	0'-2'		19	18	25-26			
	2	5'-7'		11	10	9-20			
	3	10'-12'		67	5"				
	4	15'-17'		31	38	70-27			
	5	20'-22'		14	20	14-15			
C A S I N G	6	25'-27'		OBSTRUCTION					
	7	30'-32'		22	23	47-27			
	8	35'-37'		OBSTRUCTION					
							0-38'	(F411)	

72
38
34

0-38'	(F111)
-------	--------

its Engineer: _____
Lifting Inspector: _____

Driller: T. Tirro
 Talsper: _____

JOB LOCATION: <u>1500 Brook Clarkstown</u> <u>New York</u>	WARREN GEORGE, INC. FOOT OF JERSEY AVENUE P. O. BOX 413 JERSEY CITY, N.J. 07303 FOR: <u>X Metcalf & Eddy, Inc.</u>	SHEET <u>2</u> OF <u>3</u> LOCATION <u>CLARKSTOWN, N.Y.</u> HOLE NO. <u>3</u> LINE & STA. _____ OFFSET _____
--	---	--

DEPTH _____ FT. FT. CASING OUT DATE: _____ DEPTH _____ FT. ALL CASING OUT DATE: _____	DATE, START: <u>4/14/81</u> DATE, FINISH: <u>4/15/81</u>	GROUND ELEVATION _____ GROUND WATER ELEVATION _____
CASING O.D. _____ I.D. _____ SAMPLER O.D. _____ I.D. _____ DIAMOND BIT SIZE _____	WEIGHT OF HAMMER <u>300-140</u> LBS. INSIDE LENGTH OF SAMPLER _____ IN.	HAMMER FALL _____ CASING <u>24"</u> SAMPLER <u>30"</u>

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
					0-6	6-12	12-18			
0		9	40'-42'		3	2	3-3			
10		10	45'-47'		2	1	1-2			
20		11	50'-52'		2	2	1-2 A&B			
30		12	55'-57'		WR		A&B			
40		13	60'-62'		WH		A&B			
50		14	65'-67'		15	18	18-14			
60		15	70'-72'		11	13	13-24			
70		16	75'-77'		37	22	21-19			

72
 50
 22
 38'-50' Peat

72
 50
 17
 50'-55' Grey Organic Silt

72
 50
 17
 55'-65' Red-Br Clay

Soils Engineer: _____	Driller: <u>T. Tirro</u>
Drilling Inspector: _____	Helper: _____

EPTH _____ FT. _____ FT. CASING OUT DATE: _____ EPTH _____ FT. ALL CASING OUT DATE: _____		DATE, START: <u>4/14/81</u> DATE, FINISH: <u>4/15/81</u>		GROUND ELEVATION _____ GROUND WATER ELEVATION _____	
ASING O.D. _____ I.D. _____ AMPLER O.D. _____ I.D. _____ AMOND BIT SIZE _____		WEIGHT OF HAMMER <u>300-140</u> LBS. INSIDE LENGTH OF SAMPLER _____ IN.		HAMMER FALL _____ CASING <u>24"</u> SAMPLER <u>30"</u>	

[illegible]

Site Engineer: _____ Driller: T. Tirro
 Milling Inspector: _____ Helper: _____

Soils Engineer: _____ Driller: Tony Tirro, J. Chambers Vg
Drilling Inspector: _____ Helper: J. Bowen

JOB LOCATION: Clarkstown,
Black, NY NY

WARREN GEORGE, INC.
FOOT OF JERSEY AVENUE
P. O. BOX 413
JERSEY CITY, N.J. 07303

FOR: **METCALF & EDDY, INC.**

SHEET 2 OF 3
LOCATION CLARKSTOWN, N.Y.
HOLE NO. 4
LINE & STA. _____
OFFSET _____

DEPTH _____ FT. FT. CASING OUT DATE: _____

DATE, START: 4/81

GROUND ELEVATION _____

DEPTH _____ FT. ALL CASING OUT DATE: _____

DATE, FINISH: 4/81

GROUND WATER ELEVATION _____

SING O.D. 4" NW I.D. _____

WEIGHT OF HAMMER 300/140 LBS.

HAMMER FALL

SAMPLER O.D. 2" I.D. _____

INSIDE LENGTH OF SAMPLER 2" IN.

CASING 24" SAMPLER 30"

AMOND BIT SIZE _____

CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
				0-6	6-12	12-18			
	9	40' - 42'		39-8-8-7 (300 lbs)					0/43' Garbage Fill:
	10	45' - 47'		8-7-7-5					
	11	50' - 52'		9-9-8-8					43'-54' Peat 73 54 19
	12	55' - 57'		WR - WR - 1 - 2					
	13	60' - 62'		WR-WR- 1 - 2					73 66 19
	14	65' - 67'		WR/24'					54-66 Grey Organic Silt
	15	70' - 72'		WR/24'					
	16	76-1/2' - 78'		13-13-9					66-75.5 Red-Br. Clay

So Engineer: _____

Driller: Tony Tirro, J. Chambers Vg

Logging Inspector: _____

Helper: J. Bowen

SHEET 3 OF 3
LOCATION CLINTON, N.Y.
HOLE NO. 4
LINE & STA. _____
OFFSET _____

DIAMOND BIT SIZE _____[illegible]

Helped: _____ J. BOWEN

Helped: J. Bowen

JOB LOCATION:
Clarkstown, NY

WARREN GEORGE, INC.

FOOT OF JERSEY AVENUE
P. O. BOX 413
JERSEY CITY, N.J. 07303

FOR: Metcalf and Eddy, Inc.

SHEET 2 OF 3
LOCATION Clarkstown, NY
HOLE NO. 6
LINE & STA. _____
OFFSET _____

DEPTH _____ FT. FT. CASING OUT DATE: _____ DATE, START: 4/28/81 GROUND ELEVATION _____
DEPTH _____ FT. ALL CASING OUT DATE: _____ DATE, FINISH: 4/29/81 GROUND WATER ELEVATION _____

CASING O.D. 1 1/2" I.D. _____
SAMPLER O.D. 2" I.D. _____
DIAMOND BIT SIZE _____

WEIGHT OF HAMMER 300/140 LBS.
INSIDE LENGTH OF SAMPLER 2" IN.

HAMMER FALL _____
CASING 24" SAMPLER 30"

CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTH ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 8" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
				0-8	8-12	12-16			
	5	40' - 42'		12	4	4			<u>82</u> <u>47</u> <u>33</u>
	6	45' - 47'		2	1	2		32' / 49'	Brown Peat
	7	50' - 51' 6"		6	7	7		<u>82</u> <u>53</u> <u>19</u>	49' / 53' Dark Brown Organic Silt
HOLE Cased TO 80'. NO CASING BLOWS NEEDED	8	55' - 57'		WR	24"			<u>82</u> <u>64</u> <u>16</u>	
	9	60' - 62'		WR	24"			53' / 65' 6"	Brown Soft Silty Clay
	10	65' - 67'		16	16	9-9		65' 6" / 68'	Coarse Sand and Gravel
	11	70' - 72'		7	6	10-6		68' / 72'	Medium to fine sand and Gravel, Trace of Silt
	12	75' - 77'		20	13	0-19		<u>82</u> <u>66</u> <u>76</u>	

Is Engineer: _____

Driller: J. Chambers Vg

Logging Inspector: _____

Helper: J. Bowen

Engineers: _____ Driller: J. Chambers _____
ing Inspector: _____ Helper: J. Lickan _____

B-7

JOB LOCATION: <u>Clarkstown, NY</u>	WARREN GEORGE, INC. FOOT OF JERSEY AVENUE P. O. BOX 413 JERSEY CITY, N.J. 07303 FOR: Metcalf & Eddy, Inc.	SHEET <u>1</u> OF <u>2</u> LOCATION <u>Clarkstown, NY</u> HOLE NO. <u>7</u> LINE & STA. _____ OFFSET _____
--	--	--

DEPTH _____ FT. FT. CASING OUT DATE: _____	DATE, START: <u>5-4-81</u>	GROUND ELEVATION <u>61.5</u>
DEPTH _____ FT. ALL CASING OUT DATE: _____	DATE, FINISH: <u>5-5-81</u>	GROUND WATER ELEVATION _____
CASING O.D. <u>8 1/2"</u> I.D. _____	WEIGHT OF HAMMER <u>300/140</u> LBS.	HAMMER FALL _____
SAMPLER O.D. <u>2 1/2"</u> I.D. _____	INSIDE LENGTH OF SAMPLER <u>2'</u> IN.	CASING <u>24"</u> SAMPLER <u>30"</u>
DIAMOND BIT SIZE _____		

DEPTH BEL- OW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
					0-6	6-12	12-18			
0		1	0' - 2'		4	7	10	9		
		2	5' - 7'		4	4	5	6		
-10		3	10' - 12'		30	25	28	6	6 1/2 0' / 14'	Miscellaneous Fill
		4	15' - 17'		2	2	2	2		
-20		5	20' - 22'		1	0	0	1	6 1/2 4' / 23'	Brown Peat
		6	25' - 27'		0	1	1	1	3 1/2	
-30		7	30' - 32'		W	O	H	-2	6 1/2 23' / 34'	Brown Organic Silt
		8	35' - 37'		W	O	H		6	
-40										

Soils Engineer: _____	Driller: <u>R. Reid</u>	Vg
Drilling Inspector: _____	Helper: <u>B. Verpent</u>	

DEPTH _____ FT. _____ FT. CASING OUT DATE: _____	DATE, START: <u>5-4-81</u>	GROUND ELEVATION _____
DEPTH _____ FT. ALL CASING OUT DATE: _____	DATE, FINISH: <u>5-5-81</u>	GROUND WATER ELEVATION _____
CASING O.D. <u>BW</u> I.D. _____	WEIGHT OF HAMMER <u>300/140</u> LBS.	HAMMER FALL _____
SAMPLER O.D. <u>2"</u> I.D. _____	INSIDE LENGTH OF SAMPLER <u>2"</u> IN.	CASING <u>24"</u> SAMPLER <u>30"</u>
DIAMOND BIT SIZE _____		

[illegible]

Solfe Engineer: _____ Driller: R. Reid _____ Vg _____
Drilling Inspector: _____ Helpers: B. Verpent _____

B-9

JOB LOCATION: <u>Clarkstown, N.Y.</u>	WARREN GEORGE, INC. FOOT OF JERSEY AVENUE P. O. BOX 413 JERSEY CITY, N.J. 07303 FOR: Metcalf & Eddy, Inc	SHEET <u>1</u> OF <u>3</u> LOCATION <u>Clarkstown, N.Y.</u> HOLE NO. <u>9</u> LINE & STA. _____ OFFSET _____
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DEPTH _____ FT. CASING OUT DATE: _____	DATE, START: <u>5/6/81</u>	GROUND ELEVATION <u>62.4</u>
DEPTH _____ FT. ALL CASING OUT DATE: _____	DATE, FINISH: <u>5/6/81</u>	GROUND WATER ELEVATION _____

CASING O.D. <u>BV</u> I.D. _____ SAMPLER O.D. <u>2"</u> I.D. _____ DIAMOND BIT SIZE _____	WEIGHT OF HAMMER <u>300/140</u> LBS. INSIDE LENGTH OF SAMPLER _____ IN.	HAMMER FALL CASING <u>24"</u> SAMPLER <u>30"</u>
---	--	---

DEPTH BL- ON SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
					0-6	6-12	12-18			
0		1	0'-2'		3	5	8			
		2	5'-7'		9	3	3			
10		3	10'-12'		5	3	2		0'-12'	Misc. Fill.
		4	15'-17'		0	0	1			
20		5	17'-20'		0	0	1		12'-21'	Brown Peat.
		6	25'-27'		W	0	H			
30		7	30'-32'		W	0	H			
		8	35'-37'		W	0	H			
40										

Soils Engineers: _____	Drillers: <u>K. Reid</u>	
Drilling Inspectors: _____	Helper: <u>B. Verpent</u>	519

JOB LOCATION: <u>Clarkstown, NY</u>	WARREN GEORGE. INC. FOOT OF JERSEY AVENUE P. O. BOX 413 JERSEY CITY, N.J. 07303 FOR: <u>Metcalf & Eddy, Inc</u>	SHEET <u>2</u> OF <u>3</u> LOCATION <u>Clarkstown, NY</u> HOLE NO. <u>9</u> LINE & STA. _____ OFFSET _____
--	--	--

PTH _____ FT. _____	FT. CASING OUT DATE: _____	DATE, START: <u>5/6/81</u>	GROUND ELEVATION _____
PTH _____ FT. _____	ALL CASING OUT DATE: _____	DATE, FINISH: <u>5/6/81</u>	GROUND WATER ELEVATION _____
SING O.D. <u>RW</u> I.D. _____ PLER O.D. <u>2"</u> I.D. _____ MOND BIT SIZE _____		WEIGHT OF HAMMER <u>300/140</u> LBS. INSIDE LENGTH OF SAMPLER _____ IN.	HAMMER FALL <u>24"</u> CASING <u>30"</u> SAMPLER

CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER S'-" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
				0-6	6-12	12-18			
	9	40'-42'							21'-41' Brown & Grey Organic Silt
	10	45'-47'							
	11	50'-52'							
	12	55'-57'							
	13	60'-62'							43'-60' Brown Clay
	14	65'-67'							
	15	70'-72'							
	16	75'-77'							60'-75' Brown Silt trace clay

Engineer: _____	Driller: <u>K. Reid</u>	
Field Inspector: _____	Helper: <u>R. Verpent</u>	<u>sjg</u>

Clarkstown, NY

FOOT OF JERSEY AVENUE

JERSEY CITY, N.J. 07303

FOR: HETCALF & EDDY, INC.

SHEET 1 OF 4

LOCATION Clarkstown, NY

NOLE NO. _____ 10

LINE & STA. 96.0

OFFSET

DEPTH _____ FT. _____ FT. CASING OUT DATE: _____

DATE, START: 4/24/81

GROUND ELEVATION 96.0

DEPTH _____ FT. ALL CASING OUT DATE: _____

DATE, FINISH: 4/23/81

GROUND WATER ELEVATION

CASING O. D. NW I. D. _____

SAMPLER O.D. 2" I.D. 1.5"

DIAMOND BIT SIZE _____

WEIGHT OF HAMMER 300/140 LBS.

INSIDE LENGTH OF SAMPLER 2" IN.

KANNER FALL

CASING 24" SAMPLER 30"

Na?per:

JOB LOCATION: <u>Clarkstown, NY</u>	WARREN GEORGE. INC. FOOT OF JERSEY AVENUE P. O. BOX 413 JERSEY CITY, N.J. 07303 FOR: METCALF & EDDY, INC.	SHEET <u>2</u> OF <u>4</u> LOCATION <u>Clarkstown, NY</u> HOLE NO. <u>10</u> LINE & STA. _____ OFFSET _____
--	---	---

DEPTH _____ FT. _____ FT. CASING OUT DATE: _____ DEPTH _____ FT. ALL CASING OUT DATE: _____	DATE, START: <u>4/24/81</u> DATE, FINISH: <u>4/27/81</u>	GROUND ELEVATION _____ GROUND WATER ELEVATION _____
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CASING O.D. <u>NW</u> I.D. _____ SAMPLER O.D. <u>2"</u> I.D. _____ DIAMOND BIT SIZE _____	WEIGHT OF HAMMER <u>300/140</u> LBS. INSIDE LENGTH OF SAMPLER <u>2"</u> IN.	HAMMER FALL _____ CASING <u>24"</u> SAMPLER <u>30"</u>
---	--	---

DEPTH FEET	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
					0-6	6-12	12-18			
0		5	40' - 42'		7	9	9	23		
		6	45' - 47'		4	5	5	14		
10		7	50' - 52'		7	8	6	7		
		8	55' - 57'		5	5	5	8		
20		9	60' - 62'		2	2	2	2		0'/60' Miscellaneous Fill
		10	65' - 67'		1	1	2	5		
30		11	70' - 72' 6"		WR	2	3			60'-75' Peat
		12	76' 6" - 78' 6"		WR	WR	WR	3		
40										

Soils Engineer: _____	Driller: <u>J. Chambers</u>	Vg
Drilling Inspector: _____	Helper: <u>J. Bowan</u>	

DEPTH _____ FT. _____ FT. CASING OUT DATE: _____		DATE, START: <u>4/24/81</u>	GROUND ELEVATION _____
DEPTH _____ FT. ALL CASING OUT DATE: _____		DATE, FINISH: <u>4/27/81</u>	GROUND WATER ELEVATION _____
CASING O.D. <u>NW</u> I.D. _____		WEIGHT OF HAMMER <u>300/140</u> LBS.	HAMMER FALL _____
SAMPLER O.D. <u>2"</u> I.D. _____		INSIDE LENGTH OF SAMPLER <u>2"</u> IN.	CASING <u>24"</u> SAMPLER <u>30"</u>
DIAMOND BIT SIZE _____			

DEPTH BEL- OW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER			DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
				0-6	6-12	12-18			
		13		WR-WR-1-2					
-10		14		WR/24"					
		15		WH-WH-1-1				75'-96'	Gr. Organic Silt
-20									
		16		WR/24"				96'-100'	Dark Gray Organic Silty Clay
		17		WR-WR-WR-2					
-30									
		18		16-25-17-20				100-109	Red Brown Clay
		19	NR	19-13-10-19					
-40									
								127- 109'- 120'	Medium to Coarse Sand and Gravel, some Cobbles

Soils Engineer: _____
Drilling Inspector: _____

Driller: J. Chambers Vg
Helper: J. Bowan

Soils Engineer: _____ Driller: _____
Drilling Inspector: _____ Helper: _____

**REPORT OF GEOTECHNICAL
INVESTIGATION AND
GROUNDWATER MONITORING
PROGRAM
EXISTING LANDFILL
CLARKSTOWN, NEW YORK**

**For
CHARLES R. VELZY ASSOCIATES, INC.**

**By
CONVERSE WARD DAVIS DIXON**

18 July 1979

Project No. 79-8107-01

APPENDIX A

Converse Ward Davis Dixon

VISUAL IDENTIFICATION OF SAMPLES

The samples were identified in accordance with the American Society for Engineering Education System of Definition.

I. Definition of Soil Components and Fractions

Material	Symbol	Fraction	Sieve Size	Definition
Boulders	Bldr	—	9" +	Material retained on 9" sieve.
Cobbles	Cbl	—	3" to 9"	Material passing the 9" sieve and retained on the 3" sieve.
Gravel	G	coarse (c) medium (m) fine (f)	1" to 3" $\frac{3}{8}$ " to 1" No. 10 to $\frac{3}{16}$ "	Material passing the 3" sieve and retained on the No. 10 sieve.
Sand	S	coarse (c) medium (m) fine (f)	No. 30 to No. 10 No. 60 to No. 30 No. 200 to No. 60	Material passing the No. 10 sieve and retained on the No. 200 sieve.
Silt	s	—	Passing No. 200 (0.074 mm)	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air dried.

Organic Silt (OS)
Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content, and exhibits fine granular and organic characteristics.

		Plasticity	Plasticity Index	
Clayey SILT	OSs	Slight (SI)	1 to 5	Clay-Silt
SILT & CLAY	S&C	Low (L)	5 to 10	Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.
CLAY & SILT	C&S	Medium (M)	10 to 20	
Silty CLAY	SyC	High (H)	20 to 40	
CLAY	C	Very High (VH)	40 plus	

II. Definition of Component Proportions

Component	Written	Proportions	Symbol	Percentage Range by Weight *
Principal	CAPITALS	—	z	50 or more
Minor	Lower Case	and some little trace	z z l t	35 to 50 20 to 35 10 to 20 1 to 10

* Minus sign (—) lower limit, plus sign (+) upper limit, no sign middle range.

III. Glossary of Modifying Abbreviations

Category	Symbol	Term	Symbol	Term	Symbol	Term
A. Borings	U/D	Undisturbed	B	Exploratory	A	Auger
B. Samples	C	Casing	L	Lost	U	Undisturbed
	D	Decision	S	Spoon	W	Wash
	O.E.	Open End				
C. Colors	bk	black	gr	green	wh	white
	bl	blue	or	orange	yw	yellow
	br	brown	rd	red	dk	dark
	gr	gray	tn	tan	R	light
D. Organic Soils	dec	decayed	o	organic	veg	vegetation
	dec'g	decaying	rts	roots	pt	peat
	lg	lignite	ts	topsoil		
E. Rocks	LS	Limestone	rt	rock	Sst	Schist
	Gss	Gneiss	SS	Sandstone	Sh	Shale
F. Fill and Miscellaneous Materials	bldr (s)	boulder (s)	chl (s)	cobble(s)	gls	glass
	brk (s)	brick (s)	wd	wood	misc	miscellaneous
	cndr (s)	cinder (s)	thr	debris	rbl	rubble
G. Miscellaneous Terms	dn	ditto	pp	pocket	ref	refusal
	el, El	elevation		penetrometer	sm	small
	fgmt (s)	fragment(s)	P. L.	Plasticity	W. L.	water level
	fret	frequent		index	W. H.	weight of hammer
	lrg	large	P	pushed	W. R.	weight of rods
	mtld	mottled		pressed		
	no rec	no recovery	pc (s)	piece (s)		
	pen	penetration	rec or R	recovered		
H. Stratified Soils	alt	alternating				
	thk	thick				
	thin	thin				
	u	with				
	prt	parting				
	seam	seam				
	lvr	layer				
	strat	stratum				
	varv c	varved Clay				
	pht	pocket				
	lens	lens				
	occ	occasional				
	freg	frequent				

- 0 to 1/16" thickness
- 1/16 to 1/8" thickness
- 1/8 to 1/4" thickness
- 1/4 to 1/2" thickness
- greater than 1/2" thickness
- alternating seams or layers of sand, silt and clay
- small, erratic deposit, usually less than 1 foot
- lenticular deposit
- one or less per foot of thickness
- more than one per foot of thickness

PROJECT Clarkstown Landfill, Clarkstown, New York								SHEET NO. 1 of 1	
CLIENT Charles R. Velzy Associates, Inc.								JOB NO.: 79-8107-01	
BORING CONTRACTOR Warren George, Inc.								ELEVATION: 60.2	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATUM: U.S.C & C.S.	
DATE	TIME	DEPTH	CASING	TYPE	PIPE	SS		DATE START: 3/15/79	
3/15/79	11:30	2' 0"	--	DIA.	4"	2"		DATE FINISHED: 3/16/79	
				WT.	300#	140#		DRILLER: G. Marney	
				FALL	24"	30"		INSPECTOR: R. Shine	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	4	S-1	1		FILL (Br cfS, t.s, t.fG, Veg)	
2	3		4			
3	4		2			
4	5		4			
5	6					
6	4	S-2	1			
7	3		1			
8	3		1			
9	3					
10	3					
11	6	S-3	1			
12	5		0			
13	4		1			
14	4		0			
15	4					
16	10	S-4	W			
17	8		0			
18	6		H			
19	8					
20	8					
21	15	S-5	W			
22	11		0			
23	11		H			

PROJECT		Clarkstown Landfill, Clarkstown, MD				JOB NO.: 79-8107-01	
CLIENT		Charles R. Velzy Associates, Inc.					
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON, PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
24	10	S-6			Bk O\$ <u>Black Organic SILT</u>		
25	9						
26	22		W				
27	14		O				
28	14		R				
29	10	S-7			do		
30	10						
31	17		W				
32	17		O				
33	13		R				
34	13	S-8			35'0"		
35	11						
36	10		W				
37	13		O				
38	14		R				
39	14	S-9			<u>Gray varved CLAY & SILT, with occasional seams of fine Sand</u>		
40	12						
41			W				
42			O				
43			R				
44		S-10			do, sms fs		
45							
46			W				
47			O				
48			R				
49							

PROJECT Clarkstown Landfill, Clarkstown, New York					SHEET NO: 3 OF 3	
CLIENT Charles R. Velzy Associates, Inc.					JOB NO.: 79-8107-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
50		S-11			Rd br alt lyrs C&S, a. c ⁻ fS, c. ⁻ S	
51			1			
52			0			
53			1			
54			1		SS'0"	
55						
56						
57						
58		S-12	5		Rd br cfS, 1. ⁺ S, s. cfG	
59			6			
60			6			
61			4			
62		S-13			<u>Red brown coarse to fine SAND,</u> <u>little(+) Silt, some coarse to</u> <u>fine Gravel</u>	
63			30			
64			23			
65			12			
66			15		do	
67						
68						
69						
70					END OF BORING @ 62'0"	
71						
72						
73						
74						
75						

PROJECT Clarkstown Landfill, Clarkstown, N.J.						JOB NO.: 79-8107-01	
CLIENT Charles R. Velzy Associates, Inc.						ELEVATION: 60.4	
BORING CONTRACTOR Warren George, Inc.						DATUM: U.S.C & G.S.	
GROUND WATER				CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	Auger	SS	
2/02/79	0830	3'0"	None	DIA.		2"	
				WT.		140#	
				FALL		30"	
						DRILLER: G. Marney	
						INSPECTOR: R. Shine	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	A				<u>FILL (Brown medium to fine SAND, some Silt)</u>	Fill placed for access ramp
2	U					
3	G					
4	E					
5	R					
6		S-1	1		Bk Pt	
7			0			
8			1			
9			1			
10		UD-1				
11		S-2			do	UD-1 8'0"-10'0" Push 24" Rec. 24"
12						
13						
14		UD-2				
15						
16		S-3			Rd br C&S, occ sms fs	UD-2 13'0"-15'0" Push 24" Rec. 20"
17						
18						
19		UD-3				
20						
21		S-4			do	UD-3 18'0"-20'0" Push 24" Rec. 18"
22						
23						

PROJECT					Clarkstown Landfill, Clarkstown, N.Y.		JOB NO.		79-8107-01		
CLIENT					Charles R. Velzy Associates, Inc.						
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION				REMARKS		
24		S-5			Rd br Cy\$, occ sms fS <u>Red brown Clayey SILT, with occasional seams fine Sand</u>				30'0"		
25											
26			3								
27			5								
28			4								
29			8								
30		S-6			Rd br Cy\$ a., cfS, s.cfG						
31											
32			3								
33			4								
34			11								
35		S-7	13		do <u>Red brown coarse to fine Sand, some Clayey Silt, some coarse to fine Gravel</u>						
36											
37											
38											
39											
40		S-8			Rd br cfS, l.Cy\$, a.cfG						
41											
42			11								
43			22								
44			22								
45		S-9	31		do						
46											
47			26								
48			19								
49			30								
					END OF BORING @ 47'0" Installed Monitoring Well @ 12'6"						

PROJECT Clarkstown Landfill, Clarkstown, N.J.										JOB 79-8107-01	
CLIENT Charles R. Velzy Associates, Inc.										ELEVATION: 85±	
BORING CONTRACTOR Warren George, Inc.										DATUM: U.S.C & G.S	
GROUND WATER										DATE START: 1/29/79	
DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE	DATE FINISHED: 1/31/79		
1/31/79	0930	26'0"	60'0"	DIA.	4"	2"			DRILLER: G. Marney		
				WT.		140#			INSPECTOR: R. Shine		
				FALL		30"					

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	A	S-1	8			
			10			
			10			
2	U		9			
3	C					
4	E					
5	R					
			10			
6		S-2	8		do	
			6			
7			6			
8						
9						
10			5			
11		S-3	17		do	
			14			
12			11			
13						
14						
15			23			
16		S-4	11		do	
			8			
17			13			
18						
19						
20			12			
21		S-5	19		do	
			100/5"			
22						
23						

Bk Paper, Wd, Mtl

MISCELLANEOUS GARBAGE FILL
(Paper, Wood, Metal, etc.)

PROJECT		Clarkstown Landfill, Clarkstown, Md.		JOB NO.: 79-8107-01	
CLIENT		Charles R. Velzy Associates, Inc.			
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	REMARKS
24		S-6		Bk Paper, Wd, Mtl	
25					
26			11		
27			17		
28			6		
29			9		
30		S-7		do	
31					
32			22		
33			16		
34			16		
35			50/2"		<u>MISCELLANEOUS GARBAGE FILL</u>
36					
37					
38					
39					
40		S-8		do	*300 lb. hammer Sample S-8 wet
41			10*		
42			11*		
43			6*		
44			8*		
45		S-9		do	
46					
47			37		
48			7		
49			6		
50			9		
51		S-10A		do	45'0"
52					
53					
54					
55					
56					Gas encountered at 45 feet
57		S-10B	4	Black PEAT	46'0"
58			4		
59			6	Gr cfS, t. \$, t. fG	
60			10		
61					

PROJECT Clarkstown Landfill, Clarkstown, N.Y.					SHEET NO. 3 OF 3	
CLIENT Charles R. Velzy Associates, Inc.					JOB NO. 79-8107-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
50		S-11			Br cfS, l. \$, t. Veg	
51			11			
52			28			
53			16			
54		S-12	12		<u>Brown coarse to fine SAND, trace Silt, trace fine Gravel</u>	
55						
56			6			
57			6			
58		S-13	7		Br cfS, t. \$, t. fG	
59			10			
60						
61			7			
62			8		do	
			12			
			18			
					END OF BORING @ 62'0"	

PROJECT Clarkstown Landfill, Clarkstown, N.I.						JOB NO.: 79-8107-01	
CLIENT Charles R. Velzy Associates, Inc.						ELEVATION: 60.0	
BORING CONTRACTOR Warren George, Inc.						DATUM: U.S.C & G.S	
GROUND WATER				CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	Mud	SS	
2/06/79	1100	2'6"	None	DIA.		2"	
				WT.		140#	
				FALL		30"	
						DATE START: 2/06/79	
						DATE FINISHED: 2/07/79	
						DRILLER: G. Marney	
						INSPECTOR: R. Shine	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON, PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	M				<u>FILL</u>	Fill placed for access ramp
2	U					
3	D					
4						
5						
6		S-1	1		Bk Pt <u>Black PEAT</u>	
7			0			
8			1			
9			0			
10						
11		UD-1	P		Bk O\$	UD-1 10'0"-12'0" Push 24" Rec. 20"
12			U			
13		S-2	S		do	
14			H			
15			WOH			
16			WOH			
17			WOH			
18			WOH			
19						
20						
21		UD-2	P			UD-2 20'0"-22'0" Push 24" Rec. 19"
22			U			
23		S-4	S			
			H			
			1			
			1			

PROJECT		Clarkstown Landfill, Clarkstown, Md.				JOB NO.:	79-8107-01
CLIENT		Charles R. Velzy Associates, Inc.					
DEPTH FT.	CASINO BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
24		S-4	1		Bk O\$		
			1				
25			2				
26		S-5	2		Gr bk O\$		
			1				
27			2			28'0"	
28						UD-3 30'0"-32'0" Push 24" Rec. 12"	
29							
30			P				
31		UD-3	U		Gr vvd C6\$		
			S				
32			H		<u>Gray varved CLAY & SILT, with occasional seams fine Sand</u>		
			WOH				
33		S-6	WOH		do		
			WOH				
34			WOH				
35			WOH			38'0"	
36		S-7	WOH		do		
			WOH				
37			WOH				
38						Change in wash at 38'0" UD-4 40'0"-42'0" Push 24" Rec. 24"	
39							
40			P				
41		UD-4	U		Rd br C6\$		
			S				
42			H				
			1				
43		S-8	1		do, occ sms fS		
			1				
44			1		<u>Red brown varved CLAY & SILT, occasional seams fine Sand</u>		
45							
			1				
46		S-9	1		do		
			1				
47			1				
48							
49							

PROJECT		Clarkstown Landfill, Clarkstown, N.Y.			SHEET NO.: 3 OF 4		
CLIENT		Charles R. Velzy Associates, Inc.			JOB NO.: 79-8107-01		
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
50		UD-5	P		Rd br Cy\$	UD-5 50'0"-52'0" Push 24" Rec. 24"	
51			U				
52			S				
53			H				
53		S-10L	WOH	■	54'0"		
54			WOH				
55			WOH				
56			WOH				
56		S-11	9	■	Rd br Cy\$		
57			9				
58			5				
59			5				
60		S-12		■	<u>Red brown fine SAND, and Silt</u>		
61			5				
62			5				
63			6				
64		S-13		■	do		67'0"
65			12				
66			13				
67			14				
68		S-14	19	■	Rd br cfS, l.Cy\$, s.cfG	S-14 Poor recovery	
69			16				
70			29				
71			33				
72					<u>Red brown coarse to fine SAND, little Clayey Silt, some coarse to fine Gravel, with Boulder fragments (Glacial Till)</u>		
73							
74							
75							

PROJECT		Clarkstown Landfill, Clarkstown, N.Y.			SHEET NO. 4 of 4	
CLIENT		Charles R. Velzy Associates, Inc.			JOB NO.: 79-8107-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
76		S-15	38	do		
	31					
	18					
77			18			
78		S-16		do, Bldr fgmts		
79						
80						
81			80			
			60			
			95			
82			115			
					END OF BORING @ 82'0"	

PROJECT Clarkstown Landfill, Clarkstown, New York						SHEET NO. 1 OF 4	
CLIENT Charles R. Velzy Associates, Inc.						JOB NO.: 79-8107-01	
BORING CONTRACTOR Warren George, Inc.						ELEVATION: 60.0	
GROUND WATER				CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE			shelby
				DIA.			3"
				WT.			
				FALL			
						DATUM: D.S.C & G.S	
						DATE START: 3/12/79	
						DATE FINISHED: 3/13/79	
						DRILLER: G. Marney	
						INSPECTOR: R. Shine	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1					<u>See Boring B-4 for strata descriptions above 26 feet</u>	
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						

PROJECT		Clarkstown Landfill, Clarkstown, Md.				JOB NO.:	13-0107-04
CLIENT		Charles R. Velzy Associates, Inc.					
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON, PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
24							
25							
26							
27		UD-1	P		Gr vvd C&S	UD-1 26'0"-28'0" Push 24" Rec 24"	
28			U				
29		UD-2	S				
30			H				
31		UD-3	P		Gr vvd C&S	UD-2 28'0"-30'0" Push 24" Rec 21"	
32			U				
33		UD-4L	S		<u>Gray varved CLAY & SILT</u>	UD-3 30'0"-32'0" Push 24" Rec 20"	
34			H		do	UD-4 32'0"-34'0" Push 24" Rec 0"	
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
					END OF BORING @ 34'0"		

PROJECT Clarkstown Landfill, Clarkstown, N.Y.							SHEET NO. 1 OF 2		
CLIENT Charles R. Velzy Associates, Inc.							JOB NO.: 79-8107-01		
BORING CONTRACTOR Warren George, Inc.							ELEVATION: 62.9		
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATUM: U.S.C & G.S	
DATE	TIME	DEPTH	CASING	TYPE	Mud	SS		DATE START: 1/22/79	
1/22/79	0900	3'0"	None	DIA.		2"		DATE FINISHED: 1/23/79	
				WT.		140#		DRILLER: G. Marney	
				FALL		30"		INSPECTOR: R. Shine	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION			REMARKS	
1	M	S-1	17		<u>FILL (Brown coarse to fine SAND, little Silt, little coarse to fine Gravel, Wood, Stumps)</u> 3'0"			S-4 Layer of Silt & Sand 3/4" thick	
2	U		19						
3	D		25						
4			46						
5		S-2			<u>Brown PEAT</u> 11'0"				
6									
7									
8									
9		S-3			Rd br fS, a.\$ 18'0"				
10									
11									
12									
13		S-4	9		Rd br fS, 1.+\$, lyr fS, a.\$ <u>Red brown fine SAND, and Silt</u> 18'0"				
14			7						
15			7						
16			5						
17		S-5	4		Rd br mfS, 1.\$ <u>Brown medium to fine SAND, little Silt</u>				
18			5						
19			4						
20									
21									
22									
23									

PROJECT		CLARKSTOWN, MARYLAND, WATERWAY				JOB NO.: 79-8107-01	
CLIENT		Charles R. Velzy Associates, Inc.					
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
24		S-6			Br mfS, t.\$		
25			7				
26			4				
27			7				
28			10				
29		S-7			Br cfS, t.\$		
30			14				
31			14				
32			15				
33			8				
34					END OF BORING @ 32'0"		
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							

PROJECT Clarkstown Landfill, Clarkstown, N.I.							JOB NO.: 79-8107-01
CLIENT Charles R. Velzy Associates, Inc.							ELEVATION: 61.6
BORING CONTRACTOR Warren George, Inc.							DATUM: U.S.C & G.S
GROUND WATER							DATE START: 1/16/79
DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	DATE FINISHED: 1/16/79
1/06/79	1000	3'0"	None	DIA.	Mud	SS	DRILLER: G. Harney
				WT.		140#	INSPECTOR: R. Shine
				FALL		30"	

DEPTH FT.		CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
1	H	S-1	55			FILL (Brown coarse to fine SAND, little (+) Silt, some medium to fine Gravel) 2'0"		
			42					
			13					
2	U		3					
3	D							
4								
5								
6		S-2	WOH		Br Pt			
7			WOH					
8			WOH					
9			WOH					
10								
11		UD-1	P					UD-1
12			U					10'0"-12'0"
13			S					Push 24"
14			H					Rec. 24"
15		S-3	WOR					
16			WOR					
17			WOR					do 13'6"
18			WOR					
19								
20		UD-2	P					UD-2
21			U					15'0"-17'0"
22			S				Push 24"	
23			H				Rec. 20"	
24		S-4	WOH					
25			WOH					
26			WOH				Red brown coarse to fine SAND, trace Silt, and coarse to fine Gravel	
27			WOH					
28								
29		S-5	13					
30			14					
31			32				Rd cfS, t.\$, a.cfG	
32			36					
33								
34						END OF BORING @ 22'0"		

PROJECT Clarkstown Landfill, Clarkstown, N.Y.					JOB NO.: 79-8107-01	
CLIENT Charles R. Velzy Associates, Inc.					ELEVATION: 61.6	
BORING CONTRACTOR Warren George, Inc.					DATUM: U.S.C & G.S.	
GROUND WATER					DATE START: 1/16/79	
DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.
1/16/79	0900	3'0"	None	DIA.	Mud	SS
				WT.		2"
				FALL		140#
						30"
					INSPECTOR: R. Shine	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
1	M					Located south of B-6
2	U					
3	D					
4						
5						
6						
7						
8						
9						
10						
11		S-1	WOE	Br Pt	<u>Brown PEAT</u>	
12			WOE	do		
13		S-2	WOE	Gr & rd vvd \$yC		
14			WOE		<u>Red brown varved Silty CLAY</u>	
15		S-3	WOE	do		
16			WOE			
17		S-4	11	Rd br cfS, t.\$, t.fG		
18			9		<u>Red brown coarse to fine Sand, some Clay & Silt, some coarse</u>	
19		S-5	13			
20			23			
21		S-6	15	Rd br C&\$, s. ⁺ cfS, l.fG		
22			21		<u>to fine Gravel (Glacial Till)</u>	
23			45			
			11			
			23	Rd br cfS, l.C&\$, s.cfG		
			41			
			93			

PROJECT		Clarkstown Landfill, Clarkstown, N.Y.		SHEET NO. 2 OF 2		
CLIENT		Charles R. Velzy Associates, Inc.		JOB NO.: 79-8107-01		
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS
24		S-7			Rd br cfS, 1.S, 1.cfG	
25			34			
26			75			
27					END OF BORING @ 26'0"	
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						

TOWN OF ORANGETOWN
ROCKLAND COUNTY
NEW YORK

APPLICATION FOR APPROVAL TO OPERATE
A SOLID WASTE MANAGEMENT FACILITY

AND

APPLICATION FOR APPROVAL TO CONSTRUCT
A SOLID WASTE MANAGEMENT FACILITY

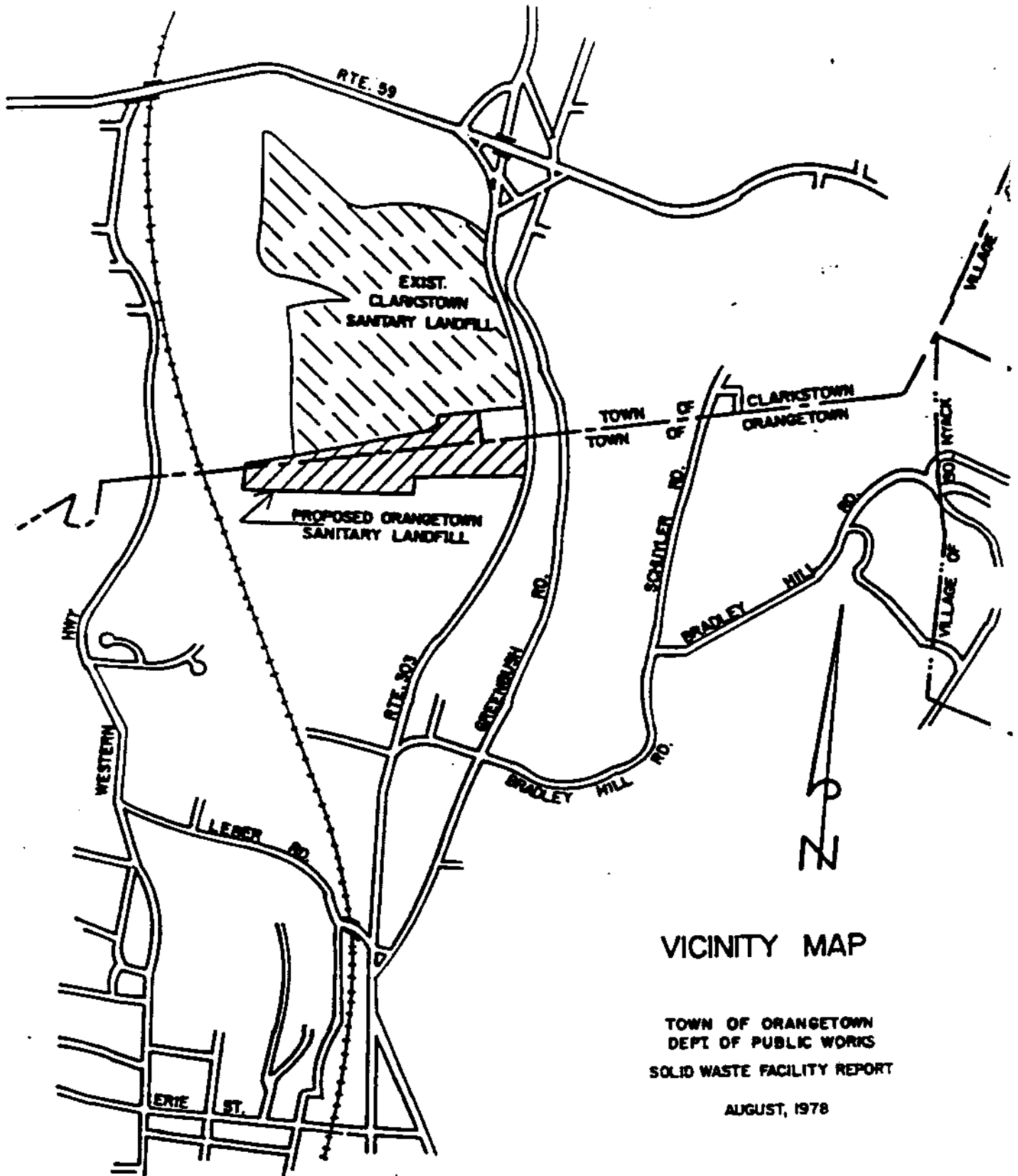
WITH

REQUIRED SUPPORTING DATA

SOLID WASTE FACILITY REPORT

AUGUST 1978

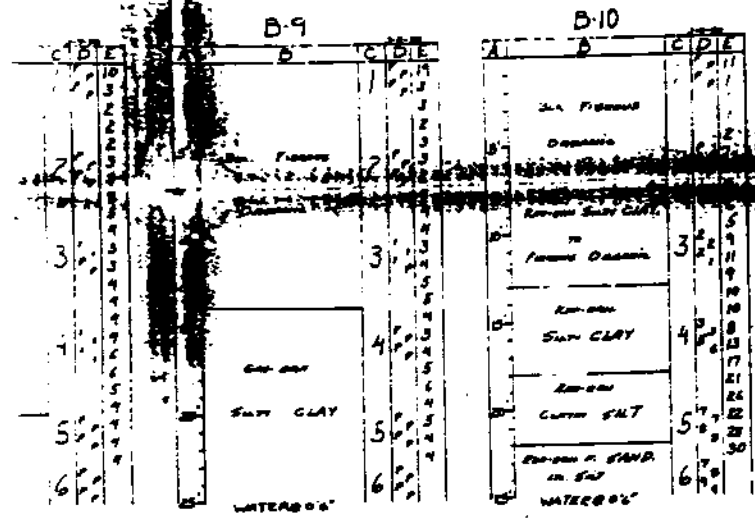
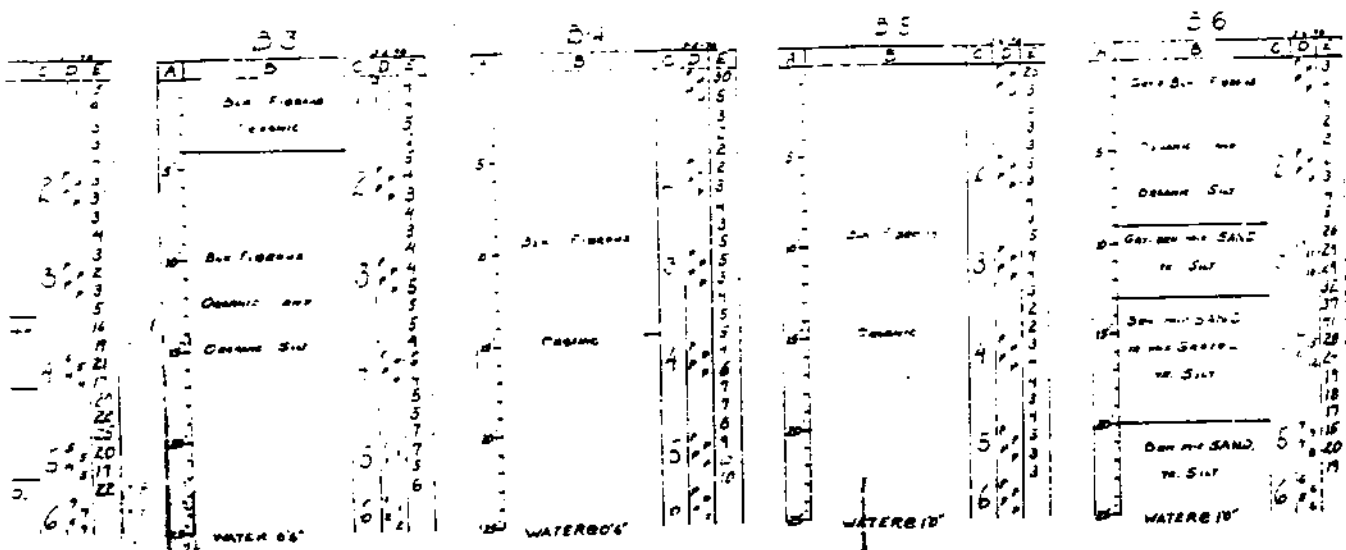
DONALD BRENNER, P.E.
EXECUTIVE DIRECTOR
DEPARTMENT OF PUBLIC WORKS



VICINITY MAP

TOWN OF ORANGETOWN
DEPT OF PUBLIC WORKS
SOLID WASTE FACILITY REPORT

AUGUST, 1978

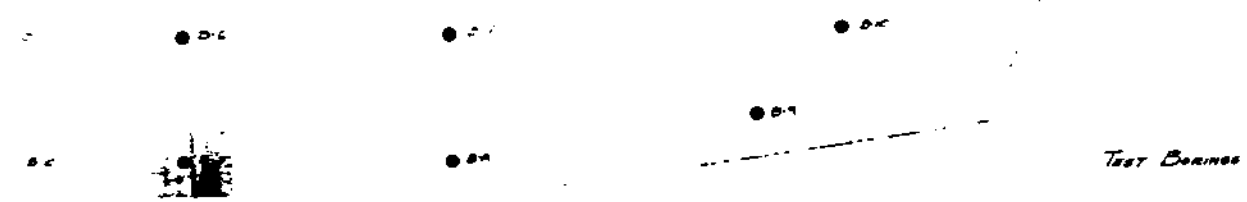


BORING LOG PRESENTATION

- Col. A denotes depths below existing ground surface.
- Col. B denotes a visual classification of material sampled.
- Col. C denotes sample numbers at appropriate depths.

WATER READINGS WERE TAKEN IN THE BORING AT THE TIME IT WAS MADE. SOIL MOISTURE, SITE TEMPERATURE, AND RECENT PRECIPITATION MAY CAUSE ENVIRONMENTAL FLUCTUATIONS IN WATER READINGS.

BORING ORIENTATION PLAN
(SCALE 1"=200')



REPORT OF SOILS AND
FOUNDATION INVESTIGATION
PROPOSED TRUCK SCALE
CLARKSTOWN, NEW YORK

For

CHARLES R. VELZY ASSOCIATES, INC.

By

CONVERSE WARD DAVIS DIXON

30 October 1978

Project No. 78-8247-01

APPENDIX A

VISUAL IDENTIFICATION OF SAMPLES

The samples were identified in accordance with the American Society for Engineering Education System of Definition.

I. Definition of Soil Components and Fractions

Material	Symbol	Fraction	Sieve Size	Definition
Boulders	Bldr	—	9" +	Material retained on 9" sieve.
Cobbles	Cbl	—	3" to 9"	Material passing the 9" sieve and retained on the 3" sieve.
Gravel	G	coarse (c) medium (m) fine (f)	1" to 3" ¾" to 1" No. 10 to ¾"	Material passing the 3" sieve and retained on the No. 10 sieve.
Sand	S	coarse (c) medium (m) fine (f)	No. 30 to No. 10 No. 60 to No. 30 No. 200 to No. 60	Material passing the No. 10 sieve and retained on the No. 200 sieve.
Silt	\$	—	Passing No. 200 (0.074 mm)	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air dried.

Organic Silt (OS)

Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content, and exhibits fine granular and organic characteristics.

		Plasticity	Plasticity Index	
Clayey SILT	CyS	Slight (SI)	1 to 5	Clay-Soil Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.
SILT & CLAY	\$&C	Low (L)	5 to 10	
CLAY & SILT	C&\$	Medium (M)	10 to 20	
Silty CLAY	\$yC	High (H)	20 to 40	
CLAY	C	Very High (VH)	40 plus	

II. Definition of Component Proportions

Component	Written	Proportions	Symbol	Percentage Range by Weight *
Principal	CAPITALS	—		50 or more
Minor	Lower Case	and some little trace	a. s. l. t.	35 to 50 20 to 35 10 to 20 1 to 10

* Minus sign (—) lower limit, plus sign (+) upper limit, no sign middle range.

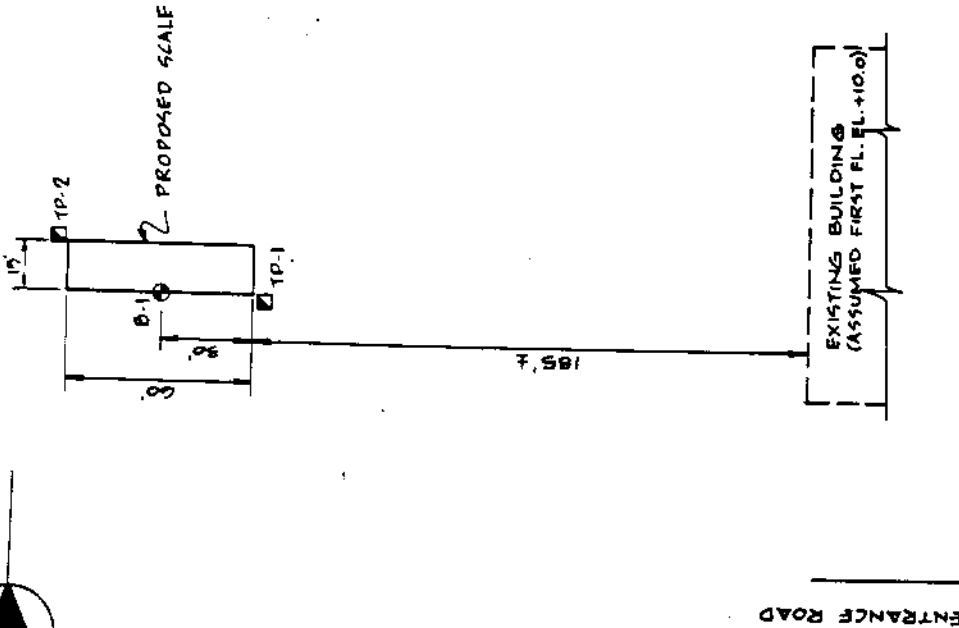
III. Glossary of Modifying Abbreviations

Category	Symbol	Term	Symbol	Term	Symbol	Term
A. Borings	U/D	Undisturbed	B	Exploratory	A	Auger
B. Samples	C	Casing	L	Lost	U	Undisturbed
	D	Denison	S	Spoon	W	Wash
	O.E.	Open End				
C. Colors	bk	black	gn	green	wh	white
	bl	blue	or	orange	yw	yellow
	br	brown	rd	red	dk	dark
	gr	gray	tn	tan	lt	light
D. Organic Soils	dec	decayed	o	organic	veg	vegetation
	dec'g	decaying	rts	roots	pt	peat
	lig	lignite	ts	topsoil		
E. Rocks	LS	Limestone	rk	rock	Shst	Schist
	Gns	Gneiss	SS	Sandstone	Sh	Shale
F. Fill and Miscellaneous Materials	bldr (s)	boulder (s)	chl (s)	cobble(s)	gis	glass
	brk (s)	brick (s)	wd	wood	misc	miscellaneous
	cndr (s)	cinder (s)	dbr	debris	rbl	rubble
G. Miscellaneous Terms	do	ditto	pp	pocket	ref	refusal
	el, El	elevation		penetrometer	sm	small
	fgmt (s)	fragment(s)	P. L	Plasticity Index	W. L	water level
	frq	frequent			W. H.	weight of hammer
	lrg	large	P	pushed	W. R.	weight of rods
	mtld	mottled		pressed		
	no rec	no recovery	pc (s)	piece (s)		
	pen	penetration	rec or R	recovered		
H. Stratified Soils	alt	alternating				
	thk	thick				
	thn	thin				
	w	with				
	pri	parting				
	seam	seam				
	lyr	layer				
	stra	stratum				
	vvd c	varved Clay				
	pkt	pocket				
	lms	lens				
	occ	occasional				
	freq	frequent				

- 0 to 1/16" thickness
- 1/16 to 1/2" thickness
- 1/2 to 12" thickness
- greater than 12" thickness
- alternating seams or layers of sand, silt and clay
- small, erratic deposit, usually less than 1 foot
- lenticular deposit
- one or less per foot of thickness
- more than one per foot of thickness

Converse Ward Davis Dixon, Inc. Geotechnical Consultants				TEST BORING LOG				BORING NO.: B-1	
PROJECT Proposed Truck Scale, Clarkestown, New York								SHEET NO. 1 OF 2	
CLIENT Charles R. Velzy Associates, Inc.								JOB NO.: 78-8247-01	
BORING CONTRACTOR Warren George, Inc.								ELEVATION: +9±	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATUM: Site(See Loc.Plan)	
DATE	TIME	DEPTH	CASING	TYPE	Pipe	S.S.		DATE START: 9/25/78	
Not measured in boring				DIA.	4"	2"		DATE FINISHED: 9/25/78	
(see Test Pit logs)				WT.	300#	140#		DRILLER: Nelson Coyle	
				FALL	24"	30"		INSPECTOR: P. Echaniz	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION				REMARKS
1	18				<u>Miscellaneous Fill (See Test Pit #1 and #2 for description of materials)</u>				
2	37								
3	45								
4	53								
5	41								
6	22								
7	28								
8	25								
9	28								
10	30								
11	28	S-1L	22 18*		Tan cfS, 1.cfg (Wash Sample)				*300# Hammer
12	12		9 3						
13	7	S-2L	4 2		12'0"				S-2L Boulder fragment in the tip of the spoon
14	5		3 2						
15					<u>Dark Brown Peat</u>				
16		U-1L	Push 24"						
17			Rec. 6"	Br Pt					U-1L Piece of Wood in the tube
18			Push 24"	do					
19		U-2	Rec. 24"	do					
20		S-3	1						
21			1						
22			2						
23			2						

Converse Ward Davis Dixon, Inc. Geotechnical Consultants				TEST BORING LOG		BORING NO.: B-1	
PROJECT Proposed Truck Scale, Clarkestown, New York						SHEET NO.: 2 OF 2	
CLIENT Charles R. Velzy Associates, Inc.						JOB NO.: 78-8247-01	
DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SYMBOL	IDENTIFICATION	REMARKS	
24					Brown Peat	Stratum change observed in the wash	
25							
26						Attempt to press a tube at 34 feet was unsuc- cessful because of the density of the soil.	
27		U-3	Press 24"		Rd gr vvd \$yC		
28			Rec. 24"				
29		S-4	WOH		do		
30			WOH				
31			WOH				
32			WOH				
33					<u>Red gray varved Silty CLAY</u>		
34							
35		S-5A	8		do w t.fG		
36		S-5B	5				
37		S-6	30		Rd br Cy\$, s.cfG, 1.cmfS		
38			23				
39			37		Rd br Sh frgs		
40			54				
41							
42							
43		S-7	9				
44			11		Rd br Rk frgs 1.cfS, t.Cy\$		
45			51			END OF BORING @ 44'0"	
46							
47							
48							
49							



ROUTE 303

GENERAL NOTES

1. THIS DRAWING IS PART OF CONVERSE WARD DAVIS DIXON REPORT NO. 78-8247-01 AND SHOULD BE READ TOGETHER WITH THE REPORT FOR COMPLETE EVALUATION.
2. BORING WAS PERFORMED BY WARREN GEORGE, INC., AND TEST PITS WERE EXCAVATED WITH A BACKHOE PROVIDED BY DEPARTMENT OF ENVIRONMENTAL CONTROL, CLARKSTOWN, NEW YORK.
3. BORING AND TEST PITS WERE OBSERVED BY CONVERSE WARD DAVIS DIXON ON 9/25/78.
4. PROPOSED TRUCK SCALE LOCATION WAS STAKED IN THE FIELD BY D.E.C., CLARKSTOWN, NEW YORK.
5. BORING AND TEST PIT LOCATIONS ARE REFERENCED TO THE FINISHED FLOOR OF AN EXISTING BUILDING (AS SHOWN) AT ASSUMED EL. +10.0.

LEGEND

- ⊙ 4-INCH DIAMETER BORING
- TEST PIT

BORING AND TEST PIT LOCATION PLAN

PROPOSED TRUCK SCALE
CLARKSTOWN, NEW YORK
FOR CHARLES R. VELZY ASSOC., INC.

Project No.
78-8247-01
Date
OCT 1978
Prepared by
JAP
Checked by
JDC
Approved by
JDC

ConverseWardDavisDixon Geotechnical Consultants

MAI 7 1963

MARKETOWN RECORDS



KENDRICK DRILLING, INC.

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

1005-90

914 469-2266

Sheet 1 of 2

Boring No. SB 1

PROJECT: Clarkstown Landfill

Clarkstown, NY

Location of Boring: _____

CLIENT: Garfinkle

REMARKS: _____

Date, start 2-14-90

Finish 2-15-90

Casing Hammer

Sampler Hammer

Wt. _____ lbs.

Wt. 140 lbs.

Fall _____ in.

Fall 30 in.

Ground Elev. 66.5'

O.D. Spoon 2"

LD. Casing 5" & 4"

Driller: CD

Helper: _____

Ground Water Observations

Date

Time

Depth

Casing at

DEPTH BELOW GND. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
5'				0-20' Fill, (sandy silt, gravel, boulders, cement, wood etc.)
10'				20'-29' Organic peat.
15'				29'-38' Brown silt with little fine sand, trace clay.
20'				38'-42' Brown reddish brown very fine silty sand.
25'				
30'		1	2 - 4 5 - 6	
35'		2	WOH 24"	
		3	WOH-12" 1 - 2	



Chester, N.Y. 10918

Boring No. SB 1

Ground Water Observations			
Date	Time	Depth	Casing at

Driller: ED Helper: [illegible]



KENDRICK DRILLING, INC.

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

914 469-2266

sheet 1 of 2

Boring No. SB 2

PROJECT: Clarkstown Landfill
Clarkstown, NY

Location of Boring: _____

CLIENT: _____

Date, start 2-12-90 Finish 2-13-90

REMARKS: _____

Ground Water Observations

Date _____ Time _____ Depth _____ Casing at _____

Casing Hammer

Wt. _____ lbs.

Fall _____ in.

Sampler Hammer

Wt. 140 lbs.

Fall 30 in.

O.D. Spoon 2"

I.D. Casing 4"

Ground Elev. 67.5±
M.S.L.

Driller: CD

Helper: _____

FIELD IDENTIFICATION OF SOIL & REMARKS

DEPTH BELOW END. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	
5'		1	11 - 14 100/2"	0-20' Fill, (sand, silt, wood, boulders, gravel.)
10'		2	3 - 4 4 - 6 No recovery	20'-27' Brown silty medium to fine sand, with little small gravel.
15'		3	100/3"	27'-40' No samples.
20'		4	2 - 7 7 - 8	
25'		5	6 - 6 3 - 4	
30'		6	6 - 3 3 - 6	
35'				
40'				

Chester, N.Y. 10918

Boring No. SB 2

PROJECT: Clarkstown Landfill
Clarkstown NY Location of Boring: _____

CLIENT: _____ Date start 2-12-90 Finish 2-13-90

REMARKS:

REMARKS: _____

Casing Hammer		Sampler Hammer		Date	Ground Water Observations		
Wt.	lbs.	Wt.	lbs.		Time	Depth	Casing at
Fall	in.	Fall	in.				
		O.D. Spoon	"				
Ground Elev.	67.5 ± H.S.A.L.D.	Casing	4" & 5"	Driller:	CD	Helper:	

[illegible]

Chester, N.Y. 10918

Boring No. SB 3

PROJECT:

Location of Boring:

Clarkstown, NY

CLIENT:

Garfinkle

Date, start 2-12-90

Finish 2-13-90

REMARKS:

Ground Water Observations

Date _____

Tides

Deaths

Caring at

Casing Hammer

Sampler Hammer

Wt. 300 lbs.

Wt. 140 lbs.

Fall 24 in.

Fall 30 in.

O.D. Spoon 2"

Ground Elev. 69.0 ± MSL I.D. Casing 5"

2-13-90

2:30 PM

10' 3"

20'

2-14-90

7:00 AM

11' 2"

0

Driller: JS

JS

Helper:

[illegible]

Chester, N.Y. 10918

Boring No. SB4

Location of Boring: _____

CLIENT: _____ Date start 2-14-90 Finish 2-14-90

REMARKS: _____ Ground Water Observations: _____

Ground Water Observations

Date	Time	Depth	Casing at
------	------	-------	-----------

Casing Hammer		Sampler Hammer					
Wt. <u>300</u> lbs.		Wt. <u>140</u> lbs.		<u>2-14-90</u>	<u>12:30 PM</u>	<u>15' 2"</u>	<u>30'</u>
Fall <u>24</u> in.		Fall <u>30</u> in.					
		O.D. Spoon <u>2"</u>					
Ground Elev. <u>69.51</u> M.S.L.		I.D. Casing <u>5"</u>		Casing & mud	Driller: _____	Helper: _____	

DEPTH BELOW GND. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
-42'		1	2 - 2	
			2 - 3	
45'				0-30' Drove Casing, no sample. Washed out casing @ 30'-35' Garbage in wash. No samples.
		2	6 - 5	40'-50' Fine to medium reddish brown sand.
			4 - 1	
				50'-74' Reddish brown clayey silt, trace fine sand seams.
50'				
		3	1 - 1	74'-75'5" Reddish brown clay and silt, trace med to fine sand and gravel.
			1 - 1	
				75'5"-78' Used roller bit(hard).
		4	1 - 1	End of boring 78'
			1 - 2	
		5	1 - 2	
			1 - 2	
		6	5 - 22	
			6 - 5	
		7	6 - 9	
			12 - 13	
75'				
		8	100/2" 140 lb. hammer	
			5/3" 300 lb. hammer.	



KENDRICK DRILLING, INC.

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

sheet 1 of 2

314 403-2200

Boring No. SB5

PROJECT: Clarkstown Landfill
Clarkstown NY

Location of Boring: _____

CLIENT: Garfinkle

Date, start 2-19-90 Finish 2-22-90

REMARKS: _____

Casing Hammer Sampler Hammer
Wt. _____ lbs. Wt. 140 lbs.
Fall _____ in. Fall 30 in.
O.D. Spoon 2"
Ground Elev. 73.5' MSL I.D. Casing 5"-4"

Ground Water Observations
Date Time Depth Casing at

Driller: JS Helper: _____

DEPTH BELOW END SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
5'				
10'				0-35' No samples: Garbage and a lot of big wood, fill. Note: Lost 15' of 5" Casing in fill while pulling out.
15'				
20'				
25'				
30'				
35'				
		1	16 - 21	
			20 - 10	
40'				



KENDRICK DRILLING, INC.

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

Sheet 2 of 2

Boring No. SB5PROJECT: Clarkstown Landfill

Location of Boring: _____

CLIENT: Clarkstown NY
GarfinkleDate, start 2-19-90 Finish 2-22-90

REMARKS: _____

Ground Water Observations

Date Time Depth Casing at

Casing Hammer

Sampler Hammer

Wt. _____ lbs. Wt. 140 lbs.
Fall _____ in. Fall 30 in.O.D. Spoon 2"Ground Elev. 73.5 + M.S.L. L.D. Casing 5" & 4"Driller: JS Helper: _____

DEPTH BELOW END. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
		2	1 - 1 1 - 1	
45'				35'-40' Coarse to fine gray sand and fine gravel. (may be fill)
		3	1 - 1 1 - 1	
				40'-47' Dark brown peat.
50'				47'-55' Very fine dark brown silty clay.
		4	1 - 1 1 - 1	
55'				55'-64' Very fine reddish brown silty clay, trace very fine sand seams.
		5	1 - 1 1 - 2	
60'				64'-74'6" Fine to medium reddish brown sand, some silt and clay seams.
		6	1 - 1 1 - 1	
65'				74'6"-75' Compact sand, silt and gravel.
				75'-76' Used rollerbit (hard)
70'		7	1 - 7 9 - 20	
				76'-81' Cored rock, Run #1 Recovery = 4'6" 8 pieces and fragments Reddish to gray sandstone.
75'		8	10 - 21 30 - 31	
				End of boring 81'
80'		9	100/6" 300 lb. hammer.	



KENDRICK DRILLING, INC.

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

sheet 1 of 3

914 409-2200

Boring No. SB6

PROJECT: Clarkstown Landfill
Clarkstown, NY

Location of Boring: _____

CLIENT: Garfinkle

Date, start 2-15-90

Finish 2-22-90

REMARKS: _____

Ground Water Observations

Date

Time

Depth

Casing at

Casing Hammer

Wt. _____ lbs.

Fall _____ in.

Sampler Hammer

Wt. 140 lbs.

Fall 30 in.

O.D. Spoon 2 in.

Ground Elev. 78.0' ± MSL I.D. Casing 5" & 4"

Driller: CD

Helper: _____

DEPTH BELOW GND. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
5'				0-44' Fill, (sandy silt, gravel, boulders wood, metal, etc.)
35'		1	22 - 22	
			23 - 20	
40'				



KENDRICK DRILLING, INC.

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

914 469-2266

sheet 2 of 3

Boring No. SB 6

PROJECT: Clarkstown Landfill Location of Boring: _____
Clarkstown NY

CLIENT: Garfinkle Date, start 2-15-90 Finish 2-22-90

REMARKS: _____

Ground Water Observations
Date Time Depth Casing at

Casing Hammer Sampler Hammer
Wt. _____ lbs. Wt. _____ lbs.
Fall _____ in. Fall _____ in.

Ground Elev. 780' MSL O.D. Spoon _____
I.D. Casing _____

Driller: CD Helper: _____

DEPTH BELOW GND. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
		2	100/6"	
45'				44'-59' Black silty peat.
		3	2 - 1	
			2 - 2	59'-73' Tan-brown gray silt with some clay.
50'				
		4	3 - 6	
			7 - 8	73'-77' Brown silty medium to fine sand with small to medium gravel.
				77'-86' Decomposed rock.
		5	3 - 3	
			5 - 7	
		6	2 - 1	
			2 - 2	
		7	2 - 2	
			1 - 2	
		8	2 - 2	
			2 - 2	
		9	28 - 51	
			36 - 41	

**KENDRICK DRILLING, INC.**

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

sheet 1 of 2

914 469-2266

Boring No. SB7PROJECT: Clarkstown Landfill Location of Boring: _____
Clarkstown, NYCLIENT: Garfinkle & GereckeDate, start 2-22-90 Finish 2-27-90

REMARKS: _____

Casing Hammer		Sampler Hammer		Ground Water Observations			
Wt.	lb.	Wt.	lb.	Date	Time	Depth	Casing at
300	lb.	140	lb.	2-27-90	1:30	18'6"	40
24	in.	30	in.				
		2"					
Ground Elev. <u>75.5' MSL</u>				O.D. Spoon <u>5" 4" & Mud</u>			
				Driller: <u>JS</u> Helper: _____			

DEPTH BELOW GND. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	FIELD IDENTIFICATION OF SOIL & REMARKS
40'		1	8 - 9 15 - 60	0-47' Garbages Heavy wood, boulders, (fill)
5'				
50'		2	2 - 3 3 - 3	47'-53' Dark Brown Peat.
5'		3	2 - 2 1 - 2	53'-60' Fine gray to brown silty clay.
60'		4	2 - 1 1 - 2	60'-78' Fine light brown to reddish brown silty clay, trace fine sand seams.
5'		5	2 - 3 2 - 2	
70'		6	1 - 2 3 - 5	
5'		7	WOR 12" 1 - 1	

**KENDRICK DRILLING, INC.**

Test Borings & Diamond Drilling

Box 2A Black Meadow Rd.

Chester, N.Y. 10918

S14 403-2200

sheet 2 of 2

Boring No. 387PROJECT: Clarkstown Landfill

Location of Boring: _____

Clarkstown, NYCLIENT: Garfinkle & GereckeDate, start 2-22-90Finish 2-27-90

REMARKS: _____

Ground Water Observations

Date

Time

Depth

Casing at

Casing Hammer**Sampler Hammer**

Wt. _____ lbs.

Wt. 140 lbs.

Fall _____ in.

Fall 30 in.O.D. Spoon 2"Ground Elev. 75.5' MSLI.D. Casing 5" & 4" & MudDriller: JS

Helper: _____

FIELD IDENTIFICATION OF SOIL & REMARKS

DEPTH BLOW END. SURF.	CASING BLOWS PER FOOT	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"
30'		8	1 - 1 1 - 2
35'		9	1 - 1 2 - 1
90'		10	1 - 1 2 - 1
95'		11	10 - 12 15 - 29
00'		12	12 - 17 21 - 39
05'		13	57 - 110/5"

78'-95'

Very fine reddish silty clay, trace fine sand seams.

95'-105'

Fine to medium reddish brown sand, very fine seams of silt and clay.

105'-110'

Weathered rock.

End of boring 110'

APPENDIX E
HYDROGEOLOGIC AND ECOLOGICAL DATA

CLARKSTOWN SANTARY LANDFILL RI/FS
FINAL REMEDIAL INVESTIGATION REPORT

CONTENTS

1. Well Construction Diagrams
2. Well Sampling Data Sheets
3. Subsurface Soil Physical Testing Data
4. Surface Geophysical (EM-34) Data
5. Subsurface Geophysical (EM-34) Data
6. In-Situ Permeability Testing
7. New York Natural Heritage Database Information (Significant Habitats)
8. Rockland County Health Department - Private Well Water Supply Analytical Data

WELL CONSTRUCTION DIAGRAMS

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN SITE NAME CLARKSTOWN LANDFILL		DRILLING FIRM MOORETRENCH AMERICAN INSPECTOR J. RHYNER/R. SANSONE	
WELL ID RFW1S START DATE 12/10/90 COMPLETION DATE 12/12/90		WATER LEVELS	
	DEPTH 2.09 0.00	TC GS	ELEV. 72.11 70.02
	DRILLING SUMMARY Driller ED STEC Drilling Fluid FRESH WATER Well Type DOUBLE CASED SCREENED		
	WELL DESIGN CONSTRUCTION Casing #1 Diameter: 8.00 inch Interval: 0.00 to 16.50 ft. Type: LOW CARBON Casing #2 Diameter: 2.00 inch Interval: 0.00 to 25.00 ft. Type: STAINLESS Stick Up Inner Casing: 2.09 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT/BENT Interval: 0.00 to 15.00 ft. Seal Type: BENTONITE PELLETS Interval: 15.00 to 18.00 ft. Sand Pack Type: MORIE #0 Interval: 18.00 to 28.00 ft. Grain Size: UNIFORM Median Diameter: Screen Diameter: 2.00 Interval: 20.00 to 25.00 ft. Type: STAINLESS Slots: .010 inches		
	WELL DEVELOPMENT Date 12/12/90 Method MANUAL Rate 2.5 gpm		
	COMMENTS TC = Top of Casing SP = Top Sand Pack GS = Ground Surface SC = Top Screen BN = Top Seal BS = Bottom Screen OC = Outer Casing TD = Total Depth Additional Comments:		
	Legend: = Grout = Seal = Sand Pack = Formation		
	25.00 BS 45.02 28.00 TD 42.02		
	20.00 SC 50.02 18.00 SP 52.02 15.00 BN 55.02 16.50 OC 53.52		
	0.00 GS 70.02		
	2.09 TC 72.11		

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

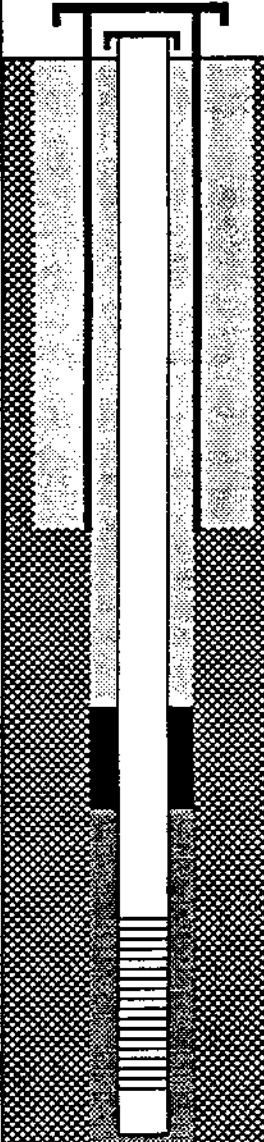
Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR RHYNER/SANSONE/HIRSHENSON

WELL ID RFW1D
START DATE 11/20/90
COMPLETION DATE 11/30/90

WATER LEVELS

2.00 inch	DEPTH		ELEV.	DRILLING SUMMARY	
	2.07	TC	71.70	Driller	ED STEC
	0.00	GS	69.63	Drilling Fluid	FRESH WATER
				Well Type	DOUBLE CASED SCREENED
WELL DESIGN CONSTRUCTION					
				Casing #1 Diameter: 10.00 inch	Interval: 0.00 to 19.00 ft.
				Type: LOW CARBON	
				Casing #2 Diameter: 2.00 inch	Interval: 0.00 to 55.00 ft.
				Type: STAINLESS	
				Stick Up Inner Casing: 2.07 ft.	Protective Casing: 0.00 ft.
				Casing Grout: CEMENT/BENT	Interval: 0.00 to 38.50 ft.
	19.00	OC	50.63	Seal Type: BENTONITE PELLETS	Interval: 38.50 to 42.00 ft.
				Sand Pack Type: MORIE #0	Interval: 42.00 to 60.00 ft.
				Grain Size: UNIFORM	Median Diameter:
				Screen Diameter: 2.00	Interval: 45.00 to 55.00 ft.
	38.50	BN	31.13	Type: STAINLESS	Slots: .010 inches
	42.00	SP	27.63	WELL DEVELOPMENT	
				Date	11/30/90
	45.00	SC	24.63	Method	CENTRIFUGAL PUMP
				Rate	2 gpm
				COMMENTS	
	55.00	BS	14.63	TC = Top of Casing	SP = Top Sand Pack
				GS = Ground Surface	SC = Top Screen
				BH = Top Seal	BS = Bottom Screen
	60.00	TD	9.63	OC = Outer Casing	TD = Total Depth
				Additional Comments:	

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	

WELL ID	RFW2	WATER LEVELS	
START DATE	12/11/90		
COMPLETION DATE	12/14/90		

		DEPTH		ELEV.	DRILLING SUMMARY	
	2.00 inch	2.71	TC	66.20	Driller	ED STEC
		0.00	GS	63.49	Drilling Fluid	FRESH WATER
					Well Type	DOUBLE CASED SCREENED
WELL DESIGN CONSTRUCTION						
Casing #1 Diameter: 8.00 inch		Interval: 0.00 to 18.00 ft.				
Type: LOW CARBON						
Casing #2 Diameter: 2.00 inch		Interval: 0.00 to 29.00 ft.				
Type: STAINLESS						
Stick Up Inner Casing: 2.71 ft.		Protective Casing: 0.00 ft.				
Casing Grout: CEMENT		Interval: 0.00 to 19.50 ft.				
Seal Type: BENTONITE PELLETS		Interval: 19.50 to 22.50 ft.				
Sand Pack Type: MORIE #0		Interval: 22.50 to 30.00 ft.				
Grain Size: UNIFORM						
Screen Diameter: 2.00		Interval: 24.00 to 29.00 ft.				
Type: STAINLESS		Slots: .010 inches				
WELL DEVELOPMENT						
Date		12/14/90				
Method		CENTRIFUGAL PUMP				
Rate		8 gpm				
COMMENTS						
TC = Top of Casing		SP = Top Sand Pack		= Grout		
GS = Ground Surface		SC = Top Screen		= Seal		
BN = Top Seal		BS = Bottom Screen		= Sand Pack		
OC = Outer Casing		TD = Total Depth		= Formation		
Additional Comments:						
BORING BACKFILLED WITH BENTONITE PELLETS FROM 30'-35'						
MORIE #00 SAND USED FROM 22.5'-23' AND 29.5'-30'						

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT	TOWN OF CLARKSTOWN	DRILLING FIRM	MOORETRENCH AMERICAN
SITE NAME	CLARKSTOWN LANDFILL	INSPECTOR	J. RHYNER/R. SANSONE

WELL ID	RFW3S	WATER LEVELS
START DATE	01/09/91	
COMPLETION DATE	01/11/91	

	DEPTH		ELEV.	DRILLING SUMMARY
	2.12	TC	65.28	Driller ED STEC
	0.00	GS	63.16	Drilling Fluid FRESH WATER
				Well Type DOUBLE CASED SCREENED
				WELL DESIGN CONSTRUCTION
				Casing #1 Diameter: 8.00 inch Interval: 0.00 to 14.00 ft. Type : LOW CARBON Casing #2 Diameter: 2.00 inch Interval: 0.00 to 34.00 ft. Type : LOW CARBON Stick Up Inner Casing: 2.12 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT/BENT Interval: 0.00 to 22.00 ft. Seal Type: BENTONITE PELLETS Interval: 22.00 to 27.00 ft. Sand Pack Type : MORTAR #0 Interval: 27.00 to 35.00 ft. Grain Size : UNIFORM Screen Diameter: 2.00 Type : STAINLESS Median Diameter: Interval: 29.00 to 34.00 ft. Slots: .010 inches
14.00	OC	49.16		
22.00	BN	41.16		
27.00	SP	36.16		
29.00	SC	34.16		
34.00	BS	29.16		
35.00	TD	28.16		

WELL DEVELOPMENT	
Date	01/11/91
Method	CENTRIFUGAL PUMP
Rate	0.5 gpm

COMMENTS	
TC = Top of Casing SP = Top Sand Pack GS = Ground Surface SC = Top Screen BN = Top Seal BS = Bottom Screen OC = Outer Casing TD = Total Depth	= Grout = Seal = Sand Pack = Formation
Additional Comments:	

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	
WELL ID				RFW3D		WATER LEVELS	
START DATE				12/17/90			
COMPLETION DATE				01/02/91			
		DEPTH		ELEV.	DRILLING SUMMARY		
		1.63	TC	64.89	Driller	ED STEC	
		0.00	GS	63.26	Drilling Fluid	FRESH WATER	
					Well Type	DOUBLE CASED SCREENED	
WELL DESIGN CONSTRUCTION							
				Casing #1 Diameter:	10.00 inch	Interval:	0.00 to 16.00 ft.
				Type :	LOW CARBON		
				Casing #2 Diameter:	2.00 inch	Interval:	0.00 to 60.50 ft.
				Type :	STAINLESS		
				Stick Up Inner Casing:	1.63 ft.	Protective Casing:	0.00 ft.
				Casing Grout:	CENT/BENT	Interval:	0.00 to 39.50 ft.
				Seal Type:	BENTONITE PELLETS	Interval:	39.50 to 42.50 ft.
				Sand Pack Type :	MORIE #0	Interval:	42.50 to 63.00 ft.
				Grain Size :	UNIFORM	Median Diameter:	
				Screen Diameter:	2.00	Interval:	45.50 to 60.50 ft.
				Type :	STAINLESS	Slots:	.010 inches
WELL DEVELOPMENT							
				Date	01/02/91		
				Method	CENTRIFUGAL PUMP		
				Rate	4 gpm		
COMMENTS							
		TC = Top of Casing	SP = Top Sand Pack				= Grout
		GS = Ground Surface	SC = Top Screen				= Seal
		BN = Top Seal	BS = Bottom Screen				= Sand Pack
		OC = Outer Casing	TD = Total Depth				= Formation
Additional Comments:							

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

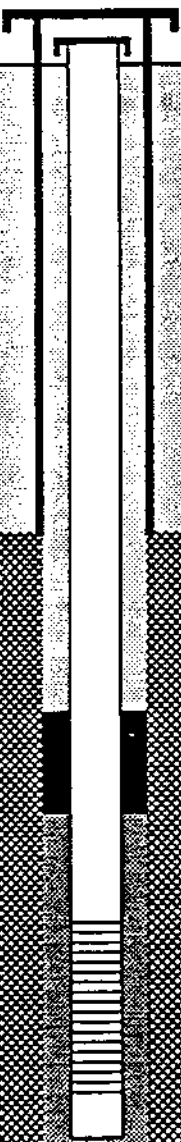
Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW4S
START DATE 01/07/91
COMPLETION DATE 01/08/91

WATER LEVELS

		DEPTH		ELEV.	DRILLING SUMMARY	
2.00 inch		1.95	TC	62.51	Driller	ED STEC
		0.00	GS	60.56	Drilling Fluid	FRESH WATER
					Well Type	DOUBLE CASED SCREENED
WELL DESIGN CONSTRUCTION						
					Casing #1 Diameter:	8.00 inch
					Type:	LOW CARBON
					Casing #2 Diameter:	2.00 inch
					Type:	STAINLESS
					Stick Up Inner Casing:	1.95 ft.
					Protective Casing:	0.00 ft.
					Casing Grout:	CEMT/BENT
					Interval:	0.00 to 9.50 ft.
					Seal Type:	BENTONITE PELLETS
					Interval:	9.50 to 13.00 ft.
					Sand Pack Type:	MORIE #00
					Grain Size:	UNIFORM
					Screen Diameter:	2.00
					Type:	STAINLESS
					Interval:	13.00 to 22.00 ft.
					Median Diameter:	
					Interval:	15.00 to 20.00 ft.
					Slots:	.010 inches
WELL DEVELOPMENT						
					Date	01/08/91
					Method	MANUAL
					Rate	1.5 gpm
COMMENTS						
		TC = Top of Casing	SP = Top Sand Pack	 = Grout		
		GS = Ground Surface	SC = Top Screen	 = Seal		
		BN = Top Seal	BS = Bottom Screen	 = Sand Pack		
		OC = Outer Casing	TD = Total Depth	 = Formation		
Additional Comments:						

NOTE: Well Diagram not to Scale

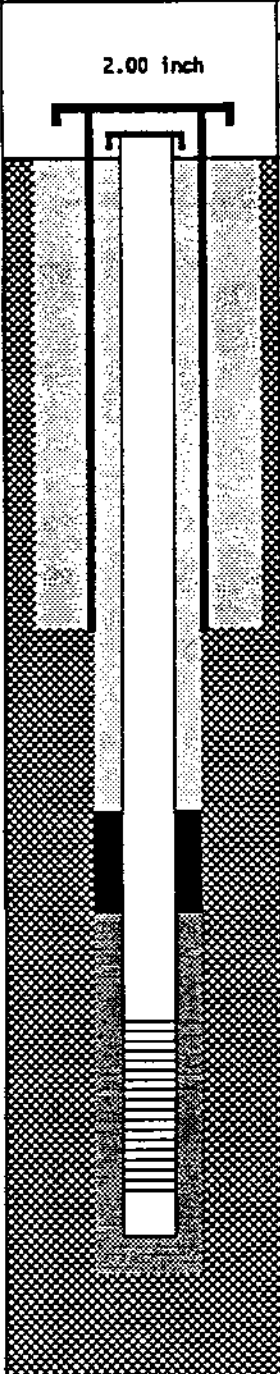
Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	

WELL ID		RFW4D		WATER LEVELS			
START DATE		12/18/90					
COMPLETION DATE		01/04/91					

	DEPTH	TC	ELEV.	DRILLING SUMMARY			
	2.23	TC	62.83	Driller	ED STEC		
	0.00	GS	60.60	Drilling Fluid	FRESH WATER		
				Well Type	DOUBLE CASED SCREENED		

WELL DESIGN CONSTRUCTION							
Casing #1 Diameter: 10.00 inch				Interval: 0.00 to 14.00 ft.			
Type: LOW CARBON							
Casing #2 Diameter: 2.00 inch				Interval: 0.00 to 45.00 ft.			
Type: STAINLESS							
Stick Up Inner Casing: 2.23 ft.				Protective Casing: 0.00 ft.			
Casing Grout: CEMENT/BENT				Interval: 0.00 to 28.50 ft.			
Seal Type: BENTONITE PELLETS				Interval: 28.50 to 31.25 ft.			
Sand Pack Type: MORIE #0				Interval: 31.25 to 50.00 ft.			
Grain Size: UNIFORM				Median Diameter:			
Screen Diameter: 2.00				Interval: 35.00 to 45.00 ft.			
Type: STAINLESS				Slots: .010 inches			

WELL DEVELOPMENT							
Date				01/04/91			
Method				CENTRIFUGAL PUMP			
Rate				10 gpm			

COMMENTS							
TC = Top of Casing		SP = Top Sand Pack				= Grout	
GS = Ground Surface		SC = Top Screen				= Seal	
BN = Top Seal		BS = Bottom Screen				= Sand Pack	
OC = Outer Casing		TD = Total Depth				= Formation	

Additional Comments:

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

ROY F. WESTON, Inc.

CLIENT	TOWN OF CLARKSTOWN	DRILLING FIRM	MOORETRENCH AMERICAN
SITE NAME	CLARKSTOWN LANDFILL	INSPECTOR	J. RHYNER/R. SANSONE

WELL ID	RFW5S	WATER LEVELS
START DATE	02/04/91	
COMPLETION DATE	02/05/91	

			DEPTH		ELEV.	DRILLING SUMMARY	
	2.00 inch		2.07	TC	60.44	Driller	ED STEC
						Drilling Fluid	FRESH WATER
			0.00	GS	58.37	Well Type	DOUBLE CASED SCREENED
						WELL DESIGN CONSTRUCTION	
						Casing #1 Diameter:	8.00 inch
						Interval:	0.00 to 10.00 ft.
						Type :	LOW CARBON
						Casing #2 Diameter:	2.00 inch
						Interval:	0.00 to 43.00 ft.
						Type :	STAINLESS
						Stick Up Inner Casing:	2.07 ft.
						Protective Casing:	0.00 ft.
						Casing Grout:	CEMT/BENT
						Interval:	0.00 to 28.00 ft.
						Seal Type:	BENTONITE PELLETS
						Interval:	28.00 to 31.00 ft.
						Sand Pack Type :	MORIE #00
						Interval:	31.00 to 44.00 ft.
						Grain Size :	UNIFORM
						Median Diameter:	
						Screen Diameter:	2.00
						Interval:	33.00 to 43.00 ft.
						Type :	STAINLESS
						Slots:	.010 inches
						WELL DEVELOPMENT	
						Date	02/05/91
						Method	CENTRIFUGAL PUMP
						Rate	3 gpm
						COMMENTS	
						TC = Top of Casing	SP = Top Sand Pack
						GS = Ground Surface	SC = Top Screen
						BN = Top Seal	BS = Bottom Screen
						OC = Outer Casing	TD = Total Depth
							= Grout
							= Seal
							= Sand Pack
							= Formation
						Additional Comments:	

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	

WELL ID	RFW5D	WATER LEVELS	
START DATE	01/25/91		
COMPLETION DATE	02/01/91		

	DEPTH		ELEV.	DRILLING SUMMARY	
	1.77	TC	60.06	Driller	ED STEC
	0.00	GS	58.29	Drilling Fluid	FRESH WATER
				Well Type	DOUBLE CASED SCREENED

WELL DESIGN CONSTRUCTION					
Casing #1 Diameter: 10.00 inch		Interval: 0.00 to 10.50 ft.			
Type : LOW CARBON					
Casing #2 Diameter: 2.00 inch		Interval: 0.00 to 94.00 ft.			
Type : STAINLESS					
Stick Up Inner Casing: 1.77 ft.		Protective Casing: 0.00 ft.			
Casing Grout: CEMENT/BENT		Interval: 0.00 to 75.00 ft.			
Seal Type: BENTONITE PELLETS		Interval: 75.00 to 80.50 ft.			
Sand Pack Type : MORIE #0		Interval: 80.50 to 96.00 ft.			
Grain Size : UNIFORM		Median Diameter:			
Screen Diameter: 2.00		Interval: 84.00 to 94.00 ft.			
Type : STAINLESS		Slots: .010 inches			

WELL DEVELOPMENT					
Date		02/01/91			
Method		CENTRIFUGAL PUMP/MANUAL			
Rate		25 gpm			

COMMENTS					
TC = Top of Casing	SP = Top Sand Pack		= Grout		
GS = Ground Surface	SC = Top Screen		= Seal		
BN = Top Seal	BS = Bottom Screen		= Sand Pack		
OC = Outer Casing	TD = Total Depth		= Formation		

Additional Comments:

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN SITE NAME CLARKSTOWN LANDFILL		DRILLING FIRM MOORETRENCH AMERICAN INSPECTOR J. RHYNER/R. SANSONE	
WELL ID RFW6S START DATE 11/01/90 COMPLETION DATE 11/06/90		WATER LEVELS	
	DEPTH 2.72 0.00 22.00 17.00 20.00 22.50 27.50 29.00	ELEV. TC 69.39 GS 66.67 OC 44.67 BN 49.67 SP 46.67 SC 44.17 BS 39.17 TD 37.67	DRILLING SUMMARY Driller ED STEC Drilling Fluid FRESH WATER Well Type DOUBLE CASED SCREENED
	WELL DESIGN CONSTRUCTION Casing #1 Diameter: 8.00 inch Interval: 0.00 to 22.00 ft. Type: LOW CARBON Casing #2 Diameter: 2.00 inch Interval: 0.00 to 27.50 ft. Type: STAINLESS Stick Up Inner Casing: 2.72 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT/BENT Interval: 0.00 to 17.00 ft. Seal Type: BENTONITE PELLETS Interval: 17.00 to 20.00 ft. Sand Pack Type: MORIE #00 Interval: 20.00 to 29.00 ft. Grain Size: UNIFORM Median Diameter: Screen Diameter: 2.00 Interval: 22.50 to 27.50 ft. Type: STAINLESS Slots: .010 inches		
	WELL DEVELOPMENT Date 11/06/90 Method MANUAL Rate 1 gpm		
	COMMENTS TC = Top of Casing SP = Top Sand Pack [Pattern] = Grout GS = Ground Surface SC = Top Screen [Pattern] = Seal BN = Top Seal BS = Bottom Screen [Pattern] = Sand Pack OC = Outer Casing TD = Total Depth [Pattern] = Formation		
	Additional Comments:		

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

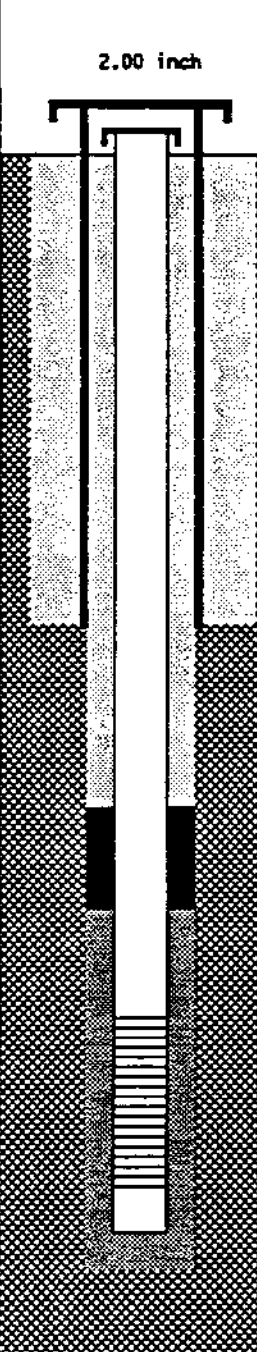
Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW6D
START DATE 11/02/90
COMPLETION DATE 11/09/90

WATER LEVELS

	2.00 inch	DEPTH	2.43 TC	ELEV.	69.86	DRILLING SUMMARY	
						Driller	ED STEC
						Drilling Fluid	FRESH WATER
						Well Type	DOUBLE CASED SCREENED
	WELL DESIGN CONSTRUCTION						
						Casing #1 Diameter:	10.00 inch
						Type :	LOW CARBON
						Casing #2 Diameter:	2.00 inch
						Type :	STAINLESS
						Stick Up Inner Casing:	2.43 ft.
					Protective Casing:	0.00 ft.	
					Casing Grout:	CENT/BENT	
					Interval:	0.00 to 32.00 ft.	
					Seal Type:	BENTONITE PELLETS	
					Interval:	32.00 to 35.00 ft.	
					Sand Pack Type :	MORIE #0	
					Grain Size :	UNIFORM	
					Screen Diameter:	2.00	
					Type :	STAINLESS	
					Interval:	35.00 to 46.50 ft.	
					Median Diameter:		
					Interval:	37.00 to 42.00 ft.	
					Slots:	.010 inches	
					WELL DEVELOPMENT		
					Date	11/09/90	
					Method	CENTRIFUGAL PUMP/MANUAL	
					Rate	8 gpm	
					COMMENTS		
					TC = Top of Casing	SP = Top Sand Pack	
					GS = Ground Surface	SC = Top Screen	
					BN = Top Seal	BS = Bottom Screen	
					OC = Outer Casing	TD = Total Depth	
					Additional Comments:		
					BORING BACKFILLED WITH BENTONITE PELLETS FROM 46.5'-49'		

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW7S
START DATE 10/31/90
COMPLETION DATE 12/20/90

WATER LEVELS

		DEPTH		ELEV.	DRILLING SUMMARY	
		2.72	TC	65.69	Driller	ED STEC
		0.00	GS	62.97	Drilling Fluid	FRESH WATER
					Well Type	DOUBLE CASED SCREENED
WELL DESIGN CONSTRUCTION						
Casing #1 Diameter: 10.00 inch		Interval: 0.00 to 28.00 ft.				
Type: LCM CARBON						
Casing #2 Diameter: 2.00 inch		Interval: 0.00 to 58.00 ft.				
Type: STAINLESS						
Stick Up Inner Casing: 2.72 ft.		Protective Casing: 0.00 ft.				
Casing Grout: CENT/BENT		Interval: 0.00 to 47.75 ft.				
28.00	OC	34.97	Seal Type: BENTONITE SLURRY	Interval: 47.75 to 51.00 ft.		
Sand Pack Type: MORTE #00		Interval: 51.00 to 61.00 ft.				
Grain Size: UNIFORM		Median Diameter:				
47.75	BN	15.22	Screen Diameter: 2.00	Interval: 53.00 to 58.00 ft.		
Type: STAINLESS		Slots: .010 inches				
51.00	SP	11.97				
WELL DEVELOPMENT						
53.00	SC	9.97	Date	12/20/90		
			Method	CENTRIFUGAL PUMP/MANUAL		
			Rate	13 gpm		
COMMENTS						
TC = Top of Casing		SP = Top Sand Pack		= Grout		
GS = Ground Surface		SC = Top Screen		= Seal		
BN = Top Seal		BS = Bottom Screen		= Sand Pack		
OC = Outer Casing		TD = Total Depth		= Formation		
58.00	BS	4.97	Additional Comments:			
61.00	TD	1.97				

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	

WELL ID		RFW7D		WATER LEVELS			
START DATE		10/30/90					
COMPLETION DATE		12/18/90					

	DEPTH		ELEV.	DRILLING SUMMARY			
	3.01	TC	65.99	Driller	ED STEC		
	0.00	GS	62.98	Drilling Fluid	FRESH WATER		
				Well Type	DOUBLE CASED SCREENED		

WELL DESIGN CONSTRUCTION							
Casing #1 Diameter: 10.00 inch				Interval: 0.00 to 28.00 ft.			
Type : LOW CARBON							
Casing #2 Diameter: 2.00 inch				Interval: 0.00 to 87.00 ft.			
Type : STAINLESS							
Stick Up Inner Casing: 3.01 ft.				Protective Casing: 0.00 ft.			
Casing Grout: CEMENT/BENT				Interval: 0.00 to 65.00 ft.			
28.00	OC	34.98	Seal Type:	BENTONITE SLURRY		Interval: 65.00 to 69.00 ft.	
			Sand Pack Type : MORIE #0		Interval: 69.00 to 99.00 ft.		
			Grain Size : UNIFORM		Median Diameter:		
65.00	BN	-2.02	Screen Diameter: 2.00		Interval: 77.00 to 87.00 ft.		
			Type : STAINLESS		Slots: .010 inches		
69.00	SP	-6.02					
77.00	SC	-14.02					
87.00	BS	-24.02					
99.00	TD	-36.02					

WELL DEVELOPMENT			
Date	12/18/90		
Method	CENTRIFUGAL PUMP		
Rate	7 gpm		

COMMENTS			
TC = Top of Casing	SP = Top Sand Pack		= Grout
GS = Ground Surface	SC = Top Screen		= Seal
BN = Top Seal	BS = Bottom Screen		= Sand Pack
OC = Outer Casing	TD = Total Depth		= Formation

Additional Comments:
 BOREHOLE BACKFILLED WITH MORIE #00 SAND FROM 90'-99' AND FROM 69'-72'

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	

WELL ID	RFW8S	WATER LEVELS	
START DATE	10/29/90		
COMPLETION DATE	12/07/90		

	DEPTH	ELEV.	DRILLING SUMMARY	
	2.08 TC	64.77	Driller	ED STEC
	0.00 GS	62.69	Drilling Fluid	FRESH WATER
			Well Type	DOUBLE CASED SCREENED

WELL DESIGN CONSTRUCTION				
Casing #1 Diameter: 8.00 inch		Interval: 0.00 to 20.00 ft.		
Type : LOW CARBON				
Casing #2 Diameter: 2.00 inch		Interval: 0.00 to 30.00 ft.		
Type : STAINLESS				
Stick Up Inner Casing: 2.08 ft.		Protective Casing: 0.00 ft.		
Casing Grout: CEMENT		Interval: 0.00 to 20.00 ft.		
Seal Type: BENTONITE PELLETS		Interval: 20.00 to 22.50 ft.		
Sand Pack Type : NORIE #0		Interval: 22.50 to 32.00 ft.		
Grain Size : UNIFORM		Median Diameter:		
Screen Diameter: 2.00		Interval: 25.00 to 30.00 ft.		
Type : STAINLESS		Slots: .010 inches		

WELL DEVELOPMENT				
Date		12/07/90		
Method		CENTRIFUGAL PUMP		
Rate		1 gpm		

COMMENTS				
TC = Top of Casing	SP = Top Sand Pack		= Grout	
GS = Ground Surface	SC = Top Screen		= Seal	
BN = Top Seal	BS = Bottom Screen		= Sand Pack	
OC = Outer Casing	TD = Total Depth		= Formation	

Additional Comments:
BORING BACKFILLED WITH CUTTINGS FROM 32'-34'

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER	

WELL ID	RFW8D	WATER LEVELS	
START DATE	10/26/90		
COMPLETION DATE	12/06/90		

	DEPTH		ELEV.	DRILLING SUMMARY	
	1.41	TC	63.90	Driller	TOM KLINE
	0.00	GS	62.49	Drilling Fluid	FRESH WATER
				Well Type	DOUBLE CASED SCREENED

WELL DESIGN CONSTRUCTION					
Casing #1 Diameter: 10.00 inch		Interval: 0.00 to 20.00 ft.			
Type : LOW CARBON					
Casing #2 Diameter: 2.00 inch		Interval: 0.00 to 118.00 ft.			
Type : STAINLESS					
Stick Up Inner Casing: 1.41 ft.		Protective Casing: 0.00 ft.			
Casing Grout: CEMENT/BENT		Interval: 0.00 to 97.00 ft.			
Seal Type: BENTONITE PELLETS		Interval: 97.00 to 104.50 ft.			
Sand Pack Type : MORIE #0		Interval: 104.50 to 125.00 ft.			
Grain Size :		Median Diameter:			
Screen Diameter: 2.00		Interval: 108.00 to 118.00 ft.			
Type : STAINLESS		Slots: .010 inches			

WELL DEVELOPMENT					
Date		12/06/90			
Method		CENTRIFUGAL PUMP			
Rate		3 gpm			

COMMENTS					
TC = Top of Casing	SP = Top Sand Pack		= Grout		
GS = Ground Surface	SC = Top Screen		= Seal		
BN = Top Seal	BS = Bottom Screen		= Sand Pack		
OC = Outer Casing	TD = Total Depth		= Formation		

Additional Comments:
 BOREHOLE GROUT SEALED 133'-153'/BENT. PELLET SEALED 125'-133'
 SANDPACKED WITH MORIE #00 SAND FROM 120'-125'

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	
WELL ID				RFW9S		WATER LEVELS	
START DATE				11/16/90			
COMPLETION DATE				11/16/90			
		DEPTH		ELEV.	DRILLING SUMMARY		
		1.96	TC	66.86	Driller	ED STEC	
		0.00	GS	64.90	Drilling Fluid	NONE	
					Well Type	SINGLE CASED SCREENED	
WELL DESIGN CONSTRUCTION							
Casing #1 Diameter: 2.00 inch Interval: 7.00 to 17.00 ft. Type : STAINLESS Casing #2 Diameter: 0.00 inch Interval: 0.00 to 0.00 ft. Type : Stick Up Inner Casing: 1.96 ft. Protective Casing: 0.00 ft. Casing Grout: CENT/BENT Interval: 0.00 to 3.00 ft. Seal Type: BENTONITE PELLETS Interval: 3.00 to 5.00 ft. Sand Pack Type : MORIE #0 Interval: 5.00 to 18.00 ft. Grain Size : UNIFORM Median Diameter: Screen Diameter: 2.00 Interval: 7.00 to 17.00 ft. Type : STAINLESS Slots: .010 inches							
		17.00	OC	47.90	WELL DEVELOPMENT		
		3.00	BN	61.90			
		5.00	SP	59.90			
		7.00	SC	57.90			
		17.00	BS	47.90	COMMENTS TC = Top of Casing SP = Top Sand Pack = Grout GS = Ground Surface SC = Top Screen = Seal BN = Top Seal BS = Bottom Screen = Sand Pack OC = Outer Casing TD = Total Depth = Formation		
		18.00	TD	46.90			
Additional Comments:							

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW9D
START DATE 10/24/90
COMPLETION DATE 11/08/90

WATER LEVELS

2.00 inch		DEPTH		ELEV.	DRILLING SUMMARY	
		1.52	TC	66.58	Driller	TOM KLINE
		0.00	GS	65.06	Drilling Fluid	FRESH WATER
					Well Type	DOUBLE CASED SCREENED
WELL DESIGN CONSTRUCTION						
Casing #1 Diameter: 10.00 inch Interval: 0.00 to 28.00 ft. Type: LOW CARBON Casing #2 Diameter: 2.00 inch Interval: 0.00 to 58.00 ft. Type: STAINLESS Stick Up Inner Casing: 1.52 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT/BENT Interval: 0.00 to 43.00 ft. Seal Type: BENTONITE PELLETS Interval: 43.00 to 46.00 ft. Sand Pack Type: MORIE #0 Interval: 46.00 to 60.00 ft. Grain Size: UNIFORM Median Diameter: Screen Diameter: 2.00 Interval: 48.00 to 58.00 ft. Type: STAINLESS Slots: .010 inches						
WELL DEVELOPMENT						
Date 11/08/90 Method CENTRIFUGAL PUMP Rate 2 gpm						
COMMENTS						
TC = Top of Casing SP = Top Sand Pack = Grout GS = Ground Surface SC = Top Screen = Seal BN = Top Seal BS = Bottom Screen = Sand Pack OC = Outer Casing TD = Total Depth = Formation						
Additional Comments:						

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT	TOWN OF CLARKSTOWN	DRILLING FIRM	MOORETRENCH AMERICAN
SITE NAME	CLARKSTOWN LANDFILL	INSPECTOR	J. RHYNER/R. SANSONE

WELL ID	RFW10S	WATER LEVELS
START DATE	11/19/90	
COMPLETION DATE	12/05/90	

	DEPTH		ELEV.	DRILLING SUMMARY	
	1.58	TC	60.67	Driller	ED STEC
	0.00	GS	59.09	Drilling Fluid	FRESH WATER
				Well Type	DOUBLE CASED SCREENED

WELL DESIGN CONSTRUCTION					
				Casing #1 Diameter: 10.00 inch	Interval: 0.00 to 12.00 ft.
				Type: LOW CARBON	
				Casing #2 Diameter: 2.00 inch	Interval: 0.00 to 35.00 ft.
				Type: STAINLESS	
				Stick Up Inner Casing: 1.58 ft.	Protective Casing: 0.00 ft.
				Casing Grout: CEMENT/BENT	Interval: 0.00 to 26.00 ft.
12.00	OC	47.09		Seal Type: BENTONITE PELLETS	Interval: 26.00 to 29.00 ft.
				Sand Pack Type: MORIE #0	Interval: 29.00 to 36.00 ft.
				Grain Size: UNIFORM	Median Diameter:
26.00	BN	33.09		Screen Diameter: 2.00	Interval: 30.00 to 35.00 ft.
				Type: STAINLESS	Slots: .010 inches
29.00	SP	30.09			
30.00	SC	29.09			
35.00	BS	24.09			
40.00	TD	19.09			

WELL DEVELOPMENT			
Date	12/05/90		
Method	MANUAL		
Rate	1.5 gpm		

COMMENTS			
TC = Top of Casing	SP = Top Sand Pack	= Grout	
GS = Ground Surface	SC = Top Screen	= Seal	
BN = Top Seal	BS = Bottom Screen	= Sand Pack	
OC = Outer Casing	TD = Total Depth	= Formation	

Additional Comments:
BORING BACKFILLED WITH BENTONITE PELLETS FROM 36'-40'

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/E. HIRSHENSON	

WELL ID		RFW10D		WATER LEVELS			
START DATE		12/05/90					
COMPLETION DATE		01/16/91					

4.00 inch	DEPTH		ELEV.	DRILLING SUMMARY			
	1.99	TC	61.09	Driller	TOM KLINE		
	0.00	GS	59.10	Drilling Fluid	BENTONITE MUD		
				Well Type	DOUBLE CASED OPEN HOLE		
	WELL DESIGN CONSTRUCTION						
				Casing #1 Diameter:	10.00 inch	Interval:	0.00 to 12.00 ft.
				Type :	LOW CARBON		
				Casing #2 Diameter:	4.00 inch	Interval:	0.00 to 90.00 ft.
				Type :	STAINLESS		
				Stick Up Inner Casing:	1.99 ft.	Protective Casing:	0.00 ft.
			Casing Grout:	CENT/BENT	Interval:	0.00 to 90.00 ft.	
12.00	OC	47.10	Seal Type:		Interval:	0.00 to 0.00 ft.	
			Sand Pack Type :		Interval:	0.00 to 0.00 ft.	
			Grain Size :		Median Diameter:		
0.00	BN	59.10	Screen Diameter:	0.00	Interval:	0.00 to 0.00 ft.	
			Type :		Slots:	inches	
0.00	SP	59.10					
WELL DEVELOPMENT							
			Date	01/16/91			
0.00	SC	59.10	Method	CENTRIFUGAL PUMP			
			Rate	6 gpm			
COMMENTS							
			TC = Top of Casing	SP = Top Sand Pack	[Pattern] = Grout		
			GS = Ground Surface	SC = Top Screen	[Pattern] = Seal		
			BN = Top Seal	BS = Bottom Screen	[Pattern] = Sand Pack		
			OC = Outer Casing	TD = Total Depth	[Pattern] = Formation		
0.00	BS	59.10					
125.00	TD	-65.90					
Additional Comments:							
BEDROCK WELL/OPEN HOLE CONSTRUCTION 90'-125'							

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

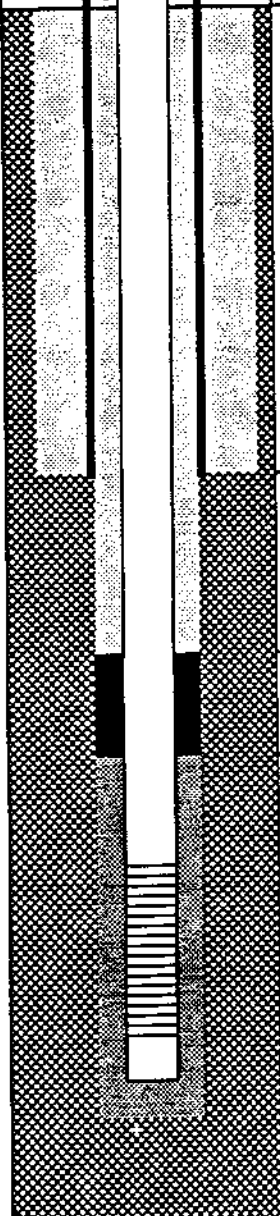
Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW11
START DATE 01/14/91
COMPLETION DATE 01/24/91

WATER LEVELS

2.00 inch	DEPTH		ELEV.	DRILLING SUMMARY	
	2.36	TC	70.57	Driller	ED STEC
				Drilling Fluid	FRESH WATER
	0.00	GS	68.21	Well Type	DOUBLE CASED SCREENED
WELL DESIGN CONSTRUCTION					
				Casing #1 Diameter: 10.00 inch	Interval: 0.00 to 13.00 ft.
				Type: LOW CARBON	
				Casing #2 Diameter: 2.00 inch	Interval: 0.00 to 36.00 ft.
				Type: STAINLESS	
				Stick Up Inner Casing: 2.36 ft.	Protective Casing: 0.00 ft.
				Casing Grout: CEMENT/BENT	Interval: 0.00 to 27.00 ft.
	13.00	OC	55.21	Seal Type: BENTONITE PELLETS	Interval: 27.00 to 30.00 ft.
				Sand Pack Type: MORIE #0	Interval: 30.00 to 36.00 ft.
				Grain Size: UNIFORM	Median Diameter:
				Screen Diameter: 2.00	Interval: 31.00 to 36.00 ft.
	27.00	BN	41.21	Type: STAINLESS	Slots: .010 inches
	30.00	SP	38.21	WELL DEVELOPMENT	
				Date	01/24/91
				Method	CENTRIFUGAL PUMP
				Rate	9 gpm
	31.00	SC	37.21	COMMENTS	
				TC = Top of Casing	SP = Top Sand Pack
				GS = Ground Surface	SC = Top Screen
				BN = Top Seal	BS = Bottom Screen
				OC = Outer Casing	TD = Total Depth
	36.00	BS	32.21	Additional Comments:	
	43.00	TD	25.21	ROCK CUTTINGS 36'-43'	
				UNRECOVERED 6" CASING 3'-29'	

NOTE: Well Diagram not to Scale

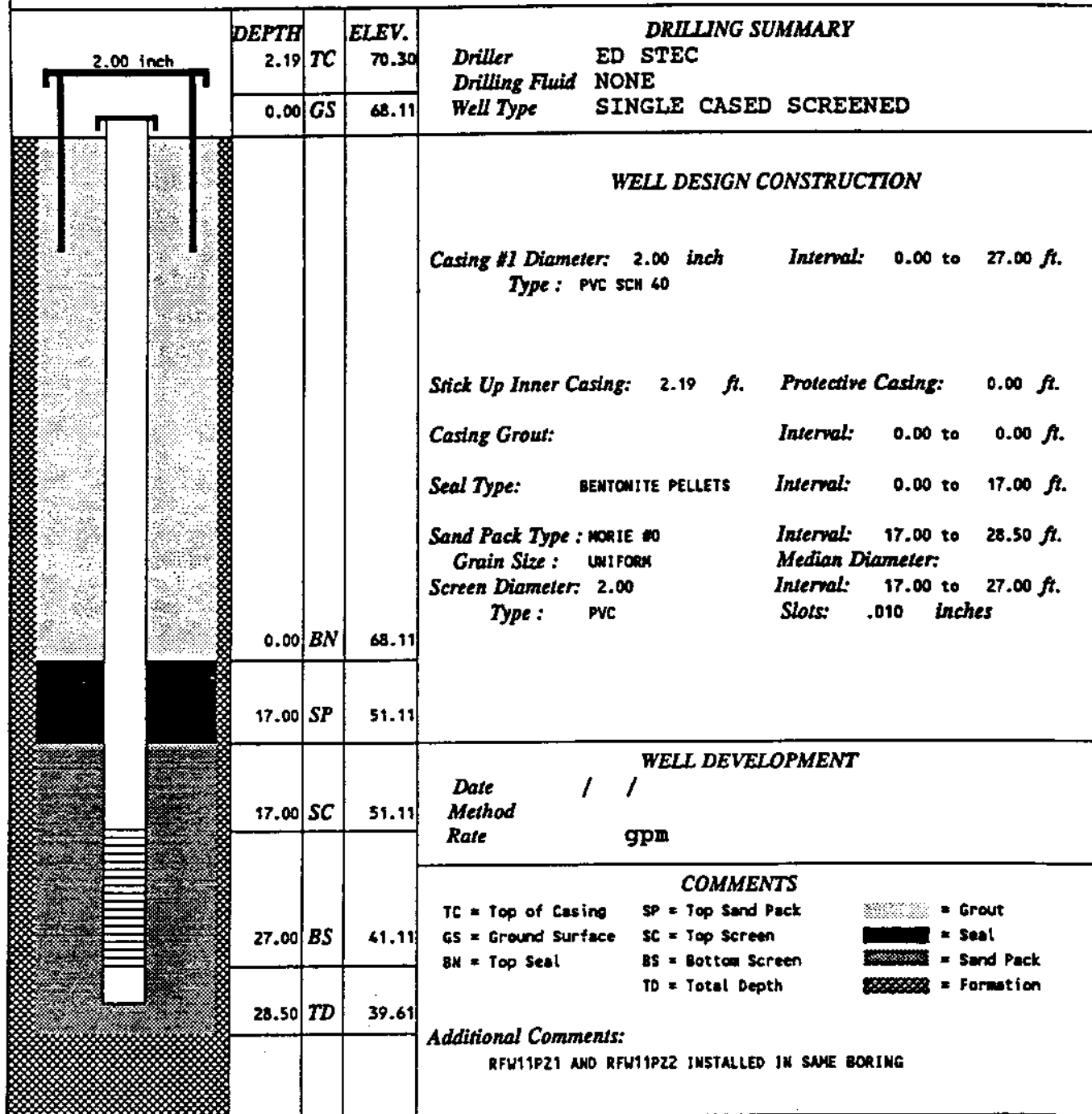
Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW11PZ1 WATER LEVELS
START DATE 02/06/91
COMPLETION DATE 02/07/91



NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/R. SANSONE	

WELL ID			RFW11PZ2			WATER LEVELS		
START DATE			02/06/91					
COMPLETION DATE			02/07/91					

	DEPTH		ELEV.	DRILLING SUMMARY			
	2.16	TC	70.27	Driller	ED STEC		
	0.00	GS	68.11	Drilling Fluid	NONE		
				Well Type	SINGLE CASSED SCREENED		

WELL DESIGN CONSTRUCTION							
Casing #1 Diameter: 2.00 Inch				Interval: 0.00 to 10.00 ft.			
Type: PVC SCH 40							
Stick Up Inner Casing: 2.16 ft.				Protective Casing: 0.00 ft.			
Casing Grout:				Interval: 0.00 to 0.00 ft.			
Seal Type: BENTONITE PELLETS				Interval: 0.00 to 4.00 ft.			
Sand Pack Type: MORIE #0				Interval: 4.00 to 10.50 ft.			
Grain Size: UNIFORM				Median Diameter:			
Screen Diameter: 2.00				Interval: 5.00 to 10.00 ft.			
Type: PVC				Slots: .010 inches			

WELL DEVELOPMENT							
Date / /							
Method							
Rate gpm							

COMMENTS							
TC = Top of Casing		SP = Top Sand Pack		[Pattern] = Grout			
GS = Ground Surface		SC = Top Screen		[Pattern] = Seal			
BN = Top Seal		BS = Bottom Screen		[Pattern] = Sand Pack			
		TD = Total Depth		[Pattern] = Formation			

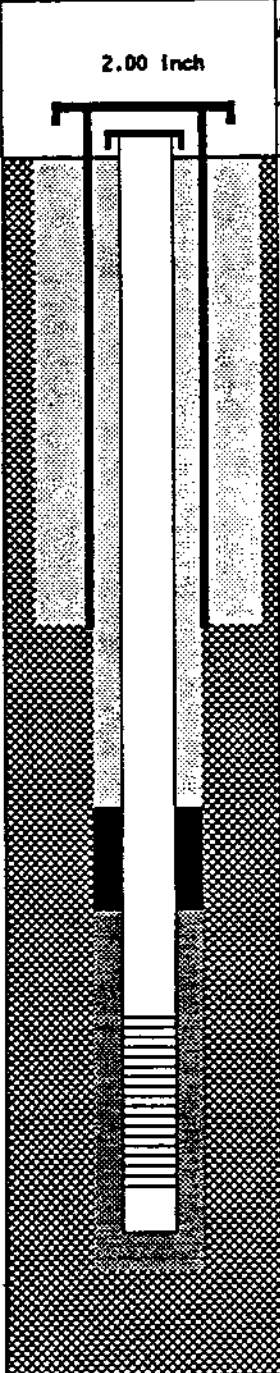
Additional Comments:			
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NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER	
WELL ID				RFW12		WATER LEVELS	
START DATE				11/12/90			
COMPLETION DATE				01/17/91			
		DEPTH		ELEV.	DRILLING SUMMARY		
		1.99	TC	63.10	Driller	TOM KLINE	
		0.00	GS	61.11	Drilling Fluid	FRESH WATER	
					Well Type	DOUBLE CASED SCREENED	
WELL DESIGN CONSTRUCTION							
Casing #1 Diameter: 10.00 inch Interval: 0.00 to 15.00 ft. Type: LOW CARBON Casing #2 Diameter: 2.00 inch Interval: 0.00 to 25.00 ft. Type: STAINLESS Stick Up Inner Casing: 1.99 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT Interval: 0.00 to 15.00 ft. Seal Type: BENTONITE PELLETS Interval: 15.00 to 18.00 ft. Sand Pack Type: MORIE #0 Interval: 18.00 to 26.00 ft. Grain Size: UNIFORM Median Diameter: Screen Diameter: 2.00 Interval: 20.00 to 25.00 ft. Type: STAINLESS Slots: .010 inches							
WELL DEVELOPMENT							
Date 01/17/91 Method CENTRIFUGAL PUMP Rate 5 gpm							
COMMENTS							
TC = Top of Casing SP = Top Sand Pack  = Grout GS = Ground Surface SC = Top Screen  = Seal BN = Top Seal BS = Bottom Screen  = Sand Pack OC = Outer Casing TD = Total Depth  = Formation							
Additional Comments:							

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW13
START DATE 01/16/91
COMPLETION DATE 01/18/91

WATER LEVELS

2.00 inch		DEPTH	TC	ELEV.	DRILLING SUMMARY	
		2.22	TC	70.84	Driller	ED STEC
		0.00	GS	68.62	Drilling Fluid	FRESH WATER
					Well Type	SINGLE CASED SCREENED
WELL DESIGN CONSTRUCTION						
Casing #1 Diameter: 2.00 inch		Interval: 0.00 to 24.50 ft.				
Type: STAINLESS						
Casing #2 Diameter: 0.00 inch		Interval: 0.00 to 0.00 ft.				
Type:						
Stick Up Inner Casing: 2.22 ft.		Protective Casing: 0.00 ft.				
Casing Grout: BENTONITE		Interval: 12.00 to 18.50 ft.				
Seal Type: BENTONITE PELLETS		Interval: 12.00 to 18.50 ft.				
Sand Pack Type: MORTE #0		Interval: 18.50 to 24.50 ft.				
Grain Size: UNIFORM		Median Diameter:				
Screen Diameter: 2.00		Interval: 19.50 to 24.50 ft.				
Type: STAINLESS		Slots: .010 inches				
WELL DEVELOPMENT						
Date 01/18/91						
Method CENTRIFUGAL PUMP						
Rate 5 gpm						
COMMENTS						
TC = Top of Casing		SP = Top Sand Pack		Grout		
GS = Ground Surface		SC = Top Screen		Seal		
BN = Top Seal		BS = Bottom Screen		Sand Pack		
OC = Outer Casing		TD = Total Depth		Formation		
Additional Comments:						
RFW13 AND RFW13P2 INSTALLED IN SAME BORING						

NOTE: Well Diagram not to Scale

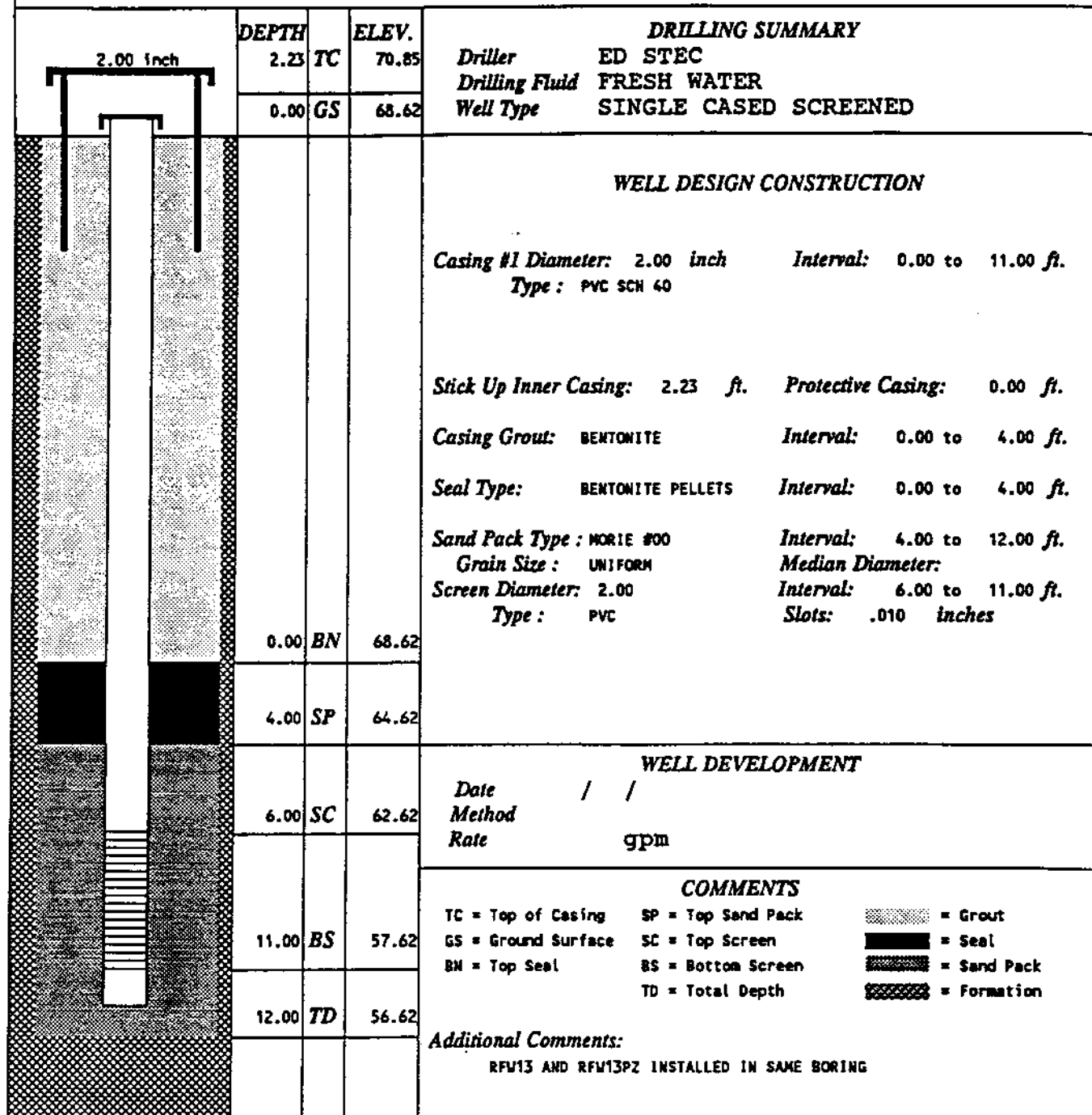
Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT TOWN OF CLARKSTOWN DRILLING FIRM MOORETRENCH AMERICAN
SITE NAME CLARKSTOWN LANDFILL INSPECTOR J. RHYNER/R. SANSONE

WELL ID RFW13PZ WATER LEVELS
START DATE 01/16/91
COMPLETION DATE 01/18/91

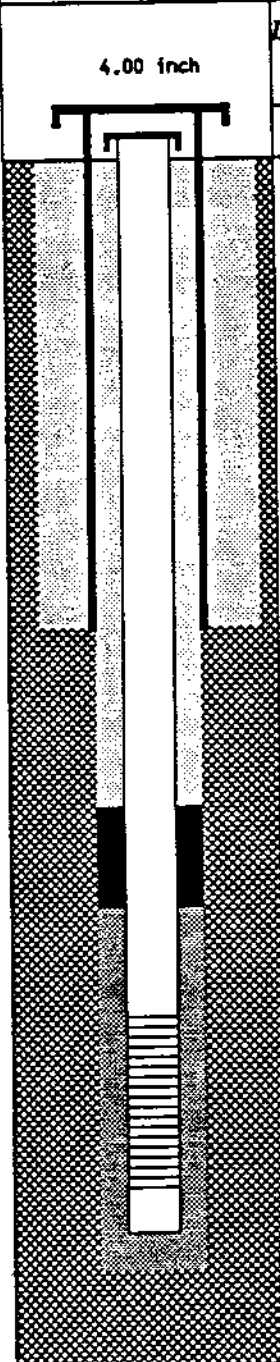


NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		ROORETRENCH AMERICAN	
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/J. HAGGETT	
WELL ID				RFW14		WATER LEVELS	
START DATE				01/22/91			
COMPLETION DATE				01/30/91			
		DEPTH		ELEV.	DRILLING SUMMARY		
		2.93	TC	121.80	Driller	TOM KLINE	
		0.00	GS	118.87	Drilling Fluid	BENTONITE MUD	
					Well Type	SINGLE CASED SCREENED	
WELL DESIGN CONSTRUCTION							
Casing #1 Diameter: 4.00 inch Interval: 0.00 to 77.00 ft. Type : STAINLESS Casing #2 Diameter: 0.00 inch Interval: 0.00 to 0.00 ft. Type : Stick Up Inner Casing: 2.93 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT/BENT Interval: 0.00 to 62.00 ft. Seal Type: BENTONITE PELLETS Interval: 82.00 to 88.00 ft. Sand Pack Type : MORIE #0 Interval: 64.00 to 82.00 ft. Grain Size : UNIFORM Median Diameter: Screen Diameter: 4.00 Interval: 67.00 to 77.00 ft. Type : STAINLESS Slots: .010 inches							
		77.00	OC	41.87	WELL DEVELOPMENT		
		82.00	BN	36.87			
		64.00	SP	54.87	Date / / Method Rate gpm		
		67.00	SC	51.87			
		77.00	BS	41.87	COMMENTS		
		123.00	TD	-4.13			
TC = Top of Casing SP = Top Sand Pack  = Grout GS = Ground Surface SC = Top Screen  = Seal BN = Top Seal BS = Bottom Screen  = Sand Pack OC = Outer Casing TD = Total Depth  = Formation							
Additional Comments: BOREHOLE GROUT SEALED 88'-123' BENTONITE PELLET SEALED 82'-88'							

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN			
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/J. HAGGETT			
WELL ID				RFW15		WATER LEVELS			
START DATE				01/31/91					
COMPLETION DATE				02/15/91					
		DEPTH		ELEV.	DRILLING SUMMARY Driller TOM KLINE Drilling Fluid BENTONITE MUD Well Type SINGLE CASED SCREENED				
		2.82	TC	136.20					
		0.00	GS	133.38					
		WELL DESIGN CONSTRUCTION Casing #1 Diameter: 4.00 inch Interval: 0.00 to 97.00 ft. Type: STAINLESS Casing #2 Diameter: 0.00 inch Interval: 0.00 to 0.00 ft. Type: Stick Up Inner Casing: 2.82 ft. Protective Casing: 0.00 ft. Casing Grout: CEMENT/BENT Interval: 0.00 to 79.00 ft. Seal Type: BENTONITE SLURRY Interval: 79.00 to 84.00 ft. Sand Pack Type: MORIE #0 Interval: 84.00 to 103.00 ft. Grain Size: UNIFORM Median Diameter: Screen Diameter: 4.00 Interval: 87.00 to 97.00 ft. Type: STAINLESS Slots: .010 inches							
						97.00	OC	36.38	
						79.00	BN	54.38	
						84.00	SP	49.38	
						87.00	SC	46.38	
						97.00	BS	36.38	
						148.00	TD	-14.62	
						WELL DEVELOPMENT Date / / Method Rate gpm			
						COMMENTS TC = Top of Casing SP = Top Sand Pack = Grout GS = Ground Surface SC = Top Screen = Seal BN = Top Seal BS = Bottom Screen = Sand Pack OC = Outer Casing TD = Total Depth = Formation			
Additional Comments: BOREHOLE GROUT SEALED 103'-148' MORIE #00 SAND FROM 84'-85'									

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

Well Completion Summary

ROY F. WESTON, Inc.

CLIENT		TOWN OF CLARKSTOWN		DRILLING FIRM		MOORETRENCH AMERICAN		
SITE NAME		CLARKSTOWN LANDFILL		INSPECTOR		J. RHYNER/J. HAGGETT		
WELL ID				RFW16		WATER LEVELS		
START DATE				02/15/91				
COMPLETION DATE				02/26/91				
		DEPTH		ELEV.	DRILLING SUMMARY			
		2.64	TC	140.01	Driller	TOM KLINE		
		0.00	GS	137.37	Drilling Fluid	BENTONITE MUD		
					Well Type	SINGLE CASED SCREENED		
WELL DESIGN CONSTRUCTION								
					Casing #1 Diameter:	4.00 inch	Interval: 0.00 to 87.00 ft.	
					Type:	STAINLESS		
					Casing #2 Diameter:	0.00 inch	Interval: 0.00 to 0.00 ft.	
					Type:			
					Stick Up Inner Casing:	2.64 ft.	Protective Casing: 0.00 ft.	
					Casing Grout:	CENT/BENT	Interval: 0.00 to 68.00 ft.	
		87.00	OC	50.37	Seal Type:	BENTONITE SLURRY	Interval: 68.00 to 73.00 ft.	
					Sand Pack Type:	MORIE #0	Interval: 73.00 to 94.00 ft.	
					Grain Size:	UNIFORM		
		68.00	BN	69.37	Screen Diameter:	4.00	Interval: 77.00 to 87.00 ft.	
					Type:	STAINLESS		
		73.00	SP	64.37	Slots:	.010 inches		
WELL DEVELOPMENT								
					Date	/ /		
		77.00	SC	60.37	Method			
					Rate	gpm		
COMMENTS								
		87.00	BS	50.37	TC = Top of Casing	SP = Top Sand Pack	= Grout	
					GS = Ground Surface	SC = Top Screen	= Seal	
					BN = Top Seal	BS = Bottom Screen	= Sand Pack	
					OC = Outer Casing	TD = Total Depth	= Formation	
		114.00	TD	23.37	Additional Comments:			
					BOREHOLE GROUT SEALED 94'-114'			
					MORIE #00 SAND 73'-74'			

NOTE: Well Diagram not to Scale

Elevations are feet above mean sea level

WELL SAMPLING DATA SHEETS

PROJECT/NO. CLARKSTOWN Landfill
3228-10-01
 SAMPLER (S) G. Gursti / S. Klepacki
 LOCATION Clarkstown Landfill
 WEATHER Rainy, 40°F

EVACUATION DATA

Well Diameter 2 inch
 Measuring Point Top of casing
 MP Elevation 72.11
 Well Depth * 28.0
 Depth to Water * 14.00
 Water-level elev 58.11
 Length of column 14.0
 Volume of column 2.2
 Evacuation Method Manual purge
 Evac. Calculation From provided chart
 Evac. Start 0950
 Evac. End 1345
 Volume Removed 11.5 gal
 Recharge Wait 1 Hour

EVACUATION CHEMS

gals	pH	temp/cond.
2.5	-	-
2.5	8.1	11.7°C 242
2.0	8.1	11.4°C 246
2.5	8.2	11.7°C 255
2.0	8.2	11.6°C 259

DATE 4-15-91
 WELL NO. RFW-15
 METER (S): pH cole parmar 5941-00
 CONDUCTIVITY YSI 3000 T-L-C
 TEMPERATURE YSI 3000 T-L-C

Turbidity Model DRT-15B
 SAMPLING DATA poly. Disposable
 Sampling Method Bailer, op. 166, 12 vol
 Sampling Start 1405
 Sampling End 1545
 Sample Appearance pale reddish brown
 Sample odor/color -
 Temperature 12.5°C
 pH 8.0
 Conductivity 252 umhos/cm
 HNw/OVA Units NR
 Comments: -

ANALYSIS DATA

Parameter	Container/Preserv.
VOA	42871, 42872, 42873 / NONE
BNA, PCB/PEST	40238 / NONE
Metals, Hg, Hardness	40237 / 11 NO ₃ pH 2
Cyanide	40236 / NaOH pH 7.1
Totals Phenols	40235 / H ₂ SO ₄ pH 2
Sulfates	40234 / 4°C
Samples analyzed by:	
TDS, BOD	40233 / 4°C
TKN	40232 / H ₂ SO ₄ pH 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
1-1/2" = 0.10	2-1/2" = 0.24	3-1/2" = 0.50	6" = 1.46

Signature/date: S. Klepacki 5/6/91

- * Measured from top of casing
- All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4/15/91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-1D

LOCATION

GILST/Klepack

METER (S): pH

7.8

WEATHER

Clarkstown Landfill

CONDUCTIVITY

188 μ mhos/cm

light rain high 40's

TEMPERATURE

12°C

heavy rain later

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

71.70

Well Depth *

58.0

Depth to Water *

14.0' (11.92')

Water-level elev

57.7

Length of column

44.0

Volume of column

7.09

Evacuation Method

Centrifugal pump

Evac. Calculation

Evac. Start

1010

Evac. End

1028

Volume Removed

38 gallons

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

1.66 c.d. $\approx$ 1 ft.

Sampling Start

polyethylene disp. bottle

Sampling End

1320

Sample Appearance

1405

Sample odor/color

clear water

Temperature

odorless

pH

12°C

Conductivity

7.8

HNu/OVA Units

188 μ mhos/cm

Comments:

(ineff. - not used due to rain)

Turbidity = 1.4 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VDA

42868, 42869, 42870 / none

BNA/p/PCB

40239 / none

Metals, Hg, Hardness

40243 / HNO₃, pH < 2

CN

40240 / NaOH, pH 12

Total Phosphorus

40241 / H₂SO₄, pH < 2

Sulfates, Chlorides, Alkalinity

40244 / 4°C

Samples analyzed by:

40245 / 4°C

TDS, BOD, Color

40242 / H₂SO₄, pH < 2

TKN, Ammonia, TOC, COD

EVACUATION CHEMS

gals pH temp/cond.

22 7.9 14.1°C / 197 μ mhos/cm

27 7.9 14.5°C / 0.198 "

33 7.9 14.5°C / 0.199 "

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

Lina T. Smith 4/30/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarks town Landfill

DATE

4/15/91

SAMPLER (S)

3228-10-01

WELL NO.

RFLW-2

LOCATION

Phy. ex / Falcone

METER (S): pH

8.2

WEATHER

Clarks town Landfill

CONDUCTIVITY

192 $\mu\text{mhos/cm}$ light-hvy rain, high 40's°F
J-Mid 50's°F

TEMPERATURE

12°C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of Casing

MP Elevation

66.20

Well Depth *

32'

Depth to Water *

8.0'

Water-level elev

58.2'

Length of column

24.0'

Volume of column

3.24 gal

Evacuation Method

Centrifugal pump

Evac. Calculation

Evac. Start

1400

Evac. End

1415

Volume Removed

25 gallons

Recharge Wait

1445

SAMPLING DATA

Sampling Method

poly. disp. bottle, 1.66 CD, 1.10

Sampling Start

1450 collected 9

Sampling End

1545 / Field dup also

Sample Appearance

clear

Sample odor/color

odorless

Temperature

12°C

pH

8.2

Conductivity

192 $\mu\text{mhos/cm}$

HNu/OVA Units

OVA 30-250 units

Comments:

Turbidity = 38.0 NTU

EVACUATION CHEMS

gals

pH

temp/cond.

5-10 8.2 13°C / 205 $\mu\text{mhos/cm}$

13-15 8.3 12.7°C / 202 "

15-20 8.3 12.7°C / 203 "

ANALYSIS DATA

Parameter

Container/Preserv.

VDA 42817, 42818, 42819 / none

BNA/PI/PCB 40331 / none

Metals: Hachuss, Hg 40335 / HNO₃, pH <2

Cu 40333 / NaOH, pH >12

Total phenols 40332 / H₂SO₄, pH <2

Sulfate, chloride, AL 40336 / 4°C

Samples analyzed by: 40337 / 4°C

TDS, Bor, Color,

TKN, Ammon, TOC, COD 40338 / H₂SO₄, pH <2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

JL Hunt 4/30/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4/15/91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-2-FD

LOCATION

Phy. wt / Falcone

METER (S): pH

8.2

WEATHER

Clarkstown Landfill

CONDUCTIVITY

192 μ mhos/cmlight-hvy rain, high 40's°F
J-Mid 50's°F

TEMPERATURE

12°C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of Casing

MP Elevation

62.00

Well Depth *

32'

Depth to Water *

8.0'

Water-level elev

58.2'

Length of column

24.0'

Volume of column

3.84 gal

Evacuation Method

Centrifugal pump

Evac. Calculation

Evac. Start

1400

Evac. End

1415

Volume Removed

25 gallons

Recharge Wait

1445

SAMPLING DATA

Sampling Method

poly. disp. bottle, 1.66 OD, 1.1

Sampling Start

1450 collected

Sampling End

1545 Field dup also

Sample Appearance

clear

Sample odor/color

odorless

Temperature

12°C

pH

8.2

Conductivity

192 μ mhos/cm

HNU/OVA Units

OVA 30-250 umh

Comments:

Turbidity = 38.0 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VDA

42820, 42821, 42822 / none

BNA/P/PCB

40330 / none

Metals: Hg, As, H

40329 / HNO₃, pH < 2

Cu

40328 / H₂O, pH 5/2

Total phos

40327 / H₂SO₄, pH < 2

Sulfate/chlorides, AK

40326 / 4°C

Samples analyzed by

40325 / 4°C

TDS, Bar. Color,

TKN, Ammon, TOC, EOL 40324 / H₂SO₄, pH < 2

EVACUATION CHEMS

gals

pH

temp/cond.

5-10 8.2 12°C / 205 μ mhos/cm

13-15 8.3 12.7°C / 202 "

15-20 8.3 12.7°C / 203 "

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

J. J. Smith 4/30/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO. Clarkstown Landfill
3228-10-01
SAMPLER (S) Sansone / Falcone
LOCATION Clarkstown, N.Y.
WEATHER Sunny 70's

EVACUATION DATA

Well Diameter 2"
Measuring Point Top of casing
MP Elevation 65.28
Well Depth * 37.00
Depth to Water * 7.25
Water-level elev 58.03
Length of column 29.75
Volume of column 4.76
Evacuation Method Centrifugal pump
Evac. Calculation 0.58/in x 48 in = 24 gal
Evac. Start 1450
Evac. End 1545
Volume Removed 24 gal
Recharge Wait N/A

EVACUATION CHEMS

gals	pH	temp/cond.
15-17.5	8.3	24.3°C 335 umhos
17.5-20	8.3	24.2°C 330 umhos
20-22.5	8.3	24.8°C 333 umhos
Final Turbidity - 82 NTU		

DATE 4-16-91
WELL NO. RFW-35
METER (S): pH cole parmer 5941-00
CONDUCTIVITY YSI 3000 T-L-C
TEMPERATURE YSI 3000 T-L-C
Turbidity
DET-15B

SAMPLING DATA

Sampling Method poly disp. bailer, 001.66, 12 vol
Sampling Start 1645
Sampling End 1730
Sample Appearance clear
Sample odor/color —
Temperature 24.8°C
pH 8.3
Conductivity 333 umhos
HNU/OVA Units No response
Comments:

ANALYSIS DATA

Parameter	Container/Preserv.
VOA	42954, 42955, 42956 / NONE
BVA	40147 / NONE
CN ⁻	40145 / NaOH pH > 12
phenols	40144 / H ₂ SO ₄ pH 2
sulfate	40143 / 4°C
TDS	40142 / 4°C
Samples analyzed by:	
TKN	40141 / H ₂ SO ₄ pH 2
Metals	40146 / HNO ₃ pH 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
1-1/2" = 0.10	2-1/2" = 0.24	3-1/2" = 0.50	6" = 1.46

Signature/date: S. Klapacki 5/6/91

- * Measured from top of casing
All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Land Fill

SAMPLER (S)

3228-10-01

LOCATION

Sansone/Falcone

WEATHER

CLARKSTOWN, N.Y.

Sunny 70's

DATE

4-16-91

WELL NO.

RFW-3P

METER (S): pH

Cole parmer 5941-00

CONDUCTIVITY

YSZ 3000 T-L-C

TEMPERATURE

YSZ 3000 T-L-C

Turbidity meter

Model DRT-15B

SAMPLING DATA

Sampling Method

poly. disp. boiler 1.6600, 1L

Sampling Start

1645

Sampling End

1730

Sample Appearance

clear

Sample odor/color

—

Temperature

15.2°C

pH

8.3

Conductivity

150 umhos

HNu/OVA Units

NR

Comments:

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

64.89

Well Depth *

62.00

Depth to Water *

4.67

Water-level elev

60.22

Length of column

57.33

Volume of column

9.17

Evacuation Method

centrifugal pump

Evac. Calculation

49/m x 12 min = 48 gal

Evac. Start

1555

Evac. End

1618

Volume Removed

48 gal.

Recharge Wait

N/A

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42948, 42949, 42950 / NONE

BWA 40132 / NONE

CN⁻ 40134 / NaOH pH > 12phenols 40135 / H₂SO₄ pH < 2

Sulfate 40136 / 40°C

TDS 40137 / 40°C

Samples analyzed by:

TKN 40138 / H₂SO₄ pH < 2METALS 40133 / HNO₃ pH < 2

EVACUATION CHEMS

gals pH temp/cond.

30-35 8.4 15.3°C 150 umhos

35-40 8.3 15.2°C 150 umhos

40-45 8.3 15.2°C 150 umhos

Turbidity = 7.5 NTU

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Depacki 5/6/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4/16/91

SAMPLER (S)

GUSTI/Kleparki

WELL NO.

RFD-45

LOCATION

Clarkstown Landfill

METER (S): pH

6.8

WEATHER

Clear Sunny, 70° F

CONDUCTIVITY

390 μ mhos/cm

TEMPERATURE

18°C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

62.5'

Well Depth *

23.0'

Depth to Water *

4.5'

Water-level elev

57.9'

Length of column

18.5'

Volume of column

2.96

Evacuation Method

Manual

Evac. Calculation

Evac. Start

1005 4/15

Evac. End

0905 4/16

Volume Removed

Recharge Wait

SAMPLING DATA

Sampling Method

dep. poly. bailer / 66" O.D. 1" x

Sampling Start

1310

Sampling End

1340

Sample Appearance

clear

Sample odor/color

colorless

Temperature

18°C

pH

6.8

Conductivity

390 μ mhos/cm

HNu/OVA Units

HNu 3-64.34 in casing

Comments:

Quat hood space

Turbidity = 2200 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VDA 42811, 42812, 42813 / none

RNA/P/PCB 40344 / none

Metals/Hg/Hardness 40343 / HNO₃ pH 2.2

CN 40347 / NaOH, pH > 12

Phenols 40341 / H₂SO₄, pH < 2

Sulfate/Chlorides/AIK 40340 / 4°C

Samples analyzed by: 40339 / 4°C

TDS, BOD, COD

TKN, Amm., CO₂, TDC 40140 / H₂SO₄, pH < 2

EVACUATION CHEMS

gals pH

temp/cond.

2 - -

2.5 7.3 11.8°C / 280 μ mhos/cm2.0 13.9 13.5°C / 328 μ mhos/cm

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

Shirley Lusk 4/30/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4/16/91

WELL NO.

RFW-40

SAMPLER (S)

GUSTI/Kloppack

METER (S): pH

7.8

LOCATION

Clarkstown Landfill

CONDUCTIVITY

330 μ mhos/cm

WEATHER

TEMPERATURE

14°C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

62.83

Well Depth *

48.5

Depth to Water *

0.42'

Water-level elev.

58.41

Length of column

43.58

Volume of column

6.97

Evacuation Method

Centrifugal pump

Evac. Calculation

Evac. Start

0905

Evac. End

0940

Volume Removed

35 gallons

Recharge Wait

1400

SAMPLING DATA

Sampling Method

poly. d. ka. bottle, 1.6" C.D., 1.8 vol.

Sampling Start

1145

Sampling End

1130

Sample Appearance

clear

Sample odor/color

odorless

Temperature

14°C

pH

7.8

Conductivity

330 μ mhos/cm

HNu/OVA Units

Comments:

Turbidity = 32 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA

42951, 42952, 42953 / none

BNA/P/PCB

40345 / none

Metals/Hg/Hardness

40346 / HNO₃ pH < 2

CN

40347 / NaOH pH > 12

Phenols

40348 / H₂SO₄

Sulfate/Chloride/Alk.

40349 / 4°C

Samples analyzed by:

40350 / 4°C

TDS, BOD, COD

TKN, Amm, COD, TOC, 40351 / H₂SO₄, pH < 2

EVACUATION CHEMS

gals pH

temp/cond.

20-25 8.0 13.0°C / 352 μ mhos/cm

25-30 7.8 13.3°C / 349 "

30-35 7.0 13.3°C / 345 "

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

Linda L. Lundy 4/30/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-16-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-55

LOCATION

GUSTI/1109ACK

METER (S): pH

cole parmer 5941-00

WEATHER

Clarkstown N.Y.

CONDUCTIVITY

YSI 3000 T-L-CSunny 70's

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

60.44

Well Depth *

46.0

Depth to Water *

1.92'

Water-level elev

58.52

Length of column

44.08

Volume of column

7.05

Evacuation Method

Centrifugal pump

Evac. Calculation

pump 36 PM x 8 min = 24 gal

Evac. Start

1100

Evac. End

1106

Volume Removed

35 gallons

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

poly disp. bailer 1.66 op. 12 in.

Sampling Start

1200

Sampling End

1240

Sample Appearance

clear

Sample odor/color

—

Temperature

18°C

pH

9.9

Conductivity

168 umhos

HNu/OVA Units

NR

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

25 9.9 16.7°C 203 umhos5 9.7 16.5°C 203 umhos5 9.7 16.6°C 181 umhosturbidity - 4.8 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42833, 42833, 42834 / NONEBNA 40302 / NONEphenols 40299 / H₂SO₄ pH < 2TDS 40297 / 4°CTKN 40296 / H₂SO₄ pH < 2CN⁻ 40300 / NaOH pH > 12Samples analyzed by: 40298 24°CMetals 40301 / HNO₃ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.0772" = 0.163" = 0.374" = 0.651-1/2" = 0.102-1/2" = 0.243-1/2" = 0.506" = 1.46

Signature/date:

S. Klapach 5/6/91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

SAMPLER (S)

Klepachi/Guisti

LOCATION

Clarkstown, N.Y.

WEATHER

Sunny 70's

DATE

4-16-91

WELL NO.

RFW-5D

METER (S): pH

Cole Parmer 5941-00

CONDUCTIVITY

YSI T-L-C (3000)

TEMPERATURE

YSI T-L-C (3000)

Turbidity

ORT-15B

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

60.06

Well Depth *

97.00

Depth to Water *

0

Water-level elev

60.06

Length of column

97.00

Volume of column

15.52

Evacuation Method

Centrifugal pump/Manual

Evac. Calculation

89-1/5 min = 30 min = 48 gal

Evac. Start

1015

Evac. End

1330

Volume Removed

77 gal

Recharge Wait

1 Hour

SAMPLING DATA

Sampling Method

poly. disp. bailer, 12 vol, O.D. 1.66,

Sampling Start

1525

Sampling End

1620

Sample Appearance

Clear

Sample odor/color

—

Temperature

17°C

pH

8.8

Conductivity

155 umhos

HNu/OVA Units

No response

Comments:

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42829, 42830, 42831, /NONEBNA 40303 /NONECN- 40305 / NaOH pH > 12phenols 40306 / H₂SO₄ pH < 2Sulfate 40307 / 4°CTDS 40308 / 4°CSamples analyzed by TKN 40309 / H₂SO₄ pH < 2Metals 40304 / HNO₃ pH < 2

EVACUATION CHEMS

gals pH

temp/cond.

45-50 8.3 24.2°C 202 umhos55-60 8.3 23.0°C 196 umhos65-70 8.3 23.2°C 197 umhos70-75 8.3 23.1°C 197 umhosFinal Turbidity - 16 NTU

Well Casing Volumes (gal/ft)

1-1/4" = 0.0772" = 0.163" = 0.374" = 0.651-1/2" = 0.102-1/2" = 0.243-1/2" = 0.506" = 1.46

Signature/date:

S. Klepachi
5-6-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Land Fill

DATE

4-23-91

SAMPLER (S)

322B-10-01

WELL NO.

RFW-65

LOCATION

Guisti/Kiepacki

METER (S): pH

Cole parmer 5941-00

WEATHER

Clarkstown, N.Y.

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

Turbidity

ORT-15B

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

69.39

Well Depth *

30.00

Depth to Water *

18.50

Water-level elev

50.89

Length of column

11.5

Volume of column

1.84

Evacuation Method

Manual purge

Evac. Calculation

1.84 gal per event x 3 = 5.5 gal

Evac. Start

4-22-91 (two events)

Evac. End

4-23-91 (one event)

Volume Removed

5 gallons

Recharge Wait

1 Hour +

SAMPLING DATA

Sampling Method

Qty. Dup. Bailer, 00166, 12 vol

Sampling Start

1230

Sampling End

1250

Sample Appearance

cloudy

Sample odor/color

Temperature

18.5°C

pH

7.5

Conductivity

330 umhos

HNU/OVA Units

No Response

Comments:

EVACUATION CHEMS

gals

pH

temp/cond.

3 7.7 14.9°C 309 umhos1 7.6 15.7°C 313 umhos1 7.5 15.9°C 316 umhosFinal turbidity = 108 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42841, 42842, 42843 / NONEBNA 40275 / NONEMetals 40276 / HNO₃ pH < 2CN⁻ 40277 / NaOH pH > 12Sulfate 40279 / 40°CTKN 40281 / H₂SO₄ pH < 2Samples analyzed by: 40°CTDS 40280 / 40°Cphenols 40278 / H₂SO₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.0772" = 0.163" = 0.374" = 0.651-1/2" = 0.102-1/2" = 0.243-1/2" = 0.506" = 1.46

Signature/date:

S. Kiepacki
5-5-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Land Fill

DATE

4-22-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-6D

LOCATION

Klepcki/Guisti

METER (S): pH

Cole Parmer 5941-00

WEATHER

Clarkstown, N.Y.

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

TURBIDITY

DET-15B

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

69.86

Well Depth *

45.00

Depth to Water *

10.10

Water-level elev

59.76

Length of column

34.90

Volume of column

5.58

Evacuation Method

Centrifugal Pump w/magnat

Evac. Calculation

5.58 gal per column x 5 = 27.92 gal

Evac. Start

0927

Evac. End

1003

Volume Removed

34 gallons

Recharge Wait

30 minutes

SAMPLING DATA

Sampling Method

poly. disp. bailer, 12ml, DP 166,

Sampling Start

1005

Sampling End

1050

Sample Appearance

clear

Sample odor/color

Temperature

15°C

pH

9.8

Conductivity

152 umhos

HNU/OVA Units

High humidity not used

Comments:

Final turbidity 95 ntu

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42846, 42845, 42844 / NONE

BNA 40274 / NONE

Metals 40273 / HNO₃ pH 42

CN- 40272 / NaOH pH 712

Phenols 40271 / H₂SO₄ pH 42TKN 40268 / H₂SO₄ pH 42

Samples analyzed by: 4°C

TOS 40269 / 4°C

Sulfate 40270 / 4°C

EVACUATION CHEMS

gals pH

temp/cond.

15-20 10.5 19.7°C 200 umhos

20-25 10.5 19.3°C 196 umhos

25-27 10.3 19.4°C 191 umhos

27-29 10.2 19.2°C 183 umhos

29-32 10.0 19.5°C 184 umhos

32-34 10.0 19.6°C 184 umhos

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepcki

- * Measured from top of casing
- All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Land Fill

DATE

4-22-91

SAMPLER (S)

322B-10-01

WELL NO.

RFW-75

LOCATION

SANSONE/FALCONE

METER (S): pH

Cole Parmer 5941-00

WEATHER

Clarkstown, N.Y.

CONDUCTIVITY

YSI 3000 T-L-C

Overcast w/ drizzle

TEMPERATURE

YSI 3000 T-L-C

mid 40's

Turbidity

DR7-15B

EVACUATION DATA

Well Diameter

2"

SAMPLING DATA

Measuring Point

Top of casing

Sampling Method

poly. disp. bailer, 001.64, 12 m

MP Elevation

65.69

Sampling Start

1613.

Well Depth *

61.00

Sampling End

1640

Depth to Water *

5.67

Sample Appearance

Water-level elev

60.02

Sample odor/color

dark reddish brown

Length of column

55.33

Temperature

13.0°C

Volume of column

8.85

pH

8.8

Evacuation Method

Centrifugal pump w/ manual assist

Conductivity

210 μ mho

Evac. Calculation

8.85 x 5 = 44.25

HNU/OVA Units

NO RESPONSE

Evac. Start

1200

Comments:

Metals collected on

Evac. End

1417

4-23-91, Final turbidity 7200 NTU

Volume Removed

46 gal

ANALYSIS DATA

Recharge Wait

30 min.

Parameter

Container/Preserv.

EVACUATION CHEMS

gals

pH

temp/cond.

VOA 42808, 42809, 42810 / NONE

BVA 40365 / NONE

CN- 40363 / NaOH pH 7.12

TDS 40360 / 4°C

TKN 40359 / H₂SO₄ pH < 2

Sulfate 40361 / 4°C

Samples analyzed by: H₂SO₄ pH < 2Phenols 40362 / H₂SO₄ pH < 2Metals 40364 / HNO₃ pH < 2

25-30	9.3	14.9	215 μ mho
30-35	9.1	14.6	218 μ mho
35-40	9.1	15.3	226 μ mho
40-43.5	9.0	15.4	228 μ mho
43.5-46	9.0	15.9	232 μ mho

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepacki
5-7-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

SAMPLER (S)

322B-10-01

LOCATION

Gusti / Klepacki

WEATHER

Clarkstown, N.Y.

Overcast w/drizzle

Mid 40's

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of Casing

MP Elevation

65.99

Well Depth *

90.00

Depth to Water *

6.00

Water-level elev

59.99

Length of column

30.01

Volume of column

4.80

Evacuation Method

Centrifugal Pump

Evac. Calculation

5 gal/min x 13 min = 65 gal

Evac. Start

1434

Evac. End

1449

Volume Removed

69 gal.

Recharge Wait

N/A

EVACUATION CHEMS

gals	pH	temp/cond.
45-50	8.9	13.2°C 140 umhos
50-55	8.9	13.2°C 140 umhos
55-60	8.9	13.2°C 140 umhos
60-65	8.8	13.2°C 140 umhos

DATE

4-22-91

WELL NO.

RFW-7D

METER (S): pH

Cde Palmer 5941-00

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

TURBIDITY

0.27-15B

SAMPLING DATA

Sampling Method

poly disp. barrel, 00166, 12 vol

Sampling Start

1535

Sampling End

1610

Sample Appearance

Clear

Sample odor/color

Temperature

13.5°C

pH

8.7

Conductivity

140 umhos

HNu/OVA Units

No response

Comments:

Final turbidity 2.6 NTU

ANALYSIS DATA

Parameter	Container/Preserv.
VOA	42806, 42805, 42807 / NONE
BVA	40358 / NONE
Metals	40357 / HNO ₃ pH < 2
Cu-	40356 / NaOH pH 7-12
phenols	40355 / H ₂ SO ₄ pH < 2
Sulfate	40354 / 4°C
Samples analyzed by:	
TDS	40353 / 4°C
TKN	40352 / H ₂ SO ₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepacki

5-8-91

* Measured from top of casing.

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-22-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-85

LOCATION

Klepceci / Grubki

METER (S): pH

Cole-Parmer 5941-00

WEATHER

Clarkstown, NY

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

64.77

Well Depth *

33.00

Depth to Water *

6.0

Water-level elev

58.77

Length of column

27.00

Volume of column

4.32

Evacuation Method

centrifugal pump w/ manual assist.

Evac. Calculation

120/min x 21 min = 2520 gal

Evac. Start

1037

Evac. End

1100

Volume Removed

23 gal

Recharge Wait

NA

SAMPLING DATA

Sampling Method

pdy. disp. bailer, 00166 12 vol

Sampling Start

1140

Sampling End

1245

Sample Appearance

clear

Sample odor/color

Temperature

13°C

pH

6.7

Conductivity

1080 umhos

HNu/OVA Units

NO Response

Comments:

EVACUATION CHEMS

gals pH temp/cond.

12.5-15 6.8 17.3 1275 umhos

15-17.5 6.8 17.6 1280 umhos

17.5-20 6.8 17.7 1281 umhos

20-22 6.8 17.7 1280 umhos

Final turbidity 21 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42796, 42797, 42798 / NONE

BVA 40387 / NONE

Metals 40388 / HNO₃ pH < 2

CN 40389 / NaOH pH 7-12

Sulfate 40391 / 40°C

Chemicals 40390 / H₂SO₄ pH < 2

Samples analyzed by:

TOS 40392 / 40°C

TKN 40393 / H₂SO₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepceci

5-6-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-22-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-85MS

LOCATION

Kleporek / Grubbi

METER (S): pH

Coleman 5941-00

WEATHER

Clarkstown, NY

CONDUCTIVITY

YSF 3000 T-L-C

Overcast, drizzle, 40's

TEMPERATURE

YSF 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

64.77

Well Depth *

33.00

Depth to Water *

6.0

Water-level elev

58.77

Length of column

27.00

Volume of column

4.32

Evacuation Method

centrifugal pump w/manual assist.

Evac. Calculation

1 1/2 min x 2 l/min = 2 l gal

Evac. Start

1037

Evac. End

1100

Volume Removed

23 gal

Recharge Wait

NA

SAMPLING DATA

Sampling Method

pdy. disp. bailer, 00166, 12 vol

Sampling Start

1140

Sampling End

1245

Sample Appearance

clear

Sample odor/color

—

Temperature

13°C

pH

6.7

Conductivity

1080 umhos

HNu/OVA Units

NO Response

Comments:

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 40257, 40258, 40259 / NONE

BVA 22596 / NONE

Metal 22598 / HNO₃ pH < 2

CN- 40259 / NaOH pH 7-12

Sulfate 40255 / 40°C

Chemicals 40257 / H₂SO₄ pH < 2

Samples analyzed by:

TOS 40214 / 40°C

TKN 40212 / H₂SO₄ pH < 2

EVACUATION CHEMS

gals pH

temp/cond.

12.5-15 6.8 17.3 1275 umhos

5-17.5 6.8 17.6 1280 umhos

7.5-20 6.8 17.7 1281 umhos

20-22 6.8 17.7 1280 umhos

Final turbidity 21 NTU

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Kleporek
5-6-91

Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-22-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-25MSD

LOCATION

Klepachi / Grubbi

METER (S): pH

Cole Parmer 5941-00

WEATHER

Clarkstown, NY

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

64.77

Well Depth *

33.00

Depth to Water *

6.0

Water-level elev

58.77

Length of column

27.00

Volume of column

4.32

Evacuation Method

Centrifugal pump w/ manual assist

Evac. Calculation

174/min x 21 min = 21 gal

Evac. Start

1037

Evac. End

1100

Volume Removed

23 gal

Recharge Wait

NA

SAMPLING DATA

Sampling Method

pdy. disp. bailer, 0016612

Sampling Start

1140

Sampling End

1245

Sample Appearance

clear

Sample odor/color

—

Temperature

13°C

pH

6.7

Conductivity

1080 umhos

HNU/OVA Units

NO response

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

12-15 6.8 17.3 1275 umhos

15-17.5 6.8 17.6 1280 umhos

17.5-20 6.8 17.7 1281 umhos

20-22 6.8 17.7 1280 umhos

Final turbidity 21 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42852, 42851, 42850 / NONE

BVA 22597 / NONE

Metal 22599 / HNO₃ pH < 2

CN 40258 / NaOH pH 7-12

Sulfate 40254 / 40°C

Chemicals 40256 / H₂SO₄ pH < 2

Samples analyzed by:

TOS 40213 / 40°C

TKN 40211 / H₂SO₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepachi
5-6-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

SAMPLER (S)

3228-10-01

LOCATION

Klepacki / Guish

WEATHER

Clarkstown, N.Y.

Sunny, 60's

DATE

4-23-91

WELL NO.

RFW-8D

METER (S): pH

Cole parmer 5941-00

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

63.90

Well Depth *

121.0

Depth to Water *

4.08'

Water-level elev

59.82

Length of column

61.18

Volume of column

9.79

Evacuation Method

Centrifugal pump

Evac. Calculation

32 gal/min x 3 min = 96 gal

Evac. Start

0945

Evac. End

1042

Volume Removed

120 gal

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

poly. disp. bailer, 00466, 12 in

Sampling Start

1100

Sampling End

1200

Sample Appearance

clear

Sample odor/color

—

Temperature

13°C

pH

8.3

Conductivity

750 umhos

HNU/OVA Units

NO RESPONSE

Comments:

Final Turbidity - 1.4 NT

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42794, 42795, 42793 / NONE

BNA 40386 / NONE

METALS 40385 / HNO₃ pH 4.2

CN- 40384 / NaOH pH 12

phenols 40383 / H₂SO₄ pH 4.2

SW Gate 40382 / 4°C

Samples analyzed by: 4°C

TDS 40381 / 4°C

TKN 40380 / H₂SO₄ pH 4.2

EVACUATION CHEMS

gals pH temp/cond.

60-65 9.0 14.9 996 umhos

75-80 8.9 14.5 954 umhos

85-90 8.9 14.4 926 umhos

90-95 8.9 14.4 909 umhos

95-100 8.9 14.1 883 umhos

100-105 8.8 15.0 893 umhos

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

105-110 8.9 14.5 863 umhos

110-115 8.8 14.4 854 umhos

115-120 — 14.4 832 umhos

Signature/date:

J. Klepacki

5-8-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarks town Land Fill

DATE

4-23-91

SAMPLER (S)

Gust. / Klepacki

WELL NO.

RFW-95

LOCATION

Clarkstown, N.Y.

METER (S): pH

Cole parmer 5941-00

WEATHER

Sunny 50's

CONDUCTIVITY

YSZ 3000 T-L-C

TEMPERATURE

YSZ 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

66.86

Well Depth *

20.00

Depth to Water *

8.75

Water-level elev

58.11

Length of column

11.25

Volume of column

1.8

Evacuation Method

Manual purge

Evac. Calculation

1.8 gal per event x 5 = 9 gal

Evac. Start

1115

Evac. End

1143

Volume Removed

12 gal

Recharge Wait

2 hours

SAMPLING DATA

Sampling Method

Poly disp. bottle 001.66, 1 liter

Sampling Start

1400

Sampling End

1421

Sample Appearance

dark olive green-brown

Sample odor/color

pungent and odor

Temperature

14.2°C

pH

6.9

Conductivity

3000 umhos

HNu/OVA Units

NO response

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

5-7.5 6.9 13.0°C 2910 umhos

7.5-10 6.9 13.7°C 2900 umhos

10-12 6.9 13.8°C 2870 umhos

Final turbidity > 200 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 402840, 402838, 402839 / NONE

BVA 40295 / NONE

METALS 40294 / HNO₃ pH < 2CN⁻ 40293 / NaOH pH 7.12

Sulfate 40291 / 4°C

Chemicals 40292 / H₂SO₄ pH < 2

Samples analyzed by: 40c

TDS 40290

TKN 40289 / H₂SO₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepacki

5-9-91

* Measured from top of casing.

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-23-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-9D

LOCATION

Klepachi/Guisti

METER (S): pH

Cole parmer 5941-00

WEATHER

Clarkstown, N.Y.

