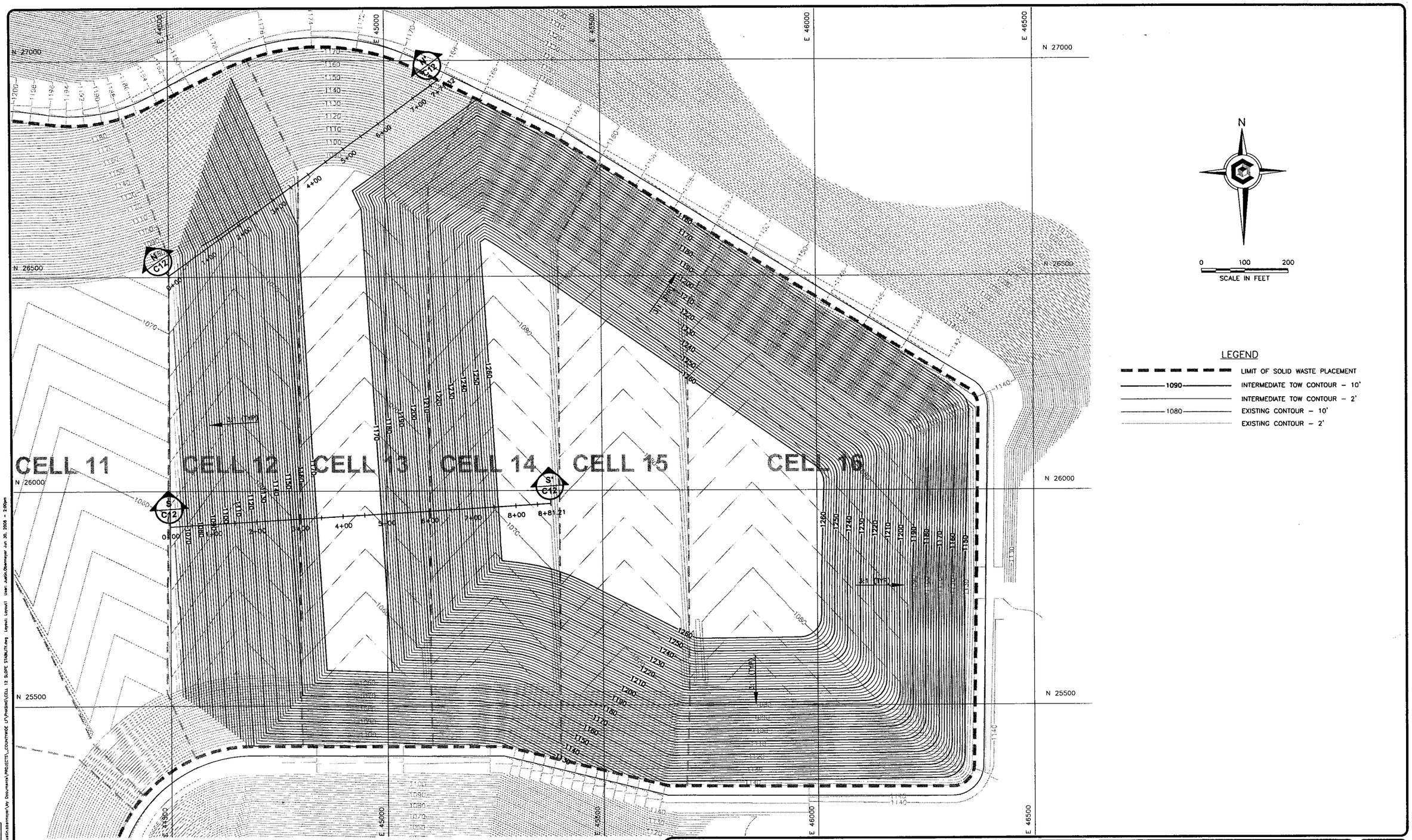

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 07/01/08 — DRAWN BY JCO — DESIGNED BY JCO — CHECKED BY JGW — APPROVED BY JGW

CORNERSTONE Environmental Group, LLC

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
CELL 12
SLOPE STABILITY SECTION LOCATIONS

FIGURE **5**

PROJECT NO. 070340

File: C:\Documents and Settings\justin.obermeyer\My Documents\PROJECTS_COUNTYWIDE LF\Phase\CELL 12 SLOPE STABILITY.dwg Layout: Layout1 User: justin.obermeyer Jun 30, 2008 - 2:40pm

0" 1/2" 1" 2"

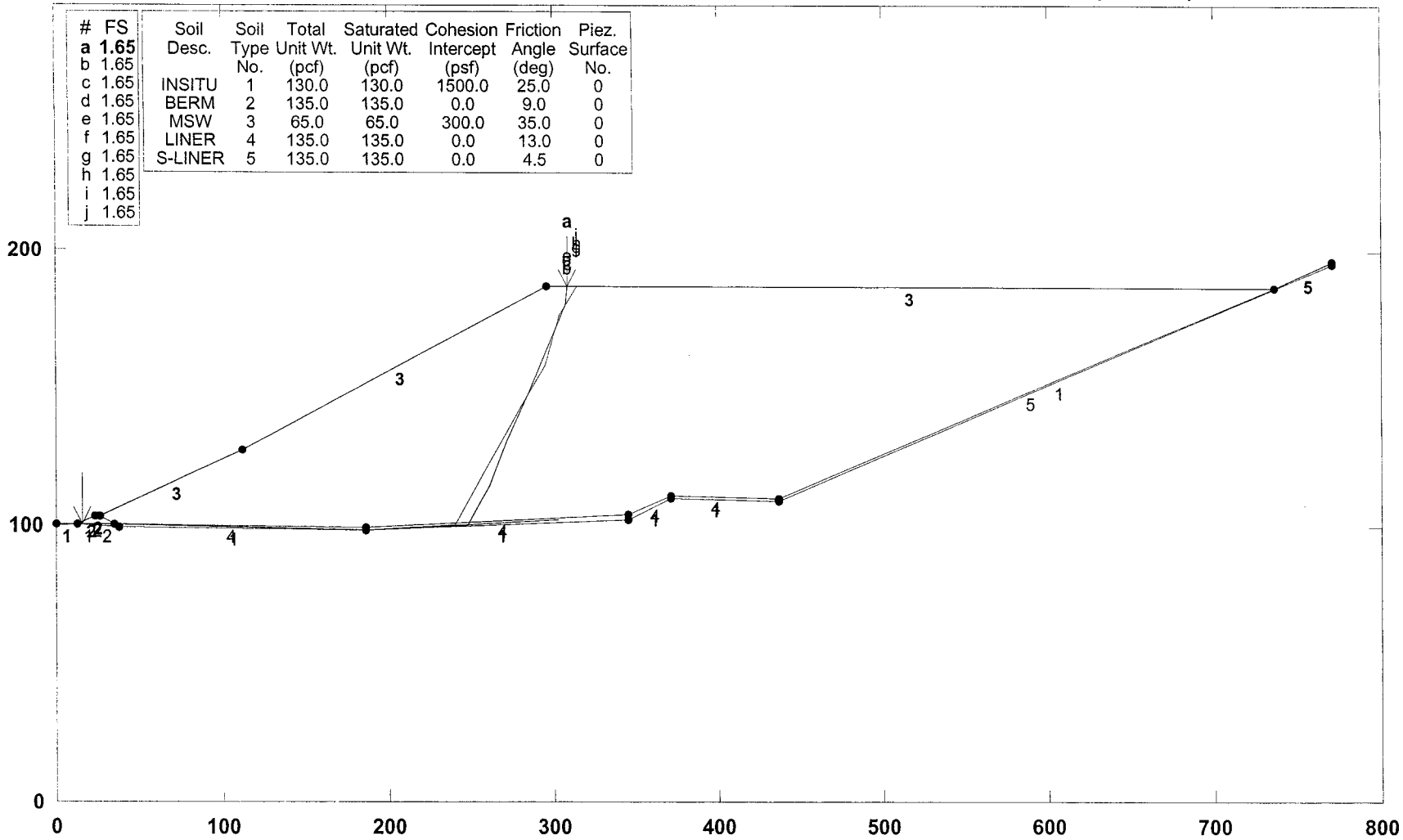
CELL 12 SLOPE STABILITY CALCULATIONS

COUNTYWIDE - 2008 PTI ALTERATION CELL 12, SECTION N-N' (EL 1170)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c12_n-n'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:32PM

#	FS
a	**1.65**
b	1.65
c	1.65
d	1.65
e	1.65
f	1.65
g	1.65
h	1.65
i	1.65
j	1.65

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0



STABL6H FSmin=1.65

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:32PM
Run By: JObermeyer, CEG
Input Data Filename: C:c12_n-n'_0.in
Output Filename: C:c12_n-n'_0.OUT
Plotted Output Filename: C:c12_n-n'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 12, SECTION N-N' (EL 1170)

BOUNDARY COORDINATES
7 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	12.36	99.87	1
2	12.36	99.87	23.47	103.05	2
3	23.47	103.05	25.94	103.05	2
4	25.94	103.05	111.33	127.10	3
5	111.33	127.10	296.10	187.32	3
6	296.10	187.32	735.77	187.32	3
7	735.77	187.32	770.86	196.36	5
8	25.94	103.05	34.34	100.65	2
9	34.34	100.65	186.19	99.10	4
10	186.19	99.10	345.08	103.60	4
11	345.08	103.60	370.50	110.70	4
12	370.50	110.70	436.59	110.30	4
13	436.59	110.30	735.77	187.32	5
14	34.34	100.65	37.96	99.61	2
15	37.96	99.61	186.20	98.10	1
16	186.20	98.10	345.23	102.61	1
17	345.23	102.61	370.64	109.69	1
18	370.64	109.69	436.71	109.30	1
19	436.71	109.30	770.86	195.32	1
20	12.36	99.87	37.96	99.61	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Horizontal Earthquake Loading Coefficient
Of0.000 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	15.74	100.34	15.84	100.34	0.25
2	37.96	100.11	38.06	100.11	0.25

3	186.20	98.60	186.30	98.60	0.25
4	187.70	98.64	302.20	101.89	0.25

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 Janbu Method * *
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.06	100.64
2	15.79	100.37
3	37.97	100.01
4	186.20	98.50
5	247.35	100.22
6	261.20	114.65
7	272.15	131.38
8	284.35	147.23
9	296.19	163.35
10	307.21	180.04
11	308.69	187.32

*** 1.647 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.06	100.64
2	15.79	100.37
3	37.97	100.01
4	186.20	98.50
5	247.35	100.22
6	261.20	114.65
7	272.15	131.38
8	284.35	147.23
9	296.19	163.35
10	307.21	180.04
11	308.69	187.32

*** 1.647 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.06	100.64
2	15.79	100.37
3	37.97	100.01
4	186.20	98.50
5	247.35	100.22
6	261.20	114.65
7	272.15	131.38
8	284.35	147.23
9	296.19	163.35
10	307.21	180.04
11	308.69	187.32

*** 1.647 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.06	100.64
2	15.79	100.37
3	37.97	100.01
4	186.20	98.50
5	247.35	100.22
6	261.20	114.65
7	272.15	131.38
8	284.35	147.23
9	296.19	163.35
10	307.21	180.04
11	308.69	187.32

*** 1.647 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.06	100.64

2	15.79	100.37
3	37.97	100.01
4	186.20	98.50
5	247.35	100.22
6	261.20	114.65
7	272.15	131.38
8	284.35	147.23
9	296.19	163.35
10	307.21	180.04
11	308.69	187.32

*** 1.647 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.50	100.48
2	15.79	100.30
3	37.97	100.09
4	186.29	98.70
5	239.66	100.20
6	253.72	114.43
7	267.17	129.22
8	280.70	143.95
9	294.44	158.49
10	303.66	176.24
11	314.00	187.32

*** 1.650 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.50	100.48
2	15.79	100.30
3	37.97	100.09
4	186.29	98.70
5	239.66	100.20
6	253.72	114.43
7	267.17	129.22
8	280.70	143.95
9	294.44	158.49
10	303.66	176.24
11	314.00	187.32

*** 1.650 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.50	100.48
2	15.79	100.30
3	37.97	100.09
4	186.29	98.70
5	239.66	100.20
6	253.72	114.43
7	267.17	129.22
8	280.70	143.95
9	294.44	158.49
10	303.66	176.24
11	314.00	187.32

*** 1.650 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.50	100.48
2	15.79	100.30
3	37.97	100.09
4	186.29	98.70
5	239.66	100.20
6	253.72	114.43
7	267.17	129.22
8	280.70	143.95
9	294.44	158.49
10	303.66	176.24
11	314.00	187.32

```
     ***     1.650   ***
Failure Surface Specified By 11 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         14.50      100.48
    2         15.79      100.30
    3         37.97      100.09
    4        186.29       98.70
    5        239.66      100.20
    6        253.72      114.43
    7        267.17      129.22
    8        280.70      143.95
    9        294.44      158.49
   10        303.66      176.24
   11        314.00      187.32
     ***     1.650   ***
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COUNTYWIDE - 2008 PTI ALTERATION CELL 12, SECTION N-N' (EL 1170)

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c	1.25
d	1.25
e	1.25
f	1.26
g	1.26
h	1.26
i	1.26
j	1.26

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0

Load	Value
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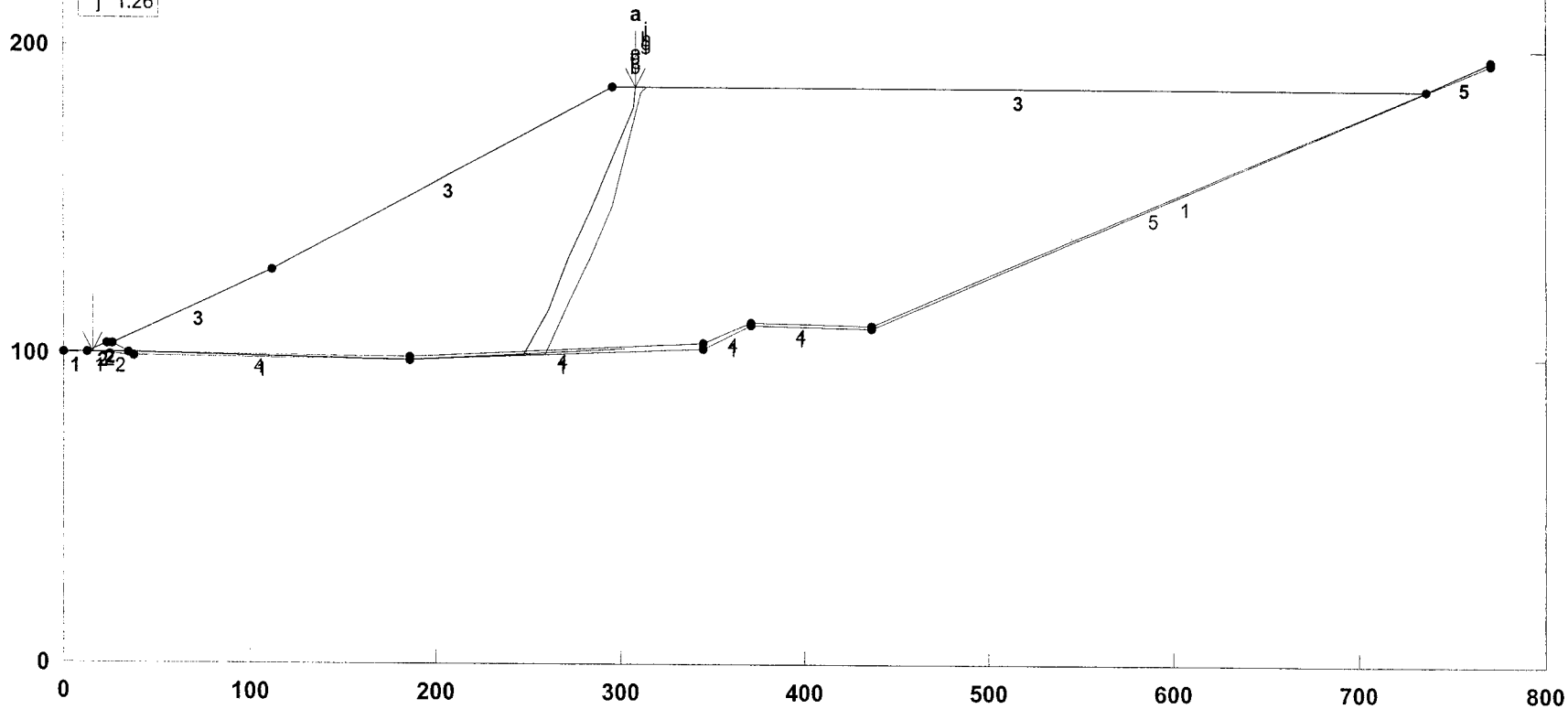

STABL6H FSmin=1.25

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:31PM
Run By: JObermeyer, CEG
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Plotted Output Filename: C:c12_n-n'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 12, SECTION N-N' (EL 1170)

BOUNDARY COORDINATES
7 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	12.36	99.87	1
2	12.36	99.87	23.47	103.05	2
3	23.47	103.05	25.94	103.05	2
4	25.94	103.05	111.33	127.10	3
5	111.33	127.10	296.10	187.32	3
6	296.10	187.32	735.77	187.32	3
7	735.77	187.32	770.86	196.36	5
8	25.94	103.05	34.34	100.65	2
9	34.34	100.65	186.19	99.10	4
10	186.19	99.10	345.08	103.60	4
11	345.08	103.60	370.50	110.70	4
12	370.50	110.70	436.59	110.30	4
13	436.59	110.30	735.77	187.32	5
14	34.34	100.65	37.96	99.61	2
15	37.96	99.61	186.20	98.10	1
16	186.20	98.10	345.23	102.61	1
17	345.23	102.61	370.64	109.69	1
18	370.64	109.69	436.71	109.30	1
19	436.71	109.30	770.86	195.32	1
20	12.36	99.87	37.96	99.61	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	15.74	100.34	15.84	100.34	0.25
2	37.96	100.11	38.06	100.11	0.25
3	186.20	98.60	186.30	98.60	0.25
4	187.70	98.64	302.20	101.89	0.25

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 Janbu Method * *
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         15.06       100.64
    2         15.79       100.37
    3         37.97       100.01
    4        186.20        98.50
    5        247.35       100.22
    6        261.20       114.65
    7        272.15       131.38
    8        284.35       147.23
    9        296.19       163.35
   10        307.21       180.04
   11        308.69       187.32
      ***     1.254   ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         15.06       100.64
    2         15.79       100.37
    3         37.97       100.01
    4        186.20        98.50
    5        247.35       100.22
    6        261.20       114.65
    7        272.15       131.38
    8        284.35       147.23
    9        296.19       163.35
   10        307.21       180.04
   11        308.69       187.32
      ***     1.254   ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         15.06       100.64
    2         15.79       100.37
    3         37.97       100.01
    4        186.20        98.50
    5        247.35       100.22
    6        261.20       114.65
    7        272.15       131.38
    8        284.35       147.23
    9        296.19       163.35
   10        307.21       180.04
   11        308.69       187.32
      ***     1.254   ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         15.06       100.64
    2         15.79       100.37
    3         37.97       100.01
    4        186.20        98.50
    5        247.35       100.22
    6        261.20       114.65
    7        272.15       131.38
    8        284.35       147.23
    9        296.19       163.35
   10        307.21       180.04
   11        308.69       187.32
      ***     1.254   ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         15.06       100.64
    2         15.79       100.37
    3         37.97       100.01
    4        186.20        98.50
    5        247.35       100.22
    6        261.20       114.65
```

7	272.15	131.38
8	284.35	147.23
9	296.19	163.35
10	307.21	180.04
11	308.69	187.32

*** 1.254 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.77	100.56
2	15.82	100.26
3	37.98	100.08
4	186.21	98.67
5	258.84	100.60
6	271.39	116.17
7	284.16	131.56
8	295.53	148.01
9	303.21	166.48
10	311.40	184.73
11	313.94	187.32

*** 1.257 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.77	100.56
2	15.82	100.26
3	37.98	100.08
4	186.21	98.67
5	258.84	100.60
6	271.39	116.17
7	284.16	131.56
8	295.53	148.01
9	303.21	166.48
10	311.40	184.73
11	313.94	187.32

*** 1.257 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.77	100.56
2	15.82	100.26
3	37.98	100.08
4	186.21	98.67
5	258.84	100.60
6	271.39	116.17
7	284.16	131.56
8	295.53	148.01
9	303.21	166.48
10	311.40	184.73
11	313.94	187.32

*** 1.257 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.77	100.56
2	15.82	100.26
3	37.98	100.08
4	186.21	98.67
5	258.84	100.60
6	271.39	116.17
7	284.16	131.56
8	295.53	148.01
9	303.21	166.48
10	311.40	184.73
11	313.94	187.32

*** 1.257 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.77	100.56

2	15.82	100.26
3	37.98	100.08
4	186.21	98.67
5	258.84	100.60
6	271.39	116.17
7	284.16	131.56
8	295.53	148.01
9	303.21	166.48
10	311.40	184.73
11	313.94	187.32
***	1.257	***

COUNTYWIDE - 2008 PTI ALTERATION CELL 12, SECTION S-S' (EL 1070 & 1260)

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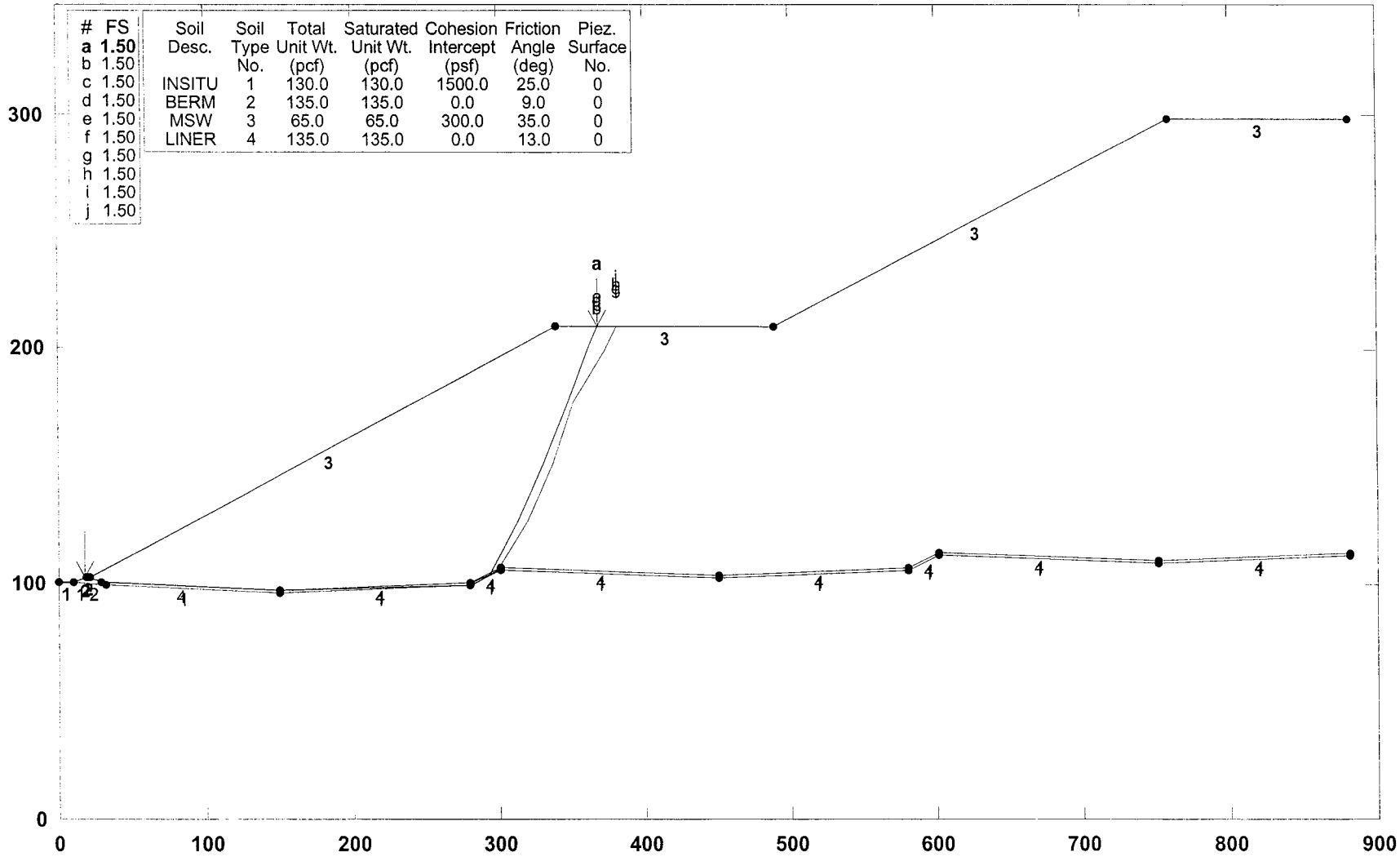

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a	**1.50**
b	1.50
c	1.50
d	1.50
e	1.50
f	1.50
g	1.50
h	1.50
i	1.50
j	1.50

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0

STABL6H FSmin=1.50

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 01:43PM
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Plotted Output Filename: C:c12_s-s'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 12, SECTION S-S' (EL 1070 & 1260)

BOUNDARY COORDINATES
7 Top Boundaries
26 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.74	1
2	10.02	99.74	19.04	102.75	2
3	19.04	102.75	21.04	102.75	2
4	21.04	102.75	339.53	209.02	3
5	339.53	209.02	489.53	209.02	3
6	489.53	209.02	759.25	299.02	3
7	759.25	299.02	881.21	299.02	3
8	21.04	102.75	28.54	100.25	2
9	28.54	100.25	150.27	97.06	4
10	150.27	97.06	279.94	99.87	4
11	279.94	99.87	300.40	106.69	4
12	300.40	106.69	450.82	103.59	4
13	450.82	103.59	580.49	106.42	4
14	580.49	106.42	600.94	113.25	4
15	600.94	113.25	751.36	110.16	4
16	751.36	110.16	881.21	113.07	4
17	28.54	100.25	31.79	99.17	2
18	31.79	99.17	150.27	96.06	1
19	150.27	96.06	280.12	98.87	1
20	280.12	98.87	300.55	105.69	1
21	300.55	105.69	450.82	102.59	1
22	450.82	102.59	580.66	105.43	1
23	580.66	105.43	601.09	112.24	1
24	601.09	112.24	751.36	109.16	1
25	751.36	109.16	881.21	112.07	1
26	10.02	99.74	31.79	99.17	1

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	31.79	99.70	31.89	99.70	0.25
2	150.28	96.56	150.38	96.56	0.25
3	280.35	99.48	280.45	99.48	0.25
4	281.35	99.81	299.55	105.88	0.25

