APPENDIX 7-6

Slope Stability Analyses

I hereby certify that the analyses contained herein were prepared by myself and are true and correct to the best of my knowledge.

REGISTERED PROFESSIONAL ENGINEER
No. 7102
RICHARD B. WHITE
STATE OF UTAH

Richard B. White P.E.

Mid-Term Revisions 5-11-1986

SLOPE STABILITY ANALYSES OF REVISED GENWAL SED. POND

Methodology

Use GEOSLOPE, a PC version of STAB3 (developed at Purdue University). Examine circular slip surface using the modified Bishop method.

Parameters

From Shelby tube samples collected from the dam and natural foundation, Chen & Associates determined the following parameters:

Dry unit weight = 122.9 lb/ft³
Sat. unit weight = 139.7 lb/ft³

Test No.	Total stress (psi) σ_1	σ_3
1	72.6	50
2	137.2	75
3	190.1	100

} Dam

Sat. unit weight = 101.2 lb/ft³ } Foundation

Sample damage during shipment prevented other reliable tests on the foundation material.

The total stresses above were converted to effective stresses by accounting for the pore pressure. Typical pore pressures for a moisture content of 10-12% were obtained from:

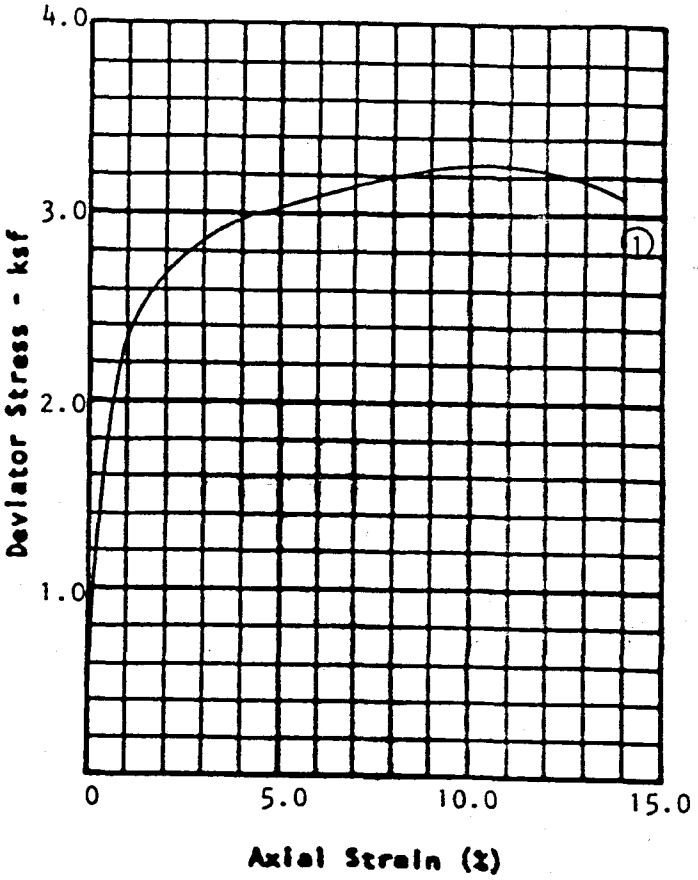
Salisbury, F.B. and C. Ross. 1969. Plant Physiology. Wadsworth Publishing Co., Inc. Belmont, CA.

Since the dam is constructed from foundation material that has been compacted, the cohesion of the foundation was set equal to that of the dam. The friction angle of the foundation was reduced 2° to account for compaction of the dam.

CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers

TEST NUMBER	1	2	3	4
LOCATION	Dam #2			
HEIGHT - INCH	4.376			
DIAMETER - INCH	2.320			
WATER CONTENT - %	10.1			
DRY DENSITY - pcf	122.9			
$\sigma_1 - \sigma_3$	3.25			
σ_1 - ksf	10.45			
σ_3 - ksf	7.20			



TYPE OF SPECIMEN: Shelby tube, undisturbed

SOIL DESCRIPTION: Gravelly sandy silt

TYPE OF TEST: Unsaturated, Unconsolidated, Undrained

*Saturated unit weight: (1) 139.7 pcf

TAN ϕ

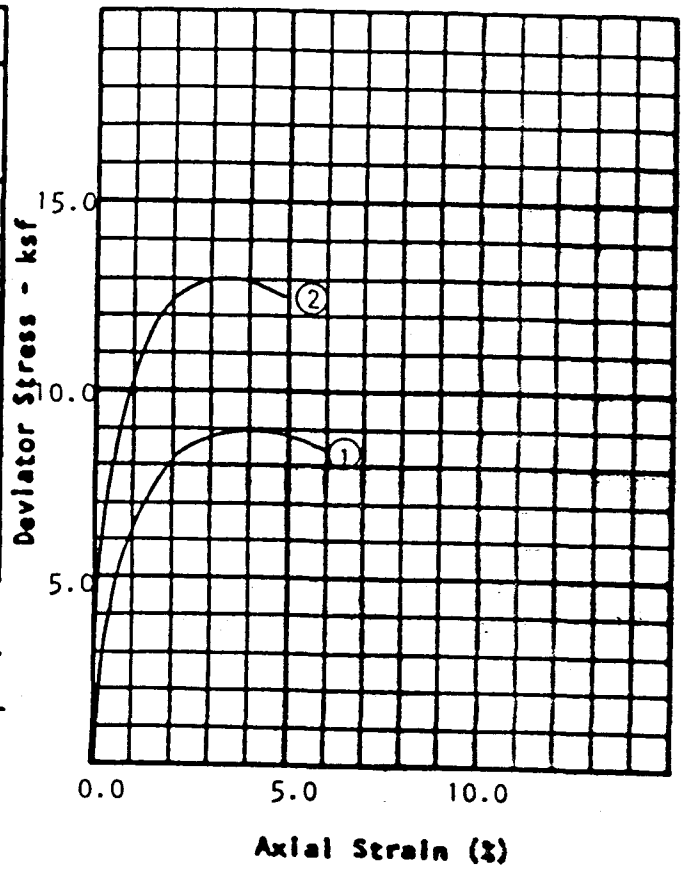
ϕ

COHESION - ksf

CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers

TEST NUMBER	1	2	3	4
LOCATION	Dam, #2	Dam, #2		
HEIGHT - INCH	3.950	3.950		
DIAMETER - INCH	1.880	1.880		
WATER CONTENT - %	12.0	11.8		
DRY DENSITY - pcf	120.6	120.9		
$\sigma_1 - \sigma_3$	8.960	12.980		
σ_1 - ksf	19.760	27.380		
σ_3 - ksf	10.800	14.400		



TYPE OF SPECIMEN Remolded

SOIL DESCRIPTION Gravelly sandy silt

TYPE OF TEST Unsaturated, Unconsolidated, Undrained

*Saturated unit weights:
1 138.0 pcf
2 138.2 pcf

TAN ϕ

ϕ

COHESION - ksf

K+E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

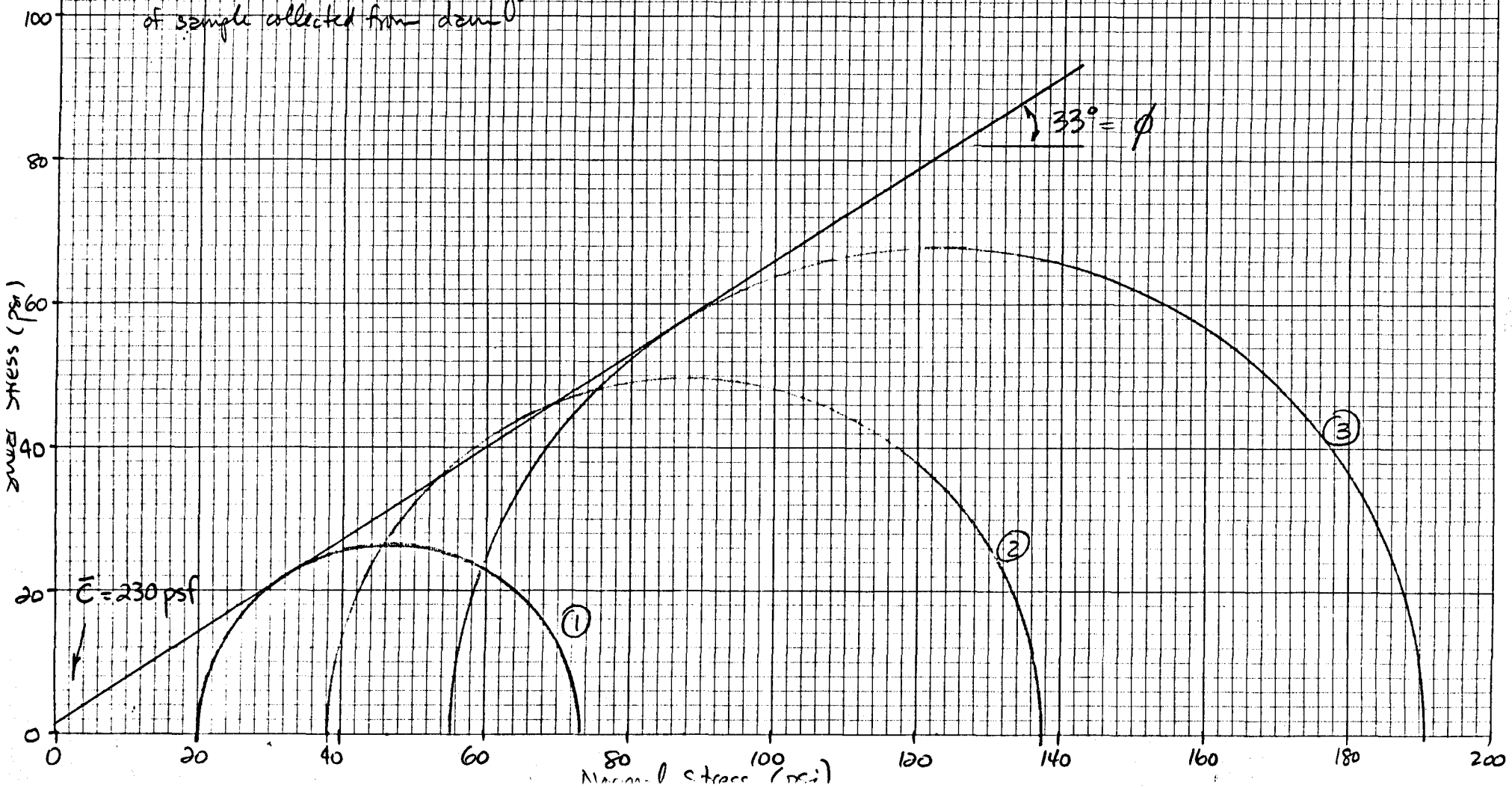
46 0700

Mohr's circles for Genwal sed. pond dam

Test No.	σ_1* (psi)	σ_3* (psi)	u (psi)	$\bar{\sigma}_3$ (psi)
1	72.6	50	29.4	20.6
2	137.2	75	36.8	38.2
3	190.1	100	44.1	55.9

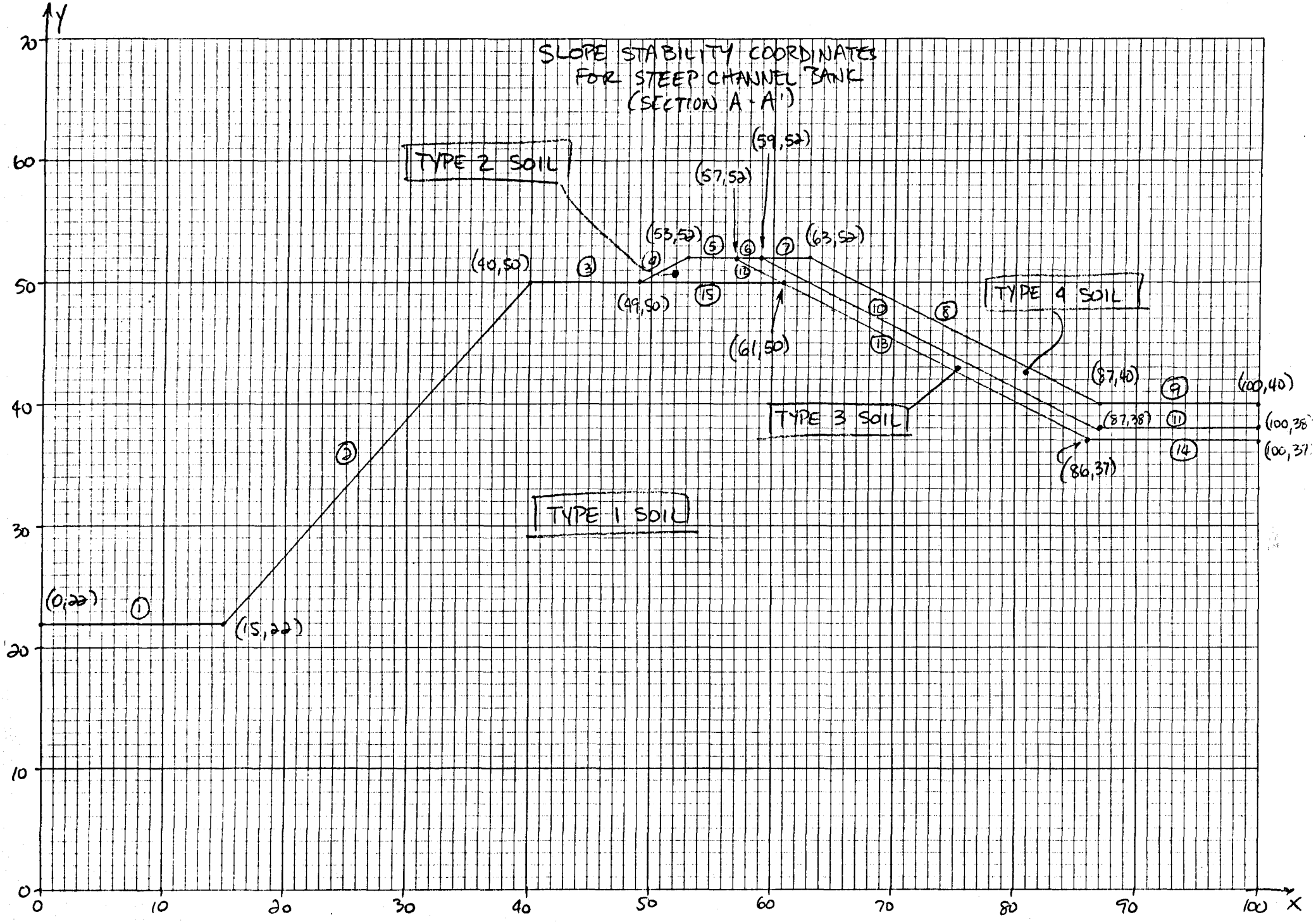
Conversion from total to effective stress

* Data from Chen & Assoc. analysis of sample collected from dam



K+E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0700



--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION A-A'
UNSATURATED, STATIC CONDITION

BOUNDARY COORDINATES

9 TOP BOUNDARIES
15 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)	SOIL TYPE BELOW BND
1	.00	22.00	15.00	22.00	1
2	15.00	22.00	40.00	50.00	1
3	40.00	50.00	49.00	50.00	1
4	49.00	50.00	53.00	52.00	2
5	53.00	52.00	57.00	52.00	2
6	57.00	52.00	59.00	52.00	3
7	59.00	52.00	63.00	52.00	4
8	63.00	52.00	87.00	40.00	4
9	87.00	40.00	100.00	40.00	4
10	59.00	52.00	87.00	38.00	3
11	87.00	38.00	100.00	38.00	3
12	57.00	52.00	61.00	50.00	2
13	61.00	50.00	86.00	37.00	1
14	86.00	37.00	100.00	37.00	1
15	49.00	50.00	61.00	50.00	1

SOTROPIC 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 PARAMETER	PRESSURE CONSTANT (PSF)	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 2 COORDINATE POINTS

POINT NO.	X-WATER (FT)	Y-WATER (FT)
1	67.00	50.00
2	100.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 5.00 FT.
AND X = 20.00 FT.