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

66.58

Well Depth *

61.00

Depth to Water *

6.25

Water-level elev

60.33

Length of column

54.75

Volume of column

8.76

Evacuation Method

Centrifugal pump

Evac. Calculation

291 in x 22 min = 44 gal

Evac. Start

1152

Evac. End

1215

Volume Removed

46 gal

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

poly. disp. bailer, 12 vol, 00166,

Sampling Start

1440

Sampling End

1515

Sample Appearance

clear

Sample odor/color

—

Temperature

15°C

pH

7.5

Conductivity

1200 umhos

HNu/OVA Units

No response

Comments:

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42835, 42836, 42837 / NONE

BVA 40288 / NONE

Metals 40287 / HNO₃ pH < 2CN⁻ 40286 / NaOH pH 7-12Organics 40285 / H₂SO₄ pH < 2

Sulfate 40284 / 4°C

Samples analyzed by: 40283 / 4°C

TDS 40283 / 4°C

TKN 40282 / H₂SO₄ pH < 2

EVACUATION CHEMS

gals pH

temp/cond.

25-30 7.3 14.9°C 1210 umhos

30-35 7.3 15.7°C 1209

35-40 7.3 15.3°C 1202

40-45 7.3 15.2°C 1200 ✓

Final Turbidity 18 NTU

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepachi
5-9-91

- Measured from top of casing
- All depths and elevations are in "feet" unless noted otherwise

WESTON

NOT SAMPLED - DUE TO UNSTABLE PARAMETERS

PROJECT/NO.

Clarkstown Landfill

DATE

WELL NO.

RFW-105

SAMPLER (S)

METER (S): pH

LOCATION

Clarkstown N.Y.

CONDUCTIVITY

WEATHER

TEMPERATURE

EVACUATION DATA

Well Diameter

Measuring Point

MP Elevation

Well Depth *

Depth to Water *

Water-level elev

Length of column

Volume of column

Evacuation Method

Evac. Calculation

Evac. Start

Evac. End

Volume Removed

Recharge Wait

SAMPLING DATA

Sampling Method

Sampling Start

Sampling End

Sample Appearance

Sample odor/color

Temperature

pH

Conductivity

HNu/OVA Units

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

ANALYSIS DATA

Parameter

Container/Preserv.

Samples analyzed by:

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-17-91

WELL NO.

RFW-10D

SAMPLER (S)

322B-10-01

METER (S): pH

Cole parmer 5941-00

LOCATION

Klepachi/Ginesti

CONDUCTIVITY

YSZ 3000 T-L-C

WEATHER

Clarkstown, N.Y.

TEMPERATURE

YSZ 3000 T-L-C

Rainy 50's

SAMPLING DATA

Sampling Method

poly-disp bailer, 00.6612

Sampling Start

1100-

Sampling End

1130

Sample Appearance

clear

Sample odor/color

Temperature

11.5°C

pH

8.1

Conductivity

195 umhos

HNU/OVA Units

Effectuated by High humidity

Comments:

Final turbidity 2.2 N.

EVACUATION DATA

Well Diameter

4"

Measuring Point

Top of casing

MP Elevation

61.09

Well Depth *

128.00

Depth to Water *

0

Water-level elev

Flowing Artesian

Length of column

128.00

Volume of column

83.2 gal

Evacuation Method

Centrifugal pump

Evac. Calculation

5 gal/min x 83 min = 415 gal

Evac. Start

845

Evac. End

1023

Volume Removed

415 gal

Recharge Wait

N/A

EVACUATION CHEMS

gals	pH	temp/cond.
295	7.9	11.7 214 umhos
320	8.0	11.8 215
340	8.0	11.8 214
360	8.1	11.8 215
380	8.0	11.8 215
400	8.0	11.8 215

ANALYSIS DATA

Parameter	Container/Preserv.
VOA	42874, 42875, 42876 / NONE
BVA	40231 / NONE
Metals	40230 / HNO ₃ pH < 2
CN	40229 / NaOH pH 7-12
phenol	40228 / H ₂ SO ₄ pH < 2
Sulfate	40227 / 4°C
Samples analyzed by:	
TOS	40226 / 4°C
TKN	40226 / H ₂ SO ₄ pH < 2

Well-Casing Volumes (gal/ft)

1-1/4" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
1-1/2" = 0.10	2-1/2" = 0.24	3-1/2" = 0.50	6" = 1.46

415 8.0 11.8 215 umhos

Signature/date:

S. Klepachi
5/9/91

Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-17-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-11

LOCATION

Guisti/Klepach

METER (S): pH

Coleparmer 5941-00

WEATHER

Clarkstown N.Y.

CONDUCTIVITY

YSI 3000 T-L-C

Rainy SD's

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

70.57

Well Depth *

39.00

Depth to Water *

10.42

Water-level elev

60.15

Length of column

28.58

Volume of column

4.57

Evacuation Method

Centrifugal pump

Evac. Calculation

96ml/min x 3min = 27 gal

Evac. Start

1150

Evac. End

1158

Volume Removed

24 gal

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

poly. disp. bailer, 001.66/L

Sampling Start

1345

Sampling End

1430

Sample Appearance

clear

Sample odor/color

Temperature

12.5°C

pH

6.9

Conductivity

820 umhos

HNU/OVA Units

effected by rain

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

10-15 7.0 12.8°C 597 umhos

15-20 6.8 12.9°C 588

20-23 6.9 13.0°C 588

Final turbidity - 26 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42959, 42957, 42958 / NONE

BVA 40418 / NONE

METALS 40417 / HNO₃ pH < 2CN⁻ 40416 / NaOH pH > 12

Sulfate 40414 / 4°C

phenols 40415 / H₂SO₄ pH < 2

Samples analyzed by:

TDS 40413 / 4°C

TCN 40412 / H₂SO₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepach
5-9-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Landfill

DATE

4-17-91

SAMPLER (S)

Sansone / Falcone

WELL NO.

RFW-12

LOCATION

Clarkstown, NY

METER (S): pH

Cole parmer 5941-00

WEATHER

Rainy, SO's

CONDUCTIVITY

YSI 3000 T-L-C

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top casing

MP Elevation

63.10

Well Depth *

28.00

Depth to Water *

3.92

Water-level elev

59.18

Length of column

24.08

Volume of column

3.85

Evacuation Method

Centrifugal pump

Evac. Calculation

5 gal/min x 4 min = 20 gal

Evac. Start

1305

Evac. End

1317

Volume Removed

20 gal.

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

poly disp. beiler, 001.66, 1L

Sampling Start

1405

Sampling End

1440

Sample Appearance

clear

Sample odor/color

Temperature

12.7

pH

7.4

Conductivity

362

HNu/OVA Units

NO response

Comments:

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42960, 42961, 42962 / NONEBVA 40425 / NONEMetals 40424 / HNO₃ pH < 2CN⁻ 40423 / NaOH pH 7-12Sulfate 40421 / 4°CPhenols 40422 / H₂SO₄ pH < 2

Samples analyzed by:

TOS 40420 / 4°CTKN 40419 / H₂SO₄ pH < 2

EVACUATION CHEMS

gals pH

temp/cond.

10-15 7.4 12.6°C 367 units15-17.5 7.4 13.0°C 368 units17.5-20 7.3 12.8°C 366 unitsFinal turbidity 12 NTU

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepach
5-9-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

Clarkstown Land Fill

DATE

4-23-91

SAMPLER (S)

3228-10-01

WELL NO.

RFW-13

LOCATION

Sansone/Falcone

METER (S): pH

Calcipar 5941-00

WEATHER

Clarkstown N.Y.

CONDUCTIVITY

YSI 3000 T-L-CSunny 50's

TEMPERATURE

YSI 3000 T-L-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

70.84

Well Depth *

27.00

Depth to Water *

10.10

Water-level elev

60.74

Length of column

16.90

Volume of column

2.70

Evacuation Method

Centrifugal pump

Evac. Calculation

50 gal/min x 8 min = 15 gal

Evac. Start

1357

Evac. End

1406

Volume Removed

20 gallons

Recharge Wait

5 min

SAMPLING DATA

Sampling Method

poly. disp. bailer, 001.66, 124

Sampling Start

141431

Sampling End

1453

Sample Appearance

clear

Sample odor/color

—

Temperature

13°C

pH

7.1

Conductivity

803 umhos

HNu/OVA Units

NO RESPONSE

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

8-10 7.1 13.2°C 804 umhos10-12 7.1 13.5°C 795 umhos12-14 7.1 13.6°C 800 umhos15-20 7.1 13.6°C 802 umhosFinal turbidity 2.5 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42791, 42790, 42792 / NONEBNA 40407 / NONEMETALS 40406 / HNO₃ pH < 2CU²⁺ 40405 / NaOH pH > 12Sulfate 40403 / 4°Cphenols 40404 / H₂SO₄ pH < 2

Samples analyzed by:

TDS 40402 / 4°CTKN 40401 / H₂SO₄ pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.0772" = 0.163" = 0.374" = 0.651-1/2" = 0.102-1/2" = 0.243-1/2" = 0.506" = 1.46

Signature/date:

S. Klepach

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

5-9-91**WESTON**

PROJECT/NO.

Clarkstown Landfill

DATE

4-24-1991

SAMPLER (S)

3228-10-01

WELL NO.

RFW-14

LOCATION

Klepacki / Guisti

METER (S): pH

Cele Partner 4957-00

WEATHER

Clarkstown NY.

CONDUCTIVITY

YSI 3000 T-L-e

Rainy 50's

TEMPERATURE

YSI 3000 T-C-C

EVACUATION DATA

Well Diameter

2"

Measuring Point

Top of casing

MP Elevation

121.80

Well Depth *

80.00

Depth to Water *

57.50

Water-level elev

64.30

Length of column

15.70

Volume of column

2.51

Evacuation Method

submersible pump

Evac. Calculation

4 gal/min x 20 min = 80 gal

Evac. Start

1045

Evac. End

1130

Volume Removed

155 gal

Recharge Wait

N/A

SAMPLING DATA

Sampling Method

dup. poly bailer, 00166, 12 in

Sampling Start

Sampling End

Sample Appearance

brownish-green

Sample odor/color

Temperature

pH

Conductivity

HNu/OVA Units

Comments:

EVACUATION CHEMS

gals pH

temp/cond.

100 7.1 39.9°C 1452 umh

115 7.1 39.3°C 1435

140 7.1 39.1°C 1412

155 7.1 39.4°C 1392 ✓

Final turbidity 120 NTU

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42787, 42788, 42789 / NONE

BNA 40400 / NONE

METALS 40399 / HN03. pH < 2

CN- 40398 / NaOH pH > 12

SuPate 40396 / 4°C

Olanols 40397 / H2SO4 pH < 2

Samples analyzed by

TDS 40395 / 4°C

TKN 40394 / H2SO4 pH < 2

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klepacki
5-9-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

PROJECT/NO.

3 CLARESTOWN Landfill
3228-40-01

DATE

4-15-91

SAMPLER (S)

Klopacel / Gurski

WELL NO.

GWFB-01

LOCATION

CLARESTOWN NY.

METER (S): pH

WEATHER

rainy, 40's

CONDUCTIVITY

TEMPERATURE

EVACUATION DATA

Well Diameter

Measuring Point

MP Elevation

Well Depth *

Depth to Water *

Water-level elev

Length of column

Volume of column

Evacuation Method

Evac. Calculation

Evac. Start

Evac. End

Volume Removed

Recharge Wait

SAMPLING DATA

Sampling Method

Sampling Start

Sampling End

Sample Appearance

Sample odor/color

Temperature

pH

Conductivity

HNU/OVA Units

Comments:

Disp. poly. bailer

0945

1025

ANALYSIS DATA

Parameter

Container/Preserv.

VOA 42882, 42883, 42881 / NONE

BNA 40204 / NONE

METALS 40205 / HNO₃ pH < 2

CN 40206 / NaOH pH 7-12

Sulfate 40208 / 40°C

Alend's 40207 / H₂SO₄ pH < 2

Samples analyzed by:

TDS 40209 / 40°C

TKN 40210 / H₂SO₄ pH < 2

EVACUATION CHEMS

gals

pH

temp/cond.

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

S. Klopacel
5-9-91

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

Well obstructed, not sampled

PROJECT/NO.

Clarkstown Landfill
3228-10-01

DATE

WELL NO.

RFW-15

SAMPLER (S)

METER (S): pH

LOCATION

CONDUCTIVITY

WEATHER

TEMPERATURE

EVACUATION DATA

Well Diameter

Measuring Point

MP Elevation

Well Depth *

Depth to Water *

Water-level elev

Length of column

Volume of column

Evacuation Method

Evac. Calculation

Evac. Start

Evac. End

Volume Removed

Recharge Wait

SAMPLING DATA

Sampling Method

Sampling Start

Sampling End

Sample Appearance

Sample odor/color

Temperature

pH

Conductivity

HNu/OVA Units

Comments:

ANALYSIS DATA

Parameter

Container/Preserv.

EVACUATION CHEMS

gals pH

temp/cond.

Samples analyzed by:

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

* Measured from top of casing
All depths and elevations are in "feet" unless noted otherwise

WESTON

Well ~~SAM~~ Obstructed, Not Sampled

PROJECT/NO.

Clarks town Land Fill
322B-10-01

DATE

WELL NO.

RFW-16

SAMPLER (S)

METER (S): pH

LOCATION

CONDUCTIVITY

WEATHER

TEMPERATURE

EVACUATION DATA

Well Diameter

Measuring Point

MP Elevation

Well Depth *

Depth to Water *

Water-level elev

Length of column

Volume of column

Evacuation Method

Evac. Calculation

Evac. Start

Evac. End

Volume Removed

Recharge Wait

SAMPLING DATA

Sampling Method

Sampling Start

Sampling End

Sample Appearance

Sample odor/color

Temperature

pH

Conductivity

HNu/OVA Units

Comments:

ANALYSIS DATA

Parameter

Container/Preserv.

EVACUATION CHEMS

gals pH

temp/cond.

Samples analyzed by:

Well Casing Volumes (gal/ft)

1-1/4" = 0.077

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.10

2-1/2" = 0.24

3-1/2" = 0.50

6" = 1.46

Signature/date:

* Measured from top of casing

All depths and elevations are in "feet" unless noted otherwise

WESTON

SUBSURFACE SOIL PHYSICAL TESTING DATA

Custody Transfer Record/Lab Work Request

WESTON

WESTON Analytics Use Only
9012X001

Client: Town of Clarkston
Work Order: 3228-10-01-0142
Date Rec'd: 12/14/90 Date Due:
RFW Contact: John Payne G. Suttie
Client Contact/Phone: 404-866-0000

Refrigerator#	Type Container	Containers/Volume	Preservative	ANALYSES REQUESTED	Date Collected	Matrix	Client ID/Description	Item/Reason	Relinquished by	Received by	Date	Time
				TOC, Moisture, CEC	11-5-90	Soil	RFW-6D-SH1					
					11-5-90		-63-SS11					
					10-31-90		-78-SH2					
					10-29-90		-8D-SS9					
					11-2-90		-8D-SS16					
					11-13-90		-8D-SS17					
					11-13-90		-8D-SS20					
					11-13-90		-8D-SS21					
					11-14-90		-8D-SS24					
					11-14-90		-8D-SS25					
					11-14-90		-8D-SS26					
					11-14-90		-8D-SS27					
					11-13-90		-8D-SH4					
					11-13-90		-8D-SH5 (Shelly Tube)					
					11-19-90	✓	V-105-SS5					

Matrix: W - Water, D - Drum Solids, S - Soil, SE - Sediment, SO - Solid, O - Oil, F - Fish, X - Other

Special Instructions: ① Analyze samples with "0" for TOC ASAP ② Please transfer CEC samples to Analytics Division for analysis with method S1846-9080/81 ③ "Physical Parameters" means After-

RFW 21-21-001/A-5/88 beg Limits, grain size analysis, moisture content, and specific gravity
④ All methods as per latest Scope of work memo ⑤ please hold onto Shelly tubes until further notice

st 2

Custody Transfer Record/Lab Work Request



WESTON Analytics Use Only	
9012X001	

Client Town of Clarkstown
 Work Order 3228-10-01
 Date Rec'd.
 RFW Contact John Rhymer, G. Suttie
 Client Contact/Phone Les Bellman

WESTON Analytics Use Only		Refrigerators		ANALYSES REQUESTED		Date Collected		Matrix		Client ID/Description		Date		Time		Received by		Relinquished by		Item/Reason		Date		Time	
Samples Were: 1 Shipped or Hand-Delivered NOTES:		#Type Container Volume Preservative		▲		TOL		Nati. Moist. Good		Hold until further notice															
2 Ambient or Chilled NOTES:																									
3 Received Broken/Leaking (Improperly Sealed) Y N NOTES:																									
4 Properly Preserved Y N NOTES:																									
5 Received Within Holding Times Y N NOTES:																									
COC Tape Was: 1 Present on Outer Package Y N 2 Unbroken on Outer Package Y N 3 Present on Sample Y N 4 Unbroken on Sample Y N NOTES:																									
COC Record Was: 1 Present Upon Receipt of Samples Y N Discrepancies Between Sample Labels and COC Record? Y N NOTES:																									

Special Instructions:

Matrix: W - Water DS - Drum Solids X - Other
 S - Soil O - Oil DL - Drum Liquids
 SE - Sediment A - Air F - Fish
 SO - Solid WI - Wipe L - EP/TCLP Leachate

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
Transfer CEC samples to 208 lab on new chain of custody			12/10/01	16:00					

WESTON

WESTON Analytics Use Only
90121966

Town of Clarkstown

Work Order 3228-10-01

Date Rec'd. 12/14/90 Date Due _____

REFW Contact Ben Shapiro of R. Flye

Client ContactPhone 6173

[illegible]

Matrix:	W - Water	DS - Drum Solids	X - Other
O - Oil		DL - Drum Liquids	
A - Air		F - Fish	
EE - Sediment		L - SPOTLP Leachate	
SO - Solid			

[illegible]

91044001

WESTON Analytics Use Only
91044001

Custody Transfer Record/Lab Work Request

WESTON

Client Town of Clarkstown
 Work Order 3238-10-01
 Date Rec'd. 4/15/91 Date Due
 RFW Contact John Rhynar, George Suttie
 Client Contact/Phone LEB Bollman

WA Use Only	Client ID/Description	Matrix	Date Collected	Refrigerator#	#Type Container	Volume	Preservative	ANALYSES REQUESTED	Attn: Gm. Size (cont. Gov. Perm)	Sp. Ver. CEC
1000	REW-5D-SS4	S			1/6	500		TDC		
2	REW-3D-SS5			X					X	
3	REW-5D-SS4			X					X	
4	REW-2-SS11			X					X	
5	REW-B7-SS15			X					X	
6	REW-5D-SS7			X					X	
7	REW-5D-SS15			X					X	
8	REW-15-SS8 (2 jars)			X					X	
9	REW-9D-SS3			X					X	
10	REW-7D-SS8 (3 jars)			X					X	
11	REW-6D-SS9			X					X	
12	REW-3D-SS13			X					X	
13	REW-3D-SS6			X					X	
14	REW-2-SS13			X					X	
15	REW-10D-SS7			X					X	

Matrix: W - Water DS - Drum Solids X - Other
 S - Soil O - Oil DL - Drum Liquids
 SE - Sediment A - Air F - Fish
 SO - Solid WI - Wipe L - EP/CLP Leachate

Special Instructions: ① RFW-7D-SS8 Grain Size Analysis
 Combine 2 jars provided, a third jar is provided for CEC analysis ② For CEC, use method SW846 9.806

Item/Reason	Relinquished by	Date	Time	Item/Reason	Relinquished by	Date	Time
1000	John Rhynar	4/15/91	1000				
Shipping	John Rhynar						

Notes: 1. Received Broken/Leaking (Improperly Sealed) Y (N) NOTES: 2. Properly Preserved Y (N) NOTES: 3. Received Within Holding Times Y (N) NOTES: 4. Present on Outer Package Y (N) 5. Present on Outer Package Y (N) 6. Present on Sample Y (N) 7. Unbroken on Sample Y (N) NOTES: 8. Present Upon Receipt of Samples Y (N) 9. Discrepancies Between Sample Labels and COC Record? Y (N) NOTES:

RFW 21-21-001/A-12/88

unless this is different than method used for CEC for previous shipment, if so, hold until further notice ③ RFW specific gravity analyses for all barrels, but not for it.

7-115

7104X001

Custody Transfer Record/Lab Work Request



WESTON Analytica Use Only

9107 2177411

Town of Clarkstown

3028-10-01

Work Order

Date Rec'd.

John Ryan George Suther

Client Contact

Client Contact/Phone

Lab ID

Client ID/Description

WA Use Only

Matrix

Date Collected

ANALYSES REQUESTED

After Grain Mon. Spec. Vrt. Size Out. Grain Perm

Refrigerator#

#Type Container

Volume

Preservative

Special Instructions: 0.1ur RFW 8D-SS4 and RFW 9D-SS4 Grain Size Analysis combine jars

W - Water DS - Drum Solids X - Other

O - Oil DL - Drum Liquids

SE - Sediment A - Air F - Fish

SO - Solid W - Wipe L - EPTCLP Leachate

Relinquished by

Received by

Date

Time

Item/Reason

Relinquished by

Received by

Date

Time

WESTON Analytica Use Only

Samples Were:

1 Shipped or Hand-Delivered

NOTES:

2 Ambient or Chilled

NOTES:

3 Received Broken/Leaking (Improperly Sealed)

Y N

NOTES:

4 Properly Preserved

Y N

NOTES:

5 Received Within Holding Times

Y N

NOTES:

COC Tape Was:

1 Present on Outer Package Y N

2 Unbroken on Outer Package Y N

3 Present on Sample Y N

4 Unbroken on Sample Y N

NOTES:

COC Record Was:

1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record?

Y N

NOTES:

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

ASTM D 2974-87 MOISTURE, ASH, AND ORGANIC MATTER OF ORGANIC SOILS

PROJECT	CLARKSTOWN	DRYING OVEN	VWR	PROJECT ANALYST	V.F.
JOB NO.	9012X001	ASHING FURNACE	Thermalynx	QA/QC ANALYST	RWF
W. O. NO.	3226-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	12/18/90

Sample No.	Client Sample I.D.	Ashing Temperature Degrees C	Percent Dry Basis(1)			Percent Wet Basis(2)		
			Moisture Content	Ash Content	Organic Fraction	Moisture Content	Ash Content	Organic Fraction
001	RFW-6D-SH1	440	138.1	76.6	23.4	58.0	32.2	9.8
002	RFW-6S-SH1	440	39.7	96.8	3.2	28.4	69.3	2.3
003	RFW-7B-SH2	440	96.0	89.2	10.8	49.0	45.5	5.5
004	RFW-8D-SS9	440	354.2	27.7	72.3	78.0	6.1	15.9
005	RFW-8D-SS16	440	150.4	82.3	17.7	60.1	32.9	7.0
006	RFW-8D-SS17	440	174.6	79.9	20.1	63.6	29.1	7.3
007	RFW-8D-SS20	440	74.8	92.6	7.4	42.8	52.9	4.2
008	RFW-8D-SS21	440	45.3	97.9	2.1	31.2	67.4	1.4
009	RFW-8D-SS24	440	54.0	97.3	2.7	35.1	63.2	1.7
012	RFW-8D-SS27	440	35.8	98.7	1.3	26.4	72.7	1.0
013	RFW-8D-SH4	440	56.8	96.5	3.5	36.2	61.6	2.2
015	RFW-10S-SS5	440	710.5	8.4	91.6	87.7	1.0	11.3
016	RFW-10S-SS8	440	493.3	66.7	33.3	83.1	11.2	5.6
017	RFW-10S-SS10	440	52.9	97.5	2.5	34.6	63.8	1.6
018	RFW-10S-SS10	440	51.8	98.7	1.3	34.1	65.0	0.9
001	RFW-6D-SH1	750	138.1	74.8	25.2	58.0	31.4	10.6
002	RFW-6S-SH1	750	39.7	96.1	3.9	28.4	68.8	2.8
003	RFW-7B-SH2	750	96.0	88.9	11.1	49.0	45.3	5.7
004	RFW-8D-SS9	750	354.2	27.0	73.0	78.0	5.9	16.1
005	RFW-8D-SS16	750	150.4	81.9	18.1	60.1	32.7	7.2
006	RFW-8D-SS17	750	174.6	79.1	20.9	63.6	28.8	7.6
007	RFW-8D-SS20	750	74.8	91.9	8.1	42.8	52.6	4.6
008	RFW-8D-SS21	750	45.3	96.9	3.1	31.2	66.7	2.1
009	RFW-8D-SS24	750	54.0	94.4	5.6	35.1	61.3	3.6
012	RFW-8D-SS27	750	35.8	94.9	5.1	26.4	69.9	3.8
013	RFW-8D-SH4	750	56.8	96.0	4.0	36.2	61.3	2.5
015	RFW-10S-SS5	750	710.5	6.1	93.9	87.7	0.8	11.6
016	RFW-10S-SS8	750	493.3	65.8	34.2	83.1	11.1	5.8
017	RFW-10S-SS10	750	52.9	96.6	3.4	34.6	63.2	2.2
018	RFW-10S-SS10	750	51.8	94.8	5.4	34.1	62.3	3.5

NOTES

- (1) Calculated as percent of the dry soil weight
 (2) Calculated as percent of the wet soil weight (as received)

NATURAL MOISTURE CONTENT, TOTAL ORGANIC CONTENT, SPECIFIC GRAVITY, AND ATTERBERG'S LIMITS DETERMINATION							
PROJECT	CLARKSTOWN	PROJECT ANALYST		CRT, JDT	DATE COMPLETED	05/09/91	
JOB NUMBER	9104X001	QA/QC ANALYST		RWF			
W. O. NUMBER	3228-10-01	DATE RECEIVED		04/05/91			

Project Sample Number	ETL Sample Number	% Moisture (Dry Basis)	% Moisture (Wet Basis)	% Total Solids	% Total Organic Content @ 400C	% Total Organic Content @ 750C	Specific Gravity	Plastic Limit	Liquid Limit	Plasticity Index
RFW 5D SS4	001	538.1	84.3	15.7	76.64	77.74	---	---	---	---
RFW 3D SS5	002	317.7	76.1	23.9	56.56	59.68	---	---	---	---
RFW 2SS 11	004	39.0	28.0	72.0	0.90	4.67	---	26.90	32.25	5.35
RFW B7 SS15	005	40.8	26.9	71.1	0.92	6.55	2.74	---	---	---
RFW 5D SS7	006	47.2	32.0	68.0	1.41	7.18	---	---	---	---
RFW 5D SS5	021	44.1	30.8	69.4	---	---	---	23.74	29.00	5.26

NOTES

***Plastic and liquid limit determinations could not be performed due to insufficient sample quantity.

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW-8D-SS9	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9012X001	ETL SAMPLE NUMBER	004	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	01/11/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	100.0	
3/8"	9.500	100.0	
#4	4.750	98.5	
#10	2.000	74.7	
#20	0.850	48.1	
#50	0.300	24.8	
#100	0.150	16.9	
#200	0.075	14.0	
HYDROMETER	0.0518	9.4	
	0.0367	9.4	
	0.0259	9.4	
	0.0184	7.4	
	0.0135	5.4	
	0.0096	5.4	
	0.0068	5.4	
	0.0048	5.4	
	0.0034	3.4	
	0.0024	3.4	
	0.0014	3.4	
	0.0010	3.4	

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	1.363	
30	0.423	
10	NA	
Uniformity Coefficient	Gradation	Coefficient
NA	NA	

SPECIFIC GRAVITY
2.58

MOISTURE CONTENT	
% dry basis	% wet basis
354.2	78.0

ORGANIC CONTENT	
% dry basis	% wet basis
72.3	15.9

SOIL DESCRIPTION
black brown silty or clayey highly organic material with particle size of sands and only 14% silt or clay
Unified Soil Classification System (USCS)
Group Symbol
SM or SC

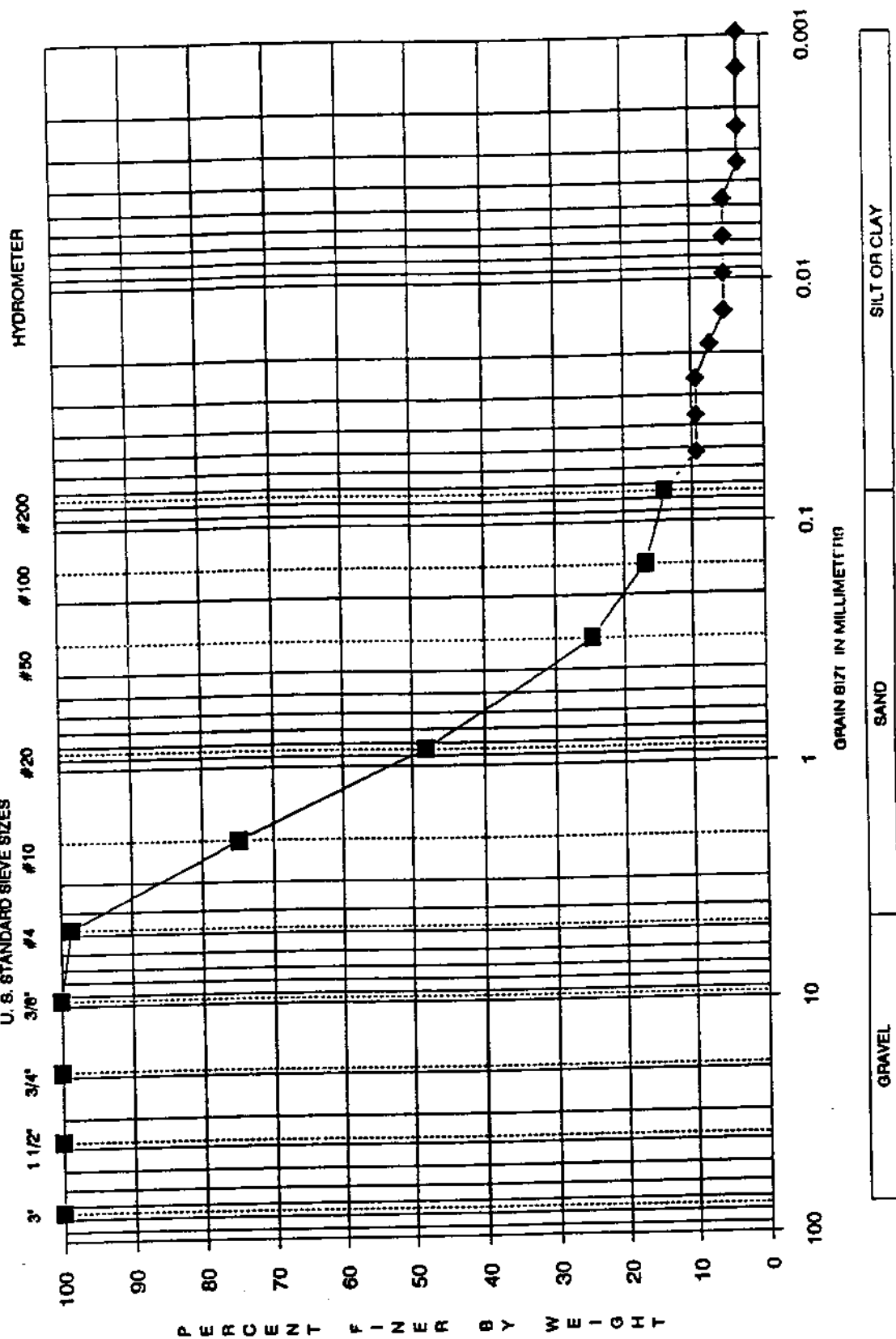
INDEX PROPERTIES		
% moisture dry basis		
Plastic Limit	Liquid Limit	Plasticity Index
not analyzed-insufficient sample		

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW-8D-SS9, ETL SAMPLE # 9012X001-004



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS					
PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW-8D-SS17	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9012X001	ETL SAMPLE NUMBER	006	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	01/12/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	100.0	
3/8"	9.500	100.0	
#4	4.750	100.0	
#10	2.000	98.8	
#20	0.850	95.9	
#50	0.300	92.9	
#100	0.150	89.7	
#200	0.075	86.3	
HYDROMETER	0.0379	82.1	
	0.0271	80.4	
	0.0196	77.2	
	0.0142	74.0	
	0.0106	67.5	
	0.0080	57.8	
	0.0060	46.5	
	0.0044	37.2	
	0.0032	29.5	
	0.0021	23.8	
	0.0013	18.9	
	0.0009	15.7	

EFFECTIVE SIZES	
% Finer	Diameter mm
60	NA
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

SOIL DESCRIPTION	
black brown sandy organic silt of high plasticity with 14% sand	
Unified Soil Classification System (USCS)	
Group Symbol	OH

SPECIFIC GRAVITY	
2.56	

INDEX PROPERTIES			
% moisture dry basis			
Plastic Limit	Liquid Limit	Plasticity Index	
108.3	121.8		13.5

MOISTURE CONTENT	
% dry basis	% wet basis
174.6	63.6

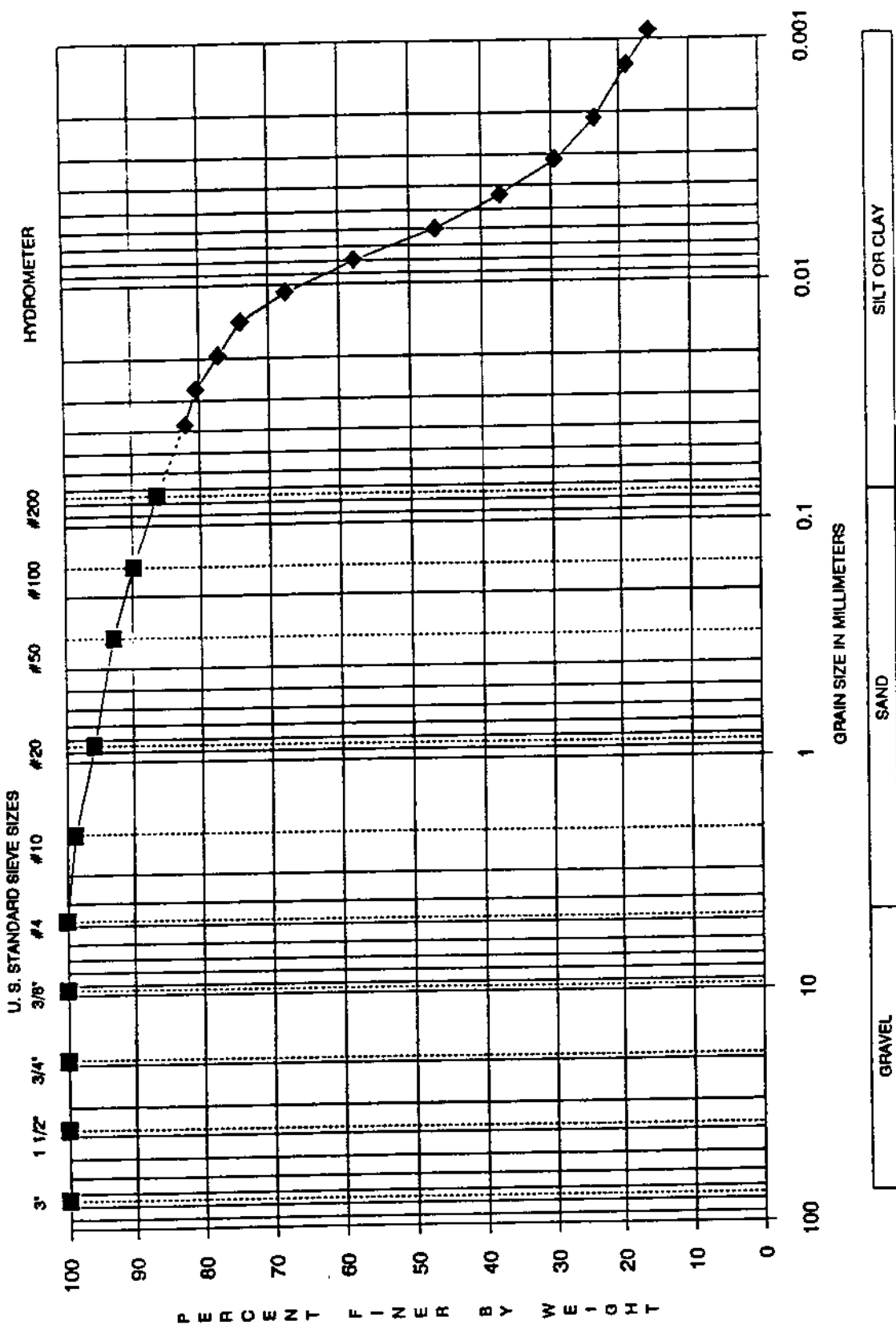
ORGANIC CONTENT	
% dry basis	% wet basis
20.1	7.3

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW-80-SS17, ETL SAMPLE # 9012X001-006



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW-8D-S520	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9012X001	ETL SAMPLE NUMBER	007	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	01/12/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	100.0
#4	4.750	100.0
#10	2.000	99.7
#20	0.850	98.5
#50	0.300	96.6
#100	0.150	95.3
#200	0.075	92.9
HYDROMETER	0.0318	82.3
	0.0238	76.9
	0.0181	68.8
	0.0115	56.6
	0.0106	52.5
	0.0079	44.4
	0.0058	36.2
	0.0043	28.5
	0.0031	22.0
	0.0021	15.9
	0.0013	11.8
	0.0009	7.7

EFFECTIVE SIZES	
% Finer	Diameter mm
60	NA
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

SPECIFIC GRAVITY
2.71

MOISTURE CONTENT	
% dry basis	% wet basis
74.8	42.8

ORGANIC CONTENT	
% dry basis	% wet basis
7.4	4.2

SOIL DESCRIPTION
light grey sandy (slightly organic) silt of high plasticity with 7% sand
Unified Soil Classification System (USCS)
Group Symbol
MH/OH

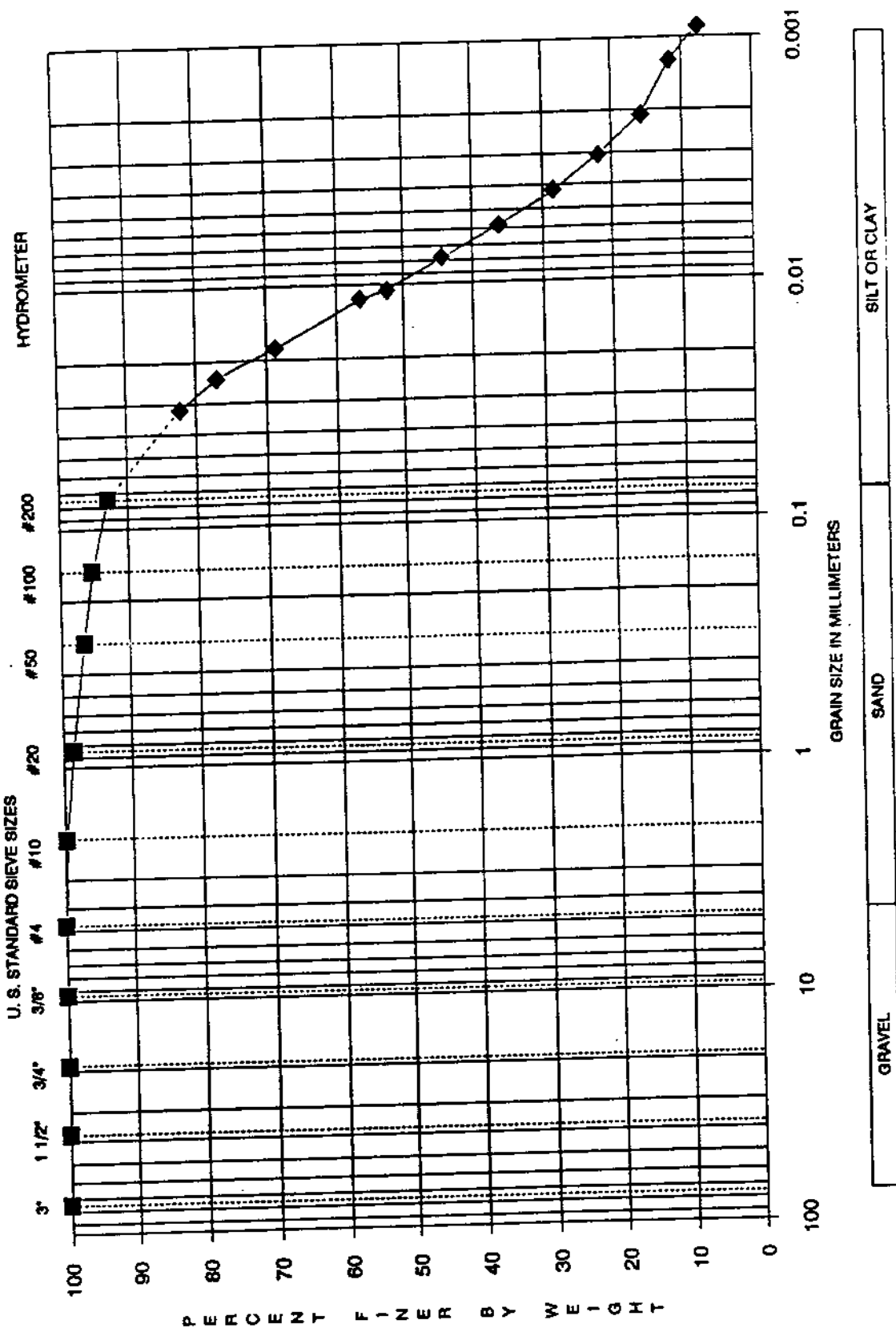
INDEX PROPERTIES		
% moisture dry basis		
Plastic Limit	Liquid Limit	Plasticity Index
51.4	52.1	0.8

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW-8D-SS20, ETL SAMPLE # 9012X001-007



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW-8D-SS21	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9012X001	ETL SAMPLE NUMBER	008	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	08/06/90

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	100.0
#4	4.750	100.0
#10	2.000	99.7
#20	0.850	99.6
#50	0.300	99.0
#100	0.150	98.7
#200	0.075	98.0
HYDROMETER	0.0282	84.1
	0.0214	79.1
	0.0159	75.4
	0.0120	69.2
	0.0092	64.2
	0.0070	56.8
	0.0052	50.6
	0.0038	44.7
	0.0028	35.0
	0.0020	29.4
	0.0012	23.2
	0.0009	19.5

EFFECTIVE SIZES	
% Finer	Diameter mm
60	NA
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

SPECIFIC GRAVITY
2.72

MOISTURE CONTENT	
% dry basis	% wet basis
45.3	31.2

ORGANIC CONTENT	
% dry basis	% wet basis
2.1	1.4

SOIL DESCRIPTION
brown sandy silt of low plasticity with 2% sand
Unified Soil Classification System (USCS) Group Symbol ML

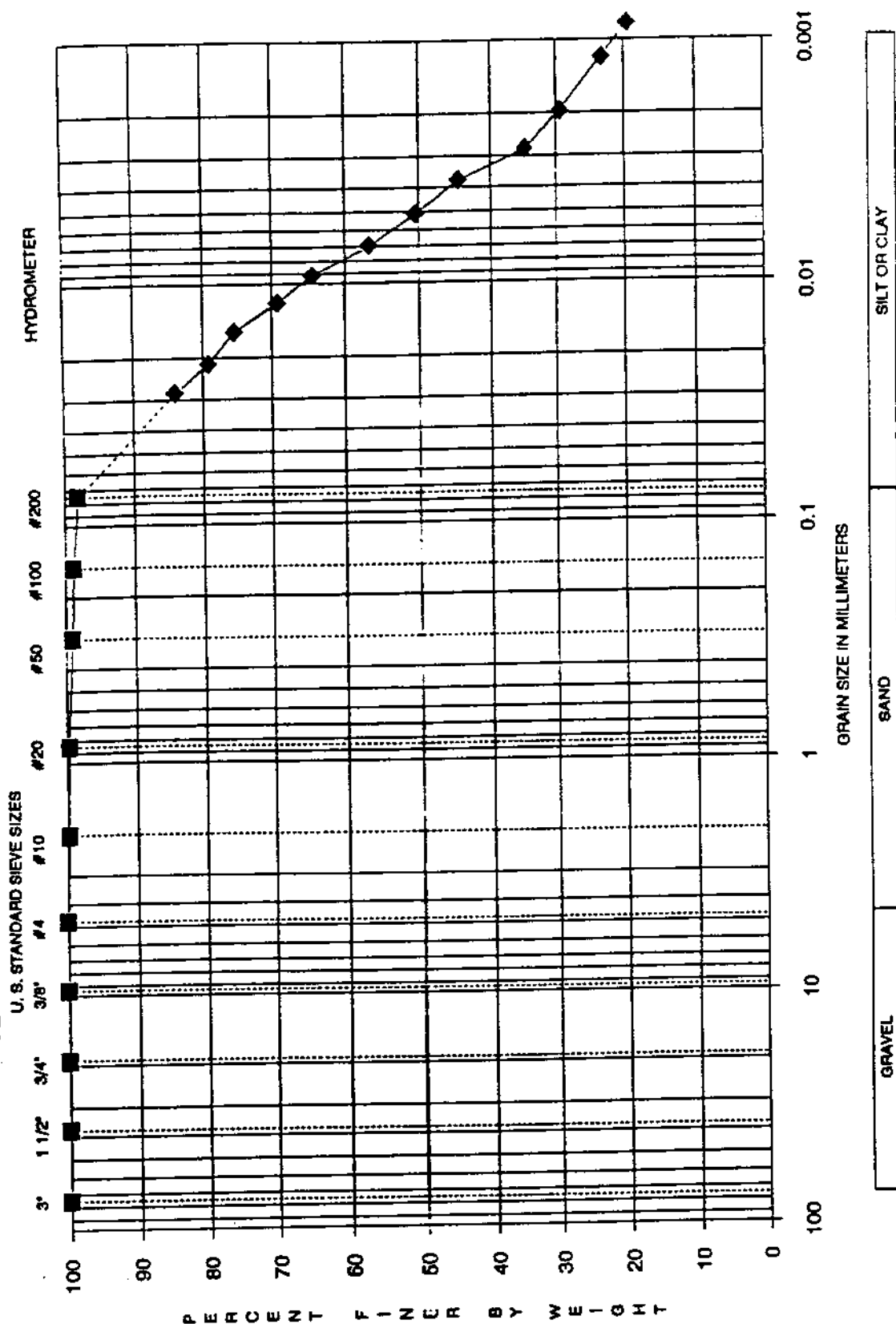
INDEX PROPERTIES		
% moisture dry basis		
Plastic Limit	Liquid Limit	Plasticity Index
32.8	33.9	1.1

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW-8D-SS21, ETL SAMPLE # 9012X001-008



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS					
PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW-8D-SS25	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9012X001	ETL SAMPLE NUMBER	010	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	01/12/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	100.0	
3/8"	9.500	100.0	
#4	4.750	100.0	
#10	2.000	100.0	
#20	0.850	100.0	
#50	0.300	99.8	
#100	0.150	99.5	
#200	0.075	99.0	
HYDROMETER	0.0287	97.6	
	0.0209	94.5	
	0.0152	91.5	
	0.0114	85.3	
	0.0087	79.2	
	0.0065	71.5	
	0.0050	57.8	
	0.0037	50.1	
	0.0027	40.9	
	0.0020	31.7	
	0.0012	24.1	
	0.0009	13.3	

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	NA	
30	NA	
10	NA	
Uniformity Coefficient	Gradation Coefficient	
NA	NA	

SPECIFIC GRAVITY	
2.79	

MOISTURE CONTENT	
% dry basis	% wet basis
39.7	28.4

SOIL DESCRIPTION	
light brown sandy silt of low plasticity with 1% sand	
Unified Soil Classification System (USCS)	
Group Symbol	ML

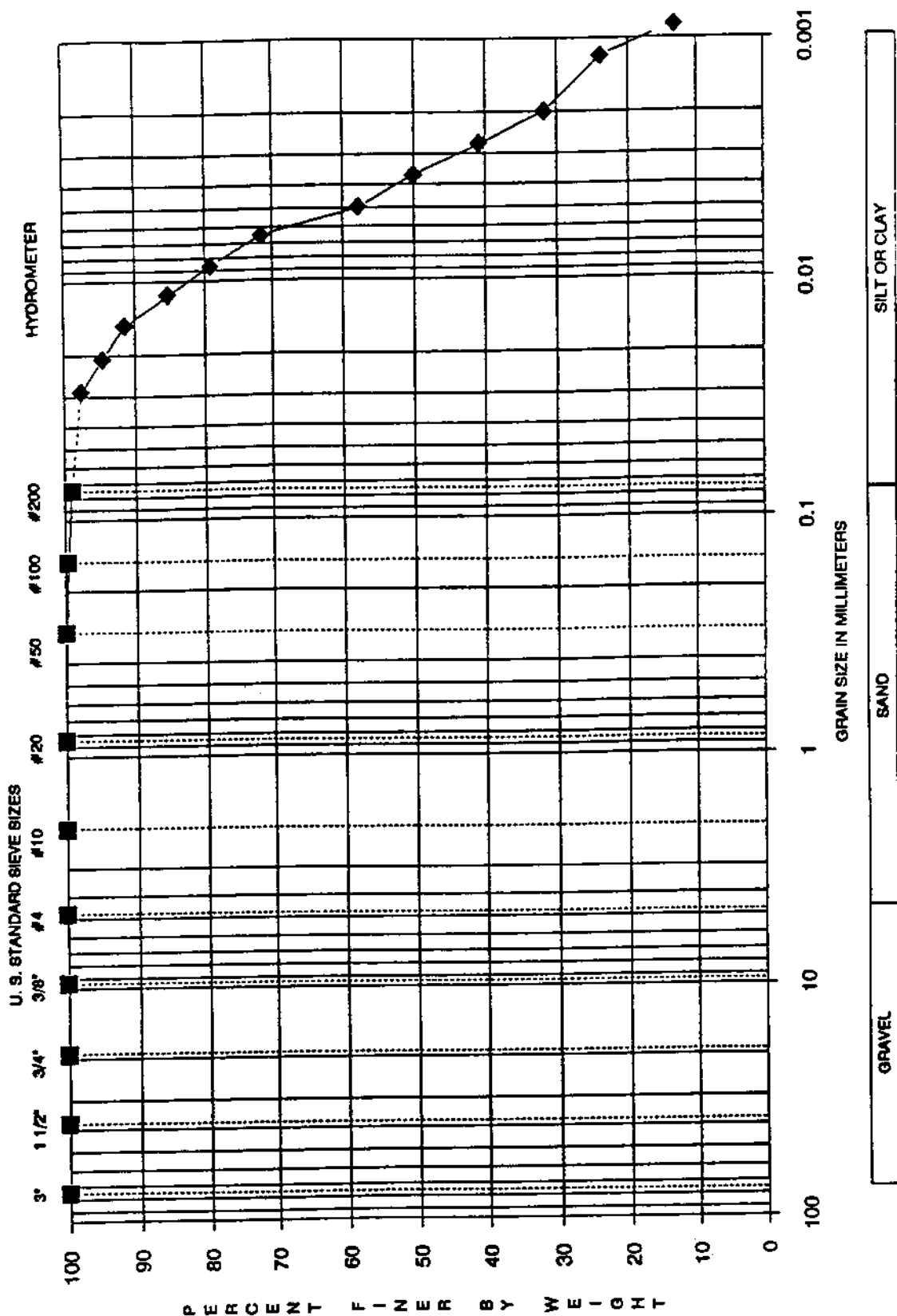
INDEX PROPERTIES			
% moisture dry basis			
Plastic Limit	Liquid Limit	Plasticity Index	
26.0	34.7	8.7	

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR CLARKSTOWN PROJECT SAMPLE RFW-8D-SS25, ETL SAMPLE # 9012X001-010



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 5D SH4	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	003	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	100.0
#4	4.750	99.8
#10	2.000	99.7
#20	0.850	99.5
#50	0.300	99.2
#100	0.150	98.7
#200	0.075	97.4
HYDROMETER	0.0322	100.3
	0.0231	98.6
	0.0163	98.6
	0.0117	97.0
	0.0088	93.7
	0.0063	90.4
	0.0047	83.8
	0.0034	77.7
	0.0026	68.9
	0.0019	60.6
	0.0012	49.1
	0.0008	44.1

EFFECTIVE SIZES	
% Finer	Diameter mm
60	NA
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE	
CONTENT, % dry basis	
65.3	

SPECIFIC GRAVITY	
(estimated)	
2.65	

SOIL DESCRIPTION	
light brown sandy gravelly silt or clay with 3% sand and <1% gravel	
Unified Soil Classification System (USCS)	
Group Symbol	ML, CL, MH, or CH

% TOTAL ORGANIC CONTENT (at 440°C)	
2.15	

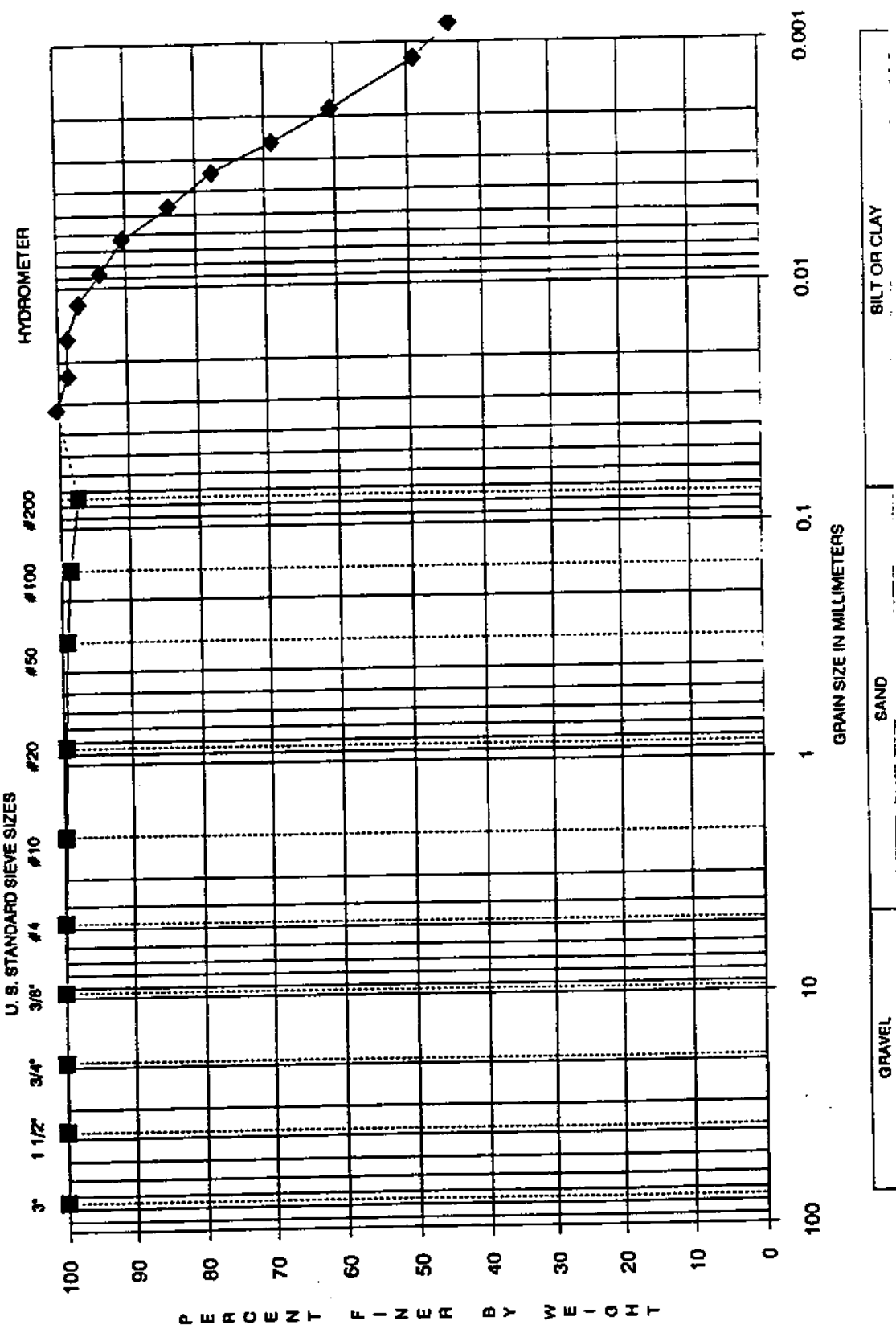
% TOTAL ORGANIC CONTENT (at 750°C)	
4.97	

NOTES

NA=NOT APPLICABLE
Specific gravity is estimated.

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 5D SH4, ETL SAMPLE # 9104X001-003



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 15 SS8	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	008	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	89.2
3/8"	9.500	80.8
#4	4.750	78.2
#10	2.000	74.1
#20	0.850	69.9
#50	0.300	58.2
#100	0.150	40.6
#200	0.075	23.9
HYDROMETER	0.0432	20.7
	0.0310	19.2
	0.0222	17.6
	0.0160	15.3
	0.0118	14.5
	0.0084	12.9
	0.0060	11.4
	0.0043	9.3
	0.0031	7.5
	0.0022	6.0
	0.0013	5.2
	0.0009	5.2

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	0.383	
30	0.102	
10	NA	
Uniformity Coefficient	Gradation Coefficient	
NA	NA	

NATURAL MOISTURE CONTENT, % dry basis
13.4

SPECIFIC GRAVITY
2.77

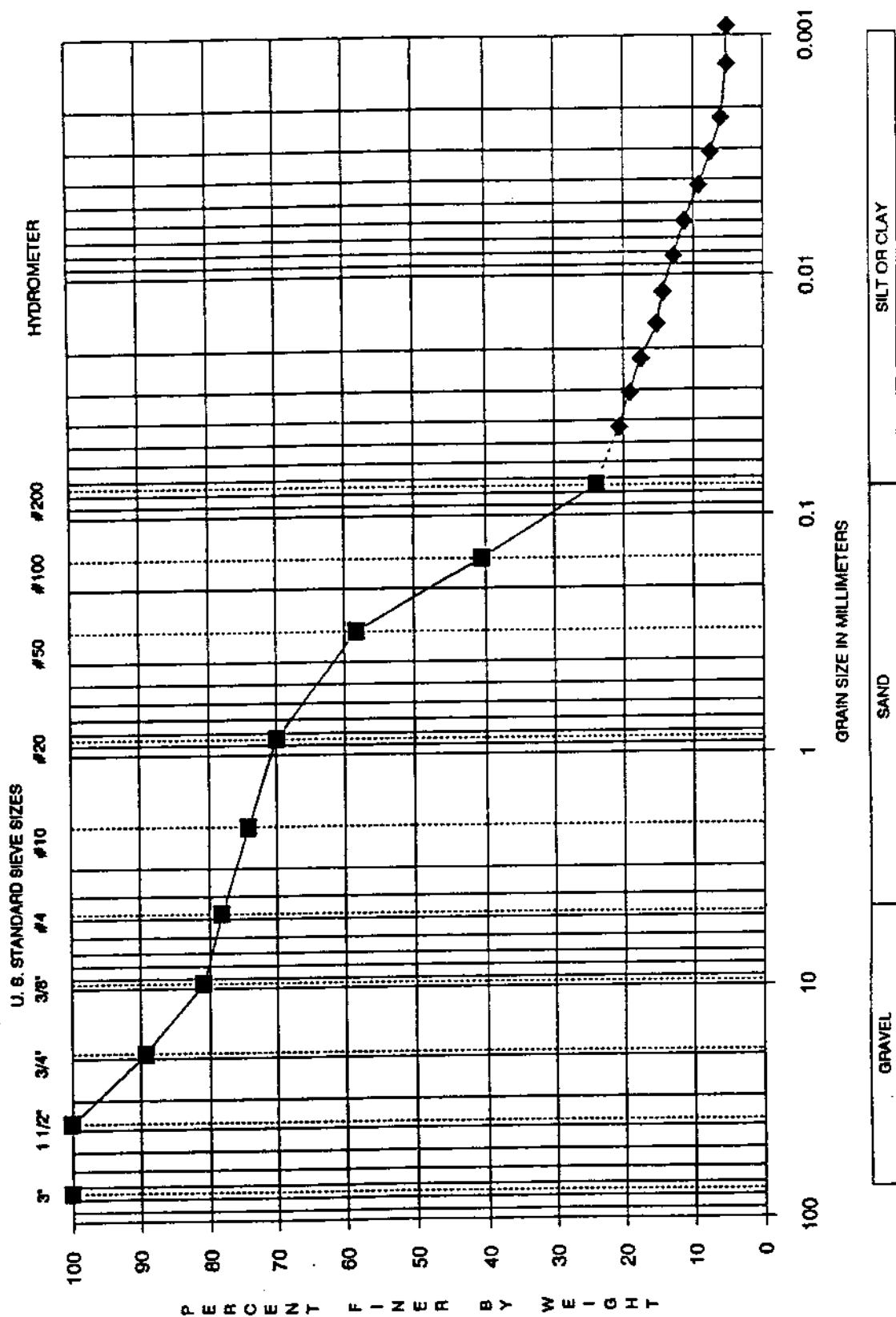
SOIL DESCRIPTION
brown gravelly silty or clayey sand with 22% gravel and 24% silt or clay
Unified Soil Classification System (USCS) Group Symbol SM or SC

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 15 SS8, ETL SAMPLE # 9104X001-008



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS					
PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 7D SS8	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	010	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	66.8
3/8"	9.500	58.4
#4	4.750	57.0
#10	2.000	54.1
#20	0.850	50.8
#50	0.300	42.0
#100	0.150	38.7
#200	0.075	34.5

EFFECTIVE SIZES	
% Finer	Diameter mm
60	11.293
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE CONTENT, % dry basis
15.1

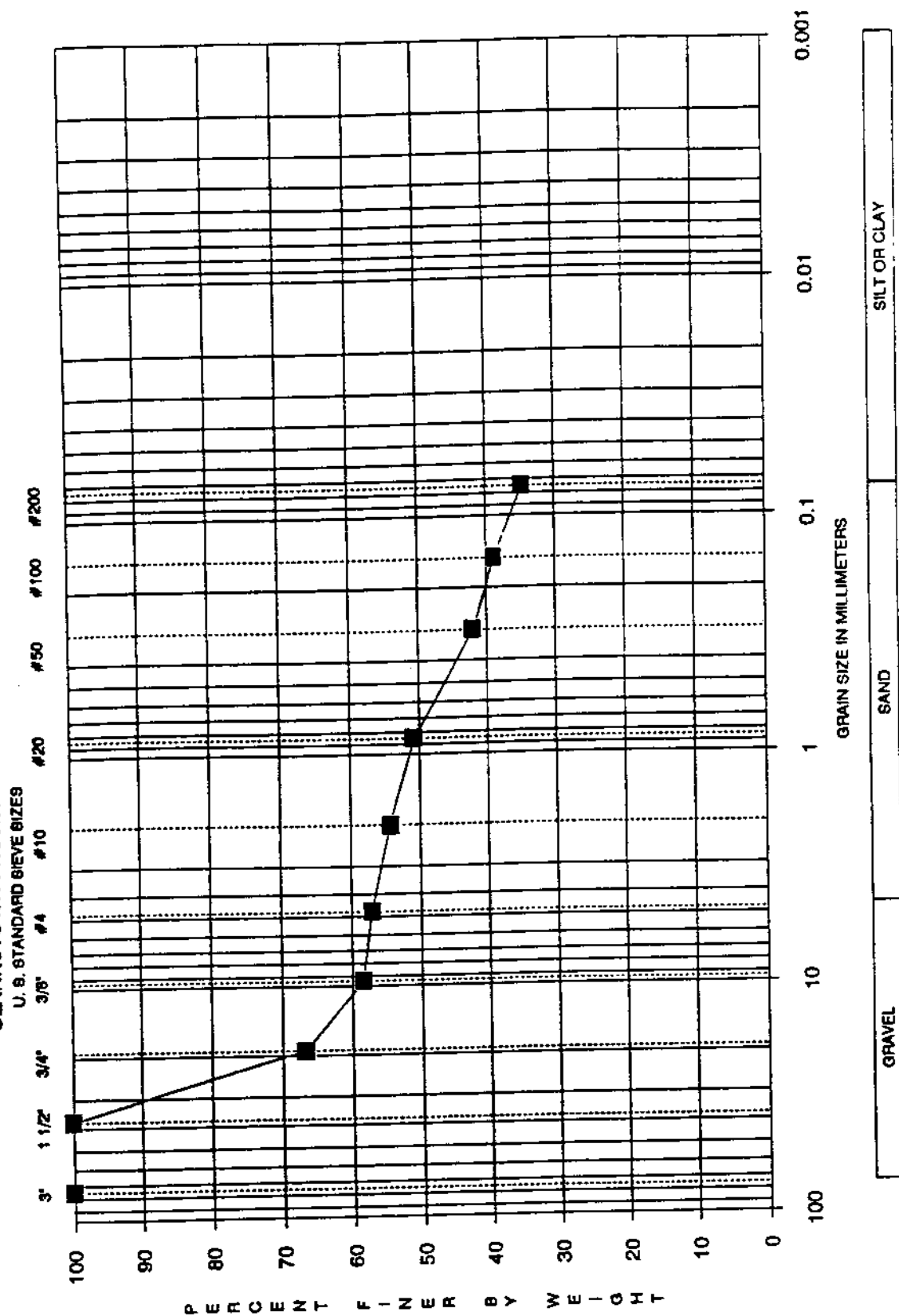
SOIL DESCRIPTION
multi-colored silty or clayey and sandy gravel with 35% silt or clay and 22% sand
Unified Soil Classification System (USCS) Group Symbol
GM or GC

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 7D SS8, ETL SAMPLE # 9104X001-010



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 6D SS9	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	011	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	100.0	
3/8"	9.500	100.0	
#4	4.750	99.5	
#10	2.000	98.3	
#20	0.850	96.2	
#50	0.300	93.3	
#100	0.150	89.1	
#200	0.075	80.0	
HYDROMETER	0.0343	71.3	
	0.0257	64.9	
	0.0191	58.5	
	0.0143	50.8	
	0.0108	45.7	
	0.0079	40.6	
	0.0057	35.5	
	0.0042	29.4	
	0.0030	25.2	
	0.0022	22.7	
	0.0013	20.1	
	0.0009	17.5	

EFFECTIVE SIZES	
% Finer	Diameter mm
60	NA
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE CONTENT, % dry basis
12.4

SPECIFIC GRAVITY (estimated)
2.65

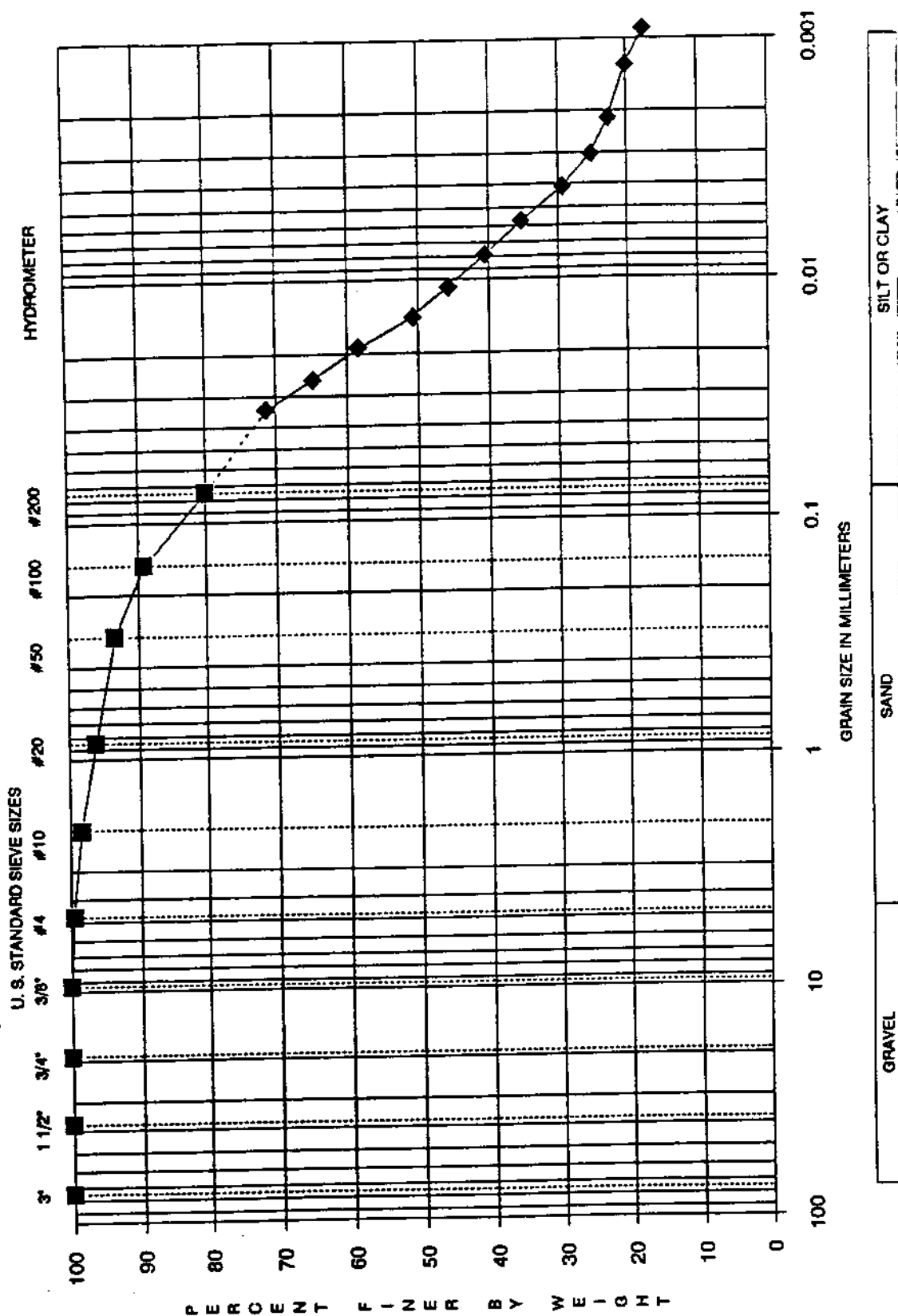
SOIL DESCRIPTION
red-brown sandy gravelly silt or clay with 20% sand and <1% gravel
Unified Soil Classification System (USCS) Group Symbol
ML, CL, MH, or CH

NOTES

NA=NOT APPLICABLE
Specific gravity is estimated.

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 6D SS9, ETL SAMPLE # 9104X001-011



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 3D SS13	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	012	QA/QC ANALYST	RWF
W.O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	95.4
#4	4.750	92.7
#10	2.000	87.2
#20	0.850	82.8
#50	0.300	75.4
#100	0.150	65.5
#200	0.075	49.9
HYDROMETER	0.0345	41.9
	0.0260	37.1
	0.0187	35.5
	0.0140	30.7
	0.0104	29.2
	0.0076	25.2
	0.0055	23.6
	0.0040	19.6
	0.0029	17.2
	0.0021	14.9
	0.0013	12.5
	0.0009	11.7

EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.123
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE CONTENT, % dry basis
8.2

SPECIFIC GRAVITY
2.75

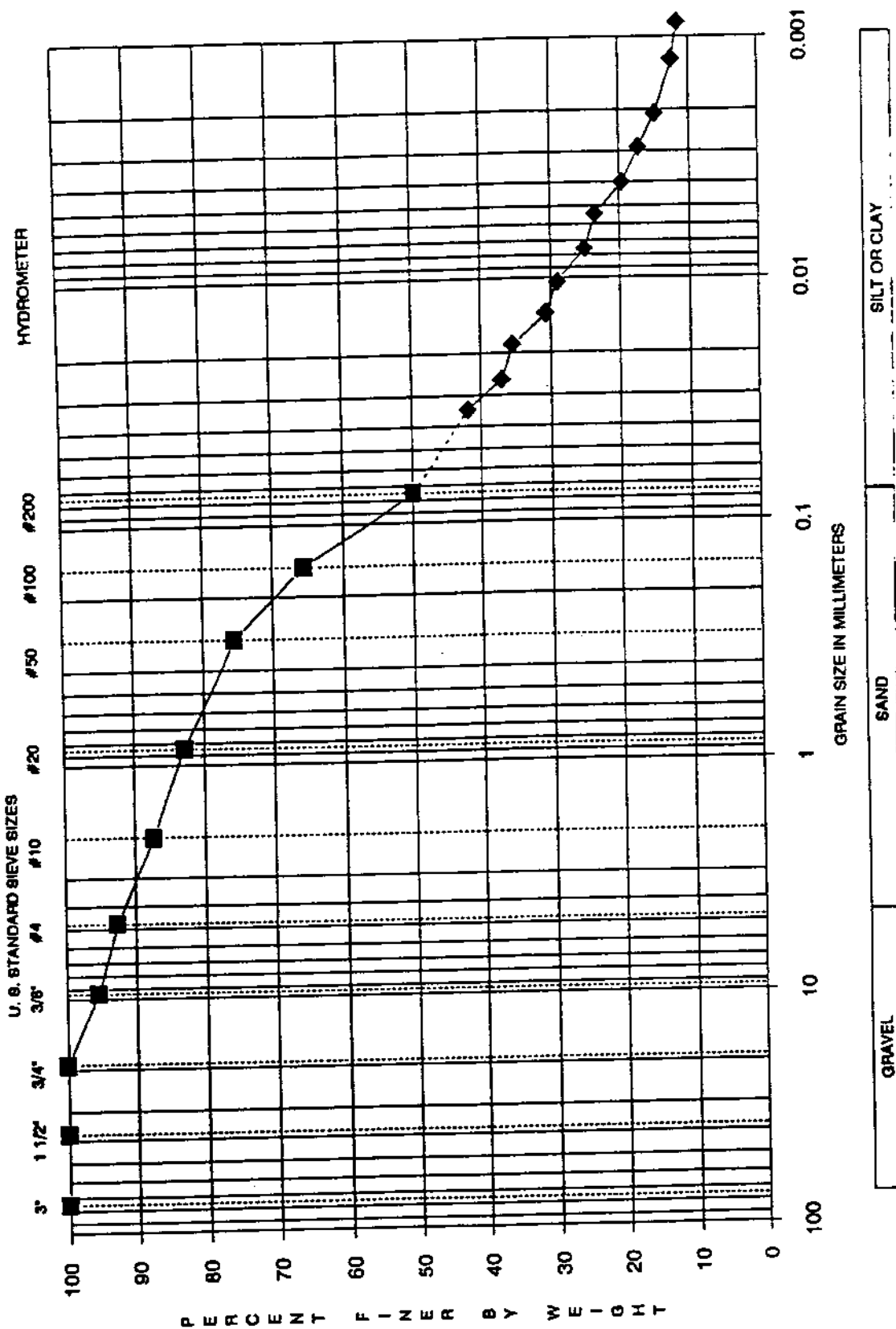
SOIL DESCRIPTION
red-brown sandy gravelly silt or clay with 43% sand and 7% gravel
Unified Soil Classification System (USCS) Group Symbol ML, CL, MH, or CH

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR CLARKSTOWN PROJECT SAMPLE RFW 3D SS13, ETL SAMPLE # 9104X001-012



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS					
PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 9D SS6	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	013	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	18.00	100.0	
3/8"	9.500	86.7	
#4	4.750	66.9	
#10	2.000	49.9	
#20	0.850	39.0	
#50	0.300	30.3	
#100	0.150	26.3	
#200	0.075	23.8	
HYDROMETER	0.0425	24.5	
	0.0307	22.3	
	0.0219	21.6	
	0.0157	20.1	
	0.0117	18.0	
	0.0084	16.5	
	0.0061	14.3	
	0.0043	12.9	
	0.0031	11.4	
	0.0022	10.0	
	0.0013	6.5	
	0.0009	7.8	

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	3.637	
30	0.289	
10	NA	
Uniformity Coefficient	Gradation	
NA	Coefficient	
	NA	

NATURAL MOISTURE CONTENT, % dry basis
6.0

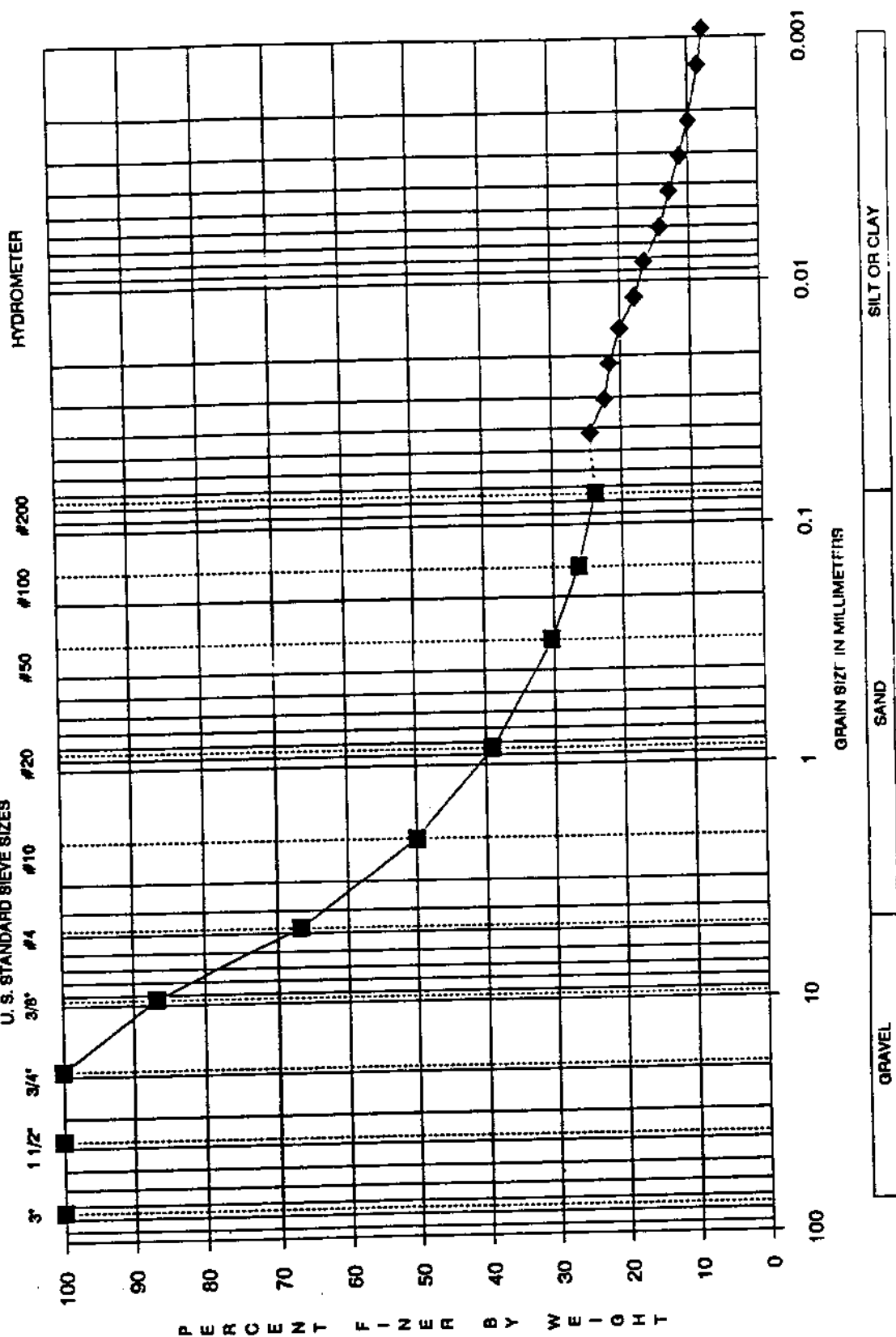
SPECIFIC GRAVITY (estimated)
2.65

SOIL DESCRIPTION
red-brown gravelly silty or clayey sand with 24% silt or clay and 33% gravel
Unified Soil Classification System (USCS)
Group Symbol
SM or SC

NOTES
NA=NOT APPLICABLE Specific gravity is estimated.

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 9D SS8, ETL SAMPLE # 9104X001-013
U. S. STANDARD SIEVE SIZES



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 2 SS13	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	014	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	94.5
3/8"	9.500	67.5
#4	4.750	57.4
#10	2.000	47.4
#20	0.850	38.9
#50	0.300	25.6
#100	0.150	15.8
#200	0.075	9.8

EFFECTIVE SIZES	
% Finer	Diameter mm
60	5.961
30	0.482
10	0.078
Uniformity Coefficient	Gradation Coefficient
76.6	0.5

NATURAL MOISTURE CONTENT, % dry basis
8.9

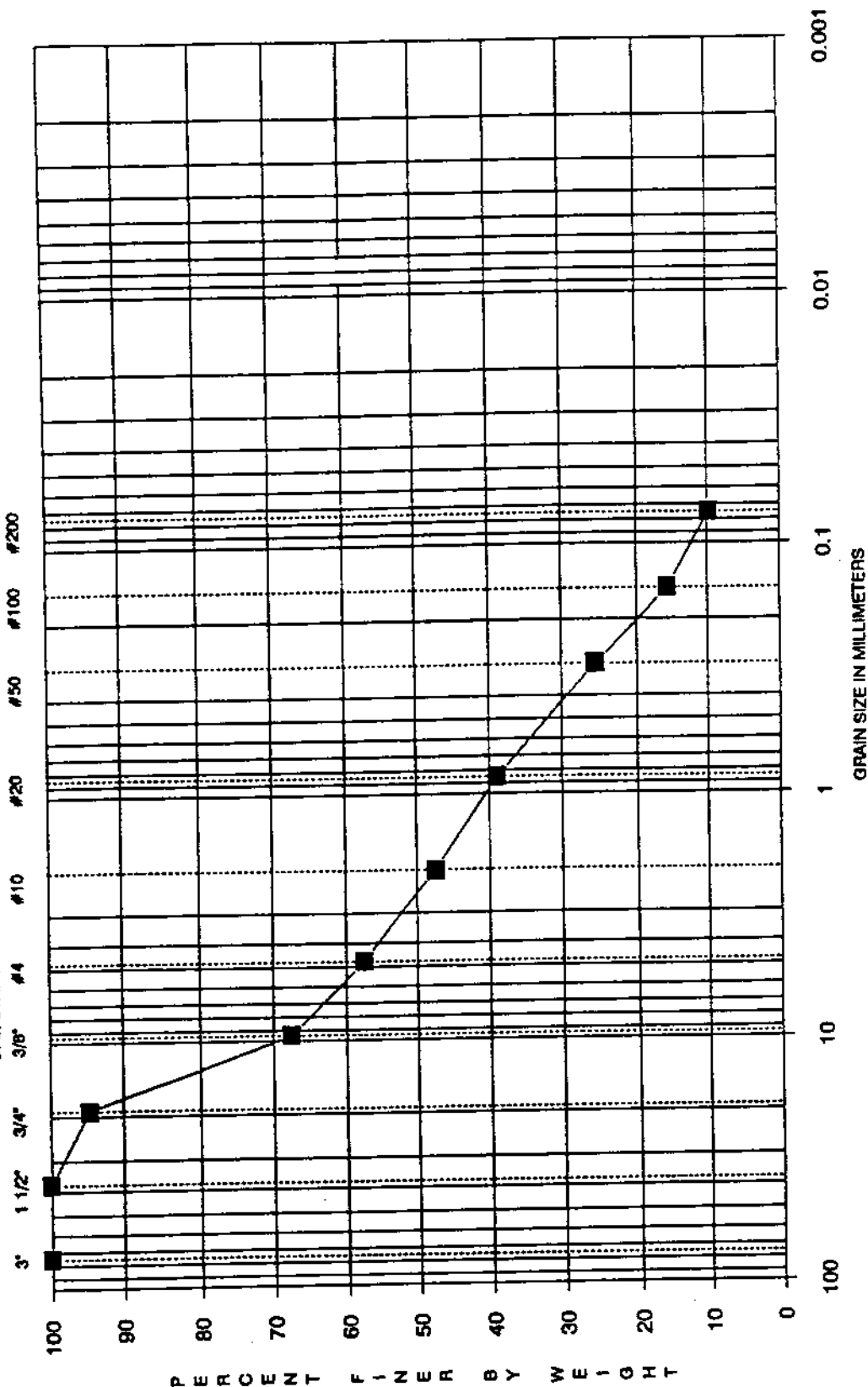
SOIL DESCRIPTION
multi-colored poorly graded gravelly and silty or clayey sand with 43% gravel and 10% silt or clay
Unified Soil Classification System (USCS) Group Symbol
SP/SM or SP/SC

NOTES

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 2 SS13, ETL SAMPLE # 9104X001-014

U. S. STANDARD SIEVE SIZES



GRAVEL SAND SILT OR CLAY

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 10D SS7	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	015	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	84.7	
3/8"	9.500	76.0	
#4	4.750	69.8	
#10	2.000	63.3	
#20	0.850	57.3	
#50	0.300	49.4	
#100	0.150	43.2	
#200	0.075	33.9	
HYDROMETER	0.0397	28.8	
	0.0292	25.1	
	0.0216	20.8	
	0.0159	17.2	
	0.0119	14.3	
	0.0086	12.1	
	0.0062	9.9	
	0.0044	8.5	
	0.0031	7.8	
	0.0022	6.3	
	0.0013	5.6	
	0.0009	4.9	

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	1.367	
30	NA	
10	NA	
Uniformity Coefficient	Gradation Coefficient	
NA	NA	

NATURAL MOISTURE CONTENT, % dry basis
7.7

SPECIFIC GRAVITY
2.71

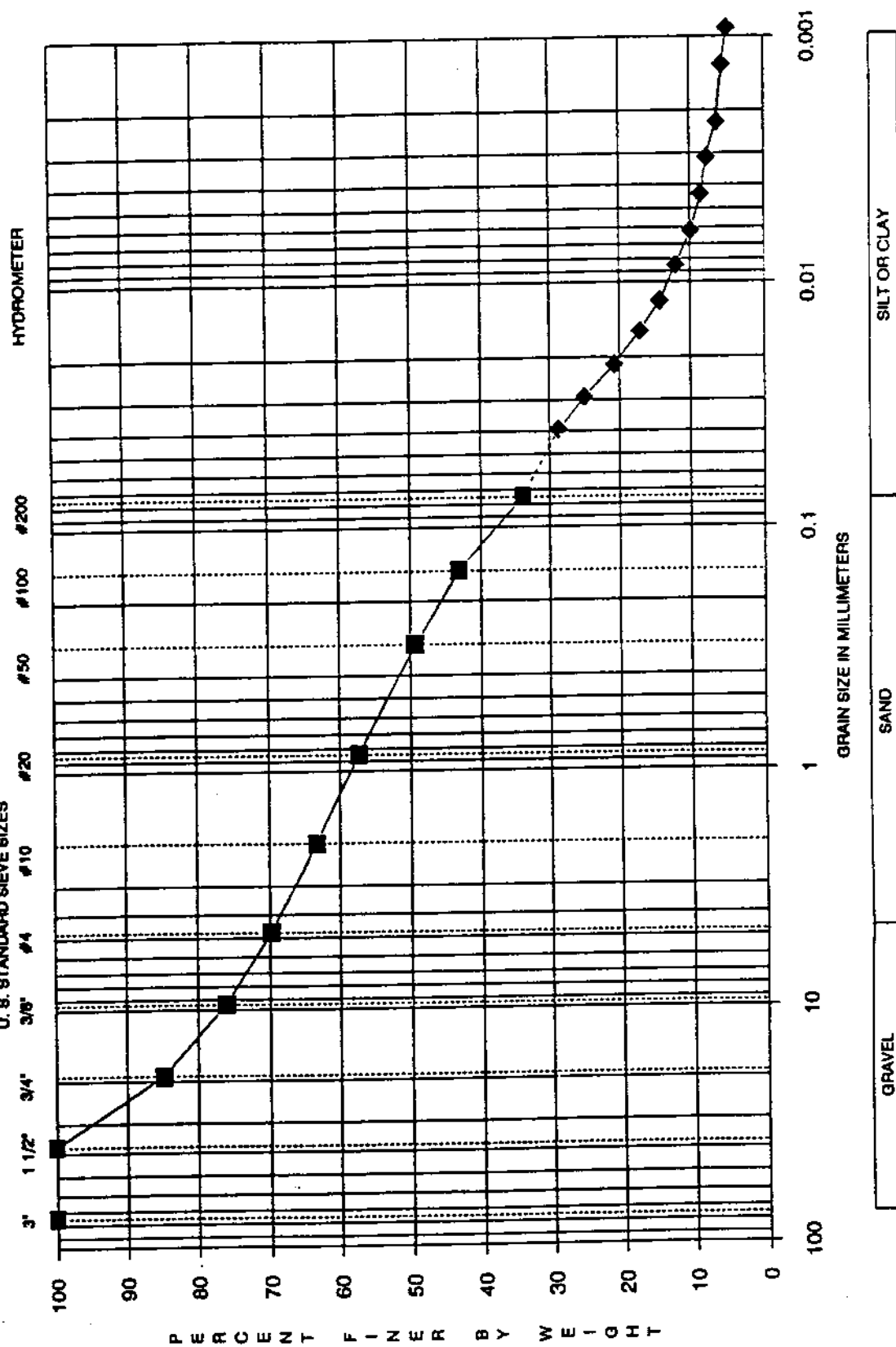
SOIL DESCRIPTION
brown gravelly silty or clayey sand with 30% gravel and 34% silt or clay
Unified Soil Classification System (USCS) Group Symbol SM or SC

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 10D SS7, ETL SAMPLE # 9104X001-015



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 5D SS16	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	016	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	100.0	
3/8"	9.500	100.0	
#4	4.750	100.0	
#10	2.000	99.9	
#20	0.850	99.7	
#50	0.300	97.1	
#100	0.150	61.2	
#200	0.075	16.9	
HYDROMETER	0.0478	12.2	
	0.0342	10.6	
	0.0246	8.1	
	0.0176	6.4	
	0.0129	6.4	
	0.0092	4.7	
	0.0065	4.7	
	0.0046	3.9	
	0.0033	3.9	
	0.0023	3.9	
	0.0013	3.9	
	0.0009	3.1	

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	0.148	
30	0.097	
10	NA	
Uniformity Coefficient	Gradation Coefficient	
NA	NA	

NATURAL MOISTURE CONTENT, % dry basis
22.1

SPECIFIC GRAVITY
2.69

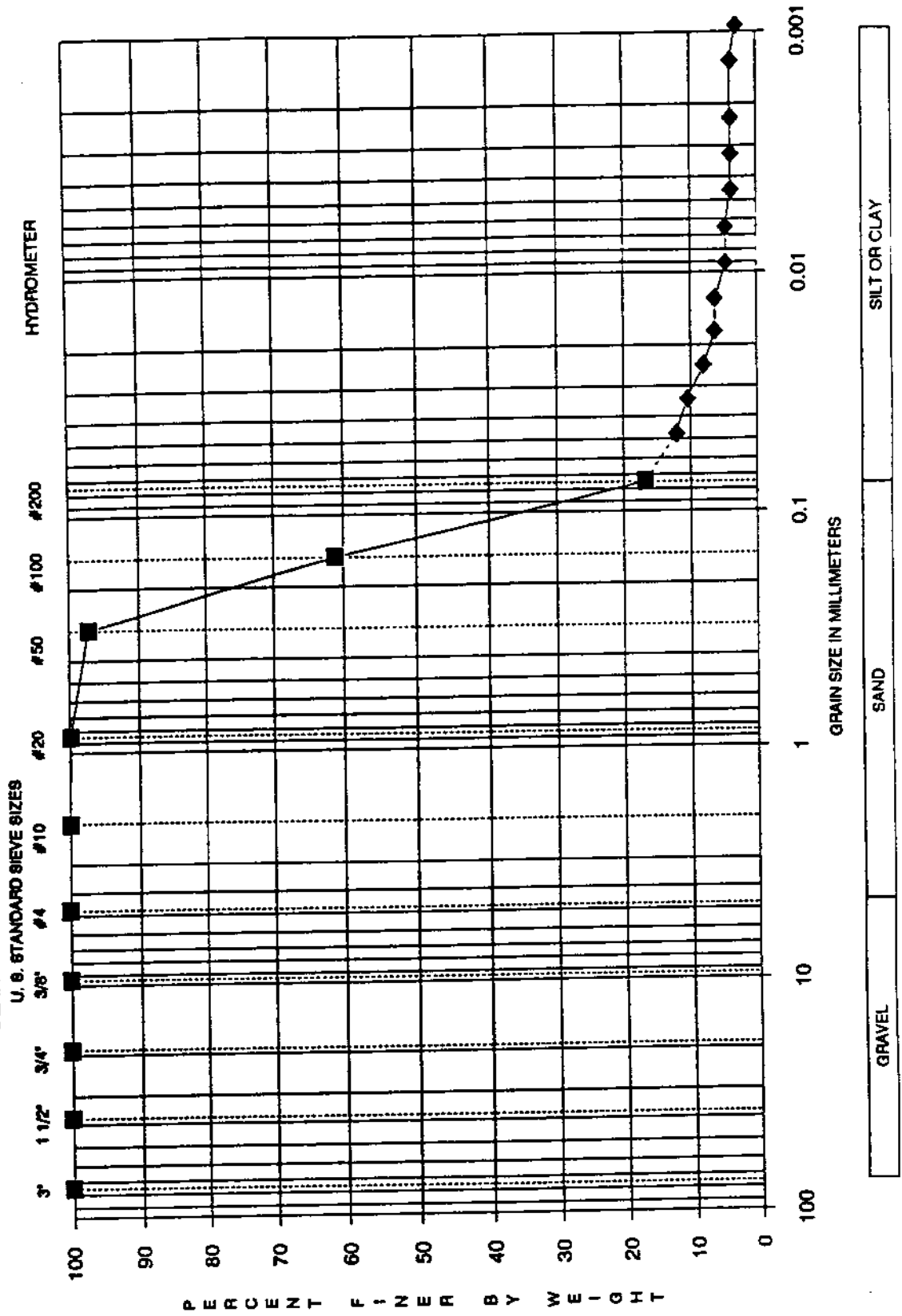
SOIL DESCRIPTION
brown silty or clayey sand with 17% silt or clay
Unified Soil Classification System (USCS) Group Symbol
SM or SC

NOTES

NA=NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 5D SS16, ETL SAMPLE # 9104X001-016



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 4D SS14	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	017	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	90.0
3/8"	9.500	89.2
#4	4.750	82.7
#10	2.000	62.6
#20	0.850	43.9
#50	0.300	28.5
#100	0.150	18.3
#200	0.075	9.7

EFFECTIVE SIZES	
% Finer	Diameter mm
60	1.843
30	0.355
10	0.078
Uniformity Coefficient	Gradation Coefficient
23.7	0.9

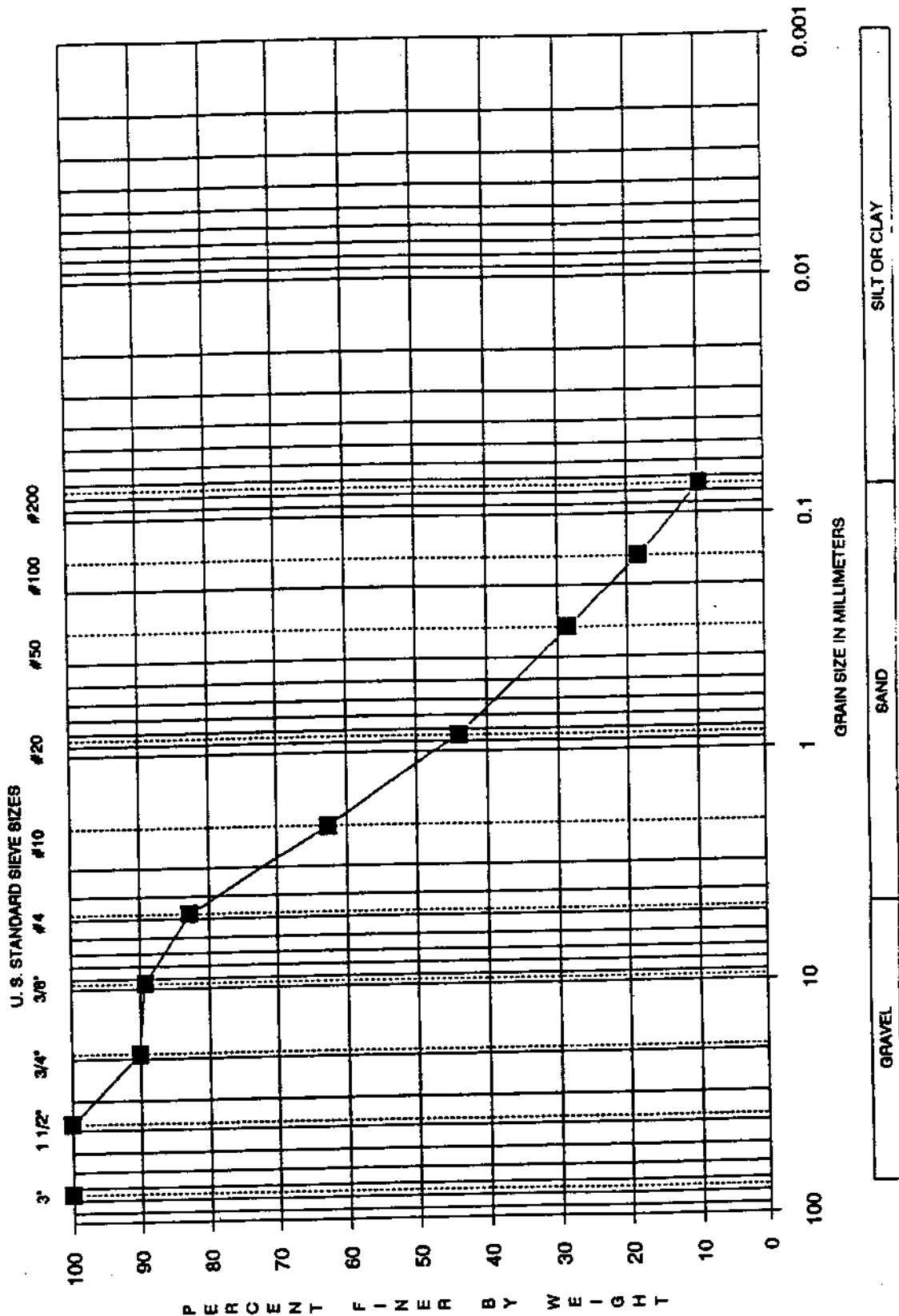
SOIL DESCRIPTION
multi-colored poorly graded gravelly silty or clayey sand with 17% gravel and 10% silt or clay
Unified Soil Classification System (USCS) Group Symbol SP/SM or SP/SC

NATURAL MOISTURE CONTENT, % dry basis
14.8

NOTES

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 4D SS14, ETL SAMPLE # 9104X001-017



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	REW 7S SS3	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	018	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	100.0
#4	4.750	100.0
#10	2.000	99.8
#20	0.850	99.5
#50	0.300	99.3
#100	0.150	99.0
#200	0.075	97.1
HYDROMETER	0.0370	73.0
	0.0284	58.6
	0.0212	47.4
	0.0158	34.7
	0.0120	25.1
	0.0087	18.7
	0.0062	15.5
	0.0045	12.3
	0.0032	9.1
	0.0023	9.1
	0.0013	9.1
	0.0009	7.5

EFFECTIVE SIZES		
% Finer	Diameter mm	
60	NA	
30	NA	
10	NA	
Uniformity Coefficient	Gradation Coefficient	
NA	NA	

NATURAL MOISTURE CONTENT, % dry basis
23.5

SPECIFIC GRAVITY
2.76

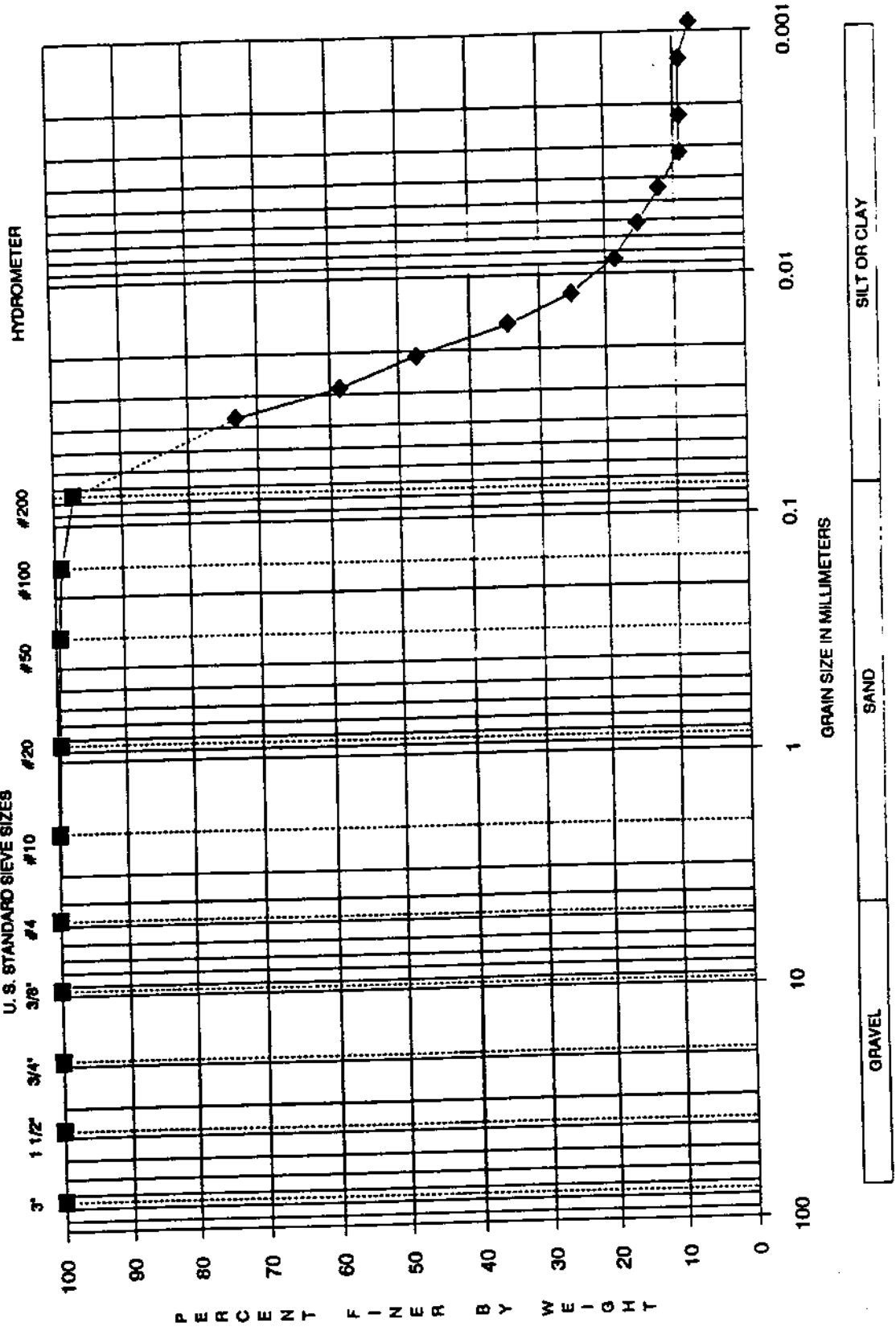
SOIL DESCRIPTION
red-brown sandy silt or clay with 3% sand
Unified Soil Classification System (USCS) Group Symbol ML, CL, MH, or CH

NOTES

NA = NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 7S SS3, ETL SAMPLE # 9104X001-018



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 8D SS41	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	019	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	92.9
# 4	4.750	80.0
# 10	2.000	60.2
# 20	0.850	44.7
# 50	0.300	14.6
# 100	0.150	6.2
# 200	0.075	3.4

EFFECTIVE SIZES	
% Finer	Diameter mm
60	1.982
30	0.581
10	0.217
Uniformity Coefficient	Gradation Coefficient
9.1	0.8

NATURAL MOISTURE CONTENT, % dry basis
10.3

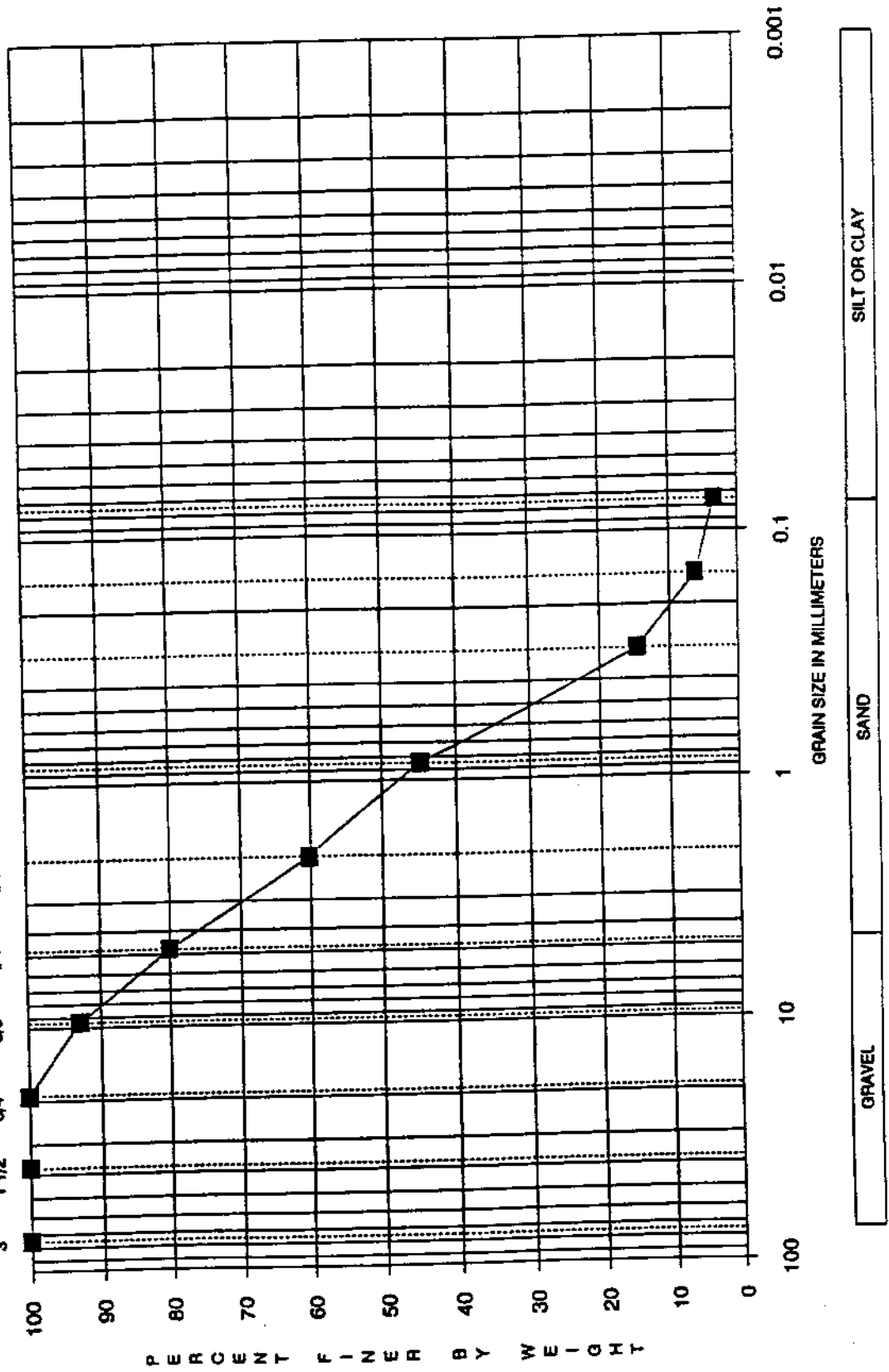
SPECIFIC GRAVITY
2.71

SOIL DESCRIPTION
multi-colored poorly graded sand with 20% gravel and 3% silt or clay
Unified Soil Classification System (USCS) Group Symbol
SP

NOTES

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 8D SS41, ETL SAMPLE # 9104X001-019
U. S. STANDARD SIEVE SIZES



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 9D SS4	PROJECT ANALYST	CRT, JDT
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	020	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01	DATE RECEIVED	4/5/91	DATE COMPLETED	05/09/91

GRAIN SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	87.8
3/4"	19.00	77.7
3/8"	9.500	63.5
#4	4.750	56.0
#10	2.000	47.8
#20	0.850	39.4
#50	0.300	23.4
#100	0.150	16.6
#200	0.075	11.9

EFFECTIVE SIZES	
% Finer	Diameter mm
60	7.252
30	0.527
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE CONTENT, % dry basis
9.6

SPECIFIC GRAVITY
2.76

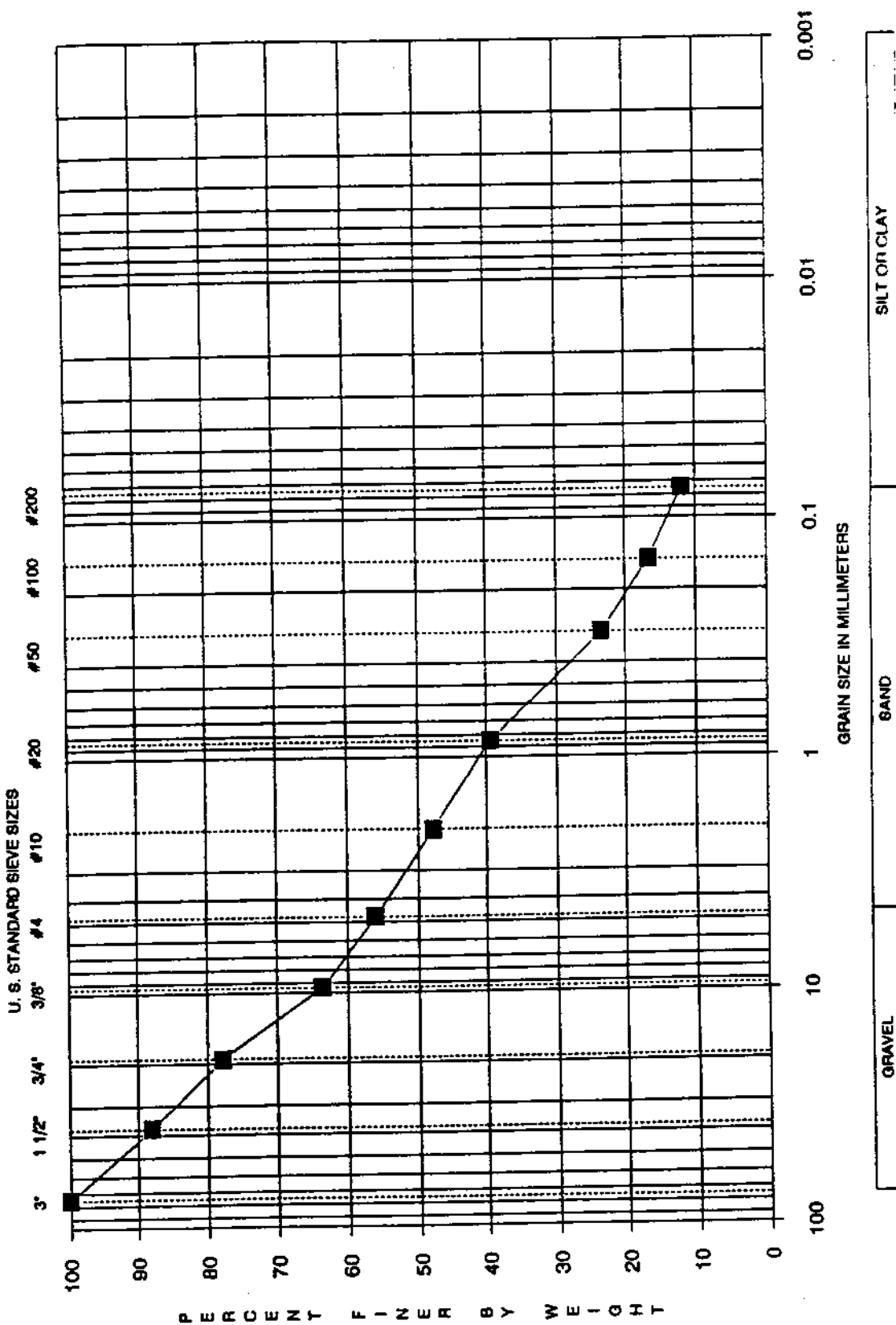
SOIL DESCRIPTION
multi-colored poorly graded gravelly and silty or clayey sand with 44% gravel and 12% silt or clay
Unified Soil Classification System (USCS) Group Symbol
SP/SM or SP/SC

NOTES

NA = NOT APPLICABLE

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 9D SS4, ETL SAMPLE # 8104X001-020



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I.D.	RFW 7D-SH4	PROJECT ANALYST	CRT
JOB NUMBER	9012X001	ETL SAMPLE NUMBER	027	QA/QC ANALYST	RWF
W. O. NUMBER	3228-10-01-0142	DATE RECEIVED	12/14/90	DATE COMPLETED	05/23/91

GRAIN SIZE DISTRIBUTION			
U. S. Standard Sieve Size	Diameter mm	% Finer	
3"	75.00	100.0	
1 1/2"	37.50	100.0	
3/4"	19.00	100.0	
3/8"	9.500	100.0	
#4	4.750	100.0	
#10	2.000	99.1	
#20	0.850	97.2	
#50	0.300	93.0	
#100	0.150	88.9	
#200	0.075	77.6	
HYDROMETER	0.0442	70.8	
	0.0323	62.4	
	0.0235	54.0	
	0.0170	47.7	
	0.0127	39.3	
	0.0092	33.0	
	0.0065	30.9	
	0.0047	24.6	
	0.0034	20.4	
	0.0024	14.1	
	0.0014	12.0	
	0.0010	9.9	

EFFECTIVE SIZES	
% Finer	Diameter mm
60	NA
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

NATURAL MOISTURE CONTENT, % dry basis
104.6

SPECIFIC GRAVITY
2.47

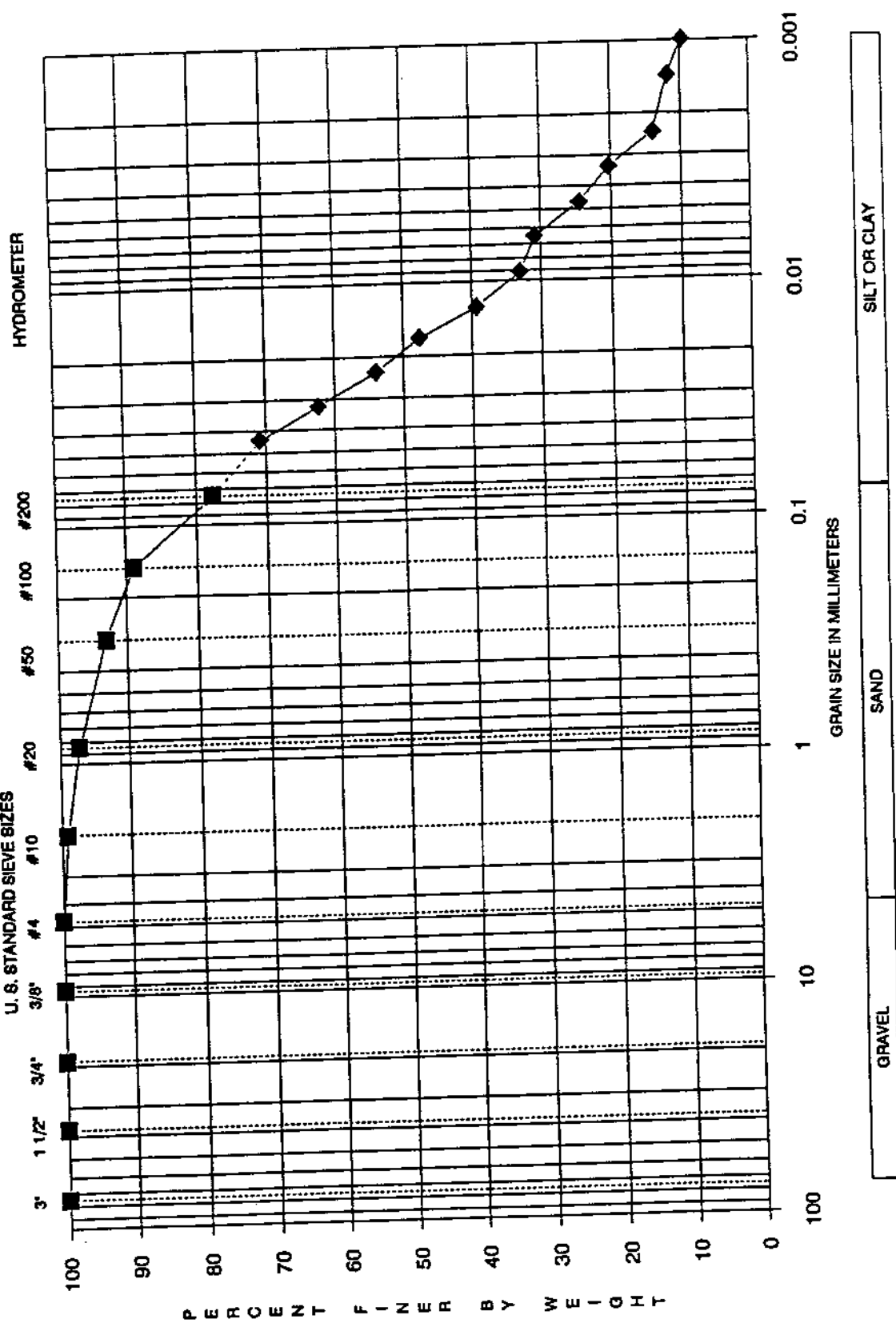
SOIL DESCRIPTION
dark brown sandy silt of high plasticity with 22% sand
Unified Soil Classification System (USCS) Group Symbol MH

INDEX PROPERTIES		
% moisture dry basis		
Plastic Limit	Liquid Limit	Plasticity Index
63.2	78.0	14.8

NOTES

NA=NOT APPLICABLE

GRAIN SIZE DISTRIBUTION CURVE FOR
CLARKSTOWN PROJECT SAMPLE RFW 7D-SH4, ETL SAMPLE # 9012X001-027
U. S. STANDARD SIEVE SIZES



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I. D.	RFW 7S-SH3
JOB NUMBER	9103X001	ETL SAMPLE NUMBER	006
W. O. NUMBER	3228-10-01-0142	PERM TEST DATE	5/31/91 to 6/3/91

SPECIMEN DESCRIPTION

brown sandy silt or clay

TEST DATA AND RESULTS

Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	104.6	56.7			
Wet Unit Weight, pcf	91	103			
Dry Unit Weight, pcf	44.7	66.0			
Specific Gravity	2.47	2.47			
Void Ratio	2.45	1.33			
Porosity, %	71.0	57.2			
Degree of Saturation, %	105.5	105.0			
Maximum Confining Pressure, psi		10.5			
Average Differential Pressure, psi		6.22			
Hydraulic Gradient		43.7			
Hydraulic Permeability, cm/sec		7.55 E-08			

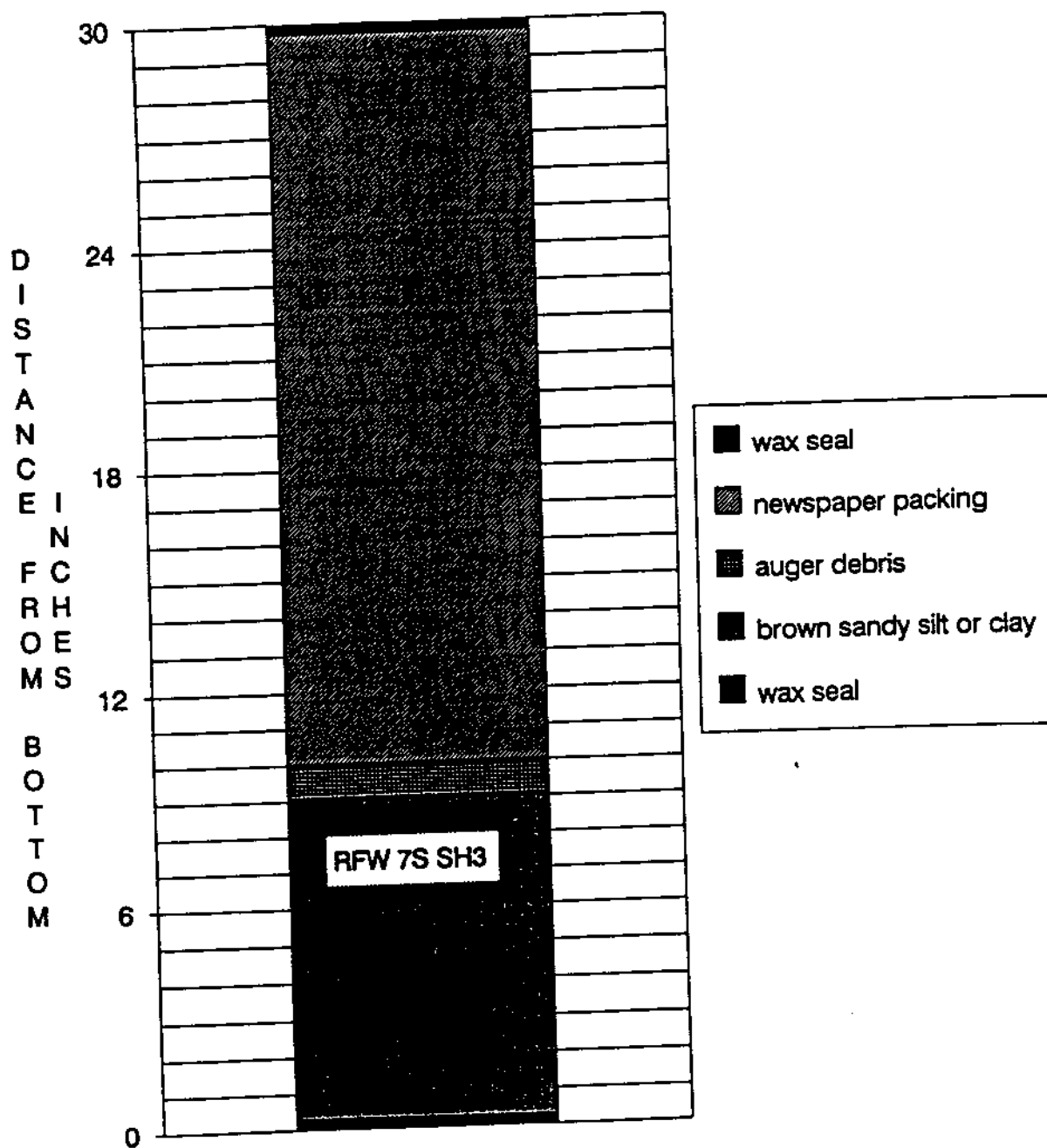
NOTES

- (1) Initial conditions: specimen cut from top 5' of undisturbed soil sample collected in 3" diameter by 30" long Shelby tube with 10" recovery
- (2) Final conditions: estimated conditions after consolidation at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL TUBE LOG

CLARKSTOWN PROJECT SAMPLE RFW 7S SH3, ETL SAMPLE #
9103X001-006



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I. D.	RFW 15 SH1
JOB NUMBER	9103X001	ETL SAMPLE NUMBER	014
W. O. NUMBER	3228-10-01-0142	PERM TEST DATE	5/31/91 to 6/5/91

SPECIMEN DESCRIPTION

dark brown peat and organic silt or clay, contained metal debris (rusty nails and heavy gage wire) which were removed horizontally from specimen, surface voids patched with native soil

TEST DATA AND RESULTS

Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	85.0	74.9			
Wet Unit Weight, pcf	88	93			
Dry Unit Weight, pcf	47.6	53.2			
Specific Gravity	2.47	2.47			
Void Ratio	2.24	1.90			
Porosity, %	69.1	65.5			
Degree of Saturation, %	93.9	97.6			
Maximum Confining Pressure, psi		43.3			
Average Differential Pressure, psi		6.15			
Hydraulic Gradient		42.0			
Hydraulic Permeability, cm/sec		9.78 E-08			

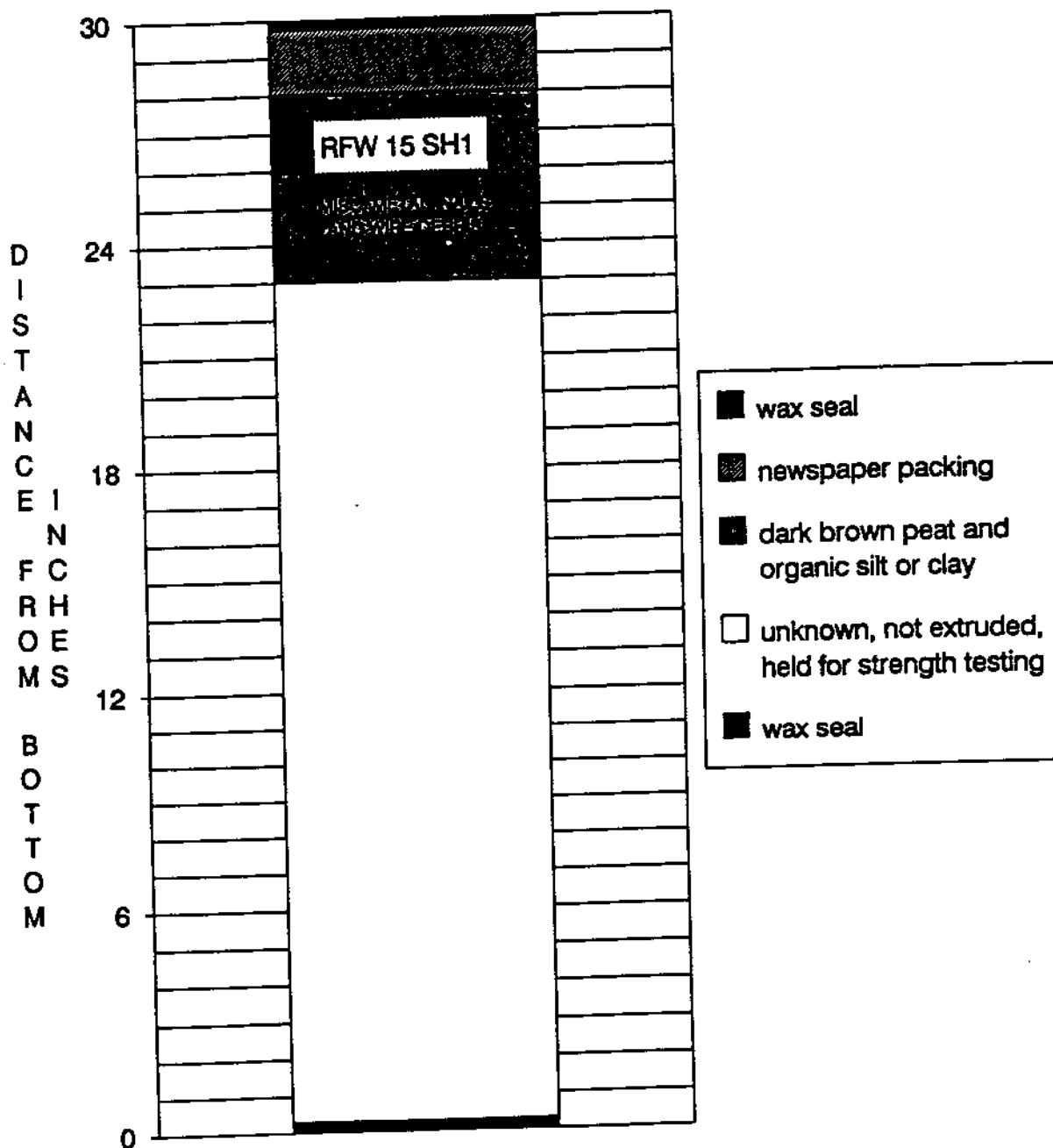
NOTES

- (1) Initial conditions: specimen cut from top 5" of undisturbed soil sample collected in 3" diameter by 30" long Shelby tube with 28" recovery
- (2) Final conditions: estimated conditions after consolidation at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL TUBE LOG

CLARKSTOWN PROJECT SAMPLE RFW 15 SH1, ETL SAMPLE #
9103X001-014



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I. D.	RFW 7A SH1-1
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	022-1
W. O. NUMBER	3228-10-01-0142	PERM TEST DATE	6/12/91 to 6/16/91

SPECIMEN DESCRIPTION

black peat and organic silt or clay, 1 of 2 specimens cut from soil tube sample that contained two distinct soil types, the other soil type was a black silty sand

TEST DATA AND RESULTS

Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	387.4	364.6			
Wet Unit Weight, pcf	70	71			
Dry Unit Weight, pcf	14.3	15.2			
Specific Gravity	2.11	2.11			
Void Ratio	8.22	7.65			
Porosity, %	89.2	88.4			
Degree of Saturation, %	99.5	100.5			
Maximum Confining Pressure, psi		8.1			
Average Differential Pressure, psi		6.24			
Hydraulic Gradient		70.2			
Hydraulic Permeability, cm/sec		1.45 E-07			

NOTES

- (1) Initial conditions: specimen cut from top 2 1/2" of the bottom 11 1/4" interval (black peat and organic silt or clay) of undisturbed soil sample collected in 3" diameter by 30" long Shelby tube with 18" recovery
- (2) Final conditions: estimated conditions after consolidation at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

HYDRAULIC CONDUCTIVITY OF FINE GRAINED SOILS - TEST DATA AND RESULTS

PROJECT	CLARKSTOWN	PROJECT SAMPLE I. D.	RFW 7A SH1-2
JOB NUMBER	9104X001	ETL SAMPLE NUMBER	022-2
W. O. NUMBER	3228-10-01-0142	PERM TEST DATE	6/10/91 to 6/14/91

SPECIMEN DESCRIPTION

grey silty sand, 2 of 2 specimens cut from soil tube sample that contained 3 distinct soil types, the other soil types were a black peat and organic silt or clay, and a black organic silty sand

TEST DATA AND RESULTS

Test Condition	Initial(1)	Final(2)			
Moisture Content, % dry basis	62.6	61.3			
Wet Unit Weight, pcf	93	96			
Dry Unit Weight, pcf	57.0	59.4			
Specific Gravity	2.27	2.27			
Void Ratio	1.48	1.39			
Porosity, %	59.8	58.1			
Degree of Saturation, %	95.7	100.4			
Maximum Confining Pressure, psi		8.1			
Average Differential Pressure, psi		6.08			
Hydraulic Gradient		99.0			
Hydraulic Permeability, cm/sec		6.71 E-07			

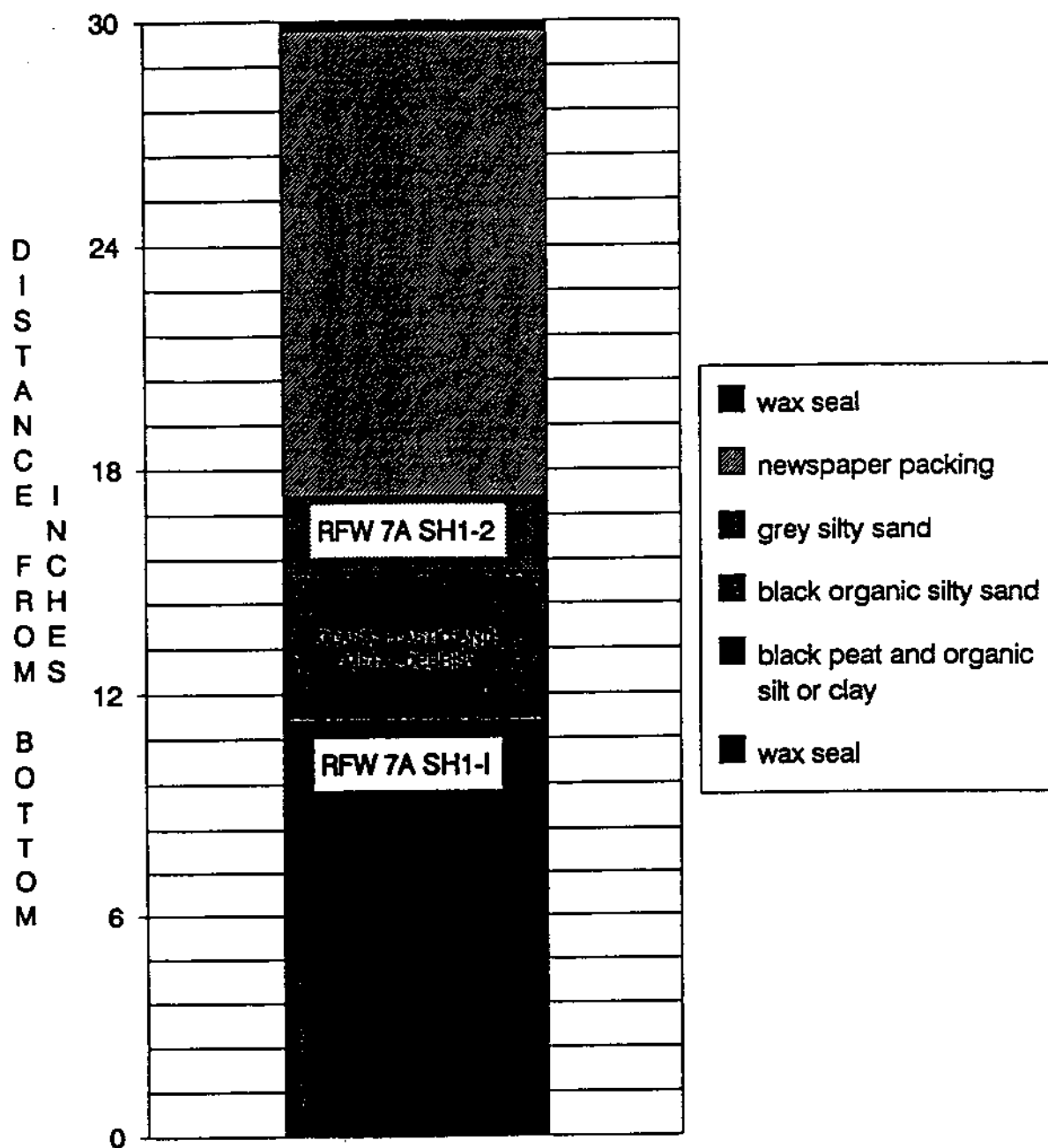
NOTES

- (1) Initial conditions: specimen cut from top 2" of the bottom 11 1/4" interval (black peat and organic silt or clay) of undisturbed soil sample collected in 3" diameter by 30" long Shelby tube with 18" recovery
- (2) Final conditions: estimated conditions after consolidation at reported maximum confining pressure

WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

SOIL TUBE LOG

CLARKSTOWN PROJECT SAMPLE RFW 7A SH1, ETL SAMPLE #
9104X001-022



WESTON ENVIRONMENTAL TECHNOLOGY LABORATORY

ASTM D 2974-87 MOISTURE, ASH, AND ORGANIC MATTER OF ORGANIC SOILS

PROJECT	CLARKSTOWN	DRYING OVEN	VWR	PROJECT ANALYST	V.F.
JOB NO.	9012X001	ASHING FURNACE	Thermalynx	QA/QC ANALYST	RWF
W. O. NO.	3226-10-01	DATE RECEIVED	12/14/90	DATE COMPLETED	12/18/90

Sample No.	Client Sample I.D.	Ashing Temperature Degrees C	Percent Dry Basis(1)			Percent Wet Basis(2)		
			Moisture Content	Ash Content	Organic Fraction	Moisture Content	Ash Content	Organic Fraction
001	RFW-6D-SH1	440	138.1	76.6	23.4	58.0	32.2	9.8
002	RFW-6S-SH1511	440	39.7	98.8	3.2	28.4	69.3	2.3
003	RFW-7B-SH2	440	98.0	89.2	10.8	49.0	45.5	5.5
004	RFW-8D-SS9	440	354.2	27.7	72.3	78.0	6.1	15.9
005	RFW-8D-SS16	440	150.4	82.3	17.7	60.1	32.9	7.0
006	RFW-8D-SS17	440	174.6	79.9	20.1	63.6	29.1	7.3
007	RFW-8D-SS20	440	74.8	92.6	7.4	42.8	52.9	4.2
008	RFW-8D-SS21	440	45.3	97.9	2.1	31.2	67.4	1.4
009	RFW-8D-SS24	440	54.0	97.3	2.7	35.1	63.2	1.7
012	RFW-8D-SS27	440	35.8	98.7	1.3	26.4	72.7	1.0
013	RFW-8D-SH4	440	56.8	96.5	3.5	36.2	61.6	2.2
015	RFW-10S-SS5	440	710.5	8.4	91.6	87.7	1.0	11.3
016	RFW-10S-SS8	440	493.3	66.7	33.3	83.1	11.2	5.6
017	RFW-10S-SS10	440	52.9	97.5	2.5	34.6	63.8	1.6
018	RFW-10S-SS1011	440	51.8	98.7	1.3	34.1	65.0	0.9
001	RFW-6D-SH1	750	138.1	74.8	25.2	58.0	31.4	10.6
002	RFW-6S-SH1511	750	39.7	96.1	3.9	28.4	68.8	2.8
003	RFW-7B-SH2	750	98.0	88.9	11.1	49.0	45.3	5.7
004	RFW-8D-SS9	750	354.2	27.0	73.0	78.0	5.9	16.1
005	RFW-8D-SS16	750	150.4	81.9	18.1	60.1	32.7	7.2
006	RFW-8D-SS17	750	174.6	79.1	20.9	63.6	28.8	7.6
007	RFW-8D-SS20	750	74.8	91.9	8.1	42.8	52.6	4.6
008	RFW-8D-SS21	750	45.3	96.9	3.1	31.2	66.7	2.1
009	RFW-8D-SS24	750	54.0	94.4	5.6	35.1	61.3	3.6
012	RFW-8D-SS27	750	35.8	94.9	5.1	26.4	69.9	3.8
013	RFW-8D-SH4	750	56.8	96.0	4.0	36.2	61.3	2.5
015	RFW-10S-SS5	750	710.5	6.1	93.9	87.7	0.8	11.6
016	RFW-10S-SS8	750	493.3	65.8	34.2	83.1	11.1	5.8
017	RFW-10S-SS10	750	52.9	96.8	3.4	34.6	63.2	2.2
018	RFW-10S-SS1011	750	51.8	94.6	5.4	34.1	62.3	3.5

NOTES

- (1) Calculated as percent of the dry soil weight
 (2) Calculated as percent of the wet soil weight (as received)

NATURAL MOISTURE CONTENT, TOTAL ORGANIC CONTENT, SPECIFIC GRAVITY, AND ATTERBERG'S LIMITS DETERMINATION									
PROJECT	CLARKSTOWN	PROJECT ANALYST				CRT, JDT	DATE COMPLETED		03/09/91
JOB NUMBER	9104X001	QA/QC ANALYST				RWF			
W. O. NUMBER	3228-10-01	DATE RECEIVED				04/05/91			

Project Sample Number	ETL Sample Number	% Moisture (Dry Basis)	% Moisture (Wet Basis)	% Total Solids	% Total Organic Content @ 440°C	% Total Organic Content @ 750°C	Specific Gravity	Plastic Limit	Liquid Limit	Plasticity Index
RFW 5D SS4	001	538.1	84.3	15.7	76.64	77.74	---	---	---	---
RFW 3D SS5	002	317.7	76.1	23.9	66.56	59.66	---	---	---	---
RFW 2SS 11	004	39.0	26.0	72.0	0.90	4.67	---	26.90	32.25	5.35
RFW 87 SS15	005	40.6	26.9	71.1	0.92	6.55	2.74	---	---	---
RFW 5D SS7	006	47.2	32.0	68.0	1.41	7.16	---	---	---	---
RFW 5D SS5	021	44.1	30.6	69.4	---	---	---	23.74	29.00	5.26

NOTES

--- Plastic and liquid limit determinations could not be performed due to insufficient sample quantity.

SURFACE GEOPHYSICAL (EM-34) DATA

GEOPHYSICAL INVESTIGATION ELECTROMAGNETIC TERRAIN CONDUCTIVITY (EM) TECHNIQUE

General Theory: The electromagnetic terrain conductivity (EM) survey method provides a means of measuring the electrical conductivity of geologic subsurface materials. The parameter measured with this technique is the apparent conductivity of the subsurface.

Natural variations in subsurface conductivity may be caused by changes in soil moisture content, groundwater specific conductance, and thickness of soil and rock layers. Changes in basic soil or rock types, and structural features such as fractures or voids, may also produce changes in conductivity (Benson, 1982). Localized deposits of natural organics, clay, sand, or gravel will also affect subsurface conductivity. Conductivity ranges for natural soil and rock are shown in Figure 1.

The EM conductivity instrumentation consists of a receiver coil (Rx) and a separate transmitter coil (Tx). The Tx coil radiates an electromagnetic field which induces eddy currents in the subsurface earth, as shown in Figure 2. These eddy currents produce a secondary electromagnetic field. The Rx coil picks up this secondary field at some known distance away from the Tx coil. The voltage value received by the Rx coil is linearly proportional to the underlying subsurface conductivity. The EM instrument is calibrated to permit direct reading of conductivity values in millimhos per meter. The conductivity measured by the EM instrument represents a cumulative response of the electromagnetic field to the subsurface materials, ranging from the land surface to the penetration depth of the unit. In a layered subsurface, each horizon may have a different conductivity potential. The resulting apparent conductivity will represent a cumulative value based on the thickness and depth of each layer. Due to this cumulative effect, it is important that interpretations based on EM results be calibrated and supported by drilling data or other geologic information (McNeil, 1980).

The penetration depth of the EM survey technique is dependent on the spacing distance between the Tx and Rx coils. The Geonics EM 34-3 unit permits the use of three spacings, 10m, 20m and 40m. Readings obtained with the EM 34-3 are commonly made with the coils in a vertical coplanar configuration and a horizontal dipole. Deeper penetration with an equivalent coil spacing can be achieved by using the horizontal coplanar configuration, vertical dipole mode (VDM) (Geonics, 1980). The estimated penetration depths for different coil spacing and orientations are shown below:

FIGURE 1

CONDUCTIVITY RANGES FOR NATURAL SOIL AND ROCK
FROM GEOPHYSICAL TECHNIQUES, RICHARD BENSON,
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY

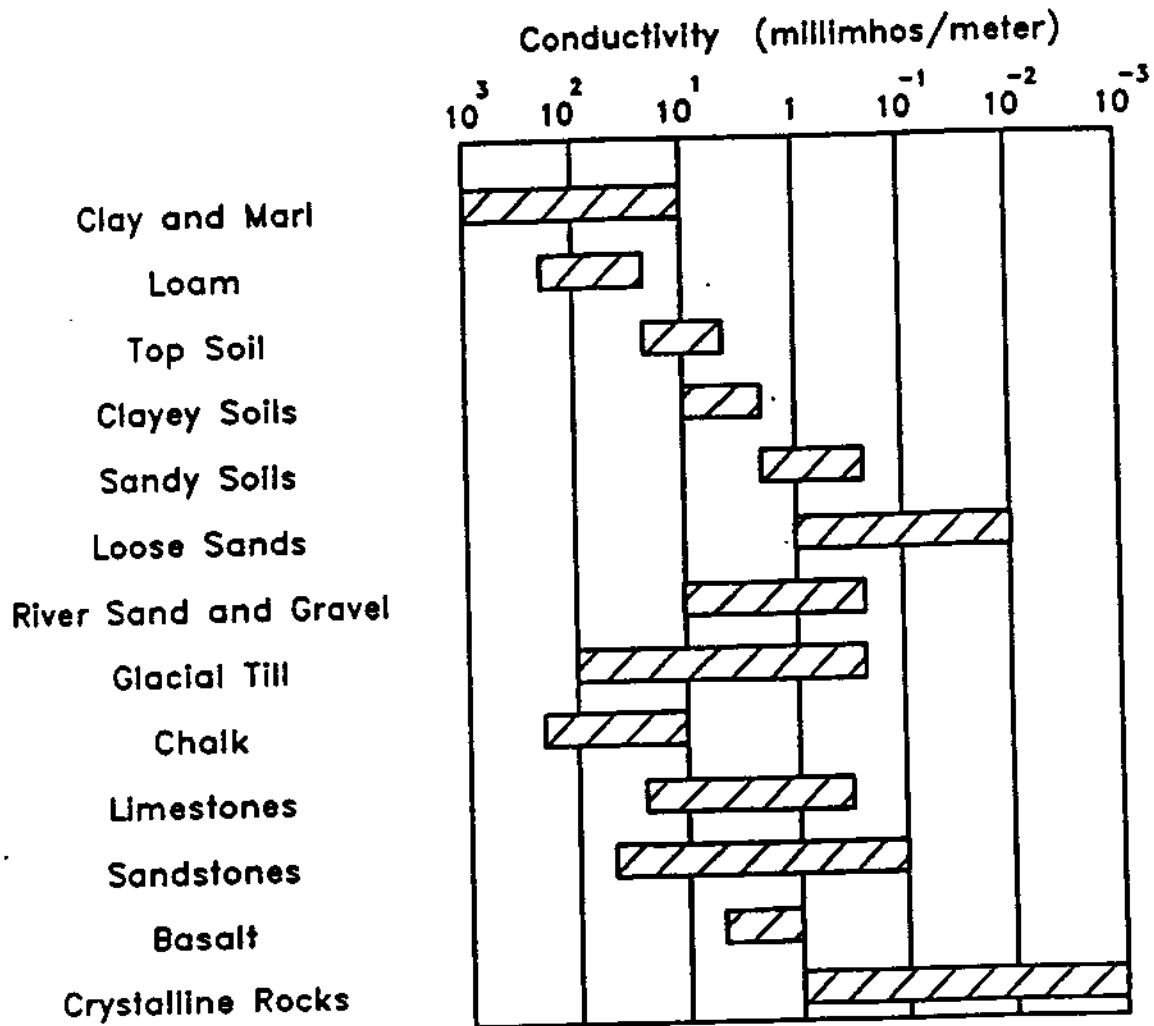
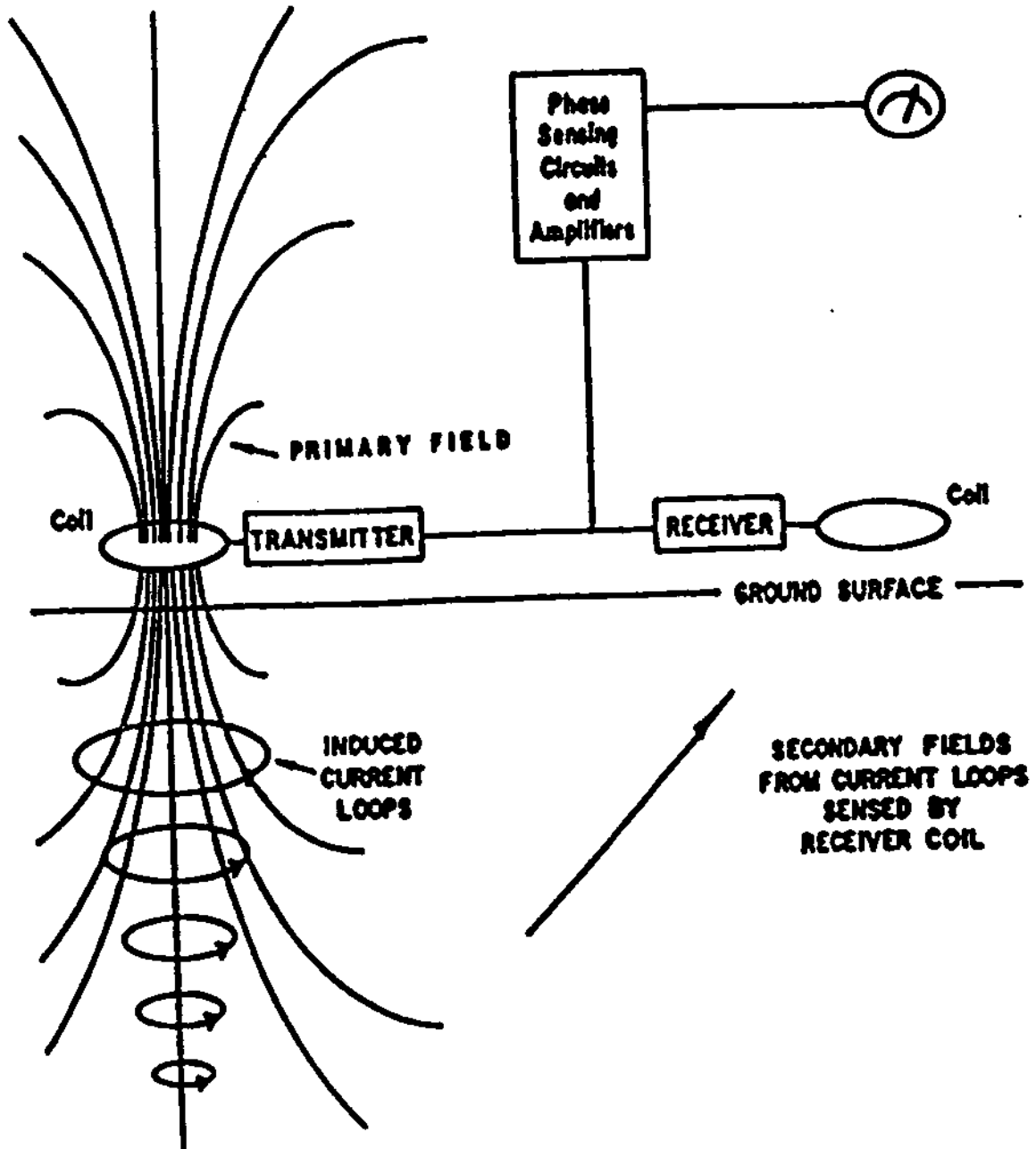


FIGURE 2.

SCHEMATIC OF ELECTROMAGNETIC CONDUCTIVITY
INSTRUMENTATION SETUP FROM GEOPHYSICAL TECHNIQUES,
RICHARD BENSON, ENVIRONMENTAL MONITORING SYSTEMS LABORATORY



<u>Intercoil Spacing (meters)</u>	<u>Penetration Depth (meters)</u>	
	Horizontal Dipoles	Vertical Dipoles
10	7.5	15
20	15	30
40	30	60

EM Field Survey Procedures: A Geonics Model EM 34-3 was utilized for this survey. Conductivity data in millimhos per meter were obtained over a series of lines using a 10 meter coil spacing with both horizontal and vertical dipoles orientations. Conductivity measurements along lines 1 - 5 were read at 10 feet intervals. Measurements along lines 6 - 8 were read at 20 feet intervals. This type survey allow for station to station profiling of both horizontal and vertical readings and for dipole comparison of shallow vs. deeper conductivity values

Field Calibration Procedures (Geonics, 1980):

- 1) Battery Check
 - A) Check to assure Battery Monitor Meter indicator is in the black arc of the scale.
 - B) Check condition of receiver battery by rotating receiver "SEPARATION" switch to "BATT" position with "POWER/OFF" switch in "OFF" position.
- 2) Nulling
 - A) Prior to turning receiver on, insure that meters read zero by adjusting mechanical meter zero control.
 - B) Turn on receiver ("POWER/OFF" switch to "POWER" position).
 - C) With receiver coil disconnected depress 60 "NULL MODE" pushed button switch. Both meter needles should go to zero.
 - D) If either needle is not at zero reading, the lock on the appropriate "NULL" control potentiometer is released and the "NULL" control adjusted to zero the meter.

3) Periodic Daily Checks

- A) Nulling: The nulling procedure is to be performed at least once a day during the survey, to check possible drift.
- B) Battery Check: The battery test is to be performed several times a day to assure condition of battery.

Data Presentation: Conductivity values for both vertical and horizontal dipoles of the 10 meter spaced coils for each EM line traversed during the survey were measured and are presented on the following tables and diagrams. The diagrams are profiles of measured conductivity along each line, plotted with conductivity in millimhos/meter on the Y axis and line distance on the X axis.

References

Benson, R.C., Glaccum, R.A. and Noel, M.R., 1982, Geophysical Techniques for Sensing Buried Wastes and Waste Migration, Environmental Monitoring Systems Laboratory Office of Research and Development, U.S. EPA.