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 Janbu Method * *
Failure Surface Specified By 10 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         17.24       102.15
    2         31.84        99.76
    3        150.35        96.66
    4        280.40        99.51
    5        293.48       103.94
    6        313.04       126.69
    7        329.98       151.45
    8        347.22       176.00
    9        362.94       201.55
   10        367.52       209.02
      ***     1.496   ***
Failure Surface Specified By 10 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         17.24       102.15
    2         31.84        99.76
    3        150.35        96.66
    4        280.40        99.51
    5        293.48       103.94
    6        313.04       126.69
    7        329.98       151.45
    8        347.22       176.00
    9        362.94       201.55
   10        367.52       209.02
      ***     1.496   ***
Failure Surface Specified By 10 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         17.24       102.15
    2         31.84        99.76
    3        150.35        96.66
    4        280.40        99.51
    5        293.48       103.94
    6        313.04       126.69
    7        329.98       151.45
    8        347.22       176.00
    9        362.94       201.55
   10        367.52       209.02
      ***     1.496   ***
Failure Surface Specified By 10 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         17.24       102.15
    2         31.84        99.76
    3        150.35        96.66
    4        280.40        99.51
    5        293.48       103.94
    6        313.04       126.69
    7        329.98       151.45
    8        347.22       176.00
    9        362.94       201.55
   10        367.52       209.02
      ***     1.496   ***
Failure Surface Specified By 10 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         17.24       102.15
    2         31.84        99.76
    3        150.35        96.66
    4        280.40        99.51
    5        293.48       103.94
    6        313.04       126.69
    7        329.98       151.45
    8        347.22       176.00
    9        362.94       201.55
   10        367.52       209.02
```

*** 1.496 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.497 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.497 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.497 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.497 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.497 ***

COUNTYWIDE - 2008 PTI ALTERATION CELL 12, SECTION S-S' (EL 1070 & 1260)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c12_s-s'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:25PM

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c	1.15
d	1.15
e	1.15
f	1.15
g	1.15
h	1.15
i	1.15
j	1.15

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0

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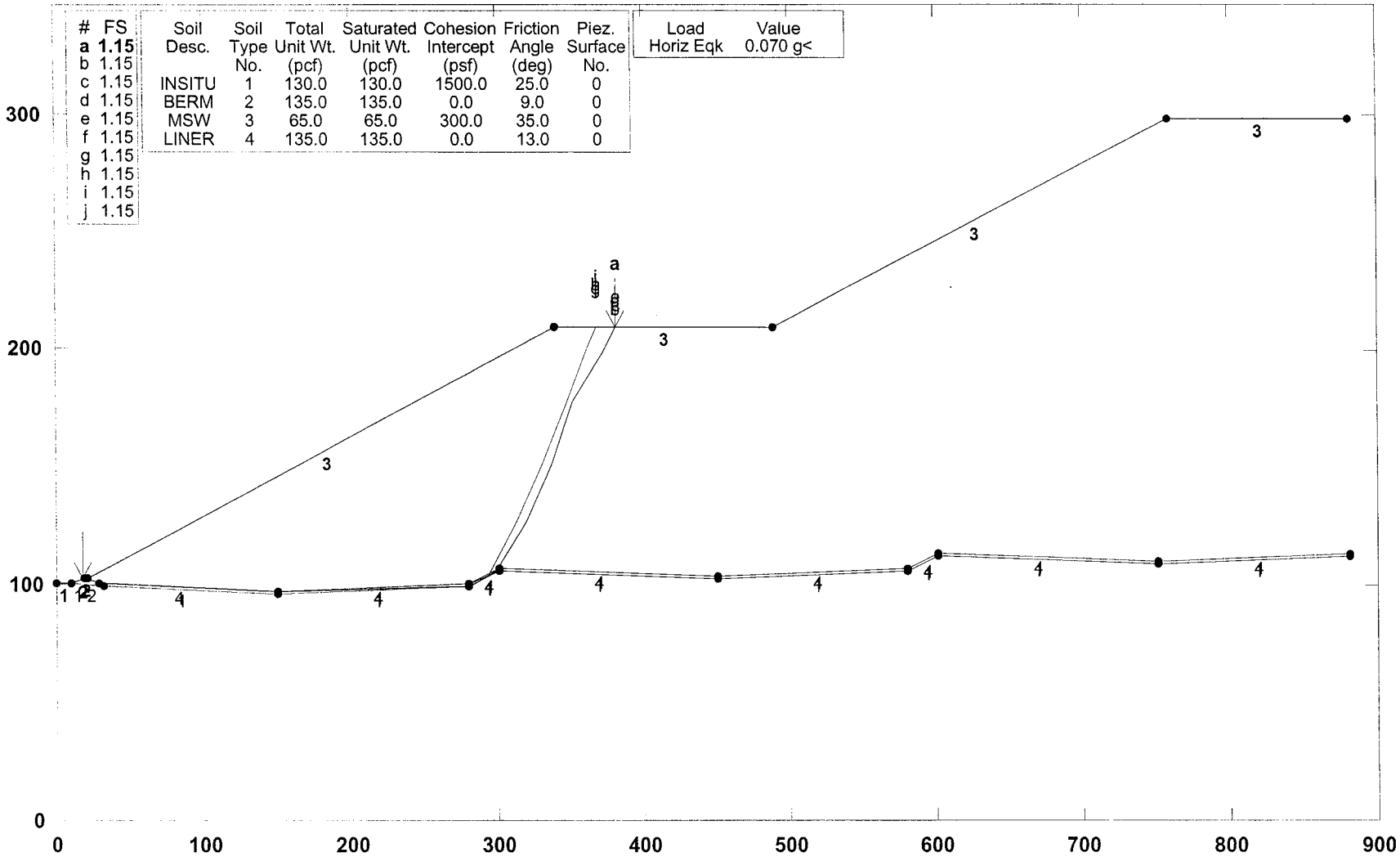

STABL6H FSmin=1.15

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:25PM
Run By: JObermeyer, CEG
Input Data Filename: C:c12_s-s'_0.in
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Plotted Output Filename: C:c12_s-s'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 12, SECTION S-S' (EL 1070 & 1260)

BOUNDARY COORDINATES
7 Top Boundaries
26 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.74	1
2	10.02	99.74	19.04	102.75	2
3	19.04	102.75	21.04	102.75	2
4	21.04	102.75	339.53	209.02	3
5	339.53	209.02	489.53	209.02	3
6	489.53	209.02	759.25	299.02	3
7	759.25	299.02	881.21	299.02	3
8	21.04	102.75	28.54	100.25	2
9	28.54	100.25	150.27	97.06	4
10	150.27	97.06	279.94	99.87	4
11	279.94	99.87	300.40	106.69	4
12	300.40	106.69	450.82	103.59	4
13	450.82	103.59	580.49	106.42	4
14	580.49	106.42	600.94	113.25	4
15	600.94	113.25	751.36	110.16	4
16	751.36	110.16	881.21	113.07	4
17	28.54	100.25	31.79	99.17	2
18	31.79	99.17	150.27	96.06	1
19	150.27	96.06	280.12	98.87	1
20	280.12	98.87	300.55	105.69	1
21	300.55	105.69	450.82	102.59	1
22	450.82	102.59	580.66	105.43	1
23	580.66	105.43	601.09	112.24	1
24	601.09	112.24	751.36	109.16	1
25	751.36	109.16	881.21	112.07	1
26	10.02	99.74	31.79	99.17	1

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	31.79	99.70	31.89	99.70	0.25
2	150.28	96.56	150.38	96.56	0.25

3	280.35	99.48	280.45	99.48	0.25
4	281.35	99.81	299.55	105.88	0.25

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 Janbu Method * *
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48
6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.42	102.21
2	31.81	99.77
3	150.35	96.53
4	280.43	99.46
5	298.13	105.48

6	319.28	126.75
7	336.76	151.14
8	351.76	177.12
9	372.80	198.50
10	380.59	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.24	102.15
2	31.84	99.76
3	150.35	96.66
4	280.40	99.51
5	293.48	103.94
6	313.04	126.69
7	329.98	151.45
8	347.22	176.00
9	362.94	201.55
10	367.52	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.24	102.15
2	31.84	99.76
3	150.35	96.66
4	280.40	99.51
5	293.48	103.94
6	313.04	126.69
7	329.98	151.45
8	347.22	176.00
9	362.94	201.55
10	367.52	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.24	102.15
2	31.84	99.76
3	150.35	96.66
4	280.40	99.51
5	293.48	103.94
6	313.04	126.69
7	329.98	151.45
8	347.22	176.00
9	362.94	201.55
10	367.52	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.24	102.15
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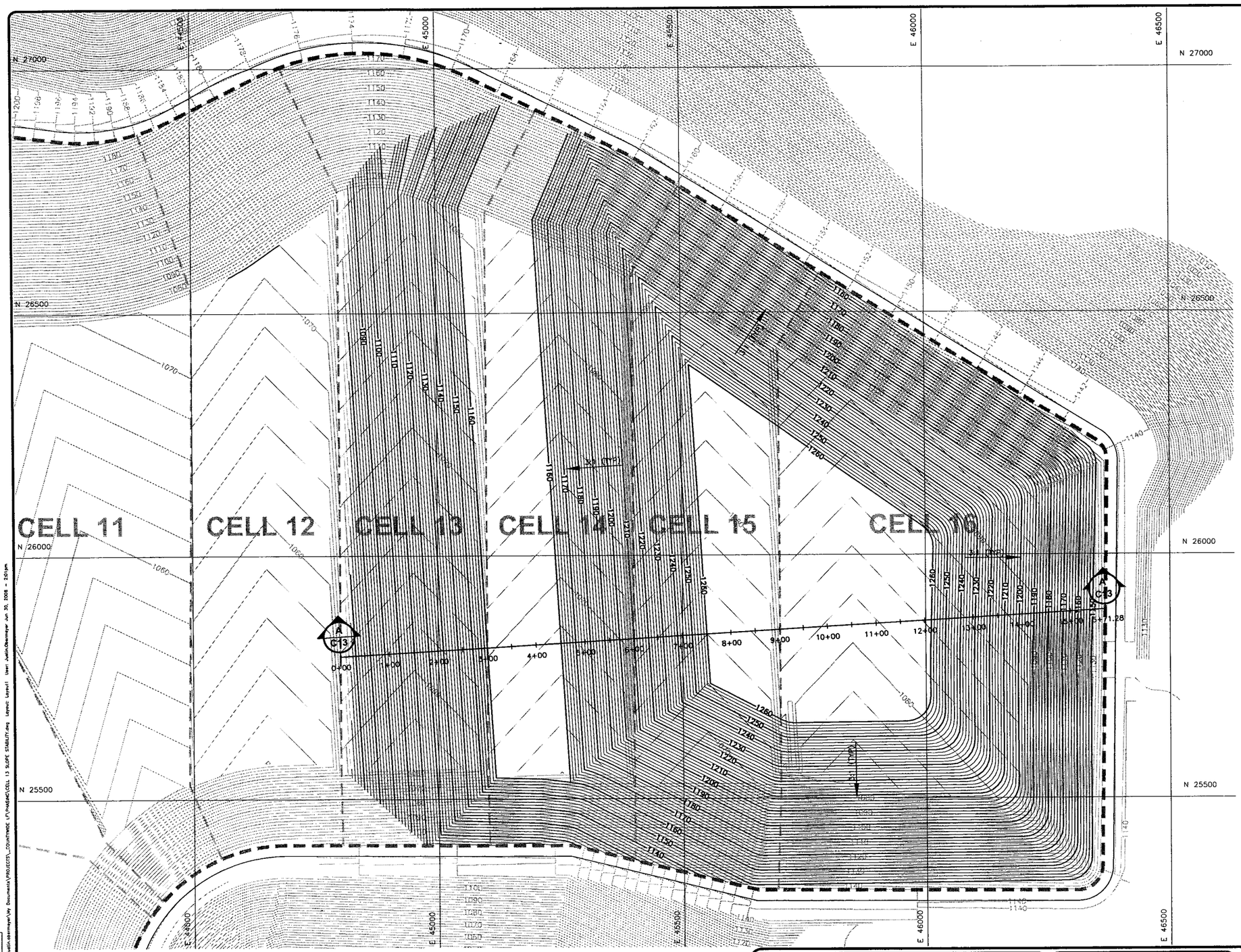
5	293.48	103.94
6	313.04	126.69
7	329.98	151.45
8	347.22	176.00
9	362.94	201.55
10	367.52	209.02

*** 1.146 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17.24	102.15
2	31.84	99.76
3	150.35	96.66
4	280.40	99.51
5	293.48	103.94

6	313.04	126.69
7	329.98	151.45
8	347.22	176.00
9	362.94	201.55
10	367.52	209.02
***	1.146	***



LEGEND

- LIMIT OF SOLID WASTE PLACEMENT
- 1090 — INTERMEDIATE TOW CONTOUR – 10'
- INTERMEDIATE TOW CONTOUR – 2'
- 1080 — EXISTING CONTOUR – 10'
- EXISTING CONTOUR – 2'

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 07/01/08
DRAWN BY JCO
DESIGNED BY JCO
CHECKED BY JGW
APPROVED BY JGW

CORNERSTONE Environmental Group, LLC

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
CELL 13
SLOPE STABILITY SECTION LOCATIONS

FIGURE **4**

PROJECT NO. 070340

File: C:\Documents and Settings\justin.desmeyer\My Documents\PROJECTS_COUNTYWIDE CT\PHASE\CELL 13 SLOPE STABILITY.dwg Layout: Layout1 User: Justin.Desmeyer Jun 30, 2008 - 2:01pm

0" 1/2" 1" 2"

CELL 13 SLOPE STABILITY CALCULATIONS

COUNTYWIDE - 2008 PTI ALTERATION CELL 13, SECTION A-A' (EL 1160 & 1260)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c13_a-a'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 01:44PM

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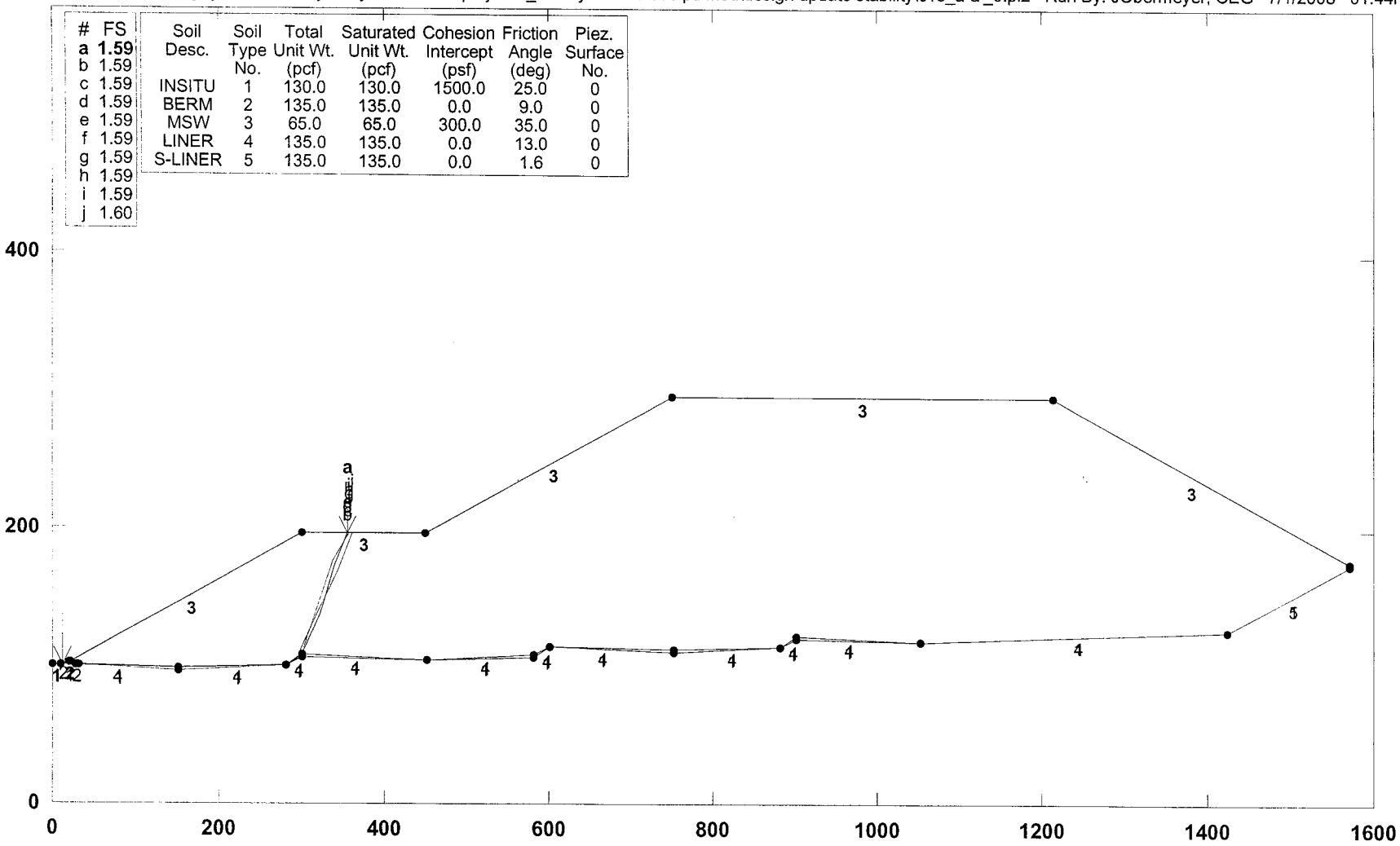
b	1.59
c	1.59
d	1.59
e	1.59
f	1.59
g	1.59
h	1.59
i	1.59
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	1.6	0



STABL6H FSmin=1.59

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 01:44PM
Run By: JObermeyer, CEG
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Output Filename: C:c13_a-a'_0.OUT
Plotted Output Filename: C:c13_a-a'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 13, SECTION A-A' (EL 1160 & 1260)

BOUNDARY COORDINATES
8 Top Boundaries
35 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.80	1
2	10.02	99.80	19.03	102.90	2
3	19.03	102.90	21.04	102.90	2
4	21.04	102.90	300.67	196.28	3
5	300.67	196.28	450.67	196.28	3
6	450.67	196.28	750.13	296.28	3
7	750.13	296.28	1213.94	296.28	3
8	1213.94	296.28	1571.28	177.64	3
9	21.04	102.90	28.20	100.44	2
10	28.20	100.44	150.27	98.00	4
11	150.27	98.00	279.95	100.83	4
12	279.95	100.83	300.38	107.65	4
13	300.38	107.65	450.81	104.57	4
14	450.81	104.57	580.48	107.47	4
15	580.48	107.47	600.92	114.30	4
16	600.92	114.30	751.35	111.30	4
17	751.35	111.30	881.02	114.15	4
18	881.02	114.15	901.45	120.97	4
19	901.45	120.97	1051.89	118.02	4
20	1051.89	118.02	1423.42	126.48	4
21	1423.42	126.48	1571.28	175.68	5
22	28.20	100.40	31.28	99.38	2
23	31.28	99.38	150.27	97.00	1
24	150.27	97.00	280.12	99.84	1
25	280.12	99.84	300.54	106.65	1
26	300.54	106.65	450.81	103.57	1
27	450.81	103.57	580.65	106.48	1
28	580.65	106.48	601.07	113.29	1
29	601.07	113.29	751.35	110.30	1
30	751.35	110.30	881.19	113.16	1
31	881.19	113.16	901.60	119.97	1
32	901.60	119.97	1051.89	117.02	1
33	1051.89	117.02	1423.59	125.48	1
34	1423.59	125.48	1571.28	174.63	1
35	10.02	99.80	31.28	99.38	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	1.6	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	12.76	100.25	12.86	100.25	0.25
2	150.27	97.50	150.37	97.50	0.25
3	280.12	100.36	280.22	100.36	0.25
4	281.12	100.70	299.53	106.84	0.25

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 Janbu Method * *
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.589 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.589 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.589 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.589 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.589 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.49	100.65
2	12.84	100.33
3	150.36	97.53
4	280.21	100.34
5	298.33	106.49
6	317.42	141.64
7	338.21	175.81
8	357.84	196.28

*** 1.592 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.49	100.65
2	12.84	100.33
3	150.36	97.53
4	280.21	100.34
5	298.33	106.49
6	317.42	141.64
7	338.21	175.81
8	357.84	196.28

*** 1.592 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.49	100.65
2	12.84	100.33
3	150.36	97.53
4	280.21	100.34
5	298.33	106.49
6	317.42	141.64
7	338.21	175.81
8	357.84	196.28

*** 1.592 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.49	100.65
2	12.84	100.33
3	150.36	97.53
4	280.21	100.34
5	298.33	106.49
6	317.42	141.64
7	338.21	175.81
8	357.84	196.28

*** 1.592 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.31	100.59
2	12.80	100.32
3	150.28	97.56
4	280.14	100.34
5	294.62	105.32
6	318.09	137.71
7	343.12	168.91
8	360.82	196.28

*** 1.596 ***

COUNTYWIDE - 2008 PTI ALTERATION CELL 13, SECTION A-A' (EL 1160 & 1260)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c13_a-a'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:26PM

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b	1.19
c	1.19
d	1.19
e	1.19
f	1.19
g	1.19
h	1.19
i	1.19
j	1.19

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	1.6	0

Load	Value
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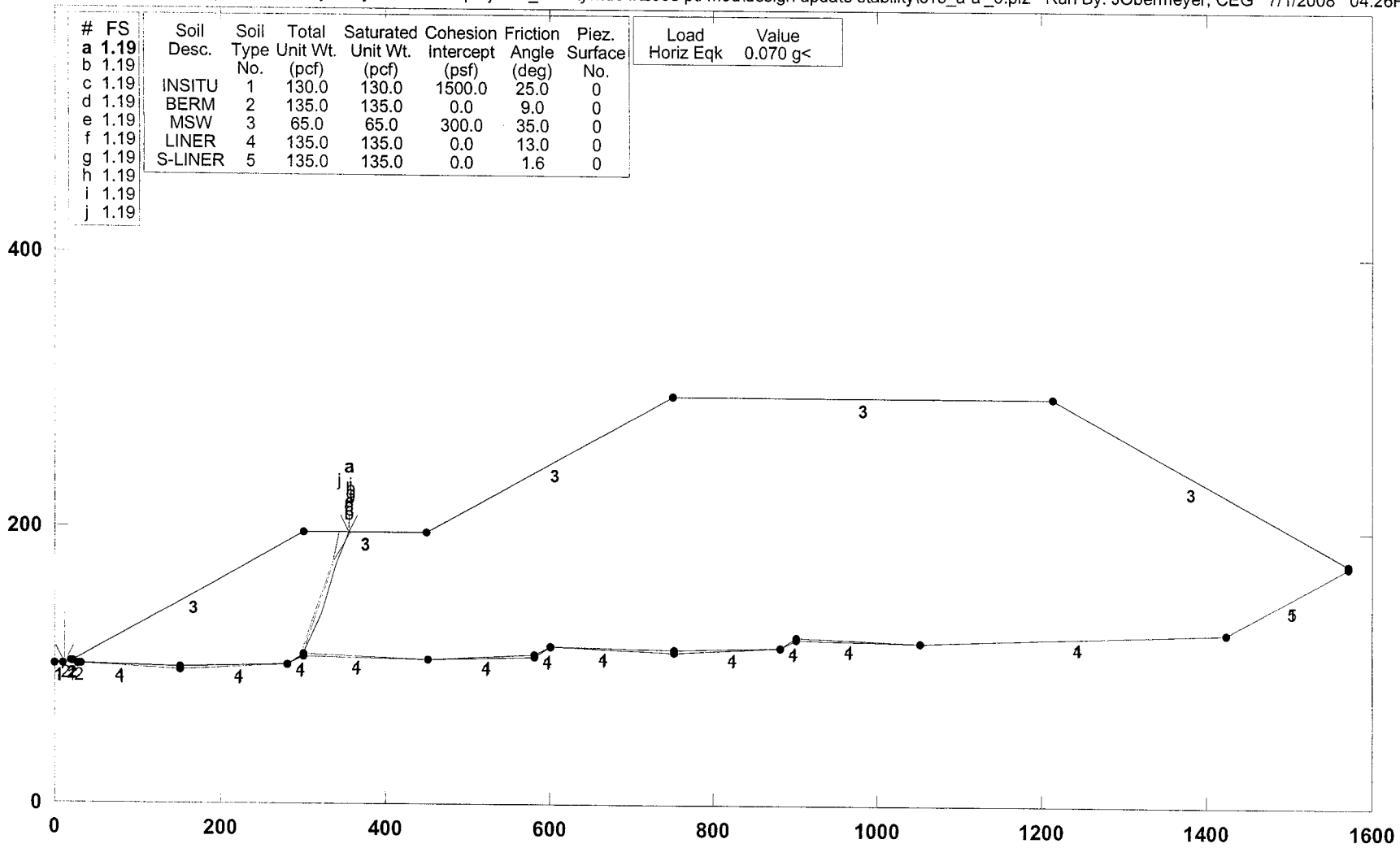

STABL6H FSmin=1.19

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:26PM
Run By: JObermeyer, CEG
Input Data Filename: C:c13_a-a'_0.in
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Plotted Output Filename: C:c13_a-a'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 13, SECTION A-A' (EL 1160 & 1260)

BOUNDARY COORDINATES
8 Top Boundaries
35 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.80	1
2	10.02	99.80	19.03	102.90	2
3	19.03	102.90	21.04	102.90	2
4	21.04	102.90	300.67	196.28	3
5	300.67	196.28	450.67	196.28	3
6	450.67	196.28	750.13	296.28	3
7	750.13	296.28	1213.94	296.28	3
8	1213.94	296.28	1571.28	177.64	3
9	21.04	102.90	28.20	100.44	2
10	28.20	100.44	150.27	98.00	4
11	150.27	98.00	279.95	100.83	4
12	279.95	100.83	300.38	107.65	4
13	300.38	107.65	450.81	104.57	4
14	450.81	104.57	580.48	107.47	4
15	580.48	107.47	600.92	114.30	4
16	600.92	114.30	751.35	111.30	4
17	751.35	111.30	881.02	114.15	4
18	881.02	114.15	901.45	120.97	4
19	901.45	120.97	1051.89	118.02	4
20	1051.89	118.02	1423.42	126.48	4
21	1423.42	126.48	1571.28	175.68	5
22	28.20	100.40	31.28	99.38	2
23	31.28	99.38	150.27	97.00	1
24	150.27	97.00	280.12	99.84	1
25	280.12	99.84	300.54	106.65	1
26	300.54	106.65	450.81	103.57	1
27	450.81	103.57	580.65	106.48	1
28	580.65	106.48	601.07	113.29	1
29	601.07	113.29	751.35	110.30	1
30	751.35	110.30	881.19	113.16	1
31	881.19	113.16	901.60	119.97	1
32	901.60	119.97	1051.89	117.02	1
33	1051.89	117.02	1423.59	125.48	1
34	1423.59	125.48	1571.28	174.63	1
35	10.02	99.80	31.28	99.38	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	1.6	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been

Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	12.76	100.25	12.86	100.25	0.25
2	150.27	97.50	150.37	97.50	0.25
3	280.12	100.36	280.22	100.36	0.25
4	281.12	100.70	299.53	106.84	0.25

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 Janbu Method * *
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.187 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.187 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.187 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36
5	297.59	106.19
6	321.56	138.21
7	340.42	173.49
8	354.72	196.28

*** 1.187 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.30	100.58
2	12.81	100.18
3	150.31	97.62
4	280.12	100.36

```
     5        297.59      106.19
     6        321.56      138.21
     7        340.42      173.49
     8        354.72      196.28
       ***     1.187   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.49      100.65
     2        12.84      100.33
     3       150.36       97.53
     4       280.21      100.34
     5       298.33      106.49
     6       317.42      141.64
     7       338.21      175.81
     8       357.84      196.28
       ***     1.188   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.49      100.65
     2        12.84      100.33
     3       150.36       97.53
     4       280.21      100.34
     5       298.33      106.49
     6       317.42      141.64
     7       338.21      175.81
     8       357.84      196.28
       ***     1.188   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.49      100.65
     2        12.84      100.33
     3       150.36       97.53
     4       280.21      100.34
     5       298.33      106.49
     6       317.42      141.64
     7       338.21      175.81
     8       357.84      196.28
       ***     1.188   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.49      100.65
     2        12.84      100.33
     3       150.36       97.53
     4       280.21      100.34
     5       298.33      106.49
     6       317.42      141.64
     7       338.21      175.81
     8       357.84      196.28
       ***     1.188   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.07      100.51
     2        12.84      100.27
     3       150.35       97.59
     4       280.18      100.36
     5       296.47      105.76
     6       315.99      140.68
     7       335.81      175.42
     8       344.18      196.28
       ***     1.192   ***
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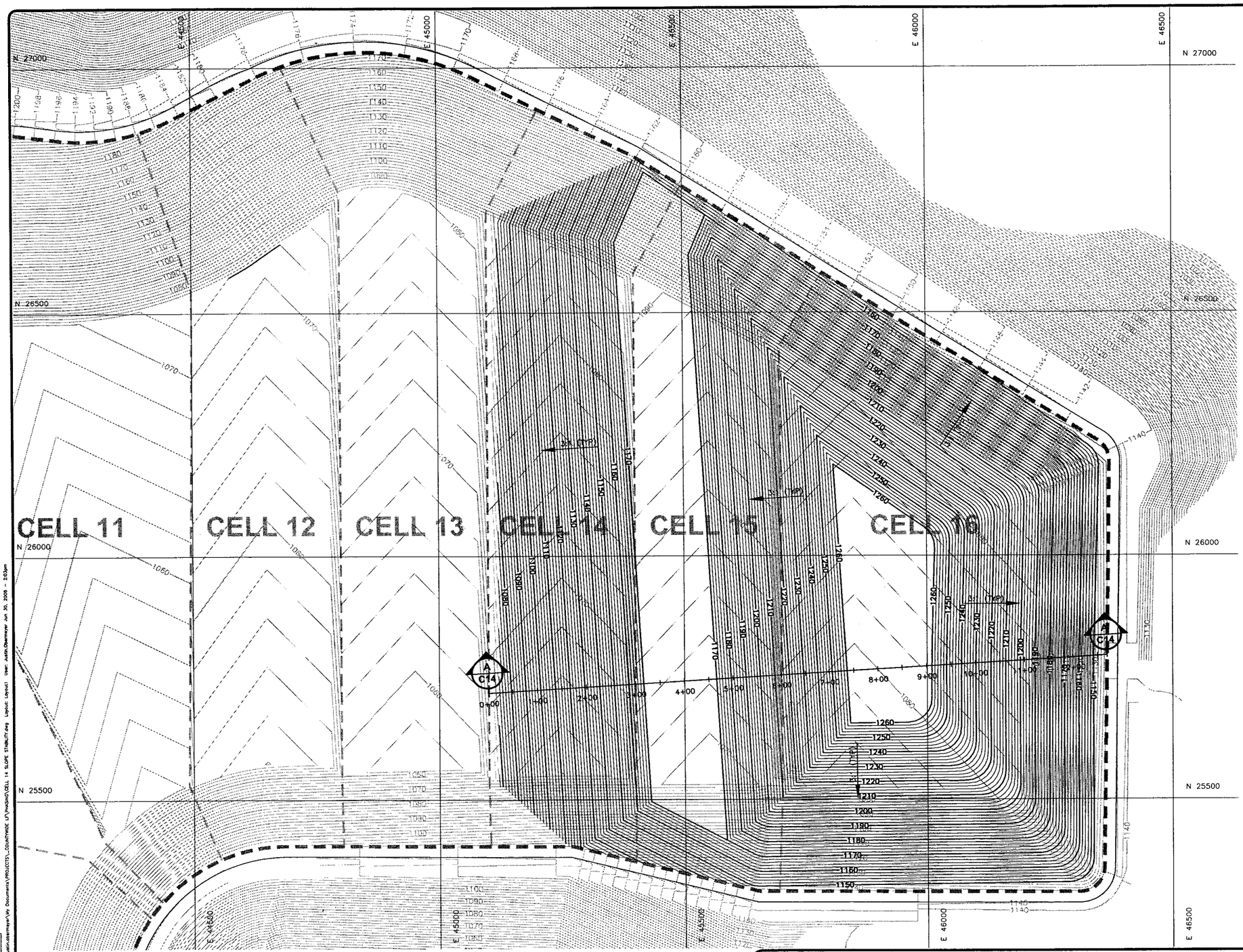

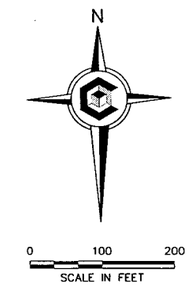

LEGEND

- LIMIT OF SOLID WASTE PLACEMENT
- 1090 — INTERMEDIATE TOW CONTOUR – 10'
- INTERMEDIATE TOW CONTOUR – 2'
- 1080 — EXISTING CONTOUR – 10'
- EXISTING CONTOUR – 2'

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 07/01/08
DRAWN BY JCO
DESIGNED BY JCO
CHECKED BY JGW
APPROVED BY JGW

CORNERSTONE Environmental Group, LLC

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
CELL 14
SLOPE STABILITY SECTION LOCATIONS

FIGURE
3
PROJECT NO.
070340

File: C:\Documents and Settings\justin.obermeyer\My Documents\PROJECTS_COUNTYWIDE LF\PHASING\CELL 14 SLOPE STABILITY.dwg Layout: Layout1 User: Justin.Obermeyer Jun 30, 2008 - 2:03pm

0" 1/2" 1" 2"

CELL 14 SLOPE STABILITY CALCULATIONS

COUNTYWIDE - 2008 PTI ALTERATION CELL 14, SECTION A-A' (EL 1170 & 1260)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c14_a-a'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:33PM

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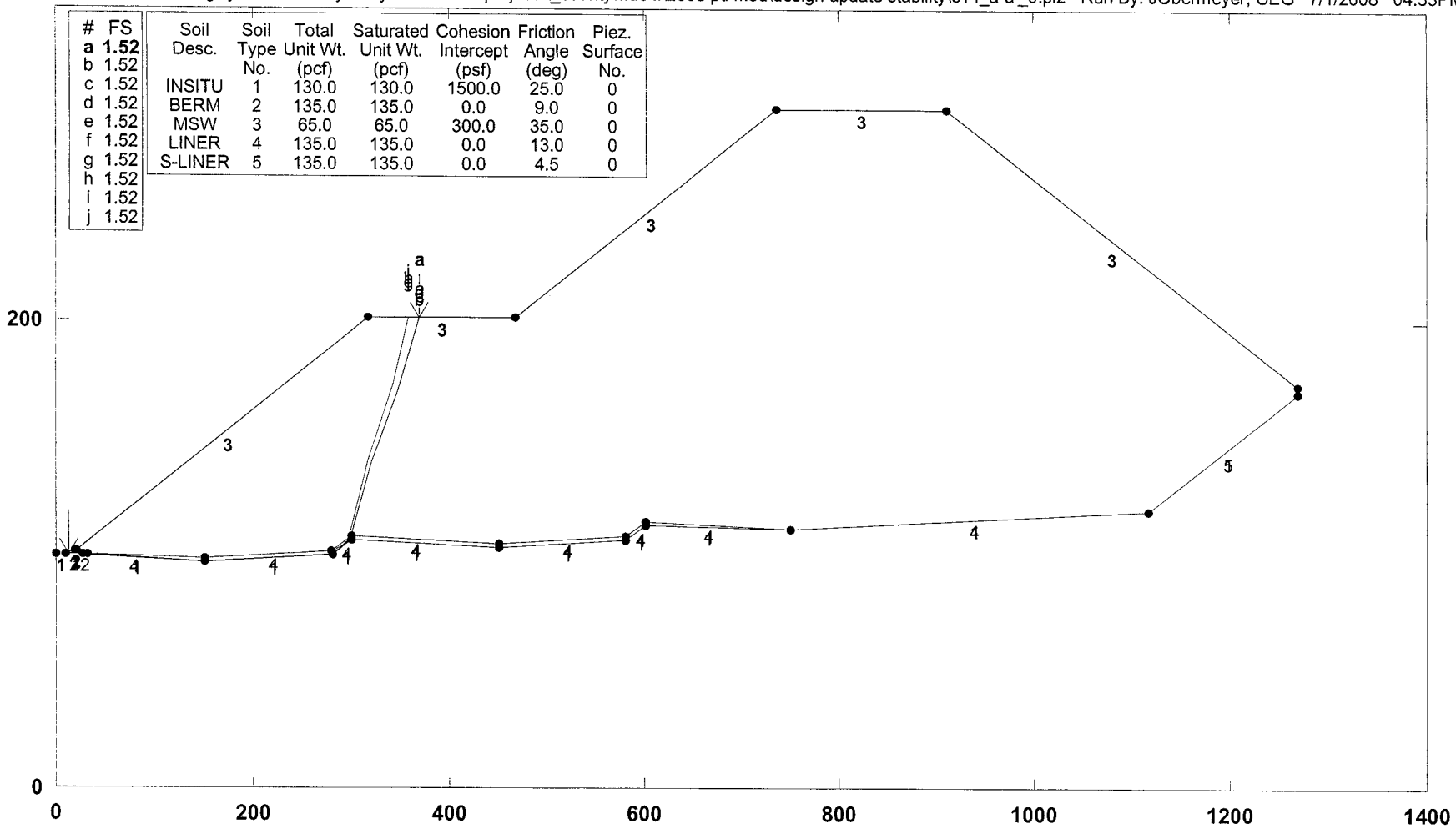
b	1.52
c	1.52
d	1.52
e	1.52
f	1.52
g	1.52
h	1.52
i	1.52
j	1.52

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0



STABL6H FSmin=1.52

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:33PM
Run By: JObermeyer, CEG
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Output Filename: C:c14_a-a'_0.OUT
Plotted Output Filename: C:c14_a-a'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 14, SECTION A-A' (EL 1170 & 1260)

BOUNDARY COORDINATES
8 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.79	1
2	10.02	99.79	19.03	101.75	2
3	19.03	101.75	21.04	101.75	2
4	21.04	101.75	317.98	201.46	3
5	317.98	201.46	467.98	201.46	3
6	467.98	201.46	735.99	291.46	3
7	735.99	291.46	911.25	291.46	3
8	911.25	291.46	1269.39	172.36	3
9	10.02	99.79	27.05	100.45	2
10	27.05	100.45	150.27	97.92	4
11	150.27	97.92	279.94	100.83	4
12	279.94	100.83	300.38	107.65	4
13	300.38	107.65	450.80	104.65	4
14	450.80	104.65	580.48	107.50	4
15	580.48	107.50	600.98	114.34	4
16	600.98	114.34	751.12	111.36	4
17	751.12	111.36	1116.75	119.69	4
18	1116.75	119.69	1269.39	170.40	5
19	27.05	100.45	32.14	99.37	2
20	32.14	99.37	150.27	96.92	1
21	150.27	96.92	280.12	99.83	1
22	280.12	99.83	300.53	106.65	1
23	300.53	106.65	450.81	103.65	1
24	450.81	103.65	580.66	106.51	1
25	580.66	106.51	601.13	113.33	1
26	601.13	113.33	751.12	110.36	1
27	751.12	110.36	1116.92	118.69	1
28	1116.92	118.69	1269.39	169.35	1
29	10.02	99.79	32.14	99.34	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Horizontal Earthquake Loading Coefficient
Of0.000 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been

Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	14.23	100.21	14.33	100.21	0.25
2	150.27	97.42	150.37	97.42	0.25
3	280.12	100.36	280.22	100.36	0.25
4	281.12	100.69	299.53	106.84	0.25

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 Janbu Method * *
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.516 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.516 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.516 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.516 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43

```
     5        299.03      106.57
     6        321.20      139.86
     7        347.13      170.32
     8        370.48      201.46
       ***     1.516   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        13.42      100.53
     2        14.24      100.14
     3       150.33       97.52
     4       280.22      100.38
     5       297.37      106.23
     6       318.05      140.48
     7       342.30      172.29
     8       359.38      201.46
       ***     1.516   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        13.42      100.53
     2        14.24      100.14
     3       150.33       97.52
     4       280.22      100.38
     5       297.37      106.23
     6       318.05      140.48
     7       342.30      172.29
     8       359.38      201.46
       ***     1.516   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        13.42      100.53
     2        14.24      100.14
     3       150.33       97.52
     4       280.22      100.38
     5       297.37      106.23
     6       318.05      140.48
     7       342.30      172.29
     8       359.38      201.46
       ***     1.516   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        13.42      100.53
     2        14.24      100.14
     3       150.33       97.52
     4       280.22      100.38
     5       297.37      106.23
     6       318.05      140.48
     7       342.30      172.29
     8       359.38      201.46
       ***     1.516   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        13.42      100.53
     2        14.24      100.14
     3       150.33       97.52
     4       280.22      100.38
     5       297.37      106.23
     6       318.05      140.48
     7       342.30      172.29
     8       359.38      201.46
       ***     1.516   ***
```

COUNTYWIDE - 2008 PTI ALTERATION CELL 14, SECTION A-A' (EL 1170 & 1260)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c14_a-a'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:33PM

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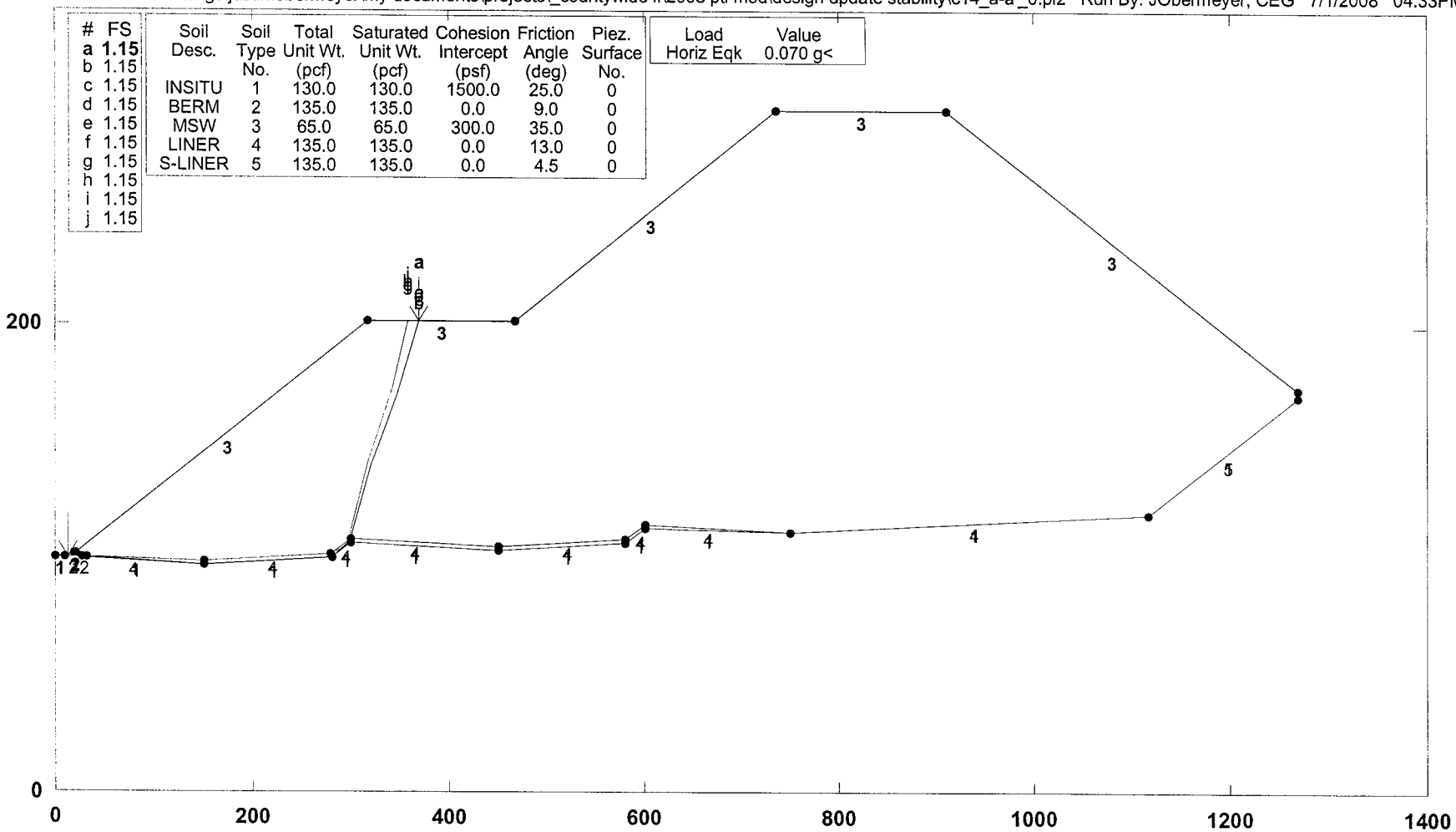
b	1.15
c	1.15
d	1.15
e	1.15
f	1.15
g	1.15
h	1.15
i	1.15
j	1.15

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0

Load	Value
Horiz Eqk	0.070 g<



STABL6H FSmin=1.15

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:33PM
Run By: JObermeyer, CEG
Input Data Filename: C:c14_a-a'_0.in
Output Filename: C:c14_a-a'_0.OUT
Plotted Output Filename: C:c14_a-a'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 14, SECTION A-A' (EL 1170 & 1260)

BOUNDARY COORDINATES
8 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.79	1
2	10.02	99.79	19.03	101.75	2
3	19.03	101.75	21.04	101.75	2
4	21.04	101.75	317.98	201.46	3
5	317.98	201.46	467.98	201.46	3
6	467.98	201.46	735.99	291.46	3
7	735.99	291.46	911.25	291.46	3
8	911.25	291.46	1269.39	172.36	3
9	10.02	99.79	27.05	100.45	2
10	27.05	100.45	150.27	97.92	4
11	150.27	97.92	279.94	100.83	4
12	279.94	100.83	300.38	107.65	4
13	300.38	107.65	450.80	104.65	4
14	450.80	104.65	580.48	107.50	4
15	580.48	107.50	600.98	114.34	4
16	600.98	114.34	751.12	111.36	4
17	751.12	111.36	1116.75	119.69	4
18	1116.75	119.69	1269.39	170.40	5
19	27.05	100.45	32.14	99.37	2
20	32.14	99.37	150.27	96.92	1
21	150.27	96.92	280.12	99.83	1
22	280.12	99.83	300.53	106.65	1
23	300.53	106.65	450.81	103.65	1
24	450.81	103.65	580.66	106.51	1
25	580.66	106.51	601.13	113.33	1
26	601.13	113.33	751.12	110.36	1
27	751.12	110.36	1116.92	118.69	1
28	1116.92	118.69	1269.39	169.35	1
29	10.02	99.79	32.14	99.34	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	14.23	100.21	14.33	100.21	0.25
2	150.27	97.42	150.37	97.42	0.25
3	280.12	100.36	280.22	100.36	0.25
4	281.12	100.69	299.53	106.84	0.25

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 Janbu Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.28	100.50
2	14.27	100.11
3	150.36	97.32
4	280.16	100.43
5	299.03	106.57
6	321.20	139.86
7	347.13	170.32
8	370.48	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.42	100.53
2	14.24	100.14
3	150.33	97.52
4	280.22	100.38
5	297.37	106.23
6	318.05	140.48
7	342.30	172.29
8	359.38	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.42	100.53
2	14.24	100.14
3	150.33	97.52
4	280.22	100.38
5	297.37	106.23
6	318.05	140.48
7	342.30	172.29
8	359.38	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.42	100.53
2	14.24	100.14
3	150.33	97.52
4	280.22	100.38
5	297.37	106.23
6	318.05	140.48
7	342.30	172.29
8	359.38	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

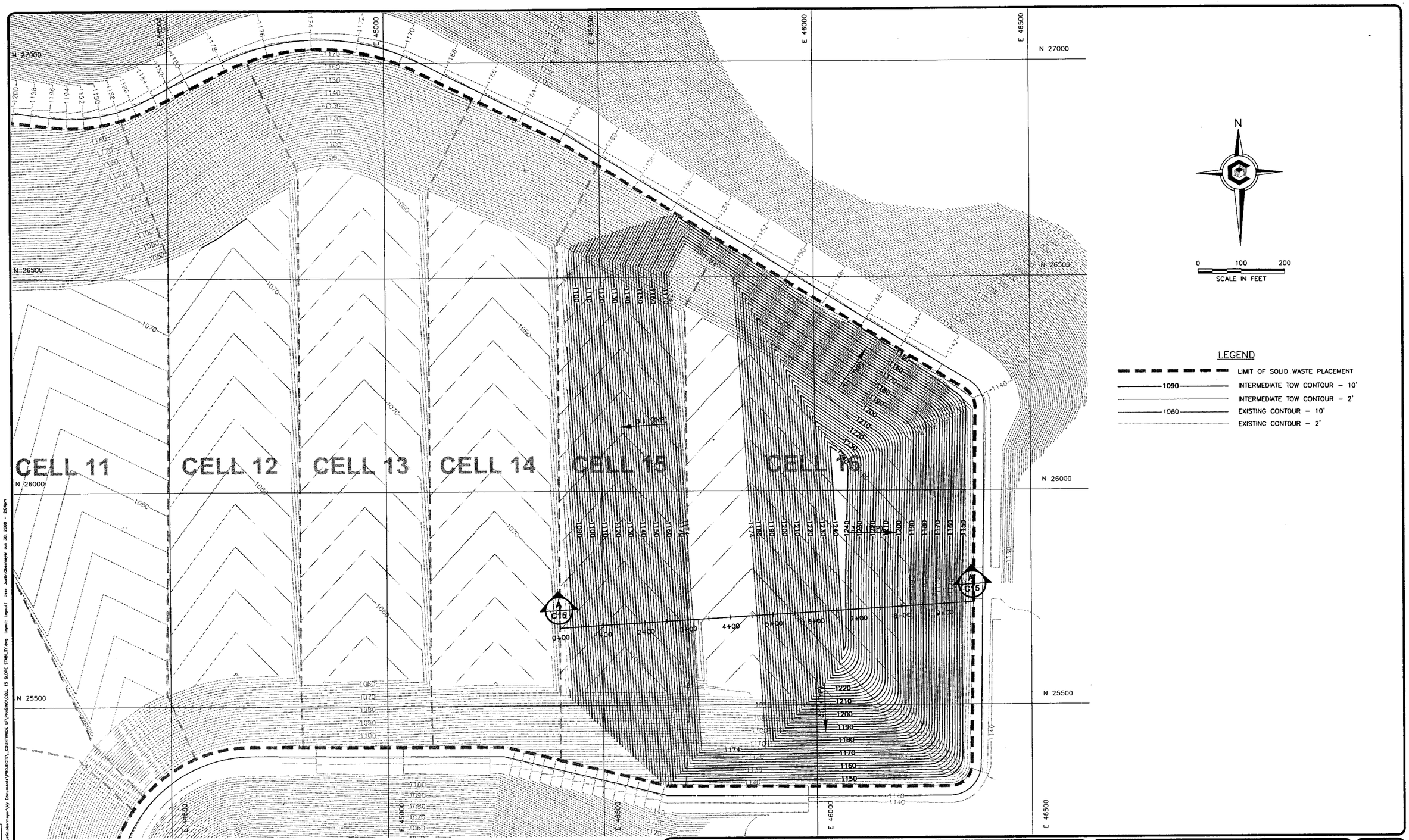
Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.42	100.53
2	14.24	100.14
3	150.33	97.52
4	280.22	100.38
5	297.37	106.23
6	318.05	140.48
7	342.30	172.29
8	359.38	201.46

