

MIRAVAR
EXCAVATION PLAN
S. MELROSE DR & MATAGUAL DR

REV #0

DESIGN CALCULATIONS
May 10, 2025

PREPARED BY:
SCOTT F CANNON, PE



MZB ENGINEERING, INC

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1192 Athlone Lane

Corona, CA

92882

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M Z B E N G I N E E R I N G , I N C

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PLANS FOR CONSTRUCTION ON
MIRAVAR PLACE
 IN SAN DIEGO COUNTY
 -
EXCAVATION PLAN
 REVISION 0

INDEX TO PLANS

SHEET NO.	TITLE
1	COVER
2	NOTES
3	PLAN VIEW / SECTION VIEW

LOCATION MAP



May 12, 2025



REV.	DATE	DESCRIPTION
0	5-9-25	RELEASED FOR CONSTRUCTION

DESIGN BY: S.CANNON
 DRAWN BY: S.CANNON
 SCALE: AS SHOWN

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SEWER & WATER IMPROVEMENT

COVER

PROJECT: CITY OF VISTA PUBLIC IMPROVEMENT
 CONTRACTOR: KANA PIPELINE CONTRACT NO: -

SHEET NUMBER:
1
 OF 3 SHEETS
Miravar File



GENERAL NOTES:

1. ALL EXCAVATIONS SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH OSHA CFR 29, PART 1926, SUBPART P, AND CAL/OSHA SAFETY ORDERS TITLE 8, SECTION 1504, AND 1539-1547.
2. THE DESIGN OF THIS TEMPORARY EXCAVATION IS IN ACCORDANCE WITH OCTA CONTRACT C-5-3843 AND TP SECTION 13 GEOTECHNICAL AND 22.4.5 EXCAVATIONS AND TRENCHES.
3. THE DESIGN OF THIS EXCAVATION IS IN ACCORDANCE WITH THE 2018 CALTRANS STANDARD SPECIFICATIONS AND THE 2011 CT TRENCHING AND SHORING MANUAL

LOCATION AND PROTECTION OF EXISTING UTILITIES:

1. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES, OTHER OBSTACLES, DIMENSIONS, OFFSETS, ELEVATIONS AND CONDITIONS IN THE FIELD PRIOR TO STARTING ANY WORK. ALL EXISTING UTILITIES SHOWN ON THE CONTRACT PLANS WITHIN THE WORK ZONE SHALL BE POSITIVELY IDENTIFIED PRIOR TO STARTING WORK. THE CONTRACTOR IS RESPONSIBLE TO POTHOLE ALL UTILITIES (AS NEEDED) BEFORE SHORING WALL CONSTRUCTION IS TO BEGIN. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES BEFORE PROCEEDING FURTHER WITH THE WORK.

SURVEYING AND GROUND ELEVATION INFORMATION:

1. EXISTING GROUND ELEVATIONS AND CONSEQUENTIAL ELEVATION HEIGHTS HAVE BEEN DETERMINED BASED ON TOPOGRAPHICAL INFORMATION PROVIDED BY THE PLANS AND OR ACTUAL FIELD DATA.

COMPETENT PERSONS:

1. A COMPETENT PERSON IS CAPABLE OF IDENTIFYING EXISTING AND PREDICTABLE HAZARDS IN THE SURROUNDINGS, OR WORKING CONDITIONS WHICH ARE UNSANITARY, HAZARDOUS, OR DANGEROUS TO EMPLOYEES AND WHO HAS AUTHORIZATION TO TAKE PROMPT CORRECTIVE MEASURES TO ELIMINATE THEM.
2. BEFORE COMMENCING ANY EXCAVATION, THE CONTRACTOR SHALL OBTAIN UNDERGROUND SERVICE ALERT (USA) INQUIRY I.D. NUMBER. A MINIMUM OF 3 DAYS SHALL BE ALLOWED AFTER THE I.D. NUMBER IS OBTAINED AND BEFORE THE EXCAVATION WORK IS STARTED TO NOTIFY UTILITY OWNERS. IF THE UTILITY OWNER IS THE CITY, A CONFIRMATION NUMBER INDICATING THE CITY HAS BEEN NOTIFIED SHALL BE OBTAINED BY USA AND/OR THE CONTRACTOR FROM THE APPROPRIATE CITY DEPARTMENT. THE I.D. NUMBER TOGETHER WITH THE DATE ACQUIRED SHALL BE REPORTED TO THE INSPECTOR WHEN CALLING FOR INSPECTION. USA I.D. NUMBERS WILL NOT BE GIVEN MORE THAN TEN (10) WORK DAYS BEFORE STARTING EXCAVATION WORK.
3. THE CONTRACTORS COMPETENT PERSON SHALL BE ON-SITE OBSERVING THE EXCAVATION PROCESS AND SHALL BE THE RESPONSIBLE PARTY IN THE DETERMINATION OF THE SOIL TYPE EXPOSED IN THE EXCAVATION WALLS. IF THE SOIL TYPE ENCOUNTERED IS DIFFERENT THAN THAT SPECIFIED ON THE PLANS, THE DESIGN ENGINEER MUST BE NOTIFIED.
4. THE COMPETENT PERSON SHALL INSPECT THE TRENCH OR EXCAVATION AT THE BEGINNING OF EACH SHIFT PRIOR TO WORKERS ENTERING THE TRENCH OR EXCAVATION AND/OR IF WEATHER HAS CHANGED OR EFFECTED THE WORK AREA.

ENVIRONMENTAL/SWPPP COMPLIANCE:

1. DESIGN OF EXCAVATIONS IS BASED ON ASSUMPTIONS THAT SOIL PROPERTIES AND GROUND CONDITIONS REMAIN CONSTANT THROUGH THE LIFE OF THE EXCAVATION. WATER CAN EFFECT THE STRENGTH OF SOILS AND GREAT CARE SHOULD BE TAKEN TO PREVENT CHANGES FROM EXISTING SOIL CONDITIONS. SLOPES MUST BE PROTECTED FROM EXCESSIVE SOIL SATURATION AND EROSION DURING CONSTRUCTION. WATER PONDING IN THE BASE OF EXCAVATIONS IS UNACCEPTABLE AND SHOULD BE DIVERTED OR REMOVED. PROPER SWPPP AND BMP MEASURES SHALL BE USED TO PREVENT ENVIRONMENTAL INDUCED SLOPE INSTABILITY.

CAL/OSHA REQUIREMENTS:

1. A CAL/OSHA EXCAVATION PERMIT MUST BE OBTAINED PRIOR TO ANY EXCAVATION.
2. A COPY OF THIS SHORING PLAN MUST BE AT THE JOB SITE DURING CONSTRUCTION.
3. INGRESS AND EGRESS TO THE EXCAVATION SHALL CONFORM TO ALL OSHA REQUIREMENTS INCLUDING: HANDRAILS, LADDER ACCESS AND FALL PROTECTION AS REQUIRED.
4. CONTINGENCY PLANS FOR EMERGENCY SITUATIONS SHALL BE ADDRESSED IN JHA.

CONSTRUCTION REQUIREMENTS:

1. CONTACT THE DESIGN ENGINEER IF EXCAVATION SHOWS SIGNS OF SLOUGHING, SWELLING OR PUMPING.
2. CAUTION SHALL BE TAKEN WHEN EXCAVATIONS ARE ADJACENT TO TRAFFIC AND THE TRAVELING PUBLIC.
3. THESE EXCAVATIONS SHOULD NOT BE ALLOWED TO BECOME SATURATED OR TO DRY OUT.

CONTROLLING FIELD DIMENSIONS

1. THE FIELD SUPERINTENDENT WILL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING, FABRICATING, OR INSTALLING SHORING. UPON APPROVAL BY THE DESIGN ENGINEER DIMENSIONS OF THE SHORING WILL BE ADJUSTED TO FIT THE ACTUAL DIMENSIONS.
2. IF AT ANY POINT THE EXCAVATION EXCEEDS THE DEPTH SHOWN ON THE PLANS BY MORE THAN 1FT, NOTIFY THE DESIGN ENGINEER IMMEDIATELY.

LAVENDER

SOIL LAYER DESCRIPTIONS:

1. THE FOLLOWING SOIL DESCRIPTIONS ARE ASSUMED TO BE PRESENT DURING EXCAVATION. IF SOILS DIFFER FROM THOSE DESCRIBED BELOW, STOP THE EXCAVATION AND CONSULT WITH THE DESIGN ENGINEER.
SOIL TYPES & DESCRIPTIONS:
350.0' TO 400.0' - (SM) SILTY SANDSTONE

DESIGN PARAMETERS:

EXCAVATION SLOPE DESIGN BASED ON BORING LOGS B-1 TO B-8, & TP 1 TO TP 16 OF THE INFORMATION PROVIDED IN THE REPORT OF GEOTECHNICAL INVESTIGATION, VISTA, CA DATED MARCH 5, 2024.

SOIL PARAMETERS:

520.0' TO 475.0'
 $\gamma = 125$ PCF
 $\Phi = 28^\circ$
 $S_u = 200$ PSF

DESIGN SURCHARGE PARAMETERS:

1. IF K-RAIL IS LESS THAN 2FT FROM TOP OF SLOPE IT MUST BE PINNED. SEE 2015 CALTRANS STANDARD PLAN T3B.
2. K-RAIL MAY NOT BE PLACED CLOSER THAN 3" FROM TOP OF SLOPE. (200PSF).
3. SLOPES WERE DESIGNED WITH A HS20-44 TRAFFIC SURCHARGE (300PSF) PLACED 2FT FROM TOP OF SLOPE OR AS SHOWN IN THE SURCHARGE TABLE(S) IN THESE PLANS.
4. FOR SURCHARGE OFFSETS REFER TO "ASSUMED SURCHARGES & MIN. OFFSETS" TABLES ON SECTION VIEWS..
5. IF HIGHER GROUND PRESSURE IS ANTICIPATED, CONSULT WITH THE DESIGN ENGINEER.

May 12, 2025



REV.	DATE	DESCRIPTION
0	5-9-25	RELEASED FOR CONSTRUCTION

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SEWER & WATER IMPROVEMENT

NOTES

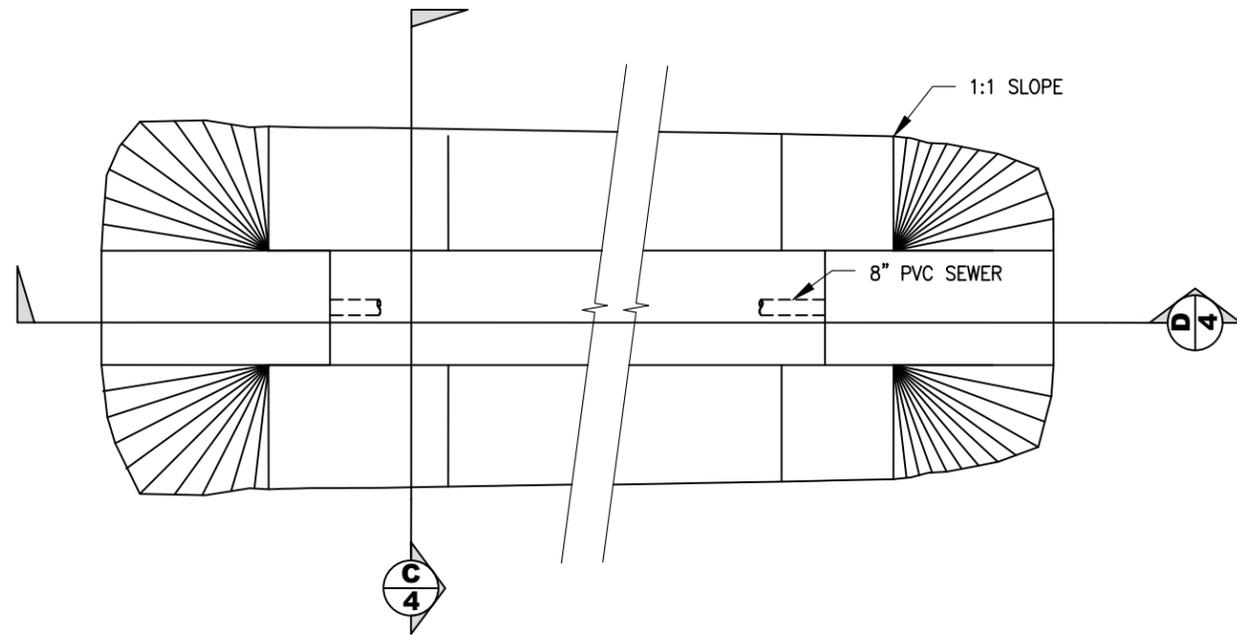
PROJECT: CITY OF VISTA PUBLIC IMPROVEMENT
 CONTRACTOR: KANA PIPELINE | CONTRACT NO: -

