HAVEN RESIDENTIAL EXCAVATION PLAN

REV #0

DESIGN CALCULATIONS
February 2, 2026

PREPARED BY:
SCOTT F CANNON, PE

Table of Contents
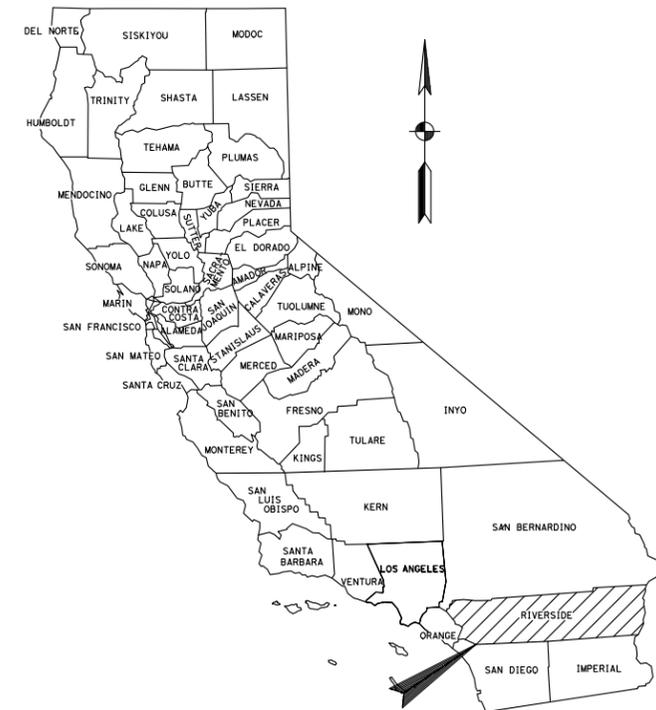
PLANS FOR CONSTRUCTION ON
HAVEN RESIDENTIAL
IN RIVERSIDE COUNTY

-

STORM DRAIN EXCAVATION PLAN
REVISION 0

INDEX TO PLANS

LOCATION MAP

Underground Service Alert

Call: TOLL FREE
1-800-422-4133

TWO WORKING DAYS BEFORE YOU DIG

REGISTERED PROFESSIONAL ENGINEER
SCOTT F. CANNON
84327
Exp. 09-30-27
CIVIL
STATE OF CALIFORNIA

REV.	DATE	DESCRIPTION
0	1-31-26	ISSUSED FOR CONSTRUCTION

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

MZB ENGINEERING INC.
engineering@mzbinc.com
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1192 ATHLONE LANE
CORONA, CA 92882
(949) 254-4792

MZB ENGINEERING

SEWER & WATER EXCAVATION

COVER

PROJECT: CITY OF MENIFEE
CONTRACTOR: KANA PIPELINE
CONTRACT NO: -

SHEET NUMBER:
1
OF 4 SHEETS

Haven 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 2024 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:
0.0' TO 8.0'   – (ML) SANDY SILT
8.0' to 13.0' – (SM) SILTY SAND

DESIGN PARAMETERS:

EXCAVATION SLOPE DESIGN BASED ON BORING LOGS HS-1 TO HS-4 OF THE INFORMATION PROVIDED IN THE REPORT OF GEOTECHNICAL INVESTIGATION, RESIDENTIAL DEVELOPMENT NORTHWEST CORNER OF EVANS ROAD & GARBANI ROAD, CITY OF MENIFEE, CA DATED JANUARY 31, 2023.

SOIL PARAMETERS:

0.0' TO 8.0'	8.0' TO 13.0'
γ = 110 PCF	γ = 110 PCF
Φ = 28°	Φ = 40°
S_u = 100 PSF	S_u = 25 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.

REGISTERED PROFESSIONAL ENGINEER
SCOTT F. CANNON
84327
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0 | 1-31-26

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MZB ENGINEERING

SEWER & WATER EXCAVATION

NOTES

PROJECT: CITY OF MENIFEE
CONTRACTOR: KANA PIPELINE
CONTRACT NO: -

SHEET NUMBER:
2
OF 4 SHEETS

Haven File

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

SITE PLAN
SCALE: 1:8
HAVEN

1:1 SLOPE

18" TO 36" RCP

SURCHARGE OFFSET
SEE TABLE ON RIGHT

STORM DRAIN

OG

18" TO 36" RCP

SURCHARGE OFFSET
SEE TABLE ON RIGHT

8'-0" MAX HT

4'-0"

VARIES
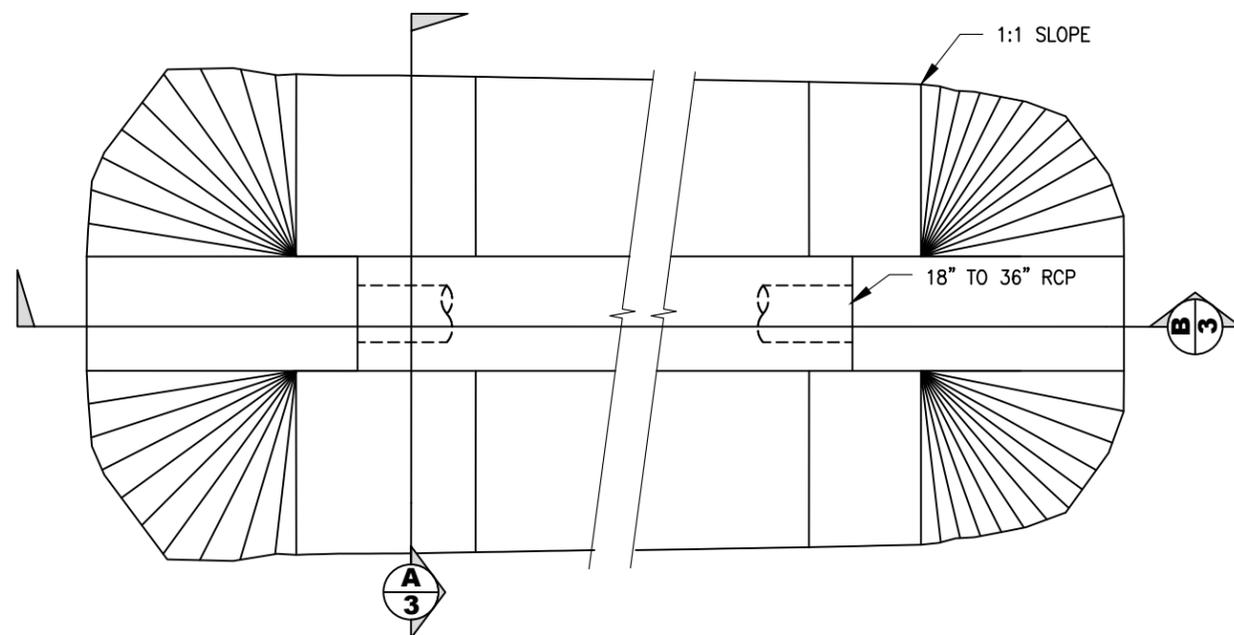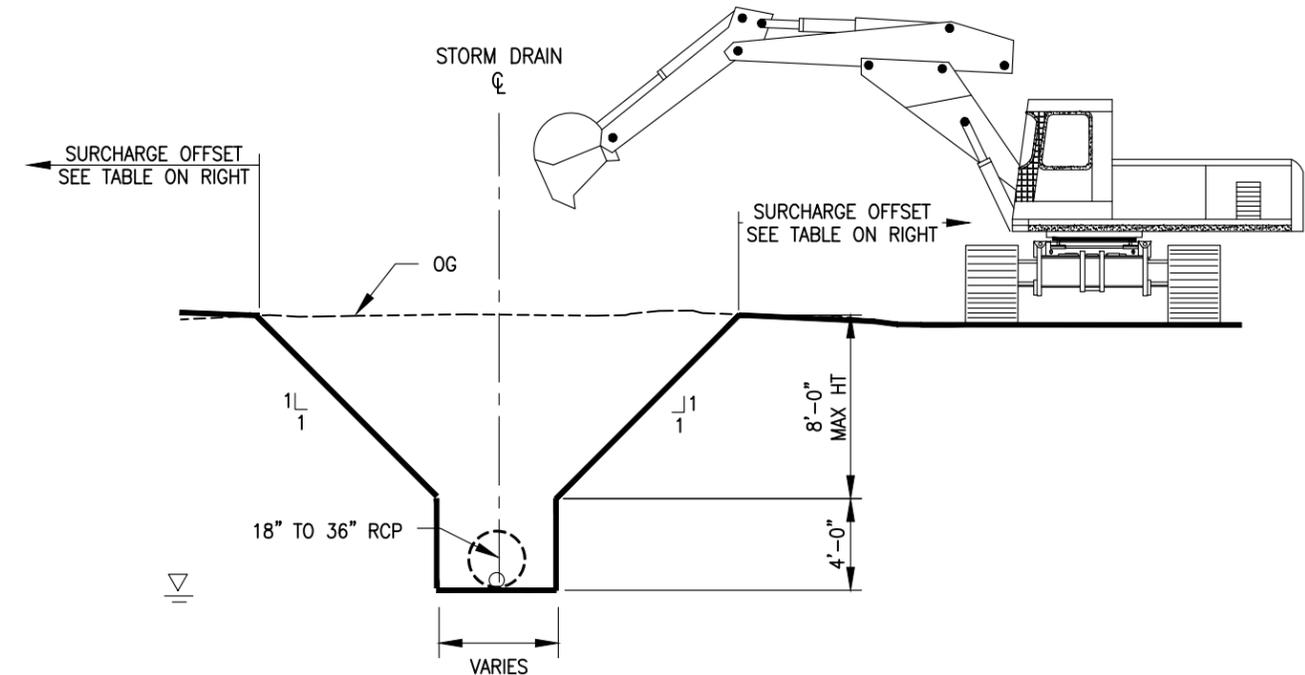
SECTION VIEW A
SCALE: 1:8
HAVEN

SURCHARGE OFFSET
SEE TABLE ON RIGHT

SURCHARGE OFFSET
SEE TABLE ON RIGHT

OG

12'-0" MAX HT

BEDDING PER SPEC.

18" TO 36" RCP

VARIES
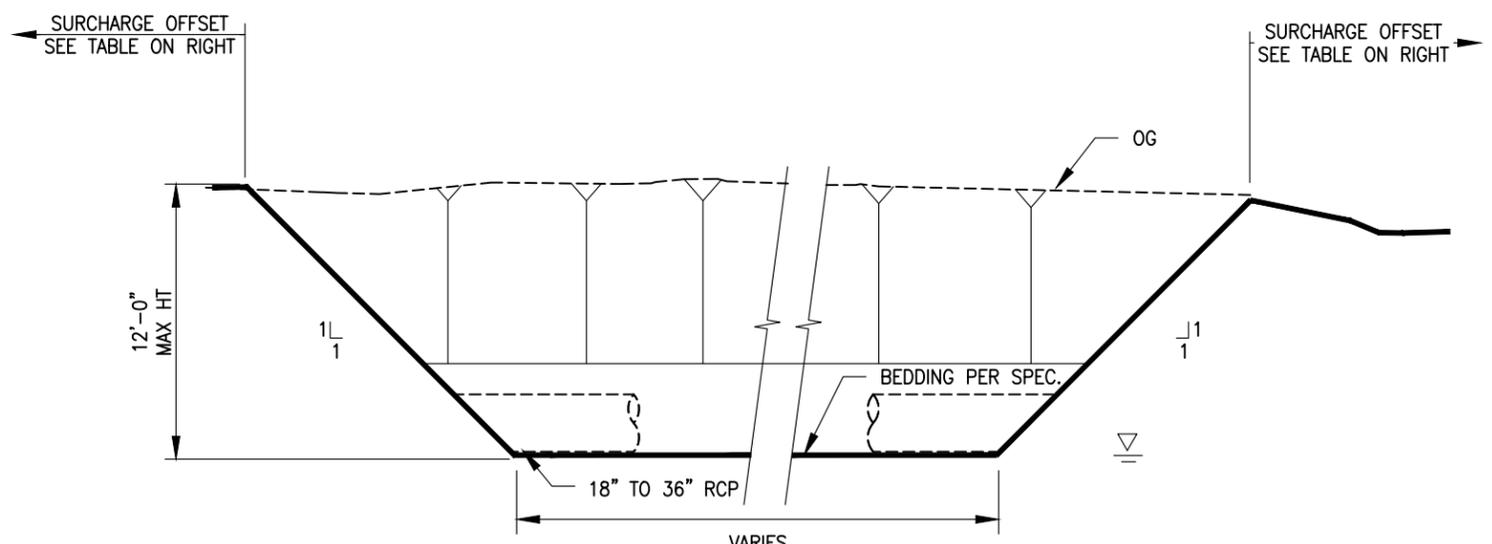
SECTION VIEW B
SCALE: 1:8
HAVEN

ASSUMED MINIMUM OFFSETS	
SURCHARGE	OFFSET
HS 20-44 TRAFFIC	5 FT
CAT 330 EXCAVATOR	3 FT
3 CY LOADER	7 FT
K-RAIL	2 FT
CONCRETE TRUCK	12 FT
SPOIL PILE*	3 FT

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

OFFSET

OFFSET

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TWO WORKING DAYS BEFORE YOU DIG

SITE PLAN
SCALE: 1:8
HAVEN

1:1 SLOPE

18" TO 36" RCP

C/4

D/4

SECTION VIEW C
SCALE: 1:8
HAVEN

STORM DRAIN ℄

SURCHARGE OFFSET
SEE TABLE ON RIGHT

SURCHARGE OFFSET
SEE TABLE ON RIGHT

OG

18" TO 36" RCP

7'-0" MAX HT

5'-0"

VARIES

1/1

1/1

SECTION VIEW D
SCALE: 1:8
HAVEN

SURCHARGE OFFSET
SEE TABLE ON RIGHT

SURCHARGE OFFSET
SEE TABLE ON RIGHT

OG

12'-0" MAX HT

1/1

1/1

BEDDING PER SPEC.

18" TO 36" RCP

VARIES

ASSUMED MINIMUM OFFSETS	
SURCHARGE	OFFSET
HS 20-44 TRAFFIC	5 FT
CAT 330 EXCAVATOR	3 FT
3 CY LOADER	9 FT
K-RAIL	2 FT
CONCRETE TRUCK	12 FT
SPOIL PILE*	3 FT
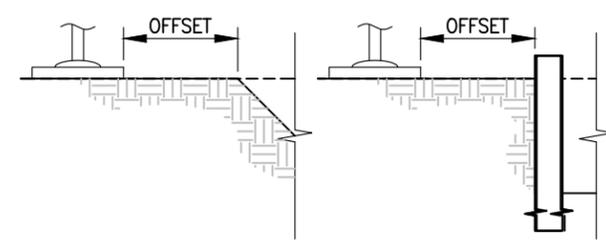
*SPOIL PILE HT = 8 FT W/ 1:1 SLOPE

OFFSET

OFFSET

February 2, 2026

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

REV. 0 | DATE 1-31-26 | ISSUSED FOR CONSTRUCTION

DESCRIPTION

SEWER & WATER EXCAVATION

5 FT - PLAN VIEW / SECTION VIEW

PROJECT: CITY OF MENIFEE
CONTRACTOR: KANA PIPELINE
CONTRACT NO.: -

SHEET NUMBER:
4
OF 4 SHEETS
Haven File

Slope Stability Analysis (4 ft Vertical)

1031 PSF Excavator Surcharge

Factor of Safety = 1.352, X = 27.84, Y = 26.72, R = 16.35

F.S. = 1.352

3' Offset

Excavator Surcharge

Excavator Surcharge

1:1 Slope

4' Vert

1

2

2

1

2

Ht = 13 ft

Vertical Coordinate

Horizontal Coordinate

```
        ==========================================================================

                        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\12.0 Haven\Design\4 ft\
        Name of input data file    : 3. Excavator.sl4d
        Name of output file        : 3. Excavator.sl4o
        Name of plot output file   : 3. Excavator.sl4p


        --------------------------------------------------------------------------
                            Time and Date of Analysis
        --------------------------------------------------------------------------

                 Date:  February 02, 2026     Time:  16:33:45
```

1

PROBLEM DESCRIPTION   New Slope

BOUNDARY COORDINATES

    4 Top   Boundaries
    5 Total Boundaries

```
        Boundary    X-Left     Y-Left     X-Right    Y-Right   Soil Type
          No.        ft.        ft.        ft.        ft.      Below Bnd

           1         0.00      11.00      30.00      11.00        2
           2        30.00      11.00      30.25      15.00        2
           3        30.25      15.00      39.25      24.00        1
           4        39.25      24.00      75.00      24.00        1
           5        30.25      15.00      75.00      15.00        2
  1


    ISOTROPIC SOIL PARAMETERS


      2 Type(s) of Soil


    Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept  Angle   Pressure Constant  Surface
    No.   pcf      pcf       psf      (deg)    Param.     psf      No.

      1  110.0    110.0     100.0     28.0     0.00      0.0        0
      2  110.0    110.0      25.0     41.0     0.00      0.0        0
  1


    BOUNDARY LOAD(S)

        2 Load(s) Specified


    Load        X-Left     X-Right     Intensity    Deflection
    No.          ft.        ft.          psf         (deg)


      1         42.25      44.50       1031.0        0.0
      2         50.75      53.00       1031.0        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 = 34.00 ft.
                               and   X = 75.00 ft.

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

 2.60 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 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.33	11.00
2	25.88	10.48
3	28.48	10.38
4	31.06	10.69
5	33.56	11.40
6	35.92	12.50
7	38.07	13.96
8	39.96	15.74
9	41.55	17.80
10	42.79	20.08
11	43.65	22.54
12	43.92	24.00

Circle Center At X =   27.8 ; Y =   26.7 and Radius,   16.4

           ***   1.352   ***

            Individual data on the   16   slices

                    Water   Water   Tie   Tie   Earthquake
                    Force   Force   Force   Force   Force   Surcharge
Slice Width Weight Top   Bot   Norm   Tan   Hor   Ver   Load
No.   Ft   Lbs   Lbs   Lbs   Lbs   Lbs   Lbs   Lbs   Lbs

  1   2.5 0.72E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  2   2.6 0.16E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  3   1.5 0.89E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  4   0.2 0.67E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  5   0.8 0.43E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  6   2.5 0.17E+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 0.20E+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 0.20E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  9   1.1 0.11E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 10   0.1 0.70E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 11   0.7 0.67E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 12   1.6 0.13E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 13   0.7 0.43E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 14   0.5 0.26E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.56E+03
 15   0.9 0.26E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.89E+03
 16   0.3 0.21E+02 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 14 Coordinate Points

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

            1   20.00   11.00
            2   22.47   10.19
            3   25.04   9.76
            4   27.63   9.70
            5   30.21   10.02
            6   32.72   10.71
            7   35.10   11.76
            8   37.30   13.15
            9   39.27   14.84

```
       10        40.98        16.80
       11        42.38        18.99
       12        43.45        21.36
       13        44.16        23.86
       14        44.18        24.00