*** 1.149 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.42	100.53
2	14.24	100.14
3	150.33	97.52
4	280.22	100.38
5	297.37	106.23
6	318.05	140.48
7	342.30	172.29
8	359.38	201.46

*** 1.149 ***



REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 07/01/08
DRAWN BY JCO
DESIGNED BY JCO
CHECKED BY JGW
APPROVED BY JGW

CORNERSTONE Environmental Group, LLC

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
CELL 15
SLOPE STABILITY SECTION LOCATIONS

FIGURE **2**

PROJECT NO. 070340

File: C:\Documents and Settings\jason.rosenmeyer\My Documents\PROJECTS_COUNTYWIDE LF\PHASE IV\CELL 15 SLOPE STABILITY.dwg Layout: Layout1 User: Jason.Rosenmeyer Jun 30, 2008 - 2:04pm

0" 1/2" 1" 2"

CELL 15 SLOPE STABILITY CALCULATIONS

COUNTYWIDE - 2008 PTI ALTERATION CELL 15, SECTION A-A' (EL 1174 & 1240)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c15_a-a'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:40PM

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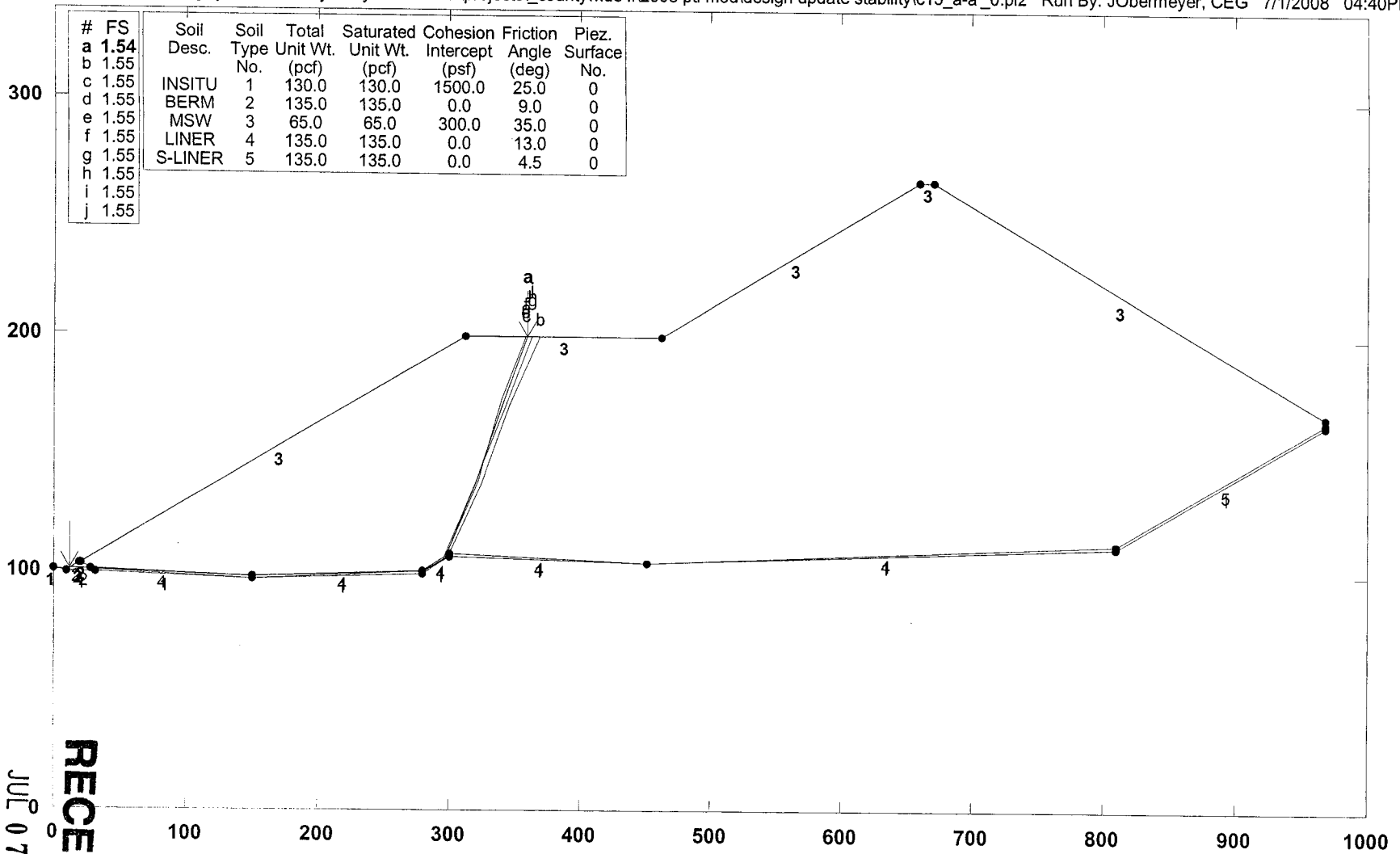
b	1.55
c	1.55
d	1.55
e	1.55
f	1.55
g	1.55
h	1.55
i	1.55
j	1.55

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0



STABL6H FSmin=1.54

Safety Factors Are Calculated By The Modified Janbu Method

RECEIVED
JUL 07 2008
OHIO EPA NEDO
STED

**** STABL6H ****

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer`s Method of Slices

Run Date: 7/1/2008

Time of Run: 04:40PM

Run By: JObermeyer, CEG

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Output Filename: C:c15_a-a'_0.OUT

Plotted Output Filename: C:c15_a-a'_0.PLT

PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 15, SECTION A-A' (EL 1174 & 1240)

BOUNDARY COORDINATES

8 Top Boundaries

23 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.78	1
2	10.02	99.78	19.03	102.65	2
3	19.03	102.65	21.04	102.65	2
4	21.04	102.65	311.88	199.78	3
5	311.88	199.78	461.88	199.78	3
6	461.88	199.78	659.53	265.78	3

7	659.53	265.78	670.64	265.78	3
8	670.64	265.78	968.03	166.82	3
9	21.04	102.65	27.78	100.40	2
10	27.78	100.40	150.27	97.85	4
11	150.27	97.85	279.95	100.70	4
12	279.95	100.70	300.38	107.52	4
13	300.38	107.52	450.81	104.56	4
14	450.81	104.56	809.34	112.17	4
15	809.34	112.17	968.03	164.87	5
16	27.78	100.40	30.98	99.33	2
17	30.98	99.33	150.27	96.85	1
18	150.27	96.85	280.12	99.70	1
19	280.12	99.70	300.53	106.51	1
20	300.53	106.51	450.81	103.56	1
21	450.81	103.56	809.51	111.17	1
22	809.51	111.17	968.03	163.81	1
23	10.02	99.78	30.98	99.33	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Horizontal Earthquake Loading Coefficient
Of0.000 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	12.97	100.22	13.07	100.22	0.25
2	150.27	97.35	150.37	97.35	0.25
3	280.12	100.23	280.22	100.23	0.25
4	281.12	100.56	299.53	106.71	0.25

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 Janbu Method * *
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.51	100.57
2	13.02	100.10
3	150.35	97.43
4	280.22	100.18
5	296.83	105.70
6	320.44	137.99
7	341.68	171.88
8	359.23	199.78

*** 1.540 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.56	100.59

```
    2          13.03       100.15
    3         150.28        97.32
    4         280.19       100.15
    5         298.56       106.35
    6         324.06       137.17
    7         346.05       170.58
    8         369.36       199.78
      ***      1.545    ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.58       100.60
    2          13.00       100.19
    3         150.35        97.27
    4         280.15       100.34
    5         296.90       105.77
    6         321.42       137.37
    7         340.62       172.46
    8         358.17       199.78
      ***      1.545    ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.58       100.60
    2          13.00       100.19
    3         150.35        97.27
    4         280.15       100.34
    5         296.90       105.77
    6         321.42       137.37
    7         340.62       172.46
    8         358.17       199.78
      ***      1.545    ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.58       100.60
    2          13.00       100.19
    3         150.35        97.27
    4         280.15       100.34
    5         296.90       105.77
    6         321.42       137.37
    7         340.62       172.46
    8         358.17       199.78
      ***      1.545    ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.58       100.60
    2          13.00       100.19
    3         150.35        97.27
    4         280.15       100.34
    5         296.90       105.77
    6         321.42       137.37
    7         340.62       172.46
    8         358.17       199.78
      ***      1.545    ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.56       100.59
    2          13.06       100.21
    3         150.37        97.34
    4         280.21       100.28
    5         294.76       105.08
    6         319.98       136.13
    7         342.05       169.49
    8         362.45       199.78
      ***      1.551    ***
Failure Surface Specified By  8 Coordinate Points
  Point       X-Surf       Y-Surf
```

```
  No.        (ft)        (ft)
   1         12.56      100.59
   2         13.06      100.21
   3        150.37       97.34
   4        280.21      100.28
   5        294.76      105.08
   6        319.98      136.13
   7        342.05      169.49
   8        362.45      199.78
     ***     1.551   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
  No.         (ft)        (ft)
   1         12.56      100.59
   2         13.06      100.21
   3        150.37       97.34
   4        280.21      100.28
   5        294.76      105.08
   6        319.98      136.13
   7        342.05      169.49
   8        362.45      199.78
     ***     1.551   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
  No.         (ft)        (ft)
   1         12.56      100.59
   2         13.06      100.21
   3        150.37       97.34
   4        280.21      100.28
   5        294.76      105.08
   6        319.98      136.13
   7        342.05      169.49
   8        362.45      199.78
     ***     1.551   ***
```

COUNTYWIDE - 2008 PTI ALTERATION CELL 15, SECTION A-A' (EL 1174 & 1240)

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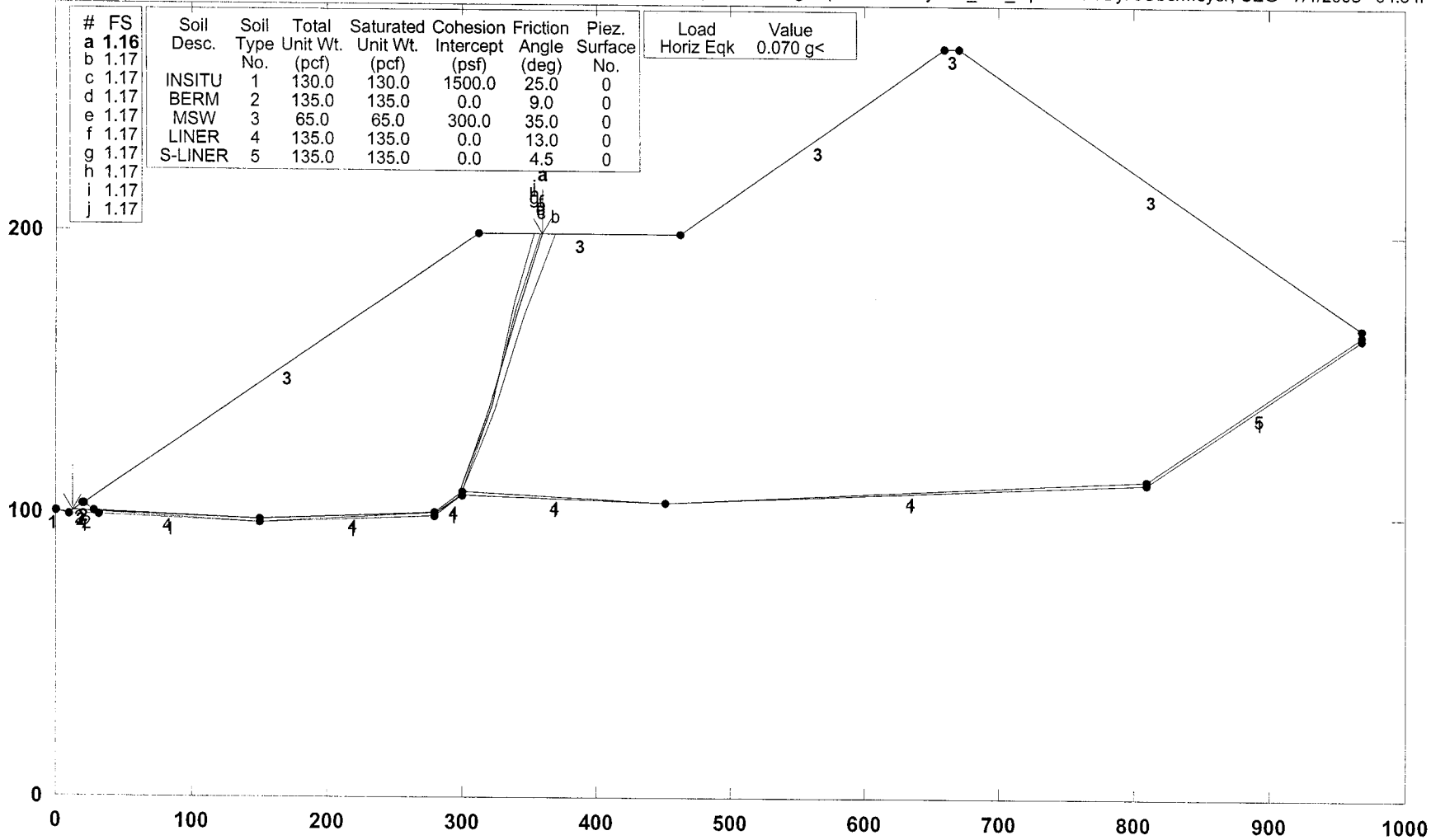
c	1.17
d	1.17
e	1.17
f	1.17
g	1.17
h	1.17
i	1.17
j	1.17

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0

Load	Value
Horiz Eqk	0.070 g<



STABL6H FSmin=1.16

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:34PM
Run By: JObermeyer, CEG
Input Data Filename: C:c15_a-a'_0.in
Output Filename: C:c15_a-a'_0.OUT
Plotted Output Filename: C:c15_a-a'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 15, SECTION A-A' (EL 1174 & 1240)

BOUNDARY COORDINATES
8 Top Boundaries
23 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.02	99.78	1
2	10.02	99.78	19.03	102.65	2
3	19.03	102.65	21.04	102.65	2
4	21.04	102.65	311.88	199.78	3
5	311.88	199.78	461.88	199.78	3
6	461.88	199.78	659.53	265.78	3
7	659.53	265.78	670.64	265.78	3
8	670.64	265.78	968.03	166.82	3
9	21.04	102.65	27.78	100.40	2
10	27.78	100.40	150.27	97.85	4
11	150.27	97.85	279.95	100.70	4
12	279.95	100.70	300.38	107.52	4
13	300.38	107.52	450.81	104.56	4
14	450.81	104.56	809.34	112.17	4
15	809.34	112.17	968.03	164.87	5
16	27.78	100.40	30.98	99.33	2
17	30.98	99.33	150.27	96.85	1
18	150.27	96.85	280.12	99.70	1
19	280.12	99.70	300.53	106.51	1
20	300.53	106.51	450.81	103.56	1
21	450.81	103.56	809.51	111.17	1
22	809.51	111.17	968.03	163.81	1
23	10.02	99.78	30.98	99.33	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	12.97	100.22	13.07	100.22	0.25
2	150.27	97.35	150.37	97.35	0.25
3	280.12	100.23	280.22	100.23	0.25
4	281.12	100.56	299.53	106.71	0.25

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 Janbu Method * *
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.51	100.57
2	13.02	100.10
3	150.35	97.43
4	280.22	100.18
5	296.83	105.70
6	320.44	137.99
7	341.68	171.88
8	359.23	199.78

*** 1.162 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.56	100.59
2	13.03	100.15
3	150.28	97.32
4	280.19	100.15
5	298.56	106.35
6	324.06	137.17
7	346.05	170.58
8	369.36	199.78

*** 1.165 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.58	100.60
2	13.00	100.19
3	150.35	97.27
4	280.15	100.34
5	296.90	105.77
6	321.42	137.37
7	340.62	172.46
8	358.17	199.78

*** 1.165 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.58	100.60
2	13.00	100.19
3	150.35	97.27
4	280.15	100.34
5	296.90	105.77
6	321.42	137.37
7	340.62	172.46
8	358.17	199.78

*** 1.165 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.58	100.60
2	13.00	100.19
3	150.35	97.27
4	280.15	100.34
5	296.90	105.77
6	321.42	137.37
7	340.62	172.46
8	358.17	199.78

*** 1.165 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.58	100.60
2	13.00	100.19
3	150.35	97.27

```
     4        280.15      100.34
     5        296.90      105.77
     6        321.42      137.37
     7        340.62      172.46
     8        358.17      199.78
       ***     1.165   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.01      100.41
     2        13.04      100.17
     3       150.33       97.45
     4       280.20      100.16
     5       299.03      106.46
     6       322.78      138.64
     7       338.43      175.46
     8       353.29      199.78
       ***     1.167   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.01      100.41
     2        13.04      100.17
     3       150.33       97.45
     4       280.20      100.16
     5       299.03      106.46
     6       322.78      138.64
     7       338.43      175.46
     8       353.29      199.78
       ***     1.167   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.01      100.41
     2        13.04      100.17
     3       150.33       97.45
     4       280.20      100.16
     5       299.03      106.46
     6       322.78      138.64
     7       338.43      175.46
     8       353.29      199.78
       ***     1.167   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        12.01      100.41
     2        13.04      100.17
     3       150.33       97.45
     4       280.20      100.16
     5       299.03      106.46
     6       322.78      138.64
     7       338.43      175.46
     8       353.29      199.78
       ***     1.167   ***
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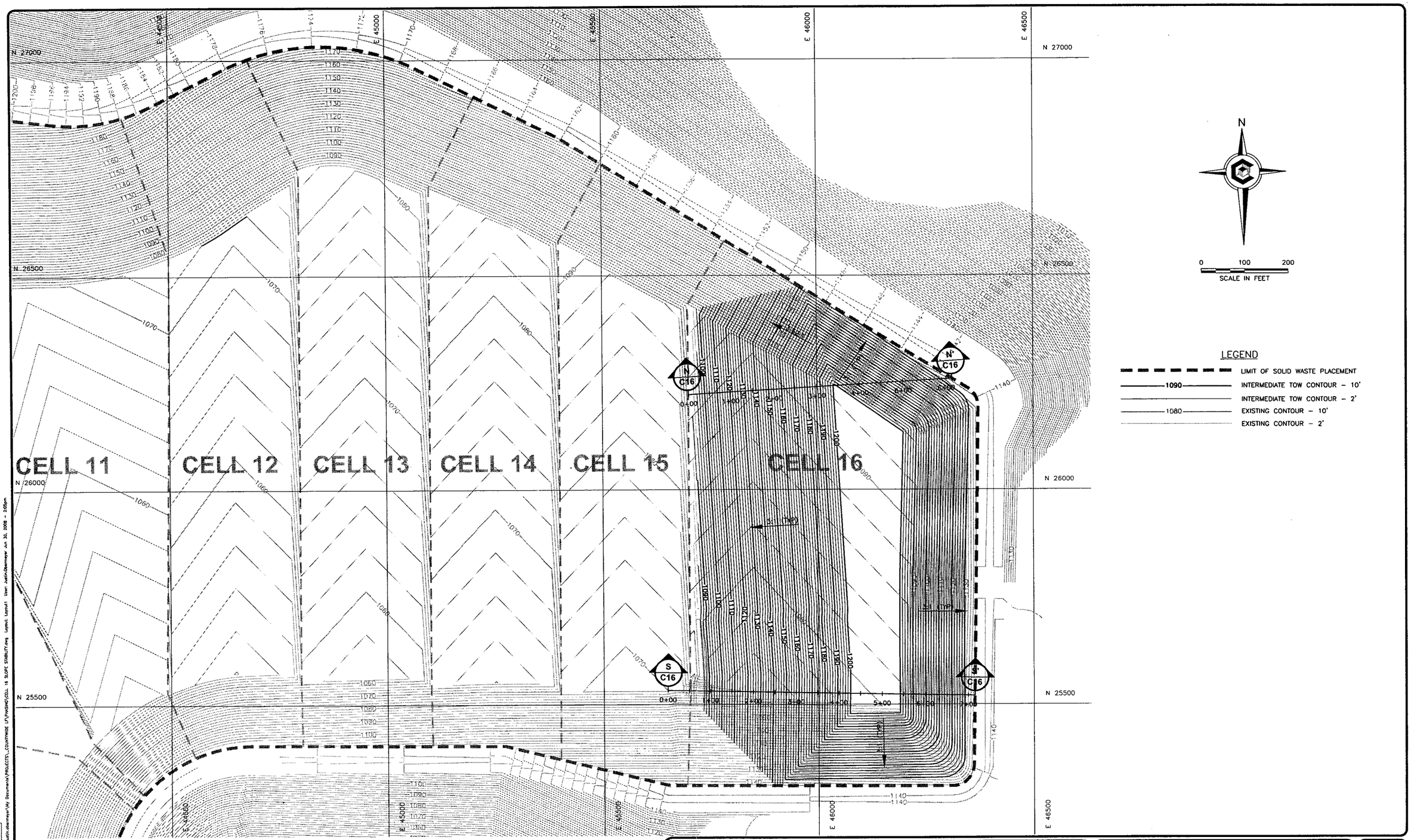

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 07/01/08
DRAWN BY JCO
DESIGNED BY JCO
CHECKED BY JGW
APPROVED BY JGW

CORNERSTONE Environmental Group, LLC

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
CELL 16
SLOPE STABILITY SECTION LOCATIONS

FIGURE
1
PROJECT NO.
070340

File: C:\Documents and Settings\justin.obermeyer\My Documents\PROJECTS_COUNTYWIDE LF\PHASING\CELL 16 SLOPE STABILITY.dwg Layout: Layout1 User: justin.obermeyer Jun 30, 2008 - 2:05pm

0" 1/2" 1" 2"

CELL 16 SLOPE STABILITY CALCULATIONS

COUNTYWIDE - 2008 PTI ALTERATION CELL 16, SECTION N-N' (EL 1200)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c16_n-n'_1.pl2 Run By: JObermeyer, CEG 7/1/2008 04:35PM

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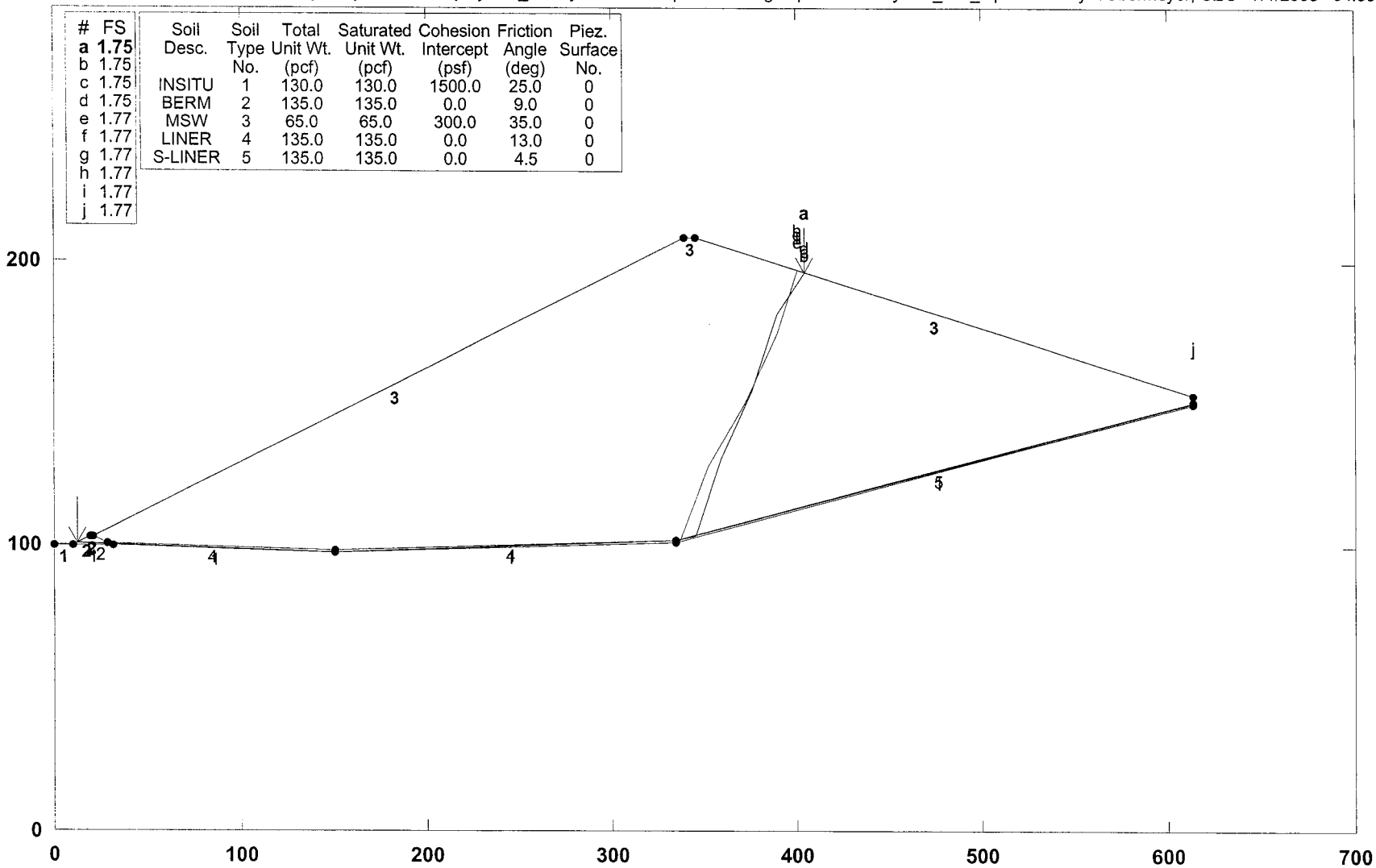
a	**1.75**
b	1.75
c	1.75
d	1.75
e	1.77
f	1.77
g	1.77
h	1.77
i	1.77
j	1.77

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0



STABL6H FSmin=1.75

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:35PM
Run By: JObermeyer, CEG
Input Data Filename: C:c16_n-n'_1.in
Output Filename: C:c16_n-n'_1.OUT
Plotted Output Filename: C:c16_n-n'_1.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 16, SECTION N-N' (EL 1200)

BOUNDARY COORDINATES
6 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.07	99.80	1
2	10.07	99.80	19.09	102.81	2
3	19.09	102.81	21.09	102.82	2
4	21.09	102.82	338.71	208.79	3
5	338.71	208.79	345.45	208.79	3
6	345.45	208.79	613.62	153.33	3
7	21.09	102.82	28.18	100.45	2
8	28.18	100.45	150.32	98.05	4
9	150.32	98.05	334.48	102.24	4
10	334.48	102.24	613.62	151.25	5
11	28.18	100.45	31.36	99.38	2
12	31.36	99.38	150.33	97.05	1
13	150.33	97.05	334.58	101.24	1
14	334.58	101.24	613.62	150.23	1
15	10.07	99.80	31.36	99.38	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Horizontal Earthquake Loading Coefficient
Of0.000 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	12.90	100.25	13.00	100.25	0.25
2	150.33	97.55	150.43	97.55	0.25
3	334.58	101.75	334.68	101.75	0.25
4	335.23	101.87	613.24	150.67	0.25

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 Janbu Method * *
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         12.21       100.51
    2         12.97       100.13
    3        150.33        97.53
    4        334.59       101.71
    5        345.26       103.53
    6        359.23       130.08
    7        375.51       155.28
    8        389.70       181.71
    9        404.55       196.57
      ***     1.750    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         12.21       100.51
    2         12.97       100.13
    3        150.33        97.53
    4        334.59       101.71
    5        345.26       103.53
    6        359.23       130.08
    7        375.51       155.28
    8        389.70       181.71
    9        404.55       196.57
      ***     1.750    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         12.21       100.51
    2         12.97       100.13
    3        150.33        97.53
    4        334.59       101.71
    5        345.26       103.53
    6        359.23       130.08
    7        375.51       155.28
    8        389.70       181.71
    9        404.55       196.57
      ***     1.750    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         12.21       100.51
    2         12.97       100.13
    3        150.33        97.53
    4        334.59       101.71
    5        345.26       103.53
    6        359.23       130.08
    7        375.51       155.28
    8        389.70       181.71
    9        404.55       196.57
      ***     1.750    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         12.61       100.65
    2         12.98       100.28
    3        150.39        97.55
    4        334.65       101.80
    5        336.98       102.09
    6        352.12       127.99
    7        372.14       150.32
    8        389.73       174.63
    9        400.36       197.43
      ***     1.768    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         12.61       100.65
```

```
     2          12.98       100.28
     3         150.39        97.55
     4         334.65       101.80
     5         336.98       102.09
     6         352.12       127.99
     7         372.14       150.32
     8         389.73       174.63
     9         400.36       197.43
       ***      1.768    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1         12.61       100.65
     2         12.98       100.28
     3         150.39        97.55
     4         334.65       101.80
     5         336.98       102.09
     6         352.12       127.99
     7         372.14       150.32
     8         389.73       174.63
     9         400.36       197.43
       ***      1.768    ***
Failure Surface Specified By  9 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1         12.61       100.65
     2         12.98       100.28
     3         150.39        97.55
     4         334.65       101.80
     5         336.98       102.09
     6         352.12       127.99
     7         372.14       150.32
     8         389.73       174.63
     9         400.36       197.43
       ***      1.768    ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1         12.56       100.63
     2         12.99       100.21
     3         150.36        97.48
     4         334.61       101.67
     5         610.98       150.35
     6         613.29       153.40
       ***      1.770    ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1         12.56       100.63
     2         12.99       100.21
     3         150.36        97.48
     4         334.61       101.67
     5         610.98       150.35
     6         613.29       153.40
       ***      1.770    ***
```

COUNTYWIDE - 2008 PTI ALTERATION CELL 16, SECTION N-N' (EL 1200)

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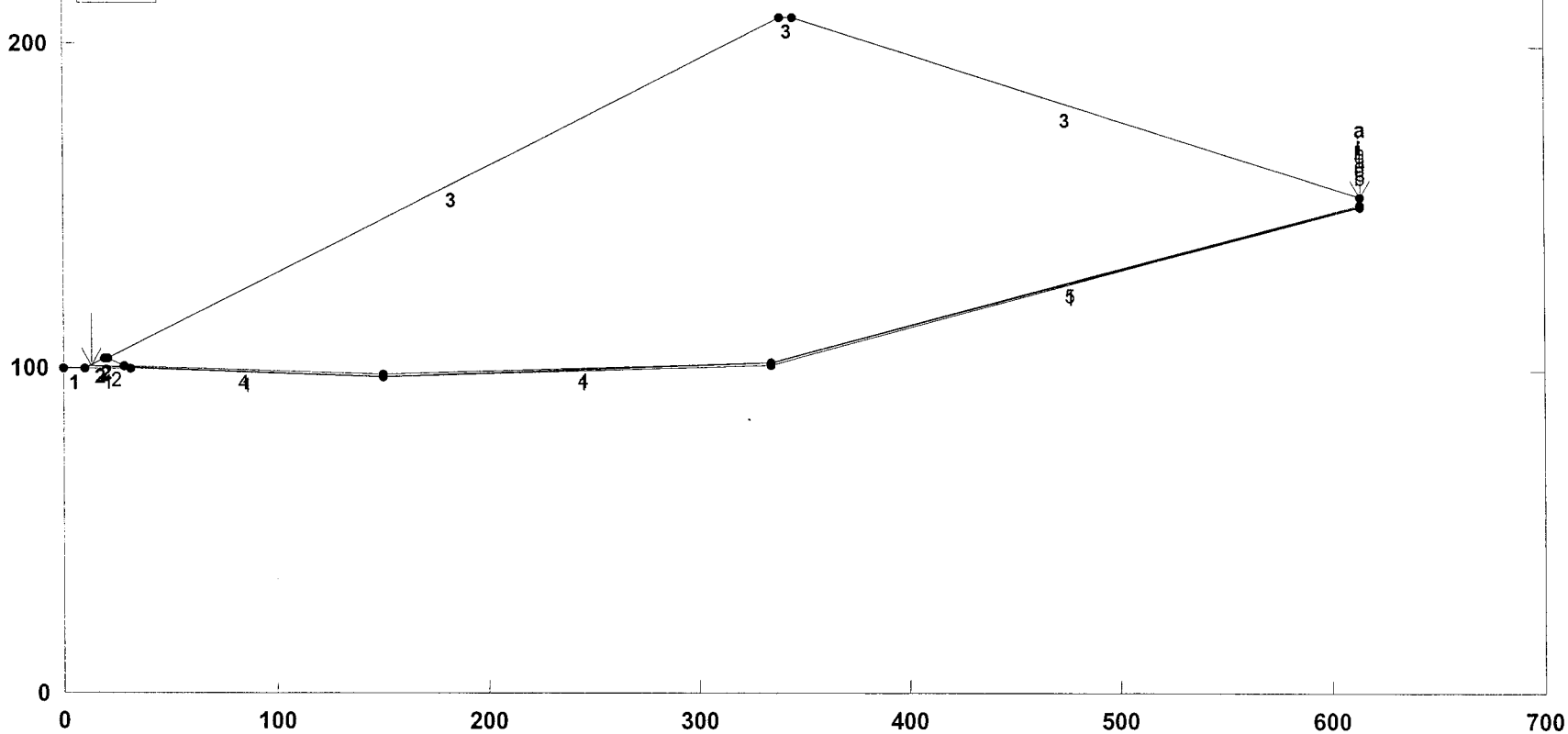
a	**1.00**
b	1.00
c	1.00
d	1.00
e	1.00
f	1.00
g	1.00
h	1.00
i	1.00
j	1.00

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0

Load	Value
Horiz Eqk	0.070 g<



STABL6H FSmin=1.00

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:35PM
Run By: JObermeyer, CEG
Input Data Filename: C:c16_n-n'_1.in
Output Filename: C:c16_n-n'_1.OUT
Plotted Output Filename: C:c16_n-n'_1.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 16, SECTION N-N' (EL 1200)

BOUNDARY COORDINATES
6 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	10.07	99.80	1
2	10.07	99.80	19.09	102.81	2
3	19.09	102.81	21.09	102.82	2
4	21.09	102.82	338.71	208.79	3
5	338.71	208.79	345.45	208.79	3
6	345.45	208.79	613.62	153.33	3
7	21.09	102.82	28.18	100.45	2
8	28.18	100.45	150.32	98.05	4
9	150.32	98.05	334.48	102.24	4
10	334.48	102.24	613.62	151.25	5
11	28.18	100.45	31.36	99.38	2
12	31.36	99.38	150.33	97.05	1
13	150.33	97.05	334.58	101.24	1
14	334.58	101.24	613.62	150.23	1
15	10.07	99.80	31.36	99.38	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	12.90	100.25	13.00	100.25	0.25
2	150.33	97.55	150.43	97.55	0.25
3	334.58	101.75	334.68	101.75	0.25
4	335.23	101.87	613.24	150.67	0.25

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 Janbu Method * *
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.66	100.67

```
    2          12.99       100.34
    3         150.42        97.53
    4         334.59       101.69
    5         612.14       150.37
    6         613.50       153.36
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.66       100.67
    2          12.99       100.34
    3         150.42        97.53
    4         334.59       101.69
    5         612.14       150.37
    6         613.50       153.36
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.66       100.67
    2          12.99       100.34
    3         150.42        97.53
    4         334.59       101.69
    5         612.14       150.37
    6         613.50       153.36
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.66       100.67
    2          12.99       100.34
    3         150.42        97.53
    4         334.59       101.69
    5         612.14       150.37
    6         613.50       153.36
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.56       100.63
    2          12.99       100.21
    3         150.36        97.48
    4         334.61       101.67
    5         610.98       150.35
    6         613.29       153.40
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.56       100.63
    2          12.99       100.21
    3         150.36        97.48
    4         334.61       101.67
    5         610.98       150.35
    6         613.29       153.40
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.56       100.63
    2          12.99       100.21
    3         150.36        97.48
    4         334.61       101.67
    5         610.98       150.35
    6         613.29       153.40
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.56       100.63
```