McNeil, J.D., 1980 Electromagnetic Terrain Conductivity Measurements at Low Induction Numbers, Technical Note TN-6, Geonics Limited, Canada.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 1

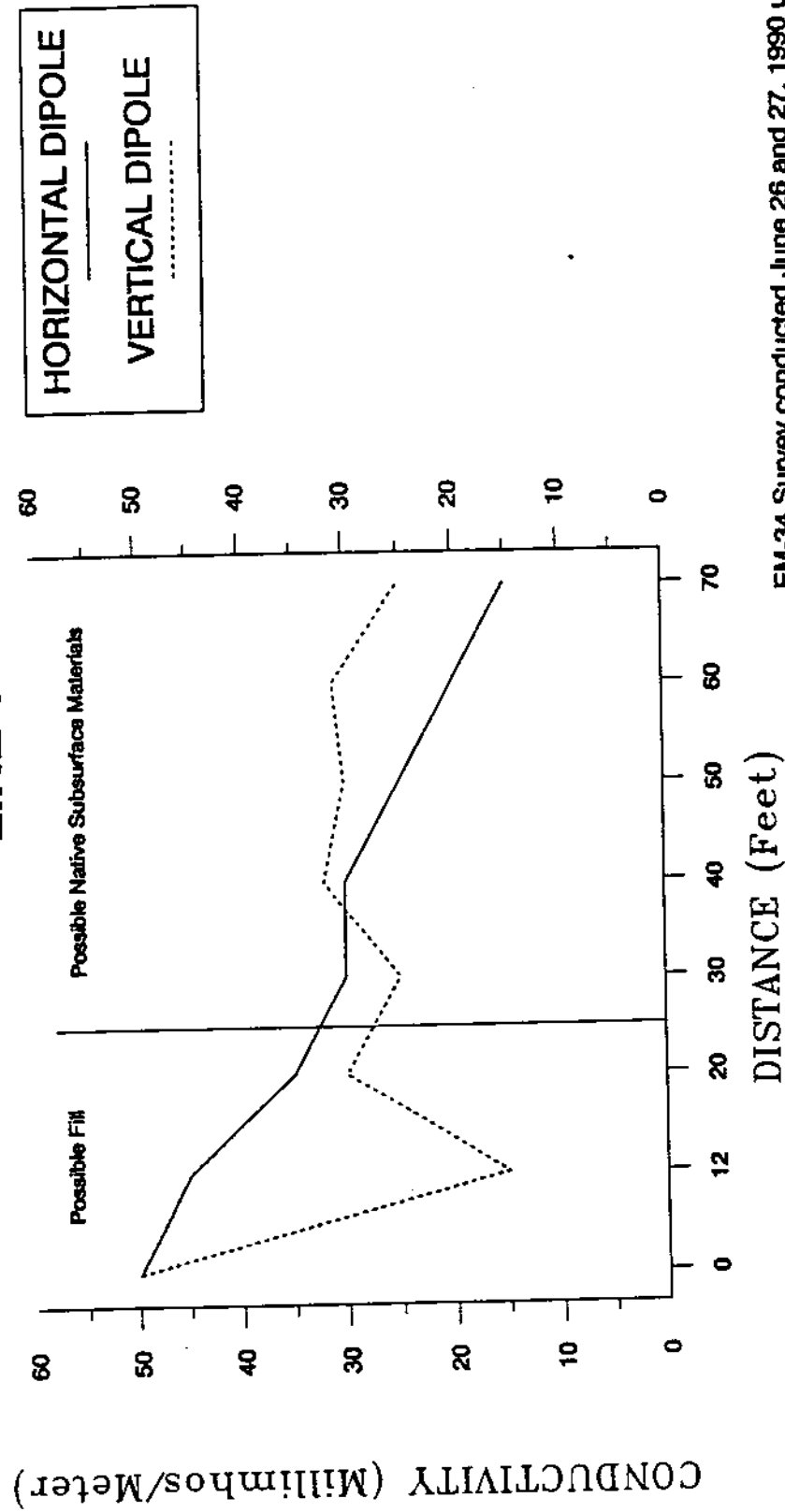
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	50	50
12	45	15
20	35	30
30	30	25
40	30	32
50	25	30
60	20	31
70	15	25

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 1



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 2

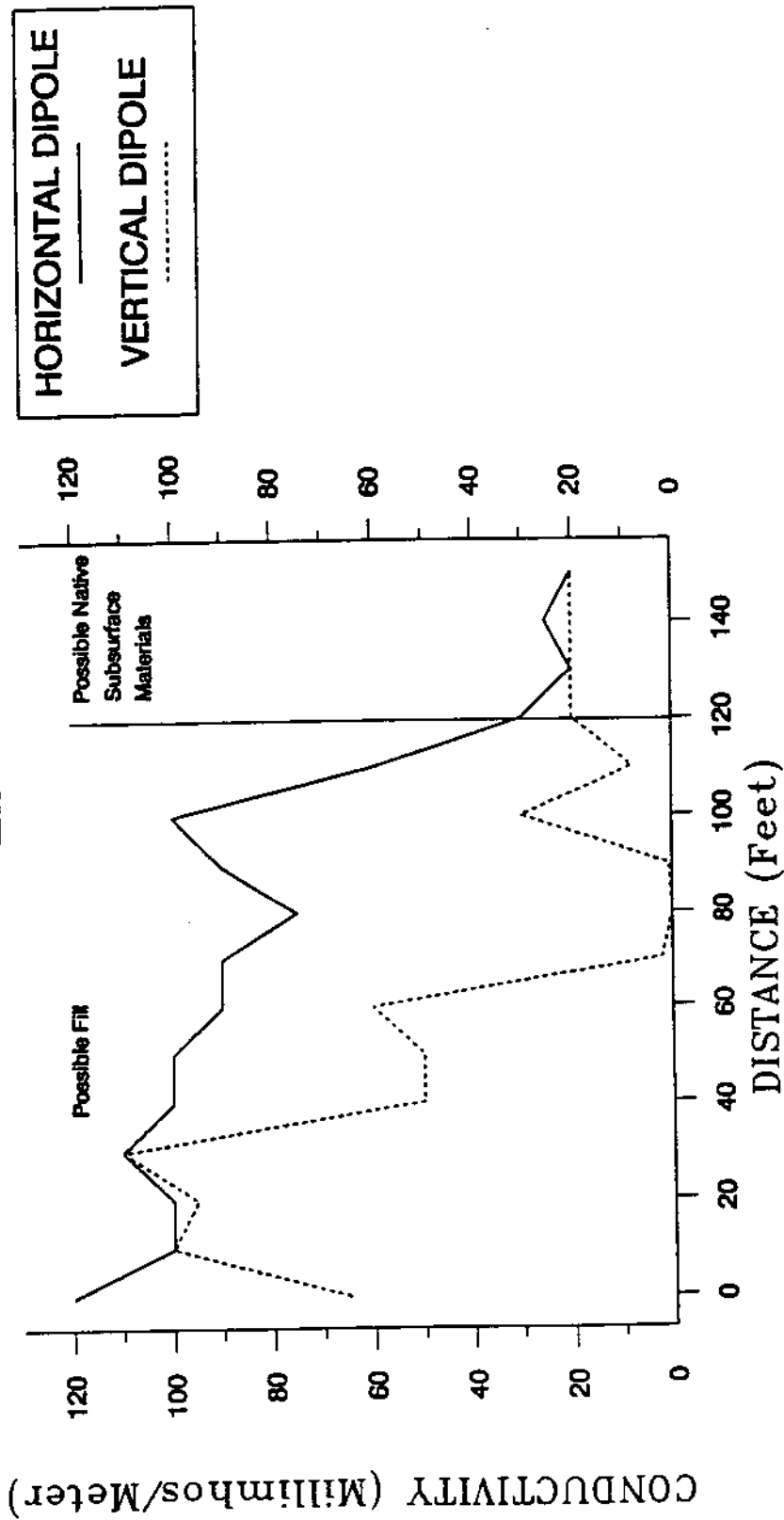
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	120	65.0
12	100	100.0
20	100	95.0
30	110	110.0
40	100	50.0
50	100	50.0
60	90	60.0
70	90	2.0
80	75	0.0
90	90	0.5
100	100	30.0
110	60	8.0
120	30	20.0
130	20	20.0
140	25	20.0
150	20	20.0

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 2



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 3

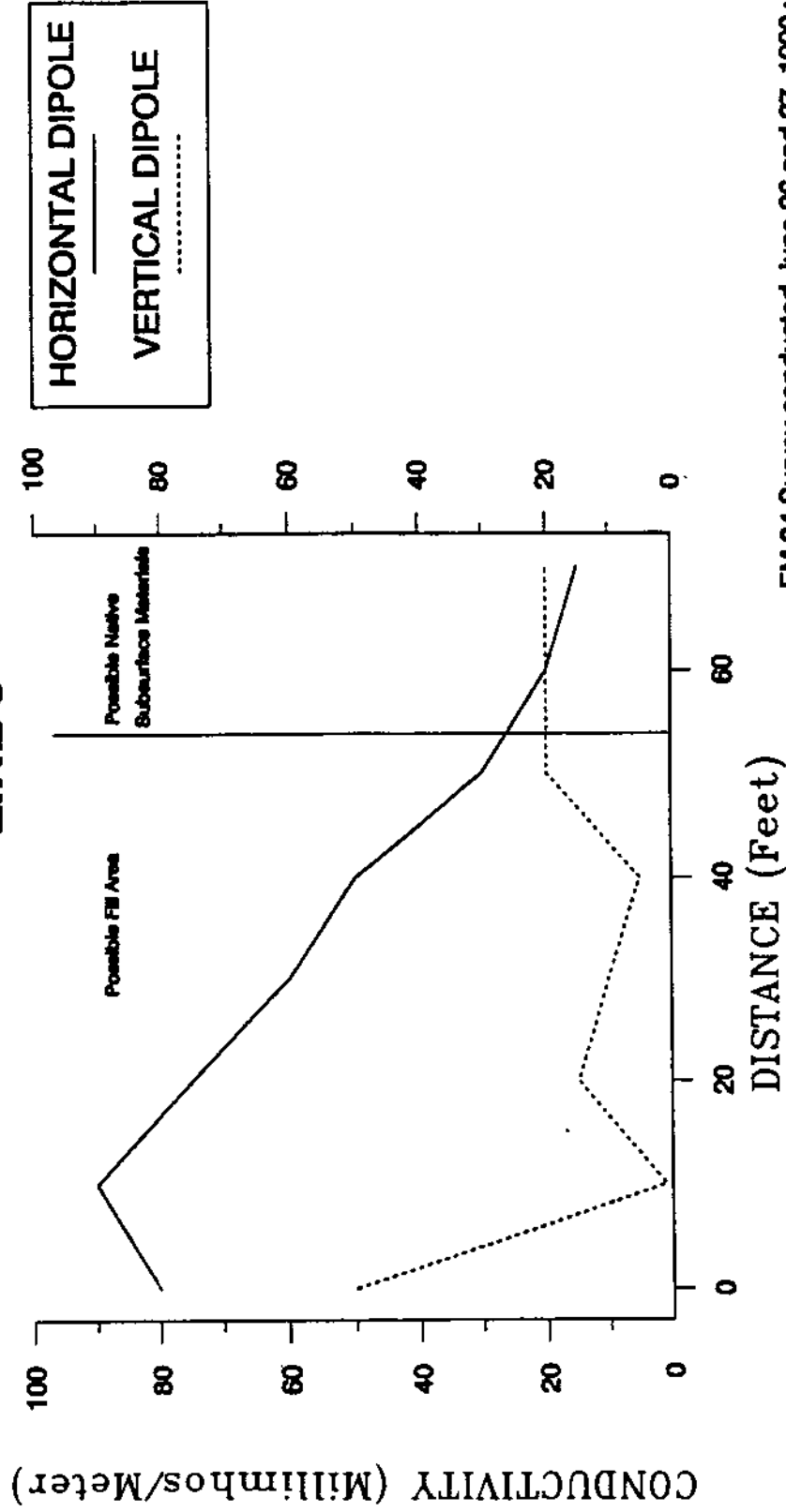
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	80	50
12	90	1
20	75	15
30	60	10
40	50	5
50	30	20
60	20	20
70	15	20

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 3



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 4

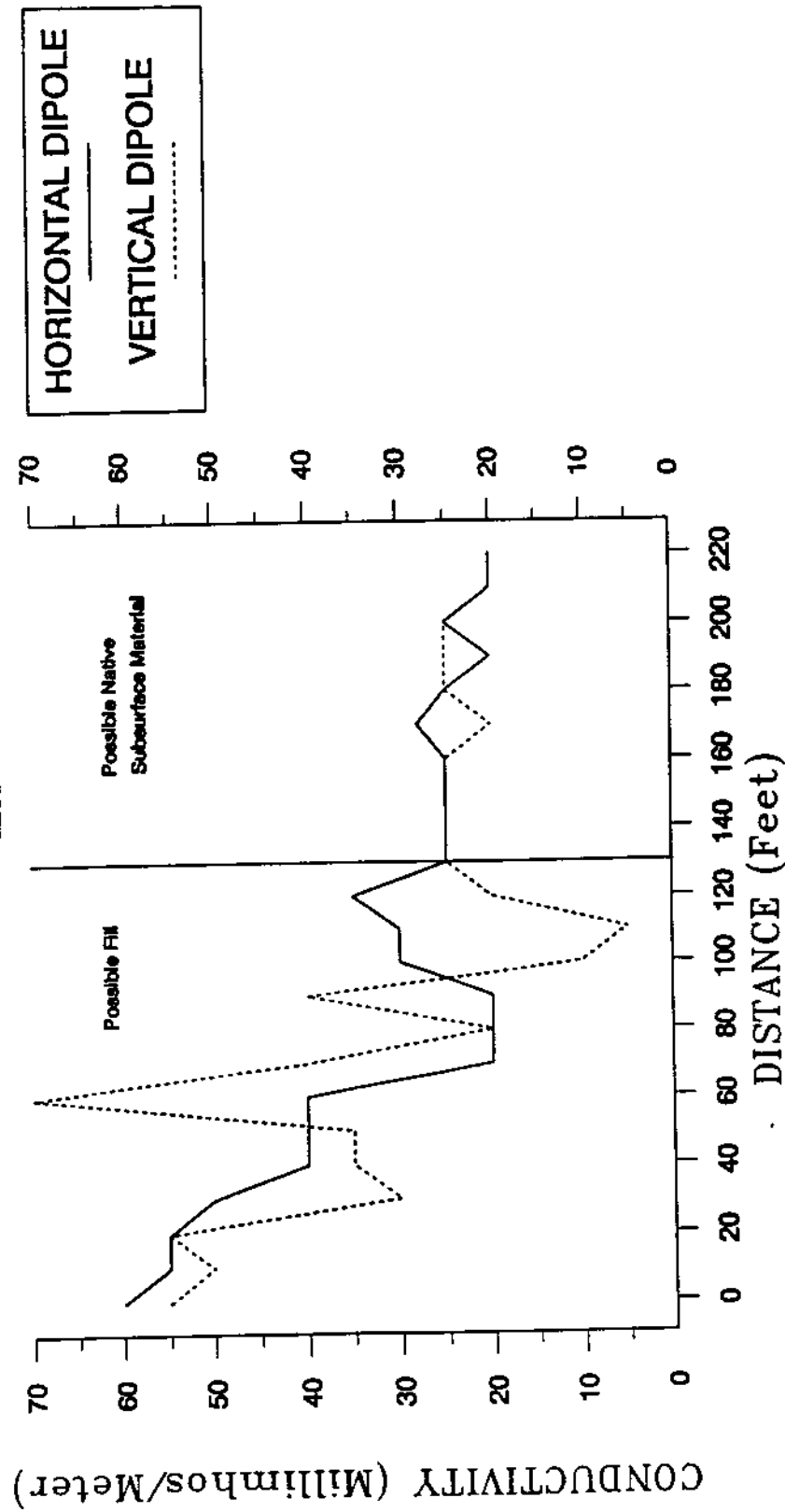
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	60	55
10	55	50
20	55	55
30	50	30
40	40	35
50	40	35
60	40	70
70	20	40
80	20	20
90	20	40
100	30	10
110	30	5
120	35	20
130	25	25
140	25	25
150	25	25
160	25	25
170	20	20
180	25	25
190	20	25
200	25	25
210	20	20
220	20	20

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 4



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 5

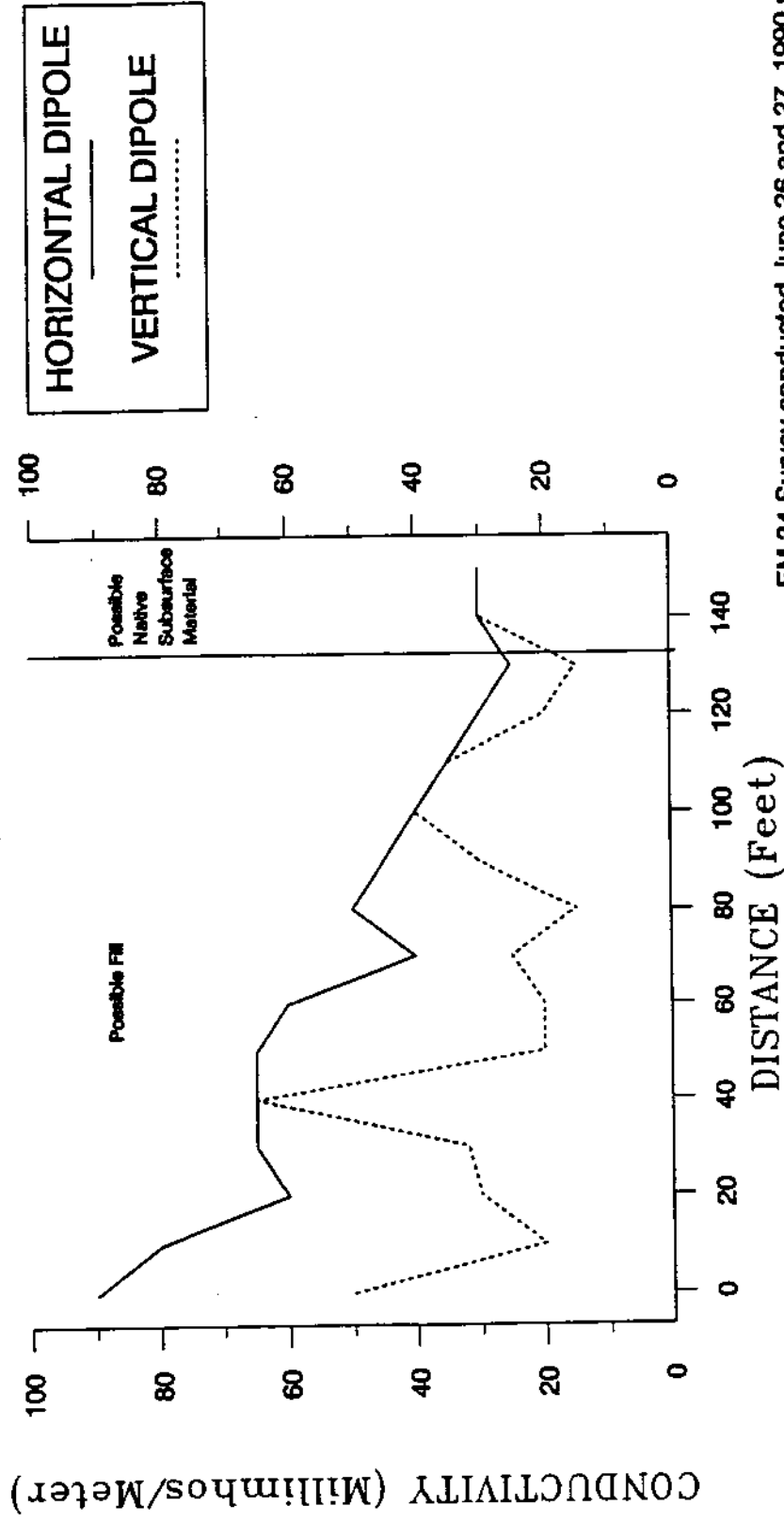
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	90	50
10	80	20
20	60	30
30	65	32
40	65	65
50	65	20
60	60	20
70	40	25
80	50	15
90	45	30
100	40	40
110	35	35
120	30	20
130	25	15
140	30	30
150	30	30

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 5



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 10 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 6

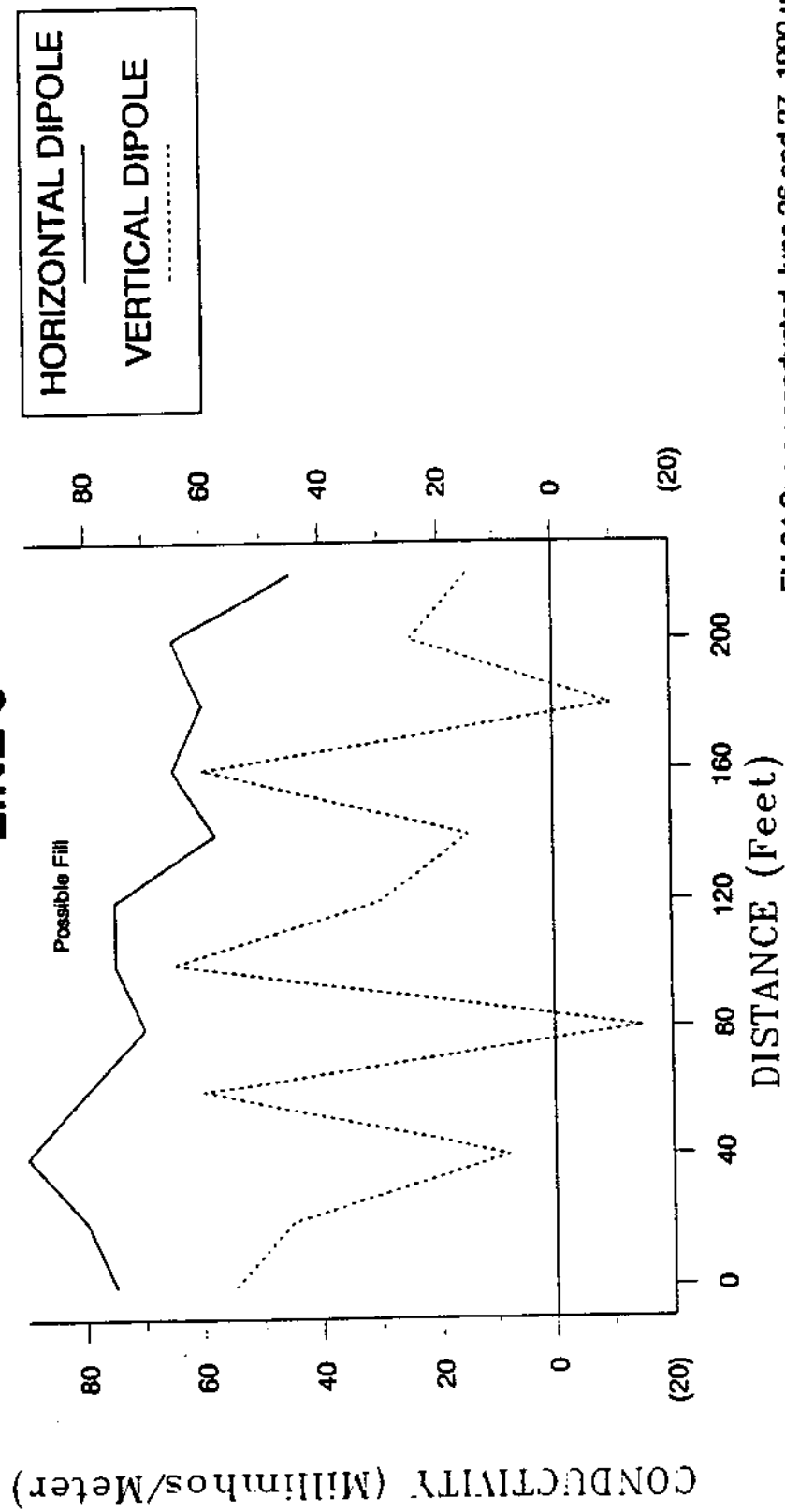
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	75	55
20	80	45
40	90	8
60	80	60
80	70	- (15)
100	75	65
120	75	30
140	58	15
160	65	60
180	60	- (10)
200	65	25
220	45	15

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 20 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 6



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 20 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 7

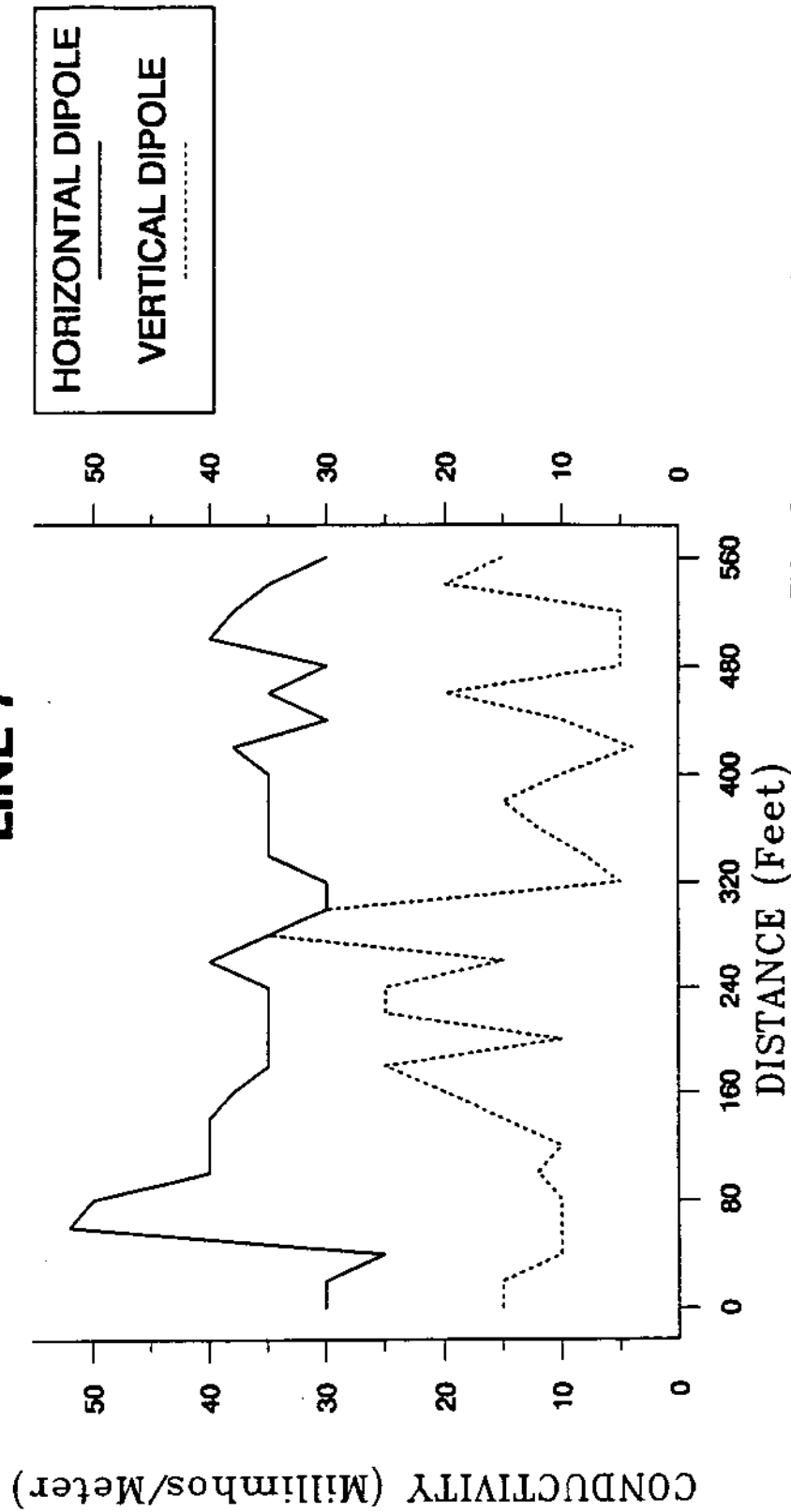
DISTANCE feet	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	30	16
20	30	16
40	26	10
60	22	10
80	20	10
100	40	12
120	40	10
140	40	18
160	38	20
180	36	28
200	36	10
220	36	26
240	36	26
260	40	18
280	36	38
300	30	30
320	30	8
340	36	8
360	36	12
380	36	18
400	36	10
420	36	4
440	30	10
460	36	20
480	30	6
500	40	6
520	38	8
540	36	20
560	30	16

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 20 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 7



EM-34 Survey conducted June 26 and 27, 1990 using a 10 meter coil spacing. Conductivity readings were taken at 20 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

LINE 8 (line starts at Line 7 (460 feet))

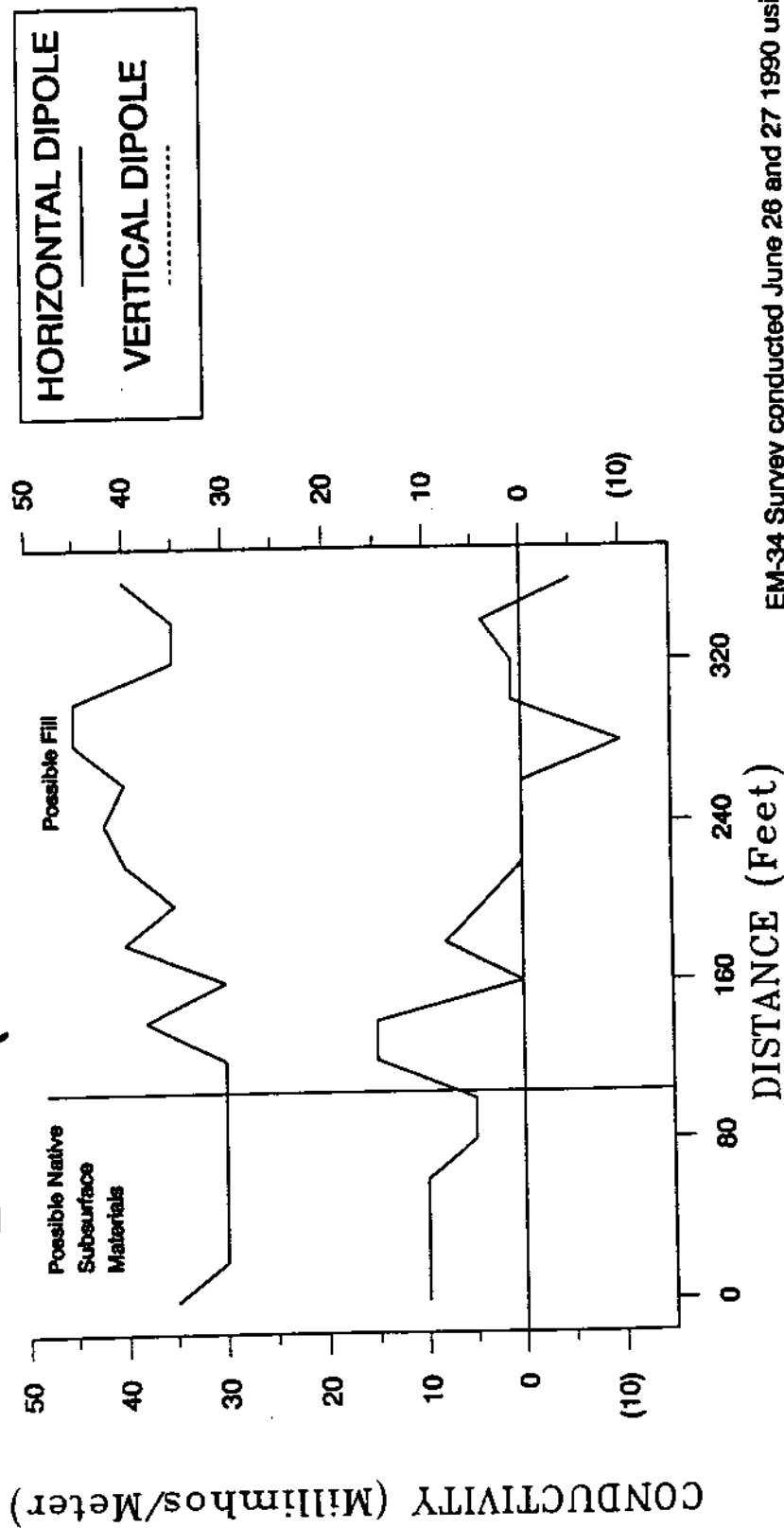
DISTANCE FEET	HORIZONTAL DIPOLE millimhos/meter	VERTICAL DIPOLE millimhos/meter
0	35	10
20	30	10
40	30	10
60	30	10
80	30	5
100	30	5
120	30	15
140	38	15
160	30	0
180	40	8
200	35	4
220	40	0
240	42	0
260	40	0
280	45	-(10)
300	45	1
320	35	1
340	35	4
360	40	(5)

EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 20 foot intervals along the line.

CLARKSTOWN LANDFILL

EM-34 SURVEY

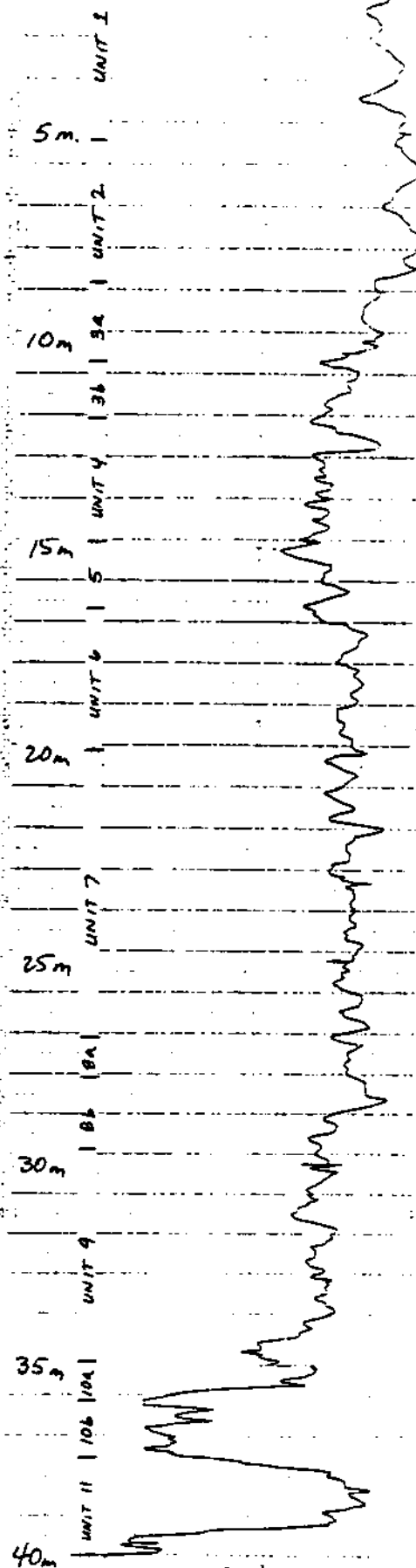
LINE 8 (line starts at Line 7 - 460 feet)



EM-34 Survey conducted June 26 and 27 1990 using a 10 meter coil spacing. Conductivity readings were taken at 20 foot intervals along the line.

SUBSURFACE GEOPHYSICAL (EM-34) DATA

GRADE SURFACE



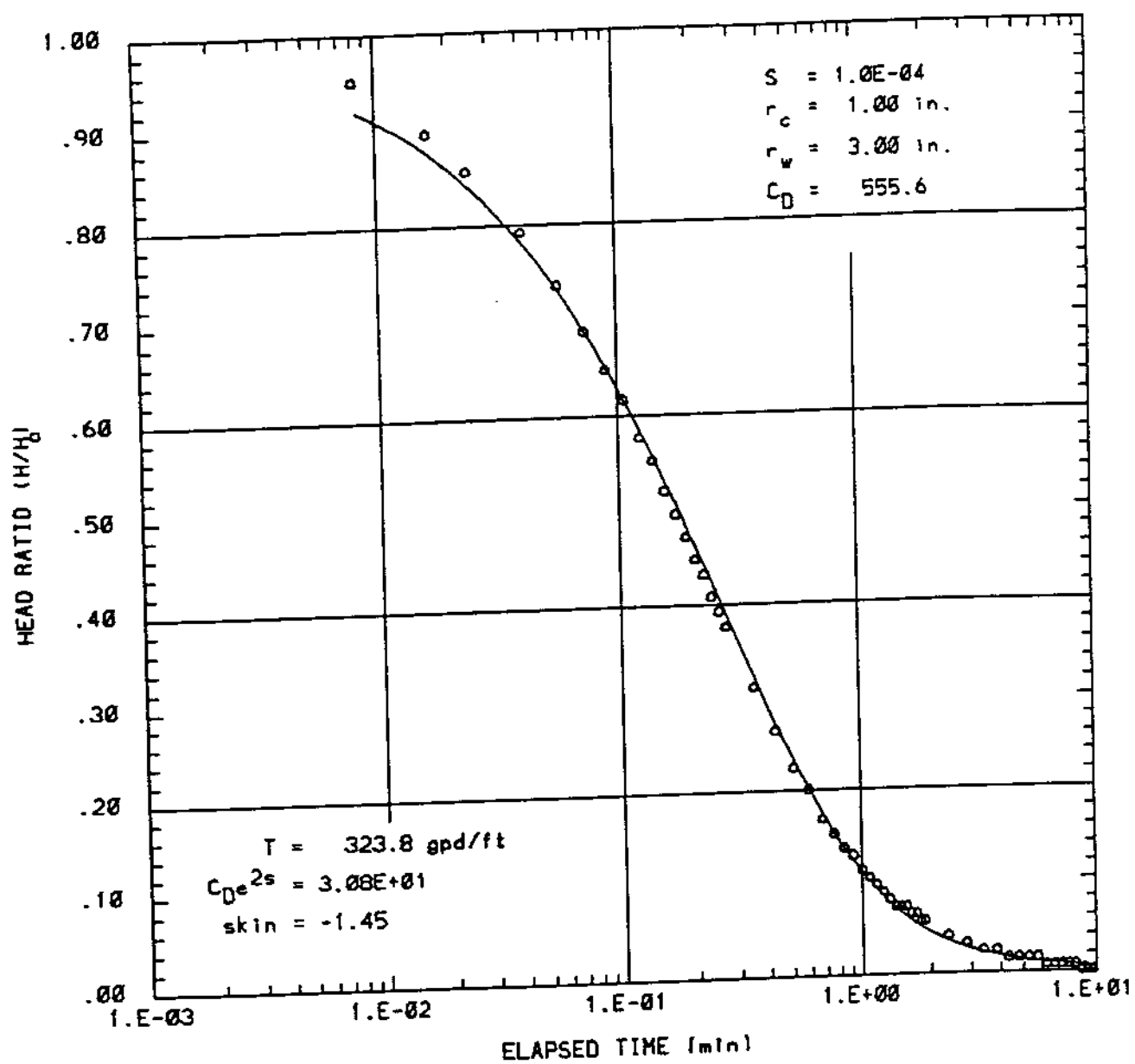
Gamma Log - Boring B-7

IN-SITU PERMEABILITY TESTING

	1	2	3	4	5	6
1			SLUG TEST SUMMARY			
2						
3	PROJECT: CLARKSTOWN SANITARY LANDFILL RI/FS; HYDROGEO INVESTIGATION					
4						
5		COOPER, BREDEHOEFT and PAPADOPULOS ANALYSIS				
6						
7						
8						
9		L	T	K	K	
10	WELL	TESTED	TRANSMISSIVITY	HYDRAULIC		FORMATION
11	NUMBER	INTERVAL	(K*L)	CONDUCTIVITY		SCREENED
12		(feet)	(gal/day-ft)	(gal/day-sqft)	(cm/sec)	
13						
14	RFW-1D	13	323.8	24.91	0.00118	Rock
15	RFW-2	6.5	2761.8	424.89	0.02	Loose Till
16	RFW-3S	13	137.1	10.55	0.000498	Till
17	RFW-3D	20.5	359.2	17.52	0.000827	Rock
18	RFW-4D	18.7	4814.1	257.44	0.0122	Outwash
19	RFW-5S	13	254.5	19.58	0.000924	Fine Sand
20	RFW-5D	14.5	24.04	1.66	0.0000782	Rock
21	RFW-6D	11.5	618	53.74	0.00254	Outwash
22	RFW-7S	10	15.75	1.575	0.0000743	Silt
23	RFW-7D	18	12982.5	721.25	0.034	Outwash
24	RFW-8S	9.5	341	35.89	0.00169	Peaty Sand
25	RFW-8D	15.5	530.3	34.21	0.00161	Outwash
26	RFW-9D	14	1059.4	75.67	0.00357	Outwash
27	RFW-11	6	5086.2	847.7	0.04	Rock
28	RFW-13	6	1165.7	194.28	0.00917	Outwash

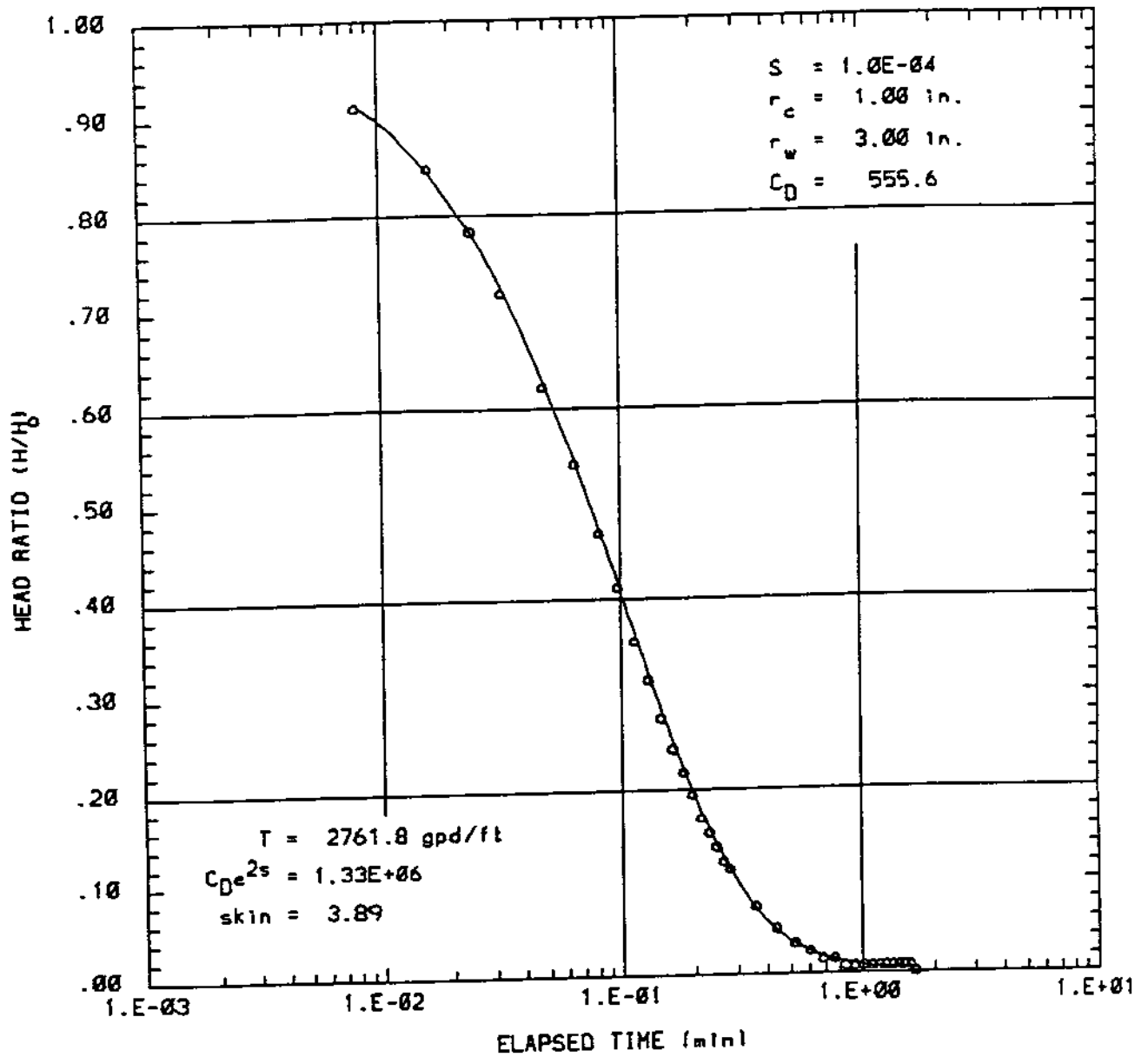
RFW-1D Rising Head Duplicate

STEP (Slug) Test Automated Type-Curve Match (V1.2)



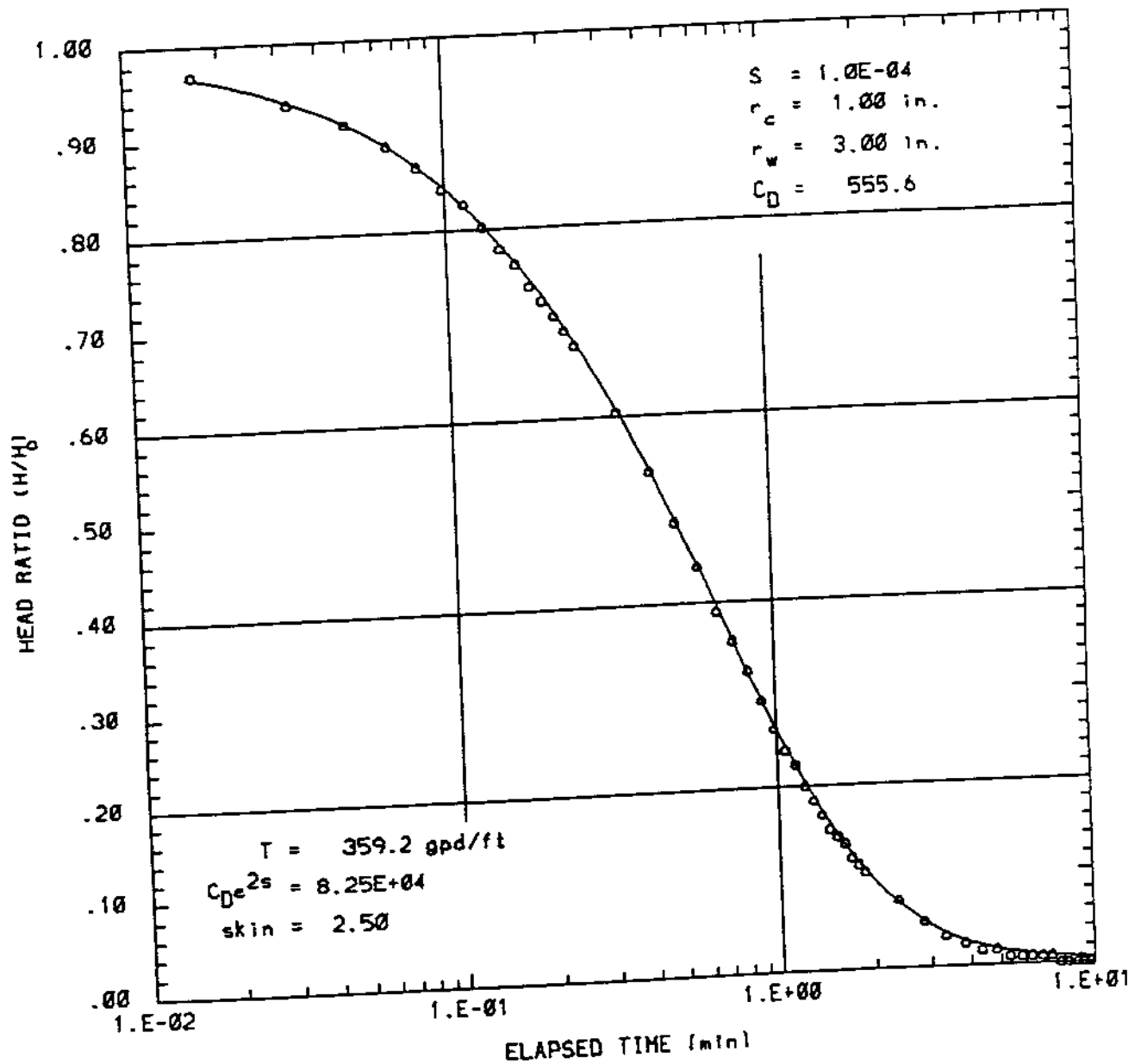
RFW-2 Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



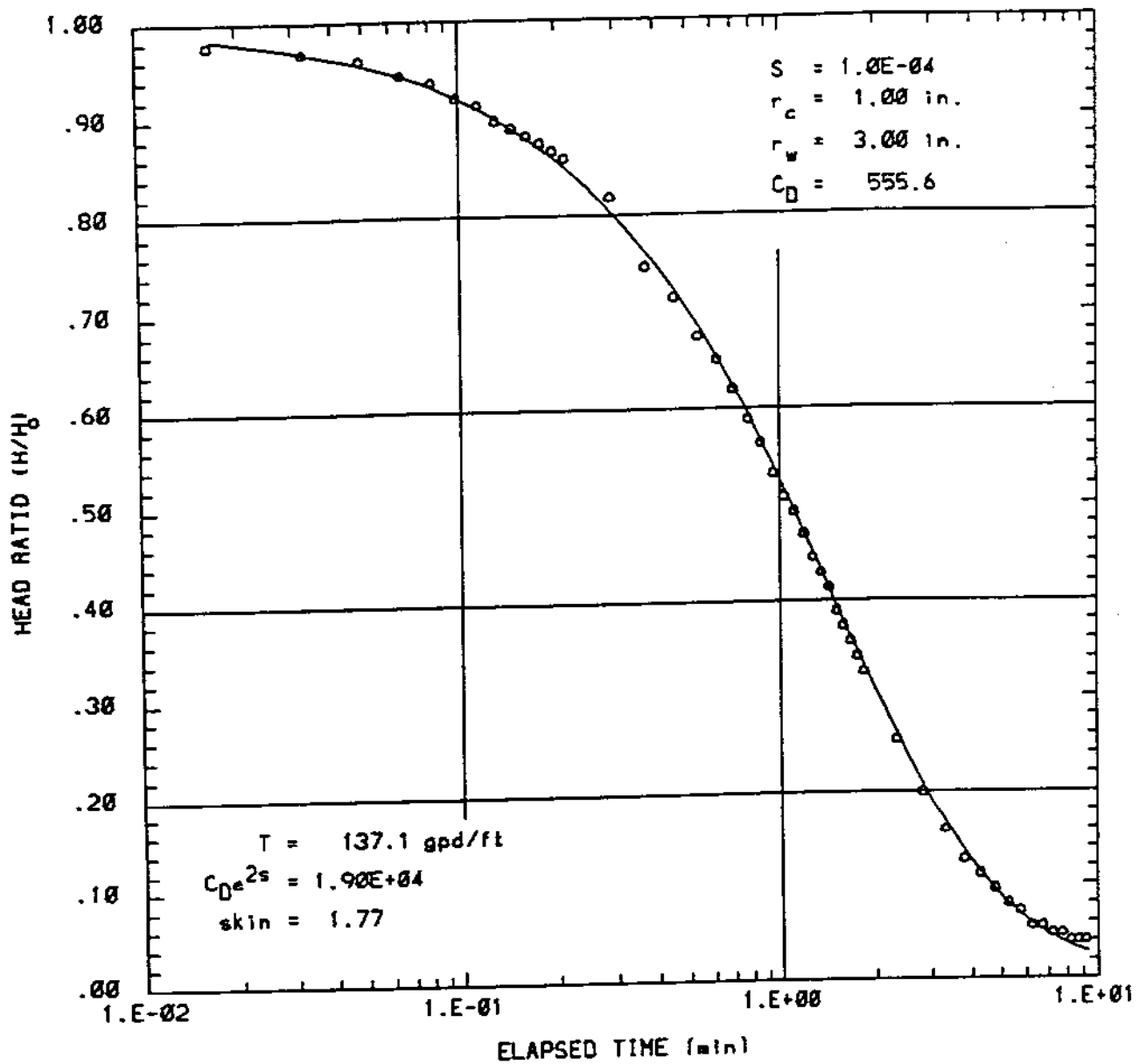
RFW-3D Rising Head Duplicate

STEP (Slug) Test Automated Type-Curve Match (V1.2)



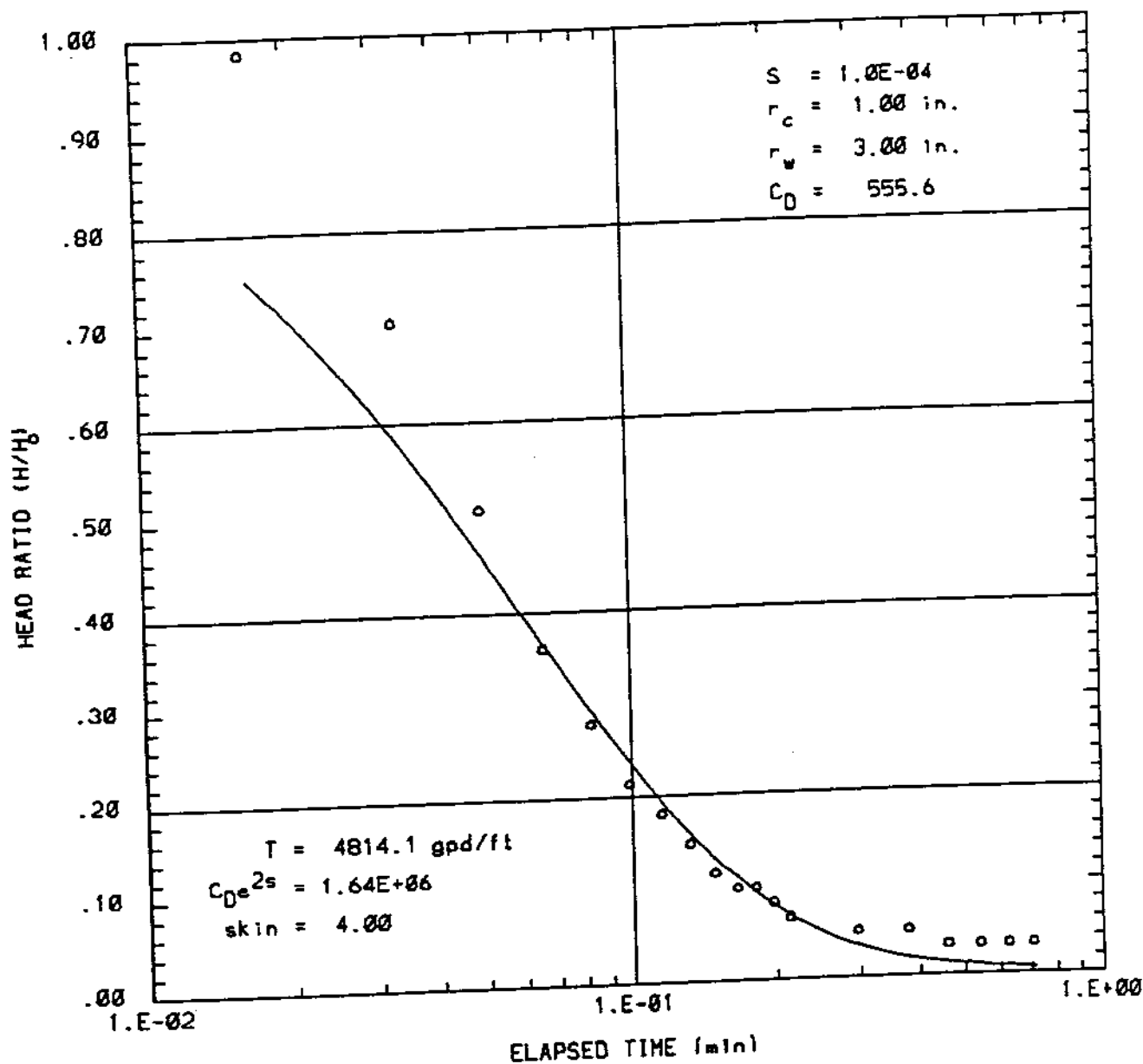
RFW-3S Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



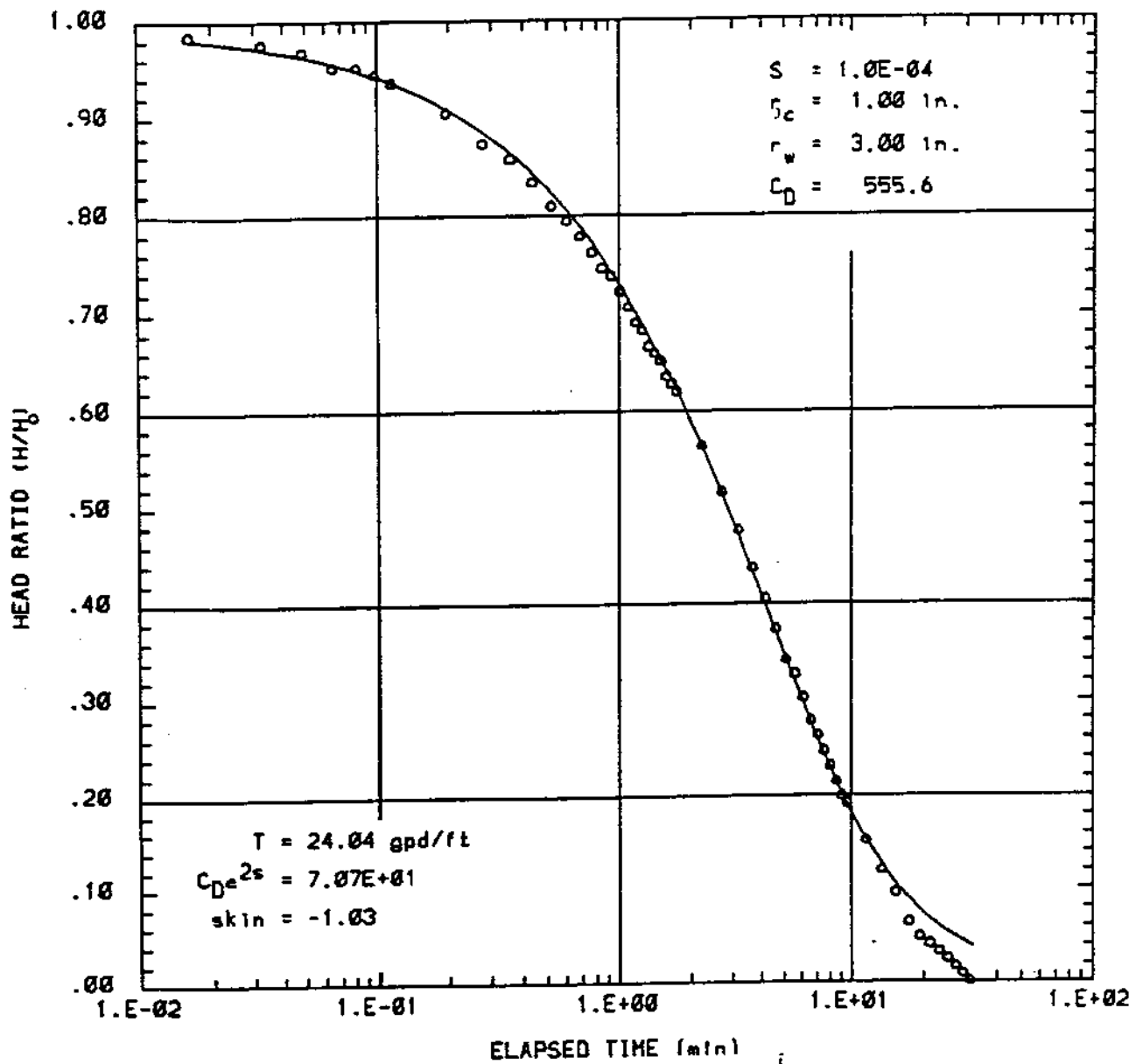
RFW-4D Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



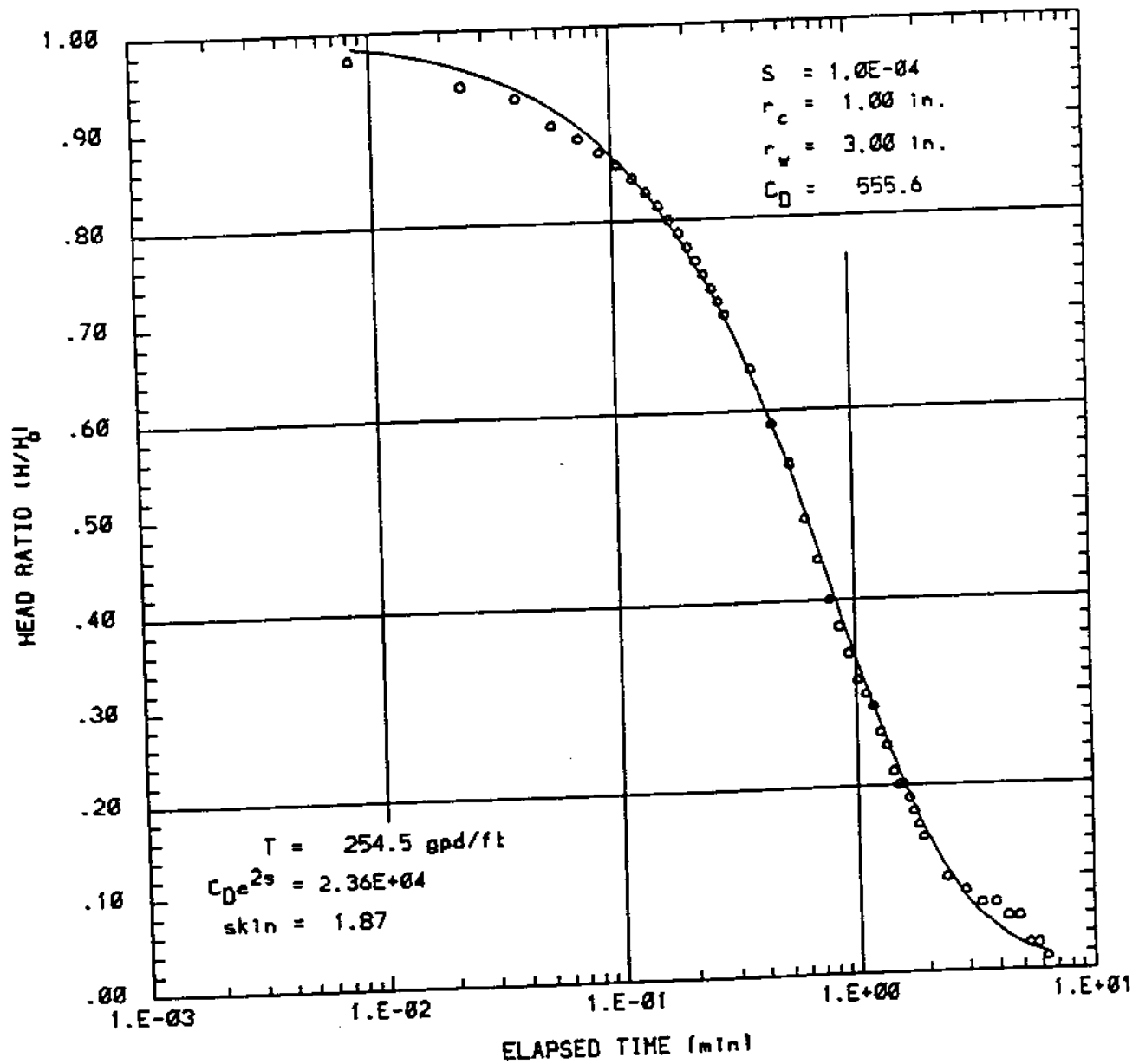
RFW-5D Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



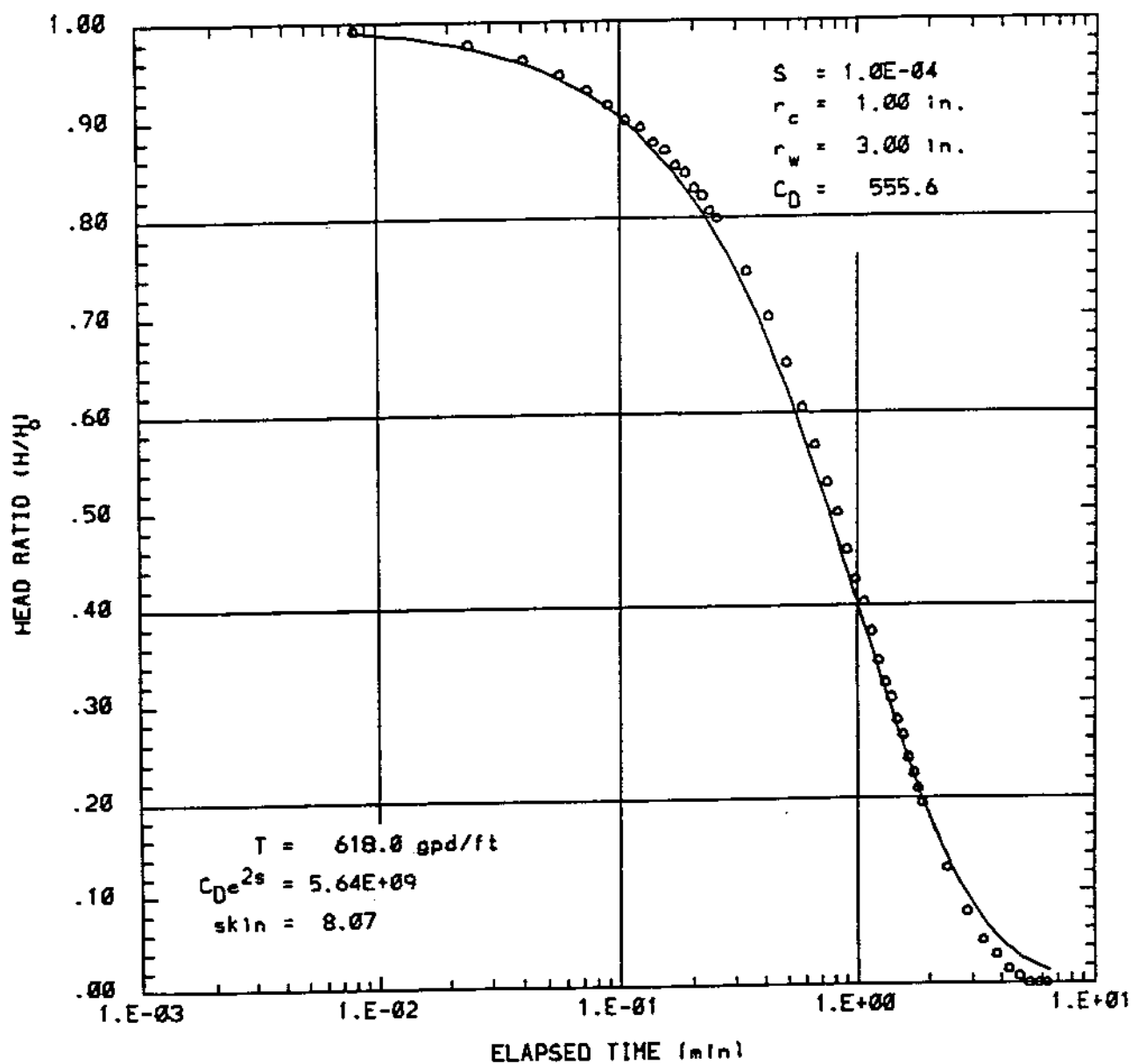
RFW-5S Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



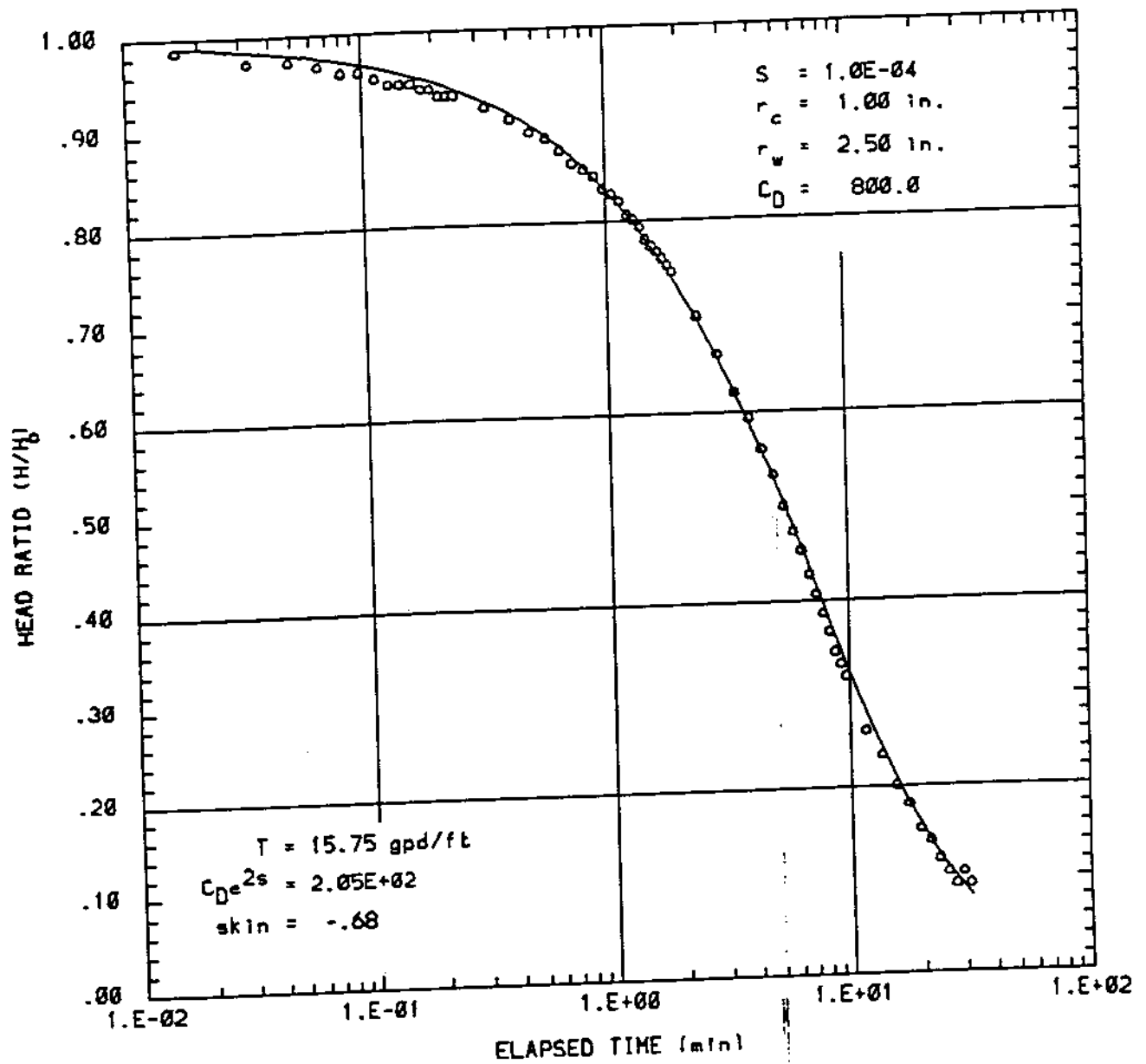
RFW-6D Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



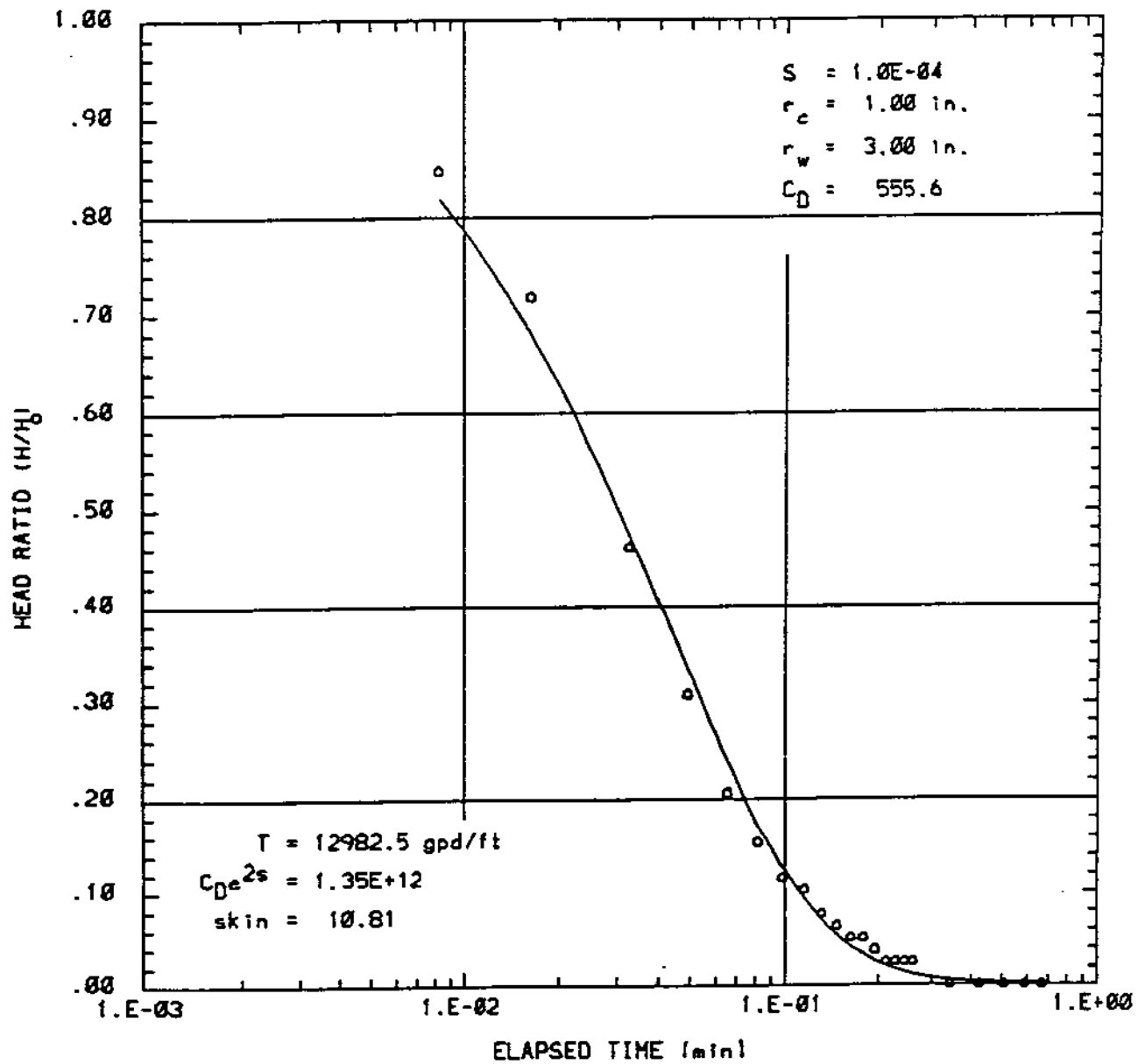
RFW-7S Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



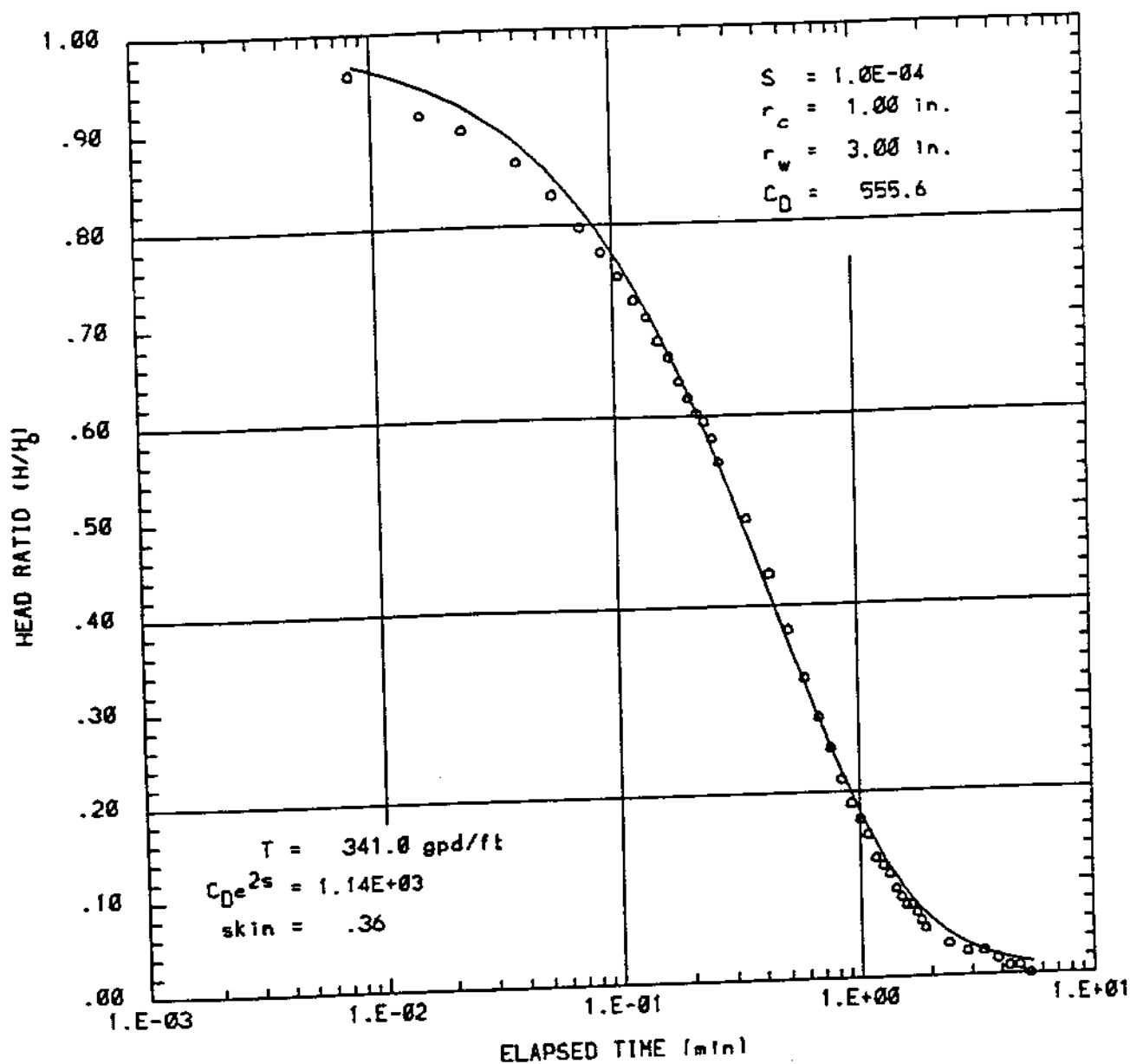
RFW-7D Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



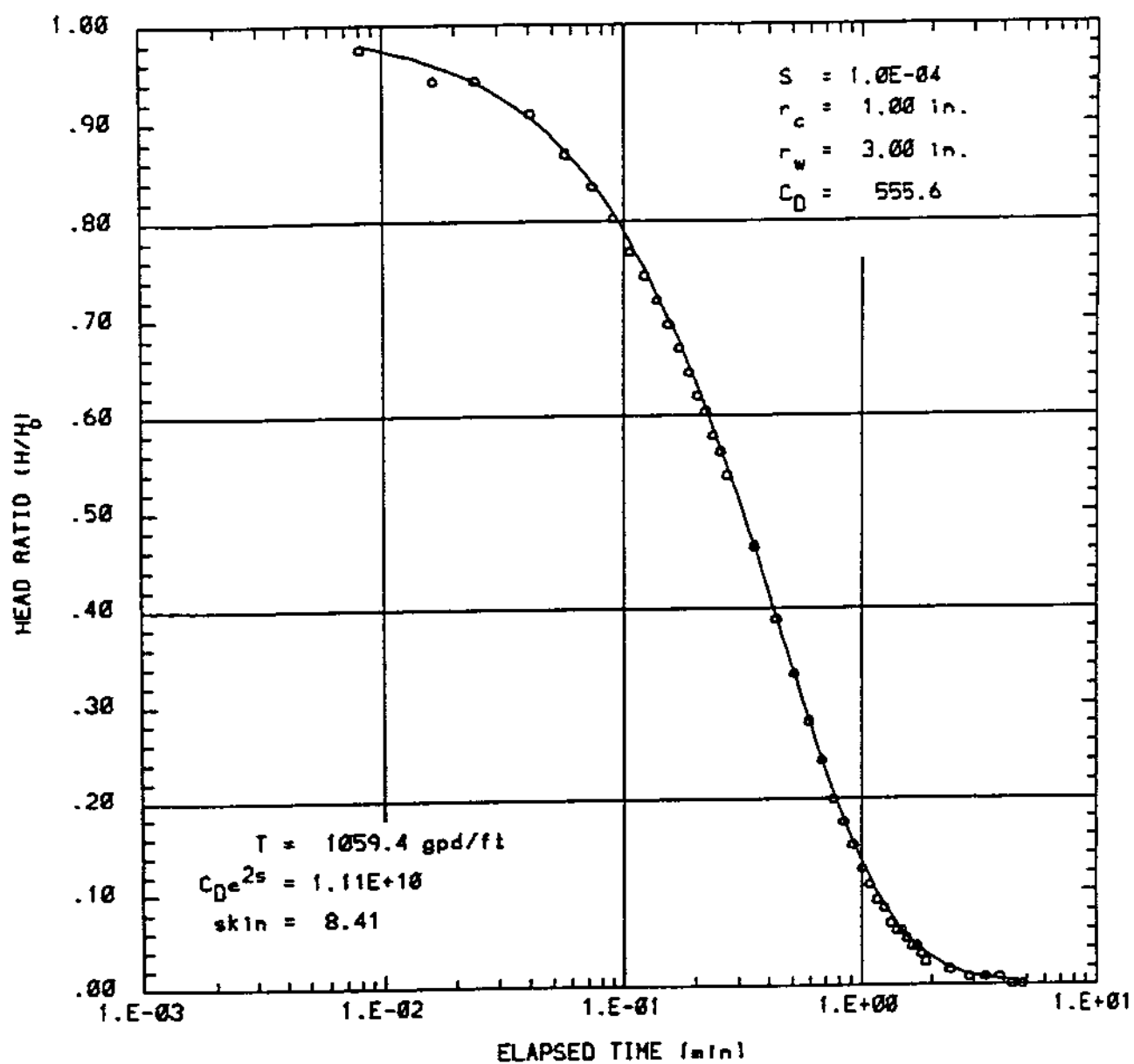
RFW-8S Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



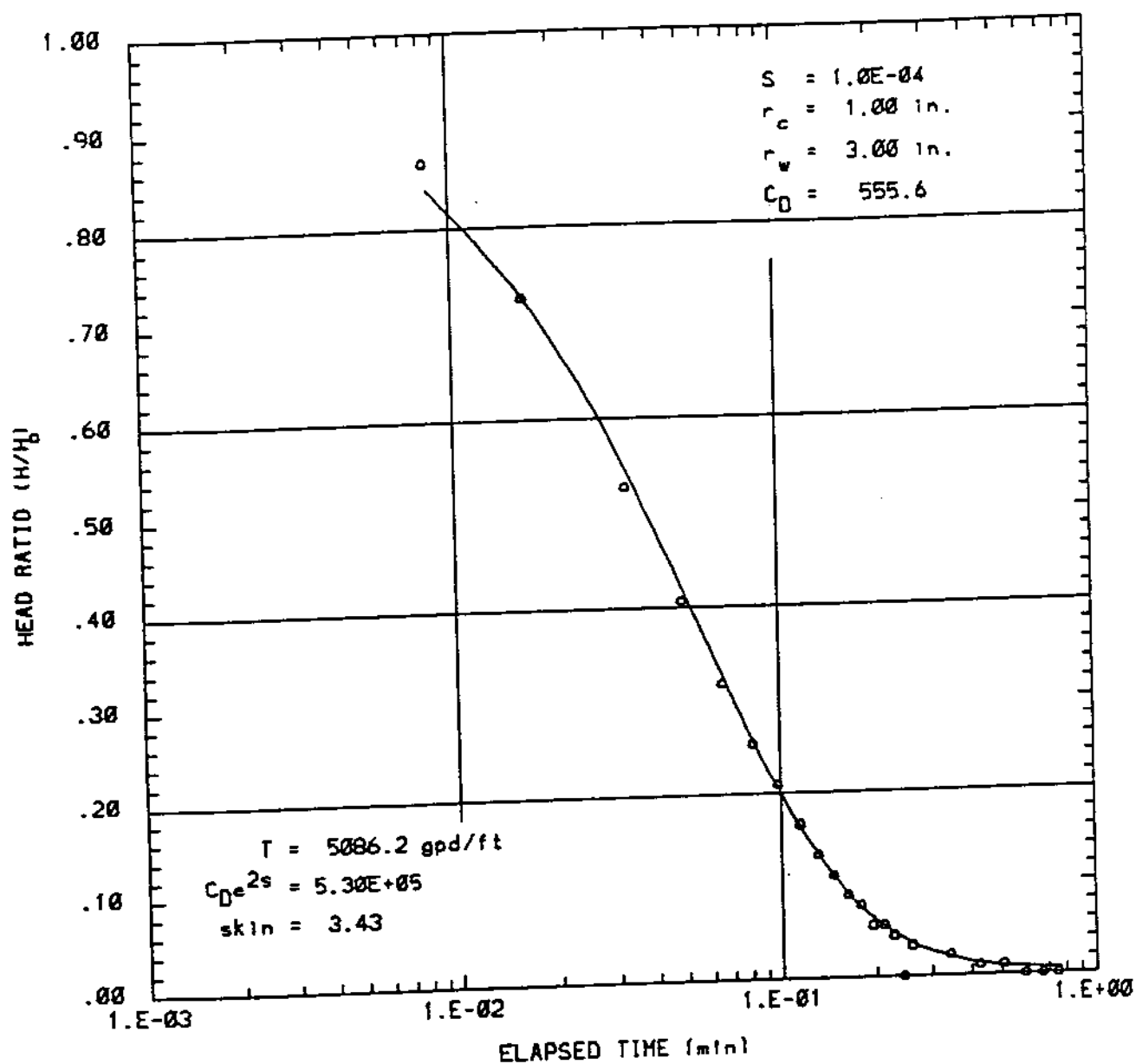
RFW-9D Rising Head Duplicate

STEP (Slug) Test Automated Type-Curve Match (V1.2)



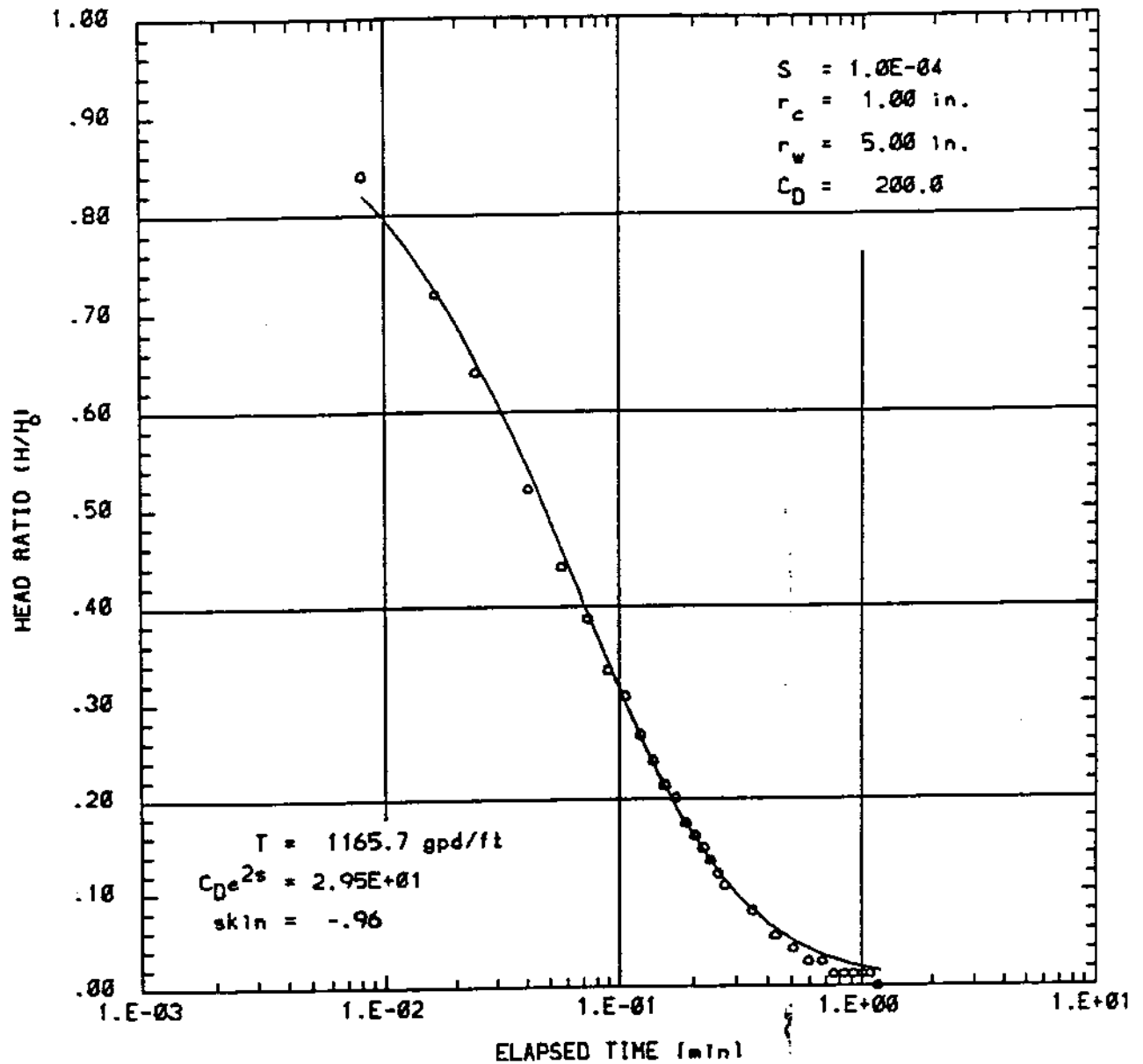
RFW-11 Rising Head

STEP (Slug) Test Automated Type-Curve Match (V1.2)



RFW-13 Rising Head Duplicate

STEP (Slug) Test Automated Type-Curve Match (V1.2)



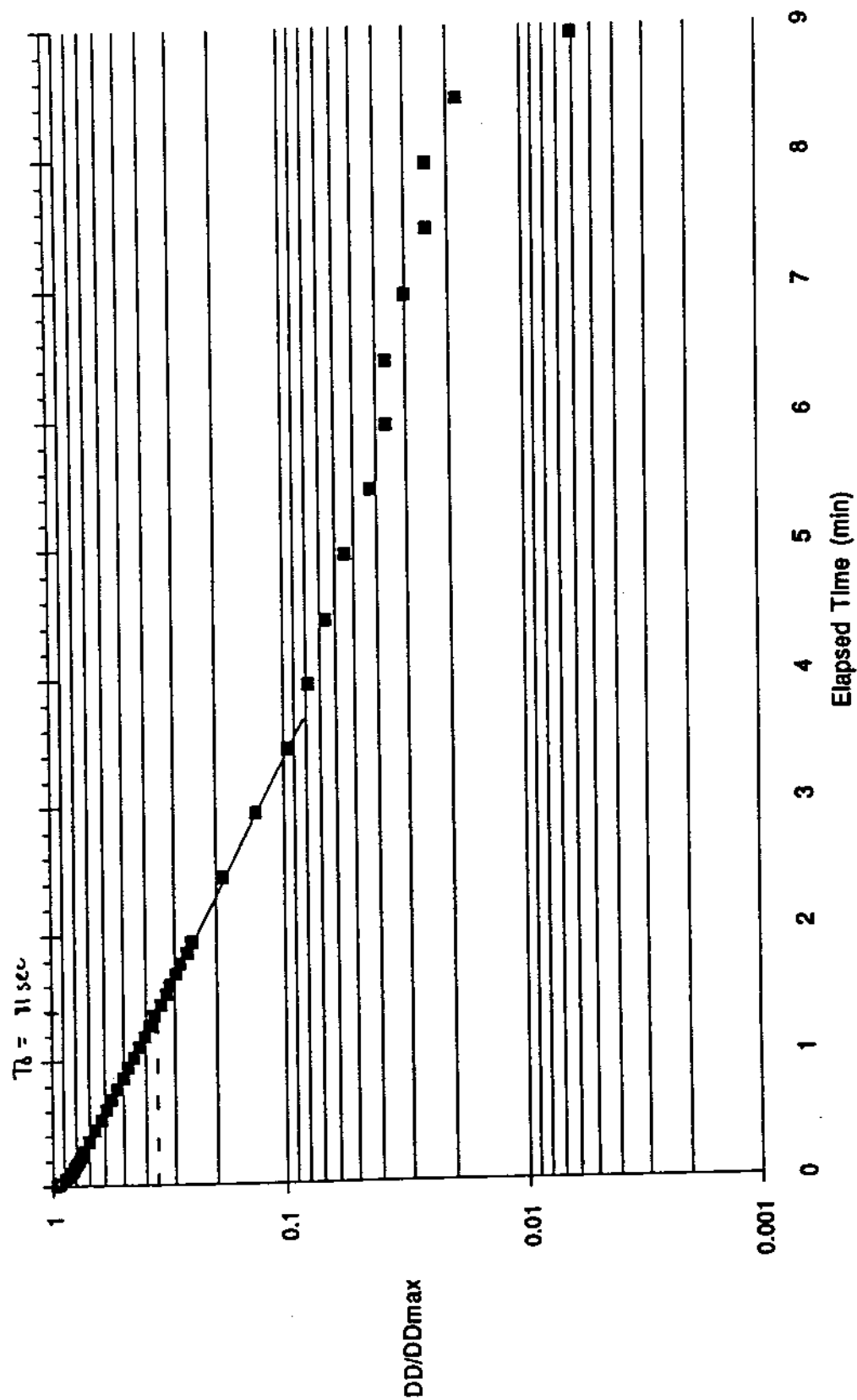
HVORSLEV 2

1	2	3	4	5	6	7	8	9
1				SLUG TEST SUMMARY				
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WELL NUMBER	r WELL RADIUS (feet)	Re BOREHOLE RADIUS (feet)	L TESTED INTERVAL (feet)	L/Re	To TIME RATIO (min)	To TIME RATIO (sec)	HYDRAULIC CONDUCTIVITY (cm/sec)	FORMATION SCREENED
21 RFW-1S	0.083	0.25	10	40	1.35	81	0.000478	Till
22 RFW-4S	0.083	0.25	9	38	104	6240	0.000067	Peat
23 RFW-6S	0.083	0.25	9	38	1565	93900	0.0000004	Peat & Silt
24 RFW-9S	0.083	0.29	13	44.83	0.8	48	0.00084	Fill
25 B-201S	0.125	0.25	13	52	21.3	1278	0.000588	Peat & Silt
26 B-202S	0.125	0.25	18	72	1.83	110	0.000514	Peat & Silt
27 B-203S	0.125	0.25	14	56	213	12780	0.0000053	Organic Silt
28 B-205S	0.125	0.25	8	32	38.8	2208	0.0000487	Peat
29 RFW-PZ1	0.083	0.42	11.5	27.38	9.5	570	0.000053	Till

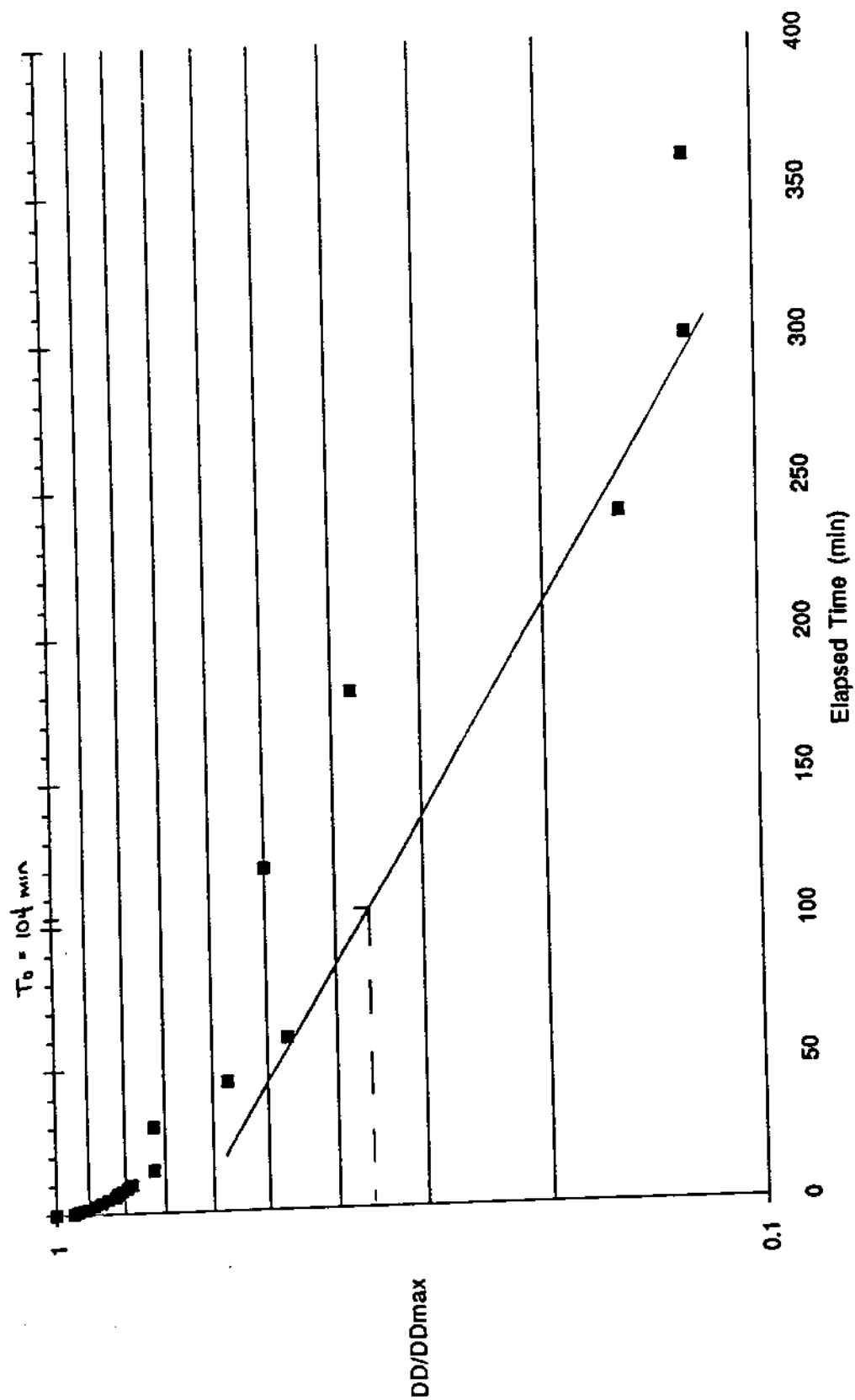
1srhd DD/DDmax

RFW-1S Rising Head Duplicate



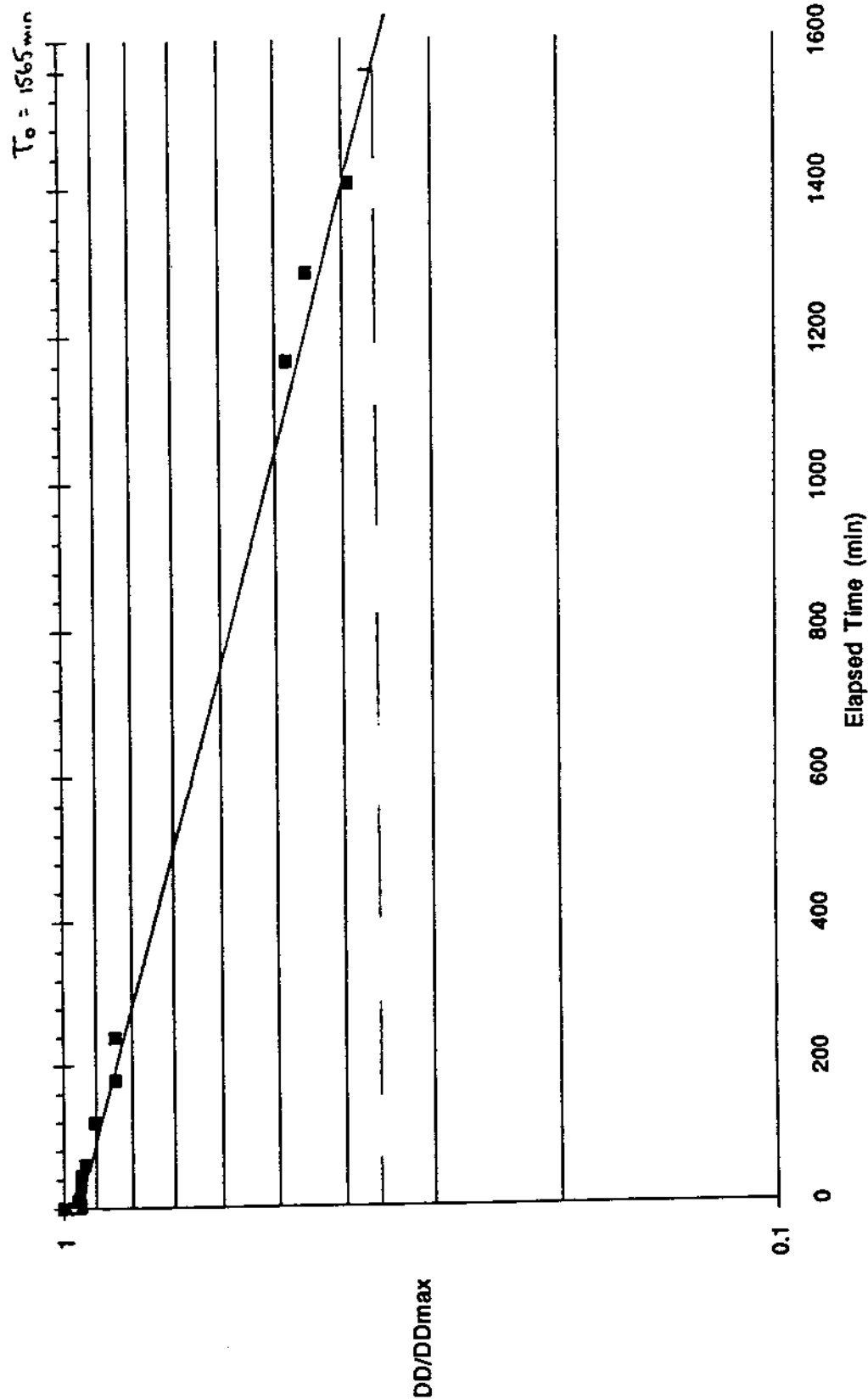
4SRH DD/DDmax

RFW-4S Rising Head



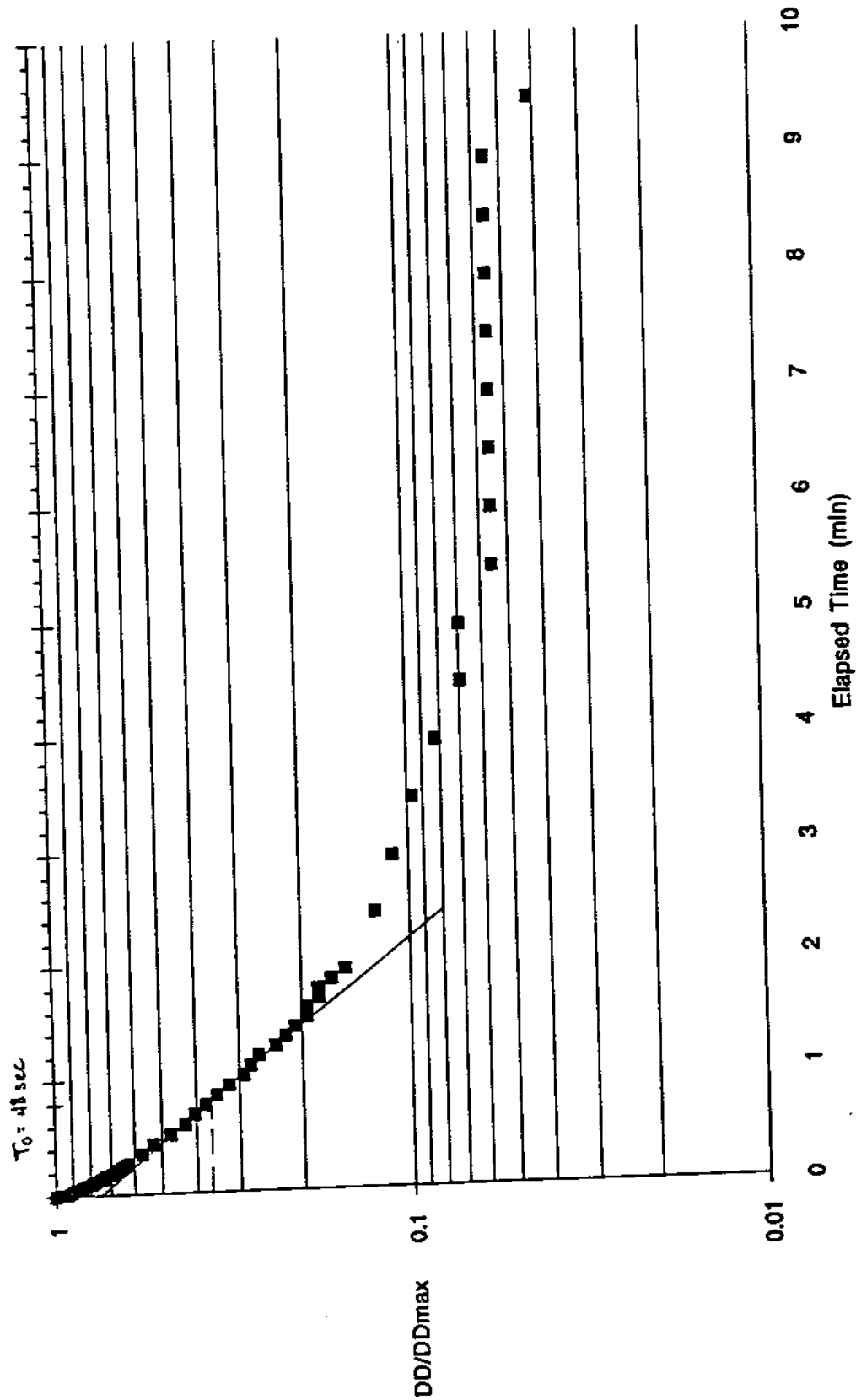
6SFH DD/DDmax1

RFW-6S Falling Head



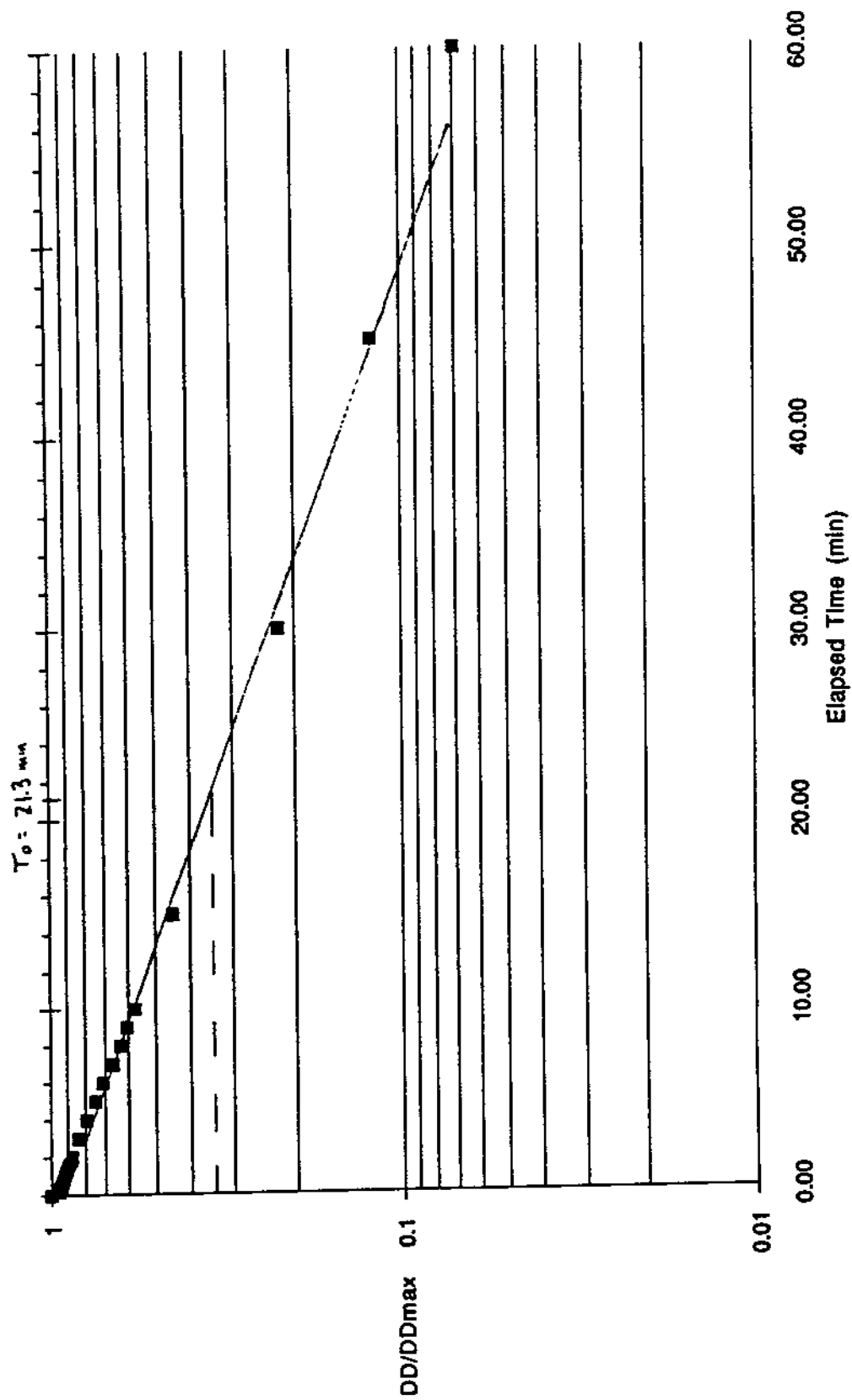
9SRH DD/DDmax

RFW-9S Rising Head



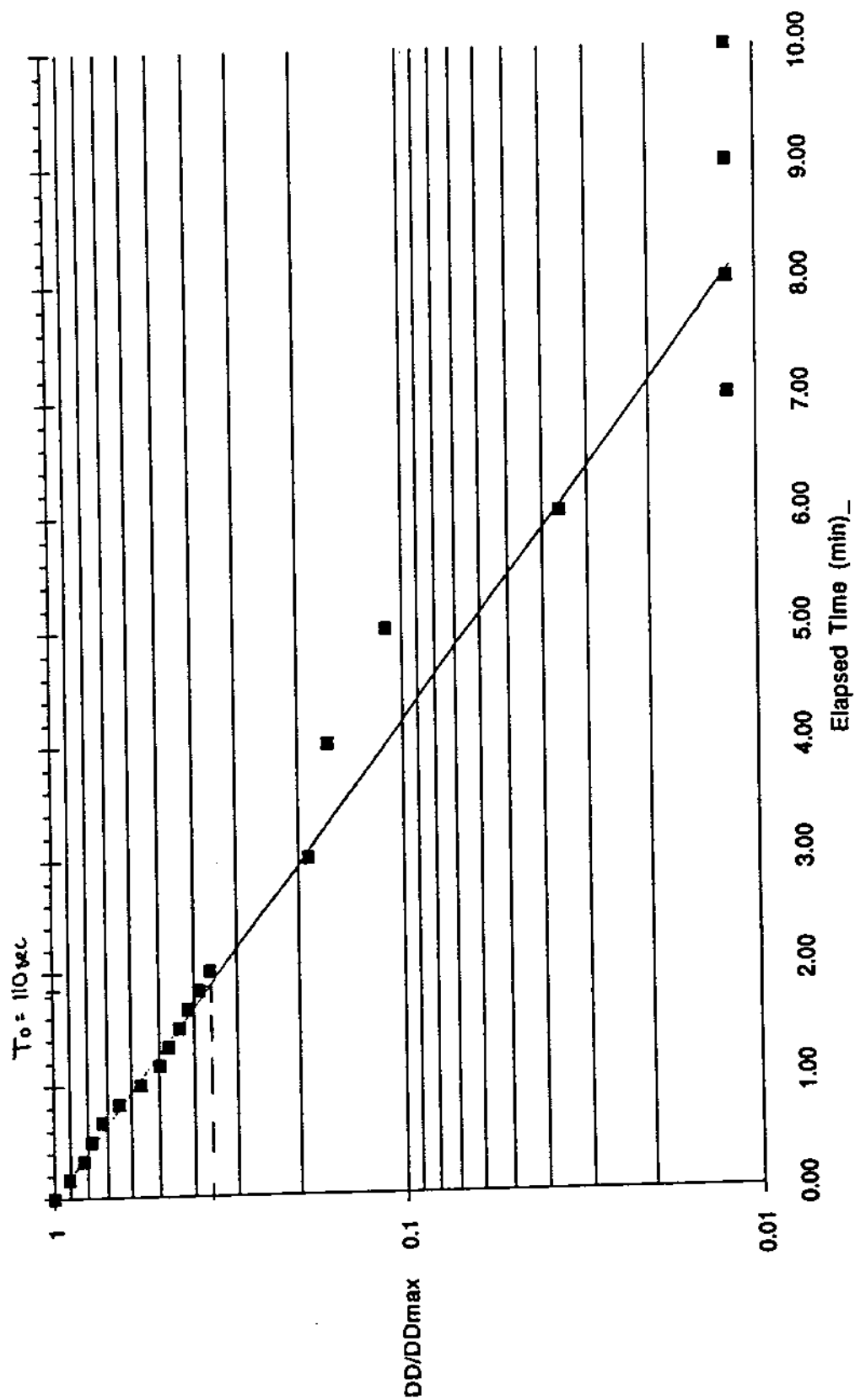
B201-SRH DD/DDmax

B-201S Rising Head



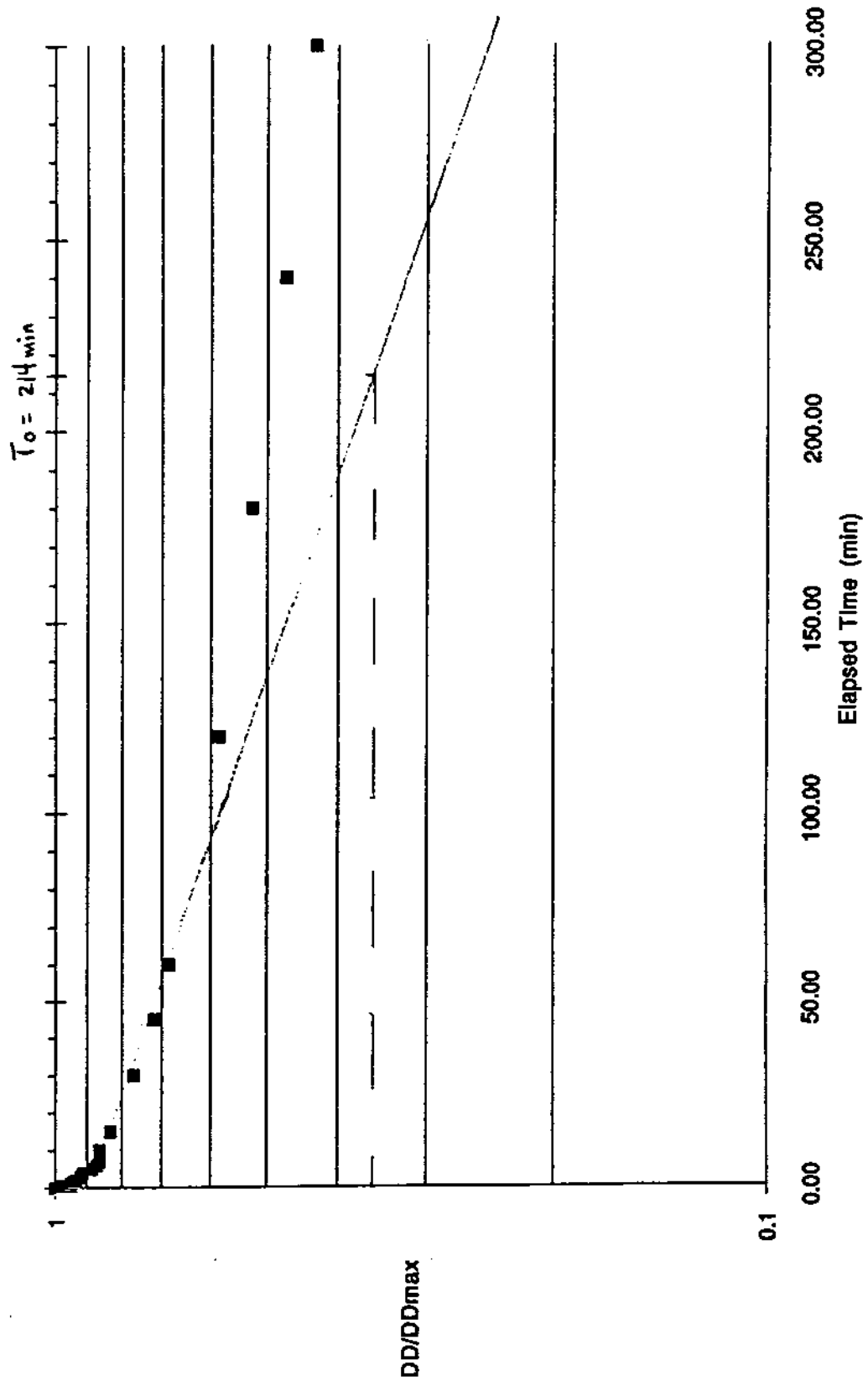
B202-SRH DD/DDmax

B-202S Rising Head



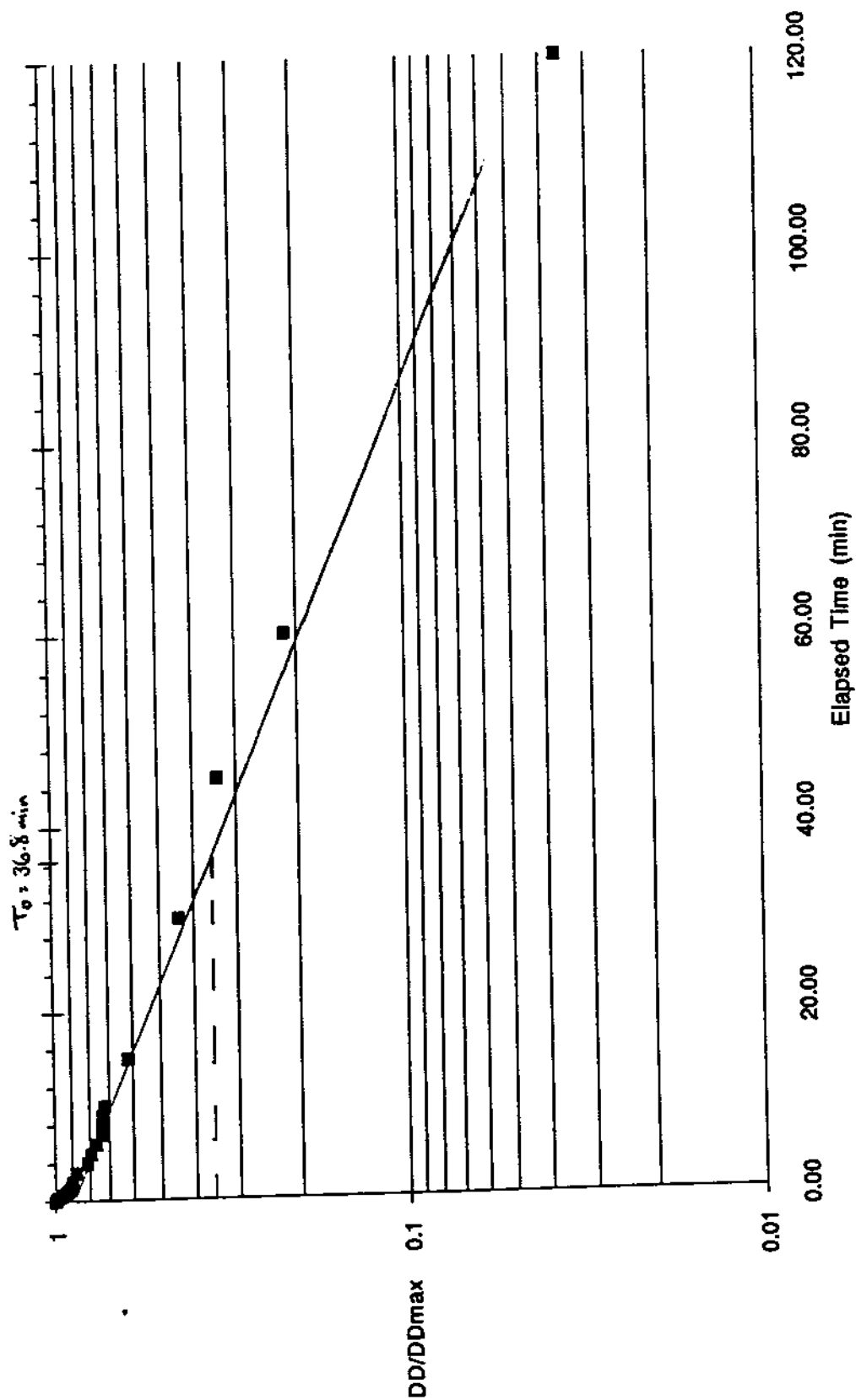
B203-SRH DD/DDmax2

B-203S Rising Head



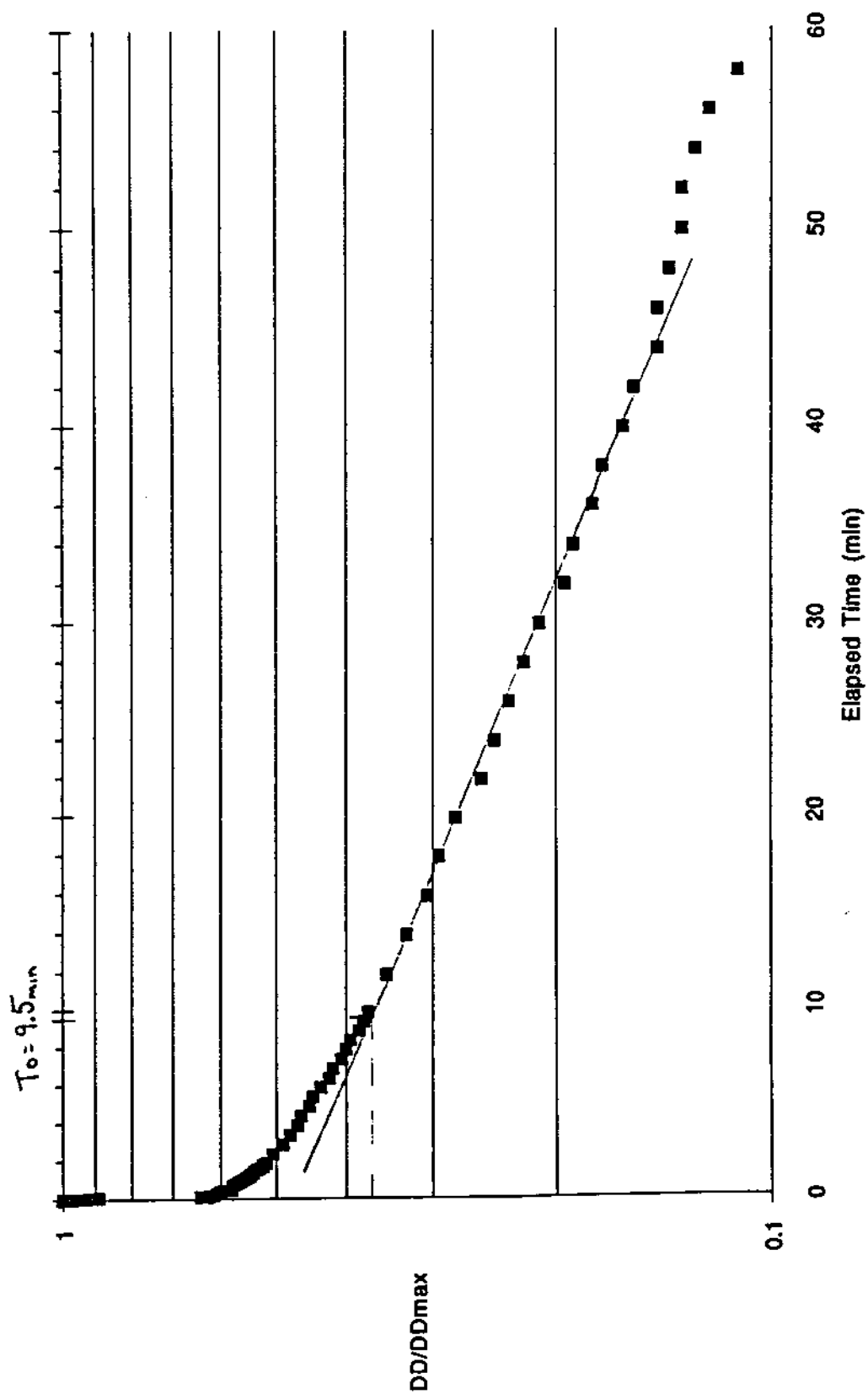
B205-SRH DD/DDmax

B-205S Rising Head



PZ2RH DD/DDmax

RFW-PZ2 Rising Head



**NEW YORK NATURAL HERITAGE DATABASE
INFORMATION (SIGNIFICANT HABITATS)**



ROY F. WESTON, INC.
SUTTON PARK - SUITE 180
465 COLUMBUS AVENUE
VALHALLA, N.Y. 10595
PHONE: 914-749-5400

January 11, 1991

Mr. Burrell Buffington
Significant Habitat Unit
NYSDEC - Wildlife Resources Center
700 Troy-Schenectady Road
Latham, New York 12110

Re: Information on Clarkstown Sanitary Landfill and vicinity

Dear Mr. Buffington:

As per our telephone conversation on January 10, 1991, I am writing to request background data regarding one of our projects. As an Associate Project Scientist working on the Clarkstown Sanitary Landfill RI/FS, one of my tasks is to compile various maps, documents and information pertaining to soils, vegetation, wildlife, wetland designations, ground water and surface water classifications, etc.

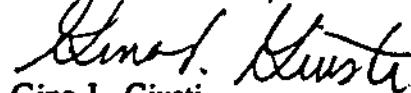
We need to know what is contained in DEC's database as far as rare, threatened and endangered species of wildlife and vegetation along with significant and/or critical habitat designations on and near the project site. This information is very important because we are required to evaluate the impacts of the remediation on any such species or areas and make the proper recommendations taking any such effects into account.

I have enclosed a xeroxed copy of the appropriate USGS Quad with the area of the site itself highlighted. My request is that you send me all information on rare, threatened, and endangered species (including significant/critical habitats) of flora and fauna within a radius of 1.5 miles from the middle of the site. It is my understanding that such a search could be completed in about 2-3 weeks.

If you have any questions or if my request is not clear, please call me at (914)749-5400. Thank you for your consideration and attention in this matter.

Very truly yours,

ROY F. WESTON, INC.


Gina L. Giusti
Associate Project Scientist

New York State Department of Environmental Conservation

Information Services
700 Troy-Schenectady Road
Latham, New York 12110-2400



Thomas C. Jorling
Commissioner

January 30, 1991

Ms. Gina L. Biusti
Roy F. Weston, Inc.
Sutton Pk, Suite 180, 465 Columbus Ave.
Valhalla, New York 10595

Dear Ms. Biusti:

We have reviewed the Significant Habitat Program and the Natural Heritage Program files with respect to your request for biological information concerning the Clarkstown Landfill vicinity, in the Town of Clarkstown, Rockland County.

We did not identify any potential impacts on endangered, threatened, or special concern wildlife species, rare plant, animal or natural community occurrences, or other significant habitats.

The absence of data does not necessarily mean that rare or endangered elements, natural communities or other significant habitats do not exist on or adjacent to the proposed site, but rather that our files currently do not contain any information which indicates the presence of these. Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we cannot provide a definitive statement on the presence or absence of species, habitats or communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals, plants and natural communities and/or significant wildlife habitats. You should contact our regional office(s), Division of Regulatory Affairs, at the address(es) on the enclosed list for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under state law.

If this proposed project is still active one year from now we recommend that you contact us again so that we can update this response.

Sincerely,

Burrell Buffington
Burrell Buffington
Significant Habitat Unit

Enc.

**ROCKLAND COUNTY HEALTH DEPARTMENT -
PRIVATE WELL WATER SUPPLY
ANALYTICAL DATA**

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number -- 10108
(914) 593-5575

Lab Number: 92-0022510

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: 570 N. ROUTE 303, BLAUVELT, NY

Sampling Point: BATHROOM SINK

Collected By: KORCHAK

ON: 9/25/1992 TIME: 11:50:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:52:51

METHOD	ANALYTES	RESULTS	REPORTED ON
501/524	THM'S - VOLATILE HALOGENATED COMPOUNDS (PART 1)		10/06/1992
	BROMOFORM	LT 2.00 UG/L	
	BROMODICHLOROMETHANE	LT 0.50 UG/L	
	CHLOROFORM	LT 0.50 UG/L	
	DIBROMOCHLOROMETHANE	LT 2.00 UG/L	
502/524	VOLATILE HALOGENATED COMPOUNDS (PART 2)		10/06/1992
	BROMOCHLOROMETHANE	LT 0.50 UG/L	
	BROMOMETHANE	LT 0.50 UG/L	
	CARBON TETRACHLORIDE	LT 0.50 UG/L	
	CHLOROETHANE	LT 0.50 UG/L	
	CHLOROMETHANE	LT 0.50 UG/L	
	DIBROMOMETHANE	LT 0.50 UG/L	
	DICHLORODIFLUOROMETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHANE	LT 0.50 UG/L	
	1,2-DICHLOROETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHENE	LT 0.50 UG/L	
	CIS-1,2-DICHLOROETHENE	1.30 UG/L	
	TRANS-1,2-DICHLOROETHENE	LT 0.50 UG/L	
	1,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,3-DICHLOROPROPANE	LT 0.50 UG/L	
	2,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,1-DICHLOROPROPENE	LT 0.50 UG/L	
	CIS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	
	TRANS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

RECEIVED

OCT 29 1992

Bureau of Environmental
Exposure Investigation

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0022510

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: 570 N. ROUTE 303, BLAUVELT, NY

Sampling Point: BATHROOM SINK

Collected By: KORCHAK

ON: 9/25/1992 TIME: 11:50:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:52:51

METHOD	ANALYTES	RESULTS	REPORTED ON
	METHYLENE CHLORIDE	LT 0.50 UG/L	
	1,1,1,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	1,1,2,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	TETRACHLOROETHENE	16.00 UG/L	
	1,1,1-TRICHLOROETHANE	1.00 UG/L	
	1,1,2-TRICHLOROETHANE	LT 0.50 UG/L	
	TRICHLOROETHENE	LT 0.50 UG/L	
	TRICHLOROFLUOROMETHANE	LT 0.50 UG/L	
	1,2,3-TRICHLOROPROPANE	LT 0.50 UG/L	
	VINYL CHLORIDE	LT 0.50 UG/L	
503/524	VOLATILE AROMATIC COMPOUNDS BY GC OR GC/MS		10/06/1992
	BENZENE	LT 0.50 UG/L	
	BROMOBENZENE	LT 0.50 UG/L	
	N-BUTYLBENZENE	LT 0.50 UG/L	
	SEC-BUTYLBENZENE	LT 0.50 UG/L	
	TERT-BUTYLBENZENE	LT 0.50 UG/L	
	CHLOROBENZENE	LT 0.50 UG/L	
	2-CHLOROTOLUENE	LT 0.50 UG/L	
	4-CHLOROTOLUENE	LT 0.50 UG/L	
	1,2-DICHLOROBENZENE	LT 0.50 UG/L	
	1,3-DICHLOROBENZENE	LT 0.50 UG/L	
	1,4-DICHLOROBENZENE	LT 0.50 UG/L	
	ETHYL BENZENE	LT 0.50 UG/L	
	HEXACHLOROBUTADIENE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

WESTCHESTER COUNTY

Department of Laboratories & Research
 Hammond House Road
 Valhalla, N.Y. 10595

Environmental Laboratories
 NYS-ELAP Number - 10108
 (914) 593-5575

Lab Number: 92-0022510

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: 570 N. ROUTE 303, BLAUVELT, NY

Sampling Point: BATHROOM SINK

Collected By: KORCHAK

ON: 9/25/1992 TIME: 11:50:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:52:51

METHOD	ANALYTES	RESULTS	REPORTED ON
	ISOPROPYLBENZENE	LT 0.50 UG/L	
	P-ISOPROPYLTOLUENE	LT 0.50 UG/L	
	NAPHTHALENE	LT 0.50 UG/L	
	N-PROPYLBENZENE	LT 0.50 UG/L	
	STYRENE	LT 0.50 UG/L	
	TOLUENE	LT 0.50 UG/L	
	1,2,3-TRICHLOROBENZENE	LT 0.50 UG/L	
	1,2,4-TRICHLOROBENZENE	LT 0.50 UG/L	
	1,2,4-TRIMETHYLBENZENE	LT 0.50 UG/L	
	1,3,5-TRIMETHYLBENZENE	LT 0.50 UG/L	
	P&M-XYLENE	LT 0.50 UG/L	
	O-XYLENE	LT 0.50 UG/L	
	METHYL T-BUTYL ETHER (MTBE)	LT 1.00 UG/L	
	METHYL ISOBUTYL KETONE (MIBK)	LT 1.00 UG/L	

APPROVED BY: DAVID VINCI
 COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0022511

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: N. ROUTE 303, BLAUVELT, NY

Sampling Point: OUTSIDE TAP

Collected By: KORCHAK

ON: 9/25/1992 TIME: 11:00:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:55:23

METHOD	ANALYTES	RESULTS	REPORTED ON
501/524	THM'S - VOLATILE HALOGENATED COMPOUNDS (PART 1)		10/06/1992
	BROMOFORM	LT 2.00 UG/L	
	BROMODICHLOROMETHANE	LT 0.50 UG/L	
	CHLOROFORM	LT 0.50 UG/L	
	DIBROMOCHLOROMETHANE	LT 2.00 UG/L	
502/524	VOLATILE HALOGENATED COMPOUNDS (PART 2)		10/06/1992
	BROMOCHLOROMETHANE	LT 0.50 UG/L	
	BROMOMETHANE	LT 0.50 UG/L	
	CARBON TETRACHLORIDE	LT 0.50 UG/L	
	CHLOROETHANE	LT 0.50 UG/L	
	CHLOROMETHANE	LT 0.50 UG/L	
	DIBROMOMETHANE	LT 0.50 UG/L	
	DICHLORODIFLUOROMETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHANE	LT 0.50 UG/L	
	1,2-DICHLOROETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHENE	LT 0.50 UG/L	
	CIS-1,2-DICHLOROETHENE	LT 0.50 UG/L	
	TRANS-1,2-DICHLOROETHENE	LT 0.50 UG/L	
	1,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,3-DICHLOROPROPANE	LT 0.50 UG/L	
	2,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,1-DICHLOROPROPENE	LT 0.50 UG/L	
	CIS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	
	TRANS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

DATE: 10/06/1992

PAGE: 2 of 2

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0022511

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: N. ROUTE 303, BLAUVELT, NY

Sampling Point: OUTSIDE TAP

Collected By: KORCHAK

ON: 9/25/1992 TIME: 11:00:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:55:23

METHOD	ANALYTES	RESULTS	REPORTED ON
	METHYLENE CHLORIDE	LT 0.50 UG/L	
	1,1,1,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	1,1,2,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	TETRACHLOROETHENE	1.50 UG/L	
	1,1,1-TRICHLOROETHANE	LT 0.50 UG/L	
	1,1,2-TRICHLOROETHANE	LT 0.50 UG/L	
	TRICHLOROETHENE	LT 0.50 UG/L	
	TRICHLOROFLUOROMETHANE	LT 0.50 UG/L	
	1,2,3-TRICHLOROPROPANE	LT 0.50 UG/L	
	VINYL CHLORIDE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0022508

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: N. ROUTE 303, BLAUVELT, NY

Sampling Point: KITCHENETTE

Collected By: KORCHAK

ON: 9/30/1992 TIME: 11:20:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:49:35

METHOD	ANALYTES	RESULTS	REPORTED ON
501/524	THM'S - VOLATILE HALOGENATED COMPOUNDS (PART 1)		10/06/1992
	BROMOFORM	LT 2.00 UG/L	
	BROMODICHLOROMETHANE	LT 0.50 UG/L	
	CHLOROFORM	LT 0.50 UG/L	
	DIBROMOCHLOROMETHANE	LT 2.00 UG/L	
502/524	VOLATILE HALOGENATED COMPOUNDS (PART 2)		10/06/1992
	BROMOCHLOROMETHANE	LT 0.50 UG/L	
	BROMOMETHANE	LT 0.50 UG/L	
	CARBON TETRACHLORIDE	LT 0.50 UG/L	
	CHLOROETHANE	LT 0.50 UG/L	
	CHLOROMETHANE	LT 0.50 UG/L	
	DIBROMOMETHANE	LT 0.50 UG/L	
	DICHLORODIFLUOROMETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHANE	LT 0.50 UG/L	
	1,2-DICHLOROETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHENE	LT 0.50 UG/L	
	CIS-1,2-DICHLOROETHENE	LT 0.50 UG/L	
	TRANS-1,2-DICHLOROETHENE	LT 0.50 UG/L	
	1,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,3-DICHLOROPROPANE	LT 0.50 UG/L	
	2,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,1-DICHLOROPROPENE	LT 0.50 UG/L	
	CIS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	
	TRANS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

DATE: 12/07/1992

PAGE: 2 of 2

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0025763

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: 570 N RT 303 BLAUVELT

Sampling Point: WASH RM

Collected By: GUIDICE

ON: 11/02/1992 TIME: 11:00:00

Bottle Numbers:

Login Comment:

Sample Type: P

Received By: ST

ON: 11/05/1992 TIME: 11:14:35

METHOD	ANALYTES	RESULTS	REPORTED ON
	1,2,3-TRICHLOROPROPANE	LT 0.50 UG/L	
	VINYL CHLORIDE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 12/07/1992

LT = LESS THAN

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0025763

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: 570 N RT 303 BLAUVELT

Sampling Point: WASH RM

Collected By: GUIDICE

ON: 11/02/1992 TIME: 11:00:00

Bottle Numbers:

Login Comment:

Sample Type: P

Received By: ST

ON: 11/05/1992 TIME: 11:14:35

METHOD	ANALYTES	RESULTS	REPORTED ON
502/524	VOLATILE HALOGENATED COMPOUNDS (PART 2)		11/18/1992
	BROMOCHLOROMETHANE	LT 0.50 UG/L	
	BROMOMETHANE	LT 0.50 UG/L	
	CARBON TETRACHLORIDE	LT 0.50 UG/L	
	CHLOROETHANE	LT 0.50 UG/L	
	CHLOROMETHANE	LT 0.50 UG/L	
	DIBROMOMETHANE	LT 0.50 UG/L	
	DICHLORODIFLUOROMETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHANE	LT 0.50 UG/L	
	1,2-DICHLOROETHANE	LT 0.50 UG/L	
	1,1-DICHLOROETHENE	0.74 UG/L	
	CIS-1,2-DICHLOROETHENE	2.60 UG/L	
	TRANS-1,2-DICHLOROETHENE	LT 0.50 UG/L	
	1,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,3-DICHLOROPROPANE	LT 0.50 UG/L	
	2,2-DICHLOROPROPANE	LT 0.50 UG/L	
	1,1-DICHLOROPROPENE	LT 0.50 UG/L	
	CIS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	
	TRANS-1,3-DICHLOROPROPENE	LT 0.50 UG/L	
	METHYLENE CHLORIDE	LT 0.50 UG/L	
	1,1,1,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	1,1,2,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	TETRACHLOROETHENE	29.00 UG/L	
	1,1,1-TRICHLOROETHANE	1.90 UG/L	
	1,1,2-TRICHLOROETHANE	LT 0.50 UG/L	
	TRICHLOROETHENE	5.80 UG/L	
	TRICHLOROFLUOROMETHANE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 12/07/1992

LT = LESS THAN

RECEIVED

DEC 14 1992

Bureau of Environmental
Exposure Investigation

WESTCHESTER COUNTY

Department of Laboratories & Research
Hammond House Road
Valhalla, N.Y. 10595

Environmental Laboratories
NYS-ELAP Number - 10108
(914) 593-5575

Lab Number: 92-0022508

Agency: ROCKLAND COUNTY HEALTH DEPT.

Sample Location: [REDACTED]

Address: N. ROUTE 303, BLAUVELT, NY

Sampling Point: KITCHENETTE

Collected By: KORCHAK

ON: 9/30/1992 TIME: 11:20:00

Bottle Numbers: A & B

Login Comment:

Sample Type: P

Received By: ST

ON: 9/30/1992 TIME: 13:49:35

METHOD	ANALYTES	RESULTS	REPORTED ON
	METHYLENE CHLORIDE	LT 0.50 UG/L	
	1,1,1,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	1,1,2,2-TETRACHLOROETHANE	LT 0.50 UG/L	
	TETRACHLOROETHENE	2.70 UG/L	
	1,1,1-TRICHLOROETHANE	0.56 UG/L	
	1,1,2-TRICHLOROETHANE	LT 0.50 UG/L	
	TRICHLOROETHENE	LT 0.50 UG/L	
	TRICHLOROFLUOROMETHANE	LT 0.50 UG/L	
	1,2,3-TRICHLOROPROPANE	LT 0.50 UG/L	
	VINYL CHLORIDE	LT 0.50 UG/L	

APPROVED BY: DAVID VINCI
COMMENTS:

DATE APPROVED: 10/06/1992

LT = LESS THAN

PAGE 1

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 928080294 SAMPLE RECEIVED: 92/06/02/ CHARGE: 19.00
PROGRAM: 110: STATE SUPERFUND ANALYTICAL SERVICES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE: 4350
POLITICAL SUBDIVISION: CLARKSTOWN COUNTY: ROCKLAND
LATITUDE: LONGITUDE: Z DIRECTION:
LOCATION: 344001 CLARKSTOWN LANDFILL
DESCRIPTION: [REDACTED]
REPORTING LAB: 80: LABORATORY OF ANALYTICAL CHEMISTRY
TEST PATTERN: 10-001: SAFE DRINKING WATER ACT - METALS ONLY
SAMPLE TYPE: 120: PRIVATE WATER SUPPLY - DRILLED WELL
TIME OF SAMPLING: 92/06/02 10:15 DATE PRINTED: 92/07/01

ANALYSIS: ICP-1 ICP GROUPING 1

-----PARAMETER-----	-----RESULT-----
MERCURY	< 0.2 MCG/L
ARSENIC	< 10. MCG/L
SELENIUM	< 5. MCG/L
LEAD	< 10. MCG/L
BERYLLIUM	< 1. MCG/L
SILVER	< 10. MCG/L
BARIUM	269. MCG/L
CADMIUM	< 5. MCG/L
COBALT	< 5. MCG/L
CHROMIUM	< 5. MCG/L
COPPER	10. MCG/L
IRON	176. MCG/L
MANGANESE	< 5. MCG/L
NICKEL	< 5. MCG/L
STRONTIUM	281. MCG/L
TITANIUM	< 5. MCG/L
VANADIUM	< 5. MCG/L
ZINC	183. MCG/L
MOLYBDENUM	< 20. MCG/L
ANTIMONY	< 80. MCG/L
TIN	< 50. MCG/L
THALLIUM	< 80. MCG/L
ALUMINUM	< 100. MCG/L
CALCIUM	44.9 MG/L
POTASSIUM	1.2 MG/L
MAGNESIUM	6.0 MG/L
SODIUM	10.7 MG/L

**** CONTINUED ON NEXT PAGE ****

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NY STATE DEP'T. HEALTH
11 UNIVERSITY PLACE - RM. 205
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SUBMITTED BY: MILES

PAGE 2

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 928080294

SAMPLE RECEIVED: 92/06/02/

CHARGE: 19.00

POLITICAL SUBDIVISION: CLARKSTOWN

COUNTY: ROCKLAND

LOCATION: 344001 CLARKSTOWN LANDFILL

TIME OF SAMPLING: 92/06/02 10:15

DATE PRINTED: 92/07/01

FOLLOWING PARAMETERS NOT PART OF TEST PATTERN

ANALYSIS: 5022W VOLATILE ORGANICS IN WATER-EPA 502.2 (DES 310-33)
DATE REPORTED: 92/06/19 REPORT MAILED OUT

PARAMETER	RESULT
DICHLORODIFLUOROMETHANE (FREON-12)	< 0.5 MCG/L
CHLOROMETHANE	< 0.5 MCG/L
VINYL CHLORIDE	< 0.5 MCG/L
BROMOMETHANE	< 0.5 MCG/L
CHLOROETHANE	< 0.5 MCG/L
TRICHLOROFLUOROMETHANE (FREON-11)	< 0.5 MCG/L
1,1-DICHLOROETHENE	< 0.5 MCG/L
METHYLENE CHLORIDE (DICHLOROMETHANE)	< 0.5 MCG/L
TRANS-1,2-DICHLOROETHENE	< 0.5 MCG/L
1,1-DICHLOROETHANE	< 0.5 MCG/L
2,2-DICHLOROPROPANE	< 0.5 MCG/L
CIS-1,2-DICHLOROETHENE	< 0.5 MCG/L
CHLOROFORM	< 0.5 MCG/L
BROMOCHLOROMETHANE	< 0.5 MCG/L
1,1,1-TRICHLOROETHANE	< 0.5 MCG/L
1,1-DICHLOROPROPENE	< 0.5 MCG/L
CARBON TETRACHLORIDE	< 0.5 MCG/L
1,2-DICHLOROETHANE	< 0.5 MCG/L
BENZENE	< 0.5 MCG/L
TRICHLOROETHENE	< 0.5 MCG/L
1,2-DICHLOROPROPANE	< 0.5 MCG/L
BROMODICHLOROMETHANE	< 0.5 MCG/L
DIBROMOMETHANE	< 0.5 MCG/L
CIS-1,3-DICHLOROPROPENE	< 0.5 MCG/L
TOLUENE	< 0.5 MCG/L
TRANS-1,3-DICHLOROPROPENE	< 0.5 MCG/L
1,1,2-TRICHLOROETHANE	< 0.5 MCG/L
1,3-DICHLOROPROPANE	< 0.5 MCG/L
TETRACHLOROETHENE	2. MCG/L
DIBROMOCHLOROMETHANE	< 0.5 MCG/L
1,2-DIBROMOETHANE (EDB)	< 0.5 MCG/L
CHLOROBENZENE	< 0.5 MCG/L
1,1,1,2-TETRACHLOROETHANE	< 0.5 MCG/L
ETHYLBENZENE	< 0.5 MCG/L
M/P-XYLENE	< 0.5 MCG/L
O-XYLENE	< 0.5 MCG/L
STYRENE	< 0.5 MCG/L
ISOPROPYLBENZENE (Cumene)	< 0.5 MCG/L
BROMOFORM	< 0.5 MCG/L
1,1,2,2-TETRACHLOROETHANE	< 0.5 MCG/L
1,2,3-TRICHLOROPROPANE	< 0.5 MCG/L
N-PROPYLBENZENE	< 0.5 MCG/L
BROMOBENZENE	< 0.5 MCG/L

**** CONTINUED ON NEXT PAGE ****

PAGE 3

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 928080294 SAMPLE RECEIVED: 92/06/02/ CHARGE: 19.00
POLITICAL SUBDIVISION: CLARKSTOWN COUNTY: ROCKLAND
LOCATION: 344001 CLARKSTOWN LANDFILL
TIME OF SAMPLING: 92/06/02 10:15 DATE PRINTED: 92/07/01

PARAMETER	RESULT
1,3,5-TRIMETHYLBENZENE	< 0.5 MCG/L
O-CHLOROTOLUENE	< 0.5 MCG/L
P-CHLOROTOLUENE	< 0.5 MCG/L
TERT-BUTYLBENZENE	< 0.5 MCG/L
1,2,4-TRIMETHYLBENZENE	< 0.5 MCG/L
SEC-BUTYLBENZENE	3. MCG/L
4-ISOPROPYLTOLUENE (p-Cymene)	< 0.5 MCG/L
1,3-DICHLOROBENZENE	< 0.5 MCG/L
1,4-DICHLOROBENZENE	< 0.5 MCG/L
N-BUTYLBENZENE	< 0.5 MCG/L
1,2-DICHLOROBENZENE	< 0.5 MCG/L
1,2-DIBROMO-3-CHLOROPROPANE	< 0.5 MCG/L
1,2,4-TRICHLOROBENZENE	< 0.5 MCG/L
HEXACHLOROBUTADIENE (C-46)	< 0.5 MCG/L
NAPHTHALENE	< 0.5 MCG/L
1,2,3-TRICHLOROBENZENE	< 0.5 MCG/L
PH OF VOLATILE ALIQUOT	2

ANALYSIS: KET KETONES - PURGE & TRAP TECHNIQUE (DES 310-25)
DATE PRINTED: 92/07/01 FINAL REPORT

PARAMETER	RESULT
2-BUTANONE (METHYL ETHYL KETONE)	< 10. MCG/L
4-METHYL-2-PENTANONE (MIBK)	< 10. MCG/L
ACETONE	< 10. MCG/L
METHYL TERT BUTYL ETHER	< 10. MCG/L

*** END OF REPORT ***

1615

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER FOR LABORATORIES AND RESEARCH

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PAGE 1

RESULTS OF EXAMINATION

FINAL REPORT

SAMPLE ID: 928080300 SAMPLE RECEIVED: 92/06/02/ CHARGE: 19.00
PROGRAM: 110: STATE SUPERFUND ANALYTICAL SERVICES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE: 4350
POLITICAL SUBDIVISION: CLARKSTOWN COUNTY: ROCKLAND
LATITUDE: LONGITUDE: Z DIRECTION:
LOCATION: 344001 CLARKSTOWN LANDFILL
DESCRIPTION: [REDACTED] ES., RT 303 CLARKSTOWN
REPORTING LAB: 80: LABORATORY OF ANALYTICAL CHEMISTRY
TEST PATTERN: 10-001: SAFE DRINKING WATER ACT - METALS ONLY
SAMPLE TYPE: 120: PRIVATE WATER SUPPLY - DRILLED WELL
TIME OF SAMPLING: 92/06/02 10:30 DATE PRINTED: 92/07/01

ANALYSIS: ICP-1 ICP GROUPING 1

-----PARAMETER-----	-----RESULT-----
MERCURY	< 0.2 MCG/L
ARSENIC	< 10. MCG/L
SELENIUM	< 5. MCG/L
LEAD	< 10. MCG/L
BERYLLIUM	< 1. MCG/L
SILVER	< 10. MCG/L
BARIUM	116. MCG/L
CADMIUM	< 5. MCG/L
COBALT	< 5. MCG/L
CHROMIUM	< 5. MCG/L
COPPER	94. MCG/L
IRON	< 10. MCG/L
MANGANESE	< 5. MCG/L
NICKEL	< 5. MCG/L
STRONTIUM	67. MCG/L
TITANIUM	< 5. MCG/L
VANADIUM	< 5. MCG/L
ZINC	17. MCG/L
MOLYBDENUM	< 20. MCG/L
ANTIMONY	< 80. MCG/L
TIN	< 50. MCG/L
THALLIUM	< 80. MCG/L
ALUMINUM	< 100. MCG/L
CALCIUM	37.3 MG/L
POTASSIUM	1.3 MG/L
MAGNESIUM	10.0 MG/L
SODIUM	31.1 MG/L

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APPENDIX F
GEOTECHNICAL REPORTS

CLARKSTOWN SANITARY LANDFILL RI/FS
FINAL REMEDIAL INVESTIGATION REPORT

CONTENTS

1. Slope Stability Evaluation, September 1991 (originally submitted as Appendix J of the Interim Report)
2. Slope Stability Analysis, March 13, 1992 (originally submitted as separate bound document in response to NYSDEC comments on September 1991, Slope Stability Evaluation)
3. Earth Buttress Berm Analysis, March 13, 1992 (originally submitted as separate bound document)
4. Re-evaluation of Initial Slope Stability Analysis, March 9, 1993 (originally submitted as separate bound document)

**TOWN OF CLARKSTOWN
ROCKLAND COUNTY, NEW YORK**

SUPPLEMENT TO

INTERIM REPORT

**REMEDIAL INVESTIGATION/
FEASIBILITY STUDY**

CLARKSTOWN SANITARY LANDFILL

**VOLUME 2 OF 2
APPENDICES**

APPENDIX J

**LANDFILL SLOPES AND SUBSURFACE
SOILS STABILITY EVALUATION**

SEPTEMBER 1991

Prepared by:

Velzy / WESTON

**Sutton Park - Suite 180
465 Columbus Avenue
Valhalla, N.Y.**

SLOPE STABILITY EVALUATION

SEPTEMBER 1991

SLOPE STABILITY EVALUATION

CLARKSTOWN SANITARY LANDFILL

INTRODUCTION

The geotechnical evaluation reported herein presents the results of a slope stability analysis completed in conjunction with the planned closure of the Clarkstown Sanitary Landfill in Clarkstown, New York. This closure will consist of capping of the landfill with up to 5 feet of cover soil as required by NYSDEC Municipal Solid Waste (MSW) regulations. The weight of this final cover system will surcharge the existing waste mass as well as underlying soil layers. This surcharge loading may reduce the Factors of Safety against slope instability which presently exist at critical slope sections of the landfill. The NYSDEC has questioned this potential in light of the possible development of "mud waving" of the peat and other underlying weak soil strata, and the effects of this "mud waving" phenomenon on the slope stability of the closed facility. WESTON has interpreted "mud waving" as the potential development of a shear failure surface within the waste and weak soil components of the subsurface stratigraphy. This could eventually cause the mass of material above the failure surface to move with respect to adjacent materials. If initiated, this could result in potential uplifting and deposition of the failure mass into an area adjacent to the toe of slope of the landfill.

WESTON has previously proposed to NYSDEC to evaluate this "mud waving" potential through the completion of a slope stability analysis using the Modified Bishop Method of Slices procedure. This procedure defines a large number of potential circular arc failure surfaces through the slope and calculates the Factor of Safety of each failure surface by dividing the failure mass into an appropriate number of slices. The overall moment equilibrium and force equilibrium for each slice is then statically analyzed for both short term (end of construction) and long term stability conditions. The generated Factors of Safety for these two conditions are then searched by the computer for the minimum values. These values are compared with minimum acceptable values for both short term, end of construction (i.e., undrained) and long term (i.e., drained) soil shear strength conditions within the slope. In this manner, an existing slope as well as one to be surcharged through cap construction can be evaluated for potential slope instability. It should be noted that this analysis can predict the likelihood of failure (via the computed Factor of Safety values) as well as the location of the critical failure surface. However, it cannot predict the duration of the failure should it occur. That is, it cannot differentiate between a near instantaneous

failure and one that will gradually occur over a long time period as a result of "creep" movements.

The remainder of this report discusses in detail the referenced slope stability analysis. A discussion of the Modified Bishop Method of Slices computer program (STABL2) used to complete these slope stability analyses is presented in Appendix A of this report. Results of the various slope stability analyses completed are presented in Appendices B through D for the three different cross sections analyzed. Geotechnical laboratory data which was used to determine soil shear strength parameters for the various fine-grained and organic soils at this site is presented as Appendix E.

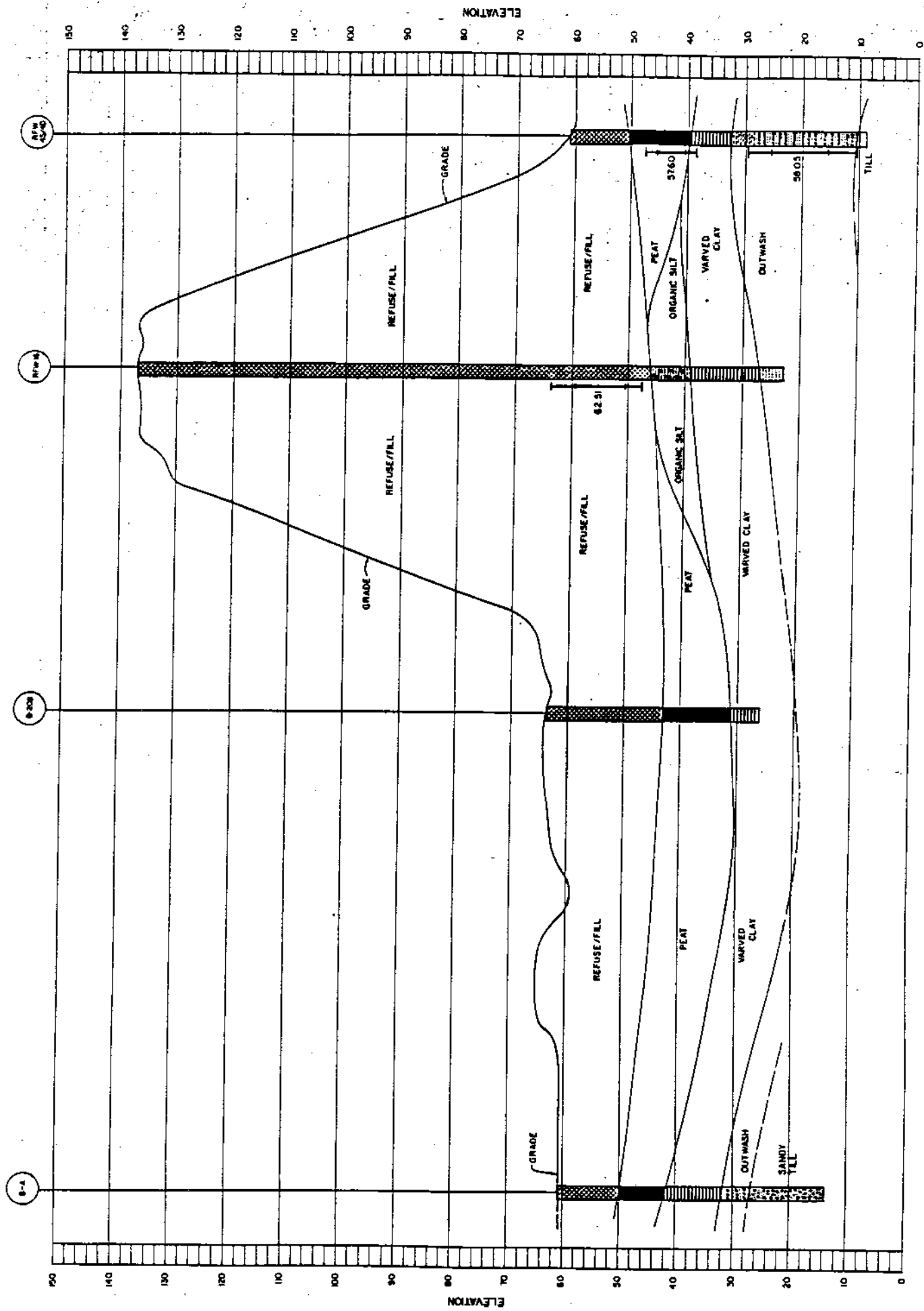
SUBSURFACE STRATIGRAPHY

Subsurface conditions at the Clarkstown Sanitary Landfill were explored by Velzy/WESTON as part of the Remedial Investigation/ Feasibility Study (RI/FS) completed for this facility. The subsurface exploration program consisted of the completion of 16 test borings, all of which were converted to temporary piezometers. These test borings included logging of soil stratigraphy, groundwater conditions and Standard Penetration Resistance (N) values as determined from split spoon sampling of the encountered soils. Additional groundwater and subsurface soil information was also available from previous investigations completed by others. The locations of the site soil borings and groundwater monitoring wells are shown on Figure 1.

Based on the available subsurface information, seven (7) subsurface profiles designated as A-A through G-G were developed by Velzy/WESTON. The locations of these subsurface profiles are shown on Figure 1. Subsurface Profiles B-B and E-E, which were used to develop the critical cross sections for slope stability analysis as discussed subsequently, are presented as Figures 2 and 3. These profiles indicate the presence of seven (7) subsurface strata which will impact the stability of the landfill sideslopes. These strata are listed as follows:

- Stratum 1 - Municipal Solid Waste
- Stratum 2 - Peat, very soft
- Stratum 3 - Organic silt, very soft
- Stratum 4 - Varved Clay, very soft to soft
- Stratum 5 - Outwash, very loose becoming dense
- Stratum 6 - Clayey/Sandy Till, Dense to very dense
- Stratum 7 - Sandstone bedrock

Based on an evaluation of the existing topography of the site as well as the subsurface stratigraphy, four (4) cross sections of the existing landfill sideslopes were identified as being critical cross sections with respect to slope stability of the landfill mass. These cross sections



CROSS-SECTION E-E

SCALE: HORIZ: 1"=100'
VERT: 1"=10'

SECTION 2

are designated as 1-1 through 4-4. The locations of these cross sections are also shown on Figure 1. These cross sections were determined to be the most critical cross sections from the perspective of potential slope instability based on greater heights and steeper inclinations of the slope at these locations in combination with the presence of thicker deposits of the weaker soils (Strata 2 through 4) at these same locations. After subsequent review, however, it was determined that the 2.5H:1V inclination and 50 foot height of the Cross Section 2-2 landfill sideslope would preclude effective construction and maintenance of a final cover system in the vicinity of this location. For this reason, we believe that this area of the landfill should be regraded to a 3H:1V inclination before final capping begins. Therefore, a slope stability analysis of the existing slope conditions at this critical cross section location was not completed.

Cross Section 1-1 defines a profile through the maximum height of waste in combination with an increasing thickness of the peat stratum at the toe of slope. Cross Section 3-3 was selected because the profile passes through the maximum height of waste, an increasing thickness of the peat stratum at the toe of the slope, and a significant thickness of the organic silt stratum. Cross section 4-4 defines a profile similar to that of Cross section 1-1, except that the waste layer extends far beyond the toe of slope of the main landfill mass at a reduced thickness of approximately 15 feet. These three (3) cross sections were subsequently plotted on an X-Y coordinate system with an appropriate number of straight line segments being used to define the slope topography and the subsurface stratigraphy. This information was then coded as required by the STABL2 computer program and input to the program. Computer input data files prepared for the STABL2 slope stability computer program are included within Appendices B, C, and D.

SOIL/MSW PROPERTIES

Soil properties, including moist and saturated unit weights, cohesion, and angle of internal friction, are required as input to the STABL2 Slope Stability Computer Program for each soil layer encountered. The values of these parameters are presented in Table 1. Soil unit weights were selected to be consistent with the constituency of the respective soil layer. The unit weight of the municipal solid waste (MSW) was selected to be 80 pcf, representative of a mass of this material which has been densified using trash compactors.

Cohesion and angle of internal friction values for the peat, organic silt and varved clay materials were determined from the results of a laboratory testing program completed on Shelby Table samples of these materials by Empire Soil Investigations, Inc. Both Unconsolidated-Undrained (UU) and Consolidated Undrained (CIU with pore pressure measurements) triaxial compression tests were performed on these samples so as to measure the undrained and drained shear strength properties of these materials. These test results are presented in Appendix E. It should be noted that the total stress Mohrs circles, which

defined a reasonably accurate Mohrs CTU failure envelope for each of the three (3) soil types, was used to select the value of ϕ' for the drained case for each soil. This procedure was implemented because the effective stress Mohrs circles were erratically behaved, probably due to a problem with the pore water pressure measurement equipment. It must be noted that this procedure results in a conservative selection of ϕ' . It should also be noted that any value of cohesion determined from the total stress Mohrs circles was conservatively neglected. That is, c' was defined to be zero for all three (3) tested soil types.

The shear strength parameters for the much more competent outwash and glacial till soils were determined from correlations with the N values of these materials.¹ Since these soils are predominantly granular, the same shear strength parameters were assigned for both the undrained and drained cases. A cohesion value of 300 psf was also assigned to the glacial till material to account for the observed plasticity properties of this material. The undrained and drained shear strength properties of the waste materials were determined from the plot of Figure 4 as the midpoint of the cohesion range for the $\phi = 0^\circ$ condition (i.e. undrained case) and the midpoint of the angle of internal friction range for the $c = 0$ condition (i.e. drained case).

GROUNDWATER

The location of the groundwater table at each of the three critical cross section locations was defined on the subsurface profiles provided by Velzy/WESTON. The geometry of the water table was subdivided into straight line segments whose endpoints were coded by x,y coordinates. This information was input to the slope stability program for use in the analysis.

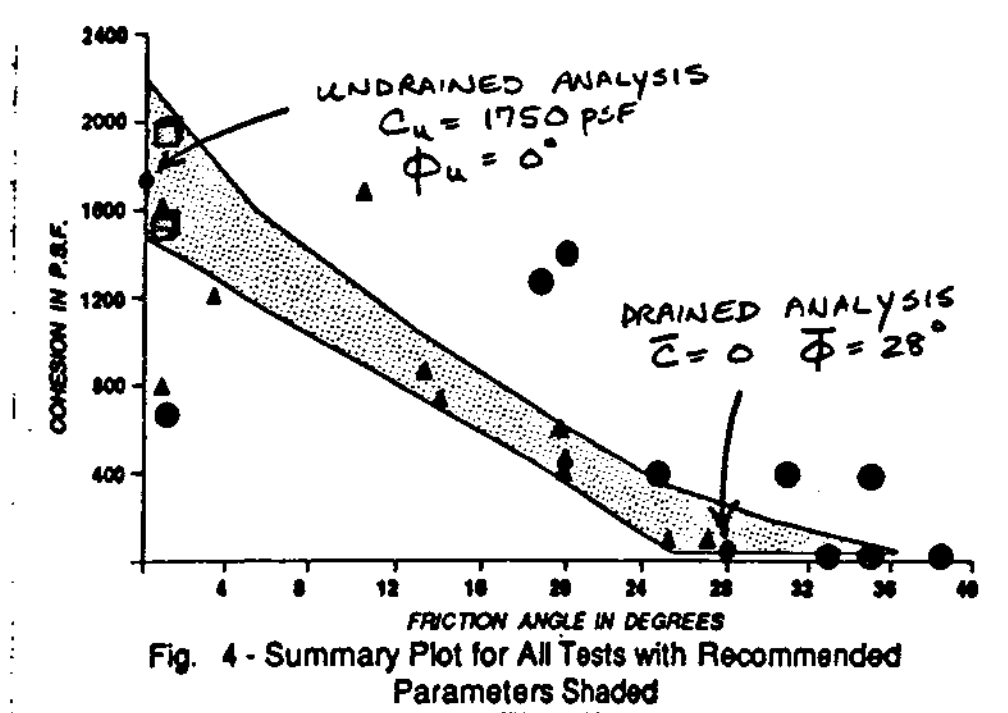
SEISMIC EFFECTS

As discussed subsequently, Cross Section 3-3 was determined to be the most critical cross section from the perspective of potential slope instability. Therefore, this cross section was also analyzed for seismic effects. Because of the low probability of a seismic event occurring in the short-term while undrained soil shear strength conditions govern the behavior of the soils, seismic analyses are typically only completed under long-term, drained soil shear strength conditions. Average horizontal and vertical seismic coefficients of "0.05 g" were assigned for this case in accordance with Figure 5. The results of the seismic analysis are presented in Appendix C.

1Bowles, J.E., "Foundation analysis and design"; 4th edition, McGraw-Hill, Inc., 1988 (Table 3-4, pg. 141).

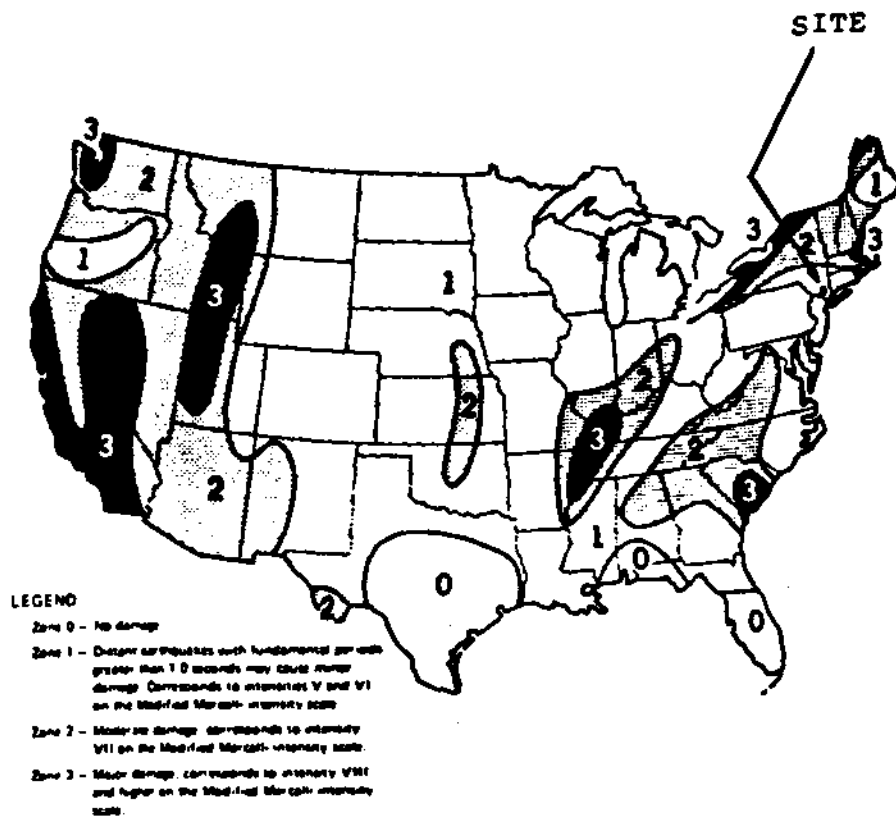
Table 1
Physical Property and Shear Strength Input Data

Stizata	UNDRAINED			DRAINED	
	γ_r (pcf)	C_u (psf)	ϕ_u (°)	c' (psf)	ϕ' (°)
MSW	80	1750	0	0	28
Peat	80	30	0	0	23
Organic Silt	88	820	0	0	20
Varved Clay	104	380	0	0	16
Outwash	125	0	32	0	32
Till	125	300	32	300	32
Final Cover	125	0	32	0	32



REFERENCE: Singh S. and Murphy B.; "A Critical Examination of the Strength and Stability of Sanitary Landfills"

FIGURE 4
SHEAR STRENGTH PARAMETERS FOR MUNICIPAL SOLID WASTE



Seismic Coefficients Corresponding to Each Zone

ZONE	INTENSITY OF MODIFIED MERCALLI SCALE	AVERAGE SEISMIC COEFFICIENT	REMARK
0	—	0	No damage
1	V and VI	0.03 to 0.07	Minor damage
2	VII	0.13	Moderate damage
3	VIII and higher	0.27	Major damage

Reference: Huang, "Stability Analysis of Earth Slopes", pg. 22.

FIGURE 5

SEISMIC ZONE MAP OF THE CONTINENTAL UNITED STATES

FINAL COVER SYSTEM

The effects of the weight of the final cover system on the stability of the existing landfill mass were evaluated by inputting this cover system into the STABL2 Computer Program as an additional soil layer. The maximum required thickness of this layer, per current NYSDEC MSW regulations, will be five (5) feet, assuming all components of this system are earthen. For this analysis, the capping material was therefore assumed to be a five (5) foot thick soil layer with a unit weight of 125 pcf. The cohesion and angle of internal friction of this material was assumed to be 0 and 32° respectively. The geometry of the final cover soil layer can be seen in the computer printouts of the plotted slope in Appendices B, C and D. Note that this layer extends from at least the toe of slope of the landfill across the complete top width of the landfill.

RESULTS

The results of the slope stability analysis are presented in Table 2. These results are presented in terms of the calculated Factor of Safety (FS) values tabulated as a function of the critical cross section analyzed, the existing (without cap) and final (with cap) topographic configurations of the landfill, undrained (end of construction) and drained (long term) soil/waste shear strength conditions, and seismic effects. The calculated Factor of Safety values are also compared in this Table to minimum recommended values per conventional Geotechnical Engineering practice. These minimum recommended values have been established at levels well above the incipient failure condition (FS=1.0) to account for variations in subsurface stratigraphy and groundwater conditions, soil nonhomogeneity and anisotropy, and variations in soil shear strength which invariably exist between actual field conditions and those assumed in the analysis. The computer output presented in Appendices B, C, and D also lists these minimum Factor of Safety values and illustrates, on printed cross sections of the slope, the critical circular arc failure surfaces to which these minimum FS values apply.

CONCLUSIONS

Conclusions derived from the results of the slope stability analysis are presented as follows:

- I. Undrained Soil Shear Strength Conditions - The calculated FS values for the existing slope at Cross Sections 1-1 and 4-4 (i.e. 1.46 and 1.42 respectively) are acceptable with respect to the minimum recommended value of 1.3 for undrained soil shear strength conditions. These values decrease to marginally acceptable values (1.32 and 1.28) once the slope is loaded by the final cover system. The calculated FS value at Cross Section 3-3 for the existing slope condition (i.e. 1.18) is unacceptable with

TABLE 2
CLARKSTOWN SANITARY LANDFILL
SUMMARY OF SLOPE STABILITY ANALYSES

<u>SECTION ANALYZED</u>	<u>SOIL SHEAR STRENGTH CONDITIONS</u>	<u>SEISMIC EFFECTS</u>	<u>CALCULATED¹ MIN. F.S.</u>	<u>RECOMMENDED² MIN. F.S.</u>	<u>COMMENTS</u>
1-1, Existing	Undrained	No	1.46	1.3	OK
1-1, Final	Undrained	No	1.32	1.3	OK
1-1, Existing	Drained	No	1.49	1.5	Marginal
1-1, Final	Drained	No	1.67	1.5	OK
3-3, Existing	Undrained	No	1.18	1.3	NG
3-3, Final	Undrained	No	1.10	1.3	NG
3-3, Existing	Drained	No	1.53	1.5	Marginal
3-3, Final	Drained	No	1.62	1.5	OK
3-3, Final	Drained	Yes	1.10	1.0	OK
4-4, Existing	Undrained	No	1.42	1.3	OK
4-4, Final	Undrained	No	1.28	1.3	Marginal
4-4, Existing	Drained	No	1.46	1.5	Marginal
4-4, Final	Drained	No	1.69	1.5	OK

Existing: Five (5) foot thick final cover system not in place for analysis.

Final: Five (5) foot thick final cover system in place for analysis.

¹Calculated values rounded to the nearest hundredth.

²Recommended Minimum Factor of Safety values for slope stability analyses as proposed in the Federal Register.

respect to the recommended minimum value of 1.3. This value further decreases to 1.10 upon final capping of the landfill. It must be noted that even though the values at Cross Section 3-3 are below the minimum recommended value of 1.3, they do represent a marginally stable mass with respect to the theoretical incipient failure condition (i.e. FS = 1.0).

- II. Drained Soil Shear Strength Conditions - The calculated FS values at all three critical Cross Sections for the existing slope condition (i.e. 1.49, 1.53 and 1.46) are marginally acceptable with respect to the minimum recommended value of 1.5 for drained soil shear strength conditions. These values increase once the slope is loaded by the final cover system to acceptable values of 1.67, 1.62 and 1.69 respectively. This is due to the increased weight of the failure mass which mobilizes increased frictional resistance (based on ϕ') to sliding along the critical failure plane. Therefore, once the landfill is final capped, and soil shear strength conditions have progressed with time from undrained to drained behavior, the landfill sideslopes will be more stable than presently exist. However, as discussed above, it is that critical time period following construction of the final cover system when undrained soil shear strength conditions govern the behavior of the mass, during which FS values are marginal to unacceptable.
- III. Drained Soil Shear Strength Conditions with Seismic Effects - Based on a single analysis of the most critical of the three cross sections (i.e. Cross Section 3-3) under seismic loadings for the final (capped) configuration of the landfill, an FS value of 1.10 was calculated. This value is acceptable with respect to the minimum recommended value of 1.0 under seismic conditions.

RECOMMENDATIONS

Based on the results of the slope stability analyses completed for the Clarkstown MSW landfill, it has been concluded that it should be possible to construct the final cover system for the landfill without initiating a slope failure of the landfill mass. However, it must also be noted that calculated FS values for undrained soil shear strength conditions, which will govern the stability of the landfill sideslopes in the short term following cap construction, indicate marginal to unacceptable conditions with respect to the minimum recommended FS value. To somewhat compensate for these less than desirable FS values during this time period, the following recommendations should be considered during final design of the capping system.

- The final cover system should use geosynthetics as substitutes for some of the earthen components of the assumed 5 foot thick final cover system. This would reduce the thickness and weight of the final cover system, thereby minimizing the reduction in

FS values which occur in the short term following cap construction during undrained soil shear strength behavior.

- Areas of the landfill which are presently steeper than 3H:1V should be flattened to at least this inclination for increased stability.
- Consideration should be given to staging the construction of the final cover system. That is, the earthen components of this system should be sequentially constructed, allowing enough time between placement of these various components for excess pore water pressure dissipation and waste/soil consolidation to occur, such that increased soil shear strength (i.e. drained behavior) will develop.
- Toe of slope buttressing berms should be considered in the vicinity of Cross Section 3-3 where FS values under undrained soil shear strength conditions were well below the minimum recommended value.

APPENDIX A
STABL2 COMPUTER PROGRAM SUMMARY

THE STABL2 SLOPE STABILITY COMPUTER PROGRAM

The STABL2 Slope Stability Computer Program is based on the Modified Bishop Method of Slices analysis procedure. (This procedure is also referred to as the Simplified Bishop Method of Slices). It assumes a circular arc failure mode and calculates the Factor of Safety (FS) of the slope for the assumed failure arc by dividing the slope into an appropriate number of slices and statically analyzing the overall moment equilibrium and vertical force equilibrium of each slice. The development of the governing equation for this analysis procedure is presented in Figure 1. This equation (No. 12-35 of Figure 1) is repeated here for the convenience of the reader and is modified to include the effects of a seismic event. The terms in this equation are defined in the schematic of Figure 1.

$$FS = \frac{\sum_{i=1}^n \left[\frac{C'_i \Delta X_i + (W_i + Q_{iv} - U_i \Delta X_i) \tan \phi'_i}{\cos \theta_i + \frac{\sin \theta_i \tan \phi'_i}{FS}} \right]}{\sum_{i=1}^n \left[\frac{(W_i + Q_{iv}) \sin \theta_i - Q_{ih} \frac{d_i}{R} + C_s W_i \frac{A_i}{R}}{R} \right]}$$

Note that this equation represents the condition of long-term stability (drained analysis) and utilizes the effective stress shear strength parameters (c' , ϕ') and the pore water pressures (u_w) pertinent to each slice. This latter parameter is calculated as $\gamma_w H$ where γ_w is the unit weight of water and H is the distance from the phreatic surface to the bottom of the slice as measured along a vertical line passing through the centroid of each slice. The seismic event is incorporated into the denominator of this equation as the product of the earthquake force (i.e. the seismic coefficient (C_s) times the weight of the slice (W_i)) and the moment arm of this horizontal force about the center of the circle (A_i) divided by the radius of the circle.