EACH SURFACE TERMINATES BETWEEN X = 40.00 FT.
AND X = 70.00 FT.

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 10.00 FT.

5.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE SPECIFIED BY 12 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.95	22.73
3	24.80	23.92
4	29.53	25.56
5	34.08	27.62
6	38.42	30.11
7	42.51	32.98
8	46.31	36.23
9	49.80	39.82
10	52.93	43.71
11	55.69	47.88
12	57.90	52.00

*** 2.204 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.98	21.59
3	24.98	21.80
4	29.91	22.63
5	34.70	24.07
6	39.27	26.09
7	43.56	28.67
8	47.49	31.76
9	51.00	35.31
10	54.05	39.28
11	56.57	43.59
12	58.55	48.19
13	59.64	52.00

*** 2.294 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	23.87
2	21.62	24.56
3	26.51	25.59
4	31.32	26.97
5	36.02	28.68
6	40.58	30.72
7	44.99	33.07
8	49.23	35.73
9	53.26	38.68
10	57.08	41.91
11	60.66	45.40
12	63.99	49.13
13	65.31	50.84

*** 2.352 ***

AILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.25	21.07
3	23.24	20.91
4	28.20	21.55
5	33.00	22.95
6	37.52	25.09
7	41.65	27.91
8	45.28	31.35
9	48.34	35.31
10	50.73	39.70
11	52.40	44.41
12	53.32	49.32
13	53.39	52.00

*** 2.386 ***

FAILURE SURFACE SPECIFIED BY 11 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.31	21.54
3	23.29	21.98
4	28.12	23.30
5	32.63	25.46
6	36.68	28.39
7	40.14	32.00
8	42.91	36.16
9	44.88	40.75
10	46.01	45.63
11	46.21	50.00

*** 2.390 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.22	20.94
3	23.20	20.53
4	28.20	20.78
5	33.12	21.69
6	37.87	23.23
7	42.39	25.38
8	46.58	28.10
9	50.38	31.36
10	53.71	35.08
11	56.53	39.21
12	58.79	43.67
13	60.44	48.39
14	61.19	52.00

*** 2.391 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.82	20.68
3	19.79	20.06
4	24.78	20.15
5	29.72	20.95
6	34.49	22.43
7	39.01	24.58
8	43.18	27.35
9	46.91	30.67
10	50.13	34.50
11	52.78	38.74
12	54.81	43.31
13	56.16	48.12
14	56.68	52.00

*** 2.393 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.21	20.89
3	23.19	20.46
4	28.18	20.72
5	33.10	21.65
6	37.84	23.24
7	42.31	25.47
8	46.45	28.28
9	50.15	31.64
10	53.37	35.47
11	56.04	39.70
12	58.10	44.25
13	59.52	49.05
14	59.97	52.00

*** 2.397 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

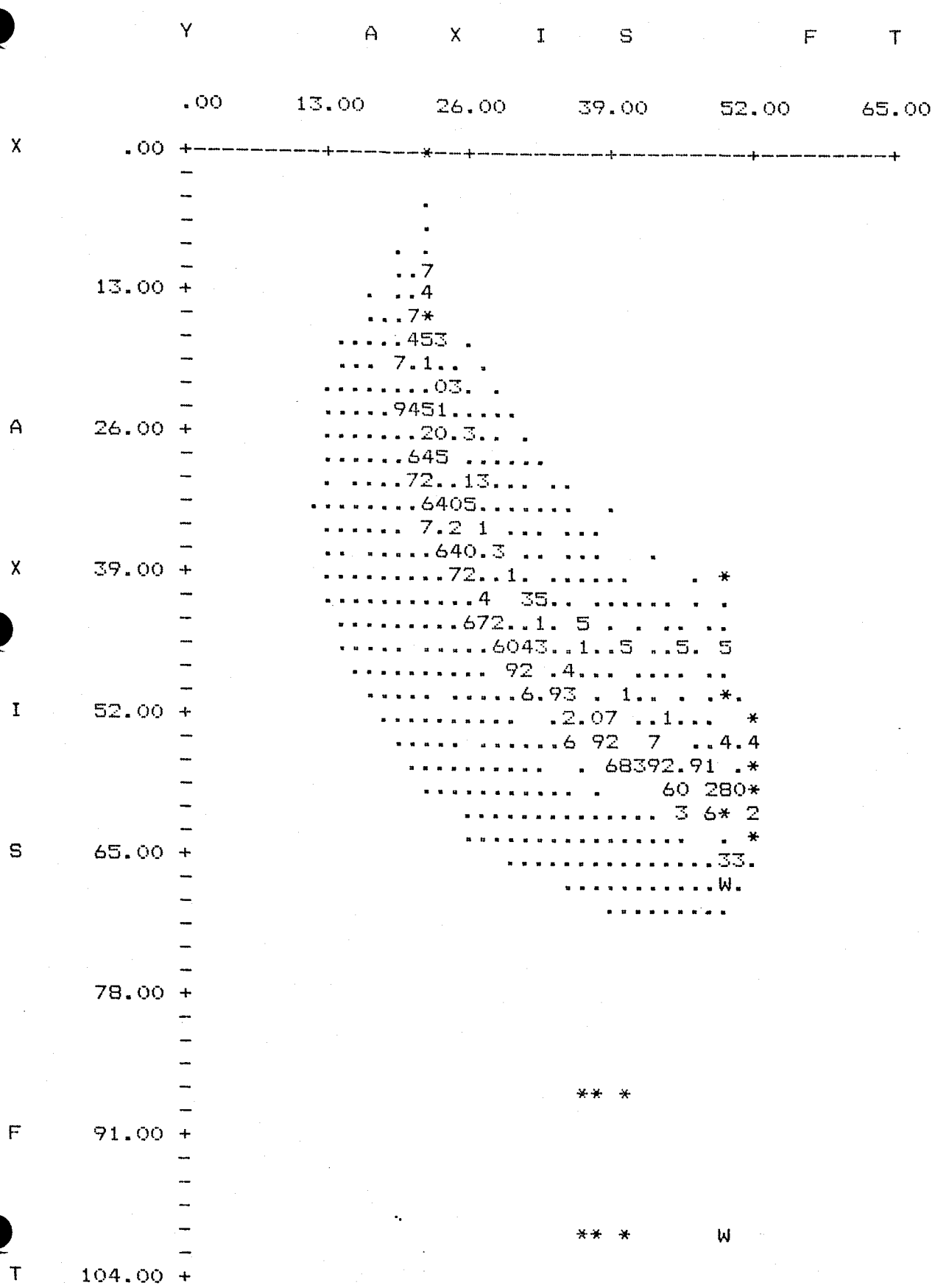
POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.83	20.70
3	19.79	20.07
4	24.79	20.14
5	29.73	20.89
6	34.53	22.31
7	39.08	24.37
8	43.31	27.04
9	47.13	30.27
10	50.46	33.99
11	53.26	38.14
12	55.46	42.63
13	57.03	47.38
14	57.87	52.00

*** 2.398 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	23.87
2	21.63	23.28
3	26.63	23.37
4	31.57	24.13
5	36.37	25.54
6	40.93	27.59
7	45.18	30.24
8	49.03	33.43
9	52.41	37.10
10	55.27	41.20
11	57.56	45.65
12	59.23	50.37
13	59.56	52.00

*** 2.403 ***


Y A X I S F T
.00 13.00 26.00 39.00 52.00 65.00
X .00
13.00
A 26.00
X 39.00
I 52.00
S 65.00
78.00
F 91.00
T 104.00

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION A-A'
UNSATURATED, SEISMIC CONDITION

BOUNDARY COORDINATES

9 TOP BOUNDARIES
15 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)	SOIL TYPE BELOW BND
1	.00	22.00	15.00	22.00	1
2	15.00	22.00	40.00	50.00	1
3	40.00	50.00	49.00	50.00	1
4	49.00	50.00	53.00	52.00	2
5	53.00	52.00	57.00	52.00	2
6	57.00	52.00	59.00	52.00	3
7	59.00	52.00	63.00	52.00	4
8	63.00	52.00	87.00	40.00	4
9	87.00	40.00	100.00	40.00	4
10	59.00	52.00	87.00	38.00	3
11	87.00	38.00	100.00	38.00	3
12	57.00	52.00	61.00	50.00	2
13	61.00	50.00	86.00	37.00	1
14	86.00	37.00	100.00	37.00	1
15	49.00	50.00	61.00	50.00	1

SOTROPIC 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 PARAMETER	PRESSURE CONSTANT (PSF)	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 2 COORDINATE POINTS

POINT NO.	X-WATER (FT)	Y-WATER (FT)
1	67.00	50.00
2	100.00	50.00

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT
OF .080 HAS BEEN ASSIGNED

A VERTICAL EARTHQUAKE LOADING COEFFICIENT
OF .000 HAS BEEN ASSIGNED

CAVITATION PRESSURE = .0 PSF

CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 5.00 FT.
AND X = 20.00 FT.

EACH SURFACE TERMINATES BETWEEN X = 40.00 FT.
AND X = 70.00 FT.

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 10.00 FT.

5.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE SPECIFIED BY 12 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.95	22.73
3	24.80	23.92
4	29.53	25.56
5	34.08	27.62
6	38.42	30.11
7	42.51	32.98
8	46.31	36.23
9	49.80	39.82
10	52.93	43.71
11	55.69	47.88
12	57.90	52.00

*** 1.759 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	23.87
2	21.62	24.56
3	26.51	25.59
4	31.32	26.97
5	36.02	28.68
6	40.58	30.72
7	44.99	33.07
8	49.23	35.73
9	53.26	38.68
10	57.08	41.91
11	60.66	45.40
12	63.99	49.13
13	65.31	50.84

*** 1.796 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.98	21.59
3	24.98	21.80
4	29.91	22.63
5	34.70	24.07
6	39.27	26.09
7	43.56	28.67
8	47.49	31.76
9	51.00	35.31
10	54.05	39.28
11	56.57	43.59
12	58.55	48.19
13	59.64	52.00

*** 1.823 ***

AILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	23.87
2	21.67	23.83
3	26.65	24.19
4	31.60	24.94
5	36.46	26.10
6	41.22	27.64
7	45.84	29.56
8	50.28	31.84
9	54.53	34.47
10	58.56	37.44
11	62.33	40.72
12	65.83	44.29
13	69.03	48.13
14	69.48	48.76

*** 1.864 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.72	23.66
3	24.40	25.42
4	29.03	27.30
5	33.62	29.29
6	38.16	31.38
7	42.65	33.58
8	47.08	35.89
9	51.46	38.30
10	55.79	40.82
11	60.05	43.43
12	64.25	46.15
13	68.38	48.96
14	68.67	49.17

*** 1.868 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.64	23.88
3	24.22	25.87
4	28.75	27.98
5	33.23	30.21
6	37.64	32.56
7	42.00	35.02
8	46.28	37.59
9	50.50	40.27
10	54.65	43.07
11	58.73	45.96
12	62.72	48.97
13	65.18	50.91

*** 1.876 ***

FAILURE SURFACE SPECIFIED BY 15 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.95	21.29
3	24.94	21.06
4	29.94	21.34
5	34.88	22.10
6	39.72	23.34
7	44.42	25.06
8	48.92	27.24
9	53.19	29.84
10	57.18	32.86
11	60.85	36.25
12	64.17	39.99
13	67.10	44.04
14	69.62	48.35
15	69.75	48.63

*** 1.876 ***

FAILURE SURFACE SPECIFIED BY 15 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.27	21.21
3	23.26	20.90
4	28.26	21.07
5	33.22	21.71
6	38.09	22.83
7	42.83	24.41
8	47.40	26.44
9	51.76	28.89
10	55.86	31.76
11	59.66	35.00
12	63.14	38.59
13	66.26	42.50
14	68.99	46.69
15	69.95	48.53

*** 1.883 ***

FAILURE SURFACE SPECIFIED BY 16 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.91	21.05
3	19.89	20.57
4	24.89	20.55
5	29.87	20.99
6	34.78	21.90
7	39.59	23.26
8	44.26	25.07
9	48.73	27.30
10	52.98	29.93
11	56.96	32.96
12	60.65	36.34
13	64.00	40.04
14	67.00	44.05
15	69.60	48.31
16	69.76	48.62

*** 1.889 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.22	20.94
3	23.20	20.53
4	28.20	20.78
5	33.12	21.69
6	37.87	23.23
7	42.39	25.38
8	46.58	28.10
9	50.38	31.36
10	53.71	35.08
11	56.53	39.21
12	58.79	43.67
13	60.44	48.39
14	61.19	52.00