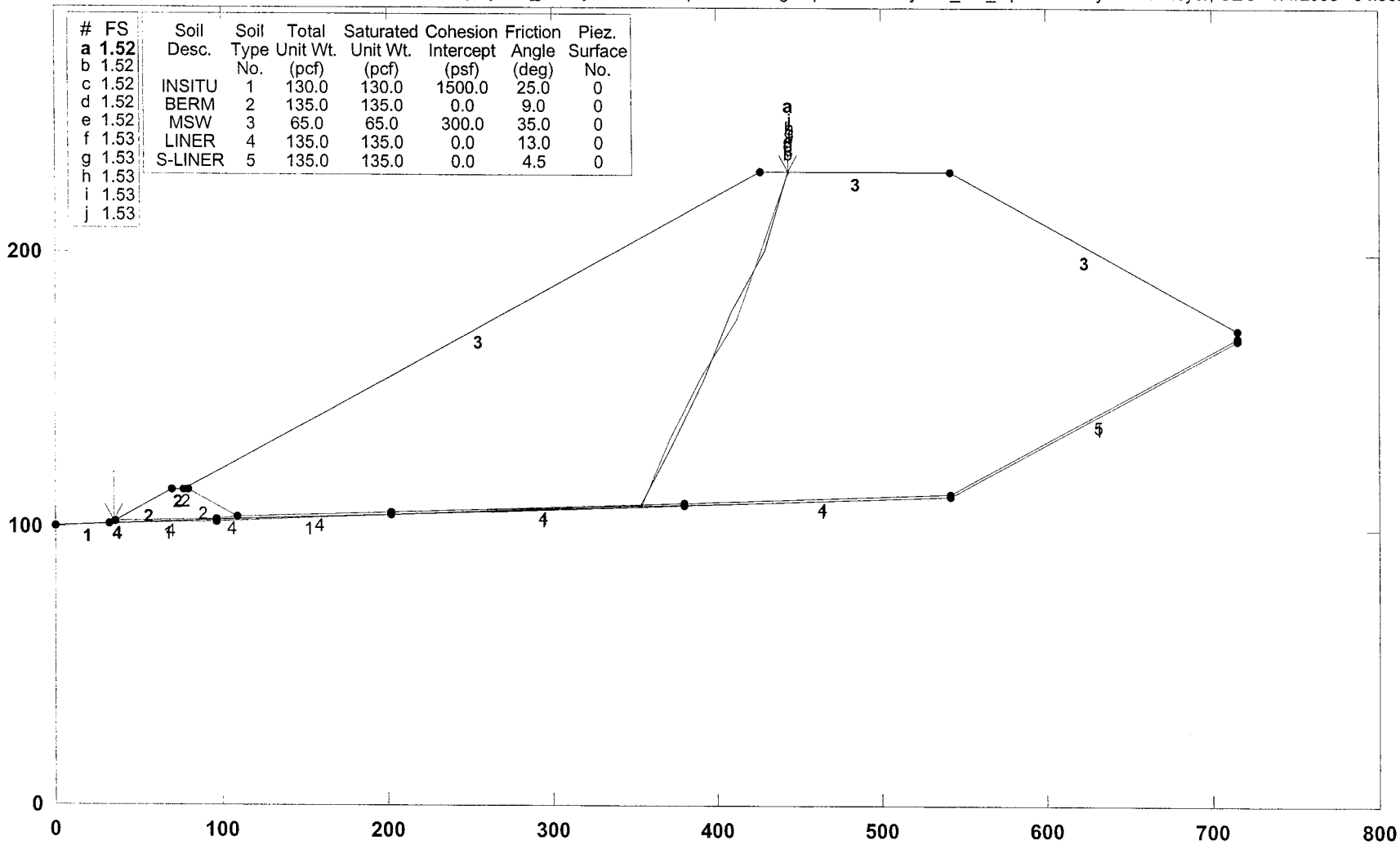
```
    2          12.99       100.21
    3         150.36        97.48
    4         334.61       101.67
    5         610.98       150.35
    6         613.29       153.40
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.56       100.63
    2          12.99       100.21
    3         150.36        97.48
    4         334.61       101.67
    5         610.98       150.35
    6         613.29       153.40
      ***      0.995   ***
Failure Surface Specified By  6 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          12.49       100.61
    2          12.99       100.30
    3         150.39        97.62
    4         334.64       101.85
    5         612.41       150.49
    6         613.04       153.45
      ***      0.995   ***
```

COUNTYWIDE - 2008 PTI ALTERATION CELL 16, SECTION S-S' (EL 1200)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c16_s-s'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:36PM

#	FS
a	**1.52**
b	1.52
c	1.52
d	1.52
e	1.52
f	1.53
g	1.53
h	1.53
i	1.53
j	1.53

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0



STABL6H FSmin=1.52

Safety Factors Are Calculated By The Modified Janbu Method

STED

** STABL6H **
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/1/2008
Time of Run: 04:36PM
Run By: JObermeyer, CEG
Input Data Filename: C:c16_s-s'_0.in
Output Filename: C:c16_s-s'_0.OUT
Plotted Output Filename: C:c16_s-s'_0.PLT
PROBLEM DESCRIPTION COUNTYWIDE - 2008 PTI ALTERATION
CELL 16, SECTION S-S' (EL 1200)

BOUNDARY COORDINATES
7 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	100.00	32.15	100.66	1
2	32.15	100.66	35.35	101.73	4
3	35.35	101.73	69.85	113.23	2
4	69.85	113.23	76.47	113.23	2
5	76.47	113.23	426.79	230.00	3
6	426.79	230.00	541.59	230.00	3
7	541.59	230.00	715.22	172.14	3
8	76.47	113.23	79.48	113.23	2
9	79.48	113.23	109.36	103.27	2
10	109.36	103.27	202.03	105.22	4
11	202.03	105.22	379.78	109.00	4
12	379.78	109.00	542.04	112.45	4
13	542.04	112.45	715.22	170.15	5
14	35.35	101.73	96.73	103.00	4
15	96.73	103.00	109.36	103.27	4
16	32.15	100.66	96.75	102.00	1
17	96.75	102.00	202.05	104.22	1
18	202.05	104.22	379.80	108.00	1
19	379.80	108.00	542.22	111.45	1
20	542.22	111.45	715.22	169.10	1

ISOTROPIC SOIL PARAMETERS
5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	130.0	1500.0	25.0	0.00	0.0	0
2	135.0	135.0	0.0	9.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0
4	135.0	135.0	0.0	13.0	0.00	0.0	0
5	135.0	135.0	0.0	4.5	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Horizontal Earthquake Loading Coefficient
Of0.000 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
4 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	35.35	101.23	35.45	101.23	0.25
2	109.36	102.77	109.46	102.77	0.25

3	202.05	104.72	202.15	104.72	0.25
4	260.59	105.97	418.45	109.32	0.25

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 Janbu Method * *

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.94	101.59
2	35.39	101.27
3	109.41	102.89
4	202.12	104.82
5	353.38	107.86
6	373.05	130.51
7	391.45	154.21
8	408.94	178.58
9	428.78	201.09
10	442.65	227.69
11	443.64	230.00

*** 1.524 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.94	101.59
2	35.39	101.27
3	109.41	102.89
4	202.12	104.82
5	353.38	107.86
6	373.05	130.51
7	391.45	154.21
8	408.94	178.58
9	428.78	201.09
10	442.65	227.69
11	443.64	230.00

*** 1.524 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.94	101.59
2	35.39	101.27
3	109.41	102.89
4	202.12	104.82
5	353.38	107.86
6	373.05	130.51
7	391.45	154.21
8	408.94	178.58
9	428.78	201.09
10	442.65	227.69
11	443.64	230.00

*** 1.524 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.94	101.59
2	35.39	101.27
3	109.41	102.89
4	202.12	104.82
5	353.38	107.86
6	373.05	130.51
7	391.45	154.21
8	408.94	178.58
9	428.78	201.09
10	442.65	227.69
11	443.64	230.00

*** 1.524 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.94	101.59

2	35.39	101.27
3	109.41	102.89
4	202.12	104.82
5	353.38	107.86
6	373.05	130.51
7	391.45	154.21
8	408.94	178.58
9	428.78	201.09
10	442.65	227.69
11	443.64	230.00

*** 1.524 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.98	101.61
2	35.39	101.20
3	109.40	102.85
4	202.14	104.67
5	353.89	107.86
6	371.44	132.19
7	390.78	155.12
8	411.91	176.42
9	427.69	201.93
10	442.35	228.11
11	443.89	230.00

*** 1.530 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.98	101.61
2	35.39	101.20
3	109.40	102.85
4	202.14	104.67
5	353.89	107.86
6	371.44	132.19
7	390.78	155.12
8	411.91	176.42
9	427.69	201.93
10	442.35	228.11
11	443.89	230.00

*** 1.530 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.98	101.61
2	35.39	101.20
3	109.40	102.85
4	202.14	104.67
5	353.89	107.86
6	371.44	132.19
7	390.78	155.12
8	411.91	176.42
9	427.69	201.93
10	442.35	228.11
11	443.89	230.00

*** 1.530 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.98	101.61
2	35.39	101.20
3	109.40	102.85
4	202.14	104.67
5	353.89	107.86
6	371.44	132.19
7	390.78	155.12
8	411.91	176.42
9	427.69	201.93
10	442.35	228.11
11	443.89	230.00

```
     ***     1.530   ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          34.98       101.61
    2          35.39       101.20
    3         109.40       102.85
    4         202.14       104.67
    5         353.89       107.86
    6         371.44       132.19
    7         390.78       155.12
    8         411.91       176.42
    9         427.69       201.93
   10         442.35       228.11
   11         443.89       230.00
     ***     1.530   ***
```

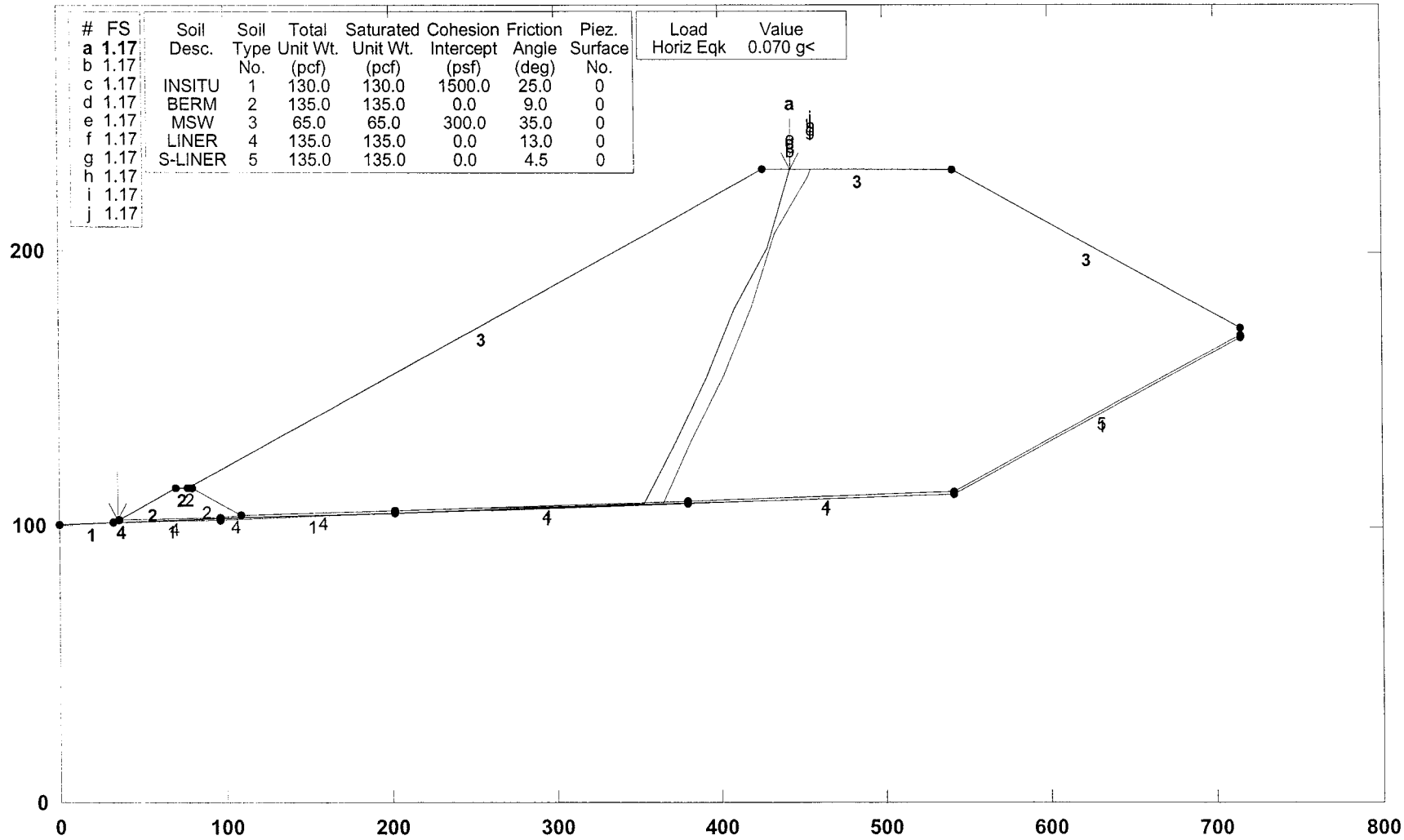
COUNTYWIDE - 2008 PTI ALTERATION CELL 16, SECTION S-S' (EL 1200)

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\c16_s-s'_0.pl2 Run By: JObermeyer, CEG 7/1/2008 04:36PM

#	FS
a	**1.17**
b	1.17
c	1.17
d	1.17
e	1.17
f	1.17
g	1.17
h	1.17
i	1.17
j	1.17

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
INSITU	1	130.0	130.0	1500.0	25.0	0
BERM	2	135.0	135.0	0.0	9.0	0
MSW	3	65.0	65.0	300.0	35.0	0
LINER	4	135.0	135.0	0.0	13.0	0
S-LINER	5	135.0	135.0	0.0	4.5	0