Note also that for short-term stability representative of the end of construction condition for slopes, an undrained analysis is appropriate in the case of saturated or nearly saturated soils of

low permeability which cannot readily dissipate excess pore water pressures generated during construction of the slope. The undrained analysis utilizes total stresses (i.e. neglects effects of u_w) and total stress shear strength parameters (i.e. C_u, ϕ_u). In this instance, equation 12-33 of Figure 1, repeated here for convenience, is appropriate for slope stability analysis.

$$FS = \frac{\sum_{i=1}^n \left[\frac{C_u \Delta X_i + (W_i + Q_{iv}) \tan \phi_u}{\cos \theta_i + \sin \theta_i \tan \phi_u} \right]}{\sum_{i=1}^n \left[\frac{(W_i + Q_{iv}) \sin \theta_i - Q_{ih} \frac{d_i}{R} + C_s W_i \frac{A_i}{R}}{R} \right]}$$

For the case of undrained analysis in a fully saturated clay soil, ϕ may be assumed to be zero, and the numerator of the above equation may be simplified accordingly.

It should also be noted that the governing equations for undrained and drained slope stability analysis (with the exception of the $\phi = 0$ case) require an iterative solution since the Factor of Safety (FS) term occurs on both sides of the equations. The equations are, therefore, solved by an initial assumption of an FS value, followed by utilization of this assumed value in the equation to determine a calculated FS. The solution is achieved when the difference between the assumed and calculated values of FS is less than a selected tolerance limit. Note also that a solution to these equations is only appropriate for the assumed failure surface, which does not necessarily constitute the critical failure surface. It is, therefore, necessary to investigate a number of potential failure surfaces and select from among them the critical failure surface which produces the lowest FS. The STABL2 computer program is structured to conduct this search within limitations established by the user. The manner in which this is conducted is discussed as follows.

The STABL 2 Slope Stability Program requires that the slope geometry be defined with respect to a cartesian coordinate system utilizing positive values of the X and Y coordinates. The line segments defining the slope configuration and internal soil stratigraphy are then coded by line segment number and the X, Y coordinates of their beginning and end points. The soil type

underlying each line segment is also coded by number. This information, as well as information on each soil type including moist and saturated unit weights, cohesion, angle of internal friction and a pore water pressure coefficient, are input into the program. The geometry of the phreatic surface, if appropriate, is also coded by coordinates of the line segments defining its geometry, and input to the program. The choice of appropriate soil strength parameters and pore water pressure coefficients is used to define the end of construction and long-term stability cases. Following input of the appropriate data, the search routine is initiated by defining boundaries within which the failure circles can initiate and terminate on or adjacent to the slope. In typical analyses, these are initially chosen in a very liberal fashion so as to permit virtually any circle with any conceivable radius and center point to be selected by the computer. The computer then proceeds to define a large number of these circles and calculates their FS values based on the appropriate governing equation. A copy of a computer printout which illustrates the circles analyzed for the non-seismic evaluation of an existing municipal waste landfill side slope is presented as Figure 2. Note that at least one circle defining virtually every conceivable failure mode has been generated as a result of the very liberal entrance and exist point boundaries selected for this search routine. This body of information is subsequently searched by the computer for the ten most critical circles. The most critical circle having the lowest FS of all circles analyzed is also identified. Figure 3 illustrates the 10 most critical circles for the evaluation of this slope under undrained shear strength conditions. The most critical of these circles is identified by hatch marks. Note from Figure 3 that the FS of this circle has been determined to be 2.462. Figure 4 illustrates the 10 most critical circles for the non-seismic evaluation of this same slope under drained shear strength conditions. Note from Figure 4 that the FS of this circle has been determined to be 1.645. Since FS values of 1.3 and 1.5 are generally regarded to be the minimum acceptable values for short-term (undrained) and long-term (drained) stability conditions, respectively, it may be concluded that the above municipal waste landfill side slope exists in a stable condition with respect to the development of potential shear failures within these materials.

low permeability which cannot readily dissipate excess pore water pressures generated during construction of the slope. The undrained analysis utilizes total stresses (i.e. neglects effects of u_w) and total stress shear strength parameters (i.e. C_u, ϕ_u). In this instance, equation 12-33 of Figure 1, repeated here for convenience, is appropriate for slope stability analysis.

$$FS = \frac{\sum_{i=1}^n \left[\frac{C_u A_i + (W_i + Q_{iv}) \tan \phi_u}{\cos \theta_i + \sin \theta_i \tan \phi_u} \right]}{\sum_{i=1}^n \left[\frac{(W_i + Q_{iv}) \sin \theta_i - Q_{ih} \frac{d_i}{R} + C_s W_i \frac{A_i}{R}}{R} \right]}$$

For the case of undrained analysis in a fully saturated clay soil, ϕ may be assumed to be zero, and the numerator of the above equation may be simplified accordingly.

It should also be noted that the governing equations for undrained and drained slope stability analysis (with the exception of the $\phi = 0$ case) require an iterative solution since the Factor of Safety (FS) term occurs on both sides of the equations. The equations are, therefore, solved by an initial assumption of an FS value, followed by utilization of this assumed value in the equation to determine a calculated FS. The solution is achieved when the difference between the assumed and calculated values of FS is less than a selected tolerance limit. Note also that a solution to these equations is only appropriate for the assumed failure surface, which does not necessarily constitute the critical failure surface. It is, therefore, necessary to investigate a number of potential failure surfaces and select from among them the critical failure surface which produces the lowest FS. The STABL2 computer program is structured to conduct this search within limitations established by the user. The manner in which this is conducted is discussed as follows.

The STABL 2 Slope Stability Program requires that the slope geometry be defined with respect to a cartesian coordinate system utilizing positive values of the X and Y coordinates. The line segments defining the slope configuration and internal soil stratigraphy are then coded by line segment number and the X, Y coordinates of their beginning and end points. The soil type

Bishop Simplified Method of Slices

If we assume that the failure surface is an arc of a circle, we may eliminate N_i by taking moments about the center of the assumed circle. Doing this for the typical element shown in Figure 12.15b, with Δx_i suitably small, we find that

$$\sum M_{ic} = 0:$$

$$\begin{aligned} W_i R \sin \theta_i - S_i R + Q_{ir} R \sin \theta_i - Q_{ib} d_i \\ + E_{x+\Delta x} (R \cos \theta_i - b_{x+\Delta x}) - E_x (R \cos \theta_i - b_x) \\ + (T_{x+\Delta x} - T_x) R \sin \theta_i = 0 \quad (12-25) \end{aligned}$$

where d_i is the moment arm of Q_{ib} about the center of the circle. Substituting Equation 12-23 into Equation 12-25 and dividing through by R , we can express the forces on the element in terms of the defined factor of safety:

$$\begin{aligned} W_i \sin \theta_i - \frac{1}{FS} (c_i \Delta x_i \sec \theta_i + N_i \tan \phi_i) \\ + Q_{ir} \sin \theta_i - Q_{ib} \frac{d_i}{R} + E_{x+\Delta x} \left(\cos \theta_i - \frac{b_{x+\Delta x}}{R} \right) \\ - E_x \left(\cos \theta_i - \frac{b_x}{R} \right) + (T_{x+\Delta x} - T_x) \sin \theta_i = 0 \quad (12-26) \end{aligned}$$

Our definition of factor of safety will not change if we now sum Equation 12-26 over the n slices. In this case the moment of the forces on the sides of the slice, E and T , will be cancelled by the moment of the same force acting in the opposite direction on the adjacent slices. Thus the remaining expression for the factor of safety is

$$FS = \frac{\sum_{i=1}^n (c_i \Delta x_i \sec \theta_i + N_i \tan \phi_i)}{\sum_{i=1}^n \left[(W_i + Q_{ir}) \sin \theta_i - Q_{ib} \frac{d_i}{R} \right]} \quad (12-27)$$

In order to determine N_i , we sum the forces acting in a vertical direction: $\sum F_v = 0$:

$$W_i + Q_{ir} - N_i \cos \theta_i - S_i \sin \theta_i + T_{x+\Delta x_i} - T_x = 0 \quad (12-28)$$

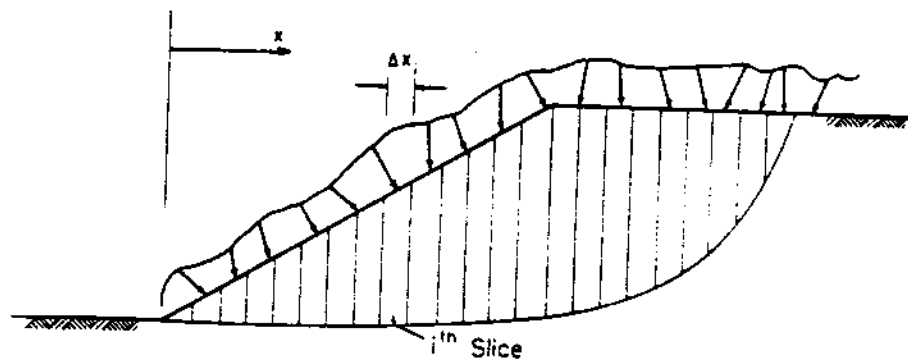
Substituting Equation 12-23 into Equation 12-28 and rearranging terms, we solve for the normal force:

$$N_i = \frac{W_i + Q_{ir} - \frac{c_i \Delta x_i \tan \theta_i}{FS} + T_x - T_{x+\Delta x_i}}{\cos \theta_i + \frac{\sin \theta_i \tan \phi_i}{FS}} \quad (12-29)$$

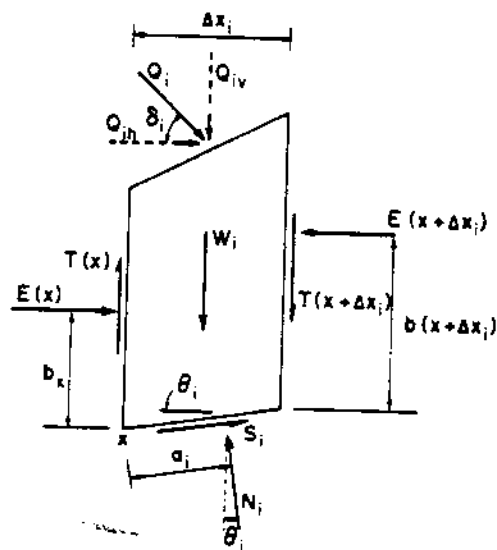
We can eliminate N_i from Equation 12-27 by substituting Equation 12-29 into the expression. After some simplification Equation 12-27 becomes

$$FS = \frac{\sum \left[\frac{c_i \Delta x_i + [(W_i + Q_{ir}) + (T_x - T_{x+\Delta x_i})] \tan \phi_i}{\cos \theta_i + \frac{\sin \theta_i \tan \phi_i}{FS}} \right]}{\sum \left[(W_i + Q_{ir}) \sin \theta_i - Q_{ib} \frac{d_i}{R} \right]} \quad (12-30)$$

Reference: Perloff and Baron; "Soil Mechanics, Principles and Applications", John Wiley and Sons, 1976



a) - Sliding Mass



b) - Thin Slice of Sliding Mass

This expression gives the factor of safety in an *implicit* form in which all the quantities in the equation are known except FS, T_x , and $T_{x-\Delta x}$. The result is as general as that for the "accurate" method except that a *circular* failure surface has been assumed.

Recognizing that equilibrium requires

$$\sum (T_x - T_{x-\Delta x}) = 0 \quad (12-31)$$

if we further assume that

$$\sum \left[\frac{(T_x - T_{x-\Delta x}) \tan \phi_i}{\cos \theta_i + \frac{\sin \theta_i \tan \phi_i}{FS}} \right] = 0 \quad (12-32)$$

Equation 12-30 becomes a simple implicit expression in a single unknown, the factor of safety, FS:

$$FS = \frac{\sum \left[\frac{c_i \Delta x_i - (W_i + Q_u) \tan \phi_i}{\cos \theta_i + \frac{\sin \theta_i \tan \phi_i}{FS}} \right]}{\sum \left[(W_i + Q_u) \sin \theta_i - Q_{uh} \frac{d_i}{R} \right]} \quad (12-33)$$

We can solve this expression readily by an iterative approach, which is particularly effective when using a digital computer. Equation 12-33 can be reformulated conveniently for this purpose as described by Little and Price (1956). If the equation is solved manually, Figure 12.16 is of assistance. This figure gives the quantity

$$\cos \theta_i + \frac{\sin \theta_i \tan \phi_i}{FS}$$

for various values of θ_i and $\tan \phi_i$, FS.

Note: θ_i is + When Slope of Failure arc is in Same Quadrant as Slope of Ground Surface

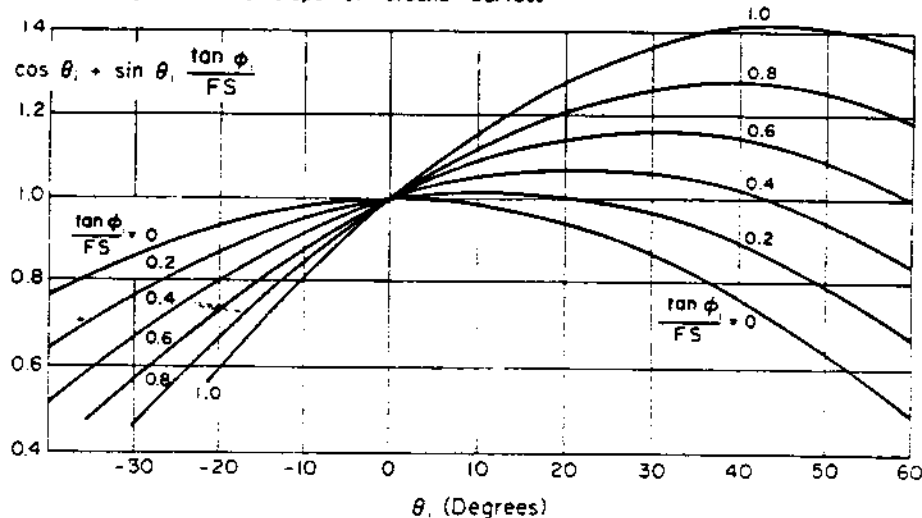


Fig. 12.16—Values of $\cos \theta_i + \sin \theta_i (\tan \phi_i / FS)$ for use in simplified method of slices (After Janbu, et al., 1955)

Bishop (1955) investigated many cases and found that generally less than a 2 per cent error was introduced by the assumption stated in Equation 12-32. This approach is called the *Bishop simplified method of slices*.

Note that Equation 12-33 assumes that the surface load Q_i affects the failure surface stresses only beneath the i th element. This neglects the distributional effect of the slope material, and may lead to significant error if the external loads are concentrated. Whether the error is on the safe side or unsafe side depends upon the location of Q_i . In the case of relatively uniformly distributed external loads, the assumption is reasonable.

Effect of Pore Water Pressure

In the preceding discussion we tacitly assumed the use of *total stresses* in regard to both stress and strength parameters. There are cases where the total stresses and total strength parameters will lead to accurate answers. However, in many other important circumstances, failure to consider effective stresses will lead to serious errors. Incorporating pore water pressures into Equation 12-23:

$$S_i = \frac{1}{FS} [c_i \Delta x_i \sec \theta_i + (N_i - u_i \Delta x_i \sec \theta_i) \tan \phi_i] \quad (12-34)$$

where c_i is the cohesive component of strength in terms of effective stress, ϕ_i is the apparent angle of shearing resistance in terms of effective stresses and u_i is the pore water pressure on the base of the slice. Following a procedure analogous to that in the development of Equation 12-26 through 12-33 will lead us to a computed factor of safety in terms of effective stresses:

$$FS = \frac{\sum \left[\frac{c_i \Delta x_i + (W_i + Q_{ix} - u_i \Delta x_i) \tan \phi_i}{\cos \theta_i + \frac{\sin \theta_i \tan \phi_i}{FS}} \right]}{\sum \left[(W_i + Q_{ix}) \sin \theta_i - Q_{iy} \frac{d_i}{R} \right]} \quad (12-35)$$

Recall that Equations 12-33 or 12-35 permit determination of the factor of safety for a specific assumed circular sliding surface. The factor of safety for the slope will be that factor of safety corresponding to the surface along which failure is most likely to occur. Thus it is necessary to investigate a number of potential sliding surfaces, and select from among them the one which produces the lowest factor of safety.

Roy F. Weston, Inc.
West Chester, PA

Oceanside Landfill - Phase 4, Section 4
Undrained Condition

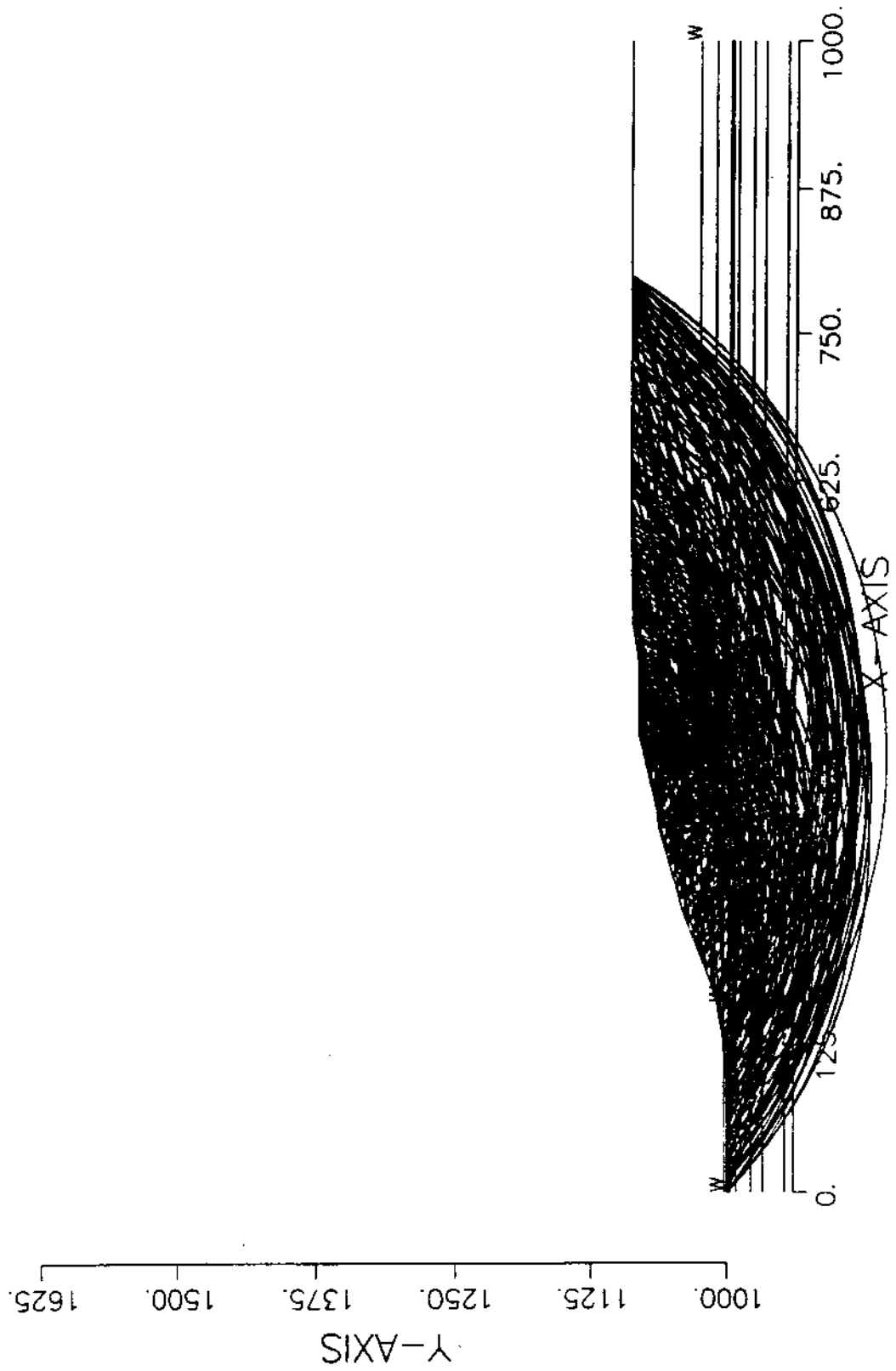


FIGURE 2

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West Chester, PA

Oceanside Landfill - Phase 4, Section 4
Undrained Condition

381 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 2.462

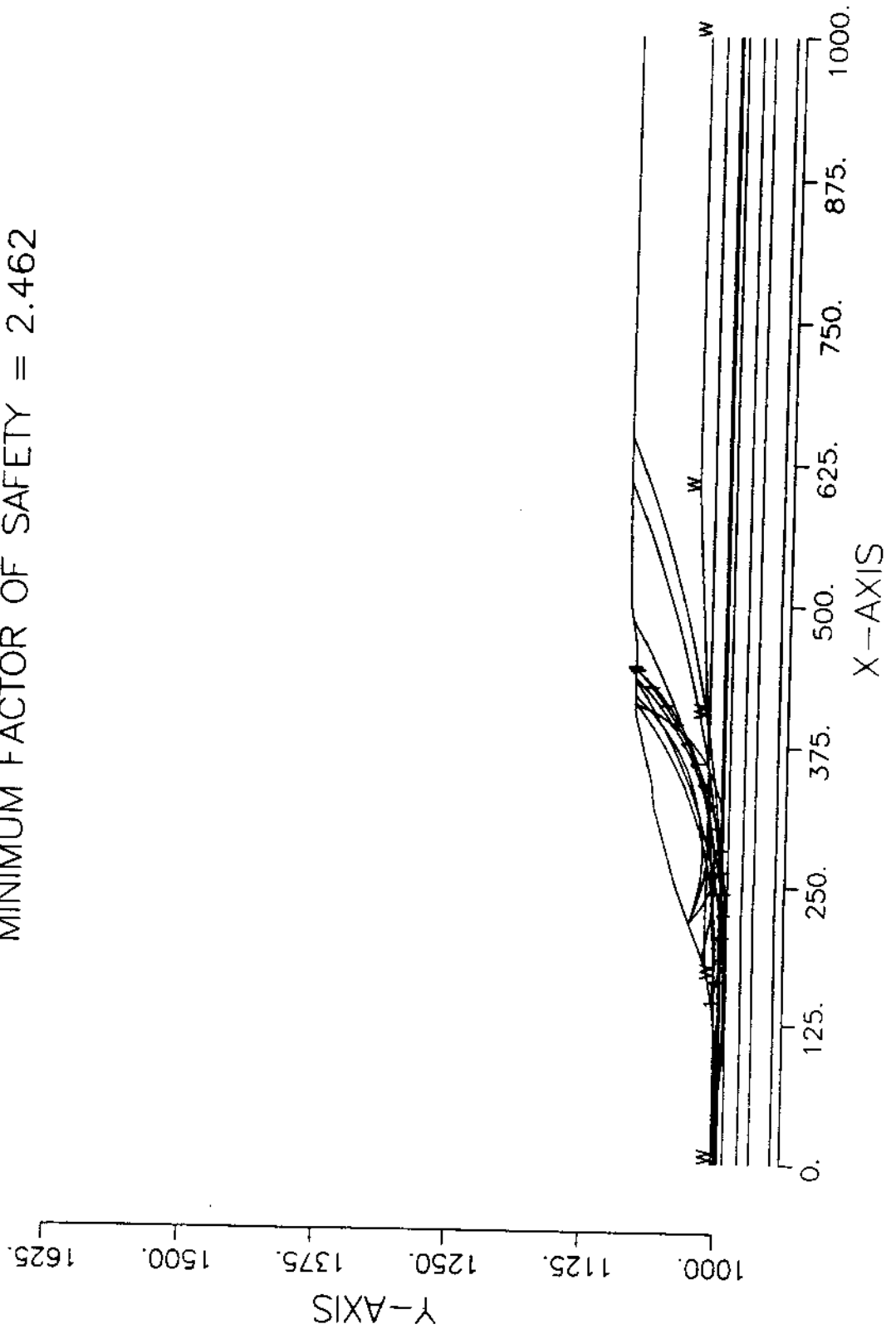


FIGURE 3

Roy F. Weston, Inc.
West Chester, PA

Oceanside Landfill - Phase 4, Section 4
Drained Condition
381 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.645

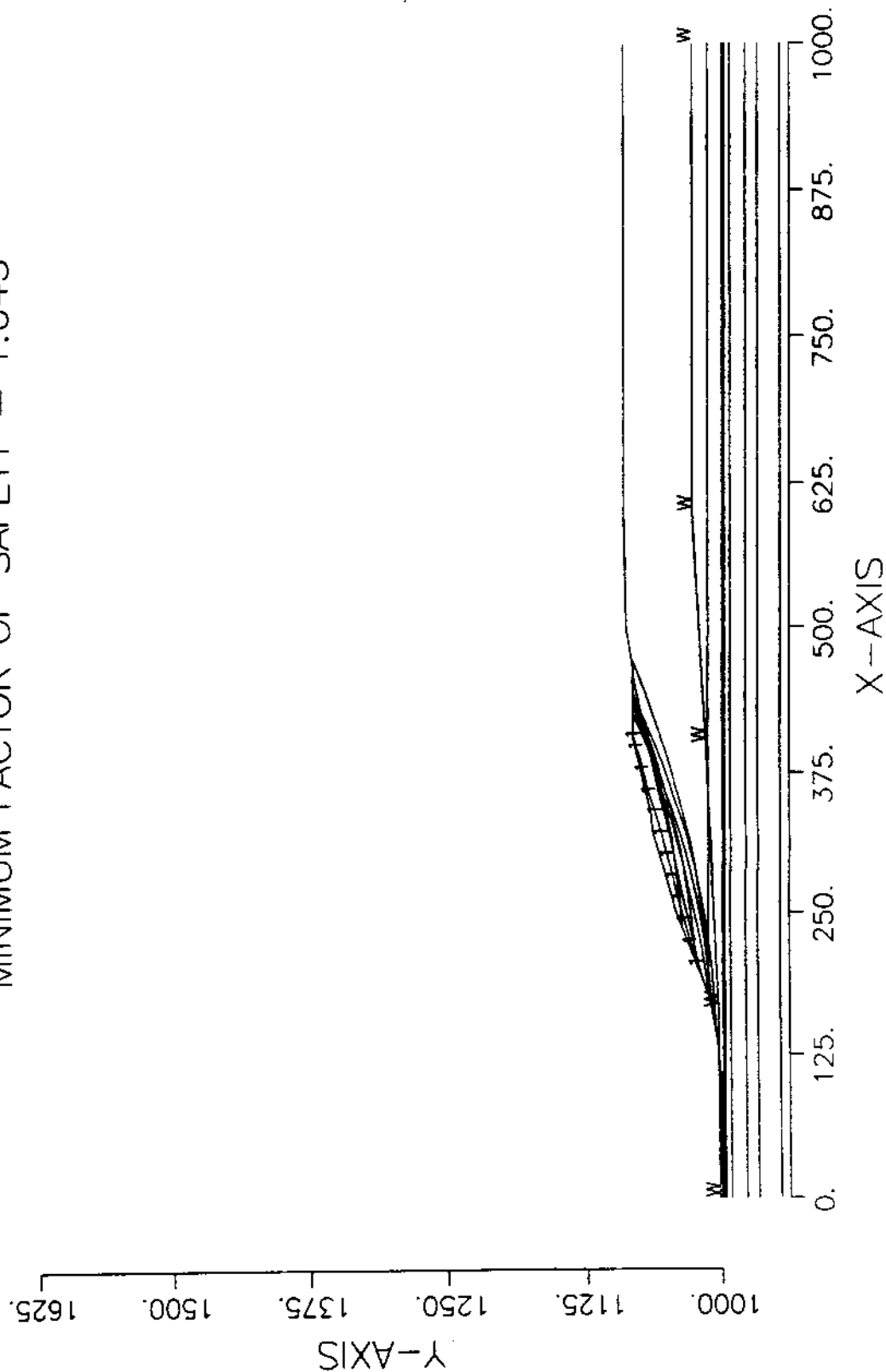


FIGURE 4

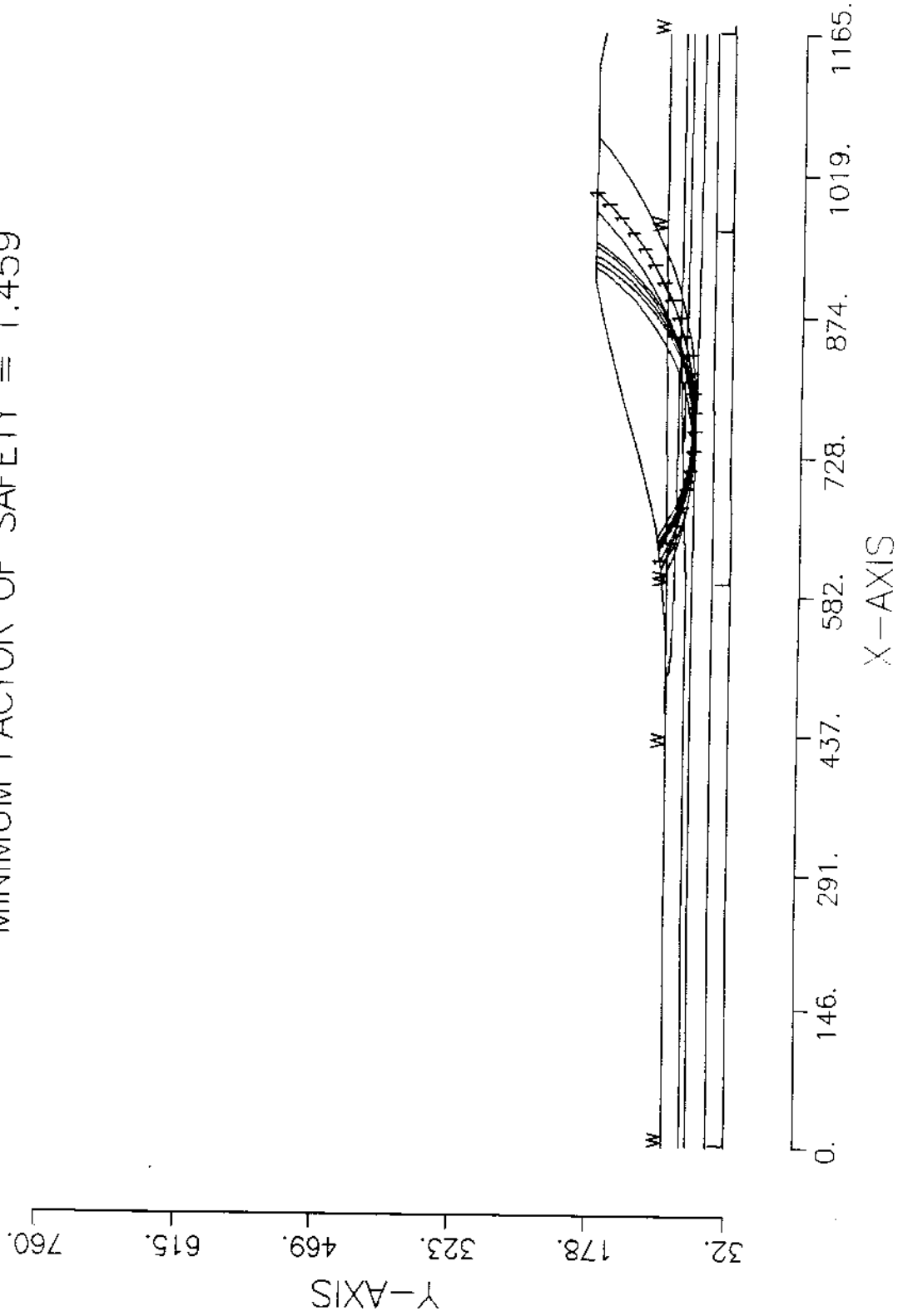
APPENDIX B
CROSS SECTION 1-1 COMPUTER DATA

UNDRAINED ANALYSIS

EXISTING TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.459



HPLSR150HPLSR150HPLSR150PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 EXISTING TOPOGRAPHY UNDRAINED ANALY

32 16

0. 97. 424. 97. 2
424. 97. 498. 97.5 2
498. 97.5 524. 97.9 1
524. 97.9 541. 98. 1
541. 98. 559. 100. 1
559. 100. 609. 104. 1
609. 104. 652. 110. 1
652. 110. 696. 120. 1
696. 120. 733. 130. 1
733. 130. 764. 140. 1
764. 140. 801. 150. 1
801. 150. 837. 160. 1
837. 160. 875. 170. 1
875. 170. 910. 176.5 1
910. 176.5 1132. 176. 1
1132. 176. 1165. 170. 1
498. 97.5 504. 94. 2
504. 94. 594. 90.5 2
594. 90.5 861. 87.5 2
861. 87.5 961. 86. 3
961. 86. 1165. 85. 3
0. 79. 594. 79. 4
594. 79. 716. 83. 4
716. 83. 861. 87.5 3
716. 83. 961. 79. 4
961. 79. 1165. 78. 4
0. 72. 594. 72. 5
594. 72. 961. 67. 5
961. 67. 1165. 65. 5
0. 51. 594. 51. 6
594. 51. 961. 52. 6
961. 52. 1165. 52. 6

SOIL

6

80.0 80.0 1750. 0. 0. 0. 1
80.0 80.0 30. 0. 0. 0. 1
88.0 88.0 820. 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.

5

0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.

LIMITS

3 3

0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.

CIRCL2

50 10

594. 644. 900. 1160.
20. 20. 0. 0.

END

CL1EUB.DAT

SECTION 1-1 UNDRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 EXISTING TOPOGRAPHY UNDRAINED ANALY

32 16

0. 97. 424. 97. 2
424. 97. 498. 97.5 2
498. 97.5 524. 97.9 1
524. 97.9 541. 98. 1
541. 98. 559. 100. 1
559. 100. 609. 104. 1
609. 104. 652. 110. 1
652. 110. 696. 120. 1
696. 120. 733. 130. 1
733. 130. 764. 140. 1
764. 140. 801. 150. 1
801. 150. 837. 160. 1
837. 160. 875. 170. 1
875. 170. 910. 176.5 1
910. 176.5 1132. 176. 1
1132. 176. 1165. 170. 1
498. 97.5 504. 94. 2
504. 94. 594. 90.5 2
594. 90.5 861. 87.5 2
861. 87.5 961. 86. 3
961. 86. 1165. 85. 3
0. 79. 594. 79. 4
594. 79. 716. 83. 4
716. 83. 861. 87.5 3
716. 83. 961. 79. 4
961. 79. 1165. 78. 4
0. 72. 594. 72. 5
594. 72. 961. 67. 5
961. 67. 1165. 65. 5
0. 51. 594. 51. 6
594. 51. 961. 52. 6
961. 52. 1165. 52. 6

SOIL

6

80.0 80.0 1750. 0. 0. 0. 1
80.0 80.0 30. 0. 0. 0. 1
88.0 88.0 820. 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.

5

0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.

LIMITS

3 3

0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.

CIRCL2

80 10

0. 730. 900. 1160.
20. 20. 0. 0.

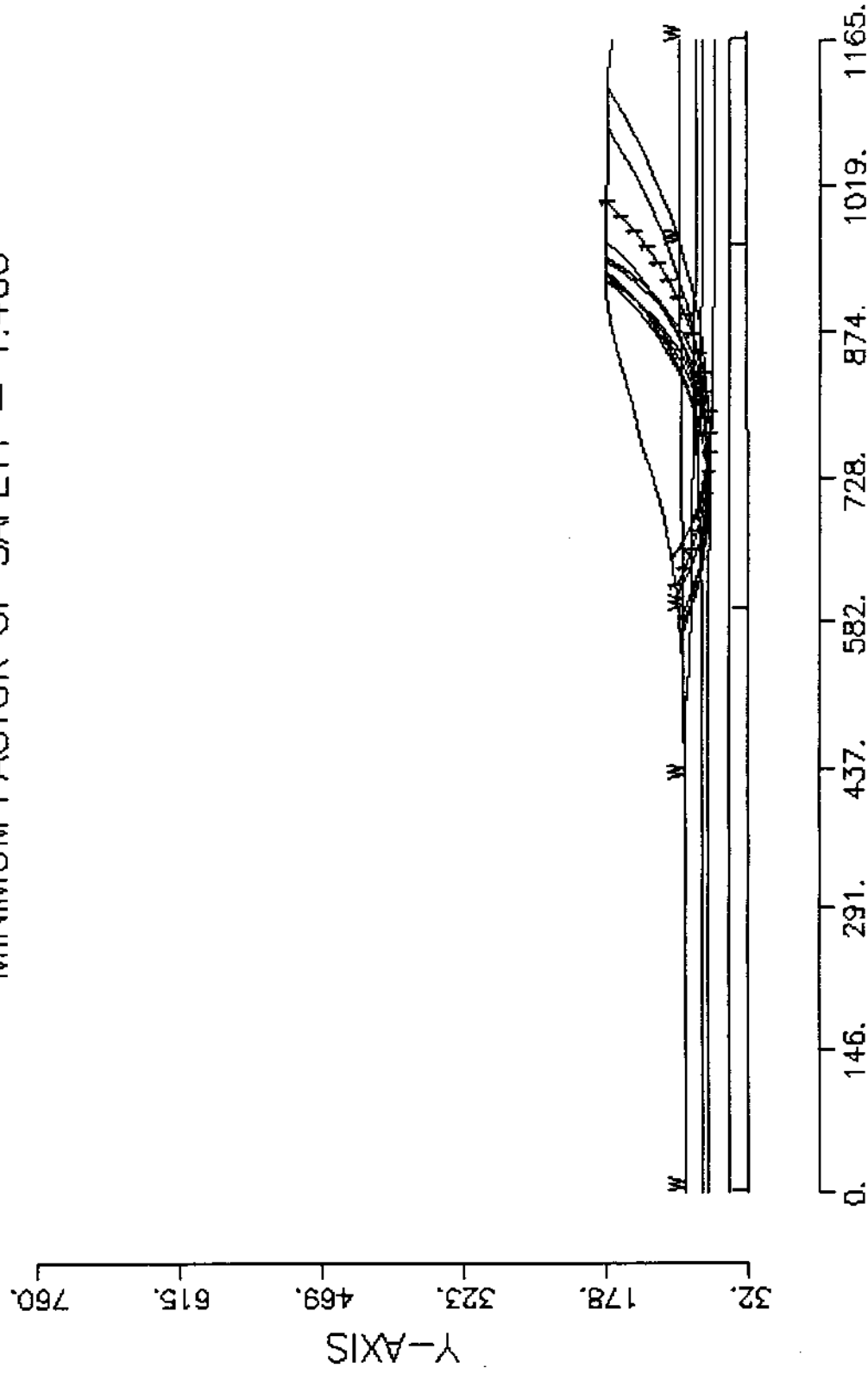
END

CL1EUA.DAT

SECTION 1-1 UNDRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.460



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 1-1
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
32 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	97.00	424.00	97.00	2
2	424.00	97.00	498.00	97.50	2
3	498.00	97.50	524.00	97.90	1
4	524.00	97.90	541.00	98.00	1
5	541.00	98.00	559.00	100.00	1
6	559.00	100.00	609.00	104.00	1
7	609.00	104.00	652.00	110.00	1
8	652.00	110.00	696.00	120.00	1
9	696.00	120.00	733.00	130.00	1
10	733.00	130.00	764.00	140.00	1
11	764.00	140.00	801.00	150.00	1
12	801.00	150.00	837.00	160.00	1
13	837.00	160.00	875.00	170.00	1
14	875.00	170.00	910.00	176.50	1
15	910.00	176.50	1132.00	176.00	1
16	1132.00	176.00	1165.00	170.00	1
17	498.00	97.50	504.00	94.00	2
18	504.00	94.00	594.00	90.50	2
19	594.00	90.50	861.00	87.50	2
20	861.00	87.50	961.00	86.00	3
21	961.00	86.00	1165.00	85.00	3
22	.00	79.00	594.00	79.00	4
23	594.00	79.00	716.00	83.00	4
24	716.00	83.00	861.00	87.50	3
25	716.00	83.00	961.00	79.00	4
26	961.00	79.00	1165.00	78.00	4
27	.00	72.00	594.00	72.00	5
28	594.00	72.00	961.00	67.00	5
29	961.00	67.00	1165.00	65.00	5
30	.00	51.00	594.00	51.00	6
31	594.00	51.00	961.00	52.00	6
32	961.00	52.00	1165.00	52.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	80.0	80.0	1750.0	.0	.00	.0	1
2	80.0	80.0	30.0	.0	.00	.0	1
3	88.0	88.0	820.0	.0	.00	.0	1
4	104.0	104.0	380.0	.0	.00	.0	1
5	125.0	125.0	.0	32.0	.00	.0	1
6	125.0	125.0	300.0	40.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	97.00
2	424.00	97.00
3	594.00	97.50
4	961.00	102.50
5	1165.00	102.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 3 BOUNDARIES
OF WHICH THE FIRST 3 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	32.00	594.00	32.00
2	594.00	32.00	961.00	34.00
3	961.00	34.00	1165.00	34.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 730.00

EACH SURFACE TERMINATES BETWEEN X = 900.00
AND X = 1160.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.460

X-CENTER = 765.01
Y-CENTER = 392.40
RADIUS = 321.95

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	619.11	105.41	-25.17
2	637.22	96.91	-21.61
3	655.81	89.54	-18.05
4	674.83	83.34	-14.49
5	694.19	78.34	-10.93
6	713.83	74.55	-7.37
7	733.66	71.98	-3.81
8	753.62	70.65	-.25
9	773.62	70.57	3.31
10	793.58	71.72	6.87
11	813.44	74.11	10.43
12	833.11	77.73	13.99
13	852.52	82.57	17.55
14	871.59	88.60	21.11
15	890.24	95.80	24.67
16	908.42	104.15	28.23
17	926.04	113.61	31.79

594: 1644

18	943.04	124.14	35.35
19	959.35	135.72	38.91
20	974.92	148.28	42.47
21	989.67	161.78	46.03
22	1003.56	176.17	49.59
23	1003.66	176.29	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	626.94	15.65	5974.08	.00	.00	16339.91	1198.31
2	635.99	2.45	2013.10	.00	99.76	3646.50	1198.31
3	644.61	14.78	17730.34	.00	4179.12	22439.16	1198.31
4	653.56	3.12	4976.23	.00	1651.21	5295.07	1198.31
5	655.47	.69	1161.71	.00	339.83	855.71	20.54
6	665.32	19.02	40441.98	.00	15012.32	27656.44	20.54
7	677.74	5.82	15480.43	.00	6018.20	10002.63	20.54
8	687.42	13.55	41774.20	.00	16309.28	27777.79	260.20
9	695.09	1.81	6208.43	.00	2382.60	4033.14	260.20
10	704.91	17.83	68526.31	.00	25764.89	44939.50	260.20
11	714.91	2.17	9259.89	.00	3382.21	6028.54	260.20
12	724.50	17.00	78176.04	.00	27927.65	51476.35	260.20
13	733.33	.66	3249.78	.00	1139.99	2159.32	260.20
14	743.64	19.96	104748.70	.00	35218.06	70109.15	260.20
15	758.81	10.38	59300.85	.00	18861.33	40451.87	260.20
16	768.81	9.62	57263.80	.00	17580.02	39695.24	260.20
17	783.60	19.97	124109.80	.00	36114.94	87901.23	260.20
18	797.29	7.42	47499.97	.00	13097.59	34511.69	260.20
19	807.22	12.44	80852.66	.00	21142.71	59901.77	260.20
20	823.28	19.67	129611.80	.00	30824.38	100006.80	260.20
21	835.06	3.89	25721.24	.00	5644.45	20603.07	260.20
22	841.37	8.74	57558.51	.00	11849.48	46884.23	260.20
23	849.13	6.77	44446.34	.00	8386.70	36441.47	561.49
24	856.76	8.48	55400.28	.00	9531.79	46992.82	561.49
25	864.39	6.79	43973.94	.00	6599.39	38257.10	561.49
26	869.69	3.80	24501.95	.00	3296.75	20890.95	1198.31
27	873.29	3.41	21927.81	.00	2750.66	19061.55	1198.31
28	882.62	15.24	95801.61	.00	8740.63	86392.45	1198.31
29	896.68	12.87	77470.31	.00	2532.60	74925.88	1198.31
30	905.76	5.31	30913.54	.00	.00	30802.62	1198.31
31	909.21	1.58	9078.24	.00	.00	9149.36	1198.31
32	918.02	16.04	86205.78	.00	.00	86130.40	1198.31
33	934.54	17.00	78292.95	.00	.00	77256.02	1198.31
34	951.20	16.31	60655.53	.00	.00	57364.91	1198.31
35	967.14	15.56	42799.81	.00	.00	35657.68	1198.31
36	982.29	14.75	25150.69	.00	.00	12159.39	1198.31
37	996.61	13.89	8141.66	.00	.00	-13114.65	1198.31
38	1003.61	.10	.46	.00	.00	-214.30	1198.31

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.482

X-CENTER = 767.79
Y-CENTER = 275.99

RADIUS = 205.97

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	646.84	109.28	-33.18
2	663.57	98.33	-27.61
3	681.30	89.06	-22.05
4	699.83	81.56	-16.48
5	719.01	75.88	-10.92
6	738.65	72.09	-5.35
7	758.56	70.23	.21
8	778.56	70.30	5.78
9	798.46	72.32	11.35
10	818.07	76.25	16.91
11	837.21	82.07	22.48
12	855.69	89.72	28.04
13	873.34	99.12	33.61
14	890.00	110.19	39.17
15	905.50	122.82	44.74
16	919.71	136.90	50.30
17	932.48	152.29	55.87
18	943.70	168.84	61.44
19	947.82	176.41	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.526

X-CENTER = 730.68

Y-CENTER = 313.51

RADIUS = 241.74

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	609.87	104.12	-27.61
2	627.60	94.85	-22.87
3	646.02	87.08	-18.13
4	665.03	80.86	-13.39
5	684.49	76.22	-8.65
6	704.26	73.22	-3.90
7	724.21	71.86	.84
8	744.21	72.15	5.58
9	764.12	74.09	10.32
10	783.79	77.68	15.06
11	803.11	82.87	19.80
12	821.92	89.65	24.54
13	840.12	97.96	29.29
14	857.56	107.74	34.03
15	874.13	118.93	38.77
16	889.73	131.46	43.51
17	904.23	145.22	48.25
18	917.55	160.15	52.99
19	929.59	176.12	57.73
20	929.80	176.46	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.551

X-CENTER = 704.14
Y-CENTER = 376.32
RADIUS = 304.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	572.91	101.11	-23.61
2	591.24	93.10	-19.85
3	610.05	86.31	-16.09
4	629.26	80.76	-12.34
5	648.80	76.49	-8.58
6	668.58	73.51	-4.82
7	688.51	71.83	-1.06
8	708.51	71.46	2.70
9	728.48	72.40	6.46
10	748.36	74.65	10.22
11	768.04	78.20	13.98
12	787.45	83.03	17.74
13	806.50	89.13	21.50
14	825.10	96.45	25.26
15	843.19	104.99	29.01
16	860.68	114.69	32.77
17	877.50	125.51	36.53
18	893.57	137.42	40.29
19	908.83	150.35	44.05
20	923.20	164.26	47.81
21	934.25	176.45	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.585

X-CENTER = 764.00
Y-CENTER = 283.19
RADIUS = 209.69

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	646.84	109.28	-31.23
2	663.94	98.91	-25.77
3	681.95	90.21	-20.30
4	700.71	83.28	-14.83
5	720.04	78.16	-9.37
6	739.77	74.90	-3.90
7	759.73	73.54	1.57
8	779.72	74.09	7.03
9	799.57	76.53	12.50
10	819.09	80.86	17.97

11	838.12	87.03	23.43
12	856.47	94.99	28.90
13	873.98	104.65	34.37
14	890.49	115.94	39.83
15	905.85	128.75	45.30
16	919.92	142.97	50.77
17	932.57	158.46	56.23
18	943.68	175.08	61.70
19	944.40	176.42	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.610

X-CENTER = 706.96
Y-CENTER = 354.72
RADIUS = 281.99

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	582.15	101.85	-24.24
2	600.39	93.64	-20.17
3	619.16	86.74	-16.11
4	638.38	81.20	-12.04
5	657.94	77.02	-7.98
6	677.74	74.25	-3.91
7	697.70	72.88	.15
8	717.70	72.93	4.21
9	737.64	74.40	8.28
10	757.43	77.28	12.34
11	776.97	81.56	16.41
12	796.16	87.21	20.47
13	814.89	94.20	24.54
14	833.09	102.51	28.60
15	850.65	112.08	32.67
16	867.48	122.88	36.73
17	883.51	134.84	40.80
18	898.65	147.91	44.86
19	912.83	162.01	48.92
20	925.43	176.47	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 18 COORDINATE POINTS

SAFETY FACTOR = 1.653

X-CENTER = 756.58
Y-CENTER = 262.88
RADIUS = 188.78

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	646.84	109.28	-32.51

2	663.70	98.53	-26.43
3	681.61	89.63	-20.36
4	700.36	82.67	-14.29
5	719.74	77.73	-8.22
6	739.54	74.88	-2.14
7	759.52	74.13	3.93
8	779.48	75.50	10.00
9	799.17	78.97	16.08
10	818.39	84.51	22.15
11	836.91	92.05	28.22
12	854.54	101.51	34.30
13	871.06	112.78	40.37
14	886.30	125.73	46.44
15	900.08	140.23	52.51
16	912.25	156.10	58.59
17	922.67	173.16	64.66
18	924.24	176.47	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 22 COORDINATE POINTS

SAFETY FACTOR = 1.667

X-CENTER = 723.90

Y-CENTER = 394.07

RADIUS = 324.78

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	582.15	101.85	-24.11
2	600.41	93.68	-20.58
3	619.13	86.65	-17.05
4	638.25	80.79	-13.53
5	657.70	76.11	-10.00
6	677.39	72.64	-6.47
7	697.27	70.38	-2.94
8	717.24	69.36	.59
9	737.24	69.56	4.12
10	757.19	71.00	7.65
11	777.01	73.66	11.18
12	796.63	77.54	14.71
13	815.97	82.62	18.23
14	834.97	88.87	21.76
15	853.54	96.29	25.29
16	871.63	104.83	28.82
17	889.15	114.48	32.35
18	906.05	125.18	35.88
19	922.25	136.90	39.41
20	937.70	149.59	42.94
21	952.35	163.22	46.46
22	964.85	176.38	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.673

X-CENTER = 759.68
Y-CENTER = 739.40
RADIUS = 668.41

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	563.67	100.37	-16.20
2	582.88	94.80	-14.48
3	602.24	89.79	-12.77
4	621.75	85.37	-11.05
5	641.38	81.54	-9.34
6	661.11	78.30	-7.62
7	680.94	75.64	-5.91
8	700.83	73.58	-4.19
9	720.78	72.12	-2.48
10	740.76	71.26	-.77
11	760.75	70.99	.95
12	780.75	71.32	2.66
13	800.73	72.25	4.38
14	820.67	73.78	6.09
15	840.56	75.90	7.81
16	860.37	78.62	9.52
17	880.10	81.92	11.24
18	899.71	85.82	12.95
19	919.21	90.30	14.67
20	938.55	95.37	16.38
21	957.74	101.01	18.09
22	976.75	107.22	19.81
23	995.57	114.00	21.52
24	1014.18	121.34	23.24
25	1032.55	129.23	24.95
26	1050.69	137.66	26.67
27	1068.56	146.64	28.38
28	1086.15	156.15	30.10
29	1103.46	166.18	31.81
30	1119.34	176.03	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.682

X-CENTER = 742.23
Y-CENTER = 670.82
RADIUS = 597.74

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	563.67	100.37	-16.42
2	582.86	94.72	-14.50
3	602.22	89.71	-12.59
4	621.74	85.35	-10.67
5	641.39	81.65	-8.75
6	661.16	78.60	-6.84

7	681.02	76.22	-4.92
8	700.94	74.51	-3.00
9	720.92	73.46	-1.08
10	740.91	73.08	.83
11	760.91	73.37	2.75
12	780.89	74.33	4.67
13	800.82	75.96	6.58
14	820.69	78.25	8.50
15	840.47	81.21	10.42
16	860.14	84.83	12.34
17	879.68	89.10	14.25
18	899.06	94.02	16.17
19	918.27	99.59	18.09
20	937.28	105.80	20.00
21	956.07	112.65	21.92
22	974.63	120.11	23.84
23	992.92	128.20	25.76
24	1010.94	136.89	27.67
25	1028.65	146.18	29.59
26	1046.04	156.05	31.51
27	1063.09	166.50	33.42
28	1077.66	176.12	

1

Roy F. Weston, Inc.
West Chester, PA

	Y	A	X	I	S	
	32.00	177.63	323.25	468.88	614.50	760.13
X	.00	L*--**	-----+	-----+	-----+	-----+
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		-.....				
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A	291.25					
						
						
						
						
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X	436.88					
						
						
		*				
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I	582.50	L*..**4				
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		...411				
		...31*.				

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		...15.*
S	728.13	...1*...*
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		...14...
		...14...*
		...136...*
		...1*34...
	873.75	...91236.*
		11233.*
		9012233
		991.822
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		-9.0.
		-900
		-9.
		-9
		-*
	1165.00	L***W *.

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Version 4.0

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(617) 369-8304

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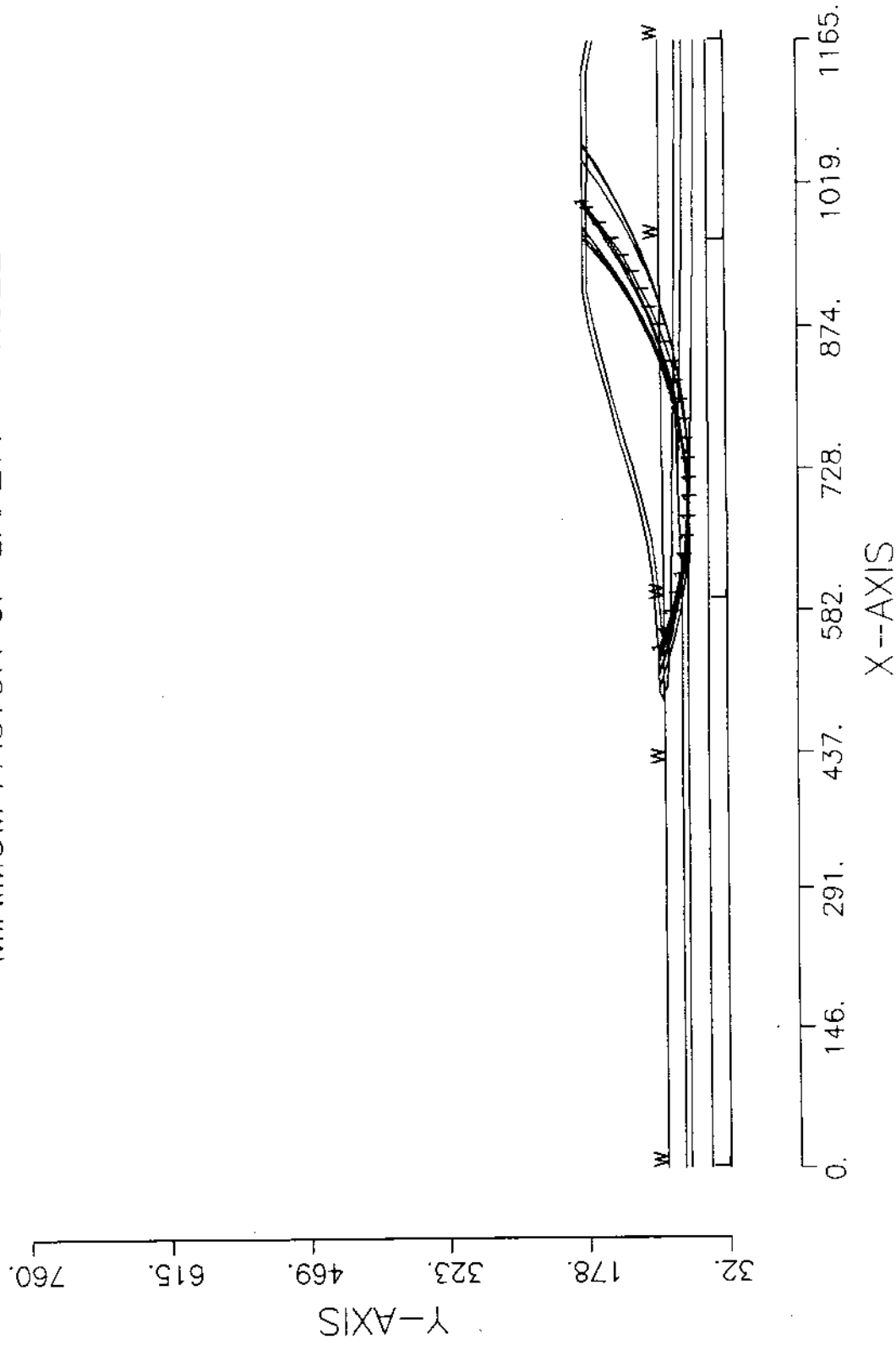
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West Chester, PA

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.322



CLARKSTOWN SANITARY LANDFILL SECTION 1-1 FINAL TOPOGRAPHY PROFIL
UNDRAINED ANALYSIS

47 16

0. 97. 488. 97. 3
488. 97. 498. 102.5 1
498. 102.5 524. 102.9 1
524. 102.9 541. 103. 1
541. 103. 559. 105. 1
559. 105. 609. 109. 1
609. 109. 652. 115. 1
652. 115. 696. 125. 1
696. 125. 733. 135. 1
733. 135. 764. 145. 1
764. 145. 801. 155. 1
801. 155. 837. 165. 1
837. 165. 875. 175. 1
875. 175. 910. 181.5 1
910. 181.5 1132. 181. 1
1132. 181. 1165. 175. 1

488. 97. 498. 97.5 3
498. 97.5 524. 97.9 2
524. 97.9 541. 98. 2
541. 98. 559. 100. 2
559. 100. 609. 104. 2
609. 104. 652. 110. 2
652. 110. 696. 120. 2
696. 120. 733. 130. 2
733. 130. 764. 140. 2
764. 140. 801. 150. 2
801. 150. 837. 160. 2
837. 160. 875. 170. 2
875. 170. 910. 176.5 2
910. 176.5 1132. 176. 2
1132. 176. 1165. 170. 2

498. 97.5 504. 94. 3
504. 94. 594. 90.5 3
594. 90.5 861. 87.5 3
861. 87.5 961. 86. 4
961. 86. 1165. 85. 4

0. 79. 594. 79. 5
594. 79. 716. 83. 5
716. 83. 861. 87.5 4
716. 83. 961. 79. 5
961. 79. 1165. 78. 5

0. 72. 594. 72. 6
594. 72. 961. 67. 6
961. 67. 1165. 65. 6

0. 51. 594. 51. 7
594. 51. 961. 52. 7
961. 52. 1165. 52. 7

SOIL

7

125. 125. 0.0 32. 0. 0. 1
80.0 80.0 1750. 0. 0. 0. 1
80.0 80.0 30. 0. 0. 0. 1
88.0 88.0 820. 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.
5
0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.
LIMITS
3 3
0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.
CIRCL2
50 10
501. 551. 900. 1160.
20. 20. 0. 0.
END

CL1FUB.DAT

SECTION 1-1 FINAL UNDRAINED ANALYSIS

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 FINAL TOPOGRAPHY PROFIL
UNDRAINED ANALYSIS

47 16

0. 97. 488. 97. 3
488. 97. 498. 102.5 1
498. 102.5 524. 102.9 1
524. 102.9 541. 103. 1
541. 103. 559. 105. 1
559. 105. 609. 109. 1
609. 109. 652. 115. 1
652. 115. 696. 125. 1
696. 125. 733. 135. 1
733. 135. 764. 145. 1
764. 145. 801. 155. 1
801. 155. 837. 165. 1
837. 165. 875. 175. 1
875. 175. 910. 181.5 1
910. 181.5 1132. 181. 1
1132. 181. 1165. 175. 1
488. 97. 498. 97.5 3
498. 97.5 524. 97.9 2
524. 97.9 541. 98. 2
541. 98. 559. 100. 2
559. 100. 609. 104. 2
609. 104. 652. 110. 2
652. 110. 696. 120. 2
696. 120. 733. 130. 2
733. 130. 764. 140. 2
764. 140. 801. 150. 2
801. 150. 837. 160. 2
837. 160. 875. 170. 2
875. 170. 910. 176.5 2
910. 176.5 1132. 176. 2
1132. 176. 1165. 170. 2
498. 97.5 504. 94. 3
504. 94. 594. 90.5 3
594. 90.5 861. 87.5 3
861. 87.5 961. 86. 4
961. 86. 1165. 85. 4
0. 79. 594. 79. 5
594. 79. 716. 83. 5
716. 83. 861. 87.5 4
716. 83. 961. 79. 5
961. 79. 1165. 78. 5
0. 72. 594. 72. 6
594. 72. 961. 67. 6
961. 67. 1165. 65. 6
0. 51. 594. 51. 7
594. 51. 961. 52. 7
961. 52. 1165. 52. 7

SOIL

7

125. 125. 0.0 32. 0. 0. 1
80.0 80.0 1750. 0. 0. 0. 1
80.0 80.0 30. 0. 0. 0. 1
88.0 88.0 820. 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
125.0 125.0 300.0 40. 0. 0. 1

WATER

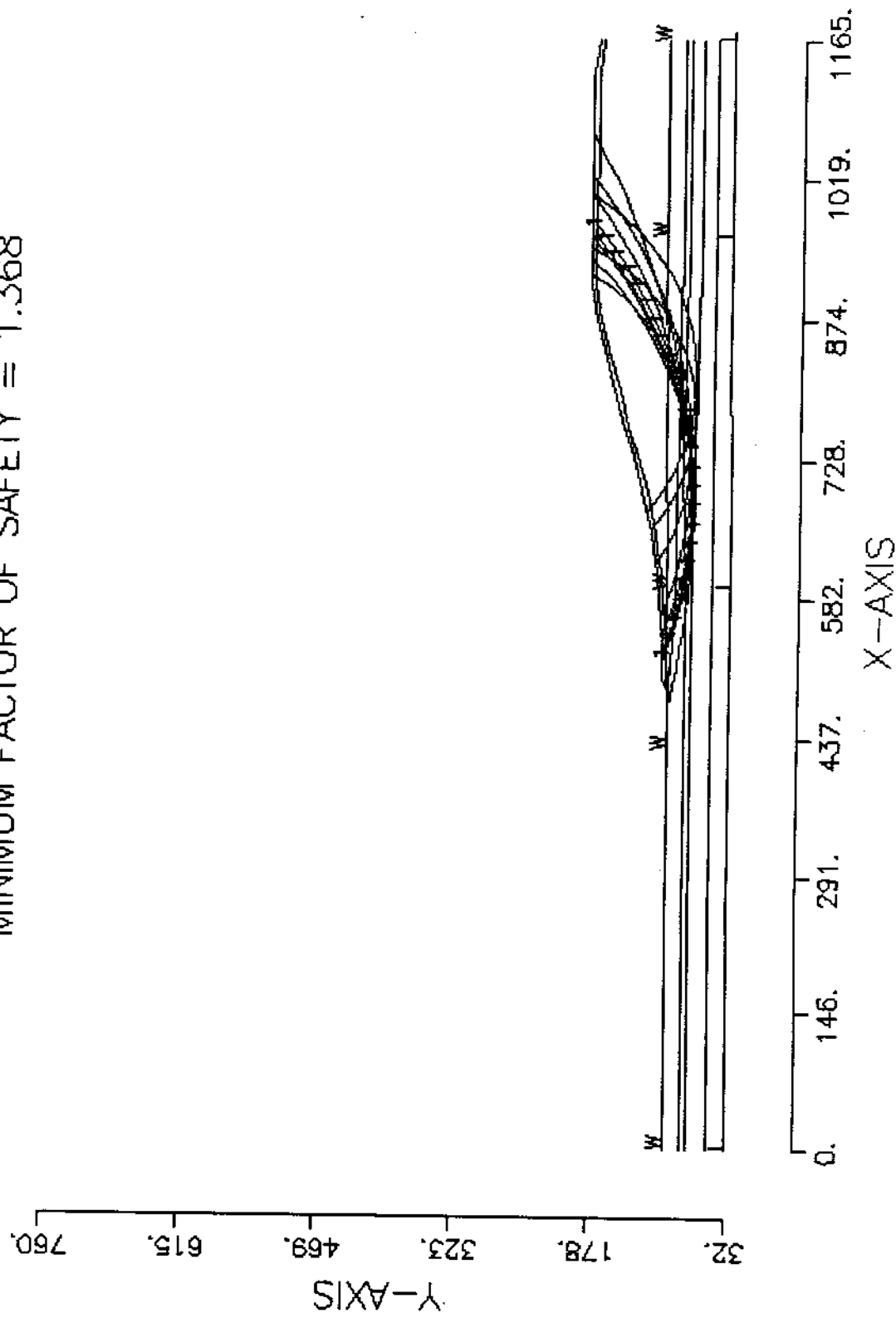
1 0.
5
0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.
LIMITS
3 3
0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.
CIRCL2
80 10
0. 730. 900. 1160.
20. 20. 0. 0.
END

CL1FUA.DAT

SECTION 1-1 FINAL UNDRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.368



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
47 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	97.00	488.00	97.00	3
2	488.00	97.00	498.00	102.50	1
3	498.00	102.50	524.00	102.90	1
4	524.00	102.90	541.00	103.00	1
5	541.00	103.00	559.00	105.00	1
6	559.00	105.00	609.00	109.00	1
7	609.00	109.00	652.00	115.00	1
8	652.00	115.00	696.00	125.00	1
9	696.00	125.00	733.00	135.00	1
10	733.00	135.00	764.00	145.00	1
11	764.00	145.00	801.00	155.00	1
12	801.00	155.00	837.00	165.00	1
13	837.00	165.00	875.00	175.00	1
14	875.00	175.00	910.00	181.50	1
15	910.00	181.50	1132.00	181.00	1
16	1132.00	181.00	1165.00	175.00	1
17	488.00	97.00	498.00	97.50	3
18	498.00	97.50	524.00	97.90	2
19	524.00	97.90	541.00	98.00	2
20	541.00	98.00	559.00	100.00	2
21	559.00	100.00	609.00	104.00	2
22	609.00	104.00	652.00	110.00	2
23	652.00	110.00	696.00	120.00	2
24	696.00	120.00	733.00	130.00	2
25	733.00	130.00	764.00	140.00	2
26	764.00	140.00	801.00	150.00	2
27	801.00	150.00	837.00	160.00	2
28	837.00	160.00	875.00	170.00	2
29	875.00	170.00	910.00	176.50	2
30	910.00	176.50	1132.00	176.00	2
31	1132.00	176.00	1165.00	170.00	2
32	498.00	97.50	504.00	94.00	3
33	504.00	94.00	594.00	90.50	3
34	594.00	90.50	861.00	87.50	3

35	861.00	87.50	961.00	86.00	4
36	961.00	86.00	1165.00	85.00	4
37	.00	79.00	594.00	79.00	5
38	594.00	79.00	716.00	83.00	5
39	716.00	83.00	861.00	87.50	4
40	716.00	83.00	961.00	79.00	5
41	961.00	79.00	1165.00	78.00	5
42	.00	72.00	594.00	72.00	6
43	594.00	72.00	961.00	67.00	6
44	961.00	67.00	1165.00	65.00	6
45	.00	51.00	594.00	51.00	7
46	594.00	51.00	961.00	52.00	7
47	961.00	52.00	1165.00	52.00	7

ISOTROPIC SOIL PARAMETERS

7 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	1750.0	.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1
7	125.0	125.0	300.0	40.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	97.00
2	424.00	97.00
3	594.00	97.50
4	961.00	102.50
5	1165.00	102.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 3 BOUNDARIES
OF WHICH THE FIRST 3 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	32.00	594.00	32.00
2	594.00	32.00	961.00	34.00
3	961.00	34.00	1165.00	34.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 730.00

EACH SURFACE TERMINATES BETWEEN X = 900.00
AND X = 1160.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.368

X-CENTER = 688.29
Y-CENTER = 508.21
RADIUS = 436.32

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)	
1	526.71	102.92	-20.42	501; 557

2	545.45	95.94	-17.80
3	564.50	89.82	-15.17
4	583.80	84.59	-12.54
5	603.32	80.25	-9.92
6	623.02	76.80	-7.29
7	642.86	74.27	-4.66
8	662.79	72.64	-2.04
9	682.78	71.93	.59
10	702.78	72.14	3.22
11	722.75	73.26	5.84
12	742.65	75.29	8.47
13	762.43	78.24	11.10
14	782.05	82.09	13.72
15	801.48	86.83	16.35
16	820.67	92.46	18.98
17	839.59	98.96	21.60
18	858.18	106.33	24.23
19	876.42	114.54	26.85
20	894.26	123.57	29.48
21	911.67	133.41	32.11
22	928.62	144.04	34.73
23	945.05	155.44	37.36
24	960.95	167.57	39.99
25	976.27	180.43	42.61
26	977.27	181.35	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	533.32	13.22	4131.21	.00	.00	5311.91	2426.90
2	540.46	1.07	686.60	.00	.00	1277.01	1279.53
3	541.33	.67	448.13	.00	.00	818.03	1279.53
4	543.56	3.78	2862.18	.00	178.88	4798.83	1279.53
5	551.74	12.58	13174.06	.00	2851.15	16412.09	1279.53
6	558.52	.97	1237.27	.00	357.70	948.88	21.93
7	561.75	5.50	7616.82	.00	2412.38	5627.84	21.93
8	574.15	19.30	33689.71	.00	12771.46	22253.40	21.93
9	588.90	10.20	21829.42	.00	9148.44	13265.69	21.93
10	598.66	9.32	22147.58	.00	9699.85	13035.81	21.93
11	605.59	4.54	11507.83	.00	5120.42	6579.61	21.93
12	608.43	1.14	2957.51	.00	1323.78	1734.76	277.84
13	616.01	14.02	39564.52	.00	17561.42	23294.56	277.84
14	632.94	19.84	65134.35	.00	28074.41	38301.53	277.84
15	647.43	9.14	33149.07	.00	13923.78	19543.21	277.84
16	657.40	10.79	41760.45	.00	17086.92	25057.68	277.84
17	672.79	19.99	84813.45	.00	32808.28	52256.41	277.84
18	689.39	13.22	60646.86	.00	22107.90	38504.37	277.84
19	699.39	6.78	32404.56	.00	11355.46	21031.42	277.84
20	709.39	13.22	65575.27	.00	21947.74	43524.26	277.84
21	719.37	6.75	34579.32	.00	11026.75	23501.58	277.84
22	727.87	10.25	53638.70	.00	16423.09	37202.76	277.84
23	737.82	9.65	51719.31	.00	14919.72	36794.00	277.84
24	752.54	19.78	109533.20	.00	28571.68	81341.73	277.84
25	763.21	1.57	8874.39	.00	2141.20	6814.92	277.84
26	772.64	17.27	97723.34	.00	21628.70	76997.10	277.84
27	781.66	.78	4432.64	.00	897.05	3526.36	599.55
28	789.00	13.90	78865.82	.00	14615.58	64472.98	599.55
29	798.48	5.05	28689.13	.00	4601.03	24903.18	21.93

30	801.24	.48	2746.01	.00	420.16	2403.86	21.93
31	803.68	4.39	24958.36	.00	3676.49	22304.10	21.93
32	813.27	14.80	83995.26	.00	9815.33	71929.27	1279.53
33	828.84	16.33	91786.62	.00	5850.83	83614.67	1279.53
34	838.29	2.59	14412.82	.00	394.10	13643.23	1279.53
35	842.05	4.92	27239.84	.00	310.60	26305.74	1279.53
36	851.35	13.67	74356.10	.00	.00	72521.21	1279.53
37	866.59	16.82	88107.02	.00	.00	85998.45	1279.53
38	875.71	1.42	7244.83	.00	.00	7047.35	1279.53
39	885.34	17.84	86619.10	.00	.00	84132.30	1279.53
40	902.13	15.74	69028.40	.00	.00	66219.92	1279.53
41	910.84	1.67	6882.00	.00	.00	6514.14	1279.53
42	920.15	16.94	61749.78	.00	.00	56842.02	1279.53
43	936.83	16.44	45379.44	.00	.00	37476.93	1279.53
44	953.00	15.90	28880.49	.00	.00	16797.79	1279.53
45	966.19	10.48	10240.67	.00	.00	-1308.93	1279.53
46	973.85	4.85	1794.51	.00	.00	1693.28	773.62
47	976.77	1.00	57.88	.00	.00	55.37	25.30

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.379

X-CENTER = 683.47

Y-CENTER = 483.91

RADIUS = 411.99

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	526.71	102.92	-20.97
2	545.38	95.76	-18.19
3	564.38	89.51	-15.41
4	583.67	84.20	-12.63
5	603.18	79.83	-9.85
6	622.89	76.41	-7.06
7	642.74	73.95	-4.28
8	662.68	72.45	-1.50
9	682.67	71.93	1.28
10	702.67	72.38	4.06
11	722.62	73.79	6.84
12	742.47	76.18	9.63
13	762.19	79.52	12.41
14	781.73	83.82	15.19
15	801.03	89.06	17.97
16	820.05	95.23	20.75
17	838.75	102.31	23.53
18	857.09	110.30	26.31
19	875.02	119.16	29.10
20	892.49	128.89	31.88
21	909.48	139.45	34.66
22	925.93	150.83	37.44
23	941.81	162.99	40.22
24	957.08	175.90	43.01
25	962.95	181.38	

1

Roy F. Weston, Inc.

West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.396

X-CENTER = 675.99

Y-CENTER = 492.87

RADIUS = 421.05

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	517.47	102.80	-20.76
2	536.17	95.71	-18.03
3	555.19	89.52	-15.31
4	574.48	84.24	-12.59
5	594.00	79.88	-9.87
6	613.70	76.45	-7.15
7	633.55	73.96	-4.42
8	653.49	72.42	-1.70
9	673.48	71.83	1.02
10	693.47	72.18	3.74
11	713.43	73.49	6.46
12	733.30	75.74	9.18
13	753.05	78.93	11.91
14	772.62	83.06	14.63
15	791.97	88.11	17.35
16	811.06	94.07	20.07
17	829.85	100.93	22.79
18	848.28	108.68	25.51
19	866.33	117.30	28.24
20	883.95	126.76	30.96
21	901.10	137.05	33.68
22	917.75	148.14	36.40
23	933.84	160.01	39.12
24	949.36	172.63	41.85
25	959.14	181.39	

1

Roy F. Weston, Inc.

West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.417

X-CENTER = 777.69

Y-CENTER = 255.66

RADIUS = 185.24

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	656.08	115.93	-37.94
2	671.85	103.63	-31.75
3	688.86	93.11	-25.56
4	706.90	84.48	-19.37
5	725.77	77.84	-13.18
6	745.24	73.28	-6.99
7	765.09	70.85	- .80

8	785.09	70.57	5.38
9	805.00	72.44	11.57
10	824.60	76.46	17.76
11	843.64	82.56	23.95
12	861.92	90.68	30.14
13	879.22	100.72	36.33
14	895.33	112.57	42.52
15	910.07	126.08	48.71
16	923.27	141.11	54.90
17	934.77	157.47	61.08
18	944.44	174.98	67.27
19	947.14	181.42	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.427

X-CENTER = 729.89

Y-CENTER = 524.39

RADIUS = 450.78

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	563.67	105.37	-20.37
2	582.42	98.41	-17.82
3	601.46	92.29	-15.28
4	620.75	87.02	-12.74
5	640.26	82.61	-10.20
6	659.95	79.07	-7.65
7	679.77	76.40	-5.11
8	699.69	74.62	-2.57
9	719.67	73.73	-.03
10	739.67	73.72	2.51
11	759.65	74.59	5.06
12	779.57	76.36	7.60
13	799.39	79.00	10.14
14	819.08	82.52	12.68
15	838.59	86.91	15.23
16	857.89	92.17	17.77
17	876.94	98.27	20.31
18	895.69	105.21	22.85
19	914.12	112.98	25.40
20	932.19	121.56	27.94
21	949.86	130.93	30.48
22	967.10	141.07	33.02
23	983.87	151.97	35.57
24	1000.14	163.60	38.11
25	1015.87	175.95	40.65
26	1022.05	181.25	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.438

X-CENTER = 686.84
Y-CENTER = 417.66
RADIUS = 344.64

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	545.19	103.47	-22.60
2	563.65	95.78	-19.28
3	582.53	89.17	-15.95
4	601.76	83.68	-12.63
5	621.28	79.31	-9.30
6	641.02	76.07	-5.98
7	660.91	73.99	-2.65
8	680.89	73.06	.67
9	700.88	73.30	4.00
10	720.83	74.69	7.32
11	740.67	77.24	10.65
12	760.33	80.94	13.98
13	779.74	85.77	17.30
14	798.83	91.72	20.63
15	817.55	98.76	23.95
16	835.83	106.88	27.28
17	853.60	116.05	30.60
18	870.82	126.23	33.93
19	887.41	137.39	37.25
20	903.33	149.50	40.58
21	918.52	162.51	43.90
22	932.93	176.38	47.23
23	937.61	181.44	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.440

X-CENTER = 688.50
Y-CENTER = 590.38
RADIUS = 516.71

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	517.47	102.80	-18.22
2	536.47	96.55	-16.00
3	555.69	91.03	-13.79
4	575.12	86.27	-11.57
5	594.71	82.26	-9.35
6	614.44	79.01	-7.13
7	634.29	76.52	-4.91
8	654.21	74.81	-2.70
9	674.19	73.87	-.48
10	694.19	73.70	1.74
11	714.18	74.31	3.96
12	734.14	75.69	6.18
13	754.02	77.84	8.39
14	773.81	80.76	10.61

15	793.46	84.44	12.83
16	812.96	88.88	15.05
17	832.28	94.08	17.26
18	851.38	100.01	19.48
19	870.23	106.68	21.70
20	888.81	114.08	23.92
21	907.10	122.19	26.14
22	925.05	131.00	28.35
23	942.65	140.49	30.57
24	959.87	150.67	32.79
25	976.69	161.50	35.01
26	993.07	172.97	37.22
27	1004.02	181.29	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 1.490

X-CENTER = 665.26
Y-CENTER = 873.71
RADIUS = 800.57

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	471.27	97.00	-13.31
2	490.73	92.40	-11.88
3	510.30	88.28	-10.45
4	529.97	84.65	-9.01
5	549.72	81.52	-7.58
6	569.55	78.88	-6.15
7	589.43	76.74	-4.72
8	609.37	75.09	-3.29
9	629.33	73.95	-1.86
10	649.32	73.30	-.43
11	669.32	73.15	1.01
12	689.32	73.50	2.44
13	709.30	74.35	3.87
14	729.25	75.70	5.30
15	749.17	77.55	6.73
16	769.03	79.89	8.16
17	788.83	82.73	9.59
18	808.55	86.07	11.03
19	828.18	89.89	12.46
20	847.71	94.21	13.89
21	867.12	99.01	15.32
22	886.41	104.29	16.75
23	905.56	110.06	18.18
24	924.57	116.30	19.61
25	943.40	123.01	21.05
26	962.07	130.19	22.48
27	980.55	137.84	23.91
28	998.84	145.95	25.34
29	1016.91	154.51	26.77
30	1034.77	163.52	28.20
31	1052.39	172.97	29.63
32	1066.77	181.15	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.499

X-CENTER = 736.43
Y-CENTER = 289.23
RADIUS = 213.87

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	619.11	110.41	-30.59
2	636.33	100.23	-25.23
3	654.42	91.71	-19.87
4	673.23	84.91	-14.51
5	692.60	79.90	-9.15
6	712.34	76.73	-3.79
7	732.30	75.40	1.57
8	752.29	75.95	6.93
9	772.14	78.37	12.29
10	791.69	82.63	17.65
11	810.74	88.69	23.01
12	829.15	96.51	28.37
13	846.75	106.01	33.73
14	863.38	117.12	39.09
15	878.91	129.73	44.45
16	893.18	143.74	49.81
17	906.09	159.02	55.17
18	917.51	175.43	60.53
19	920.93	181.48	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.502

X-CENTER = 813.38
Y-CENTER = 287.38
RADIUS = 217.36

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	674.56	120.13	-37.06
2	690.52	108.07	-31.78
3	707.52	97.54	-26.51
4	725.42	88.61	-21.23
5	744.06	81.37	-15.96
6	763.29	75.87	-10.69
7	782.94	72.16	-5.41
8	802.85	70.27	-.14
9	822.85	70.23	5.13
10	842.77	72.02	10.41
11	862.44	75.63	15.68

12	881.70	81.03	20.96
13	900.37	88.19	26.23
14	918.32	97.03	31.50
15	935.37	107.48	36.78
16	951.39	119.45	42.05
17	966.24	132.85	47.32
18	979.80	147.55	52.60
19	991.94	163.44	57.87
20	1002.58	180.37	63.15
21	1003.04	181.29	

1

Roy F. Weston, Inc.
West Chester, PA

Y A X I S

32.00 177.63 323.25 468.88 614.50 760.13

X .00 L*--**-----+-----+-----+-----+-----+

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145.63 + ...

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A 291.25

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X 436.88

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...81*

I 582.50 L*...5

...15*

...159.

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S 728.13 ...1*...*

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...12....

...41...*

...413...*

...4*16...

873.75 ...04413.**

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L****W.5711
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1019.38 +8.5
-88
-8
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1165.00 L****W **

GEOSLOPE
Version 4.0

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(617) 369-8304

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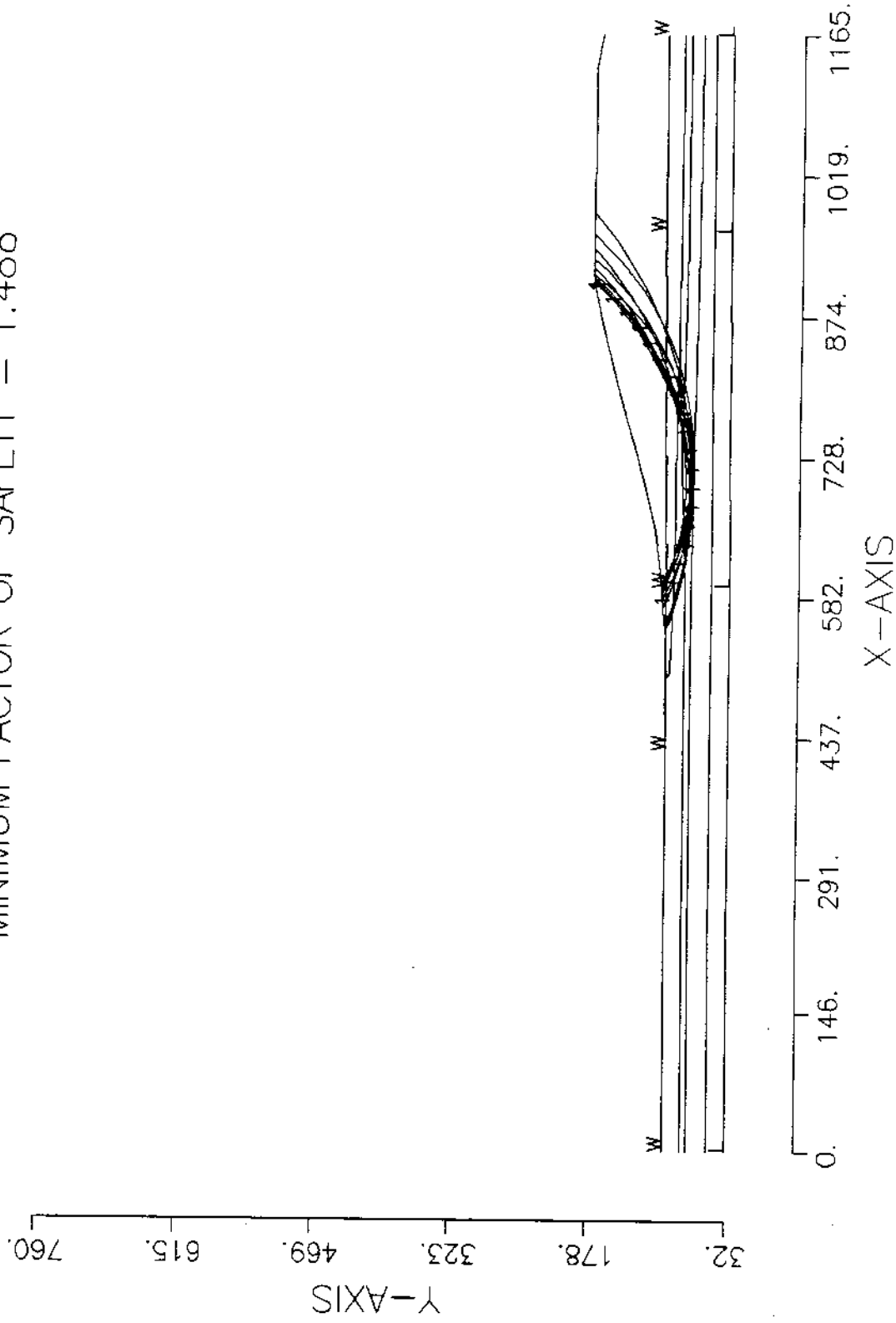
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Roy F. Weston, Inc.
West Chester, PA

DRAINED ANALYSIS

EXISTING TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
EXISTING TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.488



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 EXISTING TOPOGRAPHY DRAINED ANALYS.

32 16

0. 97. 424. 97. 2
 424. 97. 498. 97.5 2
 498. 97.5 524. 97.9 1
 524. 97.9 541. 98. 1
 541. 98. 559. 100. 1
 559. 100. 609. 104. 1
 609. 104. 652. 110. 1
 652. 110. 696. 120. 1
 696. 120. 733. 130. 1
 733. 130. 764. 140. 1
 764. 140. 801. 150. 1
 801. 150. 837. 160. 1
 837. 160. 875. 170. 1
 875. 170. 910. 176.5 1
 910. 176.5 1132. 176. 1
 1132. 176. 1165. 170. 1
 498. 97.5 504. 94. 2
 504. 94. 594. 90.5 2
 594. 90.5 861. 87.5 2
 861. 87.5 961. 86. 3
 961. 86. 1165. 85. 3
 0. 79. 594. 79. 4
 594. 79. 716. 83. 4
 716. 83. 861. 87.5 3
 716. 83. 961. 79. 4
 961. 79. 1165. 78. 4
 0. 72. 594. 72. 5
 594. 72. 961. 67. 5
 961. 67. 1165. 65. 5
 0. 51. 594. 51. 6
 594. 51. 961. 52. 6
 961. 52. 1165. 52. 6

SOIL

6
 80.0 80.0 0. 28. 0. 0. 1
 80.0 80.0 0. 23. 0. 0. 1
 88.0 88.0 0. 20. 0. 0. 1
 104.0 104.0 0. 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1
 125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.
 5
 0. 97.
 424. 97.
 594. 97.5
 961. 102.5
 1165. 102.

LIMITS

3 3
 0. 32. 594. 32.
 594. 32. 961. 34.
 961. 34. 1165. 34.

CIRCL2

50 10
 547. 597. 900. 1160.
 20. 20. 0. 0.

END

CL1EDB.DAT

SECTION 1-1 DRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 EXISTING TOPOGRAPHY

DRAINED ANALYS

32 16

0. 97. 424. 97. 2
 424. 97. 498. 97.5 2
 498. 97.5 524. 97.9 1
 524. 97.9 541. 98. 1
 541. 98. 559. 100. 1
 559. 100. 609. 104. 1
 609. 104. 652. 110. 1
 652. 110. 696. 120. 1
 696. 120. 733. 130. 1
 733. 130. 764. 140. 1
 764. 140. 801. 150. 1
 801. 150. 837. 160. 1
 837. 160. 875. 170. 1
 875. 170. 910. 176.5 1
 910. 176.5 1132. 176. 1
 1132. 176. 1165. 170. 1
 498. 97.5 504. 94. 2
 504. 94. 594. 90.5 2
 594. 90.5 861. 87.5 2
 861. 87.5 961. 86. 3
 961. 86. 1165. 85. 3
 0. 79. 594. 79. 4
 594. 79. 716. 83. 4
 716. 83. 861. 87.5 3
 716. 83. 961. 79. 4
 961. 79. 1165. 78. 4
 0. 72. 594. 72. 5
 594. 72. 961. 67. 5
 961. 67. 1165. 65. 5
 0. 51. 594. 51. 6
 594. 51. 961. 52. 6
 961. 52. 1165. 52. 6

SOIL

6
 80.0 80.0 0. 28. 0. 0. 1
 80.0 80.0 0. 23. 0. 0. 1
 88.0 88.0 0. 20. 0. 0. 1
 104.0 104.0 0. 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1
 125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.
 5
 0. 97.
 424. 97.
 594. 97.5
 961. 102.5
 1165. 102.

LIMITS

3 3
 0. 32. 594. 32.
 594. 32. 961. 34.
 961. 34. 1165. 34.

CIRCL2

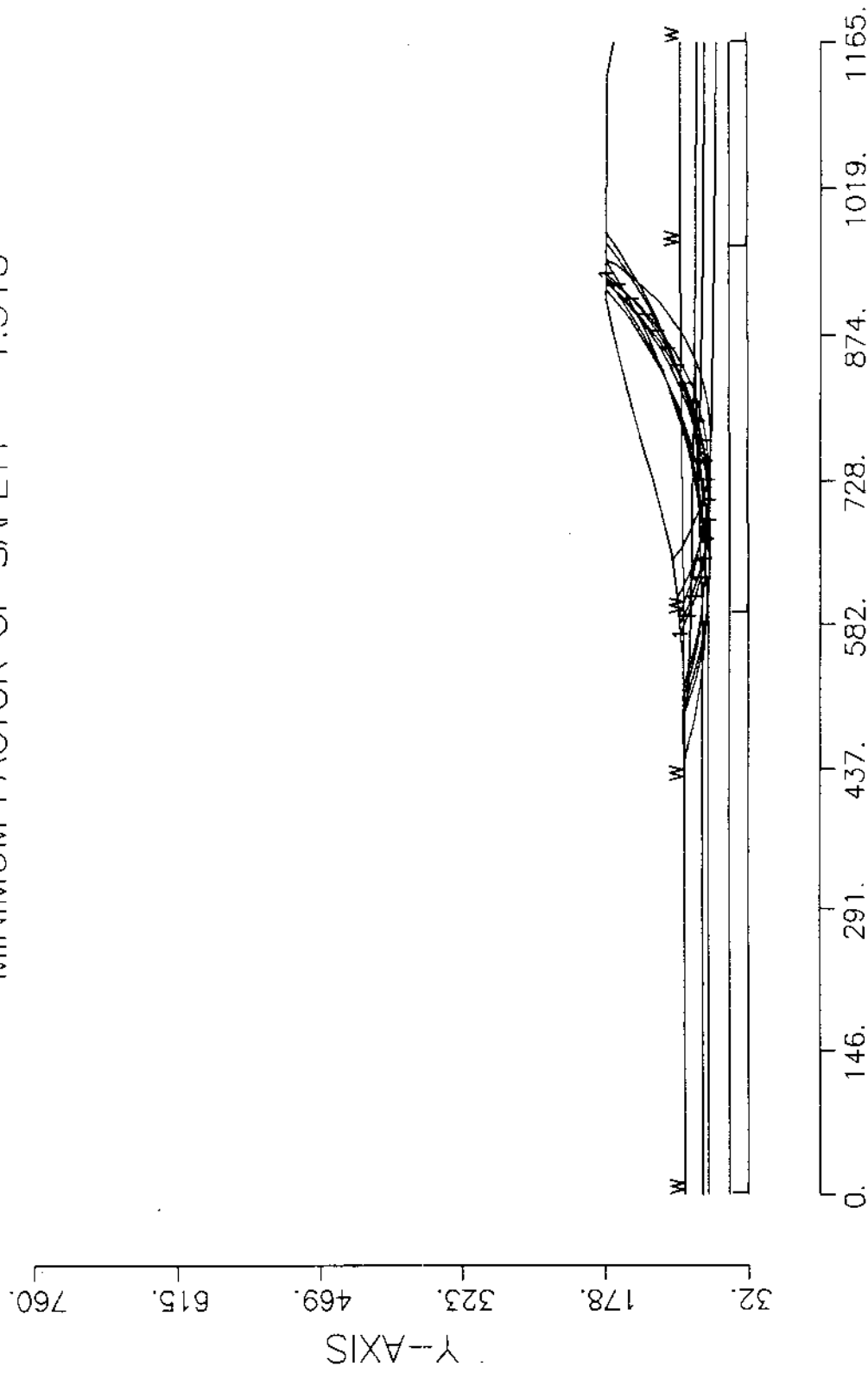
80 10
 0. 730. 900. 1160.
 20. 20. 0. 0.

END

CL1EDA.DAT

SECTION 1-1 DRAINED ANALYSIS

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
EXISTING TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.518



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 1-1
EXISTING TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
32 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	97.00	424.00	97.00	2
2	424.00	97.00	498.00	97.50	2
3	498.00	97.50	524.00	97.90	1
4	524.00	97.90	541.00	98.00	1
5	541.00	98.00	559.00	100.00	1
6	559.00	100.00	609.00	104.00	1
7	609.00	104.00	652.00	110.00	1
8	652.00	110.00	696.00	120.00	1
9	696.00	120.00	733.00	130.00	1
10	733.00	130.00	764.00	140.00	1
11	764.00	140.00	801.00	150.00	1
12	801.00	150.00	837.00	160.00	1
13	837.00	160.00	875.00	170.00	1
14	875.00	170.00	910.00	176.50	1
15	910.00	176.50	1132.00	176.00	1
16	1132.00	176.00	1165.00	170.00	1
17	498.00	97.50	504.00	94.00	2
18	504.00	94.00	594.00	90.50	2
19	594.00	90.50	861.00	87.50	2
20	861.00	87.50	961.00	86.00	3
21	961.00	86.00	1165.00	85.00	3
22	.00	79.00	594.00	79.00	4
23	594.00	79.00	716.00	83.00	4
24	716.00	83.00	861.00	87.50	3
25	716.00	83.00	961.00	79.00	4
26	961.00	79.00	1165.00	78.00	4
27	.00	72.00	594.00	72.00	5
28	594.00	72.00	961.00	67.00	5
29	961.00	67.00	1165.00	65.00	5
30	.00	51.00	594.00	51.00	6
31	594.00	51.00	961.00	52.00	6
32	961.00	52.00	1165.00	52.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	80.0	80.0	.0	28.0	.00	.0	1
2	80.0	80.0	.0	23.0	.00	.0	1
3	88.0	88.0	.0	20.0	.00	.0	1
4	104.0	104.0	.0	16.0	.00	.0	1
5	125.0	125.0	.0	32.0	.00	.0	1
6	125.0	125.0	300.0	40.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	97.00
2	424.00	97.00
3	594.00	97.50
4	961.00	102.50
5	1165.00	102.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 3 BOUNDARIES
OF WHICH THE FIRST 3 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	32.00	594.00	32.00
2	594.00	32.00	961.00	34.00
3	961.00	34.00	1165.00	34.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 730.00

EACH SURFACE TERMINATES BETWEEN X = 900.00
AND X = 1160.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.518

X-CENTER = 704.14
Y-CENTER = 376.32
RADIUS = 304.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	572.91	101.11	-23.61
2	591.24	93.10	-19.85
3	610.05	86.31	-16.09
4	629.26	80.76	-12.34
5	648.80	76.49	-8.58
6	668.58	73.51	-4.82
7	688.51	71.83	-1.06
8	708.51	71.46	2.70
9	728.48	72.40	6.46
10	748.36	74.65	10.22
11	768.04	78.20	13.98
12	787.45	83.03	17.74
13	806.50	89.13	21.50
14	825.10	96.45	25.26
15	843.19	104.99	29.01
16	860.68	114.69	32.77
17	877.50	125.51	36.53

547; 591

18	893.57	137.42	40.29
19	908.83	150.35	44.05
20	923.20	164.26	47.81
21	934.25	176.45	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	577.09	8.35	1442.41	.00	.00	1858.89	651.20
2	586.25	9.98	5504.47	.00	1491.12	5333.07	1868.27
3	592.62	2.76	2229.31	.00	896.82	1686.73	590.89
4	596.29	4.59	4294.79	.00	1902.91	3048.96	1068.11
5	603.79	10.41	12509.80	.00	6263.28	7827.49	2189.09
6	609.52	1.05	1474.17	.00	779.99	875.78	244.93
7	619.66	19.22	33743.20	.00	17861.85	18772.69	5250.09
8	630.47	2.42	5130.93	.00	2705.24	2712.86	758.70
9	640.24	17.12	41960.83	.00	21612.02	22260.12	4205.45
10	650.40	3.20	8927.61	.00	4442.08	4721.00	891.91
11	660.29	16.58	51791.45	.00	24736.77	28451.03	5375.06
12	678.54	19.93	73489.11	.00	32425.56	41992.71	7933.39
13	692.25	7.49	30280.90	.00	12660.06	17687.75	3341.62
14	702.25	12.51	53427.96	.00	21383.57	32165.78	6076.86
15	712.25	7.49	33653.05	.00	12863.12	20643.38	3900.01
16	722.24	12.48	58170.90	.00	21162.83	36745.29	6942.03
17	730.74	4.52	21620.67	.00	7575.05	13886.71	2623.52
18	740.68	15.36	75495.09	.00	24797.63	50107.99	9466.56
19	756.18	15.64	79456.77	.00	23455.37	55395.52	10465.49
20	766.02	4.04	20759.02	.00	5635.42	14949.08	2824.23
21	775.48	14.89	76140.05	.00	19070.13	56725.69	10716.79
22	785.19	4.52	22964.58	.00	5124.40	17496.54	4195.72
23	791.23	7.57	38269.30	.00	7903.51	29976.47	7188.44
24	798.01	5.99	30072.44	.00	5440.66	23986.94	6708.34
25	802.22	2.44	12201.87	.00	2008.62	9915.27	2772.97
26	804.97	3.06	15284.93	.00	2352.18	12315.61	4314.39
27	815.80	18.61	91290.03	.00	9649.95	77739.27	27233.50
28	829.68	9.16	43477.91	.00	1325.02	40117.98	14054.07
29	835.63	2.74	12752.06	.00	.00	12100.10	4238.89
30	840.10	6.19	28383.13	.00	.00	26932.03	9434.79
31	851.94	17.49	75688.24	.00	.00	72469.63	25387.45
32	867.84	14.32	55916.77	.00	.00	54264.29	19009.78
33	876.25	2.50	9102.37	.00	.00	8833.37	3094.49
34	885.53	16.07	52055.34	.00	.00	51435.16	18018.69
35	901.20	15.26	37807.86	.00	.00	38216.49	13387.94
36	909.41	1.17	2393.89	.00	.00	2487.68	871.48
37	916.60	13.20	19652.84	.00	.00	20422.77	7154.47
38	928.72	11.05	5395.91	.00	.00	5794.86	2030.05

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.526

X-CENTER = 706.96
Y-CENTER = 354.72
RADIUS = 281.99

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	582.15	101.85	-24.24
2	600.39	93.64	-20.17
3	619.16	86.74	-16.11
4	638.38	81.20	-12.04
5	657.94	77.02	-7.98
6	677.74	74.25	-3.91
7	697.70	72.88	.15
8	717.70	72.93	4.21
9	737.64	74.40	8.28
10	757.43	77.28	12.34
11	776.97	81.56	16.41
12	796.16	87.21	20.47
13	814.89	94.20	24.54
14	833.09	102.51	28.60
15	850.65	112.08	32.67
16	867.48	122.88	36.73
17	883.51	134.84	40.80
18	898.65	147.91	44.86
19	912.83	162.01	48.92
20	925.43	176.47	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.566

X-CENTER = 730.68
Y-CENTER = 313.51
RADIUS = 241.74

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	609.87	104.12	-27.61
2	627.60	94.85	-22.87
3	646.02	87.08	-18.13
4	665.03	80.86	-13.39
5	684.49	76.22	-8.65
6	704.26	73.22	-3.90
7	724.21	71.86	.84
8	744.21	72.15	5.58
9	764.12	74.09	10.32
10	783.79	77.68	15.06
11	803.11	82.87	19.80
12	821.92	89.65	24.54
13	840.12	97.96	29.29
14	857.56	107.74	34.03
15	874.13	118.93	38.77
16	889.73	131.46	43.51
17	904.23	145.22	48.25
18	917.55	160.15	52.99
19	929.59	176.12	57.73
20	929.80	176.46	

1

Roy F. Weston, Inc.

West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 24 COORDINATE POINTS

SAFETY FACTOR = 1.604

X-CENTER = 638.06

Y-CENTER = 497.25

RADIUS = 426.43

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	489.75	97.44	-19.01
2	508.66	90.93	-16.32
3	527.85	85.31	-13.63
4	547.29	80.59	-10.95
5	566.92	76.80	-8.26
6	586.72	73.92	-5.57
7	606.62	71.98	-2.88
8	626.60	70.98	-.20
9	646.60	70.91	2.49
10	666.58	71.78	5.18
11	686.50	73.58	7.87
12	706.31	76.32	10.55
13	725.97	79.98	13.24
14	745.44	84.56	15.93
15	764.67	90.05	18.62
16	783.62	96.44	21.30
17	802.26	103.70	23.99
18	820.53	111.83	26.68
19	838.40	120.81	29.37
20	855.83	130.62	32.05
21	872.78	141.24	34.74
22	889.21	152.63	37.43
23	905.10	164.79	40.12
24	918.97	176.48	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 24 COORDINATE POINTS

SAFETY FACTOR = 1.632

X-CENTER = 644.92

Y-CENTER = 528.14

RADIUS = 451.66

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	508.23	97.66	-16.35
2	527.42	92.03	-13.81
3	546.84	87.25	-11.27
4	566.46	83.34	-8.74
5	586.22	80.31	-6.20
6	606.11	78.15	-3.66
7	626.07	76.87	-1.12
8	646.06	76.48	1.41

9	666.06	76.97	3.95
10	686.01	78.35	6.49
11	705.88	80.61	9.02
12	725.63	83.75	11.56
13	745.23	87.75	14.10
14	764.62	92.63	16.64
15	783.79	98.35	19.17
16	802.68	104.92	21.71
17	821.26	112.32	24.25
18	839.49	120.53	26.79
19	857.35	129.55	29.32
20	874.79	139.34	31.86
21	891.77	149.90	34.40
22	908.28	161.20	36.93
23	924.26	173.21	39.47
24	928.20	176.46	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.662

X-CENTER = 707.32

Y-CENTER = 369.55

RADIUS = 291.04

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	591.39	102.59	-21.50
2	610.00	95.26	-17.57
3	629.07	89.22	-13.63
4	648.50	84.51	-9.69
5	668.22	81.14	-5.75
6	688.12	79.14	-1.81
7	708.11	78.51	2.12
8	728.09	79.25	6.06
9	747.98	81.36	10.00
10	767.68	84.83	13.94
11	787.09	89.65	17.88
12	806.12	95.79	21.81
13	824.69	103.22	25.75
14	842.71	111.91	29.69
15	860.08	121.82	33.63
16	876.73	132.89	37.57
17	892.59	145.09	41.50
18	907.56	158.34	45.44
19	921.60	172.59	49.38
20	924.92	176.47	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.718

X-CENTER = 668.77

Y-CENTER = 585.79
RADIUS = 510.91

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	517.47	97.80	-16.10
2	536.68	92.25	-13.86
3	556.10	87.46	-11.62
4	575.69	83.43	-9.38
5	595.42	80.17	-7.13
6	615.27	77.69	-4.89
7	635.20	75.99	-2.65
8	655.18	75.06	-.40
9	675.18	74.92	1.84
10	695.17	75.56	4.08
11	715.11	76.99	6.33
12	734.99	79.19	8.57
13	754.77	82.17	10.81
14	774.41	85.92	13.05
15	793.90	90.44	15.30
16	813.19	95.72	17.54
17	832.26	101.75	19.78
18	851.08	108.51	22.03
19	869.62	116.02	24.27
20	887.85	124.24	26.51
21	905.75	133.16	28.76
22	923.28	142.79	31.00
23	940.42	153.09	33.24
24	957.15	164.05	35.48
25	973.44	175.66	37.73
26	974.34	176.36	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.722

X-CENTER = 608.03
Y-CENTER = 686.57
RADIUS = 611.96

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	443.54	97.13	-14.66
2	462.89	92.07	-12.78
3	482.40	87.65	-10.91
4	502.04	83.86	-9.04
5	521.79	80.72	-7.17
6	541.63	78.22	-5.29
7	561.55	76.38	-3.42
8	581.51	75.19	-1.55
9	601.50	74.65	.32
10	621.50	74.76	2.20
11	641.49	75.53	4.07
12	661.44	76.94	5.94
13	681.33	79.02	7.81

14	701.15	81.73	9.69
15	720.86	85.10	11.56
16	740.45	89.11	13.43
17	759.91	93.75	15.31
18	779.20	99.03	17.18
19	798.31	104.94	19.05
20	817.21	111.47	20.92
21	835.89	118.61	22.80
22	854.33	126.36	24.67
23	872.50	134.71	26.54
24	890.40	143.64	28.41
25	907.99	153.16	30.29
26	925.26	163.25	32.16
27	942.19	173.89	34.03
28	945.93	176.42	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.729

X-CENTER = 660.22
Y-CENTER = 557.39
RADIUS = 487.32

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	498.99	97.52	-18.14
2	517.99	91.29	-15.79
3	537.24	85.84	-13.44
4	556.69	81.19	-11.09
5	576.32	77.35	-8.74
6	596.08	74.31	-6.39
7	615.96	72.08	-4.03
8	635.91	70.68	-1.68
9	655.90	70.09	.67
10	675.90	70.32	3.02
11	695.87	71.38	5.37
12	715.79	73.25	7.72
13	735.60	75.94	10.08
14	755.30	79.44	12.43
15	774.83	83.74	14.78
16	794.17	88.84	17.13
17	813.28	94.73	19.48
18	832.13	101.40	21.83
19	850.70	108.84	24.19
20	868.94	117.04	26.54
21	886.84	125.97	28.89
22	904.35	135.63	31.24
23	921.45	146.01	33.59
24	938.11	157.07	35.94
25	954.30	168.81	38.30
26	963.88	176.38	

1

Roy F. Weston, Inc.
West Chester, PA



RADIUS = 205.97

1	646.84	109.28	-33.18
2	663.57	98.33	-27.61
3	681.30	89.06	-22.05
4	699.83	81.56	-16.48
5	719.01	75.88	-10.92
6	738.65	72.09	-5.35
7	758.56	70.23	.21
8	778.56	70.30	5.78
9	798.46	72.32	11.35
10	818.07	76.25	16.91
11	837.21	82.07	22.48
12	855.69	89.72	28.04
13	873.34	99.12	33.61
14	890.00	110.19	39.17
15	905.50	122.82	44.74
16	919.71	136.90	50.30
17	932.48	152.29	55.87
18	943.70	168.84	61.44
19	947.82	176.41	

Roy F. Weston, Inc.
West Chester, PA

32.00	177.63	323.25	468.88	614.50	760.13
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		...14...*
		...115..
		...314...*
		...0125...*
		*114..
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		07114*
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SLOPE

Version 4.0

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(617) 369-8304

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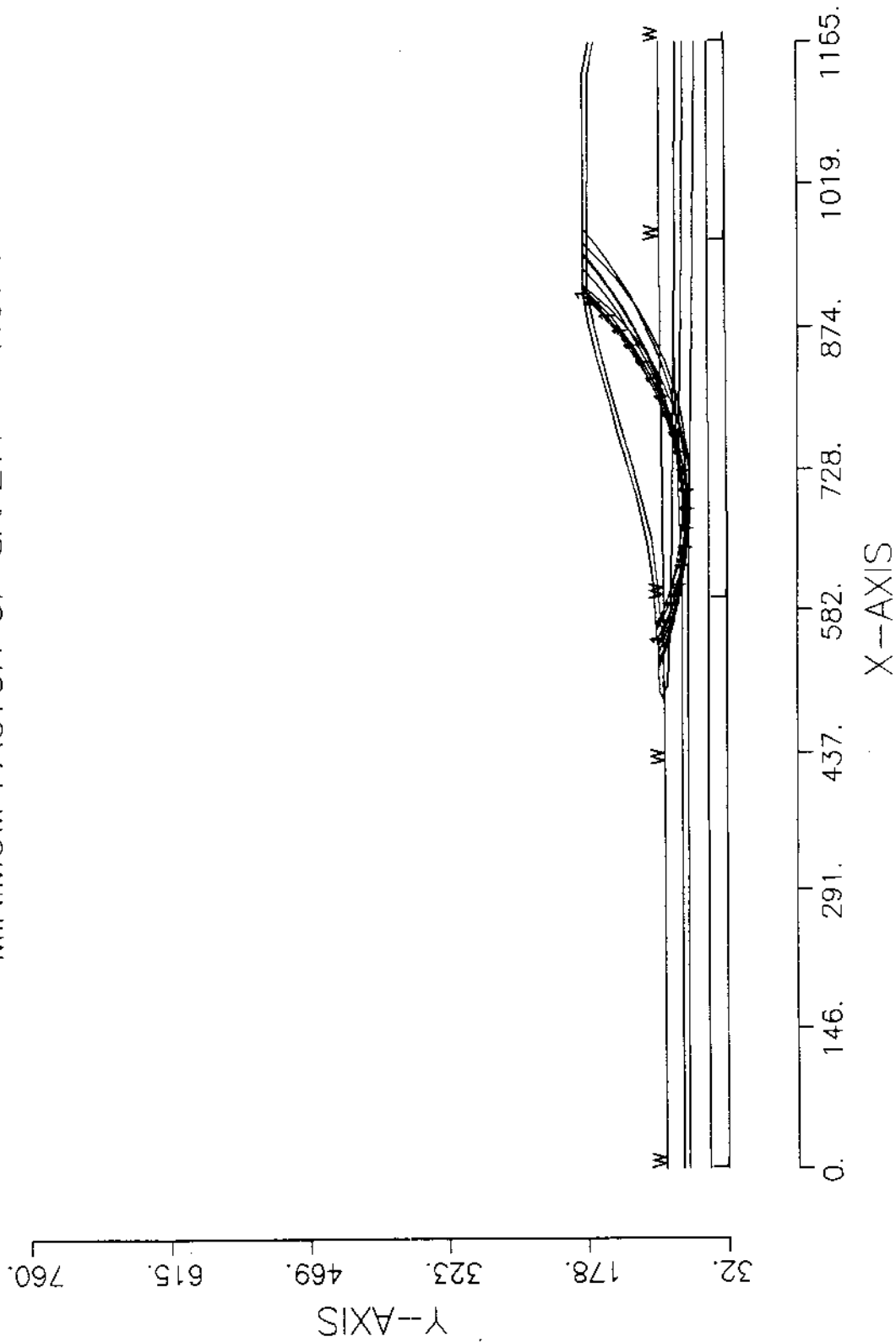
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West Chester, PA

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.674



CLARKSTOWN SANITARY LANDFILL SECTION 1-1 FINAL TOPOGRAPHY

PROFIL
DRAINED ANALYSIS

47 16

0. 97. 488. 97. 3
488. 97. 498. 102.5 1
498. 102.5 524. 102.9 1
524. 102.9 541. 103. 1
541. 103. 559. 105. 1
559. 105. 609. 109. 1
609. 109. 652. 115. 1
652. 115. 696. 125. 1
696. 125. 733. 135. 1
733. 135. 764. 145. 1
764. 145. 801. 155. 1
801. 155. 837. 165. 1
837. 165. 875. 175. 1
875. 175. 910. 181.5 1
910. 181.5 1132. 181. 1
1132. 181. 1165. 175. 1
488. 97. 498. 97.5 3
498. 97.5 524. 97.9 2
524. 97.9 541. 98. 2
541. 98. 559. 100. 2
559. 100. 609. 104. 2
609. 104. 652. 110. 2
652. 110. 696. 120. 2
696. 120. 733. 130. 2
733. 130. 764. 140. 2
764. 140. 801. 150. 2
801. 150. 837. 160. 2
837. 160. 875. 170. 2
875. 170. 910. 176.5 2
910. 176.5 1132. 176. 2
1132. 176. 1165. 170. 2
498. 97.5 504. 94. 3
504. 94. 594. 90.5 3
594. 90.5 861. 87.5 3
861. 87.5 961. 86. 4
961. 86. 1165. 85. 4
0. 79. 594. 79. 5
594. 79. 716. 83. 5
716. 83. 861. 87.5 4
716. 83. 961. 79. 5
961. 79. 1165. 78. 5
0. 72. 594. 72. 6
594. 72. 961. 67. 6
961. 67. 1165. 65. 6
0. 51. 594. 51. 7
594. 51. 961. 52. 7
961. 52. 1165. 52. 7

SOIL

7

125. 125. 0.0 32. 0. 0. 1
80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.
5
0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.
LIMITS
3 3
0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.
CIRCL2
50 10
520. 570. 900. 1160.
20. 20. 0. 0.
END

CL1FDB.DAT

SECTION 1-1 FINAL DRAINED ANALYSIS

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 FINAL TOPOGRAPHY PROFIL
DRAINED ANALYSIS

47 16

0. 97. 488. 97. 3
488. 97. 498. 102.5 1
498. 102.5 524. 102.9 1
524. 102.9 541. 103. 1
541. 103. 559. 105. 1
559. 105. 609. 109. 1
609. 109. 652. 115. 1
652. 115. 696. 125. 1
696. 125. 733. 135. 1
733. 135. 764. 145. 1
764. 145. 801. 155. 1
801. 155. 837. 165. 1
837. 165. 875. 175. 1
875. 175. 910. 181.5 1
910. 181.5 1132. 181. 1
1132. 181. 1165. 175. 1
488. 97. 498. 97.5 3
498. 97.5 524. 97.9 2
524. 97.9 541. 98. 2
541. 98. 559. 100. 2
559. 100. 609. 104. 2
609. 104. 652. 110. 2
652. 110. 696. 120. 2
696. 120. 733. 130. 2
733. 130. 764. 140. 2
764. 140. 801. 150. 2
801. 150. 837. 160. 2
837. 160. 875. 170. 2
875. 170. 910. 176.5 2
910. 176.5 1132. 176. 2
1132. 176. 1165. 170. 2
498. 97.5 504. 94. 3
504. 94. 594. 90.5 3
594. 90.5 861. 87.5 3
861. 87.5 961. 86. 4
961. 86. 1165. 85. 4
0. 79. 594. 79. 5
594. 79. 716. 83. 5
716. 83. 861. 87.5 4
716. 83. 961. 79. 5
961. 79. 1165. 78. 5
0. 72. 594. 72. 6
594. 72. 961. 67. 6
961. 67. 1165. 65. 6
0. 51. 594. 51. 7
594. 51. 961. 52. 7
961. 52. 1165. 52. 7

SOIL

7

125. 125. 0.0 32. 0. 0. 1
80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
125.0 125.0 300.0 40. 0. 0. 1

WATER

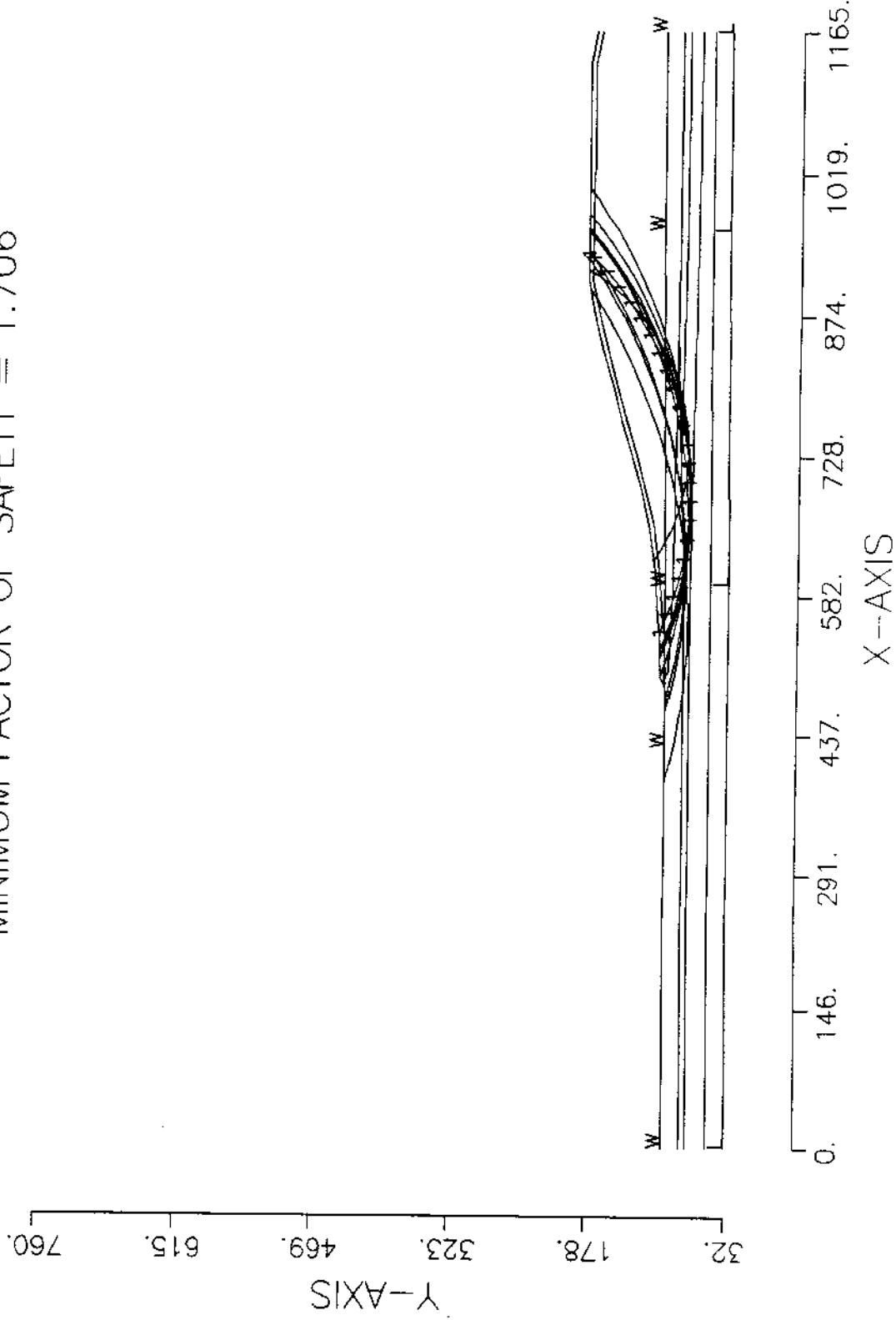
1 0.
5
0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.
LIMITS
3 3
0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.
CIRCL2
80 10
0. 730. 900. 1160.
20. 20. 0. 0.
END

CL1FDA.DAT

SECTION 1-1 FINAL DRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.706



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
47 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	97.00	488.00	97.00	3
2	488.00	97.00	498.00	102.50	1
3	498.00	102.50	524.00	102.90	1
4	524.00	102.90	541.00	103.00	1
5	541.00	103.00	559.00	105.00	1
6	559.00	105.00	609.00	109.00	1
7	609.00	109.00	652.00	115.00	1
8	652.00	115.00	696.00	125.00	1
9	696.00	125.00	733.00	135.00	1
10	733.00	135.00	764.00	145.00	1
11	764.00	145.00	801.00	155.00	1
12	801.00	155.00	837.00	165.00	1
13	837.00	165.00	875.00	175.00	1
14	875.00	175.00	910.00	181.50	1
15	910.00	181.50	1132.00	181.00	1
16	1132.00	181.00	1165.00	175.00	1
17	488.00	97.00	498.00	97.50	3
18	498.00	97.50	524.00	97.90	2
19	524.00	97.90	541.00	98.00	2
20	541.00	98.00	559.00	100.00	2
21	559.00	100.00	609.00	104.00	2
22	609.00	104.00	652.00	110.00	2
23	652.00	110.00	696.00	120.00	2
24	696.00	120.00	733.00	130.00	2
25	733.00	130.00	764.00	140.00	2
26	764.00	140.00	801.00	150.00	2
27	801.00	150.00	837.00	160.00	2
28	837.00	160.00	875.00	170.00	2
29	875.00	170.00	910.00	176.50	2
30	910.00	176.50	1132.00	176.00	2
31	1132.00	176.00	1165.00	170.00	2
32	498.00	97.50	504.00	94.00	3
33	504.00	94.00	594.00	90.50	3
34	594.00	90.50	861.00	87.50	3

35	861.00	87.50	961.00	86.00	4
36	961.00	86.00	1165.00	85.00	4
37	.00	79.00	594.00	79.00	5
38	594.00	79.00	716.00	83.00	5
39	716.00	83.00	861.00	87.50	4
40	716.00	83.00	961.00	79.00	5
41	961.00	79.00	1165.00	78.00	5
42	.00	72.00	594.00	72.00	6
43	594.00	72.00	961.00	67.00	6
44	961.00	67.00	1165.00	65.00	6
45	.00	51.00	594.00	51.00	7
46	594.00	51.00	961.00	52.00	7
47	961.00	52.00	1165.00	52.00	7

ISOTROPIC SOIL PARAMETERS

7 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1
7	125.0	125.0	300.0	40.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	97.00
2	424.00	97.00
3	594.00	97.50
4	961.00	102.50
5	1165.00	102.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 3 BOUNDARIES
OF WHICH THE FIRST 3 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	32.00	594.00	32.00
2	594.00	32.00	961.00	34.00
3	961.00	34.00	1165.00	34.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 730.00

EACH SURFACE TERMINATES BETWEEN X = 900.00
AND X = 1160.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.706

X-CENTER = 686.84
Y-CENTER = 417.66
RADIUS = 344.64

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)	
1	545.19	103.47	-22.60	520 ; 570

2	563.65	95.78	-19.28
3	582.53	89.17	-15.95
4	601.76	83.68	-12.63
5	621.28	79.31	-9.30
6	641.02	76.07	-5.98
7	660.91	73.99	-2.65
8	680.89	73.06	.67
9	700.88	73.30	4.00
10	720.83	74.69	7.32
11	740.67	77.24	10.65
12	760.33	80.94	13.98
13	779.74	85.77	17.30
14	798.83	91.72	20.63
15	817.55	98.76	23.95
16	835.83	106.88	27.28
17	853.60	116.05	30.60
18	870.82	126.23	33.93
19	887.41	137.39	37.25
20	903.33	149.50	40.58
21	918.52	162.51	43.90
22	932.93	176.38	47.23
23	937.61	181.44	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	549.93	9.48	2962.30	.00	.00	3786.32	1387.11
2	556.83	4.33	3102.03	.00	.00	3861.31	1203.68
3	559.38	.76	625.81	.00	.00	778.98	242.83
4	561.71	3.89	3563.37	.00	214.81	4188.72	1305.74
5	570.24	13.18	16070.31	.00	3448.38	15238.19	4750.18
6	579.68	5.70	8793.93	.00	2744.13	7198.88	1791.51
7	588.27	11.47	20749.93	.00	7403.24	15263.78	3798.54
8	597.88	7.76	16229.45	.00	6430.78	11249.05	2799.44
9	605.38	7.24	16592.80	.00	6844.56	10759.47	2677.60
10	613.99	9.98	25218.31	.00	10748.73	15986.05	3978.28
11	620.13	2.29	6218.86	.00	2683.17	3834.27	644.59
12	631.15	19.74	59957.19	.00	25355.97	36402.73	6119.74
13	646.51	10.98	37889.85	.00	15657.33	22841.71	3839.97
14	656.45	8.91	33022.41	.00	13352.52	20206.07	3396.89
15	670.90	19.98	81478.00	.00	31225.84	50734.55	8529.09
16	688.44	15.11	67261.48	.00	24178.64	43002.50	7229.24
17	698.44	4.88	22639.57	.00	7817.74	14794.16	2487.08
18	708.44	15.12	72588.63	.00	23857.95	48339.72	8126.49
19	718.42	4.83	23937.88	.00	7461.03	16343.19	2747.49
20	726.92	12.17	61261.58	.00	18241.99	42603.00	7162.08
21	736.84	7.67	39383.68	.00	10953.88	28145.62	4731.62
22	750.50	19.66	103045.90	.00	25634.23	76790.20	12909.36
23	762.16	3.67	19479.47	.00	4344.18	15097.81	2538.12
24	764.68	1.37	7241.79	.00	1563.88	5661.92	951.84
25	770.73	10.73	56859.19	.00	11303.82	44905.02	9582.16
26	777.92	3.64	19272.25	.00	3434.11	15468.00	3849.36
27	783.83	8.19	43326.74	.00	6980.44	35637.02	8868.62
28	793.38	10.91	57345.70	.00	7267.54	48122.98	15001.32
29	799.92	2.17	11350.26	.00	1183.20	9795.16	3053.44
30	809.27	16.55	85339.33	.00	5278.56	76884.63	23967.16
31	819.62	4.14	20964.04	.00	251.93	19927.93	6212.11
32	828.76	14.14	69876.66	.00	.00	67160.69	20935.93

33	836.41	1.17	5678.28	.00	.00	5504.00	1715.76
34	845.30	16.60	77338.32	.00	.00	74964.59	23368.61
35	862.21	17.21	73412.74	.00	.00	72014.58	22449.02
36	872.91	4.18	16608.23	.00	.00	16546.47	5158.01
37	881.21	12.41	45422.65	.00	.00	45253.74	14106.90
38	895.37	15.92	48585.51	.00	.00	49341.93	15381.30
39	906.67	6.67	16719.83	.00	.00	17375.02	5416.30
40	914.26	8.52	17343.95	.00	.00	18023.60	5618.48
41	925.73	14.41	17099.88	.00	.00	18256.01	5690.93
42	932.96	.06	40.58	.00	.00	44.70	13.93
43	935.30	4.62	1442.42	.00	.00	1521.55	557.42

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.744

X-CENTER = 675.99

Y-CENTER = 492.87

RADIUS = 421.05

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	517.47	102.80	-20.76
2	536.17	95.71	-18.03
3	555.19	89.52	-15.31
4	574.48	84.24	-12.59
5	594.00	79.88	-9.87
6	613.70	76.45	-7.15
7	633.55	73.96	-4.42
8	653.49	72.42	-1.70
9	673.48	71.83	1.02
10	693.47	72.18	3.74
11	713.43	73.49	6.46
12	733.30	75.74	9.18
13	753.05	78.93	11.91
14	772.62	83.06	14.63
15	791.97	88.11	17.35
16	811.06	94.07	20.07
17	829.85	100.93	22.79
18	848.28	108.68	25.51
19	866.33	117.30	28.24
20	883.95	126.76	30.96
21	901.10	137.05	33.68
22	917.75	148.14	36.40
23	933.84	160.01	39.12
24	949.36	172.63	41.85
25	959.14	181.39	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.749

X-CENTER = 683.47

Y-CENTER = 483.91
RADIUS = 411.99

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	526.71	102.92	-20.97
2	545.38	95.76	-18.19
3	564.38	89.51	-15.41
4	583.67	84.20	-12.63
5	603.18	79.83	-9.85
6	622.89	76.41	-7.06
7	642.74	73.95	-4.28
8	662.68	72.45	-1.50
9	682.67	71.93	1.28
10	702.67	72.38	4.06
11	722.62	73.79	6.84
12	742.47	76.18	9.63
13	762.19	79.52	12.41
14	781.73	83.82	15.19
15	801.03	89.06	17.97
16	820.05	95.23	20.75
17	838.75	102.31	23.53
18	857.09	110.30	26.31
19	875.02	119.16	29.10
20	892.49	128.89	31.88
21	909.48	139.45	34.66
22	925.93	150.83	37.44
23	941.81	162.99	40.22
24	957.08	175.90	43.01
25	962.95	181.38	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.790

X-CENTER = 688.29
Y-CENTER = 508.21
RADIUS = 436.32

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	526.71	102.92	-20.42
2	545.45	95.94	-17.80
3	564.50	89.82	-15.17
4	583.80	84.59	-12.54
5	603.32	80.25	-9.92
6	623.02	76.80	-7.29
7	642.86	74.27	-4.66
8	662.79	72.64	-2.04
9	682.78	71.93	.59
10	702.78	72.14	3.22
11	722.75	73.26	5.84
12	742.65	75.29	8.47
13	762.43	78.24	11.10
14	782.05	82.09	13.72

15	801.48	86.83	16.35
16	820.67	92.46	18.98
17	839.59	98.96	21.60
18	858.18	106.33	24.23
19	876.42	114.54	26.85
20	894.26	123.57	29.48
21	911.67	133.41	32.11
22	928.62	144.04	34.73
23	945.05	155.44	37.36
24	960.95	167.57	39.99
25	976.27	180.43	42.61
26	977.27	181.35	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.813

X-CENTER = 736.43
Y-CENTER = 289.23
RADIUS = 213.87

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	619.11	110.41	-30.59
2	636.33	100.23	-25.23
3	654.42	91.71	-19.87
4	673.23	84.91	-14.51
5	692.60	79.90	-9.15
6	712.34	76.73	-3.79
7	732.30	75.40	1.57
8	752.29	75.95	6.93
9	772.14	78.37	12.29
10	791.69	82.63	17.65
11	810.74	88.69	23.01
12	829.15	96.51	28.37
13	846.75	106.01	33.73
14	863.38	117.12	39.09
15	878.91	129.73	44.45
16	893.18	143.74	49.81
17	906.09	159.02	55.17
18	917.51	175.43	60.53
19	920.93	181.48	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.815

X-CENTER = 554.97
Y-CENTER = 695.44
RADIUS = 621.27

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	388.10	97.00	-14.66
2	407.45	91.94	-12.81
3	426.95	87.50	-10.97
4	446.59	83.70	-9.12
5	466.33	80.53	-7.28
6	486.17	77.99	-5.44
7	506.08	76.10	-3.59
8	526.04	74.85	-1.75
9	546.03	74.24	.10
10	566.03	74.27	1.94
11	586.02	74.95	3.79
12	605.98	76.27	5.63
13	625.88	78.23	7.48
14	645.71	80.83	9.32
15	665.45	84.07	11.17
16	685.07	87.95	13.01
17	704.56	92.45	14.85
18	723.89	97.58	16.70
19	743.05	103.32	18.54
20	762.01	109.68	20.39
21	780.75	116.65	22.23
22	799.27	124.22	24.08
23	817.53	132.38	25.92
24	835.51	141.12	27.77
25	853.21	150.44	29.61
26	870.60	160.32	31.46
27	887.66	170.76	33.30
28	901.66	179.95	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.846

X-CENTER = 609.66

Y-CENTER = 626.15

RADIUS = 549.35

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	462.03	97.00	-14.55
2	481.38	91.98	-12.46
3	500.91	87.66	-10.37
4	520.59	84.06	-8.29
5	540.38	81.18	-6.20
6	560.26	79.02	-4.12
7	580.21	77.58	-2.03
8	600.20	76.87	.06
9	620.20	76.89	2.14
10	640.18	77.64	4.23
11	660.13	79.12	6.31
12	680.01	81.31	8.40
13	699.79	84.24	10.49
14	719.46	87.88	12.57
15	738.98	92.23	14.66
16	758.33	97.29	16.75

17	777.48	103.05	18.83
18	796.41	109.51	20.92
19	815.09	116.65	23.00
20	833.50	124.47	25.09
21	851.61	132.95	27.18
22	869.41	142.08	29.26
23	886.85	151.86	31.35
24	903.93	162.26	33.43
25	920.62	173.28	35.52
26	932.07	181.45	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.849

X-CENTER = 660.66
Y-CENTER = 559.80
RADIUS = 485.02

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	498.99	102.52	-18.29
2	517.98	96.24	-15.93
3	537.21	90.75	-13.56
4	556.65	86.06	-11.20
5	576.27	82.17	-8.84
6	596.03	79.10	-6.48
7	615.91	76.85	-4.11
8	635.85	75.41	-1.75
9	655.84	74.80	.61
10	675.84	75.01	2.98
11	695.82	76.05	5.34
12	715.73	77.91	7.70
13	735.55	80.59	10.06
14	755.24	84.09	12.43
15	774.77	88.39	14.79
16	794.11	93.50	17.15
17	813.22	99.40	19.52
18	832.07	106.08	21.88
19	850.63	113.53	24.24
20	868.87	121.74	26.60
21	886.75	130.70	28.97
22	904.25	140.38	31.33
23	921.33	150.78	33.69
24	937.97	161.88	36.05
25	954.14	173.65	38.42
26	963.89	181.38	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.922

X-CENTER = 615.62

Y-CENTER = 642.07
RADIUS = 563.86

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	471.27	97.00	-13.82
2	490.69	92.22	-11.78
3	510.27	88.14	-9.75
4	529.98	84.75	-7.72
5	549.80	82.06	-5.69
6	569.70	80.08	-3.66
7	589.66	78.81	-1.62
8	609.65	78.24	.41
9	629.65	78.38	2.44
10	649.63	79.23	4.47
11	669.57	80.79	6.51
12	689.44	83.06	8.54
13	709.22	86.03	10.57
14	728.88	89.70	12.60
15	748.40	94.06	14.64
16	767.75	99.12	16.67
17	786.91	104.85	18.70
18	805.85	111.26	20.73
19	824.56	118.34	22.76
20	843.00	126.08	24.80
21	861.16	134.47	26.83
22	879.00	143.50	28.86
23	896.52	153.15	30.89
24	913.68	163.42	32.93
25	930.47	174.29	34.96
26	940.68	181.43	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.929

X-CENTER = 688.50
Y-CENTER = 590.38
RADIUS = 516.71

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	517.47	102.80	-18.22
2	536.47	96.55	-16.00
3	555.69	91.03	-13.79
4	575.12	86.27	-11.57
5	594.71	82.26	-9.35
6	614.44	79.01	-7.13
7	634.29	76.52	-4.91
8	654.21	74.81	-2.70
9	674.19	73.87	-.48
10	694.19	73.70	1.74
11	714.18	74.31	3.96
12	734.14	75.69	6.18
13	754.02	77.84	8.39

1

Y	A	X	I	S	
32.00	177.63	323.25	468.88	614.50	760.13

X	.00	L*..**	-----+-----+-----+-----+-----+-----+
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		.	...6**
		.	...62*
		.	...61*
I	582.50	L*..**.	
		.	...21*
		.	...1.5.
		.	...15**
		.	...15..
		.	...16.*.
S	728.13	.	...1*6.*
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		.	...4176..
		.	...5176.*
		.	...3176.*
		.	...*2176.

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GEOSLOPE
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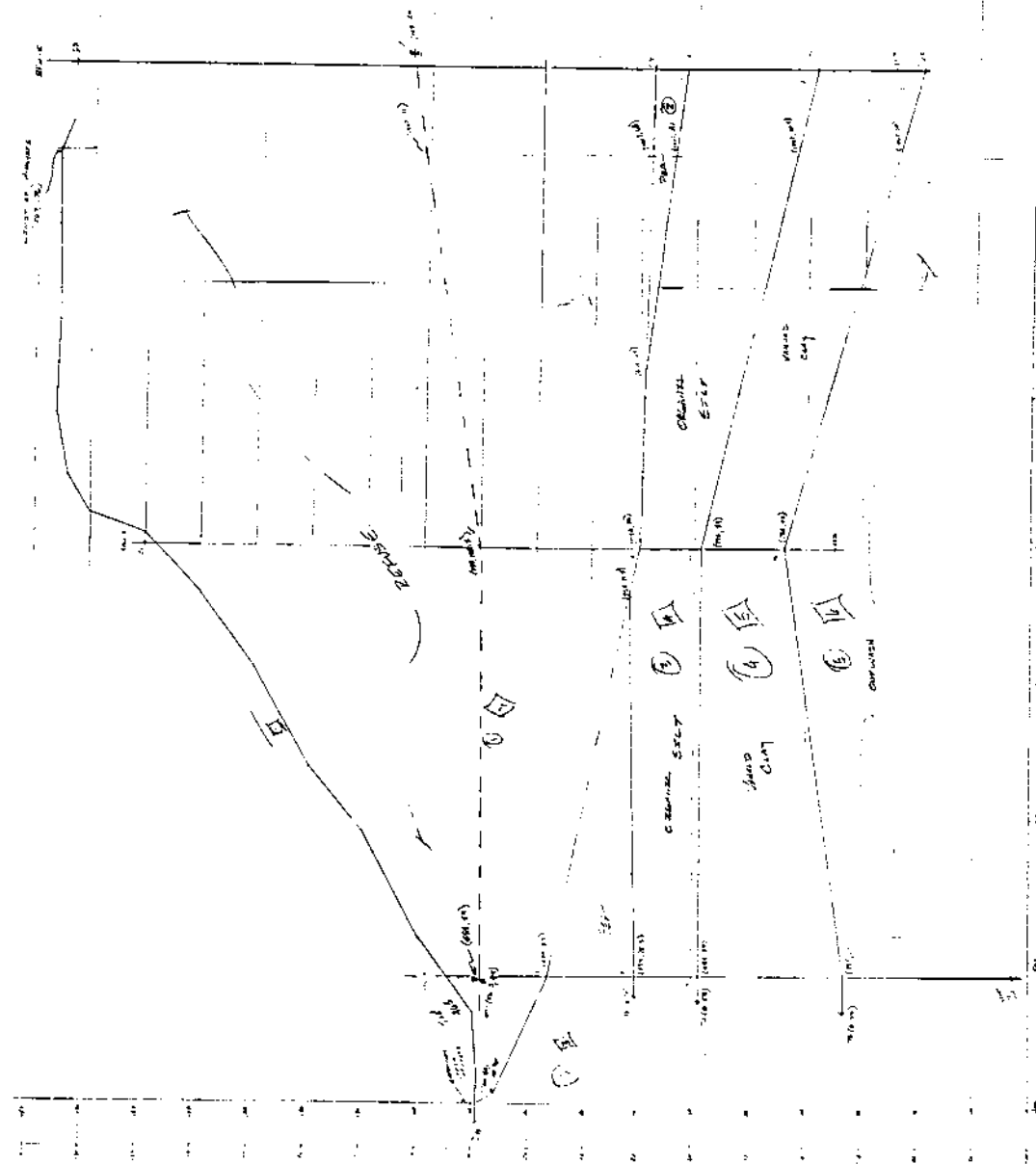
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West Chester, PA

APPENDIX C
CROSS SECTION 3-3 COMPUTER DATA

Sheet 3-3



See Sheet 3-2 for
Continuation of
Geological Section

See Sheet 3-2 for
Continuation of
Geological Section

Sheet 3-3

Geological Section

Sheet 3-3

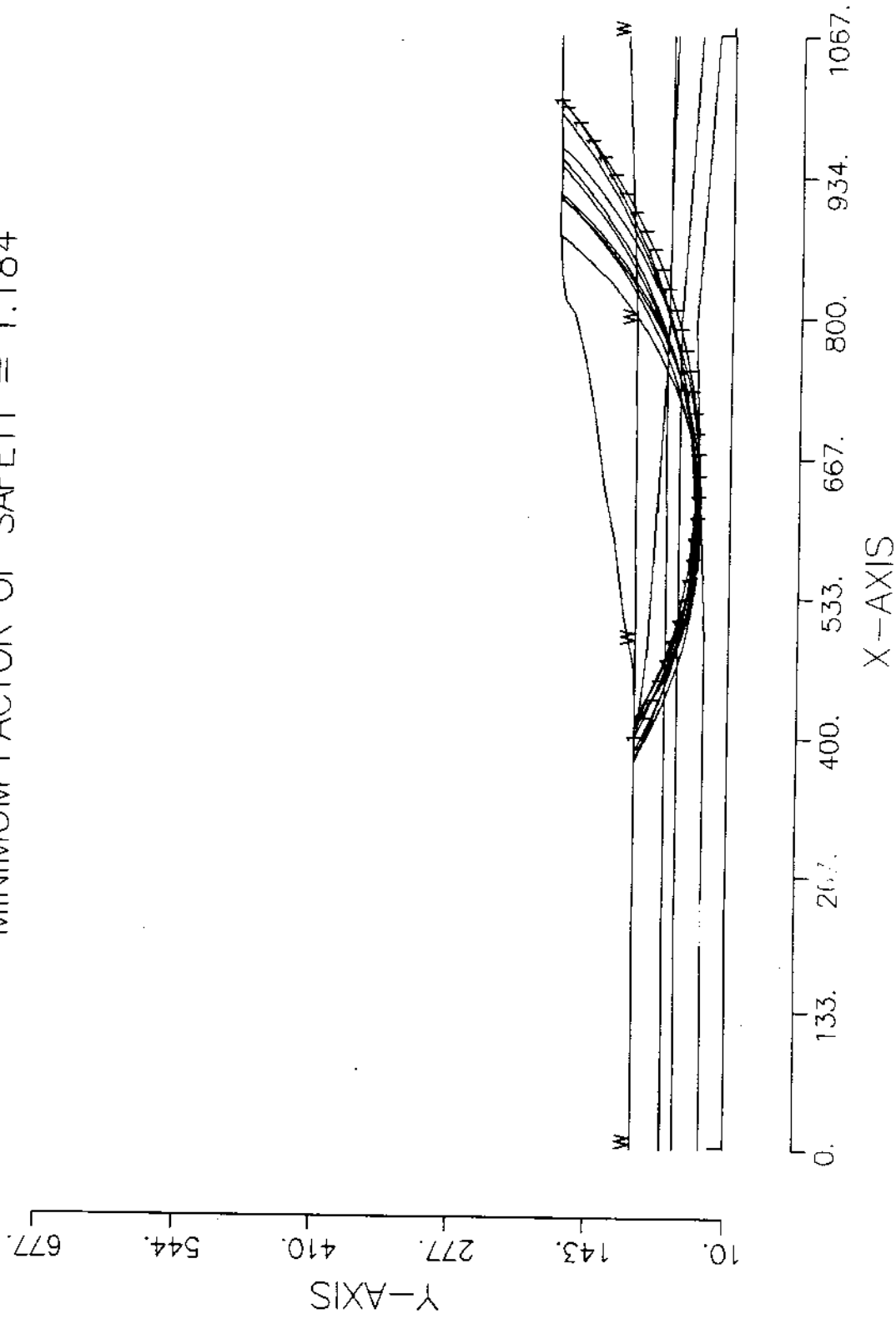
See Sheet 3-2 for
Continuation of
Geological Section

UNDRAINED ANALYSIS

EXISTING TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.184



CLARKSTOWN SANITARY LANDFILL SECTION 3-3 EXISTING TOPOGRAPHY UNDRAINED ANAL

29 15

0. 99. 400. 99. 2
 400. 99. 419. 99. 1
 419. 99. 464. 100. 1
 464. 100. 516. 110. 1
 516. 110. 590. 120. 1
 590. 120. 637. 130. 1
 637. 130. 707. 140. 1
 707. 140. 760. 150. 1
 760. 150. 803. 160. 1
 803. 160. 817. 170. 1
 817. 170. 843. 174. 1
 843. 174. 885. 176. 1
 885. 176. 945. 175.5 1
 945. 175.5 1015. 176. 1
 1015. 176. 1067. 176. 1
 400. 99. 408. 96. 2
 408. 96. 489. 87. 2
 489. 87. 760. 71.5 2
 760. 71.5 794. 70. 3
 794. 70. 914. 69. 3
 914. 69. 1067. 68. 2
 0. 70. 489. 70.5 3
 489. 70.5 760. 71.5 3
 914. 69. 1067. 64. 3
 0. 59. 794. 59. 4
 794. 59. 1067. 40.5 4
 0. 33. 489. 33. 5
 489. 33. 794. 44. 5
 794. 44. 1067. 24. 5

SOIL

5

80.0 80.0 1750.0 0. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.
 489. 99.
 794. 100.8
 1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

50 10

370. 420. 800. 1067.

20. 20. 0. 0.

END

CL3EUB.DAT

SECTION 3-3 UNDRAINED ANALYSIS

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 EXISTING TOPOGRAPHY PROFIL
29 15 UNDRAINED ANALYS

0. 99. 400. 99. 2
400. 99. 419. 99. 1
419. 99. 464. 100. 1
464. 100. 516. 110. 1
516. 110. 590. 120. 1
590. 120. 637. 130. 1
637. 130. 707. 140. 1
707. 140. 760. 150. 1
760. 150. 803. 160. 1
803. 160. 817. 170. 1
817. 170. 843. 174. 1
843. 174. 885. 176. 1
885. 176. 945. 175.5 1
945. 175.5 1015. 176. 1
1015. 176. 1067. 176. 1
400. 99. 408. 96. 2
408. 96. 489. 87. 2
489. 87. 760. 71.5 2
760. 71.5 794. 70. 3
794. 70. 914. 69. 3
914. 69. 1067. 68. 2
0. 70. 489. 70.5 3
489. 70.5 760. 71.5 3
914. 69. 1067. 64. 3
0. 59. 794. 59. 4
794. 59. 1067. 40.5 4
0. 33. 489. 33. 5
489. 33. 794. 44. 5
794. 44. 1067. 24. 5

SOIL

5
80.0 80.0 1750.0 0. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1
88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
4
0. 99.
489. 99.
794. 100.8
1067. 111.

LIMITS

1 1
0. 10. 1067. 10.

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80 10
0. 650. 800. 1067.
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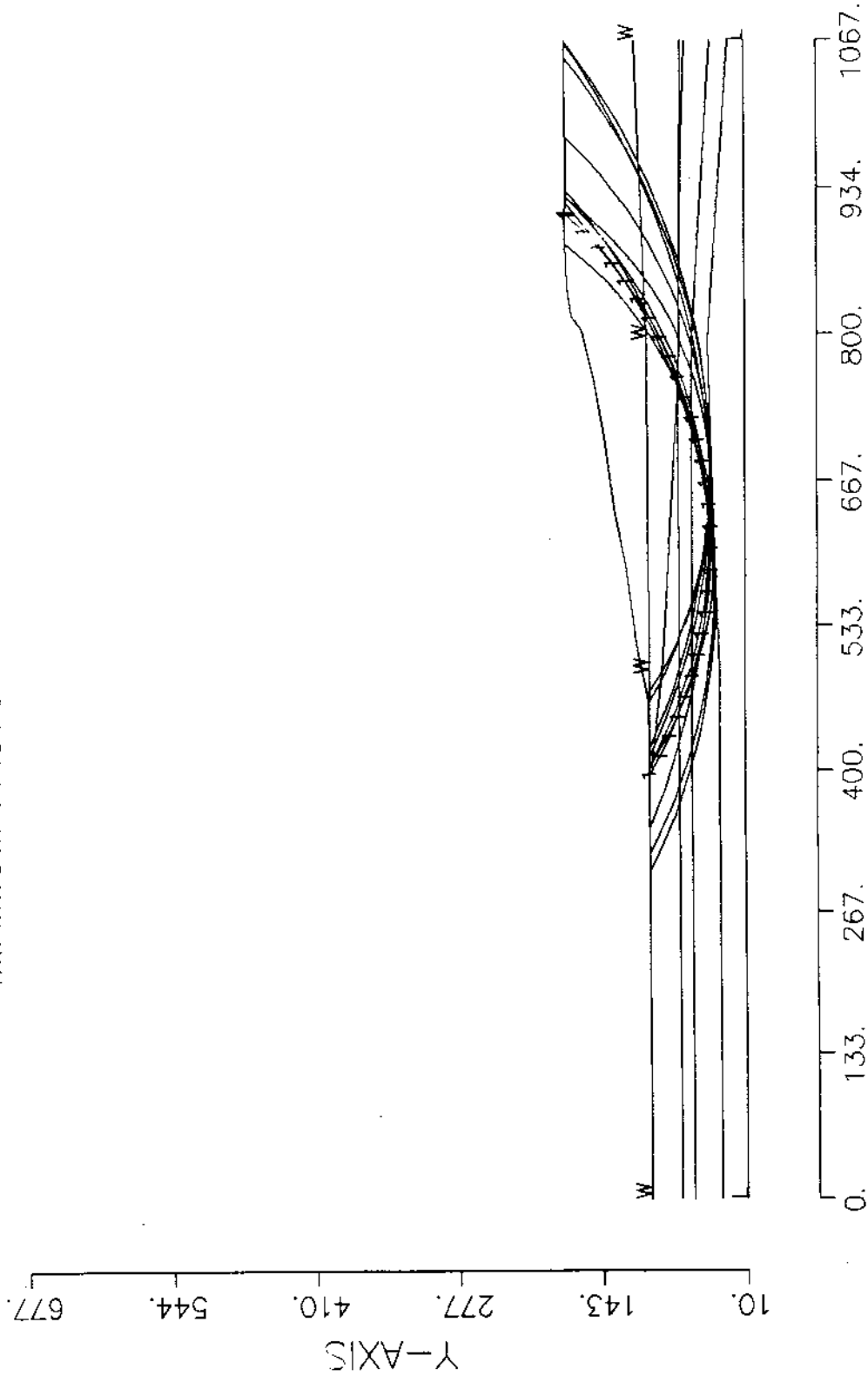
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CL3EUA.DAT

SECTION 3-3 UNDRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3--3
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.263



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 3-3
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
29 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	400.00	99.00	2
2	400.00	99.00	419.00	99.00	1
3	419.00	99.00	464.00	100.00	1
4	464.00	100.00	516.00	110.00	1
5	516.00	110.00	590.00	120.00	1
6	590.00	120.00	637.00	130.00	1
7	637.00	130.00	707.00	140.00	1
8	707.00	140.00	760.00	150.00	1
9	760.00	150.00	803.00	160.00	1
10	803.00	160.00	817.00	170.00	1
11	817.00	170.00	843.00	174.00	1
12	843.00	174.00	885.00	176.00	1
13	885.00	176.00	945.00	175.50	1
14	945.00	175.50	1015.00	176.00	1
15	1015.00	176.00	1067.00	176.00	1
16	400.00	99.00	408.00	96.00	2
17	408.00	96.00	489.00	87.00	2
18	489.00	87.00	760.00	71.50	2
19	760.00	71.50	794.00	70.00	3
20	794.00	70.00	914.00	69.00	3
21	914.00	69.00	1067.00	68.00	2
22	.00	70.00	489.00	70.50	3
23	489.00	70.50	760.00	71.50	3
24	914.00	69.00	1067.00	64.00	3
25	.00	59.00	794.00	59.00	4
26	794.00	59.00	1067.00	40.50	4
27	.00	33.00	489.00	33.00	5
28	489.00	33.00	794.00	44.00	5
29	794.00	44.00	1067.00	24.00	5

ISOTROPIC SOIL PARAMETERS

5 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRI SURFACE NO.
1	80.0	80.0	1750.0	.0	.00	.0	1
2	80.0	80.0	30.0	.0	.00	.0	1
3	88.0	88.0	820.0	.0	.00	.0	1
4	104.0	104.0	380.0	.0	.00	.0	1
5	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00

AND X =1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.263

X-CENTER = 605.49
Y-CENTER = 454.08
RADIUS = 412.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	394.94	99.00	-29.28
2	412.38	89.22	-26.50
3	430.28	80.29	-23.73
4	448.59	72.25	-20.95
5	467.27	65.10	-18.17
6	486.27	58.86	-15.40
7	505.55	53.55	-12.62
8	525.07	49.18	-9.85
9	544.77	45.76	-7.07
10	564.62	43.30	-4.29
11	584.57	41.80	-1.52
12	604.56	41.27	1.26
13	624.55	41.71	4.04
14	644.50	43.12	6.81
15	664.36	45.49	9.59
16	684.08	48.82	12.36
17	703.62	53.10	15.14
18	722.93	58.33	17.92
19	741.96	64.48	20.69
20	760.67	71.55	23.47
21	779.01	79.51	26.24
22	796.95	88.35	29.02
23	814.44	98.06	31.80
24	831.44	108.60	34.57

370, 420

25	847.91	119.95	37.35
26	863.80	132.08	40.13
27	879.10	144.97	42.90
28	893.75	158.58	45.68
29	907.72	172.89	48.45
30	910.29	175.79	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	397.47	5.06	574.89	.00	514.08	222.28	23.75
2	404.00	8.00	3252.10	.00	2908.14	942.36	23.75
3	410.19	4.38	2998.30	.00	2681.19	823.12	23.75
4	415.69	6.62	6051.92	.00	5274.79	1575.32	23.75
5	424.64	11.28	14455.87	.00	12501.01	3801.56	23.75
6	439.44	18.31	33958.46	.00	28366.32	8936.08	23.75
7	450.92	4.66	10566.48	.00	8604.50	2755.30	23.75
8	458.62	10.75	27250.58	.00	21979.22	10061.28	649.06
9	465.63	3.27	9167.92	.00	7266.39	3420.05	649.06
10	476.55	18.57	61219.00	.00	45065.23	23532.37	649.06
11	486.05	.43	1610.34	.00	1139.65	600.25	300.78
12	487.64	2.73	10344.64	.00	7158.85	3805.46	300.78
13	497.28	16.55	69754.74	.00	46304.55	27469.34	300.78
14	510.78	10.45	49950.27	.00	31233.23	20675.07	300.78
15	520.53	9.07	46595.89	.00	28412.32	19963.38	300.78
16	534.92	19.71	109903.20	.00	64650.81	47939.13	300.78
17	554.70	19.85	121023.10	.00	68466.31	54229.77	300.78
18	574.59	19.94	130014.80	.00	71083.02	59749.16	300.78
19	587.28	5.43	36633.20	.00	19622.48	17066.85	300.78
20	597.28	14.56	100794.40	.00	52872.06	48073.66	300.78
21	614.56	20.00	144261.00	.00	72697.94	71465.71	300.78
22	630.78	12.45	92381.01	.00	44912.14	47433.73	300.78
23	640.75	7.50	56277.73	.00	26780.39	29477.57	300.78
24	654.43	19.86	149033.30	.00	69480.55	79893.67	300.78
25	674.22	19.72	146619.40	.00	66067.47	81612.87	300.78
26	693.85	19.54	141906.80	.00	61461.06	82496.50	300.78
27	705.31	3.38	24078.16	.00	10205.80	14453.24	300.78
28	714.96	15.93	111373.30	.00	45466.50	68568.84	300.78
29	723.97	2.08	14318.87	.00	5702.96	9132.66	300.78
30	733.48	16.95	114180.00	.00	43011.85	73250.04	649.06
31	750.98	18.04	116589.10	.00	39307.76	80592.51	649.06
32	760.24	.49	3071.93	.00	951.03	2204.83	649.06
33	760.58	.18	1120.98	.00	345.83	752.77	1385.19
34	769.84	18.35	112656.40	.00	31361.21	79426.78	1385.19
35	786.51	14.99	87481.18	.00	18300.57	67822.77	1385.19
36	795.48	2.95	16667.29	.00	2714.83	13621.82	1385.19
37	799.98	6.05	33523.06	.00	4744.66	28275.00	1385.19
38	808.72	11.44	63326.55	.00	5277.62	57088.90	1385.19
39	815.72	2.56	14390.06	.00	518.98	13824.39	1385.19
40	818.73	3.46	19234.31	.00	255.58	18882.25	1385.19
41	825.95	10.98	58137.80	.00	.00	57309.45	1385.19
42	837.22	11.56	55991.78	.00	.00	54595.13	1385.19
43	845.45	4.91	21921.47	.00	.00	20936.06	1385.19
44	855.85	15.90	61815.70	.00	.00	56618.02	1385.19
45	871.45	15.29	45060.21	.00	.00	35580.50	1385.19
46	882.05	5.90	13293.08	.00	.00	7773.35	1385.19
47	889.37	8.75	15007.08	.00	.00	5114.93	1385.19
48	900.73	13.97	11326.42	.00	.00	-12156.45	1385.19

1 49 909.01 2.57 299.88 .00 .00 -5600.51 1385.19

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.265

X-CENTER = 670.56
Y-CENTER = 646.17
RADIUS = 605.45

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	411.39	99.00	-24.40
2	429.61	90.74	-22.51
3	448.08	83.08	-20.61
4	466.80	76.04	-18.72
5	485.75	69.62	-16.83
6	504.89	63.83	-14.93
7	524.21	58.68	-13.04
8	543.70	54.17	-11.15
9	563.32	50.30	-9.26
10	583.06	47.08	-7.36
11	602.90	44.52	-5.47
12	622.80	42.61	-3.58
13	642.77	41.37	-1.68
14	662.76	40.78	.21
15	682.76	40.85	2.10
16	702.74	41.58	3.99
17	722.69	42.98	5.89
18	742.59	45.03	7.78
19	762.40	47.74	9.67
20	782.12	51.10	11.57
21	801.71	55.11	13.46
22	821.17	59.76	15.35
23	840.45	65.05	17.24
24	859.55	70.98	19.14
25	878.45	77.54	21.03
26	897.12	84.72	22.92
27	915.54	92.51	24.81
28	933.69	100.90	26.71
29	951.56	109.89	28.60
30	969.12	119.46	30.49
31	986.35	129.61	32.39
32	1003.24	140.32	34.28
33	1019.76	151.59	36.17
34	1035.91	163.39	38.06
35	1051.66	175.72	39.95
36	1051.99	176.00	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.274

X-CENTER = 602.17
Y-CENTER = 391.12
RADIUS = 353.47

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	99.00	-32.64
2	420.01	88.21	-29.40
3	437.43	78.39	-26.16
4	455.38	69.58	-22.92
5	473.80	61.79	-19.67
6	492.64	55.06	-16.43
7	511.82	49.40	-13.19
8	531.29	44.84	-9.95
9	550.99	41.38	-6.70
10	570.85	39.05	-3.46
11	590.82	37.84	-.22
12	610.82	37.76	3.02
13	630.79	38.82	6.26
14	650.67	41.00	9.51
15	670.40	44.30	12.75
16	689.90	48.72	15.99
17	709.13	54.22	19.23
18	728.01	60.81	22.48
19	746.49	68.46	25.72
20	764.51	77.14	28.96
21	782.01	86.82	32.20
22	798.93	97.48	35.45
23	815.23	109.08	38.69
24	830.84	121.58	41.93
25	845.72	134.95	45.17
26	859.82	149.13	48.41
27	873.09	164.09	51.66
28	882.42	175.88	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.283

X-CENTER = 615.42
Y-CENTER = 469.68
RADIUS = 427.15

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	99.00	-28.45
2	420.75	89.47	-25.77
3	438.76	80.78	-23.09
4	457.16	72.93	-20.40
5	475.90	65.96	-17.72
6	494.95	59.87	-15.04
7	514.27	54.68	-12.36
8	533.81	50.40	-9.67
9	553.52	47.04	-6.99
10	573.37	44.61	-4.31

11	593.32	43.11	-1.62
12	613.31	42.54	1.06
13	633.30	42.91	3.74
14	653.26	44.21	6.42
15	673.14	46.45	9.11
16	692.88	49.62	11.79
17	712.46	53.70	14.47
18	731.83	58.70	17.16
19	750.94	64.60	19.84
20	769.75	71.39	22.52
21	788.23	79.05	25.20
22	806.32	87.57	27.89
23	824.00	96.92	30.57
24	841.22	107.09	33.25
25	857.94	118.06	35.94
26	874.14	129.80	38.62
27	889.76	142.28	41.30
28	904.79	155.48	43.99
29	919.18	169.37	46.67
30	925.12	175.67	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.286

X-CENTER = 673.18
Y-CENTER = 460.88
RADIUS = 418.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	460.76	99.93	-29.11
2	478.23	90.20	-26.37
3	496.15	81.31	-23.64
4	514.47	73.30	-20.90
5	533.16	66.16	-18.16
6	552.16	59.93	-15.43
7	571.44	54.61	-12.69
8	590.95	50.21	-9.95
9	610.65	46.76	-7.22
10	630.49	44.24	-4.48
11	650.43	42.68	-1.74
12	670.42	42.07	.99
13	690.42	42.42	3.73
14	710.38	43.72	6.46
15	730.25	45.97	9.20
16	749.99	49.17	11.94
17	769.56	53.30	14.67
18	788.91	58.37	17.41
19	807.99	64.36	20.15
20	826.77	71.24	22.88
21	845.19	79.02	25.62
22	863.23	87.67	28.36
23	880.83	97.17	31.09
24	897.96	107.50	33.83
25	914.57	118.63	36.57

26	930.63	130.55	39.30
27	946.11	143.21	42.04
28	960.96	156.61	44.77
29	975.16	170.69	47.51
30	979.79	175.75	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.294

X-CENTER = 659.16
Y-CENTER = 370.88
RADIUS = 330.19

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	468.99	100.96	-33.43
2	485.68	89.94	-29.96
3	503.01	79.95	-26.49
4	520.91	71.03	-23.02
5	539.31	63.21	-19.55
6	558.16	56.52	-16.08
7	577.38	50.98	-12.60
8	596.90	46.62	-9.13
9	616.64	43.44	-5.66
10	636.55	41.47	-2.19
11	656.53	40.70	1.28
12	676.53	41.15	4.75
13	696.46	42.81	8.22
14	716.25	45.67	11.69
15	735.84	49.72	15.16
16	755.14	54.95	18.63
17	774.09	61.34	22.11
18	792.62	68.87	25.58
19	810.66	77.50	29.05
20	828.15	87.21	32.52
21	845.01	97.96	35.99
22	861.19	109.72	39.46
23	876.63	122.43	42.93
24	891.28	136.05	46.40
25	905.07	150.54	49.87
26	917.96	165.83	53.35
27	925.28	175.66	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.295

X-CENTER = 635.64
Y-CENTER = 786.73
RADIUS = 746.40

POINT	X-SURF	Y-SURF	ALPHA
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NO.			(DEG)
1	345.57	99.00	-22.10
2	364.10	91.48	-20.57
3	382.83	84.45	-19.03
4	401.73	77.93	-17.50
5	420.81	71.92	-15.96
6	440.04	66.42	-14.42
7	459.41	61.43	-12.89
8	478.90	56.97	-11.35
9	498.51	53.03	-9.82
10	518.22	49.62	-8.28
11	538.01	46.74	-6.75
12	557.87	44.39	-5.21
13	577.79	42.57	-3.68
14	597.75	41.29	-2.14
15	617.73	40.54	-.61
16	637.73	40.33	.93
17	657.73	40.66	2.46
18	677.71	41.52	4.00
19	697.66	42.91	5.53
20	717.57	44.84	7.07
21	737.42	47.30	8.60
22	757.19	50.29	10.14
23	776.88	53.81	11.68
24	796.47	57.86	13.21
25	815.94	62.43	14.75
26	835.28	67.52	16.28
27	854.48	73.13	17.82
28	873.52	79.25	19.35
29	892.39	85.88	20.89
30	911.07	93.01	22.42
31	929.56	100.63	23.96
32	947.84	108.76	25.49
33	965.89	117.36	27.03
34	983.71	126.45	28.56
35	1001.27	136.02	30.10
36	1018.57	146.05	31.63
37	1035.60	156.53	33.17
38	1052.34	167.48	34.70
39	1064.65	176.00	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.312

X-CENTER = 679.55
Y-CENTER = 665.11
RADIUS = 622.92

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	419.62	99.01	-23.74
2	437.93	90.96	-21.90
3	456.48	83.50	-20.06
4	475.27	76.64	-18.22

5	494.27	70.38	-16.38
6	513.46	64.74	-14.54
7	532.81	59.72	-12.70
8	552.32	55.32	-10.87
9	571.97	51.55	-9.03
10	591.72	48.41	-7.19
11	611.56	45.91	-5.35
12	631.47	44.05	-3.51
13	651.44	42.83	-1.67
14	671.43	42.24	.17
15	691.43	42.30	2.01
16	711.42	43.01	3.85
17	731.37	44.35	5.69
18	751.27	46.33	7.53
19	771.10	48.95	9.37
20	790.83	52.21	11.21
21	810.45	56.10	13.05
22	829.93	60.62	14.89
23	849.26	65.75	16.73
24	868.42	71.51	18.57
25	887.38	77.88	20.41
26	906.12	84.85	22.25
27	924.63	92.43	24.09
28	942.89	100.59	25.93
29	960.88	109.33	27.77
30	978.57	118.65	29.61
31	995.96	128.53	31.45
32	1013.02	138.97	33.29
33	1029.74	149.94	35.13
34	1046.10	161.45	36.97
35	1062.08	173.48	38.80
36	1065.22	176.00	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.317

X-CENTER = 561.71

Y-CENTER = 599.02

RADIUS = 562.33

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	304.43	99.00	-26.21
2	322.37	90.17	-24.17
3	340.62	81.98	-22.13
4	359.15	74.44	-20.09
5	377.93	67.57	-18.06
6	396.94	61.37	-16.02
7	416.17	55.85	-13.98
8	435.58	51.02	-11.94
9	455.14	46.88	-9.91
10	474.84	43.44	-7.87
11	494.66	40.70	-5.83
12	514.55	38.67	-3.79
13	534.51	37.35	-1.75

14	554.50	36.74	.28
15	574.50	36.84	2.32
16	594.48	37.65	4.36
17	614.43	39.17	6.40
18	634.30	41.40	8.44
19	654.08	44.33	10.47
20	673.75	47.97	12.51
21	693.28	52.30	14.55
22	712.63	57.32	16.59
23	731.80	63.03	18.63
24	750.76	69.42	20.66
25	769.47	76.48	22.70
26	787.92	84.20	24.74
27	806.08	92.57	26.78
28	823.94	101.58	28.82
29	841.46	111.22	30.85
30	858.63	121.47	32.89
31	875.43	132.33	34.93
32	891.82	143.79	36.97
33	907.80	155.81	39.00
34	923.35	168.40	41.04
35	931.63	175.61	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.326

X-CENTER = 566.15
Y-CENTER = 562.24
RADIUS = 524.16

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	320.89	99.00	-26.81
2	338.74	89.98	-24.62
3	356.92	81.65	-22.43
4	375.41	74.02	-20.25
5	394.17	67.09	-18.06
6	413.18	60.89	-15.87
7	432.42	55.42	-13.69
8	451.85	50.69	-11.50
9	471.45	46.70	-9.32
10	491.19	43.47	-7.13
11	511.03	40.98	-4.94
12	530.96	39.26	-2.76
13	550.94	38.30	-.57
14	570.93	38.10	1.62
15	590.93	38.66	3.80
16	610.88	39.99	5.99
17	630.77	42.08	8.18
18	650.57	44.92	10.36
19	670.24	48.52	12.55
20	689.77	52.86	14.73
21	709.11	57.95	16.92
22	728.24	63.77	19.11
23	747.14	70.32	21.29

1

Y	A	X	I	S	
10.00	143.38	276.75	410.13	543.50	676.88

X	.00	L-***-+-----+-----+-----+
		- ..
		- ...
		-
		-
		-
133.38	+	
		-
		-
		-
		-
		-
		-
A	266.75	+.....
		-
		-9
		-99.
		-977
		-907.
X	400.13	+...97**
		-..9011*
		-..9318.
		-..9128*
		-.*31**W
		-.9125.*.
I	533.50	+..912....
		-.115....
		-.12....
		-.12.....*
		-.15.....
		-.14.....*
S	666.88	+..21.....
		-.21.....
		-.219.....*
		-.221.....
		-.23*.....*
		-.2513.....
800.25	+	...**61W...*
		25613...*
		25.413...*

- ...256413.3
- ...225.611*
- ...*.2.5..41
933.63 + ...82.5..4
- ...27.55*
- ...22..5
- ...72..
- ..72*
- ..72
1067.00 L** * W *

GEOSLOPE
Version 4.0

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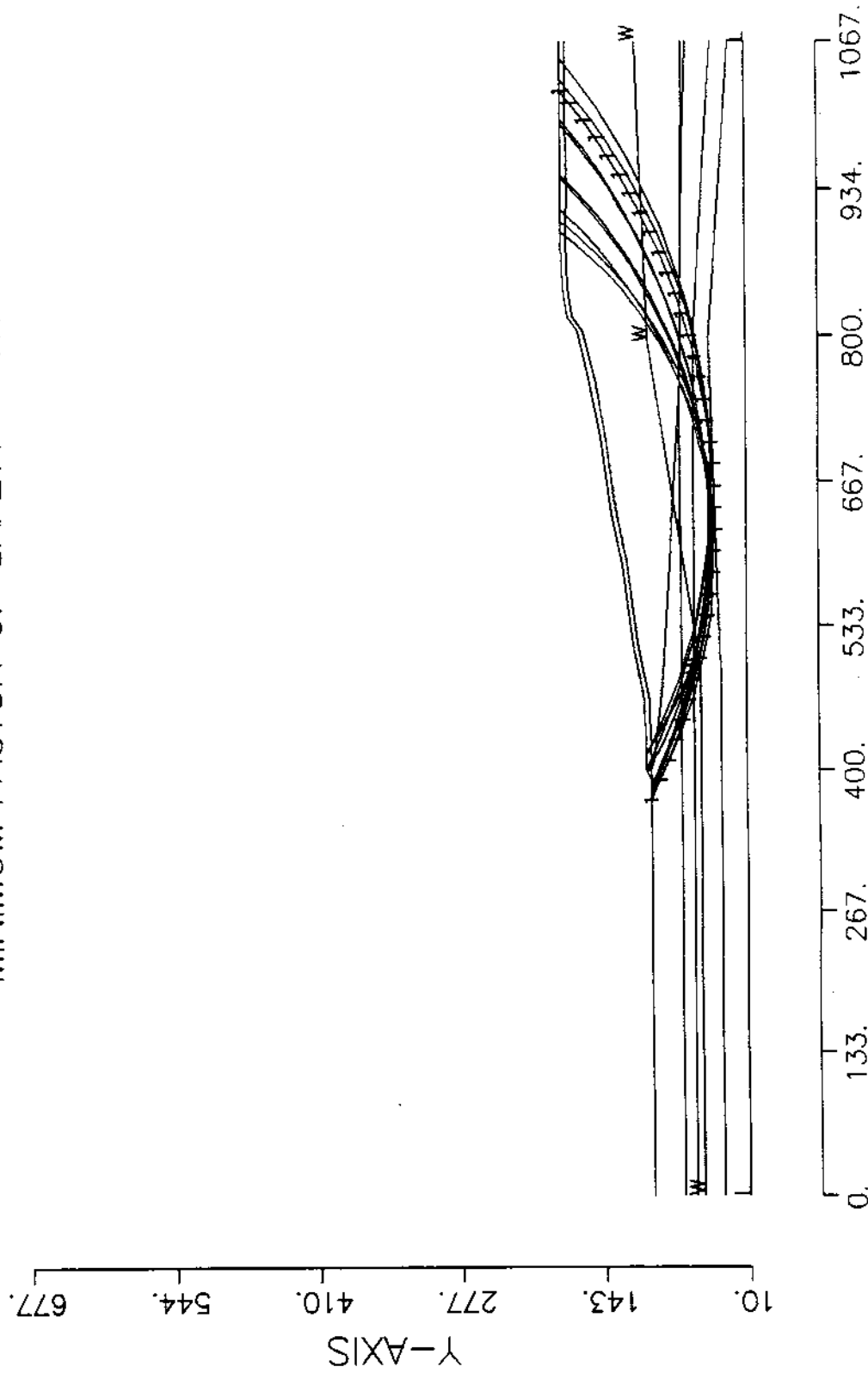
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West Chester, PA

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.099



CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY PROFIL
UNDRAINED ANALYSIS

45 16

0. 99. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1

390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2

400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
80.0 80.0 1750.0 0. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1
88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 52.