SHEET NUMBER:
2
 OF 3 SHEETS

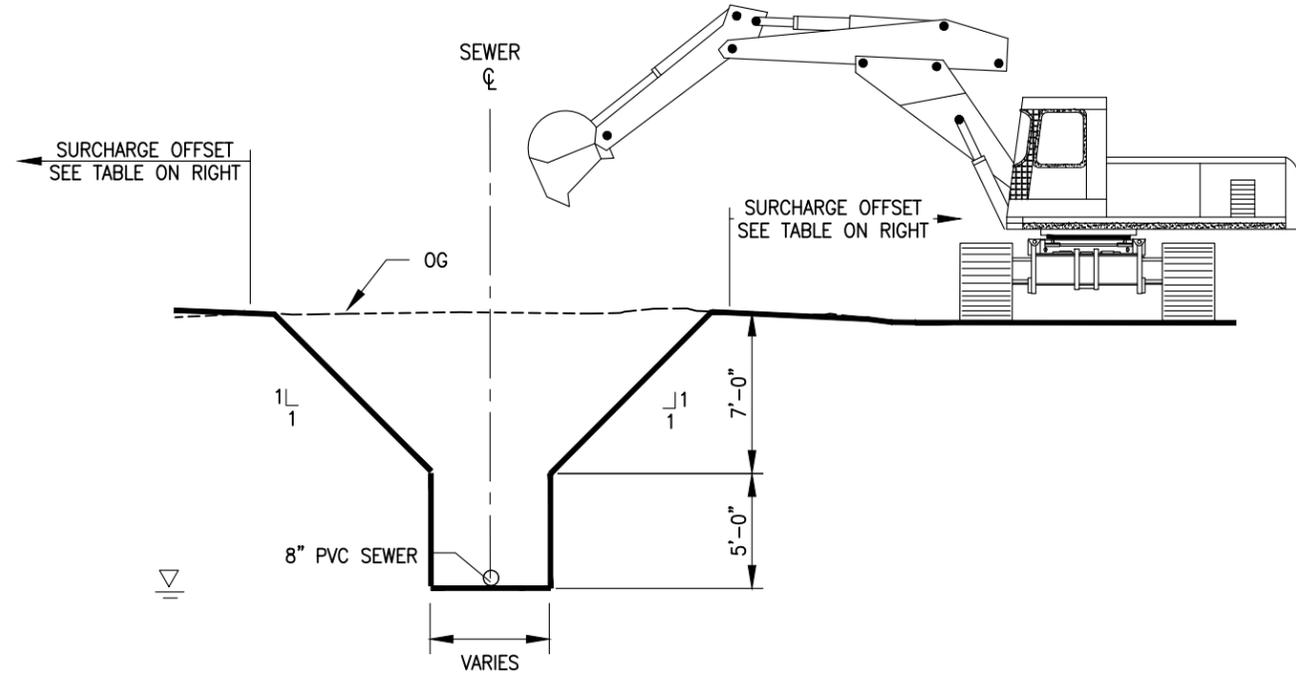
Miravar File



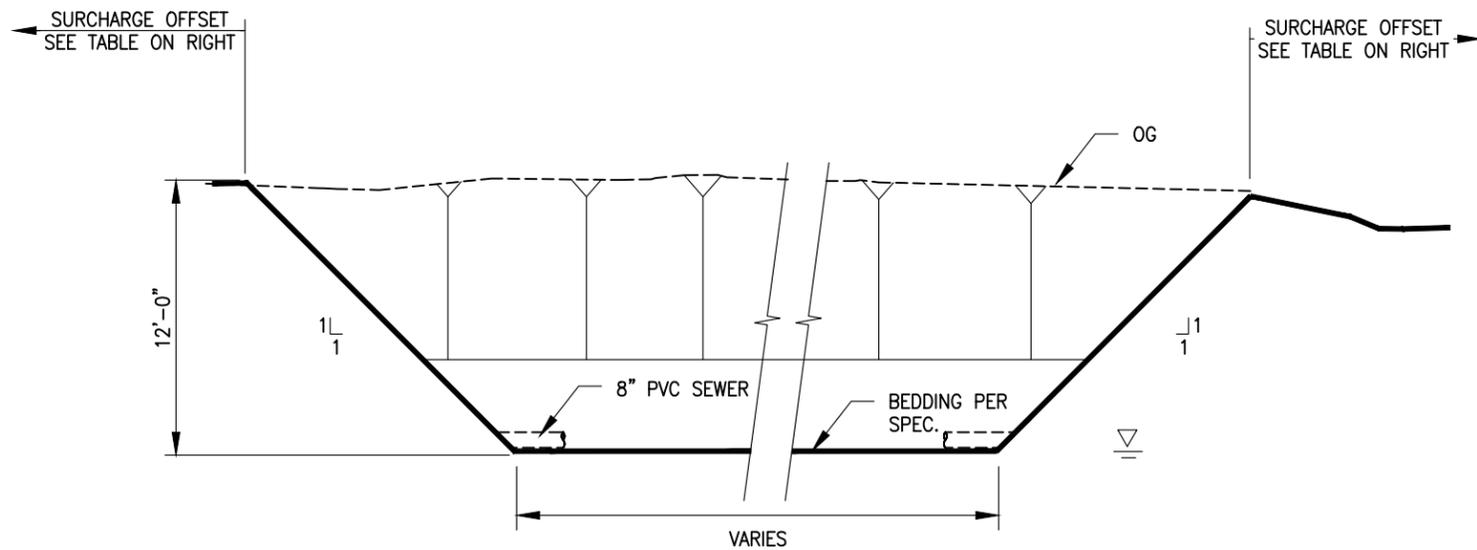
May 12, 2025



SITE PLAN
SCALE: 1:8
LUNA



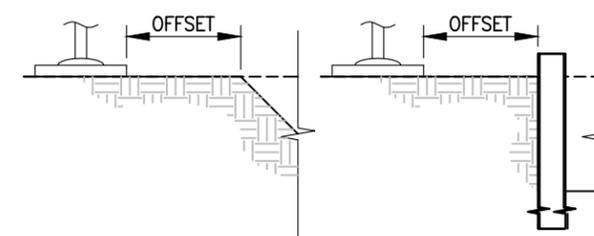
SECTION VIEW C
SCALE: 1:8
LUNA



SECTION VIEW D
SCALE: 1:8
LUNA

ASSUMED MINIMUM OFFSETS	
SURCHARGE	OFFSET
HS 20-44 TRAFFIC	5 FT
CAT 330 EXCAVATOR	4 FT
3 CY LOADER	15 FT
K-RAIL	2 FT
CONCRETE TRUCK	15 FT
SPOIL PILE*	3 FT

*SPOIL PILE HT = 8 FT W/ 1:1 SLOPE



Underground Service Alert

 Call: TOLL FREE
 1-800-422-4133
 TWO WORKING DAYS BEFORE YOU DIG

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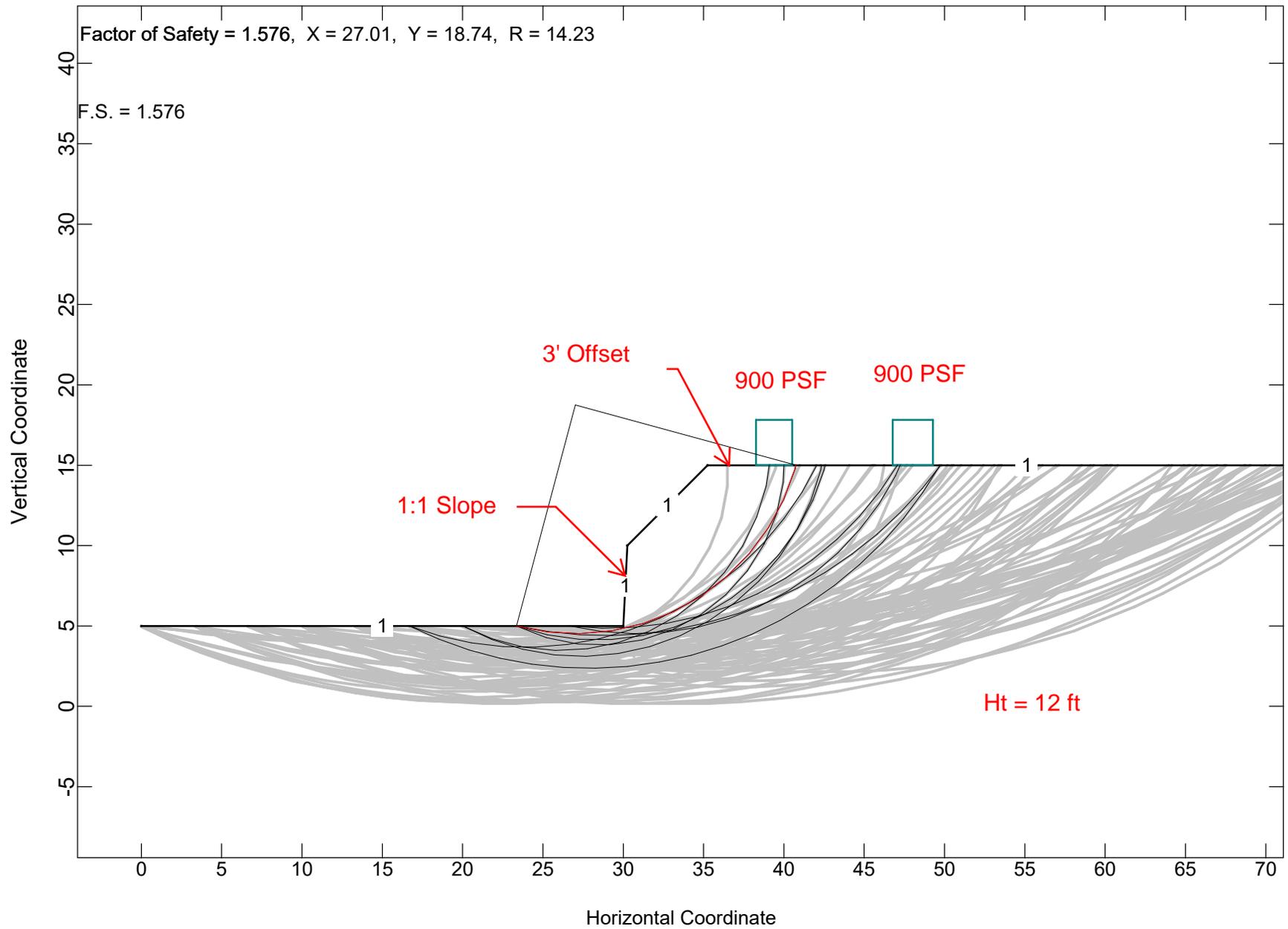


SEWER & WATER IMPROVEMENT
PLAN VIEW / SECTION VIEW
 PROJECT: CITY OF VISTA PUBLIC IMPROVEMENT
 CONTRACTOR: KANA PIPELINE CONTRACT NO. -

SHEET NUMBER:
3
 OF 3 SHEETS
Miravar File

Slope Stability Analysis

R Tank Storage
900 PSF Excavator Surcharge



=====

STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

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Path to file locations :

D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\

Name of input data file : 1. Pad 7 Excavator.sl4d
Name of output file : 1. Pad 7 Excavator.sl4o
Name of plot output file : 1. Pad 7 Excavator.sl4p

Time and Date of Analysis

Date: May 09, 2025 Time: 19:24:30

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	5.00	30.00	5.00	1
2	30.00	5.00	30.25	10.00	1
3	30.25	10.00	35.25	15.00	1
4	35.25	15.00	75.00	15.00	1

1

ISOTROPIC SOIL PARAMETERS

1 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	125.0	125.0	200.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	38.25	40.50	900.0	0.0
2	46.75	49.25	900.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.
and X = 30.00 ft.

Each Surface Terminates Between X = 30.20 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

**** ERROR - RC11 ****

1

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 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	5.00
2	25.30	4.62
3	27.29	4.52
4	29.29	4.70
5	31.23	5.16
6	33.10	5.88
7	34.84	6.86
8	36.43	8.08
9	37.83	9.51
10	39.02	11.11
11	39.97	12.87

12 40.67 14.75
 13 40.72 15.00

Circle Center At X = 27.0 ; Y = 18.7 and Radius, 14.2

*** 1.576 ***

Individual data on the 17 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surchage Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.0	0.47E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	2.0	0.11E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	2.0	0.97E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.7	0.19E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	0.2	0.81E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.0	0.67E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	1.9	0.15E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.7	0.16E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.4	0.40E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	1.2	0.11E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	1.4	0.11E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.4	0.27E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	0.8	0.42E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.69E+03
14	1.0	0.36E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.86E+03
15	0.5	0.93E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.48E+03
16	0.2	0.99E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	0.1	0.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	5.00
2	25.20	4.27
3	27.16	3.88
4	29.16	3.83
5	31.14	4.12
6	33.03	4.75

7	34.80	5.70
8	36.37	6.94
9	37.71	8.42
10	38.77	10.12
11	39.52	11.97
12	39.94	13.93
13	39.99	15.00

Circle Center At X = 28.5 ; Y = 15.4 and Radius, 11.6

*** 1.710 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	5.00
2	25.26	4.45
3	27.24	4.16
4	29.24	4.15
5	31.22	4.40
6	33.15	4.93
7	34.99	5.71
8	36.71	6.73
9	38.28	7.97
10	39.66	9.42
11	40.83	11.04
12	41.78	12.80
13	42.47	14.68
14	42.54	15.00

Circle Center At X = 28.3 ; Y = 18.9 and Radius, 14.7

*** 1.720 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
-----------	------------	------------

1	20.00	5.00
2	21.81	4.15
3	23.72	3.55
4	25.69	3.20
5	27.69	3.11
6	29.68	3.28
7	31.63	3.71
8	33.52	4.39
9	35.29	5.30
10	36.94	6.44
11	38.42	7.79
12	39.71	9.31
13	40.80	10.99
14	41.65	12.80
15	42.27	14.70
16	42.33	15.00

Circle Center At X = 27.4 ; Y = 18.5 and Radius, 15.4

*** 1.860 ***

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	5.00
2	28.66	4.86
3	30.66	4.91
4	32.65	5.16
5	34.60	5.59
6	36.50	6.21
7	38.34	7.00
8	40.09	7.97
9	41.74	9.10
10	43.27	10.38
11	44.68	11.80
12	45.94	13.35
13	47.04	15.00

Circle Center At X = 29.1 ; Y = 25.8 and Radius, 20.9

*** 1.967 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.67	5.00
2	18.57	4.38
3	20.52	3.95
4	22.51	3.72
5	24.51	3.68
6	26.50	3.84
7	28.47	4.20
8	30.39	4.75
9	32.25	5.48
10	34.03	6.40
11	35.71	7.49
12	37.27	8.74
13	38.70	10.14
14	39.99	11.67
15	41.11	13.32
16	42.03	15.00

Circle Center At X = 23.9 ; Y = 23.9 and Radius, 20.2

*** 1.973 ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	5.00
2	25.30	4.65
3	27.29	4.45
4	29.29	4.41
5	31.29	4.52
6	33.27	4.79
7	35.23	5.21
8	37.15	5.78
9	39.01	6.49
10	40.82	7.35
11	42.56	8.34

12	44.21	9.46
13	45.78	10.71
14	47.24	12.07
15	48.59	13.55
16	49.73	15.00

Circle Center At X = 28.8 ; Y = 30.3 and Radius, 25.9

*** 1.994 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.00	5.00
2	21.83	4.20
3	23.77	3.69
4	25.76	3.48
5	27.75	3.58
6	29.71	3.98
7	31.59	4.67
8	33.34	5.65
9	34.92	6.87
10	36.29	8.33
11	37.42	9.98
12	38.29	11.78
13	38.88	13.69
14	39.07	15.00

Circle Center At X = 26.1 ; Y = 16.5 and Radius, 13.1

*** 2.024 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.67	5.00
2	28.64	4.65

3	30.63	4.52
4	32.63	4.62
5	34.61	4.93
6	36.54	5.45
7	38.40	6.19
8	40.16	7.12
9	41.82	8.25
10	43.34	9.55
11	44.71	11.01
12	45.90	12.61
13	46.92	14.33
14	47.22	15.00