Load	Value
Horiz Eqk	0.070 g<



STABL6H FSmin=1.17

Safety Factors Are Calculated By The Modified Janbu Method

STED

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                    ** STABL6H  **
                          by
                   Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
Run Date:                    7/1/2008
Time of Run:                 04:36PM
Run By:                      JObermeyer, CEG
Input Data Filename:         C:c16_s-s'_0.in
Output Filename:             C:c16_s-s'_0.OUT
Plotted Output Filename:     C:c16_s-s'_0.PLT
PROBLEM DESCRIPTION   COUNTYWIDE - 2008 PTI ALTERATION
                      CELL 16, SECTION S-S'  (EL 1200)
BOUNDARY COORDINATES
    7 Top   Boundaries
   20 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     100.00      32.15     100.66        1
    2        32.15     100.66      35.35     101.73        4
    3        35.35     101.73      69.85     113.23        2
    4        69.85     113.23      76.47     113.23        2
    5        76.47     113.23     426.79     230.00        3
    6       426.79     230.00     541.59     230.00        3
    7       541.59     230.00     715.22     172.14        3
    8        76.47     113.23      79.48     113.23        2
    9        79.48     113.23     109.36     103.27        2
   10       109.36     103.27     202.03     105.22        4
   11       202.03     105.22     379.78     109.00        4
   12       379.78     109.00     542.04     112.45        4
   13       542.04     112.45     715.22     170.15        5
   14        35.35     101.73      96.73     103.00        4
   15        96.73     103.00     109.36     103.27        4
   16        32.15     100.66      96.75     102.00        1
   17        96.75     102.00     202.05     104.22        1
   18       202.05     104.22     379.80     108.00        1
   19       379.80     108.00     542.22     111.45        1
   20       542.22     111.45     715.22     169.10        1
ISOTROPIC SOIL PARAMETERS
  5 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (psf)    No.
   1   130.0    130.0    1500.0     25.0    0.00       0.0      0
   2   135.0    135.0       0.0      9.0    0.00       0.0      0
   3    65.0     65.0     300.0     35.0    0.00       0.0      0
   4   135.0    135.0       0.0     13.0    0.00       0.0      0
   5   135.0    135.0       0.0      4.5    0.00       0.0      0
 A Horizontal Earthquake Loading Coefficient
 Of0.070 Has Been Assigned
 A Vertical Earthquake Loading Coefficient
 Of0.000 Has Been Assigned
 Cavitation Pressure =    0.0 psf
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
1600 Trial Surfaces Have Been Generated.
 4 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  30.0
 Box        X-Left     Y-Left    X-Right    Y-Right      Height
 No.         (ft)       (ft)       (ft)       (ft)        (ft)
  1         35.35     101.23      35.45     101.23       0.25
  2        109.36     102.77     109.46     102.77       0.25
  3        202.05     104.72     202.15     104.72       0.25
  4        260.59     105.97     418.45     109.32       0.25
 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 Janbu Method * *
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          34.94       101.59
    2          35.39       101.27
    3         109.41       102.89
    4         202.12       104.82
    5         353.38       107.86
    6         373.05       130.51
    7         391.45       154.21
    8         408.94       178.58
    9         428.78       201.09
   10         442.65       227.69
   11         443.64       230.00
      ***      1.171    ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          34.94       101.59
    2          35.39       101.27
    3         109.41       102.89
    4         202.12       104.82
    5         353.38       107.86
    6         373.05       130.51
    7         391.45       154.21
    8         408.94       178.58
    9         428.78       201.09
   10         442.65       227.69
   11         443.64       230.00
      ***      1.171    ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          34.94       101.59
    2          35.39       101.27
    3         109.41       102.89
    4         202.12       104.82
    5         353.38       107.86
    6         373.05       130.51
    7         391.45       154.21
    8         408.94       178.58
    9         428.78       201.09
   10         442.65       227.69
   11         443.64       230.00
      ***      1.171    ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          34.94       101.59
    2          35.39       101.27
    3         109.41       102.89
    4         202.12       104.82
    5         353.38       107.86
    6         373.05       130.51
    7         391.45       154.21
    8         408.94       178.58
    9         428.78       201.09
   10         442.65       227.69
   11         443.64       230.00
      ***      1.171    ***
Failure Surface Specified By 11 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1          34.94       101.59
    2          35.39       101.27
    3         109.41       102.89
    4         202.12       104.82
    5         353.38       107.86
    6         373.05       130.51
```

7	391.45	154.21
8	408.94	178.58
9	428.78	201.09
10	442.65	227.69
11	443.64	230.00

*** 1.171 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.96	101.60
2	35.45	101.12
3	109.44	102.69
4	202.13	104.68
5	364.56	108.18
6	383.01	131.83
7	402.05	155.02
8	418.86	179.87
9	433.30	206.16
10	454.51	227.38
11	455.77	230.00

*** 1.172 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.96	101.60
2	35.45	101.12
3	109.44	102.69
4	202.13	104.68
5	364.56	108.18
6	383.01	131.83
7	402.05	155.02
8	418.86	179.87
9	433.30	206.16
10	454.51	227.38
11	455.77	230.00

*** 1.172 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.96	101.60
2	35.45	101.12
3	109.44	102.69
4	202.13	104.68
5	364.56	108.18
6	383.01	131.83
7	402.05	155.02
8	418.86	179.87
9	433.30	206.16
10	454.51	227.38
11	455.77	230.00

*** 1.172 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.96	101.60
2	35.45	101.12
3	109.44	102.69
4	202.13	104.68
5	364.56	108.18
6	383.01	131.83
7	402.05	155.02
8	418.86	179.87
9	433.30	206.16
10	454.51	227.38
11	455.77	230.00

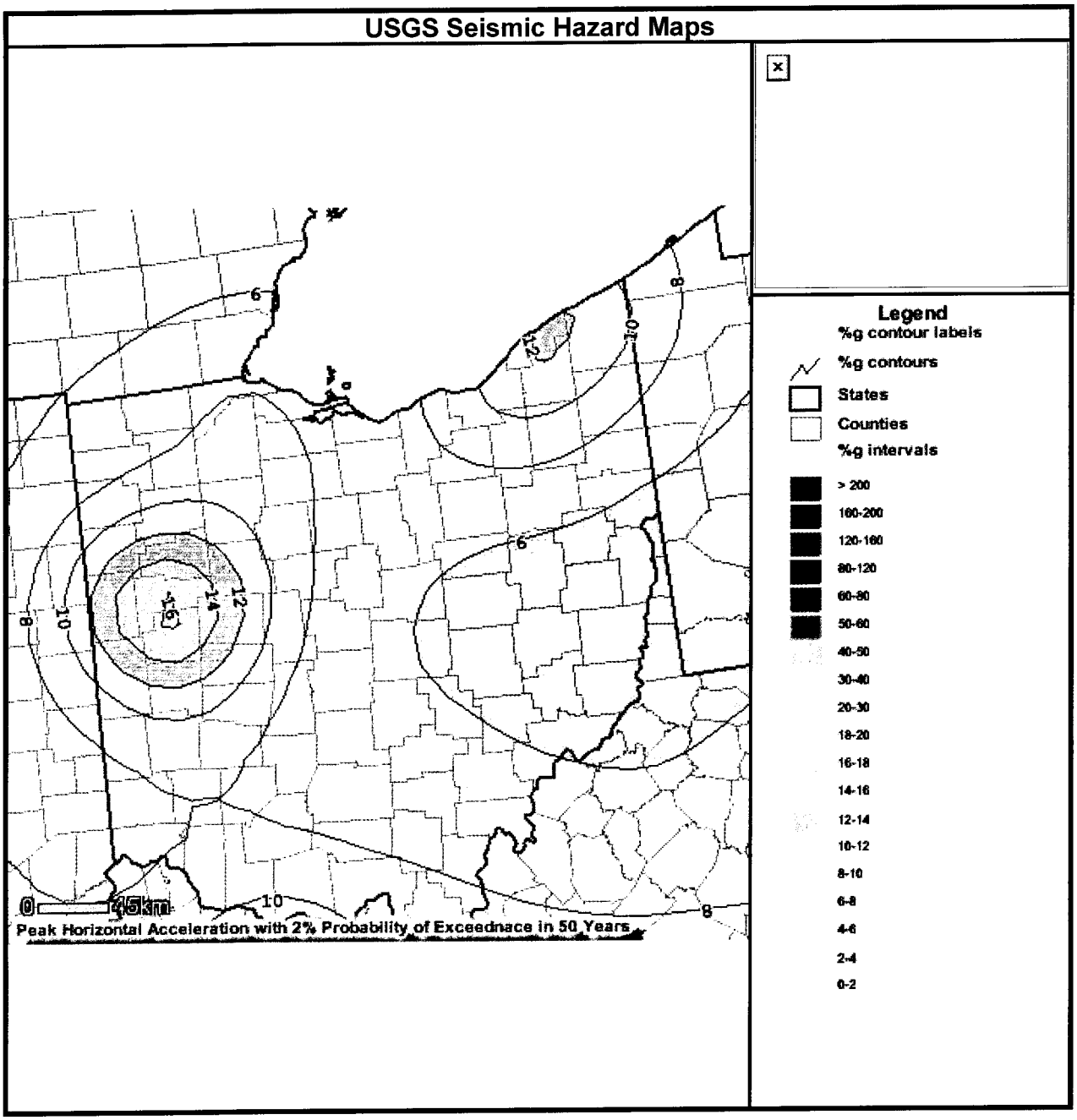
*** 1.172 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.96	101.60

2	35.45	101.12
3	109.44	102.69
4	202.13	104.68
5	364.56	108.18
6	383.01	131.83
7	402.05	155.02
8	418.86	179.87
9	433.30	206.16
10	454.51	227.38
11	455.77	230.00
***	1.172	***

SEISMIC HAZARD MAP


USGS Seismic Hazard Maps
Legend
%g contour labels
%g contours
States
Counties
%g intervals
> 200
160-200
120-160
80-120
60-80
50-60
40-50
30-40
20-30
18-20
16-18
14-16
12-14
10-12
8-10
6-8
4-6
2-4
0-2
6
8
10
12
14
16
0
45km
Peak Horizontal Acceleration with 2% Probability of Exceednace in 50 Years

STORMWATER BASIN 1 – 1A DESIGN CALCULATIONS

INTRODUCTION

Basin 1-1A (formerly Basins 1 and 1A) provides erosion and sedimentation control for a portion of the developed and un-developed site and must satisfy the following regulations:

OEPA 3745-27-08 (D) (3):

(a) Minimum storage volume, excluding sediment storage, shall be provided based on the larger of the following:

(i) The calculated runoff from a 10-year, 24-hour storm event.

(ii) The scheculed frequency of pond cleanout, that shall be no more than once per year, multiplied by 0.125 acre-feet per year for each acre of disturbed area within the upstream drainage area.

(b) The principal spillway shall safely discharge the flow from a 10-year, 24-hour storm event using non-mechanical means.

(c) The inlet elevation of the emergency spillway shall provide flood storage with no flow entering the emergency spillway while allowing flow through the principal spillway during a 25-year, 24-hour storm event.

(d) The combination of the principal and emergency spillways shall safely discharge the flow from a 100-year, 24-hour storm event using non-mechanical means.

(e) The embankment design shall provide for no less than 1-foot net freeboard when flow is at the design depth, after allowance for embankment settlement.

All designs are based upon accepted design equations, methodologies and assumptions. Where applicable, design references have been made.

BASIS OF ANALYSIS

To satisfy **OEPA 3745-27-08 (D) (3) (c) (d) and (e)**, it is necessary to route both the 25-year and 100-year storms through the basin to determine the maximum water surface elevations attained within the basin.

All stormwater modeling for the design of the basin was performed using the HydroCAD 8.0 computer program, which is a computer aided design system for modeling the hydrology and hydraulics of stormwater runoff. The program is based largely on the hydrology techniques developed by the Soil Conservation Service (SCS/NRCS), combined with other hydrology and hydraulics calculations.

Stormwater routing calculations for the 25-year and 100-year storm events is based on the assumption that the starting water surface elevation within the basin is 1/3 of the riser height (1042.8 feet).

A. Required Size of Sediment Basin

As per **OEPA 3745-27-08 (D) (3) (a)**, exluding sediment storage, the sediment basin must have adequate capacity to store 0.125 acre-feet per acre of disturbed area or the runoff from a 10-year, 24-hour storm event. Basin 1-1A shall serve as a temporary basin during construction of Cells 16 - 12. The drainage area for the basin is approximately 236 acres, which includes the unconstructed areas of exposed mine spoils and constructed areas of temporary FML capping. The volume required from a 10-year storm event will be calculated using TR-55.

Required storage for 10-year, 24-hour storm (using TR-55 methodology)

$Q = (P-0.2S)^2/(P+0.8S)$ (TR-55 Eq 2-3)

$S = (1000/CN)-10$ (TR-55 Eq 2-4)

Where

S = Potential max. retention after runoff begins (in)

P = Rainfall (in)

P_{10} = 3.42

P_{25} = 3.94

P_{100} = 4.92

Therefore:

1. Contributing Area #1: (Unconstructed Cell Areas, Exposed Mine Spoils/Rock)

CN = SCS Curve Number =	91	
Area =	194	ac
S = (1000/CN) - 10 =	0.99	in
$Q_{10} = (P_{10}-0.2S)^2/(P+0.8S)$ =	2.47	in
$VOL_{req} = Q_{10}(Area)$ =	1,736,225	cf

2. Contributing Area #2: (Temporary FML Cap Areas)

CN = SCS Curve Number =	98	
Area =	32.2	ac
S = (1000/CN) - 10 =	0.20	in
$Q_{10} = (P_{10}-0.2S)^2/(P+0.8S)$ =	3.19	in
$VOL_{req} = Q_{10}(Area)$ =	372,484	cf

3. Contributing Area #2: (Basin Area)

CN = SCS Curve Number =	100	
Area =	9.8	ac
S = (1000/CN) - 10 =	0.00	in
$Q_{10} = (P_{10}-0.2S)^2/(P+0.8S)$ =	3.42	in
$VOL_{req} = Q_{10}(Area)$ =	121,663	cf
VOL_{req} (1+2+3) =	**2,230,372**	**cf**
	51.202	**ac-ft**

Required Storage using 0.125 acre-feet per acre constant:

VOL_{req} = (0.125 ac-ft/ac) (233 ac) (43560 sf/ac) =	**1,268,685**	**cf**
	29.125	**ac-ft**

The required storage volume, excluding sediment storage, for the basin is 51.202 acre-feet. The top of the principal spillway (riser pipe) will be set at an elevation that provides a total storage capacity of at least 51.202 acre-feet (principal spillway design does not include available forebay storage capacity a summary of which is attached). Referencing the HydroCAD 10-year storm event summary (attached), the principal spillway should be set at an elevation higher than or equal to 1053.08 feet. The primary spillway elevation is based on the a starting water surface within the basin of 1037.6 feet, which allows for 1.6 feet of dedicated sediment storage (bottom elevation of basin is 1036 feet).

B. Principal Spillway Design

As per **OEPA 3745-27-08 (D) (3) (a) (b) and (c)**, the principal spillway must have the capacity to pass the 25-year, 24-hour storm without any flow entering the emergency spillway.

The principal spillway will consist of a riser, barrel, and anti-vortex device with a trash rack. The structure will be constructed of concrete.

A 4' x 4' concrete box riser will be assumed, with the crest being set at an elevation of 1053.08 feet. A 36-inch diameter barrel will be assumed with an upstream invert elevation of 1037.6 feet and a downstream invert elevation of 1034 feet.

HydroCAD routing calculations for the 25-year, 24-hour storm event (attached) indicate that the maximum water surface elevation reached is approximately 1054.01 feet. The maximum water surface elevation is less than the emergency spillway invert elevation of 1054.15 feet, therefore the design of the primary spillway is sufficient.

Note: Basin storage capacity for the routing analysis above elevation 1054 feet includes the additional capacity provided by the forebay. Storage in the forebay below elevation 1054 is assumed to be available for sediment storage. In addition, two feet of sediment storage in the basin from elevation 1036 to elevation 1038 is assumed to be available for sediment storage.

C. Emergency Spillway Design

As per **OEPA 3745-27-08 (D) (3) (d)**, the emergency spillway shall be sized such that the combination of principal and emergency spillways shall safely discharge the 100-year, 24-hour storm event. The emergency spillway will be assumed to be trapezoidal in cross section with a 30 foot crest length and 2.5H:1V sideslopes. The invert of the emergency spillway will be set at elevation 1054.15 feet, which provides 1.85 feet of freeboard between the invert and the top of the basin (elevation 1056 feet).

HydroCAD routing calculations for the 100-year, 24-hour storm event (attached) indicate that the maximum water surface elevation reached is approximately 1055 feet. The resulting freeboard is 1 foot, therefore the design of the emergency spillway is sufficient.

Note: Basin storage capacity above elevation 1054 feet includes the additional capacity provided by the forebay.

ATTACHMENTS

1. Basin 1-1A Forebay Storage Summary
2. Basin 1-1A Storage Summary
3. 10-year, 24-hour Storm Event Summary
4. 25-year, 24-hour Storm Event Summary
5. 100-year, 24-hour Storm Event Summary

Stage-Area-Storage for Pond FB: FOREBAY

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,046.00	12,764	0
1,046.10	13,157	1,296
1,046.20	13,557	2,632
1,046.30	13,962	4,008
1,046.40	14,373	5,424
1,046.50	14,790	6,882
1,046.60	15,213	8,382
1,046.70	15,642	9,925
1,046.80	16,078	11,511
1,046.90	16,519	13,141
1,047.00	16,966	14,815
1,047.10	17,419	16,534
1,047.20	17,878	18,299
1,047.30	18,342	20,110
1,047.40	18,813	21,968
1,047.50	19,290	23,873
1,047.60	19,773	25,826
1,047.70	20,262	27,828
1,047.80	20,757	29,878
1,047.90	21,257	31,979
1,048.00	21,764	34,130
1,048.10	22,190	36,328
1,048.20	22,620	38,568
1,048.30	23,054	40,852
1,048.40	23,492	43,179
1,048.50	23,934	45,550
1,048.60	24,381	47,966
1,048.70	24,831	50,427
1,048.80	25,286	52,933
1,048.90	25,745	55,484
1,049.00	26,208	58,082
1,049.10	26,675	60,726
1,049.20	27,146	63,417
1,049.30	27,621	66,155
1,049.40	28,101	68,941
1,049.50	28,584	71,775
1,049.60	29,072	74,658
1,049.70	29,564	77,590
1,049.80	30,060	80,571
1,049.90	30,560	83,602
1,050.00	31,064	86,683
1,050.10	31,513	89,812
1,050.20	31,966	92,986
1,050.30	32,422	96,205
1,050.40	32,881	99,470
1,050.50	33,343	102,781
1,050.60	33,808	106,139
1,050.70	34,277	109,543
1,050.80	34,749	112,994
1,050.90	35,224	116,493
1,051.00	35,702	120,039
1,051.10	36,184	123,634
1,051.20	36,669	127,276
1,051.30	37,157	130,967
1,051.40	37,648	134,708
1,051.50	38,142	138,497
1,051.60	38,640	142,336
1,051.70	39,141	146,225
1,051.80	39,645	150,164
1,051.90	40,152	154,154
1,052.00	40,663	158,195
1,052.10	41,132	162,285
1,052.20	41,604	166,422
1,052.30	42,079	170,606
1,052.40	42,557	174,838
1,052.50	43,037	179,117
1,052.60	43,520	183,445
1,052.70	44,005	187,821
1,052.80	44,493	192,246
1,052.90	44,984	196,720
1,053.00	45,478	201,243
1,053.10	45,974	205,816
1,053.20	46,473	210,438
1,053.30	46,975	215,110
1,053.40	47,479	219,833
1,053.50	47,986	224,606
1,053.60	48,496	229,430
1,053.70	49,008	234,306
1,053.80	49,524	239,232
1,053.90	50,041	244,210
1,054.00	**50,562**	**249,240**

Stage-Area-Storage for Pond 1-1A: BASIN 1-1A

Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,036.00	1.918	0.000
1,036.20	1.945	0.386
1,036.40	1.973	0.778
1,036.60	2.000	1.175
1,036.80	2.028	1.578
1,037.00	2.056	1.987
1,037.20	2.084	2.401
1,037.40	2.113	2.820
1,037.60	2.141	3.246
1,037.80	2.170	3.677
1,038.00	2.199	4.114
1,038.20	2.227	4.556
1,038.40	2.256	5.005
1,038.60	2.284	5.459
1,038.80	2.313	5.918
1,039.00	2.342	6.384
1,039.20	2.371	6.855
1,039.40	2.400	7.332
1,039.60	2.430	7.815
1,039.80	2.459	8.304
1,040.00	2.489	8.799
1,040.20	2.518	9.300
1,040.40	2.548	9.806
1,040.60	2.577	10.319
1,040.80	2.607	10.837
1,041.00	2.637	11.361
1,041.20	2.667	11.892
1,041.40	2.697	12.428
1,041.60	2.728	12.971
1,041.80	2.758	13.519
1,042.00	2.789	14.074
1,042.20	2.819	14.635
1,042.40	2.850	15.202
1,042.60	2.880	15.775
1,042.80	2.911	16.354
1,043.00	2.941	16.939
1,043.20	2.972	17.530
1,043.40	3.004	18.128
1,043.60	3.035	18.732
1,043.80	3.066	19.342
1,044.00	3.098	19.958
1,044.20	3.129	20.581
1,044.40	3.160	21.210
1,044.60	3.192	21.845
1,044.80	3.223	22.487
1,045.00	3.255	23.134
1,045.20	3.287	23.789
1,045.40	3.319	24.449
1,045.60	3.351	25.116
1,045.80	3.384	25.790
1,046.00	3.416	26.470
1,046.20	3.448	27.156
1,046.40	3.480	27.849
1,046.60	3.513	28.548
1,046.80	3.545	29.254
1,047.00	3.578	29.966
1,047.20	3.610	30.685
1,047.40	3.643	31.410
1,047.60	3.676	32.142
1,047.80	3.710	32.881
1,048.00	3.743	33.626
1,048.20	3.776	34.378
1,048.40	3.809	35.137
1,048.60	3.842	35.902
1,048.80	3.876	36.673
1,049.00	3.909	37.452
1,049.20	3.943	38.237
1,049.40	3.977	39.029
1,049.60	4.011	39.828
1,049.80	4.045	40.633
1,050.00	4.079	41.446
1,050.20	4.099	42.264
1,050.40	4.120	43.086
1,050.60	4.140	43.912
1,050.80	4.161	44.742
1,051.00	4.181	45.576
1,051.20	4.202	46.414
1,051.40	4.223	47.257
1,051.60	4.243	48.103
1,051.80	4.264	48.954
1,052.00	4.285	49.809
1,052.20	4.306	50.668
1,052.40	4.327	51.531
1,052.60	4.348	52.399
1,052.80	4.369	53.270
1,053.00	4.390	54.146
1,053.20	4.411	55.026
1,053.40	4.432	55.911
1,053.60	4.453	56.799
1,053.80	4.475	57.692
1,054.00	4.496	58.589
1,054.20	5.744	59.703
1,054.40	5.788	60.856
1,054.60	5.832	62.018
1,054.80	5.876	63.189
1,055.00	5.920	64.368
1,055.20	5.965	65.557
1,055.40	6.010	66.754
1,055.60	6.055	67.961
1,055.80	6.100	69.176
1,056.00	**6.145**	**70.401**

Pond 9P: BASIN 1B

Inflow Area =	236.000 ac,	Inflow Depth =	2.60"	for	10 yr event
Inflow =	1,150.29 cfs @	11.89 hrs,	Volume=	51.202 af	
Outflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af,	Atten= 100%, Lag= 0.0 min
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 1,037.60' Surf.Area= 2.141 ac Storage= 3.246 af
Peak Elev= 1,053.07' @ 24.05 hrs Surf.Area= 4.397 ac Storage= 54.448 af (51.202 af above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,036.00'	70.401 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,036.00	1.918	1,203.4	0.000	0.000	1.918
1,038.00	2.199	1,268.3	4.114	4.114	2.216
1,040.00	2.489	1,369.3	4.685	8.799	2.707
1,042.00	2.789	1,452.2	5.275	14.074	3.139
1,044.00	3.098	1,353.2	5.884	19.958	3.651
1,046.00	3.416	1,617.8	6.511	26.470	5.088
1,048.00	3.743	1,697.4	7.157	33.626	5.576
1,050.00	4.079	1,777.0	7.820	41.446	6.088
1,052.00	4.285	1,816.1	8.363	49.809	6.357
1,054.00	4.496	1,855.1	8.780	58.589	6.632
1,054.05	5.711	3,699.2	0.255	58.844	25.344
1,056.00	6.145	3,759.7	11.557	70.401	26.185

Device	Routing	Invert	Outlet Devices
#1	Primary	1,037.60'	**36.0" x 372.0' long Culvert** Ke= 0.900 Outlet Invert= 1,034.00' S= 0.0097 '/' Cc= 0.900 n= 0.010
#2	Device 1	1,053.08'	**4.00' x 4.00' Horiz. RISER** Limited to weir flow C= 0.600
#3	Secondary	1,054.15'	**30.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,037.60' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 0.00 cfs potential flow)
└─**2=RISER** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,037.60' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: BASIN 1B

Inflow Area =	236.000 ac,	Inflow Depth =	3.10"	for 25 yr event	
Inflow =	1,356.40 cfs @	11.89 hrs,	Volume=	61.012 af	
Outflow =	46.57 cfs @	13.31 hrs,	Volume=	22.868 af,	Atten= 97%, Lag= 85.0 min
Primary =	46.57 cfs @	13.31 hrs,	Volume=	22.868 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 1,042.80' Surf.Area= 2.911 ac Storage= 16.354 af
Peak Elev= 1,054.01' @ 13.31 hrs Surf.Area= 4.616 ac Storage= 58.613 af (42.259 af above start)

Plug-Flow detention time= 847.2 min calculated for 6.507 af (11% of inflow)
Center-of-Mass det. time= 258.5 min (1,033.9 - 775.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,036.00'	70.401 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,036.00	1.918	1,203.4	0.000	0.000	1.918
1,038.00	2.199	1,268.3	4.114	4.114	2.216
1,040.00	2.489	1,369.3	4.685	8.799	2.707
1,042.00	2.789	1,452.2	5.275	14.074	3.139
1,044.00	3.098	1,353.2	5.884	19.958	3.651
1,046.00	3.416	1,617.8	6.511	26.470	5.088
1,048.00	3.743	1,697.4	7.157	33.626	5.576
1,050.00	4.079	1,777.0	7.820	41.446	6.088
1,052.00	4.285	1,816.1	8.363	49.809	6.357
1,054.00	4.496	1,855.1	8.780	58.589	6.632
1,054.05	5.711	3,699.2	0.255	58.844	25.344
1,056.00	6.145	3,759.7	11.557	70.401	26.185

Device	Routing	Invert	Outlet Devices
#1	Primary	1,037.60'	**36.0" x 372.0' long Culvert** Ke= 0.900 Outlet Invert= 1,034.00' S= 0.0097 '/' Cc= 0.900 n= 0.010
#2	Device 1	1,053.08'	**4.00' x 4.00' Horiz. RISER** Limited to weir flow C= 0.600
#3	Secondary	1,054.15'	**30.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=46.56 cfs @ 13.31 hrs HW=1,054.01' (Free Discharge)
└─**1=Culvert** (Passes 46.56 cfs of 103.74 cfs potential flow)
└─**2=RISER** (Weir Controls 46.56 cfs @ 3.15 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,042.80' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: BASIN 1B

Inflow Area =	236.000 ac,	Inflow Depth =	4.05"	for	100 yr event
Inflow =	1,742.90 cfs @	11.89 hrs,	Volume=	79.707 af	
Outflow =	170.11 cfs @	12.22 hrs,	Volume=	41.562 af,	Atten= 90%, Lag= 19.6 min
Primary =	106.78 cfs @	12.22 hrs,	Volume=	37.013 af	
Secondary =	63.34 cfs @	12.21 hrs,	Volume=	4.549 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 1,042.80' Surf.Area= 2.911 ac Storage= 16.354 af
Peak Elev= 1,055.00' @ 12.22 hrs Surf.Area= 5.921 ac Storage= 64.385 af (48.032 af above start)

Plug-Flow detention time= 450.3 min calculated for 25.182 af (32% of inflow)
Center-of-Mass det. time= 176.2 min (945.3 - 769.1)

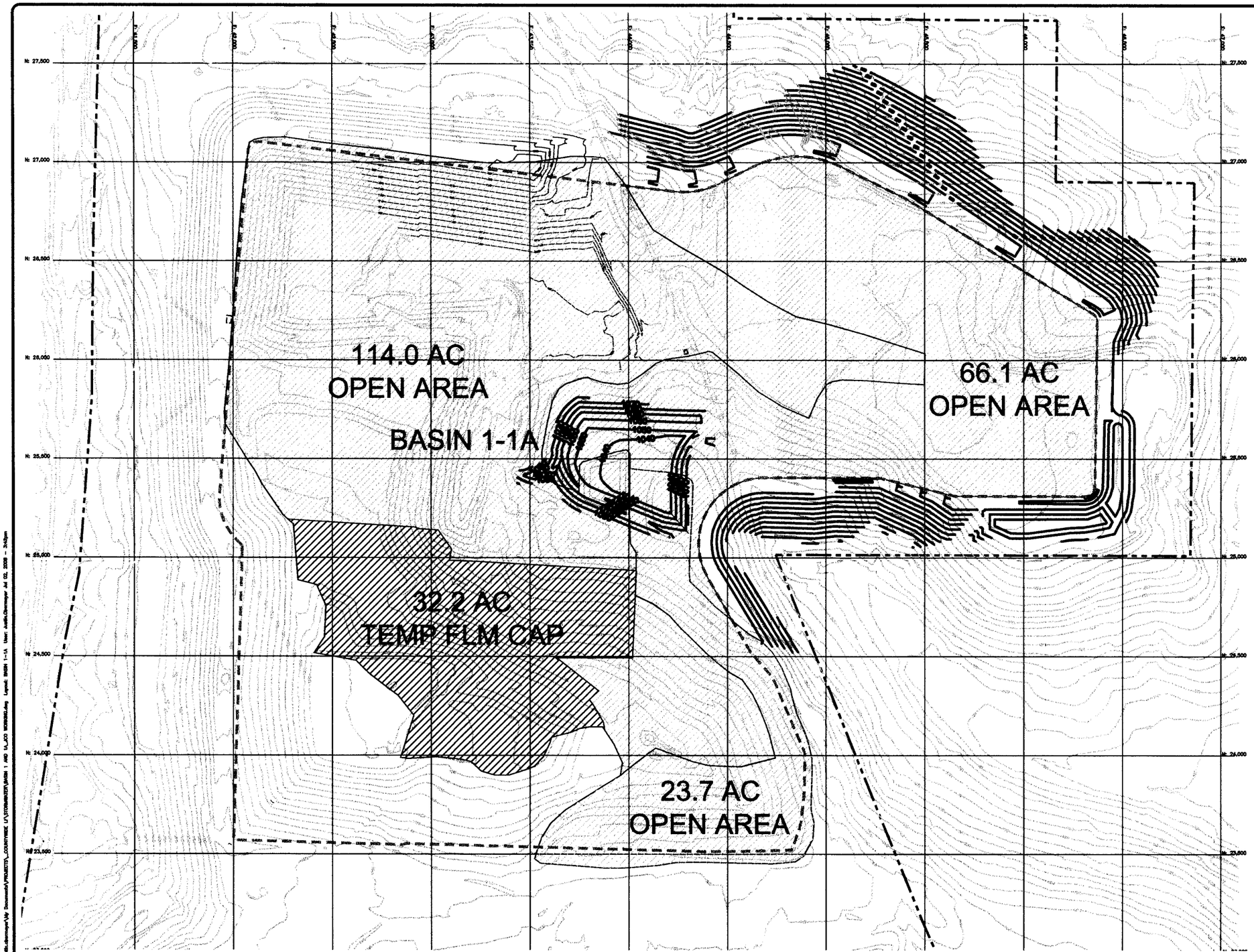
Volume	Invert	Avail.Storage	Storage Description
#1	1,036.00'	70.401 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,036.00	1.918	1,203.4	0.000	0.000	1.918
1,038.00	2.199	1,268.3	4.114	4.114	2.216
1,040.00	2.489	1,369.3	4.685	8.799	2.707
1,042.00	2.789	1,452.2	5.275	14.074	3.139
1,044.00	3.098	1,353.2	5.884	19.958	3.651
1,046.00	3.416	1,617.8	6.511	26.470	5.088
1,048.00	3.743	1,697.4	7.157	33.626	5.576
1,050.00	4.079	1,777.0	7.820	41.446	6.088
1,052.00	4.285	1,816.1	8.363	49.809	6.357
1,054.00	4.496	1,855.1	8.780	58.589	6.632
1,054.05	5.711	3,699.2	0.255	58.844	25.344
1,056.00	6.145	3,759.7	11.557	70.401	26.185

Device	Routing	Invert	Outlet Devices
#1	Primary	1,037.60'	**36.0" x 372.0' long Culvert** Ke= 0.900 Outlet Invert= 1,034.00' S= 0.0097 '/' Cc= 0.900 n= 0.010
#2	Device 1	1,053.08'	**4.00' x 4.00' Horiz. RISER** Limited to weir flow C= 0.600
#3	Secondary	1,054.15'	**30.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=106.80 cfs @ 12.22 hrs HW=1,055.00' (Free Discharge)
└─**1=Culvert** (Passes 106.80 cfs of 107.15 cfs potential flow)
└─**2=RISER** (Orifice Controls 106.80 cfs @ 6.67 fps)

Secondary OutFlow Max=63.22 cfs @ 12.21 hrs HW=1,055.00' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 63.22 cfs @ 2.47 fps)



N

0 125 250
SCALE IN FEET

LEGEND

- LIMIT OF SOLID WASTE PLACEMENT
- PROPERTY BOUNDARY
- DESIGN CONTOUR – 10'
- EXISTING CONTOUR – 10'
- CONTRIBUTING AREA OPEN AREA – CN=91
- CONTRIBUTING AREA TEMP FML CAP AREA – CN=98

TOTAL CONTRIBUTING AREA: 236.00 AC

RECEIVED
JUL 07 2008
OHIO EPA NEDO

REV	DATE	DESCRIPTION	DRN BY	RES BY	CHK BY	APP BY

DATE OF ISSUE 06/20/08
DRAWN BY JCO
DESIGNED BY JCO
CHECKED BY JGW
APPROVED BY JGW

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REPUBLIC SERVICES OF OHIO
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

BASIN 1-1A CONTRIBUTING AREA

FIGURE 1

PROJECT NO. 070340

0" 1/2" 1" 2"

STORMWATER BASIN 2 DESIGN CALCULATIONS

INTRODUCTION

Basin #2 provides erosion and sedimentation control for a portion of the developed and un-developed site and must satisfy the following regulations:

OEPA 3745-27-08 (D) (3):

(a) Minimum storage volume, excluding sediment storage, shall be provided based on the larger of the following:

(i) The calculated runoff from a 10-year, 24-hour storm event.

(ii) The scheculed frequency of pond cleanout, that shall be no more than once per year, multiplied by 0.125 acre-feet per year for each acre of disturbed area within the upstream drainage area.

(b) The principal spillway shall safely discharge the flow from a 10-year, 24-hour storm event using non-mechanical means.

(c) The inlet elevation of the emergency spillway shall provide flood storage with no flow entering the emergency spillway while allowing flow through the principal spillway during a 25-year, 24-hour storm event.

(d) The combination of the principal and emergency spillways shall safely discharge the flow from a 100-year, 24-hour storm event using non-mechanical means.

(e) The embankment design shall provide for no less than 1-foot net freeboard when flow is at the design depth, after allowance for embankment settlement.

All designs are based upon accepted design equations, methodologies and assumptions. Where applicable, design references have been made.

BASIS OF ANALYSIS

To satisfy **OEPA 3745-27-08 (D) (3) (c) (d) and (e),** it is necessary to route both the 25-year and 100-year storms through the basin to determine the maximum water surface elevations attained within the basin.

All stormwater modeling for the design of the basin was performed using the HydroCAD 8.0 computer program, which is a computer aided design system for modeling the hydrology and hydraulics of stormwater runoff. The program is based largely on the hydrology techniques developed by the Soil Conservation Service (SCS/NRCS), combined with other hydrology and hydraulics calculations.

Stormwater routing calculations for the 25 year and 100 year storm events is based on the assumption that the starting water surface elevation within the basin is 1/3 of the riser height (962.34 feet).

A. Required Size of Sediment Basin

As per **OEPA 3745-27-08 (D) (3) (a),** excluding sediment storage, the sediment basin must have adequate capacity to store 0.125 acre-feet per acre of disturbed area or the runoff from a 10-year, 24-hour storm event. The drainage area for the basin is approximately 62.1 acres, which includes areas outside of the SWB and constructed areas of temporary FML capping. The volume required from a 10-year storm event will be calculated using TR-55.

Required storage for 10-year, 24-hour storm (using TR-55 methodology)

$Q = (P-0.2S)^2/(P+0.8S)$ (TR-55 Eq 2-3)

$S = (1000/CN)-10$ (TR-55 Eq 2-4)

Where

S = Potential max. retention after runoff begins (in)

P = Rainfall (in)

P_{10} = 3.42

P_{25} = 3.94

P_{100} = 4.92

Therefore:

1. Contributing Area #1: (Existing areas outside of SWB)

CN = SCS Curve Number =	84	
Area =	31	ac
S = (1000/CN) - 10 =	1.90	in
$Q_{10} = (P_{10}-0.2S)^2/(P+0.8S)$ =	1.87	in
$VOL_{req} = Q_{10}(Area)$ =	210,224	cf

2. Contributing Area #2: (Temporary FML Cap Areas)

CN = SCS Curve Number =	98	
Area =	37.4	ac
S = (1000/CN) - 10 =	0.20	in
$Q_{10} = (P_{10}-0.2S)^2/(P+0.8S)$ =	3.19	in
$VOL_{req} = Q_{10}(Area)$ =	432,636	cf

2. Contributing Area #2: (Basin Area)

CN = SCS Curve Number =	100	
Area =	3.7	ac
S = (1000/CN) - 10 =	0.00	in
$Q_{10} = (P_{10}-0.2S)^2/(P+0.8S)$ =	3.42	in
$VOL_{req} = Q_{10}(Area)$ =	45,934	cf
VOL_{req} (1+2+3) =	**688,794**	**cf**
	15.813	**ac-ft**

Required Storage using 0.125 acre-feet per acre constant:

VOL_{req} = (0.125 ac-ft/ac) (62 ac) (43560 sf/ac) =	**338,135**	**cf**
	7.763	**ac-ft**

The controlling volume for the basin 15.813 acre-feet, calculated using TR-55. The top of the principal spillway (riser pipe) will be set at an elevation that provides a total storage capacity of at least 15.813 acre-feet (principal spillway design does not include available forebay storage capacity a summary of which is attached). Referencing the HydroCAD 10-year storm event summary (attached), the principal spillway should be set at an elevation higher than or equal to 967.21 feet. The primary spillway elevation is based on the a starting water surface within the basin of 959.91 feet, which allows for 1.9 feet of dedicated sediment storage (bottom elevation of basin is 958 feet).

B. Principal Spillway Design

As per **OEPA 3745-27-08 (D) (3) (a) (b) and (c),** the principal spillway must have the capacity to pass the 25-year, 24-hour storm without any flow entering the emergency spillway.

The existing principal spillway consists of a 24-inch riser with a trash rack connected to an 18-inch CMP barrel. The crest elevation of the riser pipe is 967.21 feet, based elevation is 959.91 feet, and the downstream barrel invert is 949.90 feet.

HydroCAD routing calculations for the 25-year, 24-hour storm event (attached) indicate that the maximum water surface elevation reached is approximately 967.91 feet. The maximum water surface elevation is less than the emergency spillway invert elevation of 969.00 feet, therefore the design of the primary spillway is sufficient.

C. Emergency Spillway Design

As per **OEPA 3745-27-08 (D) (3) (d),** the emergency spillway shall be sized such that the combination of principal and emergency spillways shall safely discharge the 100-year, 24-hour storm event. The emergency spillway will be assumed to be trapezoidal in cross section with a 20 foot crest length and 2.5H:1V sideslopes. The invert of the emergency spillway will be set at elevation 969.00 feet, which provides 3 feet of freeboard between the invert and the top of the basin (elevation 972 feet).

HydroCAD routing calculations for the 100-year, 24-hour storm event (attached) indicate that the maximum water surface elevation reached is approximately 969.05 feet. The resulting freeboard is 2.95 feet, therefore the design of the emergency spillway is sufficient.

ATTACHMENTS

1. Basin 2 Storage Summary
2. 10-year, 24-hour Storm Event Summary
3. 25-year, 24-hour Storm Event Summary
4. 100-year, 24-hour Storm Event Summary

Stage-Area-Storage for Pond #2: BASIN #2

Elevation (feet)	Surface (acres)	Storage (acre-feet)
958.00	1.390	0.000
958.15	1.401	0.209
958.30	1.412	0.420
958.45	1.423	0.633
958.60	1.434	0.847
958.75	1.445	1.063
958.90	1.457	1.281
959.05	1.468	1.500