489. 52.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
50 10
370. 420. 800. 1067.
20. 20. 0. 0.
END

CL3FUB.DAT

SECTION 3-3 FINAL UNDRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY UNDRAINED ANALYSIS

45 16

0. 99. 390. 99. 3
 390. 99. 400. 104. 1
 400. 104. 419. 104. 1
 419. 104. 464. 105. 1
 464. 105. 516. 115. 1
 516. 115. 590. 125. 1
 590. 125. 637. 135. 1
 637. 135. 707. 145. 1
 707. 145. 760. 155. 1
 760. 155. 803. 165. 1
 803. 165. 817. 175. 1
 817. 175. 843. 179. 1
 843. 179. 885. 181. 1
 885. 181. 945. 180.5 1
 945. 180.5 1015. 181. 1
 1015. 181. 1067. 181. 1
 390. 99. 400. 99. 3
 400. 99. 419. 99. 2
 419. 99. 464. 100. 2
 464. 100. 516. 110. 2
 516. 110. 590. 120. 2
 590. 120. 637. 130. 2
 637. 130. 707. 140. 2
 707. 140. 760. 150. 2
 760. 150. 803. 160. 2
 803. 160. 817. 170. 2
 817. 170. 843. 174. 2
 843. 174. 885. 176. 2
 885. 176. 945. 175.5 2
 945. 175.5 1015. 176. 2
 1015. 176. 1067. 176. 2
 400. 99. 408. 96. 3
 408. 96. 489. 87. 3
 489. 87. 760. 71.5 3
 760. 71.5 794. 70. 4
 794. 70. 914. 69. 4
 914. 69. 1067. 68. 3
 0. 70. 489. 70.5 4
 489. 70.5 760. 71.5 4
 914. 69. 1067. 64. 4
 0. 59. 794. 59. 5
 794. 59. 1067. 40.5 5
 0. 33. 489. 33. 6
 489. 33. 794. 44. 6
 794. 44. 1067. 24. 6

SOIL

5
 125.0 125.0 0.0 32. 0. 0. 1
 30.0 80.0 1750.0 0. 0. 0. 1
 30.0 80.0 30.0 0. 0. 0. 1
 38.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.

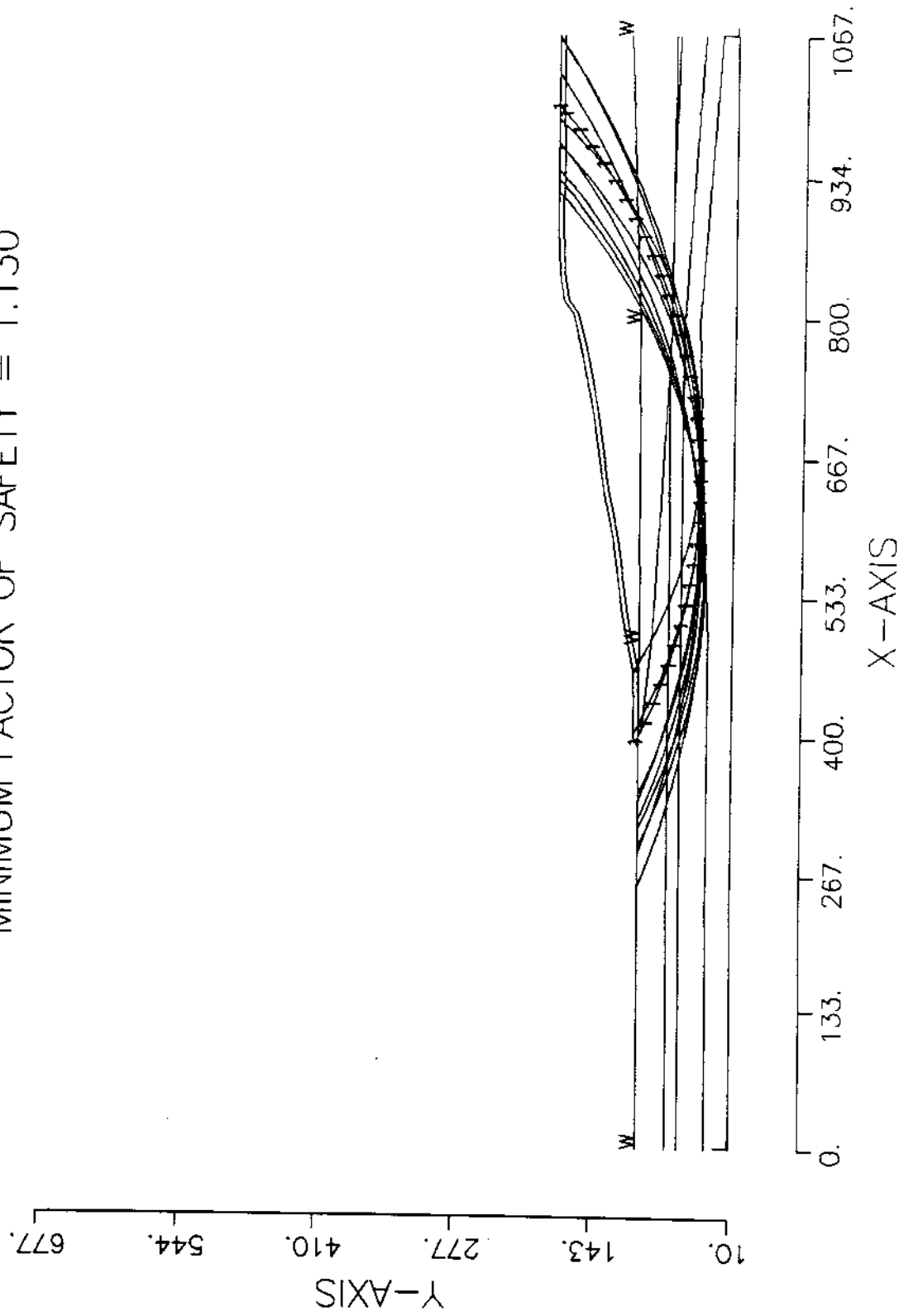
489. 99.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
30 10
0. 650. 800. 1067.
20. 20. 0. 0.
END

CL3FUA.DAT

SECTION 3-3 FINAL UNDRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.130



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
45 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	390.00	99.00	3
2	390.00	99.00	400.00	104.00	1
3	400.00	104.00	419.00	104.00	1
4	419.00	104.00	464.00	105.00	1
5	464.00	105.00	516.00	115.00	1
6	516.00	115.00	590.00	125.00	1
7	590.00	125.00	637.00	135.00	1
8	637.00	135.00	707.00	145.00	1
9	707.00	145.00	760.00	155.00	1
10	760.00	155.00	803.00	165.00	1
11	803.00	165.00	817.00	175.00	1
12	817.00	175.00	843.00	179.00	1
13	843.00	179.00	885.00	181.00	1
14	885.00	181.00	945.00	180.50	1
15	945.00	180.50	1015.00	181.00	1
16	1015.00	181.00	1067.00	181.00	1
17	390.00	99.00	400.00	99.00	3
18	400.00	99.00	419.00	99.00	2
19	419.00	99.00	464.00	100.00	2
20	464.00	100.00	516.00	110.00	2
21	516.00	110.00	590.00	120.00	2
22	590.00	120.00	637.00	130.00	2
23	637.00	130.00	707.00	140.00	2
24	707.00	140.00	760.00	150.00	2
25	760.00	150.00	803.00	160.00	2
26	803.00	160.00	817.00	170.00	2
27	817.00	170.00	843.00	174.00	2
28	843.00	174.00	885.00	176.00	2
29	885.00	176.00	945.00	175.50	2
30	945.00	175.50	1015.00	176.00	2
31	1015.00	176.00	1067.00	176.00	2
32	400.00	99.00	408.00	96.00	3
33	408.00	96.00	489.00	87.00	3
34	489.00	87.00	760.00	71.50	3

35	760.00	71.50	794.00	70.00	4
36	794.00	70.00	914.00	69.00	4
37	914.00	69.00	1067.00	68.00	3
38	.00	70.00	489.00	70.50	4
39	489.00	70.50	760.00	71.50	4
40	914.00	69.00	1067.00	64.00	4
41	.00	59.00	794.00	59.00	5
42	794.00	59.00	1067.00	40.50	5
43	.00	33.00	489.00	33.00	6
44	489.00	33.00	794.00	44.00	6
45	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	1750.0	.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
-----------------	--------	--------	---------	---------

1 .00 10.00 1067.00 10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.130

X-CENTER = 640.60
Y-CENTER = 577.86
RADIUS = 536.00

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)	
1	394.94	101.47	-26.21	370, 420
2	412.88	92.64	-24.07	
3	431.14	84.48	-21.93	
4	449.69	77.01	-19.80	
5	468.51	70.23	-17.66	
6	487.57	64.17	-15.52	
7	506.84	58.82	-13.38	

8	526.30	54.19	-11.24
9	545.91	50.29	-9.11
10	565.66	47.12	-6.97
11	585.51	44.70	-4.83
12	605.44	43.01	-2.69
13	625.42	42.07	-.55
14	645.42	41.88	1.59
15	665.41	42.43	3.72
16	685.37	43.73	5.86
17	705.27	45.78	8.00
18	725.07	48.56	10.14
19	744.76	52.08	12.28
20	764.30	56.33	14.41
21	783.67	61.31	16.55
22	802.84	67.01	18.69
23	821.79	73.42	20.83
24	840.48	80.53	22.97
25	858.90	88.33	25.10
26	877.01	96.82	27.24
27	894.79	105.97	29.38
28	912.22	115.78	31.52
29	929.27	126.24	33.66
30	945.91	137.32	35.79
31	962.14	149.02	37.93
32	977.91	161.32	40.07
33	993.22	174.19	42.21
34	1000.61	180.90	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	397.44	5.01	1559.48	.00	.00	2388.25	1320.50
2	399.98	.05	30.19	.00	.04	34.31	26.55
3	404.00	8.00	6275.45	.00	1108.86	6002.28	26.55
4	410.44	4.88	5066.52	.00	1752.74	3965.49	26.55
5	415.94	6.12	7609.41	.00	3233.39	5180.27	26.55
6	425.07	12.14	19190.94	.00	9800.02	11376.50	26.55
7	440.42	18.55	39399.26	.00	22785.45	19901.96	26.55
8	456.85	14.31	38021.43	.00	23309.04	17245.58	26.55
9	465.92	3.83	11348.13	.00	7073.95	5025.81	26.55
10	468.17	.68	2080.24	.00	1290.69	1108.78	725.58
11	478.04	19.06	66535.80	.00	39685.73	34759.14	725.58
12	488.28	1.43	5626.00	.00	3244.94	2893.04	725.58
13	497.59	17.18	73935.59	.00	41901.45	38423.88	725.58
14	506.51	.66	3088.56	.00	1724.89	1544.75	336.24
15	511.42	9.16	44512.00	.00	24326.06	22181.21	336.24
16	521.15	10.30	53822.30	.00	28914.82	27256.13	336.24
17	536.11	19.62	112185.50	.00	58706.35	57011.11	336.24
18	555.79	19.75	124407.30	.00	63259.53	63813.10	336.24
19	575.59	19.85	135097.10	.00	66894.05	70029.87	336.24
20	587.76	4.49	31774.44	.00	15472.26	16543.26	336.24
21	597.72	15.44	113141.30	.00	54132.80	59851.76	336.24
22	615.43	19.98	154730.50	.00	71388.58	83828.79	336.24
23	631.21	11.58	93428.67	.00	41779.55	51691.04	336.24
24	641.21	8.42	69260.42	.00	30462.57	38828.40	336.24
25	655.42	19.99	167215.20	.00	72164.60	94928.51	336.24
26	675.39	19.96	169571.60	.00	71155.89	98336.75	336.24
27	695.32	19.90	170128.00	.00	69217.85	101113.90	336.24

28	706.13	1.73	14840.07	.00	5943.72	8959.41	336.24
29	716.04	18.07	154650.90	.00	60408.96	94899.25	336.24
30	734.91	19.69	167905.30	.00	62564.77	106801.00	336.24
31	752.38	15.24	128591.80	.00	45567.44	84892.05	336.24
32	762.15	4.30	36004.51	.00	12291.81	24233.10	336.24
33	769.49	10.38	86349.88	.00	28756.22	59473.59	336.24
34	779.18	8.99	74182.74	.00	23486.38	51376.64	725.58
35	788.84	10.33	84617.94	.00	25498.10	60454.32	725.58
36	798.42	8.84	71792.91	.00	20304.65	52602.40	725.58
37	802.92	.16	1268.05	.00	352.35	945.65	725.58
38	807.13	8.26	67726.05	.00	17871.97	51483.12	725.58
39	814.13	5.74	48158.42	.00	11610.93	36056.14	1548.49
40	819.39	4.79	40442.95	.00	9192.39	30853.99	1548.49
41	831.14	18.69	154053.00	.00	31468.62	121573.70	1548.49
42	841.74	2.52	20260.23	.00	3673.48	16535.96	1548.49
43	850.95	15.90	123644.40	.00	19353.37	103605.90	1548.49
44	867.95	18.11	131015.50	.00	13714.09	116458.40	1548.49
45	881.00	7.99	54190.95	.00	2903.78	50880.47	1548.49
46	888.42	6.84	44397.23	.00	784.85	43014.32	1548.49
47	893.32	2.94	18500.42	.00	.00	18167.82	1548.49
48	903.50	17.43	101471.50	.00	.00	99012.26	1548.49
49	920.74	17.05	85251.31	.00	.00	81012.81	1548.49
50	937.13	15.73	65329.41	.00	.00	58996.43	1548.49
51	945.46	.91	3382.47	.00	.00	2932.43	1548.49
52	954.02	16.22	52177.23	.00	.00	41995.81	1548.49
53	970.02	15.77	35742.64	.00	.00	21178.84	1548.49
54	985.56	15.31	19405.68	.00	.00	-693.29	1548.49
55	994.13	1.84	1270.32	.00	.00	-1770.07	1548.49
56	997.83	5.56	1736.38	.00	.00	1561.25	863.24

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.159

X-CENTER = 554.69

Y-CENTER = 601.47

RADIUS = 565.06

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	296.20	99.00	-26.21
2	314.15	90.17	-24.18
3	332.39	81.97	-22.15
4	350.92	74.43	-20.12
5	369.69	67.55	-18.10
6	388.71	61.34	-16.07
7	407.92	55.80	-14.04
8	427.33	50.95	-12.01
9	446.89	46.79	-9.98
10	466.59	43.32	-7.96
11	486.39	40.55	-5.93
12	506.29	38.49	-3.90
13	526.24	37.13	-1.87
14	546.23	36.47	.16
15	566.23	36.53	2.18
16	586.21	37.29	4.21

17	606.16	38.76	6.24
18	626.04	40.93	8.27
19	645.83	43.81	10.30
20	665.51	47.38	12.32
21	685.05	51.65	14.35
22	704.43	56.61	16.38
23	723.62	62.25	18.41
24	742.59	68.56	20.44
25	761.33	75.55	22.46
26	779.82	83.19	24.49
27	798.02	91.48	26.52
28	815.91	100.41	28.55
29	833.48	109.97	30.58
30	850.70	120.14	32.60
31	867.55	130.92	34.63
32	884.00	142.28	36.66
33	900.05	154.22	38.69
34	915.66	166.73	40.72
35	930.82	179.77	42.74
36	931.73	180.61	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 1.167

X-CENTER = 633.81
Y-CENTER = 506.75
RADIUS = 464.11

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	104.00	-28.56
2	420.73	94.44	-26.09
3	438.69	85.64	-23.63
4	457.02	77.63	-21.16
5	475.67	70.41	-18.69
6	494.61	64.00	-16.22
7	513.82	58.41	-13.75
8	533.24	53.66	-11.28
9	552.86	49.75	-8.81
10	572.62	46.69	-6.34
11	592.50	44.48	-3.87
12	612.45	43.13	-1.40
13	632.45	42.64	1.07
14	652.45	43.01	3.54
15	672.41	44.24	6.01
16	692.30	46.34	8.48
17	712.08	49.29	10.94
18	731.71	53.08	13.41
19	751.17	57.72	15.88
20	770.41	63.20	18.35
21	789.39	69.49	20.82
22	808.08	76.60	23.29
23	826.45	84.51	25.76
24	844.46	93.20	28.23
25	862.09	102.66	30.70

26	879.28	112.87	33.17
27	896.02	123.82	35.64
28	912.28	135.47	38.11
29	928.02	147.81	40.58
30	943.21	160.82	43.05
31	957.82	174.47	45.52
32	963.87	180.63	

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 40 COORDINATE POINTS

SAFETY FACTOR = 1.169

X-CENTER = 627.98
Y-CENTER = 788.11
RADIUS = 747.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	337.34	99.00	-22.10
2	355.87	91.48	-20.57
3	374.60	84.45	-19.04
4	393.50	77.92	-17.50
5	412.58	71.91	-15.97
6	431.81	66.41	-14.44
7	451.17	61.42	-12.91
8	470.67	56.95	-11.38
9	490.28	53.01	-9.84
10	509.98	49.59	-8.31
11	529.77	46.69	-6.78
12	549.63	44.33	-5.25
13	569.55	42.50	-3.71
14	589.51	41.21	-2.18
15	609.49	40.45	-.65
16	629.49	40.22	.88
17	649.49	40.53	2.41
18	669.47	41.37	3.95
19	689.42	42.75	5.48
20	709.33	44.66	7.01
21	729.18	47.10	8.54
22	748.96	50.07	10.08
23	768.65	53.57	11.61
24	788.24	57.59	13.14
25	807.72	62.14	14.67
26	827.07	67.20	16.20
27	846.27	72.78	17.74
28	865.32	78.88	19.27
29	884.20	85.48	20.80
30	902.90	92.58	22.33
31	921.40	100.18	23.86
32	939.69	108.27	25.40
33	957.75	116.85	26.93
34	975.58	125.91	28.46
35	993.17	135.44	29.99
36	1010.49	145.44	31.53
37	1027.54	155.89	33.06
38	1044.30	166.80	34.59

39 1060.76 178.16 36.12
40 1064.66 181.00

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.169

X-CENTER = 559.26
Y-CENTER = 564.87
RADIUS = 527.11

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	312.66	99.00	-26.81
2	330.51	89.98	-24.63
3	348.69	81.64	-22.46
4	367.17	74.00	-20.28
5	385.93	67.07	-18.11
6	404.94	60.85	-15.94
7	424.17	55.36	-13.76
8	443.60	50.61	-11.59
9	463.19	46.59	-9.41
10	482.92	43.32	-7.24
11	502.76	40.80	-5.07
12	522.68	39.03	-2.89
13	542.66	38.02	-.72
14	562.66	37.77	1.46
15	582.65	38.28	3.63
16	602.61	39.55	5.80
17	622.51	41.57	7.98
18	642.31	44.34	10.15
19	662.00	47.87	12.33
20	681.54	52.14	14.50
21	700.90	57.15	16.68
22	720.06	62.89	18.85
23	738.99	69.35	21.02
24	757.66	76.52	23.20
25	776.04	84.40	25.37
26	794.11	92.97	27.55
27	811.84	102.22	29.72
28	829.21	112.14	31.89
29	846.19	122.70	34.07
30	862.76	133.91	36.24
31	878.89	145.73	38.42
32	894.56	158.16	40.59
33	909.75	171.17	42.76
34	920.06	180.71	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 42 COORDINATE POINTS

SAFETY FACTOR = 1.188

X-CENTER = 568.19

Y-CENTER = 850.53
RADIUS = 814.16

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	255.06	99.00	-21.92
2	273.62	91.54	-20.51
3	292.35	84.53	-19.10
4	311.25	77.98	-17.69
5	330.30	71.91	-16.29
6	349.50	66.30	-14.88
7	368.83	61.16	-13.47
8	388.28	56.50	-12.06
9	407.84	52.32	-10.66
10	427.49	48.63	-9.25
11	447.23	45.41	-7.84
12	467.05	42.68	-6.43
13	486.92	40.44	-5.03
14	506.84	38.69	-3.62
15	526.80	37.43	-2.21
16	546.79	36.66	-.80
17	566.79	36.38	.60
18	586.79	36.59	2.01
19	606.77	37.29	3.42
20	626.74	38.48	4.83
21	646.67	40.17	6.24
22	666.55	42.34	7.64
23	686.37	45.00	9.05
24	706.12	48.15	10.46
25	725.79	51.78	11.87
26	745.36	55.89	13.27
27	764.83	60.48	14.68
28	784.18	65.55	16.09
29	803.39	71.09	17.50
30	822.47	77.10	18.90
31	841.39	83.58	20.31
32	860.15	90.52	21.72
33	878.73	97.92	23.13
34	897.12	105.78	24.53
35	915.31	114.08	25.94
36	933.30	122.83	27.35
37	951.06	132.02	28.76
38	968.60	141.64	30.16
39	985.89	151.69	31.57
40	1002.93	162.16	32.98
41	1019.71	173.05	34.39
42	1031.33	181.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.195

X-CENTER = 583.50
Y-CENTER = 574.32
RADIUS = 531.54

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	345.57	99.00	-25.51
2	363.62	90.39	-23.36
3	381.98	82.46	-21.20
4	400.63	75.22	-19.04
5	419.53	68.70	-16.89
6	438.67	62.89	-14.73
7	458.01	57.80	-12.58
8	477.53	53.45	-10.42
9	497.20	49.83	-8.27
10	516.99	46.95	-6.11
11	536.88	44.82	-3.95
12	556.83	43.45	-1.80
13	576.82	42.82	.36
14	596.82	42.94	2.51
15	616.80	43.82	4.67
16	636.74	45.45	6.83
17	656.60	47.83	8.98
18	676.35	50.95	11.14
19	695.97	54.81	13.29
20	715.44	59.41	15.45
21	734.71	64.74	17.61
22	753.78	70.79	19.76
23	772.60	77.55	21.92
24	791.15	85.02	24.07
25	809.41	93.18	26.23
26	827.36	102.02	28.39
27	844.95	111.53	30.54
28	862.18	121.69	32.70
29	879.01	132.49	34.85
30	895.42	143.92	37.01
31	911.39	155.96	39.17
32	926.89	168.60	41.32
33	940.48	180.54	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.195

X-CENTER = 679.85
Y-CENTER = 452.72
RADIUS = 411.05

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	460.76	104.93	-30.81
2	477.94	94.68	-28.03
3	495.59	85.29	-25.24
4	513.68	76.76	-22.45
5	532.17	69.12	-19.66
6	551.00	62.39	-16.87
7	570.14	56.58	-14.09
8	589.54	51.72	-11.30
9	609.15	47.80	-8.51

10	628.93	44.84	-5.72
11	648.83	42.84	-2.93
12	668.80	41.82	-.15
13	688.80	41.77	2.64
14	708.78	42.69	5.43
15	728.69	44.58	8.22
16	748.49	47.44	11.01
17	768.12	51.26	13.79
18	787.54	56.03	16.58
19	806.71	61.74	19.37
20	825.58	68.37	22.16
21	844.10	75.91	24.95
22	862.24	84.35	27.73
23	879.94	93.66	30.52
24	897.17	103.81	33.31
25	913.88	114.80	36.10
26	930.04	126.58	38.89
27	945.61	139.14	41.67
28	960.55	152.44	44.46
29	974.82	166.44	47.25
30	988.10	180.81	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.199

X-CENTER = 578.68
Y-CENTER = 651.71
RADIUS = 609.87

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	320.89	99.00	-24.07
2	339.15	90.84	-22.19
3	357.67	83.29	-20.31
4	376.42	76.35	-18.43
5	395.40	70.03	-16.55
6	414.57	64.33	-14.67
7	433.92	59.27	-12.79
8	453.42	54.84	-10.91
9	473.06	51.05	-9.03
10	492.81	47.91	-7.15
11	512.66	45.42	-5.28
12	532.57	43.58	-3.40
13	552.54	42.40	-1.52
14	572.53	41.87	.36
15	592.53	41.99	2.24
16	612.51	42.78	4.12
17	632.46	44.21	6.00
18	652.35	46.30	7.88
19	672.16	49.04	9.76
20	691.87	52.43	11.64
21	711.46	56.47	13.52
22	730.91	61.14	15.39
23	750.19	66.45	17.27
24	769.29	72.39	19.15

25	788.18	78.95	21.03
26	806.85	86.13	22.91
27	825.27	93.91	24.79
28	843.43	102.30	26.67
29	861.30	111.28	28.55
30	878.87	120.83	30.43
31	896.12	130.96	32.31
32	913.02	141.65	34.18
33	929.56	152.89	36.06
34	945.73	164.66	37.94
35	961.50	176.96	39.82
36	965.93	180.65	

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 42 COORDINATE POINTS

SAFETY FACTOR = 1.206

X-CENTER = 599.30
Y-CENTER = 881.56
RADIUS = 842.22

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	287.98	99.00	-21.01
2	306.64	91.83	-19.65
3	325.48	85.10	-18.29
4	344.47	78.82	-16.93
5	363.60	73.00	-15.57
6	382.87	67.63	-14.21
7	402.26	62.72	-12.85
8	421.76	58.27	-11.49
9	441.35	54.29	-10.13
10	461.04	50.77	-8.77
11	480.81	47.72	-7.41
12	500.64	45.14	-6.05
13	520.53	43.04	-4.69
14	540.46	41.40	-3.33
15	560.43	40.24	-1.97
16	580.42	39.56	-.60
17	600.42	39.35	.76
18	620.42	39.61	2.12
19	640.40	40.35	3.48
20	660.37	41.56	4.84
21	680.29	43.25	6.20
22	700.18	45.41	7.56
23	720.00	48.04	8.92
24	739.76	51.14	10.28
25	759.44	54.71	11.64
26	779.03	58.75	13.00
27	798.52	63.25	14.36
28	817.89	68.21	15.72
29	837.14	73.63	17.08
30	856.26	79.50	18.44
31	875.23	85.83	19.81
32	894.05	92.61	21.17
33	912.70	99.83	22.53

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GEOSLOPE
Version 4.0

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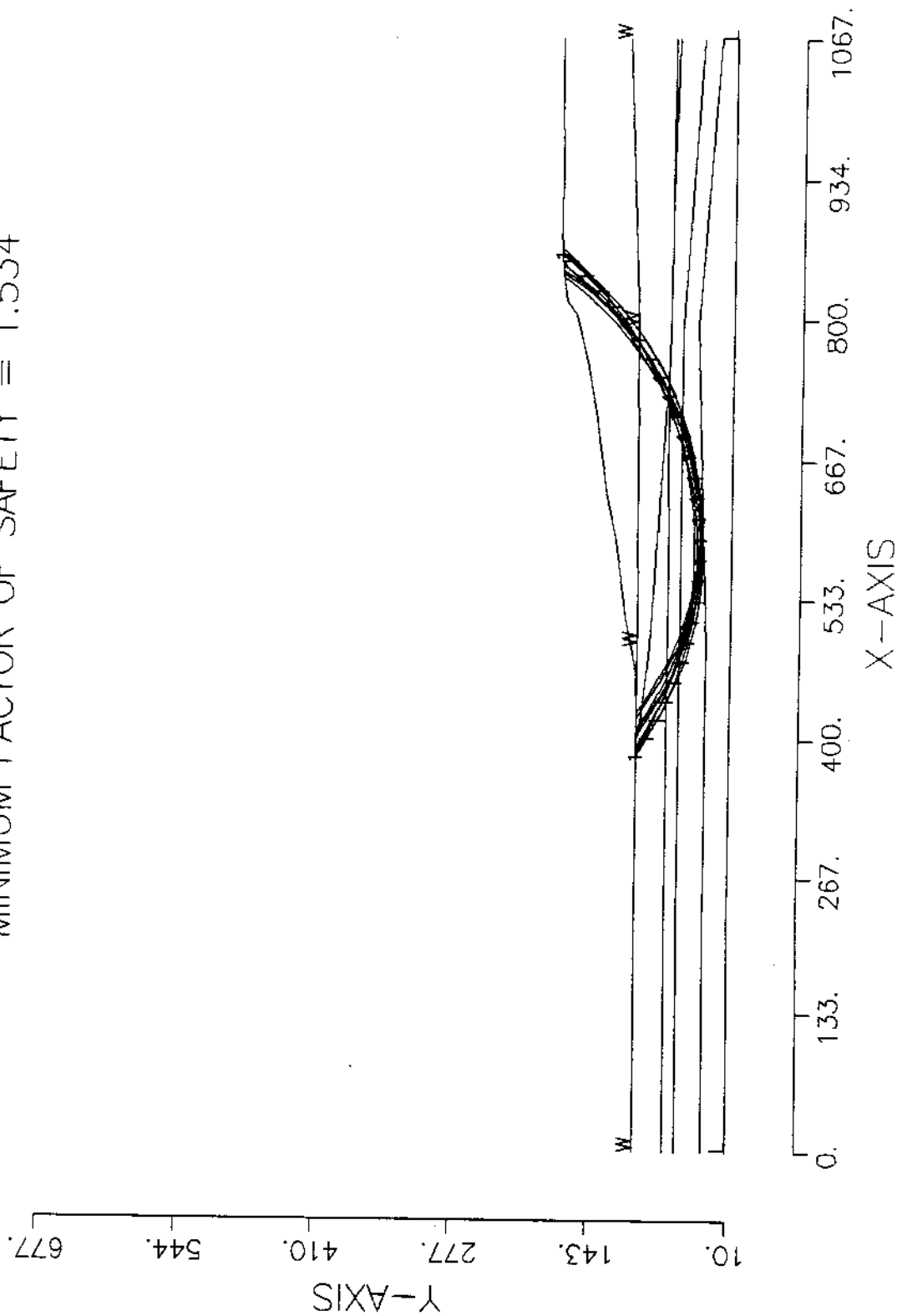
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West Chester, PA

DRAINED ANALYSIS

EXISTING TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
EXISTING TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.534



CLARKSTOWN SANITARY LANDFILL SECTION 3-3 EXISTING TOPOGRAPHY DRAINED ANALYSIS

29 15

0. 99. 400. 99. 2

400. 99. 419. 99. 1

419. 99. 464. 100. 1

464. 100. 516. 110. 1

516. 110. 590. 120. 1

590. 120. 637. 130. 1

637. 130. 707. 140. 1

707. 140. 760. 150. 1

760. 150. 803. 160. 1

803. 160. 817. 170. 1

817. 170. 843. 174. 1

843. 174. 885. 176. 1

885. 176. 945. 175.5 1

945. 175.5 1015. 176. 1

1015. 176. 1067. 176. 1

400. 99. 408. 96. 2

408. 96. 489. 87. 2

489. 87. 760. 71.5 2

760. 71.5 794. 70. 3

794. 70. 914. 69. 3

914. 69. 1067. 68. 2

0. 70. 489. 70.5 3

489. 70.5 760. 71.5 3

914. 69. 1067. 64. 3

0. 59. 794. 59. 4

794. 59. 1067. 40.5 4

0. 33. 489. 33. 5

489. 33. 794. 44. 5

794. 44. 1067. 24. 5

SOIL

5

80.0 80.0 0.0 28. 0. 0. 1

80.0 80.0 0.0 23. 0. 0. 1

88.0 88.0 0.0 20. 0. 0. 1

104.0 104.0 0.0 16. 0. 0. 1

125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

50 10

378. 428. 800. 1067.

20. 20. 0. 0.

END

CL3EDB.DAT

SECTION 3-3 DRAINED ANALYSIS

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 EXISTING TOPOGRAPHY PROFIL
29 15 DRAINED ANALYSIS

0. 99. 400. 99. 2
400. 99. 419. 99. 1
419. 99. 464. 100. 1
464. 100. 516. 110. 1
516. 110. 590. 120. 1
590. 120. 637. 130. 1
637. 130. 707. 140. 1
707. 140. 760. 150. 1
760. 150. 803. 160. 1
803. 160. 817. 170. 1
817. 170. 843. 174. 1
843. 174. 885. 176. 1
885. 176. 945. 175.5 1
945. 175.5 1015. 176. 1
1015. 176. 1067. 176. 1
400. 99. 408. 96. 2
408. 96. 489. 87. 2
489. 87. 760. 71.5 2
760. 71.5 794. 70. 3
794. 70. 914. 69. 3
914. 69. 1067. 68. 2
0. 70. 489. 70.5 3
489. 70.5 760. 71.5 3
914. 69. 1067. 64. 3
0. 59. 794. 59. 4
794. 59. 1067. 40.5 4
0. 33. 489. 33. 5
489. 33. 794. 44. 5
794. 44. 1067. 24. 5

SOIL

5
80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
4
0. 99.
489. 99.
794. 100.8
1067. 111.

LIMITS

1 1
0. 10. 1067. 10.

CIRCL2

80 10
0. 650. 800. 1067.
20. 20. 0. 0.

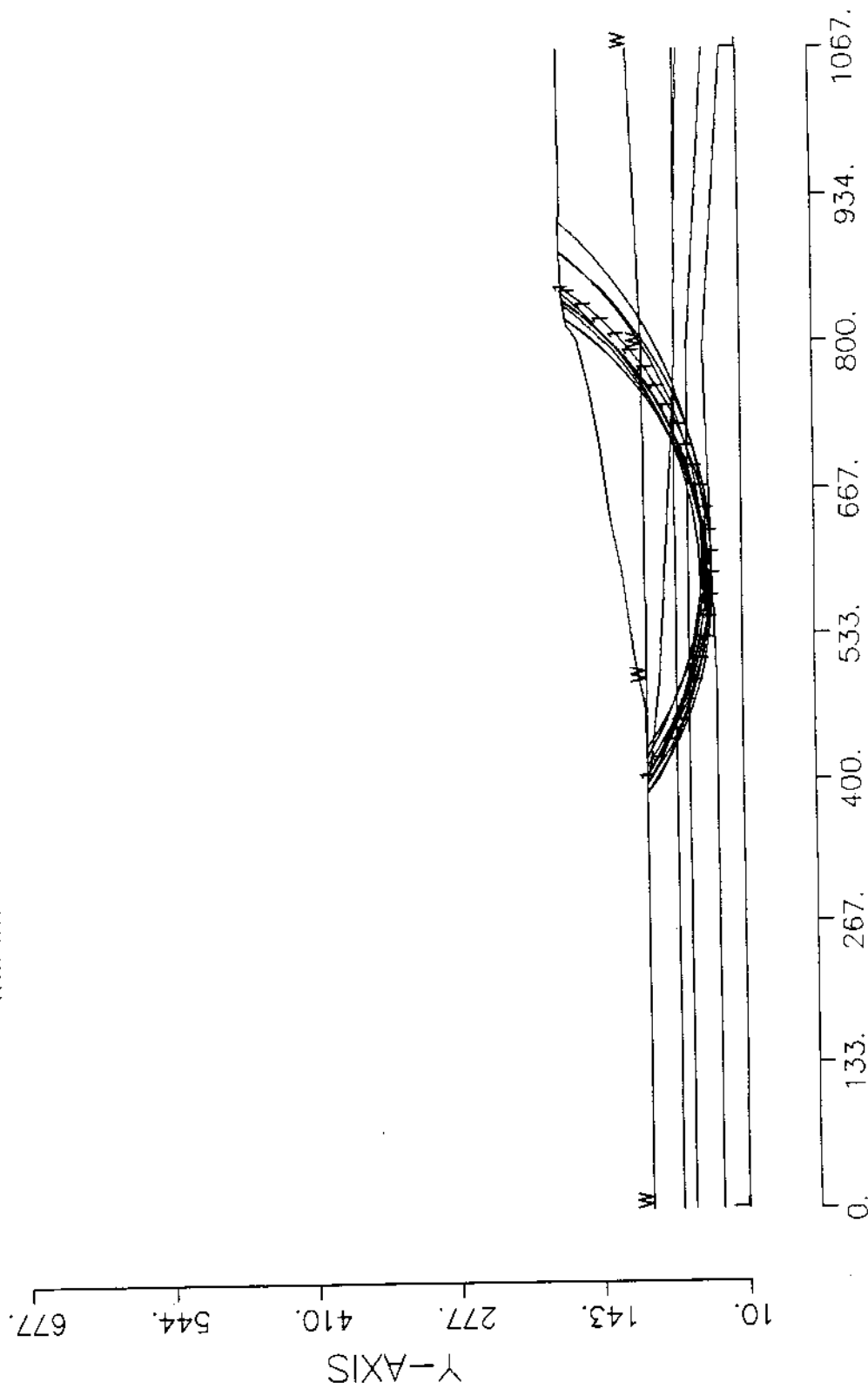
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SECTION 3-3 DRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
EXISTING TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.534



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 3-3
EXISTING TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
29 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	400.00	99.00	2
2	400.00	99.00	419.00	99.00	1
3	419.00	99.00	464.00	100.00	1
4	464.00	100.00	516.00	110.00	1
5	516.00	110.00	590.00	120.00	1
6	590.00	120.00	637.00	130.00	1
7	637.00	130.00	707.00	140.00	1
8	707.00	140.00	760.00	150.00	1
9	760.00	150.00	803.00	160.00	1
10	803.00	160.00	817.00	170.00	1
11	817.00	170.00	843.00	174.00	1
12	843.00	174.00	885.00	176.00	1
13	885.00	176.00	945.00	175.50	1
14	945.00	175.50	1015.00	176.00	1
15	1015.00	176.00	1067.00	176.00	1
16	400.00	99.00	408.00	96.00	2
17	408.00	96.00	489.00	87.00	2
18	489.00	87.00	760.00	71.50	2
19	760.00	71.50	794.00	70.00	3
20	794.00	70.00	914.00	69.00	3
21	914.00	69.00	1067.00	68.00	2
22	.00	70.00	489.00	70.50	3
23	489.00	70.50	760.00	71.50	3
24	914.00	69.00	1067.00	64.00	3
25	.00	59.00	794.00	59.00	4
26	794.00	59.00	1067.00	40.50	4
27	.00	33.00	489.00	33.00	5
28	489.00	33.00	794.00	44.00	5
29	794.00	44.00	1067.00	24.00	5

ISOTROPIC SOIL PARAMETERS

5 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	80.0	80.0	.0	28.0	.00	.0	1
2	80.0	80.0	.0	23.0	.00	.0	1
3	88.0	88.0	.0	20.0	.00	.0	1
4	104.0	104.0	.0	16.0	.00	.0	1
5	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00

AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.534

X-CENTER = 590.67
Y-CENTER = 350.74
RADIUS = 313.90

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	99.00	-34.85
2	419.58	87.57	-31.20
3	436.68	77.21	-27.55
4	454.42	67.96	-23.90
5	472.70	59.86	-20.25
6	491.46	52.93	-16.60
7	510.63	47.22	-12.95
8	530.12	42.74	-9.30
9	549.86	39.51	-5.64
10	569.76	37.54	-1.99
11	589.75	36.85	1.66
12	609.74	37.42	5.31
13	629.66	39.28	8.96
14	649.41	42.39	12.61
15	668.93	46.76	16.26
16	688.13	52.36	19.91
17	706.93	59.17	23.57
18	725.27	67.17	27.22
19	743.05	76.31	30.87
20	760.22	86.57	34.52
21	776.70	97.91	38.17
22	792.42	110.27	41.82
23	807.33	123.60	45.47
24	821.35	137.86	49.12

378 ; 428

25	834.44	152.98	52.77
26	846.54	168.91	56.43
27	850.14	174.34	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	405.01	3.69	379.84	.00	361.04	134.23	46.52
2	407.43	1.14	271.38	.00	257.95	90.12	24.93
3	413.50	11.00	6333.75	.00	6020.29	2103.29	581.93
4	419.29	.58	518.77	.00	492.82	172.62	47.76
5	428.13	17.11	23009.65	.00	20729.67	7413.88	2051.25
6	443.15	12.94	26600.67	.00	22913.75	8285.32	2292.35
7	452.02	4.80	11757.50	.00	10053.96	3660.48	868.41
8	459.21	9.58	26469.24	.00	21694.72	8109.63	1923.92
9	468.35	8.70	27789.62	.00	22101.76	9268.66	2198.89
10	473.86	2.32	8081.77	.00	6101.95	2753.14	653.15
11	482.01	13.98	54764.93	.00	39592.20	20171.08	3770.04
12	490.23	2.46	10745.33	.00	7479.03	4268.43	797.78
13	501.05	19.17	93348.38	.00	61144.98	38401.39	7177.34
14	513.32	5.37	29100.52	.00	18059.53	12329.83	2304.48
15	523.06	14.12	81513.69	.00	49588.84	35579.80	6649.98
16	539.99	19.74	124187.00	.00	72604.73	54914.65	10263.72
17	559.81	19.90	134884.80	.00	75993.95	60668.71	11339.17
18	579.76	19.99	142549.40	.00	77802.45	65257.69	12196.87
19	589.88	.25	1808.66	.00	973.50	831.41	155.39
20	599.87	19.74	146431.30	.00	77049.11	69069.85	12909.37
21	619.70	19.91	151924.80	.00	76653.59	74629.62	13948.51
22	633.33	7.34	56574.98	.00	27829.56	28601.49	5345.71
23	643.21	12.41	95291.84	.00	45871.58	49149.12	9186.13
24	659.17	19.52	146980.60	.00	69177.09	78168.68	14609.97
25	678.53	19.20	138895.40	.00	63099.90	77366.46	14460.04
26	697.30	18.33	124901.10	.00	54207.91	73649.81	13765.38
27	706.70	.47	3088.93	.00	1286.07	1841.08	436.78
28	706.97	.07	429.74	.00	183.25	258.81	61.40
29	716.13	18.27	115965.50	.00	46207.30	72778.16	17265.82
30	729.38	8.24	49518.01	.00	17994.12	33590.41	7968.96
31	734.91	2.82	16517.29	.00	5610.30	11348.55	3139.88
32	739.69	6.73	38519.11	.00	12222.00	26389.07	9145.74
33	751.53	16.95	90870.73	.00	23619.75	68132.46	23612.86
34	760.11	.22	1114.95	.00	224.77	889.84	308.39
35	768.46	16.48	78737.17	.00	10493.33	68694.35	23807.60
36	778.49	3.58	15731.07	.00	395.97	15414.19	5342.14
37	786.35	12.15	49206.05	.00	.00	49188.24	17047.31
38	797.71	10.58	37040.15	.00	.00	37938.24	13148.37
39	805.16	4.33	13802.11	.00	.00	14136.76	4899.42
40	812.16	9.67	29426.20	.00	.00	31029.49	10753.98
41	819.18	4.35	12074.58	.00	.00	12732.46	4412.73
42	827.90	13.09	27489.24	.00	.00	29994.29	10395.21
43	838.72	8.56	10082.55	.00	.00	11445.53	3966.71
44	844.77	3.54	2124.61	.00	.00	2411.82	835.87
45	848.34	3.60	758.20	.00	.00	900.71	312.16

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.541

X-CENTER = 602.17
Y-CENTER = 391.12
RADIUS = 353.47

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	99.00	-32.64
2	420.01	88.21	-29.40
3	437.43	78.39	-26.16
4	455.38	69.58	-22.92
5	473.80	61.79	-19.67
6	492.64	55.06	-16.43
7	511.82	49.40	-13.19
8	531.29	44.84	-9.95
9	550.99	41.38	-6.70
10	570.85	39.05	-3.46
11	590.82	37.84	-0.22
12	610.82	37.76	3.02
13	630.79	38.82	6.26
14	650.67	41.00	9.51
15	670.40	44.30	12.75
16	689.90	48.72	15.99
17	709.13	54.22	19.23
18	728.01	60.81	22.48
19	746.49	68.46	25.72
20	764.51	77.14	28.96
21	782.01	86.82	32.20
22	798.93	97.48	35.45
23	815.23	109.08	38.69
24	830.84	121.58	41.93
25	845.72	134.95	45.17
26	859.82	149.13	48.41
27	873.09	164.09	51.66
28	882.42	175.88	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.553

X-CENTER = 572.14
Y-CENTER = 366.45
RADIUS = 325.44

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	386.71	99.00	-32.97
2	403.49	88.11	-29.45
3	420.90	78.28	-25.93
4	438.89	69.54	-22.41
5	457.38	61.91	-18.89
6	476.30	55.44	-15.37
7	495.59	50.14	-11.84
8	515.16	46.03	-8.32

9	534.95	43.14	-4.80
10	554.88	41.46	-1.28
11	574.88	41.02	2.24
12	594.86	41.80	5.76
13	614.76	43.81	9.29
14	634.50	47.03	12.81
15	654.00	51.47	16.33
16	673.19	57.09	19.85
17	692.00	63.88	23.37
18	710.36	71.81	26.89
19	728.20	80.86	30.41
20	745.45	90.99	33.94
21	762.04	102.15	37.46
22	777.92	114.32	40.98
23	793.02	127.43	44.50
24	807.28	141.45	48.02
25	820.66	156.32	51.54
26	833.10	171.98	55.06
27	833.48	172.54	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.560

X-CENTER = 569.98
Y-CENTER = 340.88
RADIUS = 303.47

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	386.71	99.00	-35.26
2	403.04	87.45	-31.49
3	420.09	77.01	-27.71
4	437.80	67.71	-23.93
5	456.08	59.59	-20.16
6	474.86	52.70	-16.38
7	494.04	47.06	-12.60
8	513.56	42.70	-8.83
9	533.33	39.63	-5.05
10	553.25	37.87	-1.27
11	573.24	37.43	2.50
12	593.22	38.30	6.28
13	613.10	40.49	10.06
14	632.80	43.98	13.83
15	652.22	48.76	17.61
16	671.28	54.81	21.39
17	689.90	62.11	25.16
18	708.00	70.61	28.94
19	725.51	80.29	32.72
20	742.33	91.10	36.49
21	758.41	102.99	40.27
22	773.67	115.92	44.05
23	788.05	129.83	47.82
24	801.47	144.65	51.60
25	813.90	160.32	55.38
26	821.00	170.62	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.567

X-CENTER = 573.98
Y-CENTER = 340.69
RADIUS = 300.79

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	394.94	99.00	-34.63
2	411.39	87.64	-30.82
3	428.57	77.39	-27.00
4	446.39	68.31	-23.19
5	464.77	60.43	-19.38
6	483.64	53.79	-15.57
7	502.91	48.42	-11.76
8	522.49	44.35	-7.95
9	542.29	41.58	-4.14
10	562.24	40.14	-3.33
11	582.24	40.02	3.48
12	602.20	41.23	7.29
13	622.04	43.77	11.10
14	641.67	47.62	14.91
15	661.00	52.77	18.72
16	679.94	59.19	22.53
17	698.41	66.85	26.34
18	716.33	75.72	30.15
19	733.63	85.77	33.96
20	750.22	96.94	37.77
21	766.03	109.19	41.58
22	780.98	122.47	45.39
23	795.03	136.71	49.20
24	808.10	151.85	53.01
25	820.13	167.82	56.82
26	822.06	170.78	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.572

X-CENTER = 587.90
Y-CENTER = 348.59
RADIUS = 305.69

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	411.39	99.00	-33.39
2	428.09	87.99	-29.64
3	445.47	78.10	-25.89
4	463.47	69.37	-22.15

5	481.99	61.83	-18.40
6	500.97	55.52	-14.65
7	520.32	50.46	-10.90
8	539.96	46.68	-7.15
9	559.80	44.19	-3.40
10	579.77	43.00	.35
11	599.77	43.12	4.10
12	619.72	44.55	7.85
13	639.53	47.29	11.60
14	659.12	51.31	15.35
15	678.41	56.60	19.10
16	697.31	63.14	22.85
17	715.74	70.91	26.60
18	733.62	79.86	30.34
19	750.88	89.97	34.09
20	767.44	101.18	37.84
21	783.24	113.45	41.59
22	798.19	126.72	45.34
23	812.25	140.95	49.09
24	825.35	156.06	52.84
25	837.43	172.00	56.59
26	838.27	173.27	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.589

X-CENTER = 581.79
Y-CENTER = 382.62
RADIUS = 335.18

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	99.00	-30.49
2	420.40	88.85	-27.07
3	438.21	79.75	-23.65
4	456.53	71.72	-20.24
5	475.29	64.81	-16.82
6	494.44	59.02	-13.40
7	513.89	54.39	-9.98
8	533.59	50.92	-6.56
9	553.46	48.64	-3.14
10	573.43	47.54	.28
11	593.43	47.64	3.70
12	613.39	48.93	7.12
13	633.23	51.41	10.54
14	652.90	55.07	13.96
15	672.31	59.89	17.38
16	691.39	65.86	20.80
17	710.09	72.96	24.22
18	728.33	81.17	27.63
19	746.05	90.44	31.05
20	763.18	100.76	34.47
21	779.67	112.08	37.89
22	795.45	124.36	41.31
23	810.48	137.57	44.73

24	824.68	151.64	48.15
25	838.03	166.54	51.57
26	843.98	174.05	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.589

X-CENTER = 605.49

Y-CENTER = 454.08

RADIUS = 412.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	394.94	99.00	-29.28
2	412.38	89.22	-26.50
3	430.28	80.29	-23.73
4	448.59	72.25	-20.95
5	467.27	65.10	-18.17
6	486.27	58.86	-15.40
7	505.55	53.55	-12.62
8	525.07	49.18	-9.85
9	544.77	45.76	-7.07
10	564.62	43.30	-4.29
11	584.57	41.80	-1.52
12	604.56	41.27	1.26
13	624.55	41.71	4.04
14	644.50	43.12	6.81
15	664.36	45.49	9.59
16	684.08	48.82	12.36
17	703.62	53.10	15.14
18	722.93	58.33	17.92
19	741.96	64.48	20.69
20	760.67	71.55	23.47
21	779.01	79.51	26.24
22	796.95	88.35	29.02
23	814.44	98.06	31.80
24	831.44	108.60	34.57
25	847.91	119.95	37.35
26	863.80	132.08	40.13
27	879.10	144.97	42.90
28	893.75	158.58	45.68
29	907.72	172.89	48.45
30	910.29	175.79	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.601

X-CENTER = 607.59

Y-CENTER = 403.47

RADIUS = 357.80

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	419.62	99.01	-30.09
2	436.93	88.99	-26.89
3	454.76	79.94	-23.68
4	473.08	71.91	-20.48
5	491.81	64.91	-17.28
6	510.91	58.97	-14.07
7	530.31	54.11	-10.87
8	549.95	50.34	-7.67
9	569.77	47.67	-4.47
10	589.71	46.11	-1.26
11	609.71	45.67	1.94
12	629.70	46.35	5.14
13	649.62	48.14	8.35
14	669.40	51.04	11.55
15	689.00	55.05	14.75
16	708.34	60.14	17.96
17	727.37	66.31	21.16
18	746.02	73.53	24.36
19	764.24	81.78	27.57
20	781.97	91.03	30.77
21	799.15	101.26	33.97
22	815.74	112.44	37.18
23	831.67	124.52	40.38
24	846.91	137.48	43.58
25	861.40	151.27	46.78
26	875.09	165.84	49.99
27	883.56	175.93	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.603

X-CENTER = 597.26

Y-CENTER = 330.28

RADIUS = 286.53

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	427.85	99.20	-34.25
2	444.38	87.94	-30.25
3	461.66	77.87	-26.25
4	479.60	69.02	-22.25
5	498.11	61.45	-18.25
6	517.10	55.19	-14.24
7	536.49	50.27	-10.24
8	556.17	46.71	-6.24
9	576.05	44.54	-2.24
10	596.04	43.75	1.76
11	616.03	44.37	5.76
12	635.92	46.37	9.76
13	655.64	49.76	13.76
14	675.06	54.52	17.76
15	694.11	60.62	21.76

1

Y A X I S

X .00 L-***-+-----+-----+-----+

A 266.75 +

X 400.13 +.....**

I	533.50	+.12.....
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S 666.88 + .13

800.25 +..**..8W113*..

.....22913*

-.....8291*

- 8292

-88*
- ..*.....8
933.63 +
-*
-
-
-*
-
1067.00 L** * W *

Version 4.0

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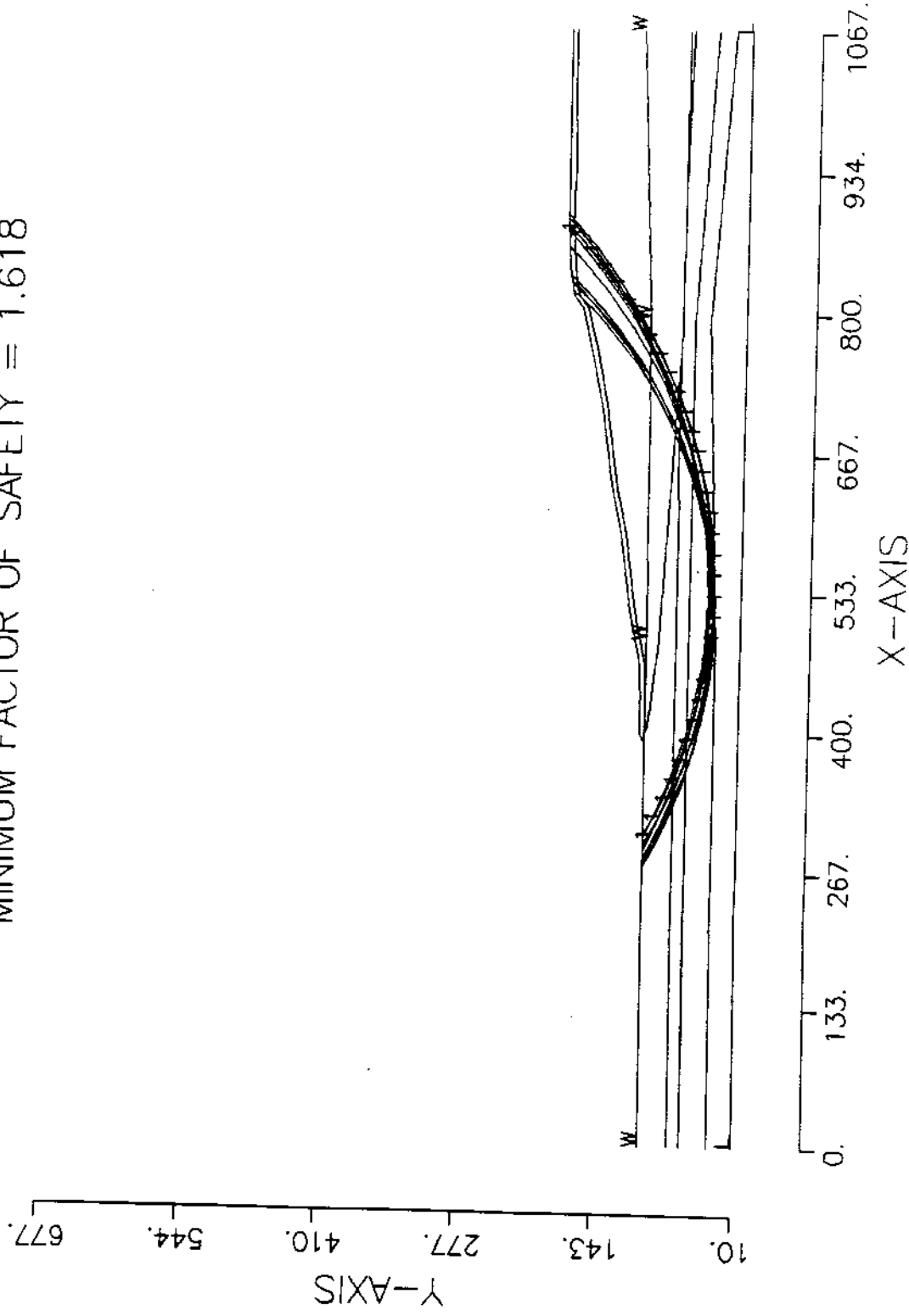
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West Chester, PA

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.618



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY DRAINED ANALYSIS

45 16

0. 99. 390. 99. 3
 390. 99. 400. 104. 1
 400. 104. 419. 104. 1
 419. 104. 464. 105. 1
 464. 105. 516. 115. 1
 516. 115. 590. 125. 1
 590. 125. 637. 135. 1
 637. 135. 707. 145. 1
 707. 145. 760. 155. 1
 760. 155. 803. 165. 1
 803. 165. 817. 175. 1
 817. 175. 843. 179. 1
 843. 179. 885. 181. 1
 885. 181. 945. 180.5 1
 945. 180.5 1015. 181. 1
 1015. 181. 1067. 181. 1
 390. 99. 400. 99. 3
 400. 99. 419. 99. 2
 419. 99. 464. 100. 2
 464. 100. 516. 110. 2
 516. 110. 590. 120. 2
 590. 120. 637. 130. 2
 637. 130. 707. 140. 2
 707. 140. 760. 150. 2
 760. 150. 803. 160. 2
 803. 160. 817. 170. 2
 817. 170. 843. 174. 2
 843. 174. 885. 176. 2
 885. 176. 945. 175.5 2
 945. 175.5 1015. 176. 2
 1015. 176. 1067. 176. 2
 400. 99. 408. 96. 3
 408. 96. 489. 87. 3
 489. 87. 760. 71.5 3
 760. 71.5 794. 70. 4
 794. 70. 914. 69. 4
 914. 69. 1067. 68. 3
 0. 70. 489. 70.5 4
 489. 70.5 760. 71.5 4
 914. 69. 1067. 64. 4
 0. 59. 794. 59. 5
 794. 59. 1067. 40.5 5
 0. 33. 489. 33. 6
 489. 33. 794. 44. 6
 794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1
 88.0 88.0 0.0 20. 0. 0. 1
 104.0 104.0 0.0 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.

489. 99.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
50 10
254. 304. 800. 1067.
20. 20. 0. 0.
END

CL3FDB.DAT

SECTION 3-3 FINAL DRAINED ANALYSIS

PROFIL
DRAINED ANALYSIS

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY

45 16

0. 99. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1
390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.

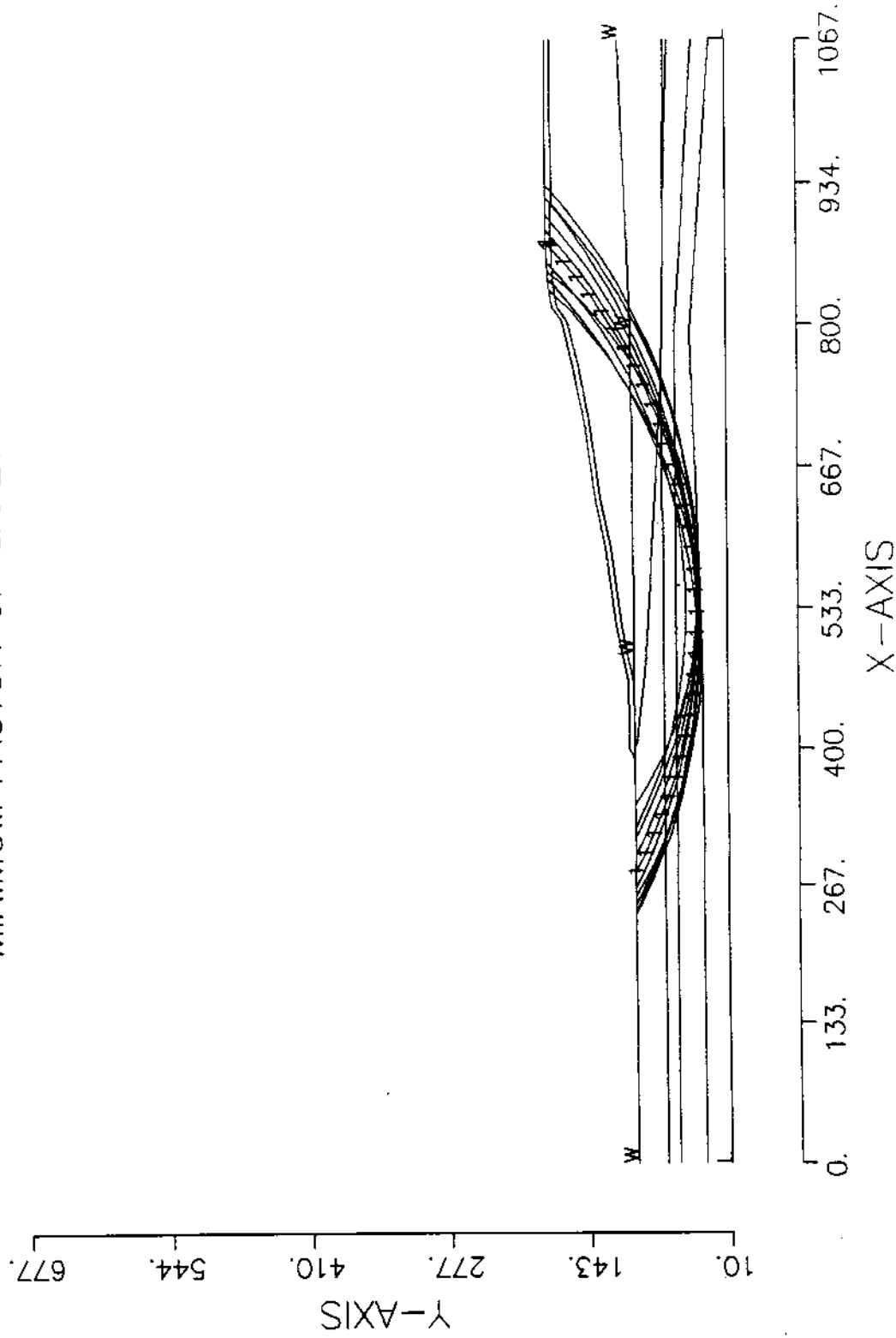
489. 99.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
80 10
0. 650. 800. 1067.
20. 20. 0. 0.
END

CL3FDA.DAT

SECTION 3-3 FINAL DRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.648



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
45 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	390.00	99.00	3
2	390.00	99.00	400.00	104.00	1
3	400.00	104.00	419.00	104.00	1
4	419.00	104.00	464.00	105.00	1
5	464.00	105.00	516.00	115.00	1
6	516.00	115.00	590.00	125.00	1
7	590.00	125.00	637.00	135.00	1
8	637.00	135.00	707.00	145.00	1
9	707.00	145.00	760.00	155.00	1
10	760.00	155.00	803.00	165.00	1
11	803.00	165.00	817.00	175.00	1
12	817.00	175.00	843.00	179.00	1
13	843.00	179.00	885.00	181.00	1
14	885.00	181.00	945.00	180.50	1
15	945.00	180.50	1015.00	181.00	1
16	1015.00	181.00	1067.00	181.00	1
17	390.00	99.00	400.00	99.00	3
18	400.00	99.00	419.00	99.00	2
19	419.00	99.00	464.00	100.00	2
20	464.00	100.00	516.00	110.00	2
21	516.00	110.00	590.00	120.00	2
22	590.00	120.00	637.00	130.00	2
23	637.00	130.00	707.00	140.00	2
24	707.00	140.00	760.00	150.00	2
25	760.00	150.00	803.00	160.00	2
26	803.00	160.00	817.00	170.00	2
27	817.00	170.00	843.00	174.00	2
28	843.00	174.00	885.00	176.00	2
29	885.00	176.00	945.00	175.50	2
30	945.00	175.50	1015.00	176.00	2
31	1015.00	176.00	1067.00	176.00	2
32	400.00	99.00	408.00	96.00	3
33	408.00	96.00	489.00	87.00	3
34	489.00	87.00	760.00	71.50	3

35	760.00	71.50	794.00	70.00	4
36	794.00	70.00	914.00	69.00	4
37	914.00	69.00	1067.00	68.00	3
38	.00	70.00	489.00	70.50	4
39	489.00	70.50	760.00	71.50	4
40	914.00	69.00	1067.00	64.00	4
41	.00	59.00	794.00	59.00	5
42	794.00	59.00	1067.00	40.50	5
43	.00	33.00	489.00	33.00	6
44	489.00	33.00	794.00	44.00	6
45	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
-----------------	--------	--------	---------	---------

1 .00 10.00 1067.00 10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.648

X-CENTER = 521.98
Y-CENTER = 555.21
RADIUS = 516.53

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	279.75	99.00	-26.86
2	297.59	89.96	-24.64
3	315.77	81.63	-22.42
4	334.26	74.00	-20.20
5	353.03	67.09	-17.98
6	372.05	60.92	-15.76
7	391.30	55.48	-13.55

254; 304

8	410.74	50.80	-11.33
9	430.35	46.87	-9.11
10	450.10	43.70	-6.89
11	469.95	41.30	-4.67
12	489.89	39.68	-2.45
13	509.87	38.82	-.23
14	529.87	38.74	1.98
15	549.86	39.43	4.20
16	569.80	40.90	6.42
17	589.68	43.13	8.64
18	609.45	46.14	10.86
19	629.09	49.90	13.08
20	648.58	54.43	15.30
21	667.87	59.70	17.51
22	686.94	65.72	19.73
23	705.77	72.48	21.95
24	724.32	79.95	24.17
25	742.56	88.14	26.39
26	760.48	97.03	28.61
27	778.04	106.61	30.83
28	795.21	116.85	33.04
29	811.98	127.76	35.26
30	828.31	139.31	37.48
31	844.18	151.48	39.70
32	859.57	164.25	41.92
33	874.45	177.61	44.14
34	877.57	180.65	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	288.67	17.84	6448.71	.00	5638.17	1828.77	471.01
2	306.68	18.18	19203.66	.00	16479.26	5270.62	1357.48
3	325.01	18.49	31337.57	.00	26442.08	8344.77	2149.25
4	339.21	9.91	21266.48	.00	17675.21	5507.25	1418.42
5	348.60	8.86	21576.38	.00	17836.49	5610.15	1238.97
6	362.54	19.02	54226.34	.00	43674.52	14366.97	3172.86
7	375.44	6.79	21774.86	.00	17189.22	5798.21	1280.50
8	384.42	11.16	38557.41	.00	30083.90	10496.09	1826.18
9	390.65	1.30	4772.27	.00	3645.21	1381.44	240.35
10	395.65	8.70	35846.68	.00	24893.39	12503.15	2175.38
11	404.00	8.00	36802.75	.00	23916.72	14549.01	2531.33
12	409.37	2.74	12978.50	.00	8422.10	5143.38	894.88
13	414.87	8.26	40100.54	.00	25769.48	15674.03	2727.07
14	424.68	11.35	57549.62	.00	36837.26	22644.96	3939.92
15	440.23	19.75	106252.60	.00	67033.78	41740.29	7262.25
16	457.05	13.90	78713.82	.00	49047.29	30888.65	5374.21
17	466.98	5.95	34808.55	.00	21459.49	13894.45	2417.45
18	479.48	19.05	117248.70	.00	69723.45	48607.25	8457.02
19	489.44	.89	5679.83	.00	3297.24	2436.16	423.86
20	499.88	19.98	131950.60	.00	74651.42	57851.48	10065.39
21	512.93	6.13	41995.18	.00	23079.25	18929.78	3293.53
22	522.93	13.87	96773.95	.00	52304.88	44501.62	7742.69
23	539.86	19.99	142470.90	.00	75150.56	67002.02	11657.46
24	559.83	19.95	144252.10	.00	73950.99	69797.67	12143.87
25	579.74	19.87	144197.40	.00	71787.59	71911.98	12511.73
26	589.84	.32	2328.94	.00	1144.93	1179.56	205.23
27	599.73	19.45	141167.30	.00	67518.23	73330.76	12758.58

28	619.27	19.64	142228.20	.00	64582.75	77646.88	13509.52
29	633.05	7.91	56803.23	.00	24832.39	32182.46	5599.32
30	642.79	11.58	81984.68	.00	34719.81	47526.75	8269.02
31	656.93	16.72	114791.50	.00	46796.60	68930.41	11992.97
32	666.58	2.58	17285.08	.00	6782.51	10502.95	2319.51
33	677.40	19.07	124688.70	.00	46672.62	78599.38	17358.20
34	694.70	15.51	96584.32	.00	32609.21	64862.30	14324.45
35	704.11	3.31	20012.21	.00	6233.80	13756.01	3542.94
36	706.38	1.23	7409.51	.00	2289.60	5163.10	1329.79
37	708.69	3.39	20168.21	.00	6067.05	14203.22	3658.12
38	717.35	13.93	80929.25	.00	21745.25	57971.73	18702.96
39	733.44	18.25	100363.80	.00	20462.43	78219.69	25235.39
40	751.28	17.44	88865.32	.00	9816.26	77051.95	24858.66
41	760.24	.48	2331.13	.00	122.86	2137.30	689.54
42	763.79	6.62	31711.41	.00	840.74	30001.35	9679.10
43	772.57	10.94	49967.69	.00	.00	48399.69	15614.80
44	786.62	17.17	71823.57	.00	.00	70136.59	22627.61
45	799.11	7.79	29609.48	.00	.00	29195.67	9419.17
46	807.49	8.98	33160.86	.00	.00	32697.42	10548.91
47	814.49	5.02	18681.16	.00	.00	18629.49	6010.28
48	822.65	11.31	39232.65	.00	.00	39124.13	12622.31
49	835.65	14.69	42014.59	.00	.00	42444.51	13693.53
50	843.59	1.18	2903.61	.00	.00	2933.33	946.36
51	851.87	15.39	30002.52	.00	.00	30756.54	9922.74
52	865.76	12.39	12970.87	.00	.00	13516.48	4360.71
53	873.20	2.49	1225.94	.00	.00	1229.14	466.03
54	876.01	3.13	563.81	.00	.00	574.31	217.75

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.659

X-CENTER = 494.55
Y-CENTER = 505.35
RADIUS = 471.67

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	255.06	99.00	-29.30
2	272.51	89.21	-26.87
3	290.35	80.17	-24.44
4	308.55	71.90	-22.01
5	327.10	64.40	-19.58
6	345.94	57.70	-17.15
7	365.05	51.80	-14.72
8	384.39	46.72	-12.29
9	403.94	42.46	-9.86
10	423.64	39.04	-7.43
11	443.47	36.45	-5.00
12	463.40	34.71	-2.57
13	483.38	33.81	-.14
14	503.38	33.76	2.29
15	523.36	34.56	4.72
16	543.29	36.20	7.15
17	563.14	38.69	9.58
18	582.86	42.02	12.01

19	602.42	46.18	14.44
20	621.79	51.16	16.86
21	640.93	56.97	19.29
22	659.81	63.58	21.72
23	678.39	70.98	24.15
24	696.63	79.16	26.58
25	714.52	88.11	29.01
26	732.01	97.81	31.44
27	749.07	108.24	33.87
28	765.68	119.39	36.30
29	781.80	131.23	38.73
30	797.40	143.75	41.16
31	812.46	156.91	43.59
32	826.94	170.70	46.02
33	833.55	177.55	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.661

X-CENTER = 508.83

Y-CENTER = 605.09

RADIUS = 569.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	246.84	99.00	-26.36
2	264.76	90.12	-24.35
3	282.98	81.87	-22.34
4	301.47	74.27	-20.33
5	320.23	67.32	-18.32
6	339.21	61.03	-16.31
7	358.41	55.42	-14.30
8	377.79	50.48	-12.29
9	397.33	46.22	-10.28
10	417.01	42.65	-8.27
11	436.80	39.78	-6.26
12	456.68	37.60	-4.24
13	476.63	36.12	-2.23
14	496.61	35.34	-.22
15	516.61	35.26	1.79
16	536.60	35.88	3.80
17	556.56	37.21	5.81
18	576.46	39.23	7.82
19	596.27	41.95	9.83
20	615.98	45.37	11.84
21	635.55	49.47	13.85
22	654.97	54.26	15.86
23	674.21	59.73	17.87
24	693.24	65.87	19.89
25	712.05	72.67	21.90
26	730.61	80.13	23.91
27	748.89	88.24	25.92
28	766.88	96.98	27.93
29	784.55	106.34	29.94
30	801.88	116.33	31.95

31	818.85	126.91	33.96
32	835.44	138.08	35.97
33	851.63	149.83	37.98
34	867.39	162.14	39.99
35	882.71	174.99	42.00
36	889.34	180.96	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.677

X-CENTER = 559.26

Y-CENTER = 564.87

RADIUS = 527.11

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	312.66	99.00	-26.81
2	330.51	89.98	-24.63
3	348.69	81.64	-22.46
4	367.17	74.00	-20.28
5	385.93	67.07	-18.11
6	404.94	60.85	-15.94
7	424.17	55.36	-13.76
8	443.60	50.61	-11.59
9	463.19	46.59	-9.41
10	482.92	43.32	-7.24
11	502.76	40.80	-5.07
12	522.68	39.03	-2.89
13	542.66	38.02	-.72
14	562.66	37.77	1.46
15	582.65	38.28	3.63
16	602.61	39.55	5.80
17	622.51	41.57	7.98
18	642.31	44.34	10.15
19	662.00	47.87	12.33
20	681.54	52.14	14.50
21	700.90	57.15	16.68
22	720.06	62.89	18.85
23	738.99	69.35	21.02
24	757.66	76.52	23.20
25	776.04	84.40	25.37
26	794.11	92.97	27.55
27	811.84	102.22	29.72
28	829.21	112.14	31.89
29	846.19	122.70	34.07
30	862.76	133.91	36.24
31	878.89	145.73	38.42
32	894.56	158.16	40.59
33	909.75	171.17	42.76
34	920.06	180.71	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.678

X-CENTER = 522.51
Y-CENTER = 618.37
RADIUS = 580.46

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	263.29	99.00	-25.54
2	281.34	90.38	-23.56
3	299.67	82.38	-21.59
4	318.27	75.02	-19.61
5	337.11	68.31	-17.64
6	356.17	62.25	-15.67
7	375.42	56.85	-13.69
8	394.86	52.12	-11.72
9	414.44	48.06	-9.74
10	434.15	44.67	-7.77
11	453.97	41.97	-5.79
12	473.86	39.95	-3.82
13	493.82	38.62	-1.85
14	513.81	37.97	.13
15	533.81	38.02	2.10
16	553.80	38.75	4.08
17	573.75	40.17	6.05
18	593.63	42.28	8.03
19	613.44	45.07	10.00
20	633.13	48.54	11.97
21	652.70	52.69	13.95
22	672.11	57.51	15.92
23	691.34	63.00	17.90
24	710.37	69.15	19.87
25	729.18	75.94	21.84
26	747.75	83.39	23.82
27	766.04	91.46	25.79
28	784.05	100.17	27.77
29	801.75	109.48	29.74
30	819.11	119.40	31.72
31	836.13	129.92	33.69
32	852.77	141.01	35.66
33	869.02	152.67	37.64
34	884.86	164.89	39.61
35	900.26	177.64	41.59
36	903.87	180.84	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.687

X-CENTER = 485.22
Y-CENTER = 560.80
RADIUS = 523.52

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	238.61	99.00	-27.01
2	256.43	89.92	-24.82
3	274.58	81.52	-22.63
4	293.04	73.83	-20.44
5	311.78	66.84	-18.25
6	330.77	60.58	-16.06
7	349.99	55.04	-13.87
8	369.41	50.25	-11.69
9	388.99	46.20	-9.50
10	408.72	42.90	-7.31
11	428.56	40.35	-5.12
12	448.48	38.57	-2.93
13	468.45	37.55	-.74
14	488.45	37.29	1.45
15	508.44	37.79	3.64
16	528.40	39.06	5.83
17	548.30	41.09	8.02
18	568.11	43.88	10.20
19	587.79	47.42	12.39
20	607.32	51.72	14.58
21	626.68	56.75	16.77
22	645.83	62.52	18.96
23	664.74	69.02	21.15
24	683.40	76.24	23.34
25	701.76	84.16	25.53
26	719.81	92.78	27.72
27	737.51	102.08	29.91
28	754.85	112.05	32.09
29	771.79	122.68	34.28
30	788.32	133.95	36.47
31	804.40	145.84	38.66
32	820.02	158.33	40.85
33	835.15	171.41	43.04
34	843.29	179.01	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.689

X-CENTER = 554.69

Y-CENTER = 601.47

RADIUS = 565.06

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	296.20	99.00	-26.21
2	314.15	90.17	-24.18
3	332.39	81.97	-22.15
4	350.92	74.43	-20.12
5	369.69	67.55	-18.10
6	388.71	61.34	-16.07
7	407.92	55.80	-14.04
8	427.33	50.95	-12.01
9	446.89	46.79	-9.98
10	466.59	43.32	-7.96

11	486.39	40.55	-5.93
12	506.29	38.49	-3.90
13	526.24	37.13	-1.87
14	546.23	36.47	.16
15	566.23	36.53	2.18
16	586.21	37.29	4.21
17	606.16	38.76	6.24
18	626.04	40.93	8.27
19	645.83	43.81	10.30
20	665.51	47.38	12.32
21	685.05	51.65	14.35
22	704.43	56.61	16.38
23	723.62	62.25	18.41
24	742.59	68.56	20.44
25	761.33	75.55	22.46
26	779.82	83.19	24.49
27	798.02	91.48	26.52
28	815.91	100.41	28.55
29	833.48	109.97	30.58
30	850.70	120.14	32.60
31	867.55	130.92	34.63
32	884.00	142.28	36.66
33	900.05	154.22	38.69
34	915.66	166.73	40.72
35	930.82	179.77	42.74
36	931.73	180.61	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.690

X-CENTER = 554.46
Y-CENTER = 410.37
RADIUS = 374.95

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	345.57	99.00	-32.33
2	362.47	88.30	-29.27
3	379.92	78.53	-26.22
4	397.86	69.69	-23.16
5	416.25	61.83	-20.10
6	435.03	54.95	-17.05
7	454.15	49.09	-13.99
8	473.56	44.25	-10.93
9	493.19	40.46	-7.88
10	513.01	37.72	-4.82
11	532.94	36.04	-1.76
12	552.93	35.43	1.29
13	572.92	35.88	4.35
14	592.86	37.39	7.41
15	612.70	39.97	10.46
16	632.36	43.61	13.52
17	651.81	48.28	16.58
18	670.98	53.99	19.63
19	689.81	60.71	22.69

20	708.27	68.42	25.75
21	726.28	77.11	28.80
22	743.81	86.75	31.86
23	760.79	97.30	34.92
24	777.19	108.75	37.97
25	792.96	121.06	41.03
26	808.05	134.19	44.09
27	822.41	148.10	47.14
28	836.02	162.76	50.20
29	848.82	178.13	53.26
30	849.71	179.32	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 38 COORDINATE POINTS

SAFETY FACTOR = 1.709

X-CENTER = 515.01
Y-CENTER = 676.58
RADIUS = 640.31

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	238.61	99.00	-24.68
2	256.78	90.65	-22.89
3	275.21	82.87	-21.10
4	293.87	75.67	-19.31
5	312.74	69.06	-17.52
6	331.81	63.04	-15.73
7	351.06	57.61	-13.94
8	370.47	52.80	-12.15
9	390.03	48.59	-10.36
10	409.70	44.99	-8.57
11	429.48	42.01	-6.78
12	449.34	39.65	-4.99
13	469.26	37.90	-3.20
14	489.23	36.79	-1.41
15	509.22	36.29	.38
16	529.22	36.43	2.17
17	549.21	37.18	3.96
18	569.16	38.56	5.75
19	589.06	40.56	7.54
20	608.89	43.19	9.33
21	628.62	46.43	11.11
22	648.25	50.28	12.90
23	667.74	54.75	14.69
24	687.09	59.82	16.48
25	706.27	65.50	18.27
26	725.26	71.77	20.06
27	744.05	78.63	21.85
28	762.61	86.07	23.64
29	780.93	94.09	25.43
30	798.99	102.68	27.22
31	816.78	111.83	29.01
32	834.27	121.53	30.80
33	851.45	131.77	32.59
34	868.30	142.55	34.38

35	884.80	153.84	36.17
36	900.95	165.64	37.96
37	916.72	177.95	39.75
38	920.04	180.71	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 31 COORDINATE POINTS

SAFETY FACTOR = 1.717

X-CENTER = 532.83

Y-CENTER = 520.81

RADIUS = 472.07

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	320.89	99.00	-25.46
2	338.94	90.40	-23.04
3	357.35	82.57	-20.61
4	376.07	75.53	-18.18
5	395.07	69.29	-15.75
6	414.32	63.86	-13.33
7	433.78	59.25	-10.90
8	453.42	55.47	-8.47
9	473.20	52.53	-6.04
10	493.09	50.42	-3.62
11	513.05	49.16	-1.19
12	533.05	48.75	1.24
13	553.04	49.18	3.67
14	573.00	50.46	6.09
15	592.89	52.58	8.52
16	612.67	55.54	10.95
17	632.30	59.34	13.38
18	651.76	63.97	15.81
19	671.00	69.42	18.23
20	690.00	75.68	20.66
21	708.71	82.73	23.09
22	727.11	90.58	25.52
23	745.16	99.19	27.94
24	762.83	108.56	30.37
25	780.08	118.67	32.80
26	796.90	129.51	35.23
27	813.23	141.04	37.65
28	829.07	153.26	40.08
29	844.37	166.14	42.51
30	859.11	179.65	44.94
31	859.23	179.77	

1

Roy F. Weston, Inc.
West Chester, PA

Y	A	X	I	S
10.00	143.38	276.75	410.13	543.50 676.88

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X      .00 L-**-+-----+-----+-----+
      -      ..
      -      ...
      -      ....
      -      ....
      -      ....
133.38 +      ....
      -      ....
      -      ....
      -      ....
      -      ....
      -.....2
A    266.75 +....625
      -....211
      -...3174
      -...214.
      -...21488
      -...214..
X    400.13 +.214.**
      -.218..*
      -.210...
      -.14...*
      -. *0.**W.
      -.10...**
I    533.50 +.10.....
      -.10.....
      -.16.....
      -.11...**
      -.416.....
      -.12.....*
S    666.88 +..41.....
      -..412.....
      -..7412...*
      -...4112...
      -.....*312.**
      -.....74162..
800.25 +...*.4W182**
      -.....44112*2
      -.....4531**
      - .....49311
      - .....44**
      -  *......44
933.63 + .....7
      - .....**
      - .....
      - .....
      - .....**
      - .....
1067.00 L** *   W   **

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Version 4.0

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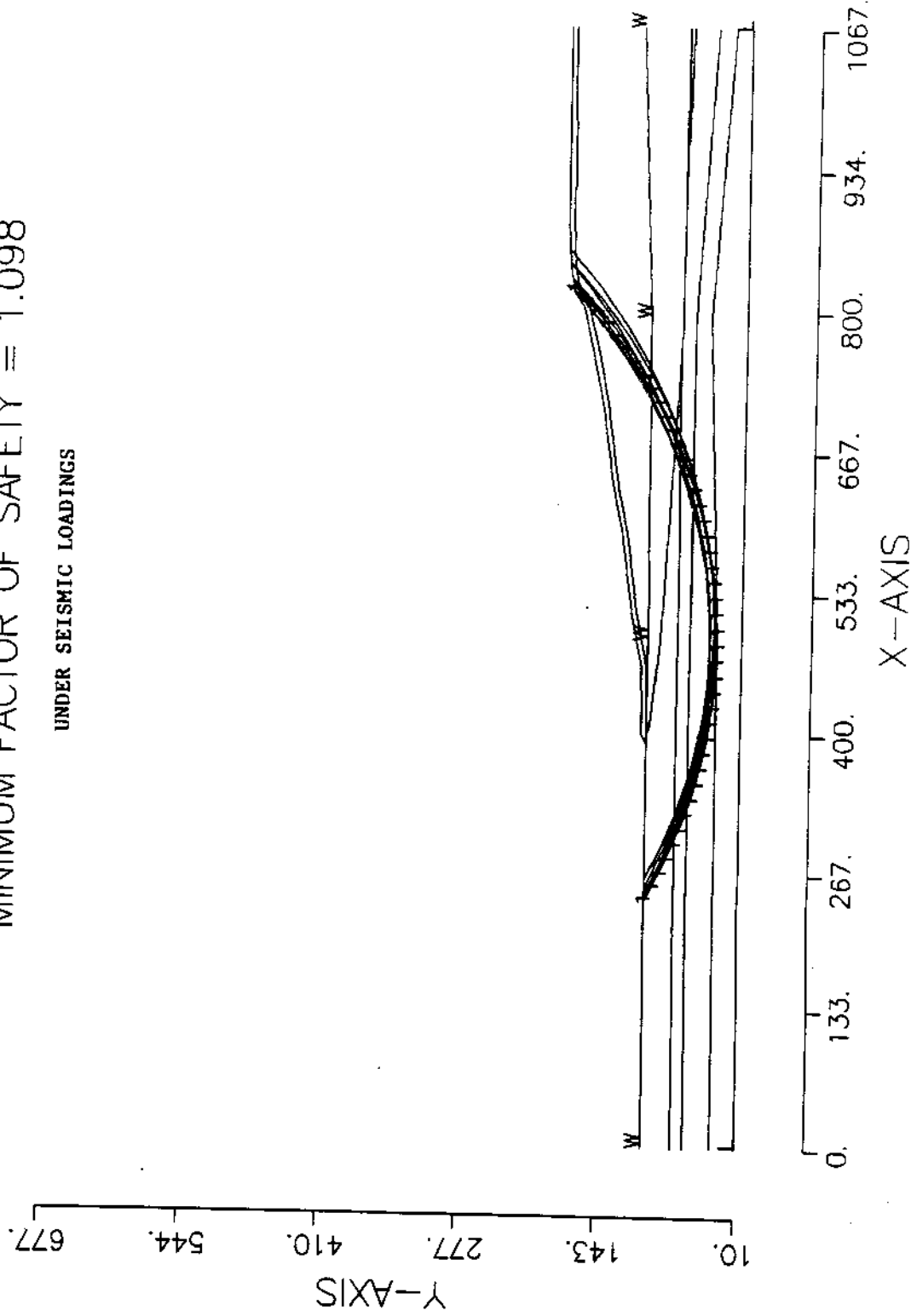
SEISMIC ANALYSIS

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.098

UNDER SEISMIC LOADINGS



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY DRAINED ANALYSIS
WITH SEISMIC LOADINGS

45 16
0. 99. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1
390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6
SOIL
6
125.0 125.0 0.0 32. 0. 0. 1
80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
WATER
1 0.
4

0. 99.
489. 99.
794. 100.8
1067. 111.
EQUAKE
0.05
0.05
0.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
50 10
230. 280. 800. 1067.
20. 15. 0. 0.
END

CLEQ3FDB.DAT SECTION 3-3 FINAL DRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY DRAINED ANALYSIS
WITH SEISMIC LOADINGS

45 16

0. 99. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1
390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

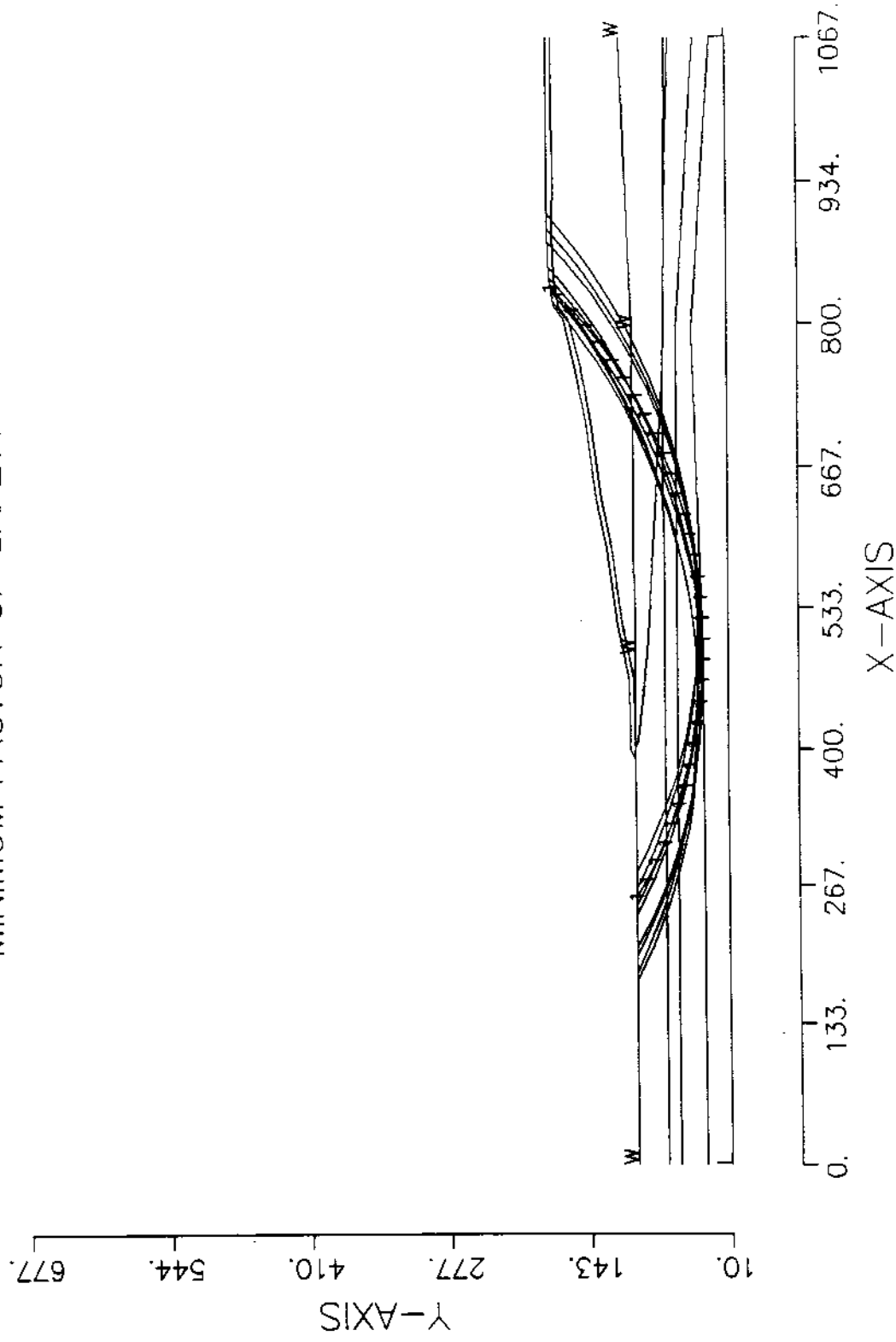
4

0. 99.
489. 99.
794. 100.8
1067. 111.
EQUAKE
0.05
0.05
0.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
80 10
0. 650. 800. 1067.
20. 20. 0. 0.
END

CLEQ3FDA.DAT SECTION 3-3 FINAL DRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.097



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
45 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	390.00	99.00	3
2	390.00	99.00	400.00	104.00	1
3	400.00	104.00	419.00	104.00	1
4	419.00	104.00	464.00	105.00	1
5	464.00	105.00	516.00	115.00	1
6	516.00	115.00	590.00	125.00	1
7	590.00	125.00	637.00	135.00	1
8	637.00	135.00	707.00	145.00	1
9	707.00	145.00	760.00	155.00	1
10	760.00	155.00	803.00	165.00	1
11	803.00	165.00	817.00	175.00	1
12	817.00	175.00	843.00	179.00	1
13	843.00	179.00	885.00	181.00	1
14	885.00	181.00	945.00	180.50	1
15	945.00	180.50	1015.00	181.00	1
16	1015.00	181.00	1067.00	181.00	1
17	390.00	99.00	400.00	99.00	3
18	400.00	99.00	419.00	99.00	2
19	419.00	99.00	464.00	100.00	2
20	464.00	100.00	516.00	110.00	2
21	516.00	110.00	590.00	120.00	2
22	590.00	120.00	637.00	130.00	2
23	637.00	130.00	707.00	140.00	2
24	707.00	140.00	760.00	150.00	2
25	760.00	150.00	803.00	160.00	2
26	803.00	160.00	817.00	170.00	2
27	817.00	170.00	843.00	174.00	2
28	843.00	174.00	885.00	176.00	2
29	885.00	176.00	945.00	175.50	2
30	945.00	175.50	1015.00	176.00	2
31	1015.00	176.00	1067.00	176.00	2
32	400.00	99.00	408.00	96.00	3
33	408.00	96.00	489.00	87.00	3
34	489.00	87.00	760.00	71.50	3

35	760.00	71.50	794.00	70.00	4
36	794.00	70.00	914.00	69.00	4
37	914.00	69.00	1067.00	68.00	3
38	.00	70.00	489.00	70.50	4
39	489.00	70.50	760.00	71.50	4
40	914.00	69.00	1067.00	64.00	4
41	.00	59.00	794.00	59.00	5
42	794.00	59.00	1067.00	40.50	5
43	.00	33.00	489.00	33.00	6
44	489.00	33.00	794.00	44.00	6
45	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT
OF .050 HAS BEEN ASSIGNED

A VERTICAL EARTHQUAKE LOADING COEFFICIENT
OF .050 HAS BEEN ASSIGNED

CAVITATION PRESSURE = .0

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.097

X-CENTER = 494.55
Y-CENTER = 505.35
RADIUS = 471.67

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	255.06	99.00	-29.30
2	272.51	89.21	-26.87
3	290.35	80.17	-24.44
4	308.55	71.90	-22.01
5	327.10	64.40	-19.58
6	345.94	57.70	-17.15
7	365.05	51.80	-14.72
8	384.39	46.72	-12.29
9	403.94	42.46	-9.86
10	423.64	39.04	-7.43
11	443.47	36.45	-5.00
12	463.40	34.71	-2.57
13	483.38	33.81	-.14
14	503.38	33.76	2.29
15	523.36	34.56	4.72
16	543.29	36.20	7.15
17	563.14	38.69	9.58
18	582.86	42.02	12.01
19	602.42	46.18	14.44
20	621.79	51.16	16.86
21	640.93	56.97	19.29
22	659.81	63.58	21.72
23	678.39	70.98	24.15
24	696.63	79.16	26.58
25	714.52	88.11	29.01
26	732.01	97.81	31.44
27	749.07	108.24	33.87
28	765.68	119.39	36.30
29	781.80	131.23	38.73
30	797.40	143.75	41.16
31	812.46	156.91	43.59
32	826.94	170.70	46.02
33	833.55	177.55	

230, 280

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	263.78	17.44	6828.18	.00	6107.20	1700.07	657.62
2	281.43	17.84	20419.45	.00	17854.69	4839.94	1872.19
3	299.45	18.21	33449.44	.00	28658.30	7578.20	2931.41
4	310.51	3.91	8720.78	.00	7336.90	1895.44	733.20
5	319.78	14.63	37386.50	.00	31161.71	8253.98	2737.71
6	334.69	15.19	46385.46	.00	37531.76	10474.68	3474.28
7	344.12	3.65	12257.44	.00	9826.10	2792.70	729.76
8	355.50	19.11	71332.47	.00	55220.21	17076.06	4462.13
9	374.72	19.34	83248.66	.00	62071.55	21150.71	5526.88
10	387.20	5.61	25962.41	.00	18933.58	6690.18	1748.20
11	395.00	10.00	51209.34	.00	34862.28	15828.97	4136.26
12	401.97	3.94	22008.02	.00	14103.63	7734.79	2021.17
13	405.97	4.06	23053.62	.00	14642.69	7947.69	2076.81
14	413.50	11.00	63898.58	.00	40546.08	22070.42	5767.20
15	421.32	4.64	27632.38	.00	17504.70	9574.63	2501.94
16	433.56	19.83	122023.30	.00	76445.08	41886.74	10945.39
17	453.43	19.92	127782.30	.00	79147.39	43709.58	11421.72
18	463.70	.60	3937.91	.00	2424.49	1335.98	349.10

19	473.69	19.38	130214.30	.00	78371.22	45997.14	12019.48
20	486.19	5.62	39134.03	.00	22878.75	14308.01	3738.81
21	496.19	14.38	102292.10	.00	58546.17	38656.75	10101.37
22	509.69	12.62	92142.67	.00	51328.73	35901.93	9381.50
23	519.68	7.36	54427.91	.00	29770.81	21749.94	5683.46
24	533.33	19.93	148334.50	.00	79722.14	60372.84	15775.98
25	553.21	19.84	147696.70	.00	77290.09	62086.16	16223.69
26	573.00	19.72	145044.50	.00	73807.03	63148.50	16501.29
27	586.43	7.14	51763.80	.00	25876.18	23114.60	6040.06
28	596.21	12.42	89141.21	.00	43403.59	40901.36	10687.90
29	612.11	19.37	136568.30	.00	63716.11	65825.44	17200.79
30	629.39	15.21	104141.90	.00	45977.18	53190.27	13899.11
31	638.96	3.93	26316.90	.00	11149.09	13876.30	3626.00
32	643.83	5.81	38242.14	.00	16098.24	20516.87	5361.25
33	653.27	13.07	83468.34	.00	33423.75	45326.72	15034.14
34	669.10	18.58	112234.60	.00	40916.93	65236.27	21637.81
35	678.63	.50	2884.91	.00	985.00	1757.26	582.85
36	683.77	9.77	55560.29	.00	17874.28	34063.46	13176.47
37	692.64	7.99	43688.76	.00	12467.40	27125.15	13143.31
38	701.82	10.37	54162.26	.00	13380.68	35539.02	17220.20
39	710.76	7.52	37476.61	.00	7387.62	26096.39	12644.83
40	723.27	17.49	81041.79	.00	9260.89	62090.94	30085.75
41	734.18	4.33	18639.67	.00	415.25	15691.34	7603.13
42	742.71	12.73	51132.53	.00	.00	43923.43	21282.81
43	754.54	10.93	39220.21	.00	.00	33861.56	16407.39
44	762.84	5.68	18623.06	.00	.00	16078.60	7790.78
45	773.74	16.12	46027.55	.00	.00	40013.79	19388.42
46	789.60	15.60	33957.71	.00	.00	29780.54	14429.97
47	800.20	5.60	9394.30	.00	.00	8326.90	4034.74
48	807.73	9.46	13930.84	.00	.00	12347.98	5983.13
49	814.73	4.54	6221.73	.00	.00	5584.63	2706.00
50	821.97	9.94	10029.91	.00	.00	9002.86	4362.27
51	827.41	.94	619.11	.00	.00	563.87	273.22
52	830.72	5.67	1770.67	.00	.00	1523.45	867.51

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.115

X-CENTER = 462.98
Y-CENTER = 579.81
RADIUS = 545.32

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	205.70	99.00	-27.10
2	223.50	89.89	-25.00
3	241.63	81.44	-22.90
4	260.05	73.66	-20.80
5	278.75	66.55	-18.69
6	297.69	60.14	-16.59
7	316.86	54.43	-14.49
8	336.22	49.43	-12.39
9	355.76	45.14	-10.29
10	375.44	41.56	-8.19
11	395.23	38.72	-6.09

12	415.12	36.60	-3.98
13	435.07	35.21	-1.88
14	455.06	34.55	.22
15	475.06	34.63	2.32
16	495.04	35.44	4.42
17	514.98	36.98	6.52
18	534.86	39.25	8.62
19	554.63	42.25	10.73
20	574.28	45.97	12.83
21	593.78	50.41	14.93
22	613.11	55.56	17.03
23	632.23	61.42	19.13
24	651.12	67.98	21.23
25	669.77	75.22	23.34
26	688.13	83.14	25.44
27	706.19	91.73	27.54
28	723.92	100.98	29.64
29	741.31	110.87	31.74
30	758.32	121.39	33.84
31	774.93	132.53	35.94
32	791.12	144.27	38.05
33	806.87	156.60	40.15
34	822.16	169.49	42.25
35	830.51	177.08	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.118

X-CENTER = 485.22

Y-CENTER = 560.80

RADIUS = 523.52

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	238.61	99.00	-27.01
2	256.43	89.92	-24.82
3	274.58	81.52	-22.63
4	293.04	73.83	-20.44
5	311.78	66.84	-18.25
6	330.77	60.58	-16.06
7	349.99	55.04	-13.87
8	369.41	50.25	-11.69
9	388.99	46.20	-9.50
10	408.72	42.90	-7.31
11	428.56	40.35	-5.12
12	448.48	38.57	-2.93
13	468.45	37.55	-.74
14	488.45	37.29	1.45
15	508.44	37.79	3.64
16	528.40	39.06	5.83
17	548.30	41.09	8.02
18	568.11	43.88	10.20
19	587.79	47.42	12.39
20	607.32	51.72	14.58
21	626.68	56.75	16.77

22	645.83	62.52	18.96
23	664.74	69.02	21.15
24	683.40	76.24	23.34
25	701.76	84.16	25.53
26	719.81	92.78	27.72
27	737.51	102.08	29.91
28	754.85	112.05	32.09
29	771.79	122.68	34.28
30	788.32	133.95	36.47
31	804.40	145.84	38.66
32	820.02	158.33	40.85
33	835.15	171.41	43.04
34	843.29	179.01	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 37 COORDINATE POINTS

SAFETY FACTOR = 1.122

X-CENTER = 465.88
Y-CENTER = 626.04
RADIUS = 591.45

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	197.47	99.00	-26.02
2	215.44	90.23	-24.08
3	233.70	82.07	-22.14
4	252.23	74.53	-20.21
5	270.99	67.62	-18.27
6	289.99	61.35	-16.33
7	309.18	55.72	-14.39
8	328.55	50.75	-12.46
9	348.08	46.44	-10.52
10	367.74	42.79	-8.58
11	387.52	39.80	-6.64
12	407.39	37.49	-4.71
13	427.32	35.85	-2.77
14	447.30	34.88	-.83
15	467.29	34.59	1.11
16	487.29	34.98	3.04
17	507.26	36.04	4.98
18	527.19	37.77	6.92
19	547.04	40.18	8.86
20	566.80	43.26	10.79
21	586.45	47.01	12.73
22	605.96	51.42	14.67
23	625.30	56.48	16.61
24	644.47	62.20	18.54
25	663.43	68.56	20.48
26	682.17	75.56	22.42
27	700.66	83.18	24.36
28	718.88	91.43	26.29
29	736.81	100.29	28.23
30	754.43	109.75	30.17
31	771.72	119.80	32.11
32	788.66	130.43	34.04

33	805.23	141.63	35.98
34	821.42	153.38	37.92
35	837.19	165.67	39.86
36	852.55	178.49	41.80
37	853.69	179.51	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.129

X-CENTER = 508.83

Y-CENTER = 605.09

RADIUS = 569.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	246.84	99.00	-26.36
2	264.76	90.12	-24.35
3	282.98	81.87	-22.34
4	301.47	74.27	-20.33
5	320.23	67.32	-18.32
6	339.21	61.03	-16.31
7	358.41	55.42	-14.30
8	377.79	50.48	-12.29
9	397.33	46.22	-10.28
10	417.01	42.65	-8.27
11	436.80	39.78	-6.26
12	456.68	37.60	-4.24
13	476.63	36.12	-2.23
14	496.61	35.34	-.22
15	516.61	35.26	1.79
16	536.60	35.88	3.80
17	556.56	37.21	5.81
18	576.46	39.23	7.82
19	596.27	41.95	9.83
20	615.98	45.37	11.84
21	635.55	49.47	13.85
22	654.97	54.26	15.86
23	674.21	59.73	17.87
24	693.24	65.87	19.89
25	712.05	72.67	21.90
26	730.61	80.13	23.91
27	748.89	88.24	25.92
28	766.88	96.98	27.93
29	784.55	106.34	29.94
30	801.88	116.33	31.95
31	818.85	126.91	33.96
32	835.44	138.08	35.97
33	851.63	149.83	37.98
34	867.39	162.14	39.99
35	882.71	174.99	42.00
36	889.34	180.96	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.136

X-CENTER = 521.98

Y-CENTER = 555.21

RADIUS = 516.53

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	279.75	99.00	-26.86
2	297.59	89.96	-24.64
3	315.77	81.63	-22.42
4	334.26	74.00	-20.20
5	353.03	67.09	-17.98
6	372.05	60.92	-15.76
7	391.30	55.48	-13.55
8	410.74	50.80	-11.33
9	430.35	46.87	-9.11
10	450.10	43.70	-6.89
11	469.95	41.30	-4.67
12	489.89	39.68	-2.45
13	509.87	38.82	-0.23
14	529.87	38.74	1.98
15	549.86	39.43	4.20
16	569.80	40.90	6.42
17	589.68	43.13	8.64
18	609.45	46.14	10.86
19	629.09	49.90	13.08
20	648.58	54.43	15.30
21	667.87	59.70	17.51
22	686.94	65.72	19.73
23	705.77	72.48	21.95
24	724.32	79.95	24.17
25	742.56	88.14	26.39
26	760.48	97.03	28.61
27	778.04	106.61	30.83
28	795.21	116.85	33.04
29	811.98	127.76	35.26
30	828.31	139.31	37.48
31	844.18	151.48	39.70
32	859.57	164.25	41.92
33	874.45	177.61	44.14
34	877.57	180.65	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.147

X-CENTER = 437.68

Y-CENTER = 637.10

RADIUS = 599.77

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
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1	172.79	99.00	-25.26
2	190.87	90.47	-23.34
3	209.24	82.54	-21.43
4	227.85	75.23	-19.52
5	246.70	68.55	-17.61
6	265.77	62.50	-15.70
7	285.02	57.09	-13.79
8	304.44	52.32	-11.88
9	324.01	48.20	-9.97
10	343.71	44.74	-8.06
11	363.52	41.93	-6.15
12	383.40	39.79	-4.24
13	403.35	38.31	-2.33
14	423.33	37.50	-.42
15	443.33	37.36	1.49
16	463.32	37.88	3.41
17	483.29	39.07	5.32
18	503.20	40.92	7.23
19	523.04	43.44	9.14
20	542.79	46.61	11.05
21	562.42	50.45	12.96
22	581.91	54.93	14.87
23	601.24	60.06	16.78
24	620.39	65.84	18.69
25	639.33	72.25	20.60
26	658.05	79.28	22.51
27	676.53	86.94	24.42
28	694.74	95.21	26.33
29	712.66	104.08	28.24
30	730.28	113.55	30.16
31	747.57	123.59	32.07
32	764.52	134.21	33.98
33	781.11	145.39	35.89
34	797.31	157.11	37.80
35	813.12	169.37	39.71
36	820.55	175.55	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.149

X-CENTER = 444.96

Y-CENTER = 647.36

RADIUS = 608.58

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	181.01	99.00	-24.76
2	199.17	90.62	-22.88
3	217.60	82.85	-21.00
4	236.27	75.68	-19.11
5	255.17	69.13	-17.23
6	274.27	63.21	-15.35
7	293.56	57.92	-13.46
8	313.01	53.26	-11.58
9	332.60	49.24	-9.70

10	352.32	45.88	-7.81
11	372.13	43.16	-5.93
12	392.02	41.09	-4.05
13	411.97	39.68	-2.16
14	431.96	38.92	-.28
15	451.96	38.82	1.60
16	471.95	39.38	3.48
17	491.92	40.60	5.37
18	511.83	42.47	7.25
19	531.67	44.99	9.13
20	551.41	48.17	11.02
21	571.05	51.99	12.90
22	590.54	56.45	14.78
23	609.88	61.56	16.67
24	629.04	67.29	18.55
25	648.00	73.66	20.43
26	666.74	80.64	22.31
27	685.24	88.23	24.20
28	703.49	96.43	26.08
29	721.45	105.22	27.96
30	739.12	114.60	29.85
31	756.46	124.55	31.73
32	773.47	135.07	33.61
33	790.13	146.14	35.50
34	806.41	157.76	37.38
35	822.31	169.90	39.26
36	831.22	177.19	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.152

X-CENTER = 446.60
Y-CENTER = 658.12
RADIUS = 619.00

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	181.01	99.00	-24.48
2	199.21	90.71	-22.63
3	217.67	83.02	-20.78
4	236.37	75.92	-18.93
5	255.29	69.43	-17.08
6	274.41	63.56	-15.23
7	293.71	58.31	-13.37
8	313.17	53.68	-11.52
9	332.76	49.68	-9.67
10	352.48	46.32	-7.82
11	372.29	43.60	-5.97
12	392.18	41.52	-4.12
13	412.13	40.09	-2.27
14	432.12	39.30	-.42
15	452.12	39.15	1.44
16	472.11	39.65	3.29
17	492.08	40.80	5.14
18	512.00	42.59	6.99

19	531.85	45.02	8.84
20	551.61	48.10	10.69
21	571.26	51.81	12.54
22	590.79	56.15	14.40
23	610.16	61.12	16.25
24	629.36	66.72	18.10
25	648.37	72.93	19.95
26	667.17	79.76	21.80
27	685.74	87.18	23.65
28	704.06	95.21	25.50
29	722.11	103.82	27.35
30	739.87	113.01	29.21
31	757.33	122.77	31.06
32	774.46	133.08	32.91
33	791.26	143.95	34.76
34	807.69	155.35	36.61
35	823.74	167.28	38.46
36	837.41	178.14	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.156

X-CENTER = 522.51

Y-CENTER = 618.37

RADIUS = 580.46

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	263.29	99.00	-25.54
2	281.34	90.38	-23.56
3	299.67	82.38	-21.59
4	318.27	75.02	-19.61
5	337.11	68.31	-17.64
6	356.17	62.25	-15.67
7	375.42	56.85	-13.69
8	394.86	52.12	-11.72
9	414.44	48.06	-9.74
10	434.15	44.67	-7.77
11	453.97	41.97	-5.79
12	473.86	39.95	-3.82
13	493.82	38.62	-1.85
14	513.81	37.97	.13
15	533.81	38.02	2.10
16	553.80	38.75	4.08
17	573.75	40.17	6.05
18	593.63	42.28	8.03
19	613.44	45.07	10.00
20	633.13	48.54	11.97
21	652.70	52.69	13.95
22	672.11	57.51	15.92
23	691.34	63.00	17.90
24	710.37	69.15	19.87
25	729.18	75.94	21.84
26	747.75	83.39	23.82
27	766.04	91.46	25.79

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Y	A	X	I	S	
10.00	143.38	276.75	410.13	543.50	676.88

X	.00	L-***-+-----+-----+-----+-----+
		- ..
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		-
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	133.38	+
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		-7
		- ...772
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		- ...72.1
A	266.75	+...4210
		-...2166
		-...231..
		-...216..
		-.711...
		-.216...
X	400.13	+ .15...*
		- .16...*
		- .16....
		- .1.....*
		- .*...**W.
		- .1.....**
I	533.50	+ .17.....
		- .17.....
		- .12.....
		- .517...**
		- .12.....
		- .517...*.
S	666.88	+...127....
		-...517....
		-...0417...*
		-5612..
		-*5117**
		-5317.
	800.25	+...**..W5.1**
		-0561*1
		-056**
		-566
		-**

- .*.0
933.63 +
-**
-
-
-**
-
1067.00 L** * W **

GEOSLOPE
Version 4.0

Supplied by GEOCOMP Corp.
342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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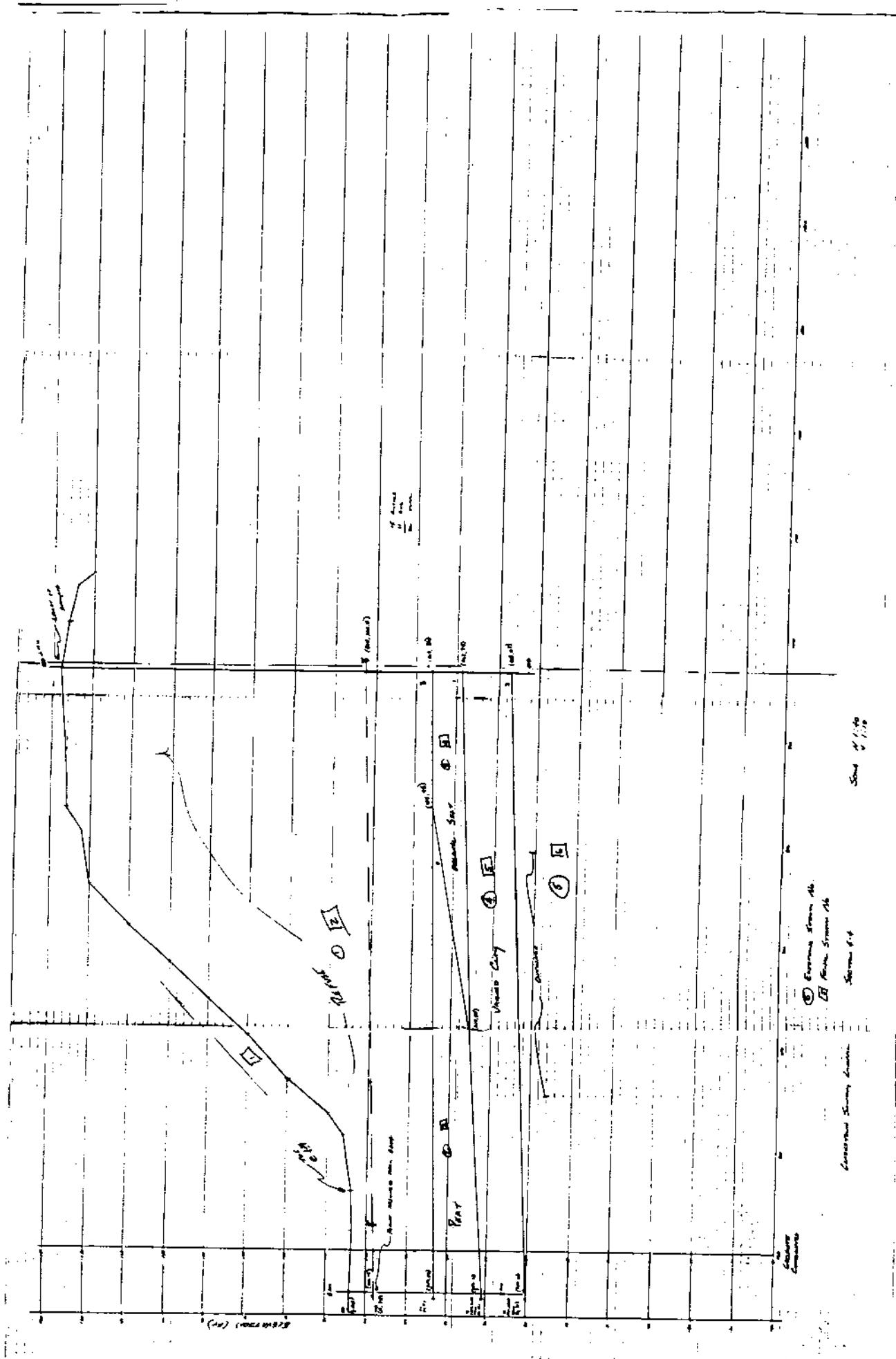
GEOSLOPE is based on the program, STABL3,
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of the Federal Highway Administration.

GEOCOMP Corp. has modified the program to run on
various microcomputers and plotting devices.

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West Chester, PA

APPENDIX D
CROSS SECTION 4-4 COMPUTER DATA

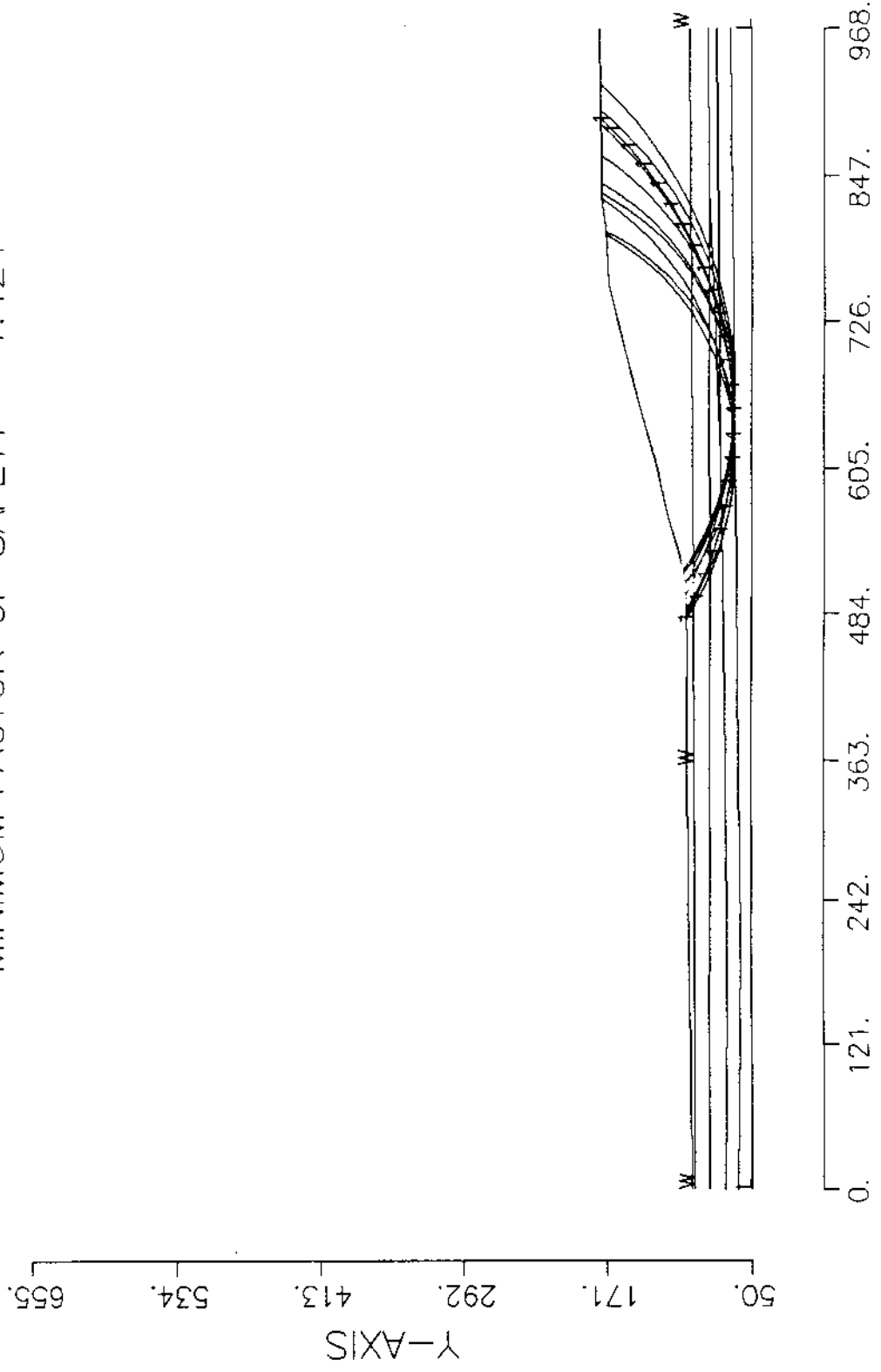


UNDRAINED ANALYSIS

EXISTING TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.421



CLARKSTOWN SANITARY LANDFILL SECTION 4-4 EXISTING TOPOGRAPHY PROFIL
UNDRAINED ANALYSIS

26 15

0. 100. 358. 104. 1
358. 104. 418. 103.5 1
418. 103.5 457. 104. 1
457. 104. 511. 106. 1
511. 106. 532. 110. 1
532. 110. 564. 120. 1
564. 120. 608. 130. 1
608. 130. 644. 140. 1
644. 140. 680. 150. 1
680. 150. 717. 160. 1
717. 160. 755. 170. 1
755. 170. 804. 172. 1
804. 172. 829. 176. 1
829. 176. 854. 176. 1
854. 176. 968. 177.5 1

0. 85. 358. 84. 2
358. 84. 838. 85. 2
838. 85. 968. 86. 3
0. 72. 158. 70.5 4
158. 70.5 358. 71. 4
358. 71. 613. 75. 4
613. 75. 838. 85. 3
613. 75. 968. 79. 4
0. 61. 200. 58.5 5
200. 58.5 358. 60. 5
358. 60. 968. 67. 5

SOIL

5

80.0 80.0 1750.0 0. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1
88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

3

0. 98.
358. 98.
968. 102.5

LIMITS

1 1

0. 50. 968. 50.

CIRCL2

50 10

476. 526. 755. 968.

20. 20. 0. 0.

END

CL4EUB.DAT

SECTION 4-4 UNDRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 EXISTING TOPOGRAPHY UNDRAINED ANAL

26 15

0. 100. 358. 104. 1
 358. 104. 418. 103.5 1
 418. 103.5 457. 104. 1
 457. 104. 511. 106. 1
 511. 106. 532. 110. 1
 532. 110. 564. 120. 1
 564. 120. 608. 130. 1
 608. 130. 644. 140. 1
 644. 140. 680. 150. 1
 680. 150. 717. 160. 1
 717. 160. 755. 170. 1
 755. 170. 804. 172. 1
 804. 172. 829. 176. 1
 829. 176. 854. 176. 1
 854. 176. 968. 177.5 1

0. 85. 358. 84. 2
 358. 84. 838. 85. 2
 838. 85. 968. 86. 3
 0. 72. 158. 70.5 4
 158. 70.5 358. 71. 4
 358. 71. 613. 75. 4
 613. 75. 838. 85. 3
 613. 75. 968. 79. 4
 0. 61. 200. 58.5 5
 200. 58.5 353. 60. 5
 358. 60. 968. 67. 5

SOIL

5
 80.0 80.0 1750.0 0. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
 3
 0. 98.
 358. 98.
 968. 102.5

LIMITS

1 1
 0. 50. 968. 50.

CIRCL2

80 10
 0. 600. 755. 968.
 20. 20. 0. 0.

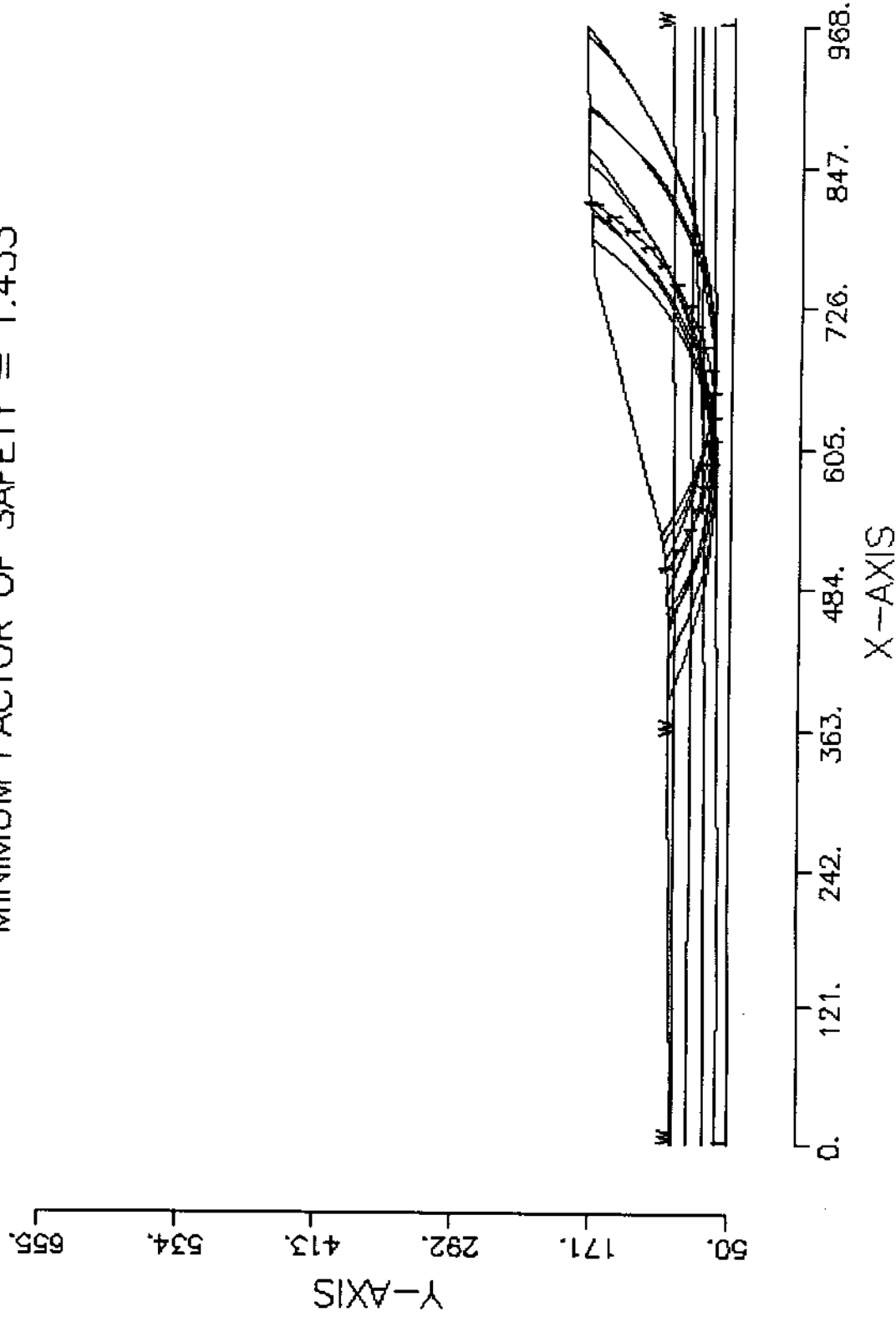
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CL4EUA.DAT

SECTION 4-4 UNDRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.433



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 4-4
EXISTING TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
26 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	100.00	358.00	104.00	1
2	358.00	104.00	418.00	103.50	1
3	418.00	103.50	457.00	104.00	1
4	457.00	104.00	511.00	106.00	1
5	511.00	106.00	532.00	110.00	1
6	532.00	110.00	564.00	120.00	1
7	564.00	120.00	608.00	130.00	1
8	608.00	130.00	644.00	140.00	1
9	644.00	140.00	680.00	150.00	1
10	680.00	150.00	717.00	160.00	1
11	717.00	160.00	755.00	170.00	1
12	755.00	170.00	804.00	172.00	1
13	804.00	172.00	829.00	176.00	1
14	829.00	176.00	854.00	176.00	1
15	854.00	176.00	968.00	177.50	1
16	.00	85.00	358.00	84.00	2
17	358.00	84.00	838.00	85.00	2
18	838.00	85.00	968.00	86.00	3
19	.00	72.00	158.00	70.50	4
20	158.00	70.50	358.00	71.00	4
21	358.00	71.00	613.00	75.00	4
22	613.00	75.00	838.00	85.00	3
23	613.00	75.00	968.00	79.00	4
24	.00	61.00	200.00	58.50	5
25	200.00	58.50	358.00	60.00	5
26	358.00	60.00	968.00	67.00	5

ISOTROPIC SOIL PARAMETERS

5 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRI SURFACE NO.
1	80.0	80.0	1750.0	.0	.00	.0	1
2	80.0	80.0	30.0	.0	.00	.0	1
3	88.0	88.0	820.0	.0	.00	.0	1
4	104.0	104.0	380.0	.0	.00	.0	1
5	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	98.00
2	358.00	98.00
3	968.00	102.50

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	50.00	968.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 600.00

EACH SURFACE TERMINATES BETWEEN X = 755.00
AND X = 968.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION

AT WHICH A SURFACE EXTENDS IS $Y = 20.00$

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.433

X-CENTER = 628.81

Y-CENTER = 280.15

RADIUS = 216.15

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	501.27	105.64	-33.51
2	517.94	94.60	-28.21
3	535.57	85.15	-22.90
4	553.99	77.36	-17.60
5	573.05	71.31	-12.30
6	592.60	67.05	-6.99
7	612.45	64.62	-1.69
8	632.44	64.03	3.61
9	652.40	65.29	8.92
10	672.16	68.39	14.22
11	691.54	73.30	19.52
12	710.39	79.99	24.83
13	728.55	88.38	30.13
14	745.84	98.42	35.43
15	762.14	110.02	40.74
16	777.29	123.07	46.04
17	791.18	137.47	51.34
18	803.67	153.09	56.65
19	814.67	169.79	61.95
20	816.95	174.07	

476; 526

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	506.13	9.73	2649.57	.00	.00	12619.12	1221.48
2	511.05	.10	54.00	.00	.00	160.37	1221.48

3	514.52	6.84	5369.33	.00	1173.40	11904.66	1221.48
4	524.97	14.06	20055.18	.00	8364.93	24843.16	1221.48
5	533.78	3.57	6979.44	.00	3333.09	7238.83	1221.48
6	536.48	1.83	3890.74	.00	1800.21	3446.20	1221.48
7	545.69	16.60	44363.72	.00	20819.24	27500.62	20.94
8	558.93	9.87	33667.56	.00	15311.73	20077.94	20.94
9	563.93	.13	493.99	.00	223.51	306.65	265.23
10	568.53	9.05	35308.33	.00	15887.20	21954.21	265.23
11	582.83	19.54	88633.36	.00	38031.54	53839.16	265.23
12	600.30	15.40	79790.05	.00	32614.22	48278.78	265.23
13	610.22	4.45	24455.87	.00	9775.89	15009.04	265.23
14	612.72	.55	3089.20	.00	1217.73	1877.15	265.23
15	622.72	19.44	113584.40	.00	43243.35	70542.59	265.23
16	638.22	11.56	71543.65	.00	25787.00	45705.13	265.23
17	648.20	8.40	53326.54	.00	18439.46	34852.36	265.23
18	662.28	19.76	128056.50	.00	41688.30	87102.52	265.23
19	676.08	7.84	51221.41	.00	15632.32	36664.32	265.23
20	685.77	11.54	74947.66	.00	21236.11	55280.14	265.23
21	695.30	7.52	48219.54	.00	12869.63	37541.11	265.23
22	703.67	9.21	58140.26	.00	13987.88	45716.65	572.35
23	709.33	2.12	13308.12	.00	2950.52	11152.69	20.94
24	713.70	6.61	41005.12	.00	8678.79	36431.33	20.94
25	718.85	3.70	22675.56	.00	4265.28	20679.81	20.94
26	724.62	7.84	47342.28	.00	7623.53	39655.13	1221.48
27	737.19	17.30	99510.55	.00	9226.29	91651.21	1221.48
28	747.57	3.46	18935.24	.00	322.96	19224.76	1221.48
29	752.15	5.70	30226.67	.00	.00	31022.01	1221.48
30	758.57	7.14	35791.75	.00	.00	36312.08	1221.48
31	769.72	15.15	65534.24	.00	.00	65449.13	1221.48
32	784.24	13.88	45452.60	.00	.00	40145.99	1221.48
33	797.42	12.49	26440.57	.00	.00	11788.17	1221.48
34	803.83	.33	492.58	.00	.00	-217.98	1221.48
35	809.33	10.67	9526.41	.00	.00	-18673.90	1221.48
36	815.81	2.28	357.19	.00	.00	-10358.24	1221.48

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.438

X-CENTER = 595.70

Y-CENTER = 320.21

RADIUS = 257.59

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	103.98	-30.70
2	472.89	93.77	-26.25
3	490.83	84.93	-21.80
4	509.40	77.50	-17.35
5	528.49	71.54	-12.90
6	547.99	67.07	-8.45
7	567.77	64.14	-4.00
8	587.72	62.74	.45
9	607.72	62.90	4.90
10	627.65	64.61	9.35
11	647.38	67.86	13.80

12	666.81	72.63	18.25
13	685.80	78.89	22.70
14	704.25	86.61	27.15
15	722.05	95.74	31.60
16	739.08	106.22	36.05
17	755.25	117.99	40.50
18	770.46	130.97	44.95
19	784.61	145.10	49.40
20	797.63	160.29	53.85
21	806.48	172.40	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 22 COORDINATE POINTS

SAFETY FACTOR = 1.503

X-CENTER = 674.53

Y-CENTER = 350.33

RADIUS = 284.83

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	524.05	108.49	-29.88
2	541.39	98.52	-25.86
3	559.39	89.80	-21.83
4	577.96	82.36	-17.81
5	597.00	76.25	-13.78
6	616.42	71.48	-9.76
7	636.13	68.09	-5.74
8	656.03	66.09	-1.71
9	676.02	65.49	2.31
10	696.01	66.30	6.34
11	715.89	68.51	10.36
12	735.56	72.10	14.38
13	754.93	77.07	18.41
14	773.91	83.39	22.43
15	792.40	91.02	26.45
16	810.30	99.93	30.48
17	827.54	110.07	34.50
18	844.02	121.40	38.53
19	859.67	133.86	42.55
20	874.40	147.38	46.57
21	888.15	161.91	50.60
22	900.22	176.61	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.525

X-CENTER = 666.03

Y-CENTER = 523.37

RADIUS = 458.67

POINT	X-SURF	Y-SURF	ALPHA
-------	--------	--------	-------

NO.			(DEG)
1	478.48	104.80	-22.89
2	496.91	97.02	-20.39
3	515.65	90.05	-17.89
4	534.69	83.91	-15.39
5	553.97	78.60	-12.89
6	573.47	74.14	-10.39
7	593.14	70.53	-7.90
8	612.95	67.78	-5.40
9	632.86	65.90	-2.90
10	652.83	64.89	-.40
11	672.83	64.75	2.10
12	692.82	65.48	4.60
13	712.76	67.08	7.09
14	732.60	69.55	9.59
15	752.32	72.88	12.09
16	771.88	77.07	14.59
17	791.23	82.11	17.09
18	810.35	87.99	19.59
19	829.19	94.69	22.09
20	847.73	102.21	24.58
21	865.91	110.54	27.08
22	883.72	119.64	29.58
23	901.11	129.51	32.08
24	918.06	140.14	34.58
25	934.53	151.49	37.08
26	950.48	163.54	39.58
27	965.90	176.29	42.07
28	967.23	177.49	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.538

X-CENTER = 576.96
Y-CENTER = 370.54
RADIUS = 307.01

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	425.32	103.59	-27.73
2	443.02	94.29	-24.00
3	461.29	86.15	-20.27
4	480.05	79.22	-16.53
5	499.23	73.53	-12.80
6	518.73	69.10	-9.07
7	538.48	65.95	-5.33
8	558.39	64.09	-1.60
9	578.38	63.53	2.13
10	598.37	64.28	5.87
11	618.27	66.32	9.60
12	637.99	69.66	13.33
13	657.45	74.27	17.07
14	676.57	80.14	20.80
15	695.26	87.24	24.53

16	713.46	95.54	28.26
17	731.07	105.01	32.00
18	748.03	115.61	35.73
19	764.27	127.29	39.46
20	779.71	140.00	43.20
21	794.29	153.69	46.93
22	807.95	168.30	50.66
23	812.03	173.28	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.552

X-CENTER = 684.15
Y-CENTER = 466.40
RADIUS = 400.84

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	508.86	105.92	-24.50
2	527.06	97.63	-21.64
3	545.65	90.25	-18.78
4	564.58	83.81	-15.93
5	583.82	78.32	-13.07
6	603.30	73.80	-10.21
7	622.98	70.26	-7.35
8	642.82	67.70	-4.49
9	662.76	66.13	-1.63
10	682.75	65.56	1.23
11	702.74	65.99	4.09
12	722.69	67.42	6.95
13	742.55	69.84	9.81
14	762.25	73.24	12.67
15	781.77	77.63	15.52
16	801.04	82.98	18.38
17	820.02	89.29	21.24
18	838.66	96.53	24.10
19	856.92	104.70	26.96
20	874.74	113.77	29.82
21	892.09	123.71	32.68
22	908.93	134.51	35.54
23	925.20	146.14	38.40
24	940.88	158.56	41.26
25	955.91	171.75	44.11
26	961.76	177.42	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.561

X-CENTER = 601.31
Y-CENTER = 409.46
RADIUS = 341.84

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	448.10	103.89	-24.95
2	466.24	95.45	-21.60
3	484.83	88.09	-18.25
4	503.83	81.82	-14.89
5	523.15	76.68	-11.54
6	542.75	72.68	-8.19
7	562.54	69.83	-4.84
8	582.47	68.15	-1.48
9	602.47	67.63	1.87
10	622.46	68.28	5.22
11	642.37	70.10	8.58
12	662.15	73.09	11.93
13	681.72	77.22	15.28
14	701.01	82.49	18.63
15	719.96	88.88	21.99
16	738.51	96.37	25.34
17	756.58	104.93	28.69
18	774.13	114.53	32.04
19	791.08	125.14	35.40
20	807.38	136.73	38.75
21	822.98	149.24	42.10
22	837.82	162.65	45.46
23	850.96	176.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.571

X-CENTER = 590.34
Y-CENTER = 296.63
RADIUS = 230.56

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	463.29	104.23	-30.95
2	480.44	93.95	-25.98
3	498.42	85.19	-21.01
4	517.09	78.02	-16.04
5	536.31	72.49	-11.07
6	555.94	68.65	-6.09
7	575.83	66.53	-1.12
8	595.83	66.14	3.85
9	615.78	67.48	8.82
10	635.54	70.55	13.79
11	654.97	75.31	18.76
12	673.90	81.75	23.74
13	692.21	89.80	28.71
14	709.75	99.40	33.68
15	726.40	110.50	38.65
16	742.02	122.99	43.62
17	756.50	136.78	48.59
18	769.72	151.79	53.57

19	781.60	167.88	58.54
20	783.62	171.17	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 22 COORDINATE POINTS

SAFETY FACTOR = 1.593

X-CENTER = 681.19

Y-CENTER = 327.59

RADIUS = 264.08

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	531.65	109.93	-32.32
2	548.55	99.24	-27.98
3	566.21	89.86	-23.64
4	584.53	81.84	-19.30
5	603.41	75.23	-14.96
6	622.73	70.06	-10.62
7	642.39	66.38	-6.28
8	662.27	64.19	-1.94
9	682.26	63.51	2.40
10	702.24	64.35	6.74
11	722.10	66.70	11.08
12	741.73	70.54	15.42
13	761.01	75.86	19.76
14	779.83	82.62	24.10
15	798.09	90.79	28.44
16	815.67	100.32	32.78
17	832.49	111.14	37.12
18	848.43	123.21	41.46
19	863.42	136.46	45.80
20	877.37	150.79	50.14
21	890.18	166.15	54.48
22	897.63	176.57	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.617

X-CENTER = 569.92

Y-CENTER = 506.98

RADIUS = 442.64

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	387.34	103.76	-23.07
2	405.74	95.92	-20.48
3	424.48	88.92	-17.89
4	443.51	82.78	-15.30
5	462.80	77.50	-12.71
6	482.31	73.10	-10.12

1
Roy F. Weston, Inc.
West Chester, PA

	Y	A	X	I	S	
	50.00	171.00	292.00	413.00	534.00	655.00
X	.00	L****-	-+-----	+-----	+-----	+-----
		- .				
		- ..				
		- ...				
		-				
		-				
	121.00	+ ...				
		~.....				
		-.*..				
		~.....				
		-*...				
						
A	242.00					
						
						
						
						
						
X	363.00	.*****				
		0				
		0				
		...0*				
		...05				
		..05*.				
I	484.00	..5284				
		..274*				
		.0241*				
		.2113..				
		.213..*				

		.143...	
S	605.00	.1*....*	
		.13.....	
		.15.....*	
		.318.....	
		.315.....*	
		.3125.....	
	726.00	.63125....*	
		..3.122....*	
		..43.1528..	
		..63..11258	
		-..43..7.1*	
		-..643..7.*	
	847.00	+ .*463..7*	
		- ..4.33.0	
		- ...4.939	
		- ..4..3	
		- .44...	
		- .46.	
	968.00	L***W	4*

GEOSLOPE
Version 4.0

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(617) 369-8304

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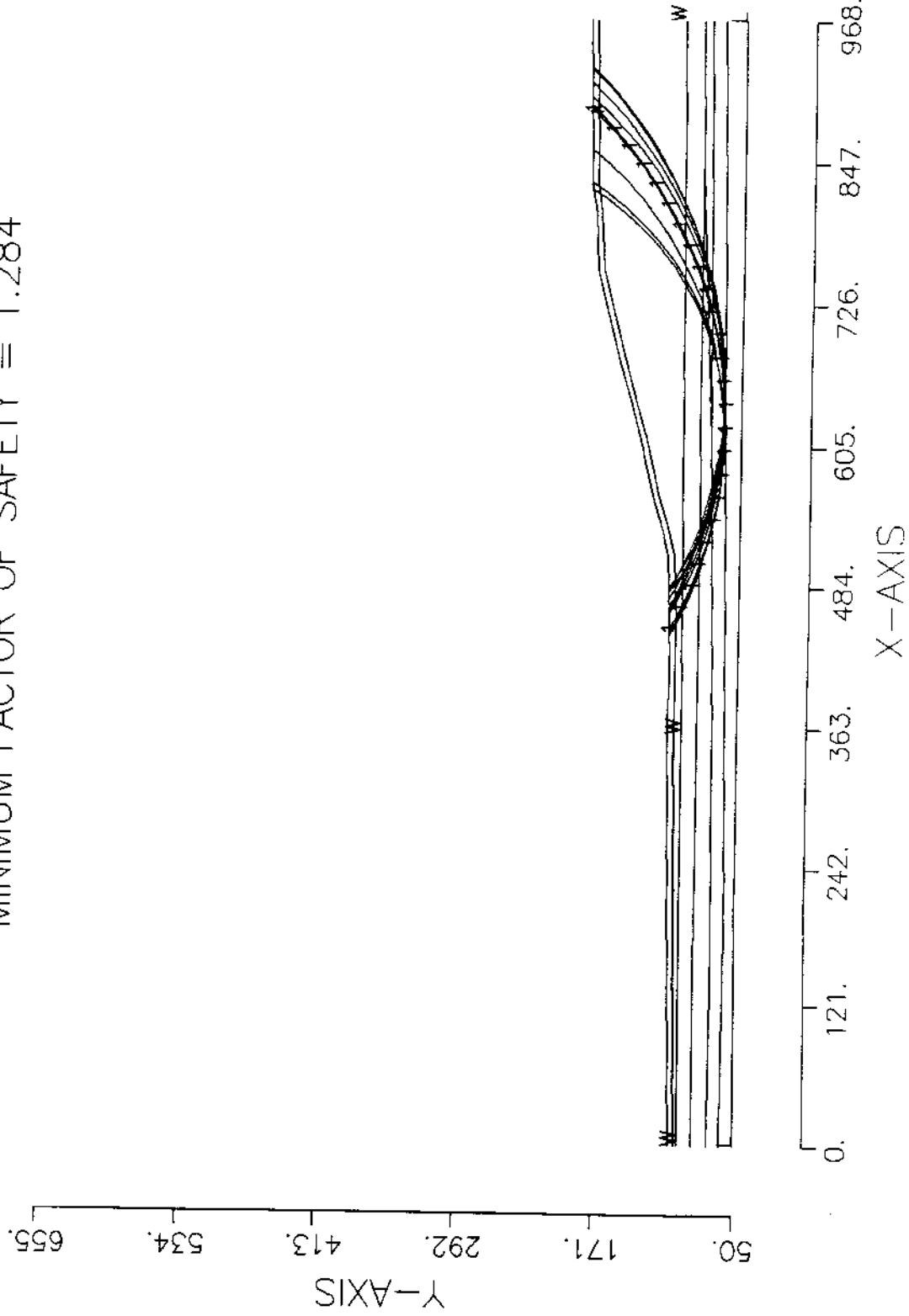
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West Chester, PA

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.284



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 FINAL TOPOGRAPHY UNDRAINED ANALYSIS

41 15

0. 105. 358. 109. 1
 358. 109. 418. 108.5 1
 418. 108.5 457. 109. 1
 457. 109. 511. 111. 1
 511. 111. 532. 115. 1
 532. 115. 564. 125. 1
 564. 125. 608. 135. 1
 608. 135. 644. 145. 1
 644. 145. 680. 155. 1
 680. 155. 717. 165. 1
 717. 165. 755. 175. 1
 755. 175. 804. 177. 1
 804. 177. 829. 181. 1
 829. 181. 854. 181. 1
 854. 181. 968. 182.5 1
 0. 100. 358. 104. 2
 358. 104. 418. 103.5 2
 418. 103.5 457. 104. 2
 457. 104. 511. 106. 2
 511. 106. 532. 110. 2
 532. 110. 564. 120. 2
 564. 120. 608. 130. 2
 608. 130. 644. 140. 2
 644. 140. 680. 150. 2
 680. 150. 717. 160. 2
 717. 160. 755. 170. 2
 755. 170. 804. 172. 2
 804. 172. 829. 176. 2
 829. 176. 854. 176. 2
 854. 176. 968. 177.5 2
 0. 85. 358. 84. 3
 358. 84. 838. 85. 3
 838. 85. 968. 86. 4
 0. 72. 158. 70.5 5
 158. 70.5 358. 71. 5
 358. 71. 613. 75. 5
 613. 75. 838. 85. 4
 613. 75. 968. 79. 5
 0. 61. 200. 58.5 6
 200. 58.5 358. 60. 6
 358. 60. 968. 67. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 1750.0 0. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

3

0. 98.

358. 98.

968. 102.5

LIMITS

1 1

0. 50. 968. 50.
CIRCL2
50 10
438. 488. 755. 968.
20. 20. 0. 0.
END

CL4FUB.DAT

SECTION 4-4 FINAL UNDRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 FINAL TOPOGRAPHY UNDRAINED ANALYSIS

41 15

0. 105. 358. 109. 1
 358. 109. 418. 108.5 1
 418. 108.5 457. 109. 1
 457. 109. 511. 111. 1
 511. 111. 532. 115. 1
 532. 115. 564. 125. 1
 564. 125. 608. 135. 1
 608. 135. 644. 145. 1
 644. 145. 680. 155. 1
 680. 155. 717. 165. 1
 717. 165. 755. 175. 1
 755. 175. 804. 177. 1
 804. 177. 829. 181. 1
 829. 181. 854. 181. 1
 854. 181. 968. 182.5 1

0. 100. 358. 104. 2
 358. 104. 418. 103.5 2
 418. 103.5 457. 104. 2
 457. 104. 511. 106. 2
 511. 106. 532. 110. 2
 532. 110. 564. 120. 2
 564. 120. 608. 130. 2
 608. 130. 644. 140. 2
 644. 140. 680. 150. 2
 680. 150. 717. 160. 2
 717. 160. 755. 170. 2
 755. 170. 804. 172. 2
 804. 172. 829. 176. 2
 829. 176. 854. 176. 2
 854. 176. 968. 177.5 2

0. 85. 358. 84. 3
 358. 84. 838. 85. 3
 838. 85. 968. 86. 4
 0. 72. 158. 70.5 5
 158. 70.5 358. 71. 5
 358. 71. 613. 75. 5
 613. 75. 838. 85. 4
 613. 75. 968. 79. 5

0. 61. 200. 58.5 6
 200. 58.5 358. 60. 6
 358. 60. 968. 67. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 1750.0 0. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

3

0. 98.

358. 98.

968. 102.5

LIMITS

1 1

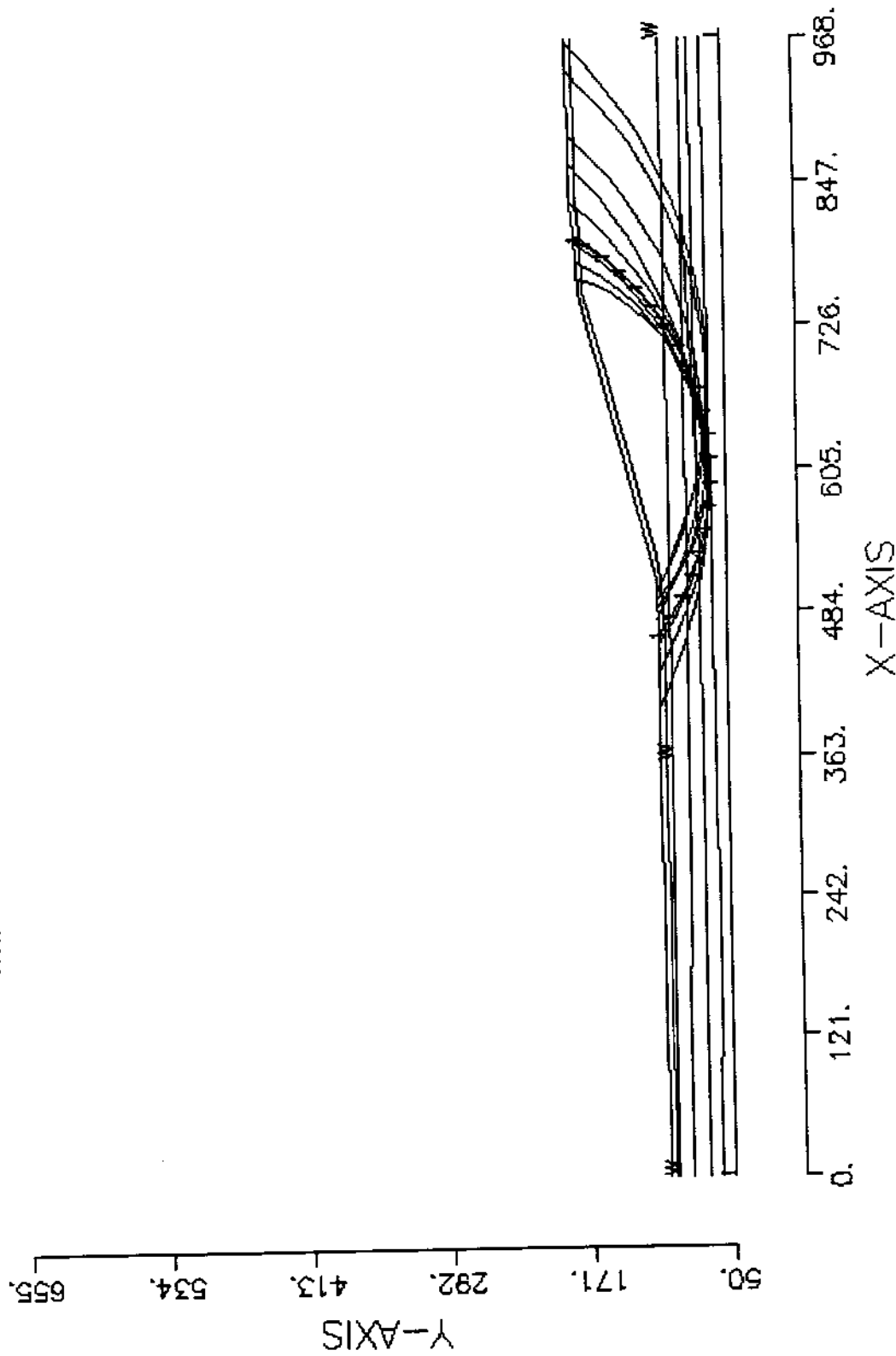
0. 50. 968. 50.
CIRCL2
80 10
0. 600. 755. 968.
20. 20. 0. 0.
END

CL4FUA.DAT

SECTION 4-4 FINAL UNDRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.307



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
41 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	105.00	358.00	109.00	1
2	358.00	109.00	418.00	108.50	1
3	418.00	108.50	457.00	109.00	1
4	457.00	109.00	511.00	111.00	1
5	511.00	111.00	532.00	115.00	1
6	532.00	115.00	564.00	125.00	1
7	564.00	125.00	608.00	135.00	1
8	608.00	135.00	644.00	145.00	1
9	644.00	145.00	680.00	155.00	1
10	680.00	155.00	717.00	165.00	1
11	717.00	165.00	755.00	175.00	1
12	755.00	175.00	804.00	177.00	1
13	804.00	177.00	829.00	181.00	1
14	829.00	181.00	854.00	181.00	1
15	854.00	181.00	968.00	182.50	1
16	.00	100.00	358.00	104.00	2
17	358.00	104.00	418.00	103.50	2
18	418.00	103.50	457.00	104.00	2
19	457.00	104.00	511.00	106.00	2
20	511.00	106.00	532.00	110.00	2
21	532.00	110.00	564.00	120.00	2
22	564.00	120.00	608.00	130.00	2
23	608.00	130.00	644.00	140.00	2
24	644.00	140.00	680.00	150.00	2
25	680.00	150.00	717.00	160.00	2
26	717.00	160.00	755.00	170.00	2
27	755.00	170.00	804.00	172.00	2
28	804.00	172.00	829.00	176.00	2
29	829.00	176.00	854.00	176.00	2
30	854.00	176.00	968.00	177.50	2
31	.00	85.00	358.00	84.00	3
32	358.00	84.00	838.00	85.00	3
33	838.00	85.00	968.00	86.00	4
34	.00	72.00	158.00	70.50	5

35	158.00	70.50	358.00	71.00	5
36	358.00	71.00	613.00	75.00	5
37	613.00	75.00	838.00	85.00	4
38	613.00	75.00	968.00	79.00	5
39	.00	61.00	200.00	58.50	6
40	200.00	58.50	358.00	60.00	6
41	358.00	60.00	968.00	67.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	1750.0	.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	98.00
2	358.00	98.00
3	968.00	102.50

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	50.00	968.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM

TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 600.00

EACH SURFACE TERMINATES BETWEEN X = 755.00
AND X = 968.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.307

X-CENTER = 601.62
Y-CENTER = 292.21
RADIUS = 229.38

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	463.29	109.23	-34.59
2	479.76	97.88	-29.59
3	497.15	88.00	-24.60
4	515.33	79.68	-19.60
5	534.17	72.97	-14.60
6	553.53	67.93	-9.60
7	573.25	64.59	-4.61
8	593.18	62.99	.39
9	613.18	63.12	5.39
10	633.09	65.00	10.38
11	652.77	68.60	15.38
12	672.05	73.91	20.38

438, 488

13	690.80	80.87	25.38
14	708.87	89.45	30.37
15	726.12	99.56	35.37
16	742.43	111.14	40.37
17	757.67	124.09	45.36
18	771.72	138.32	50.36
19	784.48	153.72	55.36
20	795.85	170.18	60.36
21	799.63	176.82	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	466.73	6.88	2150.39	.00	.00	3896.69	1862.85
2	474.23	8.12	6993.04	.00	.00	17602.62	1338.85
3	479.03	1.46	1666.20	.00	56.47	3607.19	1338.85
4	488.45	17.39	27876.71	.00	7514.73	39750.28	1338.85
5	501.19	8.07	17631.07	.00	7149.10	17683.36	1338.85
6	508.11	5.78	14199.59	.00	6392.72	9290.49	22.95
7	513.17	4.33	11632.12	.00	5493.81	7349.06	22.95
8	523.67	16.67	52685.09	.00	24850.74	31218.73	22.95
9	532.02	.04	143.14	.00	68.68	83.61	22.95
10	533.11	2.13	7670.14	.00	3666.91	4709.37	290.72
11	543.85	19.35	80678.13	.00	36094.27	48790.94	290.72
12	558.76	10.47	51322.31	.00	21496.74	31077.50	290.72
13	568.62	9.25	48956.29	.00	20005.53	30108.05	290.72
14	583.22	19.94	114212.60	.00	44769.11	70282.18	290.72
15	600.59	14.82	90821.42	.00	33980.52	56813.66	290.72
16	610.50	5.00	31584.22	.00	11469.12	20105.93	290.72
17	613.09	.18	1168.60	.00	420.59	747.67	290.72
18	623.14	19.91	129515.90	.00	44797.14	84745.14	290.72
19	638.55	10.91	72558.10	.00	23570.31	49605.45	290.72
20	648.38	8.77	58653.66	.00	17987.65	41167.90	290.72
21	662.41	19.28	128232.00	.00	36177.39	95219.02	290.72
22	674.49	4.87	31945.30	.00	8279.15	25237.63	290.72
23	678.46	3.08	19991.75	.00	4928.16	15633.85	627.35
24	681.70	3.41	22048.70	.00	5195.67	17477.54	627.35
25	687.10	7.39	47429.38	.00	10293.36	40235.62	22.95
26	694.84	8.09	51129.82	.00	9881.54	46610.95	22.95
27	703.88	9.98	61647.96	.00	9289.98	51924.36	1338.85
28	712.93	8.13	48709.01	.00	5169.22	43894.02	1338.85
29	721.56	9.12	52650.80	.00	2506.23	50221.94	1338.85
30	726.95	1.65	9265.05	.00	72.98	9368.72	1338.85
31	735.10	14.66	78165.42	.00	.00	78770.19	1338.85
32	748.72	12.57	60002.08	.00	.00	59979.90	1338.85
33	756.34	2.67	11734.50	.00	.00	11411.33	1338.85
34	764.70	14.05	52838.83	.00	.00	48085.50	1338.85
35	778.10	12.76	33411.41	.00	.00	20050.23	1338.85
36	790.17	11.37	15732.46	.00	.00	-11079.00	1338.85
37	796.28	.87	594.44	.00	.00	-2928.02	1338.85
38	798.18	2.91	910.34	.00	.00	1000.26	478.19

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.334

X-CENTER = 597.15
 Y-CENTER = 309.27
 RADIUS = 245.20

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	108.98	-32.89
2	472.49	98.12	-28.22
3	490.11	88.66	-23.55
4	508.45	80.67	-18.87
5	527.37	74.21	-14.20
6	546.76	69.30	-9.52
7	566.49	65.99	-4.85
8	586.42	64.30	-.17
9	606.42	64.24	4.50
10	626.35	65.81	9.18
11	646.10	69.00	13.85
12	665.52	73.79	18.53
13	684.48	80.15	23.20
14	702.86	88.03	27.88
15	720.54	97.38	32.55
16	737.40	108.14	37.23
17	753.32	120.24	41.90
18	768.21	133.60	46.58
19	781.96	148.12	51.25
20	794.48	163.72	55.93
21	803.44	176.98	

1

Roy F. Weston, Inc.
 West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.351

X-CENTER = 594.45
 Y-CENTER = 301.92
 RADIUS = 237.65

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	108.98	-33.31
2	472.41	98.00	-28.49
3	489.99	88.46	-23.66
4	508.31	80.43	-18.84
5	527.24	73.97	-14.02
6	546.64	69.13	-9.19
7	566.38	65.93	-4.37
8	586.33	64.41	.45
9	606.32	64.57	5.28
10	626.24	66.41	10.10
11	645.93	69.91	14.92
12	665.26	75.06	19.75
13	684.08	81.82	24.57
14	702.27	90.14	29.39
15	719.69	99.95	34.22
16	736.23	111.20	39.04

17	751.77	123.80	43.86
18	766.18	137.66	48.69
19	779.39	152.68	53.51
20	791.28	168.76	58.34
21	796.17	176.68	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 24 COORDINATE POINTS

SAFETY FACTOR = 1.357

X-CENTER = 591.01
Y-CENTER = 368.69
RADIUS = 304.29

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	432.91	108.69	-29.42
2	450.33	98.87	-25.65
3	468.36	90.21	-21.89
4	486.92	82.75	-18.12
5	505.93	76.53	-14.35
6	525.30	71.57	-10.59
7	544.96	67.90	-6.82
8	564.82	65.52	-3.06
9	584.79	64.46	.71
10	604.79	64.71	4.48
11	624.73	66.27	8.24
12	644.52	69.13	12.01
13	664.09	73.30	15.78
14	683.33	78.73	19.54
15	702.18	85.42	23.31
16	720.55	93.34	27.08
17	738.36	102.44	30.84
18	755.53	112.70	34.61
19	771.99	124.06	38.38
20	787.67	136.47	42.14
21	802.50	149.89	45.91
22	816.41	164.26	49.67
23	829.36	179.50	53.44
24	830.47	181.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.366

X-CENTER = 675.13
Y-CENTER = 423.32
RADIUS = 357.77

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	501.27	110.64	-27.47

2	519.01	101.41	-24.27
3	537.24	93.19	-21.07
4	555.91	86.00	-17.86
5	574.94	79.87	-14.66
6	594.29	74.80	-11.46
7	613.89	70.83	-8.25
8	633.68	67.96	-5.05
9	653.61	66.20	-1.85
10	673.60	65.55	1.36
11	693.59	66.03	4.56
12	713.53	67.62	7.76
13	733.34	70.32	10.97
14	752.98	74.12	14.17
15	772.37	79.02	17.37
16	791.46	84.99	20.58
17	810.18	92.02	23.78
18	828.48	100.08	26.98
19	846.31	109.16	30.19
20	863.60	119.21	33.39
21	880.29	130.22	36.59
22	896.35	142.14	39.80
23	911.72	154.94	43.00
24	926.35	168.58	46.20
25	939.33	182.12	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.388

X-CENTER = 684.73
Y-CENTER = 455.47
RADIUS = 390.60

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	501.27	110.64	-26.55
2	519.16	101.70	-23.61
3	537.48	93.69	-20.68
4	556.19	86.63	-17.75
5	575.24	80.53	-14.81
6	594.58	75.42	-11.88
7	614.15	71.30	-8.94
8	633.91	68.19	-6.01
9	653.80	66.10	-3.08
10	673.77	65.03	-.14
11	693.77	64.98	2.79
12	713.74	65.95	5.73
13	733.64	67.95	8.66
14	753.42	70.96	11.60
15	773.01	74.98	14.53
16	792.37	80.00	17.46
17	811.45	86.00	20.40
18	830.19	92.97	23.33
19	848.56	100.89	26.27
20	866.49	109.74	29.20
21	883.95	119.50	32.13

22	900.89	130.13	35.07
23	917.26	141.63	38.00
24	933.02	153.94	40.94
25	948.13	167.04	43.87
26	962.54	180.90	46.80
27	963.99	182.45	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 24 COORDINATE POINTS

SAFETY FACTOR = 1.391

X-CENTER = 638.13
Y-CENTER = 400.66
RADIUS = 331.80

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	478.48	109.80	-27.03
2	496.30	100.71	-23.58
3	514.63	92.71	-20.12
4	533.41	85.82	-16.67
5	552.57	80.09	-13.22
6	572.04	75.51	-9.76
7	591.75	72.12	-6.31
8	611.62	69.93	-2.85
9	631.60	68.93	.60
10	651.60	69.14	4.06
11	671.55	70.55	7.51
12	691.38	73.17	10.96
13	711.01	76.97	14.42
14	730.38	81.95	17.87
15	749.42	88.09	21.33
16	768.05	95.36	24.78
17	786.21	103.75	28.24
18	803.83	113.21	31.69
19	820.84	123.72	35.14
20	837.20	135.23	38.60
21	852.83	147.71	42.05
22	867.68	161.10	45.51
23	881.70	175.37	48.96
24	886.98	181.43	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.412

X-CENTER = 582.88
Y-CENTER = 461.82
RADIUS = 396.58

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	402.53	108.63	-25.60
2	420.57	99.99	-22.71
3	439.02	92.26	-19.83
4	457.83	85.48	-16.94
5	476.96	79.65	-14.05
6	496.37	74.80	-11.16
7	515.99	70.93	-8.27
8	535.78	68.06	-5.38
9	555.69	66.18	-2.49
10	575.67	65.31	.40
11	595.67	65.46	3.29
12	615.64	66.60	6.18
13	635.52	68.76	9.07
14	655.27	71.91	11.96
15	674.84	76.06	14.85
16	694.17	81.19	17.74
17	713.22	87.28	20.63
18	731.94	94.33	23.52
19	750.27	102.31	26.41
20	768.19	111.21	29.30
21	785.63	121.00	32.19
22	802.55	131.65	35.08
23	818.92	143.15	37.97
24	834.69	155.45	40.86
25	849.81	168.54	43.75
26	862.95	181.12	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 18 COORDINATE POINTS

SAFETY FACTOR = 1.416

X-CENTER = 609.44

Y-CENTER = 229.90

RADIUS = 166.41

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	493.67	110.36	-40.64
2	508.85	97.33	-33.75
3	525.48	86.22	-26.85
4	543.32	77.19	-19.96
5	562.12	70.36	-13.07
6	581.60	65.84	-6.18
7	601.49	63.68	.71
8	621.48	63.93	7.60
9	641.31	66.57	14.49
10	660.67	71.58	21.38
11	679.30	78.87	28.27
12	696.91	88.34	35.16
13	713.26	99.85	42.05
14	728.11	113.25	48.94
15	741.25	128.33	55.83
16	752.48	144.88	62.72
17	761.65	162.65	69.61
18	766.41	175.47	

1

	Y	A	X	I	S	
	50.00	171.00	292.00	413.00	534.00	655.00
X	.00	L*****	-----+-----+-----+-----+-----+			
		-	..			
		-	..			
		-	...			
		-	...			
		-				
121.00	+					
		-				
		-	*....			
		-				
		-	*....			
						