Circle Center At X = 30.8 ; Y = 22.7 and Radius, 18.1

*** 2.039 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.67	5.00
2	18.49	4.18
3	20.38	3.51
4	22.31	2.99
5	24.27	2.63
6	26.26	2.42
7	28.26	2.37
8	30.26	2.48
9	32.24	2.75
10	34.20	3.18
11	36.11	3.75
12	37.97	4.48
13	39.77	5.36
14	41.49	6.37
15	43.13	7.52
16	44.67	8.80
17	46.11	10.19
18	47.43	11.69
19	48.62	13.30
20	49.69	14.99
21	49.70	15.00

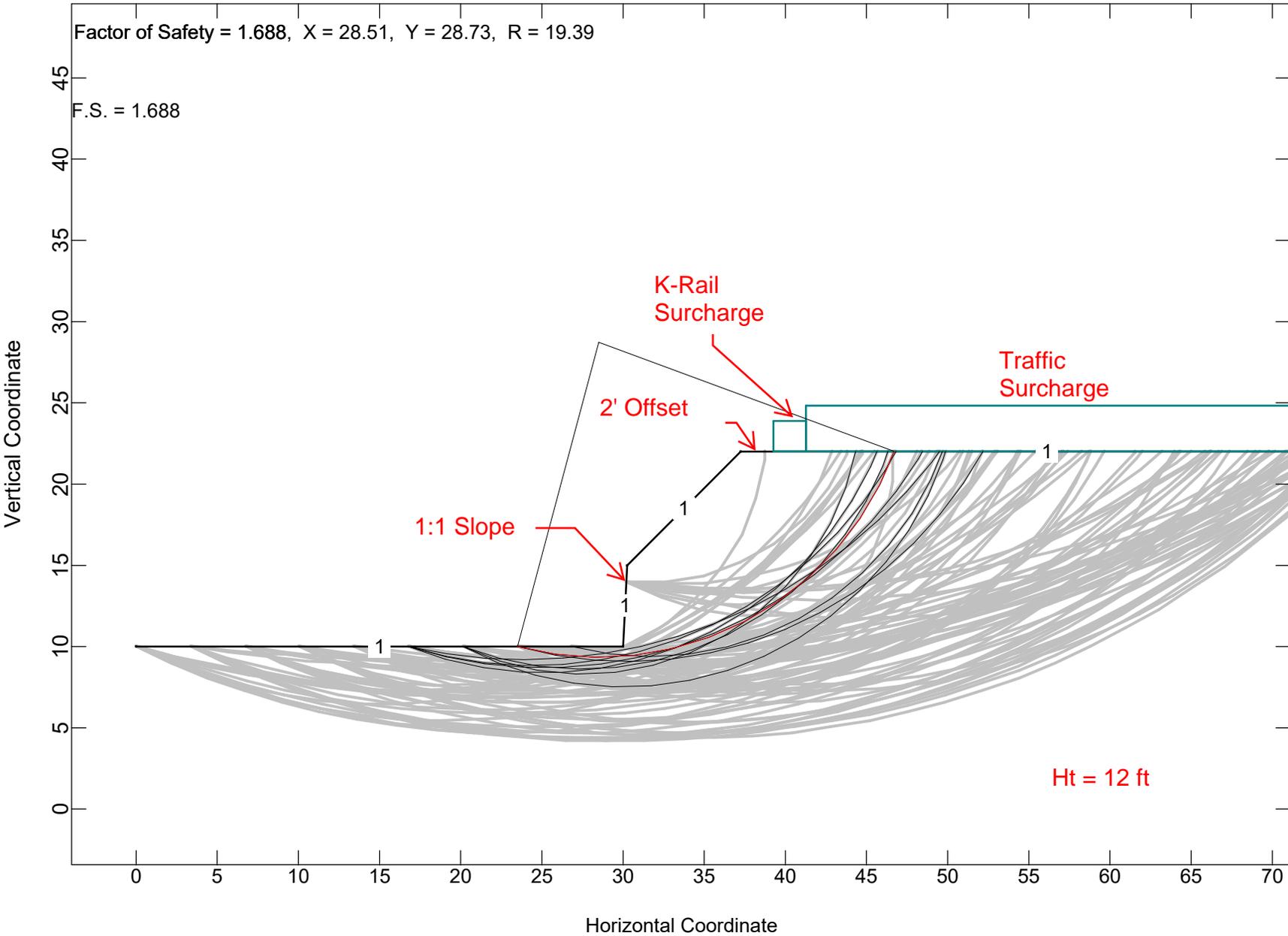
Circle Center At X = 27.9 ; Y = 27.5 and Radius, 25.2

		-
		-
		-
		-
F	65.63	+	.....
		-
		-
		-
		-
		-
		-
T	75.00	+	*

300 PSF Traffic Surcharge
200 PSF K-Rail Surcharge

Factor of Safety = 1.688, X = 28.51, Y = 28.73, R = 19.39

F.S. = 1.688



=====

STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

=====

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Path to file locations :

D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\

Name of input data file : 4. Traffic - Vert.sl4d
Name of output file : 4. Traffic - Vert.sl4o
Name of plot output file : 4. Traffic - Vert.sl4p

Time and Date of Analysis

Date: May 09, 2025 Time: 19:33:10

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	1
2	30.00	10.00	30.25	15.00	1
3	30.25	15.00	37.25	22.00	1
4	37.25	22.00	75.00	22.00	1

1

ISOTROPIC SOIL PARAMETERS

1 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	125.0	125.0	200.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	39.25	41.25	200.0	0.0
2	41.25	75.00	300.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 36.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.40 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

1

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 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.84	9.52
3	28.23	9.34
4	30.63	9.46
5	33.00	9.87
6	35.29	10.57
7	37.48	11.54
8	39.54	12.78
9	41.42	14.27
10	43.11	15.97
11	44.58	17.88
12	45.79	19.94
13	46.68	22.00

Circle Center At X = 28.5 ; Y = 28.7 and Radius, 19.4

*** 1.688 ***

Individual data on the 17 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surcharge Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.4	0.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	2.4	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	1.8	0.14E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.96E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	0.4	0.27E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.4	0.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.3	0.25E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	2.0	0.25E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.2	0.31E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	1.8	0.22E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	0.3	0.34E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.58E+02
12	1.7	0.18E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.34E+03
13	0.2	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.52E+02
14	1.7	0.15E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.51E+03
15	1.5	0.93E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.44E+03
16	1.2	0.47E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.37E+03
17	0.9	0.11E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.27E+03

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.42	9.26
3	24.77	8.79
4	27.16	8.61
5	29.56	8.72
6	31.93	9.11
7	34.23	9.79
8	36.44	10.74
9	38.51	11.94

10	40.43	13.38
11	42.16	15.05
12	43.67	16.91
13	44.96	18.94
14	45.99	21.10
15	46.29	22.00

Circle Center At X = 27.5 ; Y = 28.6 and Radius, 20.0

*** 1.769 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.36	9.11
3	24.70	8.55
4	27.08	8.31
5	29.48	8.42
6	31.84	8.85
7	34.12	9.62
8	36.26	10.69
9	38.24	12.06
10	40.00	13.68
11	41.52	15.54
12	42.76	17.60
13	43.71	19.80
14	44.30	22.00

Circle Center At X = 27.6 ; Y = 25.4 and Radius, 17.1

*** 1.792 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00

2	29.20	9.54
3	31.60	9.39
4	33.99	9.53
5	36.35	9.97
6	38.64	10.70
7	40.81	11.71
8	42.85	12.99
9	44.70	14.51
10	46.36	16.25
11	47.78	18.18
12	48.95	20.28
13	49.64	22.00

Circle Center At X = 31.7 ; Y = 28.6 and Radius, 19.2

*** 1.837 ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.10	9.39
3	21.47	9.00
4	23.86	8.84
5	26.26	8.90
6	28.65	9.18
7	30.99	9.69
8	33.28	10.41
9	35.49	11.34
10	37.60	12.48
11	39.60	13.81
12	41.47	15.32
13	43.18	17.00
14	44.73	18.83
15	46.11	20.80
16	46.79	22.00

Circle Center At X = 24.4 ; Y = 34.5 and Radius, 25.6

*** 1.861 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.05	9.23
3	21.39	8.70
4	23.78	8.43
5	26.18	8.41
6	28.56	8.66
7	30.91	9.15
8	33.19	9.90
9	35.38	10.89
10	37.45	12.11
11	39.37	13.54
12	41.13	15.17
13	42.71	16.98
14	44.08	18.95
15	45.23	21.06
16	45.62	22.00

Circle Center At X = 25.1 ; Y = 30.7 and Radius, 22.3

*** 1.863 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.09	9.37
3	21.46	8.94
4	23.85	8.73
5	26.25	8.72
6	28.64	8.93
7	31.00	9.35
8	33.32	9.98
9	35.57	10.80
10	37.74	11.83
11	39.81	13.04
12	41.77	14.43

13	43.60	15.98
14	45.28	17.70
15	46.80	19.55
16	48.16	21.53
17	48.42	22.00

Circle Center At X = 25.1 ; Y = 35.9 and Radius, 27.2

*** 1.879 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.83	9.47
3	28.21	9.16
4	30.61	9.09
5	33.00	9.24
6	35.37	9.62
7	37.70	10.22
8	39.95	11.05
9	42.11	12.09
10	44.17	13.32
11	46.10	14.75
12	47.88	16.36
13	49.50	18.13
14	50.95	20.05
15	52.14	22.00

Circle Center At X = 30.2 ; Y = 34.2 and Radius, 25.1

*** 1.902 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00

2	19.14	9.55
3	21.52	9.28
4	23.92	9.19
5	26.32	9.29
6	28.70	9.56
7	31.06	10.00
8	33.38	10.63
9	35.64	11.42
10	37.84	12.39
11	39.96	13.51
12	41.99	14.79
13	43.92	16.23
14	45.73	17.80
15	47.42	19.50
16	48.98	21.32
17	49.48	22.00

Circle Center At X = 23.9 ; Y = 41.2 and Radius, 32.0

*** 1.920 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.31	8.99
3	24.59	8.23
4	26.94	7.74
5	29.33	7.52
6	31.73	7.58
7	34.10	7.92
8	36.42	8.53
9	38.66	9.40
10	40.78	10.52
11	42.76	11.87
12	44.57	13.45
13	46.19	15.22
14	47.59	17.17
15	48.76	19.27
16	49.68	21.48
17	49.83	22.00

Circle Center At X = 30.0 ; Y = 28.4 and Radius, 20.8

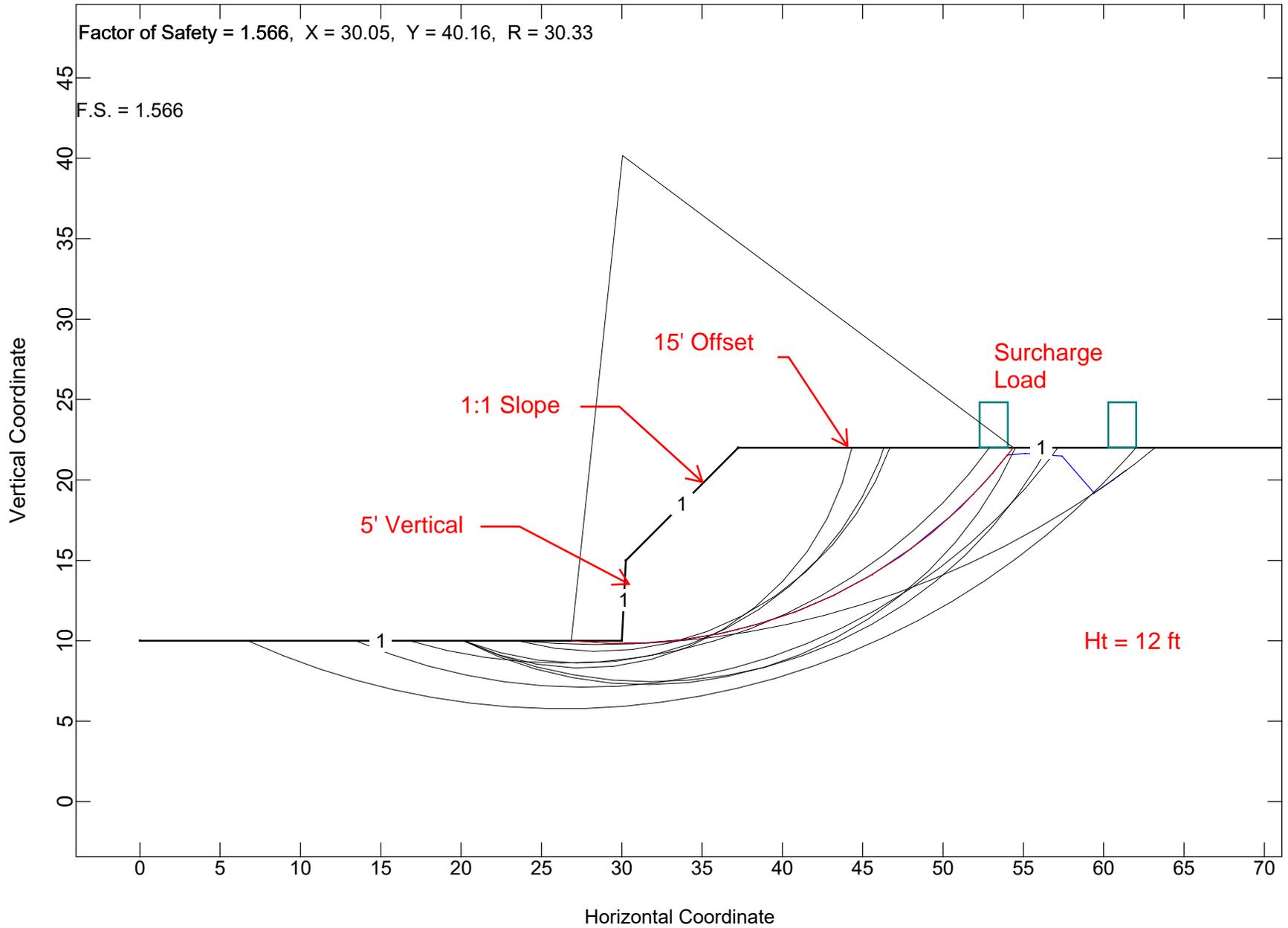
*** 1.935 ***

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3 CY Loader Surcharge



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STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