*** 1.893 ***

```
          Y            A     X     I     S           F     T

          .00      13.00     26.00     39.00     52.00     65.00
X       .00 +---------+------*--+---------+---------+---------+
            -
            -                 .
            -                 .
            -               . .
            -               ..9
      13.00 +             . ..8
            -             ...9*
            -           .....8.2 .
            -           ... .715. .
            -          ........42. .
            -          ......8.1.5...
A     26.00 +          ......73.42.. .
            -          ......8.. .56...
            -          . ....73..12... ..
            -         ........8.4...6....  .
            -          ...... 7.3 1 5.. ...
            -          .. .....0.4.2 .6 ...   .
X     39.00 +          ........7.3..15 ......    . *
            -          ............4  2..6 ...... . .
            -           ........70.3..15 . . . .. ..
            -           ..... .....04.2..16.. .... .
            -            ........89 .3 ..5.. .... ..
            -             ..... ..7..4..2 . 1.. . .*.
I     52.00 +              ........89  .3.5. ..1...  *
            -              ..... ..7...4 .2  6  .....
            -               ........87  . 052.3..1 .*
            -                ........... 4    06 3..*
            -                   .......87....5 2 0* 3
            -                   ..........84....  6 *
S     65.00 +                      ........7..45..22.
            -                           ......87...W.
            -                              ......844
            -
            -
            -
      78.00 +
            -
            -
            -
            -                             ** *
            -
F     91.00 +
            -
            -
            -
            -                             ** *      W
            -
T    104.00 +
```

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION A-A'
SATURATED, STATIC CONDITION

BOUNDARY COORDINATES

9 TOP BOUNDARIES
15 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)	SOIL TYPE BELOW BND
1	.00	22.00	15.00	22.00	1
2	15.00	22.00	40.00	50.00	1
3	40.00	50.00	49.00	50.00	1
4	49.00	50.00	53.00	52.00	2
5	53.00	52.00	57.00	52.00	2
6	57.00	52.00	59.00	52.00	3
7	59.00	52.00	63.00	52.00	4
8	63.00	52.00	87.00	40.00	4
9	87.00	40.00	100.00	40.00	4
10	59.00	52.00	87.00	38.00	3
11	87.00	38.00	100.00	38.00	3
12	57.00	52.00	61.00	50.00	2
13	61.00	50.00	86.00	37.00	1
14	86.00	37.00	100.00	37.00	1
15	49.00	50.00	61.00	50.00	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 PARAMETER	PRESSURE CONSTANT (PSF)	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER (FT)	Y-WATER (FT)
1	.00	22.00
2	15.00	22.00
3	19.50	27.00
4	67.00	50.00
5	100.00	50.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 5.00 FT.
AND X = 20.00 FT.

EACH SURFACE TERMINATES BETWEEN X = 40.00 FT.
AND X = 70.00 FT.

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 10.00 FT.

5.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE SPECIFIED BY 11 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.31	21.54
3	23.29	21.98
4	28.12	23.30
5	32.63	25.46
6	36.68	28.39
7	40.14	32.00
8	42.91	36.16
9	44.88	40.75
10	46.01	45.63
11	46.21	50.00

*** 1.189 ***

FAILURE SURFACE SPECIFIED BY 12 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	11.67	22.00
2	16.64	21.44
3	21.63	21.72
4	26.50	22.83
5	31.12	24.74
6	35.36	27.39
7	39.09	30.72
8	42.21	34.63
9	44.63	39.00
10	46.29	43.72
11	47.13	48.65
12	47.13	50.00

*** 1.204 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	13.33	22.00
2	18.25	21.07
3	23.24	20.91
4	28.20	21.55
5	33.00	22.95
6	37.52	25.09
7	41.65	27.91
8	45.28	31.35
9	48.34	35.31
10	50.73	39.70
11	52.40	44.41
12	53.32	49.32
13	53.39	52.00

*** 1.207 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.89	20.96
3	19.88	20.66
4	24.86	21.09
5	29.73	22.25
6	34.37	24.10
7	38.69	26.62
8	42.59	29.75
9	45.99	33.42
10	48.82	37.54
11	51.00	42.04
12	52.51	46.81
13	53.30	51.74
14	53.30	52.00

*** 1.211 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	15.00	22.00
2	19.98	21.59
3	24.98	21.80
4	29.91	22.63
5	34.70	24.07
6	39.27	26.09
7	43.56	28.67
8	47.49	31.76
9	51.00	35.31
10	54.05	39.28
11	56.57	43.59
12	58.55	48.19
13	59.64	52.00

*** 1.212 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.82	20.68
3	19.79	20.06
4	24.78	20.15
5	29.72	20.95
6	34.49	22.43
7	39.01	24.58
8	43.18	27.35
9	46.91	30.67
10	50.13	34.50
11	52.78	38.74
12	54.81	43.31
13	56.16	48.12
14	56.68	52.00

*** 1.213 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.93	21.14
3	19.92	21.01
4	24.89	21.62
5	29.71	22.93
6	34.29	24.94
7	38.53	27.60
8	42.33	30.84
9	45.62	34.61
10	48.33	38.81
11	50.39	43.37
12	51.77	48.17
13	52.23	51.61

*** 1.214 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.83	20.70
3	19.79	20.07
4	24.79	20.14
5	29.73	20.89
6	34.53	22.31
7	39.08	24.37
8	43.31	27.04
9	47.13	30.27
10	50.46	33.99
11	53.26	38.14
12	55.46	42.63
13	57.03	47.38
14	57.87	52.00

*** 1.219 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	22.00
2	14.76	20.46
3	19.69	19.65
4	24.69	19.58
5	29.64	20.26
6	34.44	21.67
7	38.97	23.78
8	43.14	26.54
9	46.85	29.90
10	50.01	33.77
11	52.57	38.07
12	54.45	42.70
13	55.62	47.56
14	56.00	52.00

*** 1.222 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	8.33	22.00
2	13.05	20.33
3	17.96	19.41
4	22.96	19.26
5	27.92	19.88
6	32.73	21.26
7	37.26	23.37
8	41.42	26.15
9	45.10	29.54
10	48.21	33.45
11	50.68	37.80
12	52.44	42.47
13	53.47	47.37
14	53.71	52.00

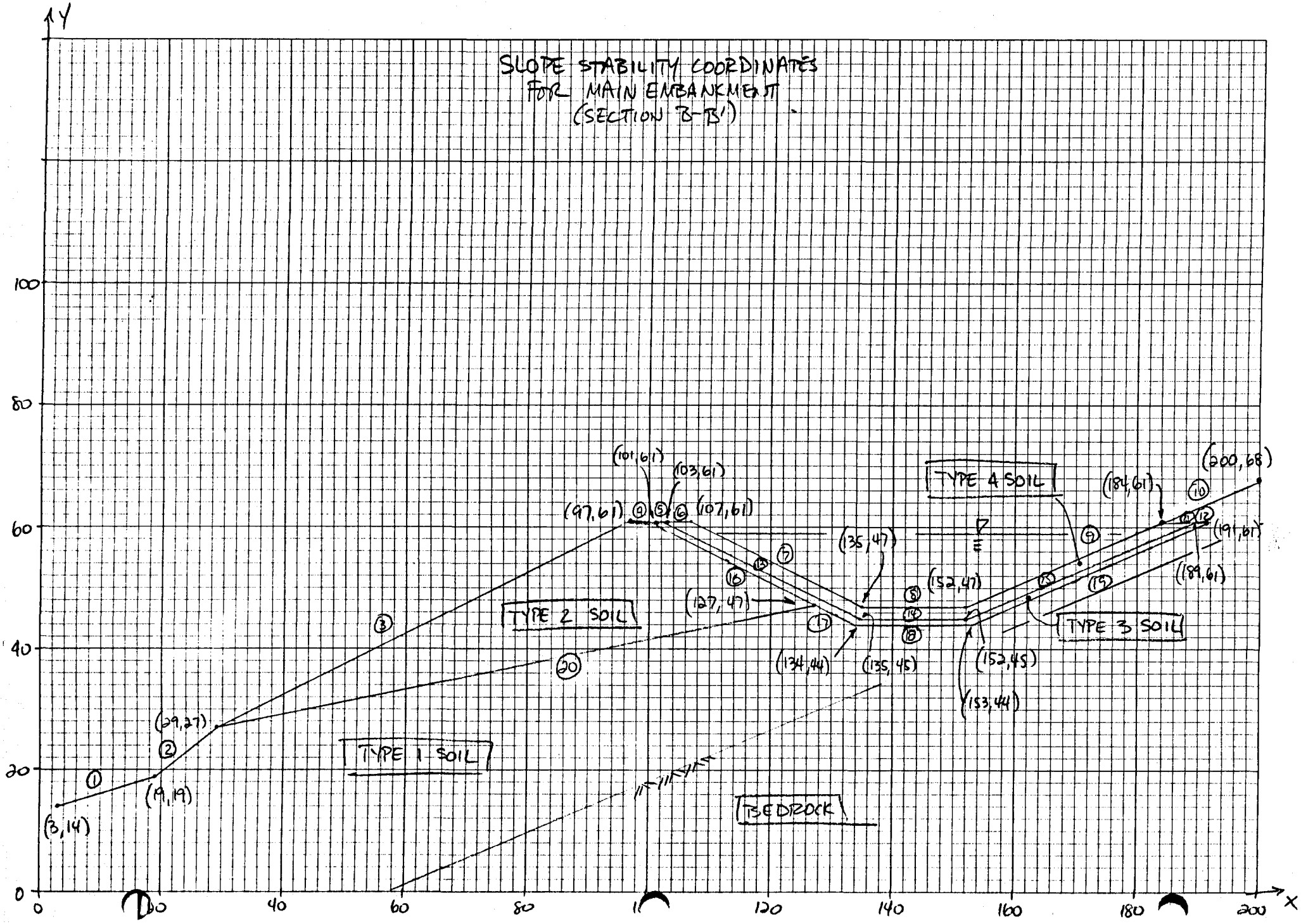
*** 1.223 ***

```
          Y            A     X     I     S           F     T

          .00      13.00     26.00     39.00     52.00     65.00
X       .00 +---------+------*--+---------+---------+---------+
            -
            -                .
            -                .
            -              . 0
            -              ..2
      13.00 +            . .01
            -            ...4*
            -          ....021. .
            -          ... 645.. W
            -         .......2... .
            -         .....831......
A     26.00 +         .......52.... .
            -         .....0.31 ......
            -         . ....6472..... ..
            -        .......0.3.1.......  .
            -         ...... 6.4 2 ... ...
            -         .. .....03..1 .. ...   .
X     39.00 +         ........9647..2 ......    . *
            -         ...........03  .1.2 ...... . .
            -          .........96547.. 1 . . .. ..
            -          ..... ......03.47..21 .21. 1
            -           ........... 85 03..7 .... 22
            -           ..... .......86 4 3.7 . .*.
I     52.00 +            ..........  .5.96 403.47  *
            -             ..... ....... 85  6  0.3.3
            -              ..........  . ...85.86 .*
            -              ........... .    .. 5..*
            -                 ............... . .* 5
            -                 ................  . *
S     65.00 +                    ...................
            -                        ...........W.
            -                           .........
            -
            -
            -
      78.00 +
            -
            -
            -
            -                          ** *
            -
F     91.00 +
            -
            -
            -
            -                          ** *      W
            -
T    104.00 +
```

K+E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0700



--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION B-B'
UNSATURATED, STATIC CONDITION

BOUNDARY COORDINATES

10 TOP BOUNDARIES
20 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)	SOIL TYPE BELOW BND
1	3.00	14.00	19.00	19.00	1
2	19.00	19.00	29.00	27.00	1
3	29.00	27.00	97.00	61.00	2
4	97.00	61.00	101.00	61.00	2
5	101.00	61.00	103.00	61.00	3
6	103.00	61.00	107.00	61.00	4
7	107.00	61.00	135.00	47.00	4
8	135.00	47.00	152.00	47.00	4
9	152.00	47.00	184.00	61.00	4
10	184.00	61.00	200.00	68.00	1
11	184.00	61.00	189.00	61.00	4
12	189.00	61.00	191.00	61.00	3
13	103.00	61.00	135.00	45.00	3
14	135.00	45.00	152.00	45.00	3
15	152.00	45.00	189.00	61.00	3
16	101.00	61.00	127.00	47.00	2
17	127.00	47.00	134.00	44.00	1
18	134.00	44.00	153.00	44.00	1
19	153.00	44.00	191.00	61.00	1
20	29.00	27.00	127.00	47.00	1

SOTROPIC 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 PARAMETER	PRESSURE CONSTANT (PSF)	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 2 COORDINATE POINTS

POINT NO.	X-WATER (FT)	Y-WATER (FT)
1	111.00	59.00
2	180.00	59.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)
1	58.00	.00	200.00	61.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED ALONG THE GROUND SURFACE BETWEEN X = 10.00 FT.
AND X = 30.00 FT.

EACH SURFACE TERMINATES BETWEEN X = 95.00 FT.
AND X = 115.00 FT.

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 5.00 FT.