A	242.00					
						
						
						
						

X	363.00	 *****8** ...84. ...4**
I	484.00	..8217 ..417* ..175* ..1205.. ..175...* ..156....
S	605.00	.1*....* .16..... .51.....** .510..... .521.....** .5719.....
	726.00	.65719....** ..5741209.* ..5.7811.99 ..657.84211 -..5.7.844*. - ..5.7.88**
	847.00	+ .*65.77.** - ..65..7.8 - ..655.77 - ..665.. - ...65. - ..65
	968.00	L***W .*

GEOSLOPE
Version 4.0

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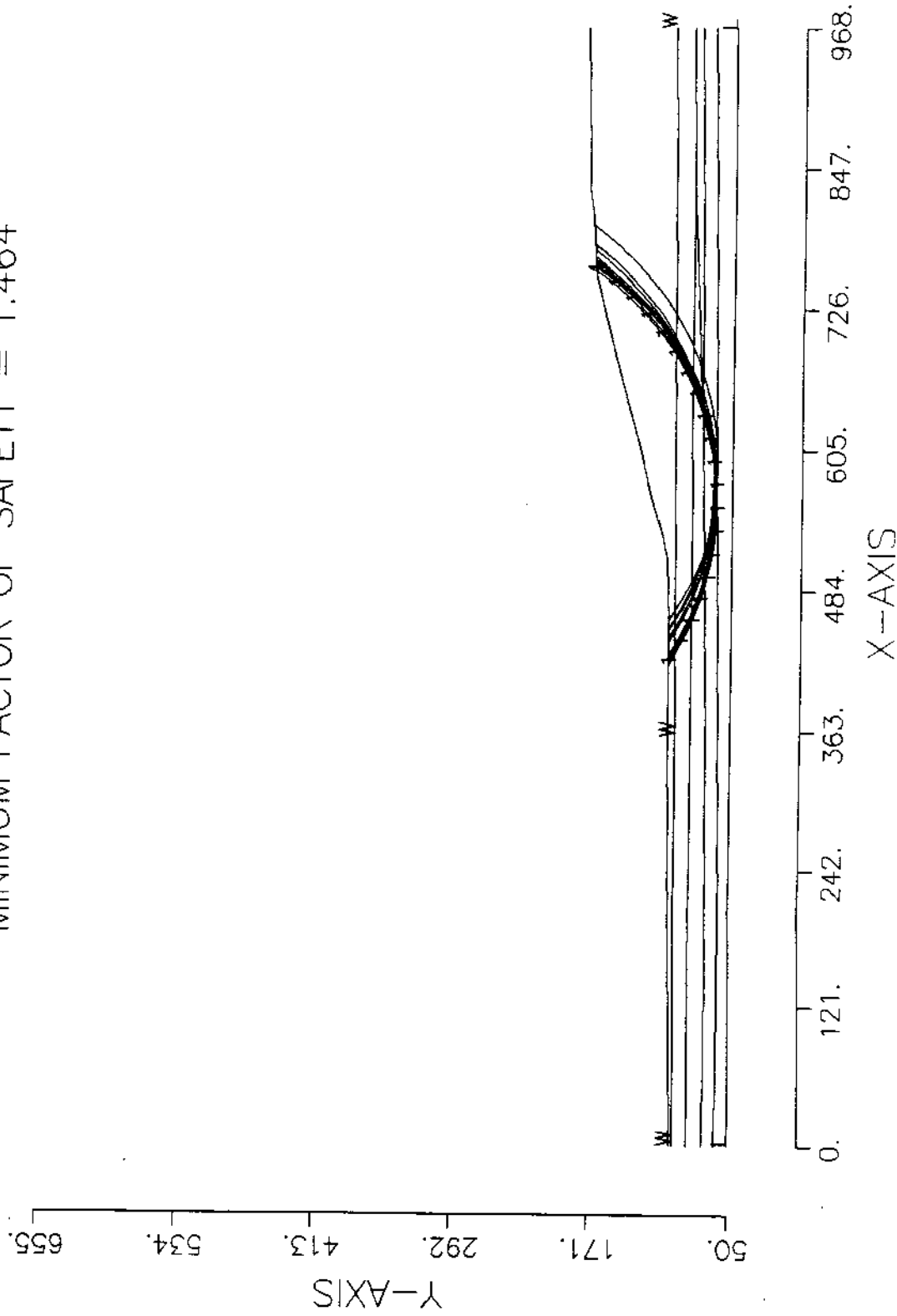
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West Chester, PA

DRAINED ANALYSIS

EXISTING TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
EXISTING TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.464



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 EXISTING TOPOGRAPHY DRAINED ANALYSIS

26 15
 0. 100. 358. 104. 1
 358. 104. 418. 103.5 1
 418. 103.5 457. 104. 1
 457. 104. 511. 106. 1
 511. 106. 532. 110. 1
 532. 110. 564. 120. 1
 564. 120. 608. 130. 1
 608. 130. 644. 140. 1
 644. 140. 680. 150. 1
 680. 150. 717. 160. 1
 717. 160. 755. 170. 1
 755. 170. 804. 172. 1
 804. 172. 829. 176. 1
 829. 176. 854. 176. 1
 854. 176. 968. 177.5 1

0. 85. 358. 84. 2
 358. 84. 838. 85. 2
 838. 85. 968. 86. 3
 0. 72. 158. 70.5 4
 158. 70.5 358. 71. 4
 358. 71. 613. 75. 4
 613. 75. 838. 85. 3
 613. 75. 968. 79. 4
 0. 61. 200. 58.5 5
 200. 58.5 358. 60. 5
 358. 60. 968. 67. 5

SOIL

5
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1
 88.0 88.0 0.0 20. 0. 0. 1
 104.0 104.0 0.0 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
 3
 0. 98.
 358. 98.
 968. 102.5

LIMITS

1 1
 0. 50. 968. 50.

CIRCL2

50 10
 420. 470. 755. 968.
 20. 20. 0. 0.

END

CL4EDB.DAT

SECTION 4-4 DRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 EXISTING TOPOGRAPHY DRAINED ANALYSIS

26 15
 0. 100. 358. 104. 1
 358. 104. 418. 103.5 1
 418. 103.5 457. 104. 1
 457. 104. 511. 106. 1
 511. 106. 532. 110. 1
 532. 110. 564. 120. 1
 564. 120. 608. 130. 1
 608. 130. 644. 140. 1
 644. 140. 680. 150. 1
 680. 150. 717. 160. 1
 717. 160. 755. 170. 1
 755. 170. 804. 172. 1
 804. 172. 829. 176. 1
 829. 176. 854. 176. 1
 854. 176. 968. 177.5 1

0. 85. 358. 84. 2
 358. 84. 838. 85. 2
 838. 85. 968. 86. 3
 0. 72. 158. 70.5 4
 158. 70.5 358. 71. 4
 358. 71. 613. 75. 4
 613. 75. 838. 85. 3
 613. 75. 968. 79. 4
 0. 61. 200. 58.5 5
 200. 58.5 358. 60. 5
 358. 60. 968. 67. 5

SOIL

5
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1
 88.0 88.0 0.0 20. 0. 0. 1
 104.0 104.0 0.0 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
 3
 0. 98.
 358. 98.
 968. 102.5

LIMITS

1 1
 0. 50. 968. 50.

CIRCL2

80 10
 0. 600. 755. 968.
 20. 20. 0. 0.

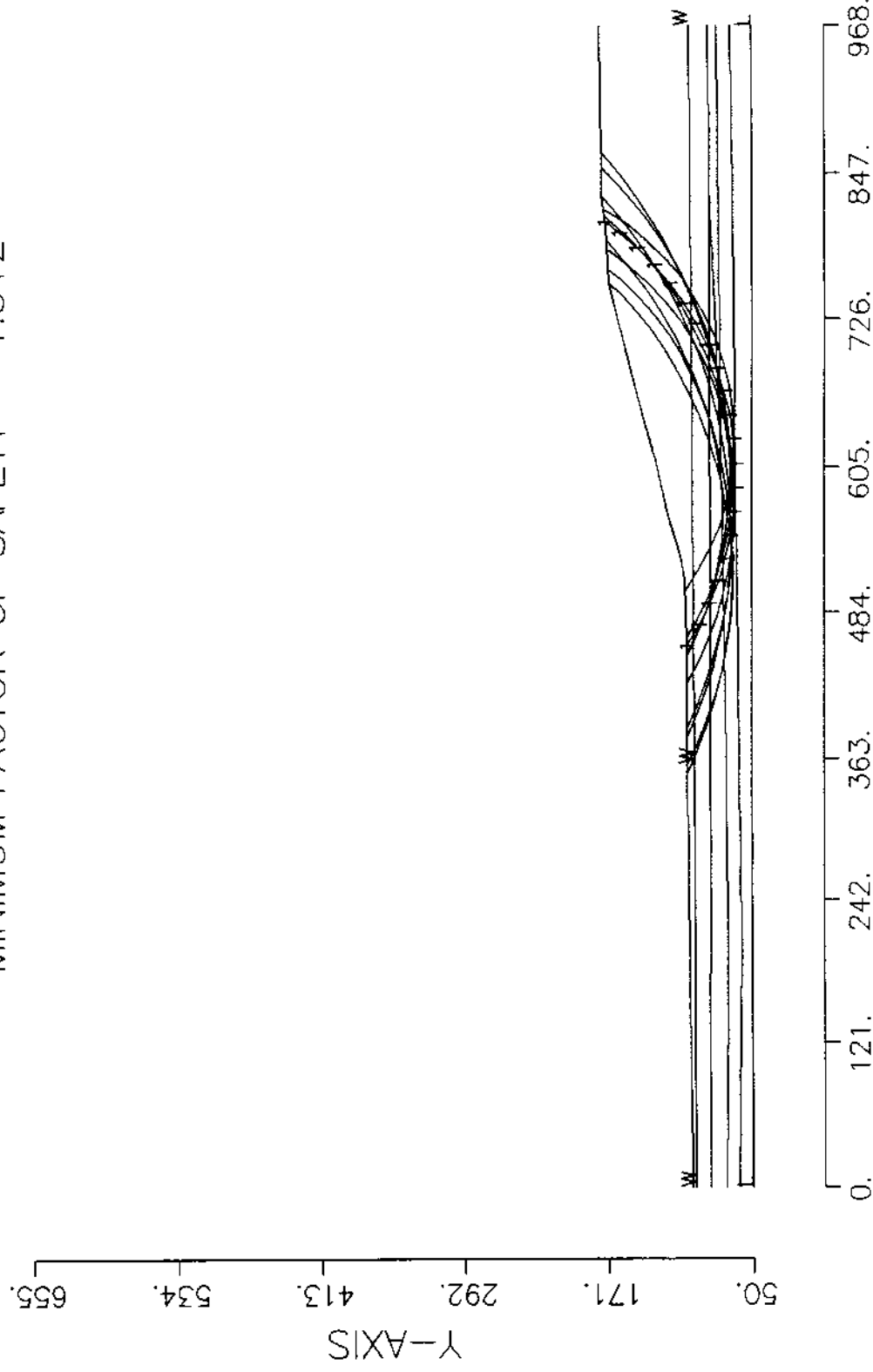
END

CL4EDA.DAT

SECTION 4-4 DRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
EXISTING TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.512



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 4-4
EXISTING TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
26 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	100.00	358.00	104.00	1
2	358.00	104.00	418.00	103.50	1
3	418.00	103.50	457.00	104.00	1
4	457.00	104.00	511.00	106.00	1
5	511.00	106.00	532.00	110.00	1
6	532.00	110.00	564.00	120.00	1
7	564.00	120.00	608.00	130.00	1
8	608.00	130.00	644.00	140.00	1
9	644.00	140.00	680.00	150.00	1
10	680.00	150.00	717.00	160.00	1
11	717.00	160.00	755.00	170.00	1
12	755.00	170.00	804.00	172.00	1
13	804.00	172.00	829.00	176.00	1
14	829.00	176.00	854.00	176.00	1
15	854.00	176.00	968.00	177.50	1
16	.00	85.00	358.00	84.00	2
17	358.00	84.00	838.00	85.00	2
18	838.00	85.00	968.00	86.00	3
19	.00	72.00	158.00	70.50	4
20	158.00	70.50	358.00	71.00	4
21	358.00	71.00	613.00	75.00	4
22	613.00	75.00	838.00	85.00	3
23	613.00	75.00	968.00	79.00	4
24	.00	61.00	200.00	58.50	5
25	200.00	58.50	358.00	60.00	5
26	358.00	60.00	968.00	67.00	5

ISOTROPIC SOIL PARAMETERS

5 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMET SURFACE NO.
1	80.0	80.0	.0	28.0	.00	.0	1
2	80.0	80.0	.0	23.0	.00	.0	1
3	88.0	88.0	.0	20.0	.00	.0	1
4	104.0	104.0	.0	16.0	.00	.0	1
5	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	98.00
2	358.00	98.00
3	968.00	102.50

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	50.00	968.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 600.00

EACH SURFACE TERMINATES BETWEEN X = 755.00
AND X = 968.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION

AT WHICH A SURFACE EXTENDS IS $Y = 20.00$

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.512

X-CENTER = 595.70

Y-CENTER = 320.21

RADIUS = 257.59

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	103.98	-30.70
2	472.89	93.77	-26.25
3	490.83	84.93	-21.80
4	509.40	77.50	-17.35
5	528.49	71.54	-12.90
6	547.99	67.07	-8.45
7	567.77	64.14	-4.00
8	587.72	62.74	.45
9	607.72	62.90	4.90
10	627.65	64.61	9.35
11	647.38	67.86	13.80
12	666.81	72.63	18.25
13	685.80	78.89	22.70
14	704.25	86.61	27.15
15	722.05	95.74	31.60
16	739.08	106.22	36.05
17	755.25	117.99	40.50
18	770.46	130.97	44.95
19	784.61	145.10	49.40
20	797.63	160.29	53.85
21	806.48	172.40	

420; 470

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	456.35	1.30	41.20	.00	.00	60.56	21.30

2	460.73	7.45	1872.36	.00	.00	2752.18	968.06
3	468.67	8.44	5506.26	.00	1554.29	6129.12	2155.87
4	481.86	17.94	22343.28	.00	11934.33	15700.54	5522.53
5	491.64	1.62	2682.33	.00	1567.13	1538.11	541.02
6	500.93	16.95	33539.16	.00	20688.58	17385.51	4881.90
7	510.20	1.60	3670.22	.00	2284.05	1711.16	480.50
8	516.49	10.98	27903.59	.00	17146.57	13248.88	3720.32
9	525.24	6.51	18996.97	.00	11353.68	9087.02	1723.72
10	530.25	3.51	11026.34	.00	6316.47	5222.10	990.58
11	539.99	15.99	57657.21	.00	31152.34	29268.57	5551.98
12	555.99	16.01	69272.19	.00	33914.29	37164.86	7049.83
13	565.89	3.77	17789.32	.00	8354.38	9909.27	1879.70
14	577.75	19.95	100535.00	.00	45155.27	56372.45	10693.33
15	597.72	20.00	109477.70	.00	46111.13	63275.40	12002.75
16	607.86	.28	1572.59	.00	643.48	919.92	174.50
17	610.50	5.00	28441.59	.00	11500.33	16772.81	3181.65
18	620.32	14.65	85312.30	.00	32986.54	51796.33	9825.28
19	635.82	16.35	97638.76	.00	35256.67	61767.63	11716.74
20	645.69	3.38	20388.56	.00	6962.24	13285.89	2520.21
21	657.09	19.42	116717.00	.00	37394.31	79106.33	15005.73
22	671.48	9.35	55428.64	.00	16060.12	39813.98	7552.34
23	678.08	3.84	22537.49	.00	6066.72	16365.16	3940.36
24	681.75	3.50	20425.61	.00	5249.34	15062.24	3626.65
25	684.65	2.30	13386.96	.00	3309.65	9872.24	2772.15
26	692.76	13.91	79745.76	.00	17567.81	61634.22	17307.06
27	701.98	4.54	25511.85	.00	4565.89	20126.71	7079.41
28	710.63	12.75	69764.48	.00	9586.67	58300.29	20506.64
29	719.52	5.05	26735.37	.00	2202.88	23588.19	8296.95
30	726.12	8.14	41793.18	.00	1476.21	39125.90	13762.21
31	734.64	8.89	43506.93	.00	.00	41993.64	14770.92
32	747.04	15.92	71184.00	.00	.00	70097.20	24656.11
33	755.13	.25	1048.07	.00	.00	1032.07	363.02
34	762.86	15.21	55772.71	.00	.00	56401.60	19838.80
35	777.54	14.15	37233.60	.00	.00	38937.70	13696.02
36	791.12	13.02	19552.96	.00	.00	21302.88	7493.11
37	800.82	6.37	3680.05	.00	.00	4210.87	1481.14
38	805.24	2.48	296.38	.00	.00	339.13	119.29

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.520

X-CENTER = 590.34
Y-CENTER = 296.63
RADIUS = 230.56

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	463.29	104.23	-30.95
2	480.44	93.95	-25.98
3	498.42	85.19	-21.01
4	517.09	78.02	-16.04
5	536.31	72.49	-11.07
6	555.94	68.65	-6.09
7	575.83	66.53	-1.12
8	595.83	66.14	3.85

9	615.78	67.48	8.82
10	635.54	70.55	13.79
11	654.97	75.31	18.76
12	673.90	81.75	23.74
13	692.21	89.80	28.71
14	709.75	99.40	33.68
15	726.40	110.50	38.65
16	742.02	122.99	43.62
17	756.50	136.78	48.59
18	769.72	151.79	53.57
19	781.60	167.88	58.54
20	783.62	171.17	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.534

X-CENTER = 576.96
Y-CENTER = 370.54
RADIUS = 307.01

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	425.32	103.59	-27.73
2	443.02	94.29	-24.00
3	461.29	86.15	-20.27
4	480.05	79.22	-16.53
5	499.23	73.53	-12.80
6	518.73	69.10	-9.07
7	538.48	65.95	-5.33
8	558.39	64.09	-1.60
9	578.38	63.53	2.13
10	598.37	64.28	5.87
11	618.27	66.32	9.60
12	637.99	69.66	13.33
13	657.45	74.27	17.07
14	676.57	80.14	20.80
15	695.26	87.24	24.53
16	713.46	95.54	28.26
17	731.07	105.01	32.00
18	748.03	115.61	35.73
19	764.27	127.29	39.46
20	779.71	140.00	43.20
21	794.29	153.69	46.93
22	807.95	168.30	50.66
23	812.03	173.28	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.658

X-CENTER = 628.81
Y-CENTER = 280.15

RADIUS = 216.15

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	501.27	105.64	-33.51
2	517.94	94.60	-28.21
3	535.57	85.15	-22.90
4	553.99	77.36	-17.60
5	573.05	71.31	-12.30
6	592.60	67.05	-6.99
7	612.45	64.62	-1.69
8	632.44	64.03	3.61
9	652.40	65.29	8.92
10	672.16	68.39	14.22
11	691.54	73.30	19.52
12	710.39	79.99	24.83
13	728.55	88.38	30.13
14	745.84	98.42	35.43
15	762.14	110.02	40.74
16	777.29	123.07	46.04
17	791.18	137.47	51.34
18	803.67	153.09	56.65
19	814.67	169.79	61.95
20	816.95	174.07	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.668

X-CENTER = 513.14

Y-CENTER = 403.63

RADIUS = 337.90

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	356.96	103.99	-25.83
2	374.96	95.27	-22.44
3	393.45	87.64	-19.05
4	412.35	81.11	-15.66
5	431.61	75.71	-12.27
6	451.16	71.46	-8.87
7	470.92	68.38	-5.48
8	490.82	66.47	-2.09
9	510.81	65.74	1.30
10	530.81	66.19	4.69
11	550.74	67.83	8.09
12	570.54	70.64	11.48
13	590.14	74.62	14.87
14	609.47	79.75	18.26
15	628.46	86.02	21.65
16	647.05	93.40	25.04
17	665.17	101.87	28.44
18	682.76	111.39	31.83
19	699.75	121.94	35.22
20	716.09	133.47	38.61

21	731.72	145.95	42.00
22	746.58	159.34	45.40
23	757.18	170.09	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.671

X-CENTER = 520.87

Y-CENTER = 461.54

RADIUS = 396.63

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	349.37	103.90	-24.18
2	367.61	95.71	-21.29
3	386.25	88.45	-18.40
4	405.23	82.14	-15.51
5	424.50	76.79	-12.62
6	444.02	72.42	-9.73
7	463.73	69.04	-6.84
8	483.59	66.66	-3.95
9	503.54	65.29	-1.06
10	523.54	64.92	1.83
11	543.53	65.55	4.72
12	563.46	67.20	7.61
13	583.28	69.85	10.50
14	602.95	73.49	13.39
15	622.40	78.12	16.28
16	641.60	83.73	19.17
17	660.49	90.29	22.06
18	679.03	97.80	24.95
19	697.16	106.24	27.83
20	714.85	115.58	30.72
21	732.04	125.80	33.61
22	748.70	136.87	36.50
23	764.77	148.77	39.39
24	780.23	161.46	42.28
25	791.25	171.48	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.673

X-CENTER = 550.09

Y-CENTER = 473.63

RADIUS = 407.15

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	379.75	103.82	-23.32
2	398.11	95.90	-20.51

3	416.85	88.89	-17.70
4	435.90	82.81	-14.88
5	455.23	77.68	-12.07
6	474.79	73.50	-9.25
7	494.53	70.28	-6.44
8	514.40	68.04	-3.62
9	534.36	66.78	-.81
10	554.36	66.50	2.01
11	574.35	67.20	4.82
12	594.28	68.88	7.64
13	614.10	71.54	10.45
14	633.77	75.16	13.27
15	653.23	79.75	16.08
16	672.45	85.29	18.90
17	691.37	91.77	21.71
18	709.95	99.17	24.53
19	728.15	107.47	27.34
20	745.91	116.66	30.16
21	763.21	126.70	32.97
22	779.99	137.59	35.78
23	796.21	149.28	38.60
24	811.84	161.76	41.41
25	826.84	174.99	44.23
26	827.66	175.79	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.686

X-CENTER = 601.31

Y-CENTER = 409.46

RADIUS = 341.84

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	448.10	103.89	-24.95
2	466.24	95.45	-21.60
3	484.83	88.09	-18.25
4	503.83	81.82	-14.89
5	523.15	76.68	-11.54
6	542.75	72.68	-8.19
7	562.54	69.83	-4.84
8	582.47	68.15	-1.48
9	602.47	67.63	1.87
10	622.46	68.28	5.22
11	642.37	70.10	8.58
12	662.15	73.09	11.93
13	681.72	77.22	15.28
14	701.01	82.49	18.63
15	719.96	88.88	21.99
16	738.51	96.37	25.34
17	756.58	104.93	28.69
18	774.13	114.53	32.04
19	791.08	125.14	35.40
20	807.38	136.73	38.75
21	822.98	149.24	42.10

22	837.82	162.65	45.46
23	850.96	176.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.697

X-CENTER = 569.92
Y-CENTER = 506.98
RADIUS = 442.64

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	387.34	103.76	-23.07
2	405.74	95.92	-20.48
3	424.48	88.92	-17.89
4	443.51	82.78	-15.30
5	462.80	77.50	-12.71
6	482.31	73.10	-10.12
7	502.00	69.59	-7.53
8	521.83	66.97	-4.94
9	541.76	65.24	-2.35
10	561.74	64.42	.24
11	581.74	64.50	2.82
12	601.71	65.49	5.41
13	621.63	67.38	8.00
14	641.43	70.16	10.59
15	661.09	73.84	13.18
16	680.56	78.40	15.77
17	699.81	83.83	18.36
18	718.79	90.13	20.95
19	737.47	97.28	23.54
20	755.81	105.27	26.13
21	773.76	114.08	28.72
22	791.30	123.69	31.30
23	808.39	134.08	33.89
24	824.99	145.23	36.48
25	841.07	157.12	39.07
26	856.60	169.73	41.66
27	863.80	176.13	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.699

X-CENTER = 568.36
Y-CENTER = 327.93
RADIUS = 254.28

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	448.10	103.89	-25.97

1

Y	A	X	I	S	
50.00	171.00	292.00	413.00	534.00	655.00

X	.00	L****	-----+-----+-----+-----+-----+
		-	.
		-	..
		-	..
		-	...
		-	...
	121.00	+	...
		-	
		-	*..
		-	
		-	*...
			
A	242.00		
			
			
			