=====

This program is licensed to :

Korpi Cannon Engineering PLLC
Las Vegas, NV, USA

Path to file locations :

D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\

Name of input data file : 5. Loader - Vert.sl4d
Name of output file : 5. Loader - Vert.sl4o
Name of plot output file : 5. Loader - Vert.sl4p

Time and Date of Analysis

Date: May 09, 2025 Time: 19:45:14

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	1
2	30.00	10.00	30.25	15.00	1
3	30.25	15.00	37.25	22.00	1
4	37.25	22.00	75.00	22.00	1

1

ISOTROPIC SOIL PARAMETERS

1 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	125.0	125.0	200.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	52.25	54.00	4700.0	0.0
2	60.25	62.00	4700.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 36.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.40 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

1

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 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	29.24	9.84
3	31.64	9.87
4	34.03	10.09
5	36.39	10.50
6	38.72	11.09
7	40.99	11.87
8	43.19	12.82
9	45.31	13.95
10	47.34	15.24
11	49.25	16.68
12	51.05	18.27
13	52.72	20.00
14	54.24	21.86

15 54.34 22.00

Circle Center At X = 30.1 ; Y = 40.2 and Radius, 30.3

*** 1.566 ***

Individual data on the 19 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surcharge Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.4	0.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	0.8	0.15E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.2	0.83E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.4	0.10E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	2.4	0.23E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.4	0.29E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	0.9	0.12E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.5	0.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	2.3	0.30E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	2.2	0.27E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	2.1	0.23E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	2.0	0.19E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	1.9	0.14E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	1.8	0.10E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	1.2	0.47E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	0.5	0.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.22E+04
17	1.3	0.20E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.60E+04
18	0.2	0.86E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19	0.1	0.89E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.32	9.02
3	24.60	8.25
4	26.93	7.70
5	29.31	7.37

6	31.71	7.27
7	34.11	7.40
8	36.48	7.76
9	38.81	8.34
10	41.07	9.14
11	43.25	10.14
12	45.32	11.36
13	47.27	12.76
14	49.07	14.34
15	50.72	16.09
16	52.19	17.98
17	53.48	20.01
18	54.50	22.00

Circle Center At X = 31.6 ; Y = 32.5 and Radius, 25.2

*** 1.731 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.36	9.10
3	24.65	8.39
4	26.99	7.87
5	29.37	7.56
6	31.77	7.45
7	34.17	7.55
8	36.55	7.85
9	38.90	8.35
10	41.19	9.05
11	43.42	9.95
12	45.56	11.03
13	47.61	12.28
14	49.54	13.71
15	51.34	15.30
16	53.00	17.03
17	54.50	18.90
18	55.84	20.89
19	56.46	22.00

Circle Center At X = 31.8 ; Y = 35.6 and Radius, 28.2

*** 1.848 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.84	9.52
3	28.23	9.34
4	30.63	9.46
5	33.00	9.87
6	35.29	10.57
7	37.48	11.54
8	39.54	12.78
9	41.42	14.27
10	43.11	15.97
11	44.58	17.88
12	45.79	19.94
13	46.68	22.00

Circle Center At X = 28.5 ; Y = 28.7 and Radius, 19.4

*** 1.913 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.88	9.83
3	28.28	9.76
4	30.68	9.80
5	33.08	9.95
6	35.47	10.19
7	37.84	10.54
8	40.20	11.00
9	42.53	11.56
10	44.84	12.21
11	47.12	12.97

12	49.36	13.83
13	51.56	14.78
14	53.72	15.83
15	55.83	16.97
16	57.89	18.20
17	59.89	19.52
18	61.84	20.93
19	63.19	22.00

Circle Center At X = 28.6 ; Y = 64.8 and Radius, 55.1

*** 1.931 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	13.42	10.00
2	15.66	9.14
3	17.95	8.43
4	20.29	7.87
5	22.65	7.46
6	25.04	7.21
7	27.44	7.11
8	29.84	7.18
9	32.23	7.40
10	34.60	7.77
11	36.94	8.30
12	39.24	8.99
13	41.49	9.82
14	43.68	10.80
15	45.80	11.92
16	47.85	13.17
17	49.81	14.56
18	51.67	16.07
19	53.43	17.70
20	55.08	19.45
21	56.61	21.30
22	57.12	22.00

Circle Center At X = 27.7 ; Y = 43.7 and Radius, 36.6

*** 1.952 ***

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.36	9.11
3	24.70	8.55
4	27.08	8.31
5	29.48	8.42
6	31.84	8.85
7	34.12	9.62
8	36.26	10.69
9	38.24	12.06
10	40.00	13.68
11	41.52	15.54
12	42.76	17.60
13	43.71	19.80
14	44.30	22.00

Circle Center At X = 27.6 ; Y = 25.4 and Radius, 17.1

*** 1.961 ***

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	6.71	10.00
2	8.92	9.07
3	11.18	8.24
4	13.47	7.54
5	15.80	6.95
6	18.15	6.48
7	20.52	6.12
8	22.91	5.89
9	25.31	5.78
10	27.71	5.79
11	30.11	5.93
12	32.49	6.18
13	34.86	6.56

14	37.21	7.05
15	39.53	7.66
16	41.82	8.39
17	44.07	9.23
18	46.27	10.19
19	48.42	11.26
20	50.51	12.43
21	52.54	13.71
22	54.51	15.09
23	56.40	16.56
24	58.21	18.13
25	59.95	19.79
26	61.59	21.54
27	61.98	22.00

Circle Center At X = 26.3 ; Y = 53.2 and Radius, 47.4

*** 1.979 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.10	9.40
3	21.46	8.96
4	23.85	8.70
5	26.25	8.61
6	28.64	8.69
7	31.03	8.95
8	33.39	9.38
9	35.71	9.98
10	37.99	10.75
11	40.20	11.68
12	42.34	12.76
13	44.40	14.00
14	46.36	15.39
15	48.21	16.91
16	49.95	18.56
17	51.57	20.34
18	52.88	22.00

Circle Center At X = 26.3 ; Y = 41.7 and Radius, 33.1

*** 1.980 ***

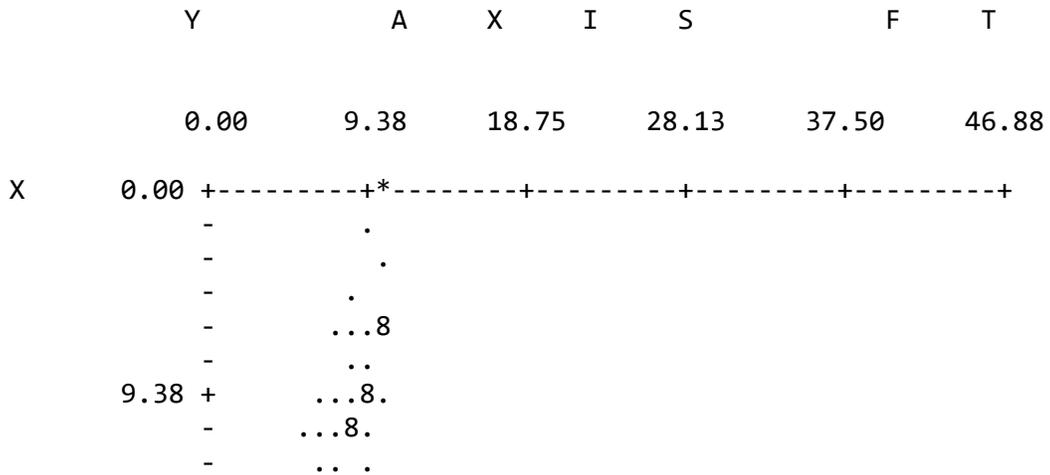
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.42	9.26
3	24.77	8.79
4	27.16	8.61
5	29.56	8.72
6	31.93	9.11
7	34.23	9.79
8	36.44	10.74
9	38.51	11.94
10	40.43	13.38
11	42.16	15.05
12	43.67	16.91
13	44.96	18.94
14	45.99	21.10
15	46.29	22.00

Circle Center At X = 27.5 ; Y = 28.6 and Radius, 20.0

*** 1.985 ***

1



		-	..8..6	
		-	..8..6	
		-	...6.9	
A	18.75	+	..8..9	
		-	..86..2	
		-	...6.2	
		-	.8..9.4	
		-	.8.62.	
		-	...2741	
X	28.13	+	..8.694.	
		-	.8.271* .*	
		-	...2741	
		-	..86.94. ..	
		-	..82.71....	
		-	.. 2..1. ...	
I	37.50	+	...86.547... . . *	
		-	...826.104.... .	
		-	.....2.5107.....	
		-	....86.5.9407.7....	
		-	....826.19.40 .7.7	
		-	.....25.1.. 404.0	
S	46.88	+	.....8.32.1.....4	
		-	.....8.62..9.....	
		-	.....8.3621.9...	
		-	.....36.1 .9./1	
		-	.....8.536.1.9	
		-	.....8. 36.11/	
	56.25	+	.....5. .33	
		-	..... 5...6	
		-	.....5..	
		-	..... 8/2	
		-	.....552/	
		-	
F	65.63	+	.....
		-	
		-	
		-	
		-	
		-	
		-	
T	75.00	+*	

=====

STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

=====

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Path to file locations :

D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\

Name of input data file : 6. Concrete Truck - Vert.sl4d
Name of output file : 6. Concrete Truck - Vert.sl4o
Name of plot output file : 6. Concrete Truck - Vert.sl4p

Time and Date of Analysis

Date: May 09, 2025 Time: 21:17:16

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	1
2	30.00	10.00	30.25	15.00	1
3	30.25	15.00	37.25	22.00	1
4	37.25	22.00	75.00	22.00	1

1

ISOTROPIC SOIL PARAMETERS

1 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	125.0	125.0	200.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

1 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	54.25	58.25	3361.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.

and X = 30.20 ft.

Each Surface Terminates Between X = 36.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.40 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

1

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 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.68	9.02
3	27.95	8.25
4	30.29	7.69
5	32.66	7.35
6	35.06	7.23
7	37.46	7.32
8	39.84	7.64
9	42.18	8.17
10	44.46	8.91
11	46.66	9.86
12	48.77	11.01
13	50.77	12.34
14	52.63	13.86
15	54.35	15.53

16	55.90	17.36
17	57.28	19.32
18	58.48	21.40
19	58.75	22.00

Circle Center At X = 35.2 ; Y = 33.4 and Radius, 26.2

*** 1.741 ***

Individual data on the 23 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surchage Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.2	0.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	2.3	0.39E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	2.0	0.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.15E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	0.0	0.35E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.4	0.26E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.4	0.34E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	2.2	0.37E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	0.2	0.38E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	2.4	0.43E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	2.3	0.41E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	2.3	0.38E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	2.2	0.35E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	2.1	0.30E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	2.0	0.26E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	1.9	0.21E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	1.6	0.15E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	0.1	0.78E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.32E+03
19	1.6	0.11E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.52E+04
20	1.4	0.63E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.46E+04
21	1.0	0.22E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.32E+04
22	0.2	0.23E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
23	0.3	0.10E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Failure Surface Specified By 20 Coordinate Points

Point	X-Surf	Y-Surf
-------	--------	--------

No.	ft.	ft.
1	16.78	10.00
2	19.15	9.62
3	21.53	9.36
4	23.93	9.22
5	26.33	9.19
6	28.73	9.28
7	31.12	9.49
8	33.50	9.82
9	35.86	10.26
10	38.19	10.81
11	40.49	11.48
12	42.76	12.27
13	44.99	13.16
14	47.17	14.16
15	49.30	15.27
16	51.38	16.48
17	53.39	17.78
18	55.33	19.19
19	57.21	20.69
20	58.69	22.00

Circle Center At X = 25.7 ; Y = 58.2 and Radius, 49.0

*** 1.746 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.71	9.10
3	28.01	8.39
4	30.35	7.88
5	32.73	7.57
6	35.13	7.47
7	37.53	7.57
8	39.91	7.88
9	42.25	8.39
10	44.54	9.10
11	46.77	10.01
12	48.90	11.10
13	50.94	12.38

14	52.86	13.82
15	54.64	15.42
16	56.29	17.17
17	57.77	19.05
18	59.09	21.06
19	59.61	22.00

Circle Center At X = 35.1 ; Y = 35.4 and Radius, 27.9

*** 1.786 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	29.06	9.07
3	31.35	8.36
4	33.70	7.89
5	36.09	7.67
6	38.49	7.69
7	40.88	7.95
8	43.23	8.45
9	45.51	9.19
10	47.70	10.16
11	49.79	11.35
12	51.74	12.74
13	53.55	14.33
14	55.18	16.09
15	56.62	18.00
16	57.87	20.06
17	58.79	22.00

Circle Center At X = 37.1 ; Y = 31.2 and Radius, 23.6

*** 1.804 ***

1

Failure Surface Specified By 22 Coordinate Points

Point	X-Surf	Y-Surf
-------	--------	--------

No.	ft.	ft.
1	13.42	10.00
2	15.66	9.14
3	17.95	8.43
4	20.29	7.87
5	22.65	7.46
6	25.04	7.21
7	27.44	7.11
8	29.84	7.18
9	32.23	7.40
10	34.60	7.77
11	36.94	8.30
12	39.24	8.99
13	41.49	9.82
14	43.68	10.80
15	45.80	11.92
16	47.85	13.17
17	49.81	14.56
18	51.67	16.07
19	53.43	17.70
20	55.08	19.45
21	56.61	21.30
22	57.12	22.00

Circle Center At X = 27.7 ; Y = 43.7 and Radius, 36.6

*** 1.828 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.36	9.10
3	24.65	8.39
4	26.99	7.87
5	29.37	7.56
6	31.77	7.45
7	34.17	7.55
8	36.55	7.85
9	38.90	8.35
10	41.19	9.05
11	43.42	9.95
12	45.56	11.03

13	47.61	12.28
14	49.54	13.71
15	51.34	15.30
16	53.00	17.03
17	54.50	18.90
18	55.84	20.89
19	56.46	22.00