959.20	1.479	1.721
959.35	1.490	1.944
959.50	1.502	2.168
959.65	1.513	2.394
959.80	1.525	2.622
959.95	1.536	2.852
960.10	1.547	3.083
960.25	1.558	3.316
960.40	1.569	3.550
960.55	1.580	3.787
960.70	1.591	4.024
960.85	1.602	4.264
961.00	1.612	4.505
961.15	1.624	4.748
961.30	1.635	4.992
961.45	1.646	5.238
961.60	1.657	5.486
961.75	1.668	5.735
961.90	1.679	5.986
962.05	1.690	6.239
962.20	1.702	6.493
962.35	1.713	6.749
962.50	1.724	7.007
962.65	1.736	7.267
962.80	1.747	7.528
962.95	1.759	7.791
963.10	1.770	8.055
963.25	1.782	8.322
963.40	1.793	8.590
963.55	1.805	8.860
963.70	1.817	9.131
963.85	1.828	9.405
964.00	1.840	9.680
964.15	1.852	9.957
964.30	1.864	10.235
964.45	1.875	10.516
964.60	1.887	10.798
964.75	1.899	11.082
964.90	1.911	11.368
965.05	1.923	11.655
965.20	1.935	11.945
965.35	1.947	12.236
965.50	1.959	12.529
965.65	1.972	12.824
965.80	1.984	13.120
965.95	1.996	13.419
966.10	2.008	13.719
966.25	2.020	14.021
966.40	2.033	14.325
966.55	2.045	14.631
966.70	2.058	14.939
966.85	2.070	15.248
967.00	2.082	15.560
967.15	2.095	15.873
967.30	2.108	16.188
967.45	2.120	16.505
967.60	2.133	16.824
967.75	2.145	17.145
967.90	2.158	17.468
968.05	2.171	17.793
968.20	2.184	18.119
968.35	2.197	18.448
968.50	2.209	18.778
968.65	2.222	19.111
968.80	2.235	19.445
968.95	2.248	19.781
969.10	2.261	20.119
969.25	2.274	20.459
969.40	2.287	20.802
969.55	2.300	21.146
969.70	2.314	21.492
969.85	2.327	21.840
970.00	2.340	22.190
970.15	2.353	22.542
970.30	2.367	22.896
970.45	2.380	23.252
970.60	2.394	23.610
970.75	2.407	23.970
970.90	**2.421**	**24.332**

Pond #2: BASIN #2

1/3 RISER HEIGHT ELEVATION = 962.34'

BASIN PRIMARY OUTLET STRUCTURE BASED ON AS-BUILT INFORMATION.

10-YR STARTING WATER SURFACE ELEVATION = 959.91' (BOTTOM OF RISER PIPE)

Inflow Area =	62.100 ac,	Inflow Depth >	2.54"	for	10 YR event
Inflow =	304.94 cfs @	11.90 hrs,	Volume=	13.146 af	
Outflow =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af,	Atten= 100%, Lag= 0.0 min
Primary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 959.91' Surf.Area= 1.533 ac Storage= 2.790 af
Peak Elev= 967.18' @ 24.01 hrs Surf.Area= 2.098 ac Storage= 15.936 af (13.146 af above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	24.575 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
958.00	1.390	1,275.0	0.000	0.000	1.390
960.00	1.540	1,312.0	2.929	2.929	1.575
970.00	2.340	1,492.0	19.261	22.190	2.551
971.00	2.430	1,510.0	2.385	24.575	2.656

Device	Routing	Invert	Outlet Devices
#1	Primary	959.91'	**18.0" x 121.3' long Culvert** Ke= 0.900
			Outlet Invert= 949.90' S= 0.0825 '/' Cc= 0.900 n= 0.025
#2	Device 1	967.21'	**24.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Secondary	969.00'	**20.0' long x 50.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=959.91' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 0.00 cfs potential flow)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=959.91' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond #2: BASIN #2

1/3 RISER HEIGHT ELEVATION = 962.34'

BASIN PRIMARY OUTLET STRUCTURE BASED ON AS-BUILT INFORMATION.

10-YR STARTING WATER SURFACE ELEVATION = 959.91' (BOTTOM OF RISER PIPE)

Inflow Area =	62.100 ac,	Inflow Depth >	3.02"	for	25 YR event
Inflow =	361.21 cfs @	11.90 hrs,	Volume=	15.651 af	
Outflow =	11.71 cfs @	13.32 hrs,	Volume=	6.294 af,	Atten= 97%, Lag= 85.6 min
Primary =	11.71 cfs @	13.32 hrs,	Volume=	6.294 af	
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 962.34' Surf.Area= 1.712 ac Storage= 6.732 af
Peak Elev= 967.91' @ 13.32 hrs Surf.Area= 2.159 ac Storage= 17.480 af (10.748 af above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= 266.8 min (1,034.4 - 767.6)

Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	24.575 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
958.00	1.390	1,275.0	0.000	0.000	1.390
960.00	1.540	1,312.0	2.929	2.929	1.575
970.00	2.340	1,492.0	19.261	22.190	2.551
971.00	2.430	1,510.0	2.385	24.575	2.656

Device	Routing	Invert	Outlet Devices
#1	Primary	959.91'	**18.0" x 121.3' long Culvert** Ke= 0.900
			Outlet Invert= 949.90' S= 0.0825 '/' Cc= 0.900 n= 0.025
#2	Device 1	967.21'	**24.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Secondary	969.00'	**20.0' long x 50.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=11.91 cfs @ 13.32 hrs HW=967.91' (Free Discharge)
└─**1=Culvert** (Passes 11.91 cfs of 18.08 cfs potential flow)
└─**2=Orifice/Grate** (Weir Controls 11.91 cfs @ 2.73 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=962.34' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond #2: BASIN #2

1/3 RISER HEIGHT ELEVATION = 962.34'

BASIN PRIMARY OUTLET STRUCTURE BASED ON AS-BUILT INFORMATION.

10-YR STARTING WATER SURFACE ELEVATION = 959.91' (BOTTOM OF RISER PIPE)

Inflow Area =	62.100 ac,	Inflow Depth >	3.95"	for	100 YR event
Inflow =	467.74 cfs @	11.90 hrs,	Volume=	20.453 af	
Outflow =	19.40 cfs @	12.88 hrs,	Volume=	11.088 af,	Atten= 96%, Lag= 58.7 min
Primary =	18.74 cfs @	12.88 hrs,	Volume=	11.055 af	
Secondary =	0.66 cfs @	12.88 hrs,	Volume=	0.033 af	

Routing by Stor-Ind method, Time Span= 1.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 962.34' Surf.Area= 1.712 ac Storage= 6.732 af
Peak Elev= 969.05' @ 12.88 hrs Surf.Area= 2.257 ac Storage= 20.011 af (13.279 af above start)

Plug-Flow detention time= 662.1 min calculated for 4.356 af (21% of inflow)
Center-of-Mass det. time= 226.4 min (989.7 - 763.3)

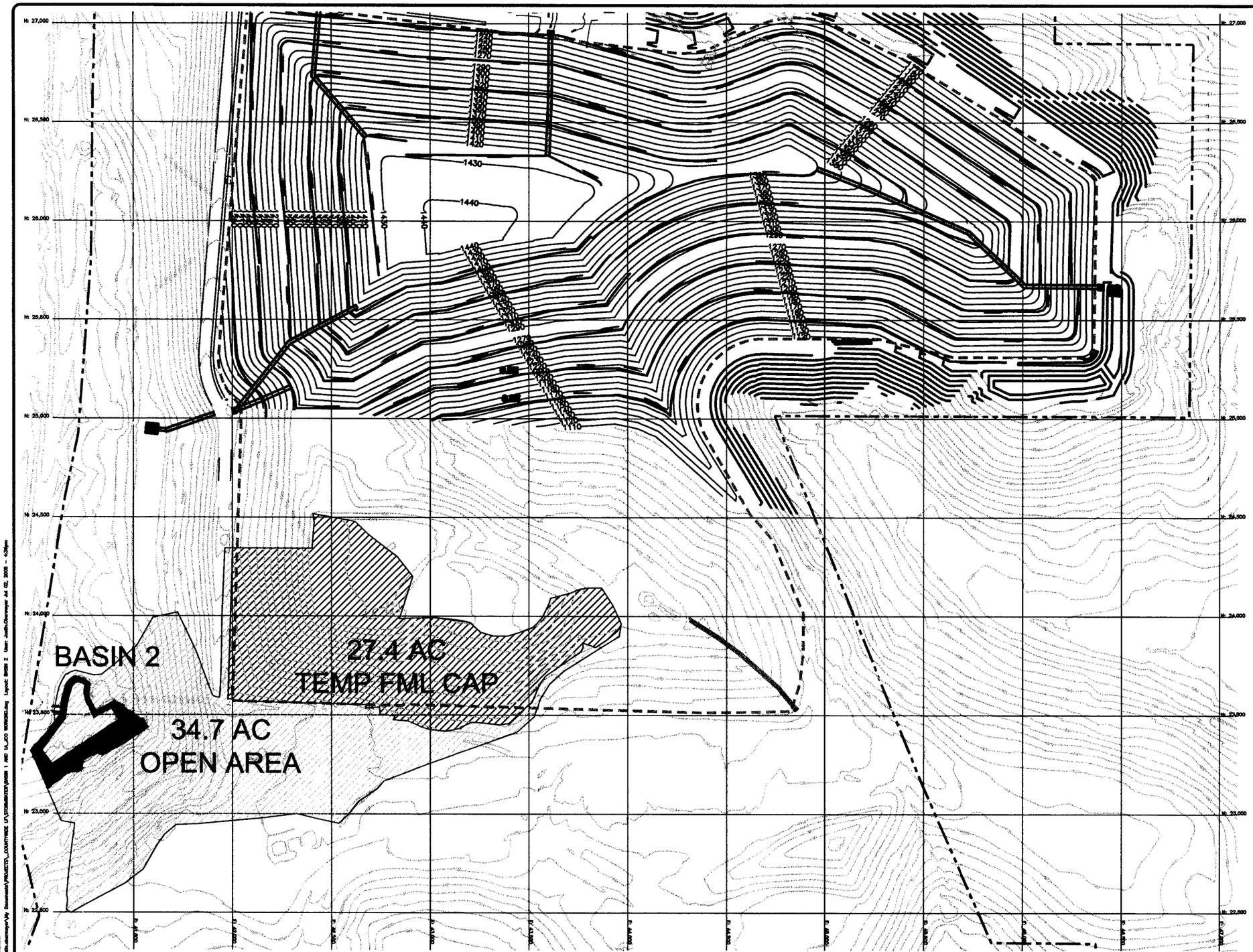
Volume	Invert	Avail.Storage	Storage Description
#1	958.00'	24.575 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
958.00	1.390	1,275.0	0.000	0.000	1.390
960.00	1.540	1,312.0	2.929	2.929	1.575
970.00	2.340	1,492.0	19.261	22.190	2.551
971.00	2.430	1,510.0	2.385	24.575	2.656

Device	Routing	Invert	Outlet Devices
#1	Primary	959.91'	**18.0" x 121.3' long Culvert** Ke= 0.900
			Outlet Invert= 949.90' S= 0.0825 '/' Cc= 0.900 n= 0.025
#2	Device 1	967.21'	**24.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Secondary	969.00'	**20.0' long x 50.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=18.74 cfs @ 12.88 hrs HW=969.05' (Free Discharge)
└─**1=Culvert** (Barrel Controls 18.74 cfs @ 10.61 fps)
└─**2=Orifice/Grate** (Passes 18.74 cfs of 20.53 cfs potential flow)

Secondary OutFlow Max=0.64 cfs @ 12.88 hrs HW=969.05' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.64 cfs @ 0.61 fps)



N

0 125 250
SCALE IN FEET

LEGEND

- LIMIT OF SOLID WASTE PLACEMENT
- PROPERTY BOUNDARY
- DESIGN CONTOUR – 10'
- EXISTING CONTOUR – 10'
- CONTRIBUTING AREA OPEN AREA
- CONTRIBUTING AREA TEMP FML CAP AREA

TOTAL CONTRIBUTING AREA: 62.1 AC

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 06/20/08
DRAWN BY JCO
DESIGNED BY JCO
CHECKED BY JGW
APPROVED BY JGW

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

BASIN 2 CONTRIBUTING AREA

FIGURE 1

PROJECT NO. 070340

0" 1/2" 1" 2"

File: C:\Documents and Settings\jwills.cornerstone\My Documents\PROJECTS_COUNTYWIDE LF\STORMWATER\BASIN 1 AND 2_JCO 20080620.dwg Layout: BASIN 2 User: jwills.Cornerstone Jul 02, 2008 - 4:29pm

STORMWATER BASIN 5 DESIGN CALCULATIONS

INTRODUCTION

Basin #5 provides erosion and sedimentation control for a portion of the developed site and must satisfy the following regulations:

OEPA 3745-27-08 (D) (3):

(a) Minimum storage volume, excluding sediment storage, shall be provided based on the larger of the following:

(i) The calculated runoff from a 10-year, 24-hour storm event.

(ii) The scheculed frequency of pond cleanout, that shall be no more than once per year, multiplied by 0.125 acre-feet per year for each acre of disturbed area within the upstream drainage area.

(b) The principal spillway shall safely discharge the flow from a 10-year, 24-hour storm event using non-mechanical means.

(c) The inlet elevation of the emergency spillway shall provide flood storage with no flow entering the emergency spillway while allowing flow through the principal spillway during a 25-year, 24-hour storm event.

(d) The combination of the principal and emergency spillways shall safely discharge the flow from a 100-year, 24-hour storm event using non-mechanical means.

(e) The embankment design shall provide for no less than 1-foot net freeboard when flow is at the design depth, after allowance for embankment settlement.

All designs are based upon accepted design equations, methodologies and assumptions. Where applicable, design references have been made.

BASIS OF ANALYSIS

To satisfy **OEPA 3745-27-08 (D) (3) (c) (d) and (e)**, it is necessary to route both the 25-year and 100-year storms through the basin to determine the maximum water surface elevations attained within the basin.

All stormwater modeling for the design of the basin was performed using the HydroCAD 8.0 computer program, which is a computer aided design system for modeling the hydrology and hydraulics of stormwater runoff. The program is based largely on the hydrology techniques developed by the Soil Conservation Service (SCS/NRCS), combined with other hydrology and hydraulics calculations.

Stormwater routing calculations for the 25-year and 100-year storm events is based on the assumption that the starting water surface elevation within the basin is 1/3 of the riser height (1124.9 feet).

A. Required Size of Sediment Basin

As per **OEPA 3745-27-08 (D) (3) (a),** excluding sediment storage, the sediment basin must have adequate capacity to store 0.125 ac-ft of disturbed area or the runoff from a 10-year, 24-hour storm event. Basin #5 has areas draining into it from channels 7A, 7B, 7C, 17A, downslope channel #5 and the area around the pond. The sum of these drainage areas is 90.9 acres. The volume required from a 10-year storm event, assuming 1/4 of the pond's watershed to be bare soil will be calculated using TR-55.

Required storage for 10-year, 24-hour storm (using TR-55 methodology)

$Q = (P-0.2S)^2/(P+0.8S)$ (TR-55 Eq 2-3)

$S = (1000/CN)-10$ (TR-55 Eq 2-4)

Where

S = Potential max. retention after runoff begins (in)

P = Rainfall (in)

P_{10} = 3.42

P_{25} = 3.94

P_{100} = 4.92

CN = SCS Curve Number = 84

Therefore:

1. Contributing Area:

S = (1000/84) - 10 = 1.90 inches

$Q_{10} = (3.42 - 0.2(1.90))^2/(3.42+0.8(1.90))$ = 1.87 inches

VOL_{req} = 1.87(1ft/12in) (88ac) (43560 sf/ac) = 596,764 cf

2. Basin Area:

CN = SCS Curve Number = 98

S = (1000/98) - 10 = 0.20 inches

$Q_{10} = (3.42 - 0.2(0.2))^2/(3.42+0.8(0.2))$ = 3.19 inches

VOL_{req} = 3.19(1ft/12in) (2.9ac) (43560 sf/ac) = 33,547 cf

VOL_{req} (1+2) = 630,311 cf

Required Storage using 0.125ac-ft constant

VOL_{req} = (0.125 ac-ft/ac) (90.9 ac) (43560 sf/ac) = **494,951 cf**

(assuming one cleaning per year)

The required storage volume, excluding sediment storage for the storage basin is 630,311 cf. The top of the principal spillway (riser pipe) will be set at an elevation which provides a total storage capacity of at least 630,311 cf. Referencing the Storage-Stage curve (attached), the principal spillway should be set at an elevation higher than or equal to 1132.7 feet. The elevation of the bottom of the pond is 1112.0 feet. Assuming 9 feet of sediment and a 1 foot water pool, the elevation of the beginning of the perforations will be set at 1122.0, and the crest of the spillway will be 1132.7. This design provides 7.6 ac-ft of sediment storage (4.3 ac-ft main basin and 3.3 ac-ft forbay) and an additional storage volume of 630,311 cubic feet between the maximum sediment storage elevation and the principal spillway elevation.

B. Principal Spillway Design

As per **OEPA 3745-27-08 (D) (3) (a) (b) and (c),** the principal spillway must be capable of handling the 10-year, 24-hour storm and have the capacity to pass the 25-year, 24-hour storm without any flow entering the emergency spillway.

The principal spillway will consist of a riser, barrel, and anti-vortex device with a trash rack. The structure will be constructed of concrete.

A 4' x 4' concrete box riser will be assumed, with the crest being set at an elevation of 1132.7. A 24" diameter barrel will be assumed with an invert elevation of 1121.0. The maximum flow that can be routed through the outlet structure was calculated by HydroCAD using the following equations:

The adequacy of the assumed spillway size will be checked by routing the 25-year, 24-hour storm event through the basin with the assumed spillway size. The spillway will be found adequate if the maximum water surface elevation is less than the invert of the emergency spillway. The result of this hydrograph routing is shown in a graphical form later in these calculations. From the graph it can be seen that the maximum elevation was found to be 1133.12, which is below the emergency spillway invert of 1133.4. Therefore, the principal spillway is sufficient for this basin.

C. Emergency Spillway Design

As per **OEPA 3745-27-08 (D) (3) (d),** the emergency spillway shall be sized such that the combination of principal and emergency spillways shall safely discharge the 100-year, 24-hour storm event. The emergency spillway will be assumed to be trapezoidal in cross section with a 20 foot base and 3H:1V sideslopes. The invert of the emergency spillway will be set at elevation 1133.4 with an embankment elevation of 1135, yielding a total channel depth of 1.6 feet. To maintain the required 1 foot freeboard, the maximum flow depth is 0.6 feet.

The adequacy of this assumption will be tested by routing the 100-year storm event hydrograph through the basin. The result of this hydrograph routing is shown in graphical form later in these calculations. The maximum water surface elevation was found to be 1133.75 which provides 1.25 feet of freeboard. Therefore, the assumed spillway cross section is sufficient.

D. **Emergency Spillway Design**

Discharges from Basin #5 are routed along the property boundary to the western discharge point using a 957 foot long, 36" diameter culvert starting at the base of the emergency letdown channel. The emergency letdown channel is excavated to 2 to 4 feet below grade to control stormwater discharges. At the based on the letdown channel is a 6-foot deep 4' x 4' concrete drop inlet, which is used to route the stormwater into the culvert. The base invert elevation of the drop inlet is 1100 and the rim elevation of the inlet is 1106. The maximum water elevations above the drop inlet for the 25-year and 100-year storm events are 1101.58 and 1105.1, both of which are below the 1108 channel top elevation.

Cleanout manholes will be installed every 300 feet along the culvert.

An average slope of 10.7% was used for the culvert modeling.

ATTACHMENTS

1. Basin 5 Forebay Storage Summary
2. Basin 5 Storage Summary
3. 10-year, 24-hour Storm Event Summary
4. 25-year, 24-hour Storm Event Summary
5. 100-year, 24-hour Storm Event Summary
6. 25-year, 24-hour Storm Event Culvert Summary
7. 100-year, 24-hour Storm Event Culvert Summary

Stage-Area-Storage for Pond FB: BASIN 5 - FOREBAY

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,126.00	0.283	0.000	1,131.30	0.577	2.264
1,126.10	0.288	0.029	1,131.40	0.583	2.322
1,126.20	0.293	0.058	1,131.50	0.589	2.381
1,126.30	0.298	0.087	1,131.60	0.595	2.440
1,126.40	0.303	0.117	1,131.70	0.601	2.500
1,126.50	0.308	0.148	1,131.80	0.607	2.560
1,126.60	0.314	0.179	1,131.90	0.613	2.621
1,126.70	0.319	0.211	1,132.00	0.619	2.683
1,126.80	0.324	0.243	1,132.10	0.625	2.745
1,126.90	0.329	0.275	1,132.20	0.631	2.808
1,127.00	0.335	0.309	1,132.30	0.636	2.871
1,127.10	0.340	0.342	1,132.40	0.642	2.935
1,127.20	0.346	0.377	1,132.50	0.648	3.000
1,127.30	0.351	0.411	1,132.60	0.654	3.065
1,127.40	0.357	0.447	1,132.70	0.660	3.130
1,127.50	0.362	0.483	1,132.80	0.666	3.197
1,127.60	0.368	0.519	1,132.90	0.672	3.264
1,127.70	0.374	0.556	1,133.00	**0.678**	**3.331**
1,127.80	0.379	0.594			
1,127.90	0.385	0.632			
1,128.00	0.391	0.671			
1,128.10	0.396	0.710			
1,128.20	0.402	0.750			
1,128.30	0.407	0.791			
1,128.40	0.412	0.832			
1,128.50	0.418	0.873			
1,128.60	0.423	0.915			
1,128.70	0.429	0.958			
1,128.80	0.434	1.001			
1,128.90	0.440	1.045			
1,129.00	0.445	1.089			
1,129.10	0.451	1.134			
1,129.20	0.457	1.179			
1,129.30	0.462	1.225			
1,129.40	0.468	1.272			
1,129.50	0.474	1.319			
1,129.60	0.479	1.366			
1,129.70	0.485	1.415			
1,129.80	0.491	1.463			
1,129.90	0.497	1.513			
1,130.00	0.503	1.563			
1,130.10	0.509	1.613			
1,130.20	0.514	1.664			
1,130.30	0.520	1.716			
1,130.40	0.525	1.768			
1,130.50	0.531	1.821			
1,130.60	0.537	1.875			
1,130.70	0.542	1.928			
1,130.80	0.548	1.983			
1,130.90	0.554	2.038			
1,131.00	0.559	2.094			
1,131.10	0.565	2.150			
1,131.20	0.571	2.207			

Stage-Area-Storage for Pond #5: BASIN 5

Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,121.00	0.790	0.000
1,121.15	0.800	0.119
1,121.30	0.811	0.240
1,121.45	0.821	0.362
1,121.60	0.832	0.486
1,121.75	0.842	0.612
1,121.90	0.853	0.739
1,122.05	0.863	0.868
1,122.20	0.874	0.998
1,122.35	0.884	1.130
1,122.50	0.894	1.263
1,122.65	0.904	1.398
1,122.80	0.915	1.535
1,122.95	0.925	1.673
1,123.10	0.936	1.812
1,123.25	0.946	1.953
1,123.40	0.957	2.096
1,123.55	0.968	2.240
1,123.70	0.978	2.386
1,123.85	0.989	2.534
1,124.00	1.000	2.683
1,124.15	1.011	2.834
1,124.30	1.022	2.986
1,124.45	1.033	3.140
1,124.60	1.044	3.296
1,124.75	1.055	3.454
1,124.90	1.066	3.613
1,125.05	1.077	3.773
1,125.20	1.089	3.936
1,125.35	1.100	4.100
1,125.50	1.112	4.266
1,125.65	1.123	4.433
1,125.80	1.135	4.603
1,125.95	1.146	4.774
1,126.10	1.158	4.947
1,126.25	1.169	5.121
1,126.40	1.181	5.297
1,126.55	1.193	5.476
1,126.70	1.205	5.655
1,126.85	1.217	5.837
1,127.00	1.229	6.020
1,127.15	1.241	6.206
1,127.30	1.253	6.393
1,127.45	1.265	6.581
1,127.60	1.277	6.772
1,127.75	1.289	6.965
1,127.90	1.302	7.159
1,128.05	1.315	7.355
1,128.20	1.328	7.553
1,128.35	1.342	7.754
1,128.50	1.356	7.956
1,128.65	1.370	8.161
1,128.80	1.384	8.367
1,128.95	1.399	8.576
1,129.10	1.413	8.787
1,129.25	1.427	9.000
1,129.40	1.442	9.215
1,129.55	1.456	9.432
1,129.70	1.471	9.652
1,129.85	1.485	9.873
1,130.00	1.500	10.097
1,130.15	1.510	10.323
1,130.30	1.519	10.550
1,130.45	1.529	10.779
1,130.60	1.538	11.009
1,130.75	1.548	11.240
1,130.90	1.558	11.473
1,131.05	1.568	11.708
1,131.20	1.577	11.944
1,131.35	1.587	12.181
1,131.50	1.597	12.420
1,131.65	1.607	12.660
1,131.80	1.617	12.902
1,131.95	1.627	13.145
1,132.10	1.702	13.393
1,132.25	1.813	13.657
1,132.40	1.927	13.937
1,132.55	2.045	14.235
1,132.70	2.167	14.551
1,132.85	2.292	14.885
1,133.00	2.420	15.239
1,133.15	2.447	15.603
1,133.30	2.473	15.972
1,133.45	2.500	16.345
1,133.60	2.527	16.723
1,133.75	2.554	17.104
1,133.90	2.582	17.489
1,134.05	2.605	17.878
1,134.20	2.620	18.270
1,134.35	2.635	18.664
1,134.50	2.650	19.060
1,134.65	2.665	19.459
1,134.80	2.680	19.860
1,134.95	**2.695**	**20.263**

Pond #5: BASIN 5

Inflow Area =	90.900 ac,	Inflow Depth >	1.75"	for	10 yr event
Inflow =	125.05 cfs @	12.31 hrs,	Volume=	13.237 af	
Outflow =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af,	Atten= 100%, Lag= 0.0 min
Primary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,132.00' @ 20.00 hrs Surf.Area= 1.631 ac Storage= 13.229 af

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,121.00'	20.398 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,121.00	0.790	1,234.2	0.000	0.000	0.790
1,122.00	0.860	1,253.0	0.825	0.825	0.880
1,124.00	1.000	1,290.3	1.858	2.683	1.063
1,126.00	1.150	1,328.0	2.148	4.831	1.253
1,128.00	1.310	1,365.6	2.458	7.290	1.448
1,130.00	1.500	1,403.6	2.808	10.097	1.651
1,132.00	1.630	1,442.1	3.129	13.226	1.861
1,133.00	2.420	2,335.2	2.012	15.239	8.024
1,134.00	2.600	2,352.7	2.509	17.748	8.183
1,135.00	2.700	2,370.0	2.650	20.398	8.342

Device	Routing	Invert	Outlet Devices
#1	Primary	1,121.00'	**24.0" x 140.0' long Culvert** Ke= 0.700 Outlet Invert= 1,115.50' S= 0.0393 '/' Cc= 0.900 n= 0.010
#2	Device 1	1,132.70'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Secondary	1,133.40'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,121.00' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 0.00 cfs potential flow)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,121.00' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond #5: BASIN 5

Inflow Area =	90.900 ac,	Inflow Depth >	2.17"	for	25 yr event
Inflow =	155.47 cfs @	12.31 hrs,	Volume=	16.429 af	
Outflow =	14.32 cfs @	14.08 hrs,	Volume=	5.017 af,	Atten= 91%, Lag= 106.5 min
Primary =	14.32 cfs @	14.08 hrs,	Volume=	5.017 af	
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 1,124.90' Surf.Area= 1.066 ac Storage= 3.613 af
Peak Elev= 1,133.12' @ 14.08 hrs Surf.Area= 2.441 ac Storage= 15.527 af (11.914 af above start)

Plug-Flow detention time= 477.4 min calculated for 1.404 af (9% of inflow)
Center-of-Mass det. time= 166.3 min (964.0 - 797.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,121.00'	20.398 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,121.00	0.790	1,234.2	0.000	0.000	0.790
1,122.00	0.860	1,253.0	0.825	0.825	0.880
1,124.00	1.000	1,290.3	1.858	2.683	1.063
1,126.00	1.150	1,328.0	2.148	4.831	1.253
1,128.00	1.310	1,365.6	2.458	7.290	1.448
1,130.00	1.500	1,403.6	2.808	10.097	1.651
1,132.00	1.630	1,442.1	3.129	13.226	1.861
1,133.00	2.420	2,335.2	2.012	15.239	8.024
1,134.00	2.600	2,352.7	2.509	17.748	8.183
1,135.00	2.700	2,370.0	2.650	20.398	8.342

Device	Routing	Invert	Outlet Devices
#1	Primary	1,121.00'	**24.0" x 140.0' long Culvert** Ke= 0.700 Outlet Invert= 1,115.50' S= 0.0393 '/' Cc= 0.900 n= 0.010
#2	Device 1	1,132.70'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Secondary	1,133.40'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=14.17 cfs @ 14.08 hrs HW=1,133.12' (Free Discharge)
└─**1=Culvert** (Passes 14.17 cfs of 44.51 cfs potential flow)
└─**2=Orifice/Grate** (Weir Controls 14.17 cfs @ 2.12 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,124.90' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: 36" CULVERT

Inflow Area =	90.900 ac,	Inflow Depth >	0.66"	for	25 yr event
Inflow =	14.32 cfs @	14.08 hrs,	Volume=	5.017 af	
Outflow =	14.32 cfs @	14.08 hrs,	Volume=	5.017 af,	Atten= 0%, Lag= 0.0 min
Primary =	14.32 cfs @	14.08 hrs,	Volume=	5.017 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 1,101.58' @ 14.08 hrs Surf.Area= 16 sf Storage= 25 cf

Plug-Flow detention time= 0.0 min calculated for 5.017 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (964.0 - 964.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,100.00'	322 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,100.00	16	0	0
1,106.00	16	96	96
1,108.00	210	226	322

Device	Routing	Invert	Outlet Devices
#1	Primary	1,100.00'	**36.0" x 957.0' long Culvert** Ke= 0.700 Outlet Invert= 998.00' S= 0.1066 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=14.32 cfs @ 14.08 hrs HW=1,101.58' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.32 cfs @ 3.78 fps)

Pond #5: BASIN 5

Inflow Area =	90.900 ac,	Inflow Depth > 2.99"	for 100 yr event		
Inflow =	214.09 cfs @	12.31 hrs, Volume=	22.670 af		
Outflow =	56.24 cfs @	13.00 hrs, Volume=	11.166 af,	Atten= 74%,	Lag= 41.5 min
Primary =	45.75 cfs @	13.00 hrs, Volume=	10.644 af		
Secondary =	10.49 cfs @	13.00 hrs, Volume=	0.523 af		

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 1,124.90' Surf.Area= 1.066 ac Storage= 3.613 af
Peak Elev= 1,133.75' @ 13.00 hrs Surf.Area= 2.554 ac Storage= 17.099 af (13.486 af above start)

Plug-Flow detention time= 252.3 min calculated for 7.553 af (33% of inflow)
Center-of-Mass det. time= 102.5 min (893.7 - 791.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,121.00'	20.398 af	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,121.00	0.790	1,234.2	0.000	0.000	0.790
1,122.00	0.860	1,253.0	0.825	0.825	0.880
1,124.00	1.000	1,290.3	1.858	2.683	1.063
1,126.00	1.150	1,328.0	2.148	4.831	1.253
1,128.00	1.310	1,365.6	2.458	7.290	1.448
1,130.00	1.500	1,403.6	2.808	10.097	1.651
1,132.00	1.630	1,442.1	3.129	13.226	1.861
1,133.00	2.420	2,335.2	2.012	15.239	8.024
1,134.00	2.600	2,352.7	2.509	17.748	8.183
1,135.00	2.700	2,370.0	2.650	20.398	8.342

Device	Routing	Invert	Outlet Devices
#1	Primary	1,121.00'	**24.0" x 140.0' long Culvert** Ke= 0.700 Outlet Invert= 1,115.50' S= 0.0393 '/' Cc= 0.900 n= 0.010
#2	Device 1	1,132.70'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#3	Secondary	1,133.40'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=45.75 cfs @ 13.00 hrs HW=1,133.75' (Free Discharge)
└─**1=Culvert** (Inlet Controls 45.75 cfs @ 14.56 fps)
└─**2=Orifice/Grate** (Passes 45.75 cfs of 56.11 cfs potential flow)

Secondary OutFlow Max=10.42 cfs @ 13.00 hrs HW=1,133.75' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 10.42 cfs @ 1.50 fps)

Pond 4P: 36" CULVERT

[88] Warning: Qout>Qin may require Finer Routing>1

Inflow Area =	90.900 ac,	Inflow Depth >	1.47"	for	100 yr event
Inflow =	56.24 cfs @	13.00 hrs,	Volume=	11.166 af	
Outflow =	56.25 cfs @	13.00 hrs,	Volume=	11.166 af,	Atten= 0%, Lag= 0.1 min
Primary =	56.25 cfs @	13.00 hrs,	Volume=	11.166 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 1,105.01' @ 13.00 hrs Surf.Area= 16 sf Storage= 80 cf

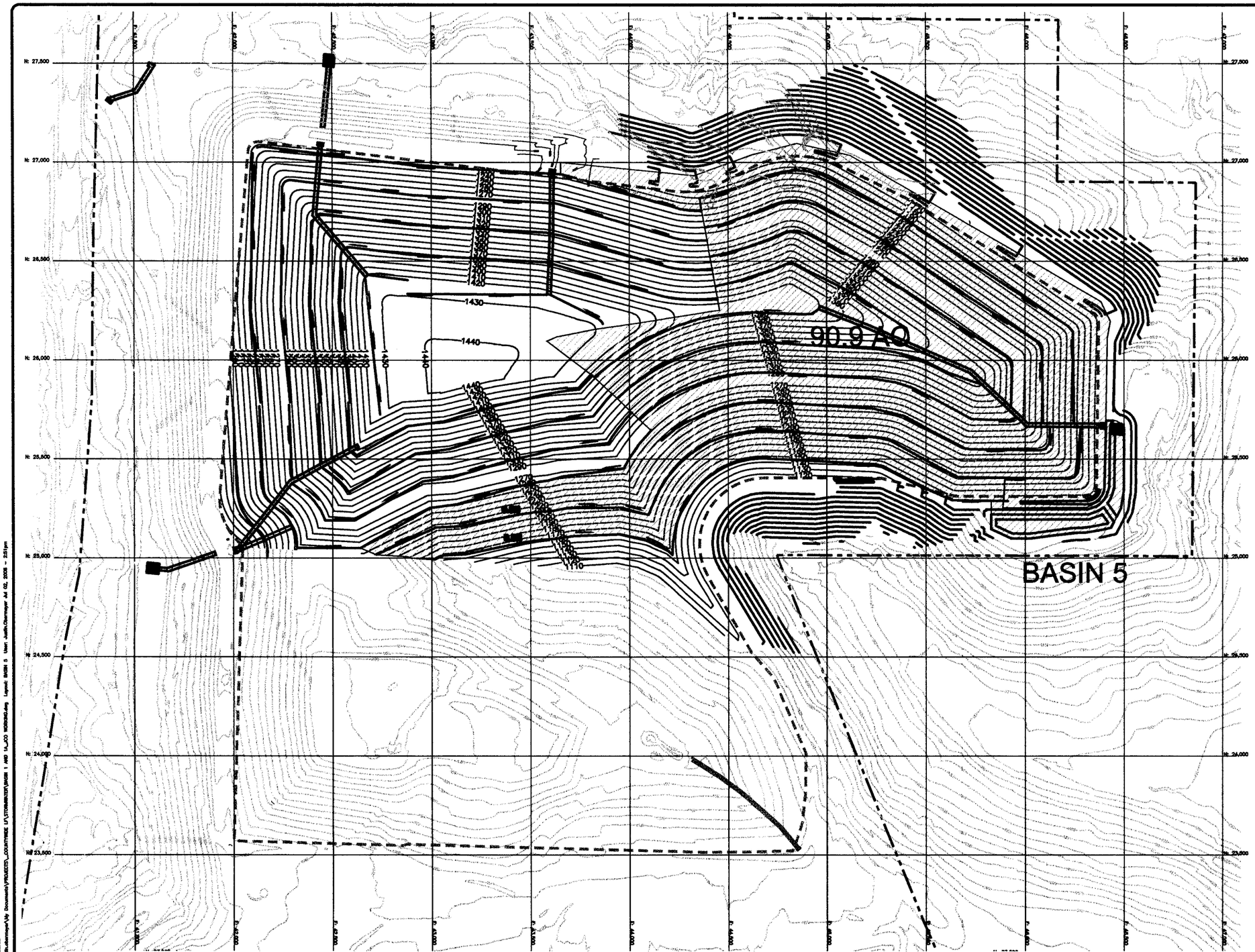
Plug-Flow detention time= 0.0 min calculated for 11.129 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (893.7 - 893.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,100.00'	322 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,100.00	16	0	0
1,106.00	16	96	96
1,108.00	210	226	322

Device	Routing	Invert	Outlet Devices
#1	Primary	1,100.00'	**36.0" x 957.0' long Culvert** Ke= 0.700 Outlet Invert= 998.00' S= 0.1066 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=56.24 cfs @ 13.00 hrs HW=1,105.01' (Free Discharge)
└**1=Culvert** (Inlet Controls 56.24 cfs @ 7.96 fps)



N

0 125 250

SCALE IN FEET

LEGEND

- LIMIT OF SOLID WASTE PLACEMENT
- PROPERTY BOUNDARY
- DESIGN CONTOUR – 10'
- EXISTING CONTOUR – 10'
- CONTRIBUTING AREA

TOTAL CONTRIBUTING AREA: 90.9 AC

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
	DATE OF ISSUE 06/20/08	DRAWN BY JCO DESIGNED BY JCO	CHECKED BY JCW APPROVED BY JCW			

CORNERSTONE Environmental Group, LLC

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REPUBLIC SERVICES OF OHIO II, LLC.
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

BASIN 5 CONTRIBUTING AREA

FIGURE 1

PROJECT NO. 070340

0" 1/2" 1" 2"

File: C:\Documents and Settings\julie.dunmyer\My Documents\PROJECT_COUNTYWIDE LF\TOWNSHIP\PHASE 1 AND 1A_CO 90\BASIN5.dwg Layout: BASIN 5 User: Julie.Dunmyer Jul 02, 2008 - 2:51pm

ATTACHMENT 3

TEMPORARY LEACHATE SUMP CALCULATIONS

Client Name: COUNTYWIDE RDF Project Number: 070340

Subject: TEMPORARY SUMP PUMP CYCLE TIME ANALYSIS

CORNERSTONE Environmental Group, LLC

Prepared By: JCO Date: 07/02/08 Checked By: JGW Date: 07/02/08 Revision: -

REQUIRED:

Determine the temporary leachate collection sump volume and pump cycle times for Cell 16.

REFERENCES:

1. Countywide 2008 Permit To Install Alteration Engineering Plans
2. Evett, J. B., Liu C. 1987 Fundamentals of Fluid Mechanics, McGraw-Hill, Inc.
3. 2003 PTI Aplication Leachate Generation Estimate

SOLUTION:

1. Sump total volume w/o granular drainage material

Cell 16 Temporary Sump	V_E =	827	cf =	**6,187** **gal**

2. Calculate empty operational sump volume based on the pump off level and the top of the sump

Pump On Elevation (12" above leachate flow line low point)	P_{ON} =	1074.0	ft
Pump Off Elevation (inches from bottom of sump)	P_{OFF} =	1073.3	in
Volume of sump between bottom and pump off elevation	V_{OFF} =	264	cf
	V_{OFF} =	1,975	gal

Operational Sump Volume ($V-V_{OFF}$)

Sump Operational Volume	V_{E-OP} =	563	cf =	**4,212** **gal**

3. Calculate the effective volume of the sump based on the void ratio of the granular drainage material and the operational sump volume

Drainage Material Void Ratio		35%	
Sump Effective Volume	V_{E-EV} =	**1,474**	**gallons**

4. Calculate leachate inflow rate for the sump contributing area

Sump Contributing Area	763,282	sf =	17.5	ac
Leachate Generation Rate (ref. 3)	1,712	gal/ac/day		
Sump Inflow Rate			**20.8**	**gpm**

5. Calculate the time required to drain the sump based on the selected pump rate

Sump Pump Flow Rate			35	gpm
Sump Time to Drain	104	mins	**2**	**hrs**

6. Calculate the time required to refill the sump

Sump Time to Fill 71 mins **1** **hrs**

7. Calculate the total cycle time of the pump (pump on time + time to refill sump)

Sump Cycle Time **3** **hrs**

CONCLUSION:

Based on the calculations above, the pump "on time" and cycle time is within the normal operating range of the EPG pumps.

ATTACHMENT 4

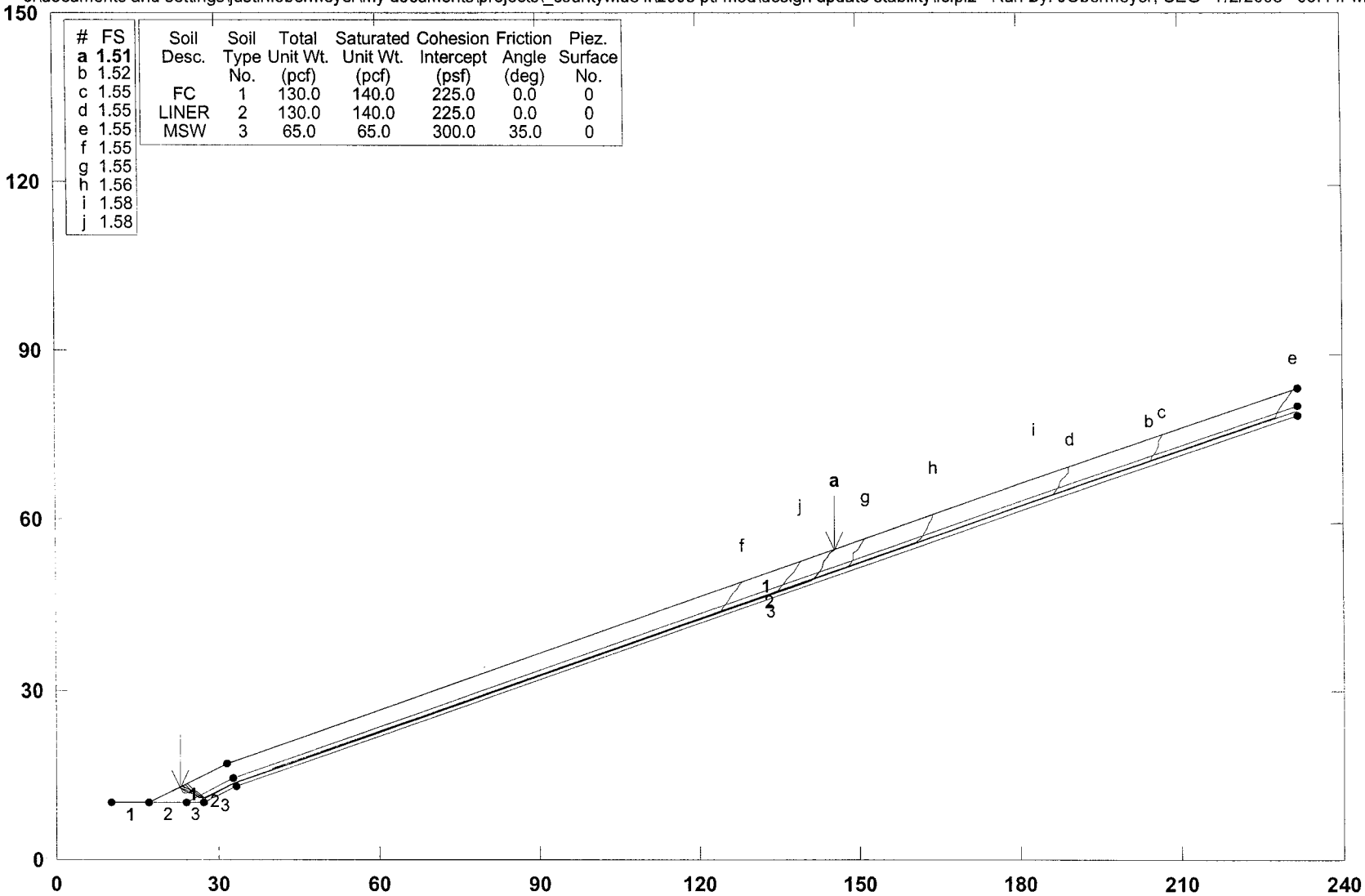
2:1 RUNOUT SLOPE STABILITY CALCULATIONS

COUNTYWIDE PTI APPLICATION FINAL COVER STABILITY

c:\documents and settings\justin.obermeyer\my documents\projects_countywide lf\2008 pti mod\design update stability\fc.pl2 Run By: JObermeyer, CEG 7/2/2008 05:44PM

#	FS
a	**1.51**
b	1.52
c	1.55
d	1.55
e	1.55
f	1.55
g	1.55
h	1.56
i	1.58
j	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FC	1	130.0	140.0	225.0	0.0	0
LINER	2	130.0	140.0	225.0	0.0	0
MSW	3	65.0	65.0	300.0	35.0	0



STABL6H FSmin=1.51

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****

by

Purdue University

--Slope Stability Analysis--

Simplified Janbu, Simplified Bishop

or Spencer`s Method of Slices

Run Date: 7/2/2008

Time of Run: 05:44PM

Run By: JObermeyer, CEG

Input Data Filename: C:fc.in

Output Filename: C:fc.OUT

Plotted Output Filename: C:fc.PLT

PROBLEM DESCRIPTION COUNTYWIDE PTI APPLICATION

FINAL COVER STABILITY

BOUNDARY COORDINATES

3 Top Boundaries

9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	10.00	17.23	10.00	1
2	17.23	10.00	31.67	17.22	1
3	31.67	17.22	231.71	83.90	1
4	17.23	10.00	23.94	10.00	2
5	23.94	10.00	32.82	14.44	2
6	32.82	14.44	231.72	80.74	2
7	23.94	10.00	27.29	10.00	3
8	27.29	10.00	33.40	13.05	3
9	33.40	13.05	231.72	79.16	3

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	140.0	225.0	0.0	0.00	0.0	0
2	130.0	140.0	225.0	0.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Horizontal Earthquake Loading Coefficient
Of0.000 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
40 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 1.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	27.29	10.81	27.39	10.84	0.25
2	32.82	13.60	32.92	13.60	0.25
3	40.03	16.05	231.71	79.95	0.25

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 Janbu Method * *
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.90	12.84
2	23.67	12.21
3	24.62	11.88
4	25.56	11.54
5	26.35	10.93
6	27.35	10.87
7	32.89	13.56
8	141.15	49.64
9	141.83	50.37
10	142.54	51.08
11	143.02	51.96
12	143.42	52.87
13	143.98	53.71
14	144.68	54.42
15	145.26	55.08

*** 1.513 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.03	13.40
2	24.20	13.29
3	24.97	12.65
4	25.82	12.12
5	26.55	11.45
6	27.31	10.79
7	32.92	13.53
8	200.86	69.74
9	201.24	70.67
10	201.95	71.37
11	202.33	72.30
12	202.89	73.12
13	203.49	73.92
14	204.19	74.64