Circle Center At X =   26.7 ; Y =   27.5  and Radius,   17.8


          ***      1.428    ***
```

1

```
       Failure Surface Specified By 15 Coordinate Points


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

           1        16.67        11.00
           2        19.17        10.28
           3        21.73         9.83
           4        24.32         9.65
           5        26.92         9.75
           6        29.49        10.12
           7        32.01        10.77
           8        34.45        11.68
           9        36.77        12.84
          10        38.96        14.24
          11        40.99        15.86
          12        42.84        17.70
          13        44.48        19.71
          14        45.89        21.89
          15        46.97        24.00

Circle Center At X =   24.7 ; Y =   34.1  and Radius,   24.5


          ***      1.510    ***



       Failure Surface Specified By 13 Coordinate Points


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

           1        23.33        11.00
```

```
            2           25.89          10.50
            3           28.48          10.33
            4           31.07          10.50
            5           33.63          11.00
            6           36.09          11.82
            7           38.43          12.96
            8           40.61          14.38
            9           42.58          16.08
           10           44.32          18.01
           11           45.79          20.15
           12           46.98          22.46
           13           47.54          24.00
```

Circle Center At X =   28.5 ; Y =   30.5 and Radius,   20.2

        ***   1.517   ***

1

        Failure Surface Specified By 12 Coordinate Points

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

            1   20.00   11.00
            2   22.50   10.27
            3   25.08   10.02
            4   27.68   10.24
            5   30.18   10.93
            6   32.52   12.06
            7   34.61   13.61
            8   36.39   15.51
            9   37.78   17.70
           10   38.75   20.11
           11   39.27   22.66
           12   39.29   24.00

Circle Center At X =   25.2 ; Y =   24.2 and Radius,   14.2

        ***   1.571   ***

        Failure Surface Specified By 16 Coordinate Points

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

              1        16.67        11.00
              2        19.14        10.20
              3        21.68         9.66
              4        24.27         9.40
              5        26.87         9.42
              6        29.45         9.72
              7        31.99        10.30
              8        34.45        11.14
              9        36.81        12.24
             10        39.03        13.58
             11        41.10        15.16
             12        42.99        16.95
             13        44.67        18.93
             14        46.14        21.07
             15        47.36        23.37
             16        47.62        24.00

    Circle Center At X =   25.4 ; Y =   33.6  and Radius,   24.3


          ***     1.609    ***




1

        Failure Surface Specified By 14 Coordinate Points


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

              1        20.00        11.00
              2        22.36         9.91
              3        24.86         9.19
              4        27.44         8.86
              5        30.04         8.92
              6        32.59         9.38
              7        35.05        10.23
              8        37.35        11.44
              9        39.44        12.99
             10        41.27        14.84
             11        42.79        16.95
             12        43.98        19.26
             13        44.80        21.73
             14        45.18        24.00

    Circle Center At X =   28.3 ; Y =   25.8  and Radius,   17.0
```

```
              ***      1.642    ***



        Failure Surface Specified By 16 Coordinate Points


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

             1          16.67        11.00
             2          19.04         9.93
             3          21.53         9.18
             4          24.09         8.74
             5          26.69         8.63
             6          29.28         8.86
             7          31.82         9.41
             8          34.27        10.28
             9          36.59        11.45
            10          38.74        12.91
            11          40.69        14.63
            12          42.41        16.58
            13          43.87        18.73
            14          45.04        21.05
            15          45.90        23.51
            16          46.01        24.00

        Circle Center At X =   26.2 ; Y =   29.1  and Radius,   20.5


              ***      1.678    ***



    1

        Failure Surface Specified By 17 Coordinate Points


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

             1          16.67        11.00
             2          19.20        10.43
             3          21.78        10.07
             4          24.37         9.92
             5          26.97         9.98
             6          29.56        10.25
             7          32.12        10.72
```

```
        8        34.62         11.41
        9        37.07         12.30
       10        39.43         13.38
       11        41.70         14.65
       12        43.86         16.09
       13        45.89         17.71
       14        47.79         19.49
       15        49.54         21.42
       16        51.12         23.48
       17        51.45         24.00

Circle Center At X =   24.9 ; Y =   41.9  and Radius,   32.0


        ***     1.700    ***




    Failure Surface Specified By 13 Coordinate Points


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

       1        20.00         11.00
       2        22.42         10.04
       3        24.96          9.51
       4        27.56          9.42
       5        30.13          9.78
       6        32.61         10.58
       7        34.91         11.79
       8        36.97         13.38
       9        38.72         15.30
      10        40.12         17.50
      11        41.12         19.90
      12        41.69         22.43
      13        41.77         24.00

Circle Center At X =   26.8 ; Y =   24.5  and Radius,   15.1


        ***     1.704    ***




  1


             Y          A    X    I    S          F    T
```
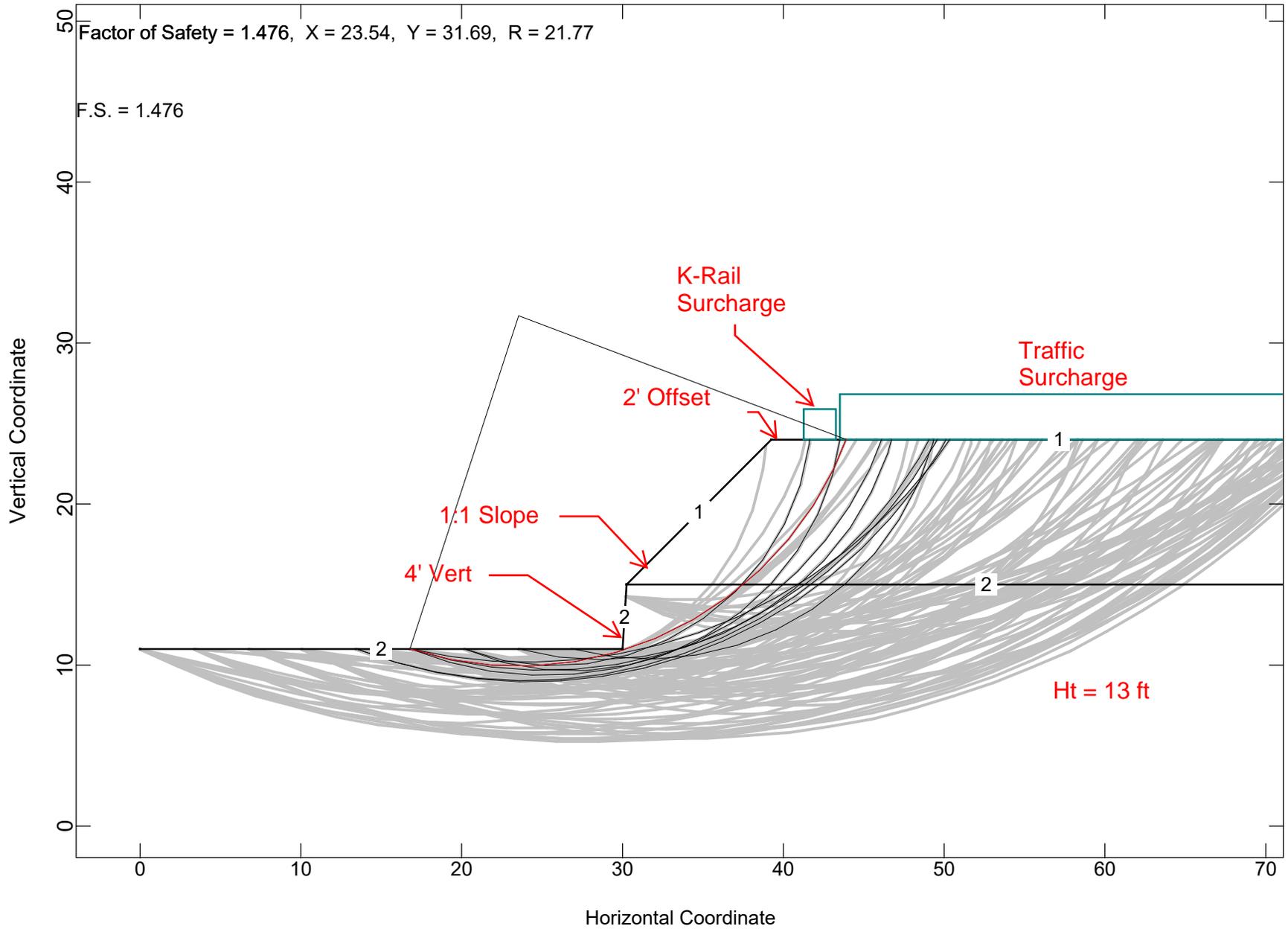
```
                 0.00       9.38      18.75      28.13      37.50      46.88

X      0.00 +---------+-*-------+---------+---------+---------+---------+
           -
           -                ..
           -                ..
           -                ..
           -               ...
      9.38 +              .. ..
           -               ...
           -              .....
           -              . ....
           -              .....
           -              ......3
A     18.75 +             ....3.
           -              ......2
           -             .....32
           -             ...8..1
           -             .....25
           -             ...831.
X     28.13 +            ....721.
           -             ....862*    *
           -             ....81..
           -             .....7215
           -             .....732.5
           -             ......81 . 5
I     37.50 +            ......7621.. 5
           -              .......432... 5   5 *
           -              .........46120.0   .
           -              .........947121  0 0/1
           -              ..........96483.21211/
           -              ............96483 87
S     46.88 +             ..............6.463
           -              ...........  ..9.. ..
           -              .........  .....9 ../2
           -               ...........  ...99
           -               ..............  ...2/
           -               ..........  ..... .
      56.25 +              ...........  ....
           -               ..........  .. ..
           -                ..............
           -                .............
           -                ............. .
           -                ........  ...
F     65.63 +               ...........
           -                 ..........
           -                  ...... .
           -                  ......
           -                  .....
           -                   ....
```

```
T     75.00 +                    *           .*
```

300 PSF Traffic Surcharge
200 PSF K-Rail Surcharge

Factor of Safety = 1.476, X = 23.54, Y = 31.69, R = 21.77

F.S. = 1.476

K-Rail
Surcharge

Traffic
Surcharge

2' Offset

1:1 Slope

4' Vert

Ht = 13 ft

Vertical Coordinate

Horizontal Coordinate

Path to file locations   :
D:\Dropbox\Korpi_Cannon_Engineering\Projects\KC-0119 - MZB Engineering\Design\Excav
- Shoring\12.0 Haven\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: January 18, 2026   Time: 11:47:16

1
PROBLEM DESCRIPTION   New Slope

BOUNDARY COORDINATES

4 Top   Boundaries
5 Total Boundaries

```
          Boundary      X-Left      Y-Left      X-Right      Y-Right      Soil Type
            No.           ft.         ft.          ft.          ft.       Below Bnd

             1           0.00        11.00        30.00        11.00          2
             2          30.00        11.00        30.25        15.00          2
             3          30.25        15.00        39.25        24.00          1
             4          39.25        24.00        75.00        24.00          1
             5          30.25        15.00        75.00        15.00          2
```
1

ISOTROPIC SOIL PARAMETERS

  2 Type(s) of Soil


```
   Soil  Total  Saturated  Cohesion Friction   Pore    Pressure    Piez.
   Type Unit Wt. Unit Wt.  Intercept  Angle  Pressure  Constant  Surface
   No.    pcf      pcf       psf      (deg)   Param.     psf       No.

    1   110.0    110.0      100.0     28.0    0.00      0.0         0
    2   110.0    110.0       25.0     40.0    0.00      0.0         0
```
1

BOUNDARY LOAD(S)

    2 Load(s) Specified


```
   Load        X-Left      X-Right     Intensity    Deflection
   No.          ft.          ft.          psf         (deg)


    1          41.25        43.25        200.0         0.0
    2          43.50        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.


         2.60 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 14 Coordinate Points


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

             1         16.78       11.00
             2         19.29       10.34
             3         21.87        9.99
             4         24.47        9.94
             5         27.06       10.21
             6         29.59       10.78
             7         32.04       11.65
             8         34.37       12.81
             9         36.54       14.23
            10         38.53       15.91
            11         40.31       17.81
            12         41.84       19.91

```
        13        43.12        22.17
        14        43.87        24.00

     Circle Center At X =   23.5 ; Y =   31.7  and Radius,   21.8


          ***      1.476    ***




              Individual data on the     20   slices


                      Water   Water    Tie      Tie      Earthquake
                      Force   Force   Force    Force       Force      Surcharge
     Slice  Width  Weight  Top     Bot     Norm     Tan      Hor      Ver      Load
      No.    Ft    Lbs    Lbs     Lbs     Lbs      Lbs      Lbs      Lbs      Lbs

       1    2.5 0.91E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       2    2.6 0.24E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       3    2.6 0.30E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       4    2.6 0.26E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       5    2.5 0.14E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       6    0.4 0.66E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       7    0.2 0.56E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
       8    1.8 0.90E+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 0.15E+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 0.16E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      11    0.9 0.71E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      12    1.1 0.86E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      13    0.7 0.58E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      14    1.1 0.79E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      15    0.9 0.58E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      16    0.6 0.29E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.12E+03
      17    1.3 0.42E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.25E+03
      18    0.1 0.24E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.26E+02
      19    0.2 0.33E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      20    0.4 0.19E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.11E+03
     ----------------------------------------------------

        Failure Surface Specified By 13 Coordinate Points


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

             1         20.13       11.00
             2         22.63       10.27
             3         25.21        9.96
```

```
          4           27.81          10.08
          5           30.35          10.62
          6           32.78          11.56
          7           35.01          12.88
          8           37.01          14.55
          9           38.70          16.53
         10           40.05          18.75
         11           41.02          21.16
         12           41.59          23.70
         13           41.60          24.00

Circle Center At X =   25.8 ; Y =   25.9  and Radius,   15.9


     ***     1.498    ***
```

1

Failure Surface Specified By 13 Coordinate Points

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

     1          23.49          11.00
     2          26.04          10.48
     3          28.63          10.32
     4          31.23          10.51
     5          33.77          11.06
     6          36.21          11.95
     7          38.51          13.16
     8          40.62          14.68
     9          42.51          16.47
    10          44.13          18.50
    11          45.46          20.74
    12          46.47          23.13
    13          46.70          24.00

Circle Center At X =   28.5 ; Y =   29.3  and Radius,   19.0


     ***     1.518    ***
```

Failure Surface Specified By 16 Coordinate Points

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

```
          No.          ft.          ft.

           1          16.78        11.00
           2          19.33        10.52
           3          21.92        10.24
           4          24.52        10.18
           5          27.11        10.32
           6          29.69        10.68
           7          32.23        11.24
           8          34.71        12.01
           9          37.12        12.98
          10          39.45        14.14
          11          41.67        15.49
          12          43.78        17.01
          13          45.76        18.70
          14          47.60        20.54
          15          49.27        22.52
          16          50.33        24.00

     Circle Center At X =   24.0 ; Y =   42.2  and Radius,   32.0


          ***      1.563    ***
```

Failure Surface Specified By 13 Coordinate Points

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

           1          20.13        11.00
           2          22.59        10.16
           3          25.15         9.70
           4          27.75         9.64
           5          30.33         9.99
           6          32.82        10.72
           7          35.18        11.83
           8          37.33        13.29
           9          39.24        15.05
          10          40.85        17.09
          11          42.13        19.36
          12          43.04        21.79
          13          43.50        24.00

     Circle Center At X =   26.8 ; Y =   26.5  and Radius,   16.9
```

```
                  ***     1.571    ***



        Failure Surface Specified By 15 Coordinate Points


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

              1          16.78        11.00
              2          19.24        10.16
              3          21.78         9.61
              4          24.37         9.37
              5          26.97         9.42
              6          29.54         9.78
              7          32.06        10.44
              8          34.48        11.38
              9          36.78        12.60
             10          38.91        14.08
             11          40.87        15.80
             12          42.60        17.74
             13          44.10        19.86
             14          45.34        22.15
             15          46.09        24.00

        Circle Center At X =   25.2 ; Y =   31.6  and Radius,   22.3


              ***     1.601    ***



 1
        Failure Surface Specified By 16 Coordinate Points


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

              1          16.78        11.00
              2          19.29        10.31
              3          21.85         9.87
              4          24.44         9.68
              5          27.04         9.73
              6          29.62        10.04
              7          32.16        10.59
              8          34.64        11.38
              9          37.03        12.40
             10          39.31        13.65
```

```
     11          41.46          15.11
     12          43.46          16.77
     13          45.30          18.61
     14          46.95          20.62
     15          48.39          22.78
     16          49.05          24.00
```

Circle Center At X =   25.2 ; Y =   36.8 and Radius,   27.1

        ***   1.603   ***

Failure Surface Specified By 18 Coordinate Points


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

    1          13.42       11.00
    2          15.89       10.17
    3          18.42        9.56
    4          20.99        9.18
    5          23.58        9.03
    6          26.18        9.11
    7          28.76        9.42
    8          31.31        9.96
    9          33.79       10.71
   10          36.20       11.69
   11          38.52       12.88
   12          40.72       14.27
   13          42.78       15.84
   14          44.70       17.59
   15          46.46       19.51
   16          48.04       21.58
   17          49.43       23.77
   18          49.55       24.00
```

Circle Center At X =   24.0 ; Y =   38.3 and Radius,   29.3

        ***   1.740   ***

     1

        Failure Surface Specified By 18 Coordinate Points

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

      1         13.42       11.00
      2         15.88       10.16
      3         18.41        9.54
      4         20.98        9.14
      5         23.57        8.97
      6         26.17        9.02
      7         28.76        9.30
      8         31.31        9.80
      9         33.80       10.53
     10         36.23       11.47
     11         38.56       12.62
     12         40.78       13.97
     13         42.88       15.50
     14         44.84       17.22
     15         46.63       19.09
     16         48.26       21.12
     17         49.71       23.28
     18         50.10       24.00
```

Circle Center At X =   24.3 ; Y =   38.7 and Radius,   29.8

        ***   1.770   ***

Failure Surface Specified By 13 Coordinate Points


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

      1         26.84       11.00
      2         29.40       10.51
      3         31.99       10.38
      4         34.58       10.62
      5         37.11       11.22
      6         39.53       12.18
      7         41.79       13.46
      8         43.85       15.05
      9         45.65       16.92
     10         47.18       19.03
     11         48.40       21.32
     12         49.28       23.77
     13         49.32       24.00
```