Circle Center At X = 31.8 ; Y = 35.6 and Radius, 28.2

*** 1.850 ***

1

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	10.07	10.00
2	12.43	9.56
3	14.80	9.23
4	17.19	8.99
5	19.59	8.85
6	21.99	8.81
7	24.39	8.88
8	26.78	9.04
9	29.17	9.31
10	31.54	9.67
11	33.89	10.13
12	36.23	10.70
13	38.53	11.35
14	40.81	12.11
15	43.06	12.96
16	45.26	13.90
17	47.43	14.93
18	49.55	16.06
19	51.62	17.27
20	53.64	18.57
21	55.60	19.95
22	57.51	21.41
23	58.21	22.00

Circle Center At X = 21.7 ; Y = 66.1 and Radius, 57.3

*** 1.863 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.84	9.52
3	28.23	9.34
4	30.63	9.46
5	33.00	9.87
6	35.29	10.57
7	37.48	11.54
8	39.54	12.78
9	41.42	14.27
10	43.11	15.97
11	44.58	17.88
12	45.79	19.94
13	46.68	22.00

Circle Center At X = 28.5 ; Y = 28.7 and Radius, 19.4

*** 1.913 ***

1

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	6.71	10.00
2	8.98	9.23
3	11.29	8.57
4	13.63	8.03
5	16.00	7.62
6	18.38	7.32
7	20.77	7.15
8	23.17	7.09
9	25.57	7.16
10	27.96	7.35
11	30.34	7.66
12	32.70	8.10
13	35.04	8.65

14	37.34	9.32
15	39.61	10.11
16	41.83	11.01
17	44.01	12.02
18	46.13	13.15
19	48.19	14.38
20	50.19	15.71
21	52.11	17.14
22	53.96	18.67
23	55.73	20.29
24	57.42	22.00

Circle Center At X = 23.0 ; Y = 54.2 and Radius, 47.1

*** 1.947 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.36	9.11
3	24.70	8.55
4	27.08	8.31
5	29.48	8.42
6	31.84	8.85
7	34.12	9.62
8	36.26	10.69
9	38.24	12.06
10	40.00	13.68
11	41.52	15.54
12	42.76	17.60
13	43.71	19.80
14	44.30	22.00

Circle Center At X = 27.6 ; Y = 25.4 and Radius, 17.1

*** 1.961 ***

	0.00	9.38	18.75	28.13	37.50	46.88
X	0.00	+-----+*	-----+	-----+	-----+	-----+
	-	.				
	-	.				
	-	.				
	-	...9				
	-	..				
	9.38	+ ...97				
	-	...9.				
	-	.. 7				
	-	...975				
	-	...9.5				
	-	...572				
A	18.75	+ ...9.2				
	-	...57.6				
	-	...572				
	-	...9.21				
	-	...561				
	-	...6024				
X	28.13	+512.				
	-	...104* .*				
	-	...642.				
	-	...1928. ..				
	-	...1907....				
	-	.. 4..2. ...				
I	37.50	+ ...159.20... . . *				
	-	...16597.8.... .				
	-	...3.6.27.0.....				
	-	....15.92.8.0.0....				
	-	...416597..8. .0.0				
	-3.6527.. 8.8..				
S	46.88	+1.6927.....8				
	-41.59.....				
	-41.627.....				
	-34.652. ...				
	-1..627...				
	-31 25../1				
	56.25	+31 765				
	-31211/				
	-31				
	-				
	-				
	-				
F	65.63	+				
	-				
	-				
	-				

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STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

=====

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D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\

Name of input data file : 7. Spoil - Vert.sl4d
Name of output file : 7. Spoil - Vert.sl4o
Name of plot output file : 7. Spoil - Vert.sl4p

Time and Date of Analysis

Date: May 09, 2025 Time: 21:20:24

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
4 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	1
2	30.00	10.00	30.25	15.00	1
3	30.25	15.00	37.25	22.00	1
4	37.25	22.00	75.00	22.00	1

1

ISOTROPIC SOIL PARAMETERS

1 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	125.0	125.0	200.0	28.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

7 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	40.25	42.25	230.0	0.0
2	42.25	44.25	690.0	0.0
3	44.25	46.25	1150.0	0.0
4	46.25	48.25	1610.0	0.0
5	48.25	50.25	1150.0	0.0
6	50.25	52.25	690.0	0.0
7	52.25	54.25	230.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 36.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.40 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

1

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 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	29.20	9.54
3	31.60	9.39
4	33.99	9.53
5	36.35	9.97
6	38.64	10.70
7	40.81	11.71
8	42.85	12.99
9	44.70	14.51

10	46.36	16.25
11	47.78	18.18
12	48.95	20.28
13	49.64	22.00

Circle Center At X = 31.7 ; Y = 28.6 and Radius, 19.2

*** 1.434 ***

Individual data on the 20 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surchage Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.4	0.67E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	0.8	0.48E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.2	0.94E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.3	0.11E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	2.4	0.24E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.4	0.30E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	0.9	0.13E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	1.4	0.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	1.6	0.22E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	0.6	0.73E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E+03
11	1.4	0.18E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.33E+03
12	0.6	0.68E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.41E+03
13	1.4	0.15E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.97E+03
14	0.5	0.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.52E+03
15	1.5	0.13E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.18E+04
16	0.1	0.77E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.17E+03
17	1.4	0.85E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.23E+04
18	0.5	0.20E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.76E+03
19	0.7	0.21E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.80E+03
20	0.7	0.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.80E+03

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00

2	25.84	9.52
3	28.23	9.34
4	30.63	9.46
5	33.00	9.87
6	35.29	10.57
7	37.48	11.54
8	39.54	12.78
9	41.42	14.27
10	43.11	15.97
11	44.58	17.88
12	45.79	19.94
13	46.68	22.00

Circle Center At X = 28.5 ; Y = 28.7 and Radius, 19.4

*** 1.451 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.09	9.37
3	21.46	8.94
4	23.85	8.73
5	26.25	8.72
6	28.64	8.93
7	31.00	9.35
8	33.32	9.98
9	35.57	10.80
10	37.74	11.83
11	39.81	13.04
12	41.77	14.43
13	43.60	15.98
14	45.28	17.70
15	46.80	19.55
16	48.16	21.53
17	48.42	22.00

Circle Center At X = 25.1 ; Y = 35.9 and Radius, 27.2

*** 1.512 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.83	9.47
3	28.21	9.16
4	30.61	9.09
5	33.00	9.24
6	35.37	9.62
7	37.70	10.22
8	39.95	11.05
9	42.11	12.09
10	44.17	13.32
11	46.10	14.75
12	47.88	16.36
13	49.50	18.13
14	50.95	20.05
15	52.14	22.00

Circle Center At X = 30.2 ; Y = 34.2 and Radius, 25.1

*** 1.513 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.14	9.55
3	21.52	9.28
4	23.92	9.19
5	26.32	9.29
6	28.70	9.56
7	31.06	10.00
8	33.38	10.63
9	35.64	11.42
10	37.84	12.39
11	39.96	13.51
12	41.99	14.79

13	43.92	16.23
14	45.73	17.80
15	47.42	19.50
16	48.98	21.32
17	49.48	22.00

Circle Center At X = 23.9 ; Y = 41.2 and Radius, 32.0

*** 1.518 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.31	8.99
3	24.59	8.23
4	26.94	7.74
5	29.33	7.52
6	31.73	7.58
7	34.10	7.92
8	36.42	8.53
9	38.66	9.40
10	40.78	10.52
11	42.76	11.87
12	44.57	13.45
13	46.19	15.22
14	47.59	17.17
15	48.76	19.27
16	49.68	21.48
17	49.83	22.00

Circle Center At X = 30.0 ; Y = 28.4 and Radius, 20.8

*** 1.546 ***

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
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1	20.13	10.00
2	22.42	9.26
3	24.77	8.79
4	27.16	8.61
5	29.56	8.72
6	31.93	9.11
7	34.23	9.79
8	36.44	10.74
9	38.51	11.94
10	40.43	13.38
11	42.16	15.05
12	43.67	16.91
13	44.96	18.94
14	45.99	21.10
15	46.29	22.00

Circle Center At X = 27.5 ; Y = 28.6 and Radius, 20.0

*** 1.560 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.00	9.10
3	21.30	8.41
4	23.65	7.94
5	26.04	7.68
6	28.44	7.64
7	30.83	7.83
8	33.20	8.23
9	35.52	8.85
10	37.77	9.69
11	39.93	10.72
12	41.99	11.95
13	43.93	13.37
14	45.73	14.95
15	47.38	16.70
16	48.86	18.59
17	50.15	20.61
18	50.88	22.00

Circle Center At X = 27.6 ; Y = 33.7 and Radius, 26.0

*** 1.567 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.34	9.05
3	24.63	8.33
4	26.98	7.85
5	29.37	7.63
6	31.77	7.66
7	34.15	7.94
8	36.49	8.47
9	38.76	9.25
10	40.94	10.26
11	43.00	11.49
12	44.92	12.93
13	46.68	14.56
14	48.25	16.37
15	49.63	18.34
16	50.79	20.44
17	51.45	22.00

Circle Center At X = 30.3 ; Y = 30.4 and Radius, 22.8

*** 1.576 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.31	8.99
3	24.58	8.22
4	26.93	7.70
5	29.31	7.44
6	31.71	7.44

I	37.50 +8423... . . *
	-61.72..... .
	-61.5..... /1
	-04125.....1/2
	-9.4..272/3
	-618. 272.7
S	46.88 +0416..3.23/4
	-4.186134/5
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STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

=====

This program is licensed to :

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Path to file locations :

D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\Alt\

Name of input data file : 7. T3 12ft Spoil - Vert.sl4d
Name of output file : 7. T3 12ft Spoil - Vert.sl4o
Name of plot output file : 7. T3 12ft Spoil - Vert.sl4p

Time and Date of Analysis

Date: May 12, 2025 Time: 06:14:26

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	2
2	30.00	10.00	30.25	15.00	2
3	30.25	15.00	37.25	22.00	1
4	37.25	22.00	75.00	22.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 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	125.0	125.0	200.0	28.0	0.00	0.0	0
2	125.0	125.0	0.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

7 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	40.25	42.25	230.0	0.0
2	42.25	44.25	690.0	0.0
3	44.25	46.25	1150.0	0.0
4	46.25	48.25	1610.0	0.0
5	48.25	50.25	1150.0	0.0
6	50.25	52.25	690.0	0.0
7	52.25	54.25	230.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 36.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.40 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

1

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 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.14	9.55
3	21.52	9.28
4	23.92	9.19
5	26.32	9.29
6	28.70	9.56
7	31.06	10.00

8	33.38	10.63
9	35.64	11.42
10	37.84	12.39
11	39.96	13.51
12	41.99	14.79
13	43.92	16.23
14	45.73	17.80
15	47.42	19.50
16	48.98	21.32
17	49.48	22.00

Circle Center At X = 23.9 ; Y = 41.2 and Radius, 32.0

*** 1.294 ***

Individual data on the 25 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surcharge Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.4	0.66E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	2.4	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	2.4	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	2.4	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	2.4	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.3	0.52E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	0.2	0.84E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	0.8	0.55E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	2.3	0.19E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	2.3	0.23E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	1.6	0.19E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.6	0.72E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	2.1	0.24E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.3	0.30E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	1.7	0.17E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.40E+03
16	0.3	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.60E+02
17	0.0	0.13E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.10E+02
18	1.7	0.13E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.11E+04
19	0.3	0.24E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.23E+03
20	1.5	0.90E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.17E+04
21	0.5	0.26E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.60E+03
22	1.2	0.45E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.19E+04
23	0.8	0.21E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E+04

24 0.7 0.10E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.84E+03
 25 0.5 0.21E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.57E+03

 Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.10	9.39
3	21.47	9.00
4	23.86	8.84
5	26.26	8.90
6	28.65	9.18
7	30.99	9.69
8	33.28	10.41
9	35.49	11.34
10	37.60	12.48
11	39.60	13.81
12	41.47	15.32
13	43.18	17.00
14	44.73	18.83
15	46.11	20.80
16	46.79	22.00

Circle Center At X = 24.4 ; Y = 34.5 and Radius, 25.6

*** 1.309 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.09	9.37
3	21.46	8.94
4	23.85	8.73
5	26.25	8.72
6	28.64	8.93
7	31.00	9.35
8	33.32	9.98
9	35.57	10.80

10	37.74	11.83
11	39.81	13.04
12	41.77	14.43
13	43.60	15.98
14	45.28	17.70
15	46.80	19.55
16	48.16	21.53
17	48.42	22.00

Circle Center At X = 25.1 ; Y = 35.9 and Radius, 27.2

*** 1.310 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.84	9.52
3	28.23	9.34
4	30.63	9.46
5	33.00	9.87
6	35.29	10.57
7	37.48	11.54
8	39.54	12.78
9	41.42	14.27
10	43.11	15.97
11	44.58	17.88
12	45.79	19.94
13	46.68	22.00

Circle Center At X = 28.5 ; Y = 28.7 and Radius, 19.4

*** 1.324 ***

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
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1	20.13	10.00
2	22.42	9.26
3	24.77	8.79
4	27.16	8.61
5	29.56	8.72
6	31.93	9.11
7	34.23	9.79
8	36.44	10.74
9	38.51	11.94
10	40.43	13.38
11	42.16	15.05
12	43.67	16.91
13	44.96	18.94
14	45.99	21.10
15	46.29	22.00

Circle Center At X = 27.5 ; Y = 28.6 and Radius, 20.0

*** 1.385 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	13.42	10.00
2	15.70	9.23
3	18.03	8.66
4	20.40	8.28
5	22.79	8.09
6	25.19	8.10
7	27.58	8.30
8	29.95	8.70
9	32.27	9.29
10	34.54	10.08
11	36.74	11.04
12	38.85	12.18
13	40.86	13.49
14	42.76	14.96
15	44.53	16.58
16	46.16	18.34
17	47.64	20.23
18	48.80	22.00

Circle Center At X = 23.9 ; Y = 37.3 and Radius, 29.3

*** 1.397 ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.05	9.23
3	21.39	8.70
4	23.78	8.43
5	26.18	8.41
6	28.56	8.66
7	30.91	9.15
8	33.19	9.90
9	35.38	10.89
10	37.45	12.11
11	39.37	13.54
12	41.13	15.17
13	42.71	16.98
14	44.08	18.95
15	45.23	21.06
16	45.62	22.00

Circle Center At X = 25.1 ; Y = 30.7 and Radius, 22.3

*** 1.404 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	13.42	10.00
2	15.69	9.22
3	18.02	8.64
4	20.39	8.24
5	22.78	8.03
6	25.18	8.01
7	27.57	8.19
8	29.94	8.56