			
			6
X	363.00		****
			...65
			...57
			..57*
			..573
			..53*.
I	484.00		.5312.
			.512.*
			.51.4*
			.124...
			.12...*
			.15....
S	605.00		.1*....*
			.165....

```

      .1265...*
      ..125...
      ..1265...*
      ..41265..
726.00 ...412655*
      ....411605*
      .....431205
      .....43132
      -.....8.1*
      -.....8.*
847.00 + .*.....8*
      - .....9
      - .....
      - .....
      - .....
      - .....
968.00 L***W      .*
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GEOSLOPE
Version 4.0

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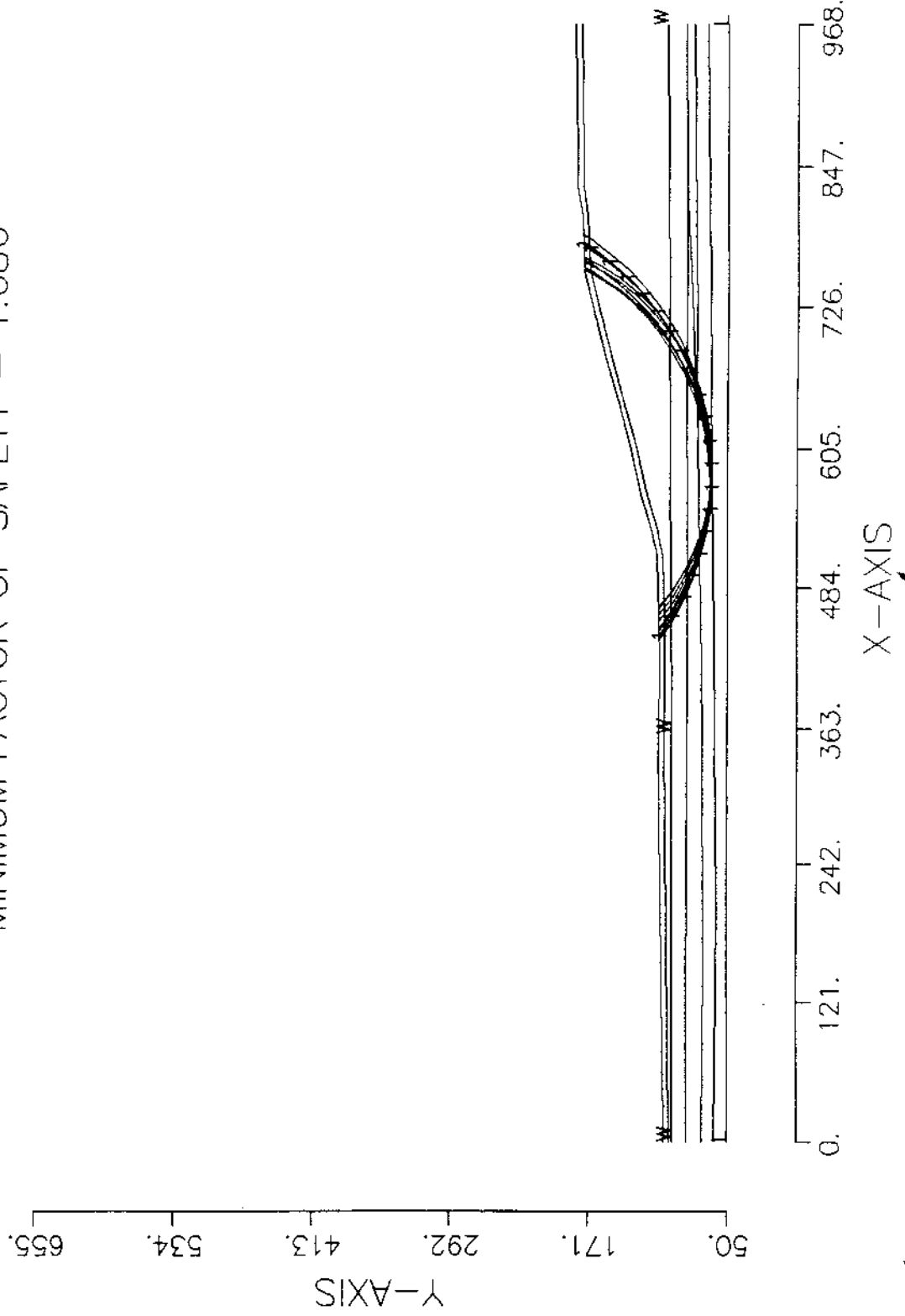
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West Chester, PA

FINAL (CAPPED) TOPOGRAPHY

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY DRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.686



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 FINAL TOPOGRAPHY DRAINED ANALYSIS

41 15

0. 105. 358. 109. 1
 358. 109. 418. 108.5 1
 418. 108.5 457. 109. 1
 457. 109. 511. 111. 1
 511. 111. 532. 115. 1
 532. 115. 564. 125. 1
 564. 125. 608. 135. 1
 608. 135. 644. 145. 1
 644. 145. 680. 155. 1
 680. 155. 717. 165. 1
 717. 165. 755. 175. 1
 755. 175. 804. 177. 1
 804. 177. 829. 181. 1
 829. 181. 854. 181. 1
 854. 181. 968. 182.5 1

0. 100. 358. 104. 2
 358. 104. 418. 103.5 2
 418. 103.5 457. 104. 2
 457. 104. 511. 106. 2
 511. 106. 532. 110. 2
 532. 110. 564. 120. 2
 564. 120. 608. 130. 2
 608. 130. 644. 140. 2
 644. 140. 680. 150. 2
 680. 150. 717. 160. 2
 717. 160. 755. 170. 2
 755. 170. 804. 172. 2
 804. 172. 829. 176. 2
 829. 176. 854. 176. 2
 854. 176. 968. 177.5 2

0. 85. 358. 84. 3
 358. 84. 838. 85. 3
 838. 85. 968. 86. 4
 0. 72. 158. 70.5 5
 158. 70.5 358. 71. 5
 358. 71. 613. 75. 5
 613. 75. 838. 85. 4
 613. 75. 968. 79. 5
 0. 61. 200. 58.5 6
 200. 58.5 358. 60. 6
 358. 60. 968. 67. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1
 88.0 88.0 0.0 20. 0. 0. 1
 104.0 104.0 0.0 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

3

0. 98.

358. 98.

968. 102.5

LIMITS

1 1

0. 50. 968. 50.
CIRCL2
50 10
438. 488. 755. 968.
20. 20. 0. 0.
END

CL4FDB.DAT

SECTION 4-4 FINAL DRAINED ANALYSIS

PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 FINAL TOPOGRAPHY DRAINED ANALYSIS

41 15

0. 105. 358. 109. 1
 358. 109. 418. 108.5 1
 418. 108.5 457. 109. 1
 457. 109. 511. 111. 1
 511. 111. 532. 115. 1
 532. 115. 564. 125. 1
 564. 125. 608. 135. 1
 608. 135. 644. 145. 1
 644. 145. 680. 155. 1
 680. 155. 717. 165. 1
 717. 165. 755. 175. 1
 755. 175. 804. 177. 1
 804. 177. 829. 181. 1
 829. 181. 854. 181. 1
 854. 181. 968. 182.5 1
 0. 100. 358. 104. 2
 358. 104. 418. 103.5 2
 418. 103.5 457. 104. 2
 457. 104. 511. 106. 2
 511. 106. 532. 110. 2
 532. 110. 564. 120. 2
 564. 120. 608. 130. 2
 608. 130. 644. 140. 2
 644. 140. 680. 150. 2
 680. 150. 717. 160. 2
 717. 160. 755. 170. 2
 755. 170. 804. 172. 2
 804. 172. 829. 176. 2
 829. 176. 854. 176. 2
 854. 176. 968. 177.5 2
 0. 85. 358. 84. 3
 358. 84. 838. 85. 3
 838. 85. 968. 86. 4
 0. 72. 158. 70.5 5
 158. 70.5 358. 71. 5
 358. 71. 613. 75. 5
 613. 75. 838. 85. 4
 613. 75. 968. 79. 5
 0. 61. 200. 58.5 6
 200. 58.5 358. 60. 6
 358. 60. 968. 67. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1
 88.0 88.0 0.0 20. 0. 0. 1
 104.0 104.0 0.0 16. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

3

0. 98.

358. 98.

968. 102.5

LIMITS

1 1

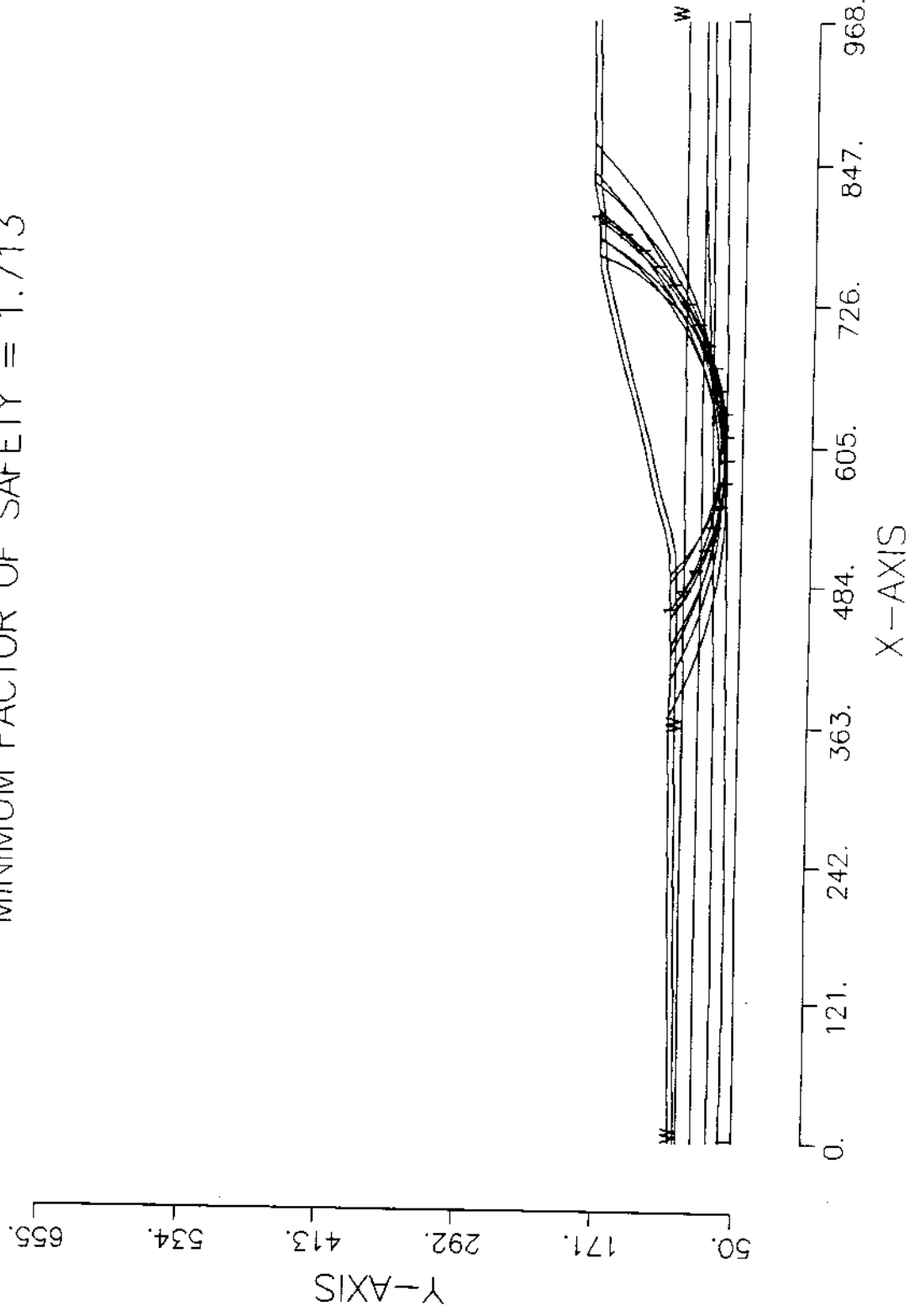
0. 50. 968. 50.
CIRCL2
80 10
0. 600. 755. 968.
20. 20. 0. 0.
END

CL4FDA.DAT

SECTION 4-4 FINAL DRAINED ANALYSIS

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY DRAINED ANALYSIS
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.713



Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY DRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
41 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	105.00	358.00	109.00	1
2	358.00	109.00	418.00	108.50	1
3	418.00	108.50	457.00	109.00	1
4	457.00	109.00	511.00	111.00	1
5	511.00	111.00	532.00	115.00	1
6	532.00	115.00	564.00	125.00	1
7	564.00	125.00	608.00	135.00	1
8	608.00	135.00	644.00	145.00	1
9	644.00	145.00	680.00	155.00	1
10	680.00	155.00	717.00	165.00	1
11	717.00	165.00	755.00	175.00	1
12	755.00	175.00	804.00	177.00	1
13	804.00	177.00	829.00	181.00	1
14	829.00	181.00	854.00	181.00	1
15	854.00	181.00	968.00	182.50	1
16	.00	100.00	358.00	104.00	2
17	358.00	104.00	418.00	103.50	2
18	418.00	103.50	457.00	104.00	2
19	457.00	104.00	511.00	106.00	2
20	511.00	106.00	532.00	110.00	2
21	532.00	110.00	564.00	120.00	2
22	564.00	120.00	608.00	130.00	2
23	608.00	130.00	644.00	140.00	2
24	644.00	140.00	680.00	150.00	2
25	680.00	150.00	717.00	160.00	2
26	717.00	160.00	755.00	170.00	2
27	755.00	170.00	804.00	172.00	2
28	804.00	172.00	829.00	176.00	2
29	829.00	176.00	854.00	176.00	2
30	854.00	176.00	968.00	177.50	2
31	.00	85.00	358.00	84.00	3
32	358.00	84.00	838.00	85.00	3
33	838.00	85.00	968.00	86.00	4
34	.00	72.00	158.00	70.50	5

35	158.00	70.50	358.00	71.00	5
36	358.00	71.00	613.00	75.00	5
37	613.00	75.00	838.00	85.00	4
38	613.00	75.00	968.00	79.00	5
39	.00	61.00	200.00	58.50	6
40	200.00	58.50	358.00	60.00	6
41	358.00	60.00	968.00	67.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	98.00
2	358.00	98.00
3	968.00	102.50

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	50.00	968.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM

TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN $X = .00$
AND $X = 600.00$

EACH SURFACE TERMINATES BETWEEN $X = 755.00$
AND $X = 968.00$

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS $Y = 20.00$

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.713

X-CENTER = 601.62
Y-CENTER = 292.21
RADIUS = 229.38

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	463.29	109.23	-34.59
2	479.76	97.88	-29.59
3	497.15	88.00	-24.60
4	515.33	79.68	-19.60
5	534.17	72.97	-14.60
6	553.53	67.93	-9.60
7	573.25	64.59	-4.61
8	593.18	62.99	.39
9	613.18	63.12	5.39
10	633.09	65.00	10.38
11	652.77	68.60	15.38
12	672.05	73.91	20.38

438, 488

13	690.80	80.87	25.38
14	708.87	89.45	30.37
15	726.12	99.56	35.37
16	742.43	111.14	40.37
17	757.67	124.09	45.36
18	771.72	138.32	50.36
19	784.48	153.72	55.36
20	795.85	170.18	60.36
21	799.63	176.82	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	466.73	6.88	2150.39	.00	.00	3490.14	1273.29
2	474.23	8.12	6993.04	.00	.00	10808.25	3355.26
3	479.03	1.46	1666.20	.00	56.47	2503.39	777.14
4	488.45	17.39	27876.71	.00	7514.73	29796.66	9249.92
5	501.19	8.07	17631.07	.00	7149.10	14268.78	4429.53
6	508.11	5.78	14199.59	.00	6392.72	10403.95	2578.38
7	513.17	4.33	11632.12	.00	5493.81	8232.93	2040.34
8	523.67	16.67	52685.09	.00	24850.74	34081.42	8446.29
9	532.02	.04	143.14	.00	68.68	91.31	22.63
10	533.11	2.13	7670.14	.00	3666.91	4758.53	796.65
11	543.85	19.35	80678.13	.00	36094.27	49432.08	8275.64
12	558.76	10.47	51322.31	.00	21496.74	31445.86	5264.49
13	568.62	9.25	48956.29	.00	20005.53	30510.93	5107.97
14	583.22	19.94	114212.60	.00	44769.11	70768.31	11847.63
15	600.59	14.82	90821.42	.00	33980.52	56778.24	9505.49
16	610.50	5.00	31584.22	.00	11469.12	20092.91	3363.84
17	613.09	.18	1168.60	.00	420.59	747.18	125.09
18	623.14	19.91	129515.90	.00	44797.14	83967.76	14057.41
19	638.55	10.91	72558.10	.00	23570.31	48701.93	8153.40
20	648.38	8.77	58653.66	.00	17987.65	40403.20	6764.08
21	662.41	19.28	128232.00	.00	36177.39	92555.80	15495.17
22	674.49	4.87	31945.30	.00	8279.15	24288.58	4066.26
23	678.46	3.08	19991.75	.00	4928.16	15198.64	3229.74
24	681.70	3.41	22048.70	.00	5195.67	16984.44	3609.22
25	687.10	7.39	47429.38	.00	10293.36	36905.25	9146.11
26	694.84	8.09	51129.82	.00	9881.54	41795.35	10358.01
27	703.88	9.98	61647.96	.00	9289.98	51376.33	15949.01
28	712.93	8.13	48709.01	.00	5169.22	43393.73	13470.93
29	721.56	9.12	52650.80	.00	2506.23	49512.38	15370.38
30	726.95	1.65	9265.05	.00	72.98	9250.63	2871.72
31	735.10	14.66	78165.42	.00	.00	78548.30	24384.14
32	748.72	12.57	60002.08	.00	.00	62309.30	19342.99
33	756.34	2.67	11734.50	.00	.00	12185.71	3782.87
34	764.70	14.05	52838.83	.00	.00	57216.06	17761.87
35	778.10	12.76	33411.41	.00	.00	38097.34	11826.75
36	790.17	11.37	15732.46	.00	.00	19096.52	5928.23
37	796.28	.87	594.44	.00	.00	777.63	241.40
38	798.18	2.91	910.34	.00	.00	1121.54	409.17

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.717

X-CENTER = 594.45
Y-CENTER = 301.92
RADIUS = 237.65

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	108.98	-33.31
2	472.41	98.00	-28.49
3	489.99	88.46	-23.66
4	508.31	80.43	-18.84
5	527.24	73.97	-14.02
6	546.64	69.13	-9.19
7	566.38	65.93	-4.37
8	586.33	64.41	.45
9	606.32	64.57	5.28
10	626.24	66.41	10.10
11	645.93	69.91	14.92
12	665.26	75.06	19.75
13	684.08	81.82	24.57
14	702.27	90.14	29.39
15	719.69	99.95	34.22
16	736.23	111.20	39.04
17	751.77	123.80	43.86
18	766.18	137.66	48.69
19	779.39	152.68	53.51
20	791.28	168.76	58.34
21	796.17	176.68	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.724

X-CENTER = 597.15
Y-CENTER = 309.27
RADIUS = 245.20

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	108.98	-32.89
2	472.49	98.12	-28.22
3	490.11	88.66	-23.55
4	508.45	80.67	-18.87
5	527.37	74.21	-14.20
6	546.76	69.30	-9.52
7	566.49	65.99	-4.85
8	586.42	64.30	-.17
9	606.42	64.24	4.50
10	626.35	65.81	9.18
11	646.10	69.00	13.85
12	665.52	73.79	18.53
13	684.48	80.15	23.20
14	702.86	88.03	27.88
15	720.54	97.38	32.55
16	737.40	108.14	37.23

17	753.32	120.24	41.90
18	768.21	133.60	46.58
19	781.96	148.12	51.25
20	794.48	163.72	55.93
21	803.44	176.98	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 24 COORDINATE POINTS

SAFETY FACTOR = 1.761

X-CENTER = 591.01

Y-CENTER = 368.69

RADIUS = 304.29

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	432.91	108.69	-29.42
2	450.33	98.87	-25.65
3	468.36	90.21	-21.89
4	486.92	82.75	-18.12
5	505.93	76.53	-14.35
6	525.30	71.57	-10.59
7	544.96	67.90	-6.82
8	564.82	65.52	-3.06
9	584.79	64.46	.71
10	604.79	64.71	4.48
11	624.73	66.27	8.24
12	644.52	69.13	12.01
13	664.09	73.30	15.78
14	683.33	78.73	19.54
15	702.18	85.42	23.31
16	720.55	93.34	27.08
17	738.36	102.44	30.84
18	755.53	112.70	34.61
19	771.99	124.06	38.38
20	787.67	136.47	42.14
21	802.50	149.89	45.91
22	816.41	164.26	49.67
23	829.36	179.50	53.44
24	830.47	181.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 18 COORDINATE POINTS

SAFETY FACTOR = 1.802

X-CENTER = 609.44

Y-CENTER = 229.90

RADIUS = 166.41

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	493.67	110.36	-40.64

2	508.85	97.33	-33.75
3	525.48	86.22	-26.85
4	543.32	77.19	-19.96
5	562.12	70.36	-13.07
6	581.60	65.84	-6.18
7	601.49	63.68	.71
8	621.48	63.93	7.60
9	641.31	66.57	14.49
10	660.67	71.58	21.38
11	679.30	78.87	28.27
12	696.91	88.34	35.16
13	713.26	99.85	42.05
14	728.11	113.25	48.94
15	741.25	128.33	55.83
16	752.48	144.88	62.72
17	761.65	162.65	69.61
18	766.41	175.47	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.804

X-CENTER = 590.72

Y-CENTER = 296.20

RADIUS = 226.26

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	463.29	109.23	-31.74
2	480.30	98.71	-26.68
3	498.17	89.73	-21.61
4	516.77	82.37	-16.54
5	535.94	76.67	-11.48
6	555.54	72.69	-6.41
7	575.41	70.46	-1.35
8	595.41	69.99	3.72
9	615.36	71.28	8.79
10	635.13	74.34	13.85
11	654.55	79.13	18.92
12	673.47	85.61	23.98
13	691.74	93.74	29.05
14	709.22	103.45	34.12
15	725.78	114.67	39.18
16	741.29	127.31	44.25
17	755.61	141.26	49.31
18	768.65	156.43	54.38
19	780.30	172.68	59.45
20	782.32	176.12	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.809

X-CENTER = 606.82
Y-CENTER = 261.54
RADIUS = 193.70

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	486.08	110.08	-35.60
2	502.34	98.43	-29.68
3	519.71	88.53	-23.76
4	538.02	80.47	-17.85
5	557.06	74.34	-11.93
6	576.62	70.21	-6.01
7	596.51	68.11	-.09
8	616.51	68.08	5.83
9	636.41	70.11	11.75
10	655.99	74.19	17.67
11	675.05	80.25	23.58
12	693.38	88.26	29.50
13	710.79	98.11	35.42
14	727.08	109.70	41.34
15	742.10	122.91	47.26
16	755.67	137.60	53.18
17	767.66	153.61	59.09
18	777.93	170.77	65.01
19	780.39	176.04	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.821

X-CENTER = 574.90
Y-CENTER = 370.51
RADIUS = 301.63

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	425.32	108.59	-27.83
2	443.00	99.26	-24.03
3	461.27	91.11	-20.23
4	480.04	84.20	-16.43
5	499.22	78.54	-12.63
6	518.74	74.16	-8.83
7	538.50	71.09	-5.03
8	558.42	69.34	-1.23
9	578.42	68.91	2.57
10	598.40	69.80	6.37
11	618.27	72.02	10.17
12	637.96	75.55	13.97
13	657.37	80.38	17.77
14	676.41	86.48	21.57
15	695.01	93.83	25.37
16	713.09	102.40	29.17
17	730.55	112.15	32.97
18	747.33	123.03	36.77
19	763.35	135.00	40.57

20	778.54	148.01	44.37
21	792.84	161.99	48.17
22	806.18	176.90	51.97
23	806.59	177.41	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.850

X-CENTER = 556.22

Y-CENTER = 461.81

RADIUS = 398.05

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	372.15	108.88	-26.10
2	390.11	100.08	-23.23
3	408.49	92.19	-20.35
4	427.24	85.24	-17.47
5	446.32	79.24	-14.59
6	465.68	74.20	-11.71
7	485.26	70.14	-8.83
8	505.02	67.07	-5.95
9	524.92	65.00	-3.07
10	544.89	63.93	-1.19
11	564.89	63.86	2.69
12	584.87	64.80	5.57
13	604.77	66.74	8.45
14	624.55	69.68	11.32
15	644.16	73.60	14.20
16	663.55	78.51	17.08
17	682.67	84.39	19.96
18	701.47	91.21	22.84
19	719.90	98.98	25.72
20	737.92	107.66	28.60
21	755.48	117.23	31.48
22	772.54	127.67	34.36
23	789.05	138.96	37.24
24	804.97	151.06	40.12
25	820.26	163.95	43.00
26	834.89	177.59	45.88
27	838.20	181.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.870

X-CENTER = 582.88

Y-CENTER = 461.82

RADIUS = 396.58

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
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1

Y	A	X	I	S	
50.00	171.00	292.00	413.00	534.00	655.00

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APPENDIX E

**LABORATORY SHEAR STRENGTH DATA
EMPIRE SOILS INVESTIGATIONS INC.**



GEOTECHNICAL TESTING REPORT
CLARKSTOWN LANDFILL RI/FS

For:

Charles R. Veltzy Associates, Inc.
Valhalla, New York

JOB NO. G050.001
MAY, 1991



May 22, 1991

Mr. George T. Suttie
Charles R. Velzy Associates, Inc.
Sutton Park - Suite 180
465 Columbus Avenue
Valhalla, New York 10595

Reference: Geotechnical Testing, Contaminated Soil Samples
Clarkstown Landfill RI/FS - W. O. #3238-10-01

Dear Mr. Suttie:

Transmitted herewith are two (2) copies of the geotechnical testing report for Triaxial compression tests performed on tube samples from the subject project. The study was performed under subcontract with Roy F. Weston, Inc. on basis of our proposal letter of September 27, 1990, to Mr. Russell Frye of Roy F. Weston ETL.

A total of ten (10) thin wall tube samples were received at our laboratory in Middleport, New York on March 12, 1991. Exterior examination of the tube samples indicated that they arrived in good condition with no signs of broken seals or leakage. The samples were catalogued with lab numbers in accord with the preliminary classification indicated on the Chain-of-Custody document as follows:

<u>MATERIAL TYPE</u>	<u>SAMPLE IDENTIFICATION</u>	<u>LAB NO.</u>
A, PEAT	RFW-7B-SH1	671.001
	RFW-7B-SH2	671.002
B, SILT	RFW-8D-SH1	671.003
	RFW-8D-SH2	671.004
	RFW-6S-SH1	671.005
	RFW-6D-SH1	671.006
C, CLAY	RFW-8D-SH3	671.007
	RFW-8D-SH4	671.008
	RFW-7D-SH5	671.009
	RFW-7D-SH6	671.010

In accordance with the instructions received on the Custody Transfer Record/Lab Work Request isotopically consolidated undrained Triaxial tests and unconsolidated undrained Triaxial tests were to be performed on each of the three types of material. also, any lithologic changes observed within the tube samples should be noted. Instructions regarding the net



confining pressures to be used in the tests were obtained from Bill Deutsche of Roy F. Weston, Inc.

A log has been prepared for each sample as it was extruded from the tube. The log presents a visual description of the material, the condition of the material, and the location of Triaxial specimens within the tube.

Three (3) CIU specimens were obtained from Lab No. 671.001 (RFW-7B-SH1). The material consisted of silty peat with water contents in the range of 268 to 328 percent. Some wax intrusion at the top of the tube necessitated minor patching of the upper specimen.

Lab No. 671.002 (RFW-7B-SH2) contained highly organic silt with water contents ranging from 93 to 114 percent. The upper 6.5 inches of this tube contained disturbed fill material. For this reason only two suitable UU specimens could be prepared from this tube. Cu = 30

Twenty inches of recovery in Lab No. 671.003 (RFW-8D-SH1) permitted trimming of three good CIU specimens. With water contents ranging from 122 to 206 percent the material is characterized as amorphous peat with a higher and more variable silt content than found in Lab No. 671.001. Occasional blotches of bright blue contaminant was observed on the surface of the specimens.

Due to poor sample recovery and disturbed fill material in the upper 5.5 inches of Lab No. 671.005 (RFW-6S-SH1), only one UU specimen could be obtained from this tube. Lithologically this material is similar to the silty peat in Lab No. 671.001 and 671.003. A slightly inclined transition to brown micaceous silt with trace of clay and fine sand was observed at the very bottom of the sample.

Lab No. 671.006 (RFW-6D-SH1) provided the remaining two UU specimens for the test on type B material, however, the water contents of 53 and 92 percent indicate a very substantial change in lithology. The lower 6 inches of this sample was highly organic silt differing from other specimens of similar description in that the organics were horizontal laminations of decayed leaves. It is doubtful that the remaining recovery from this tube will provide another suitable test specimen.

The grey clayey silt with trace of organics contained in Lab No. 671.007 (RFW-8D-SH3) and Lab No. 671.008 (RFW-8D-SH4) provided three CIU specimens with water contents ranging from 53 to 68 percent. Due to gouging in the side of the lower 6 inches of the sample only two specimens could be trimmed from Lab No. 671.007. Uneven consolidation of the upper specimens is indicative of some sample disturbance that was not obvious during specimen preparation. The upper 14 inches of Lab No. 671.008 was very soft and disturbed, and the third specimen was successfully trimmed from



the lower 10 inches. A piece of aluminum foil embedded in the side of the specimen was removed prior to testing. Even though the material was soft an unusual characteristic was observed in the form of numerous closely spaced vertical fissures which gave the material a blocky structure usually present only in heavily overconsolidated materials. Rust staining was noted along the fissures.

Three successful UU specimens were trimmed from Lab No. 671.009 (RFW-7D-SH5). This material was a brown silt with little clay and fine sand and water content ranging from 42 to 55 percent. The fissuring observed in Lab Nos. 671.007 and 671.008 was not present in this tube. Approximately 7 inches of recovery from this sample remains in the tube.

Of the samples in the original shipment two tubes, Lab No. 671.004 (RFW-8D-SH2) and Lab No. 671.010 (RFW-7D-SH6) have not been used and remain available for additional testing.

The unconsolidated undrained Triaxial tests have been performed in accordance with ASTM Designation D 2850. The results of the three tests performed show a very substantial variation in the measured shear strength. This is partially due to the difficulty in obtaining undisturbed samples of highly organic fibrous materials, and partly due to rapidly changing lithology within the samples.

Isotopically consolidated undrained Triaxial compression tests were performed in general accord with ASTM Designation D 4767 and "The Measurement of Soil Properties in the Triaxial Compression Test" by A. W. Bishop and D. J. Henkel, Second Edition, 1962. The only major deviation in procedure was in the selection of rate of shearing. For highly organic and compressible materials subject to significant secondary compression, research performed at the Waterways Experiment Station has resulted in recommendation that failure be achieved in from 2 to 4 hours in order to minimize the effect of creep-induced pore pressure during shear.

Saturation of the test specimens was achieved using a backpressure of 50 psi and a net confining pressure of about 2 psi. The pore pressure response measured the morning after specimen set up ranged from 96% to 100%. Following the saturation check the cell pressure was increased to the appropriate consolidation pressure and the consolidation stage was initiated. The quantity of water expelled from the specimen during consolidation ranged from 25 to 41 cm³ for the lowest consolidation pressure to 80 to 92 cm³ for the highest consolidation pressure. During consolidation of the first specimen from Lab No. 671.003 it became evident that a pinhole had developed in the membrane. Consolidation was interrupted for about one hour while the cell was dismantled to install a new membrane. The rate of shearing selected was 0.07%/min. for materials "A" and "C" and 0.16%/min. for material "B". The faster rate for material "B" was selected to determine if creep-induced pore pressures influenced the test results.



We have concluded that other factors also influenced the test results. It is our carefully considered opinion that fibrous organic content in materials "A" and "B" serves as reinforcement so that the observed pore pressures are incompatible with the measured shear stresses. We therefore recommend that the results of the consolidated undrained tests be applied only in terms of total stress parameters in conjunction with estimated pore pressures or pore pressures observed in the field during construction.

Should you have any questions, or in case we may be of further service, do not hesitate to contact the undersigned at 716-735-3400.

Respectfully submitted,

EMPIRE SOILS INVESTIGATIONS, INC.

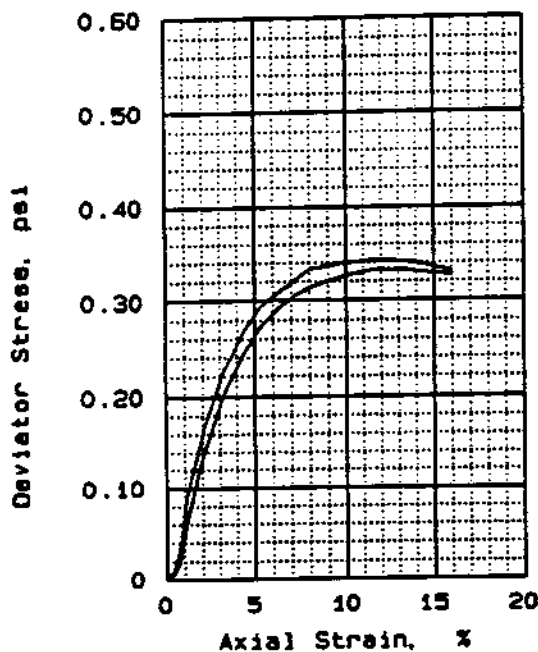
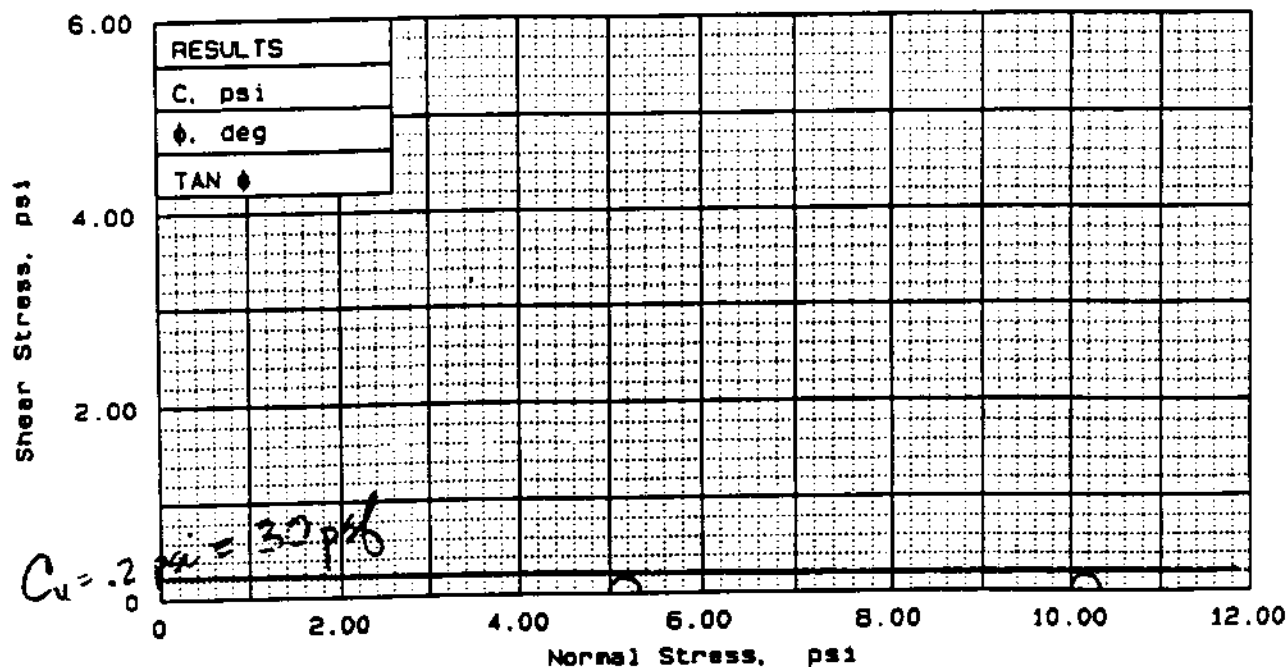
A handwritten signature in dark ink, appearing to read "Jørgen F. Christiansen". The signature is fluid and cursive, written over the printed name.

Jørgen F. Christiansen, P.E.
Director, Geotechnical Testing

JFC/lkn

Enclosures

APPENDIX A
UNCONSOLIDATED-UNDRAINED TRIAXIAL TESTS



TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: 3" SHELBY TUBE

DESCRIPTION: DARK BROWN ORGANIC SILT

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS ASSUMED

LAB NO. 671.002

FIG. NO. 1

SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	114.2	92.9
	DRY DENSITY, pcf	39.9	46.6
	SATURATION, %	96.1	96.6
	VOID RATIO	3.150	2.549
	DIAMETER, in	2.82	2.82
	HEIGHT, in	5.62	5.63
AT TEST	WATER CONTENT, %	113.8	92.7
	DRY DENSITY, pcf	39.9	46.6
	SATURATION, %	95.8	96.4
	VOID RATIO	3.150	2.549
	DIAMETER, in	2.82	2.82
	HEIGHT, in	5.62	5.63
BACK PRESSURE, psi		0.00	0.00
CELL PRESSURE, psi		10.00	5.00
FAILURE STRESS, psi		0.33	0.34
PORE PRESSURE, psi			
STRAIN RATE, %/min.		0.801	0.799
ULTIMATE STRESS, psi			
PORE PRESSURE, psi			
σ_1 FAILURE, psi		10.33	5.34
σ_3 FAILURE, psi		10	5

CLIENT: ROY WESTON ETL

LIONVILLE, PA.

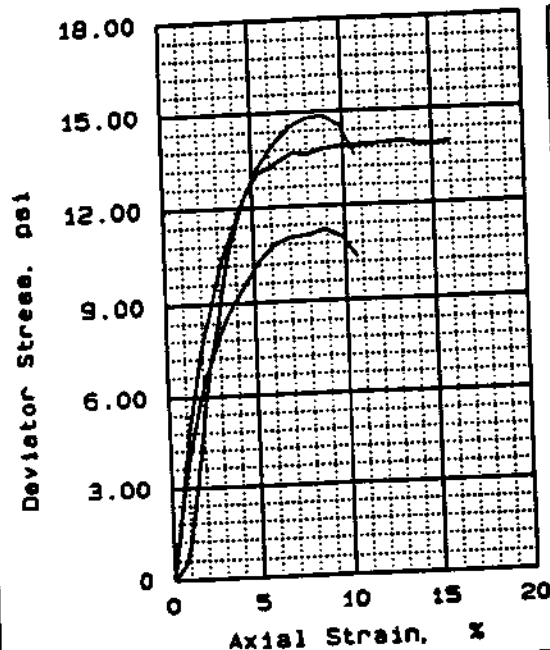
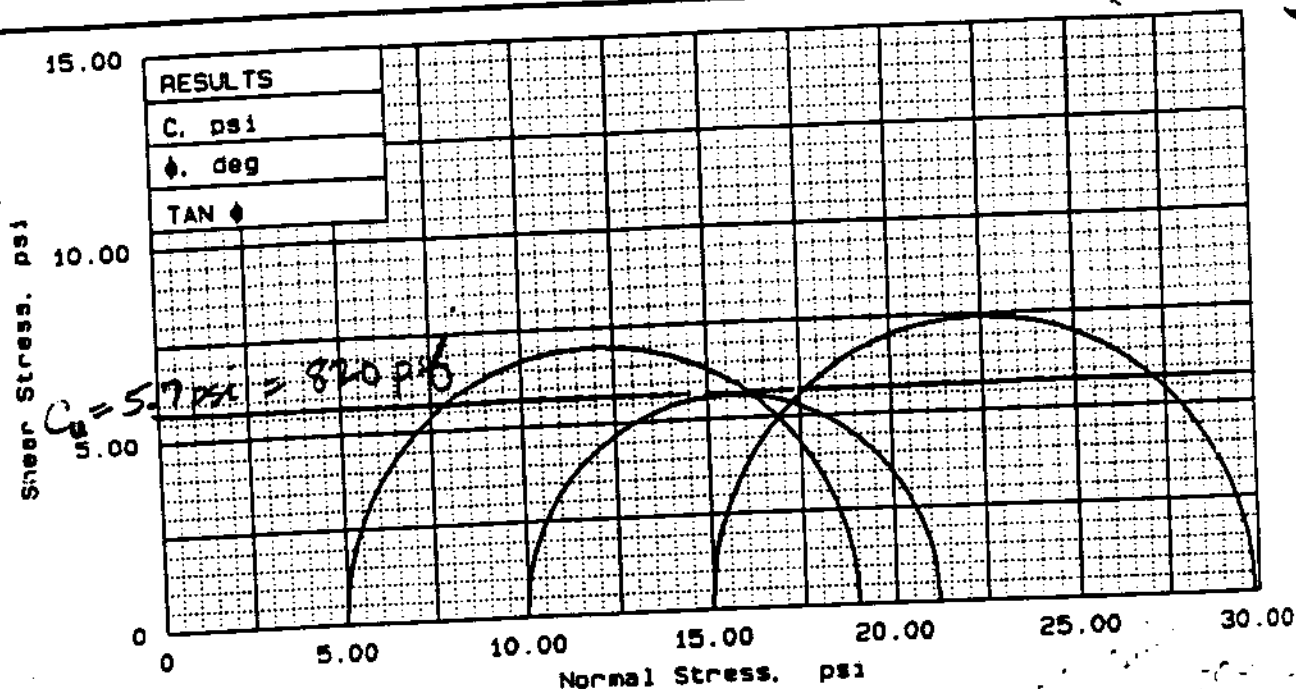
PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-7B / SH-2 / 25' - 28'

PROJ. NO.: G050.001 DATE: MARCH 29, 1991

TRIAxIAL COMPRESSION TEST

EMPIRE SOILS INVESTIGATIONS, INC.



TYPE OF TEST:

Unconsolidated undrained
 SAMPLE TYPE: 3" SHELBY TUBE
 DESCRIPTION: BROWN PEAT AND
 ORGANIC SILT

LL= PL= PI=
 SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS
 ASSUMED

LAB NO. 671.005 & 671.006

FIG. NO.

SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	262.9	53.0	92.5
	DRY DENSITY, pcf	18.7	63.2	44.0
	SATURATION, %	88.6	86.7	89.0
	VOID RATIO	7.864	1.619	2.757
	DIAMETER, in	2.85	2.84	2.84
	HEIGHT, in	5.65	5.64	5.62
AT TEST	WATER CONTENT, %	262.2	52.8	92.3
	DRY DENSITY, pcf	18.7	63.2	44.0
	SATURATION, %	88.4	86.3	88.7
	VOID RATIO	7.864	1.619	2.757
	DIAMETER, in	2.85	2.84	2.84
	HEIGHT, in	5.65	5.64	5.62
BACK PRESSURE, psi		0.00	0.00	0.00
CELL PRESSURE, psi		5.00	10.00	15.00
FAILURE STRESS, psi		14.00	11.22	14.85
PORE PRESSURE, psi				
STRAIN RATE, %/min.		0.797	0.798	0.801
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
σ_1 FAILURE, psi		19.00	21.22	29.85
σ_3 FAILURE, psi		5	10	15

CLIENT: ROY WESTON ETL
 LIONVILLE, PA.

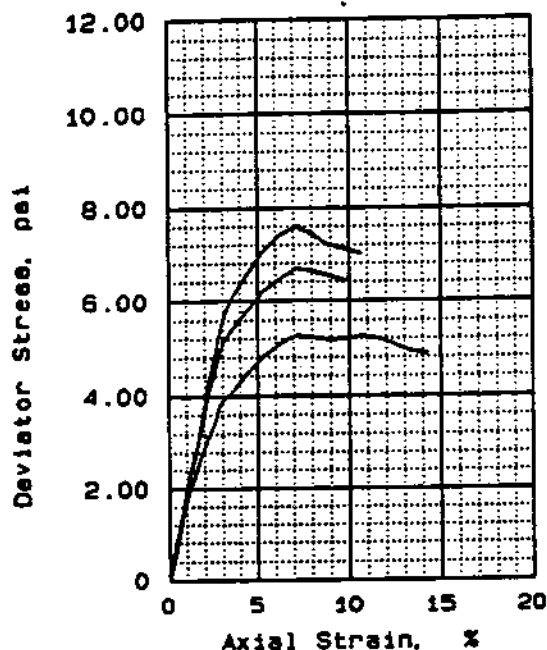
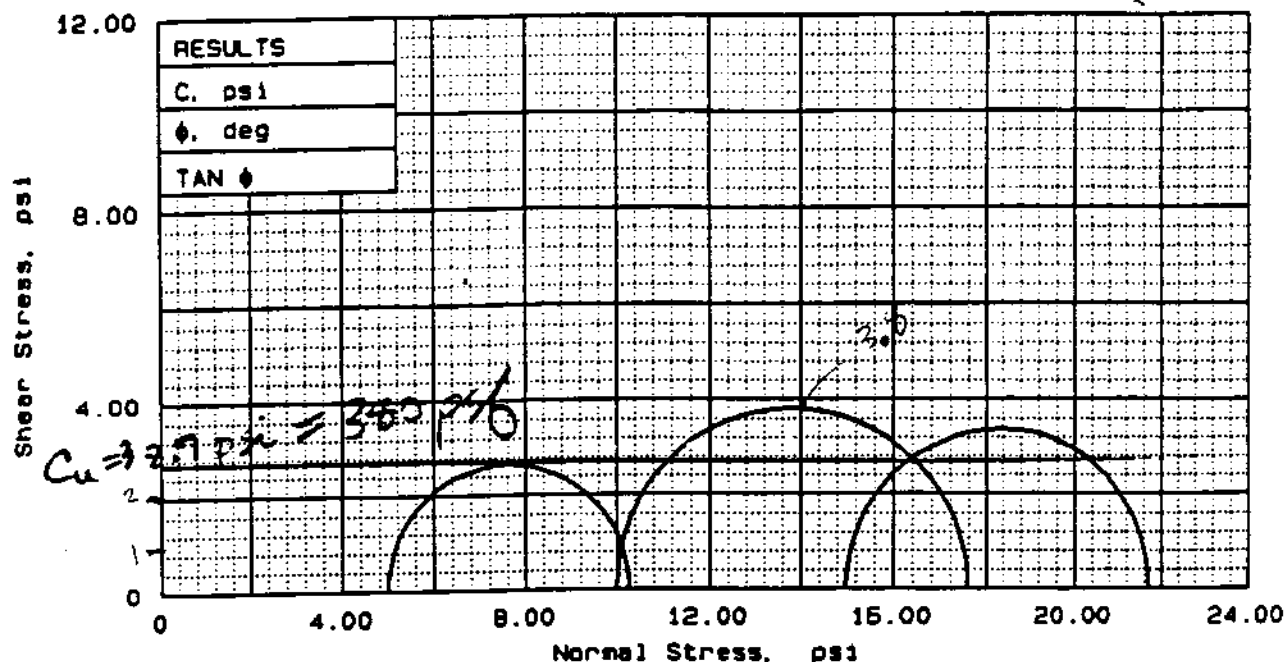
PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-6S / SH-1 / 20'-22'
 RFW-6D / SH-1 / 22'-24' SAMPLE 2 & 3

PROJ. NO.: G050.001 DATE: MARCH 29, 1991

TRIAxIAL COMPRESSION TEST

EMPIRE SOILS INVESTIGATIONS, INC.



TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: 3" SHELBY TUBE

DESCRIPTION: BROWN SILT, Some
to Little Clay

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS
ASSUMED

LAB NO. 671.009

FIG. NO. 1

SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	41.6	54.5	42.5
	DRY DENSITY, pcf	79.3	63.7	77.8
	SATURATION, %	101.6	90.5	99.8
	VOID RATIO	1.085	1.596	1.127
	DIAMETER, in	2.83	2.84	2.84
	HEIGHT, in	5.62	5.63	5.63
AT TEST	WATER CONTENT, %	41.5	54.3	42.3
	DRY DENSITY, pcf	79.3	63.7	77.8
	SATURATION, %	101.3	90.1	99.4
	VOID RATIO	1.085	1.596	1.127
	DIAMETER, in	2.83	2.84	2.84
	HEIGHT, in	5.62	5.63	5.63
BACK PRESSURE, psi		0.00	0.00	0.00
CELL PRESSURE, psi		5.00	10.00	15.00
FAILURE STRESS, psi		5.27	7.59	6.71
PORE PRESSURE, psi				
STRAIN RATE, %/min.		0.801	0.799	0.799
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
σ_1 FAILURE, psi		10.27	17.59	21.71
σ_3 FAILURE, psi		5	10	15

CLIENT: ROY WESTON ETL

LIONVILLE, PA.

PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-70 / SH-5 / 32.5'-35'

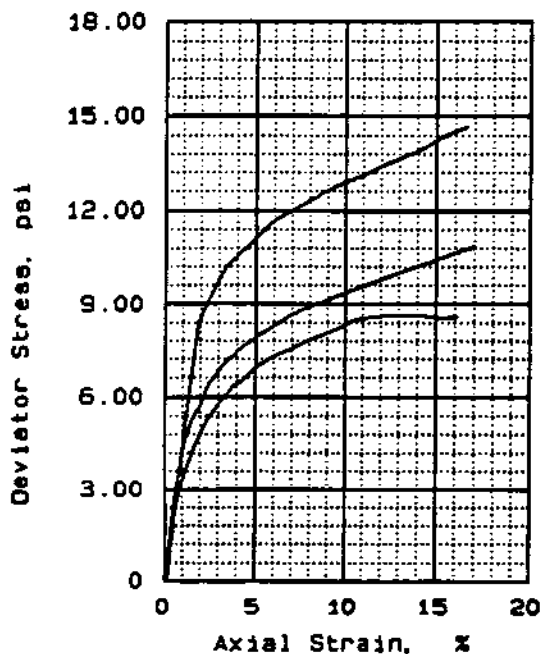
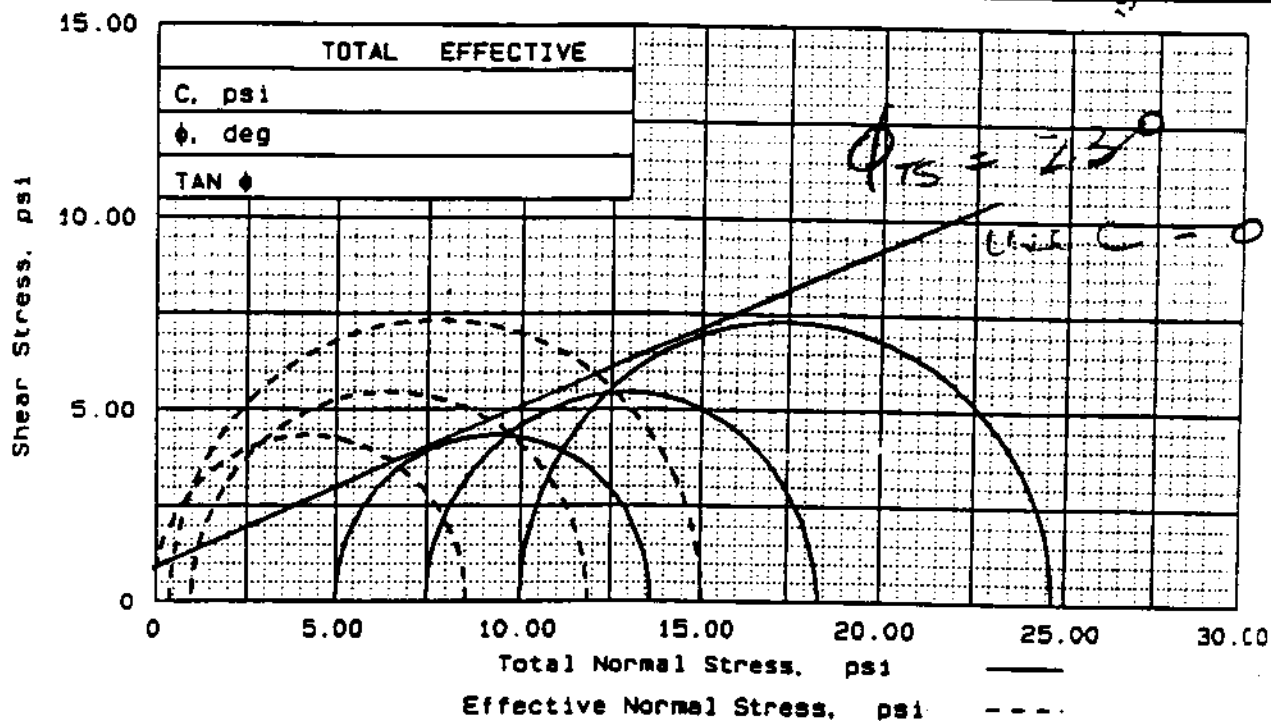
PROJ. NO.: G050.001 DATE: MARCH 29, 1991

TRIAXIAL COMPRESSION TEST

EMPIRE SOILS INVESTIGATIONS, INC.

APPENDIX B

CONSOLIDATED UNDRAINED TRIAXIAL TESTS



SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	258.1	328.3	293.9
	DRY DENSITY, pcf	19.6	16.4	18.0
	SATURATION, %	95.7	95.9	94.9
	VOID RATIO	7.421	9.071	8.206
	DIAMETER, in	2.83	2.83	2.80
	HEIGHT, in	5.63	5.62	5.63
AT TEST	WATER CONTENT, %	245.6	270.5	258.4
	DRY DENSITY, pcf	22.0	20.3	21.1
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	6.509	7.169	6.848
	DIAMETER, in	2.73	2.64	2.64
	HEIGHT, in	5.40	5.24	5.39
BACK PRESSURE, psi		50.00	50.00	50.00
CELL PRESSURE, psi		55.00	60.00	57.50
FAILURE STRESS, psi		8.65	14.65	10.86
PORE PRESSURE, psi		55.10	59.60	56.50
STRAIN RATE, %/min.		0.071	0.071	0.071
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
$\bar{\sigma}_1$ FAILURE, psi		8.55	15.06	11.86
$\bar{\sigma}_3$ FAILURE, psi		-0.1	0.4	1

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: 3" SHELBY TUBE

DESCRIPTION: BLACK BROWN PEAT,
Some Silt

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS
ASSUMED

LAB NO. 671.001

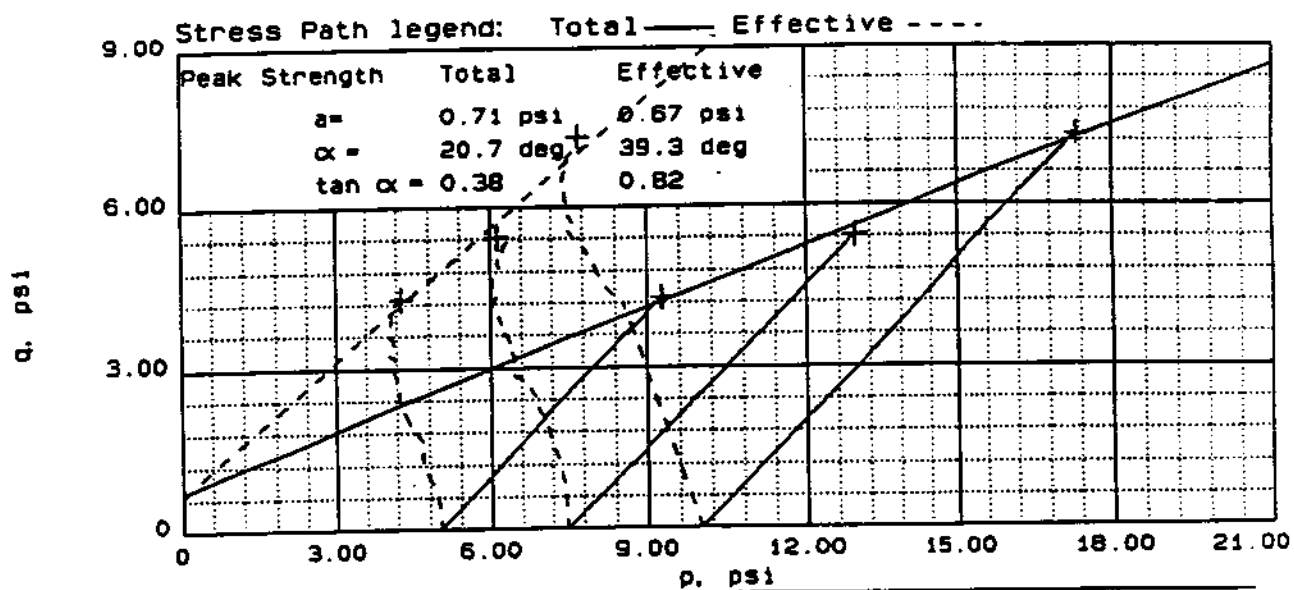
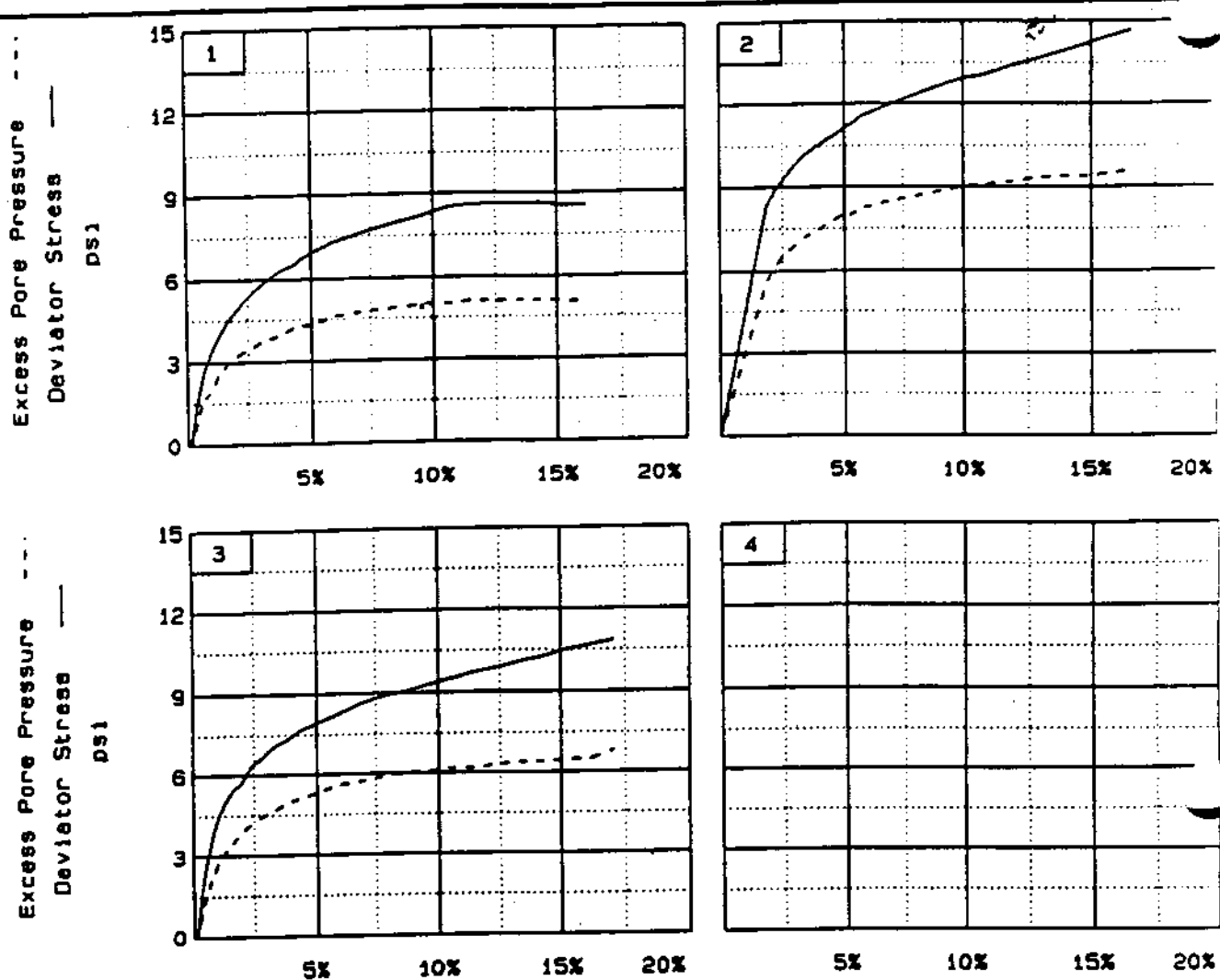
FIG. NO. 1

CLIENT: ROY WESTON ETL
LIONVILLE, PA.
PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-7B / SH-1 / 24'-26'

PROJ. NO.: G050.001 DATE: MARCH 29, 1991

TRIAXIAL COMPRESSION TEST
EMPIRE SOILS INVESTIGATIONS, INC.



Client: ROY WESTON ETL LIONVILLE, PA.

Project: CLARKSTOWN LANDFILL

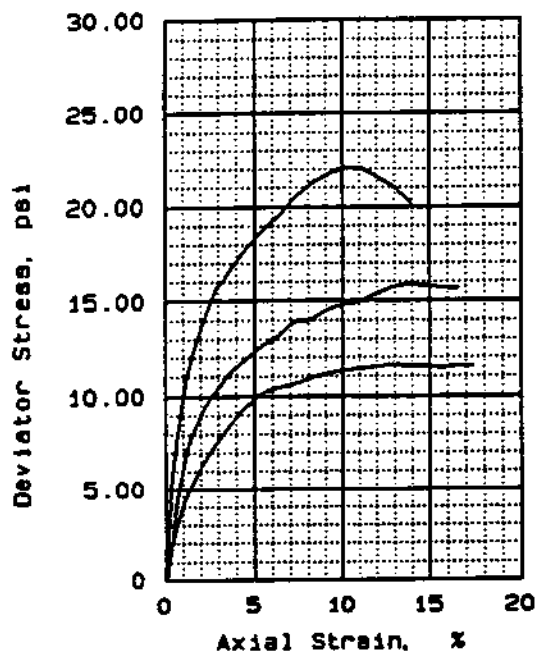
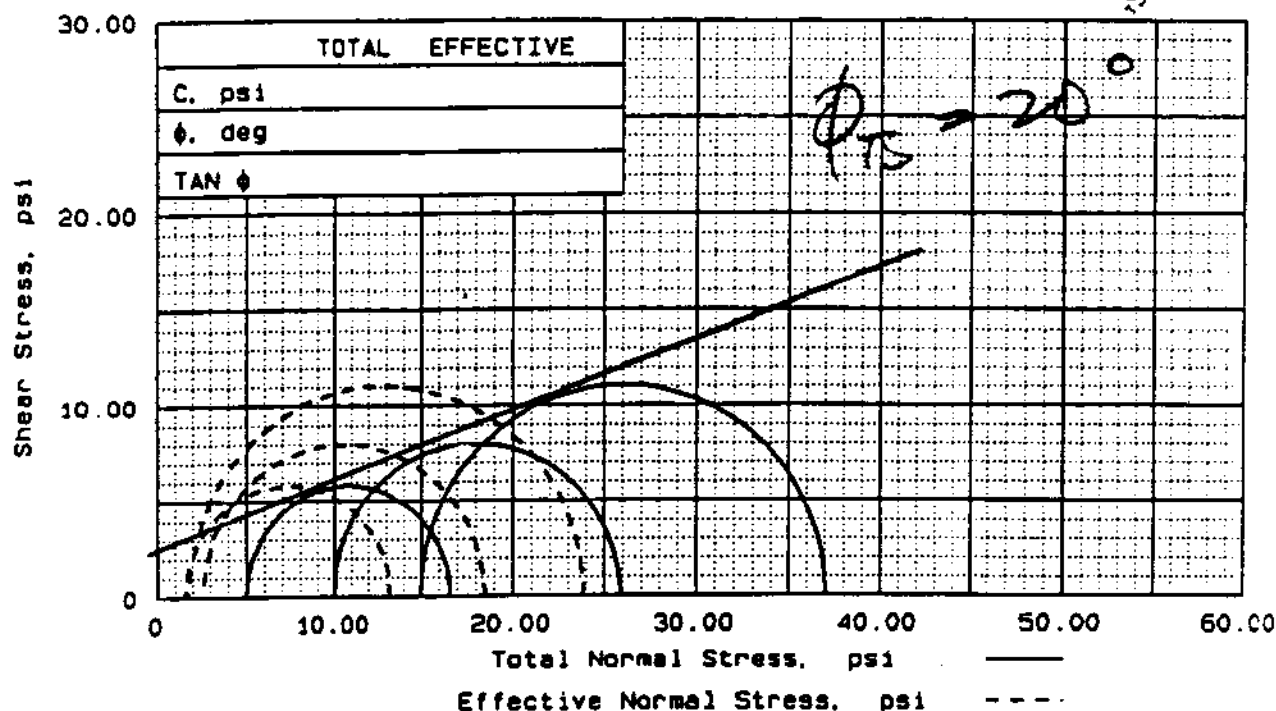
Location: RFW-7B / SH-1 / 24' - 25'

File: TEST124

Project No.: G050.001

Page 2/2

Fig. No. 1



SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	145.7	121.7	206.4
	DRY DENSITY, pcf	29.7	34.2	24.6
	SATURATION, %	84.4	83.9	95.6
	VOID RATIO	4.572	3.844	5.723
	DIAMETER, in	2.83	2.85	2.82
	HEIGHT, in	5.63	5.64	5.61
AT TEST	WATER CONTENT, %	136.7	99.3	171.0
	DRY DENSITY, pcf	35.8	45.6	29.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	3.623	2.630	4.532
	DIAMETER, in	2.60	2.54	2.63
	HEIGHT, in	5.52	5.32	5.30
BACK PRESSURE, psi		50.00	50.00	50.00
CELL PRESSURE, psi		55.00	60.00	65.00
FAILURE STRESS, psi		11.62	15.90	22.08
PORE PRESSURE, psi		53.40	57.40	63.20
STRAIN RATE, %/min.		0.160	0.160	0.160
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
$\bar{\sigma}_1$ FAILURE, psi		13.22	18.50	23.88
$\bar{\sigma}_3$ FAILURE, psi		1.6	2.6	1.8

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: 3" SHELBY TUBE

DESCRIPTION: BLACK BROWN AMOR-
PHOUS PEAT, Some Silt

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS
ASSUMED

LAB NO. 671.003

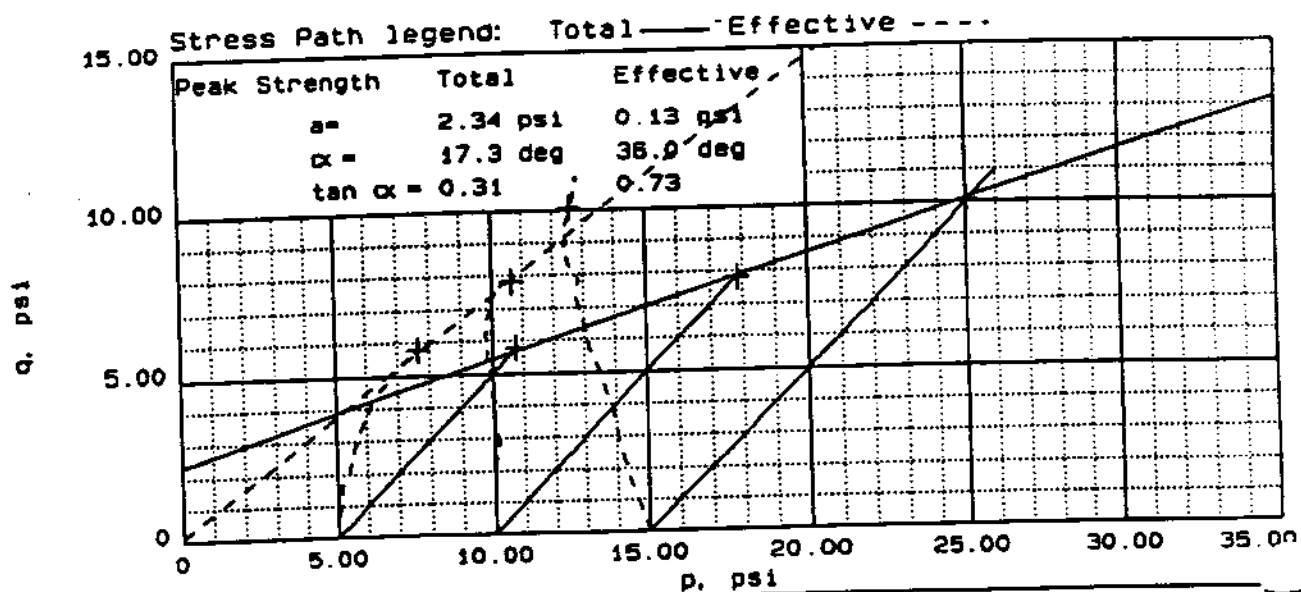
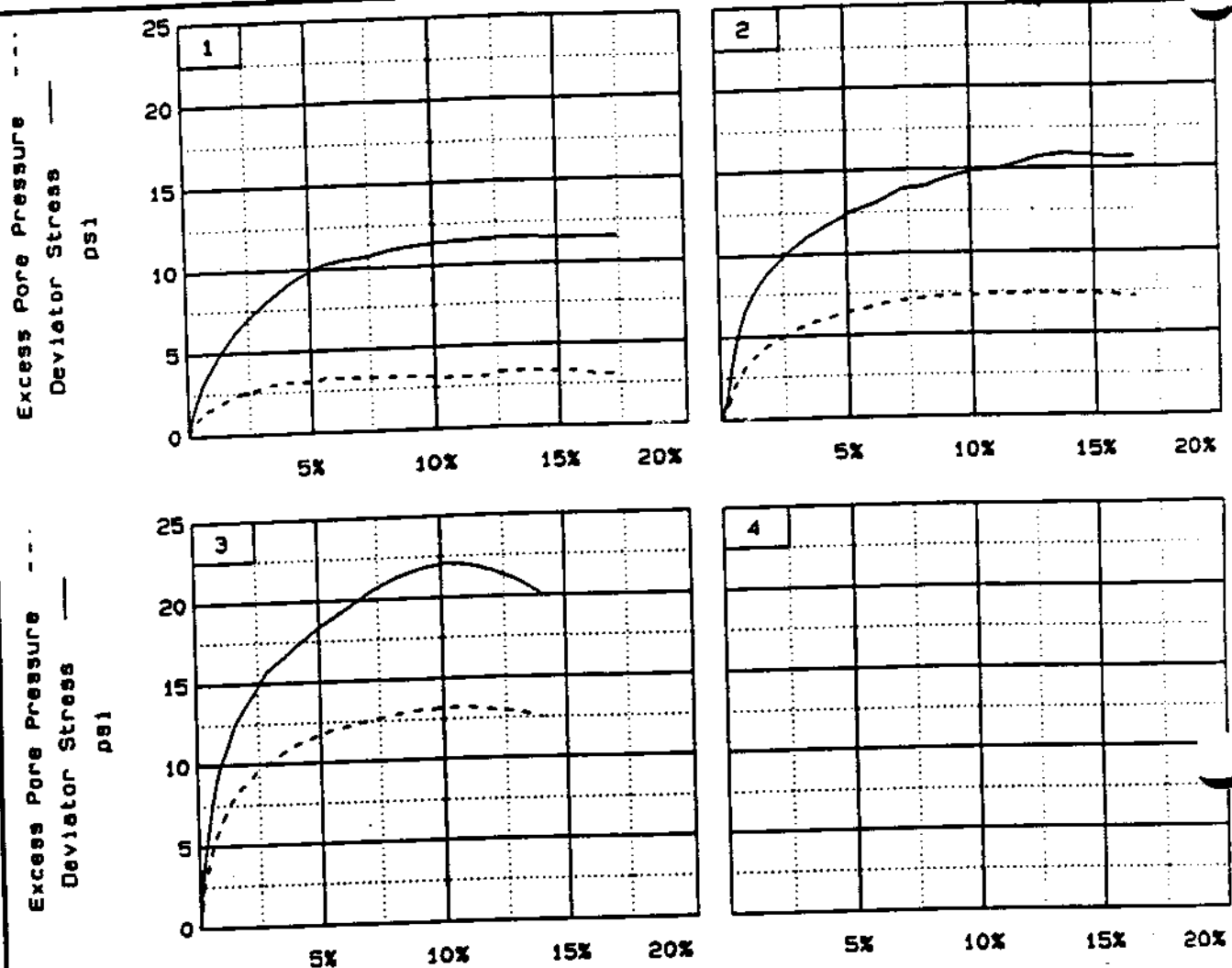
FIG. NO. 1

CLIENT: ROY WESTON ETL
LIONVILLE, PA.
PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-8D / SH-1 / 34' - 35'

PROJ. NO.: G050.001 DATE: MARCH 29, 1991

TRIAXIAL COMPRESSION TEST
EMPIRE SOILS INVESTIGATIONS, INC.



Client: ROY WESTON ETL LIONVILLE, PA.

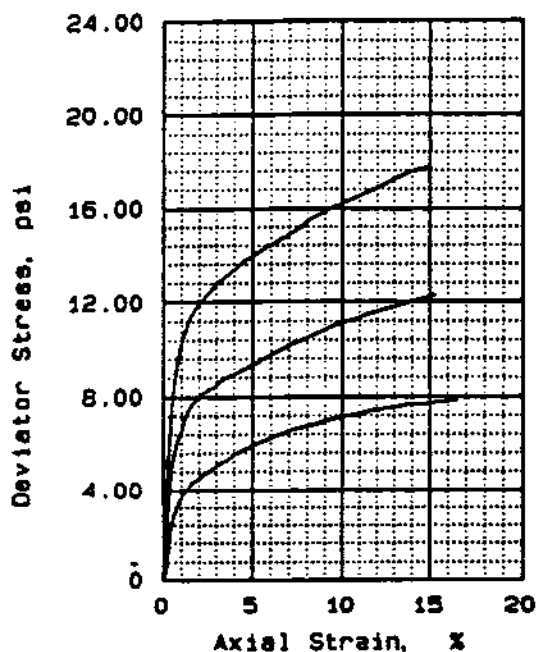
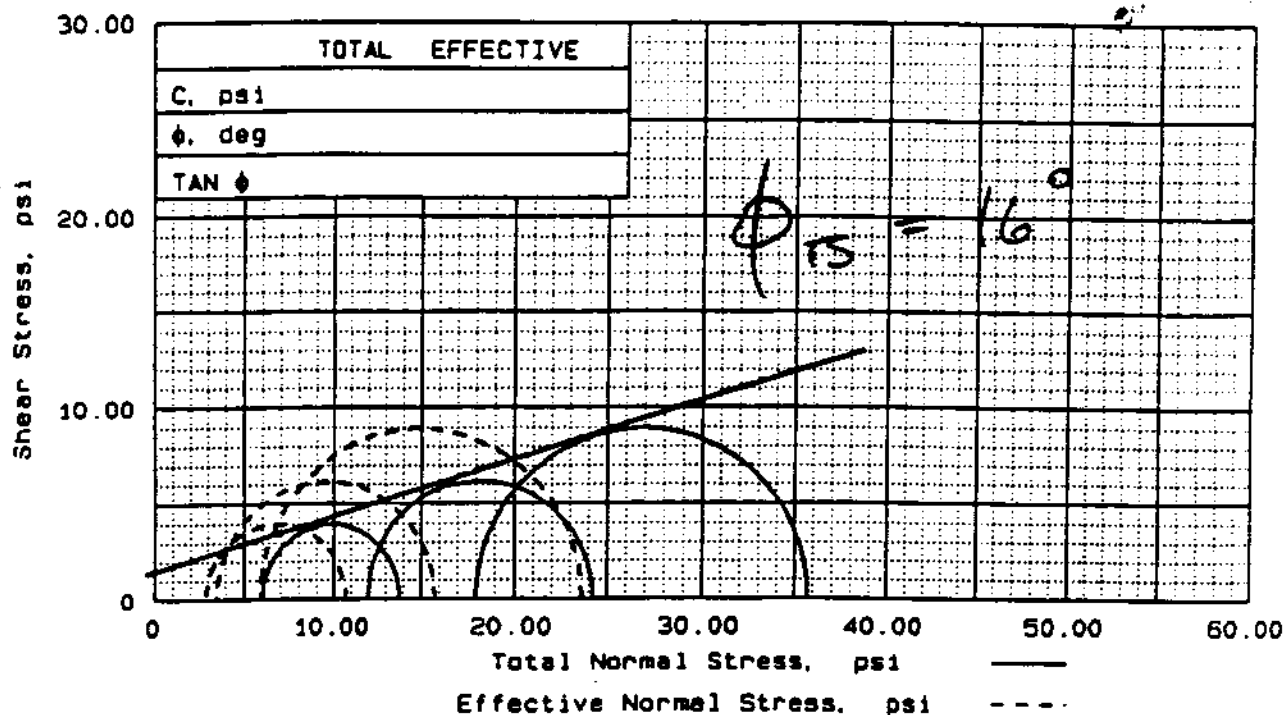
Project: CLARKSTOWN LANDFILL

Location: RFW-80 / SH-1 / 34'-36'

File: TEST125

Project No.: G050.001

Page 2/2 Fig. No. 1



TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: 3" SHELBY TUBE

DESCRIPTION: GREY SILT, Little
Clay, fissured

LL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS
ASSUMED

LAB NO. 671.007 & 671.008

FIG. NO.

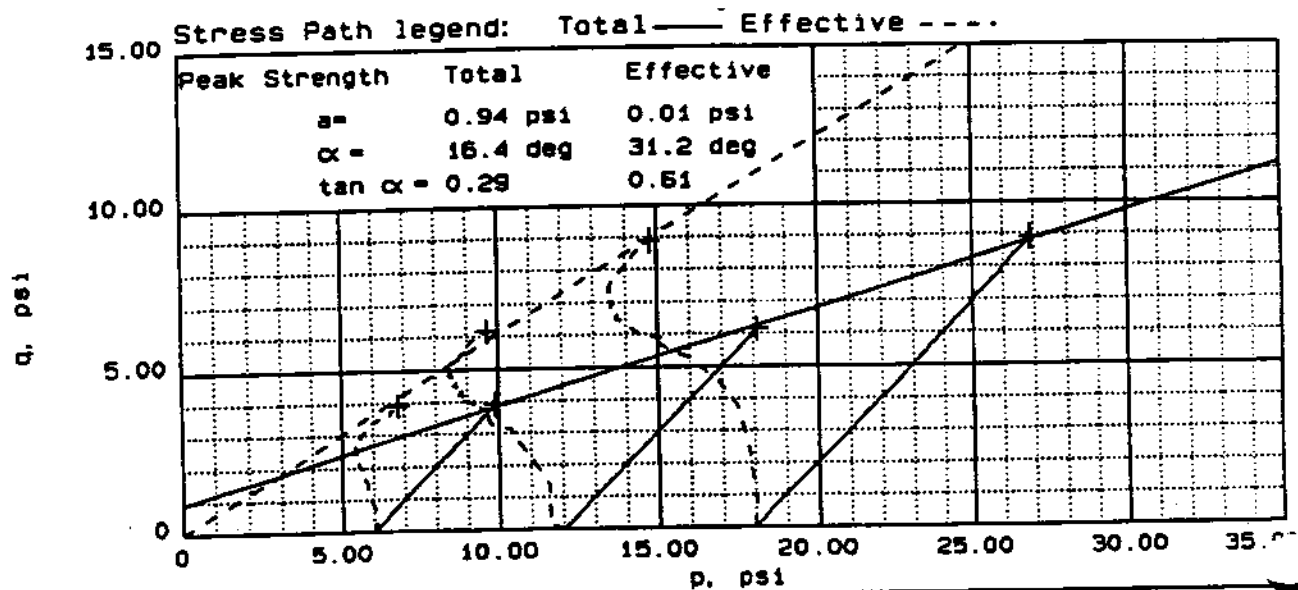
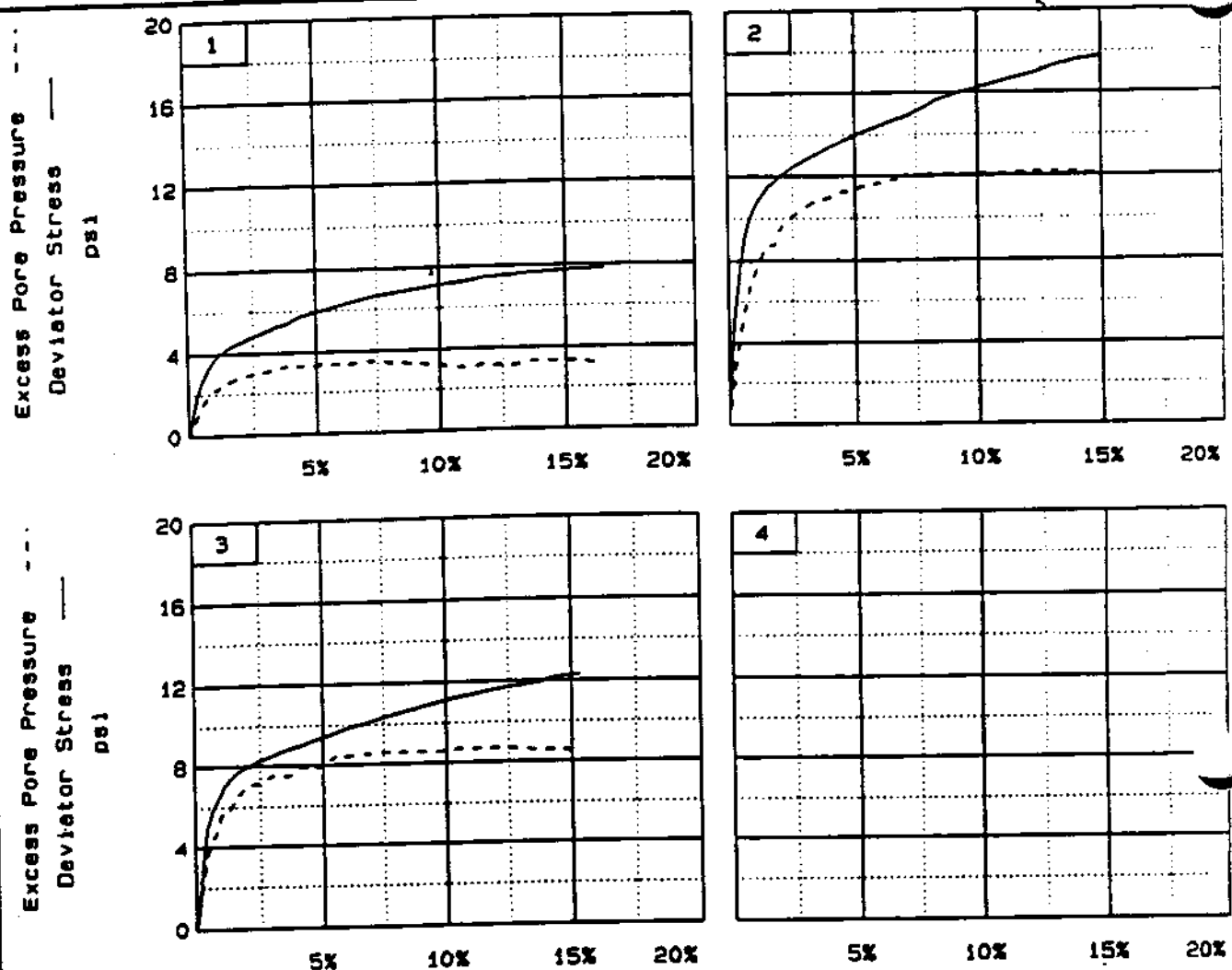
SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	52.8	67.8	52.5
	DRY DENSITY, pcf	65.4	58.8	52.5
	SATURATION, %	91.5	99.0	100.4
	VOID RATIO	1.529	1.814	1.649
	DIAMETER, in	2.83	2.83	2.84
	HEIGHT, in	5.60	5.58	5.61
AT TEST	WATER CONTENT, %	47.1	50.8	52.8
	DRY DENSITY, pcf	73.6	70.5	68.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.249	1.347	1.400
	DIAMETER, in	2.71	2.68	2.77
	HEIGHT, in	5.44	5.21	5.32
BACK PRESSURE, psi		50.00	50.00	50.00
CELL PRESSURE, psi		56.00	68.00	62.00
FAILURE STRESS, psi		7.82	17.78	12.28
PORE PRESSURE, psi		53.10	62.10	58.50
STRAIN RATE, %/min.		0.071	0.072	0.071
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
$\bar{\sigma}_1$ FAILURE, psi		10.72	23.68	15.78
$\bar{\sigma}_3$ FAILURE, psi		2.9	5.9	3.5

CLIENT: ROY WESTON ETL
LIONVILLE, PA.
PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-8D / SH-3 / 46-48.5'
RFW-8D / SH-4 / 48.5-51' SAMPLE #3

PROJ. NO.: G050.001 DATE: APRIL 11, 1991

TRIAXIAL COMPRESSION TEST
EMPIRE SOILS INVESTIGATIONS, INC.



Client: ROY WESTON ETL LIONVILLE, PA.

Project: CLARKSTOWN LANDFILL

Location: RFW-8D / SH-3 / 46-48.5' RFW-8D / SH-4 / 48.5-51' SAMPLE #3

File: TEST127

Project No.: G050.001

Page 2/2 Fig. No. —

APPENDIX C
SAMPLE EXTRUSION LOGS

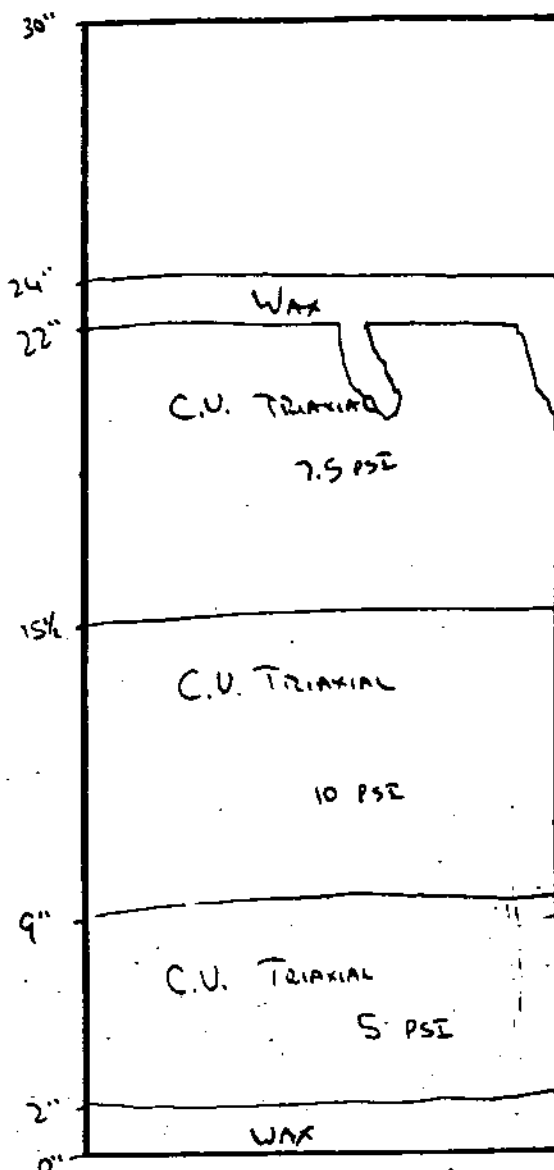


TUBE LOG

PROJECT: CLARK STORM LANDFILL BORING NO.: 12FW-16 / SW-1
LOCATION: _____ TUBE NO.: 671.001
CLIENT: _____ DEPTH (FT.): 24'-26"
REMARKS: PEAT Recovery ≈ 22" 10/31/90

VISUAL CLASSIFICATION

RECOVERY: 22"



BLACK + ~~GRAY~~ BROWN PEAT
TRACE SAND
FINE SILT, TRACE ~~PEAT~~
- WAX FLOWED INTO ~~SOIL~~
ALONG CUTTING EDGE - ~~NO~~
WAX + PATCHED SAND

BLACK, GRAY + BROWN
PEAT, ^{SP} SILT, TRACE
ORGANICS

USED W/ ~~SOIL~~
BLACK + GRAY ^{SILTY} PEAT
SILT, ~~TRACE ORGANICS~~

DATE: 3-18-91

TECHNICIAN: KSC

PROJECT NO.: G050.001



TUBE LOG

PROJECT: CLARKSTOWN LANDFILL

BORING NO.: REW-7B / SH 2

LOCATION: _____

TUBE NO.: 671.002

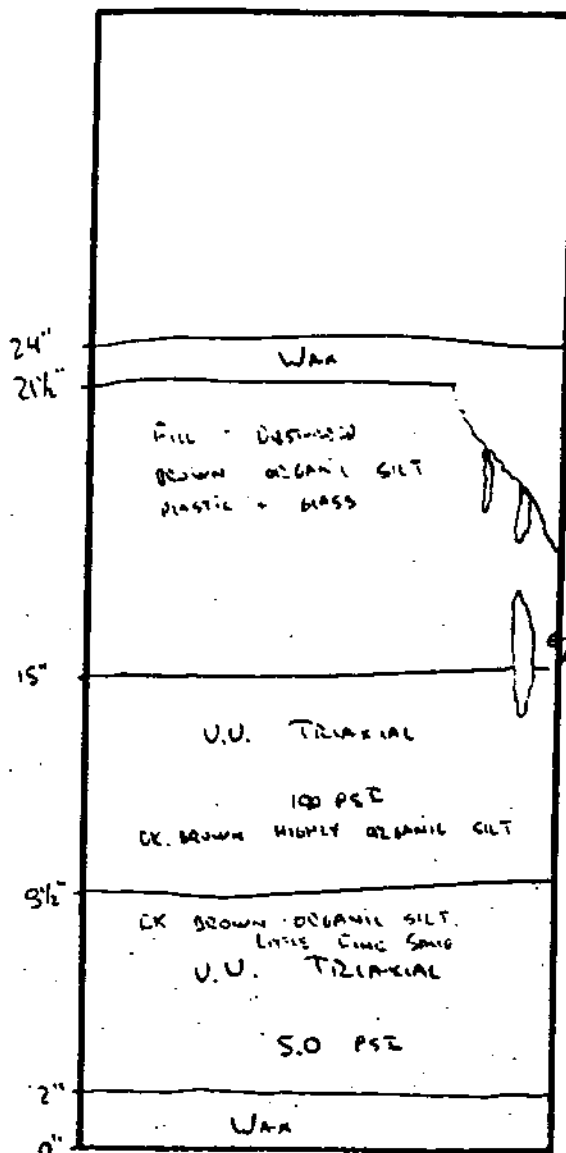
CLIENT: _____

DEPTH (FT.): 26'-28'

REMARKS: _____

VISUAL CLASSIFICATION

RECOVERY: 24"



WAX FLOWED INTO
SAMPLE

DK BROWN HIGHLY ORGANIC
SILT
GREEN PLASTIC (CARBON) IN
IN SAMPLE - COULD NOT
REMOVE WITHOUT DISTURBING
SAMPLE - CUT + TRIMMED
1/2" IN SAMPLE

BLACK - ~~GLASS~~ - DK BROWN
LEAST TRACE ORGANIC
ORGANIC SILT, LITTLE
FINE SAND

DATE: 3-24-91

TECHNICIAN: KSC

PROJECT NO.: 6050.001

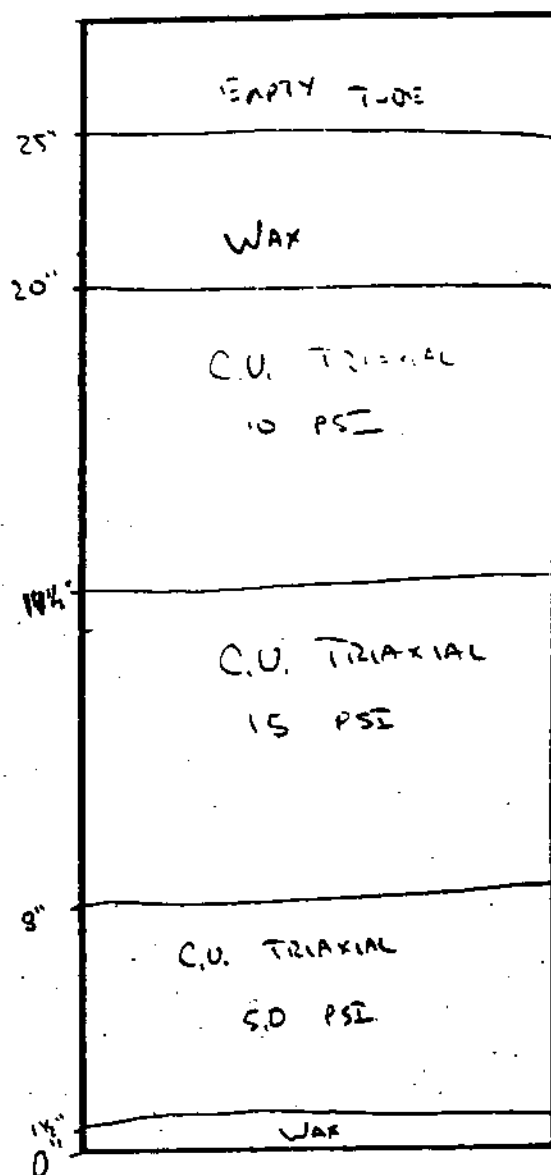


TUBE LOG

PROJECT: CHARLESTON LANDFILL BORING NO.: RFW-90 SH-1
LOCATION: _____ TUBE NO.: 671.003
CLIENT: _____ DEPTH (FT.): 34'-36'
REMARKS: ORGANIC SILT 13" RECOVERY

VISUAL CLASSIFICATION

RECOVERY: _____



BLACK BROWN
AMORPHOUS PEAT
SOME SILT
OCCASIONAL ^{BRIGHT} BLUE INCLUSIONS

DATE: 3-27-91 TECHNICIAN: KSC PROJECT NO.: 6050.001



TUBE LOG

PROJECT: CLARKSTOWN LANDFILL

BORING NO.: RFW-6 / 5-SH1

LOCATION: _____

TUBE NO.: 671.005

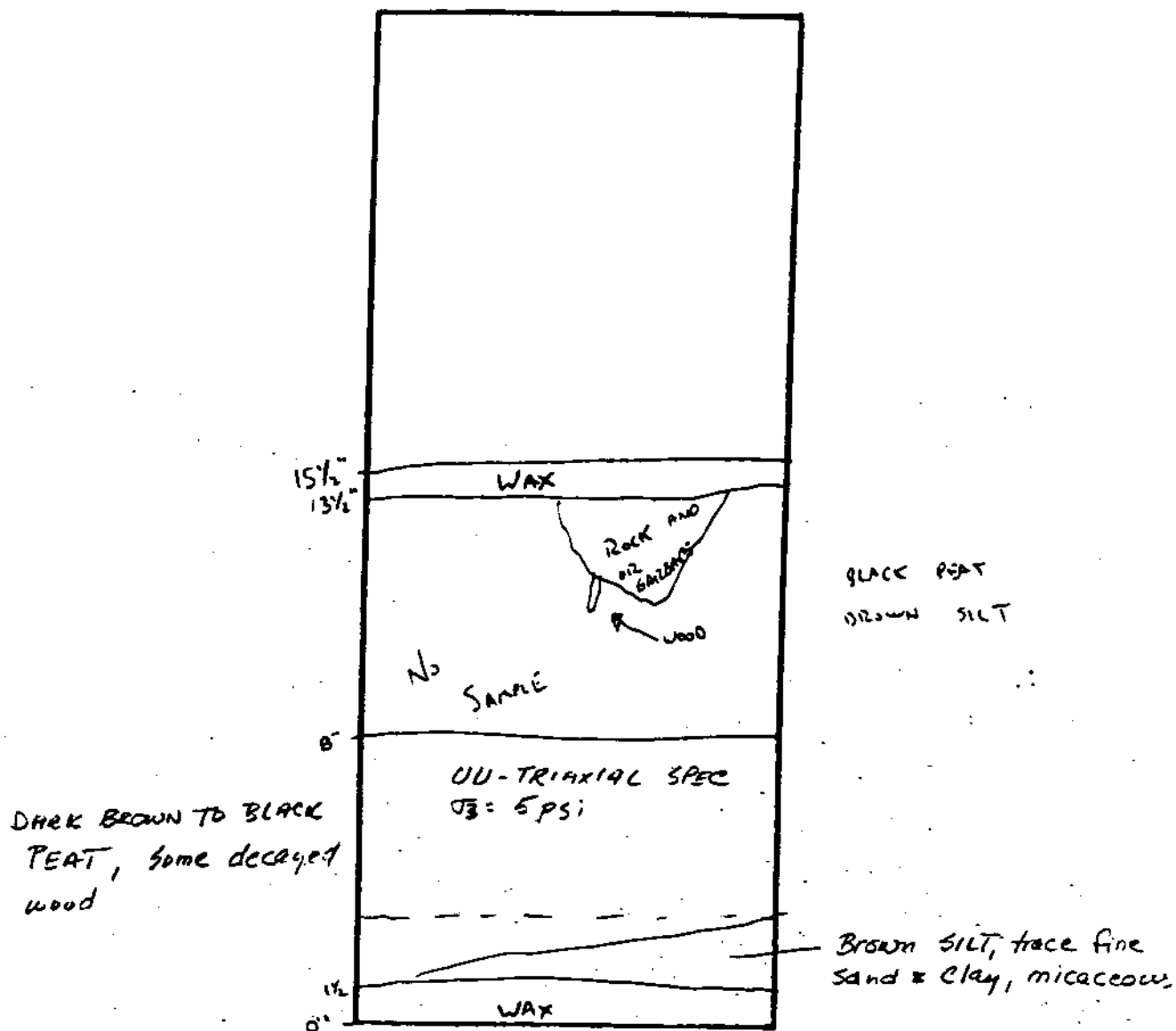
CLIENT: _____

DEPTH (FT.): 20'-22'

REMARKS: _____

VISUAL CLASSIFICATION

RECOVERY: 12"



DATE: 3-27-91

TECHNICIAN: 1650

PROJECT NO.: 6050.001



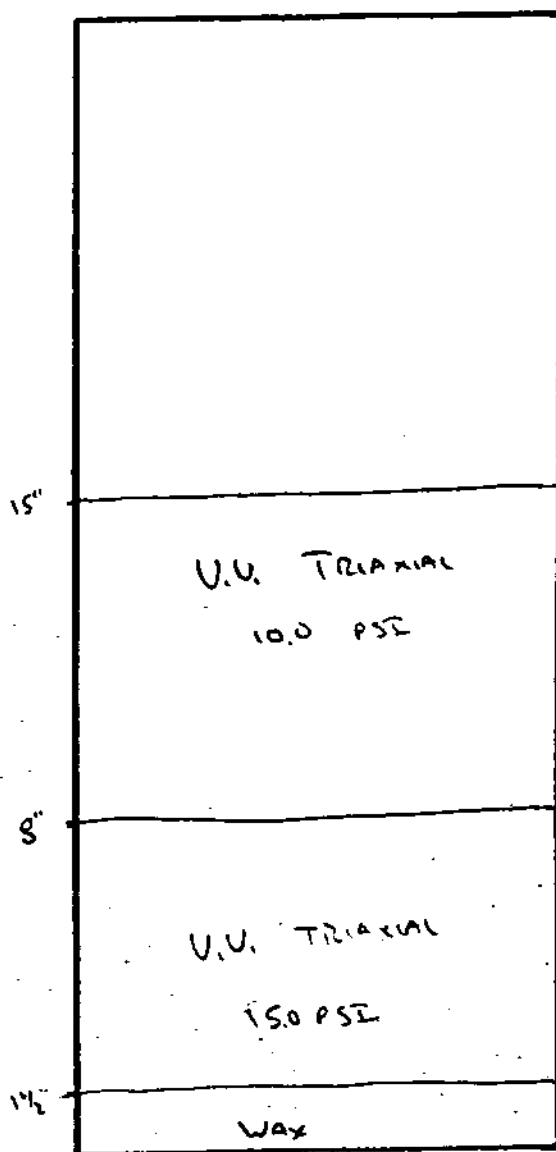
TUBE LOG

PROJECT: CLARKSON LANDFILL
LOCATION: _____
CLIENT: _____
REMARKS: 11-5-90 - PEAT

BORING NO.: RFW-60-SH-1
TUBE NO.: 671.006
DEPTH (FT.): 22'-24'

VISUAL CLASSIFICATION

RECOVERY: 20" ≈



Brown ORGANIC SILT
Grey, Black PEAT
SILT, FINE ORGANIC

Brown, HIGHLY ORGANIC
Grey, Black PEAT
SILT, FINE ORGANIC
(MOSTLY DECAYED
LEAVES WITH SILT)

DATE: 11-21-91

TECHNICIAN: KTC

PROJECT NO.: 6050.001



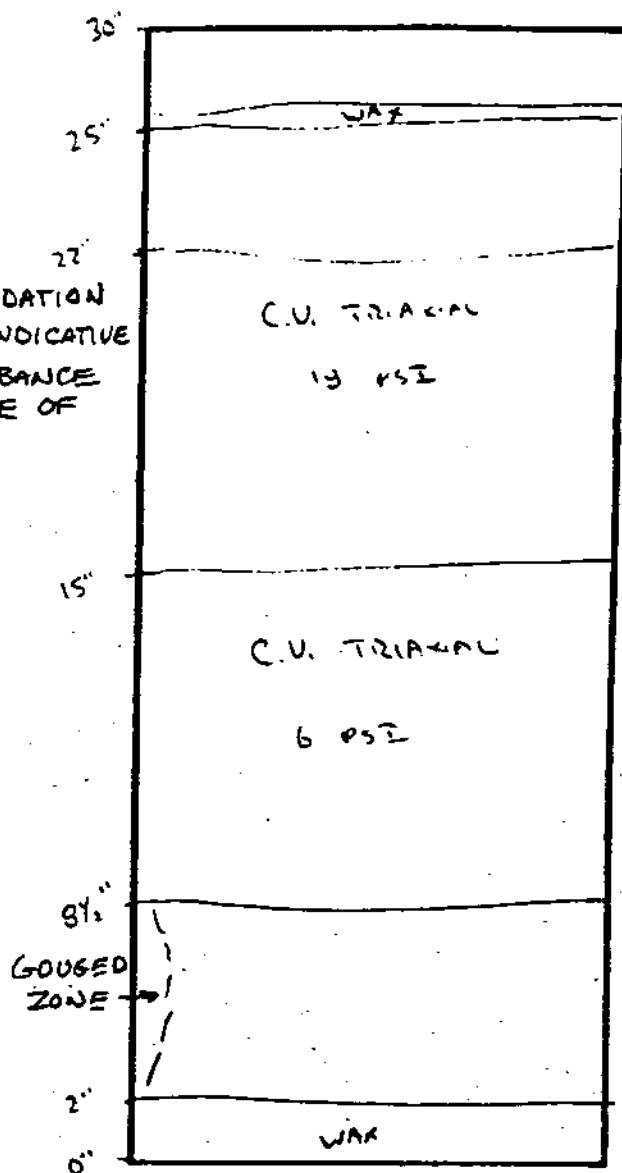
TUBE LOG

PROJECT: CLARKSTOWN LANDFILL BORING NO.: RCW-20 / SW-3
LOCATION: _____ TUBE NO.: 671.007
CLIENT: _____ DEPTH (FT.): 46 - 48.5
REMARKS: _____

VISUAL CLASSIFICATION

RECOVERY: 27"

UNEVEN CONSOLIDATION
OF SPECIMEN INDICATIVE
OF SOME DISTURBANCE
ALONG ONE SIDE OF
SPECIMEN.



GREEN SILT, LITTLE
CLAY, TRACE ORGANICS

GREY SILT, little clay
& organics. Soft,
Vertical fissures (rust
stained). Blocky structure
DISTURBED NEAR GOUGE
ZONE

DATE: 4-3-91

TECHNICIAN: KJC

PROJECT NO.: G050.001



TUBE LOG

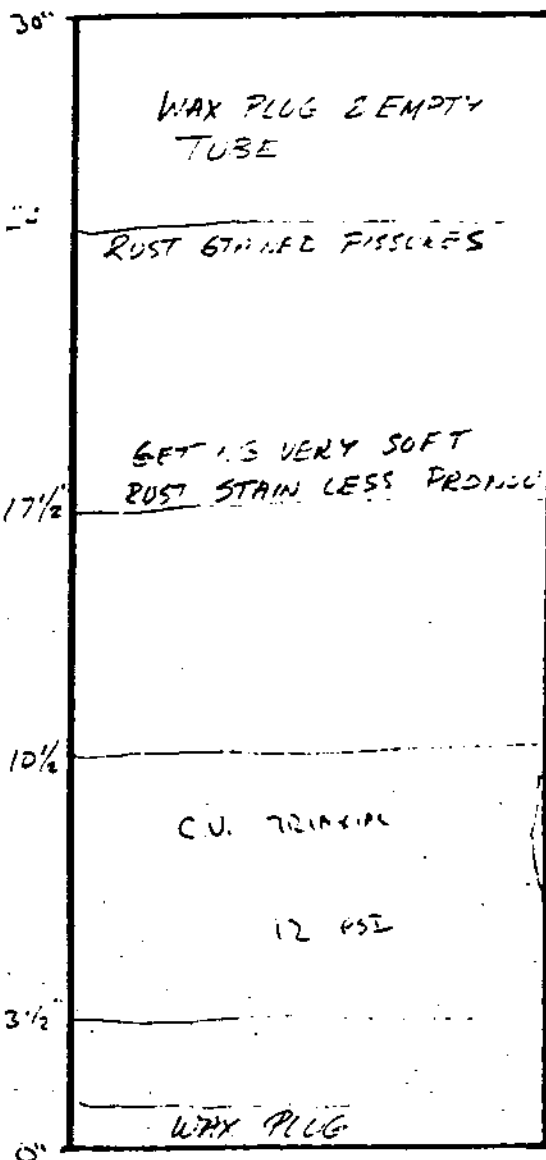
PROJECT: CLARKSTOWN LANDFILL
LOCATION: _____
CLIENT: _____
REMARKS: _____

BORING NO.: 12GW-90 / SW-4
TUBE NO.: 671.009
DEPTH (FT.): 35' - 51'

VISUAL CLASSIFICATION

RECOVERY: 24"

GREY-BROWN SILT,
little clay, trace
fine sand & organic
soft, fissured



SUITABLE
NO SPECIMEN

VERY SOFT
NUMEROUS VERTICAL
FISSURES
NO SPECIMEN
SUITABLE

PIECE OF ALUMINUM FILL
ENBEDDED IN SIDE
GETTING FIRMER

DATE: 4-4-91

TECHNICIAN: KSC

PROJECT NO.: 6050.001



TUBE LOG

PROJECT: CLARKSTOWN LANDFILL

BORING NO.: RFW-70 / SH-S

LOCATION: _____

TUBE NO.: 671.009

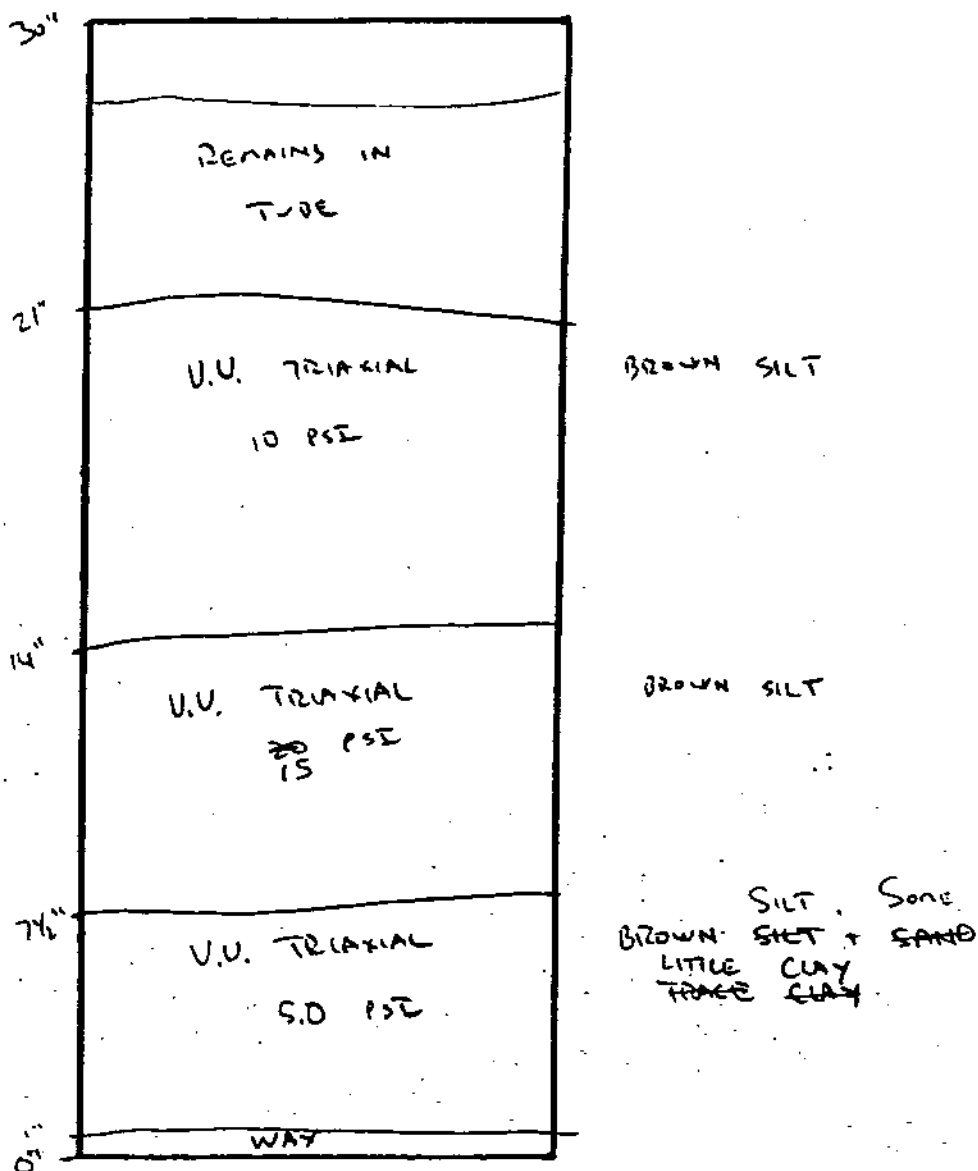
CLIENT: _____

DEPTH (FT.): 32.5' - 35'

REMARKS: _____

VISUAL CLASSIFICATION

RECOVERY: 79" ≈



DATE: 3-28-91

TECHNICIAN: KSC

PROJECT NO.: 6050.001

SLOPE STABILITY ANALYSIS

MARCH 13, 1992

**TOWN OF CLARKSTOWN
ROCKLAND COUNTY, NEW YORK**

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

SLOPE STABILITY ANALYSIS

**ANSWERS TO QUESTIONS RAISED BY
DEC IN REVIEW OF PHASE I RI REPORT**

MARCH 13, 1992

Prepared By:

Velzy / WESTON

**465 Columbus Avenue
Valhalla, N.Y. 10595**

DEC COMMENT: Drained analyses have been based on friction angles determined from total stress Mohr's circles instead of from effective stress Mohr's circles.

WESTON RESPONSE:

WESTON acknowledges this deviation from conventional practice, but as discussed in the "Soil/MSW Properties" section of our Slope Stability Summary Report, this deviation was necessary because the effective stress Mohr's circles were erratically behaved, possibly due to a problem with the pore water pressure measurement equipment at Empires Middleport, NY geotechnical laboratory. As shown in the attached Figures 1 and 2, if these obviously erroneous and erratically behaved effective stress Mohr's circles had been used to estimate ϕ , unrealistically high and, therefore, grossly underconservative values of this parameter would have been obtained. Therefore, as an alternative, the better behaved total stress Mohr's circles were used to determine a Mohr's failure envelope, the slope of which defined the total stress angle of internal friction (ϕ_u). This value was then conservatively assumed to be numerically equal to the effective stress angle of internal friction (ϕ). (It is noted that ϕ , the slope of the effective stress Mohr's failure envelope, is typically much greater in magnitude than ϕ_u .) In addition, any cohesion evident from the total stress failure envelope was conservatively neglected. That is, c was defined to be zero for the drained stability analyses.

DEC COMMENT: Insufficient testing may have been performed to determine the undrained strength of the organic silt and the varved clay. The strength of these soils will be much different under the landfill than adjacent to the fill.

WESTON RESPONSE:

A single unconsolidated-undrained triaxial compression test (UU) was performed on Shelby tube samples of both the organic silt and varved clay layers encountered at the site. This may appear insufficient, but it must be noted that three Mohr's circles at three different confining pressures were generated for each test from three separate 6-inch specimens of each soil type. The attached Figures 3 and 4 indicate that the three Mohr's circles for each soil type are reasonably well behaved considering the soft, weak, compressible nature of these soils, and the resulting disturbance effects which generally occur from sampling, handling, transporting, extruding and trimming soils of this consistency. This reasonably consistent behavior of the Mohr's circles results in a higher degree of confidence in the selected undrained cohesion

FIGURE 1

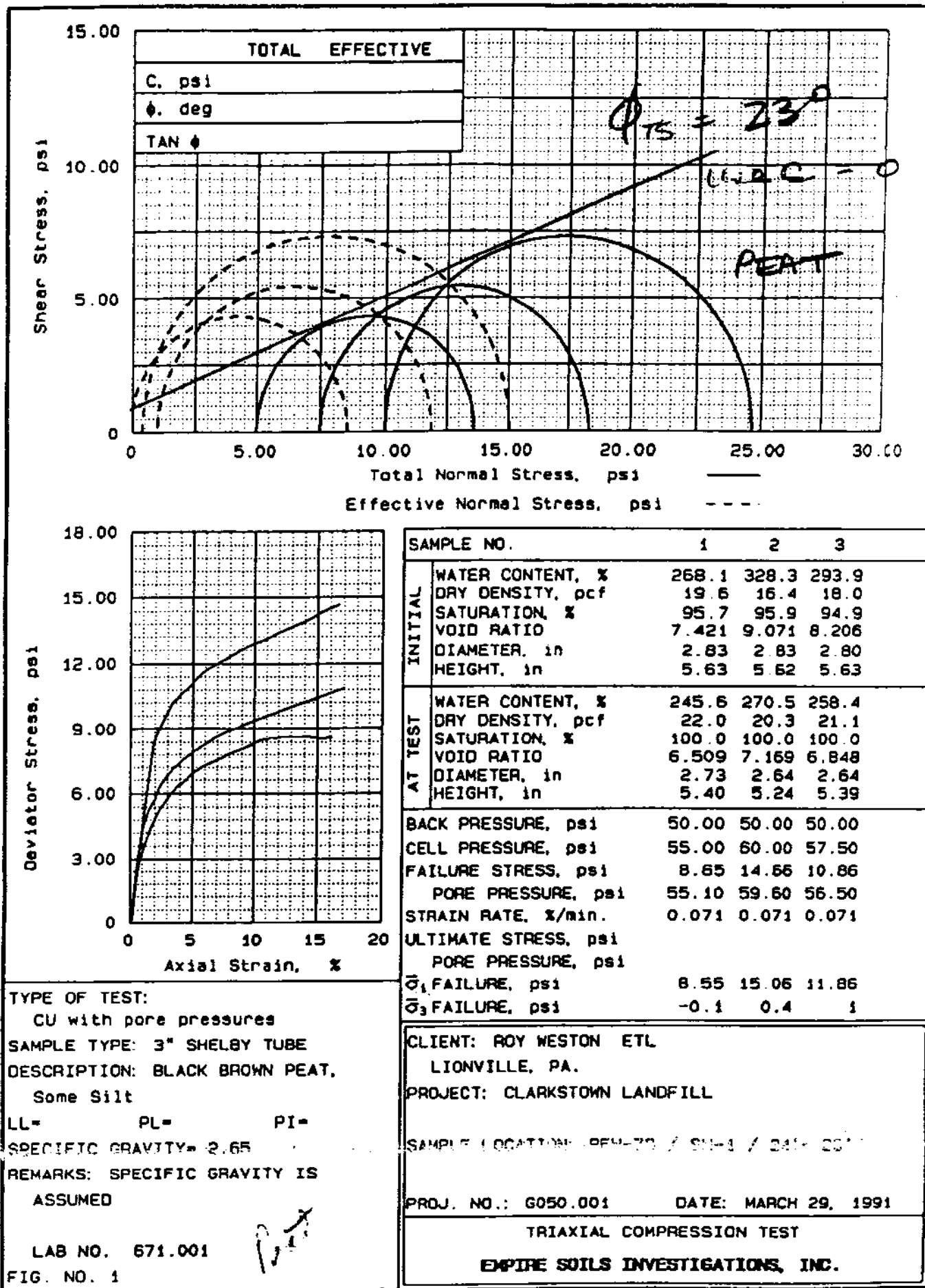


FIGURE 2

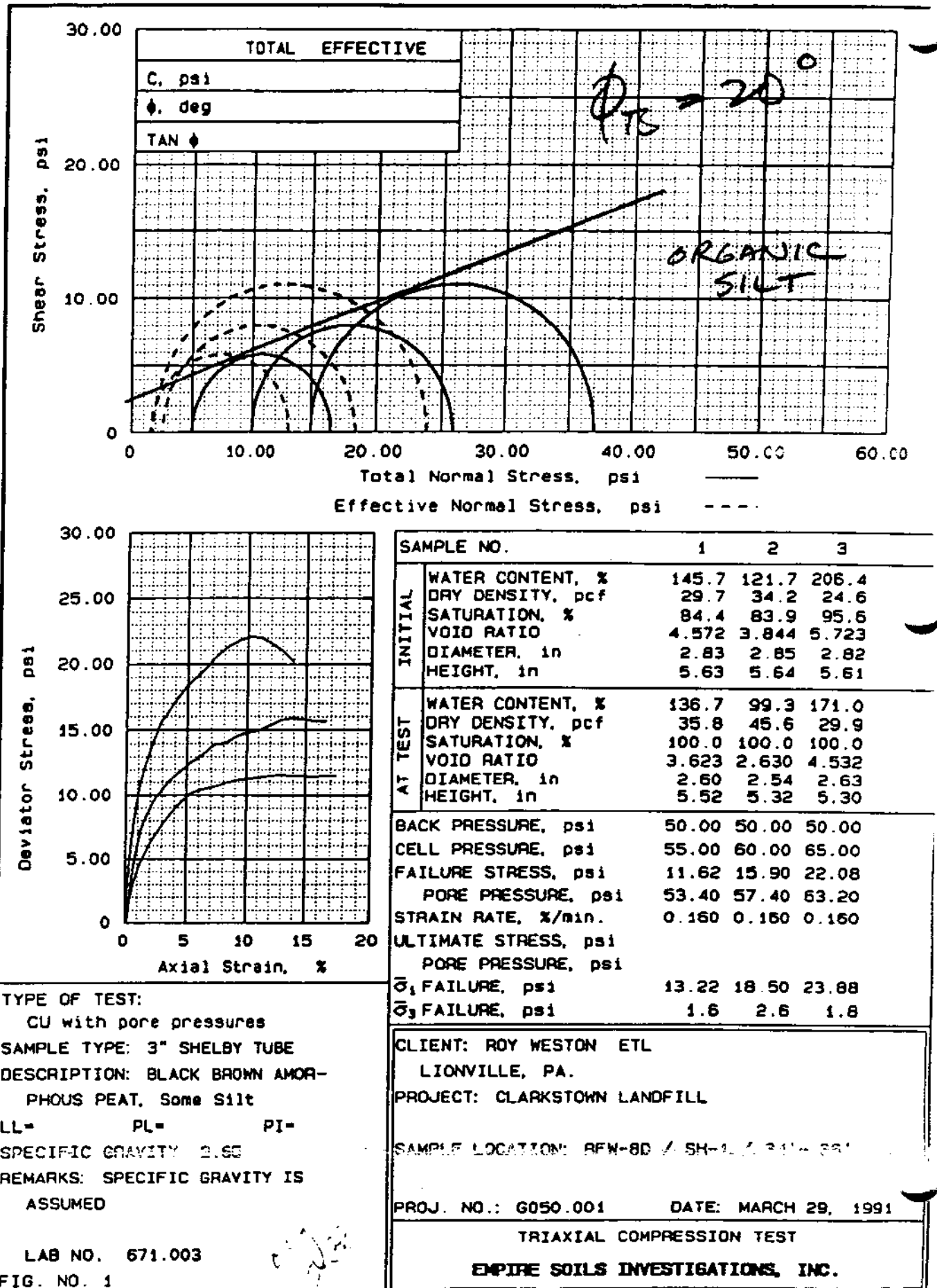
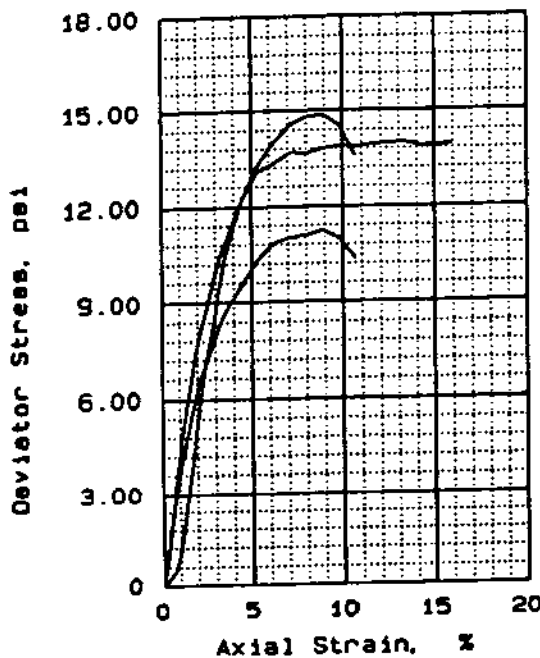
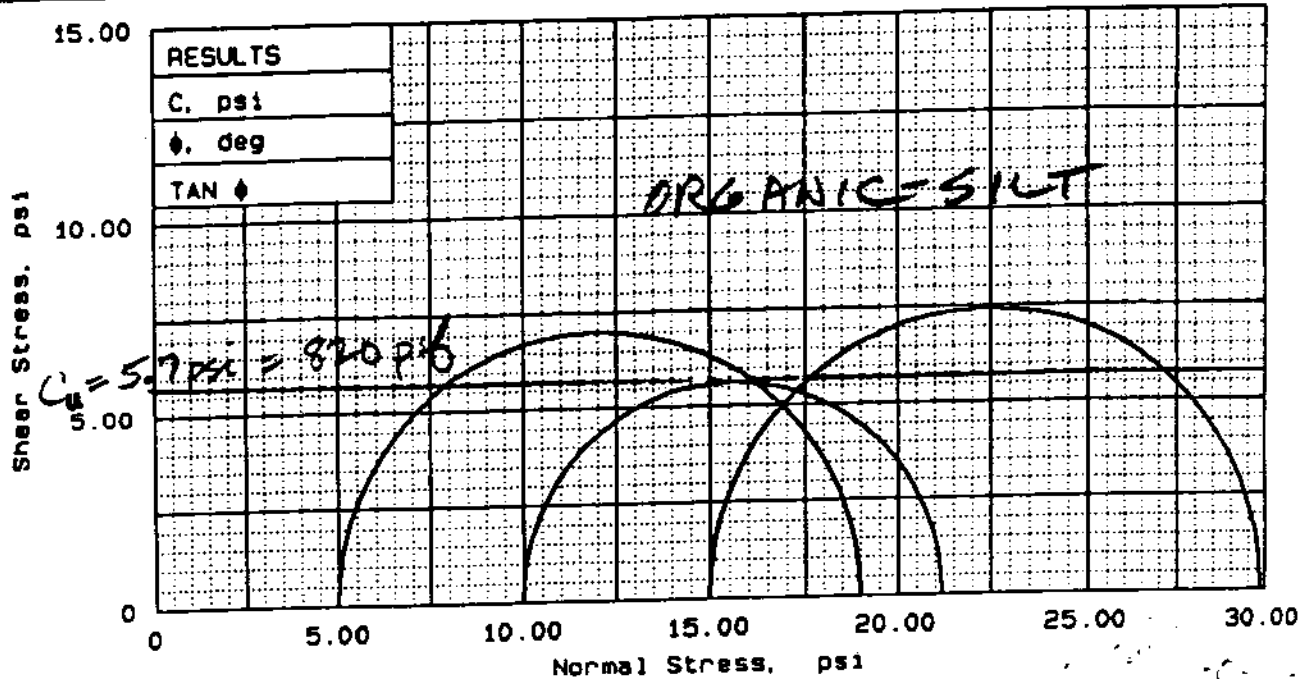


FIGURE 3



SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	262.9	53.0	92.5
	DRY DENSITY, pcf	18.7	63.2	44.0
	SATURATION, %	88.6	86.7	89.0
	VOID RATIO	7.864	6.19	2.757
	DIAMETER, in	2.85	2.84	2.84
	HEIGHT, in	5.65	5.64	5.62
AT TEST	WATER CONTENT, %	262.2	52.8	92.3
	DRY DENSITY, pcf	18.7	63.2	44.0
	SATURATION, %	88.4	86.3	88.7
	VOID RATIO	7.864	1.619	2.757
	DIAMETER, in	2.85	2.84	2.84
	HEIGHT, in	5.65	5.64	5.62
BACK PRESSURE, psi		0.00	0.00	0.00
CELL PRESSURE, psi		5.00	10.00	15.00
FAILURE STRESS, psi		14.00	11.22	14.85
PORE PRESSURE, psi				
STRAIN RATE, %/min.		0.797	0.798	0.801
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
σ ₁ FAILURE, psi		19.00	21.22	29.85
σ ₃ FAILURE, psi		5	10	15

TYPE OF TEST:
Unconsolidated undrained

SAMPLE TYPE: 3" SHELBY TUBE

DESCRIPTION: BROWN PEAT AND ORGANIC SILT

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: SPECIFIC GRAVITY IS ASSUMED

LAB NO. 671.005 & 671.006

FIG. NO.

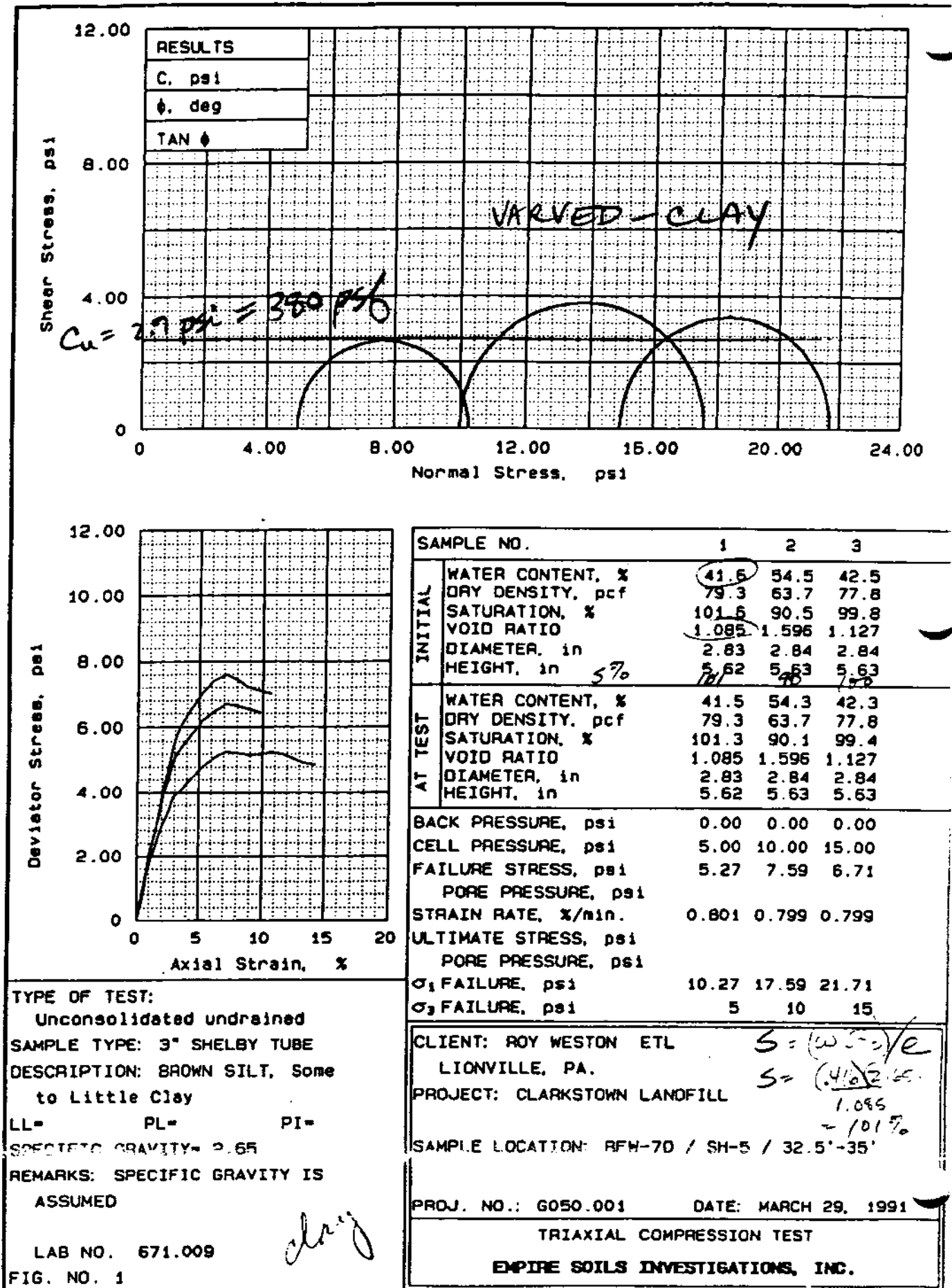
CLIENT: ROY WESTON ETL
LIONVILLE, PA.
PROJECT: CLARKSTOWN LANDFILL

SAMPLE LOCATION: RFW-65 / SH-1 / 20'-22'
RFW-60 / SH-1 / 22'-24' SAMPLE 2 & 3

PROJ. NO.: G050.001 DATE: MARCH 29, 1991

TRIAXIAL COMPRESSION TEST
EMPIRE SOILS INVESTIGATIONS, INC.

FIGURE 4



(C_u) value than would result from a single Mohr's circle test result (e.g. an unconfined compression test). Note also that the smallest Mohr's circle was conservatively selected as the basis for determining C_u for each of the soil types.

It is acknowledged that all Shelby tubes for these tests were obtained from borings completed adjacent to the landfill toe of slope. It is recognized that Shelby tubes of these same strata obtained from locations beneath the landfill mass would exhibit different undrained cohesion values. In fact, these latter values should be numerically higher because of the consolidating effects of the landfill mass which will densify and hence strengthen these underlying soils. Therefore, the WESTON assumption that measured undrained cohesion values from boring locations adjacent to the landfill toe of slope are representative of the shear strength of these layers at all locations within the critical failure mass is conservative.

DEC COMMENT: On what basis was 80 lbs./cu. ft. selected as the unit weight of the landfill material?

WESTON RESPONSE:

It is generally accepted that "fresh" municipal solid waste (MSW), following compaction at landfills, initially weighs approximately 1,000 to 1,200 pounds per cubic yard (i.e. approximately 37 to 45 pcf). As this material biodegrades with time within the landfill, it reduces in volume from the biodegradation process as well as settles under its own weight, thereby densifying in the process. In addition, the moisture content of the waste also increases with time as these materials absorb rainwater which infiltrates the daily cover soils. This further increases the unit weight of the waste mass. The presence of daily cover soils within MSW landfills also increases the unit weight of the composite MSW/cover soil mass. It is presently believed by most landfill experts that the above phenomena may be reasonably modeled in engineering slope stability, bearing capacity, and settlement analyses by assuming a unit weight of between 60 and 80 pcf for MSW landfill materials. (Dr. Robert M. Koerner of Drexel University recommends to the engineering community that a value between 60 and 70 pcf be assumed for this parameter.) Since the potential for slope instability of a landfill mass increases as the unit weight of the mass increases, WESTON has conservatively assumed a value of 80 pcf for this parameter for the Clarkstown slope stability analyses.

DEC COMMENT: The range of confining pressures used in the determination of effective stress friction angles does not reflect the level of pressure experienced by the soils in-place.

WESTON RESPONSE:

WESTON disagrees. The three values of confining pressure used in the CIU testing program for the three (3) encountered fine-grained soil layers are tabulated as follows along with the boring numbers, Shelby tube sample numbers and depths from which these samples were obtained.

<u>Soil Stratum</u>	<u>$\bar{\sigma}_3$ (psi/psf)</u>	<u>Boring No.</u>	<u>Shelby Tube Sample #</u>	<u>Avg. Depth of Tube(s)</u>
Peat	5/720 7.5/1080 10/1440	RFW-7B	SH-1	25'
Organic Silt	5/720 10/1440 15/2160	RFW-8D	SH-1	35'
Varved Clay	6/864 12/1728 18/2592	RFW-8D	SH-3 and SH-4	48.5'

As shown in the attached schematic boring logs and accompanying calculations, to determine the confining pressures at which the CIU tests were to be completed, the horizontal effective stress at the Shelby tube location was initially calculated using the following equations:

$$\bar{\sigma}_{(\text{Vertical})} = \left(\sum_{i=1}^n \gamma_{r_i} h_i \right) - \gamma_w d$$

Where γ_{r_i} = Total unit weight of soil layer i

h_i = Thickness of soil layer i

γ_w = Unit weight of water (62.4 pcf)

d = Depth of Shelby tube below water table

Then: $\bar{\sigma}_{(\text{Horizontal})} = K_o \bar{\sigma}_{(\text{Vertical})}$

in which K_o = coefficient of lateral earth pressure at rest = $1 - \sin \phi$ where ϕ = drained friction angle of the fine-grained soil layer in which the Shelby tube is

CLARKSTOWN LANDFILL

RFW-7B

0' (GL)

FILL - DK BROWN - DK REDDISH BROWN F-C SAND
WITH TRACE GRAVEL $\gamma_T = 120 \text{ pcf}$

13'

FILL AND GARBAGE $\gamma_T = 120 \text{ pcf}$
DK BROWN F-C SAND WITH NEWSPAPER, WOOD, + GLASS.

16'

DK BROWN DECOMPOSED PEAT $\gamma_T = 80 \text{ pcf}$

19'

DK BROWN - REDDISH BROWN MED-COARSE SAND
WITH TRACE MED. GRAVEL $\gamma_T = 120 \text{ pcf}$

23.5'

DARK BROWN - BLACK PEAT $\gamma_T = 80 \text{ pcf}$ $\downarrow 1.5$ SH-1
PEAT 25'

30'

BROWN ORGANIC SILT

33.7'

REDDISH BROWN VARVED CLAY AND SILT

39.3'

REDDISH BROWN, LAMINATED SILT, CLAY,
AND SAND, BECOMING SANDIER WITH DEPTH

46.2'

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____

A.) For peat layer, Shelby Tube 1 (SH-1) location

$$\begin{aligned}\bar{\sigma}_v &= 120 \text{ pcf}(13') + 120 \text{ pcf}(3') + 80 \text{ pcf}(3') \\ &+ 120 \text{ pcf}(4.5') + 80 \text{ pcf}(1.5') \\ &- 62.4 \text{ pcf}(3' + 4.5' + 1.5') = 2258 \text{ pcf}\end{aligned}$$

& assume $\Phi = 30^\circ$ for peat layer
primarily due to its fibrous content

$$\therefore K_0 = 1 - \sin 30^\circ = .50$$

$$\begin{aligned}\sigma_H &= (2258 \text{ pcf})(.50) = 1129 \text{ pcf} \\ &= 7.84 \text{ psi}\end{aligned}$$

$\therefore$ use 5, 7.5 and 10 psi for
CIU testing

CLARKSTOWN LANDFILL

RFW - 8

0 (GL)

 $\gamma_T = 120 \text{ pcf}$

GARBAGE AND FILL - DK REDDISH BROWN-BLACK SAND, SILT, AND GRAVEL WITH WOOD, PLASTIC AND ORGANICS.

 $\frac{1}{2}$

16'

DK BROWN-BLACK FIBROUS PEAT $\gamma_T = 80 \text{ pcf}$

24'

DK BROWN SANDY PEAT $\gamma_T = 95 \text{ pcf}$

32'

 $\gamma_T = 110 \text{ pcf}$

DK. BROWNISH BLACK ORGANIC SILT WITH TRACE V. FINE SAND SEAMS. TRACE PLANT REMAINS.

3' ↓

SH-1
35'ORGANIC
SILT

44'

GREENISH GRAY-BROWN SILTY CLAY

4.5' ↓

SH-3/4
48.5' $\gamma_T = 120 \text{ pcf}$

VARVED CLAY

57'

REDDISH BROWN CLAY INTERLAYERED WITH TRACE SILT AND V. FINE SAND SEAMS.

68'

REDDISH BROWN SILT WITH TRACE V. FINE SAND SEAMS AND LITTLE CLAY LAYERS

72'

REDDISH BROWN SILT AND V. FINE SAND WITH TRACE CLAY



CLIENT/SUBJECT _____ SHEET ____ of ____

TASK DESCRIPTION _____ W.O. NO. _____

PREPARED BY _____ DEPT _____ DATE _____ TASK NO. _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____

B.) For organic silt, Shelby Tube 1 (SH-1) location:

$$\begin{aligned}\bar{\sigma}_v &= 120 \text{ pcf} (16') + 80 \text{ pcf} (8') + 95 \text{ pcf} (8') \\ &\quad + 110 \text{ pcf} (3') - 62.4 \text{ pcf} (8' + 8' + 3') \\ &= 2464 \text{ psf}\end{aligned}$$

& assume $\phi = 25^\circ$ for organic silt

$$\therefore K_0 = 1 - \sin 25^\circ = .58$$

$$\begin{aligned}\therefore \bar{\sigma}_h &= (2464 \text{ psf} \times .58) = 1429 \text{ psf} \\ &= 9.92 \text{ psi}\end{aligned}$$

$\therefore$ use 5, 10, 15 psi for
CIU testing

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

c.) For varved clay, Shelby Tube 3+4 location

$$\begin{aligned}\bar{\sigma}_v &= 120 \text{ pcf}(16') + 80 \text{ pcf}(8') + 95 \text{ pcf}(8') \\ &\quad + 110 \text{ pcf}(12') + 120 \text{ pcf}(4.5') \\ &\quad - 62.4 \text{ pcf}(8' + 8' + 12' + 4.5') \\ &= 3152 \text{ pcf}\end{aligned}$$

∴ assume $\bar{\phi} = 28^\circ$ for varved clay

$$\therefore K_0 = 1 - \sin 28^\circ = .53$$

$$\begin{aligned}\therefore \bar{\sigma}_H &= (3152 \text{ pcf})(.53) = 1670 \text{ pcf} \\ &= 11.6 \text{ psi}\end{aligned}$$

∴ use 6, 12, 18 psi for CIU testing

located.

These calculations are shown as attachments to this response. Based on these calculations and in accordance with standard geotechnical practice, three confining (i.e. horizontal) pressures which span the actual horizontal effective stress calculated at the Shelby tube location were then selected for the CIU testing program for each soil type.

DEC COMMENT: Is any information available regarding the strain required to mobilize the strength of the landfill material? Stress-strain compatibility with the foundation soils should be considered when selecting strength parameters for the landfill material.

WESTON RESPONSE:

WESTON obtained the shear strength parameters of MSW under both undrained and drained conditions from a technical publication by Singh and Murphy.¹ However, this paper does not address at what levels of strains these shear strength values were determined. WESTON knows of no data available in this regard. It is acknowledged that strain compatibility between the MSW and foundation soils is an important consideration in a stability analysis involving interaction between these two materials. In theory, the shear strength parameters of these materials to be used in stability analyses should be selected at equal strain levels which are believed to be representative of the actual strains to be experienced by the stressed materials in the field. However, no practical way of accomplishing this is known to WESTON. Therefore, at this point in time, this approach is believed to be conceptual and theoretical in nature, and cannot be accomplished in a practical manner.

DEC COMMENT: Stability analyses should also be performed for the combination of undrained conditions in the foundation soils and drained conditions in the landfill material, because the permeability of these materials differ greatly.

¹Singh, S. and Murphy, B. J., "A Critical Examination of the Strength and Stability of Sanitary Landfills."

WESTON RESPONSE:

The slope stability analysis for this project consisted of evaluating three cross-sections of the landfill which WESTON believes represent the "worst-case" combinations of waste height, thicknesses of soft, compressible soil strata underlying the waste (i.e., the peat, organic silt, and varved clay layers), and landfill sideslope inclination.

Strength properties were assigned for both undrained (short-term) and drained (long-term) foundation soil/waste shear strength conditions. Slope stability analysis was then performed for each selected cross-section using a Modified Bishop Method of Slices Computer Program (STABL2). The factor-of-safety values against slope instability generated by the computer program assuming undrained and subsequently drained shear strength conditions in both the MSW as well as the underlying fine-grained soil layers at each cross-section location were determined and summarized with appropriate recommendations as presented in WESTON's geotechnical report dated 25 September 1991.

The case of undrained conditions existing in the foundation soils at the same time that drained conditions exist in the MSW was not investigated. The potential for this occurrence depends on the relative permeabilities of these materials. If the MSW is of considerably higher permeability than the foundation soils, it is conceivable that the waste materials could achieve a drained condition under the landfill cap loading while the lower permeability foundation soils are behaving in an undrained capacity. In order to assess this possibility, WESTON has reviewed available permeability data for typical MSW along with site-specific permeability data developed for the peat, organic silt and varved clay strata that underlie the Clarkstown landfill. Based on this review, which revealed that MSW is approximately two (2) orders of magnitude higher in permeability than the foundation soils, WESTON concurs with NYDEC's recommendation to analyze the landfill slope stability case in which undrained conditions exist in the foundation soils while drained conditions exist in the MSW.

Therefore, slope stability analyses have been performed using the STABL2 computer program for drained conditions within the waste layer and undrained conditions within the foundation soils for each of the three original selected slope cross-sections for the "final condition" (i.e., once the landfill cap has been constructed). The respective drained and undrained shear strength values assigned to the waste and foundation soils evaluated in this analysis were the same as those presented and discussed in WESTON's 25 September 1991 geotechnical report. The resulting factor-of-safety values generated for each cross-section are presented in the following

table. The computer output for each of the completed analyses are attached to this report and list these minimum factor-of-safety values as well as illustrate for each analyzed cross-section the critical circular arc failure surface to which the respective minimum value applies.

<u>Section¹ Analyzed</u>	<u>Soil Shear Strength Conditions</u>	<u>MSW Shear² Strength Conditions</u>	<u>Calculated³ Min. F.S.</u>	<u>Recommended⁴ Min. F.S.</u>	<u>Comments</u>
1-1, Final	Undrained	Drained	1.26	1.30	Marginal
3-3, Final	Undrained	Drained	1.10	1.30	NG
4-4, Final	Undrained	Drained	1.06	1.30	NG

NOTES:

¹Final: Five-foot thick final cover system assumed in place for analysis.

²MSW drained shear strength parameters: $\phi=28^\circ$, $c=0$ psf

³Calculated values rounded to the nearest hundredth.

⁴Recommended Minimum Factor-of-Safety values for slope stability analyses as proposed in the Federal Register.

As shown above, the calculated minimum FS values for the existing landfill sideslopes at Cross-Sections 3-3 and 4-4 under the loadings of a five-foot thick final cover system are unacceptable while the value calculated at Cross-Section 1-1 is marginal with respect to the minimum recommended value of 1.3 for undrained soil shear strength conditions. Two options for buttressing the landfill slopes in the vicinity of Cross-Section 3-3 to address unacceptable factor-of-safety values at this location have already been evaluated and are discussed in WESTON's remedial report dated 15 January 1992. Based on these latest results, consideration should also be given to stabilizing (e.g. buttressing) the landfill sideslope within the vicinity of Cross-Section 4-4 during final design of the landfill capping system to safeguard against potential slope instability at this location.

DEC COMMENT: Appendix J recommendations for construction of a toe of slope buttressing berm which were based on the slope stability analysis may be both costly and difficult to implement. The Department, therefore, requests that "value engineering" be performed to insure the most cost-effective solution is achieved. The firm retained to perform the review of your prime consultant should be a recognized expert in the field of geotechnical engineering with extensive experience in the stability of large landfills.

WESTON RESPONSE:

WESTON has completed value engineering of two (2) possible stabilization options believed to be appropriate for improving the stability of those above-grade sideslopes found from the analyses discussed and summarized in our 25 September 1991 report to exhibit unacceptable factor-of-safety values against potential slope instability. These options are as follows:

- Construction of an earthen buttressing berm along the toe alignment of the sideslopes of concern, as discussed in detail in the 25 September 1991 report. This berm would act to increase overall resistance to driving forces tending to cause potential instability by providing additional stabilizing weight at the base of the slopes;
- Installation of vertical carbon-steel sheetpiling adjacent to the toe alignment of the sideslopes of concern. The sheetpiling would be driven vertically approximately 5 feet into the "outwash" stratum that underlies the softer peat, organic silt and varved clay strata encountered at the site. Once installed, the sheetpiling would act to prevent the development of (i.e., "cut off") potential deep-seated failure surfaces exhibiting unacceptable factor-of-safety values that might otherwise become fully mobilized. (Since this option has not been engineered at the present time, it is assumed that the referenced depth of embedment will be sufficient to properly anchor the sheetpiling so as to adequately resist driving forces which develop as the critical failure surface attempts to slide.)

The attached cost estimates summarize the results of the value engineering completed by WESTON for each of the two (2) stabilization options. Briefly, each stabilization option discussed above was evaluated in conjunction with the site preparation activities and final cover system construction associated with the option. In this regard, it is noted that the

earthen berm stabilization option has been evaluated assuming two (2) phases of construction will be required for the final cover system on the landfill sideslope. For the sheetpile stabilization option, it should be noted that the actual sheetpiling section assumed in the cost estimate may change pending the results of slope stability analyses that would have to be performed to accurately determine the minimum thickness of sheetpiling required to provide for adequate factor-of-safety values against potential slope instability. Based upon the results of WESTON's value engineering study and the necessary sheetpiling assumptions which had to be made since this solution has not yet been engineered, it appears that construction of the earthen buttressing berm represents a cost savings of about \$350,000 over the installation of sheetpiling.

WEST CHESTER, PENNSYLVANIA

FILENAME: CLRKFILL.WK1

PROJECT : CLARKSTOWN LANDFILL
W.O. NO. : 3228-10-01-0010
LOCATION : CLARKSTOWN, ROCKLAND COUNTY, NEW YORK
ESTIMATE : CONCEPTUAL
ESTIMATOR : NGA
DATE :

25-Feb-92
01:28 PM

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
	VALUE ENGINEERING/ALTERNATIVE EVALUATION				
I	OPTION NO. 1				
A	SHEET PILING: DRIVE AND LEFT IN PLACE PROVIDE AND INSTALL 38 psf SHEET PILING, DRIVE INTO OUTWASH STRATUM MIN. 4.0'; AVERAGE DRIVE DEPTH +-55.0 VLF NO WALES, CONNECTORS, OR STRUTS ARE REQUIRED				
1	MOBILIZATION AND DEMOBILIZATION	1	LS	10000.00	10,000.00
2	PROVIDE AND INSTALL SHEET PILING: +-1000 LF REQUIRED	60,000	SF	19.32	1,159,200.00
B	LANDFILL SLOPE CAP: AVERAGE SLOPE LENGTH = +-450.0'; INCLINATIONS RANGING FROM 2:1 TO 8:1 SLOPES.				
1	CLEARING/GRUBBING AND REMOVAL OF VEGETATION FOR CAP INSTALLATION	10	ACRE	2500.00	25,826.45
2	SLOPE GRADING FOR NEW SIDESLOPE CAP/SUBGRADE PREPARATION:	50,000	SY	0.44	21,750.00
3	LOW-PERMEABILITY SOIL LAYER: 12" THK. CLAYEY SOILS, (FROM LOCAL BORROW, WITHIN 5 MILES OF PROJECT SITE) 10^-7 cm/sec SILTY CLAYEY TILL (SCREENED TO 3/4" MAX.)	16,667	CY	10.08	168,000.00
4	SAND DRAINAGE LAYER: 12" THK. BANK SAND	16,667	CY	11.97	199,500.00
5	GEOTEXTILE: NNWP 10-12 OZ	50,000	SY	1.19	59,500.00
6	PROTECTIVE SOIL LAYER: 36" THK. COMMON FILL/COVER SOILS (FROM CLIENT BORROW, WITHIN 2 MILES OF PROJECT SITE)	50,000	CY	6.32	316,050.00
7	VEGETATIVE SOIL LAYER: 6" THK TOPSOIL (FROM CLIENT BORROW, WITHIN 2 MILES OF PROJECT SITE)	8,333	CY	7.49	62,387.50
8	SEEDING AND MULCHING: FOR SLOPE STABILIZATION AND EROSION PREVENTION/CONTROL	50,000	SY	0.28	14,175.00
	TOTAL SHEET NO. 1				2,036,388.95

PROJECT : CLARKSTOWN LANDFILL
W.O. NO. : 3228-10-01-0010

[illegible]

ROY F. WESTON, INC.
WEST CHESTER, PENNSYLVANIA

PROJECT :CLARKSTOWN LANDFILL
W.O. NO. :3228-10-01-0010

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
	VALUE ENGINEERING/ALTERNATIVE EVALUATION SUMMARY				
I	OPTION NO. 1				
A	SHEET PILING:				1,169,200.00
B	LANDFILL SLOPE CAP:				867,188.95
C	LANDFILL TOP CAP:				400,044.47
	SUBTOTAL				2,436,433.42
	PROJECT/OPTION CONTINGENCY @ 15%				365,465.01
	OPTION 1 TOTAL (ROUNDED)				2,801,900.00
	TOTAL SHEET NO. 3				

ROY F. WESTON, INC.
WEST CHESTER, PENNSYLVANIA

PROJECT : CLARKSTOWN LANDFILL
W.O. NO. : 3228-10-01-0010

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
	VALUE ENGINEERING/ALTERNATIVE EVALUATION				
II	OPTION NO. 2				
A	LANDFILL SLOPE CAP: (PHASE 1) AVERAGE SLOPE LENGTH = +-180.0'; INCLINATIONS RANGING FROM 2:1 TO 8:1 SLOPES.				
1	CLEARING/GRUBBING AND REMOVAL OF VEGETATION FOR CAP INSTALLATION	4	ACRE	2500.00	10,330.58
2	SLOPE GRADING FOR NEW SIDESLOPE CAP/SUBGRADE PREPARATION:	20,000	SY	0.44	8,700.00
3	LOW-PERMEABILITY SOIL LAYER: 12" THK. CLAYEY SOILS, (FROM LOCAL BORROW, WITHIN 5 MILES OF PROJECT SITE) 10^-7 cm/sec SILTY CLAYEY TILL (SCREENED TO 3/4" MAX.)	6,667	CY	10.08	67,200.00
4	SAND DRAINAGE LAYER: 12" THK. BANK SAND	6,667	CY	11.97	79,800.00
5	GEOTEXTILE: NWMP 10-12 OZ	20,000	SY	1.19	23,800.00
6	PROTECTIVE SOIL LAYER: 36" THK. COMMON FILL/COVER SOILS (FROM CLIENT BORROW, WITHIN 2 MILES OF PROJECT SITE)	20,000	CY	6.32	126,420.00
B	BUTTRESS BERM: CONSTRUCT BUTTRESSING BERM ON SIDESLOPE CAP CONSTRUCTED ABOVE.				
1	BUTTRESS SOIL: COMMON FILL/COVER SOILS (FROM CLIENT BORROW, WITHIN 2 MILES OF PROJECT SITE) CONTROLLED PLACEMENT AND COMPACTION DENSITIES, AND GRADED TO REQUIRED SLOPES	123,148	CY	6.92	852,554.63
	TOTAL SHEET NO. 4				1,168,805.21

PROJECT :CLARKSTOWN LANDFILL
W.O. NO. :3228-10-01-0010

[illegible]

PROJECT : CLARKSTOWN LANDFILL
W.O. NO. : 3228-10-01-0010

[illegible]

PROJECT : CLARKSTOWN LANDFILL
W.O. NO. : 3228-10-01-0010

[illegible]

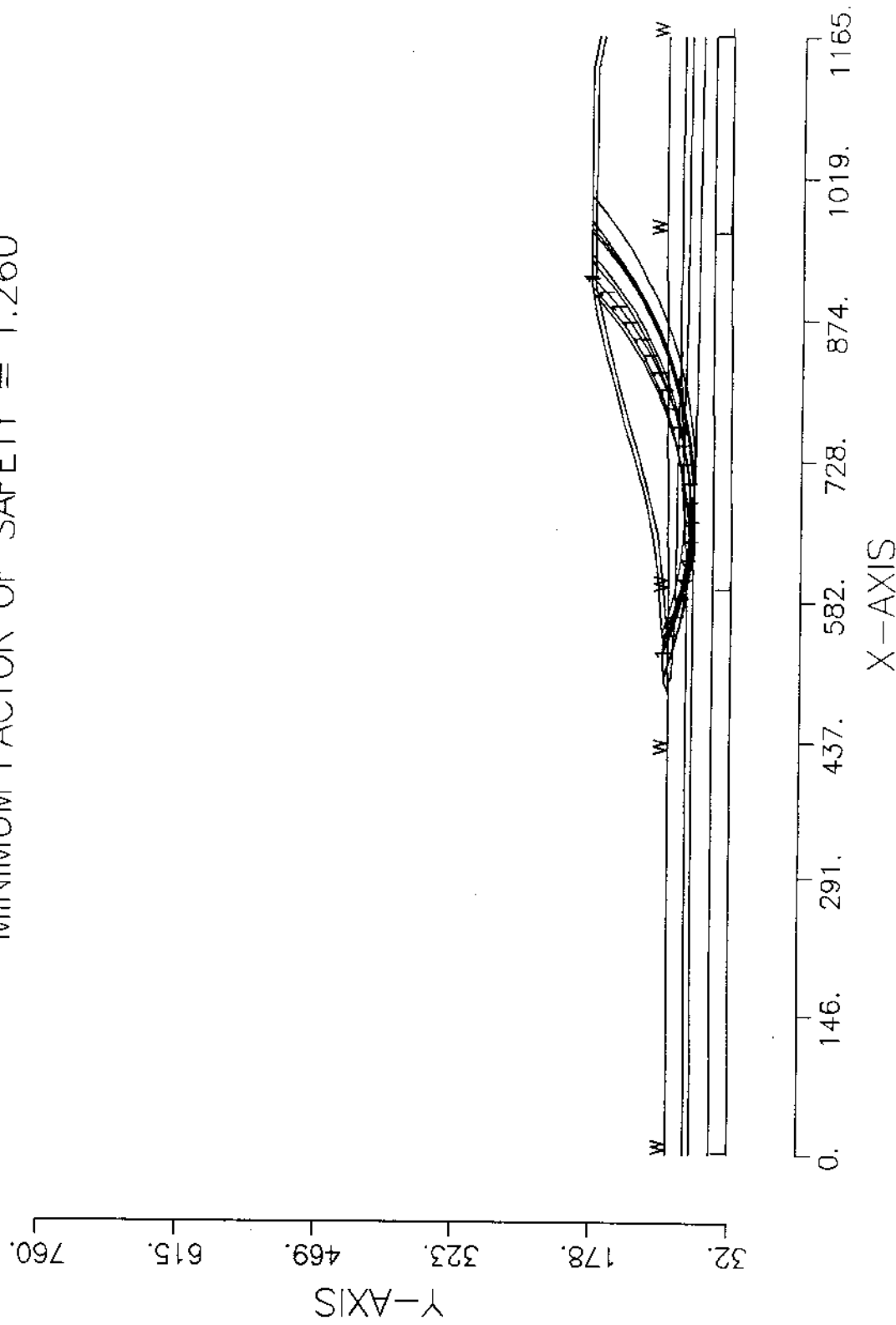
WESTEN

ATTACHMENTS

WESTON

Cross Section 1-1

CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
500SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.260



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 1-1 FINAL TOPOGRAPHY UNDRAINED ANALYSIS

47 16

0. 97. 488. 97. 3
 488. 97. 498. 102.5 1
 498. 102.5 524. 102.9 1
 524. 102.9 541. 103. 1
 541. 103. 559. 105. 1
 559. 105. 609. 109. 1
 609. 109. 652. 115. 1
 652. 115. 696. 125. 1
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 910. 181.5 1132. 181. 1
 1132. 181. 1165. 175. 1
 488. 97. 498. 97.5 3
 498. 97.5 524. 97.9 2
 524. 97.9 541. 98. 2
 541. 98. 559. 100. 2
 559. 100. 609. 104. 2
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 652. 110. 696. 120. 2
 696. 120. 733. 130. 2
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 1132. 176. 1165. 170. 2
 498. 97.5 504. 94. 3
 504. 94. 594. 90.5 3
 594. 90.5 861. 87.5 3
 861. 87.5 961. 86. 4
 961. 86. 1165. 85. 4
 0. 79. 594. 79. 5
 594. 79. 716. 83. 5
 716. 83. 861. 87.5 4
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 961. 79. 1165. 78. 5
 0. 72. 594. 72. 6
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 961. 67. 1165. 65. 6
 0. 51. 594. 51. 7
 594. 51. 961. 52. 7
 961. 52. 1165. 52. 7

SOIL

7

125. 125. 0.0 32. 0. 0. 1
 80.0 80.0 0. 28. 0. 0. 1
 80.0 80.0 30. 0. 0. 0. 1
 88.0 88.0 820. 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1
 125.0 125.0 300.0 40. 0. 0. 1

WATER

1 0.
5
0. 97.
424. 97.
594. 97.5
961. 102.5
1165. 102.
LIMITS
3 3
0. 32. 594. 32.
594. 32. 961. 34.
961. 34. 1165. 34.
CIRCL2
50 10
501. 551. 900. 1160.
20. 20. 0. 0.
END

CL1FUB.DAT

SECTION 1-1 FINAL UNDRAINED ANALYSIS

GEOSLOPE
Version 4.0

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--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 1-1
FINAL TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
47 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	97.00	488.00	97.00	3
2	488.00	97.00	498.00	102.50	1
3	498.00	102.50	524.00	102.90	1
4	524.00	102.90	541.00	103.00	1
5	541.00	103.00	559.00	105.00	1
6	559.00	105.00	609.00	109.00	1
7	609.00	109.00	652.00	115.00	1
8	652.00	115.00	696.00	125.00	1
9	696.00	125.00	733.00	135.00	1
10	733.00	135.00	764.00	145.00	1
11	764.00	145.00	801.00	155.00	1
12	801.00	155.00	837.00	165.00	1
13	837.00	165.00	875.00	175.00	1
14	875.00	175.00	910.00	181.50	1
15	910.00	181.50	1132.00	181.00	1
16	1132.00	181.00	1165.00	175.00	1
17	488.00	97.00	498.00	97.50	3
18	498.00	97.50	524.00	97.90	2
19	524.00	97.90	541.00	98.00	2
20	541.00	98.00	559.00	100.00	2
21	559.00	100.00	609.00	104.00	2
22	609.00	104.00	652.00	110.00	2
23	652.00	110.00	696.00	120.00	2
24	696.00	120.00	733.00	130.00	2
25	733.00	130.00	764.00	140.00	2
26	764.00	140.00	801.00	150.00	2
27	801.00	150.00	837.00	160.00	2
28	837.00	160.00	875.00	170.00	2
29	875.00	170.00	910.00	176.50	2
30	910.00	176.50	1132.00	176.00	2
31	1132.00	176.00	1165.00	170.00	2
32	498.00	97.50	504.00	94.00	3
33	504.00	94.00	594.00	90.50	3
34	594.00	90.50	861.00	87.50	3

35	861.00	87.50	961.00	86.00	4
36	961.00	86.00	1165.00	85.00	4
37	.00	79.00	594.00	79.00	5
38	594.00	79.00	716.00	83.00	5
39	716.00	83.00	861.00	87.50	4
40	716.00	83.00	961.00	79.00	5
41	961.00	79.00	1165.00	78.00	5
42	.00	72.00	594.00	72.00	6
43	594.00	72.00	961.00	67.00	6
44	961.00	67.00	1165.00	65.00	6
45	.00	51.00	594.00	51.00	7
46	594.00	51.00	961.00	52.00	7
47	961.00	52.00	1165.00	52.00	7

ISOTROPIC SOIL PARAMETERS

7 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1
7	125.0	125.0	300.0	40.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	97.00
2	424.00	97.00
3	594.00	97.50
4	961.00	102.50
5	1165.00	102.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 3 BOUNDARIES
OF WHICH THE FIRST 3 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	32.00	594.00	32.00
2	594.00	32.00	961.00	34.00
3	961.00	34.00	1165.00	34.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 501.00
AND X = 551.00

EACH SURFACE TERMINATES BETWEEN X = 900.00
AND X = 1160.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

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FAILURE SURFACE # 1 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.260

X-CENTER = 666.98
Y-CENTER = 422.95
RADIUS = 348.68

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	528.55	102.93	-21.75

2	547.13	95.52	-18.46
3	566.10	89.18	-15.17
4	585.40	83.95	-11.89
5	604.97	79.83	-8.60
6	624.75	76.84	-5.31
7	644.66	74.98	-2.03
8	664.65	74.28	1.26
9	684.64	74.72	4.55
10	704.58	76.30	7.83
11	724.39	79.03	11.12
12	744.02	82.89	14.41
13	763.39	87.86	17.69
14	782.44	93.94	20.98
15	801.12	101.10	24.27
16	819.35	109.32	27.56
17	837.08	118.58	30.84
18	854.25	128.83	34.13
19	870.81	140.05	37.42
20	886.69	152.20	40.70
21	901.85	165.25	43.99
22	916.24	179.14	47.28
23	918.41	181.48	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	534.73	12.35	3859.82	.00	.00	5180.22	2568.36
2	540.95	.10	61.04	.00	.00	79.01	33.33
3	541.77	1.53	1011.55	.00	.00	1309.46	552.44
4	544.83	4.59	3603.53	.00	284.85	4322.29	1823.51
5	552.54	10.83	11593.35	.00	2613.17	11184.48	4718.56
6	558.48	1.05	1341.58	.00	390.17	1032.96	23.80
7	562.55	7.10	10067.52	.00	3287.38	7385.84	23.80
8	575.75	19.30	34879.73	.00	13579.79	22689.17	23.80
9	589.70	8.60	18729.54	.00	7920.77	11263.29	23.80
10	599.49	10.97	26393.25	.00	11608.90	15418.99	23.80
11	606.24	2.54	6499.61	.00	2893.10	3689.69	23.80
12	608.26	1.49	3858.35	.00	1721.75	2249.01	301.51
13	616.87	15.75	44596.12	.00	19661.30	26168.30	301.51
14	634.70	19.91	65024.57	.00	27635.70	38230.38	301.51
15	648.33	7.34	25964.25	.00	10716.02	15342.84	301.51
16	658.32	12.65	47286.94	.00	18856.03	28595.55	301.51
17	674.65	20.00	80950.79	.00	30078.91	50758.82	301.51
18	690.32	11.36	48559.41	.00	16807.49	31632.08	301.51
19	700.29	8.58	37733.73	.00	12347.04	25299.43	301.51
20	710.29	11.42	51435.46	.00	15821.14	35620.71	301.51
21	720.20	8.39	38455.66	.00	10980.82	27485.61	301.51
22	728.70	8.61	39731.60	.00	10650.35	29321.79	301.51
23	737.70	9.40	43701.12	.00	10653.12	33316.29	301.51
24	743.21	1.61	7554.94	.00	1725.51	5763.56	650.63
25	746.20	4.35	20432.89	.00	4523.22	15821.92	650.63
26	755.88	15.02	71196.08	.00	13324.74	60088.45	23.80
27	763.69	.61	2917.67	.00	473.80	2583.90	23.80
28	764.81	1.61	7700.06	.00	1215.39	6854.21	23.80
29	774.03	16.83	79803.20	.00	9586.83	65379.45	27582.59
30	790.72	16.56	76734.59	.00	3389.87	67821.04	28612.66
31	800.00	2.00	9078.21	.00	.00	8368.87	3530.70
32	801.06	.12	532.57	.00	.00	490.95	207.13

33	810.23	18.23	80462.34	.00	.00	74156.83	31285.63
34	828.17	17.65	72623.30	.00	.00	67136.27	28323.77
35	837.04	.08	319.48	.00	.00	295.34	124.60
36	845.67	17.17	63727.84	.00	.00	59288.83	25013.05
37	862.53	16.56	53097.35	.00	.00	49881.23	21044.13
38	872.90	4.19	11941.04	.00	.00	11366.16	4795.21
39	880.85	11.69	29154.94	.00	.00	27751.33	11707.86
40	894.27	15.16	27494.37	.00	.00	26610.29	11226.47
41	905.93	8.15	9369.43	.00	.00	9254.03	3904.13
42	911.75	3.50	2665.29	.00	.00	2632.47	1110.60
43	914.87	2.74	1258.36	.00	.00	1182.88	586.48
44	917.33	2.16	317.85	.00	.00	304.84	151.14

1

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FAILURE SURFACE # 2 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.273

X-CENTER = 687.41
Y-CENTER = 475.42
RADIUS = 403.74

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	531.61	102.94	-21.28
2	550.25	95.69	-18.44
3	569.22	89.36	-15.60
4	588.48	83.98	-12.76
5	607.99	79.56	-9.92
6	627.69	76.12	-7.09
7	647.54	73.65	-4.25
8	667.48	72.17	-1.41
9	687.48	71.67	1.43
10	707.47	72.17	4.27
11	727.42	73.66	7.11
12	747.26	76.14	9.95
13	766.96	79.59	12.78
14	786.47	84.02	15.62
15	805.73	89.40	18.46
16	824.70	95.73	21.30
17	843.33	103.00	24.14
18	861.58	111.18	26.98
19	879.41	120.25	29.82
20	896.76	130.20	32.65
21	913.60	140.99	35.49
22	929.88	152.60	38.33
23	945.57	165.00	41.17
24	960.63	178.17	44.01
25	963.95	181.38	

1

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FAILURE SURFACE # 3 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.297

X-CENTER = 691.69
Y-CENTER = 475.43
RADIUS = 403.01

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	537.73	102.98	-21.04
2	556.40	95.80	-18.19
3	575.40	89.56	-15.35
4	594.69	84.26	-12.51
5	614.21	79.93	-9.66
6	633.93	76.58	-6.82
7	653.79	74.20	-3.97
8	673.74	72.81	-1.13
9	693.74	72.42	1.71
10	713.73	73.02	4.56
11	733.66	74.61	7.40
12	753.50	77.18	10.24
13	773.18	80.74	13.09
14	792.66	85.27	15.93
15	811.89	90.76	18.77
16	830.83	97.19	21.62
17	849.42	104.56	24.46
18	867.63	112.84	27.31
19	885.40	122.02	30.15
20	902.69	132.06	32.99
21	919.47	142.95	35.84
22	935.68	154.66	38.68
23	951.29	167.16	41.52
24	966.27	180.42	44.37
25	967.24	181.37	

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FAILURE SURFACE # 4 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.302

X-CENTER = 688.31
Y-CENTER = 498.28
RADIUS = 426.41

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	528.55	102.93	-20.66
2	547.27	95.87	-17.97
3	566.29	89.70	-15.28
4	585.58	84.43	-12.60
5	605.10	80.06	-9.91
6	624.80	76.62	-7.22
7	644.64	74.11	-4.53
8	664.58	72.53	-1.85
9	684.57	71.88	.84
10	704.57	72.18	3.53
11	724.53	73.41	6.22
12	744.41	75.57	8.90
13	764.17	78.67	11.59

14	783.76	82.69	14.28
15	803.15	87.62	16.97
16	822.28	93.45	19.65
17	841.11	100.18	22.34
18	859.61	107.78	25.03
19	877.73	116.24	27.72
20	895.44	125.55	30.40
21	912.69	135.67	33.09
22	929.44	146.59	35.78
23	945.67	158.28	38.47
24	961.33	170.72	41.15
25	973.50	181.36	

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FAILURE SURFACE # 5 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.309

X-CENTER = 656.99
Y-CENTER = 483.18
RADIUS = 409.77

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	505.08	102.61	-20.36
2	523.83	95.65	-17.57
3	542.90	89.61	-14.77
4	562.24	84.52	-11.97
5	581.80	80.37	-9.17
6	601.55	77.18	-6.38
7	621.42	74.96	-3.58
8	641.39	73.71	-.78
9	661.38	73.43	2.01
10	681.37	74.14	4.81
11	701.30	75.81	7.61
12	721.12	78.46	10.40
13	740.80	82.07	13.20
14	760.27	86.64	16.00
15	779.49	92.15	18.79
16	798.43	98.59	21.59
17	817.02	105.95	24.39
18	835.24	114.21	27.18
19	853.03	123.35	29.98
20	870.35	133.34	32.78
21	887.17	144.17	35.57
22	903.44	155.81	38.37
23	919.12	168.22	41.17
24	934.17	181.39	43.99
25	934.23	181.45	

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FAILURE SURFACE # 6 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.311

X-CENTER = 709.83
Y-CENTER = 506.74
RADIUS = 436.23

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	543.86	103.32	-21.05
2	562.52	96.13	-18.42
3	581.50	89.81	-15.80
4	600.74	84.37	-13.17
5	620.22	79.81	-10.54
6	639.88	76.16	-7.91
7	659.69	73.40	-5.29
8	679.60	71.56	-2.66
9	699.58	70.63	-.03
10	719.58	70.62	2.59
11	739.56	71.52	5.22
12	759.48	73.34	7.85
13	779.29	76.08	10.48
14	798.96	79.71	13.10
15	818.44	84.25	15.73
16	837.69	89.67	18.36
17	856.67	95.97	20.98
18	875.34	103.13	23.61
19	893.67	111.14	26.24
20	911.61	119.98	28.86
21	929.12	129.63	31.49
22	946.18	140.08	34.12
23	962.74	151.30	36.75
24	978.76	163.26	39.37
25	994.22	175.95	42.00
26	1000.16	181.30	

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FAILURE SURFACE # 7 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.341

X-CENTER = 677.38
Y-CENTER = 458.44
RADIUS = 382.28

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	536.71	102.97	-20.09
2	555.50	96.10	-17.09
3	574.61	90.23	-14.09
4	594.01	85.36	-11.10
5	613.64	81.51	-8.10
6	633.44	78.69	-5.10
7	653.36	76.91	-2.10
8	673.35	76.18	.89
9	693.34	76.49	3.89
10	713.30	77.85	6.89
11	733.15	80.25	9.89
12	752.86	83.68	12.89

13	772.35	88.14	15.88
14	791.59	93.62	18.88
15	810.51	100.09	21.88
16	829.07	107.54	24.88
17	847.21	115.96	27.88
18	864.89	125.31	30.87
19	882.06	135.57	33.87
20	898.67	146.72	36.87
21	914.67	158.72	39.87
22	930.02	171.54	42.87
23	940.67	181.43	

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FAILURE SURFACE # 8 SPECIFIED BY 23 COORDINATE POINTS

SAFETY FACTOR = 1.343

X-CENTER = 642.39
Y-CENTER = 452.89
RADIUS = 376.23

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	505.08	102.61	-19.88
2	523.89	95.81	-16.84
3	543.03	90.01	-13.79
4	562.46	85.25	-10.74
5	582.11	81.52	-7.70
6	601.93	78.84	-4.65
7	621.86	77.22	-1.61
8	641.85	76.66	1.44
9	661.85	77.16	4.49
10	681.78	78.72	7.53
11	701.61	81.35	10.58
12	721.27	85.02	13.62
13	740.71	89.73	16.67
14	759.87	95.47	19.72
15	778.70	102.21	22.76
16	797.14	109.95	25.81
17	815.14	118.66	28.86
18	832.66	128.31	31.90
19	849.64	138.88	34.95
20	866.03	150.34	37.99
21	881.79	162.65	41.04
22	896.88	175.78	44.09
23	901.07	179.84	

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FAILURE SURFACE # 9 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.355

X-CENTER = 671.31
Y-CENTER = 548.34
RADIUS = 476.47

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	503.04	102.58	-19.48
2	521.90	95.91	-17.07
3	541.02	90.04	-14.67
4	560.36	84.97	-12.26
5	579.91	80.72	-9.86
6	599.61	77.30	-7.45
7	619.44	74.71	-5.05
8	639.37	72.95	-2.64
9	659.34	72.02	-.24
10	679.34	71.94	2.17
11	699.33	72.70	4.57
12	719.27	74.29	6.98
13	739.12	76.72	9.38
14	758.85	79.98	11.79
15	778.43	84.07	14.19
16	797.82	88.97	16.60
17	816.98	94.69	19.00
18	835.89	101.20	21.41
19	854.51	108.50	23.81
20	872.81	116.58	26.22
21	890.75	125.41	28.63
22	908.31	134.99	31.03
23	925.45	145.30	33.44
24	942.14	156.32	35.84
25	958.35	168.04	38.25
26	974.06	180.42	40.65
27	975.15	181.35	

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FAILURE SURFACE #10 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.359

X-CENTER = 669.56

Y-CENTER = 418.42

RADIUS = 336.39

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	549.98	104.00	-19.12
2	568.88	97.45	-15.71
3	588.13	92.03	-12.30
4	607.67	87.77	-8.90
5	627.43	84.68	-5.49
6	647.34	82.76	-2.08
7	667.32	82.04	1.32
8	687.32	82.50	4.73
9	707.25	84.15	8.14
10	727.05	86.98	11.55
11	746.64	90.98	14.95
12	765.97	96.14	18.36
13	784.95	102.44	21.77
14	803.52	109.86	25.17

1

Y	A	X	I	S	
32.00	177.63	323.25	468.88	614.50	760.13

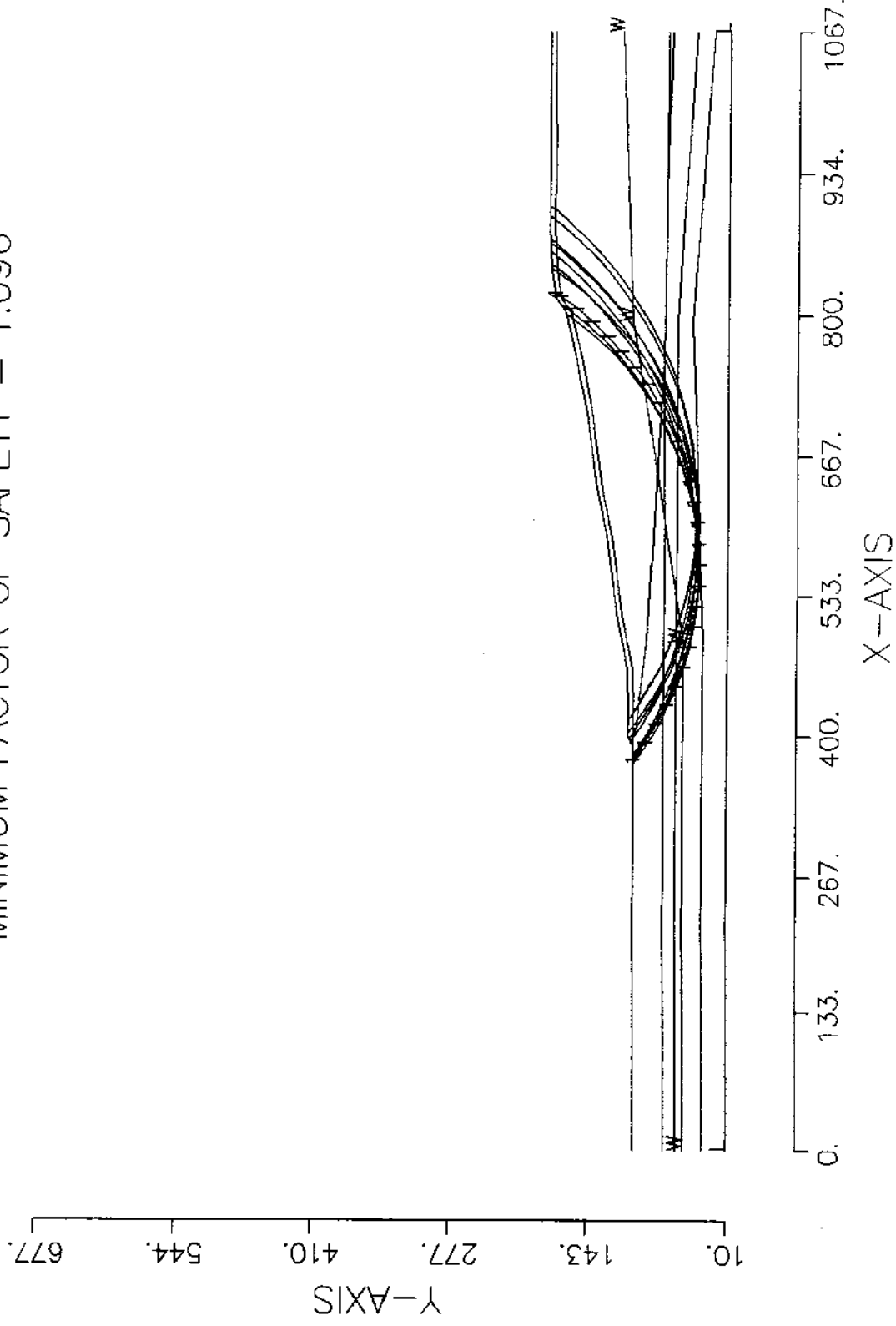
X	.00	L*	***	-----+-----+-----+-----+
		-		
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		-		
	145.63	+		
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A	291.25	+		
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X	436.88	+		
		-		
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		-	.5*	
		-	.1*	
I	582.50	L*	**.	
		-	.13*	
			...10.	
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S	728.13	...	1*...*	
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			...218.	
			...621...*	
			2118.*	
			*251.	
	873.75		6218**	
		-	64211*	
		-	62251	
		-	6327	
		L****	W..662	
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	1019.38	+		

WESTON

Cross Section 3-3

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.096



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 3-3 FINAL TOPOGRAPHY UNDRAINED ANALYSIS

45 16

0. 99. 390. 99. 3
 390. 99. 400. 104. 1
 400. 104. 419. 104. 1
 419. 104. 464. 105. 1
 464. 105. 516. 115. 1
 516. 115. 590. 125. 1
 590. 125. 637. 135. 1
 637. 135. 707. 145. 1
 707. 145. 760. 155. 1
 760. 155. 803. 165. 1
 803. 165. 817. 175. 1
 817. 175. 843. 179. 1
 843. 179. 885. 181. 1
 885. 181. 945. 180.5 1
 945. 180.5 1015. 181. 1
 1015. 181. 1067. 181. 1
 390. 99. 400. 99. 3
 400. 99. 419. 99. 2
 419. 99. 464. 100. 2
 464. 100. 516. 110. 2
 516. 110. 590. 120. 2
 590. 120. 637. 130. 2
 637. 130. 707. 140. 2
 707. 140. 760. 150. 2
 760. 150. 803. 160. 2
 803. 160. 817. 170. 2
 817. 170. 843. 174. 2
 843. 174. 885. 176. 2
 885. 176. 945. 175.5 2
 945. 175.5 1015. 176. 2
 1015. 176. 1067. 176. 2
 400. 99. 408. 96. 3
 408. 96. 489. 87. 3
 489. 87. 760. 71.5 3
 760. 71.5 794. 70. 4
 794. 70. 914. 69. 4
 914. 69. 1067. 68. 3
 0. 70. 489. 70.5 4
 489. 70.5 760. 71.5 4
 914. 69. 1067. 64. 4
 0. 59. 794. 59. 5
 794. 59. 1067. 40.5 5
 0. 33. 489. 33. 6
 489. 33. 794. 44. 6
 794. 44. 1067. 24. 6

SOIL

6
 125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
 4
 0. 52.

489. 52.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
50 10
370. 420. 800. 1067.
20. 20. 0. 0.
END

CL3FUB.DAT

SECTION 3-3 FINAL UNDRAINED ANALYSIS

GEOSLOPE
Version 4.0

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(617) 369-8304

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West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 3-3
FINAL TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

16 TOP BOUNDARIES
45 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	390.00	99.00	3
2	390.00	99.00	400.00	104.00	1
3	400.00	104.00	419.00	104.00	1
4	419.00	104.00	464.00	105.00	1
5	464.00	105.00	516.00	115.00	1
6	516.00	115.00	590.00	125.00	1
7	590.00	125.00	637.00	135.00	1
8	637.00	135.00	707.00	145.00	1
9	707.00	145.00	760.00	155.00	1
10	760.00	155.00	803.00	165.00	1
11	803.00	165.00	817.00	175.00	1
12	817.00	175.00	843.00	179.00	1
13	843.00	179.00	885.00	181.00	1
14	885.00	181.00	945.00	180.50	1
15	945.00	180.50	1015.00	181.00	1
16	1015.00	181.00	1067.00	181.00	1
17	390.00	99.00	400.00	99.00	3
18	400.00	99.00	419.00	99.00	2
19	419.00	99.00	464.00	100.00	2
20	464.00	100.00	516.00	110.00	2
21	516.00	110.00	590.00	120.00	2
22	590.00	120.00	637.00	130.00	2
23	637.00	130.00	707.00	140.00	2
24	707.00	140.00	760.00	150.00	2
25	760.00	150.00	803.00	160.00	2
26	803.00	160.00	817.00	170.00	2
27	817.00	170.00	843.00	174.00	2
28	843.00	174.00	885.00	176.00	2
29	885.00	176.00	945.00	175.50	2
30	945.00	175.50	1015.00	176.00	2
31	1015.00	176.00	1067.00	176.00	2
32	400.00	99.00	408.00	96.00	3
33	408.00	96.00	489.00	87.00	3
34	489.00	87.00	760.00	71.50	3

35	760.00	71.50	794.00	70.00	4
36	794.00	70.00	914.00	69.00	4
37	914.00	69.00	1067.00	68.00	3
38	.00	70.00	489.00	70.50	4
39	489.00	70.50	760.00	71.50	4
40	914.00	69.00	1067.00	64.00	4
41	.00	59.00	794.00	59.00	5
42	794.00	59.00	1067.00	40.50	5
43	.00	33.00	489.00	33.00	6
44	489.00	33.00	794.00	44.00	6
45	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	52.00
2	489.00	52.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
-----------------	--------	--------	---------	---------

1 .00 10.00 1067.00 10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 370.00
AND X = 420.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.096

X-CENTER = 563.52
Y-CENTER = 345.52
RADIUS = 309.05

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	377.14	99.00	-35.24
2	393.48	87.46	-31.53
3	410.53	77.00	-27.82
4	428.21	67.67	-24.11
5	446.47	59.50	-20.40
6	465.22	52.53	-16.69
7	484.37	46.78	-12.99

8	503.86	42.29	-9.28
9	523.60	39.06	-5.57
10	543.51	37.12	-1.86
11	563.49	36.47	1.85
12	583.48	37.12	5.56
13	603.39	39.06	9.27
14	623.13	42.28	12.97
15	642.62	46.77	16.68
16	661.78	52.51	20.39
17	680.52	59.48	24.10
18	698.78	67.64	27.81
19	716.47	76.97	31.52
20	733.52	87.43	35.23
21	749.86	98.96	38.93
22	765.42	111.53	42.64
23	780.13	125.08	46.35
24	793.93	139.55	50.06
25	806.77	154.89	53.77
26	818.59	171.02	57.48
27	821.58	175.70	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	383.57	12.86	4670.40	.00	.00	6022.51	27.38
2	391.74	3.48	3247.70	.00	.00	4058.63	27.38
3	396.74	6.52	9810.17	.00	.00	11637.61	27.38
4	404.00	8.00	16515.91	.00	.00	19533.81	27.38
5	409.26	2.53	5868.67	.00	.00	6934.81	27.38
6	414.76	8.47	21722.97	.00	.00	24700.21	27.38
7	420.99	3.98	11255.69	.00	.00	12791.59	27.38
8	425.60	5.24	15942.19	.00	.00	20364.12	748.34
9	437.34	18.26	64729.47	.00	.00	77615.03	748.34
10	447.14	1.34	5287.15	.00	.00	6039.07	748.34
11	455.91	16.19	69542.04	.00	.00	76424.70	346.79
12	464.61	1.22	5658.77	.00	.00	6204.78	346.79
13	466.09	1.75	8299.39	.00	.00	8855.12	346.79
14	475.67	17.40	90071.34	.00	2958.32	92965.88	346.79
15	486.69	4.63	26248.75	.00	1704.69	25612.71	346.79
16	496.43	14.86	89999.72	.00	8744.29	84837.01	346.79
17	509.93	12.14	79455.92	.00	10786.10	70419.55	346.79
18	519.80	7.60	52040.14	.00	8285.77	44880.22	346.79
19	528.17	9.15	64508.16	.00	11273.94	53850.92	346.79
20	538.13	10.76	78064.98	.00	14978.84	63821.61	346.79
21	553.50	19.99	150187.80	.00	31851.84	118640.30	346.79
22	573.49	19.99	154524.30	.00	35845.75	118535.10	346.79
23	586.74	6.52	50872.43	.00	12338.53	38553.24	346.79
24	596.70	13.39	105194.50	.00	25879.28	79358.04	346.79
25	605.37	3.96	31330.19	.00	7830.70	23686.43	346.79
26	615.24	15.77	124674.90	.00	31127.16	94291.77	346.79
27	630.06	13.87	108973.90	.00	27265.71	83425.78	346.79
28	639.81	5.62	43674.16	.00	10797.40	33560.27	346.79
29	646.38	7.53	57683.01	.00	14359.52	45041.57	346.79
30	655.96	11.63	86947.74	.00	21177.43	68328.95	346.79
31	670.51	17.47	124413.00	.00	29404.26	100924.30	346.79
32	679.88	1.28	8797.35	.00	1986.05	7019.52	748.34
33	689.65	18.26	120556.90	.00	25640.22	99733.63	748.34
34	702.25	6.93	43181.36	.00	8143.96	37581.36	748.34

35	706.36	1.29	7827.36	.00	1373.42	7454.95	27.38
36	709.18	4.37	26238.44	.00	4344.38	25248.65	27.38
37	713.92	5.10	30000.22	.00	4449.33	23463.04	11385.22
38	725.00	17.05	94124.34	.00	9433.40	77822.07	37762.45
39	736.90	6.77	34449.20	.00	955.01	30698.30	14896.07
40	745.07	9.57	45490.06	.00	.00	41476.29	20125.99
41	754.93	10.14	43648.41	.00	.00	40310.43	19560.27
42	762.71	5.42	21268.98	.00	.00	19642.45	9531.32
43	772.77	14.71	49991.73	.00	.00	46971.20	22792.35
44	787.03	13.80	35098.72	.00	.00	33705.09	16355.09
45	798.47	9.07	15808.18	.00	.00	15589.48	7564.66
46	804.89	3.77	4985.48	.00	.00	4916.51	2385.69
47	811.89	10.23	10058.95	.00	.00	10238.51	4968.14
48	817.48	.95	639.23	.00	.00	650.64	315.72
49	818.27	.64	368.91	.00	.00	351.00	200.16
50	820.09	2.99	788.87	.00	.00	774.56	441.70

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.096

X-CENTER = 591.80

Y-CENTER = 378.42

RADIUS = 340.23

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	394.49	101.25	-33.76
2	411.12	90.13	-30.39
3	428.37	80.01	-27.02
4	446.19	70.92	-23.66
5	464.50	62.90	-20.29
6	483.26	55.96	-16.92
7	502.40	50.14	-13.55
8	521.84	45.46	-10.18
9	541.53	41.92	-6.81
10	561.39	39.55	-3.44
11	581.35	38.35	-.08
12	601.35	38.32	3.29
13	621.32	39.47	6.66
14	641.18	41.79	10.03
15	660.88	45.27	13.40
16	680.33	49.91	16.77
17	699.48	55.68	20.13
18	718.26	62.56	23.50
19	736.60	70.54	26.87
20	754.44	79.58	30.24
21	771.72	89.65	33.61
22	788.38	100.72	36.98
23	804.35	112.75	40.35
24	819.60	125.70	43.71
25	834.05	139.52	47.08
26	847.67	154.17	50.45
27	860.40	169.59	53.82
28	868.16	180.20	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.107

X-CENTER = 590.34
Y-CENTER = 336.35
RADIUS = 298.69

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	402.65	104.00	-37.01
2	418.62	91.96	-33.17
3	435.36	81.02	-29.34
4	452.80	71.22	-25.50
5	470.85	62.61	-21.66
6	489.44	55.22	-17.83
7	508.48	49.10	-13.99
8	527.88	44.27	-10.15
9	547.57	40.74	-6.31
10	567.45	38.54	-2.48
11	587.43	37.68	1.36
12	607.43	38.15	5.20
13	627.34	39.96	9.04
14	647.10	43.11	12.87
15	666.59	47.56	16.71
16	685.75	53.31	20.55
17	704.48	60.33	24.38
18	722.69	68.59	28.22
19	740.31	78.05	32.06
20	757.26	88.66	35.90
21	773.47	100.39	39.73
22	788.85	113.17	43.57
23	803.34	126.96	47.41
24	816.87	141.68	51.24
25	829.39	157.28	55.08
26	840.84	173.68	58.92
27	844.08	179.05	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 29 COORDINATE POINTS

SAFETY FACTOR = 1.121

X-CENTER = 618.99
Y-CENTER = 395.41
RADIUS = 356.36

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	413.88	104.00	-33.53
2	430.55	92.95	-30.32
3	447.81	82.86	-27.10
4	465.62	73.74	-23.88

5	483.91	65.65	-20.67
6	502.62	58.59	-17.45
7	521.70	52.59	-14.24
8	541.08	47.67	-11.02
9	560.71	43.85	-7.80
10	580.53	41.13	-4.59
11	600.47	39.53	-1.37
12	620.46	39.05	1.84
13	640.45	39.70	5.06
14	660.37	41.46	8.28
15	680.16	44.34	11.49
16	699.76	48.32	14.71
17	719.11	53.40	17.92
18	738.14	59.56	21.14
19	756.79	66.77	24.36
20	775.01	75.02	27.57
21	792.74	84.27	30.79
22	809.92	94.51	34.00
23	826.50	105.70	37.22
24	842.43	117.79	40.44
25	857.65	130.76	43.65
26	872.12	144.57	46.87
27	885.79	159.17	50.08
28	898.63	174.51	53.30
29	903.35	180.85	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 29 COORDINATE POINTS

SAFETY FACTOR = 1.121

X-CENTER = 573.69

Y-CENTER = 402.41

RADIUS = 363.18

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	374.08	99.00	-31.76
2	391.09	88.47	-28.61
3	408.65	78.90	-25.45
4	426.70	70.30	-22.29
5	445.21	62.71	-19.14
6	464.10	56.16	-15.98
7	483.33	50.65	-12.83
8	502.83	46.21	-9.67
9	522.55	42.85	-6.52
10	542.42	40.58	-3.36
11	562.38	39.41	-.21
12	582.38	39.33	2.95
13	602.36	40.36	6.11
14	622.24	42.49	9.26
15	641.98	45.71	12.42
16	661.52	50.01	15.57
17	680.78	55.38	18.73
18	699.72	61.80	21.88
19	718.28	69.25	25.04
20	736.40	77.72	28.19

21	754.03	87.17	31.35
22	771.11	97.57	34.51
23	787.59	108.90	37.66
24	803.42	121.12	40.82
25	818.56	134.20	43.97
26	832.95	148.08	47.13
27	846.56	162.74	50.28
28	859.34	178.12	53.44
29	860.61	179.84	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.124

X-CENTER = 557.04
Y-CENTER = 346.14
RADIUS = 308.71

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	372.04	99.00	-34.96
2	388.43	87.54	-31.25
3	405.53	77.16	-27.54
4	423.26	67.92	-23.82
5	441.56	59.84	-20.11
6	460.34	52.96	-16.40
7	479.53	47.32	-12.69
8	499.04	42.92	-8.97
9	518.79	39.80	-5.26
10	538.71	37.97	-1.55
11	558.70	37.43	2.16
12	578.69	38.18	5.88
13	598.58	40.23	9.59
14	618.30	43.56	13.30
15	637.77	48.17	17.01
16	656.89	54.02	20.73
17	675.60	61.10	24.44
18	693.81	69.37	28.15
19	711.44	78.81	31.86
20	728.43	89.36	35.58
21	744.69	101.00	39.29
22	760.17	113.67	43.00
23	774.80	127.31	46.71
24	788.51	141.86	50.43
25	801.25	157.28	54.14
26	810.92	170.66	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.124

X-CENTER = 615.54
Y-CENTER = 384.04

RADIUS = 344.50

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	414.90	104.00	-33.96
2	431.49	92.83	-30.63
3	448.70	82.64	-27.30
4	466.47	73.46	-23.98
5	484.74	65.34	-20.65
6	503.46	58.28	-17.32
7	522.55	52.33	-14.00
8	541.96	47.49	-10.67
9	561.61	43.79	-7.34
10	581.45	41.23	-4.02
11	601.40	39.83	-.69
12	621.40	39.59	2.64
13	641.37	40.51	5.96
14	661.27	42.59	9.29
15	681.00	45.81	12.62
16	700.52	50.18	15.94
17	719.75	55.68	19.27
18	738.63	62.28	22.60
19	757.10	69.96	25.92
20	775.08	78.70	29.25
21	792.53	88.48	32.58
22	809.39	99.25	35.90
23	825.59	110.97	39.23
24	841.08	123.62	42.56
25	855.81	137.15	45.88
26	869.73	151.51	49.21
27	882.80	166.65	52.54
28	893.74	180.93	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 25 COORDINATE POINTS

SAFETY FACTOR = 1.130

X-CENTER = 559.56

Y-CENTER = 331.60

RADIUS = 293.72

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	380.20	99.00	-35.68
2	396.45	87.33	-31.78
3	413.45	76.80	-27.88
4	431.13	67.45	-23.98
5	449.40	59.32	-20.08
6	468.19	52.45	-16.17
7	487.40	46.88	-12.27
8	506.94	42.63	-8.37
9	526.73	39.72	-4.47
10	546.67	38.16	-.57
11	566.66	37.96	3.34
12	586.63	39.13	7.24

13	606.47	41.65	11.14
14	626.09	45.51	15.04
15	645.41	50.70	18.94
16	664.33	57.20	22.85
17	682.76	64.96	26.75
18	700.62	73.96	30.65
19	717.82	84.16	34.55
20	734.29	95.50	38.45
21	749.96	107.94	42.36
22	764.74	121.42	46.26
23	778.56	135.86	50.16
24	791.38	151.22	54.06
25	801.03	164.54	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.140

X-CENTER = 572.95
Y-CENTER = 383.56
RADIUS = 343.13

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	381.23	99.00	-32.30
2	398.13	88.31	-28.96
3	415.63	78.63	-25.62
4	433.66	69.98	-22.28
5	452.17	62.40	-18.94
6	471.09	55.91	-15.60
7	490.35	50.53	-12.26
8	509.89	46.28	-8.92
9	529.65	43.18	-5.58
10	549.56	41.23	-2.24
11	569.54	40.45	1.10
12	589.54	40.84	4.44
13	609.48	42.39	7.78
14	629.29	45.09	11.12
15	648.92	48.95	14.46
16	668.28	53.95	17.80
17	687.33	60.06	21.14
18	705.98	67.27	24.48
19	724.18	75.56	27.82
20	741.87	84.90	31.16
21	758.99	95.24	34.50
22	775.47	106.57	37.84
23	791.26	118.84	41.18
24	806.31	132.01	44.52
25	820.57	146.04	47.86
26	833.99	160.87	51.20
27	846.52	176.45	54.54
28	848.52	179.26	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.147

X-CENTER = 593.54

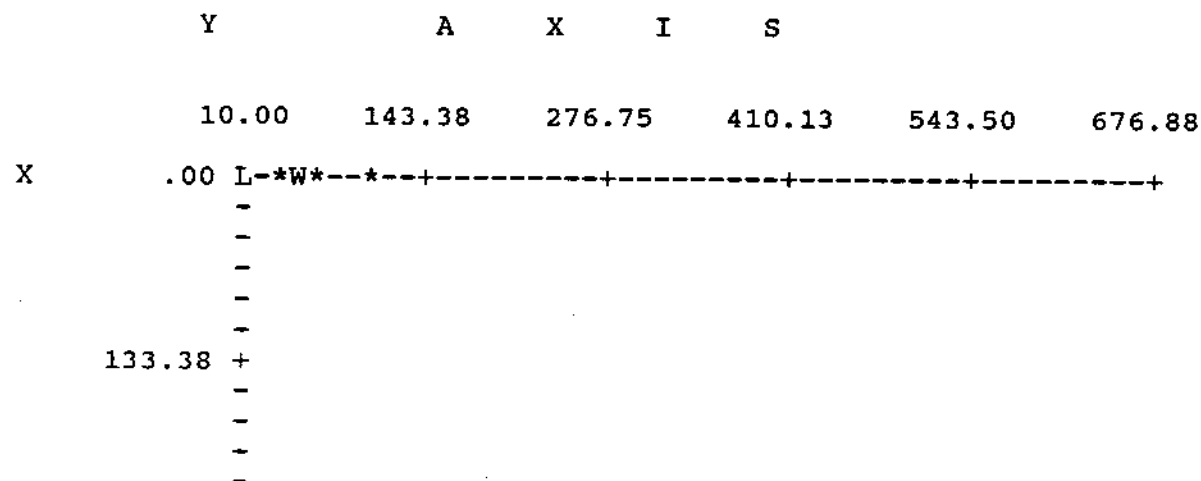
Y-CENTER = 388.90

RADIUS = 347.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	396.53	102.27	-32.85
2	413.33	91.42	-29.56
3	430.73	81.55	-26.26
4	448.67	72.70	-22.97
5	467.08	64.90	-19.67
6	485.91	58.16	-16.38
7	505.10	52.52	-13.08
8	524.58	48.00	-9.79
9	544.29	44.60	-6.49
10	564.16	42.33	-3.20
11	584.13	41.22	.10
12	604.13	41.25	3.39
13	624.10	42.44	6.69
14	643.96	44.77	9.98
15	663.66	48.23	13.28
16	683.12	52.83	16.57
17	702.29	58.53	19.87
18	721.10	65.33	23.16
19	739.49	73.20	26.46
20	757.39	82.11	29.75
21	774.76	92.04	33.05
22	791.52	102.94	36.35
23	807.63	114.80	39.64
24	823.03	127.56	42.94
25	837.67	141.18	46.23
26	851.51	155.62	49.53
27	864.49	170.84	52.82
28	871.72	180.37	

1

Roy F. Weston, Inc.
West Chester, PA



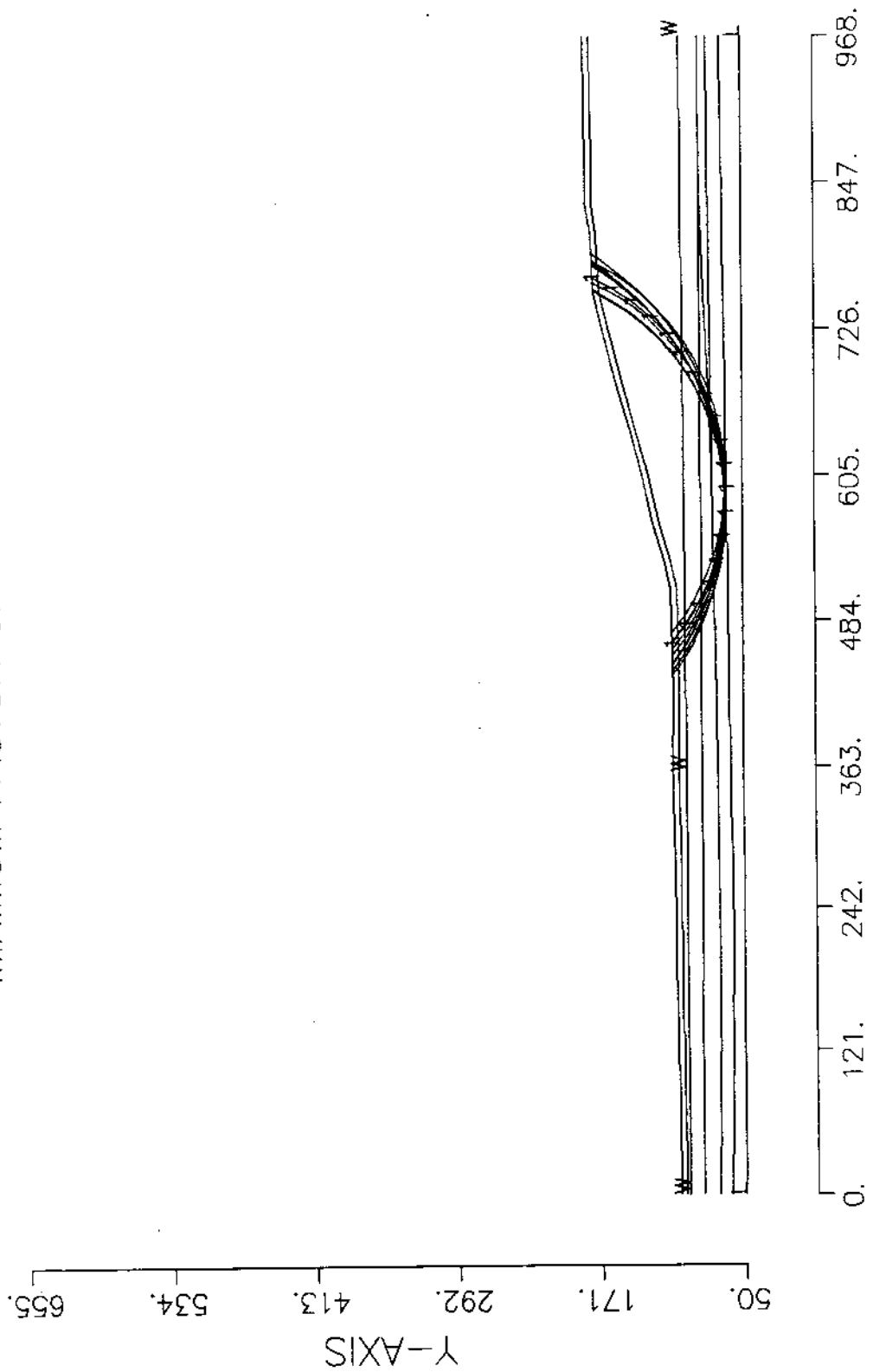
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Cross Section 4-4

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY UNDRAINED ANALYSIS
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.062



PROFIL

CLARKSTOWN SANITARY LANDFILL SECTION 4-4 FINAL TOPOGRAPHY UNDRAINED ANALYSIS

41 15

0. 105. 358. 109. 1
 358. 109. 418. 108.5 1
 418. 108.5 457. 109. 1
 457. 109. 511. 111. 1
 511. 111. 532. 115. 1
 532. 115. 564. 125. 1
 564. 125. 608. 135. 1
 608. 135. 644. 145. 1
 644. 145. 680. 155. 1
 680. 155. 717. 165. 1
 717. 165. 755. 175. 1
 755. 175. 804. 177. 1
 804. 177. 829. 181. 1
 829. 181. 854. 181. 1
 854. 181. 968. 182.5 1
 0. 100. 358. 104. 2
 358. 104. 418. 103.5 2
 418. 103.5 457. 104. 2
 457. 104. 511. 106. 2
 511. 106. 532. 110. 2
 532. 110. 564. 120. 2
 564. 120. 608. 130. 2
 608. 130. 644. 140. 2
 644. 140. 680. 150. 2
 680. 150. 717. 160. 2
 717. 160. 755. 170. 2
 755. 170. 804. 172. 2
 804. 172. 829. 176. 2
 829. 176. 854. 176. 2
 854. 176. 968. 177.5 2
 0. 85. 358. 84. 3
 358. 84. 838. 85. 3
 838. 85. 968. 86. 4
 0. 72. 158. 70.5 5
 158. 70.5 358. 71. 5
 358. 71. 613. 75. 5
 613. 75. 838. 85. 4
 613. 75. 968. 79. 5
 0. 61. 200. 58.5 6
 200. 58.5 358. 60. 6
 358. 60. 968. 67. 6

SOIL

6
 125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 820.0 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.
 3
 0. 98.
 358. 98.
 968. 102.5

LIMITS

1 1

0. 50. 968. 50.
CIRCL2
50 10
438. 488. 755. 968.
20. 20. 0. 0.
END

CL4FUB.DAT

SECTION 4-4 FINAL UNDRAINED ANALYSIS

GEOSLOPE
Version 4.0

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West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN SANITARY LANDFILL SECTION 4-4
FINAL TOPOGRAPHY UNDRAINED ANALYSIS

BOUNDARY COORDINATES

15 TOP BOUNDARIES
41 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	105.00	358.00	109.00	1
2	358.00	109.00	418.00	108.50	1
3	418.00	108.50	457.00	109.00	1
4	457.00	109.00	511.00	111.00	1
5	511.00	111.00	532.00	115.00	1
6	532.00	115.00	564.00	125.00	1
7	564.00	125.00	608.00	135.00	1
8	608.00	135.00	644.00	145.00	1
9	644.00	145.00	680.00	155.00	1
10	680.00	155.00	717.00	165.00	1
11	717.00	165.00	755.00	175.00	1
12	755.00	175.00	804.00	177.00	1
13	804.00	177.00	829.00	181.00	1
14	829.00	181.00	854.00	181.00	1
15	854.00	181.00	968.00	182.50	1
16	.00	100.00	358.00	104.00	2
17	358.00	104.00	418.00	103.50	2
18	418.00	103.50	457.00	104.00	2
19	457.00	104.00	511.00	106.00	2
20	511.00	106.00	532.00	110.00	2
21	532.00	110.00	564.00	120.00	2
22	564.00	120.00	608.00	130.00	2
23	608.00	130.00	644.00	140.00	2
24	644.00	140.00	680.00	150.00	2
25	680.00	150.00	717.00	160.00	2
26	717.00	160.00	755.00	170.00	2
27	755.00	170.00	804.00	172.00	2
28	804.00	172.00	829.00	176.00	2
29	829.00	176.00	854.00	176.00	2
30	854.00	176.00	968.00	177.50	2
31	.00	85.00	358.00	84.00	3
32	358.00	84.00	838.00	85.00	3
33	838.00	85.00	968.00	86.00	4
34	.00	72.00	158.00	70.50	5

35	158.00	70.50	358.00	71.00	5
36	358.00	71.00	613.00	75.00	5
37	613.00	75.00	838.00	85.00	4
38	613.00	75.00	968.00	79.00	5
39	.00	61.00	200.00	58.50	6
40	200.00	58.50	358.00	60.00	6
41	358.00	60.00	968.00	67.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	98.00
2	358.00	98.00
3	968.00	102.50

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	50.00	968.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM

TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 438.00
AND X = 488.00

EACH SURFACE TERMINATES BETWEEN X = 755.00
AND X = 968.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.062

X-CENTER = 591.89
Y-CENTER = 257.93
RADIUS = 195.06

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	465.55	109.32	-37.43
2	481.43	97.16	-31.55
3	498.48	86.70	-25.67
4	516.50	78.03	-19.80
5	535.32	71.26	-13.92
6	554.73	66.45	-8.04
7	574.54	63.65	-2.16
8	594.52	62.89	3.71
9	614.48	64.19	9.59
10	634.20	67.52	15.47
11	653.48	72.85	21.34
12	672.11	80.13	27.22

13	689.89	89.28	33.10
14	706.64	100.20	38.98
15	722.19	112.78	44.85
16	736.37	126.89	50.73
17	749.03	142.37	56.61
18	760.04	159.07	62.49
19	768.62	175.56	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	468.67	6.23	1947.31	.00	.00	4460.16	2623.63
2	475.48	7.39	6368.30	.00	.00	12999.16	6506.56
3	480.30	2.26	2652.79	.00	155.58	5162.76	2584.15
4	489.96	17.04	28775.32	.00	8791.83	36057.14	18047.94
5	500.97	4.98	11128.03	.00	4672.09	10106.67	5058.77
6	507.23	7.54	18820.21	.00	8676.45	12318.96	28.24
7	513.75	5.50	15400.62	.00	7541.90	9628.59	28.24
8	522.55	12.10	38871.00	.00	18744.23	22698.99	28.24
9	530.30	3.40	12128.62	.00	5905.85	7449.60	357.72
10	533.66	3.32	12499.18	.00	6043.67	7695.07	357.72
11	545.03	19.41	84726.50	.00	38098.55	50964.21	357.72
12	559.37	9.27	46763.49	.00	19675.70	28025.21	357.72
13	569.27	10.54	56978.71	.00	23351.45	34731.00	357.72
14	584.53	19.99	116064.80	.00	45427.50	70990.54	357.72
15	601.26	13.48	82368.74	.00	30730.07	51498.41	357.72
16	610.50	5.00	31154.50	.00	11234.60	19869.12	357.72
17	613.74	1.48	9302.78	.00	3309.93	5977.98	357.72
18	624.34	19.72	125134.00	.00	42570.04	83128.71	357.72
19	639.10	9.80	62388.50	.00	19792.37	43934.23	357.72
20	648.74	9.48	59789.89	.00	17549.67	43513.71	357.72
21	656.91	6.86	42640.21	.00	11948.01	32803.36	357.72
22	662.60	4.53	27799.42	.00	7238.14	21140.05	771.93
23	668.49	7.24	43944.52	.00	10459.70	36635.30	28.24
24	676.05	7.89	47086.28	.00	10072.91	42749.24	28.24
25	680.46	.93	5462.93	.00	1039.48	5088.71	28.24
26	685.41	8.96	51827.51	.00	8449.72	39629.25	19835.92
27	698.27	16.75	91152.95	.00	7197.04	76614.65	38348.48
28	706.87	.46	2373.29	.00	6.77	2168.04	1085.19
29	712.05	9.90	49006.53	.00	.00	44867.84	22458.02
30	719.60	5.19	24014.85	.00	.00	21986.75	11005.19
31	729.28	14.18	58081.59	.00	.00	54694.05	27376.40
32	742.70	12.66	40451.91	.00	.00	39640.62	19841.61
33	752.01	5.97	14388.06	.00	.00	14859.58	7437.77
34	757.52	5.04	9131.86	.00	.00	9431.12	4720.63
35	763.00	5.92	6341.37	.00	.00	7000.15	3503.84
36	767.29	2.66	831.55	.00	.00	845.36	497.27

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.064

X-CENTER = 590.96
Y-CENTER = 252.66
RADIUS = 189.76

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	466.57	109.35	-37.94
2	482.35	97.06	-31.89
3	499.33	86.49	-25.85
4	517.32	77.77	-19.81
5	536.14	70.99	-13.77
6	555.57	66.23	-7.73
7	575.38	63.54	-1.69
8	595.38	62.95	4.36
9	615.32	64.47	10.40
10	634.99	68.08	16.44
11	654.17	73.74	22.48
12	672.65	81.39	28.52
13	690.22	90.94	34.56
14	706.69	102.29	40.61
15	721.88	115.30	46.65
16	735.61	129.85	52.69
17	747.73	145.75	58.73
18	758.11	162.85	64.77
19	764.01	175.37	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.073

X-CENTER = 601.69
Y-CENTER = 265.23
RADIUS = 201.48

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	473.72	109.62	-36.59
2	489.77	97.70	-30.90
3	506.94	87.43	-25.21
4	525.03	78.91	-19.52
5	543.88	72.23	-13.83
6	563.30	67.45	-8.14
7	583.10	64.61	-2.45
8	603.08	63.76	3.24
9	623.05	64.89	8.93
10	642.81	68.00	14.62
11	662.16	73.04	20.31
12	680.92	79.99	26.00
13	698.89	88.75	31.69
14	715.91	99.26	37.38
15	731.80	111.40	43.07
16	746.41	125.06	48.76
17	759.60	140.10	54.45
18	771.22	156.37	60.14
19	781.18	173.72	65.83
20	782.26	176.11	

1

Roy F. Weston, Inc.

West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.083

X-CENTER = 581.16

Y-CENTER = 260.33

RADIUS = 196.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.35	108.98	-36.82
2	471.36	96.99	-31.00
3	488.50	86.69	-25.17
4	506.60	78.18	-19.35
5	525.47	71.56	-13.52
6	544.92	66.88	-7.70
7	564.74	64.20	-1.87
8	584.73	63.55	3.95
9	604.68	64.93	9.78
10	624.39	68.32	15.60
11	643.65	73.70	21.43
12	662.27	81.01	27.25
13	680.05	90.17	33.08
14	696.81	101.08	38.90
15	712.37	113.64	44.73
16	726.58	127.71	50.55
17	739.29	143.16	56.38
18	750.36	159.81	62.20
19	758.45	175.14	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.084

X-CENTER = 580.57

Y-CENTER = 294.78

RADIUS = 231.87

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	442.08	108.81	-34.20
2	458.62	97.57	-29.26
3	476.07	87.79	-24.32
4	494.30	79.56	-19.37
5	513.16	72.92	-14.43
6	532.53	67.94	-9.49
7	552.26	64.64	-4.54
8	572.20	63.06	.40
9	592.20	63.20	5.34
10	612.11	65.06	10.29
11	631.79	68.63	15.23
12	651.09	73.89	20.18
13	669.86	80.78	25.12

14	687.97	89.27	30.06
15	705.28	99.29	35.01
16	721.66	110.77	39.95
17	736.99	123.61	44.89
18	751.16	137.72	49.84
19	764.06	153.01	54.78
20	775.59	169.35	59.72
21	779.48	176.00	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.089

X-CENTER = 586.56

Y-CENTER = 300.12

RADIUS = 236.64

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	447.18	108.87	-33.66
2	463.83	97.79	-28.82
3	481.35	88.15	-23.97
4	499.63	80.02	-19.13
5	518.52	73.47	-14.29
6	537.91	68.53	-9.44
7	557.63	65.25	-4.60
8	577.57	63.65	.24
9	597.57	63.73	5.09
10	617.49	65.51	9.93
11	637.19	68.96	14.78
12	656.53	74.06	19.62
13	675.37	80.77	24.46
14	693.57	89.05	29.31
15	711.01	98.84	34.15
16	727.56	110.07	38.99
17	743.11	122.66	43.84
18	757.53	136.51	48.68
19	770.74	151.53	53.53
20	782.63	167.61	58.37
21	788.01	176.35	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.093

X-CENTER = 583.35

Y-CENTER = 255.97

RADIUS = 191.48

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	460.45	109.13	-36.93

2	476.44	97.11	-30.95
3	493.59	86.82	-24.96
4	511.72	78.38	-18.97
5	530.63	71.88	-12.99
6	550.12	67.39	-7.00
7	569.97	64.95	-1.01
8	589.97	64.60	4.97
9	609.90	66.33	10.96
10	629.53	70.13	16.95
11	648.66	75.96	22.94
12	667.08	83.76	28.92
13	684.59	93.43	34.91
14	700.99	104.88	40.90
15	716.10	117.97	46.88
16	729.77	132.57	52.87
17	741.85	148.51	58.86
18	752.19	165.63	64.84
19	756.62	175.07	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.097

X-CENTER = 578.34
Y-CENTER = 302.55
RADIUS = 239.27

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	438.00	108.76	-33.52
2	454.68	97.71	-28.72
3	472.21	88.10	-23.93
4	490.49	79.99	-19.14
5	509.39	73.43	-14.35
6	528.76	68.47	-9.56
7	548.49	65.15	-4.77
8	568.42	63.49	.02
9	588.42	63.49	4.81
10	608.35	65.17	9.60
11	628.07	68.50	14.39
12	647.44	73.47	19.18
13	666.33	80.05	23.97
14	684.60	88.17	28.76
15	702.14	97.80	33.55
16	718.80	108.85	38.34
17	734.49	121.26	43.13
18	749.08	134.93	47.93
19	762.49	149.78	52.72
20	774.60	165.69	57.51
21	781.21	176.07	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.098

X-CENTER = 587.22

Y-CENTER = 250.88

RADIUS = 185.97

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	466.57	109.35	-37.36
2	482.47	97.22	-31.20
3	499.58	86.86	-25.03
4	517.70	78.39	-18.87
5	536.62	71.92	-12.71
6	556.13	67.53	-6.54
7	576.00	65.25	-3.38
8	596.00	65.12	5.79
9	615.90	67.13	11.95
10	635.47	71.28	18.12
11	654.47	77.49	24.28
12	672.70	85.72	30.45
13	689.95	95.85	36.61
14	706.00	107.78	42.78
15	720.68	121.36	48.94
16	733.82	136.45	55.11
17	745.26	152.85	61.27
18	754.87	170.39	67.44
19	756.82	175.07	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.102

X-CENTER = 583.11

Y-CENTER = 291.67

RADIUS = 227.18

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	448.20	108.89	-33.91
2	464.80	97.73	-28.86
3	482.32	88.08	-23.82
4	500.62	80.00	-18.77
5	519.55	73.57	-13.72
6	538.98	68.82	-8.68
7	558.75	65.80	-3.63
8	578.71	64.54	1.41
9	598.71	65.03	6.46
10	618.58	67.28	11.50
11	638.18	71.27	16.55
12	657.35	76.97	21.60
13	675.95	84.33	26.64
14	693.82	93.29	31.69
15	710.84	103.80	36.73
16	726.87	115.76	41.78
17	741.78	129.09	46.82

18	755.47	143.67	51.87
19	767.82	159.40	56.92
20	778.61	175.96	

1

Roy F. Weston, Inc.
West Chester, PA

Y A X I S

50.00 171.00 292.00 413.00 534.00 655.00

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		..12....
		..317... **
		...314...
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EARTH BUTTRESS BERM ANALYSIS

MARCH 13, 1992

**TOWN OF CLARKSTOWN
ROCKLAND COUNTY, NEW YORK**

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

EARTH BUTTRESS BERM ANALYSIS

MARCH 13, 1992

Prepared By:

Velzy / WESTON

**465 Columbus Avenue
Valhalla, N.Y. 10595**

Inter-Office Memorandum



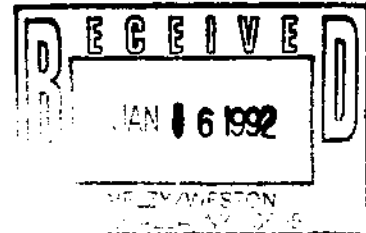
TO: George T. Suttie

cc: J. Coffman
E. Stahl

SAC for 1/15/92
WLD 1/15/92
FROM: John Vitale
Assistant Project Engineer
PROJECT: William L. Deutsch, Ph.D., P.E. W.O. NO. 3228-10-01
Technical Director
SUBJECT: Geotechnical Engineering
Clarkstown Sanitary Landfill

DATE: 15 January 1992

ACTION:



INTRODUCTION

The geotechnical analysis reported herein was completed in accordance with the recent request by the New York State Department of Environmental Conservation (NYSDEC) to resolve potential slope instability concerns in conjunction with the planned closure of the Clarkstown Sanitary Landfill located in Clarkstown, New York. This analysis was conducted to evaluate possible options for constructing a toe-of-slope earthen buttress berm in the vicinity of the critical Cross-Section 3-3. In brief summary, the initial slope stability analysis of Cross-Section 3-3, as summarized in Table 1 of our memorandum of 25 September 1991, indicated an unacceptable factor-of-safety value (FS) of 1.10 against slope instability for the undrained case following final cover system construction as compared to the recommended minimum acceptable FS value of 1.30 per conventional geotechnical practice. The following discussion summarizes our completed slope stability analysis and associated conclusions and recommendations regarding the construction of an earthen toe-of-slope buttressing berm that will provide adequate stability for the closed northern slope represented by Cross-Section 3-3.

ANALYSIS

The referenced Cross-Section 3-3 was modeled for various earthen berm configurations located along the landfill toe-of-slope. The Modified Bishop Method of Slices computer program (STABL2) was used to identify berm configurations that will provide for acceptable global slope stability. The shear strength parameters of the earthen berm material were selected to be identical to those utilized for the landfill capping material. These parameters were then input into the STABL2 program, along with estimated or

INTEROFFICE MEMORANDUM TO:
GEORGE T. SUTTIE

15 JANUARY 1992
PAGE 2

laboratory-measured shear strength values for the landfill capping material, municipal solid waste (MSW) and underlying subsurface soils relevant to Cross-Section 3-3, as discussed in the 25 September 1991 memorandum. In addition, average horizontal and vertical seismic coefficients of 0.05g were assigned to the drained case of slope stability when analyzed for the effects of seismic loadings, as also discussed in the 25 September 1991 memorandum.

Considering that the landfill sideslope is flatter at the critical Cross-Section 3-3 than at the other previously analyzed cross-section locations that yielded acceptable FS values (i.e., Sections 1-1 and 4-4), it has been concluded that slope inclination alone does not govern the limits to which the buttressing berm should be extended along the landfill toe-of-slope. Rather, the limits to which this earthen berm should be installed to provide acceptable FS values against slope instability has also been estimated based upon evaluation of subsurface soil conditions. Specifically, the thickness of each of the three (3) soft, weak, fine-grained subsurface soil strata encountered in test borings previously completed along the landfill toe-of-slope was determined for Cross-Section 3-3 and compared against the respective thicknesses of these soil strata encountered at the other two (2) cross-section locations which previously rendered acceptable FS values.

CONCLUSIONS AND RECOMMENDATIONS

Two (2) earthen berm buttressing configurations oriented along the landfill toe-of-slope have been developed for Cross-Section 3-3 which produce acceptable FS values against slope instability in the drained and undrained cases. For each configuration, the input parameters and generated STABL2 output for the buttressed Cross-Section 3-3 slope stability analyses are provided in Appendix A of this memorandum. The respective FS values against slope instability generated for the two (2) options presented herein are summarized in Table 1. The two (2) options evaluated are as follows:

- Option 1 - This option requires that an earthen buttress berm be constructed in accordance with the earthwork construction recommendations discussed below, and to the minimum cross-sectional dimensions shown on the attached Plate 1.

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GEORGE T. SUTTIE

15 JANUARY 1992
PAGE 3

- Option 2 - This option requires that an earthen buttress berm be constructed in accordance with the earthwork construction recommendations discussed below and to the minimum cross-sectional dimensions shown on the attached Plate 2. Note that the required cross-sectional dimensions of the berm for this option are significantly less than those required for Option 1. This is because the landfill soil cover thickness must also be reduced by one (1) foot to a total constructed thickness of four (4) feet across a section of the top, relatively flat portion of the landfill immediately adjacent to the top of slope to yield an acceptable FS value. This reduction in soil cover thickness lowers the overall contributing surcharge (driving) weight that might otherwise induce an unstable slope condition upon final installation of the landfill final cover system, thereby resulting in a smaller required soil buttressing berm.

To maintain compliance with the NYSDEC's MSW landfill closure regulations, a reduced soil cover thickness of four (4) feet can be achieved by eliminating the 12-inch thick low permeability soil cap and instead installing a geomembrane liner across the top of the landfill as a substitute for the soil cap. This geomembrane would need to be 40 to 60 mils in thickness and would possess a permeability dramatically lower than the fine-grained clayey soils typically used for the landfill cap construction that the membrane would replace. The geomembrane should extend from the top of the buttressed landfill sideslope for a distance of 250 ft. across the top of the landfill. The methods for proper deployment, anchorage, and seam welding of such a geomembrane are not included in the scope of this analysis.

The landfill toe-of-slope earthen buttress berms proposed in both options above should be constructed in accordance with the following earthworks construction recommendations:

- Fill material to be placed as part of the construction of the earthen buttress berm should consist of clean, inorganic, well-graded, predominantly granular soil with a maximum particle size of six (6) inches and a natural moisture content conducive to optimum compaction of said material.

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GEORGE T. SUTTIE

15 JANUARY 1992
PAGE 4

- Trees and brush of significant size that could interfere with fill placement and compaction operations should be cleared and grubbed within the entire limits of the earthen buttressing berm, both on the existing landfill sideslope and adjacent to the toe of this slope.
- Prior to placement and compaction of each layer of berm fill material, the existing landfill sideslope should be "notched" to provide effective interlocking between the landfill final cover soils and the newly-placed earthen buttress berm materials. Approved fill materials should be subsequently placed in thin horizontal lifts not exceeding a loose thickness of eight (8) inches with each lift "notched" into the landfill sideslope as discussed above. The initial and subsequent fill lifts should be compacted with appropriate compaction equipment to a minimum in-place wet (total) density value of 125.0 pounds per cubic foot (pcf) and to at least 95% of the material's maximum dry density as determined by the Modified Proctor compaction test (ASTM D 1557). Each completed lift of compacted material should be tested for compliance with this recommended compaction specification using an approved in-place soil density and moisture test method. If a measured in-situ density condition is unacceptable on any particular portion of a completed lift of fill, the lift should be recompacted until those areas of the lift are sufficiently densified to satisfy the minimum wet and dry density conditions recommended herein. In this manner, fill placement for the construction of the earthen buttress berm should proceed to the recommended minimum dimensions shown on the appropriate attached plates. The finished surface of the top of the berm should be sloped at a minimum 2% away from the landfill to promote positive surface water drainage.

Integrating the construction of the earthen buttressing berm into the overall construction sequence of the landfill closure system for the two (2) options presented should be as follows:

- Construct the five(5)-foot thick landfill final cover system from the limit of waste along the landfill toe-of-slope and proceed up slope to the maximum height of the earthen buttressing berm in accordance with the dimensions and procedures recommended herein.

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GEORGE T. SUTTIE

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- Construct the earthen buttressing berm in accordance with the recommendations presented herein.
- Continue the construction of the five(5)-foot thick final cover system to the landfill top of slope.
- Construct the final cover system on the top of the landfill (five (5) feet in thickness for Option No. 1, and four (4) feet in thickness for Option No. 2 with the installation of a geosynthetic membrane).

The limits to which the earthen buttress berm should extend have been defined by those soil borings on both sides of Cross-Section 3-3 which indicate the presence of a subsurface stratigraphy with a combined total thickness of the three (3) soft, weak, fine-grained soil strata that is less than that observed within the subsurface stratigraphy of Cross-Sections 2-2 and 4-4 which have yielded acceptable FS values. Using this criterion, the recommended limits to which either earthen buttressing berm (i.e., Option 1 or Option 2) should be constructed are shown on Plate 3 attached to this memorandum. However, the recommended minimum base width of the berm shown on Plates 1 and 2 can be slightly reduced as the berm traverses the northwest (NW) corner of the landfill but only at this location and only to that value which prevents the berm from encroaching on the limits of the stream/wetlands which presently exist along the landfill toe-of-slope at this location. It is believed that reducing the buttressing berm's base width will not significantly reduce the determined acceptable FS values because the overall steepness of the landfill sideslope inclination at this specified location is considerably less than that of the critical Cross-Section 3-3.

Based upon our review of both options, we believe that Option 2 represents the more cost-effective approach for providing adequate slope stability in the vicinity of Cross-Section 3-3. This results both from a savings in the volume of soil necessary to construct the berm as well as the volume of soil required to construct the 4-foot, rather than 5-foot thick final cover system atop the landfill. Note, however, that the cost savings resulting from these reduced soil volumes must be offset by the cost of the geomembrane required under Option 2.

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GEORGE T. SUTTIE

15 JANUARY 1992
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Options for Further Study

The plan limits to which either of the recommended earthen buttressing berm configurations should be constructed may be optimized and better defined by completing the following activities:

- Perform additional test borings along the landfill toe-of-slope proceeding in both directions from the Cross-Section 3-3 location at a specified interval (e.g., 200 ft.) to better define the comparative thickness of the various soft, weak, fine-grained subsurface soil strata.
- Model and analyze the stability of additional landfill sideslope cross-section(s), which are developed from new boring information, within the vicinity of borings RFW 7S and 7D to compute FS values against slope instability at this location.

Through completion of these activities, it may be possible to reduce the required length of the earthen buttressing options presented herein by approximately 650 lineal feet.

In addition, the installation of carbon steel sheet-piling along the landfill cap toe of slope could also be analyzed with the STABL2 computer program to determine if this installation would provide adequate FS values against slope instability and therefore constitute acceptable 'substitution' for the earthen berm. The sheet-piling system would need to be driven completely through the soft, weak, fine-grained soil strata and be embedded within the underlying "outwash" stratum so as to totally intercept the critical potential failure planes indicated by the STABL2 program. In addition, the sheet-piling would need to extend to the plan locations of the earthen buttressing berm as discussed above. Because of the very high shear strength of the steel sheet-piling sections, the resulting Factor-of-Safety values against potential slope instability would be increased over those for the case of no sheet-piling buttressing. It should be noted, however, that regulatory consideration should be given to this stabilization approach prior to its analysis due to the annulus space which may be created along the surface of the driven sheet-pile system. This annulus space could be perceived by regulatory officials as a

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PAGE 7

possible 'conduit' for contaminant migration through and beyond the fine-grained soil strata thereby transmitting leachate to the underlying uncontaminated groundwater regime.

Should you have any questions regarding the findings and recommendations presented in this memorandum, please call.

misc\deutvit.mem

TABLE 1
CLARKSTOWN SANITARY LANDFILL
SUMMARY OF CROSS-SECTION 3-3 SLOPE STABILITY ANALYSES
WITH EARTHEN TOE-OF-SLOPE BUTTRESS

<u>Condition/ Option No.</u>	<u>Soil Shear Strength Conditions</u>	<u>Seismic Effects</u>	<u>Calculated¹ Min. F.S.</u>	<u>Recommended² Min. F.S.</u>	<u>Comments</u>
Final/1	Undrained	No	1.31	1.30	OK
Final/1	Drained	No	1.96	1.50	OK
Final/1	Drained	Yes	1.42	1.00	OK
Final/2	Undrained	No	1.30	1.30	OK
Final/2	Drained	No	1.99	1.50	OK
Final/2	Drained	Yes	1.34	1.00	OK

Final: Five(5)-foot thick final cover system in place for analysis, except that the final cover system thickness is reduced to four (4) feet atop the landfill for Option 2.

¹Calculated values rounded to the nearest hundredth

²Recommended Minimum Factor-of-Safety values for slope stability analyses as proposed in the Federal Register.



PLATES



SHEET ____ of ____

CLIENT/SUBJECT CLARKSTOWN (MSW) LANDFILL

W.O. NO. ____

TASK DESCRIPTION CROSS-SECTION 3-3 / Option No. 1

TASK NO. ____

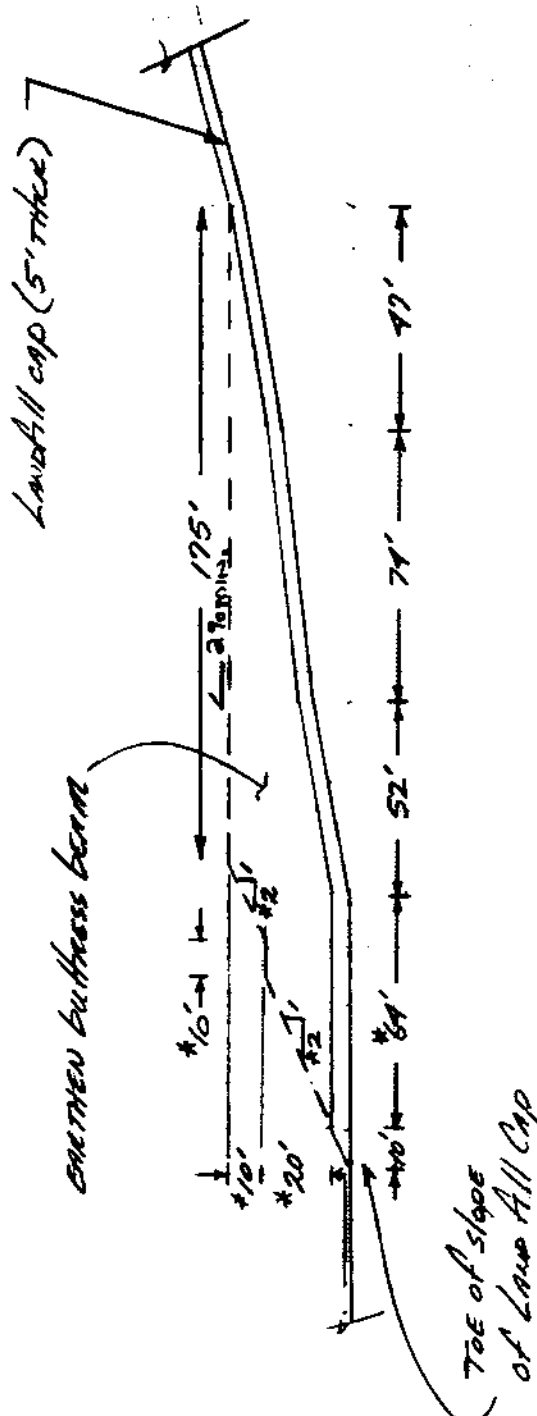
PREPARED BY J. VITALE DEPT D641 DATE 1.10.92

APPROVED BY

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

DEPT ____ DATE ____

Option No. 1Cross-Section 3-3
(NOT DRAWN TO SCALE)

* Minimum dimensions AND
Maximum slope inclination
to which beam should be
constructed

PLATE NO. 1



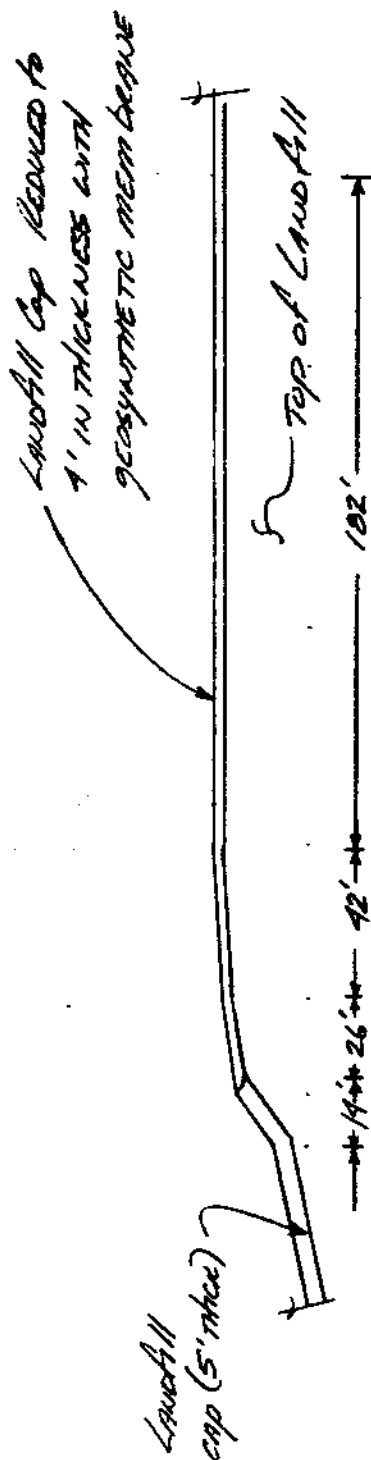
W.O. NO. _____

TASK NO. _____

APPROVED BY

DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

Option No. 2

EMERGENCY BUTTERFLY BEAM

10'

5'

158'

29' m.p.s.

LANCASHIRE CUP (5' RACE)

CROSS-SECTION 3-3

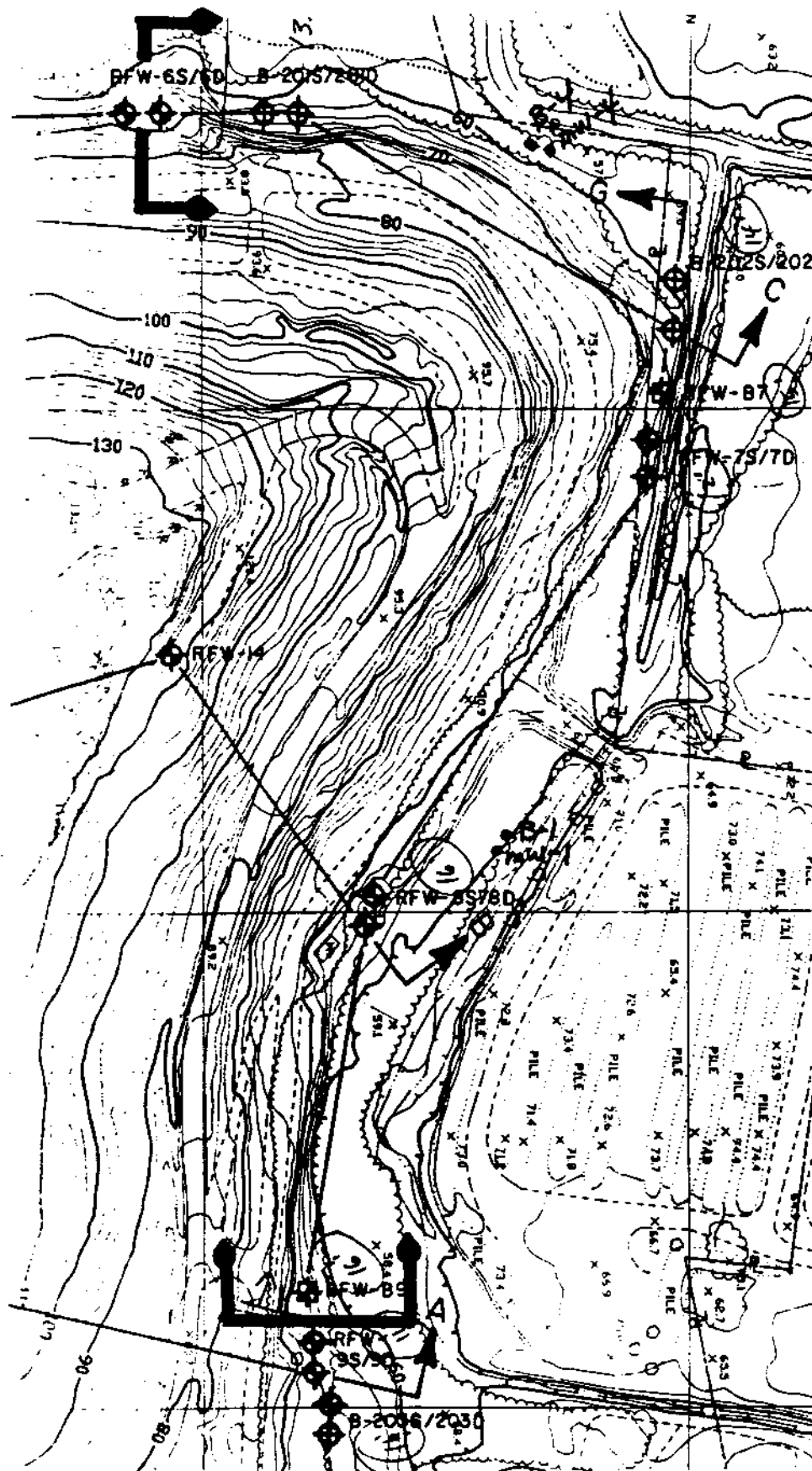
(NOT DRAWN TO SCALE)

TOE OF SLOPE OF

* MINIMUM DIMENSIONS AND MAXIMUM SLOPE MULTIPATH to which beam should be constructed

PLATE NO. 2

PLATE No. 3



LIMITS TO
UNION EARTHQUAKE
RESISTANCE DESIGN
SHOULD BE
CONSIDERED

WESTON

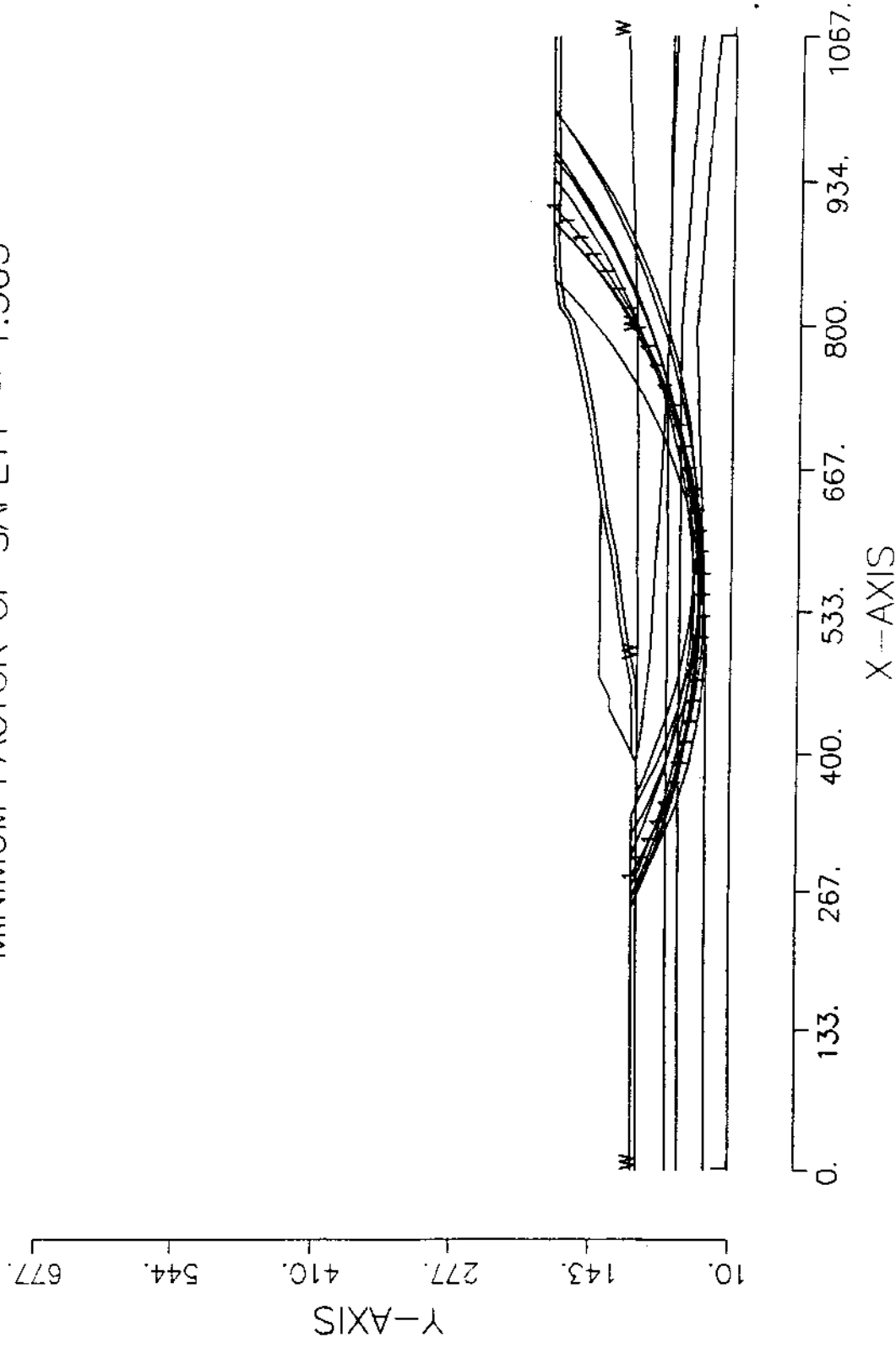
APPENDIX A



OPTION 1

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CT LANDFILL SECTION 3-3 FINAL TOPO (UNDR
AILED ANALYSIS) SLOPE BUTTRESS 9
500SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.305



PROFIL

CT LANDFILL SECTION 3-3 FINAL TOPO (UNDRAINED ANALYSIS) SLOPE BUTTRESS 9
54 20

0. 104. 341. 104. 3
341. 104. 345. 102. 3
345. 102. 350. 100. 3
350. 100. 355. 98. 3
355. 98. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 422. 115. 1
422. 115. 442. 125. 1
442. 125. 452. 125. 1
452. 125. 472. 135. 1
472. 135. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1

80.0 80.0 1750.0 0. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1
88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

50 10

250. 750. 800. 1000.

20. 20. 0. 0.

END

CL3FUB.DAT

SECTION 3-3 FINAL UNDRAINED ANALYSIS

GEOSLOPE
Version 4.0

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342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CT LANDFILL SECTION 3-3 FINAL TOPO (UNDR
AINED ANALYSIS) SLOPE BUTTRESS 9

BOUNDARY COORDINATES

20 TOP BOUNDARIES
54 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	104.00	341.00	104.00	3
2	341.00	104.00	345.00	102.00	3
3	345.00	102.00	350.00	100.00	3
4	350.00	100.00	355.00	98.00	3
5	355.00	98.00	390.00	99.00	3
6	390.00	99.00	400.00	104.00	1
7	400.00	104.00	422.00	115.00	1
8	422.00	115.00	442.00	125.00	1
9	442.00	125.00	452.00	125.00	1
10	452.00	125.00	472.00	135.00	1
11	472.00	135.00	637.00	135.00	1
12	637.00	135.00	707.00	145.00	1
13	707.00	145.00	760.00	155.00	1
14	760.00	155.00	803.00	165.00	1
15	803.00	165.00	817.00	175.00	1
16	817.00	175.00	843.00	179.00	1
17	843.00	179.00	885.00	181.00	1
18	885.00	181.00	945.00	180.50	1
19	945.00	180.50	1015.00	181.00	1
20	1015.00	181.00	1067.00	181.00	1
21	400.00	104.00	419.00	104.00	1
22	419.00	104.00	464.00	105.00	1
23	464.00	105.00	516.00	115.00	1
24	516.00	115.00	590.00	125.00	1
25	590.00	125.00	637.00	135.00	1
26	390.00	99.00	400.00	99.00	3
27	400.00	99.00	419.00	99.00	2
28	419.00	99.00	464.00	100.00	2
29	464.00	100.00	516.00	110.00	2
30	516.00	110.00	590.00	120.00	2
31	590.00	120.00	637.00	130.00	2
32	637.00	130.00	707.00	140.00	2
33	707.00	140.00	760.00	150.00	2
34	760.00	150.00	803.00	160.00	2

35	803.00	160.00	817.00	170.00	2
36	817.00	170.00	843.00	174.00	2
37	843.00	174.00	885.00	176.00	2
38	885.00	176.00	945.00	175.50	2
39	945.00	175.50	1015.00	176.00	2
40	1015.00	176.00	1067.00	176.00	2
41	400.00	99.00	408.00	96.00	3
42	408.00	96.00	489.00	87.00	3
43	489.00	87.00	760.00	71.50	3
44	760.00	71.50	794.00	70.00	4
45	794.00	70.00	914.00	69.00	4
46	914.00	69.00	1067.00	68.00	3
47	.00	70.00	489.00	70.50	4
48	489.00	70.50	760.00	71.50	4
49	914.00	69.00	1067.00	64.00	4
50	.00	59.00	794.00	59.00	5
51	794.00	59.00	1067.00	40.50	5
52	.00	33.00	489.00	33.00	6
53	489.00	33.00	794.00	44.00	6
54	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	1750.0	.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 250.00
AND X = 750.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1000.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.305

X-CENTER = 543.06
Y-CENTER = 571.70
RADIUS = 536.30

POINT	X-SURF	Y-SURF	ALPHA
-------	--------	--------	-------

NO.			(DEG)
1	280.61	104.00	-28.23
2	298.23	94.54	-26.09
3	316.20	85.74	-23.96
4	334.47	77.62	-21.82
5	353.04	70.19	-19.68
6	371.87	63.45	-17.55
7	390.94	57.42	-15.41
8	410.22	52.11	-13.27
9	429.69	47.52	-11.14
10	449.31	43.66	-9.00
11	469.07	40.53	-6.86
12	488.92	38.14	-4.72
13	508.85	36.49	-2.59
14	528.83	35.59	-.45
15	548.83	35.43	1.69
16	568.82	36.02	3.82
17	588.78	37.35	5.96
18	608.67	39.43	8.10
19	628.47	42.25	10.23
20	648.15	45.80	12.37
21	667.69	50.08	14.51
22	687.05	55.09	16.64
23	706.21	60.82	18.78
24	725.15	67.26	20.92
25	743.83	74.40	23.05
26	762.23	82.23	25.19
27	780.33	90.75	27.33
28	798.10	99.93	29.46
29	815.51	109.77	31.60
30	832.55	120.25	33.74
31	849.18	131.35	35.88
32	865.38	143.07	38.01
33	881.14	155.39	40.15
34	896.43	168.29	42.29
35	910.18	180.79	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	285.27	9.31	1862.65	.00	.00	2244.53	22.98
2	294.08	8.31	4805.34	.00	1312.19	4258.22	22.98
3	307.21	17.96	19913.73	.00	11055.45	11343.30	22.98
4	325.33	18.28	32631.60	.00	21611.93	14299.90	22.98
5	337.74	6.53	14456.52	.00	9952.53	5684.26	22.98
6	343.00	4.00	9213.33	.00	6665.52	3298.44	22.98
7	347.50	5.00	11437.33	.00	8937.39	3432.09	22.98
8	351.31	2.61	5972.21	.00	4933.95	1525.01	22.98
9	352.83	.43	981.86	.00	828.45	349.16	628.16
10	354.02	1.96	4485.93	.00	3788.32	1522.74	628.16
11	363.44	16.87	43407.81	.00	36371.46	14604.71	628.16
12	378.91	14.08	43231.50	.00	34813.54	13752.74	628.16
13	387.98	4.05	13566.90	.00	10761.24	3873.51	291.10
14	390.47	.94	3263.72	.00	2550.73	963.06	291.10
15	395.47	9.06	35575.05	.00	25111.46	12543.96	291.10
16	404.00	8.00	37636.88	.00	23392.73	16313.25	291.10
17	409.11	2.22	11488.49	.00	6699.60	5402.15	291.10

18	414.61	8.78	49630.46	.00	26972.10	24639.58	291.10
19	420.50	3.00	18494.90	.00	9485.14	9728.94	291.10
20	425.84	7.69	50929.18	.00	24927.60	27941.51	291.10
21	435.84	12.31	91851.39	.00	41260.88	53071.84	291.10
22	445.66	7.31	58752.82	.00	25399.19	34907.86	291.10
23	450.66	2.69	21854.74	.00	9437.72	12814.83	291.10
24	458.00	12.00	103400.40	.00	43001.67	62247.16	291.10
25	466.53	5.07	46915.66	.00	18582.78	29153.86	291.10
26	470.53	2.93	27994.14	.00	10818.66	17480.97	291.10
27	480.46	16.92	163604.40	.00	63646.43	101735.20	291.10
28	488.96	.08	758.78	.00	298.08	465.17	291.10
29	498.93	19.85	192596.20	.00	76758.73	116973.40	291.10
30	512.43	7.15	69220.77	.00	28036.62	41348.92	291.10
31	522.42	12.83	124018.60	.00	50758.63	73555.59	291.10
32	538.83	20.00	192048.40	.00	79604.14	112496.00	291.10
33	558.83	19.99	189103.90	.00	79482.38	109532.10	291.10
34	578.80	19.96	184358.70	.00	78430.30	105950.50	291.10
35	589.39	1.22	11103.17	.00	4760.44	6365.79	291.10
36	599.34	18.67	166133.40	.00	71688.77	94776.95	291.10
37	618.57	19.80	167636.90	.00	73541.95	94954.51	291.10
38	632.74	8.53	69113.34	.00	30731.70	39043.45	291.10
39	642.58	11.15	88595.99	.00	38980.65	50451.84	291.10
40	657.92	19.54	152207.30	.00	64966.03	89582.05	291.10
41	677.37	19.36	145813.40	.00	59309.48	89799.64	291.10
42	693.59	13.07	94789.80	.00	36737.73	61010.06	291.10
43	703.17	6.09	43133.50	.00	16012.90	27812.58	628.16
44	706.61	.79	5522.78	.00	2037.30	3618.73	628.16
45	716.07	18.15	124962.80	.00	43261.14	84634.36	628.16
46	730.58	10.86	72227.82	.00	22556.01	51976.34	628.16
47	737.67	3.32	21687.57	.00	6311.20	16875.28	22.98
48	741.58	4.50	29068.43	.00	8096.19	20556.24	1340.59
49	751.92	16.17	101470.50	.00	24901.90	75350.17	1340.59
50	761.12	2.23	13637.12	.00	2855.16	10580.59	1340.59
51	771.28	18.10	107062.30	.00	17692.26	88011.12	1340.59
52	787.17	13.67	76382.19	.00	6223.26	69096.17	1340.59
53	796.05	4.10	22080.09	.00	578.23	21079.09	1340.59
54	799.07	1.94	10328.84	.00	71.43	10100.93	1340.59
55	801.52	2.96	15519.34	.00	.00	15252.70	1340.59
56	809.26	12.51	66116.50	.00	.00	65053.98	1340.59
57	816.26	1.49	7979.86	.00	.00	7928.74	1340.59
58	824.77	15.55	79033.47	.00	.00	77738.45	1340.59
59	837.77	10.45	47894.43	.00	.00	46339.35	1340.59
60	846.09	6.18	26032.33	.00	.00	24652.45	1340.59
61	857.28	16.21	58701.93	.00	.00	53054.37	1340.59
62	873.26	15.76	42886.94	.00	.00	33476.46	1340.59
63	883.07	3.86	8242.12	.00	.00	5074.66	1340.59
64	890.71	11.43	18559.57	.00	.00	7372.15	1340.59
65	900.58	8.30	7716.97	.00	.00	-3248.31	1340.59
66	907.45	5.45	1702.40	.00	.00	1603.22	767.43

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 40 COORDINATE POINTS

SAFETY FACTOR = 1.312

X-CENTER = 564.64
Y-CENTER = 771.10
RADIUS = 733.28

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-23.75
2	278.51	95.95	-22.19
3	297.03	88.39	-20.62
4	315.75	81.35	-19.06
5	334.65	74.82	-17.50
6	353.73	68.80	-15.93
7	372.96	63.31	-14.37
8	392.33	58.35	-12.81
9	411.83	53.92	-11.25
10	431.45	50.02	-9.68
11	451.17	46.65	-8.12
12	470.97	43.83	-6.56
13	490.83	41.54	-5.00
14	510.76	39.80	-3.43
15	530.72	38.60	-1.87
16	550.71	37.95	-.31
17	570.71	37.84	1.26
18	590.71	38.28	2.82
19	610.68	39.27	4.38
20	630.62	40.79	5.94
21	650.52	42.86	7.51
22	670.35	45.48	9.07
23	690.10	48.63	10.63
24	709.75	52.32	12.20
25	729.30	56.55	13.76
26	748.73	61.30	15.32
27	768.02	66.59	16.88
28	787.15	72.40	18.45
29	806.13	78.72	20.01
30	824.92	85.57	21.57
31	843.52	92.92	23.14
32	861.91	100.78	24.70
33	880.08	109.14	26.26
34	898.02	117.99	27.82
35	915.70	127.32	29.39
36	933.13	137.13	30.95
37	950.28	147.42	32.51
38	967.15	158.17	34.07
39	983.71	169.38	35.64
40	999.78	180.89	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.345

X-CENTER = 540.17
Y-CENTER = 719.55
RADIUS = 680.51

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-24.40

2	268.21	95.74	-22.71
3	286.66	88.02	-21.03
4	305.33	80.84	-19.35
5	324.20	74.21	-17.66
6	343.26	68.15	-15.98
7	362.49	62.64	-14.29
8	381.87	57.70	-12.61
9	401.39	53.34	-10.93
10	421.02	49.55	-9.24
11	440.76	46.34	-7.56
12	460.59	43.71	-5.87
13	480.48	41.66	-4.19
14	500.43	40.20	-2.51
15	520.41	39.32	-.82
16	540.41	39.04	.86
17	560.41	39.34	2.55
18	580.39	40.23	4.23
19	600.33	41.70	5.91
20	620.23	43.76	7.60
21	640.05	46.41	9.28
22	659.79	49.63	10.97
23	679.42	53.44	12.65
24	698.94	57.82	14.33
25	718.32	62.77	16.02
26	737.54	68.29	17.70
27	756.59	74.37	19.39
28	775.46	81.01	21.07
29	794.12	88.20	22.75
30	812.57	95.93	24.44
31	830.77	104.21	26.12
32	848.73	113.01	27.81
33	866.42	122.34	29.49
34	883.83	132.19	31.17
35	900.94	142.54	32.86
36	917.74	153.39	34.54
37	934.22	164.73	36.23
38	950.35	176.55	37.91
39	955.52	180.58	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.376

X-CENTER = 541.49
Y-CENTER = 744.65
RADIUS = 703.85

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-23.65
2	268.32	95.98	-22.02
3	286.86	88.48	-20.39
4	305.61	81.51	-18.77
5	324.54	75.07	-17.14
6	343.66	69.18	-15.51
7	362.93	63.83	-13.88

8	382.34	59.03	-12.25
9	401.89	54.79	-10.63
10	421.55	51.10	-9.00
11	441.30	47.97	-7.37
12	461.13	45.41	-5.74
13	481.03	43.41	-4.11
14	500.98	41.97	-2.49
15	520.96	41.10	-.86
16	540.96	40.80	.77
17	560.96	41.07	2.40
18	580.94	41.91	4.03
19	600.89	43.32	5.66
20	620.79	45.29	7.28
21	640.63	47.82	8.91
22	660.39	50.92	10.54
23	680.05	54.58	12.17
24	699.61	58.79	13.80
25	719.03	63.56	15.42
26	738.31	68.88	17.05
27	757.43	74.75	18.68
28	776.37	81.15	20.31
29	795.13	88.10	21.94
30	813.68	95.57	23.56
31	832.02	103.56	25.19
32	850.11	112.08	26.82
33	867.96	121.10	28.45
34	885.55	130.63	30.08
35	902.85	140.65	31.71
36	919.87	151.16	33.33
37	936.58	162.15	34.96
38	952.97	173.61	36.59
39	962.41	180.62	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.399

X-CENTER = 614.84
Y-CENTER = 642.68
RADIUS = 600.21

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	362.25	98.21	-23.93
2	380.53	90.09	-22.02
3	399.07	82.59	-20.11
4	417.85	75.72	-18.21
5	436.85	69.47	-16.30
6	456.04	63.86	-14.39
7	475.41	58.89	-12.48
8	494.94	54.56	-10.57
9	514.60	50.90	-8.66
10	534.37	47.89	-6.75
11	554.24	45.53	-4.84
12	574.16	43.85	-2.93
13	594.14	42.82	-1.02

14	614.14	42.47	.89
15	634.13	42.78	2.80
16	654.11	43.75	4.71
17	674.04	45.39	6.61
18	693.91	47.70	8.52
19	713.69	50.66	10.43
20	733.36	54.28	12.34
21	752.89	58.56	14.25
22	772.28	63.48	16.16
23	791.49	69.05	18.07
24	810.50	75.25	19.98
25	829.30	82.09	21.89
26	847.86	89.54	23.80
27	866.16	97.61	25.71
28	884.18	106.29	27.62
29	901.90	115.56	29.53
30	919.30	125.42	31.43
31	936.37	135.85	33.34
32	953.07	146.84	35.25
33	969.41	158.38	37.16
34	985.34	170.46	39.07
35	998.17	180.88	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.403

X-CENTER = 559.58
Y-CENTER = 511.31
RADIUS = 471.82

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	321.43	104.00	-29.10
2	338.90	94.27	-26.67
3	356.78	85.30	-24.24
4	375.01	77.08	-21.81
5	393.58	69.65	-19.39
6	412.45	63.01	-16.96
7	431.58	57.18	-14.53
8	450.94	52.16	-12.10
9	470.49	47.97	-9.67
10	490.21	44.61	-7.24
11	510.05	42.09	-4.81
12	529.98	40.41	-2.38
13	549.96	39.58	.05
14	569.96	39.60	2.47
15	589.94	40.46	4.90
16	609.87	42.17	7.33
17	629.71	44.72	9.76
18	649.42	48.11	12.19
19	668.97	52.34	14.62
20	688.32	57.39	17.05
21	707.44	63.25	19.48
22	726.30	69.92	21.91
23	744.85	77.38	24.33

24	763.07	85.62	26.76
25	780.93	94.63	29.19
26	798.39	104.38	31.62
27	815.42	114.87	34.05
28	831.99	126.06	36.48
29	848.08	137.95	38.91
30	863.64	150.52	41.34
31	878.66	163.73	43.76
32	893.10	177.56	46.19
33	896.31	180.91	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 31 COORDINATE POINTS

SAFETY FACTOR = 1.426

X-CENTER = 572.85

Y-CENTER = 475.44

RADIUS = 436.26

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	352.04	99.18	-29.09
2	369.52	89.46	-26.47
3	387.42	80.55	-23.84
4	405.72	72.46	-21.21
5	424.36	65.22	-18.59
6	443.32	58.85	-15.96
7	462.55	53.35	-13.33
8	482.01	48.74	-10.71
9	501.66	45.02	-8.08
10	521.46	42.21	-5.45
11	541.37	40.31	-2.82
12	561.35	39.33	-.20
13	581.35	39.26	2.43
14	601.33	40.11	5.06
15	621.25	41.87	7.68
16	641.07	44.54	10.31
17	660.75	48.12	12.94
18	680.24	52.60	15.56
19	699.51	57.97	18.19
20	718.51	64.21	20.82
21	737.20	71.32	23.44
22	755.55	79.27	26.07
23	773.52	88.06	28.70
24	791.06	97.67	31.32
25	808.14	108.07	33.95
26	824.73	119.24	36.58
27	840.79	131.15	39.21
28	856.29	143.80	41.83
29	871.19	157.14	44.46
30	885.47	171.14	47.09
31	894.56	180.92	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.447

X-CENTER = 504.98
Y-CENTER = 498.64
RADIUS = 464.39

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-30.58
2	277.42	93.83	-28.11
3	295.07	84.40	-25.64
4	313.10	75.75	-23.17
5	331.48	67.88	-20.70
6	350.19	60.81	-18.24
7	369.19	54.55	-15.77
8	388.43	49.12	-13.30
9	407.90	44.51	-10.83
10	427.54	40.76	-8.36
11	447.33	37.85	-5.90
12	467.22	35.79	-3.43
13	487.19	34.59	-.96
14	507.18	34.26	1.51
15	527.18	34.79	3.97
16	547.13	36.17	6.44
17	567.00	38.42	8.91
18	586.76	41.51	11.38
19	606.37	45.46	13.85
20	625.79	50.24	16.31
21	644.98	55.86	18.78
22	663.92	62.30	21.25
23	682.56	69.55	23.72
24	700.87	77.59	26.18
25	718.82	86.42	28.65
26	736.37	96.01	31.12
27	753.49	106.35	33.59
28	770.15	117.41	36.06
29	786.32	129.18	38.52
30	801.96	141.64	40.99
31	817.06	154.76	43.46
32	831.58	168.51	45.93
33	841.51	178.77	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.453

X-CENTER = 567.77
Y-CENTER = 686.88
RADIUS = 641.01

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	301.02	104.00	-23.70

2	319.33	95.96	-21.91
3	337.89	88.50	-20.12
4	356.67	81.62	-18.33
5	375.65	75.33	-16.55
6	394.83	69.63	-14.76
7	414.17	64.54	-12.97
8	433.66	60.05	-11.18
9	453.28	56.17	-9.40
10	473.01	52.90	-7.61
11	492.83	50.26	-5.82
12	512.73	48.23	-4.03
13	532.68	46.82	-2.24
14	552.66	46.04	-.46
15	572.66	45.88	1.33
16	592.66	46.34	3.12
17	612.63	47.43	4.91
18	632.55	49.14	6.69
19	652.42	51.47	8.48
20	672.20	54.42	10.27
21	691.88	57.99	12.06
22	711.44	62.17	13.85
23	730.86	66.95	15.63
24	750.12	72.34	17.42
25	769.20	78.33	19.21
26	788.09	84.91	21.00
27	806.76	92.08	22.78
28	825.20	99.82	24.57
29	843.39	108.14	26.36
30	861.31	117.02	28.15
31	878.94	126.46	29.94
32	896.27	136.44	31.72
33	913.29	146.95	33.51
34	929.96	157.99	35.30
35	946.28	169.55	37.09
36	960.92	180.61	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 37 COORDINATE POINTS

SAFETY FACTOR = 1.461

X-CENTER = 540.23

Y-CENTER = 692.79

RADIUS = 647.67

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	270.41	104.00	-23.74
2	288.72	95.95	-21.97
3	307.26	88.47	-20.20
4	326.04	81.56	-18.43
5	345.01	75.24	-16.66
6	364.17	69.51	-14.89
7	383.50	64.37	-13.12
8	402.98	59.83	-11.35
9	422.59	55.89	-9.58
10	442.31	52.56	-7.81

11	462.12	49.85	-6.04
12	482.01	47.74	-4.27
13	501.95	46.25	-2.50
14	521.93	45.38	-.73
15	541.93	45.12	1.04
16	561.93	45.48	2.80
17	581.91	46.46	4.57
18	601.84	48.05	6.34
19	621.72	50.26	8.11
20	641.52	53.09	9.88
21	661.22	56.52	11.65
22	680.81	60.56	13.42
23	700.26	65.20	15.19
24	719.57	70.44	16.96
25	738.70	76.27	18.73
26	757.64	82.70	20.50
27	776.37	89.70	22.27
28	794.88	97.28	24.04
29	813.15	105.42	25.81
30	831.15	114.13	27.58
31	848.88	123.39	29.34
32	866.31	133.19	31.11
33	883.44	143.53	32.88
34	900.23	154.38	34.65
35	916.68	165.76	36.42
36	932.78	177.63	38.19
37	936.51	180.57	

1
Roy F. Weston, Inc.
West Chester, PA

Y A X I S

10.00 143.38 276.75 410.13 543.50 676.88

X .00 L-***-***-+-----+-----+-----+-----+

133.38 +

A 266.75 + 3 32

-.11

-.216

-.316*

-.216*

-.8165.

X 400.13 + .115**

-.8165.**

-.815....*

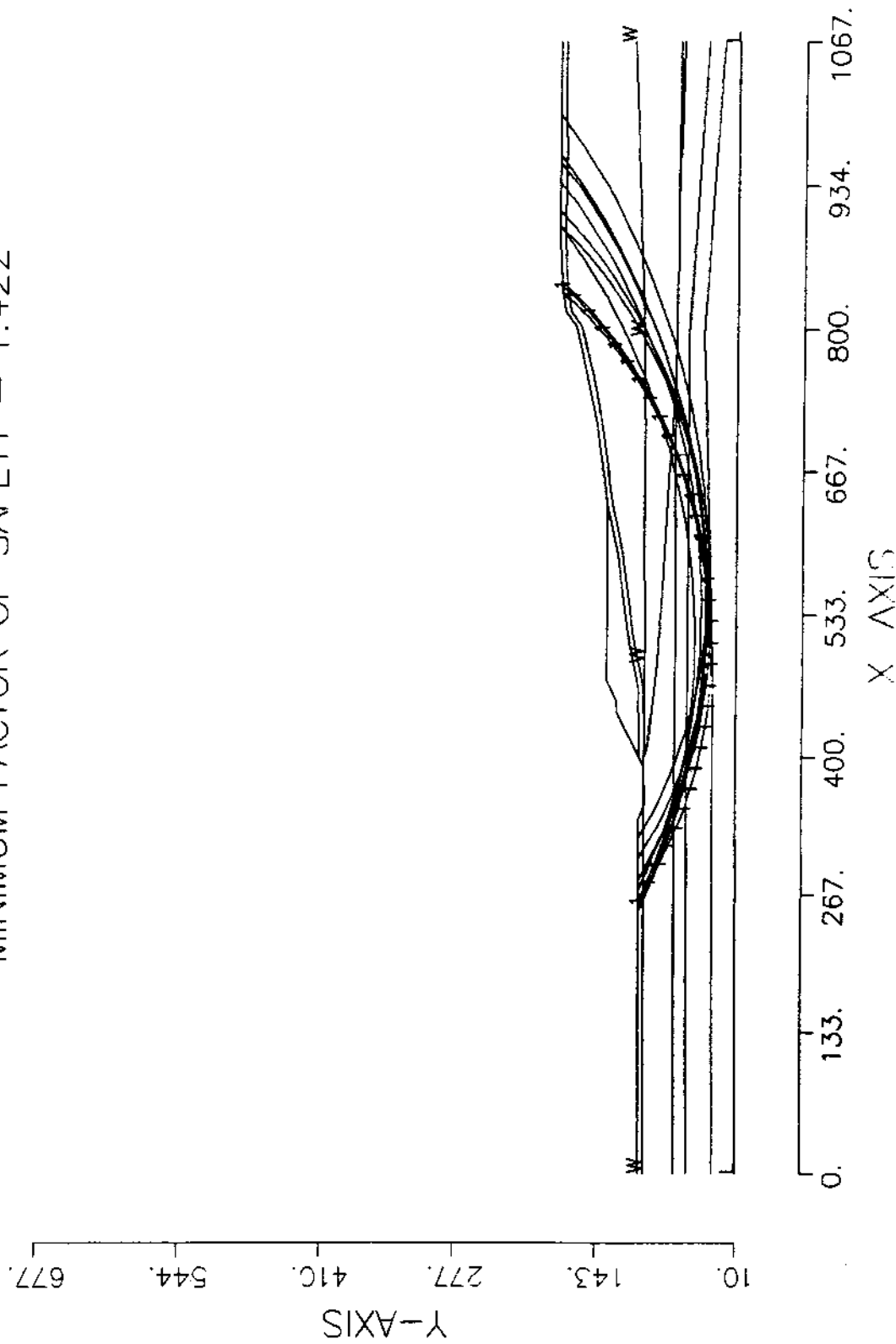
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		-.15...**.
I	533.50	+.15.....
		-.15.....
		-.15.....
		-.18...**.
		-.13.....
		-.21.....*
S	666.88	+..18.....
		-...13.....
		-...2188...*
		-...2118.....
		-...2*68...**
		- ..221.88..
	800.25	+ ..**23W..8**
		- ...52116.8*.
		- ...29316.**
		- ...23016..
		- ..22301**
		- * ..523301
	933.63	+ ..52430
		- ..2.**
		- .22.
		- .2
		- **
		-
	1067.00	L** * W **

Roy L. Weston, Inc.
West Chester, PA

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAINAGE W/EQUAKE) SLOPE BUTTRESS 9A
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.422



PROFIL

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAINED W/EQUAKE) SLOPE BUTTRESS 9A

54 20

0. 104. 341. 104. 3
 341. 104. 345. 102. 3
 345. 102. 350. 100. 3
 350. 100. 355. 98. 3
 355. 98. 390. 99. 3
 390. 99. 400. 104. 1
 400. 104. 422. 115. 1
 422. 115. 442. 125. 1
 442. 125. 452. 125. 1
 452. 125. 472. 135. 1
 472. 135. 637. 135. 1
 637. 135. 707. 145. 1
 707. 145. 760. 155. 1
 760. 155. 803. 165. 1
 803. 165. 817. 175. 1
 817. 175. 843. 179. 1
 843. 179. 885. 181. 1
 885. 181. 945. 180.5 1
 945. 180.5 1015. 181. 1
 1015. 181. 1067. 181. 1
 400. 104. 419. 104. 1
 419. 104. 464. 105. 1
 464. 105. 516. 115. 1
 516. 115. 590. 125. 1
 590. 125. 637. 135. 1
 390. 99. 400. 99. 3
 400. 99. 419. 99. 2
 419. 99. 464. 100. 2
 464. 100. 516. 110. 2
 516. 110. 590. 120. 2
 590. 120. 637. 130. 2
 637. 130. 707. 140. 2
 707. 140. 760. 150. 2
 760. 150. 803. 160. 2
 803. 160. 817. 170. 2
 817. 170. 843. 174. 2
 843. 174. 885. 176. 2
 885. 176. 945. 175.5 2
 945. 175.5 1015. 176. 2
 1015. 176. 1067. 176. 2
 400. 99. 408. 96. 3
 408. 96. 489. 87. 3
 489. 87. 760. 71.5 3
 760. 71.5 794. 70. 4
 794. 70. 914. 69. 4
 914. 69. 1067. 68. 3
 0. 70. 489. 70.5 4
 489. 70.5 760. 71.5 4
 914. 69. 1067. 64. 4
 0. 59. 794. 59. 5
 794. 59. 1067. 40.5 5
 0. 33. 489. 33. 6
 489. 33. 794. 44. 6
 794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1

80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

EQUAKE

.05

.05

0.

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

50 10

250. 750. 800. 1000.

20. 20. 0. 0.

END

CL3FUB.DAT

SECTION 3-3 FINAL DRAINED ANALYSIS

GEOSLOPE
Version 4.0

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342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CT LANDFILL SECTION 3-3 FINAL TOPO (DRAIN
ED W/EQUAKE) SLOPE BUTTRESS 9A

BOUNDARY COORDINATES

20 TOP BOUNDARIES
54 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	104.00	341.00	104.00	3
2	341.00	104.00	345.00	102.00	3
3	345.00	102.00	350.00	100.00	3
4	350.00	100.00	355.00	98.00	3
5	355.00	98.00	390.00	99.00	3
6	390.00	99.00	400.00	104.00	1
7	400.00	104.00	422.00	115.00	1
8	422.00	115.00	442.00	125.00	1
9	442.00	125.00	452.00	125.00	1
10	452.00	125.00	472.00	135.00	1
11	472.00	135.00	637.00	135.00	1
12	637.00	135.00	707.00	145.00	1
13	707.00	145.00	760.00	155.00	1
14	760.00	155.00	803.00	165.00	1
15	803.00	165.00	817.00	175.00	1
16	817.00	175.00	843.00	179.00	1
17	843.00	179.00	885.00	181.00	1
18	885.00	181.00	945.00	180.50	1
19	945.00	180.50	1015.00	181.00	1
20	1015.00	181.00	1067.00	181.00	1
21	400.00	104.00	419.00	104.00	1
22	419.00	104.00	464.00	105.00	1
23	464.00	105.00	516.00	115.00	1
24	516.00	115.00	590.00	125.00	1
25	590.00	125.00	637.00	135.00	1
26	390.00	99.00	400.00	99.00	3
27	400.00	99.00	419.00	99.00	2
28	419.00	99.00	464.00	100.00	2
29	464.00	100.00	516.00	110.00	2
30	516.00	110.00	590.00	120.00	2
31	590.00	120.00	637.00	130.00	2
32	637.00	130.00	707.00	140.00	2
33	707.00	140.00	760.00	150.00	2
34	760.00	150.00	803.00	160.00	2

35	803.00	160.00	817.00	170.00	2
36	817.00	170.00	843.00	174.00	2
37	843.00	174.00	885.00	176.00	2
38	885.00	176.00	945.00	175.50	2
39	945.00	175.50	1015.00	176.00	2
40	1015.00	176.00	1067.00	176.00	2
41	400.00	99.00	408.00	96.00	3
42	408.00	96.00	489.00	87.00	3
43	489.00	87.00	760.00	71.50	3
44	760.00	71.50	794.00	70.00	4
45	794.00	70.00	914.00	69.00	4
46	914.00	69.00	1067.00	68.00	3
47	.00	70.00	489.00	70.50	4
48	489.00	70.50	760.00	71.50	4
49	914.00	69.00	1067.00	64.00	4
50	.00	59.00	794.00	59.00	5
51	794.00	59.00	1067.00	40.50	5
52	.00	33.00	489.00	33.00	6
53	489.00	33.00	794.00	44.00	6
54	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT
OF .050 HAS BEEN ASSIGNED

A VERTICAL EARTHQUAKE LOADING COEFFICIENT
OF .050 HAS BEEN ASSIGNED

CAVITATION PRESSURE = .0

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 250.00
AND X = 750.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1000.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE # 1 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.422

X-CENTER = 504.98

Y-CENTER = 498.64

RADIUS = 464.39

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-30.58
2	277.42	93.83	-28.11
3	295.07	84.40	-25.64
4	313.10	75.75	-23.17
5	331.48	67.88	-20.70
6	350.19	60.81	-18.24
7	369.19	54.55	-15.77
8	388.43	49.12	-13.30
9	407.90	44.51	-10.83
10	427.54	40.76	-8.36
11	447.33	37.85	-5.90
12	467.22	35.79	-3.43
13	487.19	34.59	-.96
14	507.18	34.26	1.51
15	527.18	34.79	3.97
16	547.13	36.17	6.44
17	567.00	38.42	8.91
18	586.76	41.51	11.38
19	606.37	45.46	13.85
20	625.79	50.24	16.31
21	644.98	55.86	18.78
22	663.92	62.30	21.25
23	682.56	69.55	23.72
24	700.87	77.59	26.18
25	718.82	86.42	28.65
26	736.37	96.01	31.12
27	753.49	106.35	33.59
28	770.15	117.41	36.06
29	786.32	129.18	38.52
30	801.96	141.64	40.99
31	817.06	154.76	43.46
32	831.58	168.51	45.93
33	841.51	178.77	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	264.44	8.46	1692.58	.00	.00	2267.62	677.01
2	273.05	8.76	5314.58	.00	1641.63	5126.92	1530.68
3	286.24	17.64	21006.79	.00	12336.07	12240.56	3654.51
4	304.08	18.03	34507.88	.00	23615.96	14879.24	4442.30
5	319.42	12.66	31343.48	.00	22298.25	11569.36	3454.11
6	328.62	5.73	16054.70	.00	11628.68	5572.21	1426.49
7	336.24	9.52	29196.14	.00	20900.09	9688.56	2480.28
8	343.00	4.00	12849.73	.00	9465.35	3968.67	1015.98
9	347.50	5.00	16010.69	.00	12398.96	4274.91	1094.38

10	350.10	.19	611.39	.00	485.46	149.96	38.39
11	352.60	4.81	15381.67	.00	12317.38	3363.71	861.11
12	355.34	.68	2183.36	.00	1787.04	481.85	123.35
13	362.43	13.50	46715.82	.00	37463.05	10671.80	2152.33
14	378.81	19.25	77198.99	.00	58864.38	18812.87	3794.26
15	389.22	1.57	6792.92	.00	5028.88	1684.84	339.81
16	395.00	10.00	47931.51	.00	32981.18	14500.15	2924.45
17	403.95	7.90	44006.84	.00	27116.83	16635.09	3355.03
18	407.95	.10	609.09	.00	356.17	242.31	48.87
19	413.50	11.00	70159.50	.00	38826.71	30199.56	6090.77
20	420.50	3.00	20860.49	.00	10844.40	9707.25	1957.80
21	424.77	5.54	40453.75	.00	20316.32	19567.15	3946.38
22	434.77	14.46	116858.50	.00	54086.05	59899.63	12080.81
23	444.66	5.33	46221.49	.00	20418.58	24696.38	4980.87
24	449.66	4.67	40815.41	.00	17994.06	21433.35	4322.77
25	458.00	12.00	110308.80	.00	46865.51	59729.61	12046.51
26	465.61	3.22	31351.30	.00	12742.83	17565.27	3542.64
27	469.61	4.78	47671.52	.00	18921.55	26771.17	5399.32
28	479.59	15.19	153424.50	.00	60709.62	86348.67	17415.16
29	488.09	1.81	18278.45	.00	7291.63	10109.55	2038.94
30	498.09	18.18	182006.50	.00	73356.30	99912.34	20150.73
31	511.59	8.82	87254.76	.00	35638.84	47032.39	9485.69
32	521.59	11.18	109504.40	.00	45037.11	58716.60	11842.21
33	537.15	19.95	191858.80	.00	79629.94	101651.00	20501.38
34	557.07	19.87	184960.60	.00	77511.41	97106.35	19584.81
35	576.88	19.76	176032.20	.00	74324.23	92038.84	18562.77
36	588.38	3.24	28000.37	.00	11905.86	14633.80	2951.41
37	598.18	16.37	136695.80	.00	58168.31	71398.15	14399.87
38	616.08	19.42	150700.90	.00	64769.45	78765.38	15885.73
39	631.39	11.21	80677.26	.00	34962.05	42394.04	8550.20
40	640.99	7.98	55032.08	.00	23457.64	29287.20	5906.76
41	649.60	9.23	61903.31	.00	25856.63	33931.64	6843.47
42	659.06	9.71	63188.52	.00	25179.94	35163.92	9001.99
43	673.24	18.64	115702.50	.00	42633.84	68483.98	17531.95
44	684.47	3.82	22707.45	.00	7751.13	14212.46	3638.40
45	690.89	9.03	52217.62	.00	16601.13	33223.92	9919.23
46	698.14	5.46	30654.18	.00	8875.02	19696.68	7366.19
47	703.93	6.13	33492.63	.00	9025.57	22325.52	8349.32
48	712.91	11.82	61830.04	.00	13808.51	43624.85	16314.87
49	727.59	17.55	84922.76	.00	11473.75	66808.70	24985.19
50	740.09	7.44	33232.31	.00	1207.51	29100.25	10882.94
51	748.65	9.68	40447.00	.00	.00	36616.83	13694.00
52	756.74	6.51	25365.53	.00	.00	23172.01	8665.89
53	765.07	10.15	36496.32	.00	.00	33340.25	12468.62
54	778.23	16.17	50131.86	.00	.00	46302.94	17316.42
55	794.14	15.65	37980.75	.00	.00	35538.70	13290.80
56	802.48	1.04	2121.03	.00	.00	2014.74	753.48
57	810.00	14.00	27093.57	.00	.00	25735.85	9624.72
58	817.03	.06	111.93	.00	.00	106.33	39.76
59	824.32	14.52	20094.63	.00	.00	19418.04	7261.98
60	833.70	4.24	3283.25	.00	.00	3234.69	1209.71
61	838.66	5.69	1777.50	.00	.00	1669.69	733.84

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 1.465

X-CENTER = 516.90
Y-CENTER = 488.65
RADIUS = 451.42

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-30.29
2	297.88	93.91	-27.75
3	315.58	84.60	-25.22
4	333.68	76.08	-22.68
5	352.13	68.37	-20.14
6	370.91	61.48	-17.60
7	389.97	55.43	-15.06
8	409.28	50.24	-12.52
9	428.81	45.90	-9.98
10	448.50	42.43	-7.44
11	468.34	39.84	-4.91
12	488.26	38.13	-2.37
13	508.25	37.31	.17
14	528.25	37.36	2.71
15	548.22	38.31	5.25
16	568.14	40.14	7.79
17	587.96	42.85	10.33
18	607.63	46.43	12.86
19	627.13	50.89	15.40
20	646.41	56.20	17.94
21	665.44	62.36	20.48
22	684.17	69.36	23.02
23	702.58	77.18	25.56
24	720.62	85.81	28.10
25	738.27	95.23	30.63
26	755.48	105.42	33.17
27	772.22	116.36	35.71
28	788.46	128.04	38.25
29	804.16	140.42	40.79
30	819.30	153.48	43.33
31	833.85	167.21	45.87
32	845.41	179.11	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.470

X-CENTER = 543.06
Y-CENTER = 571.70
RADIUS = 536.30

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-28.23
2	298.23	94.54	-26.09
3	316.20	85.74	-23.96
4	334.47	77.62	-21.82
5	353.04	70.19	-19.68
6	371.87	63.45	-17.55

7	390.94	57.42	-15.41
8	410.22	52.11	-13.27
9	429.69	47.52	-11.14
10	449.31	43.66	-9.00
11	469.07	40.53	-6.86
12	488.92	38.14	-4.72
13	508.85	36.49	-2.59
14	528.83	35.59	-.45
15	548.83	35.43	1.69
16	568.82	36.02	3.82
17	588.78	37.35	5.96
18	608.67	39.43	8.10
19	628.47	42.25	10.23
20	648.15	45.80	12.37
21	667.69	50.08	14.51
22	687.05	55.09	16.64
23	706.21	60.82	18.78
24	725.15	67.26	20.92
25	743.83	74.40	23.05
26	762.23	82.23	25.19
27	780.33	90.75	27.33
28	798.10	99.93	29.46
29	815.51	109.77	31.60
30	832.55	120.25	33.74
31	849.18	131.35	35.88
32	865.38	143.07	38.01
33	881.14	155.39	40.15
34	896.43	168.29	42.29
35	910.18	180.79	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.512

X-CENTER = 540.17
Y-CENTER = 719.55
RADIUS = 680.51

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-24.40
2	268.21	95.74	-22.71
3	286.66	88.02	-21.03
4	305.33	80.84	-19.35
5	324.20	74.21	-17.66
6	343.26	68.15	-15.98
7	362.49	62.64	-14.29
8	381.87	57.70	-12.61
9	401.39	53.34	-10.93
10	421.02	49.55	-9.24
11	440.76	46.34	-7.56
12	460.59	43.71	-5.87
13	480.48	41.66	-4.19
14	500.43	40.20	-2.51
15	520.41	39.32	-.82
16	540.41	39.04	.86

17	560.41	39.34	2.55
18	580.39	40.23	4.23
19	600.33	41.70	5.91
20	620.23	43.76	7.60
21	640.05	46.41	9.28
22	659.79	49.63	10.97
23	679.42	53.44	12.65
24	698.94	57.82	14.33
25	718.32	62.77	16.02
26	737.54	68.29	17.70
27	756.59	74.37	19.39
28	775.46	81.01	21.07
29	794.12	88.20	22.75
30	812.57	95.93	24.44
31	830.77	104.21	26.12
32	848.73	113.01	27.81
33	866.42	122.34	29.49
34	883.83	132.19	31.17
35	900.94	142.54	32.86
36	917.74	153.39	34.54
37	934.22	164.73	36.23
38	950.35	176.55	37.91
39	955.52	180.58	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 31 COORDINATE POINTS

SAFETY FACTOR = 1.523

X-CENTER = 523.97
Y-CENTER = 457.60
RADIUS = 418.01

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	301.02	104.00	-30.86
2	318.19	93.74	-28.12
3	335.83	84.31	-25.38
4	353.90	75.74	-22.64
5	372.36	68.04	-19.90
6	391.16	61.24	-17.15
7	410.27	55.34	-14.41
8	429.64	50.36	-11.67
9	449.23	46.32	-8.93
10	468.99	43.21	-6.19
11	488.87	41.06	-3.45
12	508.84	39.86	-0.70
13	528.84	39.61	2.04
14	548.82	40.32	4.78
15	568.75	41.99	7.52
16	588.58	44.61	10.26
17	608.26	48.17	13.00
18	627.75	52.67	15.75
19	647.00	58.10	18.49
20	665.97	64.44	21.23
21	684.61	71.68	23.97
22	702.88	79.81	26.71

23	720.75	88.80	29.45
24	738.16	98.63	32.20
25	755.09	109.29	34.94
26	771.48	120.74	37.68
27	787.31	132.97	40.42
28	802.54	145.93	43.16
29	817.13	159.62	45.90
30	831.04	173.98	48.65
31	834.28	177.66	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.535

X-CENTER = 541.49
Y-CENTER = 744.65
RADIUS = 703.85

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-23.65
2	268.32	95.98	-22.02
3	286.86	88.48	-20.39
4	305.61	81.51	-18.77
5	324.54	75.07	-17.14
6	343.66	69.18	-15.51
7	362.93	63.83	-13.88
8	382.34	59.03	-12.25
9	401.89	54.79	-10.63
10	421.55	51.10	-9.00
11	441.30	47.97	-7.37
12	461.13	45.41	-5.74
13	481.03	43.41	-4.11
14	500.98	41.97	-2.49
15	520.96	41.10	-.86
16	540.96	40.80	.77
17	560.96	41.07	2.40
18	580.94	41.91	4.03
19	600.89	43.32	5.66
20	620.79	45.29	7.28
21	640.63	47.82	8.91
22	660.39	50.92	10.54
23	680.05	54.58	12.17
24	699.61	58.79	13.80
25	719.03	63.56	15.42
26	738.31	68.88	17.05
27	757.43	74.75	18.68
28	776.37	81.15	20.31
29	795.13	88.10	21.94
30	813.68	95.57	23.56
31	832.02	103.56	25.19
32	850.11	112.08	26.82
33	867.96	121.10	28.45
34	885.55	130.63	30.08
35	902.85	140.65	31.71
36	919.87	151.16	33.33

37	936.58	162.15	34.96
38	952.97	173.61	36.59
39	962.41	180.62	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 37 COORDINATE POINTS

SAFETY FACTOR = 1.561

X-CENTER = 540.23
Y-CENTER = 692.79
RADIUS = 647.67

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	270.41	104.00	-23.74
2	288.72	95.95	-21.97
3	307.26	88.47	-20.20
4	326.04	81.56	-18.43
5	345.01	75.24	-16.66
6	364.17	69.51	-14.89
7	383.50	64.37	-13.12
8	402.98	59.83	-11.35
9	422.59	55.89	-9.58
10	442.31	52.56	-7.81
11	462.12	49.85	-6.04
12	482.01	47.74	-4.27
13	501.95	46.25	-2.50
14	521.93	45.38	-.73
15	541.93	45.12	1.04
16	561.93	45.48	2.80
17	581.91	46.46	4.57
18	601.84	48.05	6.34
19	621.72	50.26	8.11
20	641.52	53.09	9.88
21	661.22	56.52	11.65
22	680.81	60.56	13.42
23	700.26	65.20	15.19
24	719.57	70.44	16.96
25	738.70	76.27	18.73
26	757.64	82.70	20.50
27	776.37	89.70	22.27
28	794.88	97.28	24.04
29	813.15	105.42	25.81
30	831.15	114.13	27.58
31	848.88	123.39	29.34
32	866.31	133.19	31.11
33	883.44	143.53	32.88
34	900.23	154.38	34.65
35	916.68	165.76	36.42
36	932.78	177.63	38.19
37	936.51	180.57	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 40 COORDINATE POINTS

SAFETY FACTOR = 1.562

X-CENTER = 564.64

Y-CENTER = 771.10

RADIUS = 733.28

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-23.75
2	278.51	95.95	-22.19
3	297.03	88.39	-20.62
4	315.75	81.35	-19.06
5	334.65	74.82	-17.50
6	353.73	68.80	-15.93
7	372.96	63.31	-14.37
8	392.33	58.35	-12.81
9	411.83	53.92	-11.25
10	431.45	50.02	-9.68
11	451.17	46.65	-8.12
12	470.97	43.83	-6.56
13	490.83	41.54	-5.00
14	510.76	39.80	-3.43
15	530.72	38.60	-1.87
16	550.71	37.95	-.31
17	570.71	37.84	1.26
18	590.71	38.28	2.82
19	610.68	39.27	4.38
20	630.62	40.79	5.94
21	650.52	42.86	7.51
22	670.35	45.48	9.07
23	690.10	48.63	10.63
24	709.75	52.32	12.20
25	729.30	56.55	13.76
26	748.73	61.30	15.32
27	768.02	66.59	16.88
28	787.15	72.40	18.45
29	806.13	78.72	20.01
30	824.92	85.57	21.57
31	843.52	92.92	23.14
32	861.91	100.78	24.70
33	880.08	109.14	26.26
34	898.02	117.99	27.82
35	915.70	127.32	29.39
36	933.13	137.13	30.95
37	950.28	147.42	32.51
38	967.15	158.17	34.07
39	983.71	169.38	35.64
40	999.78	180.89	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.564

X-CENTER = 559.58

Y-CENTER = 511.31

RADIUS = 471.82

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	321.43	104.00	-29.10
2	338.90	94.27	-26.67
3	356.78	85.30	-24.24
4	375.01	77.08	-21.81
5	393.58	69.65	-19.39
6	412.45	63.01	-16.96
7	431.58	57.18	-14.53
8	450.94	52.16	-12.10
9	470.49	47.97	-9.67
10	490.21	44.61	-7.24
11	510.05	42.09	-4.81
12	529.98	40.41	-2.38
13	549.96	39.58	.05
14	569.96	39.60	2.47
15	589.94	40.46	4.90
16	609.87	42.17	7.33
17	629.71	44.72	9.76
18	649.42	48.11	12.19
19	668.97	52.34	14.62
20	688.32	57.39	17.05
21	707.44	63.25	19.48
22	726.30	69.92	21.91
23	744.85	77.38	24.33
24	763.07	85.62	26.76
25	780.93	94.63	29.19
26	798.39	104.38	31.62
27	815.42	114.87	34.05
28	831.99	126.06	36.48
29	848.08	137.95	38.91
30	863.64	150.52	41.34
31	878.66	163.73	43.76
32	893.10	177.56	46.19
33	896.31	180.91	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.575

X-CENTER = 506.57
Y-CENTER = 703.71
RADIUS = 652.29

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-22.28
2	268.51	96.42	-20.53
3	287.24	89.40	-18.77
4	306.17	82.97	-17.01
5	325.30	77.12	-15.26
6	344.59	71.85	-13.50
7	364.04	67.18	-11.74

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Y	A	X	I	S	
10.00	143.38	276.75	410.13	543.50	676.88

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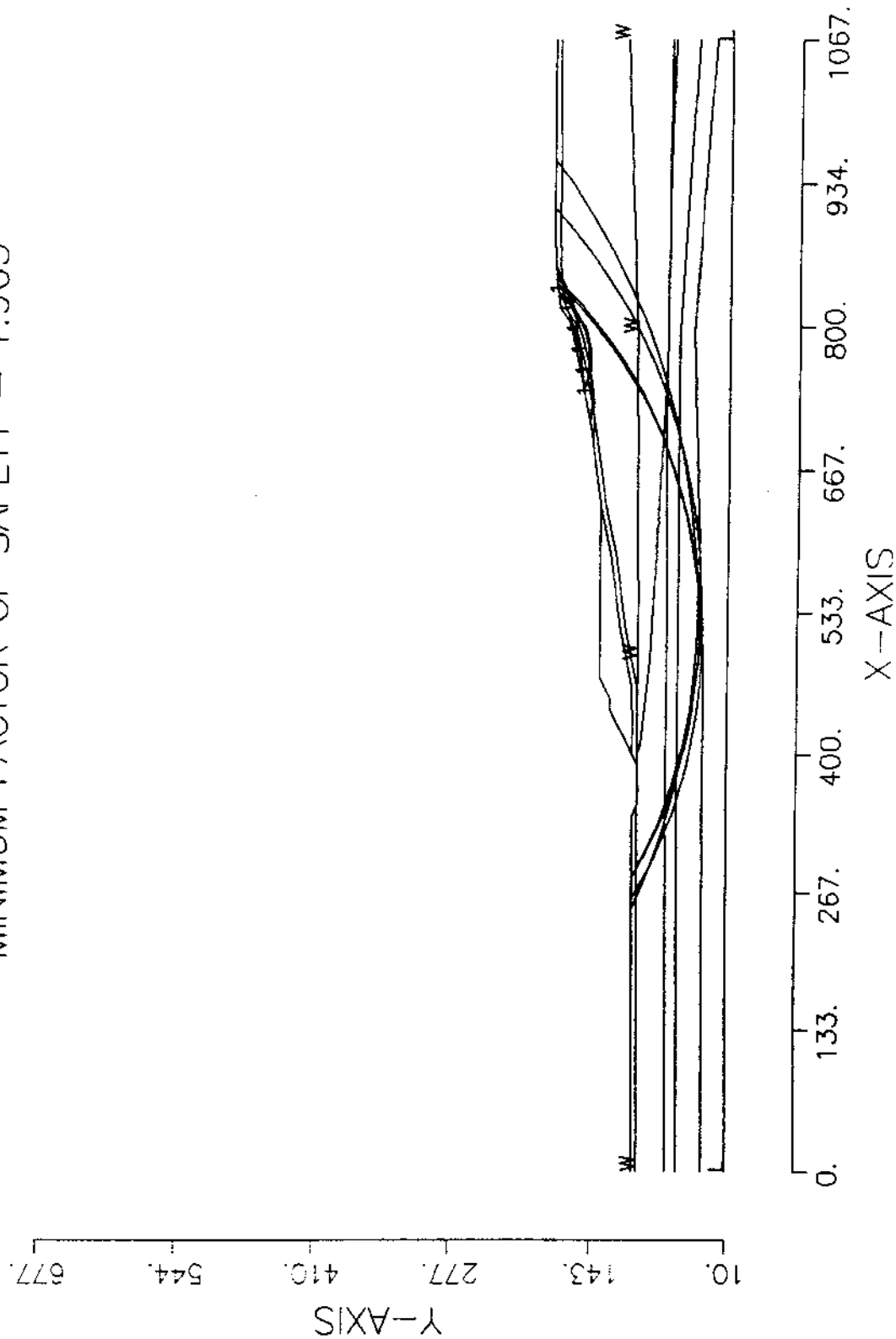
X      .00 L-*-*-+-----+-----+-----+
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133.38 +
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A      266.75 +      11
      -      .12
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      -      .129..
X      400.13 +      .13.**
      -      .129.**
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Roy F. Weston, Inc.
West Chester, PA

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAI
NED) SLOPE BUTTRESS 9B
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.963



PROFIL

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAINED) SLOPE BUTTRESS 9B
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341. 104. 345. 102. 3
345. 102. 350. 100. 3
350. 100. 355. 98. 3
355. 98. 390. 99. 3
390. 99. 400. 104. 1
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419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
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464. 100. 516. 110. 2
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637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1

80.0 80.0 0.0 28. 0. 0. 1
80.0 80.0 0.0 23. 0. 0. 1
88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
WATER
1 0.
4
0. 99.
489. 99.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
50 10
250. 750. 800. 1000.
20. 20. 0. 0.
END

CL3FUB.DAT

SECTION 3-3 FINAL DRAINED ANALYSIS

GEOSLOPE
Version 4.0

Supplied by GEOCOMP Corp.
342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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Roy F. Weston, Inc.
West Chester, PA

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	104.00	341.00	104.00	3
2	341.00	104.00	345.00	102.00	3
3	345.00	102.00	350.00	100.00	3
4	350.00	100.00	355.00	98.00	3
5	355.00	98.00	390.00	99.00	3
6	390.00	99.00	400.00	104.00	1
7	400.00	104.00	422.00	115.00	1
8	422.00	115.00	442.00	125.00	1
9	442.00	125.00	452.00	125.00	1
10	452.00	125.00	472.00	135.00	1
11	472.00	135.00	637.00	135.00	1
12	637.00	135.00	707.00	145.00	1
13	707.00	145.00	760.00	155.00	1
14	760.00	155.00	803.00	165.00	1
15	803.00	165.00	817.00	175.00	1
16	817.00	175.00	843.00	179.00	1
17	843.00	179.00	885.00	181.00	1
18	885.00	181.00	945.00	180.50	1
19	945.00	180.50	1015.00	181.00	1
20	1015.00	181.00	1067.00	181.00	1
21	400.00	104.00	419.00	104.00	1
22	419.00	104.00	464.00	105.00	1
23	464.00	105.00	516.00	115.00	1
24	516.00	115.00	590.00	125.00	1
25	590.00	125.00	637.00	135.00	1
26	390.00	99.00	400.00	99.00	3
27	400.00	99.00	419.00	99.00	2
28	419.00	99.00	464.00	100.00	2
29	464.00	100.00	516.00	110.00	2
30	516.00	110.00	590.00	120.00	2
31	590.00	120.00	637.00	130.00	2
32	637.00	130.00	707.00	140.00	2
33	707.00	140.00	760.00	150.00	2
34	760.00	150.00	803.00	160.00	2

35	803.00	160.00	817.00	170.00	2
36	817.00	170.00	843.00	174.00	2
37	843.00	174.00	885.00	176.00	2
38	885.00	176.00	945.00	175.50	2
39	945.00	175.50	1015.00	176.00	2
40	1015.00	176.00	1067.00	176.00	2
41	400.00	99.00	408.00	96.00	3
42	408.00	96.00	489.00	87.00	3
43	489.00	87.00	760.00	71.50	3
44	760.00	71.50	794.00	70.00	4
45	794.00	70.00	914.00	69.00	4
46	914.00	69.00	1067.00	68.00	3
47	.00	70.00	489.00	70.50	4
48	489.00	70.50	760.00	71.50	4
49	914.00	69.00	1067.00	64.00	4
50	.00	59.00	794.00	59.00	5
51	794.00	59.00	1067.00	40.50	5
52	.00	33.00	489.00	33.00	6
53	489.00	33.00	794.00	44.00	6
54	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 250.00
AND X = 750.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1000.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 7 COORDINATE POINTS

SAFETY FACTOR = 1.963

X-CENTER = 726.42
Y-CENTER = 386.58
RADIUS = 235.77

POINT	X-SURF	Y-SURF	ALPHA
-------	--------	--------	-------

NO.	(DEG)		
1	739.80	151.19	5.68
2	759.70	153.17	10.55
3	779.36	156.83	15.41
4	798.64	162.14	20.27
5	817.40	169.07	25.13
6	835.51	177.57	29.99
7	836.18	177.95	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	749.75	19.90	2206.77	.00	.00	2149.57	684.23
2	759.85	.30	66.92	.00	.00	64.26	20.46
3	769.68	19.36	5382.14	.00	.00	5168.34	1645.13
4	789.00	19.28	5442.47	.00	.00	5190.08	1652.05
5	800.82	4.36	841.86	.00	.00	803.04	255.61
6	808.44	10.88	4247.42	.00	.00	4051.54	1289.64
7	815.44	3.12	2085.67	.00	.00	2021.18	547.44
8	817.20	.40	285.29	.00	.00	276.47	74.88
9	818.97	3.14	2087.27	.00	.00	2045.61	554.06
10	828.03	14.97	4940.51	.00	.00	4748.12	1511.37
11	835.84	.67	11.73	.00	.00	11.44	3.64

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 8 COORDINATE POINTS

SAFETY FACTOR = 2.154

X-CENTER = 733.60
Y-CENTER = 327.67
RADIUS = 183.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	709.18	145.41	-4.51
2	729.12	143.84	1.72
3	749.11	144.44	7.96
4	768.92	147.21	14.19
5	788.31	152.11	20.43
6	807.05	159.09	26.66
7	824.93	168.07	32.89
8	841.47	178.76	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 7 COORDINATE POINTS

SAFETY FACTOR = 2.166

X-CENTER = 768.41
Y-CENTER = 225.22
RADIUS = 79.36

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	739.80	151.19	-13.88
2	759.21	146.39	.58
3	779.21	146.59	15.04
4	798.53	151.78	29.50
5	815.93	161.63	43.96
6	830.33	175.51	58.42
7	831.37	177.21	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 2.197

X-CENTER = 504.98
Y-CENTER = 498.64
RADIUS = 464.39

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-30.58
2	277.42	93.83	-28.11
3	295.07	84.40	-25.64
4	313.10	75.75	-23.17
5	331.48	67.88	-20.70
6	350.19	60.81	-18.24
7	369.19	54.55	-15.77
8	388.43	49.12	-13.30
9	407.90	44.51	-10.83
10	427.54	40.76	-8.36
11	447.33	37.85	-5.90
12	467.22	35.79	-3.43
13	487.19	34.59	-.96
14	507.18	34.26	1.51
15	527.18	34.79	3.97
16	547.13	36.17	6.44
17	567.00	38.42	8.91
18	586.76	41.51	11.38
19	606.37	45.46	13.85
20	625.79	50.24	16.31
21	644.98	55.86	18.78
22	663.92	62.30	21.25
23	682.56	69.55	23.72
24	700.87	77.59	26.18
25	718.82	86.42	28.65
26	736.37	96.01	31.12
27	753.49	106.35	33.59
28	770.15	117.41	36.06
29	786.32	129.18	38.52
30	801.96	141.64	40.99
31	817.06	154.76	43.46
32	831.58	168.51	45.93
33	841.51	178.77	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 2.220

X-CENTER = 543.06
Y-CENTER = 571.70
RADIUS = 536.30

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-28.23
2	298.23	94.54	-26.09
3	316.20	85.74	-23.96
4	334.47	77.62	-21.82
5	353.04	70.19	-19.68
6	371.87	63.45	-17.55
7	390.94	57.42	-15.41
8	410.22	52.11	-13.27
9	429.69	47.52	-11.14
10	449.31	43.66	-9.00
11	469.07	40.53	-6.86
12	488.92	38.14	-4.72
13	508.85	36.49	-2.59
14	528.83	35.59	-0.45
15	548.83	35.43	1.69
16	568.82	36.02	3.82
17	588.78	37.35	5.96
18	608.67	39.43	8.10
19	628.47	42.25	10.23
20	648.15	45.80	12.37
21	667.69	50.08	14.51
22	687.05	55.09	16.64
23	706.21	60.82	18.78
24	725.15	67.26	20.92
25	743.83	74.40	23.05
26	762.23	82.23	25.19
27	780.33	90.75	27.33
28	798.10	99.93	29.46
29	815.51	109.77	31.60
30	832.55	120.25	33.74
31	849.18	131.35	35.88
32	865.38	143.07	38.01
33	881.14	155.39	40.15
34	896.43	168.29	42.29
35	910.18	180.79	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 10 COORDINATE POINTS

SAFETY FACTOR = 2.239

X-CENTER = 710.21
Y-CENTER = 425.81
RADIUS = 284.23

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	688.78	142.40	-2.31
2	708.76	141.59	1.72
3	728.75	142.19	5.76
4	748.65	144.20	9.79
5	768.36	147.60	13.82
6	787.78	152.38	17.85
7	806.82	158.51	21.89
8	825.37	165.97	25.92
9	843.36	174.71	29.95
10	851.52	179.41	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 2.250

X-CENTER = 516.90
Y-CENTER = 488.65
RADIUS = 451.42

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-30.29
2	297.88	93.91	-27.75
3	315.58	84.60	-25.22
4	333.68	76.08	-22.68
5	352.13	68.37	-20.14
6	370.91	61.48	-17.60
7	389.97	55.43	-15.06
8	409.28	50.24	-12.52
9	428.81	45.90	-9.98
10	448.50	42.43	-7.44
11	468.34	39.84	-4.91
12	488.26	38.13	-2.37
13	508.25	37.31	.17
14	528.25	37.36	2.71
15	548.22	38.31	5.25
16	568.14	40.14	7.79
17	587.96	42.85	10.33
18	607.63	46.43	12.86
19	627.13	50.89	15.40
20	646.41	56.20	17.94
21	665.44	62.36	20.48
22	684.17	69.36	23.02
23	702.58	77.18	25.56
24	720.62	85.81	28.10
25	738.27	95.23	30.63
26	755.48	105.42	33.17
27	772.22	116.36	35.71
28	788.46	128.04	38.25
29	804.16	140.42	40.79
30	819.30	153.48	43.33
31	833.85	167.21	45.87

32 845.41 179.11

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 10 COORDINATE POINTS

SAFETY FACTOR = 2.260

X-CENTER = 706.27

Y-CENTER = 466.56

RADIUS = 324.63

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	688.78	142.40	-1.32
2	708.77	141.93	2.21
3	728.76	142.71	5.74
4	748.66	144.70	9.27
5	768.39	147.93	12.80
6	787.90	152.36	16.33
7	807.09	157.98	19.86
8	825.90	164.77	23.39
9	844.26	172.71	26.92
10	858.05	179.72	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 2.285

X-CENTER = 540.17

Y-CENTER = 719.55

RADIUS = 680.51

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-24.40
2	268.21	95.74	-22.71
3	286.66	88.02	-21.03
4	305.33	80.84	-19.35
5	324.20	74.21	-17.66
6	343.26	68.15	-15.98
7	362.49	62.64	-14.29
8	381.87	57.70	-12.61
9	401.39	53.34	-10.93
10	421.02	49.55	-9.24
11	440.76	46.34	-7.56
12	460.59	43.71	-5.87
13	480.48	41.66	-4.19
14	500.43	40.20	-2.51
15	520.41	39.32	-.82
16	540.41	39.04	.86
17	560.41	39.34	2.55
18	580.39	40.23	4.23
19	600.33	41.70	5.91

20	620.23	43.76	7.60
21	640.05	46.41	9.28
22	659.79	49.63	10.97
23	679.42	53.44	12.65
24	698.94	57.82	14.33
25	718.32	62.77	16.02
26	737.54	68.29	17.70
27	756.59	74.37	19.39
28	775.46	81.01	21.07
29	794.12	88.20	22.75
30	812.57	95.93	24.44
31	830.77	104.21	26.12
32	848.73	113.01	27.81
33	866.42	122.34	29.49
34	883.83	132.19	31.17
35	900.94	142.54	32.86
36	917.74	153.39	34.54
37	934.22	164.73	36.23
38	950.35	176.55	37.91
39	955.52	180.58	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 7 COORDINATE POINTS

SAFETY FACTOR = 2.296

X-CENTER = 770.34

Y-CENTER = 214.11

RADIUS = 69.94

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	739.80	151.19	-17.67
2	758.85	145.12	-1.24
3	778.85	144.69	15.20
4	798.15	149.93	31.63
5	815.18	160.42	48.07
6	828.54	175.30	64.50
7	829.30	176.89	

1

Roy F. Weston, Inc.
West Chester, PA

	Y	A	X	I	S	
	10.00	143.38	276.75	410.13	543.50 676.88	
X	.00	L-***-+-----+-----+-----+				
	-					
	-					
	-					
	-					
	133.38	+				
	-					

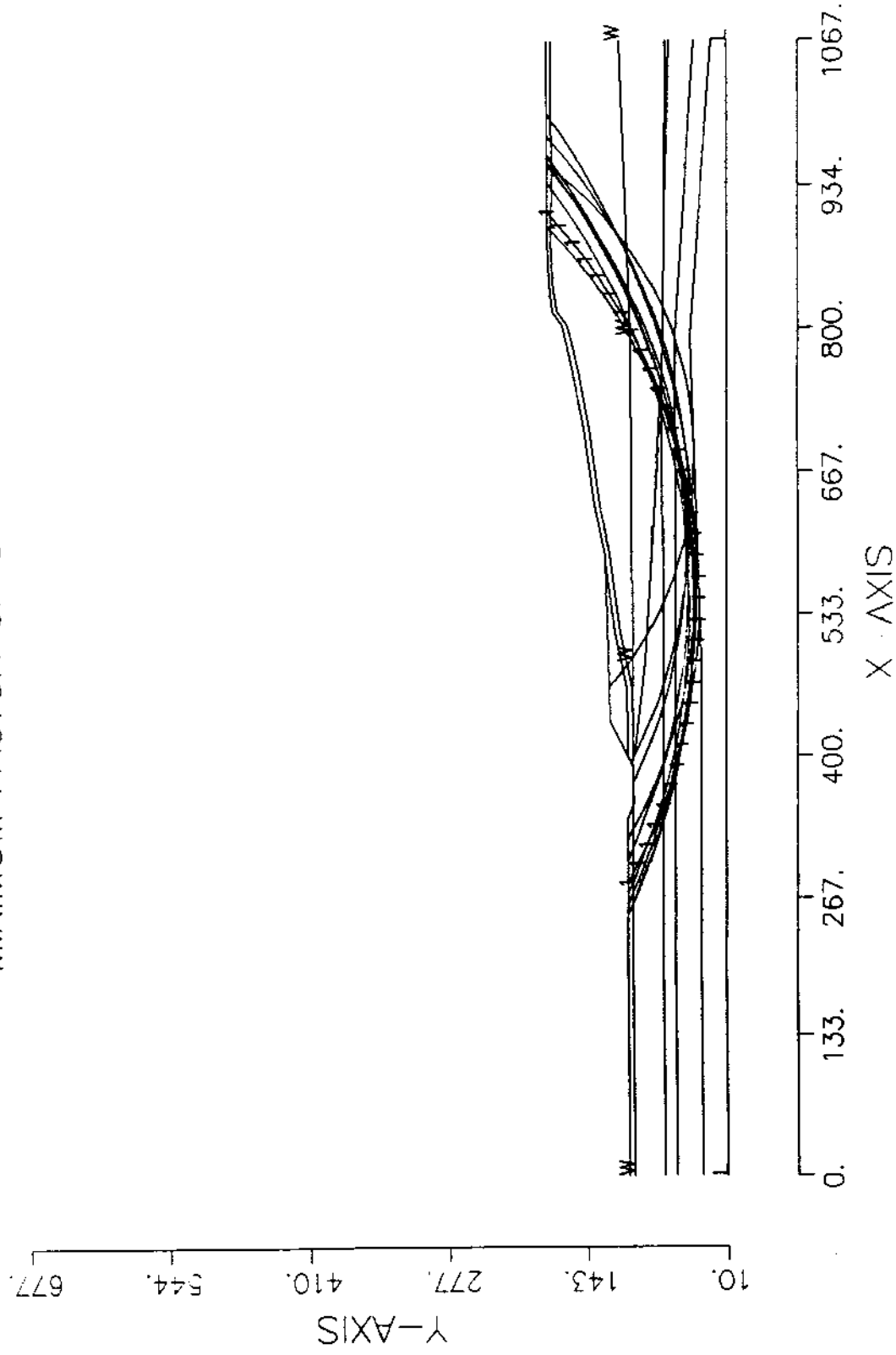
		-	9	
A	266.75	+	44	
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X	400.13	+	.45.**	
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I	533.50	+	.4.....	
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	1067.00	L** * W **		



OPTION 2

Roy F. Weston, Inc.
West Chester, PA

CT LANDFILL SECTION 3-3 FINAL TOPO (UNDR
AILED ANALYSIS) SLOPE BUTTRESS 17
500SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.302



PROFIL

CT LANDFILL SECTION 3-3 FINAL TOPO (UNDRAINED ANALYSIS) SLOPE BUTTRESS 17
52 19

0. 104. 341. 104. 3
341. 104. 345. 102. 3
345. 102. 350. 100. 3
350. 100. 355. 98. 3
355. 98. 370. 99. 3
370. 99. 390. 99. 3
390. 99. 400. 104. 1
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590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 178. 1
843. 178. 885. 180. 1
885. 180. 945. 179.5 1
945. 179.5 1015. 180. 1
1015. 180. 1067. 180. 1
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843. 174. 885. 176. 2
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945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
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489. 87. 760. 71.5 3
760. 71.5 794. 70. 4
794. 70. 914. 69. 4
914. 69. 1067. 68. 3
0. 70. 489. 70.5 4
489. 70.5 760. 71.5 4
914. 69. 1067. 64. 4
0. 59. 794. 59. 5
794. 59. 1067. 40.5 5
0. 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 1067. 24. 6

SOIL

6
125.0 125.0 0.0 32. 0. 0. 1
80.0 80.0 1750.0 0. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1

88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

50 10

250. 750. 800. 1000.

20. 20. 0. 0.

END

CL3FUB.DAT

SECTION 3-3 FINAL UNDRAINED ANALYSIS

GEOSLOPE
Version 4.0

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342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CT LANDFILL SECTION 3-3 FINAL TOPO (UNDR
AINED ANALYSIS) SLOPE BUTTRESS 17

BOUNDARY COORDINATES

19 TOP BOUNDARIES
52 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	104.00	341.00	104.00	3
2	341.00	104.00	345.00	102.00	3
3	345.00	102.00	350.00	100.00	3
4	350.00	100.00	355.00	98.00	3
5	355.00	98.00	370.00	99.00	3
6	370.00	99.00	390.00	99.00	3
7	390.00	99.00	400.00	104.00	1
8	400.00	104.00	432.00	120.00	1
9	432.00	120.00	590.00	125.00	1
10	590.00	125.00	637.00	135.00	1
11	637.00	135.00	707.00	145.00	1
12	707.00	145.00	760.00	155.00	1
13	760.00	155.00	803.00	165.00	1
14	803.00	165.00	817.00	175.00	1
15	817.00	175.00	843.00	178.00	1
16	843.00	178.00	885.00	180.00	1
17	885.00	180.00	945.00	179.50	1
18	945.00	179.50	1015.00	180.00	1
19	1015.00	180.00	1067.00	180.00	1
20	400.00	104.00	419.00	104.00	1
21	419.00	104.00	464.00	105.00	1
22	464.00	105.00	516.00	115.00	1
23	516.00	115.00	590.00	125.00	1
24	390.00	99.00	400.00	99.00	3
25	400.00	99.00	419.00	99.00	2
26	419.00	99.00	464.00	100.00	2
27	464.00	100.00	516.00	110.00	2
28	516.00	110.00	590.00	120.00	2
29	590.00	120.00	637.00	130.00	2
30	637.00	130.00	707.00	140.00	2
31	707.00	140.00	760.00	150.00	2
32	760.00	150.00	803.00	160.00	2
33	803.00	160.00	817.00	170.00	2
34	817.00	170.00	843.00	174.00	2

35	843.00	174.00	885.00	176.00	2
36	885.00	176.00	945.00	175.50	2
37	945.00	175.50	1015.00	176.00	2
38	1015.00	176.00	1067.00	176.00	2
39	400.00	99.00	408.00	96.00	3
40	408.00	96.00	489.00	87.00	3
41	489.00	87.00	760.00	71.50	3
42	760.00	71.50	794.00	70.00	4
43	794.00	70.00	914.00	69.00	4
44	914.00	69.00	1067.00	68.00	3
45	.00	70.00	489.00	70.50	4
46	489.00	70.50	760.00	71.50	4
47	914.00	69.00	1067.00	64.00	4
48	.00	59.00	794.00	59.00	5
49	794.00	59.00	1067.00	40.50	5
50	.00	33.00	489.00	33.00	6
51	489.00	33.00	794.00	44.00	6
52	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	1750.0	.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 250.00
AND X = 750.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1000.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.302

X-CENTER = 543.29
Y-CENTER = 572.14
RADIUS = 536.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	280.61	104.00	-28.23
2	298.23	94.54	-26.10
3	316.20	85.74	-23.96
4	334.47	77.62	-21.83
5	353.04	70.18	-19.69
6	371.87	63.45	-17.56
7	390.94	57.41	-15.42
8	410.22	52.10	-13.29
9	429.68	47.50	-11.15
10	449.30	43.63	-9.02
11	469.06	40.50	-6.88
12	488.91	38.10	-4.75
13	508.84	36.45	-2.61
14	528.82	35.53	-.48
15	548.82	35.37	1.66
16	568.81	35.95	3.79
17	588.77	37.27	5.93
18	608.66	39.34	8.06
19	628.47	42.14	10.20
20	648.15	45.68	12.33
21	667.69	49.95	14.47
22	687.05	54.95	16.60
23	706.22	60.66	18.74
24	725.16	67.09	20.87
25	743.85	74.21	23.01
26	762.26	82.03	25.14
27	780.36	90.53	27.28
28	798.14	99.69	29.41
29	815.56	109.51	31.55
30	832.61	119.98	33.68
31	849.25	131.07	35.82
32	865.47	142.77	37.95
33	881.24	155.07	40.09
34	896.54	167.95	42.22
35	909.59	179.80	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	285.27	9.31	1862.65	.00	.00	2244.91	23.05
2	294.08	8.31	4805.34	.00	1312.19	4258.56	23.05
3	307.21	17.96	19913.83	.00	11055.83	11344.10	23.05
4	325.33	18.28	32632.40	.00	21613.47	14300.97	23.05
5	337.74	6.53	14459.77	.00	9955.38	5685.79	23.05
6	343.00	4.00	9214.39	.00	6666.68	3298.95	23.05
7	347.50	5.00	11438.86	.00	8939.05	3432.76	23.05
8	351.30	2.60	5947.70	.00	4913.52	1519.27	23.05
9	352.82	.44	1003.67	.00	846.81	357.31	630.01
10	354.02	1.96	4490.50	.00	3792.25	1525.92	630.01
11	362.50	15.00	38470.00	.00	32012.15	12936.03	630.01
12	370.93	1.87	5363.77	.00	4361.85	1782.52	630.01
13	378.90	14.05	43502.74	.00	34746.83	13819.02	630.01
14	387.96	4.08	13693.74	.00	10847.11	3910.61	291.96
15	390.47	.94	3252.02	.00	2541.65	960.02	291.96
16	395.47	9.06	35598.92	.00	25129.60	12555.89	291.96
17	404.00	8.00	37648.29	.00	23401.18	16321.43	291.96
18	409.11	2.22	11466.82	.00	6687.67	5392.60	291.96
19	414.61	8.78	49670.23	.00	26997.02	24661.34	291.96

20	424.34	10.68	69403.74	.00	34408.00	37661.07	291.96
21	430.84	2.32	16347.99	.00	7626.86	9171.69	291.96
22	440.65	17.30	127188.90	.00	59059.80	71591.59	291.96
23	456.65	14.70	113101.80	.00	52491.86	62714.22	291.96
24	466.53	5.06	39794.89	.00	18564.19	21965.78	291.96
25	478.99	19.86	158391.30	.00	74507.17	85738.11	291.96
26	488.96	.09	700.61	.00	331.67	373.46	291.96
27	498.92	19.84	160636.20	.00	76776.18	84895.50	291.96
28	512.42	7.16	58206.38	.00	28094.80	30267.49	291.96
29	522.41	12.82	104534.10	.00	50761.54	54052.21	291.96
30	538.82	20.00	163121.10	.00	79676.09	83499.23	291.96
31	558.82	19.99	161792.00	.00	79566.09	82124.67	291.96
32	578.79	19.96	158696.20	.00	78526.45	80130.99	291.96
33	589.39	1.23	9654.77	.00	4801.02	4868.19	291.96
34	599.33	18.66	147538.40	.00	71757.86	76004.89	291.96
35	618.57	19.80	158147.80	.00	73665.77	85233.68	291.96
36	632.73	8.53	68289.45	.00	30808.10	38122.02	291.96
37	642.58	11.15	88697.39	.00	39043.30	50482.69	291.96
38	657.92	19.54	152481.00	.00	65120.86	89685.12	291.96
39	677.37	19.37	146116.60	.00	59480.88	89914.13	291.96
40	693.85	13.59	98687.50	.00	38249.84	63496.48	291.96
41	703.43	5.58	39553.51	.00	14689.26	25491.26	630.01
42	706.61	.78	5485.71	.00	2027.24	3589.64	630.01
43	716.08	18.16	125312.00	.00	43477.50	84749.00	630.01
44	730.83	11.34	75570.48	.00	23618.28	54342.94	630.01
45	738.14	3.26	21310.44	.00	6195.13	16581.21	23.05
46	741.81	4.08	26429.54	.00	7374.73	18671.54	1344.54
47	751.92	16.15	101620.00	.00	25084.19	75299.36	1344.54
48	761.13	2.26	13821.80	.00	2916.54	10699.31	1344.54
49	771.31	18.11	107420.60	.00	17955.41	88086.77	1344.54
50	787.18	13.64	76466.38	.00	6430.67	68965.13	1344.54
51	796.07	4.14	22375.96	.00	654.27	21292.53	1344.54
52	799.34	2.40	12770.23	.00	108.33	12465.56	1344.54
53	801.77	2.46	12966.98	.00	.00	12741.70	1344.54
54	809.28	12.56	66651.13	.00	.00	65582.49	1344.54
55	816.28	1.44	7750.01	.00	.00	7700.60	1344.54
56	824.80	15.61	79098.49	.00	.00	77699.44	1344.54
57	837.80	10.39	46832.73	.00	.00	45087.52	1344.54
58	846.12	6.25	25700.53	.00	.00	24156.26	1344.54
59	857.36	16.22	57103.93	.00	.00	51014.66	1344.54
60	873.35	15.77	41348.10	.00	.00	31464.12	1344.54
61	883.12	3.76	7676.66	.00	.00	4468.85	1344.54
62	890.77	11.54	17638.35	.00	.00	5986.52	1344.54
63	900.88	8.68	7105.00	.00	.00	-4713.23	1344.54
64	907.41	4.37	1092.04	.00	.00	1027.15	493.13

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 40 COORDINATE POINTS

SAFETY FACTOR = 1.304

X-CENTER = 565.28
Y-CENTER = 772.56
RADIUS = 734.88

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	260.20	104.00	-23.75
2	278.51	95.95	-22.19
3	297.03	88.39	-20.63
4	315.75	81.35	-19.07
5	334.65	74.81	-17.51
6	353.72	68.79	-15.95
7	372.95	63.30	-14.39
8	392.33	58.33	-12.83
9	411.83	53.88	-11.27
10	431.44	49.97	-9.71
11	451.15	46.60	-8.15
12	470.95	43.76	-6.60
13	490.82	41.46	-5.04
14	510.74	39.71	-3.48
15	530.70	38.50	-1.92
16	550.69	37.83	-.36
17	570.69	37.70	1.20
18	590.69	38.12	2.76
19	610.67	39.09	4.32
20	630.61	40.59	5.88
21	650.50	42.64	7.44
22	670.33	45.23	9.00
23	690.09	48.36	10.56
24	709.75	52.02	12.12
25	729.30	56.22	13.68
26	748.74	60.95	15.24
27	768.03	66.21	16.80
28	787.18	71.98	18.35
29	806.16	78.28	19.91
30	824.97	85.09	21.47
31	843.58	92.42	23.03
32	861.99	100.24	24.59
33	880.17	108.56	26.15
34	898.12	117.38	27.71
35	915.83	126.68	29.27
36	933.28	136.46	30.83
37	950.45	146.71	32.39
38	967.34	157.42	33.95
39	983.93	168.59	35.51
40	999.77	179.89	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.354

X-CENTER = 540.62
Y-CENTER = 720.54
RADIUS = 681.60

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-24.40
2	268.21	95.74	-22.72
3	286.66	88.02	-21.03
4	305.33	80.84	-19.35
5	324.20	74.21	-17.67

6	343.26	68.14	-15.99
7	362.48	62.63	-14.31
8	381.86	57.69	-12.63
9	401.38	53.31	-10.95
10	421.01	49.51	-9.27
11	440.75	46.29	-7.58
12	460.58	43.66	-5.90
13	480.47	41.60	-4.22
14	500.42	40.13	-2.54
15	520.40	39.24	-.86
16	540.40	38.94	.82
17	560.39	39.23	2.50
18	580.38	40.10	4.18
19	600.32	41.56	5.87
20	620.22	43.60	7.55
21	640.04	46.23	9.23
22	659.79	49.44	10.91
23	679.42	53.22	12.59
24	698.94	57.58	14.27
25	718.33	62.51	15.95
26	737.55	68.01	17.64
27	756.61	74.07	19.32
28	775.49	80.69	21.00
29	794.16	87.85	22.68
30	812.61	95.56	24.36
31	830.83	103.81	26.04
32	848.80	112.59	27.72
33	866.51	121.90	29.40
34	883.93	131.72	31.09
35	901.06	142.04	32.77
36	917.88	152.87	34.45
37	934.37	164.18	36.13
38	950.52	175.97	37.81
39	955.16	179.57	

1

Roy P. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.361

X-CENTER = 559.77

Y-CENTER = 511.64

RADIUS = 472.20

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	321.43	104.00	-29.10
2	338.90	94.27	-26.67
3	356.78	85.30	-24.25
4	375.01	77.08	-21.82
5	393.58	69.65	-19.39
6	412.44	63.01	-16.97
7	431.57	57.17	-14.54
8	450.93	52.15	-12.11
9	470.49	47.95	-9.69
10	490.20	44.59	-7.26
11	510.04	42.06	-4.83

12	529.97	40.38	-2.40
13	549.95	39.54	.02
14	569.95	39.55	2.45
15	589.94	40.40	4.88
16	609.86	42.10	7.30
17	629.70	44.64	9.73
18	649.41	48.02	12.16
19	668.96	52.24	14.58
20	688.32	57.27	17.01
21	707.45	63.12	19.44
22	726.31	69.78	21.86
23	744.87	77.23	24.29
24	763.10	85.45	26.72
25	780.96	94.45	29.15
26	798.43	104.19	31.57
27	815.47	114.66	34.00
28	832.05	125.84	36.43
29	848.14	137.72	38.85
30	863.72	150.26	41.28
31	878.75	163.46	43.71
32	893.20	177.28	46.13
33	895.74	179.91	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.385

X-CENTER = 541.98
Y-CENTER = 745.76
RADIUS = 705.06

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-23.65
2	268.32	95.98	-22.03
3	286.86	88.48	-20.40
4	305.61	81.50	-18.77
5	324.54	75.07	-17.15
6	343.65	69.17	-15.52
7	362.92	63.82	-13.90
8	382.34	59.01	-12.27
9	401.88	54.76	-10.65
10	421.54	51.07	-9.02
11	441.29	47.93	-7.40
12	461.12	45.35	-5.77
13	481.02	43.34	-4.15
14	500.97	41.90	-2.52
15	520.95	41.02	-.90
16	540.95	40.70	.73
17	560.95	40.96	2.35
18	580.93	41.78	3.98
19	600.88	43.17	5.60
20	620.78	45.12	7.23
21	640.63	47.64	8.86
22	660.39	50.72	10.48
23	680.05	54.36	12.11

24	699.61	58.55	13.73
25	719.04	63.30	15.36
26	738.32	68.59	16.98
27	757.45	74.44	18.61
28	776.41	80.82	20.23
29	795.17	87.73	21.86
30	813.73	95.18	23.48
31	832.08	103.15	25.11
32	850.19	111.64	26.73
33	868.05	120.63	28.36
34	885.65	130.13	29.98
35	902.97	140.13	31.61
36	920.00	150.61	33.24
37	936.73	161.57	34.86
38	953.14	173.00	36.49
39	962.09	179.62	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.393

X-CENTER = 628.08

Y-CENTER = 570.23

RADIUS = 525.40

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	392.86	100.43	-25.51
2	410.91	91.82	-23.32
3	429.27	83.90	-21.14
4	447.93	76.68	-18.96
5	466.84	70.18	-16.78
6	485.99	64.41	-14.60
7	505.34	59.37	-12.42
8	524.88	55.07	-10.24
9	544.56	51.51	-8.06
10	564.36	48.71	-5.88
11	584.26	46.66	-3.69
12	604.21	45.37	-1.51
13	624.21	44.85	.67
14	644.21	45.08	2.85
15	664.18	46.07	5.03
16	684.10	47.83	7.21
17	703.95	50.34	9.39
18	723.68	53.60	11.57
19	743.27	57.62	13.76
20	762.70	62.37	15.94
21	781.93	67.86	18.12
22	800.94	74.08	20.30
23	819.70	81.02	22.48
24	838.18	88.67	24.66
25	856.35	97.01	26.84
26	874.20	106.04	29.02
27	891.68	115.75	31.21
28	908.79	126.11	33.39
29	925.49	137.11	35.57

30	941.76	148.75	37.75
31	957.57	160.99	39.93
32	972.91	173.83	42.11
33	979.46	179.75	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.428

X-CENTER = 568.23

Y-CENTER = 687.92

RADIUS = 642.15

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	301.02	104.00	-23.70
2	319.33	95.96	-21.91
3	337.89	88.50	-20.13
4	356.67	81.62	-18.34
5	375.65	75.32	-16.56
6	394.82	69.62	-14.77
7	414.16	64.52	-12.99
8	433.65	60.03	-11.21
9	453.27	56.14	-9.42
10	473.00	52.87	-7.64
11	492.82	50.21	-5.85
12	512.72	48.17	-4.07
13	532.67	46.75	-2.28
14	552.65	45.95	-.50
15	572.65	45.78	1.29
16	592.64	46.23	3.07
17	612.62	47.30	4.86
18	632.54	48.99	6.64
19	652.41	51.31	8.42
20	672.19	54.24	10.21
21	691.88	57.78	11.99
22	711.44	61.94	13.78
23	730.87	66.70	15.56
24	750.13	72.07	17.35
25	769.22	78.03	19.13
26	788.12	84.59	20.92
27	806.80	91.73	22.70
28	825.25	99.44	24.49
29	843.45	107.73	26.27
30	861.39	116.59	28.06
31	879.04	125.99	29.84
32	896.38	135.94	31.62
33	913.41	146.43	33.41
34	930.11	157.44	35.19
35	946.45	168.97	36.98
36	960.59	179.61	

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 1.443

X-CENTER = 601.10

Y-CENTER = 581.44

RADIUS = 533.88

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	372.45	99.00	-24.28
2	390.68	90.77	-22.14
3	409.21	83.24	-19.99
4	428.00	76.40	-17.85
5	447.04	70.27	-15.70
6	466.29	64.86	-13.55
7	485.73	60.17	-11.41
8	505.34	56.22	-9.26
9	525.08	53.00	-7.11
10	544.93	50.52	-4.97
11	564.85	48.79	-2.82
12	584.83	47.81	-.67
13	604.82	47.57	1.47
14	624.82	48.09	3.62
15	644.78	49.35	5.77
16	664.68	51.36	7.91
17	684.49	54.11	10.06
18	704.18	57.60	12.21
19	723.73	61.83	14.35
20	743.10	66.79	16.50
21	762.28	72.47	18.64
22	781.23	78.86	20.79
23	799.93	85.96	22.94
24	818.35	93.76	25.08
25	836.46	102.24	27.23
26	854.24	111.39	29.38
27	871.67	121.20	31.52
28	888.72	131.65	33.67
29	905.37	142.74	35.82
30	921.58	154.45	37.96
31	937.35	166.75	40.11
32	952.55	179.55	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 37 COORDINATE POINTS

SAFETY FACTOR = 1.467

X-CENTER = 540.61

Y-CENTER = 693.64

RADIUS = 648.61

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	270.41	104.00	-23.74
2	288.72	95.95	-21.97
3	307.26	88.47	-20.20

4	326.03	81.56	-18.44
5	345.01	75.24	-16.67
6	364.17	69.50	-14.90
7	383.49	64.36	-13.14
8	402.97	59.81	-11.37
9	422.58	55.87	-9.60
10	442.30	52.53	-7.83
11	462.11	49.81	-6.07
12	482.00	47.69	-4.30
13	501.94	46.19	-2.53
14	521.92	45.31	-.77
15	541.92	45.04	1.00
16	561.92	45.39	2.77
17	581.90	46.35	4.53
18	601.83	47.94	6.30
19	621.71	50.13	8.07
20	641.51	52.94	9.83
21	661.22	56.35	11.60
22	680.81	60.37	13.37
23	700.27	65.00	15.13
24	719.58	70.22	16.90
25	738.71	76.03	18.67
26	757.66	82.44	20.43
27	776.40	89.42	22.20
28	794.92	96.98	23.97
29	813.19	105.10	25.74
30	831.21	113.79	27.50
31	848.95	123.02	29.27
32	866.40	132.80	31.04
33	883.53	143.11	32.80
34	900.35	153.95	34.57
35	916.81	165.29	36.34
36	932.93	177.14	38.10
37	936.02	179.57	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 29 COORDINATE POINTS

SAFETY FACTOR = 1.489

X-CENTER = 681.65

Y-CENTER = 373.53

RADIUS = 333.18

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	464.29	121.02	-39.00
2	479.83	108.43	-35.56
3	496.10	96.80	-32.12
4	513.04	86.17	-28.68
5	530.58	76.57	-25.24
6	548.67	68.04	-21.80
7	567.24	60.61	-18.36
8	586.22	54.31	-14.92
9	605.55	49.16	-11.48
10	625.15	45.18	-8.04
11	644.95	42.38	-4.60

12	664.89	40.78	-1.16
13	684.88	40.37	2.28
14	704.87	41.17	5.72
15	724.77	43.16	9.16
16	744.51	46.34	12.60
17	764.03	50.70	16.04
18	783.25	56.23	19.48
19	802.11	62.90	22.92
20	820.53	70.68	26.36
21	838.45	79.56	29.80
22	855.81	89.50	33.24
23	872.54	100.46	36.68
24	888.58	112.41	40.12
25	903.87	125.29	43.56
26	918.37	139.07	46.99
27	932.01	153.70	50.43
28	944.75	169.12	53.87
29	952.36	179.55	

1

Roy F. Weston, Inc.
West Chester, PA

	Y	A	X	I	S	
	10.00	143.38	276.75	410.13	543.50	676.88
X	.00	L-*	***	***	***	***
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
	133.38	+	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
A	266.75	+	3	32		
		-	.11			
		-	.214			
		-	.314*			
		-	.214*			
		-	.14.*			
X	400.13	+	.118**			
		-	.1486**			
		-	.176...			
		-	.1286.*0			
		-	.46**W.			
		-	.176.0**			
I	533.50	+	.16.0...			
		-	.160.....			
		-	.160.....			
		-	.16.....*			
		-	.13.....			
		-	.21.....*			
S	666.88	+	.01.....			
		-	.013.....			

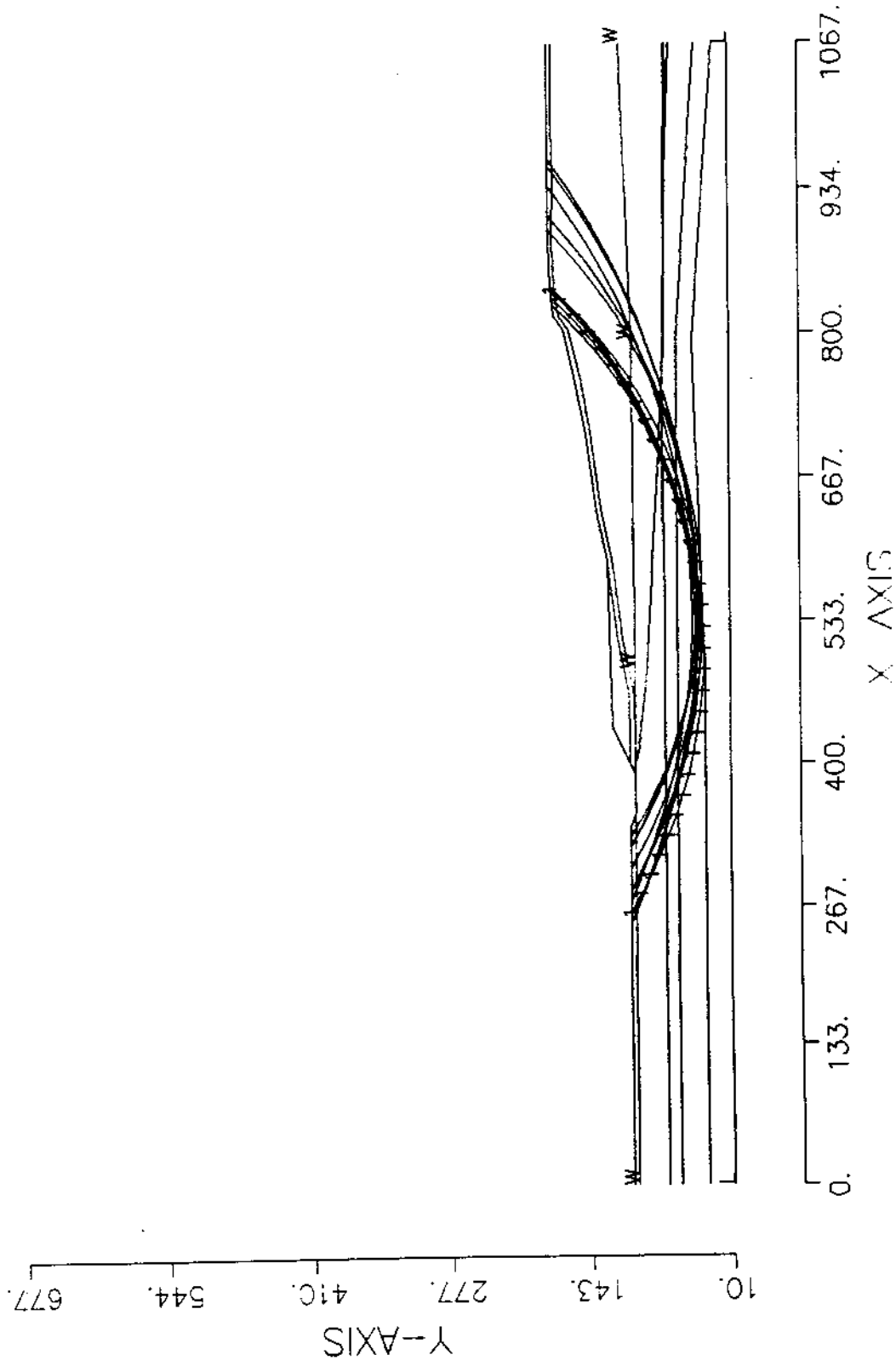
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      -.0219....*
      -.0211.....
      -..02*4....**
      -..0221.....
800.25 + .**23W....**
      - ...62114...*.
      - ...027314.**
      - ....23914..
      - ...22391**
      - *....23391
933.63 + ...26539
      - ..26**
      - .226
      - .2
      - **
      -
1067.00 L** *   W   **