Circle Center At X =   31.6 ; Y =   28.7 and Radius,   18.4

```
                 ***    1.788    ***

1

                Y            A    X    I    S              F     T


                0.00        9.38      18.75      28.13      37.50      46.88

X      0.00 +---------+-*-------+---------+---------+---------+
           -
           -                ..
           -                 .
           -                ..
           -                ...
   9.38 +           ..  ..
           -                ...
           -              ... .
           -              . ...8
           -              ....8
           -              ......1
A     18.75 +           ...81
           -            ....8.2
           -            ....61
           -            ....8.3
           -            ....51
           -            ....610
X     28.13 +           ....52.
           -            ....61*  .*
           -            ....93.
           -            .....51...
           -            ....8341
           -            ......83.1.
I     37.50 +           ......064.2..  .
           -            .......934512.    ..*
           -            .........836512 .2. ./1
           -            .......0.7436.1.  22
           -            .........0.4 36.51 11/2
           -            ...........984 3 6.6
S     46.88 +           ...........984..33
           -            ............ . 87.7
           -            .............. .484
           -              ......... ..... ..
           -              .......... . .  ..
           -              .......... .... .
      56.25 +              ...............
```

```
        -                    ....... .......
        -                    ........... ..
        -                    ............
        -                    ............
        -                    ...........
F     65.63 +                ..........
        -                    ..........
        -                     ........
        -                      .....
        -                      .....
        -                       ...
T     75.00 +           *           .*2/
```

3 CY Loader Surcharge

Factor of Safety = 1.268, X = 25.22, Y = 36.98, R = 27.32

F.S. = 1.268

7' Offset

Surcharge
Load

1:1 Slope

4' Vertical

Ht = 12 ft

Vertical Coordinate

Horizontal Coordinate

```
          ========================================================================
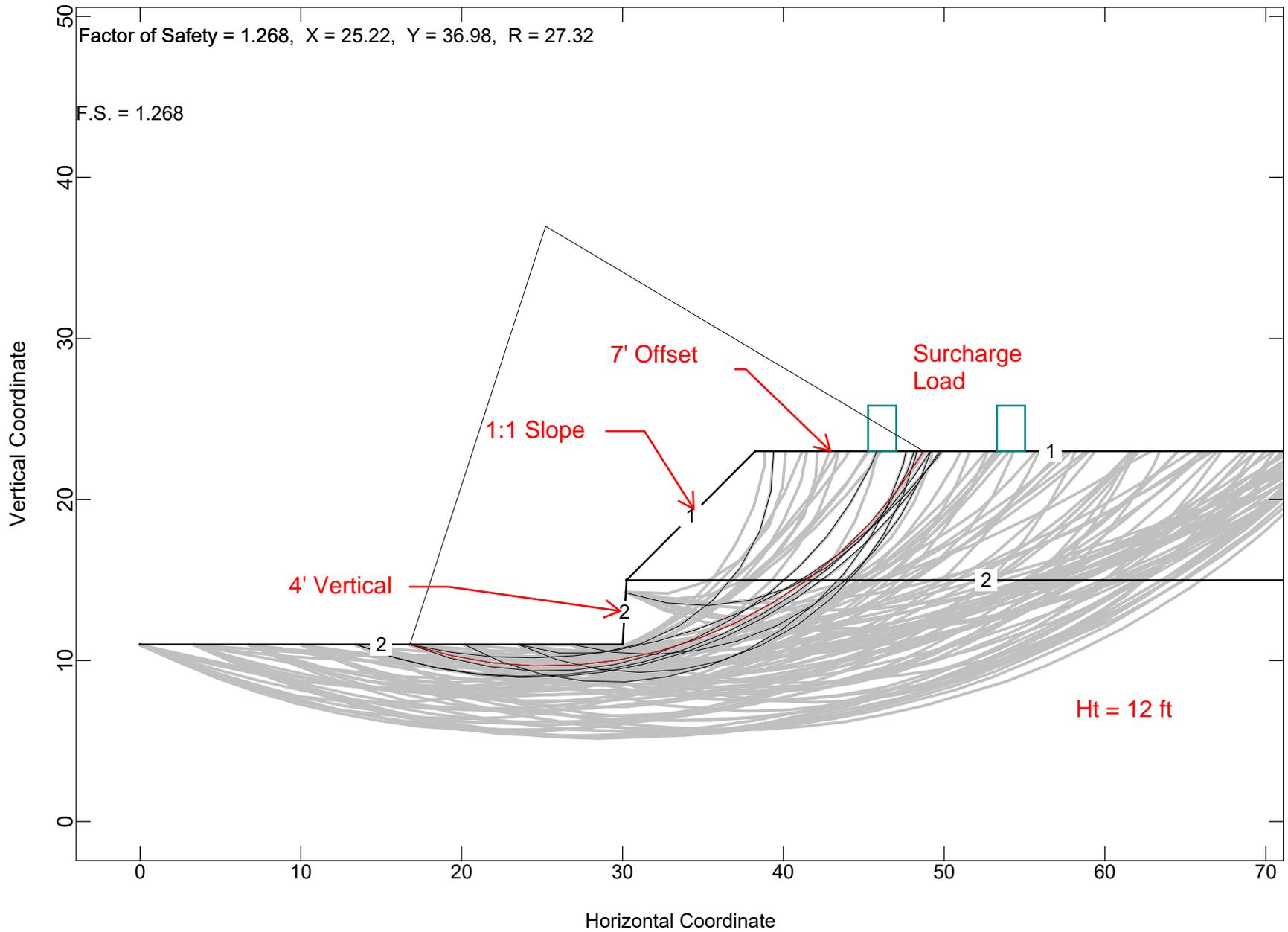
                         STABLPro for Windows, Version 2015.4.5

                                  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\12.0 Haven\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:  January 18, 2026    Time:  11:53:25
```

1
          PROBLEM DESCRIPTION   New Slope

          BOUNDARY COORDINATES

                4 Top   Boundaries
                5 Total Boundaries

```
         Boundary      X-Left     Y-Left     X-Right     Y-Right     Soil Type
            No.          ft.        ft.        ft.         ft.       Below Bnd

             1          0.00       11.00      30.00       11.00          2
             2         30.00       11.00      30.25       15.00          2
             3         30.25       15.00      38.25       23.00          1
             4         38.25       23.00      75.00       23.00          1
             5         30.25       15.00      75.00       15.00          2
```
1

ISOTROPIC SOIL PARAMETERS

 2 Type(s) of Soil


```
 Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept  Angle  Pressure  Constant  Surface
 No.    pcf      pcf       psf     (deg)   Param.      psf      No.

  1    110.0    110.0     100.0    28.0    0.00       0.0        0
  2    110.0    110.0      25.0    40.0    0.00       0.0        0
```
1

BOUNDARY LOAD(S)

    2 Load(s) Specified


```
 Load        X-Left     X-Right     Intensity    Deflection
 No.          ft.        ft.          psf         (deg)


  1          45.25      47.00       4700.0         0.0
  2          53.25      55.00       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.

         2.60 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 16 Coordinate Points

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

             1   16.78   11.00
             2   19.29   10.31
             3   21.85   9.87
             4   24.44   9.67
             5   27.04   9.72
             6   29.62   10.02
             7   32.17   10.56
             8   34.65   11.34
             9   37.04   12.35
            10   39.33   13.59
            11   41.49   15.03
            12   43.50   16.68

```
             13          45.35          18.51
             14          47.01          20.51
             15          48.48          22.65
             16          48.67          23.00


     Circle Center At X =   25.2 ; Y =   37.0  and Radius,   27.3


             ***     1.268    ***




             Individual data on the     21   slices



                      Water    Water    Tie      Tie      Earthquake
                      Force    Force    Force    Force       Force       Surcharge
    Slice  Width Weight  Top      Bot      Norm     Tan      Hor      Ver      Load
    No.     Ft   Lbs    Lbs      Lbs      Lbs      Lbs      Lbs      Lbs      Lbs


      1    2.5 0.95E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      2    2.6 0.26E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      3    2.6 0.35E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      4    2.6 0.37E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      5    2.6 0.32E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      6    0.4 0.39E+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 0.79E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      8    1.9 0.12E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
      9    2.5 0.20E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     10    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
     11    1.2 0.13E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     12    1.1 0.12E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     13    2.1 0.20E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     14    0.0 0.43E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     15    2.0 0.16E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     16    1.7 0.10E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     17    0.1 0.50E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.47E+03
     18    1.7 0.64E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.78E+04
     19    0.0 0.39E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     20    1.5 0.23E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
     21    0.2 0.37E+01 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 16 Coordinate Points


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

```
              1            16.78            11.00
              2            19.33            10.52
              3            21.92            10.24
              4            24.52            10.17
              5            27.11            10.31
              6            29.69            10.66
              7            32.23            11.21
              8            34.72            11.97
              9            37.14            12.92
             10            39.47            14.07
             11            41.70            15.40
             12            43.82            16.90
             13            45.82            18.57
             14            47.67            20.40
             15            49.37            22.37
             16            49.83            23.00
```

Circle Center At X =   24.1 ; Y =   42.5 and Radius,   32.3

        ***   1.305   ***

1

        Failure Surface Specified By 15 Coordinate Points

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

          1           20.13        11.00
          2           22.49         9.91
          3           24.98         9.15
          4           27.55         8.73
          5           30.15         8.68
          6           32.73         8.98
          7           35.25         9.63
          8           37.65        10.61
          9           39.90        11.92
         10           41.95        13.52
         11           43.75        15.39
         12           45.29        17.49
         13           46.52        19.78
         14           47.43        22.21
         15           47.61        23.00
```

Circle Center At X =   29.3 ; Y =   27.6 and Radius,   19.0

```
          ***      1.371    ***


     Failure Surface Specified By 12 Coordinate Points


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

          1          26.84        11.00
          2          29.40        10.51
          3          31.99        10.37
          4          34.58        10.61
          5          37.11        11.20
          6          39.54        12.15
          7          41.80        13.42
          8          43.87        15.00
          9          45.70        16.85
         10          47.24        18.94
         11          48.48        21.23
         12          49.14        23.00

     Circle Center At X =    31.6 ; Y =    28.9  and Radius,   18.5


          ***      1.371    ***



  1
     Failure Surface Specified By 10 Coordinate Points


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

          1          30.20        14.21
          2          32.72        13.57
          3          35.32        13.41
          4          37.90        13.73
          5          40.37        14.53
          6          42.66        15.76
          7          44.68        17.40
          8          46.36        19.38
          9          47.65        21.64
         10          48.12        23.00

     Circle Center At X =    34.9 ; Y =    27.4  and Radius,   14.0
```

```
            ***    1.377   ***



       Failure Surface Specified By 14 Coordinate Points


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

            1        23.49       11.00
            2        25.91       10.05
            3        28.44        9.47
            4        31.04        9.26
            5        33.63        9.44
            6        36.17       10.00
            7        38.60       10.93
            8        40.86       12.21
            9        42.91       13.80
           10        44.71       15.68
           11        46.21       17.81
           12        47.38       20.13
           13        48.19       22.60
           14        48.26       23.00

       Circle Center At X =   31.1 ; Y =   26.9  and Radius,   17.6


            ***    1.389   ***



  1
       Failure Surface Specified By 17 Coordinate Points


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

            1        13.42       11.00
            2        15.89       10.17
            3        18.41        9.56
            4        20.99        9.18
            5        23.58        9.02
            6        26.18        9.09
            7        28.76        9.40
            8        31.31        9.92
            9        33.80       10.67
           10        36.21       11.64
```

```
     11          38.53          12.81
     12          40.74          14.19
     13          42.82          15.75
     14          44.75          17.49
     15          46.52          19.39
     16          48.12          21.44
     17          49.12          23.00
```

Circle Center At X =   24.1 ; Y =   38.5 and Radius,   29.5

        ***   1.401   ***

Failure Surface Specified By 10 Coordinate Points

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

       1   23.49   11.00
       2   26.03   10.47
       3   28.63   10.49
       4   31.17   11.06
       5   33.53   12.16
       6   35.59   13.74
       7   37.28   15.72
       8   38.51   18.01
       9   39.22   20.51
      10   39.37   23.00

Circle Center At X =   27.2 ; Y =   22.6 and Radius,   12.2

        ***   1.446   ***

 1

Failure Surface Specified By 17 Coordinate Points

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

       1   13.42   11.00
       2   15.88   10.16
       3   18.41   9.54
       4   20.98   9.13

```

```
      5   23.57   8.96
      6   26.17   9.00
      7   28.76   9.28
      8   31.31   9.77
      9   33.81   10.49
     10   36.24   11.42
     11   38.57   12.55
     12   40.81   13.89
     13   42.91   15.41
     14   44.88   17.11
     15   46.69   18.97
     16   48.34   20.98
     17   49.71   23.00

Circle Center At X =   24.3 ; Y =   38.9 and Radius,   30.0

       ***   1.453   ***

Failure Surface Specified By 15 Coordinate Points

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

      1   16.78   11.00
      2   19.24   10.16
      3   21.78   9.61
      4   24.37   9.36
      5   26.97   9.41
      6   29.54   9.77
      7   32.06   10.42
      8   34.49   11.35
      9   36.79   12.57
     10   38.93   14.04
     11   40.89   15.75
     12   42.64   17.67
     13   44.15   19.79
     14   45.41   22.06
     15   45.79   23.00

Circle Center At X =   25.2 ; Y =   31.7 and Radius,   22.4

       ***   1.513   ***
```
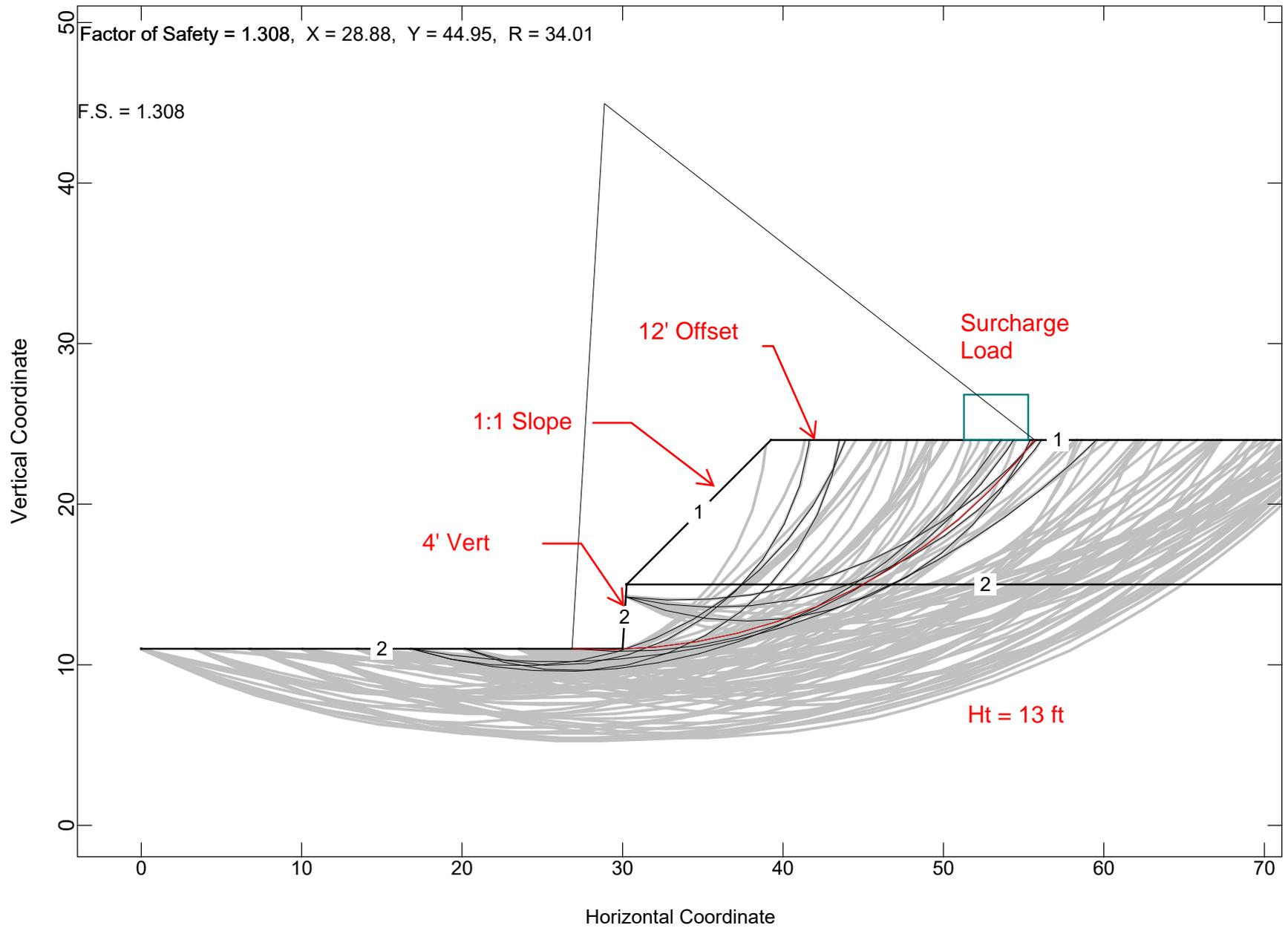
1

```
               Y              A     X     I     S              F       T

               0.00      9.38      18.75      28.13      37.50      46.88

X      0.00 +---------+-*-------+---------+---------+---------+
           -
           -            ..
           -             .
           -            ..
           -           ...
      9.38 +          ..  ..
           -           ...
           -          ...  .
           -          .  ...7
           -          ....7
           -          ......1
A     18.75 +         ...71.
           -          ....7.3
           -          ....01
           -          ....7.6
           -          ....12
           -          ....124
X     28.13 +         ...368.
           -          ...301*  5*
           -          ....648
           -          ....31285.
           -          ....6412.
           -          ....367.58.
I     37.50 +         .....34125.8.   .     *
           -          ......6412...8. 8 .8
           -          .......3.5 0... ....
           -          .......3615 0......
           -          .........3 1 .0....
           -          ..........6431 . 00/1
S     46.88 +         ........... 64315331/
           -          ............ .2411
           -          ............ .22
           -          . ....... ...... .
           -          .......... ... ../2
           -          ..............2/
      56.25 +         .......... ... .
           -          .......... ...
           -          . .............
           -          .............
           -          ...... .....
           -          ..........
F     65.63 +             ..........
```

```
                -                        .........
                -                        .......
                -                        .......
                -                          .....
                -                           ...
T      75.00 +                    *            .*
```

Concrete Truck Surcharge Load

Factor of Safety = 1.308, X = 28.88, Y = 44.95, R = 34.01

F.S. = 1.308

12' Offset

Surcharge Load

1:1 Slope

4' Vert

Ht = 13 ft

Vertical Coordinate

Horizontal Coordinate

```
========================================================================

                  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\12.0 Haven\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:  January 18, 2026    Time:  11:56:40
```

1

        PROBLEM DESCRIPTION   New Slope

        BOUNDARY COORDINATES

            4 Top   Boundaries
            5 Total Boundaries

```
        Boundary      X-Left      Y-Left      X-Right     Y-Right     Soil Type
          No.           ft.         ft.         ft.         ft.       Below Bnd

           1           0.00       11.00       30.00       11.00           2
           2          30.00       11.00       30.25       15.00           2
           3          30.25       15.00       39.25       24.00           1
           4          39.25       24.00       75.00       24.00           1
           5          30.25       15.00       75.00       15.00           2
1


     ISOTROPIC SOIL PARAMETERS


      2 Type(s) of Soil


     Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
     Type Unit Wt. Unit Wt.  Intercept  Angle  Pressure  Constant Surface
      No.   pcf      pcf        psf     (deg)    Param.     psf      No.

       1   110.0    110.0      100.0     28.0     0.00      0.0        0
       2   110.0    110.0       25.0     40.0     0.00      0.0        0
1


     BOUNDARY LOAD(S)

         1 Load(s) Specified


     Load         X-Left      X-Right      Intensity     Deflection
      No.           ft.         ft.          psf          (deg)


       1          51.25       55.25        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.

 2.60 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 14 Coordinate Points

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

       1   26.84   11.00
       2   29.44   10.94
       3   32.04   11.09
       4   34.62   11.43
       5   37.16   11.96
       6   39.66   12.69
       7   42.09   13.61
       8   44.45   14.71
       9   46.71   15.99
      10   48.87   17.44
      11   50.91   19.05
      12   52.83   20.80
      13   54.60   22.71