9	32.28	9.13
10	34.56	9.87
11	36.77	10.80
12	38.90	11.91
13	40.93	13.18
14	42.86	14.61
15	44.66	16.20
16	46.33	17.92
17	47.86	19.77
18	49.23	21.74
19	49.38	22.00

Circle Center At X = 24.2 ; Y = 37.7 and Radius, 29.7

*** 1.417 ***

1

Failure Surface Specified By 13 Coordinate Points

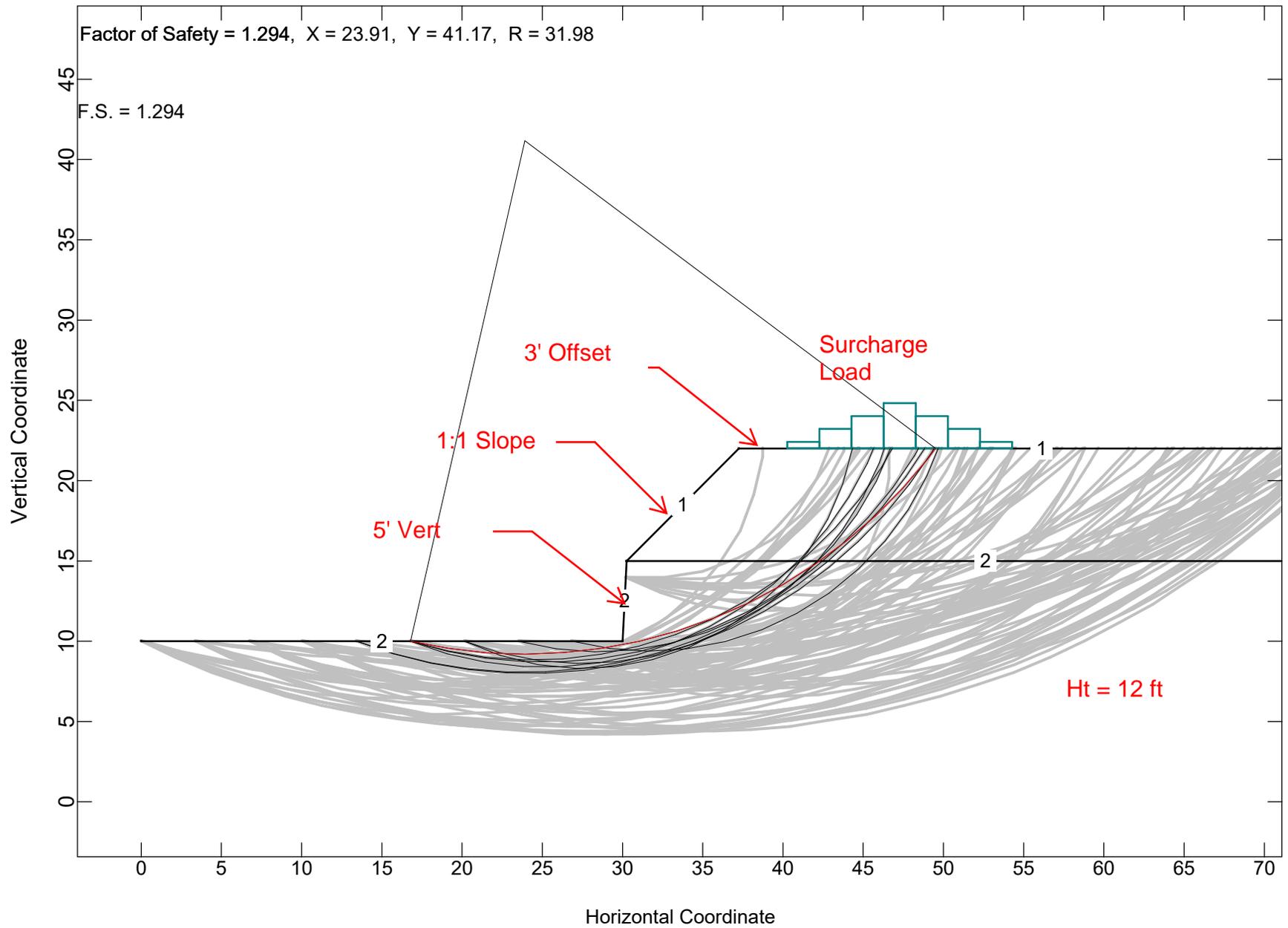
Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	29.20	9.54
3	31.60	9.39
4	33.99	9.53
5	36.35	9.97
6	38.64	10.70
7	40.81	11.71
8	42.85	12.99
9	44.70	14.51
10	46.36	16.25
11	47.78	18.18
12	48.95	20.28
13	49.64	22.00

Circle Center At X = 31.7 ; Y = 28.6 and Radius, 19.2

*** 1.478 ***

Failure Surface Specified By 14 Coordinate Points

Spoils Pile Surcharge Load Soil #2



=====

STABLPro for Windows, Version 2015.4.5

Upgraded from:
FHWA-PCSTABLE

Serial Number : 357267753

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer Method of Slices

=====

This program is licensed to :

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Las Vegas, NV, USA

Path to file locations :

D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\6.0 Miravar\Design\Alt\

Name of input data file : 7. T3 12ft Spoil - Vert.sl4d
Name of output file : 7. T3 12ft Spoil - Vert.sl4o
Name of plot output file : 7. T3 12ft Spoil - Vert.sl4p

Time and Date of Analysis

Date: May 12, 2025 Time: 06:14:26

1

PROBLEM DESCRIPTION New Slope

BOUNDARY COORDINATES

4 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left ft.	Y-Left ft.	X-Right ft.	Y-Right ft.	Soil Type Below Bnd
1	0.00	10.00	30.00	10.00	2
2	30.00	10.00	30.25	15.00	2
3	30.25	15.00	37.25	22.00	1
4	37.25	22.00	75.00	22.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 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	125.0	125.0	200.0	28.0	0.00	0.0	0
2	125.0	125.0	0.0	38.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

7 Load(s) Specified

Load No.	X-Left ft.	X-Right ft.	Intensity psf	Deflection (deg)
1	40.25	42.25	230.0	0.0
2	42.25	44.25	690.0	0.0
3	44.25	46.25	1150.0	0.0
4	46.25	48.25	1610.0	0.0
5	48.25	50.25	1150.0	0.0
6	50.25	52.25	690.0	0.0
7	52.25	54.25	230.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

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 = 0.00 ft.
and X = 30.20 ft.

Each Surface Terminates Between X = 36.00 ft.
and X = 75.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00 ft.

2.40 ft. Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -25.0
And 0.0 deg.

1

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 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.14	9.55
3	21.52	9.28
4	23.92	9.19
5	26.32	9.29
6	28.70	9.56
7	31.06	10.00

8	33.38	10.63
9	35.64	11.42
10	37.84	12.39
11	39.96	13.51
12	41.99	14.79
13	43.92	16.23
14	45.73	17.80
15	47.42	19.50
16	48.98	21.32
17	49.48	22.00

Circle Center At X = 23.9 ; Y = 41.2 and Radius, 32.0

*** 1.294 ***

Individual data on the 25 slices

Slice No.	Width Ft	Weight Lbs	Water Force		Tie Force		Earthquake Force		Surcharge Load Lbs
			Top Lbs	Bot Lbs	Norm Lbs	Tan Lbs	Hor Lbs	Ver Lbs	
1	2.4	0.66E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	2.4	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	2.4	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	2.4	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	2.4	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.3	0.52E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	0.2	0.84E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	0.8	0.55E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	2.3	0.19E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	2.3	0.23E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	1.6	0.19E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	0.6	0.72E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	2.1	0.24E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	0.3	0.30E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	1.7	0.17E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.40E+03
16	0.3	0.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.60E+02
17	0.0	0.13E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.10E+02
18	1.7	0.13E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.11E+04
19	0.3	0.24E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.23E+03
20	1.5	0.90E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.17E+04
21	0.5	0.26E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.60E+03
22	1.2	0.45E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.19E+04
23	0.8	0.21E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E+04

24 0.7 0.10E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.84E+03
 25 0.5 0.21E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.57E+03

 Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.10	9.39
3	21.47	9.00
4	23.86	8.84
5	26.26	8.90
6	28.65	9.18
7	30.99	9.69
8	33.28	10.41
9	35.49	11.34
10	37.60	12.48
11	39.60	13.81
12	41.47	15.32
13	43.18	17.00
14	44.73	18.83
15	46.11	20.80
16	46.79	22.00

Circle Center At X = 24.4 ; Y = 34.5 and Radius, 25.6

*** 1.309 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.09	9.37
3	21.46	8.94
4	23.85	8.73
5	26.25	8.72
6	28.64	8.93
7	31.00	9.35
8	33.32	9.98
9	35.57	10.80

10	37.74	11.83
11	39.81	13.04
12	41.77	14.43
13	43.60	15.98
14	45.28	17.70
15	46.80	19.55
16	48.16	21.53
17	48.42	22.00

Circle Center At X = 25.1 ; Y = 35.9 and Radius, 27.2

*** 1.310 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	25.84	9.52
3	28.23	9.34
4	30.63	9.46
5	33.00	9.87
6	35.29	10.57
7	37.48	11.54
8	39.54	12.78
9	41.42	14.27
10	43.11	15.97
11	44.58	17.88
12	45.79	19.94
13	46.68	22.00

Circle Center At X = 28.5 ; Y = 28.7 and Radius, 19.4

*** 1.324 ***

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
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1	20.13	10.00
2	22.42	9.26
3	24.77	8.79
4	27.16	8.61
5	29.56	8.72
6	31.93	9.11
7	34.23	9.79
8	36.44	10.74
9	38.51	11.94
10	40.43	13.38
11	42.16	15.05
12	43.67	16.91
13	44.96	18.94
14	45.99	21.10
15	46.29	22.00

Circle Center At X = 27.5 ; Y = 28.6 and Radius, 20.0

*** 1.385 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	13.42	10.00
2	15.70	9.23
3	18.03	8.66
4	20.40	8.28
5	22.79	8.09
6	25.19	8.10
7	27.58	8.30
8	29.95	8.70
9	32.27	9.29
10	34.54	10.08
11	36.74	11.04
12	38.85	12.18
13	40.86	13.49
14	42.76	14.96
15	44.53	16.58
16	46.16	18.34
17	47.64	20.23
18	48.80	22.00

Circle Center At X = 23.9 ; Y = 37.3 and Radius, 29.3

*** 1.397 ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.05	9.23
3	21.39	8.70
4	23.78	8.43
5	26.18	8.41
6	28.56	8.66
7	30.91	9.15
8	33.19	9.90
9	35.38	10.89
10	37.45	12.11
11	39.37	13.54
12	41.13	15.17
13	42.71	16.98
14	44.08	18.95
15	45.23	21.06
16	45.62	22.00

Circle Center At X = 25.1 ; Y = 30.7 and Radius, 22.3

*** 1.404 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	13.42	10.00
2	15.69	9.22
3	18.02	8.64
4	20.39	8.24
5	22.78	8.03
6	25.18	8.01
7	27.57	8.19
8	29.94	8.56

9	32.28	9.13
10	34.56	9.87
11	36.77	10.80
12	38.90	11.91
13	40.93	13.18
14	42.86	14.61
15	44.66	16.20
16	46.33	17.92
17	47.86	19.77
18	49.23	21.74
19	49.38	22.00

Circle Center At X = 24.2 ; Y = 37.7 and Radius, 29.7

*** 1.417 ***

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	26.84	10.00
2	29.20	9.54
3	31.60	9.39
4	33.99	9.53
5	36.35	9.97
6	38.64	10.70
7	40.81	11.71
8	42.85	12.99
9	44.70	14.51
10	46.36	16.25
11	47.78	18.18
12	48.95	20.28
13	49.64	22.00