```

Roy F. Weston, Inc.
West Chester, PA

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAIN, W/ EARTH) SLOPE BUTTRESS 17B
500 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.337



PROFIL

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAINED, W/ EQUAKE) SLOPE BUTTRESS 17B

52 19

0. 104. 341. 104. 3
 341. 104. 345. 102. 3
 345. 102. 350. 100. 3
 350. 100. 355. 98. 3
 355. 98. 370. 99. 3
 370. 99. 390. 99. 3
 390. 99. 400. 104. 1
 400. 104. 432. 120. 1
 432. 120. 590. 125. 1
 590. 125. 637. 135. 1
 637. 135. 707. 145. 1
 707. 145. 760. 155. 1
 760. 155. 803. 165. 1
 803. 165. 817. 175. 1
 817. 175. 843. 178. 1
 843. 178. 885. 180. 1
 885. 180. 945. 179.5 1
 945. 179.5 1015. 180. 1
 1015. 180. 1067. 180. 1
 400. 104. 419. 104. 1
 419. 104. 464. 105. 1
 464. 105. 516. 115. 1
 516. 115. 590. 125. 1
 390. 99. 400. 99. 3
 400. 99. 419. 99. 2
 419. 99. 464. 100. 2
 464. 100. 516. 110. 2
 516. 110. 590. 120. 2
 590. 120. 637. 130. 2
 637. 130. 707. 140. 2
 707. 140. 760. 150. 2
 760. 150. 803. 160. 2
 803. 160. 817. 170. 2
 817. 170. 843. 174. 2
 843. 174. 885. 176. 2
 885. 176. 945. 175.5 2
 945. 175.5 1015. 176. 2
 1015. 176. 1067. 176. 2
 400. 99. 408. 96. 3
 408. 96. 489. 87. 3
 489. 87. 760. 71.5 3
 760. 71.5 794. 70. 4
 794. 70. 914. 69. 4
 914. 69. 1067. 68. 3
 0. 70. 489. 70.5 4
 489. 70.5 760. 71.5 4
 914. 69. 1067. 64. 4
 0. 59. 794. 59. 5
 794. 59. 1067. 40.5 5
 0. 33. 489. 33. 6
 489. 33. 794. 44. 6
 794. 44. 1067. 24. 6

SOIL

6
 125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1

88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

EQUAKE

.05

.05

0.

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

50 10

250. 750. 800. 1000.

20. 20. 0. 0.

END

CL3FUB.DAT

SECTION 3-3 FINAL DRAINED ANALYSIS

GEOSLOPE
Version 4.0

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342 Sudbury Rd., Concord, MA. 01742
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Roy F. Weston, Inc.
West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CT LANDFILL SECTION 3-3 FINAL TOPO (DRAINED, W/ EQUAKE) SLOPE BUTTRESS 17B

BOUNDARY COORDINATES

19 TOP BOUNDARIES
52 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	104.00	341.00	104.00	3
2	341.00	104.00	345.00	102.00	3
3	345.00	102.00	350.00	100.00	3
4	350.00	100.00	355.00	98.00	3
5	355.00	98.00	370.00	99.00	3
6	370.00	99.00	390.00	99.00	3
7	390.00	99.00	400.00	104.00	1
8	400.00	104.00	432.00	120.00	1
9	432.00	120.00	590.00	125.00	1
10	590.00	125.00	637.00	135.00	1
11	637.00	135.00	707.00	145.00	1
12	707.00	145.00	760.00	155.00	1
13	760.00	155.00	803.00	165.00	1
14	803.00	165.00	817.00	175.00	1
15	817.00	175.00	843.00	178.00	1
16	843.00	178.00	885.00	180.00	1
17	885.00	180.00	945.00	179.50	1
18	945.00	179.50	1015.00	180.00	1
19	1015.00	180.00	1067.00	180.00	1
20	400.00	104.00	419.00	104.00	1
21	419.00	104.00	464.00	105.00	1
22	464.00	105.00	516.00	115.00	1
23	516.00	115.00	590.00	125.00	1
24	390.00	99.00	400.00	99.00	3
25	400.00	99.00	419.00	99.00	2
26	419.00	99.00	464.00	100.00	2
27	464.00	100.00	516.00	110.00	2
28	516.00	110.00	590.00	120.00	2
29	590.00	120.00	637.00	130.00	2
30	637.00	130.00	707.00	140.00	2
31	707.00	140.00	760.00	150.00	2
32	760.00	150.00	803.00	160.00	2
33	803.00	160.00	817.00	170.00	2
34	817.00	170.00	843.00	174.00	2

35	843.00	174.00	885.00	176.00	2
36	885.00	176.00	945.00	175.50	2
37	945.00	175.50	1015.00	176.00	2
38	1015.00	176.00	1067.00	176.00	2
39	400.00	99.00	408.00	96.00	3
40	408.00	96.00	489.00	87.00	3
41	489.00	87.00	760.00	71.50	3
42	760.00	71.50	794.00	70.00	4
43	794.00	70.00	914.00	69.00	4
44	914.00	69.00	1067.00	68.00	3
45	.00	70.00	489.00	70.50	4
46	489.00	70.50	760.00	71.50	4
47	914.00	69.00	1067.00	64.00	4
48	.00	59.00	794.00	59.00	5
49	794.00	59.00	1067.00	40.50	5
50	.00	33.00	489.00	33.00	6
51	489.00	33.00	794.00	44.00	6
52	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT
OF .050 HAS BEEN ASSIGNED

A VERTICAL EARTHQUAKE LOADING COEFFICIENT
OF .050 HAS BEEN ASSIGNED

CAVITATION PRESSURE = .0

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 250.00
AND X = 750.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1000.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.337

X-CENTER = 505.04

Y-CENTER = 498.74

RADIUS = 464.50

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-30.58
2	277.42	93.83	-28.11
3	295.07	84.40	-25.64
4	313.10	75.75	-23.17
5	331.48	67.88	-20.71
6	350.19	60.81	-18.24
7	369.19	54.55	-15.77
8	388.43	49.11	-13.30
9	407.90	44.51	-10.84
10	427.54	40.75	-8.37
11	447.33	37.84	-5.90
12	467.22	35.78	-3.44
13	487.18	34.58	-.97
14	507.18	34.24	1.50
15	527.17	34.77	3.97
16	547.13	36.15	6.43
17	567.00	38.39	8.90
18	586.76	41.48	11.37
19	606.37	45.43	13.83
20	625.79	50.21	16.30
21	644.98	55.82	18.77
22	663.92	62.26	21.24
23	682.56	69.50	23.70
24	700.87	77.54	26.17
25	718.82	86.36	28.64
26	736.38	95.95	31.11
27	753.50	106.28	33.57
28	770.16	117.34	36.04
29	786.34	129.11	38.51
30	801.99	141.56	40.97
31	817.09	154.67	43.44
32	831.61	168.43	45.91
33	840.62	177.73	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	264.44	8.46	1692.58	.00	.00	2298.98	730.09
2	273.05	8.76	5314.58	.00	1641.63	5197.82	1650.69
3	286.24	17.64	21006.84	.00	12336.21	12390.39	3934.86
4	304.08	18.03	34508.08	.00	23616.44	15039.75	4776.23
5	319.42	12.65	31337.79	.00	22294.54	11676.50	3708.15
6	328.62	5.73	16061.06	.00	11633.46	5618.58	1529.98
7	336.24	9.52	29198.96	.00	20902.49	9756.30	2656.70
8	343.00	4.00	12850.40	.00	9466.00	3996.24	1088.20
9	347.50	5.00	16011.62	.00	12399.86	4304.67	1172.19
10	350.09	.19	608.88	.00	483.48	150.38	40.95
11	352.59	4.81	15385.20	.00	12320.33	3384.51	921.62

12	355.34	.67	2159.59	.00	1767.05	479.42	130.55
13	362.43	13.51	47046.27	.00	37483.12	10785.64	2313.85
14	369.59	.81	3067.22	.00	2354.94	717.85	154.00
15	379.22	18.43	74627.91	.00	56513.80	18262.91	3917.95
16	389.22	1.57	6802.93	.00	5034.21	1692.70	363.13
17	395.00	10.00	47936.73	.00	32984.98	14549.03	3121.21
18	403.95	7.90	44000.70	.00	27113.80	16686.27	3579.71
19	407.95	.10	619.98	.00	362.56	247.28	53.05
20	413.50	11.00	70166.87	.00	38831.84	30280.80	6496.15
21	423.27	8.54	61304.41	.00	31157.16	29344.81	6295.35
22	429.77	4.46	34346.91	.00	16483.83	17034.76	3654.47
23	439.66	15.33	122756.80	.00	58031.03	61794.08	13256.71
24	455.66	16.67	137802.50	.00	64880.40	68243.65	14640.33
25	465.61	3.22	27006.32	.00	12734.73	13354.27	2864.90
26	477.20	19.96	167971.10	.00	79646.57	81259.96	17432.73
27	488.09	1.82	15306.51	.00	7304.49	7265.13	1558.59
28	498.09	18.18	152670.50	.00	73361.84	71956.90	15436.94
29	511.59	8.82	73538.91	.00	35659.46	34035.38	7301.62
30	521.59	11.17	92506.76	.00	45038.20	42634.02	9146.29
31	537.15	19.95	162791.70	.00	79655.15	74263.68	15931.81
32	557.06	19.87	157580.60	.00	77540.56	71382.90	15313.80
33	576.88	19.76	150367.40	.00	74357.48	67949.74	14577.28
34	588.38	3.24	23952.97	.00	11917.56	10826.14	2322.54
35	598.18	16.37	119842.50	.00	58194.12	55538.95	11914.79
36	616.08	19.42	139969.50	.00	64811.41	68512.73	14698.06
37	631.39	11.21	79048.40	.00	34986.93	40701.05	8731.61
38	640.99	7.98	55071.31	.00	23479.33	29197.99	6263.86
39	649.66	9.35	62747.59	.00	26208.98	34252.09	7348.11
40	659.13	9.59	62428.27	.00	24879.10	34560.52	9411.06
41	673.24	18.64	115787.80	.00	42690.57	68113.73	18547.82
42	684.53	3.93	23380.26	.00	7982.69	14537.03	3958.53
43	691.00	9.02	52178.49	.00	16584.85	32956.70	10466.18
44	698.19	5.36	30106.19	.00	8721.59	19166.89	7624.62
45	703.94	6.13	33487.32	.00	9038.90	22089.62	8787.29
46	712.91	11.82	61925.78	.00	13862.46	43234.91	17198.92
47	727.60	17.55	85018.55	.00	11546.52	66116.48	26301.26
48	740.15	7.55	33729.76	.00	1241.14	29179.37	11607.60
49	748.71	9.57	40050.09	.00	.00	35835.49	14255.42
50	756.75	6.50	25352.01	.00	.00	22868.53	9097.14
51	765.08	10.16	36615.06	.00	.00	33028.25	13138.70
52	778.25	16.17	50240.63	.00	.00	45776.04	18209.79
53	794.16	15.65	38091.77	.00	.00	35126.07	13973.21
54	802.49	1.01	2080.97	.00	.00	1946.07	774.15
55	810.00	14.00	27209.22	.00	.00	25445.41	10122.23
56	817.04	.09	162.76	.00	.00	152.21	60.55
57	824.35	14.52	19692.55	.00	.00	18715.17	7444.93
58	833.78	4.35	3032.72	.00	.00	2935.33	1167.68
59	838.29	4.66	1243.38	.00	.00	1145.05	535.31

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 1.359

X-CENTER = 543.29
Y-CENTER = 572.14
RADIUS = 536.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-28.23
2	298.23	94.54	-26.10
3	316.20	85.74	-23.96
4	334.47	77.62	-21.83
5	353.04	70.18	-19.69
6	371.87	63.45	-17.56
7	390.94	57.41	-15.42
8	410.22	52.10	-13.29
9	429.68	47.50	-11.15
10	449.30	43.63	-9.02
11	469.06	40.50	-6.88
12	488.91	38.10	-4.75
13	508.84	36.45	-2.61
14	528.82	35.53	-.48
15	548.82	35.37	1.66
16	568.81	35.95	3.79
17	588.77	37.27	5.93
18	608.66	39.34	8.06
19	628.47	42.14	10.20
20	648.15	45.68	12.33
21	667.69	49.95	14.47
22	687.05	54.95	16.60
23	706.22	60.66	18.74
24	725.16	67.09	20.87
25	743.85	74.21	23.01
26	762.26	82.03	25.14
27	780.36	90.53	27.28
28	798.14	99.69	29.41
29	815.56	109.51	31.55
30	832.61	119.98	33.68
31	849.25	131.07	35.82
32	865.47	142.77	37.95
33	881.24	155.07	40.09
34	896.54	167.95	42.22
35	909.59	179.80	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 1.359

X-CENTER = 516.96
Y-CENTER = 488.76
RADIUS = 451.55

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-30.29
2	297.88	93.91	-27.75
3	315.58	84.60	-25.22
4	333.67	76.08	-22.68
5	352.13	68.37	-20.14
6	370.91	61.48	-17.60
7	389.97	55.43	-15.07

8	409.28	50.23	-12.53
9	428.81	45.89	-9.99
10	448.50	42.42	-7.45
11	468.33	39.83	-4.91
12	488.26	38.12	-2.38
13	508.24	37.29	.16
14	528.24	37.35	2.70
15	548.22	38.29	5.24
16	568.14	40.11	7.78
17	587.95	42.82	10.31
18	607.63	46.40	12.85
19	627.13	50.85	15.39
20	646.41	56.16	17.93
21	665.44	62.31	20.47
22	684.18	69.31	23.00
23	702.59	77.12	25.54
24	720.63	85.75	28.08
25	738.28	95.16	30.62
26	755.49	105.35	33.16
27	772.23	116.28	35.69
28	788.48	127.95	38.23
29	804.19	140.33	40.77
30	819.33	153.39	43.31
31	833.89	167.11	45.85
32	844.53	178.07	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 31 COORDINATE POINTS

SAFETY FACTOR = 1.394

X-CENTER = 524.01

Y-CENTER = 457.67

RADIUS = 418.10

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	301.02	104.00	-30.86
2	318.19	93.74	-28.12
3	335.83	84.31	-25.38
4	353.90	75.74	-22.64
5	372.36	68.04	-19.90
6	391.16	61.24	-17.16
7	410.27	55.34	-14.42
8	429.64	50.36	-11.67
9	449.23	46.31	-8.93
10	468.99	43.21	-6.19
11	488.87	41.05	-3.45
12	508.83	39.85	-.71
13	528.83	39.60	2.03
14	548.82	40.31	4.77
15	568.75	41.97	7.51
16	588.58	44.59	10.25
17	608.26	48.15	13.00
18	627.75	52.64	15.74
19	647.00	58.07	18.48
20	665.97	64.41	21.22

21	684.61	71.65	23.96
22	702.89	79.77	26.70
23	720.75	88.75	29.44
24	738.17	98.59	32.18
25	755.10	109.24	34.92
26	771.50	120.69	37.67
27	787.33	132.91	40.41
28	802.56	145.87	43.15
29	817.15	159.55	45.89
30	831.07	173.91	48.63
31	833.73	176.93	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.409

X-CENTER = 559.77

Y-CENTER = 511.64

RADIUS = 472.20

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	321.43	104.00	-29.10
2	338.90	94.27	-26.67
3	356.78	85.30	-24.25
4	375.01	77.08	-21.82
5	393.58	69.65	-19.39
6	412.44	63.01	-16.97
7	431.57	57.17	-14.54
8	450.93	52.15	-12.11
9	470.49	47.95	-9.69
10	490.20	44.59	-7.26
11	510.04	42.06	-4.83
12	529.97	40.38	-2.40
13	549.95	39.54	.02
14	569.95	39.55	2.45
15	589.94	40.40	4.88
16	609.86	42.10	7.30
17	629.70	44.64	9.73
18	649.41	48.02	12.16
19	668.96	52.24	14.58
20	688.32	57.27	17.01
21	707.45	63.12	19.44
22	726.31	69.78	21.86
23	744.87	77.23	24.29
24	763.10	85.45	26.72
25	780.96	94.45	29.15
26	798.43	104.19	31.57
27	815.47	114.66	34.00
28	832.05	125.84	36.43
29	848.14	137.72	38.85
30	863.72	150.26	41.28
31	878.75	163.46	43.71
32	893.20	177.28	46.13
33	895.74	179.91	

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.421

X-CENTER = 540.62
Y-CENTER = 720.54
RADIUS = 681.60

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-24.40
2	268.21	95.74	-22.72
3	286.66	88.02	-21.03
4	305.33	80.84	-19.35
5	324.20	74.21	-17.67
6	343.26	68.14	-15.99
7	362.48	62.63	-14.31
8	381.86	57.69	-12.63
9	401.38	53.31	-10.95
10	421.01	49.51	-9.27
11	440.75	46.29	-7.58
12	460.58	43.66	-5.90
13	480.47	41.60	-4.22
14	500.42	40.13	-2.54
15	520.40	39.24	-.86
16	540.40	38.94	.82
17	560.39	39.23	2.50
18	580.38	40.10	4.18
19	600.32	41.56	5.87
20	620.22	43.60	7.55
21	640.04	46.23	9.23
22	659.79	49.44	10.91
23	679.42	53.22	12.59
24	698.94	57.58	14.27
25	718.33	62.51	15.95
26	737.55	68.01	17.64
27	756.61	74.07	19.32
28	775.49	80.69	21.00
29	794.16	87.85	22.68
30	812.61	95.56	24.36
31	830.83	103.81	26.04
32	848.80	112.59	27.72
33	866.51	121.90	29.40
34	883.93	131.72	31.09
35	901.06	142.04	32.77
36	917.88	152.87	34.45
37	934.37	164.18	36.13
38	950.52	175.97	37.81
39	955.16	179.57	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.427

X-CENTER = 545.86
 Y-CENTER = 420.81
 RADIUS = 382.44

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	331.63	104.00	-32.57
2	348.49	93.23	-29.57
3	365.88	83.36	-26.57
4	383.77	74.42	-23.58
5	402.10	66.42	-20.58
6	420.82	59.39	-17.58
7	439.89	53.34	-14.59
8	459.24	48.31	-11.59
9	478.84	44.29	-8.59
10	498.61	41.30	-5.60
11	518.52	39.35	-2.60
12	538.50	38.44	.40
13	558.50	38.58	3.39
14	578.46	39.76	6.39
15	598.34	41.99	9.39
16	618.07	45.25	12.38
17	637.60	49.54	15.38
18	656.89	54.84	18.38
19	675.87	61.15	21.37
20	694.49	68.43	24.37
21	712.71	76.69	27.37
22	730.47	85.88	30.36
23	747.73	95.99	33.36
24	764.43	106.99	36.36
25	780.54	118.84	39.35
26	796.01	131.52	42.35
27	810.79	145.00	45.35
28	824.84	159.23	48.34
29	838.14	174.17	51.34
30	841.02	177.77	

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Roy F. Weston, Inc.
 West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 1.445

X-CENTER = 541.98
 Y-CENTER = 745.76
 RADIUS = 705.06

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-23.65
2	268.32	95.98	-22.03
3	286.86	88.48	-20.40
4	305.61	81.50	-18.77
5	324.54	75.07	-17.15
6	343.65	69.17	-15.52
7	362.92	63.82	-13.90

8	382.34	59.01	-12.27
9	401.88	54.76	-10.65
10	421.54	51.07	-9.02
11	441.29	47.93	-7.40
12	461.12	45.35	-5.77
13	481.02	43.34	-4.15
14	500.97	41.90	-2.52
15	520.95	41.02	-.90
16	540.95	40.70	.73
17	560.95	40.96	2.35
18	580.93	41.78	3.98
19	600.88	43.17	5.60
20	620.78	45.12	7.23
21	640.63	47.64	8.86
22	660.39	50.72	10.48
23	680.05	54.36	12.11
24	699.61	58.55	13.73
25	719.04	63.30	15.36
26	738.32	68.59	16.98
27	757.45	74.44	18.61
28	776.41	80.82	20.23
29	795.17	87.73	21.86
30	813.73	95.18	23.48
31	832.08	103.15	25.11
32	850.19	111.64	26.73
33	868.05	120.63	28.36
34	885.65	130.13	29.98
35	902.97	140.13	31.61
36	920.00	150.61	33.24
37	936.73	161.57	34.86
38	953.14	173.00	36.49
39	962.09	179.62	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 29 COORDINATE POINTS

SAFETY FACTOR = 1.447

X-CENTER = 532.21

Y-CENTER = 432.18

RADIUS = 390.04

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	321.43	104.00	-31.24
2	338.53	93.63	-28.30
3	356.14	84.14	-25.37
4	374.21	75.58	-22.43
5	392.70	67.95	-19.49
6	411.55	61.27	-16.55
7	430.72	55.58	-13.61
8	450.16	50.87	-10.67
9	469.81	47.16	-7.74
10	489.63	44.47	-4.80
11	509.56	42.80	-1.86
12	529.55	42.15	1.08
13	549.55	42.53	4.02

14	569.50	43.93	6.96
15	589.35	46.35	9.89
16	609.05	49.79	12.83
17	628.55	54.23	15.77
18	647.80	59.66	18.71
19	666.75	66.08	21.65
20	685.33	73.46	24.58
21	703.52	81.78	27.52
22	721.26	91.02	30.46
23	738.50	101.16	33.40
24	755.19	112.17	36.34
25	771.31	124.02	39.28
26	786.79	136.68	42.21
27	801.60	150.12	45.15
28	815.70	164.30	48.09
29	826.27	176.07	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 37 COORDINATE POINTS

SAFETY FACTOR = 1.460

X-CENTER = 540.61

Y-CENTER = 693.64

RADIUS = 648.61

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	270.41	104.00	-23.74
2	288.72	95.95	-21.97
3	307.26	88.47	-20.20
4	326.03	81.56	-18.44
5	345.01	75.24	-16.67
6	364.17	69.50	-14.90
7	383.49	64.36	-13.14
8	402.97	59.81	-11.37
9	422.58	55.87	-9.60
10	442.30	52.53	-7.83
11	462.11	49.81	-6.07
12	482.00	47.69	-4.30
13	501.94	46.19	-2.53
14	521.92	45.31	-.77
15	541.92	45.04	1.00
16	561.92	45.39	2.77
17	581.90	46.35	4.53
18	601.83	47.94	6.30
19	621.71	50.13	8.07
20	641.51	52.94	9.83
21	661.22	56.35	11.60
22	680.81	60.37	13.37
23	700.27	65.00	15.13
24	719.58	70.22	16.90
25	738.71	76.03	18.67
26	757.66	82.44	20.43
27	776.40	89.42	22.20
28	794.92	96.98	23.97
29	813.19	105.10	25.74

30	831.21	113.79	27.50
31	848.95	123.02	29.27
32	866.40	132.80	31.04
33	883.53	143.11	32.80
34	900.35	153.95	34.57
35	916.81	165.29	36.34
36	932.93	177.14	38.10
37	936.02	179.57	

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Roy F. Weston, Inc.
West Chester, PA

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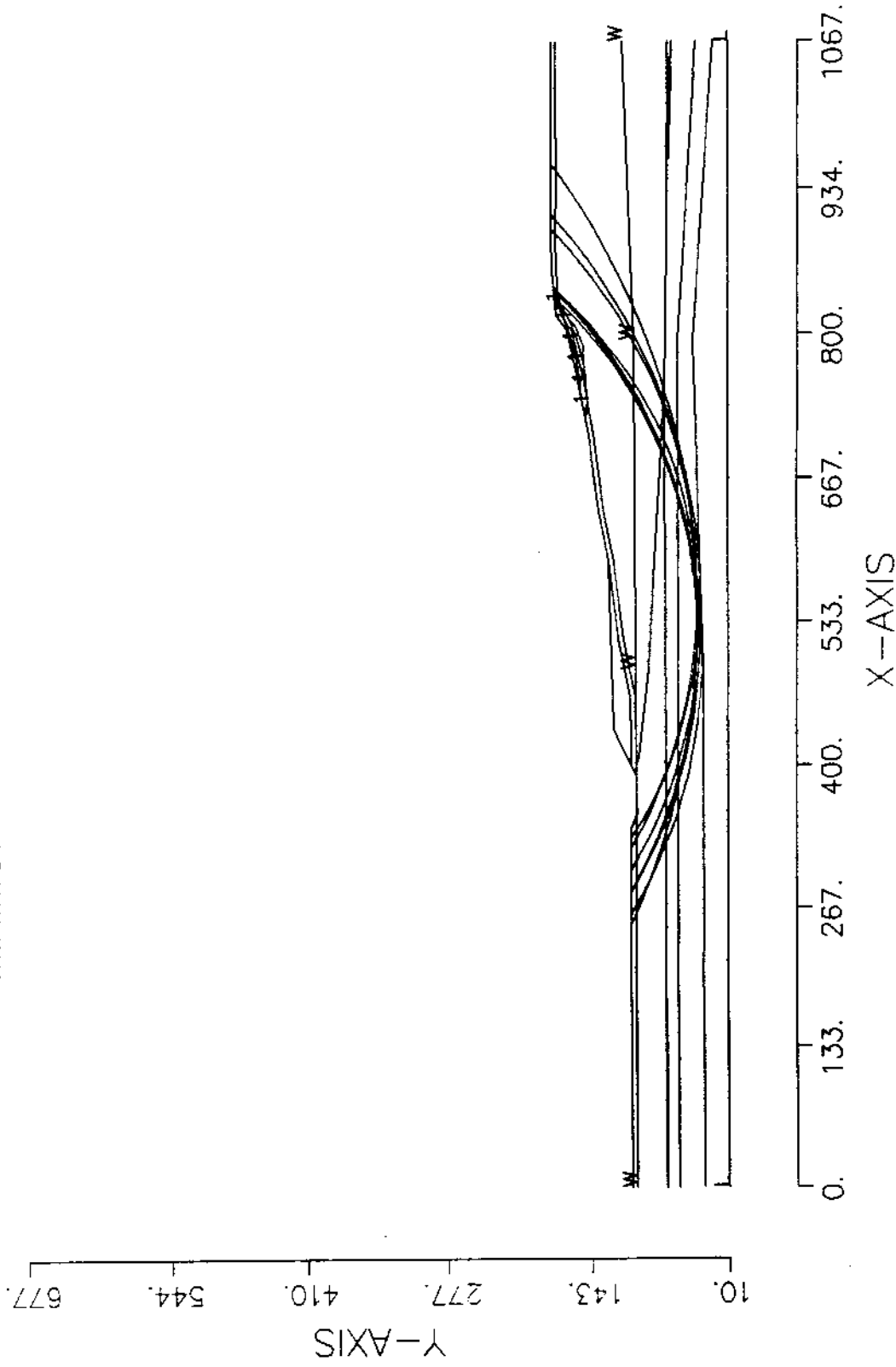
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Roy F. Weston, Inc.
West Chester, PA

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAI
NED ANALYSIS) SLOPE BUTTRESS 17C
500SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.989



PROFIL

CT LANDFILL SECTION 3-3 FINAL TOPO (DRAINED ANALYSIS) SLOPE BUTTRESS 17C

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 794. 70. 914. 69. 4
 914. 69. 1067. 68. 3
 0. 70. 489. 70.5 4
 489. 70.5 760. 71.5 4
 914. 69. 1067. 64. 4
 0. 59. 794. 59. 5
 794. 59. 1067. 40.5 5
 0. 33. 489. 33. 6
 489. 33. 794. 44. 6
 794. 44. 1067. 24. 6

SOIL

6

125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0.0 28. 0. 0. 1
 80.0 80.0 0.0 23. 0. 0. 1

88.0 88.0 0.0 20. 0. 0. 1
104.0 104.0 0.0 16. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1
WATER
1 0.
4
0. 99.
489. 99.
794. 100.8
1067. 111.
LIMITS
1 1
0. 10. 1067. 10.
CIRCL2
50 10
250. 750. 800. 1000.
20. 20. 0. 0.
END

CL3FUB.DAT

SECTION 3-3 FINAL DRAINED ANALYSIS

1

GEOSLOPE
Version 4.0

Supplied by GEOCOMP Corp.
342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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West Chester, PA



BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	104.00	341.00	104.00	3
2	341.00	104.00	345.00	102.00	3
3	345.00	102.00	350.00	100.00	3
4	350.00	100.00	355.00	98.00	3
5	355.00	98.00	370.00	99.00	3
6	370.00	99.00	390.00	99.00	3
7	390.00	99.00	400.00	104.00	1
8	400.00	104.00	432.00	120.00	1
9	432.00	120.00	590.00	125.00	1
10	590.00	125.00	637.00	135.00	1
11	637.00	135.00	707.00	145.00	1
12	707.00	145.00	760.00	155.00	1
13	760.00	155.00	803.00	165.00	1
14	803.00	165.00	817.00	175.00	1
15	817.00	175.00	843.00	178.00	1
16	843.00	178.00	885.00	180.00	1
17	885.00	180.00	945.00	179.50	1
18	945.00	179.50	1015.00	180.00	1
19	1015.00	180.00	1067.00	180.00	1
20	400.00	104.00	419.00	104.00	1
21	419.00	104.00	464.00	105.00	1
22	464.00	105.00	516.00	115.00	1
23	516.00	115.00	590.00	125.00	1
24	390.00	99.00	400.00	99.00	3
25	400.00	99.00	419.00	99.00	2
26	419.00	99.00	464.00	100.00	2
27	464.00	100.00	516.00	110.00	2
28	516.00	110.00	590.00	120.00	2
29	590.00	120.00	637.00	130.00	2
30	637.00	130.00	707.00	140.00	2
31	707.00	140.00	760.00	150.00	2
32	760.00	150.00	803.00	160.00	2
33	803.00	160.00	817.00	170.00	2
34	817.00	170.00	843.00	174.00	2

35	843.00	174.00	885.00	176.00	2
36	885.00	176.00	945.00	175.50	2
37	945.00	175.50	1015.00	176.00	2
38	1015.00	176.00	1067.00	176.00	2
39	400.00	99.00	408.00	96.00	3
40	408.00	96.00	489.00	87.00	3
41	489.00	87.00	760.00	71.50	3
42	760.00	71.50	794.00	70.00	4
43	794.00	70.00	914.00	69.00	4
44	914.00	69.00	1067.00	68.00	3
45	.00	70.00	489.00	70.50	4
46	489.00	70.50	760.00	71.50	4
47	914.00	69.00	1067.00	64.00	4
48	.00	59.00	794.00	59.00	5
49	794.00	59.00	1067.00	40.50	5
50	.00	33.00	489.00	33.00	6
51	489.00	33.00	794.00	44.00	6
52	794.00	44.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

6 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	.0	23.0	.00	.0	1
4	88.0	88.0	.0	20.0	.00	.0	1
5	104.0	104.0	.0	16.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	10.00	1067.00	10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

500 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 50 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 250.00
AND X = 750.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1000.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

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FAILURE SURFACE # 1 SPECIFIED BY 6 COORDINATE POINTS

SAFETY FACTOR = 1.989

X-CENTER = 726.37
Y-CENTER = 386.99
RADIUS = 236.19

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	739.80	151.19	5.68
2	759.70	153.17	10.54
3	779.36	156.83	15.39
4	798.64	162.13	20.24
5	817.41	169.06	25.10
6	834.38	177.01	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	749.75	19.90	2206.77	.00	.00	2150.44	675.47
2	759.85	.30	66.92	.00	.00	64.31	20.20
3	769.68	19.36	5386.02	.00	.00	5175.98	1625.82
4	789.00	19.28	5457.45	.00	.00	5209.96	1636.50
5	800.82	4.36	847.05	.00	.00	809.09	254.14
6	808.41	10.83	4236.06	.00	.00	4046.23	1270.96
7	815.41	3.17	2120.80	.00	.00	2057.61	549.96
8	817.20	.41	289.15	.00	.00	280.54	74.98
9	819.01	3.20	2100.51	.00	.00	2061.44	550.98
10	827.50	13.77	4183.75	.00	.00	4027.41	1265.05

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 35 COORDINATE POINTS

SAFETY FACTOR = 2.025

X-CENTER = 543.29
Y-CENTER = 572.14
RADIUS = 536.81

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-28.23
2	298.23	94.54	-26.10
3	316.20	85.74	-23.96
4	334.47	77.62	-21.83
5	353.04	70.18	-19.69
6	371.87	63.45	-17.56
7	390.94	57.41	-15.42
8	410.22	52.10	-13.29
9	429.68	47.50	-11.15
10	449.30	43.63	-9.02
11	469.06	40.50	-6.88
12	488.91	38.10	-4.75
13	508.84	36.45	-2.61
14	528.82	35.53	-.48
15	548.82	35.37	1.66
16	568.81	35.95	3.79
17	588.77	37.27	5.93
18	608.66	39.34	8.06
19	628.47	42.14	10.20
20	648.15	45.68	12.33
21	667.69	49.95	14.47
22	687.05	54.95	16.60
23	706.22	60.66	18.74

24	725.16	67.09	20.87
25	743.85	74.21	23.01
26	762.26	82.03	25.14
27	780.36	90.53	27.28
28	798.14	99.69	29.41
29	815.56	109.51	31.55
30	832.61	119.98	33.68
31	849.25	131.07	35.82
32	865.47	142.77	37.95
33	881.24	155.07	40.09
34	896.54	167.95	42.22
35	909.59	179.80	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 2.062

X-CENTER = 505.04

Y-CENTER = 498.74

RADIUS = 464.50

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	260.20	104.00	-30.58
2	277.42	93.83	-28.11
3	295.07	84.40	-25.64
4	313.10	75.75	-23.17
5	331.48	67.88	-20.71
6	350.19	60.81	-18.24
7	369.19	54.55	-15.77
8	388.43	49.11	-13.30
9	407.90	44.51	-10.84
10	427.54	40.75	-8.37
11	447.33	37.84	-5.90
12	467.22	35.78	-3.44
13	487.18	34.58	-.97
14	507.18	34.24	1.50
15	527.17	34.77	3.97
16	547.13	36.15	6.43
17	567.00	38.39	8.90
18	586.76	41.48	11.37
19	606.37	45.43	13.83
20	625.79	50.21	16.30
21	644.98	55.82	18.77
22	663.92	62.26	21.24
23	682.56	69.50	23.70
24	700.87	77.54	26.17
25	718.82	86.36	28.64
26	736.38	95.95	31.11
27	753.50	106.28	33.57
28	770.16	117.34	36.04
29	786.34	129.11	38.51
30	801.99	141.56	40.97
31	817.09	154.67	43.44
32	831.61	168.43	45.91
33	840.62	177.73	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 2.071

X-CENTER = 516.96
Y-CENTER = 488.76
RADIUS = 451.55

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	280.61	104.00	-30.29
2	297.88	93.91	-27.75
3	315.58	84.60	-25.22
4	333.67	76.08	-22.68
5	352.13	68.37	-20.14
6	370.91	61.48	-17.60
7	389.97	55.43	-15.07
8	409.28	50.23	-12.53
9	428.81	45.89	-9.99
10	448.50	42.42	-7.45
11	468.33	39.83	-4.91
12	488.26	38.12	-2.38
13	508.24	37.29	.16
14	528.24	37.35	2.70
15	548.22	38.29	5.24
16	568.14	40.11	7.78
17	587.95	42.82	10.31
18	607.63	46.40	12.85
19	627.13	50.85	15.39
20	646.41	56.16	17.93
21	665.44	62.31	20.47
22	684.18	69.31	23.00
23	702.59	77.12	25.54
24	720.63	85.75	28.08
25	738.28	95.16	30.62
26	755.49	105.35	33.16
27	772.23	116.28	35.69
28	788.48	127.95	38.23
29	804.19	140.33	40.77
30	819.33	153.39	43.31
31	833.89	167.11	45.85
32	844.53	178.07	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 2.077

X-CENTER = 559.77
Y-CENTER = 511.64
RADIUS = 472.20

POINT	X-SURF	Y-SURF	ALPHA
-------	--------	--------	-------

NO.			(DEG)
1	321.43	104.00	-29.10
2	338.90	94.27	-26.67
3	356.78	85.30	-24.25
4	375.01	77.08	-21.82
5	393.58	69.65	-19.39
6	412.44	63.01	-16.97
7	431.57	57.17	-14.54
8	450.93	52.15	-12.11
9	470.49	47.95	-9.69
10	490.20	44.59	-7.26
11	510.04	42.06	-4.83
12	529.97	40.38	-2.40
13	549.95	39.54	.02
14	569.95	39.55	2.45
15	589.94	40.40	4.88
16	609.86	42.10	7.30
17	629.70	44.64	9.73
18	649.41	48.02	12.16
19	668.96	52.24	14.58
20	688.32	57.27	17.01
21	707.45	63.12	19.44
22	726.31	69.78	21.86
23	744.87	77.23	24.29
24	763.10	85.45	26.72
25	780.96	94.45	29.15
26	798.43	104.19	31.57
27	815.47	114.66	34.00
28	832.05	125.84	36.43
29	848.14	137.72	38.85
30	863.72	150.26	41.28
31	878.75	163.46	43.71
32	893.20	177.28	46.13
33	895.74	179.91	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 31 COORDINATE POINTS

SAFETY FACTOR = 2.121

X-CENTER = 524.01
Y-CENTER = 457.67
RADIUS = 418.10

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	301.02	104.00	-30.86
2	318.19	93.74	-28.12
3	335.83	84.31	-25.38
4	353.90	75.74	-22.64
5	372.36	68.04	-19.90
6	391.16	61.24	-17.16
7	410.27	55.34	-14.42
8	429.64	50.36	-11.67
9	449.23	46.31	-8.93
10	468.99	43.21	-6.19

11	488.87	41.05	-3.45
12	508.83	39.85	-.71
13	528.83	39.60	2.03
14	548.82	40.31	4.77
15	568.75	41.97	7.51
16	588.58	44.59	10.25
17	608.26	48.15	13.00
18	627.75	52.64	15.74
19	647.00	58.07	18.48
20	665.97	64.41	21.22
21	684.61	71.65	23.96
22	702.89	79.77	26.70
23	720.75	88.75	29.44
24	738.17	98.59	32.18
25	755.10	109.24	34.92
26	771.50	120.69	37.67
27	787.33	132.91	40.41
28	802.56	145.87	43.15
29	817.15	159.55	45.89
30	831.07	173.91	48.63
31	833.73	176.93	

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FAILURE SURFACE # 7 SPECIFIED BY 39 COORDINATE POINTS

SAFETY FACTOR = 2.124

X-CENTER = 540.62
Y-CENTER = 720.54
RADIUS = 681.60

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	250.00	104.00	-24.40
2	268.21	95.74	-22.72
3	286.66	88.02	-21.03
4	305.33	80.84	-19.35
5	324.20	74.21	-17.67
6	343.26	68.14	-15.99
7	362.48	62.63	-14.31
8	381.86	57.69	-12.63
9	401.38	53.31	-10.95
10	421.01	49.51	-9.27
11	440.75	46.29	-7.58
12	460.58	43.66	-5.90
13	480.47	41.60	-4.22
14	500.42	40.13	-2.54
15	520.40	39.24	-.86
16	540.40	38.94	.82
17	560.39	39.23	2.50
18	580.38	40.10	4.18
19	600.32	41.56	5.87
20	620.22	43.60	7.55
21	640.04	46.23	9.23
22	659.79	49.44	10.91
23	679.42	53.22	12.59
24	698.94	57.58	14.27

25	718.33	62.51	15.95
26	737.55	68.01	17.64
27	756.61	74.07	19.32
28	775.49	80.69	21.00
29	794.16	87.85	22.68
30	812.61	95.56	24.36
31	830.83	103.81	26.04
32	848.80	112.59	27.72
33	866.51	121.90	29.40
34	883.93	131.72	31.09
35	901.06	142.04	32.77
36	917.88	152.87	34.45
37	934.37	164.18	36.13
38	950.52	175.97	37.81
39	955.16	179.57	

1

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FAILURE SURFACE # 8 SPECIFIED BY 8 COORDINATE POINTS

SAFETY FACTOR = 2.125

X-CENTER = 741.84
Y-CENTER = 304.67
RADIUS = 158.93

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	719.39	147.34	-4.51
2	739.33	145.76	2.70
3	759.30	146.71	9.92
4	779.01	150.15	17.13
5	798.12	156.04	24.35
6	816.34	164.29	31.56
7	833.38	174.76	38.78
8	836.48	177.25	

1

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FAILURE SURFACE # 9 SPECIFIED BY 6 COORDINATE POINTS

SAFETY FACTOR = 2.144

X-CENTER = 774.38
Y-CENTER = 210.10
RADIUS = 61.98

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	750.00	153.11	-13.88
2	769.42	148.32	4.69
3	789.35	149.95	23.26
4	807.72	157.85	41.83
5	822.63	171.19	60.39
6	825.34	175.96	

1

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FAILURE SURFACE #10 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 2.151

X-CENTER = 545.86

Y-CENTER = 420.81

RADIUS = 382.44

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
--------------	--------	--------	----------------

1	331.63	104.00	-32.57
2	348.49	93.23	-29.57
3	365.88	83.36	-26.57
4	383.77	74.42	-23.58
5	402.10	66.42	-20.58
6	420.82	59.39	-17.58
7	439.89	53.34	-14.59
8	459.24	48.31	-11.59
9	478.84	44.29	-8.59
10	498.61	41.30	-5.60
11	518.52	39.35	-2.60
12	538.50	38.44	.40
13	558.50	38.58	3.39
14	578.46	39.76	6.39
15	598.34	41.99	9.39
16	618.07	45.25	12.38
17	637.60	49.54	15.38
18	656.89	54.84	18.38
19	675.87	61.15	21.37
20	694.49	68.43	24.37
21	712.71	76.69	27.37
22	730.47	85.88	30.36
23	747.73	95.99	33.36
24	764.43	106.99	36.36
25	780.54	118.84	39.35
26	796.01	131.52	42.35
27	810.79	145.00	45.35
28	824.84	159.23	48.34
29	838.14	174.17	51.34
30	841.02	177.77	

1

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Y A X I S

10.00	143.38	276.75	410.13	543.50	676.88
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X .00 L-***-+-----+-----+-----+-----+

	133.38	+		
		-		
		-		
		-		
		-		
		-		7
A	266.75	+		33
		-		.22
		-		.325
		-		.325*
		-		.325*
		-		.325.*
X	400.13	+		.22.**
		-		.325...*
		-		.32.....
		-		.25...*
		-		..*5.**W.
		-		..2.....*
I	533.50	+		.2.....
		-		..2.....
		-		..26.....
		-		..23.....*
		-		..23.....
		-		..26.....*
S	666.88	+		..23.....
		-		..236.....
		-		..233...*
		-		..2236..81
		-		*53...*
		-		72.3391
	800.25	+		..**..7W.03**
		-		7225.3*.
		-		725.**
		-		7.25..
		-		7.2**
		-		*.....77.2
	933.63	+		7.
		-		**
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	1067.00	L** *	W	**

**RE-EVALUATION OF INITIAL SLOPE
STABILITY ANALYSIS**

MARCH 9, 1993

Inter-Office Memorandum



TO: George Suttie (Valhalla, NY Office)

cc: Eric Stahl
Jamie Coffman

WLD 3/9/93 JW 3.9.93
FROM: William L. Deutsch, Ph.D., P.E., and
Joseph Wartman
PROJECT: Clarkstown Sanitary Landfill Closure
SUBJECT: Reevaluation of Initial Slope Stability
Analysis

DATE: 03/09/93

W.O. NO.: 03228-010-001-9989

ACTION:

INTRODUCTION

The geotechnical study reported herein presents the results of a reevaluation of the initial slope stability analysis which was completed by WESTON in September 1991 in conjunction with the planned closure of the Clarkstown Sanitary Landfill in Clarkstown, New York. This closure will consist of capping of the landfill with up to 5 ft of cover soil as required by NYSDEC Municipal Solid Waste (MSW) regulations. The weight of this final cover system will surcharge the existing waste mass as well as underlying foundation soil layers. This surcharge loading may reduce the Factor of Safety (FS) values against slope instability which presently exist at critical slope sections of the landfill. WESTON's September 1991 report evaluated these FS values using a Method of Slices slope stability computer program at three critical cross section locations under both undrained (short-term) and drained (long-term) soil and waste shear strength conditions. The effects of a design earthquake event were also evaluated for the long-term stability condition. Based on a review of this report by the NYSDEC, additional stability analyses were requested by this agency for the case of undrained shear strength conditions in the foundation soils in combination with drained shear strength conditions in the waste mass. This latter study was documented in a report dated 13 March 1992.

Based on these two studies, it was concluded that inadequate FS values exist in the vicinity of cross sections 3-3 (north side of landfill) and 4-4 (east side of landfill) under the three soil and waste shear strength and seismic scenarios shown in Table 1. WESTON was subsequently requested to recommend measures which would increase these FS values to acceptable levels. In this regard, an additional slope stability analysis was completed which investigated the potential use of an earthen toe of slope buttressing berm for this purpose. The results of this analysis are documented in a second report dated 13 March 1992. In summary, this analysis indicated that toe of slope buttressing could be used to increase the FS values to an acceptable level. However, the economics of constructing this berm were determined to be unacceptable to the NYSDEC. Therefore, WESTON was requested to reevaluate the initial slope stability

Table 1

Cross Section Analyzed	Soil Shear Strength Conditions	MSW Shear Strength Conditions	Seismic Effects	Calculated Min. F.S.	Required Min. FS
3-3	Undrained	Undrained	No	1.10	1.3
3-3	Undrained	Drained	No	1.10	1.3
4-4	Undrained	Drained	No	1.06	1.3

Note: All three cases are pertinent for the final graded (i.e., capped) landfill condition consisting of 5 feet of soil cover over the entire landfill surface.

analysis to determine if a less conservative approach to this analysis could be utilized. At a meeting held at the landfill site on 7 December 1992, WESTON suggested that an acceptable approach to a reanalysis of the stability condition of cross sections 3-3 and 4-4 would be to vertically partition each of the fine-grained foundation soil layers into three sublayers. The first sublayer would extend outward from the toe of slope of the landfill. The second sublayer would extend from the toe of slope to the top of slope of the landfill. The third sublayer would extend inward from the top of slope of the landfill at which location the landfill height is approximately uniform. Different undrained soil shear strength values would then be assigned to these different sublayers. In this regard, it is noted that the laboratory shear strength testing program which measured the undrained shear strength parameters for the initial slope stability study were determined from test borings and Shelby tube soil sampling completed outside of the toe of slope of the landfill. Therefore, these parameters would be appropriate for the first sublayer, but would be conservative estimates of undrained shear strength for the second and third sublayers where the foundation soils would be expected to be of higher shear strength due to the consolidation effects from the overlying waste mass. Since, at the time of this reanalysis, Shelby tube samples of the foundation soils beneath the landfill mass were not available for additional undrained laboratory shear strength testing, an empirical relationship which correlated undrained shear strength to effective vertical overburden pressure and plasticity index was used to determine these parameters for sublayers 2 and 3 of the fine-grained foundation soil layers. Full details of this approach and the results of the reevaluation of the stability condition of the Clarkstown Sanitary Landfill are discussed in the remaining sections of this report.

SUBSURFACE STRATIGRAPHY

The subsurface stratigraphic conditions modelled by this analysis remain unchanged as compared to the initial slope stability analysis for the landfill, with the exception of the fine-grained organic silt and varved clay layers which exist beneath the landfill, which, as discussed above, were modelled as being vertically subdivided at the toe and top of slope of the landfill as shown in Figure 1.

SOIL PROPERTY INPUT DATA

The internal friction angle, cohesion, and unit weight values for the MSW, glacial outwash (till), and peat strata remain unchanged from the initial analysis. The internal friction angle and unit weight values for the organic silt and varved clay strata also remain unchanged from the initial analysis, however, the undrained cohesion shear strength values for these soils have been revised for this analysis to model the effects of consolidation of these fine-grained layers resulting from the surcharge loading imposed by the overlying landfill mass. In particular, the undrained cohesion shear strength values for the partitioned sublayers of the organic silt and varved clay strata that extend beyond the toe of the landfill slope (i.e., sublayer 1) were based on the results of unconsolidated-undrained (UU) triaxial compression tests which were completed on undisturbed Shelby tube samples of these soils. These samples were obtained from locations near the toe of the landfill sideslope during the initial subsurface investigation program that was completed by WESTON between July 1990 and February 1991. As in the

LEGEND

- 1 FINAL COVER SOIL
- 2 MUNICIPAL SOLID WASTE (MSW)
- 3 PEAT
- 4 ORGANIC SILT
- 5 ORGANIC SILT (UNDER SURCHARGE OF LANDFILL SIDESLOPE)
- 6 ORGANIC SILT (UNDER SURCHARGE OF FULL LANDFILL HEIGHT)
- 7 VARVED CLAY
- 8 VARVED CLAY (UNDER SURCHARGE OF LANDFILL SIDESLOPE)
- 9 VARVED CLAY (UNDER SURCHARGE OF FULL LANDFILL HEIGHT)
- 10 OUTWASH

NOTES: 1. THIS CONCEPTUAL SUBSURFACE CROSS-SECTION IS PROVIDED TO ILLUSTRATE THE STRATA OF ORGANIC SILT AND VARVED CLAY AS SUBDIVIDED TO MODEL SURCHARGE EFFECTS IMPOSED BY THE VARYING LANDFILL LOADING.

2. THE SUBSURFACE CONDITIONS DEPICTED ON THIS FIGURE ARE GENERALIZED AND ARE NOT INTENDED TO REFLECT THE ACTUAL SUBSURFACE CONDITIONS AT CROSS-SECTIONS 3-3 AND 4-4.

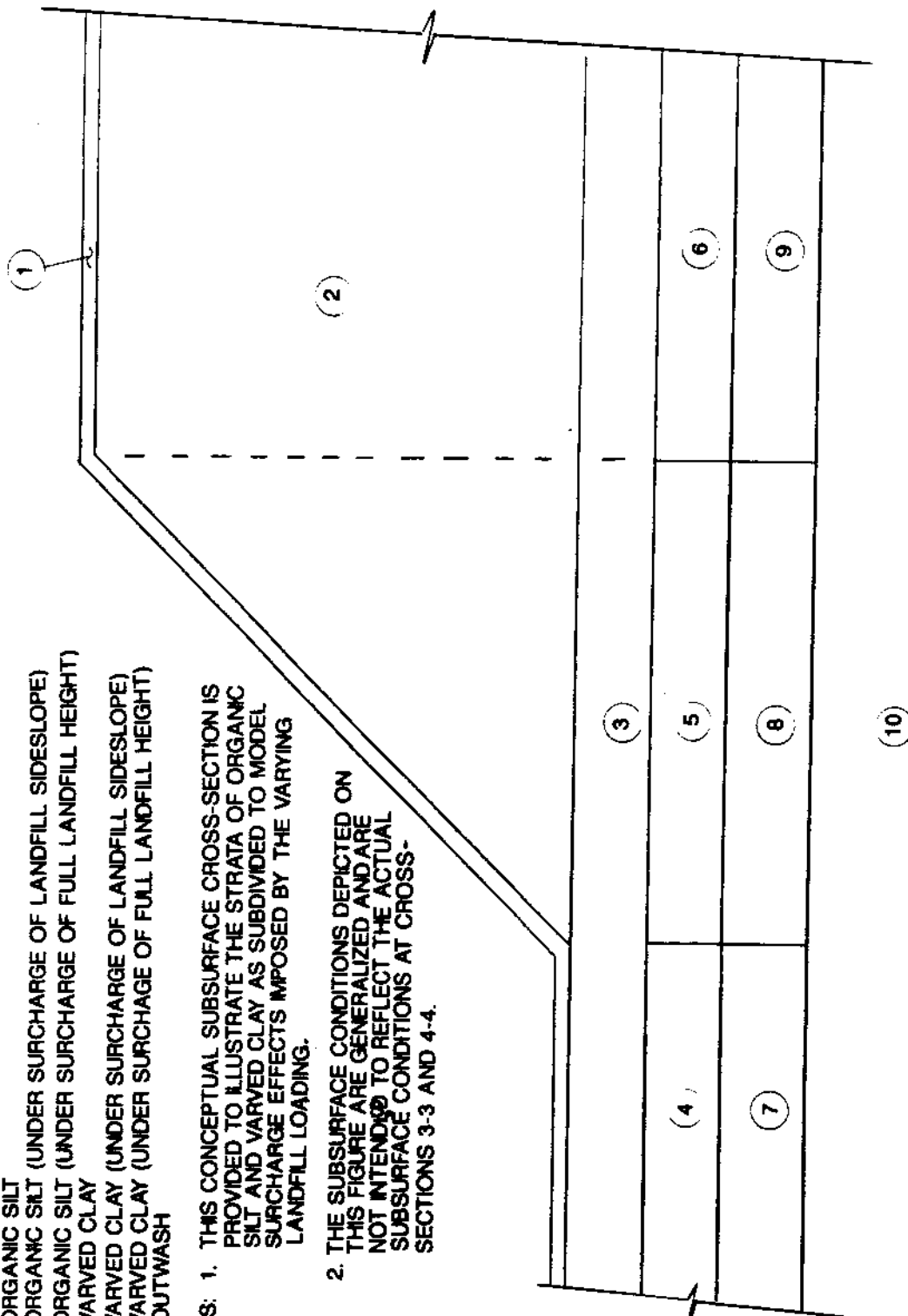


FIGURE 1

CONCEPTUAL SUBSURFACE
CROSS-SECTION

ROY F. WESTON, INC.



DRAWN J. WARTMAN	DATE 3-5-93	DES. ENG.	DATE	W. O. NO.
CHECKED		APPROVED		DWG. NO.

initial analysis, the undrained cohesion value corresponding to the smallest of the three Mohr's circles generated from each of these UU tests has been conservatively assigned to the organic silt and varved clay sublayers that lie outside the toe of the landfill sideslope.

It was assumed in the initial analysis that the undrained cohesive shear strength of the soil within the organic silt and varved clay layers was constant throughout the full areal extent of these layers. That is, the undrained cohesive shear strength of these layers at the toe of the landfill slope, as determined by the UU test results, was assumed to be representative of the undrained cohesive shear strength of these materials under the landfill mass. Hence, in the initial analysis, the strength gain resulting from consolidation of these soils under the landfill loading was conservatively neglected. In this analysis, a more realistic estimate of the undrained cohesive shear strength of the organic silt and varved clay layers under the full height of the landfill mass (i.e., sublayer 3) was calculated using the following empirical correlation¹:

$$\frac{s_u}{\bar{p}} = 0.11 + 0.0037 I_p$$

where:

$s_u = c_u$ = undrained cohesion (psf).

$\bar{p}$ = Vertical effective stress at the midheight of the respective soil stratum (psf).

I_p = Plasticity index.

The plasticity index values used in this equation were determined by computing the average plasticity indices measured on representative soil samples obtained from borings near the cross sections of concern during the laboratory physical property testing program completed as part of the initial investigation. The vertical effective stress was calculated based on the assumed soil and waste unit weights used in the original analysis and the thicknesses of these materials as encountered during test borings which were located closest to Cross Sections 3-3 and 4-4 (see Figure 2 for locations of these cross sections). The undrained cohesion value for the sublayers of the organic silt and varved clay strata which underlie the landfill sideslope (i.e., sublayer 2) was determined by taking the arithmetic average of the respective undrained cohesion values of sublayers 1 and 3 for each respective soil layer. A summary of the physical property and shear strength input data is presented in Table 2.

¹Bowles, Joseph E. 1979. *Physical and Geotechnical Properties of Soils*. McGraw Hill, New York.

Table 2

Physical Property and Shear Strength Input Data

Strata	γ_T (pcf)	Section 3-3, Undrained		Section 4-4, Undrained	
		c_u (psf)	ϕ_u (°)	c_u (psf)	ϕ_u (°)
Organic silt (beyond toe of sideslope)	88	820	0	820	0
Organic silt (between toe and top of sideslope)	88	864	0	933	0
Organic silt (inside top of sideslope)	88	908	0	1,047	0
Varved clay (beyond toe of sideslope)	104	380	0	380	0
Varved clay (between toe and top of sideslope)	104	649	0	705	0
Varved clay (inside top of sideslope)	104	917	0	1,030	0

OTHER PERTINENT INPUT DATA

Groundwater elevation and seismic coefficient input data remain unchanged from the initial slope stability analysis. However, unlike the initial analysis, which considered both existing and final capped conditions, this reanalysis of the stability condition of the landfill only considers the case of the landfill at anticipated final closure conditions (i.e., with a 5-foot-thick soil cap in place).

RESULTS

The results of the slope stability analysis are presented in Table 3. These results are presented in terms of the minimum calculated FS values tabulated as a function of the cross section analyzed, and the undrained and drained soil/waste shear strength conditions. The calculated FS values are also compared in Table 3 to the minimum recommended FS value for short term slope stability analyses per conventional Geotechnical Engineering practice. This minimum recommended value has been established at a level well above the theoretical incipient failure condition ($FS = 1.0$) to account for variations in subsurface stratigraphy and groundwater conditions, soil nonhomogeneity and anisotropy, and variations in soil/waste shear strength, which invariably exist between actual field conditions and those assumed in a stability analysis. The computer output presented in Attachment I also lists the calculated minimum FS values and illustrates, on plotted cross sections of the slopes, the critical circular arc failure surfaces to which these minimum FS values apply.

In brief summary, the results of this slope stability analysis may be stated as follows:

- I. **Section 3-3** — The calculated minimum FS values for the final graded (i.e., capped) scenario for cross section 3-3, utilizing the calculated undrained cohesive shear strength values presented in Table 2 for the two fine-grained foundation soil layers, indicate improved FS values from those previously calculated for this cross section as shown in Table 1. The calculated FS values for the undrained soil shear strength condition in combination with undrained and drained MSW shear strength conditions are 1.29 and 1.30, respectively. These calculated FS values are marginally acceptable when compared to the recommended minimum FS value of 1.3 for undrained (short term) slope stability analyses.
- II. **Section 4-4** — The calculated minimum FS value for the final graded (i.e., capped) scenario for cross section 4-4 using the undrained soil shear strength values presented in Table 2 in combination with drained MSW shear strength parameters also indicates an improved calculated minimum FS value from that previously determined for this cross section as shown in Table 1. These results indicate a calculated FS value of 1.27, which is marginally acceptable with respect to the recommended minimum value of 1.3.

It must be noted that even though two of the calculated minimum FS values are slightly below the minimum recommended value of 1.3, these values do represent a theoretically stable mass with respect to the theoretical incipient failure condition (i.e., $FS = 1.0$).



Table 3

Summary of Slop Stability Results

Cross-Section Analyzed	Soil Shear Strength Conditions	MSW Shear Strength Conditions	Calculated ² Min F.S.	Recommended ³ Min. F.S.	Comments
3-3, Final ¹	Undrained	Undrained	1.29	1.3	Marginal
3-3, Final	Undrained	Drained	1.30	1.3	OK
4-4, Final	Undrained	Drained	1.27	1.3	Marginal

¹Final: Five-foot-thick final cover system assumed to be in-place for analysis.

²Calculated values rounded to the nearest hundredth.

³Recommended minimum Factor of Safety value for short term (i.e., undrained) slope stability analyses as proposed in the *Federal Register*.



CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this reevaluation of the final capped stability condition of the Clarkstown Sanitary Landfill, the following conclusions and recommendations were developed:

1. The unacceptable calculated minimum Factor of Safety values documented in WESTON's September 1991 and March 1992 reports were increased upon reanalysis to marginally acceptable levels. This was accomplished by accounting for strength gain in that portion of the two fine grained foundation soil layers which underlies the landfill mass and results from consolidation of these materials from the weight of the overlying waste.
2. The strength gain was quantified using an empirically derived relationship between undrained cohesion, vertical effective overburden pressure and plasticity index that is reasonably accurate for most fine grained, cohesive soils.
3. Because the Factor of Safety values were only marginally acceptable, WESTON cannot, at this point in the reevaluation process, conclude that the landfill can be safely capped without the need for the toe buttressing berm or other similar stabilizing measures to safeguard against slope instability. Instead, WESTON believes it is necessary to actually measure the undrained shear strength of the two foundation soil layers of concern in the laboratory from Shelby tube samples of these soil layers. These Shelby tubes should be obtained from test borings drilled atop the landfill mass near the cross section 3-3 and 4-4 locations. By mobilizing a drill rig on top of the landfill (i.e., at least 100 feet back from the top of slope), the borings would penetrate, and therefore permit sampling of sublayer 3 of both the organic silt and varved clay strata. The recovered Shelby tubes should subsequently be tested for undrained shear strength in unconsolidated undrained triaxial compression tests. Measured values of c_u from these tests for both foundation soil strata of concern should then be input into the existing computer input file (as well as sublayer 2 values which would be directly calculated from these measured values) with new Factor of Safety values against slope instability then determined. If these values exceed the minimum required value of 1.3, WESTON could then conclude that the landfill could be safely capped at all locations without need for a toe buttressing berm or similar stabilizing measures.

Should you have any questions about the contents of this technical memo, please call.



ATTACHMENT I

GEOSLOPE COMPUTER INPUT AND OUTPUT DATA

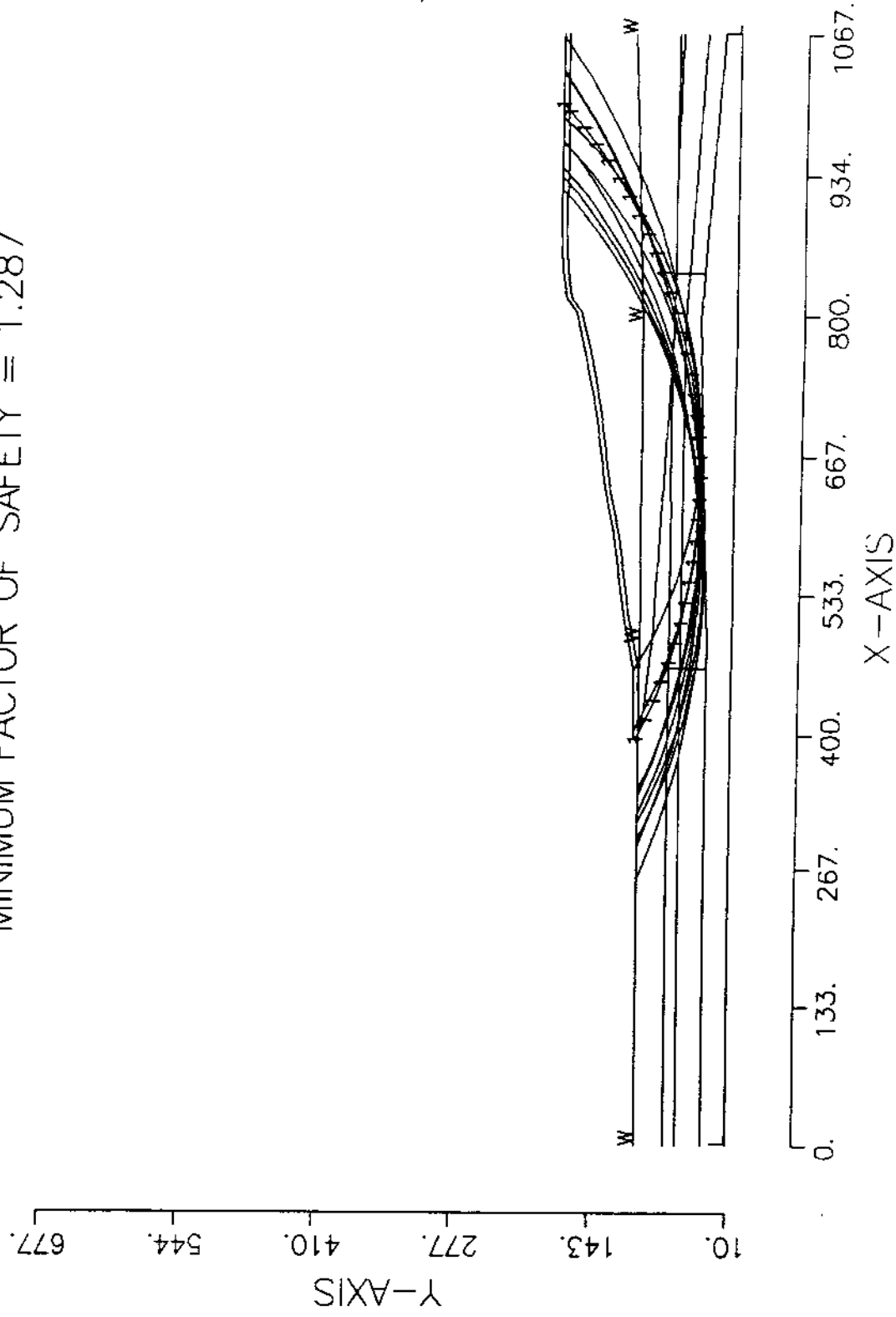
Section 3-3, Final Grades, Undrained Soil, Undrained MSW

Section 3-3, Final Grades, Undrained Soil, Drained MSW

Section 4-4, Final Grades, Undrained Soil, Drained MSW

Roy F. Weston, Inc.
West Chester, PA

CLARKSTOWN LANDFILL SECT. 3-3, FINAL
GRADES, UNDRAINED SOIL, UNDRAINED MSW
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.287



PROFIL

CLARKSTOWN LANDFILL SECT. 3-3, FINAL

GRADES, UNDRAINED SOIL, UNDRAINED MSW

55 16

0. 99. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1
390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 7
794. 70. 840.2 69.5 7
840.2 69.5 914. 69. 8
914. 69. 1067. 68. 3
0. 70. 463.9 70. 4
463.9 70. 489. 70.5 7
489. 70.5 760. 71.5 7
914. 69. 1067. 64. 8
0. 59. 463.8 59. 5
463.8 59. 463.9 70. 7
463.8 59. 794. 59. 9
794. 59. 840.1 56. 9
840.1 56. 840.2 69.5 8
840.1 56. 1067. 40.5 10
0. 33. 463.7 33. 6
463.7 33. 463.8 59. 9
463.7 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 840. 41. 6
840. 41. 840.1 56. 10
840. 41. 1067. 24. 6

SOIL

10

125.0 125.0 0. 32. 0. 0. 1
80.0 80.0 1750.0 0. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1
88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

88.0 88.0 864. 0. 0. 0. 1
88.0 88.0 908.0 0. 0. 0. 1
104.0 104.0 649.0 0. 0. 0. 1
104.0 104.0 917.0 0. 0. 0. 1

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

80 10

0. 650. 800. 1067.

20. 20. 0. 0.

END

CL3FUA

GEOSLOPE
Version 4.0

Supplied by GEOCOMP Corp.
342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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West Chester, PA

Roy F. Weston, Inc.
West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN LANDFILL SECT. 3-3, FINAL
GRADES, UNDRAINED SOIL, UNDRAINED MSW

BOUNDARY COORDINATES

16 TOP BOUNDARIES
55 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	390.00	99.00	3
2	390.00	99.00	400.00	104.00	1
3	400.00	104.00	419.00	104.00	1
4	419.00	104.00	464.00	105.00	1
5	464.00	105.00	516.00	115.00	1
6	516.00	115.00	590.00	125.00	1
7	590.00	125.00	637.00	135.00	1
8	637.00	135.00	707.00	145.00	1
9	707.00	145.00	760.00	155.00	1
10	760.00	155.00	803.00	165.00	1
11	803.00	165.00	817.00	175.00	1
12	817.00	175.00	843.00	179.00	1
13	843.00	179.00	885.00	181.00	1
14	885.00	181.00	945.00	180.50	1
15	945.00	180.50	1015.00	181.00	1
16	1015.00	181.00	1067.00	181.00	1
17	390.00	99.00	400.00	99.00	3
18	400.00	99.00	419.00	99.00	2
19	419.00	99.00	464.00	100.00	2
20	464.00	100.00	516.00	110.00	2
21	516.00	110.00	590.00	120.00	2
22	590.00	120.00	637.00	130.00	2
23	637.00	130.00	707.00	140.00	2
24	707.00	140.00	760.00	150.00	2
25	760.00	150.00	803.00	160.00	2
26	803.00	160.00	817.00	170.00	2
27	817.00	170.00	843.00	174.00	2
28	843.00	174.00	885.00	176.00	2
29	885.00	176.00	945.00	175.50	2
30	945.00	175.50	1015.00	176.00	2
31	1015.00	176.00	1067.00	176.00	2
32	400.00	99.00	408.00	96.00	3
33	408.00	96.00	489.00	87.00	3
34	489.00	87.00	760.00	71.50	3
35	760.00	71.50	794.00	70.00	7
36	794.00	70.00	840.20	69.50	7
37	840.20	69.50	914.00	69.00	8
38	914.00	69.00	1067.00	68.00	3
39	.00	70.00	463.90	70.00	4
40	463.90	70.00	489.00	70.50	7

41	489.00	70.50	760.00	71.50	7
42	914.00	69.00	1067.00	64.00	8
43	.00	59.00	463.80	59.00	5
44	463.80	59.00	463.90	70.00	7
45	463.80	59.00	794.00	59.00	9
46	794.00	59.00	840.10	56.00	9
47	840.10	56.00	840.20	69.50	8
48	840.10	56.00	1067.00	40.50	10
49	.00	33.00	463.70	33.00	6
50	463.70	33.00	463.80	59.00	9
51	463.70	33.00	489.00	33.00	6
52	489.00	33.00	794.00	44.00	6
53	794.00	44.00	840.00	41.00	6
54	840.00	41.00	840.10	56.00	10
55	840.00	41.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

10 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	1750.0	.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1
7	88.0	88.0	864.0	.0	.00	.0	1
8	88.0	88.0	908.0	.0	.00	.0	1
9	104.0	104.0	649.0	.0	.00	.0	1
10	104.0	104.0	917.0	.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
----------	--------	--------	---------	---------

NO.

1 .00 10.00 1067.00 10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

¹
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.287

X-CENTER = 640.60
Y-CENTER = 577.86
RADIUS = 536.00

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	394.94	101.47	-26.21
2	412.88	92.64	-24.07
3	431.14	84.48	-21.93
4	449.69	77.01	-19.80
5	468.51	70.23	-17.66
6	487.57	64.17	-15.52
7	506.84	58.82	-13.38
8	526.30	54.19	-11.24
9	545.91	50.29	-9.11
10	565.66	47.12	-6.97
11	585.51	44.70	-4.83

12	605.44	43.01	-2.69
13	625.42	42.07	-.55
14	645.42	41.88	1.59
15	665.41	42.43	3.72
16	685.37	43.73	5.86
17	705.27	45.78	8.00
18	725.07	48.56	10.14
19	744.76	52.08	12.28
20	764.30	56.33	14.41
21	783.67	61.31	16.55
22	802.84	67.01	18.69
23	821.79	73.42	20.83
24	840.48	80.53	22.97
25	858.90	88.33	25.10
26	877.01	96.82	27.24
27	894.79	105.97	29.38
28	912.22	115.78	31.52
29	929.27	126.24	33.66
30	945.91	137.32	35.79
31	962.14	149.02	37.93
32	977.91	161.32	40.07
33	993.22	174.19	42.21
34	1000.61	180.90	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	397.44	5.01	1559.48	.00	.00	2284.35	1109.44
2	399.98	.05	30.19	.00	.04	34.22	23.32
3	404.00	8.00	6275.45	.00	1108.86	5988.10	23.32
4	410.44	4.88	5066.52	.00	1752.74	3956.85	23.32
5	415.94	6.12	7609.41	.00	3233.39	5170.61	23.32
6	425.07	12.14	19190.94	.00	9800.02	11357.32	23.32
7	440.42	18.55	39399.26	.00	22785.45	19875.96	23.32
8	456.85	14.31	38021.43	.00	23309.04	17227.91	23.32
9	466.26	4.51	13427.71	.00	8364.65	5946.62	23.32
10	468.72	.42	1294.22	.00	792.29	569.18	23.32
11	478.25	18.64	65210.25	.00	38893.43	33722.13	671.53
12	488.28	1.43	5625.85	.00	3244.94	2870.60	671.53
13	497.59	17.18	73935.59	.00	41901.45	38156.32	671.53
14	506.51	.66	3088.56	.00	1724.89	1576.87	504.43
15	511.42	9.16	44512.00	.00	24326.06	22557.90	504.43
16	521.15	10.30	53822.30	.00	28914.82	27679.62	504.43
17	536.11	19.62	112185.50	.00	58706.35	57679.77	504.43
18	555.79	19.75	124407.30	.00	63259.53	64352.18	504.43
19	575.59	19.85	135097.10	.00	66894.05	70440.91	504.43
20	587.76	4.49	31774.44	.00	15472.26	16607.23	504.43
21	597.72	15.44	113141.30	.00	54132.80	60071.96	504.43
22	615.43	19.98	154730.50	.00	71388.58	83986.88	504.43
23	631.21	11.58	93428.67	.00	41779.55	51709.84	504.43
24	641.21	8.42	69260.42	.00	30462.57	38842.06	504.43
25	655.42	19.99	167215.20	.00	72164.60	94835.42	504.43
26	675.39	19.96	169571.60	.00	71155.89	98117.86	504.43
27	695.32	19.90	170128.00	.00	69217.85	100768.60	504.43
28	706.13	1.73	14840.07	.00	5943.72	8918.01	504.43
29	716.04	18.07	154650.90	.00	60408.96	94467.95	504.43
30	734.91	19.69	167905.30	.00	62564.77	106199.50	504.43
31	752.38	15.24	128591.80	.00	45567.44	84321.25	504.43
32	762.15	4.30	36004.51	.00	12291.81	24072.01	504.43
33	769.49	10.38	86349.88	.00	28756.22	59010.23	504.43
34	779.18	8.99	74182.74	.00	23486.38	51505.55	671.53
35	788.84	10.33	84617.94	.00	25498.10	60627.38	671.53
36	798.42	8.84	71792.13	.00	20304.65	52749.76	671.53
37	802.92	.16	1268.02	.00	352.35	948.65	671.53

38	807.07	8.14	66701.27	.00	17615.64	50846.63	671.53
39	814.07	5.86	49181.07	.00	11867.25	37205.41	1360.16
40	819.39	4.79	40442.95	.00	9192.39	31176.04	1360.16
41	831.14	18.69	154053.00	.00	31468.62	123006.50	1360.16
42	841.74	2.52	20260.23	.00	3673.48	16754.26	1360.16
43	850.95	15.90	123644.40	.00	19353.37	104983.70	1360.16
44	867.95	18.11	131015.50	.00	13714.09	118223.10	1360.16
45	881.00	7.99	54190.95	.00	2903.78	51752.17	1360.16
46	888.42	6.84	44397.23	.00	784.85	43760.69	1360.16
47	893.32	2.94	18500.42	.00	.00	18488.98	1360.16
48	903.50	17.43	101471.50	.00	.00	101132.90	1360.16
49	920.74	17.05	85251.31	.00	.00	83322.59	1360.16
50	937.13	15.73	65329.41	.00	.00	61366.66	1360.16
51	945.46	.91	3382.47	.00	.00	3070.00	1360.16
52	954.02	16.22	52177.23	.00	.00	44711.75	1360.16
53	970.02	15.77	35742.64	.00	.00	24114.42	1360.16
54	985.56	15.31	19405.68	.00	.00	2475.11	1360.16
55	994.13	1.84	1270.32	.00	.00	-1346.22	1360.16
56	997.83	5.56	1736.38	.00	.00	1627.36	790.36

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.305

X-CENTER = 554.69
Y-CENTER = 601.47
RADIUS = 565.06

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	296.20	99.00	-26.21
2	314.15	90.17	-24.18
3	332.39	81.97	-22.15
4	350.92	74.43	-20.12
5	369.69	67.55	-18.10
6	388.71	61.34	-16.07
7	407.92	55.80	-14.04
8	427.33	50.95	-12.01
9	446.89	46.79	-9.98
10	466.59	43.32	-7.96
11	486.39	40.55	-5.93
12	506.29	38.49	-3.90
13	526.24	37.13	-1.87
14	546.23	36.47	.16
15	566.23	36.53	2.18
16	586.21	37.29	4.21
17	606.16	38.76	6.24
18	626.04	40.93	8.27
19	645.83	43.81	10.30
20	665.51	47.38	12.32
21	685.05	51.65	14.35
22	704.43	56.61	16.38
23	723.62	62.25	18.41
24	742.59	68.56	20.44
25	761.33	75.55	22.46
26	779.82	83.19	24.49
27	798.02	91.48	26.52
28	815.91	100.41	28.55
29	833.48	109.97	30.58
30	850.70	120.14	32.60
31	867.55	130.92	34.63
32	884.00	142.28	36.66

33	900.05	154.22	38.69
34	915.66	166.73	40.72
35	930.82	179.77	42.74
36	931.73	180.61	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.318

X-CENTER = 559.26

Y-CENTER = 564.87

RADIUS = 527.11

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	312.66	99.00	-26.81
2	330.51	89.98	-24.63
3	348.69	81.64	-22.46
4	367.17	74.00	-20.28
5	385.93	67.07	-18.11
6	404.94	60.85	-15.94
7	424.17	55.36	-13.76
8	443.60	50.61	-11.59
9	463.19	46.59	-9.41
10	482.92	43.32	-7.24
11	502.76	40.80	-5.07
12	522.68	39.03	-2.89
13	542.66	38.02	-.72
14	562.66	37.77	1.46
15	582.65	38.28	3.63
16	602.61	39.55	5.80
17	622.51	41.57	7.98
18	642.31	44.34	10.15
19	662.00	47.87	12.33
20	681.54	52.14	14.50
21	700.90	57.15	16.68
22	720.06	62.89	18.85
23	738.99	69.35	21.02
24	757.66	76.52	23.20
25	776.04	84.40	25.37
26	794.11	92.97	27.55
27	811.84	102.22	29.72
28	829.21	112.14	31.89
29	846.19	122.70	34.07
30	862.76	133.91	36.24
31	878.89	145.73	38.42
32	894.56	158.16	40.59
33	909.75	171.17	42.76
34	920.06	180.71	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 32 COORDINATE POINTS

SAFETY FACTOR = 1.319

X-CENTER = 633.81

Y-CENTER = 506.75

RADIUS = 464.11

POINT	X-SURF	Y-SURF	ALPHA
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NO.			(DEG)
1	403.16	104.00	-28.56
2	420.73	94.44	-26.09
3	438.69	85.64	-23.63
4	457.02	77.63	-21.16
5	475.67	70.41	-18.69
6	494.61	64.00	-16.22
7	513.82	58.41	-13.75
8	533.24	53.66	-11.28
9	552.86	49.75	-8.81
10	572.62	46.69	-6.34
11	592.50	44.48	-3.87
12	612.45	43.13	-1.40
13	632.45	42.64	1.07
14	652.45	43.01	3.54
15	672.41	44.24	6.01
16	692.30	46.34	8.48
17	712.08	49.29	10.94
18	731.71	53.08	13.41
19	751.17	57.72	15.88
20	770.41	63.20	18.35
21	789.39	69.49	20.82
22	808.08	76.60	23.29
23	826.45	84.51	25.76
24	844.46	93.20	28.23
25	862.09	102.66	30.70
26	879.28	112.87	33.17
27	896.02	123.82	35.64
28	912.28	135.47	38.11
29	928.02	147.81	40.58
30	943.21	160.82	43.05
31	957.82	174.47	45.52
32	963.87	180.63	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 42 COORDINATE POINTS

SAFETY FACTOR = 1.334

X-CENTER = 568.19
Y-CENTER = 850.53
RADIUS = 814.16

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	255.06	99.00	-21.92
2	273.62	91.54	-20.51
3	292.35	84.53	-19.10
4	311.25	77.98	-17.69
5	330.30	71.91	-16.29
6	349.50	66.30	-14.88
7	368.83	61.16	-13.47
8	388.28	56.50	-12.06
9	407.84	52.32	-10.66
10	427.49	48.63	-9.25
11	447.23	45.41	-7.84
12	467.05	42.68	-6.43
13	486.92	40.44	-5.03
14	506.84	38.69	-3.62
15	526.80	37.43	-2.21
16	546.79	36.66	-.80
17	566.79	36.38	.60

18	586.79	36.59	2.01
19	606.77	37.29	3.42
20	626.74	38.48	4.83
21	646.67	40.17	6.24
22	666.55	42.34	7.64
23	686.37	45.00	9.05
24	706.12	48.15	10.46
25	725.79	51.78	11.87
26	745.36	55.89	13.27
27	764.83	60.48	14.68
28	784.18	65.55	16.09
29	803.39	71.09	17.50
30	822.47	77.10	18.90
31	841.39	83.58	20.31
32	860.15	90.52	21.72
33	878.73	97.92	23.13
34	897.12	105.78	24.53
35	915.31	114.08	25.94
36	933.30	122.83	27.35
37	951.06	132.02	28.76
38	968.60	141.64	30.16
39	985.89	151.69	31.57
40	1002.93	162.16	32.98
41	1019.71	173.05	34.39
42	1031.33	181.00	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 40 COORDINATE POINTS

SAFETY FACTOR = 1.335

X-CENTER = 627.98
Y-CENTER = 788.11
RADIUS = 747.89

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	337.34	99.00	-22.10
2	355.87	91.48	-20.57
3	374.60	84.45	-19.04
4	393.50	77.92	-17.50
5	412.58	71.91	-15.97
6	431.81	66.41	-14.44
7	451.17	61.42	-12.91
8	470.67	56.95	-11.38
9	490.28	53.01	-9.84
10	509.98	49.59	-8.31
11	529.77	46.69	-6.78
12	549.63	44.33	-5.25
13	569.55	42.50	-3.71
14	589.51	41.21	-2.18
15	609.49	40.45	-.65
16	629.49	40.22	.88
17	649.49	40.53	2.41
18	669.47	41.37	3.95
19	689.42	42.75	5.48
20	709.33	44.66	7.01
21	729.18	47.10	8.54
22	748.96	50.07	10.08
23	768.65	53.57	11.61
24	788.24	57.59	13.14
25	807.72	62.14	14.67
26	827.07	67.20	16.20

27	846.27	72.78	17.74
28	865.32	78.88	19.27
29	884.20	85.48	20.80
30	902.90	92.58	22.33
31	921.40	100.18	23.86
32	939.69	108.27	25.40
33	957.75	116.85	26.93
34	975.58	125.91	28.46
35	993.17	135.44	29.99
36	1010.49	145.44	31.53
37	1027.54	155.89	33.06
38	1044.30	166.80	34.59
39	1060.76	178.16	36.12
40	1064.66	181.00	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.346

X-CENTER = 679.85
Y-CENTER = 452.72
RADIUS = 411.05

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	460.76	104.93	-30.81
2	477.94	94.68	-28.03
3	495.59	85.29	-25.24
4	513.68	76.76	-22.45
5	532.17	69.12	-19.66
6	551.00	62.39	-16.87
7	570.14	56.58	-14.09
8	589.54	51.72	-11.30
9	609.15	47.80	-8.51
10	628.93	44.84	-5.72
11	648.83	42.84	-2.93
12	668.80	41.82	-.15
13	688.80	41.77	2.64
14	708.78	42.69	5.43
15	728.69	44.58	8.22
16	748.49	47.44	11.01
17	768.12	51.26	13.79
18	787.54	56.03	16.58
19	806.71	61.74	19.37
20	825.58	68.37	22.16
21	844.10	75.91	24.95
22	862.24	84.35	27.73
23	879.94	93.66	30.52
24	897.17	103.81	33.31
25	913.88	114.80	36.10
26	930.04	126.58	38.89
27	945.61	139.14	41.67
28	960.55	152.44	44.46
29	974.82	166.44	47.25
30	988.10	180.81	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 36 COORDINATE POINTS

SAFETY FACTOR = 1.347

X-CENTER = 578.68
 Y-CENTER = 651.71
 RADIUS = 609.87

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	320.89	99.00	-24.07
2	339.15	90.84	-22.19
3	357.67	83.29	-20.31
4	376.42	76.35	-18.43
5	395.40	70.03	-16.55
6	414.57	64.33	-14.67
7	433.92	59.27	-12.79
8	453.42	54.84	-10.91
9	473.06	51.05	-9.03
10	492.81	47.91	-7.15
11	512.66	45.42	-5.28
12	532.57	43.58	-3.40
13	552.54	42.40	-1.52
14	572.53	41.87	.36
15	592.53	41.99	2.24
16	612.51	42.78	4.12
17	632.46	44.21	6.00
18	652.35	46.30	7.88
19	672.16	49.04	9.76
20	691.87	52.43	11.64
21	711.46	56.47	13.52
22	730.91	61.14	15.39
23	750.19	66.45	17.27
24	769.29	72.39	19.15
25	788.18	78.95	21.03
26	806.85	86.13	22.91
27	825.27	93.91	24.79
28	843.43	102.30	26.67
29	861.30	111.28	28.55
30	878.87	120.83	30.43
31	896.12	130.96	32.31
32	913.02	141.65	34.18
33	929.56	152.89	36.06
34	945.73	164.66	37.94
35	961.50	176.96	39.82
36	965.93	180.65	

1

Roy F. Weston, Inc.
 West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.348

X-CENTER = 583.50
 Y-CENTER = 574.32
 RADIUS = 531.54

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	345.57	99.00	-25.51
2	363.62	90.39	-23.36
3	381.98	82.46	-21.20
4	400.63	75.22	-19.04
5	419.53	68.70	-16.89
6	438.67	62.89	-14.73
7	458.01	57.80	-12.58

8	477.53	53.45	-10.42
9	497.20	49.83	-8.27
10	516.99	46.95	-6.11
11	536.88	44.82	-3.95
12	556.83	43.45	-1.80
13	576.82	42.82	.36
14	596.82	42.94	2.51
15	616.80	43.82	4.67
16	636.74	45.45	6.83
17	656.60	47.83	8.98
18	676.35	50.95	11.14
19	695.97	54.81	13.29
20	715.44	59.41	15.45
21	734.71	64.74	17.61
22	753.78	70.79	19.76
23	772.60	77.55	21.92
24	791.15	85.02	24.07
25	809.41	93.18	26.23
26	827.36	102.02	28.39
27	844.95	111.53	30.54
28	862.18	121.69	32.70
29	879.01	132.49	34.85
30	895.42	143.92	37.01
31	911.39	155.96	39.17
32	926.89	168.60	41.32
33	940.48	180.54	

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Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 41 COORDINATE POINTS

SAFETY FACTOR = 1.359

X-CENTER = 585.57
Y-CENTER = 820.60
RADIUS = 780.56

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	287.98	99.00	-21.68
2	306.56	91.61	-20.21
3	325.33	84.70	-18.74
4	344.27	78.28	-17.27
5	363.37	72.34	-15.80
6	382.61	66.89	-14.34
7	401.99	61.94	-12.87
8	421.49	57.48	-11.40
9	441.09	53.53	-9.93
10	460.79	50.08	-8.46
11	480.57	47.14	-7.00
12	500.42	44.70	-5.53
13	520.33	42.78	-4.06
14	540.28	41.36	-2.59
15	560.26	40.45	-1.12
16	580.26	40.06	.34
17	600.26	40.18	1.81
18	620.25	40.82	3.28
19	640.21	41.96	4.75
20	660.15	43.62	6.22
21	680.03	45.78	7.69
22	699.85	48.46	9.15
23	719.59	51.64	10.62
24	739.25	55.32	12.09
25	758.81	59.51	13.56

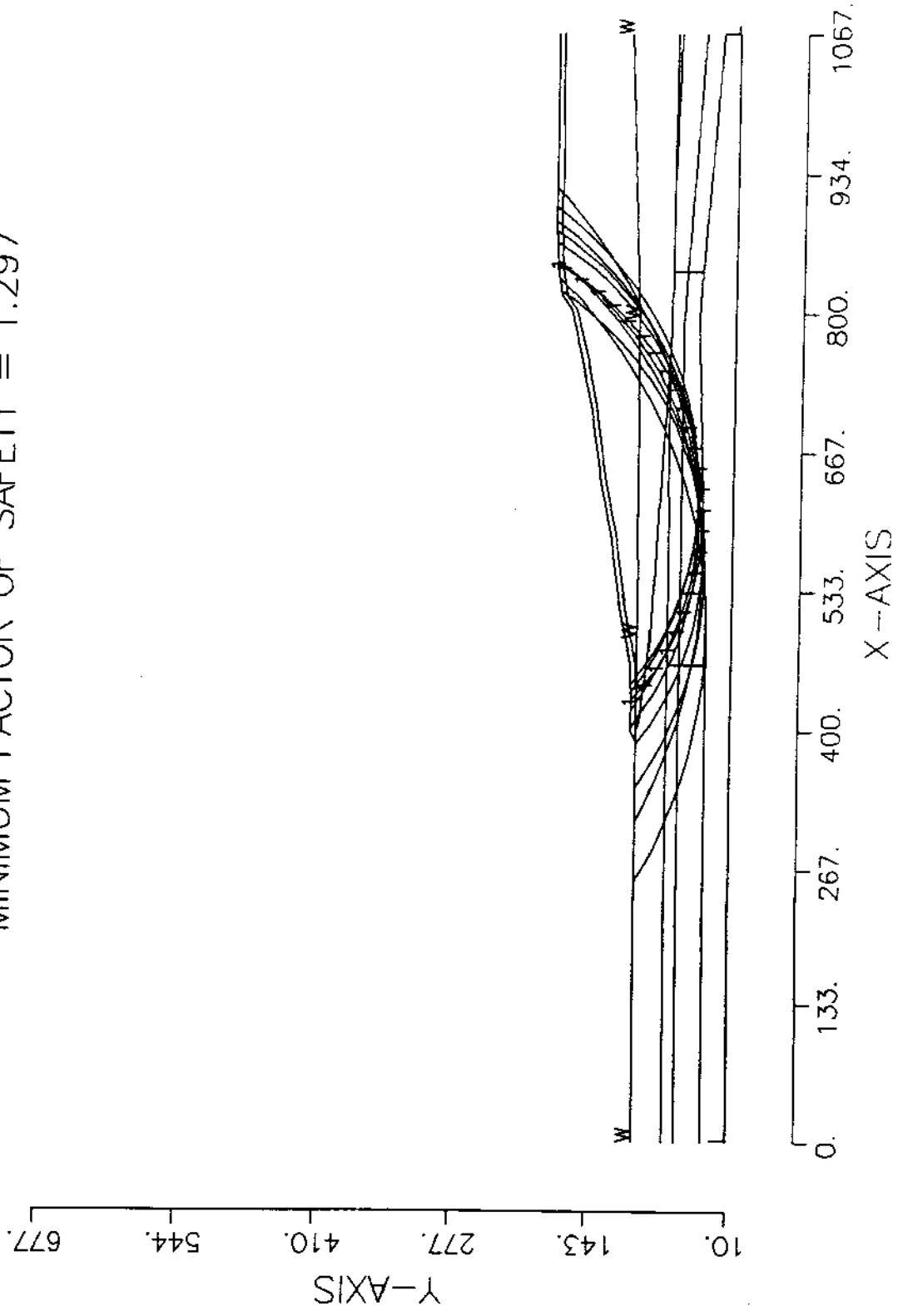
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S	666.88	+..12.....
	-	..61.....
	-	..713.....*
	-	..12.....
	-	..14*.....**
	-	..6123.....
800.25	+	****42W....**
	-	...61423....*.
	-	..***1482....**
	-	...61182.....

```
- ....614422**  
- *.66148923  
933.63 + ...6514492  
- ...6517**  
- ...65177  
- ..66511  
- ...6**  
- ..6.  
1067.00 L** * W **
```

CLARKSTOWN LANDFILL SECT. 3-3, FINAL GRADES, UNDRAINED SOIL, DRAINED MSW 800 SURFACES HAVE BEEN GENERATED 10 MOST CRITICAL OF SURFACES GENERATED MINIMUM FACTOR OF SAFETY = 1.297



PROFIL

CLARKSTOWN LANDFILL SECT. 3-3, FINAL
55 16

GRADES, UNDRAINED SOIL, DRAINED MSW

0. 99. 390. 99. 3
390. 99. 400. 104. 1
400. 104. 419. 104. 1
419. 104. 464. 105. 1
464. 105. 516. 115. 1
516. 115. 590. 125. 1
590. 125. 637. 135. 1
637. 135. 707. 145. 1
707. 145. 760. 155. 1
760. 155. 803. 165. 1
803. 165. 817. 175. 1
817. 175. 843. 179. 1
843. 179. 885. 181. 1
885. 181. 945. 180.5 1
945. 180.5 1015. 181. 1
1015. 181. 1067. 181. 1
390. 99. 400. 99. 3
400. 99. 419. 99. 2
419. 99. 464. 100. 2
464. 100. 516. 110. 2
516. 110. 590. 120. 2
590. 120. 637. 130. 2
637. 130. 707. 140. 2
707. 140. 760. 150. 2
760. 150. 803. 160. 2
803. 160. 817. 170. 2
817. 170. 843. 174. 2
843. 174. 885. 176. 2
885. 176. 945. 175.5 2
945. 175.5 1015. 176. 2
1015. 176. 1067. 176. 2
400. 99. 408. 96. 3
408. 96. 489. 87. 3
489. 87. 760. 71.5 3
760. 71.5 794. 70. 7
794. 70. 840.2 69.5 7
840.2 69.5 914. 69. 8
914. 69. 1067. 68. 3
0. 70. 463.9 70. 4
463.9 70. 489. 70.5 7
489. 70.5 760. 71.5 7
914. 69. 1067. 64. 8
0. 59. 463.8 59. 5
463.8 59. 463.9 70. 7
463.8 59. 794. 59. 9
794. 59. 840.1 56. 9
840.1 56. 840.2 69.5 8
840.1 56. 1067. 40.5 10
0. 33. 463.7 33. 6
463.7 33. 463.8 59. 9
463.7 33. 489. 33. 6
489. 33. 794. 44. 6
794. 44. 840. 41. 6
840. 41. 840.1 56. 10
840. 41. 1067. 24. 6

SOIL

10
125.0 125.0 0. 32. 0. 0. 1
80.0 80.0 0. 28. 0. 0. 1
80.0 80.0 30.0 0. 0. 0. 1
88.0 88.0 820.0 0. 0. 0. 1
104.0 104.0 380.0 0. 0. 0. 1
125.0 125.0 0.0 32. 0. 0. 1

1

88.0 88.0 864. 0. 0. 0. 1
88.0 88.0 908.0 0. 0. 0. 1
104.0 104.0 649.0 0. 0. 0. 1
104.0 104.0 917.0 0. 0. 0. 1

WATER

1 0.

4

0. 99.

489. 99.

794. 100.8

1067. 111.

LIMITS

1 1

0. 10. 1067. 10.

CIRCL2

80 10

0. 650. 800. 1067.

20. 20. 0. 0.

END

CL3FUD2

GEOSLOPE
Version 4.0

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342 Sudbury Rd., Concord, MA. 01742
(617) 369-8304

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West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN LANDFILL SECT. 3-3, FINAL
GRADES, UNDRAINED SOIL, DRAINED MSW

BOUNDARY COORDINATES

16 TOP BOUNDARIES
55 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	99.00	390.00	99.00	3
2	390.00	99.00	400.00	104.00	1
3	400.00	104.00	419.00	104.00	1
4	419.00	104.00	464.00	105.00	1
5	464.00	105.00	516.00	115.00	1
6	516.00	115.00	590.00	125.00	1
7	590.00	125.00	637.00	135.00	1
8	637.00	135.00	707.00	145.00	1
9	707.00	145.00	760.00	155.00	1
10	760.00	155.00	803.00	165.00	1
11	803.00	165.00	817.00	175.00	1
12	817.00	175.00	843.00	179.00	1
13	843.00	179.00	885.00	181.00	1
14	885.00	181.00	945.00	180.50	1
15	945.00	180.50	1015.00	181.00	1
16	1015.00	181.00	1067.00	181.00	1
17	390.00	99.00	400.00	99.00	3
18	400.00	99.00	419.00	99.00	2
19	419.00	99.00	464.00	100.00	2
20	464.00	100.00	516.00	110.00	2
21	516.00	110.00	590.00	120.00	2
22	590.00	120.00	637.00	130.00	2
23	637.00	130.00	707.00	140.00	2
24	707.00	140.00	760.00	150.00	2
25	760.00	150.00	803.00	160.00	2
26	803.00	160.00	817.00	170.00	2
27	817.00	170.00	843.00	174.00	2
28	843.00	174.00	885.00	176.00	2
29	885.00	176.00	945.00	175.50	2
30	945.00	175.50	1015.00	176.00	2
31	1015.00	176.00	1067.00	176.00	2
32	400.00	99.00	408.00	96.00	3
33	408.00	96.00	489.00	87.00	3
34	489.00	87.00	760.00	71.50	3
35	760.00	71.50	794.00	70.00	7
36	794.00	70.00	840.20	69.50	7
37	840.20	69.50	914.00	69.00	8
38	914.00	69.00	1067.00	68.00	3
39	.00	70.00	463.90	70.00	4
40	463.90	70.00	489.00	70.50	7

41	489.00	70.50	760.00	71.50	7
42	914.00	69.00	1067.00	64.00	8
43	.00	59.00	463.80	59.00	5
44	463.80	59.00	463.90	70.00	7
45	463.80	59.00	794.00	59.00	9
46	794.00	59.00	840.10	56.00	9
47	840.10	56.00	840.20	69.50	8
48	840.10	56.00	1067.00	40.50	10
49	.00	33.00	463.70	33.00	6
50	463.70	33.00	463.80	59.00	9
51	463.70	33.00	489.00	33.00	6
52	489.00	33.00	794.00	44.00	6
53	794.00	44.00	840.00	41.00	6
54	840.00	41.00	840.10	56.00	10
55	840.00	41.00	1067.00	24.00	6

ISOTROPIC SOIL PARAMETERS

10 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	820.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1
7	88.0	88.0	864.0	.0	.00	.0	1
8	88.0	88.0	908.0	.0	.00	.0	1
9	104.0	104.0	649.0	.0	.00	.0	1
10	104.0	104.0	917.0	.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	99.00
2	489.00	99.00
3	794.00	100.80
4	1067.00	111.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
----------	--------	--------	---------	---------

NO.

1 .00 10.00 1067.00 10.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 650.00

EACH SURFACE TERMINATES BETWEEN X = 800.00
AND X = 1067.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.297

X-CENTER = 606.65
Y-CENTER = 311.50
RADIUS = 273.76

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	427.85	104.20	-38.68
2	443.46	91.70	-34.50
3	459.94	80.37	-30.31
4	477.21	70.27	-26.12
5	495.17	61.47	-21.94
6	513.72	54.00	-17.75
7	532.77	47.90	-13.56
8	552.21	43.21	-9.38
9	571.94	39.95	-5.19
10	591.86	38.14	-1.00
11	611.86	37.79	3.18

12	631.83	38.90	7.37
13	651.66	41.47	11.56
14	671.25	45.47	15.74
15	690.50	50.90	19.93
16	709.31	57.72	24.12
17	727.56	65.89	28.30
18	745.17	75.37	32.49
19	762.04	86.12	36.68
20	778.08	98.06	40.86
21	793.20	111.15	45.05
22	807.33	125.30	49.24
23	820.39	140.45	53.43
24	832.31	156.51	57.61
25	843.02	173.40	61.80
26	846.10	179.15	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	430.89	6.08	1898.71	.00	.00	3959.20	1906.85
2	434.13	.41	264.51	.00	.00	504.36	206.70
3	438.64	8.59	8037.00	.00	2363.80	11806.32	4838.48
4	443.20	.53	651.99	.00	299.22	548.54	23.12
5	451.70	16.48	28359.90	.00	16183.72	18545.18	23.12
6	461.97	4.06	9276.39	.00	5810.60	4998.18	23.12
7	470.60	13.21	36930.14	.00	23739.95	19244.75	23.12
8	477.22	.02	60.58	.00	37.72	29.99	23.12
9	483.11	11.77	41822.07	.00	25870.08	24992.42	665.94
10	492.08	6.17	25151.41	.00	15444.19	14811.92	665.94
11	498.23	6.13	27061.28	.00	16005.69	14940.11	665.94
12	507.51	12.42	61208.06	.00	35609.73	33074.29	500.22
13	514.86	2.28	12181.81	.00	6805.67	6368.71	500.22
14	524.38	16.77	96640.34	.00	53415.46	50874.46	500.22
15	542.49	19.44	126049.90	.00	67094.58	64985.28	500.22
16	562.07	19.73	140280.40	.00	72199.16	71633.08	500.22
17	580.97	18.06	136681.10	.00	68358.37	69709.31	500.22
18	590.93	1.86	14456.37	.00	7149.07	7451.63	500.22
19	601.86	20.00	159769.80	.00	77001.84	82967.63	500.22
20	621.84	19.97	165561.70	.00	76674.34	88586.82	500.22
21	634.41	5.17	43535.04	.00	19738.86	23821.24	500.22
22	644.33	14.66	123250.90	.00	54788.17	68533.10	500.22
23	661.46	19.59	162568.70	.00	70570.79	93316.34	500.22
24	680.88	19.25	154549.00	.00	64827.38	92925.30	500.22
25	698.75	16.50	126032.60	.00	50745.93	80133.60	500.22
26	708.15	2.31	17060.07	.00	6581.02	11121.00	500.22
27	710.74	2.86	20971.85	.00	8209.41	14065.84	500.22
28	719.86	15.39	109201.70	.00	39900.32	74717.66	665.94
29	732.69	10.26	69202.29	.00	23120.34	51298.41	665.94
30	738.96	2.27	14833.93	.00	4569.37	12246.86	23.12
31	742.63	5.08	32718.38	.00	9535.10	22631.36	9274.80
32	752.58	14.83	90547.51	.00	22447.48	67330.23	27593.33
33	761.02	2.04	11837.74	.00	2283.05	9319.18	3819.19
34	770.06	16.04	87336.95	.00	10693.33	75239.74	30834.81
35	779.62	3.08	15495.45	.00	335.28	14878.96	6097.71
36	787.18	12.05	56100.06	.00	.00	54764.24	22443.52
37	798.10	9.80	39668.31	.00	.00	39806.92	16313.70
38	805.17	4.33	16025.23	.00	.00	16081.22	6590.42
39	812.17	9.67	33600.82	.00	.00	34880.02	14294.56
40	818.70	3.39	10741.39	.00	.00	11150.32	4569.63
41	826.35	11.92	29333.94	.00	.00	31712.64	12996.50
42	837.65	10.69	13726.33	.00	.00	15567.68	6379.96
43	843.01	.02	14.90	.00	.00	16.89	6.92
44	843.19	.33	213.60	.00	.00	256.20	105.00
45	844.73	2.75	859.82	.00	.00	958.53	461.65

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.317

X-CENTER = 568.26
Y-CENTER = 338.44
RADIUS = 300.49

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	386.71	99.00	-35.26
2	403.04	87.45	-31.45
3	420.10	77.02	-27.63
4	437.82	67.74	-23.82
5	456.12	59.66	-20.01
6	474.91	52.82	-16.19
7	494.12	47.24	-12.38
8	513.65	42.96	-8.56
9	533.43	39.98	-4.75
10	553.36	38.32	-.94
11	573.36	38.00	2.88
12	593.33	39.00	6.69
13	613.19	41.33	10.51
14	632.86	44.98	14.32
15	652.24	49.92	18.13
16	671.24	56.15	21.95
17	689.80	63.63	25.76
18	707.81	72.32	29.58
19	725.20	82.19	33.39
20	741.90	93.20	37.21
21	757.83	105.29	41.02
22	772.92	118.42	44.83
23	787.10	132.52	48.65
24	800.32	147.53	52.46
25	812.50	163.39	56.28
26	820.62	175.56	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.321

X-CENTER = 615.29
Y-CENTER = 376.15
RADIUS = 335.18

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	419.62	104.01	-34.01
2	436.20	92.83	-30.59
3	453.42	82.65	-27.17
4	471.21	73.52	-23.75
5	489.52	65.46	-20.33
6	508.27	58.52	-16.91
7	527.41	52.70	-13.49
8	546.85	48.03	-10.07
9	566.55	44.54	-6.65
10	586.41	42.22	-3.23

11	606.38	41.09	.19
12	626.38	41.16	3.61
13	646.34	42.41	7.03
14	666.19	44.86	10.44
15	685.86	48.49	13.86
16	705.28	53.28	17.28
17	724.37	59.22	20.70
18	743.08	66.29	24.12
19	761.34	74.46	27.54
20	779.07	83.71	30.96
21	796.22	94.00	34.38
22	812.73	105.29	37.80
23	828.53	117.55	41.22
24	843.57	130.73	44.64
25	857.80	144.78	48.06
26	871.17	159.66	51.48
27	883.63	175.31	54.90
28	887.62	180.98	

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 33 COORDINATE POINTS

SAFETY FACTOR = 1.330

X-CENTER = 494.55
Y-CENTER = 505.35
RADIUS = 471.67

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	255.06	99.00	-29.30
2	272.51	89.21	-26.87
3	290.35	80.17	-24.44
4	308.55	71.90	-22.01
5	327.10	64.40	-19.58
6	345.94	57.70	-17.15
7	365.05	51.80	-14.72
8	384.39	46.72	-12.29
9	403.94	42.46	-9.86
10	423.64	39.04	-7.43
11	443.47	36.45	-5.00
12	463.40	34.71	-2.57
13	483.38	33.81	-.14
14	503.38	33.76	2.29
15	523.36	34.56	4.72
16	543.29	36.20	7.15
17	563.14	38.69	9.58
18	582.86	42.02	12.01
19	602.42	46.18	14.44
20	621.79	51.16	16.86
21	640.93	56.97	19.29
22	659.81	63.58	21.72
23	678.39	70.98	24.15
24	696.63	79.16	26.58
25	714.52	88.11	29.01
26	732.01	97.81	31.44
27	749.07	108.24	33.87
28	765.68	119.39	36.30
29	781.80	131.23	38.73
30	797.40	143.75	41.16
31	812.46	156.91	43.59
32	826.94	170.70	46.02
33	833.55	177.55	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 5 SPECIFIED BY 30 COORDINATE POINTS

SAFETY FACTOR = 1.331

X-CENTER = 554.46
Y-CENTER = 410.37
RADIUS = 374.95

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	345.57	99.00	-32.33
2	362.47	88.30	-29.27
3	379.92	78.53	-26.22
4	397.86	69.69	-23.16
5	416.25	61.83	-20.10
6	435.03	54.95	-17.05
7	454.15	49.09	-13.99
8	473.56	44.25	-10.93
9	493.19	40.46	-7.88
10	513.01	37.72	-4.82
11	532.94	36.04	-1.76
12	552.93	35.43	1.29
13	572.92	35.88	4.35
14	592.86	37.39	7.41
15	612.70	39.97	10.46
16	632.36	43.61	13.52
17	651.81	48.28	16.58
18	670.98	53.99	19.63
19	689.81	60.71	22.69
20	708.27	68.42	25.75
21	726.28	77.11	28.80
22	743.81	86.75	31.86
23	760.79	97.30	34.92
24	777.19	108.75	37.97
25	792.96	121.06	41.03
26	808.05	134.19	44.09
27	822.41	148.10	47.14
28	836.02	162.76	50.20
29	848.82	178.13	53.26
30	849.71	179.32	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 6 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.335

X-CENTER = 626.77
Y-CENTER = 339.26
RADIUS = 297.28

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	444.30	104.56	-35.94
2	460.50	92.82	-32.08
3	477.44	82.20	-28.22
4	495.07	72.74	-24.37
5	513.28	64.49	-20.51
6	532.02	57.48	-16.66

7	551.18	51.75	-12.80
8	570.68	47.32	-8.95
9	590.44	44.21	-5.09
10	610.36	42.43	-1.24
11	630.35	42.00	2.62
12	650.33	42.92	6.47
13	670.20	45.17	10.33
14	689.88	48.76	14.19
15	709.27	53.66	18.04
16	728.29	59.85	21.90
17	746.84	67.31	25.75
18	764.86	76.00	29.61
19	782.25	85.88	33.46
20	798.93	96.91	37.32
21	814.84	109.03	41.17
22	829.89	122.20	45.03
23	844.03	136.35	48.89
24	857.18	151.42	52.74
25	869.29	167.34	56.60
26	878.08	180.67	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 7 SPECIFIED BY 28 COORDINATE POINTS

SAFETY FACTOR = 1.338

X-CENTER = 630.15

Y-CENTER = 374.68

RADIUS = 332.76

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	436.08	104.38	-33.96
2	452.67	93.21	-30.51
3	469.90	83.05	-27.07
4	487.71	73.95	-23.62
5	506.03	65.94	-20.18
6	524.80	59.04	-16.73
7	543.96	53.28	-13.29
8	563.42	48.68	-9.85
9	583.13	45.26	-6.40
10	603.00	43.03	-2.96
11	622.97	42.00	.49
12	642.97	42.17	3.93
13	662.93	43.54	7.37
14	682.76	46.11	10.82
15	702.41	49.86	14.26
16	721.79	54.79	17.71
17	740.84	60.87	21.15
18	759.49	68.09	24.60
19	777.68	76.42	28.04
20	795.33	85.82	31.48
21	812.39	96.26	34.93
22	828.78	107.71	38.37
23	844.46	120.13	41.82
24	859.37	133.46	45.26
25	873.45	147.67	48.70
26	886.65	162.70	52.15
27	898.92	178.49	55.59
28	900.55	180.87	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 8 SPECIFIED BY 26 COORDINATE POINTS

SAFETY FACTOR = 1.342

X-CENTER = 622.62

Y-CENTER = 330.09

RADIUS = 287.51

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	444.30	104.56	-36.34
2	460.41	92.71	-32.35
3	477.31	82.01	-28.37
4	494.91	72.51	-24.38
5	513.13	64.25	-20.39
6	531.87	57.28	-16.41
7	551.06	51.63	-12.42
8	570.59	47.33	-8.43
9	590.37	44.40	-4.45
10	610.31	42.85	-.46
11	630.31	42.68	3.53
12	650.27	43.91	7.51
13	670.10	46.53	11.50
14	689.70	50.52	15.48
15	708.97	55.86	19.47
16	727.83	62.52	23.46
17	746.18	70.48	27.44
18	763.93	79.70	31.43
19	780.99	90.13	35.42
20	797.29	101.72	39.40
21	812.75	114.42	43.39
22	827.28	128.16	47.38
23	840.82	142.87	51.36
24	853.31	158.49	55.35
25	864.68	174.95	59.34
26	867.79	180.18	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 9 SPECIFIED BY 27 COORDINATE POINTS

SAFETY FACTOR = 1.342

X-CENTER = 590.67

Y-CENTER = 355.74

RADIUS = 313.90

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	403.16	104.00	-34.85
2	419.58	92.57	-31.20
3	436.68	82.21	-27.55
4	454.42	72.96	-23.90
5	472.70	64.86	-20.25
6	491.46	57.93	-16.60
7	510.63	52.22	-12.95
8	530.12	47.74	-9.30
9	549.86	44.51	-5.64
10	569.76	42.54	-1.99
11	589.75	41.85	1.66
12	609.74	42.42	5.31
13	629.66	44.28	8.96

14	649.41	47.39	12.61
15	668.93	51.76	16.26
16	688.13	57.36	19.91
17	706.93	64.17	23.57
18	725.27	72.17	27.22
19	743.05	81.31	30.87
20	760.22	91.57	34.52
21	776.70	102.91	38.17
22	792.42	115.27	41.82
23	807.33	128.60	45.47
24	821.35	142.86	49.12
25	834.44	157.98	52.77
26	846.54	173.91	56.43
27	850.14	179.34	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE #10 SPECIFIED BY 34 COORDINATE POINTS

SAFETY FACTOR = 1.346

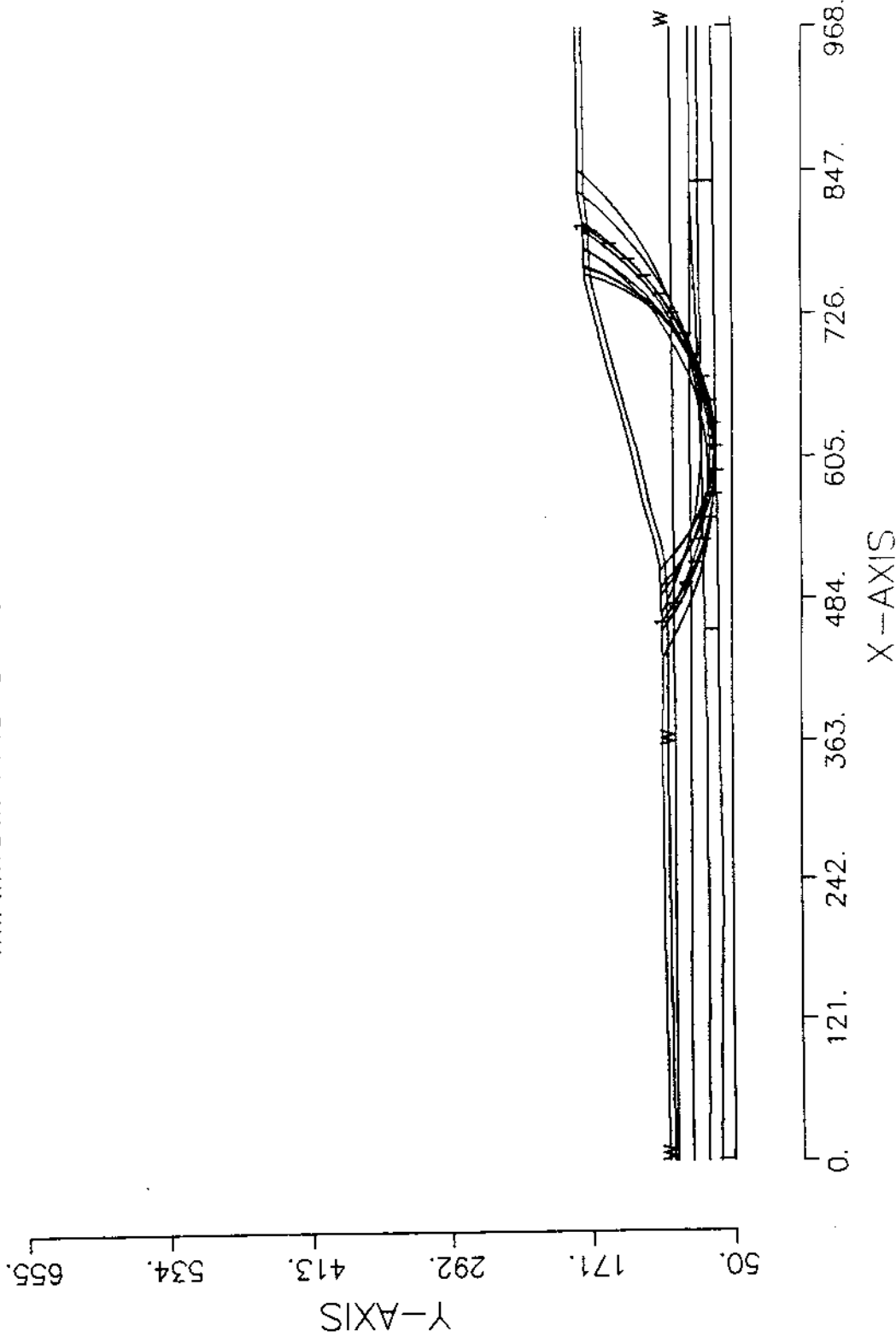
X-CENTER = 559.26
Y-CENTER = 564.87
RADIUS = 527.11

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	312.66	99.00	-26.81
2	330.51	89.98	-24.63
3	348.69	81.64	-22.46
4	367.17	74.00	-20.28
5	385.93	67.07	-18.11
6	404.94	60.85	-15.94
7	424.17	55.36	-13.76
8	443.60	50.61	-11.59
9	463.19	46.59	-9.41
10	482.92	43.32	-7.24
11	502.76	40.80	-5.07
12	522.68	39.03	-2.89
13	542.66	38.02	-.72
14	562.66	37.77	1.46
15	582.65	38.28	3.63
16	602.61	39.55	5.80
17	622.51	41.57	7.98
18	642.31	44.34	10.15
19	662.00	47.87	12.33
20	681.54	52.14	14.50
21	700.90	57.15	16.68
22	720.06	62.89	18.85
23	738.99	69.35	21.02
24	757.66	76.52	23.20
25	776.04	84.40	25.37
26	794.11	92.97	27.55
27	811.84	102.22	29.72
28	829.21	112.14	31.89
29	846.19	122.70	34.07
30	862.76	133.91	36.24
31	878.89	145.73	38.42
32	894.56	158.16	40.59
33	909.75	171.17	42.76
34	920.06	180.71	

1
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CLARKSTOWN LANDFILL SECT. 4--4: FINAL
GRADES, UNDRAINED SOIL, DRAINED MSW
800 SURFACES HAVE BEEN GENERATED
10 MOST CRITICAL OF SURFACES GENERATED
MINIMUM FACTOR OF SAFETY = 1.267



PROFIL

CLARKSTOWN LANDFILL SECT. 4-4: FINAL

GRADES, UNDRAINED SOIL, DRAINED MSW

48 15

0. 105. 358. 109. 1
 358. 109. 418. 108.5 1
 418. 108.5 457. 109. 1
 457. 109. 511. 111. 1
 511. 111. 532. 115. 1
 532. 115. 564. 125. 1
 564. 125. 608. 135. 1
 608. 135. 644. 145. 1
 644. 145. 680. 155. 1
 680. 155. 717. 165. 1
 717. 165. 755. 175. 1
 755. 175. 804. 177. 1
 804. 177. 829. 181. 1
 829. 181. 854. 181. 1
 854. 181. 968. 182.5 1

0. 100. 358. 104. 2
 358. 104. 418. 103.5 2
 418. 103.5 457. 104. 2
 457. 104. 511. 106. 2
 511. 106. 532. 110. 2
 532. 110. 564. 120. 2
 564. 120. 608. 130. 2
 608. 130. 644. 140. 2
 644. 140. 680. 150. 2
 680. 150. 717. 160. 2
 717. 160. 755. 170. 2
 755. 170. 804. 172. 2
 804. 172. 829. 176. 2
 829. 176. 854. 176. 2
 854. 176. 968. 177.5 2

0. 85. 358. 84. 3
 358. 84. 838. 85. 3
 838. 85. 968. 86. 7
 0. 72. 158. 70.5 5
 158. 70.5 358. 71. 5
 358. 71. 458.1 73. 5
 458.1 73. 613. 75. 8
 613. 75. 838. 85. 4
 613. 75. 837.9 78. 8
 837.9 78. 838. 85. 7
 837.9 78. 968. 79. 9

0. 61. 200. 58.5 6
 200. 58. 358. 60. 6
 358. 60. 458. 61. 6
 458. 61. 458.1 73. 8
 458. 61. 837.8 66. 6
 837.8 66. 837.9 78. 9
 837.8 66. 968. 67. 6

SOIL

9
 125.0 125.0 0.0 32. 0. 0. 1
 80.0 80.0 0. 28. 0. 0. 1
 80.0 80.0 30.0 0. 0. 0. 1
 88.0 88.0 933. 0. 0. 0. 1
 104.0 104.0 380.0 0. 0. 0. 1
 125.0 125.0 0. 32. 0. 0. 1
 88.0 88.0 1046. 0. 0. 0. 1
 104.0 104.0 705. 0. 0. 0. 1
 104.0 104.0 1030. 0. 0. 0. 1

WATER

1 0.

3

0. 98.

358. 98.
968. 102.5
LIMITS
1 1
0. 50. 968. 50.
CIRCL2
80 10
0. 600. 755. 968.
20. 20. 0. 0.
END

CL4FUD2

GEOSLOPE
Version 4.0

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(617) 369-8304

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West Chester, PA

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION CLARKSTOWN LANDFILL SECT. 4-4: FINAL
GRADES, UNDRAINED SOIL, DRAINED MSW

BOUNDARY COORDINATES

15 TOP BOUNDARIES
48 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	.00	105.00	358.00	109.00	1
2	358.00	109.00	418.00	108.50	1
3	418.00	108.50	457.00	109.00	1
4	457.00	109.00	511.00	111.00	1
5	511.00	111.00	532.00	115.00	1
6	532.00	115.00	564.00	125.00	1
7	564.00	125.00	608.00	135.00	1
8	608.00	135.00	644.00	145.00	1
9	644.00	145.00	680.00	155.00	1
10	680.00	155.00	717.00	165.00	1
11	717.00	165.00	755.00	175.00	1
12	755.00	175.00	804.00	177.00	1
13	804.00	177.00	829.00	181.00	1
14	829.00	181.00	854.00	181.00	1
15	854.00	181.00	968.00	182.50	1
16	.00	100.00	358.00	104.00	2
17	358.00	104.00	418.00	103.50	2
18	418.00	103.50	457.00	104.00	2
19	457.00	104.00	511.00	106.00	2
20	511.00	106.00	532.00	110.00	2
21	532.00	110.00	564.00	120.00	2
22	564.00	120.00	608.00	130.00	2
23	608.00	130.00	644.00	140.00	2
24	644.00	140.00	680.00	150.00	2
25	680.00	150.00	717.00	160.00	2
26	717.00	160.00	755.00	170.00	2
27	755.00	170.00	804.00	172.00	2
28	804.00	172.00	829.00	176.00	2
29	829.00	176.00	854.00	176.00	2
30	854.00	176.00	968.00	177.50	2
31	.00	85.00	358.00	84.00	3
32	358.00	84.00	838.00	85.00	3
33	838.00	85.00	968.00	86.00	7
34	.00	72.00	158.00	70.50	5
35	158.00	70.50	358.00	71.00	5
36	358.00	71.00	458.10	73.00	5
37	458.10	73.00	613.00	75.00	8
38	613.00	75.00	838.00	85.00	4
39	613.00	75.00	837.90	78.00	8
40	837.90	78.00	838.00	85.00	7

41	837.90	78.00	968.00	79.00	9
42	.00	61.00	200.00	58.50	6
43	200.00	58.00	358.00	60.00	6
44	358.00	60.00	458.00	61.00	6
45	458.00	61.00	458.10	73.00	8
46	458.00	61.00	837.80	66.00	6
47	837.80	66.00	837.90	78.00	9
48	837.80	66.00	968.00	67.00	6

ISOTROPIC SOIL PARAMETERS

9 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	125.0	125.0	.0	32.0	.00	.0	1
2	80.0	80.0	.0	28.0	.00	.0	1
3	80.0	80.0	30.0	.0	.00	.0	1
4	88.0	88.0	933.0	.0	.00	.0	1
5	104.0	104.0	380.0	.0	.00	.0	1
6	125.0	125.0	.0	32.0	.00	.0	1
7	88.0	88.0	1046.0	.0	.00	.0	1
8	104.0	104.0	705.0	.0	.00	.0	1
9	104.0	104.0	1030.0	.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 3 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	98.00
2	358.00	98.00
3	968.00	102.50

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT
1	.00	50.00	968.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

800 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 80. POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = .00
AND X = 600.00

EACH SURFACE TERMINATES BETWEEN X = 755.00
AND X = 968.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 20.00

20.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL
FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

1

Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 1 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.267

X-CENTER = 601.62
Y-CENTER = 292.21
RADIUS = 229.38

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	463.29	109.23	-34.59
2	479.76	97.88	-29.59
3	497.15	88.00	-24.60
4	515.33	79.68	-19.60
5	534.17	72.97	-14.60
6	553.53	67.93	-9.60
7	573.25	64.59	-4.61
8	593.18	62.99	.39
9	613.18	63.12	5.39
10	633.09	65.00	10.38
11	652.77	68.60	15.38
12	672.05	73.91	20.38
13	690.80	80.87	25.38
14	708.87	89.45	30.37
15	726.12	99.56	35.37
16	742.43	111.14	40.37
17	757.67	124.09	45.36
18	771.72	138.32	50.36
19	784.48	153.72	55.36
20	795.85	170.18	60.36

21 799.63 176.82

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	466.73	6.88	2150.39	.00	.00	3957.80	1951.47
2	474.23	8.12	6993.04	.00	.00	11952.69	5014.86
3	479.03	1.46	1666.20	.00	56.47	2768.46	1161.53
4	488.45	17.39	27876.71	.00	7514.73	32220.81	13518.55
5	501.19	8.07	17631.07	.00	7149.10	15150.92	6356.71
6	508.11	5.78	14199.59	.00	6392.72	9292.59	23.67
7	513.17	4.33	11632.12	.00	5493.81	7350.63	23.67
8	523.38	16.10	50688.87	.00	23893.37	30056.57	23.67
9	531.72	.57	1997.66	.00	957.37	1282.61	556.30
10	533.09	2.17	7824.83	.00	3735.59	5027.63	556.30
11	543.85	19.35	80767.26	.00	36094.27	50266.69	556.30
12	558.76	10.47	51360.13	.00	21496.74	31593.09	556.30
13	568.62	9.25	48983.62	.00	20005.53	30557.28	556.30
14	583.22	19.94	114252.20	.00	44769.11	70749.82	556.30
15	600.59	14.82	90833.66	.00	33980.52	56799.09	556.30
16	610.50	5.00	31585.05	.00	11469.12	20097.71	556.30
17	613.09	.18	1168.60	.00	420.59	747.34	556.30
18	623.14	19.91	129522.60	.00	44797.14	84250.94	556.30
19	638.55	10.91	72567.34	.00	23570.31	49075.26	556.30
20	648.38	8.77	58663.94	.00	17987.65	40744.55	556.30
21	662.41	19.28	128263.60	.00	36177.39	93790.53	556.30
22	674.67	5.24	34364.63	.00	8883.87	26619.32	556.30
23	678.65	2.71	17582.74	.00	4323.43	13643.93	736.21
24	681.70	3.41	22048.70	.00	5195.67	17330.45	736.21
25	687.10	7.39	47429.38	.00	10293.36	40233.51	23.67
26	694.84	8.09	51129.82	.00	9881.54	46607.89	23.67
27	703.88	9.98	61647.96	.00	9289.98	49158.45	20624.89
28	712.93	8.13	48709.01	.00	5169.22	41166.23	17271.68
29	721.56	9.12	52650.80	.00	2506.23	46970.80	19707.04
30	726.95	1.65	9265.05	.00	72.98	8698.48	3649.53
31	735.10	14.66	78165.42	.00	.00	73859.88	30988.61
32	748.72	12.57	60002.08	.00	.00	58048.74	24354.90
33	756.34	2.67	11734.50	.00	.00	11352.48	4763.04
34	764.70	14.05	52838.83	.00	.00	52778.21	22143.60
35	778.10	12.76	33411.41	.00	.00	34766.02	14586.41
36	790.17	11.37	15732.46	.00	.00	17219.94	7224.79
37	796.28	.87	594.44	.00	.00	691.80	290.25
38	798.18	2.91	910.34	.00	.00	986.13	486.23

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 2 SPECIFIED BY 18 COORDINATE POINTS

SAFETY FACTOR = 1.290

X-CENTER = 609.44
Y-CENTER = 229.90
RADIUS = 166.41

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	493.67	110.36	-40.64
2	508.85	97.33	-33.75
3	525.48	86.22	-26.85
4	543.32	77.19	-19.96
5	562.12	70.36	-13.07
6	581.60	65.84	-6.18

7	601.49	63.68	.71
8	621.48	63.93	7.60
9	641.31	66.57	14.49
10	660.67	71.58	21.38
11	679.30	78.87	28.27
12	696.91	88.34	35.16
13	713.26	99.85	42.05
14	728.11	113.25	48.94
15	741.25	128.33	55.83
16	752.48	144.88	62.72
17	761.65	162.65	69.61
18	766.41	175.47	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 3 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.291

X-CENTER = 594.45
Y-CENTER = 301.92
RADIUS = 237.65

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	108.98	-33.31
2	472.41	98.00	-28.49
3	489.99	88.46	-23.66
4	508.31	80.43	-18.84
5	527.24	73.97	-14.02
6	546.64	69.13	-9.19
7	566.38	65.93	-4.37
8	586.33	64.41	.45
9	606.32	64.57	5.28
10	626.24	66.41	10.10
11	645.93	69.91	14.92
12	665.26	75.06	19.75
13	684.08	81.82	24.57
14	702.27	90.14	29.39
15	719.69	99.95	34.22
16	736.23	111.20	39.04
17	751.77	123.80	43.86
18	766.18	137.66	48.69
19	779.39	152.68	53.51
20	791.28	168.76	58.34
21	796.17	176.68	

1
Roy F. Weston, Inc.
West Chester, PA

FAILURE SURFACE # 4 SPECIFIED BY 21 COORDINATE POINTS

SAFETY FACTOR = 1.293

X-CENTER = 597.15
Y-CENTER = 309.27
RADIUS = 245.20

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	455.70	108.98	-32.89
2	472.49	98.12	-28.22
3	490.11	88.66	-23.55

4	508.45	80.67	-18.87
5	527.37	74.21	-14.20
6	546.76	69.30	-9.52
7	566.49	65.99	-4.85
8	586.42	64.30	-1.17
9	606.42	64.24	4.50
10	626.35	65.81	9.18
11	646.10	69.00	13.85
12	665.52	73.79	18.53
13	684.48	80.15	23.20
14	702.86	88.03	27.88
15	720.54	97.38	32.55
16	737.40	108.14	37.23
17	753.32	120.24	41.90
18	768.21	133.60	46.58
19	781.96	148.12	51.25
20	794.48	163.72	55.93
21	803.44	176.98	

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FAILURE SURFACE # 5 SPECIFIED BY 19 COORDINATE POINTS

SAFETY FACTOR = 1.312

X-CENTER = 606.82
Y-CENTER = 261.54
RADIUS = 193.70

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	486.08	110.08	-35.60
2	502.34	98.43	-29.68
3	519.71	88.53	-23.76
4	538.02	80.47	-17.85
5	557.06	74.34	-11.93
6	576.62	70.21	-6.01
7	596.51	68.11	-0.09
8	616.51	68.08	5.83
9	636.41	70.11	11.75
10	655.99	74.19	17.67
11	675.05	80.25	23.58
12	693.38	88.26	29.50
13	710.79	98.11	35.42
14	727.08	109.70	41.34
15	742.10	122.91	47.26
16	755.67	137.60	53.18
17	767.66	153.61	59.09
18	777.93	170.77	65.01
19	780.39	176.04	

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FAILURE SURFACE # 6 SPECIFIED BY 20 COORDINATE POINTS

SAFETY FACTOR = 1.326

X-CENTER = 590.72
Y-CENTER = 296.20
RADIUS = 226.26

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
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1	463.29	109.23	-31.74
2	480.30	98.71	-26.68
3	498.17	89.73	-21.61
4	516.77	82.37	-16.54
5	535.94	76.67	-11.48
6	555.54	72.69	-6.41
7	575.41	70.46	-1.35
8	595.41	69.99	3.72
9	615.36	71.28	8.79
10	635.13	74.34	13.85
11	654.55	79.13	18.92
12	673.47	85.61	23.98
13	691.74	93.74	29.05
14	709.22	103.45	34.12
15	725.78	114.67	39.18
16	741.29	127.31	44.25
17	755.61	141.26	49.31
18	768.65	156.43	54.38
19	780.30	172.68	59.45
20	782.32	176.12	

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FAILURE SURFACE # 7 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.344

X-CENTER = 618.39
Y-CENTER = 216.56
RADIUS = 152.17

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	508.86	110.92	-42.27
2	523.66	97.47	-34.73
3	540.10	86.07	-27.20
4	557.89	76.93	-19.66
5	576.72	70.20	-12.13
6	596.27	66.00	-4.59
7	616.21	64.40	2.95
8	636.18	65.43	10.48
9	655.85	69.07	18.02
10	674.87	75.25	25.55
11	692.91	83.88	33.09
12	709.67	94.80	40.62
13	724.85	107.82	48.16
14	738.19	122.72	55.69
15	749.46	139.24	63.23
16	758.47	157.10	70.77
17	764.86	175.40	

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FAILURE SURFACE # 8 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.347

X-CENTER = 617.11
Y-CENTER = 210.02
RADIUS = 146.76

POINT	X-SURF	Y-SURF	ALPHA
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