```
        14            55.64          24.00

       Circle Center At X =   28.9 ; Y =   44.9  and Radius,   34.0


              ***     1.308    ***




              Individual data on the    19   slices



                         Water   Water    Tie     Tie      Earthquake
                         Force   Force   Force   Force        Force       Surcharge
       Slice  Width  Weight  Top     Bot    Norm    Tan      Hor     Ver       Load
        No.    Ft     Lbs    Lbs     Lbs     Lbs     Lbs      Lbs     Lbs        Lbs

         1    2.6 0.80E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         2    0.6 0.25E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         3    0.2 0.56E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         4    1.8 0.96E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         5    2.6 0.19E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         6    2.5 0.25E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         7    2.1 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    0.4 0.51E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
         9    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
        10    2.4 0.25E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
        11    0.5 0.51E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
        12    1.8 0.16E+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 0.17E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
        14    2.0 0.13E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
        15    0.3 0.18E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
        16    1.6 0.68E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.53E+04
        17    1.8 0.44E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.60E+04
        18    0.6 0.63E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.22E+04
        19    0.4 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 14 Coordinate Points


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

               1        26.84       11.00
               2        29.44       10.83
               3        32.04       10.89
               4        34.62       11.18
               5        37.17       11.70
```

```
            6         39.66          12.45
            7         42.07          13.42
            8         44.39          14.60
            9         46.59          15.99
           10         48.66          17.56
           11         50.58          19.32
           12         52.33          21.24
           13         53.90          23.31
           14         54.34          24.00

   Circle Center At X =    30.1 ; Y =   39.8  and Radius,   29.0


          ***      1.347    ***
```

1

Failure Surface Specified By 12 Coordinate Points


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

      1         30.20         14.21
      2         32.79         14.03
      3         35.39         14.08
      4         37.98         14.35
      5         40.53         14.85
      6         43.03         15.57
      7         45.45         16.51
      8         47.79         17.65
      9         50.01         19.00
     10         52.11         20.53
     11         54.07         22.24
     12         55.76         24.00
```

   Circle Center At X =   33.6 ; Y =   43.7 and Radius,   29.7

          ***   1.395   ***

Failure Surface Specified By 18 Coordinate Points


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

```
            1              16.78              11.00
            2              19.29              10.35
            3              21.85               9.89
            4              24.44               9.64
            5              27.04               9.59
            6              29.64               9.75
            7              32.21              10.12
            8              34.75              10.68
            9              37.23              11.44
           10              39.65              12.40
           11              41.99              13.54
           12              44.22              14.87
           13              46.35              16.37
           14              48.35              18.03
           15              50.21              19.84
           16              51.93              21.79
           17              53.49              23.88
           18              53.56              24.00
```

Circle Center At X =   26.3 ; Y =   42.5 and Radius,   33.0

        ***   1.460   ***

1

Failure Surface Specified By 13 Coordinate Points

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

        1   30.20   14.21
        2   32.76   13.76
        3   35.35   13.57
        4   37.95   13.66
        5   40.53   14.02
        6   43.05   14.64
        7   45.50   15.52
        8   47.84   16.65
        9   50.05   18.02
       10   52.11   19.61
       11   53.99   21.41
       12   55.67   23.39
       13   56.09   24.00

Circle Center At X =   35.8 ; Y =   38.5 and Radius,   25.0

```
                    ***      1.504     ***




        Failure Surface Specified By 13 Coordinate Points


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

               1          20.13          11.00
               2          22.63          10.27
               3          25.21           9.96
               4          27.81          10.08
               5          30.35          10.62
               6          32.78          11.56
               7          35.01          12.88
               8          37.01          14.55
               9          38.70          16.53
              10          40.05          18.75
              11          41.02          21.16
              12          41.59          23.70
              13          41.60          24.00

        Circle Center At X =   25.8 ; Y =   25.9  and Radius,   15.9


                    ***      1.507     ***




1

        Failure Surface Specified By 14 Coordinate Points


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

               1          16.78          11.00
               2          19.29          10.34
               3          21.87           9.99
               4          24.47           9.94
               5          27.06          10.21
               6          29.59          10.78
               7          32.04          11.65
               8          34.37          12.81
               9          36.54          14.23
              10          38.53          15.91
              11          40.31          17.81
              12          41.84          19.91
```

```
      13          43.12          22.17
      14          43.87          24.00

Circle Center At X =   23.5 ; Y =   31.7  and Radius,   21.8


       ***      1.555   ***



Failure Surface Specified By 13 Coordinate Points


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

     1          30.20          14.21
     2          32.66          13.37
     3          35.21          12.87
     4          37.81          12.71
     5          40.40          12.89
     6          42.95          13.42
     7          45.40          14.28
     8          47.72          15.46
     9          49.86          16.94
    10          51.78          18.69
    11          53.46          20.67
    12          54.86          22.87
    13          55.38          24.00

Circle Center At X =   37.7 ; Y =   32.3  and Radius,   19.5


       ***      1.582   ***




1

      Failure Surface Specified By 13 Coordinate Points


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

     1          20.13          11.00
     2          22.59          10.16
     3          25.15           9.70
     4          27.75           9.64
     5          30.33           9.99
     6          32.82          10.72
```

```
         7          35.18           11.83
         8          37.33           13.29
         9          39.24           15.05
        10          40.85           17.09
        11          42.13           19.36
        12          43.04           21.79
        13          43.50           24.00

Circle Center At X =   26.8 ; Y =   26.5  and Radius,   16.9


        ***      1.631    ***




Failure Surface Specified By 19 Coordinate Points


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

      1          16.78           11.00
      2          19.35           10.59
      3          21.93           10.32
      4          24.53           10.19
      5          27.13           10.20
      6          29.72           10.35
      7          32.31           10.63
      8          34.87           11.06
      9          37.41           11.62
     10          39.92           12.32
     11          42.38           13.15
     12          44.79           14.11
     13          47.15           15.21
     14          49.45           16.42
     15          51.68           17.76
     16          53.84           19.22
     17          55.91           20.78
     18          57.89           22.46
     19          59.53           24.00

Circle Center At X =   25.7 ; Y =   58.6  and Radius,   48.4


        ***      1.650    ***




   1
```

```
                Y           A      X      I      S           F      T


               0.00        9.38      18.75      28.13      37.50      46.88

      X    0.00 +---------+-*-------+---------+---------+---------+
               -
               -                ..
               -                .
               -                ..
               -                ...
               -                ...
           9.38 +              .. ..
               -                ...
               -               ... .
               -               . ....
               -               .....
               -               ......4
      A   18.75 +             ....4
               -               ......6
               -               .....4
               -               .......
               -               ....46
               -               ....471
      X   28.13 +             ....96.
               -               ....46*  3*
               -               .......
               -               .....41.83
               -               .....41.6
               -               .......953.
      I   37.50 +             ......21836..  .
               -               .......21.976.     ..*
               -               .......0853.976 .6. .
               -               .......21.....7.  66
               -               .........13. ...97 7
               -               ........8.53.. . ...
      S   46.88 +             ........01.........
               -               ........8.51 . ....
               -               .........8532 ....
               -               ........ 01532 ../1
               -               .......... 0 1  24
               -               .......... ..51 21/
           56.25 +            ..........0..51
               -               ....... ....0..
               -               .......... .0
               -               ............
               -               ............
               -               ..........
      F   65.63 +             ..........
               -               ..........
               -                ........
```

```
              -                              ......
              -                              .....
              -                              ...
  T     75.00 +                   *           .*
```

Spoils Pile Surcharge Load
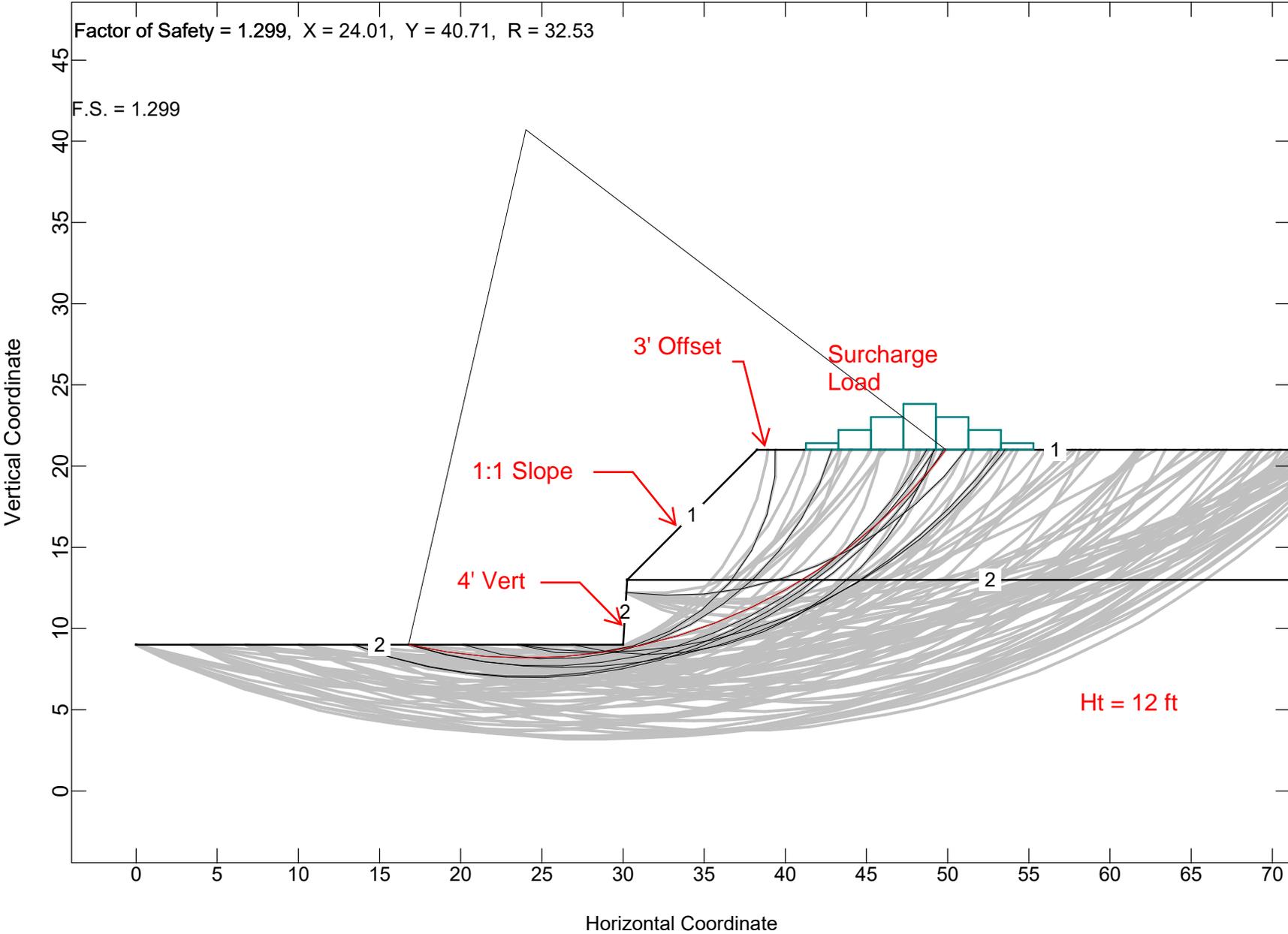
Factor of Safety = 1.299, X = 24.01, Y = 40.71, R = 32.53

F.S. = 1.299

3' Offset

Surcharge
Load

1:1 Slope

4' Vert

Ht = 12 ft

Vertical Coordinate

Horizontal Coordinate

```
============================================================================

                    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\12.0 Haven\Design\4 ft\
     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:  February 02, 2026    Time:  15:29:09
```

1
```
          PROBLEM DESCRIPTION    New Slope




          BOUNDARY COORDINATES

             4 Top    Boundaries
             5 Total Boundaries
```

```
      Boundary    X-Left     Y-Left     X-Right    Y-Right    Soil Type
        No.        ft.        ft.        ft.        ft.       Below Bnd

          1        0.00       9.00      30.00       9.00          2
          2       30.00       9.00      30.25      13.00          2
          3       30.25      13.00      38.25      21.00          1
          4       38.25      21.00      75.00      21.00          1
          5       30.25      13.00      75.00      13.00          2
1


      ISOTROPIC SOIL PARAMETERS


       2 Type(s) of Soil


      Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
      Type Unit Wt. Unit Wt.  Intercept  Angle  Pressure  Constant  Surface
      No.    pcf      pcf       psf     (deg)    Param.     psf       No.

       1   110.0    110.0      100.0    28.0     0.00       0.0         0
       2   110.0    110.0       25.0    40.0     0.00       0.0         0
1


      BOUNDARY LOAD(S)

          7 Load(s) Specified


      Load        X-Left     X-Right     Intensity    Deflection
       No.         ft.         ft.          psf         (deg)


          1       41.25       43.25        230.0         0.0
          2       43.25       45.25        690.0         0.0
          3       45.25       47.25       1150.0         0.0
          4       47.25       49.25       1610.0         0.0
          5       49.25       51.25       1150.0         0.0
          6       51.25       53.25        690.0         0.0
          7       53.25       55.25        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	9.00
2	19.14	8.55
3	21.52	8.28
4	23.92	8.19
5	26.32	8.27
6	28.70	8.52
7	31.06	8.96

```
        8          33.39          9.56
        9          35.66         10.34
       10          37.87         11.28
       11          40.00         12.38
       12          42.04         13.64
       13          43.99         15.04
       14          45.83         16.58
       15          47.55         18.26
       16          49.14         20.05
       17          49.86         21.00
```

Circle Center At X =   24.0 ; Y =   40.7 and Radius,   32.5

***   1.299   ***

Individual data on the   25   slices

Slice No.	Width Ft	Weight Lbs	Water Force Top Lbs	Water Force Bot Lbs	Tie Force Norm Lbs	Tie Force Tan Lbs	Earthquake Force Hor Lbs	Earthquake Force Ver Lbs	Surcharge Load Lbs
1	2.4	0.58E+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	0.15E+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	0.20E+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	0.20E+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	0.16E+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	0.51E+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	0.61E+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	0.41E+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	0.15E+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	0.18E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	2.2	0.21E+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	0.40E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	1.7	0.17E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	1.0	0.92E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	0.2	0.22E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	0.8	0.66E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.18E+03
17	1.2	0.92E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.28E+03
18	0.7	0.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.51E+03
19	1.3	0.75E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.87E+03
20	0.6	0.30E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.67E+03
21	1.4	0.58E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.16E+04
22	0.3	0.95E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.48E+03
23	1.6	0.32E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.26E+04

```
 24      0.1 0.11E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.18E+03
 25      0.6 0.27E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.70E+03
 -------------------------------------------------------
```

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	9.00
2	19.09	8.37
3	21.45	7.94
4	23.84	7.72
5	26.24	7.71
6	28.64	7.91
7	31.00	8.31
8	33.32	8.92
9	35.58	9.73
10	37.76	10.74
11	39.84	11.93
12	41.82	13.30
13	43.66	14.84
14	45.36	16.53
15	46.91	18.36
16	48.30	20.32
17	48.69	21.00

Circle Center At X =   25.2 ; Y =   35.2 and Radius,   27.5

***   1.355   ***

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	9.00
2	25.84	8.51
3	28.24	8.48
4	30.60	8.93
5	32.82	9.83
6	34.83	11.14
7	36.55	12.82
8	37.90	14.80

```
         9          38.84          17.01
        10          39.33          19.36
        11          39.35          21.00

Circle Center At X =    27.2 ; Y =    20.7  and Radius,   12.2


        ***      1.427    ***




Failure Surface Specified By 11 Coordinate Points


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

      1          30.20          12.21
      2          32.59          12.04
      3          34.99          12.12
      4          37.37          12.46
      5          39.70          13.04
      6          41.95          13.86
      7          44.11          14.92
      8          46.14          16.20
      9          48.02          17.68
     10          49.74          19.36
     11          51.11          21.00

Circle Center At X =    33.0 ; Y =    34.8  and Radius,   22.8


        ***      1.440    ***




  1

Failure Surface Specified By 13 Coordinate Points


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

      1          26.84           9.00
      2          29.20           8.54
      3          31.60           8.40
      4          33.99           8.56
      5          36.35           9.02
      6          38.62           9.79
      7          40.78          10.84
```

```
        8          42.78          12.16
        9          44.60          13.73
       10          46.20          15.52
       11          47.56          17.49
       12          48.65          19.63
       13          49.14          21.00

Circle Center At X =   31.6 ; Y =   27.0  and Radius,   18.6


       ***     1.444   ***




Failure Surface Specified By 19 Coordinate Points


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

     1          13.42          9.00
     2          15.70          8.23
     3          18.03          7.66
     4          20.39          7.27
     5          22.79          7.07
     6          25.19          7.07
     7          27.58          7.26
     8          29.95          7.65
     9          32.28          8.22
    10          34.55          8.98
    11          36.76          9.93
    12          38.88         11.04
    13          40.91         12.33
    14          42.83         13.78
    15          44.62         15.37
    16          46.28         17.11
    17          47.79         18.97
    18          49.15         20.95
    19          49.17         21.00

Circle Center At X =   24.0 ; Y =   36.7  and Radius,   29.7


       ***     1.446   ***



1

Failure Surface Specified By 19 Coordinate Points
```

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

         1          13.42          9.00
         2          15.69          8.22
         3          18.02          7.63
         4          20.39          7.23
         5          22.78          7.01
         6          25.18          6.99
         7          27.57          7.16
         8          29.94          7.51
         9          32.28          8.06
        10          34.57          8.79
        11          36.79          9.69
        12          38.93         10.78
        13          40.98         12.03
        14          42.92         13.43
        15          44.75         14.99
        16          46.44         16.69
        17          48.00         18.52
        18          49.40         20.47
        19          49.72         21.00
```