9.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

OLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.95	15.21
3	27.95	15.07
4	36.92	15.78
5	45.78	17.32
6	54.47	19.69
7	62.89	22.86
8	70.98	26.81
9	78.66	31.50
10	85.87	36.89
11	92.54	42.93
12	98.62	49.57
13	104.05	56.75
14	106.67	61.00

*** 2.001 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.97	15.40
3	27.97	15.42
4	36.93	16.24
5	45.78	17.85
6	54.46	20.24
7	62.89	23.40
8	71.00	27.29
9	78.74	31.89
10	86.03	37.16
11	92.83	43.06
12	99.08	49.54
13	104.72	56.55
14	107.52	60.74

*** 2.004 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.06	15.16
3	30.03	14.46
4	39.02	14.82
5	47.91	16.21
6	56.58	18.62
7	64.92	22.02
8	72.80	26.37
9	80.12	31.60
10	86.79	37.64
11	92.72	44.41
12	97.82	51.83
13	102.02	59.79
14	102.50	61.00

*** 2.026 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.66	17.80
3	34.65	18.19
4	43.56	19.43
5	52.32	21.51
6	60.84	24.42
7	69.04	28.12
8	76.86	32.58
9	84.21	37.76
10	91.04	43.62
11	97.29	50.10
12	102.89	57.15
13	105.39	61.00

*** 2.032 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.61	17.30
3	34.61	17.32
4	43.56	18.34
5	52.33	20.34
6	60.83	23.30
7	68.95	27.19
8	76.59	31.94
9	83.66	37.52
10	90.06	43.84
11	95.73	50.83
12	100.59	58.41
13	101.87	61.00

*** 2.033 ***

'AILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	18.89	18.97
2	27.87	18.33
3	36.86	18.51
4	45.81	19.52
5	54.62	21.34
6	63.23	23.96
7	71.57	27.36
8	79.55	31.50
9	87.13	36.37
10	94.23	41.90
11	100.79	48.06
12	106.76	54.79
13	110.16	59.42

*** 2.047 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.21	16.44
3	30.21	16.69
4	39.16	17.64
5	48.01	19.27
6	56.71	21.58
7	65.20	24.56
8	73.44	28.18
9	81.38	32.43
10	88.96	37.27
11	96.15	42.69
12	102.90	48.64
13	109.17	55.10
14	111.99	58.50

*** 2.052 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.67	18.11
3	34.65	18.65
4	43.56	19.90
5	52.35	21.85
6	60.95	24.48
7	69.33	27.79
8	77.41	31.74
9	85.16	36.31
10	92.53	41.49
11	99.46	47.22
12	105.92	53.49
13	110.85	59.08

*** 2.060 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.43	16.23
3	34.39	15.32
4	43.38	15.54
5	52.28	16.91
6	60.93	19.38
7	69.20	22.93
8	76.96	27.50
9	84.07	33.01
10	90.43	39.38
11	95.94	46.50
12	100.49	54.26
13	103.38	61.00

*** 2.068 ***

AILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.48	16.46
3	34.46	15.81
4	43.44	16.34
5	52.28	18.04
6	60.82	20.88
7	68.92	24.81
8	76.44	29.76
9	83.24	35.65
10	89.22	42.37
11	94.27	49.82
12	98.30	57.87
13	99.39	61.00

*** 2.069 ***

```
              Y              A     X     I     S              F     T

              .00      25.00     50.00     75.00    100.00    125.00
X          .00 +---------+---------+---------+---------+---------+
               -     *
               -     1
               -      3
               -    . 4
               -    .17*
           25.00 +  .. 94...
               -  ...16...*
               - .  .94....
               -  ...16.....
               - . ..954... .
               - ....316.....
A          50.00 +  .....7....  .
               - .....914......
               L  ....3.7..... .
               -  . ...914......
               -   .....37 ....  .
               -  ......901.....
X          75.00 +  . ......704....  .
               -    ........1.....
               -   . .......704.... .
               -     .........1.0....
               -     . ........913... .
               -       .........6.943..*
I         100.00 +         .........61.95*
               -           . ......7.8.1*
               -              ........6.*
               -                .......7W
               -                       .
               -
S         125.00 +                  *
               -
               -                 **
               -
               -
               -
           150.00 +                 **
               -                 *
               -
               -
               -
               -
F         175.00 +
               -                       W
               -                       *
               -                       *
               -                       *
               -
T         200.00 +                      L   *
```

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION B-B'
UNSATURATED, SEISMIC CONDITION

BOUNDARY COORDINATES

10 TOP BOUNDARIES
20 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)	SOIL TYPE BELOW BND
1	3.00	14.00	19.00	19.00	1
2	19.00	19.00	29.00	27.00	1
3	29.00	27.00	97.00	61.00	2
4	97.00	61.00	101.00	61.00	2
5	101.00	61.00	103.00	61.00	3
6	103.00	61.00	107.00	61.00	4
7	107.00	61.00	135.00	47.00	4
8	135.00	47.00	152.00	47.00	4
9	152.00	47.00	184.00	61.00	4
10	184.00	61.00	200.00	68.00	1
11	184.00	61.00	189.00	61.00	4
12	189.00	61.00	191.00	61.00	3
13	103.00	61.00	135.00	45.00	3
14	135.00	45.00	152.00	45.00	3
15	152.00	45.00	189.00	61.00	3
16	101.00	61.00	127.00	47.00	2
17	127.00	47.00	134.00	44.00	1
18	134.00	44.00	153.00	44.00	1
19	153.00	44.00	191.00	61.00	1
20	29.00	27.00	127.00	47.00	1

SOTROPIC 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 PARAMETER	PRESSURE CONSTANT (PSF)	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 2 COORDINATE POINTS

POINT NO.	X-WATER (FT)	Y-WATER (FT)
1	111.00	59.00
2	180.00	59.00

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT
OF .080 HAS BEEN ASSIGNED

A VERTICAL EARTHQUAKE LOADING COEFFICIENT
OF .000 HAS BEEN ASSIGNED

CAVITATION PRESSURE = .0 PSF

'EARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES
OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)
1	58.00	.00	200.00	61.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED ALONG THE GROUND SURFACE BETWEEN X = 10.00 FT.
AND X = 30.00 FT.

EACH SURFACE TERMINATES BETWEEN X = 95.00 FT.
AND X = 115.00 FT.

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 5.00 FT.

9.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.97	15.40
3	27.97	15.42
4	36.93	16.24
5	45.78	17.85
6	54.46	20.24
7	62.89	23.40
8	71.00	27.29
9	78.74	31.89
10	86.03	37.16
11	92.83	43.06
12	99.08	49.54
13	104.72	56.55
14	107.52	60.74

*** 1.557 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.95	15.21
3	27.95	15.07
4	36.92	15.78
5	45.78	17.32
6	54.47	19.69
7	62.89	22.86
8	70.98	26.81
9	78.66	31.50
10	85.87	36.89
11	92.54	42.93
12	98.62	49.57
13	104.05	56.75
14	106.67	61.00

*** 1.557 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.21	16.44
3	30.21	16.69
4	39.16	17.64
5	48.01	19.27
6	56.71	21.58
7	65.20	24.56
8	73.44	28.18
9	81.38	32.43
10	88.96	37.27
11	96.15	42.69
12	102.90	48.64
13	109.17	55.10
14	111.99	58.50

*** 1.571 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	18.89	18.97
2	27.87	18.33
3	36.86	18.51
4	45.81	19.52
5	54.62	21.34
6	63.23	23.96
7	71.57	27.36
8	79.55	31.50
9	87.13	36.37
10	94.23	41.90
11	100.79	48.06
12	106.76	54.79
13	110.16	59.42

*** 1.577 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.09	15.36
3	30.06	14.65
4	39.06	14.77
5	48.01	15.72
6	56.84	17.48
7	65.47	20.05
8	73.82	23.39
9	81.83	27.49
10	89.44	32.31
11	96.57	37.80
12	103.16	43.92
13	109.17	50.63
14	114.20	57.40

*** 1.580 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.21	16.43
3	30.21	16.65
4	39.17	17.53
5	48.03	19.08
6	56.76	21.28
7	65.30	24.12
8	73.61	27.58
9	81.63	31.65
10	89.34	36.31
11	96.67	41.52
12	103.60	47.26
13	110.09	53.50
14	113.77	57.61

*** 1.581 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.67	18.11
3	34.65	18.65
4	43.56	19.90
5	52.35	21.85
6	60.95	24.48
7	69.33	27.79
8	77.41	31.74
9	85.16	36.31
10	92.53	41.49
11	99.46	47.22
12	105.92	53.49
13	110.85	59.08

*** 1.583 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.66	17.80
3	34.65	18.19
4	43.56	19.43
5	52.32	21.51
6	60.84	24.42
7	69.04	28.12
8	76.86	32.58
9	84.21	37.76
10	91.04	43.62
11	97.29	50.10
12	102.89	57.15
13	105.39	61.00

*** 1.583 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.06	15.16
3	30.03	14.46
4	39.02	14.82
5	47.91	16.21
6	56.58	18.62
7	64.92	22.02
8	72.80	26.37
9	80.12	31.60
10	86.79	37.64
11	92.72	44.41
12	97.82	51.83
13	102.02	59.79
14	102.50	61.00

*** 1.585 ***

FAILURE SURFACE SPECIFIED BY 13 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	16.67	18.27
2	25.61	17.30
3	34.61	17.32
4	43.56	18.34
5	52.33	20.34
6	60.83	23.30
7	68.95	27.19
8	76.59	31.94
9	83.66	37.52
10	90.06	43.84
11	95.73	50.83
12	100.59	58.41
13	101.87	61.00

*** 1.590 ***

```
            Y              A     X     I     S            F     T

            .00      25.00     50.00     75.00    100.00    125.00

X        .00 +---------+---------+---------+---------+---------+
            -     *
            -     1
            -      3
            -    . 7
            -    .13*
         25.00 +  .. .7...
            -  ...13...*
            - .  ..7....
            -  ...13.....
            - . ...07... .
            - ....914.....
A        50.00 +  ...5.3....  .
            - ......14......
            L  ....5.3..... .
            -  . ....14......
            -   ....593 ....  .
            -  ........1.....
X        75.00 +  . ....5.3.8....  .
            -    ........1.....
            -   . .....5.3.7.... .
            -     .......5.1......
            -     . .........19... .
            -       .......5.3..89..*
I       100.00 +         .........41..0*
            -          . .....53.7.1*
            -             ......563.*
            -               .......3W
            -                      .
            -
S       125.00 +                  *
            -
            -                 **
            -
            -
            -
       150.00 +                 **
            -                 *
            -
            -
            -
            -
            -
F       175.00 +
            -                       W
            -                       *
            -                       *
            -                       *
            -
T       200.00 +                      L  *
```

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION B-B'
SATURATED, STATIC CONDITION

BOUNDARY COORDINATES

10 TOP BOUNDARIES
20 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)	SOIL TYPE BELOW BND
1	3.00	14.00	19.00	19.00	1
2	19.00	19.00	29.00	27.00	1
3	29.00	27.00	97.00	61.00	2
4	97.00	61.00	101.00	61.00	2
5	101.00	61.00	103.00	61.00	3
6	103.00	61.00	107.00	61.00	4
7	107.00	61.00	135.00	47.00	4
8	135.00	47.00	152.00	47.00	4
9	152.00	47.00	184.00	61.00	4
10	184.00	61.00	200.00	68.00	1
11	184.00	61.00	189.00	61.00	4
12	189.00	61.00	191.00	61.00	3
13	103.00	61.00	135.00	45.00	3
14	135.00	45.00	152.00	45.00	3
15	152.00	45.00	189.00	61.00	3
16	101.00	61.00	127.00	47.00	2
17	127.00	47.00	134.00	44.00	1
18	134.00	44.00	153.00	44.00	1
19	153.00	44.00	191.00	61.00	1
20	29.00	27.00	127.00	47.00	1

.SOTROPIC 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 PARAMETER	PRESSURE CONSTANT (PSF)	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 5 COORDINATE POINTS

POINT NO.	X-WATER (FT)	Y-WATER (FT)
1	3.00	14.00
2	19.00	19.00
3	29.00	27.00
4	111.00	59.00
5	180.00	59.00

SEARCHING ROUTINE WILL BE LIMITED TO AN AREA DEFINED BY 1 BOUNDARIES OF WHICH THE FIRST 1 BOUNDARIES WILL DEFLECT SURFACES UPWARD

BOUNDARY NO.	X-LEFT (FT)	Y-LEFT (FT)	X-RIGHT (FT)	Y-RIGHT (FT)
1	58.00	.00	200.00	61.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED ALONG THE GROUND SURFACE BETWEEN X = 10.00 FT.
AND X = 30.00 FT.

EACH SURFACE TERMINATES BETWEEN X = 95.00 FT.
AND X = 115.00 FT.

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 5.00 FT.

9.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.06	15.16
3	30.03	14.46
4	39.02	14.82
5	47.91	16.21
6	56.58	18.62
7	64.92	22.02
8	72.80	26.37
9	80.12	31.60
10	86.79	37.64
11	92.72	44.41
12	97.82	51.83
13	102.02	59.79
14	102.50	61.00

*** 1.076 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.43	13.03
3	27.21	11.05
4	36.17	10.27
5	45.16	10.72
6	54.01	12.39
7	62.54	15.25
8	70.61	19.23
9	78.06	24.28
10	84.76	30.29
11	90.58	37.16
12	95.41	44.75
13	99.17	52.93
14	101.62	61.00

*** 1.080 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.95	15.21
3	27.95	15.07
4	36.92	15.78
5	45.78	17.32
6	54.47	19.69
7	62.89	22.86
8	70.98	26.81
9	78.66	31.50
10	85.87	36.89
11	92.54	42.93
12	98.62	49.57
13	104.05	56.75
14	106.67	61.00

*** 1.082 ***

FAILURE SURFACE SPECIFIED BY 15 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.41	12.99
3	27.18	10.96
4	36.14	10.13
5	45.13	10.51
6	53.99	12.10
7	62.56	14.87
8	70.67	18.77
9	78.18	23.72
10	84.96	29.65
11	90.87	36.43
12	95.82	43.95
13	99.71	52.06
14	102.47	60.63
15	102.54	61.00

*** 1.083 ***

FAILURE SURFACE SPECIFIED BY 15 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.00	14.91
3	29.94	13.81
4	38.93	13.61
5	47.91	14.29
6	56.77	15.87
7	65.43	18.31
8	73.81	21.60
9	81.82	25.71
10	89.38	30.58
11	96.42	36.19
12	102.88	42.46
13	108.68	49.34
14	113.76	56.77
15	114.13	57.43

*** 1.088 ***

FAILURE SURFACE SPECIFIED BY 15 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.34	12.81
3	27.05	10.54
4	35.98	9.43
5	44.98	9.49
6	53.90	10.72
7	62.58	13.10
8	70.87	16.60
9	78.64	21.14
10	85.76	26.65
11	92.09	33.04
12	97.54	40.21
13	102.01	48.02
14	105.43	56.34
15	106.66	61.00

*** 1.089 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	10.00	16.19
2	18.97	15.40
3	27.97	15.42
4	36.93	16.24
5	45.78	17.85
6	54.46	20.24
7	62.89	23.40
8	71.00	27.29
9	78.74	31.89
10	86.03	37.16
11	92.83	43.06
12	99.08	49.54
13	104.72	56.55
14	107.52	60.74