Circle Center At X = 31.7 ; Y = 28.6 and Radius, 19.2

*** 1.478 ***

Failure Surface Specified By 14 Coordinate Points


```

X  28.13 + .....61.
      - .....59*  .*
      - .....021
      - .....61.  ..
      - .....56....
      - .. ...41 ...
I  37.50 + .....41... . . *
      - .....9.532...  .
      - .....9.107....  /1
      - .....931070....1/2
      - .....12 70.02/3
      - .....9.8 12475
S  46.88 + .....9.861223/4
      - .....9.8914/5
      - .....15/6
      - .....6/7
      - .....
      - .....7/
56.25 + .....
      - .....
      - .....
      - .....
      - .....
      - .....
      - .....
F  65.63 + .....
      - .....
      - .....
      - .....
      - .....
      - .....
T  75.00 + .....
      *      *

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Reference Documents

- 8.4.21. Imported fill (if necessary) should consist of the characteristics presented in the following table. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values
Expansion Potential	“Very Low” to “Medium” (Expansion Index of 90 or less)
Particle Size	Maximum Dimension Less Than 3 Inches
	Generally Free of Debris

8.5 Slope Stability

- 8.5.1. Slopes with heights up to approximately 16 feet (cut) and less than 10 feet (fill) will be constructed during grading. Slope stability analyses for the proposed slopes with inclinations as steep as 2:1 (horizontal:vertical) indicate a calculated factor of safety of at least 1.5 under static conditions for both deep-seated and surficial failure. The following table presents the slope stability analysis for a the proposed sloping conditions.

SLOPE STABILITY EVALUATION

Parameter	Value
Slope Height, H	16 Feet
Slope Inclination, I (Horizontal to Vertical)	2:1
Total Soil Unit Weight, γ	125 pcf
Friction Angle, f	28 Degrees
Cohesion, C	200 psf
Slope Factor $\gamma_{cf} = (\gamma H \tan f) / C$	5.3
N_{cf} (From Chart)	21
Factor of Safety = $(N_{cf} C) / (\gamma H)$	2.1

- 8.5.2. The surficial slope stability analysis for a the proposed sloping conditions is summarized in the following table.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 1			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>353'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
MATERIAL DESCRIPTION										
0					3 INCH ASPHALT CONCRETE					
	TP1-1			SM CL	UNDOCUMENTED FILL (Qudf) Loose to medium dense, damp to moist, brown, Silty, fine to coarse SAND					
2	TP1-2				ALLUVIUM (Qal) Stiff, damp, dark brown, Sandy CLAY					
	TP1-3									
4				SC	Medium dense to dense, damp, mottled yellowish brown and light brown, Clayey, fine to medium SAND; some manganese staining, some pin holes, some root casts					
6										
8										
10	TP1-4				SANTIAGO FORMATION (Tsa) Very dense, dry to damp, yellowish brown to olive brown, Silty SANDSTONE; weakly cemented, breaks down to Silty, fine to coarse SAND					
12					TERMINATED AT 12 FEET No groundwater No Seepage					

Figure A-1,
Log of Test Pit TP 1, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 2			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>350'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
MATERIAL DESCRIPTION										
0	TP2-1			CL	3 INCH ASPHALT CONCRETE					
2					ALLUVIUM (Qal) Stiff, damp, brown to dark brown, Sandy CLAY; some manganese staining, trace calcium carbonate nodules					
6					-Becomes brown					
8					SANTIAGO FORMATION (Tsa) Very dense, dry to damp, olive to light brown, Silty SANDSTONE; weakly cemented, breaks down to Silty, fine to medium SAND					
10					TERMINATED AT 11 FEET No groundwater No seepage					

Figure A-2,
Log of Test Pit TP 2, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 3			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>347'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
					MATERIAL DESCRIPTION					
0	TP3-1			SM SC	2.5 INCH ASPHALT CONCRETE					
1					UNDOCUMENTED FILL (Qudf) Medium dense, moist, brown, Silty, fine to coarse SAND					
2					ALLUVIUM (Qal) Residual soil: very stiff to hard, damp, dark brown, Sandy CLAY; some manganese staining, some plant roots, some pinholes					
6					SANTIAGO FORMATION (Tsa) Very dense, damp, olive to light brown, Silty, SANDSTONE; weakly cemented, breaks down to Silty, fine to coarse SAND					
11	TERMINATED AT 11 FEET No groundwater No seepage									

Figure A-3,
Log of Test Pit TP 3, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

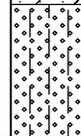
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 4			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>352'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
MATERIAL DESCRIPTION										
0	TP4-1			SM	3 INCH ASPHALT CONCRETE					
2				CL	UNDOCUMENTED FILL (Qudf) Medium dense, moist, brown, Silty, fine to coarse SAND					
10				SM	SANTIAGO FORMATION (Tsa) Very dense, dry to damp, olive to light brown, Silty, SANDSTONE; weakly cemented, breaks down to Silty, fine to medium SAND					
12					TERMINATED AT 12 FEET No groundwater No seepage					

Figure A-4,
Log of Test Pit TP 4, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 5			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>355'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
					MATERIAL DESCRIPTION					
0	TP5-1			CL	3 INCH ASPHALT CONCRETE ALLUVIUM (Qal) Medium dense to dense, damp, brown, Sandy CLAY; some manganese staining					
2	TP5-2				SANTIAGO FORMATION (Tsa) Very dense, damp, olive to light brown, Silty SANDSTONE; weakly cemented, breaks down to Silty, fine to medium SAND					
4										
6										
8	TP5-3				IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry, varied light brown and grayish brown, TONALITE; breaks down to very dense Silty, fine to coarse SAND					
10					TERMINATED AT 10 FEET No groundwater No seepage					

Figure A-5,
Log of Test Pit TP 5, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 6			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.)	DATE COMPLETED	EQUIPMENT			
					ELEV. (MSL.) 350'	DATE COMPLETED 01-11-2024	EQUIPMENT BACKHOE EXCAVATOR W/ 24" BUCKET	BY: J. SHELTON		
MATERIAL DESCRIPTION										
0	TP6-1			CL/SC	3 INCHES TOPSOIL					
2					UNDOCUMENTED FILL (Qudf) Medium dense, damp, brown, Sandy CLAY to Clayey, fine SAND; trace gravel, asphalt debris					
4				CL	ALLUVIUM (Qal) Residual soil: very stiff, damp, dark brown, Sandy CLAY; trace manganese staining, trace roots					
6				-Becomes brown						
8										
10										
12					SANTIAGO FORMATION (Tsa) Very dense, damp, olive to light brown, Sandy SILTSTONE; weakly cemented, breaks down to Sandy SILT					
14					IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry, varied reddish brown and light brown, TONALITE; breaks down to very dense, Silty, fine to coarse SAND					
					TERMINATED AT 14 FEET No groundwater No seepage					

Figure A-6,
Log of Test Pit TP 6, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS		
	... SAMPLING UNSUCCESSFUL	
	... DISTURBED OR BAG SAMPLE	
	... STANDARD PENETRATION TEST	
	... CHUNK SAMPLE	
	... WATER TABLE OR	
	... SEEPAGE	

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 7			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>354'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
					MATERIAL DESCRIPTION					
0	TP7-1			CL	3 INCHES OF TOPSOIL ALLUVIUM (Qal) Very stiff to hard, damp, dark brown to brown, Sandy CLAY; some manganese staining, some plant roots, some root infilling					
2	TP7-2				-Becomes mottled brown, some iron oxide staining					
8	TP7-3				<div style="border: 2px dashed red; padding: 5px;"> SANTIAGO FORMATION (Tsa) Very dense, damp, olive to light brown, Sandy SILTSTONE; weakly cemented, breaks down to Sandy SILT </div>					
14					IGNEOUS ROCK (Kt) Completely weathered to moderately weathered, weak to moderately weak, dry, varied light brown and bluish gray, TONALITE; breaks down to very dense Silty, fine to coarse SAND					
					TERMINATED AT 15 FEET No groundwater No seepage					

Figure A-7,
Log of Test Pit TP 7, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 8			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>354'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
MATERIAL DESCRIPTION										
0					3 INCHES GRASS AND TOPSOIL					
2				CL	ALLUVIUM (Qal) Very stiff to hard, damp, brown to dark brown, Sandy CLAY; some manganese staining, plant roots					
4										
6	TP8-1				-Some iron oxide staining				104.2	14.6
8					SANTIAGO FORMATION (Tsa) Very dense, damp, olive to light brown, Sandy SILTSTONE; weakly cemented, breaks down to Sandy SILT					
10										
12					IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry, varied light brown and bluish gray, TONALITE; breaks down to Silty, fine to coarse SAND					
					TERMINATED AT 12 FEET No groundwater No seepage					

Figure A-8,
Log of Test Pit TP 8, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

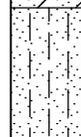
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 9			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>357'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
					MATERIAL DESCRIPTION					
0					4 INCHES VEGETATION AND TOPSOIL					
2				CL	ALLUVIUM (Qal) Very stiff, damp, dark brown, Sandy CLAY -Becomes brown					
4										
6										
8					IGNEOUS ROCK (Kt) Completely to moderately weathered, completely to moderately weak, damp, varied bluish gray and light brown, TONALITE; breaks down to very dense, Silty, fine to coarse SAND					
10										
					TERMINATED AT 10 FEET No groundwater No seepage					

Figure A-9,
Log of Test Pit TP 9, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

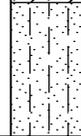
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 10			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>358'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
					MATERIAL DESCRIPTION					
0				CL	3 INCHES VEGETATION AND TOPSOIL ALLUVIUM (Qal) Very stiff to hard, damp, dark brown, Sandy CLAY					
2										
4					IGNEOUS ROCK (Kt) Slightly to moderately weathered, weak to moderately weak, dry, varied reddish brown and brown TONALITE; breaks down to very dense, Silty, fine to coarse SAND					
6						TERMINATED AT 6 FEET No groundwater No seepage				

Figure A-10,
Log of Test Pit TP 10, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

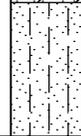
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 11			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) 366'	DATE COMPLETED 01-11-2024	EQUIPMENT BACKHOE EXCAVATOR W/ 24" BUCKET BY: J. SHELTON			
					MATERIAL DESCRIPTION					
0					4 INCHES VEGETATION AND TOPSOIL					
2				CL	ALLUVIUM (Qal) Very stiff to hard, damp, dark brown, Sandy CLAY; some roots some manganese staining					
4					IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry to damp, varied reddish brown and light brown, TONALITE, breaks down to very dense, Silty, fine to coarse SAND					
6					TERMINATED AT 6 FEET No groundwater No seepage					

Figure A-11,
Log of Test Pit TP 11, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

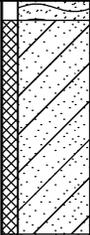
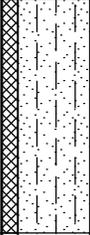
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 12			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) 382'	DATE COMPLETED 01-11-2024	EQUIPMENT BACKHOE EXCAVATOR W/ 24" BUCKET BY: J. SHELTON			
MATERIAL DESCRIPTION										
0	TP12-1			CL	3 INCHES GRASS AND TOPSOIL RESIDUAL SOIL Stiff, damp, dark brown, Sandy CLAY; some manganese staining, some roots					
2										
4	TP12-2				IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry, varied light brown and light gray, TONALITE, breaks down to very dense, Silty, fine to coarse SAND				110.6	12.3
6										
					TERMINATED AT 7 FEET No groundwater No seepage					

Figure A-12,
Log of Test Pit TP 12, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

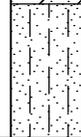
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 13			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>403'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
MATERIAL DESCRIPTION										
0	TP13-1			CL	RESIDUAL SOIL Very stiff, damp, dark brown to brown, Sandy CLAY; some manganese staining, some roots infilling					