Circle Center At X =   24.3 ; Y =   37.1 and Radius,   30.1

        ***   1.460   ***

Failure Surface Specified By 13 Coordinate Points


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

         1          20.13          9.00
         2          22.46          8.41
         3          24.84          8.14
         4          27.24          8.19
         5          29.62          8.56
         6          31.92          9.24
         7          34.10         10.23
         8          36.14         11.50
         9          37.99         13.03
        10          39.61         14.79
        11          40.99         16.76
        12          42.09         18.89
        13          42.83         21.00
```

Circle Center At X =   25.7 ; Y =   26.0 and Radius,   17.9

       ***   1.490   ***

        Failure Surface Specified By 16 Coordinate Points

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

            1   23.49   9.00
            2   25.87   8.68
            3   28.27   8.55
            4   30.66   8.61
            5   33.05   8.85
            6   35.41   9.28
            7   37.74   9.89
            8   40.00   10.68
            9   42.20   11.64
           10   44.32   12.77
           11   46.34   14.06
           12   48.26   15.50
           13   50.06   17.09
           14   51.73   18.81
           15   53.26   20.66
           16   53.51   21.00

Circle Center At X =   28.7 ; Y =   39.4 and Radius,   30.9

       ***   1.500   ***

        Failure Surface Specified By 18 Coordinate Points

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

            1   16.78   9.00
            2   19.10   8.40
            3   21.46   7.96
            4   23.85   7.69
            5   26.24   7.60

```
            6          28.64          7.67
            7          31.03          7.92
            8          33.39          8.34
            9          35.72          8.93
           10          38.00          9.68
           11          40.22         10.60
           12          42.37         11.67
           13          44.43         12.89
           14          46.41         14.25
           15          48.28         15.76
           16          50.04         17.39
           17          51.67         19.15
           18          53.17         21.00

Circle Center At X =   26.4 ; Y =   41.1  and Radius,   33.5


       ***     1.519    ***




1


               Y              A    X    I    S              F    T


            0.00      9.38     18.75     28.13     37.50     46.88

X      0.00 +---------*---------+---------+---------+---------+
            -            .
            -             .
            -          .
            -          ....
            -           ..
       9.38 +        .. ..
            -         .....
            -          ....
            -         .....6
            -         .....6
            -          .....1
A     18.75 +      ....61
            -      ....6.8
            -      ....21
            -      ...7213
            -       ...768
            -       .....215
X     28.13 +      .....21.
            -      .....65*  4*
            -      .....021
            -       .....61..4


                        Page 64 of 138
```

```
          -     .....56834
          -     ......218.3.
I    37.50 +    ......72148.3. .   *
          -     ......576.4.8.3  33
          -     .......951 ...8..../1
          -     ........9521 ...8.8
          -     .........9.1   ....1/2
          -     ..........56.1....2/3
S    46.88 +    ..........9.4612..3/4
          -     ...........9.4612
          -     ............90.414/5
          -     .............9.45/6
          -     .............96/7
          -     .............7/
     56.25 +    ......... ....
          -     .......... ..
          -     ............
          -     ............
          -     ............
          -     ...........
F    65.63 +    ...... ..
          -     ........
          -     .......
          -     ......
          -     ....
          -     ...
T    75.00 +        *       *
```

CAT 330 C EXCAVATOR SURCHARGE LOADING ANALYSIS

Total Equipment Weight $\qquad$ $P := 77400 \cdot lb$ $\qquad$ Per Richie Specs

Equipment Weight Per Track $\qquad$ $P2 := \dfrac{P}{2} = 38700 \ lb$ $\qquad$ Number of Tracks = 2

Width of Equipment Track (N2) $\qquad$ $N2 := \dfrac{34 \cdot in}{12 \cdot \dfrac{in}{ft}} = 2.833 \ ft$ $\qquad$ $N := 34 \cdot in$

Length of Track (D) $\qquad$ $D := 13.25 \cdot ft$

Excavator Surcharge Weight (wt) $\qquad$ $wt := \dfrac{P2}{D \cdot N2} = 1031 \ \dfrac{lb}{ft^2}$ $\qquad$ Per Track
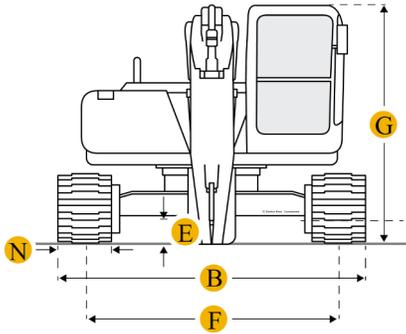
$F := 8.42 \cdot ft$
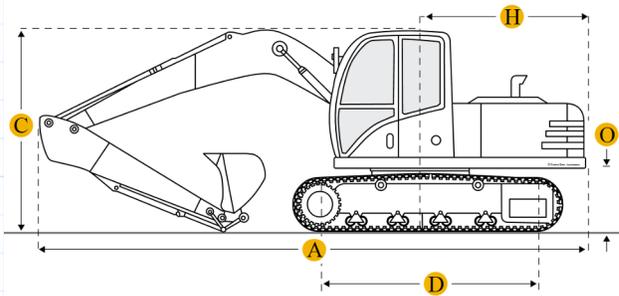
Corrected N-value for (ML) Sandy Silt

$N_{field} := 10$ Field measured Blow Counts

$E_H := 0.6$ Donut/Ring

$C_B := 1$ 2.5 inch

$C_S := 1$ Standard Sampler

$C_R := 0.75$ Rod Length (10ft-13ft)

$N_{60} := E_H \cdot C_B \cdot C_S \cdot C_R \cdot N_{field} = 4.5$ Corrected N-value

Cohesion

$c := 100 \ psf$ Typical for Compacted soil

Internal angle of Friction

$\phi := 28 \ deg$ Caltrans Trench & Shoring
Manuel (Table 3.1)

Corrected N-value for (SM) Silty Sand

$N_{field} := 100$ Field measured Blow Counts

$E_H := 0.6$ Donut/Ring

$C_B := 1$ 2.5 inch

$C_S := 1$ Standard Sampler

$C_R := 0.75$ Rod Length (10ft-13ft)

$N_{60} := E_H \cdot C_B \cdot C_S \cdot C_R \cdot N_{field} = 45$ Corrected N-value

Cohesion

$c := 25 \; \boldsymbol{psf}$ Typical for Compacted soil

Internal angle of Friction

$\phi := 40 \; \boldsymbol{deg}$ Caltrans Trench & Shoring Manuel (Table 3.1)

Slope Stability Analysis (5 ft Vertical)

1031 PSF Excavator Surcharge

Factor of Safety = 1.356, X = 27.97, Y = 25.69, R = 16.32

F.S. = 1.356

3' Offset

Excavator Surcharge

Excavator Surcharge

1:1 Slope

5' Vert

1

1

2

2

2

Ht = 13 ft

Vertical Coordinate

Horizontal Coordinate

===

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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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\12.0 Haven\Design\5 ft\
Name of input data file   : 3. Excavator.sl4d
Name of output file   : 3. Excavator.sl4o
Name of plot output file   : 3. Excavator.sl4p

Time and Date of Analysis

Date: February 02, 2026   Time: 14:45:37

1
PROBLEM DESCRIPTION   New Slope

BOUNDARY COORDINATES

4 Top   Boundaries
5 Total Boundaries

Boundary	X-Left	Y-Left	X-Right	Y-Right	Soil Type
No.	ft.	ft.	ft.	ft.	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	38.25	23.00	1
4	38.25	23.00	75.00	23.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil	Total	Saturated	Cohesion	Friction	Pore	Pressure	Piez.
Type	Unit Wt.	Unit Wt.	Intercept	Angle	Pressure	Constant	Surface
No.	pcf	pcf	psf	(deg)	Param.	psf	No.
1	110.0	110.0	100.0	28.0	0.00	0.0	0
2	110.0	110.0	25.0	41.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load	X-Left	X-Right	Intensity	Deflection
No.	ft.	ft.	psf	(deg)
1	41.25	43.50	1031.0	0.0
2	49.75	52.00	1031.0	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 =   30.17 ft.

          Each Surface Terminates Between   X =   34.00 ft.
                                        and   X =   75.00 ft.

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

           2.60 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 12 Coordinate Points

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

               1   23.47   10.00
               2   26.01   9.48
               3   28.61   9.38
               4   31.19   9.69
               5   33.69   10.40
               6   36.05   11.50
               7   38.20   12.97
               8   40.09   14.75
               9   41.67   16.82
              10   42.91   19.10
              11   43.76   21.56
              12   44.02   23.00

Circle Center At X =   28.0 ; Y =   25.7 and Radius,   16.3

         ***   1.356   ***

         Individual data on the   17 slices

			Water	Water	Tie	Tie	Earthquake		
			Force	Force	Force	Force	Force		Surcharge
Slice	Width	Weight	Top	Bot	Norm	Tan	Hor	Ver	Load
No.	Ft	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs
1	2.5	0.72E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	2.6	0.16E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	1.4	0.82E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	0.2	0.81E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	0.9	0.61E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.5	0.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.4	0.22E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	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
9	0.1	0.57E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	1.8	0.18E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	0.2	0.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	1.0	0.79E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	0.4	0.30E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.43E+03
14	1.2	0.68E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.13E+04
15	0.6	0.20E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.61E+03
16	0.3	0.53E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	0.3	0.20E+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 13 Coordinate Points

| Point | X-Surf | Y-Surf |
No.	ft.	ft.
1	20.11	10.00
2	22.59	9.19
3	25.15	8.76
4	27.75	8.71
5	30.33	9.04
6	32.83	9.75
7	35.20	10.82
8	37.38	12.23

```
    9        39.34        13.95
   10        41.02        15.93
   11        42.38        18.14
   12        43.41        20.53
   13        44.06        23.00

Circle Center At X =   26.8 ; Y =   26.3  and Radius,   17.6


      ***    1.424    ***
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```
        Failure Surface Specified By 15 Coordinate Points


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

          1         16.76        10.00
          2         19.26         9.28
          3         21.82         8.83
          4         24.42         8.67
          5         27.01         8.79
          6         29.58         9.19
          7         32.09         9.87
          8         34.52        10.81
          9         36.82        12.01
         10         38.98        13.46
         11         40.97        15.13
         12         42.77        17.01
         13         44.35        19.07
         14         45.70        21.29
         15         46.50        23.00

Circle Center At X =   24.6 ; Y =   32.6  and Radius,   23.9


      ***    1.536    ***



        Failure Surface Specified By 13 Coordinate Points


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

          1         20.11        10.00
```

```
        2          22.53          9.04
        3          25.08          8.51
        4          27.67          8.43
        5          30.25          8.80
        6          32.72          9.61
        7          35.01         10.84
        8          37.06         12.44
        9          38.79         14.38
       10          40.17         16.58
       11          41.15         18.99
       12          41.69         21.54
       13          41.74         23.00
```

Circle Center At X =   26.8 ; Y =   23.4 and Radius,   15.0

        ***   1.643   ***

1

        Failure Surface Specified By 16 Coordinate Points

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

          1   16.76   10.00
          2   19.23   9.20
          3   21.78   8.67
          4   24.37   8.42
          5   26.97   8.46
          6   29.55   8.78
          7   32.08   9.38
          8   34.53   10.25
          9   36.87   11.39
         10   39.07   12.77
         11   41.10   14.39
         12   42.95   16.22
         13   44.59   18.24
         14   45.99   20.43
         15   47.15   22.75
         16   47.25   23.00

Circle Center At X =   25.3 ; Y =   32.2 and Radius,   23.8

        ***   1.651   ***

Failure Surface Specified By 13 Coordinate Points

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

       1          23.47        10.00
       2          26.02         9.50
       3          28.61         9.33
       4          31.21         9.50
       5          33.76        10.01
       6          36.22        10.83
       7          38.56        11.97
       8          40.73        13.40
       9          42.70        15.10
      10          44.44        17.03
      11          45.90        19.18
      12          47.09        21.50
      13          47.62        23.00
```

Circle Center At X =   28.6 ; Y =   29.5 and Radius,   20.1

        ***   1.668   ***

Failure Surface Specified By 16 Coordinate Points

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

       1          16.76        10.00
       2          19.13         8.93
       3          21.62         8.18
       4          24.19         7.75
       5          26.78         7.66
       6          29.37         7.90
       7          31.91         8.47
       8          34.35         9.37
       9          36.66        10.56
      10          38.79        12.05
      11          40.72        13.80
      12          42.40        15.78
      13          43.82        17.96
      14          44.94        20.30
      15          45.76        22.77
```

```
        16           45.80         23.00

Circle Center At X =   26.2 ; Y =   27.8  and Radius,   20.2


        ***     1.720    ***



Failure Surface Specified By 17 Coordinate Points


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

       1          13.41         10.00
       2          15.87          9.17
       3          18.41          8.58
       4          20.98          8.23
       5          23.58          8.13
       6          26.18          8.28
       7          28.75          8.67
       8          31.27          9.30
       9          33.72         10.17
      10          36.07         11.27
      11          38.32         12.59
      12          40.42         14.11
      13          42.37         15.83
      14          44.15         17.73
      15          45.74         19.78
      16          47.13         21.98
      17          47.65         23.00

Circle Center At X =   23.4 ; Y =   35.5  and Radius,   27.3


        ***     1.726    ***



1

Failure Surface Specified By 17 Coordinate Points


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

       1          16.76         10.00
       2          19.30          9.43
       3          21.87          9.07
```

```
        4           24.47           8.93
        5           27.07           9.01
        6           29.65           9.30
        7           32.20           9.81
        8           34.70          10.52
        9           37.13          11.45
       10           39.48          12.57
       11           41.72          13.88
       12           43.85          15.38
       13           45.85          17.04
       14           47.70          18.87
       15           49.39          20.84
       16           50.91          22.95
       17           50.94          23.00
```

Circle Center At X =   24.9 ; Y =   40.1 and Radius,   31.2

        ***   1.754   ***

Failure Surface Specified By 17 Coordinate Points


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

      1          13.41        10.00
      2          15.87         9.16
      3          18.40         8.55
      4          20.97         8.19
      5          23.57         8.06
      6          26.17         8.18
      7          28.74         8.54
      8          31.27         9.14
      9          33.73         9.97
     10          36.11        11.03
     11          38.37        12.31
     12          40.51        13.79
     13          42.50        15.46
     14          44.32        17.32
     15          45.96        19.33
     16          47.41        21.49
     17          48.23        23.00
```

Circle Center At X =   23.6 ; Y =   35.9 and Radius,   27.8

        ***   1.792   ***

1

<pre>
                Y   A   X   I   S   F   T

                0.00   9.38   18.75   28.13   37.50   46.88

    X   0.00 +---------+*--------+---------+---------+---------+
              -
              -          ...
              -          ...
              -           ..
              -          ...
        9.38 + ...
              -          ...
              -         .....
              -      8
              -       8
              -       3
    A   18.75 +   ...83
              - 8.2
              -       32
              -        ...78.1
              -       29
              -        ...731.
    X   28.13 + ...21.
              -        ....742* . *
              -        ....71.
              -        ......23...
              -        .....713.
              -        ......71..
    I   37.50 + ...521..   *
              -        632   .
              -         ....65124 4. .   /1
              -        965121   4 4
              - 9 673 21 11/
              -        95685377
    S   46.88 + ... 653
              -         ....9.. .0
              -         ....9.../2
              - 992/
              -         ....
              -         ....
        56.25 + ...
              -         ....
              -         ....
              -         ....
</pre>

```
          -                      ............ .
          -                      ....... . .
F    65.63 +                      ....... ..
          -                      ..........
          -                       ...... .
          -                        ......
          -                         .....
          -                          ....
T    75.00 +              *           . *
```
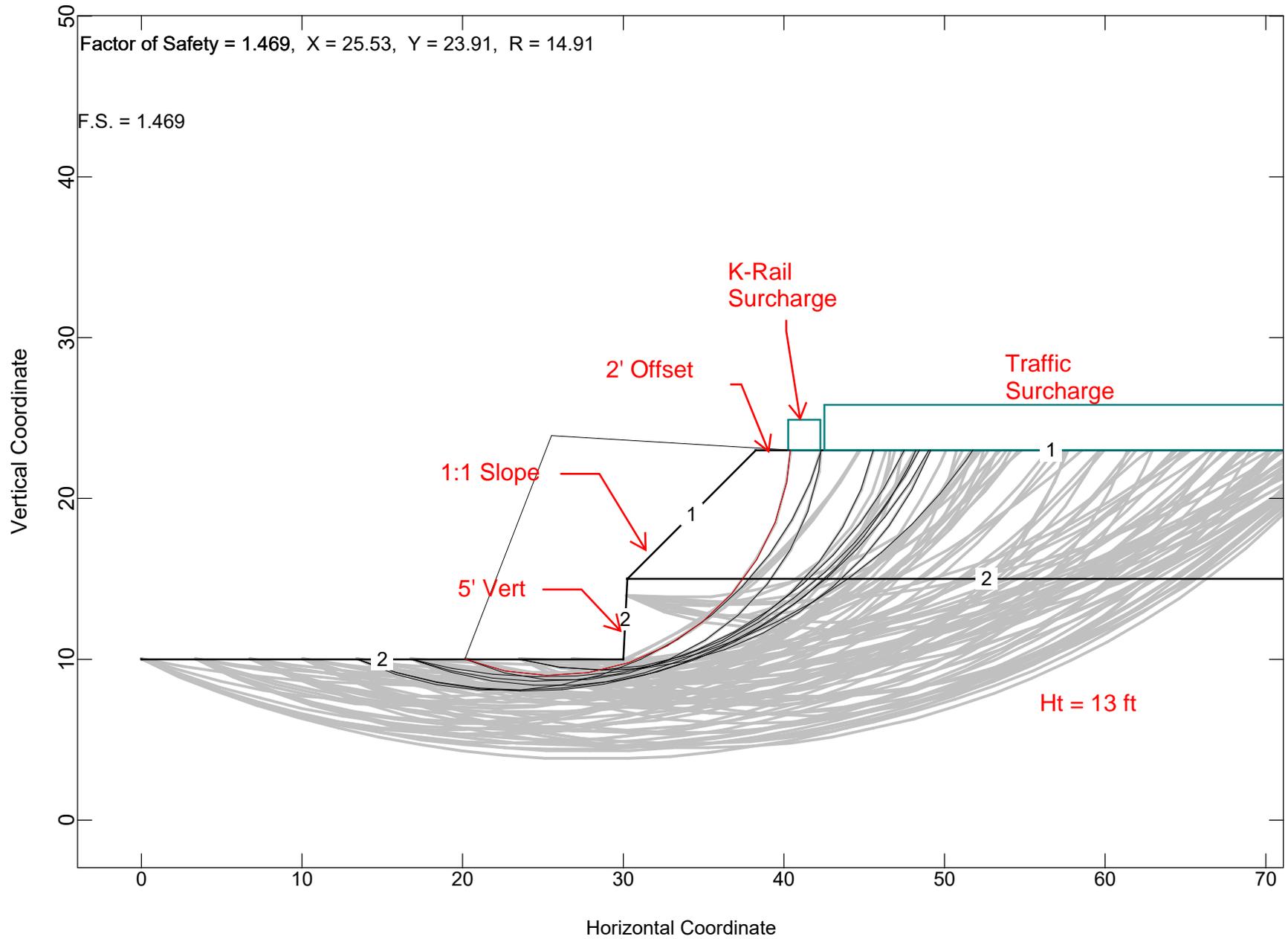
300 PSF Traffic Surcharge
200 PSF K-Rail Surcharge

Factor of Safety = 1.469, X = 25.53, Y = 23.91, R = 14.91

F.S. = 1.469

K-Rail
Surcharge

2' Offset

Traffic
Surcharge

1:1 Slope

5' Vert

Ht = 13 ft

Vertical Coordinate

Horizontal Coordinate

===

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\12.0 Haven\Design\5 ft\
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: February 02, 2026   Time: 14:49:10

1
PROBLEM DESCRIPTION   New Slope

BOUNDARY COORDINATES

4 Top   Boundaries
5 Total Boundaries

Boundary	X-Left	Y-Left	X-Right	Y-Right	Soil Type
No.	ft.	ft.	ft.	ft.	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	38.25	23.00	1
4	38.25	23.00	75.00	23.00	1
5	30.25	15.00	75.00	15.00	2

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil	Total	Saturated	Cohesion	Friction	Pore	Pressure	Piez.
Type	Unit Wt.	Unit Wt.	Intercept	Angle	Pressure	Constant	Surface
No.	pcf	pcf	psf	(deg)	Param.	psf	No.
1	110.0	110.0	100.0	28.0	0.00	0.0	0
2	110.0	110.0	25.0	40.0	0.00	0.0	0

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load	X-Left	X-Right	Intensity	Deflection
No.	ft.	ft.	psf	(deg)
1	40.25	42.25	200.0	0.0
2	42.50	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 = 35.00 ft.
                                    and   X = 75.00 ft.