```
   15        204.24       74.74
      ***     1.523   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         23.13       12.95
    2         23.89       12.64
    3         24.88       12.48
    4         25.82       12.13
    5         26.55       11.45
    6         27.37       10.89
    7         32.87       13.53
    8        204.46       70.86
    9        204.79       71.80
   10        205.47       72.54
   11        205.81       73.48
   12        205.95       74.47
   13        206.43       75.35
   14        206.62       75.54
      ***     1.546   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         23.72       13.24
    2         24.07       12.90
    3         24.79       12.21
    4         25.51       11.51
    5         26.45       11.18
    6         27.37       10.78
    7         32.92       13.58
    8        186.12       64.79
    9        186.81       65.51
   10        187.32       66.37
   11        187.77       67.26
   12        188.48       67.97
   13        189.12       68.74
   14        189.28       69.73
   15        189.29       69.76
      ***     1.548   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         22.93       12.85
    2         23.80       12.55
    3         24.71       12.12
    4         25.43       11.43
    5         26.39       11.16
    6         27.36       10.91
    7         32.89       13.62
    8        227.72       78.74
    9        227.90       79.72
   10        228.61       80.43
   11        229.12       81.29
   12        229.79       82.03
   13        230.31       82.89
   14        230.94       83.64
      ***     1.548   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         22.70       12.73
    2         22.84       12.60
    3         23.55       11.90
    4         24.54       11.76
    5         25.51       11.53
    6         26.33       10.95
    7         27.32       10.81
    8         32.85       13.50
    9        123.88       44.11
   10        124.55       44.84
```

11	125.24	45.57
12	125.70	46.46
13	126.38	47.19
14	127.02	47.96
15	127.56	48.80
16	128.04	49.34

*** 1.549 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.02	12.90
2	23.87	12.63
3	24.82	12.34
4	25.74	11.94
5	26.56	11.37
6	27.32	10.72
7	32.83	13.53
8	147.56	51.80
9	148.22	52.54
10	148.82	53.35
11	148.98	54.33
12	149.66	55.07
13	150.28	55.85
14	150.82	56.70
15	151.15	57.05

*** 1.552 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.50	13.13
2	24.12	12.85
3	24.83	12.14
4	25.61	11.52
5	26.61	11.45
6	27.34	10.77
7	32.90	13.51
8	160.85	56.45
9	161.55	57.15
10	162.13	57.97
11	162.76	58.75
12	162.96	59.73
13	163.65	60.45
14	164.05	61.35

*** 1.560 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.02	13.39
2	24.24	13.17
3	24.95	12.47
4	25.89	12.14
5	26.64	11.47
6	27.38	10.80
7	32.83	13.67
8	179.29	62.58
9	179.97	63.31
10	180.29	64.26
11	180.87	65.07
12	181.55	65.80
13	182.21	66.55
14	182.75	67.39
15	182.78	67.59

*** 1.576 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.18	13.48
2	24.23	13.44
3	24.97	12.76
4	25.72	12.10

5	26.59	11.61
6	27.31	10.92
7	32.90	13.67
8	134.55	47.60
9	135.25	48.31
10	135.90	49.08
11	136.53	49.85
12	137.23	50.56
13	137.94	51.27
14	138.58	52.04
15	138.90	52.96
***	1.577	***

COUNTYWIDE PTI APPLICATION FINAL COVER STABILITY

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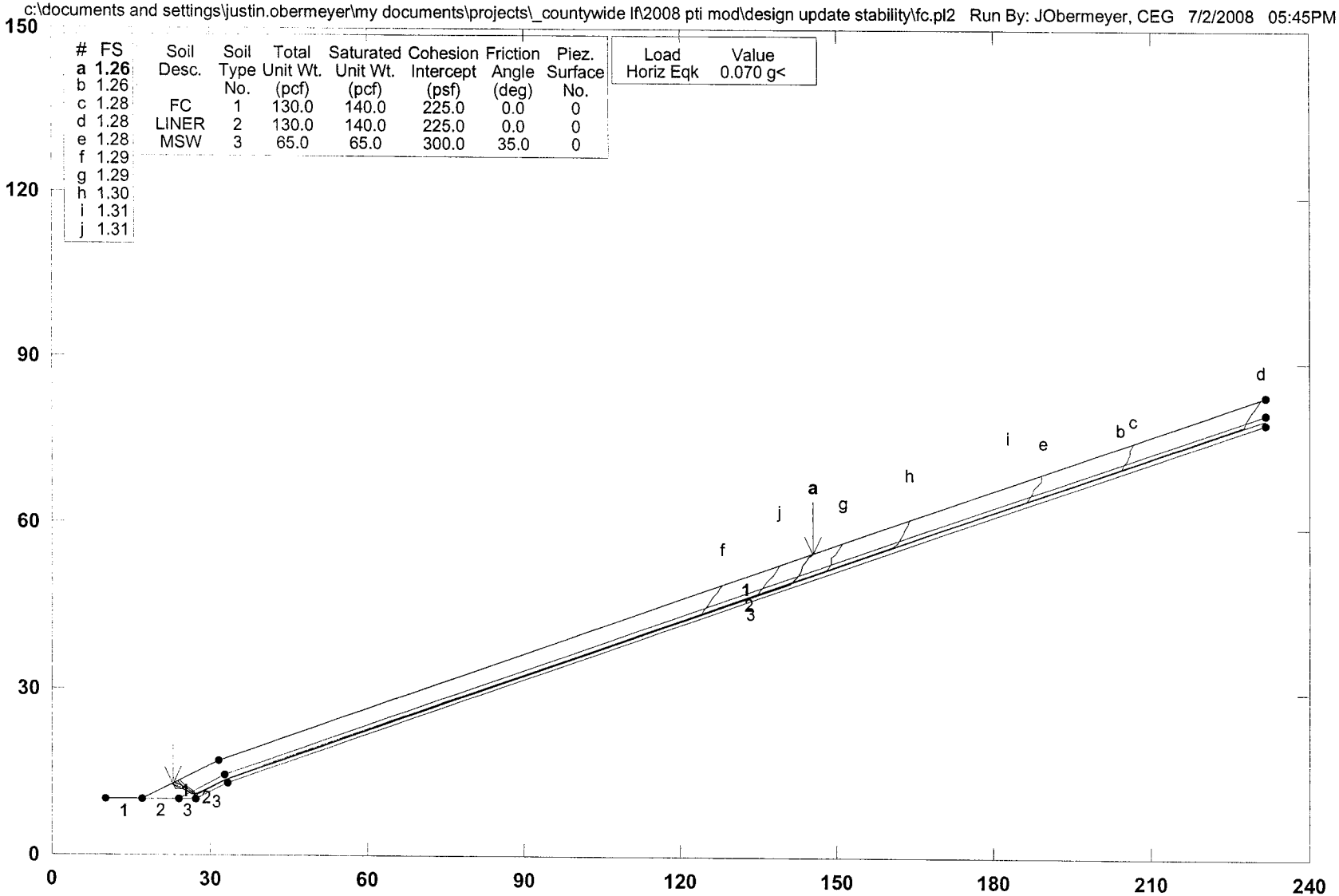
b	1.26
c	1.28
d	1.28
e	1.28
f	1.29
g	1.29
h	1.30
i	1.31
j	1.31

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FC	1	130.0	140.0	225.0	0.0	0
LINER	2	130.0	140.0	225.0	0.0	0
MSW	3	65.0	65.0	300.0	35.0	0

Load	Value
Horiz Eqk	0.070 g<



STABL6H FSmin=1.26

Safety Factors Are Calculated By The Modified Janbu Method

STED

**** STABL6H ****
by
Purdue University
--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date: 7/2/2008
Time of Run: 05:45PM
Run By: JObermeyer, CEG
Input Data Filename: C:fc.in
Output Filename: C:fc.OUT
Plotted Output Filename: C:fc.PLT
PROBLEM DESCRIPTION COUNTYWIDE PTI APPLICATION
FINAL COVER STABILITY

BOUNDARY COORDINATES
3 Top Boundaries
9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	10.00	10.00	17.23	10.00	1
2	17.23	10.00	31.67	17.22	1
3	31.67	17.22	231.71	83.90	1
4	17.23	10.00	23.94	10.00	2
5	23.94	10.00	32.82	14.44	2
6	32.82	14.44	231.72	80.74	2
7	23.94	10.00	27.29	10.00	3
8	27.29	10.00	33.40	13.05	3
9	33.40	13.05	231.72	79.16	3

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	140.0	225.0	0.0	0.00	0.0	0
2	130.0	140.0	225.0	0.0	0.00	0.0	0
3	65.0	65.0	300.0	35.0	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0 psf
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
40 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 1.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	27.29	10.81	27.39	10.84	0.25
2	32.82	13.60	32.92	13.60	0.25
3	40.03	16.05	231.71	79.95	0.25

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 Janbu Method * *
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.90	12.84
2	23.67	12.21
3	24.62	11.88
4	25.56	11.54
5	26.35	10.93
6	27.35	10.87
7	32.89	13.56
8	141.15	49.64
9	141.83	50.37
10	142.54	51.08
11	143.02	51.96

12	143.42	52.87
13	143.98	53.71
14	144.68	54.42
15	145.26	55.08

*** 1.257 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.03	13.40
2	24.20	13.29
3	24.97	12.65
4	25.82	12.12
5	26.55	11.45
6	27.31	10.79
7	32.92	13.53
8	200.86	69.74
9	201.24	70.67
10	201.95	71.37
11	202.33	72.30
12	202.89	73.12
13	203.49	73.92
14	204.19	74.64
15	204.24	74.74

*** 1.262 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.13	12.95
2	23.89	12.64
3	24.88	12.48
4	25.82	12.13
5	26.55	11.45
6	27.37	10.89
7	32.87	13.53
8	204.46	70.86
9	204.79	71.80
10	205.47	72.54
11	205.81	73.48
12	205.95	74.47
13	206.43	75.35
14	206.62	75.54

*** 1.282 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.93	12.85
2	23.80	12.55
3	24.71	12.12
4	25.43	11.43
5	26.39	11.16
6	27.36	10.91
7	32.89	13.62
8	227.72	78.74
9	227.90	79.72
10	228.61	80.43
11	229.12	81.29
12	229.79	82.03
13	230.31	82.89
14	230.94	83.64

*** 1.283 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.72	13.24
2	24.07	12.90
3	24.79	12.21
4	25.51	11.51
5	26.45	11.18
6	27.37	10.78
7	32.92	13.58

8	186.12	64.79
9	186.81	65.51
10	187.32	66.37
11	187.77	67.26
12	188.48	67.97
13	189.12	68.74
14	189.28	69.73
15	189.29	69.76

*** 1.284 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.70	12.73
2	22.84	12.60
3	23.55	11.90
4	24.54	11.76
5	25.51	11.53
6	26.33	10.95
7	27.32	10.81
8	32.85	13.50
9	123.88	44.11
10	124.55	44.84
11	125.24	45.57
12	125.70	46.46
13	126.38	47.19
14	127.02	47.96
15	127.56	48.80
16	128.04	49.34

*** 1.288 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.02	12.90
2	23.87	12.63
3	24.82	12.34
4	25.74	11.94
5	26.56	11.37
6	27.32	10.72
7	32.83	13.53
8	147.56	51.80
9	148.22	52.54
10	148.82	53.35
11	148.98	54.33
12	149.66	55.07
13	150.28	55.85
14	150.82	56.70
15	151.15	57.05

*** 1.288 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.50	13.13
2	24.12	12.85
3	24.83	12.14
4	25.61	11.52
5	26.61	11.45
6	27.34	10.77
7	32.90	13.51
8	160.85	56.45
9	161.55	57.15
10	162.13	57.97
11	162.76	58.75
12	162.96	59.73
13	163.65	60.45
14	164.05	61.35

*** 1.295 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.02	13.39

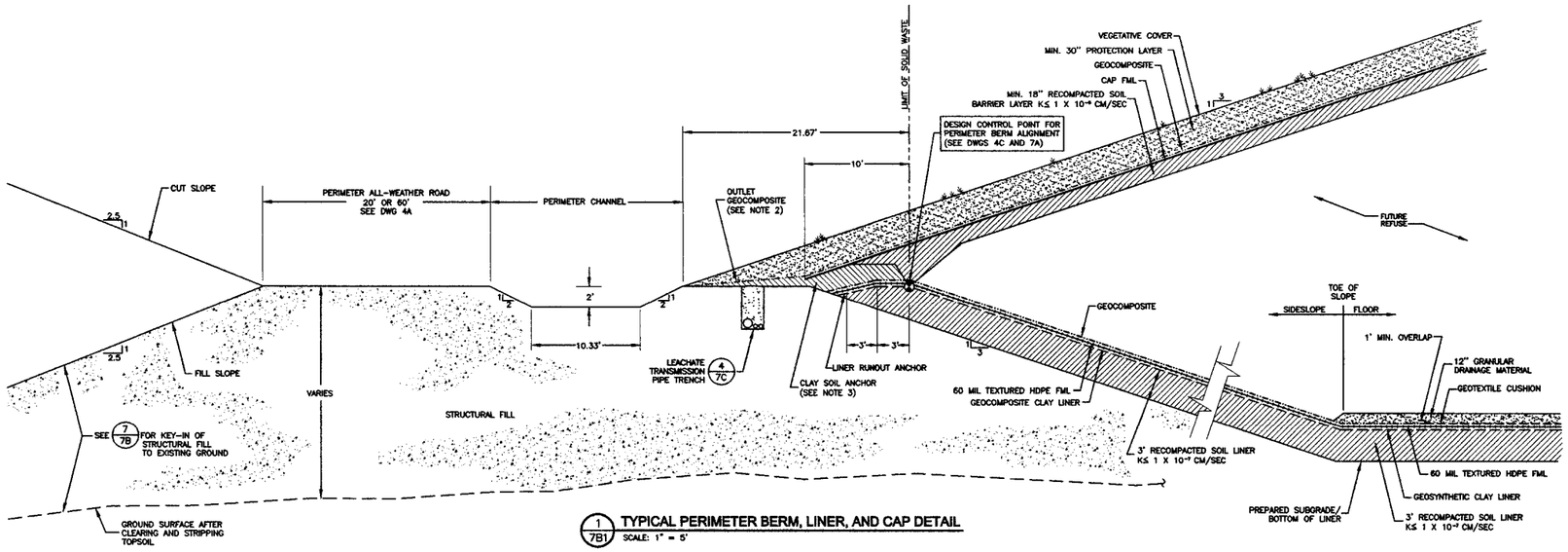
2	24.24	13.17
3	24.95	12.47
4	25.89	12.14
5	26.64	11.47
6	27.38	10.80
7	32.83	13.67
8	179.29	62.58
9	179.97	63.31
10	180.29	64.26
11	180.87	65.07
12	181.55	65.80
13	182.21	66.55
14	182.75	67.39
15	182.78	67.59

*** 1.307 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.18	13.48
2	24.23	13.44
3	24.97	12.76
4	25.72	12.10
5	26.59	11.61
6	27.31	10.92
7	32.90	13.67
8	134.55	47.60
9	135.25	48.31
10	135.90	49.08
11	136.53	49.85
12	137.23	50.56
13	137.94	51.27
14	138.58	52.04
15	138.90	52.96

*** 1.310 ***



1/7B1 TYPICAL PERIMETER BERM, LINER, AND CAP DETAIL

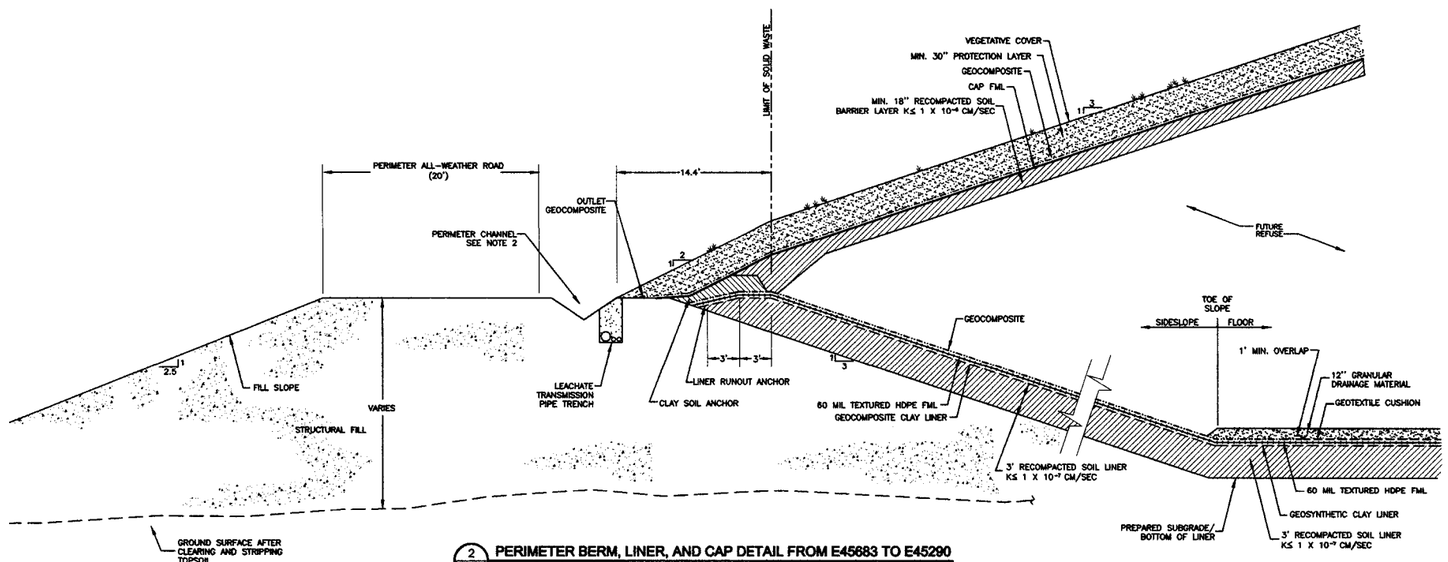
SCALE: 1" = 5'

NOTE:

1. DETAIL 1 AND NOTES ARE FROM THE 2003 PTI APPLICATION DESIGN AND HAVE NOT BEEN CHANGED FOR THIS SUBMITTAL.

DETAIL 1 NOTES:

1. SPECIFICATIONS FOR STRUCTURAL FILL, LINER, LEACHATE COLLECTION, AND CAP COMPONENTS ARE GIVEN IN APPENDIX C OF THE QA/QC PLAN IN SECTION 7.6 OF THE PTI APPLICATION.
2. THE CAP GEOCOMPOSITE SHOWN IN DETAIL 1 SHALL OUTLET TO THE PERIMETER DRAINAGE CHANNEL BY MEANS OF: A) EXTENDING THE GEOCOMPOSITE TO THE EDGE OF THE CHANNEL, OR B) TERMINATING THE GEOCOMPOSITE IN MINIMUM 6-INCH GRAVEL LAYER WHICH EXTENDS TO THE PERIMETER CHANNEL, OR C) TERMINATING THE GEOCOMPOSITE IN A PIPE TRENCH WITH A 4-INCH DIAMETER PERFORATED PIPE SURROUNDED BY GRAVEL, WHICH OUTLETS TO THE PERIMETER CHANNEL AT A MINIMUM SPACING OF 400 FEET.
3. A MINIMUM OF 1.5 FOOT THICK CLAY SOIL ANCHOR, COMPACTED BY CONSTRUCTION EQUIPMENT SHALL BE PLACED OVER THE LINER RUNOUT ANCHOR AT THE TIME OF LINER CONSTRUCTION (DETAIL 1).
4. THE EXISTING RECOMPACTED SOIL LINER RUNOUT AT THE TOP OF THE BERM RANGES FROM 9.49 FEET TO 15 FEET FOR CELLS 4A, 4B, 5B, AND 5C. GEOSYNTHETICS WERE RUNOUT A MINIMUM OF 3 FEET PRIOR TO V-ANCHOR TRENCH FOR CELLS 4A, 4B, AND 5B. LINER TIE-IN DETAIL 3 FOR CELLS 4A, 4B, 5B, AND 5C SHOWS EXISTING THE GEOSYNTHETIC ANCHOR TRENCH FOR CELL 5C WHICH HAS THE MINIMUM LINER RUNOUT.
5. THE ALTERNATIVE LINER DESIGN SHOWN IN DETAIL 4 APPLIES TO CELLS 7 AND 9. THE COMPOSITE LINER IN THESE CELLS MAY BE CONSTRUCTED ACCORDING TO EITHER DETAIL 1 OR DETAIL 4. IF CELLS 7 AND/OR 9 ARE CONSTRUCTED ACCORDING TO DETAIL 4, DETAIL 5 SHOWS THE LINER TRANSITION FROM A 5-FOOT COMPOSITE LINER TO A FUTURE 3-FOOT COMPOSITE LINER. GRADES IN CELLS 7 AND 9 SHOWN ON THE EXCAVATION PLAN (DRAWING 4A) AND BOTTOM OF LINER PLAN (DRAWING 4B) ARE REPRESENTATIVE OF LINER DETAIL 4; IF CELLS 7 AND 9 ARE CONSTRUCTED WITH A 3-FOOT COMPOSITE LINER, THE FLOOR GRADES OF THE CELLS 7 AND 9 WILL BE 2 FEET HIGHER.
6. DETAIL 6 SHOWS THE TEMPORARY LINER TERMINATION FOR CONSTRUCTION OF THE LATERAL EXPANSION AREA. WHEN FUTURE LINED AREAS ARE CONSTRUCTED, THE RECOMPACTED SOIL LINER SHALL BE KEYED INTO THE EXISTING RECOMPACTED SOIL LINER, AND ALL NEW LINER AND LEACHATE COMPONENTS CONNECTED TO EXISTING COMPONENTS.
7. CONSTRUCT AND OUTLET 4" ADS OR SCHEDULE 40 PVC PERFORATED DRAINAGE PIPE WRAPPED IN STONE AND 6 OZ NONWOVEN GEOTEXTILE WHERE SEEPAGE IS ENCOUNTERED DURING EXCAVATION OF KEY-IN TRENCH FOR BONDING BENCH (DETAIL 7).
8. THE INITIAL WASTE LAYER SHALL BE SELECT WASTE PLACED IN ACCORDANCE WITH SPECIFICATIONS GIVEN IN APPENDIX C OF THE QA/QC PLAN IN SECTION 7.6 OF THE PTI APPLICATION.
9. EIGHTEEN (18) INCHES OF SECONDARY TIRE CHIPS MAY BE USED IN PLACE OF THE 12" GRANULAR DRAINAGE MATERIAL.



2/7B1 PERIMETER BERM, LINER, AND CAP DETAIL FROM E45683 TO E45290

SCALE: 1" = 5'

NOTES:

1. DETAIL APPLIES TO PERIMETER BERM BETWEEN E45683 AND E45290.
2. PERIMETER CHANNEL WILL TRANSITION BETWEEN DETAIL 1 AND DETAIL 2 BETWEEN E45683 TO E45726 AND E45290 TO E45269.
3. THE PERIMETER CHANNEL IS DESIGNED TO BE 2' DEEP WITH 1.5:1 SIDESLOPES.
4. THE FINAL CAP COMPONENTS IN THE AREA OF THE 2:1 SLOPED CAP RUNOUT FOR THE FINAL CAP OUTSIDE THE LIMIT OF SOLID WASTE SHALL HAVE A MINIMUM SHEAR STRENGTH OF 225 PSF.

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 07/02/08 — DRAWN BY DAT — DESIGNED BY JCW — CHECKED BY JCO — APPROVED BY JCW

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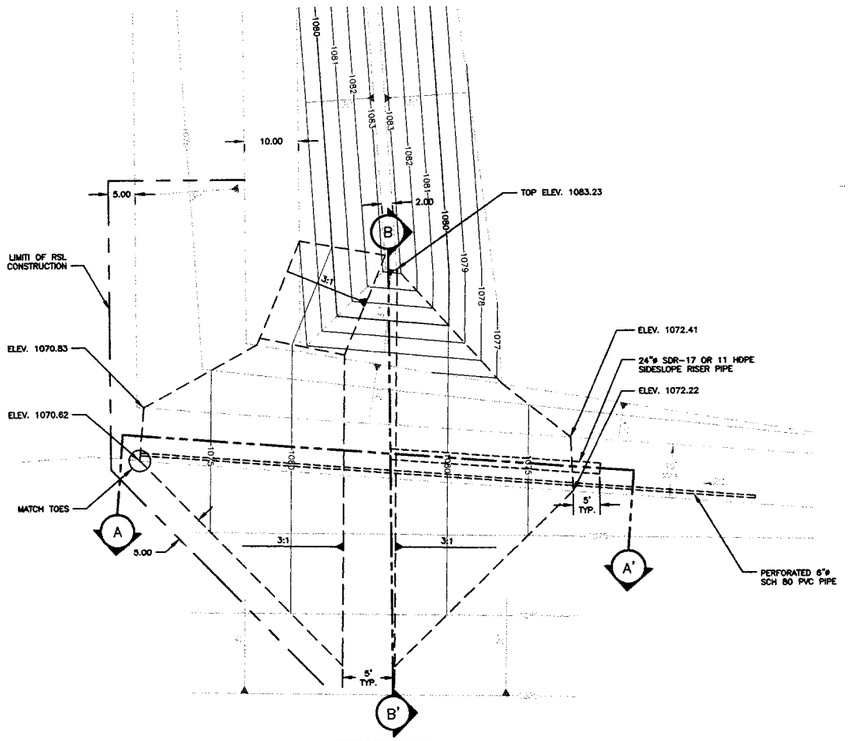
REPUBLIC SERVICES OF OHIO II, LLC
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
LINER, FINAL CAP SYSTEM AND
PERIMETER BERM DETAILS

SHEET NO. **7B1**

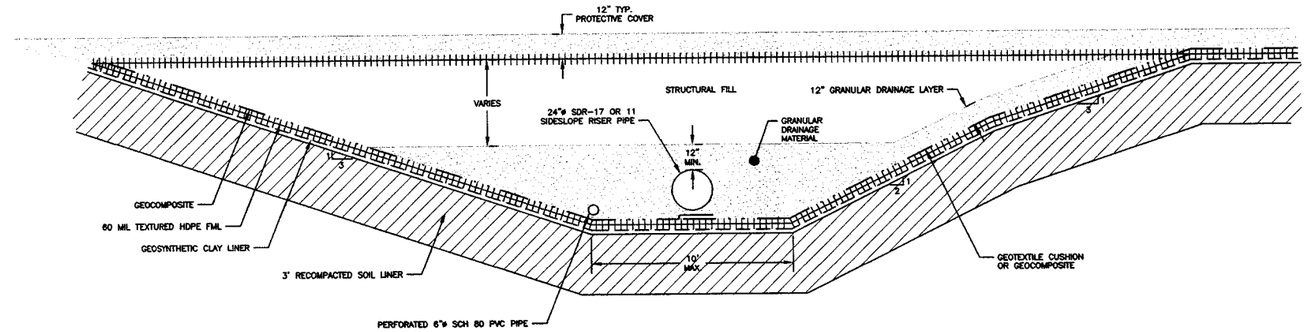
PROJECT NO. 0703340



TEMPORARY SUMP

PLAN VIEW (1/7A1)

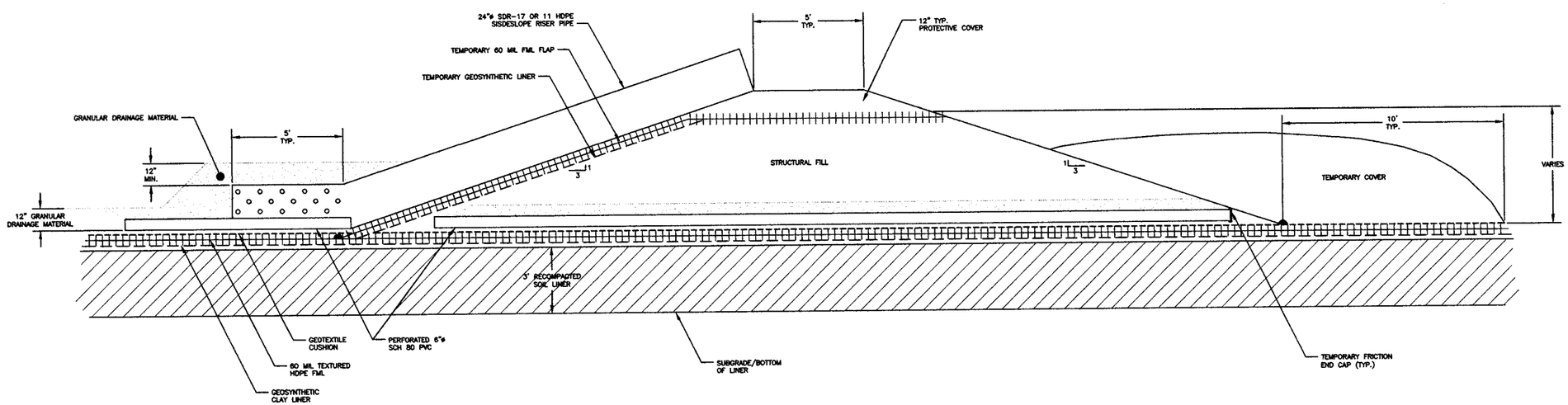
SCALE: NTS



CROSS SECTION B-B'

DETAIL (3/7A1)

SCALE: NTS



CROSS SECTION A-A'

DETAIL (2/7A1)

SCALE: NTS

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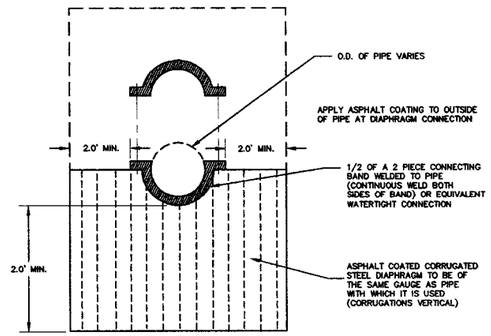
REPUBLIC SERVICES OF OHIO II, LLC
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

DETAILS

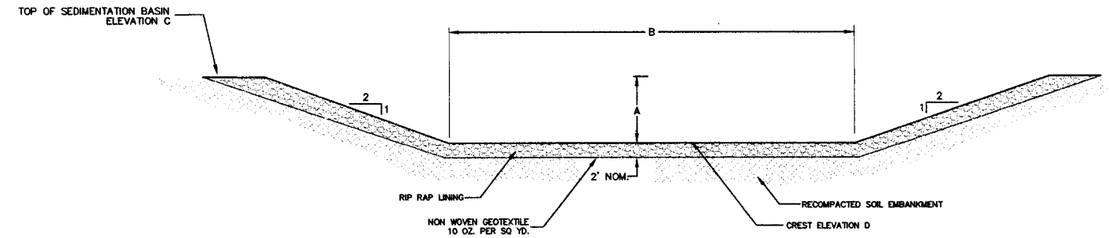
SHEET NO. **7D1**

PROJECT NO. 070340



NOTE:
THE ANTI-SEEP COLLAR SHALL EXTEND ABOVE THE PIPE. ONLY LOWER HALF IS SHOWN IN DETAIL FOR CLARITY.

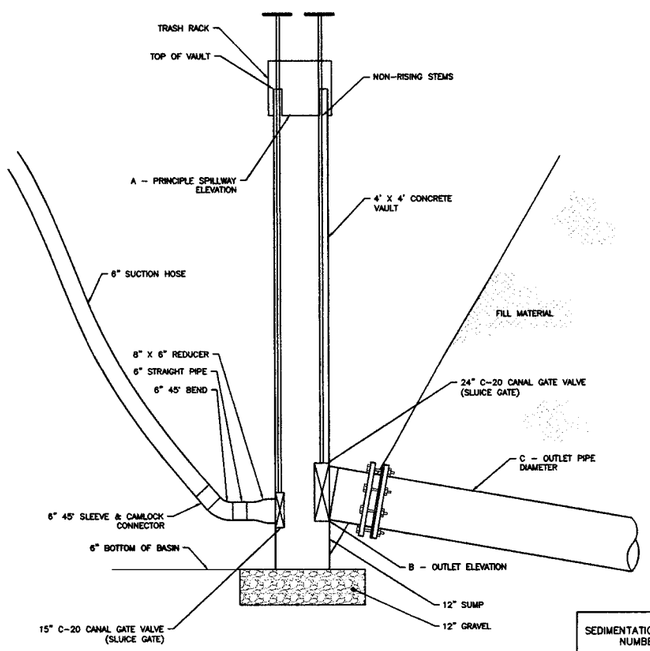
1 / 7K **ANTI-SEEP COLLAR DETAIL**
NOT TO SCALE



NOTE:
THE RIP-RAP SHALL HAVE A D_{50} OF 6".

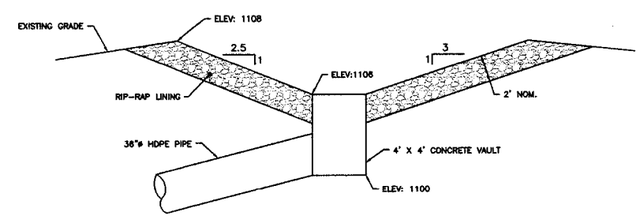
2 / 7K **EMERGENCY SPILLWAY SECTION**
NOT TO SCALE

SEDIMENTATION BASIN NUMBER	A (FEET)	B (FEET)	C MSL	D MSL
3	1.5	15	1040.1	1038.5
4	1.5	15	1131.0	1129.5
5	1.6	20	1135.0	1133.4
6	2.0	15	1140.0	1138.0
1-1A	1.9	30	1056.0	1054.15



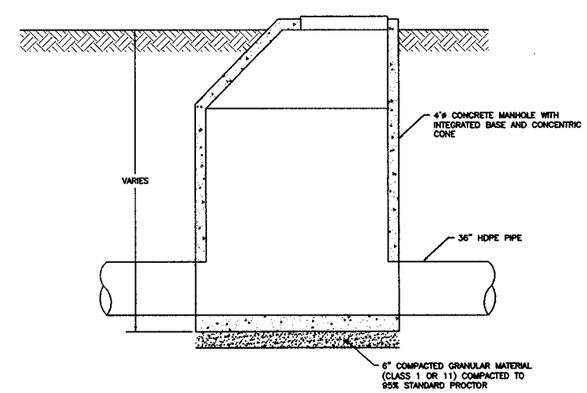
3 / 7K **PRINCIPAL SPILLWAY RISER SECTION**
NOT TO SCALE

SEDIMENTATION BASIN NUMBER	A (FEET) MSL	B (FEET) MSL	C (INCHES)
3	1037.5	1029.0	18
4	1128.5	1119.0	18
5	1132.7	1121.0	24
6	1137.0	1129.0	18
1-1A	1053.1	1037.6	36



NOTE:
THE RIP-RAP SHALL HAVE A D_{50} OF 6".

4 / 7K **DROP INLET SECTION**
NOT TO SCALE



5 / 7K **CLEANOUT MANHOLE**
NOT TO SCALE

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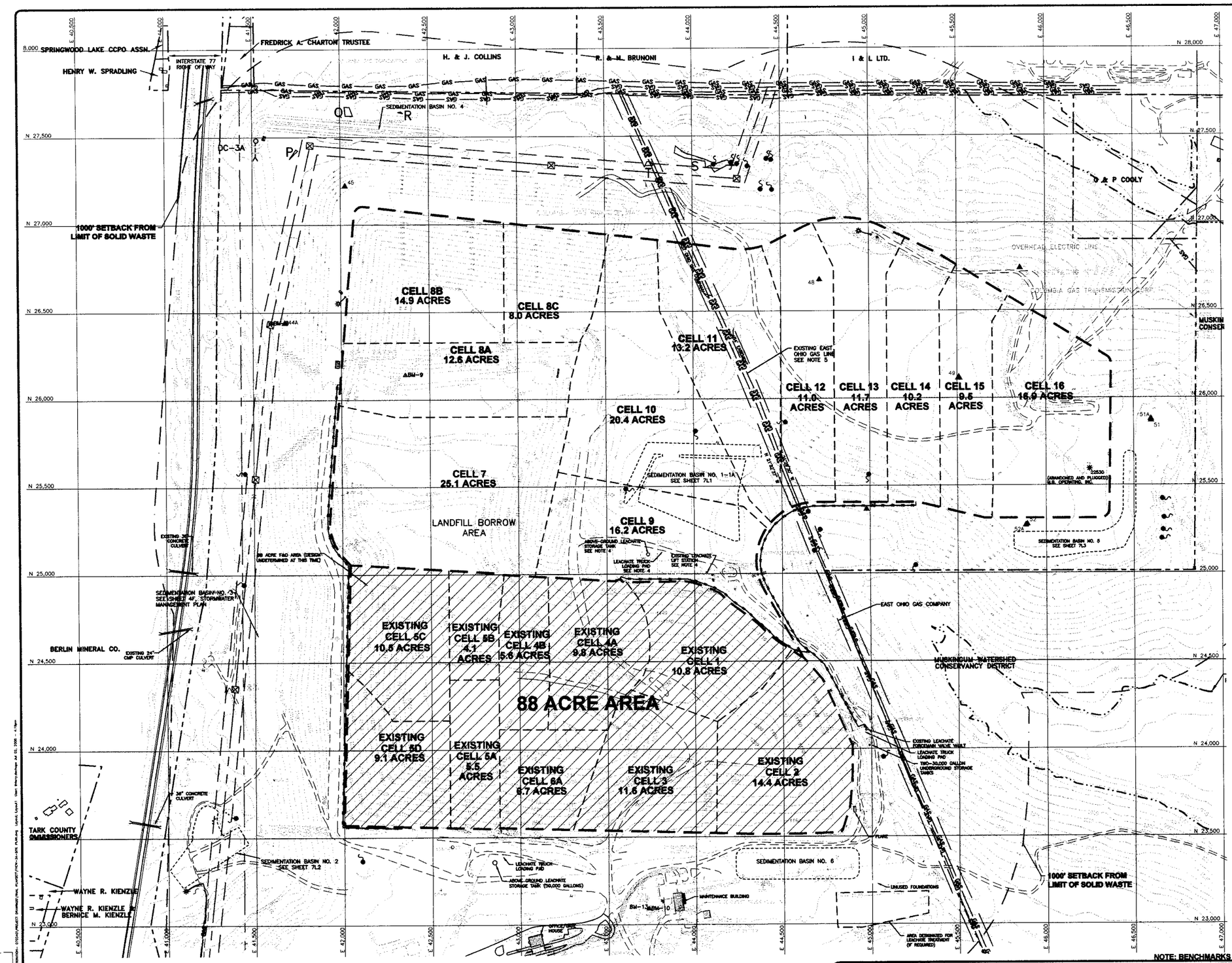
REPUBLIC SERVICES OF OHIO II, LLC
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

DRAINAGE DETAILS

SHEET NO. **7K**
PROJECT NO. 070340

1" 1/2" 0" 1"



N

NOTES:

1. CELLS WILL BE DEVELOPED ACCORDING TO THE NUMERICAL SEQUENCE OF THE CELL NUMBERS. AFTER CONSTRUCTION OF CELL 8C, CELLS 12–16 WILL BE DEVELOPED IN REVERSE NUMERICAL ORDER STARTING WITH CELL 16. AFTER CELL 12 IS CONSTRUCTED, CELLS 9–11 WILL BE DEVELOPED IN NUMERICAL ORDER. ALTERATION CELL SEQUENCING MAY REVERT BACK TO ORIGINAL SEQUENCING UPON THE RELEASE OF CELLS 8A/B, 8A/C TEMPORARY FIRE BREAK.
2. THE LINER WILL BE CONSTRUCTED AND CERTIFIED IN STAGES ACCORDING TO THE ANTICIPATED NEED FOR DISPOSAL VOLUME AT THE TIME OF CONSTRUCTION.
3. THE EXISTING LEACHATE STORAGE TANK, LIFT STATION, FORCEMAIN AND TRUCK LOADING PAD LOCATED NORTH OF EXISTING CELL 1 WILL BE DECOMMISSIONED AND REMOVED OR ABANDONED PRIOR TO CONSTRUCTION OF CELL 9. TEMPORARY LEACHATE MANAGEMENT FACILITIES WILL BE PROVIDED FOR CELL 1 AND CELL 4 DURING CONSTRUCTION OF CELL 9. ALL TEMPORARY AND PERMANENT LEACHATE MANAGEMENT FACILITIES WILL BE DOUBLE WALLED OUTSIDE LINED AREAS.
4. SEDIMENTATION BASINS 1 AND 1A WILL BE ABANDONED PRIOR TO CONSTRUCTION OF CELL 9.
5. THE EXISTING EAST OHIO GAS LINE WILL BE REMOVED OR RELOCATED PRIOR TO CONSTRUCTION OF CELL 12.
6. EXISTING UTILITIES FROM DRAWING ARE SHOWN SCREENED. PROPOSED FORCEMAIN TRENCH LOCATION FOR LEACHATE FORCEMAIN AND ELECTRIC IS SHOWN IN BOLD.
7. TOPOGRAPHIC CONTOURS SHOWN WERE DEVELOPED FROM AERIAL MAPPING AND FIELD SURVEYS CONDUCTED IN 2007 AND 2008.
8. THE 88 ACRE AREA IS UNDER THE DIRECTOR'S FINAL FINDINGS AND ORDERS DATED MARCH 28, 2007 AND SUBSEQUENT ORDERS FOR COMPLIANCE ACTIVITIES. REMEDIAL ACTIONS ARE PRESENTLY UNDECIDED FOR THE 88 ACRE AREA. THE FINAL TOP OF WASTE, TOP OF FINAL CAP GRADES AND STORMWATER MANAGEMENT STRUCTURES WILL BE DESIGNED ONCE THE FINAL REMEDIAL ACTIONS ARE DECIDED AND CONSTRUCTED.

LEGEND:

- PROPERTY LINE
- LIMIT OF SOLID WASTE
- EXISTING GROUND CONTOUR & DESIGNATION (ELEVATION IN FT.–M.S.L.)
- SPOT GROUND ELEVATION
- EXISTING STRUCTURE
- OCCUPIED STRUCTURE WITHIN 1000' OF LIMIT OF SOLID WASTE
- EXISTING FENCE LINE
- EXISTING ROAD
- OPEN WATER
- STREAMS
- NATURAL OR MAN MADE DEPRESSION
- TREE LINE
- ELECTRICAL TOWER
- SEEPS
- OHIO POWER TRANSMISSION LINES
- 100 YEAR FLOOD PLAIN LIMIT
- PAVED ROAD
- UNPAVED ROAD
- 1000' SETBACK FROM PROPOSED WASTE LIMITS
- CELL BOUNDARY
- WETLANDS TO REMAIN UNIMPACTED
- CULVERT
- 88 ACRE AREA, SEE NOTE 8

0 200 400
SCALE IN FEET

NOTE: BENCHMARKS (BM-X) ARE GIVEN ON SHEET 2A2 OF 2003 PTI DESIGN

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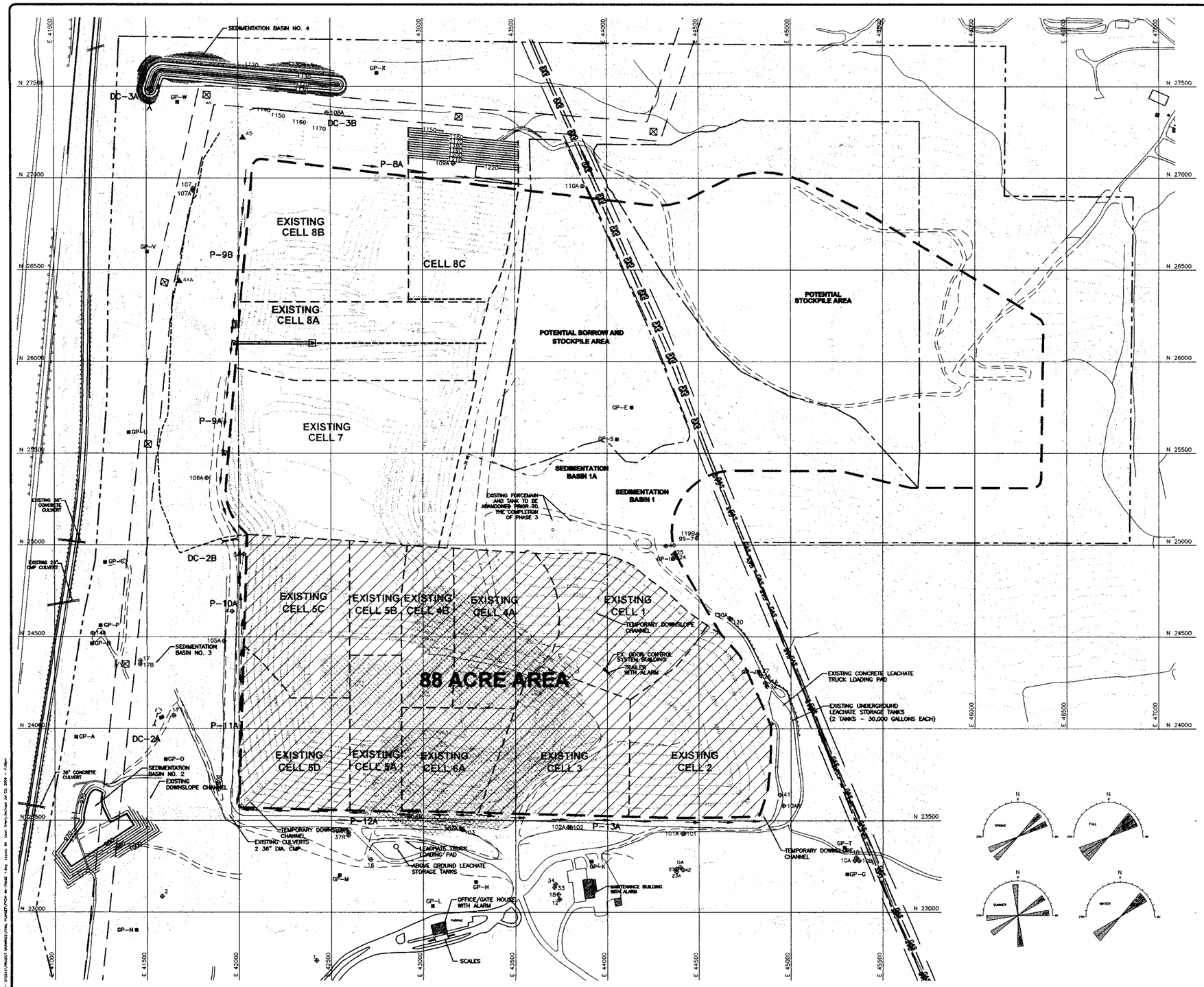
REPUBLIC SERVICES OF OHIO II, LLC
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

OVERALL SITE PLAN

SHEET NO. **3A**
PROJECT NO. 070340



LEGEND

- SOLID WASTE BOUNDARY
- PROPERTY BOUNDARY
- 1130 — TOP OF LINER 10' CONTOUR
- TOP OF LINER 2' CONTOUR
- 1260 — INTERIM WASTE 10' CONTOUR
- INTERIM WASTE 5' CONTOUR
- SLOPE BREAK
- TEMPORARY DRAINAGE DITCH
- CELL BOUNDARY
- LEACHATE COLLECTION PIPE (PERFORATED)
- EXISTING LEACHATE TRANSMISSION PIPE
- UTILITIES EASEMENT
- 2:1 C — CUT SLOPE INDICATOR HORIZONTAL:VERTICAL
- 2:1 F — FILL SLOPE INDICATOR HORIZONTAL:VERTICAL
- TEMPORARY DRAINAGE CULVERT
- ACCESS ROAD
- DC-8B — DOWNSLOPE CHANNEL WITH DESIGNATION
- TEMPORARY STOCKPILE/BORROW AREA
- SEDIMENTATION BASIN OUTLET STRUCTURE
- DOWNSLOPE CHANNEL ENERGY DISSIPATOR
- SEDIMENTATION BASIN EROSION PROTECTION
- SEDIMENTATION BASIN EMERGENCY SPILLWAY
- OUTLET CHANNEL EROSION PROTECTION
- C-3 — PROPOSED CULVERTS WITH DESIGNATION
- EXISTING CULVERT
- P-15A — DRAINAGE CHANNEL WITH DESIGNATION
- SPOT GROUND ELEVATION
- EXISTING STRUCTURE
- OCCUPIED STRUCTURE
- EXISTING FENCE LINE
- EXISTING ROAD
- NATURAL OR MAN MADE DEPRESSION
- TREE LINE
- WETLANDS WHICH SHALL REMAIN UNIMPACTED
- EXISTING TEMPORARY FML
- 88 ACRE AREA, SEE NOTE 1
- 34 — EXISTING MONITORING WELL
- GP-N# — EXISTING GAS PROBE

NOTES:

1. THE 88 ACRE AREA IS UNDER THE DIRECTOR'S FINAL FINDINGS AND ORDERS DATED MARCH 28, 2007 AND SUBSEQUENT ORDERS FOR COMPLIANCE ACTIVITIES. REMEDIAL ACTIONS ARE PRESENTLY UNDECIDED FOR THE 88 ACRE AREA. THE FINAL TOP OF WASTE, TOP OF FINAL CAP GRADES AND STORMWATER MANAGEMENT STRUCTURES WILL BE DESIGNED ONCE THE FINAL REMEDIAL ACTIONS ARE DECIDED AND CONSTRUCTED.