*** 1.090 ***

FAILURE SURFACE SPECIFIED BY 15 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.02	14.99
3	29.96	13.96
4	38.96	13.80
5	47.93	14.51
6	56.79	16.08
7	65.46	18.51
8	73.85	21.76
9	81.89	25.81
10	89.50	30.61
11	96.61	36.13
12	103.15	42.31
13	109.06	49.10
14	114.29	56.43
15	114.71	57.15

*** 1.091 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	12.22	16.88
2	21.09	15.36
3	30.06	14.65
4	39.06	14.77
5	48.01	15.72
6	56.84	17.48
7	65.47	20.05
8	73.82	23.39
9	81.83	27.49
10	89.44	32.31
11	96.57	37.80
12	103.16	43.92
13	109.17	50.63
14	114.20	57.40

*** 1.091 ***

FAILURE SURFACE SPECIFIED BY 14 COORDINATE POINTS

POINT NO.	X-SURF (FT)	Y-SURF (FT)
1	14.44	17.58
2	23.07	14.99
3	31.96	13.59
4	40.95	13.40
5	49.90	14.41
6	58.62	16.62
7	66.97	19.98
8	74.80	24.42
9	81.95	29.88
10	88.31	36.25
11	93.76	43.41
12	98.20	51.24
13	101.54	59.60
14	101.89	61.00

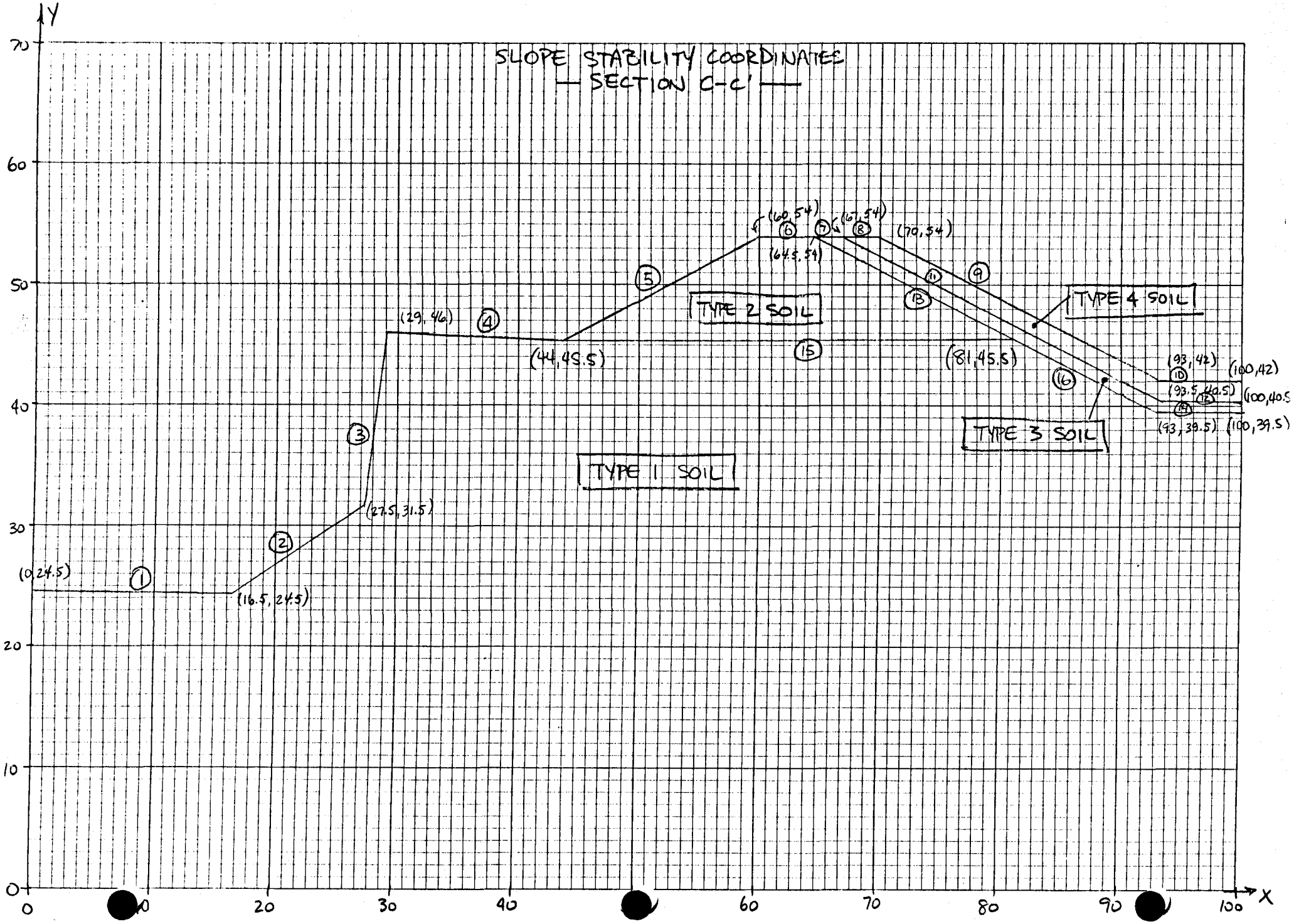
*** 1.097 ***

```
              Y              A      X      I      S              F      T

              .00      25.00      50.00      75.00     100.00     125.00
X         .00 +---------+---------+---------+---------+---------+
              -     *
              -     2
              -      1
              -    2 .
              -    .1.*
        25.00 +  .6 0....
              -  .2.1....*
              - .  0......
              -  .251......
              - . .0...... .
              - ..2.13......
A       50.00 +  ...8......  .
              - ..62..3.......
              L  ...51....... .
              -  . 62..3.......
              -   ...591. ....  .
              -  ....62..1.....
X       75.00 +  . ....50.......  .
              -    ...642..1.....
              -   . ....592....... .
              -     .....65901......
              -     . .....6.2.31... .
              -       ......59602..1..*
I      100.00 +         .........632..*
              -          . ....59....3*
              -             ......5...*
              -               .......5W
              -                      8
              -
S      125.00 +                  *
              -
              -                 **
              -
              -
              -
      150.00 +                  **
              -                 *
              -
              -
              -
              -
              -
F      175.00 +
              -                       W
              -                       *
              -                       *
              -                       *
              -
T      200.00 +                       L  *
```

K+E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0700



EARTH FAX
Midvale, UT (s/n 5080)

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION C-C' U
NSATURATED, STATIC CONDITION

BOUNDARY COORDINATES

10 TOP BOUNDARIES
16 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	1.00	24.50	16.50	24.50	1
2	16.50	24.50	27.50	31.50	1
3	27.50	31.50	29.00	46.00	1
4	29.00	46.00	44.00	45.50	1
5	44.00	45.50	60.00	54.00	2
6	60.00	54.00	64.50	54.00	2
7	64.50	54.00	67.00	54.00	3
8	67.00	54.00	70.00	54.00	4
9	70.00	54.00	93.00	42.00	4
10	93.00	42.00	100.00	42.00	4
11	67.00	54.00	93.50	40.50	3
12	93.50	40.50	100.00	40.50	3
13	64.50	54.00	81.00	45.50	2
14	93.00	39.50	100.00	39.50	1
15	44.00	45.50	81.00	45.50	1
16	81.00	45.50	93.00	39.50	1

ISOTROPIC SOIL PARAMETERS

4 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 2 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	74.00	52.00
2	100.00	52.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED ALONG THE GROUND SURFACE BETWEEN X = 10.00
AND X = 25.00

EACH SURFACE TERMINATES BETWEEN X = 50.00
AND X = 75.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 10.00

5.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 1 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 2.225

X-CENTER = 24.47
Y-CENTER = 74.75
RADIUS = 51.13

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	15.00	24.50	-7.87
2	19.95	23.82	-2.26
3	24.95	23.62	3.34
4	29.94	23.91	8.95
5	34.88	24.69	14.55
6	39.72	25.94	20.15
7	44.41	27.67	25.76
8	48.92	29.84	31.36
9	53.19	32.44	36.97
10	57.18	35.45	42.57
11	60.86	38.83	48.18
12	64.20	42.56	53.78
13	67.15	46.59	59.39
14	69.70	50.89	64.99
15	70.92	53.52	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	15.75	1.50	15.69	.00	2607.39	28.75	111.13
2	18.23	3.45	538.79	.00	6079.40	267.67	175.65
3	22.45	5.00	2306.36	.00	8824.40	912.31	349.73
4	26.22	2.55	1802.20	.00	4512.84	664.05	282.69
5	28.25	1.50	2263.33	.00	2643.02	844.10	331.31
6	29.47	.94	2100.69	.00	1653.90	786.13	315.65
7	32.41	4.94	10769.52	.00	8643.03	3918.63	1161.56
8	37.30	4.84	9975.79	.00	8325.80	3555.51	1063.50
9	41.86	4.28	8145.75	.00	7189.86	2859.77	875.62
10	44.21	.41	754.69	.00	671.22	285.38	175.03
11	46.67	4.50	8509.87	.00	7253.35	3125.10	947.27
12	51.05	4.27	8431.33	.00	6508.39	3357.35	1009.99
13	55.18	3.99	7985.19	.00	5633.34	3445.98	1033.92
14	58.59	2.82	5492.48	.00	3844.50	2764.60	849.92
15	60.43	.86	1613.56	.00	992.06	871.55	338.72
16	62.53	3.33	5472.65	.00	3527.58	3151.03	954.28
17	64.35	.30	433.89	.00	295.49	267.77	175.68
18	65.43	1.85	2331.36	.00	1519.21	1449.56	494.81
19	66.68	.65	669.91	.00	414.23	403.94	221.26
20	67.08	.15	143.60	.00	88.08	84.96	128.16
21	68.42	2.55	1598.63	.00	1016.42	836.71	347.57
22	69.78	.16	49.27	.00	22.21	6.04	105.13
23	69.93	.14	37.90	.00	12.71	-181.61	419.72
24	70.18	.35	73.71	.00	4.24	-464.96	373.37
25	70.64	.57	50.10	.00	.00	60.36	27.13

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 2 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 2.259

X-CENTER = 19.31
Y-CENTER = 76.68
RADIUS = 52.73

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-5.61
2	16.64	24.01	-.18
3	21.64	24.00	5.26
4	26.62	24.45	10.69
5	31.54	25.38	16.13
6	36.34	26.77	21.56
7	40.99	28.61	27.00
8	45.44	30.88	32.43
9	49.66	33.56	37.86
10	53.61	36.63	43.30
11	57.25	40.06	48.73
12	60.55	43.81	54.17
13	63.48	47.87	59.60
14	66.01	52.18	65.04
15	66.85	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	14.08	4.83	115.92	.00	8405.06	95.62	127.27
2	16.57	.14	7.63	.00	251.23	4.49	103.03
3	19.14	5.00	1100.30	.00	8735.00	422.45	214.22
4	24.13	4.98	2581.11	.00	8665.97	921.22	346.92
5	27.06	.88	592.66	.00	1530.99	203.12	155.87
6	28.25	1.50	2119.36	.00	2594.63	756.92	303.21
7	30.27	2.54	5330.36	.00	4324.19	1926.76	614.43
8	33.94	4.80	9586.17	.00	8088.47	3404.59	1007.59
9	38.66	4.65	8448.98	.00	7585.18	2959.64	889.21
10	42.49	3.01	4919.67	.00	4771.26	1703.86	555.13
11	44.72	1.44	2263.88	.00	2173.23	794.26	313.14
12	47.55	4.22	6777.17	.00	6172.15	2542.81	778.32
13	51.64	3.95	6391.55	.00	5275.10	2640.86	804.41
14	55.43	3.64	5724.64	.00	4261.41	2604.92	704.85
15	58.63	2.75	4008.15	.00	2699.41	2220.57	692.59
16	60.27	.55	744.40	.00	440.78	453.80	222.57
17	61.16	1.22	1510.53	.00	952.59	975.21	361.28
18	62.62	1.71	1693.23	.00	968.92	1081.05	412.67
19	63.99	1.02	719.55	.00	411.78	442.05	228.94
20	65.25	1.51	571.57	.00	204.57	274.23	180.69
21	66.20	.39	49.20	.00	.00	-53.52	86.45
22	66.62	.45	15.56	.00	.00	-734.24	324.44

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 3 SPECIFIED BY 14 COORDINATE POINTS

SAFETY FACTOR = 2.266

X-CENTER = 25.32
Y-CENTER = 61.51
RADIUS = 37.90

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	16.67	24.61	-9.42
2	21.60	23.79	-1.85
3	26.60	23.63	5.71
4	31.57	24.12	13.27
5	36.44	25.27	20.84
6	41.11	27.05	28.40
7	45.51	29.43	35.97
8	49.56	32.37	43.53
9	53.18	35.81	51.09
10	56.32	39.70	58.66
11	58.92	43.97	66.22
12	60.94	48.55	73.79
13	62.33	53.35	81.35
14	62.43	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	19.13	4.93	985.68	.00	8674.43	487.48	230.80
2	24.10	5.00	2840.62	.00	8827.27	1112.16	396.47
3	27.05	.90	687.63	.00	1603.87	248.31	167.37
4	28.25	1.50	2266.15	.00	2653.45	833.00	322.43
5	30.29	2.57	5705.79	.00	4517.56	2109.32	660.92
6	34.01	4.87	10387.95	.00	8518.16	3726.14	1089.72
7	38.78	4.67	9209.23	.00	8061.57	3245.12	962.15
8	42.56	2.89	5168.18	.00	4951.93	1806.17	580.53
9	44.75	1.51	2597.65	.00	2461.15	919.16	345.29
10	47.53	4.05	7031.80	.00	6583.95	2665.28	808.37
11	51.37	3.63	6165.14	.00	5588.62	2587.44	787.73
12	54.75	3.14	4967.45	.00	4444.42	2319.74	716.73
13	57.62	2.60	3564.80	.00	3171.25	1984.60	627.85
14	59.26	.67	793.19	.00	757.42	522.66	240.13
15	59.80	.40	435.58	.00	377.60	285.94	183.48
16	60.47	.94	824.49	.00	656.26	516.42	249.54
17	61.64	1.40	549.23	.00	328.50	-53.91	86.06
18	62.38	.10	3.98	.00	.00	-143.49	60.39

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 4 SPECIFIED BY 12 COORDINATE POINTS