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

         2.60 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 12 Coordinate Points

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

             1   20.13   10.00
             2   22.63   9.27
             3   25.22   8.99
             4   27.81   9.17
             5   30.33   9.79
             6   32.71   10.84
             7   34.87   12.28
             8   36.75   14.08
             9   38.29   16.18
            10   39.43   18.51
            11   40.16   21.01
            12   40.38   23.00

Circle Center At X =   25.5 ; Y =   23.9 and Radius,   14.9

        ***   1.469   ***

            Individual data on the   16   slices

                    Water   Water   Tie   Tie   Earthquake
                    Force   Force   Force   Force   Force   Surcharge
Slice Width Weight Top   Bot   Norm   Tan   Hor   Ver   Load
 No.   Ft   Lbs   Lbs   Lbs   Lbs   Lbs   Lbs   Lbs   Lbs

  1   2.5 0.10E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  2   2.6 0.25E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  3   2.6 0.26E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  4   2.2 0.14E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  5   0.2 0.76E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  6   0.1 0.49E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  7   2.4 0.16E+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 0.17E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  9   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
 10   0.7 0.54E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 11   0.8 0.64E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 12   0.0 0.27E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 13   1.1 0.71E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 14   0.7 0.26E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 15   0.1 0.16E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
 16   0.1 0.79E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.25E+02

     Failure Surface Specified By 12 Coordinate Points

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

            1   23.49   10.00
            2   26.04   9.48
            3   28.63   9.35
            4   31.22   9.59
            5   33.75   10.21
            6   36.16   11.19
            7   38.39   12.51
            8   40.42   14.15
            9   42.18   16.06

```
      10          43.64          18.21
      11          44.77          20.55
      12          45.54          23.00

Circle Center At X =    28.3 ; Y =    27.1  and Radius,    17.7


      ***      1.521    ***
```

```
      Failure Surface Specified By 13 Coordinate Points


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

        1          20.13        10.00
        2          22.59         9.16
        3          25.16         8.73
        4          27.76         8.72
        5          30.32         9.14
        6          32.79         9.96
        7          35.08        11.18
        8          37.15        12.76
        9          38.93        14.65
       10          40.38        16.81
       11          41.46        19.18
       12          42.14        21.69
       13          42.28        23.00

Circle Center At X =    26.5 ; Y =    24.6  and Radius,    15.9


      ***      1.542    ***



      Failure Surface Specified By 16 Coordinate Points


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

        1          16.78        10.00
        2          19.28         9.28
        3          21.84         8.82
        4          24.43         8.64
        5          27.03         8.72
```

```
        6          29.60          9.08
        7          32.13          9.70
        8          34.57         10.58
        9          36.91         11.72
       10          39.12         13.09
       11          41.18         14.68
       12          43.05         16.48
       13          44.73         18.47
       14          46.19         20.62
       15          47.42         22.91
       16          47.46         23.00

Circle Center At X =   24.9 ; Y =   33.5  and Radius,   24.9


        ***      1.592   ***




1

        Failure Surface Specified By 16 Coordinate Points


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

         1          16.78        10.00
         2          19.25         9.20
         3          21.79         8.66
         4          24.38         8.39
         5          26.98         8.39
         6          29.57         8.67
         7          32.11         9.22
         8          34.58        10.03
         9          36.95        11.09
        10          39.20        12.40
        11          41.29        13.94
        12          43.22        15.69
        13          44.95        17.63
        14          46.46        19.74
        15          47.75        22.00
        16          48.19        23.00

Circle Center At X =   25.6 ; Y =   33.1  and Radius,   24.7


        ***      1.670   ***
```

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	10.00
2	26.04	9.50
3	28.63	9.31
4	31.23	9.43
5	33.80	9.86
6	36.29	10.59
7	38.68	11.62
8	40.93	12.92
9	43.01	14.49
10	44.88	16.29
11	46.53	18.30
12	47.92	20.49
13	49.05	22.84
14	49.10	23.00

Circle Center At X =   28.9 ; Y =   31.0 and Radius,   21.7

    ***   1.671   ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	13.42	10.00
2	15.89	9.17
3	18.42	8.57
4	20.99	8.21
5	23.59	8.09
6	26.19	8.21
7	28.76	8.56
8	31.29	9.16
9	33.76	9.98
10	36.14	11.03
11	38.41	12.30
12	40.56	13.77
13	42.56	15.43
14	44.39	17.26
15	46.06	19.26

```
        16           47.53          21.41
        17           48.41          23.00

Circle Center At X =    23.6 ; Y =    36.2  and Radius,   28.1


        ***       1.724    ***




Failure Surface Specified By 17 Coordinate Points


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

       1           16.78         10.00
       2           19.32          9.43
       3           21.89          9.07
       4           24.49          8.91
       5           27.08          8.97
       6           29.67          9.23
       7           32.23          9.70
       8           34.74         10.38
       9           37.19         11.25
      10           39.56         12.32
      11           41.83         13.58
      12           44.00         15.02
      13           46.04         16.62
      14           47.95         18.39
      15           49.71         20.30
      16           51.31         22.35
      17           51.74         23.00

Circle Center At X =    25.1 ; Y =    41.2  and Radius,   32.3


        ***       1.739    ***
```

1

```
Failure Surface Specified By 15 Coordinate Points


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

       1           13.42         10.00
       2           15.84          9.05
```

```
       3          18.36           8.41
       4          20.94           8.08
       5          23.54           8.08
       6          26.12           8.40
       7          28.64           9.04
       8          31.07           9.98
       9          33.35          11.22
      10          35.47          12.73
      11          37.38          14.49
      12          39.06          16.48
      13          40.48          18.66
      14          41.62          21.00
      15          42.30          23.00
```

Circle Center At X =   22.3 ; Y =   29.0 and Radius,   20.9

        ***   1.746   ***

Failure Surface Specified By 17 Coordinate Points

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

       1   13.42   10.00
       2   15.88   9.16
       3   18.41   8.55
       4   20.98   8.17
       5   23.58   8.02
       6   26.18   8.11
       7   28.76   8.44
       8   31.29   9.00
       9   33.77   9.79
      10   36.17   10.80
      11   38.46   12.02
      12   40.64   13.45
      13   42.67   15.07
      14   44.55   16.87
      15   46.26   18.83
      16   47.78   20.93
      17   49.00   23.00

Circle Center At X =   23.9 ; Y =   36.6 and Radius,   28.6

        ***   1.753   ***

1

<pre>
                 Y   A   X   I   S   F   T

                 0.00   9.38   18.75   28.13   37.50   46.88

       X   0.00 +---------+*--------+---------+---------+---------+
                 -
                 -          ...
                 -          ...
                 -           ..
                 -          ...
              9.38 + ...
                 -          ...
                 -          .....
                 -       7
                 -        7
                 -        4
       A   18.75 +   ...74
                 - 7.1
                 -       41
                 - 7.2
                 -       31
                 -         ....42.
       X   28.13 + ...31.
                 -        .....51*   .*
                 -        .....29.
                 -        ......431 ..
                 -       0231
                 -        ......62.9.
       I   37.50 + ...4.31.   *
                 - 624 319 1
                 - 624 3.9 1 1/1
                 - 8.72 3 93 31/2
                 -       68542   . .
                 - 685472 2
       S   46.88 + ...654744
                 - 8.6565
                 -        ....8...
                 -       88
                 -        ....
                 -        ....
              56.25 + ...
                 -           ....
                 -           ....
                 -          ....
                 -          ....
</pre>

```
         -                    ....... ...
F     65.63 +                ........ .
         -                   ..........
         -                    ...... .
         -                    ......
         -                     .....
         -                      ....
T     75.00 +            *          .*2/
```

3 CY Loader Surcharge

Factor of Safety = 1.273, X = 28.97, Y = 31.21, R = 21.91

F.S. = 1.273

9' Offset

Surcharge
Load

1:1 Slope

5' Vertical

Ht = 12 ft

Vertical Coordinate

Horizontal Coordinate

```
==========================================================================

                    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\12.0 Haven\Design\5 ft\
      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:  February 02, 2026    Time:  15:24:01
```

1
          PROBLEM DESCRIPTION   New Slope

          BOUNDARY COORDINATES

              4 Top   Boundaries
              5 Total Boundaries

```
     Boundary    X-Left     Y-Left     X-Right    Y-Right    Soil Type
       No.         ft.        ft.        ft.        ft.      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  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
     Type Unit Wt. Unit Wt. Intercept  Angle   Pressure Constant  Surface
     No.   pcf      pcf       psf      (deg)    Param.     psf      No.

      1   110.0    110.0     100.0     28.0     0.00      0.0        0
      2   110.0    110.0      25.0     40.0     0.00      0.0        0
1


     BOUNDARY LOAD(S)

         2 Load(s) Specified


     Load        X-Left     X-Right    Intensity    Deflection
      No.          ft.        ft.         psf         (deg)


       1         46.25      48.00      4700.0         0.0
       2         54.25      56.00      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 =  35.00 ft.
                                      and   X =  75.00 ft.


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


     2.60 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	26.04	9.50
3	28.63	9.31
4	31.23	9.42
5	33.80	9.84
6	36.29	10.57
7	38.69	11.58
8	40.95	12.87
9	43.03	14.42
10	44.93	16.20
11	46.59	18.20
12	48.01	20.38

```
        13           48.81          22.00

     Circle Center At X =   29.0 ; Y =   31.2  and Radius,   21.9


          ***     1.273   ***



            Individual data on the     18   slices


                      Water    Water    Tie      Tie      Earthquake
                      Force    Force    Force    Force      Force      Surcharge
  Slice  Width  Weight  Top      Bot      Norm     Tan      Hor      Ver      Load
  No.    Ft    Lbs    Lbs      Lbs      Lbs      Lbs      Lbs      Lbs      Lbs

    1    2.6 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    2.6 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    1.4 0.10E+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 0.86E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    5    1.0 0.66E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    6    2.6 0.22E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    7    2.5 0.26E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    8    1.0 0.11E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    9    1.4 0.17E+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 0.24E+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 0.19E+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 0.50E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   13    1.3 0.90E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   14    1.3 0.73E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   15    0.3 0.15E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.16E+04
   16    1.4 0.42E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.66E+04
   17    0.0 0.16E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   18    0.8 0.71E+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 16 Coordinate Points


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

          1         16.78       10.00
          2         19.25        9.20
          3         21.79        8.66
          4         24.38        8.38
          5         26.98        8.38
          6         29.57        8.65
```

```
                7         32.11          9.19
                8         34.58          9.99
                9         36.96         11.04
               10         39.21         12.34
               11         41.32         13.86
               12         43.26         15.60
               13         45.00         17.53
               14         46.53         19.63
               15         47.84         21.88
               16         47.90         22.00


Circle Center At X =    25.7 ; Y =   33.2  and Radius,   24.9


        ***     1.293    ***
```

1
```
        Failure Surface Specified By 17 Coordinate Points


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

             1         13.42        10.00
             2         15.88         9.16
             3         18.41         8.55
             4         20.98         8.16
             5         23.58         8.01
             6         26.18         8.10
             7         28.76         8.42
             8         31.30         8.97
             9         33.78         9.75
            10         36.18        10.74
            11         38.48        11.96
            12         40.66        13.37
            13         42.71        14.97
            14         44.60        16.76
            15         46.32        18.71
            16         47.86        20.80
            17         48.59        22.00

Circle Center At X =    23.9 ; Y =   36.8  and Radius,   28.8


        ***     1.372    ***
```

```
      Failure Surface Specified By 15 Coordinate Points


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

        1         16.78        10.00
        2         19.28         9.28
        3         21.84         8.82
        4         24.43         8.63
        5         27.03         8.71
        6         29.60         9.06
        7         32.13         9.68
        8         34.58        10.55
        9         36.93        11.67
       10         39.14        13.03
       11         41.21        14.61
       12         43.09        16.40
       13         44.79        18.37
       14         46.27        20.51
       15         47.08        22.00

   Circle Center At X =   25.0 ; Y =   33.7  and Radius,   25.0


          ***      1.438    ***



 1
      Failure Surface Specified By 18 Coordinate Points


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

        1         10.07        10.00
        2         12.53         9.17
        3         15.05         8.54
        4         17.62         8.11
        5         20.21         7.88
        6         22.81         7.85
        7         25.40         8.03
        8         27.97         8.42
        9         30.51         9.00
       10         32.99         9.78
       11         35.40        10.76
       12         37.72        11.92
       13         39.95        13.26
       14         42.06        14.78
```

```
        15           44.05           16.45
        16           45.90           18.28
        17           47.61           20.24
        18           48.90           22.00

Circle Center At X =   21.8 ; Y =   40.9  and Radius,   33.0


        ***      1.448    ***



Failure Surface Specified By 14 Coordinate Points


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

      1           23.49        10.00
      2           26.02         9.42
      3           28.61         9.13
      4           31.21         9.13
      5           33.79         9.42
      6           36.33         9.99
      7           38.79        10.84
      8           41.13        11.95
      9           43.34        13.32
     10           45.39        14.93
     11           47.24        16.75
     12           48.88        18.77
     13           50.28        20.96
     14           50.80        22.00

Circle Center At X =   29.9 ; Y =   32.5  and Radius,   23.4


        ***      1.479    ***
```

1

```
Failure Surface Specified By 16 Coordinate Points


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

      1           16.78        10.00
      2           19.32         9.43
      3           21.89         9.07
```

```
         4          24.48         8.91
         5          27.08         8.95
         6          29.67         9.21
         7          32.23         9.67
         8          34.74        10.33
         9          37.20        11.19
        10          39.57        12.25
        11          41.86        13.49
        12          44.04        14.90
        13          46.10        16.49
        14          48.03        18.24
        15          49.81        20.13
        16          51.30        22.00
```

Circle Center At X =   25.2 ; Y =   41.5 and Radius,   32.6

        ***   1.479   ***

Failure Surface Specified By 12 Coordinate Points


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

      1          20.13        10.00
      2          22.63         9.27
      3          25.22         8.99
      4          27.81         9.16
      5          30.34         9.78
      6          32.72        10.82
      7          34.88        12.27
      8          36.76        14.06
      9          38.30        16.15
     10          39.46        18.48
     11          40.19        20.98
     12          40.31        22.00
```