2. FOR STORMWATER DESIGN, SEE ATTACHMENT 2 OF THE 2008 PTI ALTERATION. SEDIMENTATION BASIN NO. 4 IS NOT REQUIRED UNTIL THE CELL 8A/8B AND 8A/8C FIREBREAK IS NO LONGER NEEDED AND WASTE FILLING RESUMES IN CELL 8A-8C ABOVE THE PERIMETER BERM. SEDIMENTATION BASIN 4 SHALL BE CONSTRUCTED PRIOR TO WASTE PLACEMENT ABOVE THE PERIMETER BERM OF CELL 8. SEDIMENTATION POND 2 FROM PTI 02-6645 WILL NOT BE CONSTRUCTED BUT SHALL BE REPLACED WITH POND 3.
3. SILT FENCING AND/OR TEMPORARY SEDIMENT TRAPS WILL BE USED TO CONTROL SILTATION FROM PERIMETER BERM CONSTRUCTION AREAS, AND FROM STOCKPILES AND INTERIM SLOPES WHICH CANNOT BE DRAINED TO A SEDIMENTATION BASIN.
4. TRAFFIC PATTERNS TO ACCESS CELLS 8B AND 8C: ACCESS WILL BE VIA THE EXISTING NORTH-SOUTH ROAD IN THE EXISTING LANDFILL AREA, OR USING THE SOUTH AND WEST PERIMETER ROADS, OR FROM BOTH ROUTES.
5. THE WORKING FACE IN CELLS 8A AND 8C IS ANTICIPATED TO PROCEED FROM EAST TO WEST, THEN WEST TO EAST, THEN EAST TO WEST, ETC. WITHIN THE EXISTING LANDFILL AREA, THE WORKING FACE IS ANTICIPATED TO PROCEED GENERALLY PARALLEL TO THE SOLID WASTE BOUNDARY IN A COUNTERCLOCKWISE DIRECTION.
6. WASTE DISPOSAL SHALL BE CONDUCTED IN APPROXIMATELY HORIZONTAL LAYERS TO ENSURE STABLE SLOPES.
7. ALL WEATHER ACCESS ROADS SHALL BE CONSTRUCTED AND MAINTAINED FOR INTERMEDIATE COVER SHALL BE PLACED OVER ALL AREAS THAT ARE INACTIVE FOR A PERIOD OF 30 DAYS OR MORE.
8. WASTE DISPOSAL AND OPERATIONAL VEHICLE ACCESS, HENCE NO SPECIAL AREA WILL BE REQUIRED FOR INCLEMENT WEATHER.
9. GRADES SHOWN FOR CELL 8C ARE TOP OF LINER IN UNFILLED AREAS.
10. TOPOGRAPHIC CONTOURS SHOWN WERE DEVELOPED FROM AERIAL AND FIELD SURVEYS CONDUCTED IN 2007 AND 2008.

0 200 400
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN BY	DES BY	CHK BY	APP BY

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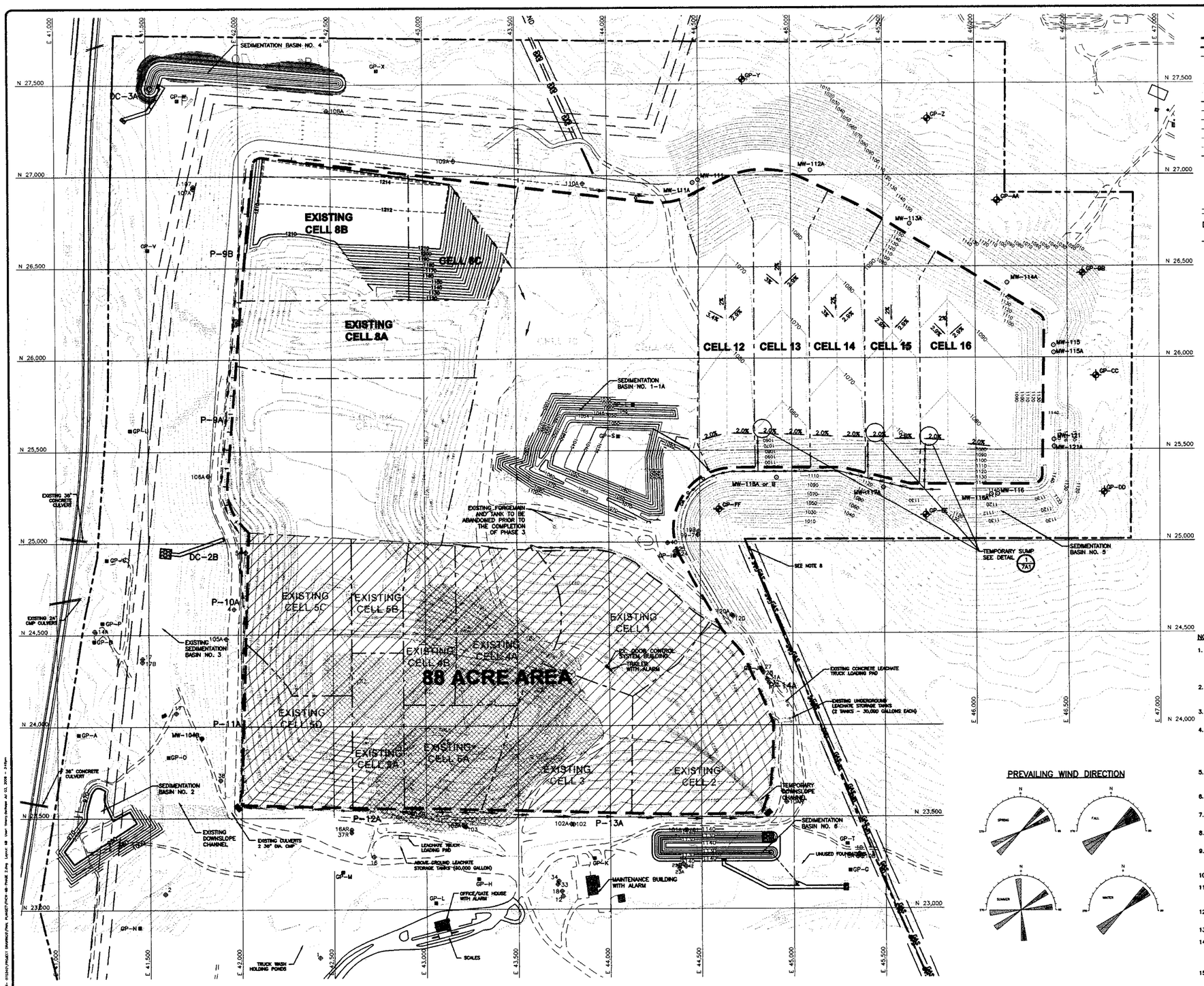
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

PHASE 1 PLAN

SHEET NO. **6A**

PROJECT NO. 070340



LEGEND

- SOLID WASTE BOUNDARY
- PROPERTY BOUNDARY
- CELL BOUNDARY
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- TOP OF LINER 10' CONTOUR
- TOP OF LINER 2' CONTOUR
- 1260 — INTERIM WASTE 10' CONTOUR
- INTERIM WASTE 2' OR 5' CONTOUR
- SLOPE BREAK
- TEMPORARY DRAINAGE DITCH
- LEACHATE COLLECTION PIPE (PERFORATED)
- EXISTING LEACHATE TRANSMISSION PIPE
- UTILITIES EASEMENT
- 2:1 — CUT SLOPE INDICATOR HORIZONTAL:VERTICAL
- 2:1 — FILL SLOPE INDICATOR HORIZONTAL:VERTICAL
- TEMPORARY DRAINAGE CULVERT
- ACCESS ROAD
- DC-6B — DOWNSLOPE CHANNEL WITH DESIGNATION
- TEMPORARY STOCKPILE/BORROW AREA
- SEDIMENTATION BASIN OUTLET STRUCTURE
- DOWNSLOPE CHANNEL ENERGY DISSIPATOR
- SEDIMENTATION BASIN EROSION PROTECTION
- SEDIMENTATION BASIN EMERGENCY SPILLWAY
- OUTLET CHANNEL EROSION PROTECTION
- C-3 — PROPOSED CULVERTS WITH DESIGNATION
- EXISTING CULVERT
- P-15A — DRAINAGE CHANNEL WITH DESIGNATION
- EXISTING STRUCTURE
- OCCUPIED STRUCTURE
- EXISTING FENCE LINE
- EXISTING ROAD
- NATURAL OR MAN MADE DEPRESSION
- TREE LINE
- WETLANDS WHICH SHALL REMAIN UNIMPACTED
- EXISTING TEMPORARY FML
- 88 ACRE AREA, SEE NOTE 1
- 34 — EXISTING MONITORING WELL
- GP-N — EXISTING GAS PROBE
- GP-EE — PROPOSED GAS PROBE
- MW-116 — PROPOSED MONITORING WELL

PREVAILING WIND DIRECTION

NOTES:

1. THE 88 ACRE AREA IS UNDER THE DIRECTOR'S FINAL FINDINGS AND ORDERS DATED MARCH 28, 2007 AND SUBSEQUENT ORDERS FOR COMPLIANCE ACTIVITIES. REMEDIAL ACTIONS ARE PRESENTLY UNDECIDED FOR THE 88 ACRE AREA. THE FINAL TOP OF WASTE, TOP OF FINAL CAP GRADES AND STORMWATER MANAGEMENT STRUCTURES WILL BE DESIGNED ONCE THE FINAL REMEDIAL ACTIONS ARE DECIDED AND CONSTRUCTED.
2. SILT FENCING AND/OR TEMPORARY SEDIMENT TRAPS WILL BE USED TO CONTROL SILTATION FROM PERIMETER BERM CONSTRUCTION AREAS, AND FROM STOCKPILES AND INTERIM SLOPES WHICH CANNOT BE DRAINED TO A SEDIMENTATION BASIN.
3. SEDIMENTATION BASIN 6 WILL BE CONSTRUCTED PRIOR TO CELL 9 TO MANAGE RUNOFF AND SILTATION FROM THE EXISTING EAST HALF OF THE SOUTH SLOPE AND EXISTING EAST SLOPE.
4. THE INITIAL CELL CONSTRUCTION OF CELL 9 SHALL EXTEND TO NORTH EDGE OF THE CELL TO PROVIDE A STABLE BASE FOR INITIAL WASTE DISPOSAL, HOWEVER THE CELL DEVELOPMENT MAY BE SUBDIVIDED IN AN EAST-WEST DIRECTION. MAXIMUM INTERIM WASTE SLOPES AND FILL HEIGHTS SHALL FOR CELL 9 PRIOR TO WASTE DISPOSAL IN CELL 10 BE IN ACCORDANCE WITH THE RECOMMENDATIONS IN SECTION 9 OF THE LANDFILL EXPANSION GEOTECHNICAL REPORT GIVEN IN SECTION 4.8 OF THE PTI APPLICATION.
5. TRAFFIC PATTERNS TO ACCESS CELLS 12-16: ACCESS WILL BE VIA THE EXISTING NORTH-SOUTH ROAD IN THE EXISTING LANDFILL AREA TO A ROAD ON THE EAST SIDE OF CELLS 7 AND 8, AND THEN EAST TO CELLS 12-16.
6. THE WORKING FACE IN CELLS 12-16 IS ANTICIPATED TO PROCEED INITIALLY FROM SOUTH TO NORTH, THEN NORTH TO SOUTH, THEN SOUTH TO NORTH, ETC.
7. WASTE DISPOSAL SHALL BE CONDUCTED IN APPROXIMATELY HORIZONTAL LAYERS TO ENSURE STABLE SLOPES.
8. THE EAST OHIO GAS PIPELINE WILL BE REMOVED OR RELOCATED PRIOR TO CONSTRUCTION OF CELL 12.
9. ALL WEATHER ACCESS ROADS WILL BE CONSTRUCTED AND MAINTAINED FOR WASTE DISPOSAL AND OPERATIONAL VEHICLE ACCESS, HENCE NO SPECIAL AREA WILL BE REQUIRED FOR INCLEMENT WEATHER.
10. GRADES SHOWN FOR CELLS 12-16 ARE TOP OF LINER.
11. CELLS 12-16 WILL BE DEVELOPED ACCORDING TO THE REVERSE NUMERICAL SEQUENCE OF THE CELL NUMBERS, BEGINNING WITH CELL 16. LINED CELL AREAS MAY BE CONSTRUCTED AND CERTIFIED IN STAGES.
12. TOPOGRAPHIC CONTOURS SHOWN WERE DEVELOPED FROM AERIAL AND FIELD SURVEYS CONDUCTED IN 2007 AND 2008.
13. INTERIM WASTE CONTOURS IN CELLS 8B AND 8C ARE PROPOSED.
14. FOR STORMWATER DESIGN, SEE ATTACHMENT 2 OF THE 2008 PTI ALTERATION. SEDIMENTATION BASIN NO. 4 IS NOT REQUIRED UNTIL THE CELL 8A/8B AND 8A/8C FIREBREAK IS NO LONGER NEEDED AND WASTE FILLING RESUMES IN CELL 8A-8C ABOVE THE PERIMETER BERM.
15. SEE ATTACHMENT 1 OF THE 2008 PTI ALTERATION BINDER FOR SHEAR STRENGTH REQUIREMENTS FOR CELLS 12-16.

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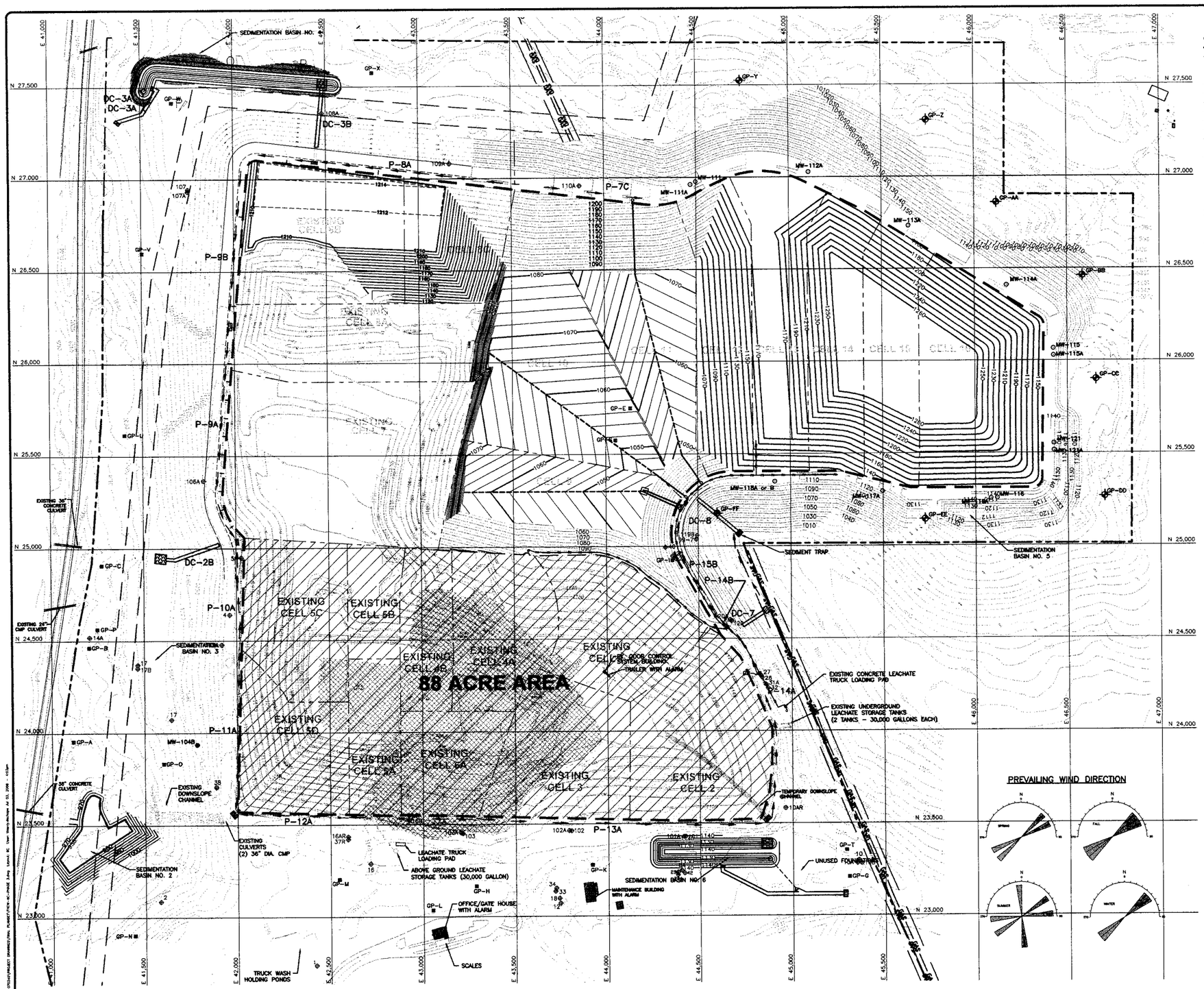
COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

PHASE 2 PLAN

SHEET NO. **6B**

PROJECT NO. 070340



LEGEND

- SOLID WASTE BOUNDARY
- PROPERTY BOUNDARY
- CELL BOUNDARY
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- 1130 — TOP OF LINER 10' CONTOUR
- TOP OF LINER 2' CONTOUR
- 1260 — INTERIM WASTE 10' CONTOUR
- INTERIM WASTE 5' CONTOUR
- SLOPE BREAK
- TEMPORARY DRAINAGE DITCH
- LEACHATE COLLECTION PIPE (PERFORATED)
- EXISTING LEACHATE TRANSMISSION PIPE
- UTILITIES EASEMENT
- 2:1 — CUT SLOPE INDICATOR HORIZONTAL:VERTICAL
- 2:1 — FILL SLOPE INDICATOR HORIZONTAL:VERTICAL
- TEMPORARY DRAINAGE CULVERT
- ACCESS ROAD
- DC-8B — DOWNSLOPE CHANNEL WITH DESIGNATION
- TEMPORARY STOCKPILE/BORROW AREA
- SEDIMENTATION BASIN OUTLET STRUCTURE
- DOWNSLOPE CHANNEL ENERGY DISSIPATOR
- SEDIMENTATION BASIN EROSION PROTECTION
- SEDIMENTATION BASIN EMERGENCY SPILLWAY
- OUTLET CHANNEL EROSION PROTECTION
- C-3 — PROPOSED CULVERTS WITH DESIGNATION
- EXISTING CULVERT
- P-15A — DRAINAGE CHANNEL WITH DESIGNATION
- EXISTING STRUCTURE
- OCCUPIED STRUCTURE
- EXISTING FENCE LINE
- EXISTING ROAD
- NATURAL OR MAN MADE DEPRESSION
- TREE LINE
- WETLANDS WHICH SHALL REMAIN UNIMPACTED
- EXISTING TEMPORARY FILL
- 88 ACRE AREA, SEE NOTE 1
- AREA TO RECEIVE FINAL COVER
- 34 — EXISTING MONITORING WELL
- GP-N — EXISTING GAS PROBE
- GP-EE — PROPOSED GAS PROBE
- MW-116 — PROPOSED MONITORING WELL

N

PREVAILING WIND DIRECTION

NOTES:

1. THE 88 ACRE AREA IS UNDER THE DIRECTOR'S FINAL FINDINGS AND ORDERS DATED MARCH 28, 2007 AND SUBSEQUENT ORDERS FOR COMPLIANCE ACTIVITIES. REMEDIAL ACTIONS ARE PRESENTLY UNDECIDED FOR THE 88 ACRE AREA. THE FINAL TOP OF WASTE, TOP OF FINAL CAP GRADES AND STORMWATER MANAGEMENT STRUCTURES WILL BE DESIGNED ONCE THE FINAL REMEDIAL ACTIONS ARE DECIDED AND CONSTRUCTED.
2. SILT FENCING AND/OR TEMPORARY SEDIMENT TRAPS WILL BE USED TO CONTROL SILTATION FROM PERIMETER BERM CONSTRUCTION AREAS, AND FROM STOCKPILES AND INTERIM SLOPES WHICH CANNOT BE DRAINED TO A SEDIMENTATION BASIN.
3. SEDIMENTATION BASIN 6 WILL BE CONSTRUCTED PRIOR TO CELL 9 TO MANAGE RUNOFF AND SILTATION FROM THE EXISTING EAST HALF OF THE SOUTH SLOPE AND EXISTING EAST SLOPE.
4. THE CELL 1 AND CELL 4 LEACHATE MANAGEMENT FACILITIES SHALL BE MODIFIED ACCORDING TO DRAWING 4C AT THE TIME OF CELL 9 CONSTRUCTION.
5. THE INITIAL CELL CONSTRUCTION OF CELL 9 SHALL EXTEND TO NORTH EDGE OF THE CELL TO PROVIDE A STABLE BASE FOR INITIAL WASTE DISPOSAL. HOWEVER THE CELL DEVELOPMENT MAY BE SUBDIVIDED IN AN EAST-WEST DIRECTION. MAXIMUM INTERIM WASTE SLOPES AND FILL HEIGHTS SHALL FOR CELL 9 PRIOR TO WASTE DISPOSAL IN CELL 10 BE IN ACCORDANCE WITH THE RECOMMENDATIONS IN SECTION 9 OF THE LANDFILL EXPANSION GEOTECHNICAL REPORT GIVEN IN SECTION 4.8 OF THE 2003 PTI APPLICATION.
6. TRAFFIC PATTERNS TO ACCESS CELLS 9, 10 AND 11: ACCESS WILL BE VIA THE EXISTING NORTH-SOUTH ROAD IN THE EXISTING LANDFILL AREA TO A ROAD OVER CELLS 7 AND 8, OR USING THE SOUTH, WEST AND NORTH PERIMETER ROADS INTO THE CELLS, OR FROM BOTH ROUTES.
7. THE WORKING FACE IN CELL 9 IS ANTICIPATED TO PROCEED FROM WEST TO EAST, THEN EAST TO WEST, THEN WEST TO EAST, ETC. THE WORKING FACE IN CELLS 10 AND 11 IS ANTICIPATED TO PROCEED FROM SOUTH TO NORTH, THEN NORTH TO SOUTH, THEN SOUTH TO NORTH, ETC. WITHIN THE EXISTING LANDFILL AREA, THE WORKING FACE IS EXPECTED TO PROCEED GENERALLY PARALLEL TO THE SOLID WASTE BOUNDARY.
8. WASTE DISPOSAL SHALL BE CONDUCTED IN APPROXIMATELY HORIZONTAL LAYERS TO ENSURE STABLE SLOPES.
9. ALL WEATHER ACCESS ROADS WILL BE CONSTRUCTED AND MAINTAINED FOR WASTE DISPOSAL AND OPERATIONAL VEHICLE ACCESS, HENCE NO SPECIAL AREA WILL BE REQUIRED FOR INCLEMENT WEATHER.
10. GRADES SHOWN FOR CELLS 9-11 ARE TOP OF LINER.
11. CELLS WILL BE DEVELOPED ACCORDING TO THE NUMERICAL SEQUENCE OF THE CELL NUMBERS. LINED CELL AREAS MAY BE CONSTRUCTED AND CERTIFIED IN STAGES.
12. TOPOGRAPHIC CONTOURS SHOWN WERE DEVELOPED FROM AERIAL AND FIELD SURVEYS CONDUCTED IN 2007 AND 2008.
13. SEE ATTACHMENT 1 OF THE 2008 PTI ALTERATION BINDER FOR SHEAR STRENGTH REQUIREMENTS FOR CELLS 9-11.

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COUNTYWIDE RECYCLING AND DISPOSAL FACILITY
EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

PHASE 3 PLAN

SHEET NO. **6C**

PROJECT NO. 070340

CELL 10

CELL 12

CELL 9

EROSION PROTECTION – SHADED AREA (RIP-RAP OR ENGINEER APPROVED ALTERNATE)

MAIN BASIN ENTRANCE

FOREBAY

ACCESS ROAD

EXISTING EAST OHIO GAS LINE SEE NOTE 5

TEMPORARY DITCH FROM CELLS 12-16

RISER PIPE SEE DETAIL 3/7K

EMERGENCY SPILLWAY SEE DETAIL 2/7K

EXISTING CULVERTS SEE NOTE 1

SEDIMENTATION BASIN 1-1A
BOTTOM OF BASIN EL. = 1056.0
TOP OF BASIN EL. = 1036.0
PRINCIPAL SPILLWAY EL. = 1053.10
EMERGENCY SPILLWAY EL. = 1054.15

36" DIA. HDPE CULVERT

INV. EL. 1034

RIP RAP CHANNEL

EXISTING (2) 48" CMP's SEE NOTE 1

EXISTING (2) 48" CMP's

N 26000

N 25500

N 25000

E 43500

E 44000

E 44500

N

0 50 100
SCALE IN FEET

NOTES:

1. EXISTING CULVERTS WILL BE SHORTENED AS REQUIRED TO CONFORM TO THE EXCAVATION SLOPES.

LEGEND:

- LIMIT OF SOLID WASTE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- OHIO POWER TRANSMISSION LINES
- 1040 PROPOSED SEDIMENTATION BASIN 10' CONTOUR
- 1038 PROPOSED SEDIMENTATION BASIN 2' CONTOUR
- OHIO POWER TRANSMISSION LINES
- GAS GAS GAS LINES
- CELL BOUNDARY
- FM FM LEACHATE FORCEMAIN

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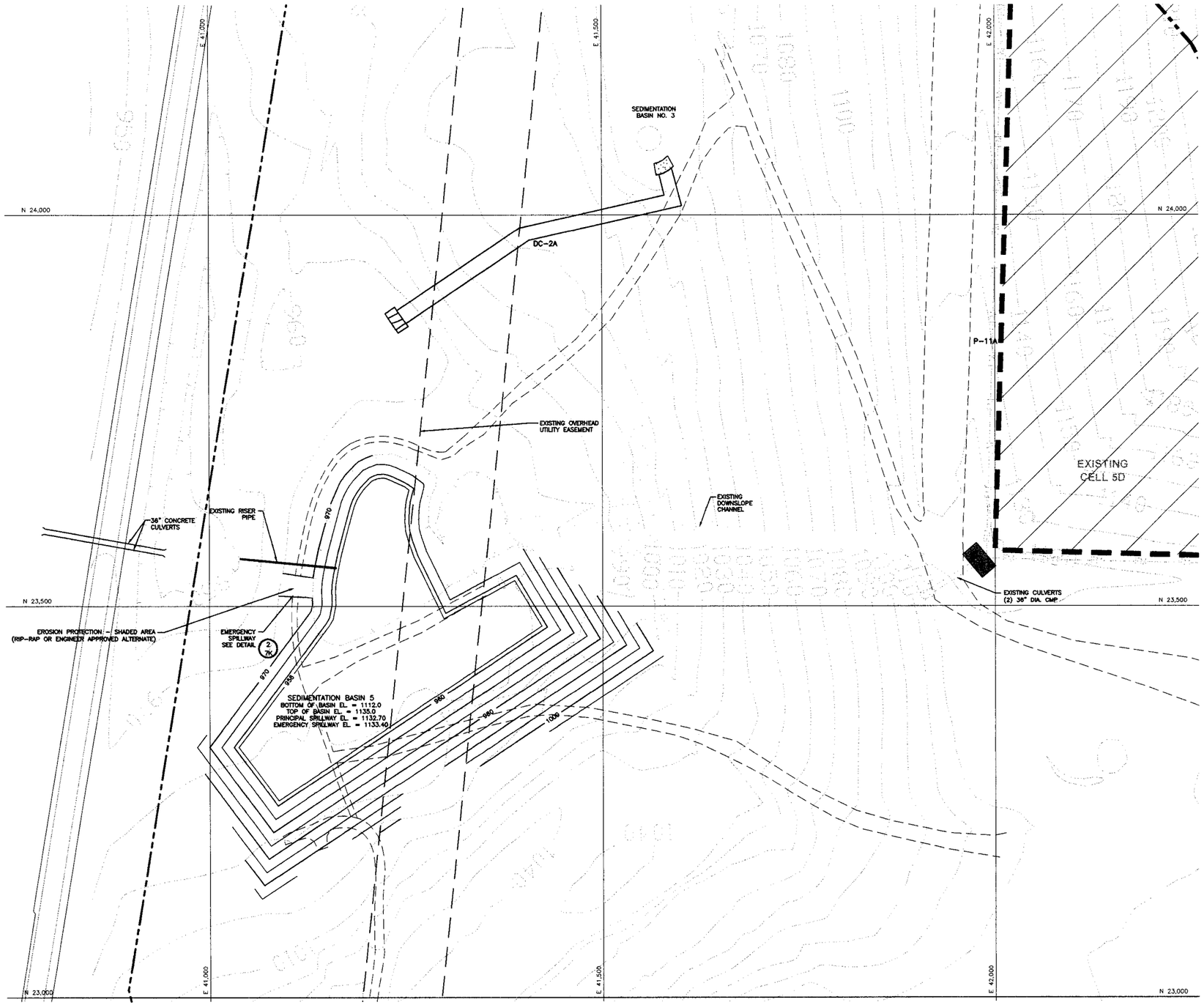
SEDIMENTATION BASIN 1-1A

SHEET NO. **7L1**

PROJECT NO. 070340



LEGEND:

- PROPERTY LINE
- LIMIT OF SOLID WASTE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- OHIO POWER TRANSMISSION LINES
- 1040 PROPOSED SEDIMENTATION BASIN 10' CONTOUR
- 1038 PROPOSED SEDIMENTATION BASIN 2' CONTOUR
- OHIO POWER TRANSMISSION LINES
- CELL BOUNDARY

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EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION

SEDIMENTATION BASIN 2

SHEET NO. **7L2**

PROJECT NO. 070340

CELL 13

CELL 14

CELL 15

CELL 16

N 26,000

N 25,500

N 25,000

E 45,000

E 45,500

E 46,000

E 46,500

51A

51

EROSION PROTECTION – SHADED AREA (RIP-RAP OR ENGINEER APPROVED ALTERNATE)

EROSION PROTECTION – SHADED AREA (RIP-RAP OR ENGINEER APPROVED ALTERNATE)

INV. EL. 1134.29 (4) 36"ø ADS N-12 CULVERTS

INV. EL. 1134.50 (4) 36"ø ADS N-12 CULVERTS

ACCESS ROAD

FOREBAY

MAIN BASIN ENTRANCE

RISER PIPE SEE DETAIL 3/7K

EMERGENCY SPILLWAY SEE DETAIL 2/7K

SEDIMENTATION BASIN 5
BOTTOM OF BASIN EL. = 1112.0
TOP OF BASIN EL. = 1135.0
PRINCIPAL SPILLWAY EL. = 1132.70
EMERGENCY SPILLWAY EL. = 1133.40

EROSION PROTECTION – SHADED AREA (RIP-RAP OR ENGINEER APPROVED ALTERNATE)

MANHOLE (TYP.) SEE DETAIL 5/7K

36"ø HDPE CULVERT (SEE PHASE PLAN 2, SHEET 6B FOR OUTLET)

DROP INLET SEE DETAIL 4/7K

EROSION PROTECTION – SHADED AREA (RIP-RAP OR ENGINEER APPROVED ALTERNATE)

LEGEND:

- PROPERTY LINE
- LIMIT OF SOLID WASTE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- OHIO POWER TRANSMISSION LINES
- 1040 PROPOSED SEDIMENTATION BASIN 10' CONTOUR
- 1038 PROPOSED SEDIMENTATION BASIN 2' CONTOUR
- OHIO POWER TRANSMISSION LINES
- CELL BOUNDARY

N

0 50 100
SCALE IN FEET

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EAST SPARTA, OHIO
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SEDIMENTATION BASIN 5

SHEET NO. **7L3**

PROJECT NO. 070340

1" 1/2" 0" 1"

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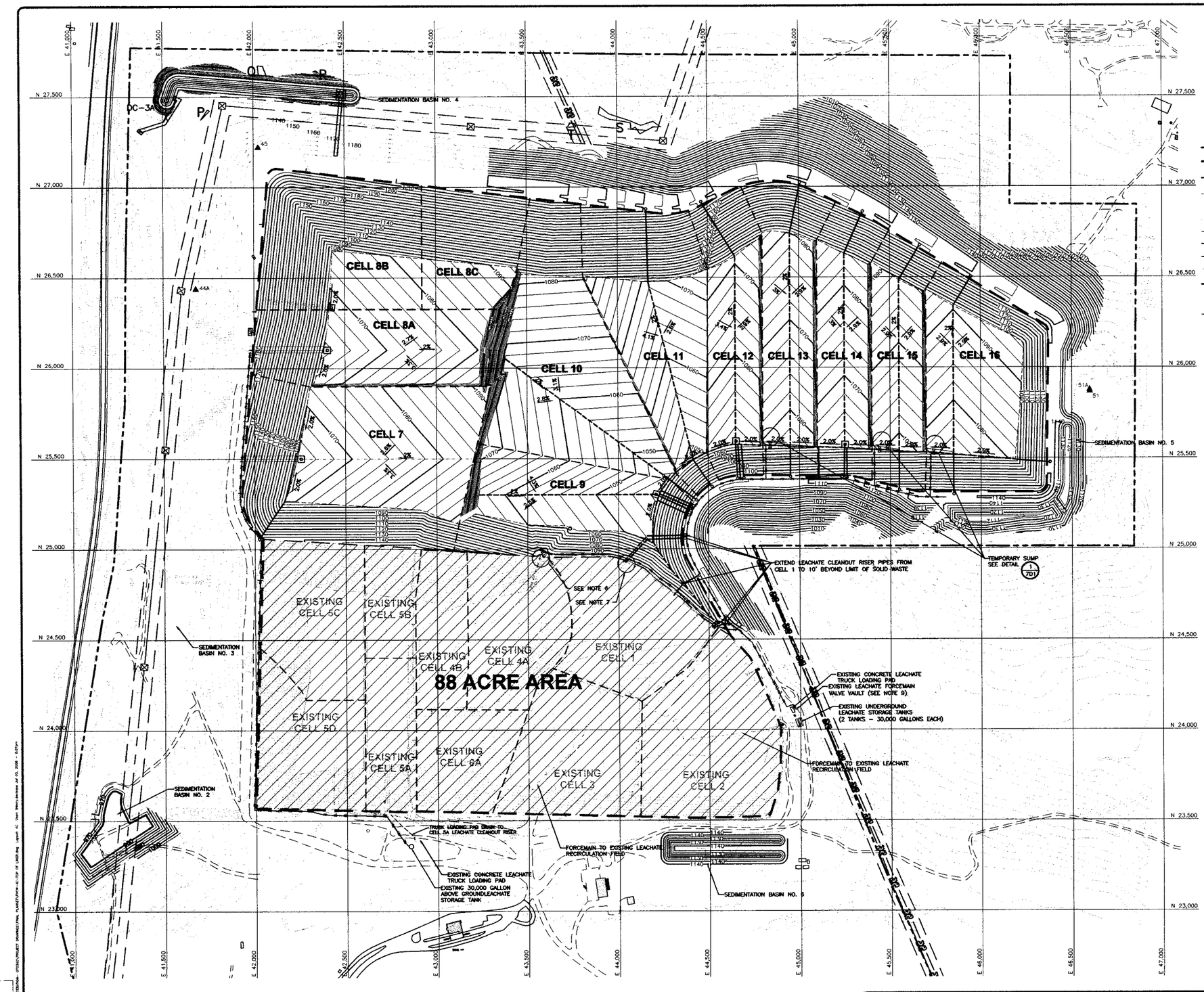

LEGEND

- PROPERTY LINE
- LIMIT OF SOLID WASTE WITH STATIONING (SEE NOTE 8)
- 1070 TOP OF LINER – 10' CONTOUR
- TOP OF LINER 2' CONTOUR INTERVAL ON BASE 5' CONTOUR INTERVAL ON SIDESLOPES
- EXISTING CONTOUR – 10'
- EXISTING CONTOUR – 2'
- SLOPE BREAK
- CELL BOUNDARY
- PROPOSED LEACHATE TRANSMISSION PIPE
- EXISTING LEACHATE TRANSMISSION PIPE
- UNCONSTRUCTED LEACHATE COLLECTION PIPE (PERFORATED)
- EXISTING LEACHATE COLLECTION PIPE (PERFORATED)
- UTILITIES EASEMENT
- EXISTING 6" SCH 80 PVC NON-PERFORATED LEACHATE COLLECTION PIPE CLEANOUT RISER
- EXISTING LEACHATE COLLECTION SUMP SIDESLOPE COLLECTION RISER PIPE
- PROPOSED 6" SCH 80 PVC NON-PERFORATED LEACHATE COLLECTION PIPE CLEANOUT RISER
- PROPOSED LEACHATE COLLECTION SUMP SIDESLOPE COLLECTION RISER PIPE
- LEACHATE COLLECTION SUMP
- LEACHATE COLLECTION TRENCH UNDERCUT
- SPOT GROUND ELEVATION
- EXISTING STRUCTURE
- OCCUPIED STRUCTURE
- EXISTING FENCE LINE
- EXISTING ROAD
- PROPOSED ROAD
- NATURAL OR MAN MADE DEPRESSION
- TREE LINE
- 88 ACRE AREA
- WETLANDS TO REMAIN UNIMPACTED

NOTES:

CONTOUR LINES OF THIS DRAWING DEPICT TOP OF LINER GRADES. LEACHATE COLLECTION PIPE INVERT ELEVATIONS WILL BE 2 INCHES ABOVE TOP OF LINER GRADES DUE TO PIPE BEDDING. TOP OF LEACHATE COLLECTION DRAINAGE LAYER GRADES WILL BE 1 FOOT ABOVE TOP OF LINER GRADES IF GRANULAR MATERIAL IS USED, OR 1.5 FEET ABOVE TOP OF LINER GRADES IF TIRE CHIPS ARE USED.

THE LINER WILL BE CONSTRUCTED AND CERTIFIED IN STAGES ACCORDING TO THE ANTICIPATED NEED FOR DISPOSAL VOLUME AT THE TIME OF CONSTRUCTION.

TEMPORARY INTRACELL BERMS SHOWN IN DETAILS 2 AND 3, DRAWING 7B MAY BE CONSTRUCTED TO MANAGE LEACHATE BY MINIMIZING THE DISPOSAL AREA DURING INITIAL DISPOSAL IN A LINED AREA.

EXISTING LEACHATE TRANSMISSION PIPES ARE DOUBLE-WALLED OUTSIDE THE LIMIT OF SOLID WASTE, MINIMUM 2" HDPE PRIMARY / MINIMUM 4" HDPE SECONDARY. NEW LEACHATE TRANSMISSION PIPES SHALL BE DOUBLE-WALLED HDPE PIPE OUTSIDE THE LIMIT OF SOLID WASTE, SEE DRAWING 7C FOR PIPE SIZES.

LEACHATE PUMPS SHALL BE EQUIPPED WITH A RELAY SWITCH WHICH WILL SHUTDOWN THE PUMP WHEN THE REMAINING STORAGE IN THE LEACHATE STORAGE TANK IS EQUIVALENT TO THE LEACHATE VOLUME IN THE TRANSMISSION PIPE.

THE SIDESLOPE RISER PIPE USED FOR CELL 4 LEACHATE EXTRACTION AND LEACHATE CLEANOUT RISER PIPES WILL BE RAISED BY CONSTRUCTION OF TELESCOPING RISER PIPES IN STAGES AS SOLID WASTE DISPOSAL PROGRESSES. DETAILS OF THE TELESCOPING RISERS ARE SHOWN ON DRAWINGS 7F1 AND 7F2 OF THE 2003 PTI DESIGN.

THE CELL 1 DOUBLE-WALLED LEACHATE GRAVITY PIPE PENETRATING THE PERIMETER BERM WILL BE MODIFIED AS SHOWN IN DRAWING 7E OF THE 2003 PTI DESIGN.

SEE DRAWING 7A OF THE 2003 PTI DESIGN FOR PROFILE OF THE LIMIT OF SOLID WASTE STATIONING, PERIMETER ROAD AND PERIMETER CHANNEL.

PROPOSED 3"/6" LEACHATE FORCEMAIN FOR CELLS 9 THROUGH 16 TO BE CONNECTED TO EXISTING 2"/4" FORCEMAIN AT EXISTING VALVE VAULT.

SPECIFICATIONS FOR LINER AND LEACHATE COLLECTION SYSTEM ARE GIVEN IN APPENDIX C OF THE QA/QC PLAN GIVEN IN SECTION 7.6 OF THE 2003 PTI DESIGN.

SEE SECTION 4.7 OF THE PTI APPLICATION FOR A DESCRIPTION OF THE EXISTING LEACHATE PIPE.

THE FORCEMAIN EXTENDING DOWN THE LINER SIDESLOPE TO THE TEMPORARY SUMPS IN CELLS 13, 15, 16 IS TEMPORARY. TEMPORARY SUMPS WILL BE CONSTRUCTED IN CELLS 13, 15 AND 16 PER DETAIL 1, SHEET NO. 7A1. THE TEMPORARY SUMP WILL BE DECOMMISSIONED UPON APPROVAL OF THE NEXT CONSTRUCTED CELL'S CERTIFICATION REPORT.

THIS DRAWING IS TAKEN FROM THE 2003 PTI APPLICATION. REVISIONS TO THIS DRAWING INCLUDE SEDIMENTATION BASINS 2 AND 5, THE SOUTH BERM OF CELLS 13 THROUGH 15, THE LOCATIONS OF TEMPORARY LEACHATE COLLECTION COMPONENTS FOR CELLS 8B AND 8C, AND DESIGNATION OF THE 88 ACRE AREA.

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EAST SPARTA, OHIO
2008 PERMIT TO INSTALL ALTERATION
TOP OF LINER AND LEACHATE MANAGEMENT SYSTEM PLAN

SHEET NO. **4C**
PROJECT NO. 070340