SAFETY FACTOR = 2.277

X-CENTER = 14.76
Y-CENTER = 83.22
RADIUS = 56.74

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	26.73	7.83
2	24.95	27.41	12.88
3	29.83	28.52	17.93
4	34.59	30.06	22.98
5	39.19	32.01	28.03
6	43.60	34.36	33.08
7	47.79	37.09	38.13
8	51.72	40.18	43.18
9	55.37	43.60	48.23
10	58.70	47.33	53.28
11	61.69	51.34	58.33
12	63.33	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	22.48	4.95	618.22	.00	7778.79	163.15	144.08
2	26.23	2.55	769.01	.00	3960.33	227.44	161.05
3	28.25	1.50	1604.10	.00	2288.81	559.57	248.71
4	29.41	.83	1468.72	.00	1249.62	524.53	239.46
5	32.21	4.76	7976.46	.00	7084.85	2801.38	840.38
6	36.89	4.60	6834.27	.00	6540.27	2358.85	723.58
7	41.40	4.41	5526.90	.00	5869.26	1862.36	592.54
8	43.80	.40	442.40	.00	518.51	145.53	139.43
9	45.90	3.79	4227.76	.00	4558.50	1485.04	492.96
10	49.76	3.93	4411.25	.00	4169.67	1752.27	563.49
11	53.55	3.65	3918.50	.00	3154.31	1755.89	564.45
12	56.22	1.70	1704.22	.00	1183.72	839.84	322.68
13	57.88	1.63	1454.05	.00	855.08	796.00	328.08
14	59.35	1.30	955.01	.00	514.90	570.21	263.68
15	60.85	1.69	841.09	.00	316.91	511.26	246.86
16	62.51	1.64	268.84	.00	.00	-.14	100.99

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 5 SPECIFIED BY 13 COORDINATE POINTS

SAFETY FACTOR = 2.280

X-CENTER = 16.13
Y-CENTER = 89.88
RADIUS = 63.27

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	26.73	5.77
2	24.98	27.23	10.30
3	29.89	28.12	14.83
4	34.73	29.40	19.36
5	39.45	31.06	23.89
6	44.02	33.09	28.41
7	48.41	35.46	32.94
8	52.61	38.18	37.47
9	56.58	41.23	42.00
10	60.29	44.57	46.53
11	63.73	48.20	51.06
12	66.88	52.09	55.59
13	68.19	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	22.49	4.97	669.03	.00	7806.59	200.70	153.74
2	26.24	2.52	825.48	.00	3929.63	261.12	169.66
3	28.25	1.50	1655.10	.00	2299.81	586.87	255.49
4	29.45	.89	1621.22	.00	1359.31	585.07	255.01
5	32.31	4.83	8360.54	.00	7249.69	2964.98	882.07
6	37.09	4.72	7384.20	.00	6791.55	2575.60	779.48
7	41.72	4.55	6213.10	.00	6194.89	2126.35	661.11
8	44.01	.02	21.68	.00	22.30	7.36	102.80
9	46.22	4.40	5710.50	.00	5530.19	2057.12	642.87
10	50.51	4.20	5709.29	.00	4734.84	2297.78	706.28
11	54.59	3.97	5449.58	.00	3836.11	2425.82	740.02
12	58.29	3.42	4516.87	.00	2652.54	2430.91	741.36
13	60.15	.29	372.19	.00	187.07	224.50	160.01
14	60.73	.88	1058.61	.00	555.92	662.59	275.44
15	62.45	2.56	2475.16	.00	1195.66	1542.83	540.21
16	64.12	.77	544.81	.00	252.81	341.61	198.14
17	65.69	2.38	967.25	.00	325.98	547.88	256.88
18	66.94	.12	19.38	.00	.00	1.56	101.30
19	67.11	.22	27.81	.00	.00	-6.51	99.00
20	67.55	.65	50.69	.00	.00	-528.69	354.13
21	68.03	.31	7.90	.00	.00	8.52	3.74

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 6 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 2.284

X-CENTER = 23.55
Y-CENTER = 77.45
RADIUS = 54.66

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-11.74
2	14.90	23.48	-6.49
3	19.86	22.92	-1.25
4	24.86	22.81	3.99
5	29.85	23.16	9.24
6	34.79	23.96	14.48
7	39.63	25.21	19.72
8	44.33	26.90	24.97
9	48.87	29.01	30.21
10	53.19	31.52	35.45
11	57.26	34.42	40.70
12	61.05	37.68	45.94
13	64.53	41.28	51.18
14	67.66	45.17	56.43
15	70.43	49.34	61.67
16	72.30	52.80	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	12.45	4.90	251.44	.00	8738.67	214.46	157.09
2	15.70	1.60	179.56	.00	2881.96	90.27	124.43
3	18.18	3.36	836.27	.00	6103.58	371.59	198.42
4	22.36	5.00	2710.33	.00	9090.77	1053.11	377.68
5	26.18	2.64	2067.13	.00	4800.51	759.41	300.43
6	28.25	1.50	2379.33	.00	2716.80	884.73	333.39
7	29.43	.85	1963.73	.00	1536.16	732.87	293.45
8	32.32	4.94	11131.22	.00	3873.96	4054.70	1167.17
9	37.21	4.84	10337.71	.00	8553.74	3699.20	1073.66
10	41.81	4.37	8648.01	.00	7539.04	3055.27	904.30
11	44.17	.33	632.94	.00	556.44	223.83	159.56
12	46.60	4.53	8910.26	.00	7503.02	3285.93	964.96
13	51.03	4.32	8907.04	.00	6781.33	3551.74	1034.88
14	55.22	4.07	8553.24	.00	5936.44	3582.99	1069.40
15	58.63	2.74	5660.98	.00	3697.69	2818.43	842.00
16	60.53	1.05	2093.05	.00	1277.72	1111.45	393.02
17	62.78	3.45	6088.95	.00	3879.06	3428.83	1002.55
18	64.51	.03	44.78	.00	27.24	25.88	107.49
19	65.76	2.47	3442.93	.00	2260.62	2063.73	643.50
20	67.33	.66	769.12	.00	477.43	465.20	223.04
21	67.77	.22	239.64	.00	163.68	150.37	140.23
22	68.94	2.12	1821.84	.00	1172.81	1078.30	407.22
23	70.21	.43	248.35	.00	143.96	131.53	138.07
24	70.77	.68	282.19	.00	181.40	95.69	127.39
25	71.38	.55	134.06	.00	64.82	-564.50	347.81
26	71.98	.63	55.21	.00	[illegible]	[illegible]	[illegible]

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 7 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 2.285

X-CENTER = 26.25
Y-CENTER = 70.65
RADIUS = 48.40

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-14.58
2	16.51	23.24	-8.66
3	21.45	22.49	-2.73
4	26.44	22.25	3.19
5	31.44	22.53	9.11
6	36.37	23.32	15.03
7	41.20	24.62	20.95
8	45.87	26.40	26.87
9	50.33	28.66	32.79
10	54.53	31.37	38.72
11	58.44	34.50	44.64
12	61.99	38.01	50.56
13	65.17	41.87	56.48
14	67.93	46.04	62.40
15	70.25	50.47	68.32
16	71.37	53.29	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	14.08	4.83	306.72	.00	8764.75	270.34	171.77
2	16.50	.01	.79	.00	11.55	.52	100.81
3	18.98	4.94	1603.25	.00	9089.99	725.45	291.47
4	23.95	4.99	3464.73	.00	9244.57	1366.85	460.16
5	26.97	1.06	947.86	.00	1962.15	351.73	193.18
6	28.25	1.50	2484.40	.00	2779.41	928.92	344.99
7	30.22	2.44	5781.15	.00	4496.84	2167.43	670.72
8	33.90	4.94	11424.63	.00	9071.54	4165.64	1196.26
9	38.79	4.83	10586.09	.00	8745.78	3786.52	1096.54
10	42.60	2.80	5763.79	.00	5019.71	2038.01	636.68
11	44.94	1.87	3806.66	.00	3244.88	1366.93	460.18
12	48.10	4.46	9453.08	.00	7633.11	3580.37	1042.33
13	52.43	4.20	9208.02	.00	6858.07	3763.89	1090.59
14	56.48	3.90	8564.16	.00	5947.75	3819.54	1105.23
15	59.22	1.56	3344.40	.00	2294.74	1735.92	557.23
16	61.00	1.99	4009.99	.00	2617.11	2174.97	672.70
17	63.25	2.51	4407.14	.00	3068.37	2565.68	775.46
18	64.83	.67	1041.18	.00	693.07	618.90	263.45
19	66.08	1.83	2451.09	.00	1808.12	1522.29	501.04
20	67.29	.57	645.57	.00	447.42	403.97	206.92
21	67.75	.36	376.54	.00	253.24	230.61	166.23
22	68.97	2.07	1510.20	.00	1108.51	836.46	338.44
23	70.12	.25	102.73	.00	58.75	38.93	111.74
24	70.34	.19	62.73	.00	40.65	.80	100.90
25	70.65	.43	102.00	.00	37.47	-749.44	318.32
26	71.12	.50	43.60	.00	[illegible]	[illegible]	[illegible]

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 8 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 2.288

X-CENTER = 23.33
Y-CENTER = 69.59
RADIUS = 47.02

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-13.42
2	14.86	23.34	-7.33
3	19.82	22.70	-1.23
4	24.82	22.59	4.86
5	29.80	23.02	10.96
6	34.71	23.97	17.06
7	39.49	25.44	23.15
8	44.09	27.40	29.25
9	48.45	29.84	35.34
10	52.53	32.74	41.44
11	56.28	36.05	47.53
12	59.66	39.73	53.63
13	62.62	43.76	59.73
14	65.14	48.08	65.82
15	67.19	52.64	71.92
16	67.63	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	12.43	4.86	285.05	.00	8761.05	247.46	165.51
2	15.68	1.64	209.16	.00	2960.89	105.48	128.23
3	18.16	3.32	886.72	.00	6080.69	398.43	205.17
4	22.32	5.00	2305.71	.00	9157.79	1089.47	386.65
5	26.16	2.68	2147.50	.00	4912.61	783.19	306.21
6	28.25	1.50	2403.37	.00	2734.91	889.08	334.02
7	29.40	.80	1867.76	.00	1460.88	693.98	282.78
8	32.26	4.91	11104.46	.00	8893.94	4020.89	1156.50
9	37.10	4.78	10151.85	.00	8516.85	3612.99	1049.38
10	41.75	4.51	8729.31	.00	7830.78	3072.59	907.46
11	44.05	.09	165.28	.00	150.62	58.02	115.77
12	46.27	4.36	8173.41	.00	7293.64	3002.47	889.04
13	50.49	4.08	7822.56	.00	6461.33	3139.43	925.01
14	54.41	3.75	7106.37	.00	5493.91	3121.37	920.27
15	57.97	3.38	6048.63	.00	4402.30	3113.92	918.31
16	59.83	.34	587.13	.00	436.38	349.69	192.36
17	61.31	2.62	3960.33	.00	2762.47	2442.01	741.85
18	63.13	1.02	1263.22	.00	926.40	849.98	323.75
19	64.07	.86	909.38	.00	616.05	600.57	270.99
20	64.82	.64	553.30	.00	354.72	352.45	200.57
21	66.07	1.86	859.43	.00	524.33	341.70	197.52
22	67.09	.18	22.62	.00	.00	-26.40	93.04
23	67.18	.01	.91	.00	.00	-14.33	434.80
24	67.37	.35	23.24	.00	.00	-975.76	281.85
25	67.59	.09	1.44	.00	.00	1.98	.86

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 9 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 2.293

X-CENTER = 24.22
Y-CENTER = 64.73
RADIUS = 41.68

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	13.33	24.50	-11.71
2	18.23	23.49	-4.83
3	23.21	23.06	2.05
4	28.21	23.24	8.93
5	33.15	24.02	15.80
6	37.96	25.38	22.68
7	42.57	27.31	29.56
8	46.92	29.78	36.43
9	50.94	32.74	43.31
10	54.58	36.17	50.19
11	57.78	40.02	57.07
12	60.50	44.21	63.94
13	62.70	48.70	70.82
14	64.34	53.43	77.70
15	64.47	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	14.92	3.17	104.89	.00	5614.71	114.34	130.26
2	17.36	1.73	242.09	.00	3123.53	138.73	136.65
3	20.72	4.98	1968.01	.00	8962.15	815.22	313.92
4	25.36	4.29	3029.05	.00	7726.48	1132.37	397.02
5	27.85	.71	837.40	.00	1273.45	314.75	182.78
6	28.60	.79	1507.78	.00	1433.83	548.13	243.93
7	31.07	4.15	9317.12	.00	7417.18	3398.44	990.81
8	35.55	4.81	10243.78	.00	8517.59	3655.68	1058.21
9	40.27	4.61	8983.35	.00	8004.41	3164.83	929.60
10	43.29	1.43	2567.40	.00	2486.56	900.81	336.35
11	45.46	2.92	5202.90	.00	4832.34	1878.52	592.54
12	48.93	4.02	7261.65	.00	6470.89	2844.76	845.73
13	52.76	3.64	6428.30	.00	5472.60	2778.18	828.28
14	56.18	3.20	5295.25	.00	4338.39	2540.27	765.94
15	58.89	2.22	3245.62	.00	2612.82	1940.80	608.86
16	60.25	.50	666.26	.00	471.76	434.69	214.21
17	60.82	.63	769.18	.00	639.28	532.32	239.79
18	61.92	1.57	1459.54	.00	1089.94	950.62	369.52
19	63.52	1.64	619.21	.00	291.81	83.32	123.90
20	64.40	.13	4.42	.00	.00	-108.54	69.56

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE #10 SPECIFIED BY 13 COORDINATE POINTS