Circle Center At X =   25.5 ; Y =   23.9 and Radius,   15.0

        ***   1.516   ***

1

Failure Surface Specified By 18 Coordinate Points

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

         1           10.07         10.00
         2           12.48          9.02
         3           14.96          8.26
         4           17.51          7.72
         5           20.09          7.41
         6           22.69          7.33
         7           25.28          7.48
         8           27.85          7.85
         9           30.38          8.46
        10           32.85          9.28
        11           35.23         10.32
        12           37.52         11.56
        13           39.68         13.01
        14           41.71         14.63
        15           43.58         16.44
        16           45.29         18.39
        17           46.82         20.50
        18           47.72         22.00
```

Circle Center At X =   22.3 ; Y =   36.7 and Radius,   29.4

         ***   1.517   ***

Failure Surface Specified By 18 Coordinate Points


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

         1           13.42         10.00
         2           15.83          9.03
         3           18.32          8.27
         4           20.87          7.74
         5           23.45          7.44
         6           26.05          7.37
         7           28.64          7.53
         8           31.21          7.93
         9           33.74          8.55
        10           36.20          9.39
        11           38.57         10.45
        12           40.84         11.72
        13           42.99         13.18
        14           45.00         14.83
```

```
        15          46.85          16.66
        16          48.54          18.64
        17          50.04          20.76
        18          50.75          22.00

Circle Center At X =   25.5 ; Y =   36.5  and Radius,   29.1


        ***     1.610    ***



1


                Y               A    X    I    S              F    T


                 0.00       9.38     18.75      28.13      37.50      46.88

        X     0.00 +---------+*--------+---------+---------+---------+
                 -
                 -            ...
                 -            ...
                 -             ..
                 -            ...
           9.38 +          .. .5
                 -            ...
                 -          ....5
                 -         .  ...3
                 -          ...53
                 -          ...95.2
        A    18.75 +        ...32
                 -          ...53.8
                 -          .....27
                 -          ...53.1
                 -          ....928.
                 -          ...021.
        X    28.13 +        ....931.
                 -          .....24*    .*
                 -          ...0.1.
                 -          ......2.8 ..
                 -          ....012.8
                 -          ......01....
        I    37.50 +        .......25.8         *
                 -          .....0124 .8. 8
                 -          .......06124 . . 88
                 -          ........7.3.  . ..
                 -          .........61725.  ..
                 -          ..........61324...
        S    46.88 +        ...........613244/1
```
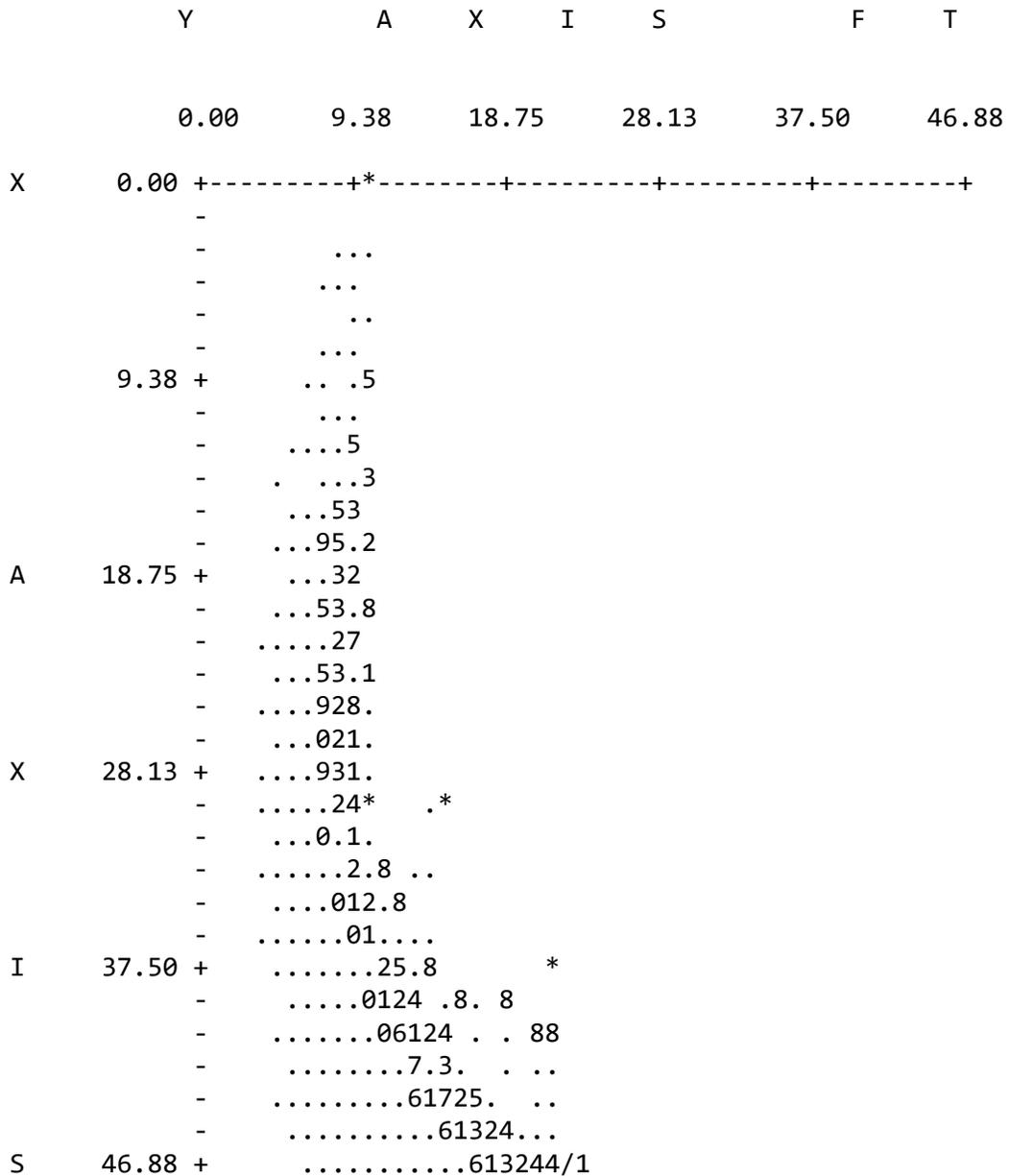
```
        -           ..............76 111/
        -           ..............760
        -           ...............6
        -           ...........  ....
        -           . .......... . ../2
   56.25 +          ...............2/
        -           ..........  ...
        -           . .......... .
        -           ...........  .
        -           ...........  .
        -           ........  ..
F  65.63 +          .  ........
        -            ........
        -            .......
        -            ......
        -            .  ...
        -               ...
T  75.00 +          *         *
```

Concrete Truck Surcharge Load
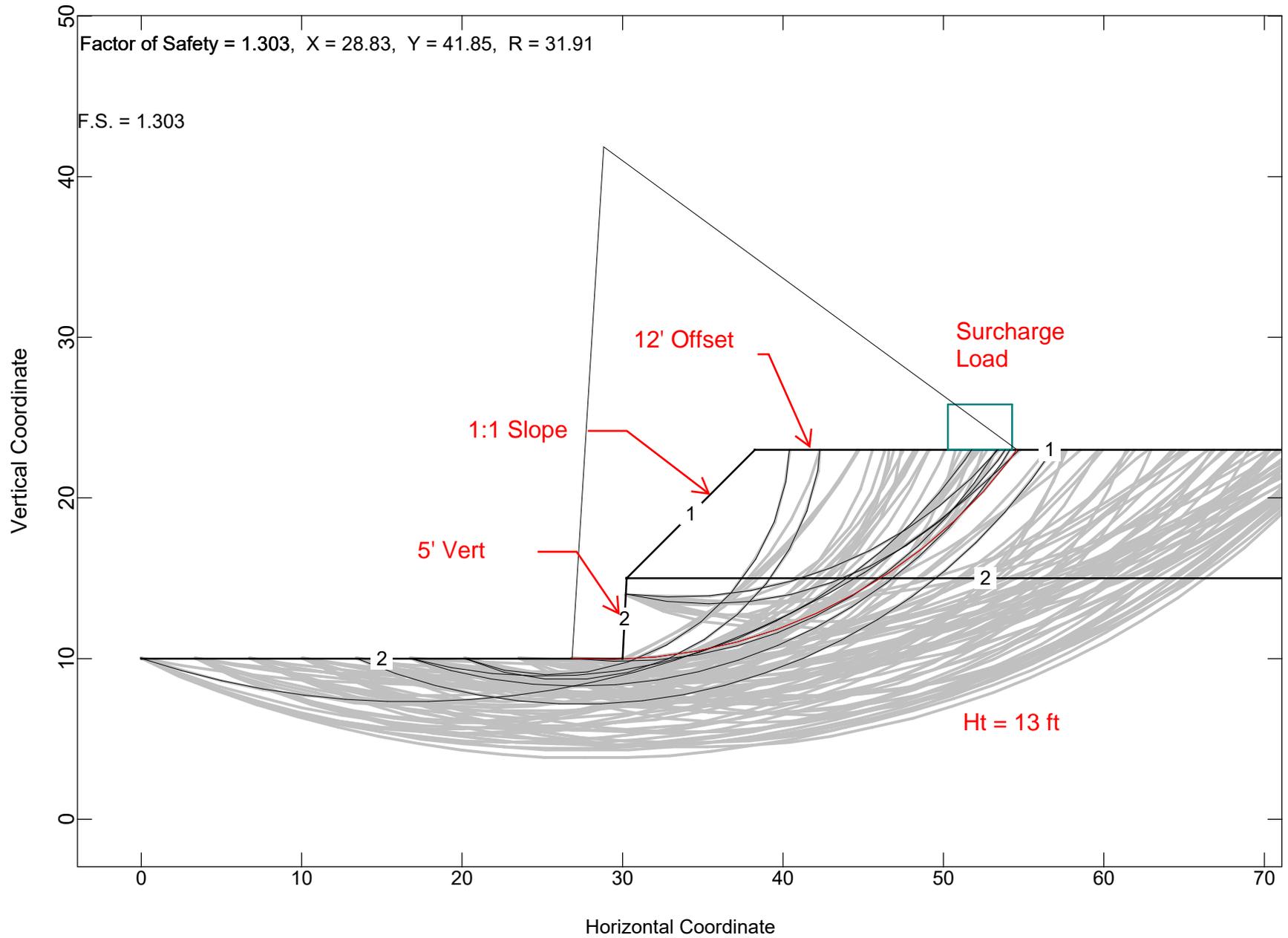
Factor of Safety = 1.303, X = 28.83, Y = 41.85, R = 31.91

F.S. = 1.303

12' Offset

Surcharge
Load

1:1 Slope

5' Vert

Ht = 13 ft

Vertical Coordinate

Horizontal Coordinate

```
    ===========================================================================

                      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\12.0 Haven\Design\5 ft\
        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:  February 02, 2026    Time:  14:33:58
```

1

      PROBLEM DESCRIPTION   New Slope

      BOUNDARY COORDINATES

        4 Top   Boundaries
        5 Total Boundaries

```
          Boundary      X-Left      Y-Left      X-Right     Y-Right     Soil Type
            No.          ft.         ft.         ft.         ft.         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       38.25       23.00          1
             4          38.25        23.00       75.00       23.00          1
             5          30.25        15.00       75.00       15.00          2
```
1

    ISOTROPIC SOIL PARAMETERS

     2 Type(s) of Soil


```
    Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
    Type Unit Wt. Unit Wt.  Intercept  Angle  Pressure  Constant  Surface
    No.    pcf     pcf        psf     (deg)   Param.     psf       No.

     1   110.0    110.0      100.0    28.0    0.00       0.0        0
     2   110.0    110.0       25.0    40.0    0.00       0.0        0
```
1

    BOUNDARY LOAD(S)

       1 Load(s) Specified


```
    Load        X-Left      X-Right     Intensity    Deflection
    No.         ft.         ft.           psf         (deg)


     1          50.25       54.25        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 = 35.00 ft.
                                          and X = 75.00 ft.

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

         2.60 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 14 Coordinate Points

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

              1   26.84   10.00
              2   29.44   9.94
              3   32.04   10.10
              4   34.61   10.47
              5   37.15   11.04
              6   39.63   11.82
              7   42.04   12.80
              8   44.36   13.97
              9   46.58   15.33
             10   48.68   16.86
             11   50.65   18.56
             12   52.47   20.41
             13   54.14   22.41

```
        14            54.55         23.00

        Circle Center At X =   28.8 ; Y =   41.8  and Radius,   31.9


              ***      1.303    ***




              Individual data on the     19   slices



                       Water    Water    Tie      Tie       Earthquake
                       Force    Force    Force    Force       Force      Surcharge
  Slice  Width  Weight  Top      Bot      Norm     Tan      Hor      Ver      Load
  No.     Ft    Lbs     Lbs      Lbs      Lbs      Lbs      Lbs      Lbs      Lbs

    1     2.6 0.80E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    2     0.6 0.24E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    3     0.2 0.69E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    4     1.8 0.12E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    5     2.6 0.22E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    6     2.5 0.28E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    7     1.1 0.14E+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 0.17E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
    9     2.4 0.28E+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 0.25E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   11     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
   12     0.5 0.46E+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 0.16E+04 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   14     1.6 0.94E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
   15     0.4 0.20E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.13E+04
   16     1.8 0.70E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.61E+04
   17     1.7 0.29E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.56E+04
   18     0.1 0.64E+01 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.38E+03
   19     0.3 0.72E+01 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      X-Surf      Y-Surf
            No.        ft.         ft.


             1        26.84       10.00
             2        29.44        9.83
             3        32.04        9.90
             4        34.62       10.23
             5        37.16       10.79
```

```
        6         39.63         11.60
        7         42.01         12.64
        8         44.29         13.90
        9         46.43         15.37
       10         48.42         17.04
       11         50.25         18.89
       12         51.89         20.90
       13         53.29         23.00
```

Circle Center At X =   29.9 ; Y =   37.1 and Radius,   27.3

        ***   1.351   ***

Failure Surface Specified By 18 Coordinate Points


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

     1          16.78        10.00
     2          19.27         9.26
     3          21.82         8.72
     4          24.39         8.40
     5          26.99         8.28
     6          29.59         8.37
     7          32.17         8.67
     8          34.72         9.18
     9          37.22         9.90
    10          39.66        10.81
    11          42.01        11.92
    12          44.26        13.21
    13          46.41        14.69
    14          48.42        16.33
    15          50.30        18.13
    16          52.02        20.07
    17          53.59        22.15
    18          54.13        23.00
```

Circle Center At X =   27.2 ; Y =   40.4 and Radius,   32.1

        ***   1.371   ***

Failure Surface Specified By 11 Coordinate Points

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

          1        30.20       14.01
          2        32.79       13.83
          3        35.39       13.90
          4        37.97       14.23
          5        40.51       14.81
          6        42.97       15.64
          7        45.35       16.70
          8        47.60       17.99
          9        49.72       19.49
         10        51.69       21.20
         11        53.39       23.00

  Circle Center At X =   33.3 ; Y =   40.4  and Radius,   26.5


        ***     1.425    ***
```

1

Failure Surface Specified By 12 Coordinate Points

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

          1        30.20       14.01
          2        32.76       13.56
          3        35.36       13.40
          4        37.95       13.55
          5        40.51       13.99
          6        43.01       14.72
          7        45.40       15.74
          8        47.66       17.02
          9        49.76       18.56
         10        51.67       20.33
         11        53.36       22.30
         12        53.83       23.00

  Circle Center At X =   35.4 ; Y =   36.0  and Radius,   22.6


        ***     1.463    ***
```

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	20.13	10.00
2	22.63	9.27
3	25.22	8.99
4	27.81	9.17
5	30.33	9.79
6	32.71	10.84
7	34.87	12.28
8	36.75	14.08
9	38.29	16.18
10	39.43	18.51
11	40.16	21.01
12	40.38	23.00

Circle Center At X =   25.5 ; Y =   23.9 and Radius,   14.9

***   1.472   ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	10.00
2	19.32	9.43
3	21.89	9.07
4	24.49	8.91
5	27.08	8.97
6	29.67	9.23
7	32.23	9.70
8	34.74	10.38
9	37.19	11.25
10	39.56	12.32
11	41.83	13.58
12	44.00	15.02
13	46.04	16.62
14	47.95	18.39
15	49.71	20.30
16	51.31	22.35

```
      17            51.74          23.00

Circle Center At X =   25.1 ; Y =   41.2  and Radius,   32.3


        ***     1.513   ***



Failure Surface Specified By 13 Coordinate Points


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

       1        20.13       10.00
       2        22.59        9.16
       3        25.16        8.73
       4        27.76        8.72
       5        30.32        9.14
       6        32.79        9.96
       7        35.08       11.18
       8        37.15       12.76
       9        38.93       14.65
      10        40.38       16.81
      11        41.46       19.18
      12        42.14       21.69
      13        42.28       23.00

Circle Center At X =   26.5 ; Y =   24.6  and Radius,   15.9


        ***     1.600   ***




   1

Failure Surface Specified By 20 Coordinate Points


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

       1        13.42       10.00
       2        15.85        9.07
       3        18.34        8.31
       4        20.88        7.75
       5        23.45        7.37
       6        26.04        7.18
       7        28.64        7.18
```

```
    8        31.23         7.38
    9        33.81         7.76
   10        36.34         8.33
   11        38.83         9.09
   12        41.25        10.02
   13        43.60        11.14
   14        45.87        12.42
   15        48.03        13.86
   16        50.08        15.46
   17        52.00        17.21
   18        53.80        19.09
   19        55.45        21.10
   20        56.78        23.00
```

Circle Center At X =   27.3 ; Y =   42.5 and Radius,   35.3

         ***   1.650   ***

Failure Surface Specified By 24 Coordinate Points


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

     1         0.00        10.00
     2         2.49         9.25
     3         5.01         8.62
     4         7.56         8.11
     5        10.13         7.72
     6        12.72         7.46
     7        15.32         7.33
     8        17.92         7.32
     9        20.51         7.44
    10        23.10         7.68
    11        25.68         8.05
    12        28.23         8.54
    13        30.75         9.16
    14        33.25         9.89
    15        35.70        10.75
    16        38.11        11.73
    17        40.47        12.82
    18        42.78        14.02
    19        45.02        15.33
    20        47.20        16.75
    21        49.31        18.28
    22        51.34        19.90
    23        53.29        21.62
```

```
      24          54.71        23.00

Circle Center At X =   16.8 ; Y =   61.0  and Radius,   53.7


        ***     1.651   ***



1


                    Y           A    X    I    S           F     T


                    0.00      9.38     18.75     28.13     37.50     46.88

X       0.00 +---------+*--------+---------+---------+---------+
             -
             -         .0.
             -         .0.
             -          ..
             -         .0.
        9.38 +        .0 ..
             -          ...
             -        ..0..
             -       .   ...9
             -        ..0.9
             -        ...0..3
A      18.75 +        ...93
             -        ...9..6
             -        .....36
             -        ...9...
             -        .....36
             -        ...9371
X      28.13 +        ....986.
             -        .....32*   4*
             -        ...9.0..
             -        .....3716 54
             -        ...9.3186
             -        ....9.0..54
I      37.50 +        ......31054.          *
             -         ....9.21. 86. 6
             -         ......9..054 8.. 6   6
             -         .......210..  8 .8 8
             -         ......9.3154..  . .
             -         .......9..054....   .
S      46.88 +         .........1.04......
             -         ........9.31.7.....
             -         .........9 .3147.../1
             -           .........9. 32477