2										
4										
6										
8					IGNEOUS ROCK (Kt) Completely weathered to highly weathered, weak to moderately weak, dry to damp, varied reddish brown and light brown, TONALITE; breaks down to very dense, Silty, fine to coarse SAND					
					TERMINATED AT 9 FEET No groundwater No seepage					

Figure A-13,
Log of Test Pit TP 13, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

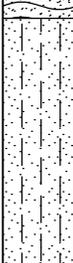
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 14			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>407'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
					MATERIAL DESCRIPTION					
0					3 INCHES VEGETATION AND TOPSOIL					
2					IGNEOUS ROCK (Kt) Completely to highly weathered, weak to moderately weak, dry to damp, varied bluish gray and light brown, TONALITE, breaks down to very dense, Silty, fine to coarse SAND					
4					TERMINATED AT 4 FEET No groundwater No Seepage					

Figure A-14,
Log of Test Pit TP 14, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)	
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR		... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

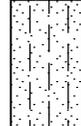
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 15			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>400'</u>	DATE COMPLETED <u>01-11-2024</u>	EQUIPMENT <u>BACKHOE EXCAVATOR W/ 24" BUCKET</u> BY: <u>J. SHELTON</u>			
MATERIAL DESCRIPTION										
0	TP15-1			SC	UNDOCUMENTED FILL (Qudf) Loose to medium dense, damp, brown, Clayey, fine to coarse SAND; trace gravel, trace plant debris					
2										
4				CL	RESIDUAL SOIL Very stiff, damp, brown to dark brown, Sandy CLAY					
6					IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry to damp, varied reddish brown and light brown, TONALITE; breaks down to very dense, Silty, fine to coarse SAND					
8					TERMINATED AT 8 FEET No groundwater No seepage					

Figure A-15,
Log of Test Pit TP 15, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR  ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

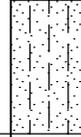
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 16			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.)	DATE COMPLETED	EQUIPMENT				
					ELEV. (MSL.) 400'	DATE COMPLETED 01-11-2024	EQUIPMENT BACKHOE EXCAVATOR W/ 24" BUCKET				
					MATERIAL DESCRIPTION						
0	TP16-1			CL	RESIDUAL SOIL Very stiff to hard, damp, dark brown, Sandy CLAY; abundant plant roots				108.6	13.3	
2											
4											
6					IGNEOUS ROCK (Kt) Completely to moderately weathered, weak to moderately weak, dry to damp, varied reddish brown and light brown, TONALITE; breaks down to very dense, Silty, fine to coarse SAND						
8					TERMINATED AT 8 FEET No groundwater No seepage						

Figure A-16,
Log of Test Pit TP 16, Page 1 of 1

G3173-42-01 TESTPITLOGS.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)	
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR		... SEEPAGE

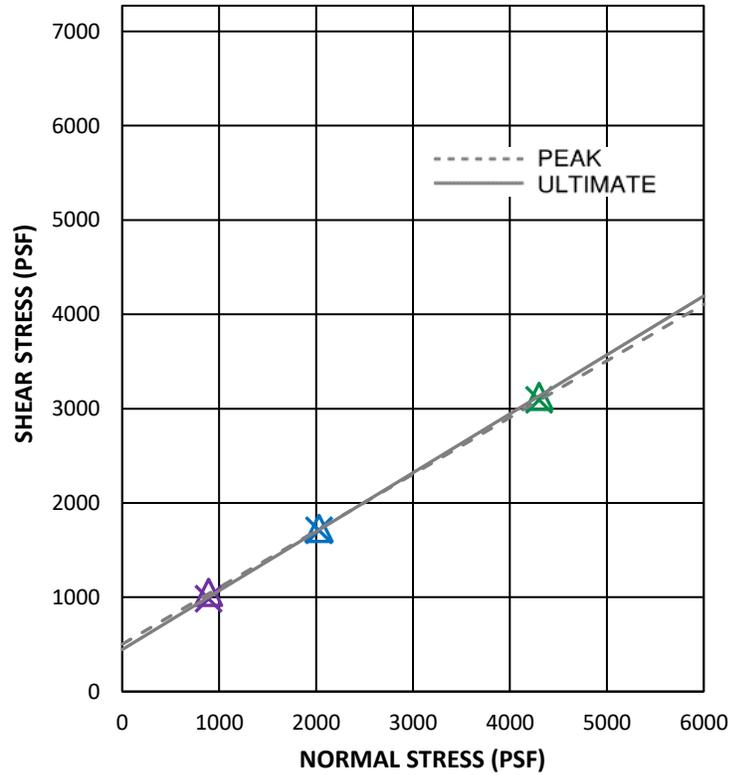
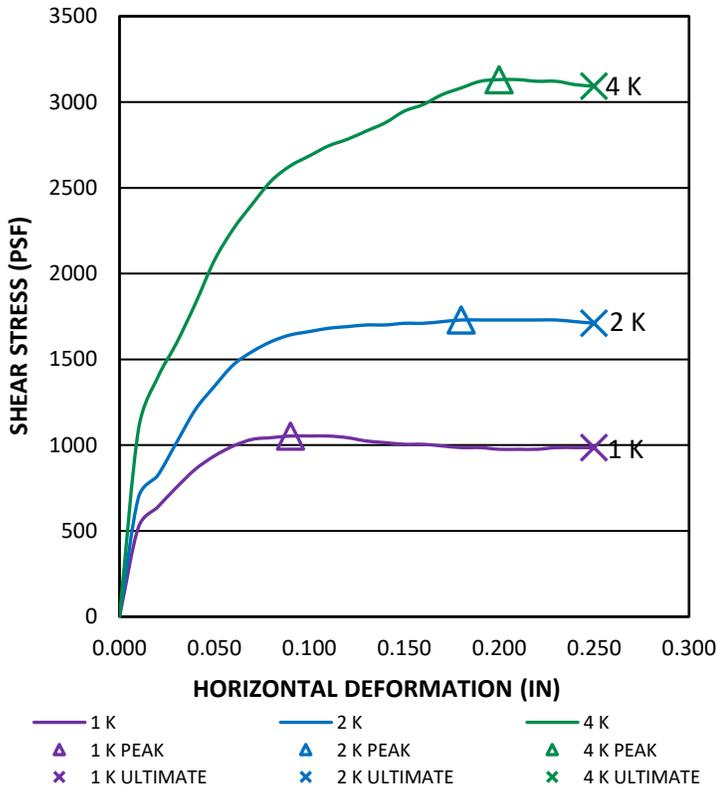
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

SAMPLE NO.: TP12-2 GEOLOGIC UNIT: Kt
 SAMPLE DEPTH (FT): 3½ to 7 NATURAL/REMOLDED: R

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	12.4	12.0	12.5	12.3
DRY DENSITY (PCF):	110.3	110.9	110.5	110.6

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
WATER CONTENT (%):	17.5	16.5	16.9	17.0
PEAK SHEAR STRESS (PSF):	1053	1729	3130	--
ULT.-E.O.T. SHEAR STRESS (PSF):	986	1710	3092	--

RESULTS		
PEAK	COHESION, C (PSF)	502
	FRICTION ANGLE (DEGREES)	31
ULTIMATE	COHESION, C (PSF)	445
	FRICTION ANGLE (DEGREES)	32



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DIRECT SHEAR - AASHTO T-236

MERLOSE AND MATAGUAL

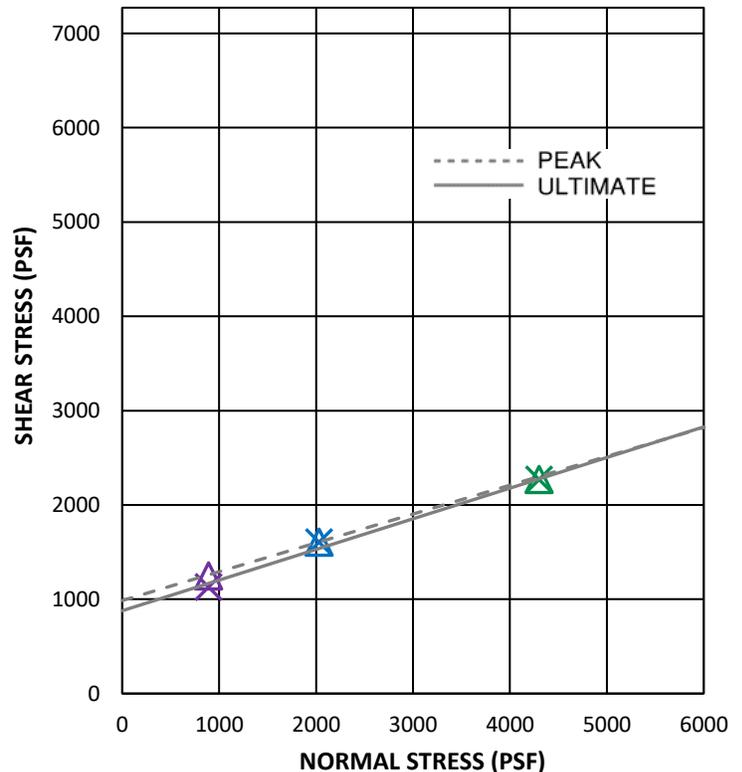
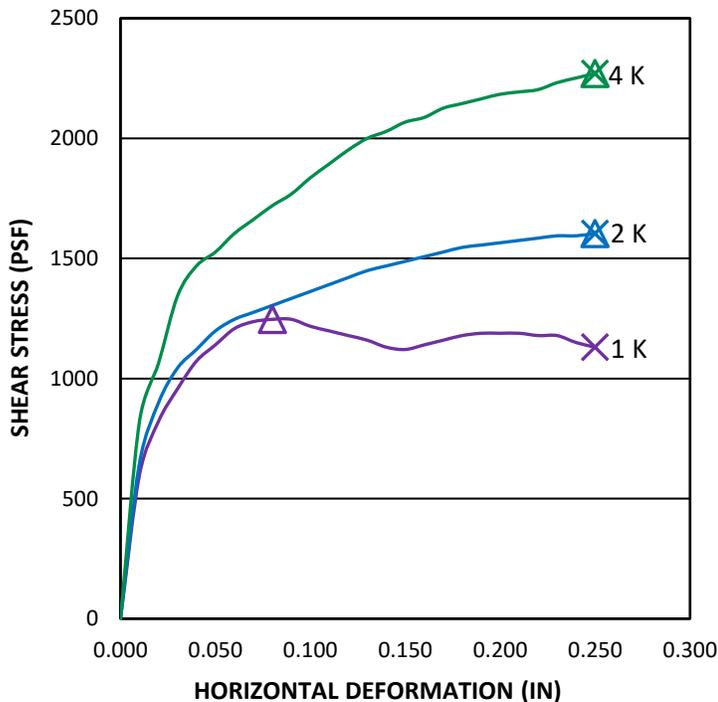
PROJECT NO.: G3173-42-01

SAMPLE NO.: TP16-1 GEOLOGIC UNIT: Qrs
 SAMPLE DEPTH (FT): 0 to 5 NATURAL/REMOLDED: R

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	13.1	13.1	13.7	13.3
DRY DENSITY (PCF):	108.7	108.8	108.3	108.6

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
WATER CONTENT (%):	20.3	21.7	22.1	21.4
PEAK SHEAR STRESS (PSF):	1246	1604	2271	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1130	1604	2271	--

RESULTS		
PEAK	COHESION, C (PSF)	986
	FRICTION ANGLE (DEGREES)	17
ULTIMATE	COHESION, C (PSF)	878
	FRICTION ANGLE (DEGREES)	18



1 K 2 K 4 K
 ▲ 1 K PEAK ▲ 2 K PEAK ▲ 4 K PEAK
 ✕ 1 K ULTIMATE ✕ 2 K ULTIMATE ✕ 4 K ULTIMATE

DIRECT SHEAR - AASHTO T-236

MELROSE AND MATAGUAL

PROJECT NO.: G3175-42-01

GEOCON
INCORPORATED



GEOTECHNICAL CONSULTANTS
 6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
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GeoTek, Inc.
LOG OF EXPLORATORY BORING



CLIENT: TTL Management, Inc. an Arizona Corp.
PROJECT NAME: APNs 166-280-60, -61, -18
PROJECT NO.: 3706-SD
LOCATION: Vista, CA

DRILLER: 2R Drilling, Inc.
DRILL METHOD: Hollow-Stem Auger
HAMMER: 140 lbs - 30 in

LOGGED BY: JD
OPERATOR: George
RIG TYPE: CME 75
DATE: 7/8/2021

Depth (ft)	SAMPLES				BORING NO.: B-1	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number	USCS Symbol		Water Content (%)	Dry Density (pcf)	Others
MATERIAL DESCRIPTION AND COMMENTS								
					3" Asphalt, 2.5" Base			
					Undocumented Fill:			
		7	R1	SM	Silty f SAND, dark brown, moist, medium dense			
		9				9.2	121.5	
		14						
		12	R2	CL	Alluvial Fan: Sandy CLAY, dark brown, moist, stiff	15.2	116.1	
		16						
		20						
5		14	R3		red-brown			
		23						
		29						
		15	R4		same as above	15.2	114.5	
		22						
		27						
10		12	R5	SC/CL	Clayey SAND to Sandy CLAY, brown, moist, dense to hard	16.5	120.1	
		25						
		36						
15		50-2.5"	R6		Granitic Bedrock Excavates as: Silty f-c SAND, olive-gray, slightly moist, very dense	1.7	118.5	
20		50-0.5"			No Recovery			
					REFUSAL DUE TO BEDROCK AT 20 FEET			
					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND	Sample type:	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	Lab testing:	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

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Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-2 MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5					Alluvial Fan:			
9			R1	SM	Silty f SAND, clayey, brown, slightly moist, dense			Maximum Density = 125.0 pcf Optimum Moisture = 10.0% SH
14						12.4	123.5	HC
20								
5			R2		fine- to coarse-grained, dark brown, very dense			
15						15.2	115.5	
32								
50-5"								
10			R3		same as above			
18								
32								
40						14.9	118.4	
10			R4		same as above			
19								
27								
42								
15			R5		Granitic Bedrock Excavates as: Silty f-c SAND, olive-brown, slightly moist, very dense			
50-5"						9.9	114.7	
15.5					REFUSAL DUE TO BEDROCK AT 15.5 FEET			
20					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND	Sample type:	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	Lab testing:	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

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LOGGED BY: JD
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RIG TYPE: CME 75
DATE: 7/8/2021

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-3	Laboratory Testing			
	Sample Type	Blows/6 in.	Sample Number			MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
5		13	R1	CL	Alluvial Fan: Sandy CLAY, dark brown, slightly moist, stiff	12.4	121.7	HC	
		15							
		21							
		18	R2						same as above
		27							
		31							
5		14	R3	very stiff to hard	15.8	118.3			
		25							
		44							
10		50-6"	R4	R5	Granitic Bedrock Excavates as: silty f-c SAND, olive-brown, slightly moist, very dense	12.8	113.3		
		50-5"	same as above						5.0	118.5
REFUSAL DUE TO BEDROCK AT 10.5 FEET									
No groundwater encountered Boring backfilled with soil cuttings									
15									
20									
25									
30									

LEGEND	Sample type:	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	Lab testing:	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

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Depth (ft)	SAMPLES				USCS Symbol	BORING NO.: B-4 MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5		17	R1	SM	Alluvial Fan: Silty f SAND, clayey, dark brown, moist, desne Sandy CLAY, brown, moist hard	11.5	123.1		
		23							
		23							
		19	R2	CL					
		29							
		42							
		23	R3						
		50-5"			Granitic Bedrock Excavates as: silty f-c SAND, red-brown, slightly moist, very dense	18.1	116.9		
		34	R4		same as above				
		50-4"				16.6	114.5		
10					REFUSAL DUE TO BEDROCK AT 8.5 FEET No groundwater encountered Boring backfilled with soil cuttings				
15									
20									
25									
30									

LEGEND	Sample type:		---Ring		---SPT		---Small Bulk		---Large Bulk		---No Recovery		---Water Table
	Lab testing:	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation	MD = Maximum Density				

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OPERATOR: George
RIG TYPE: CME 75
DATE: 7/8/2021

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-5 MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5		11 12 14	R1	CL	Alluvial Fan: Sandy CLAY, dark brown, moist, stiff			EI = 85 SR
5		50-6"	R2	SM	Silty f-c SAND, brown, moist, very dense	13.8	117.1	
		50-4"	R3		Granitic Bedrock Excavates as: Silty f-c SAND, red-brown, moist, very dense	7.7		
10					REFUSAL DUE TO BEDROCK AT 8.5 FEET No groundwater encountered Boring backfilled with soil cuttings			
15								
20								
25								
30								

LEGEND	Sample type:	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	Lab testing:	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

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DATE: 7/8/2021

Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-6 MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5		11 15 19	R1	SM	<u>Alluvial Fan:</u> Silty f SAND, clayey, dark brown, moist, dense	9.9	126	
		18 50-3.5"	R2		same as above			
		50-4"	R3		<u>Granitic Bedrock Excavates as:</u> Silty f-c SAND, olive-brown, moist, very dense	6.2		
10					REFUSAL DUE TO BEDROCK AT 8.5 FEET No groundwater encountered Boring backfilled with soil cuttings			
15								
20								
25								
30								

LEGEND	Sample type:	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	Lab testing:	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test

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Depth (ft)	SAMPLES				USCS Symbol	BORING NO.: B-7 MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number	Sample Number			Water Content (%)	Dry Density (pcf)	Others
5		16 21 28	R1		CL	Alluvial Fan: Sandy CLAY, dark brown, slightly moist, very stiff	9.3	101.2	EI = 68 SR
		50-3"	R2			Granitic Bedrock Excavates as: silty F-c SAND, red-brown, slightly moist, very dense			
		50-5"	R3			same as above	12.1		
						REFUSAL DUE TO BEDROCK AT 5.5 FEET			
10						No groundwater encountered Boring backfilled with soil cuttings			
15									
20									
25									
30									

LEGEND	Sample type:		---Ring		---SPT		---Small Bulk		---Large Bulk		---No Recovery		---Water Table
	Lab testing:	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test	SR = Sulfate/Resistivity Test	SH = Shear Test	HC = Consolidation	MD = Maximum Density				

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Depth (ft)	SAMPLES			USCS Symbol	BORING NO.: B-8 MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing		
	Sample Type	Blows/6 in.	Sample Number			Water Content (%)	Dry Density (pcf)	Others
					3" Asphalt, No Base Undocumented Fill:			
5		16 23 30	R1	SM	Silty f-c SAND, clayey, dark brown, moist, dense	9.3	131.2	
		29 50-5"	R2		very dense	10.2	127.5	
		19 38 42	R3		same as above	19.6	112.7	
10		50-5.5"	R4		Granitic Bedrock Excavates as: Silty f-c SAND, yellow-brown, slightly moist, very dense	10.1	118.3	
15		50-6"	R5		same as above	11.1	120.8	
					REFUSAL DUE TO BEDROCK AT 15.5 FEET			
20					No groundwater encountered Boring backfilled with soil cuttings			
25								
30								

LEGEND	Sample type:	---Ring	---SPT	---Small Bulk	---Large Bulk	---No Recovery	---Water Table	
	Lab testing:	AL = Atterberg Limits	SR = Sulfate/Resistivity Test	EI = Expansion Index	SH = Shear Test	SA = Sieve Analysis	HC = Consolidation	RV = R-Value Test	MD = Maximum Density