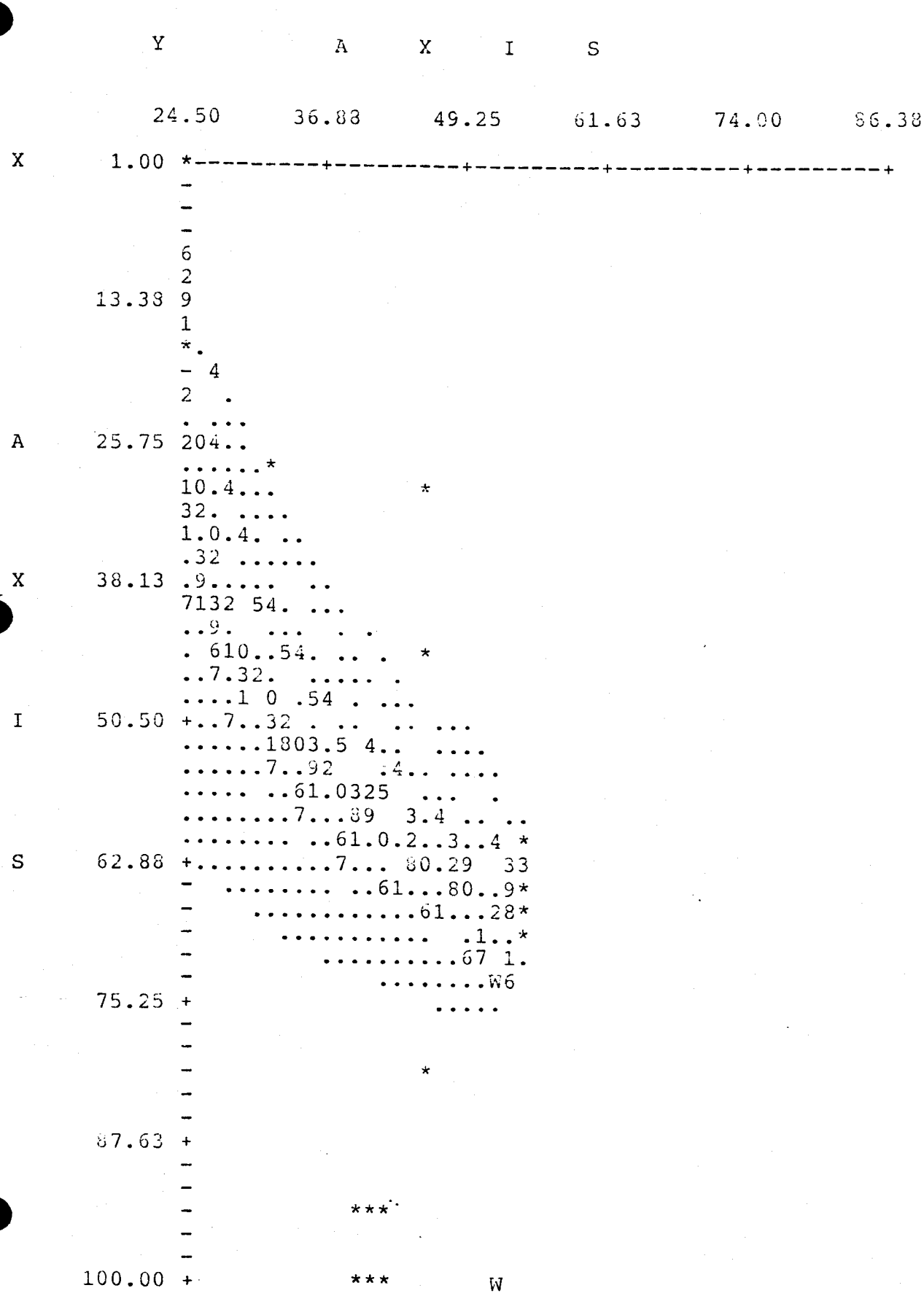
SAFETY FACTOR = 2.308

X-CENTER = 27.73
Y-CENTER = 68.27
RADIUS = 42.26

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	26.73	-7.14
2	24.96	26.11	-.36
3	29.96	26.07	6.42
4	34.93	26.63	13.21
5	39.80	27.78	19.99
6	44.50	29.49	26.77
7	48.96	31.74	33.56
8	53.13	34.50	40.34
9	56.94	37.74	47.12
10	60.34	41.40	53.91
11	63.29	45.44	60.69
12	65.73	49.80	67.47
13	67.48	54.00	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	22.48	4.96	946.75	.00	7981.98	441.51	214.62
2	26.23	2.54	1177.86	.00	4102.70	452.49	217.48
3	28.25	1.50	1918.70	.00	2425.67	735.44	291.16
4	29.48	.96	1933.35	.00	1555.48	740.71	292.53
5	32.45	4.97	9801.17	.00	8001.48	3607.60	1038.99
6	37.36	4.87	9103.30	.00	7736.00	3257.60	947.86
7	41.90	4.20	7227.39	.00	6545.58	2536.83	760.19
8	44.25	.50	817.14	.00	745.57	287.59	174.55
9	46.73	4.46	7618.51	.00	6673.14	2814.68	832.54
10	51.04	4.17	7393.02	.00	5890.63	2993.75	879.17
11	55.03	3.81	6737.90	.00	4954.57	2998.32	880.35
12	58.47	3.06	5123.08	.00	3541.23	2737.37	812.41
13	60.17	.34	541.16	.00	336.85	316.09	181.97
14	61.81	2.95	4023.17	.00	2676.20	2556.44	765.30
15	63.30	.03	37.38	.00	26.84	25.83	106.39
16	63.91	1.18	1191.75	.00	820.41	789.69	321.90
17	65.12	1.23	852.31	.00	518.53	516.23	244.94
18	66.34	1.22	362.65	.00	144.77	22.84	106.10
19	66.98	.05	4.10	.00	.00	-88.39	419.40
20	67.20	.39	20.23	.00	.00	-736.66	317.15
21	67.43	.08	.95	.00	.00	1.22	.53

EARTH FAX
Midvale, UT (s/n 5080)



EARTH FAX
Midvale, UT (s/n 5080)

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION C-C'
UNSATURATED, SEISMIC CONDITION

BOUNDARY COORDINATES

10 TOP BOUNDARIES
16 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	1.00	24.50	16.50	24.50	1
2	16.50	24.50	27.50	31.50	1
3	27.50	31.50	29.00	46.00	1
4	29.00	46.00	44.00	45.50	1
5	44.00	45.50	60.00	54.00	2
6	60.00	54.00	64.50	54.00	2
7	64.50	54.00	67.00	54.00	3
8	67.00	54.00	70.00	54.00	4
9	70.00	54.00	93.00	42.00	4
10	93.00	42.00	100.00	42.00	4
11	67.00	54.00	93.50	40.50	3
12	93.50	40.50	100.00	40.50	3
13	64.50	54.00	81.00	45.50	2
14	93.00	39.50	100.00	39.50	1
15	44.00	45.50	81.00	45.50	1
16	81.00	45.50	93.00	39.50	1

ISOTROPIC SOIL PARAMETERS

4 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 2 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	74.00	52.00
2	100.00	52.00

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT
OF .080 HAS BEEN ASSIGNED

A VERTICAL EARTHQUAKE LOADING COEFFICIENT
OF .000 HAS BEEN ASSIGNED

CAVITATION PRESSURE = .0

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 10.00
AND X = 25.00

EACH SURFACE TERMINATES BETWEEN X = 50.00
AND X = 75.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = 10.00

5.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 1 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 1.668

X-CENTER = 24.47
Y-CENTER = 74.75
RADIUS = 51.13

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	15.00	24.50	-7.87
2	19.95	23.82	-2.26
3	24.95	23.62	3.34
4	29.94	23.91	8.95
5	34.88	24.69	14.55
6	39.72	25.94	20.15
7	44.41	27.67	25.76
8	48.92	29.84	31.36
9	53.19	32.44	36.97
10	57.18	35.45	42.57
11	60.86	38.83	48.18
12	64.20	42.56	53.78
13	67.15	46.59	59.39
14	69.70	50.89	64.99
15	70.92	53.52	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	15.75	1.50	15.69	.00	2607.39	36.73	151.11
2	18.23	3.45	538.79	.00	6079.40	288.68	241.87
3	22.45	5.00	2306.36	.00	8824.40	922.53	470.18
4	26.22	2.55	1802.20	.00	4512.84	655.59	374.03
5	28.25	1.50	2263.33	.00	2643.02	836.78	439.30
6	29.47	.94	2100.69	.00	1653.90	780.21	418.92
7	32.41	4.94	10769.52	.00	8643.03	3840.30	1521.18
8	37.30	4.84	9975.79	.00	8325.80	3438.46	1376.44
9	41.86	4.28	8145.75	.00	7189.86	2725.17	1119.51
10	44.21	.41	754.69	.00	671.22	252.70	228.90
11	46.67	4.50	8509.87	.00	7253.35	2938.32	1196.28
12	51.05	4.27	8431.33	.00	6508.39	3119.80	1261.65
13	55.18	3.99	7985.19	.00	5633.34	3159.80	1276.07
14	58.59	2.82	5492.48	.00	3644.50	2501.33	1038.88
15	60.43	.86	1613.56	.00	992.06	789.39	422.22
16	62.53	3.33	5472.65	.00	3527.58	2787.14	1141.83
17	64.35	.30	433.89	.00	295.49	229.48	220.54
18	65.43	1.85	2331.36	.00	1519.21	1230.88	581.25
19	66.68	.65	669.91	.00	414.23	335.12	268.35
20	67.08	.15	143.60	.00	88.08	69.70	165.02
21	68.42	2.55	1598.63	.00	1016.42	577.68	362.78
22	69.78	.16	49.27	.00	22.21	-10.03	133.98
23	69.93	.14	37.90	.00	12.71	-240.42	547.03
24	70.18	.35	73.71	.00	4.24	-609.43	466.51
25	70.64	.57	50.10	.00	.00	51.86	31.09

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 2 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.705

X-CENTER = 23.55
Y-CENTER = 77.45
RADIUS = 54.66

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-11.74
2	14.90	23.48	-6.49
3	19.86	22.92	-1.25
4	24.86	22.81	3.99
5	29.85	23.16	9.24
6	34.79	23.96	14.48
7	39.63	25.21	19.72
8	44.33	26.90	24.97
9	48.87	29.01	30.21
10	53.19	31.52	35.45
11	57.26	34.42	40.70
12	61.05	37.68	45.94
13	64.53	41.28	51.18
14	67.66	45.17	56.43
15	70.43	49.34	61.67
16	72.30	52.80	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 3 SPECIFIED BY 13 COORDINATE POINTS

SAFETY FACTOR = 1.707

X-CENTER = 16.13
Y-CENTER = 89.88
RADIUS = 63.27

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	26.73	5.77
2	24.98	27.23	10.30
3	29.89	28.12	14.83
4	34.73	29.40	19.36
5	39.45	31.06	23.89
6	44.02	33.09	28.41
7	48.41	35.46	32.94
8	52.61	38.18	37.47
9	56.58	41.23	42.00
10	60.29	44.57	46.53
11	63.73	48.20	51.06
12	66.88	52.09	55.59
13	68.19	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 4 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 1.714

X-CENTER = 19.31
Y-CENTER = 76.68
RADIUS = 52.73

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-5.61
2	16.64	24.01	-.18
3	21.64	24.00	5.26
4	26.62	24.45	10.69
5	31.54	25.38	16.13
6	36.34	26.77	21.56
7	40.99	28.61	27.00
8	45.44	30.88	32.43
9	49.66	33.56	37.86
10	53.61	36.63	43.30
11	57.25	40.06	48.73
12	60.55	43.81	54.17
13	63.48	47.87	59.60
14	66.01	52.18	65.04
15	66.85	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 5 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.717

X-CENTER = 26.25
Y-CENTER = 70.65
RADIUS = 48.40

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-14.53
2	16.51	23.24	-8.66
3	21.45	22.49	-2.73
4	26.44	22.25	3.19
5	31.44	22.53	9.11
6	36.37	23.32	15.03
7	41.20	24.62	20.95
8	45.87	26.40	26.87
9	50.33	28.66	32.79
10	54.53	31.37	38.72
11	58.44	34.50	44.64
12	61.99	38.01	50.56
13	65.17	41.87	56.48
14	67.93	46.04	62.40
15	70.25	50.47	68.32
16	71.37	53.29	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 6 SPECIFIED BY 12 COORDINATE POINTS

SAFETY FACTOR = 1.718

X-CENTER = 14.76
Y-CENTER = 83.22
RADIUS = 56.74

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	26.73	7.83
2	24.95	27.41	12.88
3	29.83	28.52	17.93
4	34.59	30.06	22.98
5	39.19	32.01	28.03
6	43.60	34.36	33.08
7	47.79	37.09	38.13
8	51.72	40.18	43.18
9	55.37	43.60	48.23
10	58.70	47.33	53.28
11	61.69	51.34	58.33
12	63.33	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 7 SPECIFIED BY 14 COORDINATE POINTS

SAFETY FACTOR = 1.734

X-CENTER = 25.32
Y-CENTER = 61.51
RADIUS = 37.90

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	16.67	24.61	-9.42
2	21.60	23.79	-1.85
3	26.60	23.63	5.71
4	31.57	24.12	13.27
5	36.44	25.27	20.84
6	41.11	27.05	28.40
7	45.51	29.43	35.97
8	49.56	32.37	43.53
9	53.18	35.81	51.09
10	56.32	39.70	58.66
11	58.92	43.97	66.22
12	60.94	48.55	73.79
13	62.33	53.35	81.35
14	62.43	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 8 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.738

X-CENTER = 23.33
Y-CENTER = 69.59
RADIUS = 47.02

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-13.42
2	14.86	23.34	-7.33
3	19.82	22.70	-1.23
4	24.82	22.59	4.86
5	29.80	23.02	10.96
6	34.71	23.97	17.06
7	39.49	25.44	23.15
8	44.09	27.40	29.25
9	48.45	29.84	35.34
10	52.53	32.74	41.44
11	56.28	36.05	47.53
12	59.66	39.73	53.63
13	62.62	43.76	59.73
14	65.14	48.08	65.82
15	67.19	52.64	71.92
16	67.63	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 9 SPECIFIED BY 13 COORDINATE POINTS

SAFETY FACTOR = 1.744

X-CENTER = 27.73
Y-CENTER = 68.27
RADIUS = 42.26

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	20.00	26.73	-7.14
2	24.96	26.11	-.36
3	29.96	26.07	6.42
4	34.93	26.63	13.21
5	39.80	27.78	19.99
6	44.50	29.49	26.77
7	48.96	31.74	33.56
8	53.13	34.50	40.34
9	56.94	37.74	47.12
10	60.34	41.40	53.91
11	63.29	45.44	60.69
12	65.73	49.80	67.47
13	67.48	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE #10 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 1.747

X-CENTER = 24.22
Y-CENTER = 64.73
RADIUS = 41.68

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	13.33	24.50	-11.71
2	18.23	23.49	-4.83
3	23.21	23.06	2.05
4	28.21	23.24	8.93
5	33.15	24.02	15.80
6	37.96	25.38	22.68
7	42.57	27.31	29.56
8	46.92	29.78	36.43
9	50.94	32.74	43.31
10	54.58	36.17	50.19
11	57.78	40.02	57.07
12	60.50	44.21	63.94
13	62.70	48.70	70.82
14	64.34	53.43	77.70
15	64.47	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

```
          Y              A     X     I     S

          24.50     36.88     49.25     61.63     74.00     86.38

X       1.00 *---------+---------+---------+---------+---------+
             -
             -
             -
             2
             4
       13.38 0
             1
             *.
             - 3
             4  .
             . ...
A      25.75 493..
             ......*
             19.3...          *
             74. ....
             1.9.3. ..
             .74 ......
X      38.13 .0.....  ..
             5174 36. ...
             ..0.  ...  . .
             . 219..36. .. .  *
             ..5.74.  ..... .
             ....1 9 .36 . ...
I      50.50 +..5..74 . ..  .. ...
             ......1897.3 6..  ....
             ......5..04   .6.. ....
             ..... ..21.9743  ...  .
             ........5...80  7.6 .. ..
             ........ ..21.9.3..7..6 *
S      62.88 +..........5... 89.30  76
             -  ........ ..21...89..0*
             -    ............21...38*
             -      ...........  .1..*
             -         ..........25 1.
             -             ........W2
       75.25 +                 .....
             -
             -
             -                 *
             -
             -
       87.63 +
             -
             -
             -           ***
             -
             -
      100.00 +           ***       W
```

EARTH FAX
Midvale, UT (s/n 5080)

--SLOPE STABILITY ANALYSIS--
SIMPLIFIED JANBU METHOD OF SLICES
IRREGULAR FAILURE SURFACES

PROBLEM DESCRIPTION GENWAL SED. POND, FULL, SECTION C-C'
SATURATED, STATIC CONDITION

BOUNDARY COORDINATES

10 TOP BOUNDARIES
16 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT	Y-LEFT	X-RIGHT	Y-RIGHT	SOIL TYPE BELOW BND
1	1.00	24.50	16.50	24.50	1
2	16.50	24.50	27.50	31.50	1
3	27.50	31.50	29.00	46.00	1
4	29.00	46.00	44.00	45.50	1
5	44.00	45.50	60.00	54.00	2
6	60.00	54.00	64.50	54.00	2
7	64.50	54.00	67.00	54.00	3
8	67.00	54.00	70.00	54.00	4
9	70.00	54.00	93.00	42.00	4
10	93.00	42.00	100.00	42.00	4
11	67.00	54.00	93.50	40.50	3
12	93.50	40.50	100.00	40.50	3
13	64.50	54.00	81.00	45.50	2
14	93.00	39.50	100.00	39.50	1
15	44.00	45.50	81.00	45.50	1
16	81.00	45.50	93.00	39.50	1

ISOTROPIC SOIL PARAMETERS

4 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT.	SATURATED UNIT WT.	COHESION INTERCEPT	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT	PIEZOMETRIC SURFACE NO.
1	85.0	101.0	230.0	31.0	.00	.0	1
2	123.0	140.0	230.0	33.0	.00	.0	1
3	70.0	100.0	1000.0	20.0	.00	.0	1
4	115.0	125.0	.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

UNITWEIGHT OF WATER = 62.40

PIEZOMETRIC SURFACE NO. 1 SPECIFIED BY 4 COORDINATE POINTS

POINT NO.	X-WATER	Y-WATER
1	.00	24.50
2	16.50	24.50
3	74.00	52.00
4	100.00	52.00

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

100 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 10 POINTS EQUALLY SPACED ALONG THE GROUND SURFACE BETWEEN X = 10.00
AND X = 25.00

EACH SURFACE TERMINATES BETWEEN X = 50.00
AND X = 75.00

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION AT WHICH A SURFACE EXTENDS IS Y = 10.00

5.00 FT. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

SAFETY FACTORS ARE CALCULATED BY THE MODIFIED BISHOP METHOD.

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 1 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.380

X-CENTER = 26.25
Y-CENTER = 70.65
RADIUS = 48.40

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-14.58
2	16.51	23.24	-8.66
3	21.45	22.49	-2.73
4	26.44	22.25	3.19
5	31.44	22.53	9.11
6	36.37	23.32	15.03
7	41.20	24.62	20.95
8	45.87	26.40	26.87
9	50.33	28.66	32.79
10	54.53	31.37	38.72
11	58.44	34.50	44.64
12	61.99	38.01	50.56
13	65.17	41.87	56.48
14	67.93	46.04	62.40
15	70.25	50.47	68.32
16	71.37	53.29	

SLICE NO.	X	DX	DW	DQ	DU	DN	DSr
1	14.08	4.83	306.72	.00	195.30	380.63	332.39
2	16.50	.01	.79	.00	.51	.67	166.95
3	18.98	4.94	1572.27	.00	879.71	896.96	557.20
4	23.95	4.99	3370.65	.00	1775.71	1673.37	895.24
5	26.97	1.06	919.88	.00	477.21	423.99	351.27
6	28.25	1.50	2277.27	.00	728.23	1502.19	820.71
7	30.22	2.44	5200.49	.00	1309.18	3784.95	1814.62
8	33.90	4.94	10396.74	.00	3088.57	6830.52	3140.65
9	38.79	4.83	9773.70	.00	3491.43	5734.31	2663.37
10	42.60	2.80	5380.38	.00	2211.95	2878.30	1419.37
11	44.94	1.87	3569.29	.00	1506.95	1874.65	982.88
12	48.10	4.46	8867.83	.00	3768.56	4711.14	2217.88
13	52.43	4.20	8631.38	.00	3639.87	4756.68	2237.71
14	56.48	3.90	8015.92	.00	3334.20	4648.73	2190.71
15	59.22	1.56	3157.27	.00	1324.87	1923.45	1004.13
16	60.20	.41	809.38	.00	328.43	499.61	334.19
17	61.20	1.58	2989.90	.00	1201.51	1841.99	968.66
18	63.25	2.51	4188.00	.00	1802.22	2609.52	1302.84
19	64.83	.67	991.26	.00	404.64	616.00	434.87
20	66.08	1.83	2333.32	.00	1025.34	1427.68	708.27
21	67.29	.57	614.38	.00	240.13	369.35	327.48
22	67.75	.36	358.26	.00	131.73	206.42	263.80
23	68.97	2.07	1417.44	.00	437.55	630.62	463.42
24	70.03	.06	24.15	.00	.35	5.51	169.25
25	70.15	.19	68.32	.00	.00	9.71	171.23

28	71.12	.50	43.50	.00	.00	41.81	30.30

EARTH FAX
Midvale, UT (s/n 5080)

'AILURE SURFACE # 2 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 1.385

X-CENTER = 24.22
Y-CENTER = 64.73
RADIUS = 41.68

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	13.33	24.50	-11.71
2	18.23	23.49	-4.83
3	23.21	23.06	2.05
4	28.21	23.24	8.93
5	33.15	24.02	15.80
6	37.96	25.38	22.68
7	42.57	27.31	29.56
8	46.92	29.78	36.43
9	50.94	32.74	43.31
10	54.58	36.17	50.19
11	57.78	40.02	57.07
12	60.50	44.21	63.94
13	62.70	48.70	70.82
14	64.34	53.43	77.70
15	64.47	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 3 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.387

X-CENTER = 27.34
Y-CENTER = 66.96
RADIUS = 44.71

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	13.33	24.50	-15.05
2	18.16	23.20	-8.64
3	23.11	22.45	-2.23
4	28.10	22.26	4.18
5	33.09	22.62	10.59
6	38.00	23.54	17.00
7	42.78	25.00	23.41
8	47.37	26.99	29.82
9	51.71	29.48	36.24
10	55.74	32.43	42.65
11	59.42	35.82	49.06
12	62.70	39.59	55.47
13	65.53	43.71	61.88
14	67.89	48.12	68.29
15	69.74	52.77	74.70
16	70.07	53.97	

EARTH FAX
Midvale, UT (s/n 5080)

'AILURE SURFACE # 4 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.389

X-CENTER = 23.55
Y-CENTER = 77.45
RADIUS = 54.66

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-11.74
2	14.90	23.48	-6.49
3	19.86	22.92	-1.25
4	24.86	22.81	3.99
5	29.85	23.16	9.24
6	34.79	23.96	14.48
7	39.63	25.21	19.72
8	44.33	26.90	24.97
9	48.87	29.01	30.21
10	53.19	31.52	35.45
11	57.26	34.42	40.70
12	61.05	37.68	45.94
13	64.53	41.28	51.18
14	67.66	45.17	56.43
15	70.43	49.34	61.67
16	72.30	52.80	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 5 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.389

X-CENTER = 27.88
Y-CENTER = 62.44
RADIUS = 41.94

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-21.82
2	14.64	22.64	-14.98
3	19.47	21.35	-8.15
4	24.42	20.64	-1.31
5	29.42	20.53	5.52
6	34.40	21.01	12.36
7	39.28	22.08	19.19
8	44.00	23.72	26.03
9	48.50	25.92	32.86
10	52.70	28.63	39.70
11	56.54	31.82	46.53
12	59.98	35.45	53.36
13	62.97	39.46	60.20
14	65.45	43.80	67.03
15	67.40	48.41	73.87
16	68.79	53.21	80.70
17	68.92	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 6 SPECIFIED BY 15 COORDINATE POINTS

SAFETY FACTOR = 1.391

X-CENTER = 24.47
Y-CENTER = 74.75
RADIUS = 51.13

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	15.00	24.50	-7.87
2	19.95	23.82	-2.26
3	24.95	23.62	3.34
4	29.94	23.91	8.95
5	34.88	24.69	14.55
6	39.72	25.94	20.15
7	44.41	27.67	25.76
8	48.92	29.84	31.36
9	53.19	32.44	36.97
10	57.18	35.45	42.57
11	60.86	38.83	48.18
12	64.20	42.56	53.78
13	67.15	46.59	59.39
14	69.70	50.89	64.99
15	70.92	53.52	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 7 SPECIFIED BY 17 COORDINATE POINTS

SAFETY FACTOR = 1.391

X-CENTER = 29.41
Y-CENTER = 66.00
RADIUS = 45.13

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-19.98
2	16.37	22.79	-13.62
3	21.23	21.61	-7.27
4	26.19	20.98	-.92
5	31.18	20.90	5.43
6	36.16	21.37	11.78
7	41.06	22.39	18.13
8	45.81	23.95	24.48
9	50.36	26.02	30.83
10	54.65	28.58	37.18
11	58.64	31.61	43.53
12	62.26	35.05	49.89
13	65.48	38.87	56.24
14	68.26	43.03	62.59
15	70.56	47.47	68.94
16	72.36	52.14	75.29
17	72.51	52.69	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 8 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.396

X-CENTER = 23.33
Y-CENTER = 69.59
RADIUS = 47.02

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	10.00	24.50	-13.42
2	14.86	23.34	-7.33
3	19.82	22.70	-1.23
4	24.82	22.59	4.86
5	29.80	23.02	10.96
6	34.71	23.97	17.06
7	39.49	25.44	23.15
8	44.09	27.40	29.25
9	48.45	29.84	35.34
10	52.53	32.74	41.44
11	56.28	36.05	47.53
12	59.66	39.73	53.63
13	62.62	43.76	59.73
14	65.14	48.08	65.82
15	67.19	52.64	71.92
16	67.63	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE # 9 SPECIFIED BY 16 COORDINATE POINTS

SAFETY FACTOR = 1.412

X-CENTER = 28.95
Y-CENTER = 58.53
RADIUS = 38.16

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	11.67	24.50	-23.17
2	16.26	22.53	-15.66
3	21.08	21.18	-8.15
4	26.03	20.47	-.63
5	31.03	20.42	6.88
6	35.99	21.02	14.39
7	40.83	22.26	21.90
8	45.47	24.13	29.41
9	49.83	26.58	36.93
10	53.83	29.59	44.44
11	57.40	33.09	51.95
12	60.48	37.02	59.46
13	63.02	41.33	66.97
14	64.97	45.93	74.49
15	66.31	50.75	82.00
16	66.77	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

FAILURE SURFACE #10 SPECIFIED BY 14 COORDINATE POINTS

SAFETY FACTOR = 1.414

X-CENTER = 25.32
Y-CENTER = 61.51
RADIUS = 37.90

POINT NO.	X-SURF	Y-SURF	ALPHA (DEG)
1	16.67	24.61	-9.42
2	21.60	23.79	-1.85
3	26.60	23.63	5.71
4	31.57	24.12	13.27
5	36.44	25.27	20.84
6	41.11	27.05	28.40
7	45.51	29.43	35.97
8	49.56	32.37	43.53
9	53.18	35.81	51.09
10	56.32	39.70	58.66
11	58.92	43.97	66.22
12	60.94	48.55	73.79
13	62.33	53.35	81.35
14	62.43	54.00	

EARTH FAX
Midvale, UT (s/n 5080)

```
          Y              A     X     I     S

          24.50     37.00     49.50     62.00     74.50     87.00

X       .00 *---------+---------+---------+---------+---------+
            -
            -
            -
            -
            4
      12.50 1
            6
            *
            -.
            . ..
            . ..
A     25.00 ... .
            ......*
            6......          *
            0.. . .
            2..... ..
            40.... ..
X     37.50 .2... .  ..
            .4.. ..  ..
            1.2. ..... . .
            3.46..... ..    *
            7.1.0..  ..... .
            .53.2   ..... ...
I     50.00 .791..02.. .. ..  ...
            .. 53. 3   .... . ...
            ...7914..2..  ...  ....
            ......3.46..0..... .  .
            ..... 791...2.  0.. ....
            ........ 3948 ..2..0 . .*
S     62.50 +.......7..139.8...2.. 00
            - . .......7.413.9.8...2*
            -   ........... ..465.9.8*
            -      ........7.1 3.6.35
            -        .........7.41 1*
            -           ..........74
      75.00 +                  ....W
            -
            -
            -                 *
            -
            -
      87.50 +
            -
            -
            -           ***
            -
            -
     100.00 +           ***       W
```