                              Page 116 of 138
```
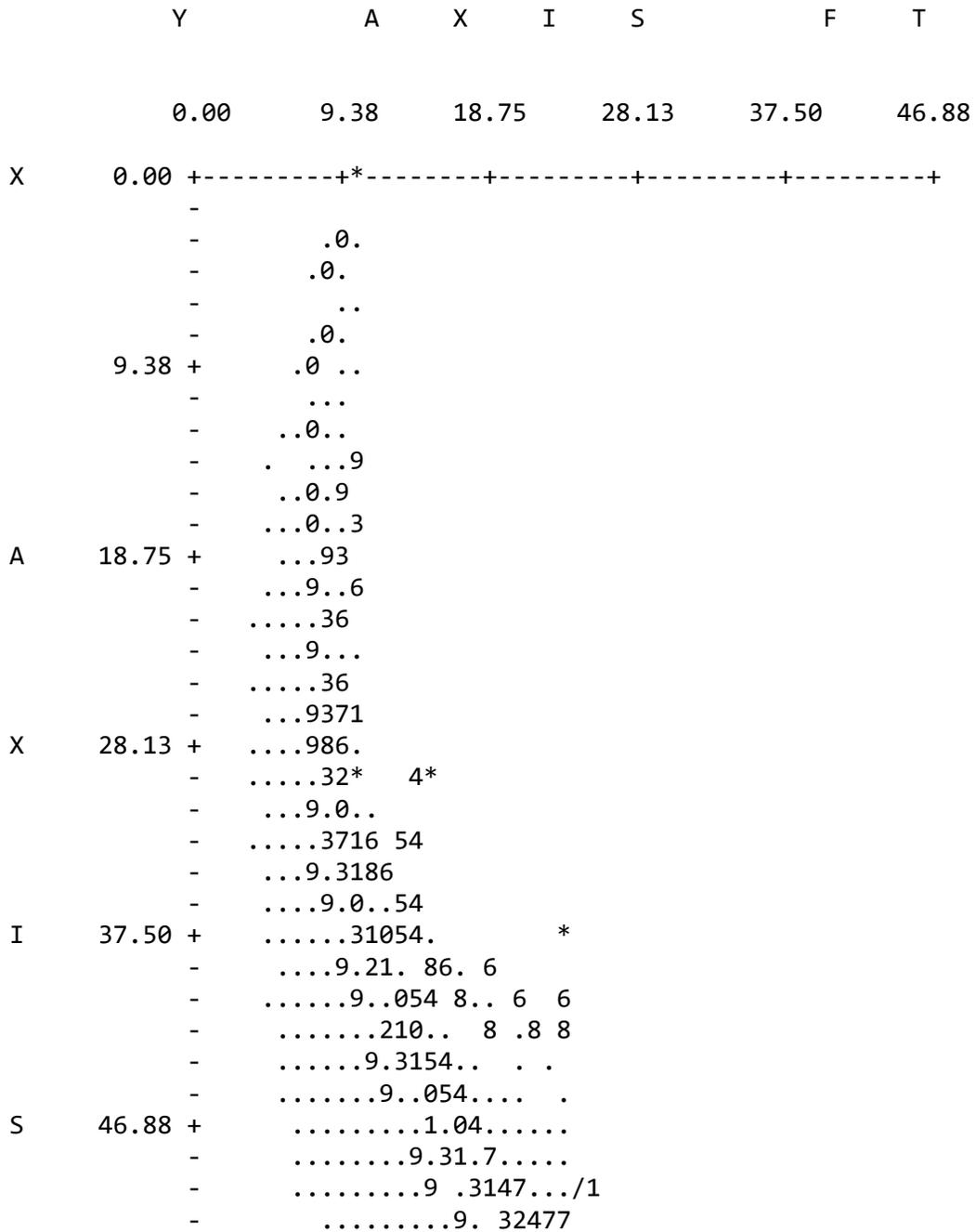
```
              -            ........... 9 1032
              -            ..........   ..9111/
     56.25 +               ...............9
              -               ............. .
              -               ..............
              -               .......... ..
              -               .............
              -               ....... ...
F     65.63 +                  ........ .
              -                  ..........
              -                  ...... .
              -                   ......
              -                   .....
              -                    ....
T     75.00 +                *          .*
```

Spoils Pile Surcharge Load
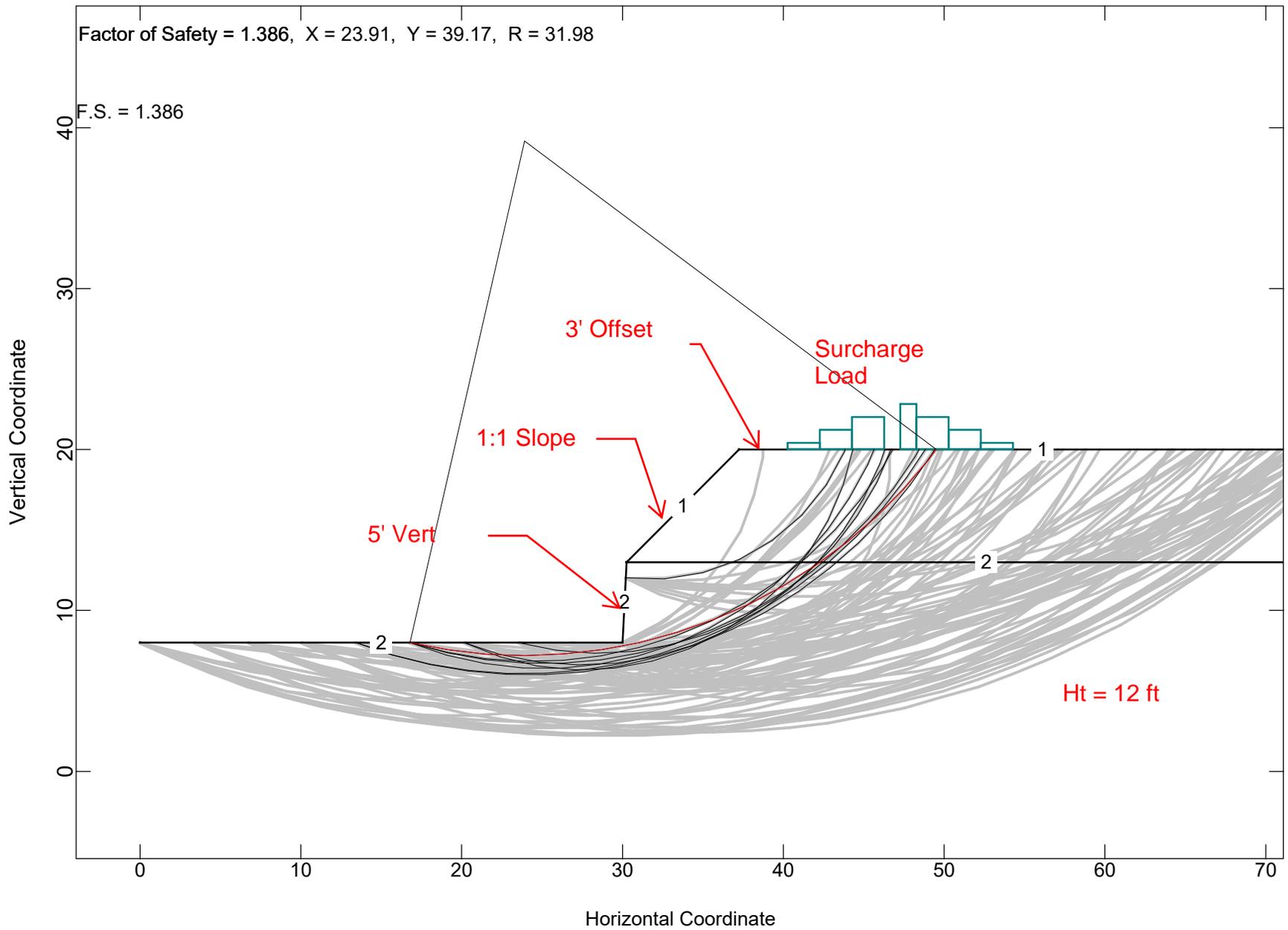
Factor of Safety = 1.386, X = 23.91, Y = 39.17, R = 31.98

F.S. = 1.386

3' Offset

Surcharge Load

1:1 Slope

5' Vert

Ht = 12 ft

Vertical Coordinate

Horizontal Coordinate

```
         ================================================================

                      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\12.0 Haven\Design\5 ft\
         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:  February 02, 2026    Time:  14:40:23
```

1
          PROBLEM DESCRIPTION   New Slope

          BOUNDARY COORDINATES

               4 Top   Boundaries
               5 Total Boundaries

```
        Boundary    X-Left      Y-Left      X-Right     Y-Right    Soil Type
          No.        ft.         ft.         ft.         ft.       Below Bnd

           1         0.00        8.00        30.00       8.00          2
           2        30.00        8.00        30.25      13.00          2
           3        30.25       13.00        37.25      20.00          1
           4        37.25       20.00        75.00      20.00          1
           5        30.25       13.00        75.00      13.00          2
1


    ISOTROPIC SOIL PARAMETERS


     2 Type(s) of Soil


    Soil  Total Saturated  Cohesion Friction  Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
    No.   pcf      pcf       psf      (deg)   Param.    psf      No.

     1   110.0    110.0     100.0     28.0    0.00      0.0       0
     2   110.0    110.0      25.0     40.0    0.00      0.0       0
1


    BOUNDARY LOAD(S)


       7 Load(s) Specified


    Load        X-Left      X-Right     Intensity    Deflection
    No.          ft.         ft.          psf         (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          47.25       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 | X-Surf | Y-Surf |
No.	ft.	ft.
1	16.78	8.00
2	19.14	7.55
3	21.52	7.28
4	23.92	7.19
5	26.32	7.29
6	28.70	7.56
7	31.06	8.00

```
            8         33.38         8.63
            9         35.64         9.42
           10         37.84        10.39
           11         39.96        11.51
           12         41.99        12.79
           13         43.92        14.23
           14         45.73        15.80
           15         47.42        17.50
           16         48.98        19.32
           17         49.48        20.00


     Circle Center At X =   23.9 ; Y =   39.2  and Radius,   32.0


            ***      1.386    ***




          Individual data on the    26  slices


                         Water    Water    Tie      Tie      Earthquake
                         Force    Force    Force    Force       Force      Surcharge
  Slice  Width  Weight   Top      Bot      Norm     Tan      Hor      Ver     Load
  No.     Ft     Lbs     Lbs      Lbs      Lbs      Lbs      Lbs      Lbs      Lbs

   1     2.4 0.58E+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 0.15E+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 0.20E+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 0.20E+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 0.15E+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 0.46E+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 0.74E+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 0.49E+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 0.17E+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 0.21E+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 0.17E+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 0.63E+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 0.21E+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 0.27E+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 0.15E+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 0.20E+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 0.12E+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 0.12E+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 0.21E+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 0.79E+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 0.23E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.60E+03
  22     1.0 0.35E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00
  23     0.2 0.49E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.28E+03
```

```
24     0.8 0.18E+03 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.13E+04
25     0.7 0.89E+02 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.84E+03
26     0.5 0.18E+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 13 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	23.49	8.00
2	25.84	7.52
3	28.23	7.34
4	30.63	7.46
5	33.00	7.87
6	35.29	8.57
7	37.48	9.54
8	39.54	10.78
9	41.42	12.27
10	43.11	13.97
11	44.58	15.88
12	45.79	17.94
13	46.68	20.00

Circle Center At X =   28.5 ; Y =   26.7 and Radius,   19.4

        ***   1.414   ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf ft.	Y-Surf ft.
1	16.78	8.00
2	19.10	7.39
3	21.47	7.00
4	23.86	6.84
5	26.26	6.90
6	28.65	7.18
7	30.99	7.69
8	33.28	8.41
9	35.49	9.34
10	37.60	10.48
11	39.60	11.81

```
        12         41.47          13.32
        13         43.18          15.00
        14         44.73          16.83
        15         46.11          18.80
        16         46.79          20.00
```

Circle Center At X =   24.4 ; Y =   32.5 and Radius,   25.6

        ***   1.416   ***

Failure Surface Specified By 17 Coordinate Points

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

      1   16.78   8.00
      2   19.09   7.37
      3   21.46   6.94
      4   23.85   6.73
      5   26.25   6.72
      6   28.64   6.93
      7   31.00   7.35
      8   33.32   7.98
      9   35.57   8.80
     10   37.74   9.83
     11   39.81   11.04
     12   41.77   12.43
     13   43.60   13.98
     14   45.28   15.70
     15   46.80   17.55
     16   48.16   19.53
     17   48.42   20.00

Circle Center At X =   25.1 ; Y =   33.9 and Radius,   27.2

        ***   1.438   ***

1

Failure Surface Specified By 15 Coordinate Points

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

```
        1       20.13        8.00
        2       22.42        7.26
        3       24.77        6.79
        4       27.16        6.61
        5       29.56        6.72
        6       31.93        7.11
        7       34.23        7.79
        8       36.44        8.74
        9       38.51        9.94
       10       40.43       11.38
       11       42.16       13.05
       12       43.67       14.91
       13       44.96       16.94
       14       45.99       19.10
       15       46.29       20.00
```

Circle Center At X =   27.5 ; Y =   26.6 and Radius,   20.0

       ***   1.450   ***

Failure Surface Specified By 16 Coordinate Points


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

     1        16.78         8.00
     2        19.05         7.23
     3        21.39         6.70
     4        23.78         6.43
     5        26.18         6.41
     6        28.56         6.66
     7        30.91         7.15
     8        33.19         7.90
     9        35.38         8.89
    10        37.45        10.11
    11        39.37        11.54
    12        41.13        13.17
    13        42.71        14.98
    14        44.08        16.95
    15        45.23        19.06
    16        45.62        20.00
```

Circle Center At X =   25.1 ; Y =   28.7 and Radius,   22.3

```
            ***    1.470   ***




1
        Failure Surface Specified By 18 Coordinate Points


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

            1         13.42        8.00
            2         15.70        7.23
            3         18.03        6.66
            4         20.40        6.28
            5         22.79        6.09
            6         25.19        6.10
            7         27.58        6.30
            8         29.95        6.70
            9         32.27        7.29
           10         34.54        8.08
           11         36.74        9.04
           12         38.85       10.18
           13         40.86       11.49
           14         42.76       12.96
           15         44.53       14.58
           16         46.16       16.34
           17         47.64       18.23
           18         48.80       20.00

    Circle Center At X =   23.9 ; Y =   35.3  and Radius,   29.3


          ***    1.537   ***




        Failure Surface Specified By 19 Coordinate Points


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

            1         13.42        8.00
            2         15.69        7.22
            3         18.02        6.64
            4         20.39        6.24
            5         22.78        6.03
            6         25.18        6.01
            7         27.57        6.19
```

```
          8          29.94         6.56
          9          32.28         7.13
         10          34.56         7.87
         11          36.77         8.80
         12          38.90         9.91
         13          40.93        11.18
         14          42.86        12.61
         15          44.66        14.20
         16          46.33        15.92
         17          47.86        17.77
         18          49.23        19.74
         19          49.38        20.00

Circle Center At X =   24.2 ; Y =   35.7  and Radius,   29.7


       ***     1.552   ***




1

        Failure Surface Specified By  9 Coordinate Points


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

           1          30.20        12.01
           2          32.60        11.96
           3          34.97        12.34
           4          37.23        13.15
           5          39.31        14.35
           6          41.13        15.91
           7          42.64        17.78
           8          43.79        19.89
           9          43.83        20.00

Circle Center At X =   31.7 ; Y =   25.1  and Radius,   13.2


       ***     1.568   ***




        Failure Surface Specified By 14 Coordinate Points


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

```
            1           20.13           8.00
            2           22.36           7.11
            3           24.70           6.55
            4           27.08           6.31
            5           29.48           6.42
            6           31.84           6.85
            7           34.12           7.62
            8           36.26           8.69
            9           38.24          10.06
           10           40.00          11.68
           11           41.52          13.54
           12           42.76          15.60
           13           43.71          17.80
           14           44.30          20.00

Circle Center At X =   27.6 ; Y =   23.4  and Radius,   17.1


        ***      1.602   ***




1


                Y              A   X   I   S            F     T


                0.00       9.38     18.75     28.13     37.50      46.88

X       0.00 +--------*+---------+---------+---------+---------+
               -          ..
               -            .
               -          ..
               -          ....
               -          ...
        9.38 +       ..  ..
               -      .....
               -      ....
               -      .....7
               -     .....7
               -      .....1
A      18.75 +   ....71
               -   ....7.5
               -   ....31
               -   ...7312
               -   ...85.
               -   .....31.
X      28.13 + .....41
               - .....5.*   9*
               - .....021


                            Page 128 of 138
```
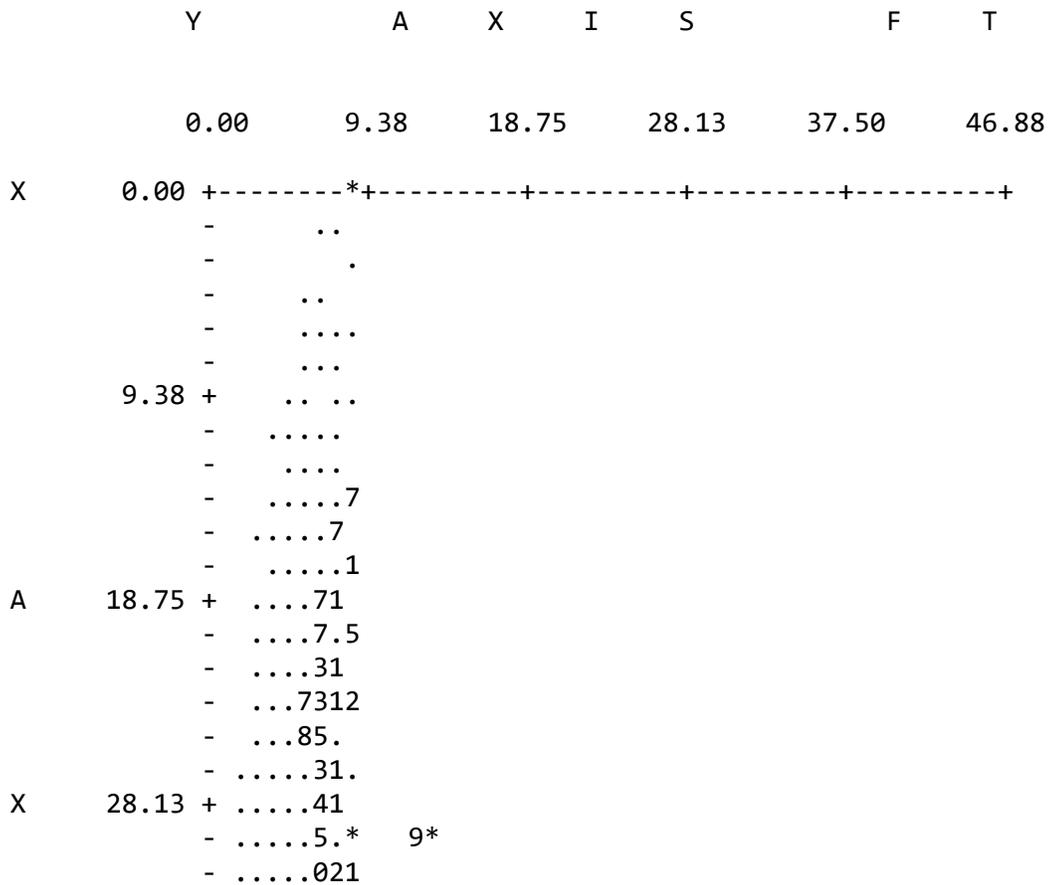
```
            -    .....21. .9
            -    .....57...9
            -    ......21....
I    37.50 +     ......821..9 . .   *
            -    ........523.9.      .
            -    .........1 6..9.   /1
            -    ..........21.60.9..1/2
            -    ...........13 60.92/3
            -    ...........8 13256
S    46.88 +     ...........7 1323/4
            -     ..............8 14/5
            -     ................15/6
            -     ............ ...6/7
            -     ............. .
            -     .........  ....7/
     56.25 +     ........... ...
            -      ....... .....
            -      ............
            -      ........  .
            -      ..........
            -      .........
F    65.63 +      ....... ..
            -         .......
            -         .......
            -          ......
            -           ....
            -             ..
T    75.00 +          *      .*
```

Reference Material

January 31, 2023

Project No. 22235-01

Mr. Matthew Blain
Brightsky Residential
9160 Irvine Center Drive, Suite 100
Irvine, CA 92618

Subject: **Preliminary Geotechnical Evaluation for the Proposed Residential Development, Northwest Corner of Evans Road and Garbani Road, City of Menifee, California**

In accordance with your request, LGC Geotechnical, Inc. has performed a geotechnical evaluation for the proposed residential development located at the northwest corner of Evans Road and Garbani Road in the City of Menifee, California. This report summarizes the results of our background review, subsurface exploration, and geotechnical analyses of the data collected, and presents our findings, conclusions, and preliminary recommendations for the proposed residential project.

If you should have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully,

LGC Geotechnical, Inc.

Dennis Boratynec, GE 2770
Vice President

Branden Petersen, EIT
Senior Staff Engineer

DJB/BPP/MJG/amm

Distribution: (1) Addressee (electronic copy, wet signed copies can be provided upon request)

FIGURE 2
Geotechnical Map
Page 132 of 138
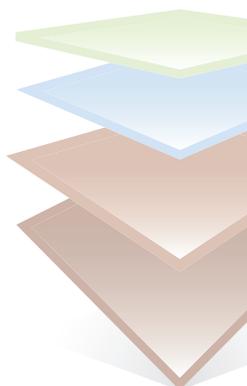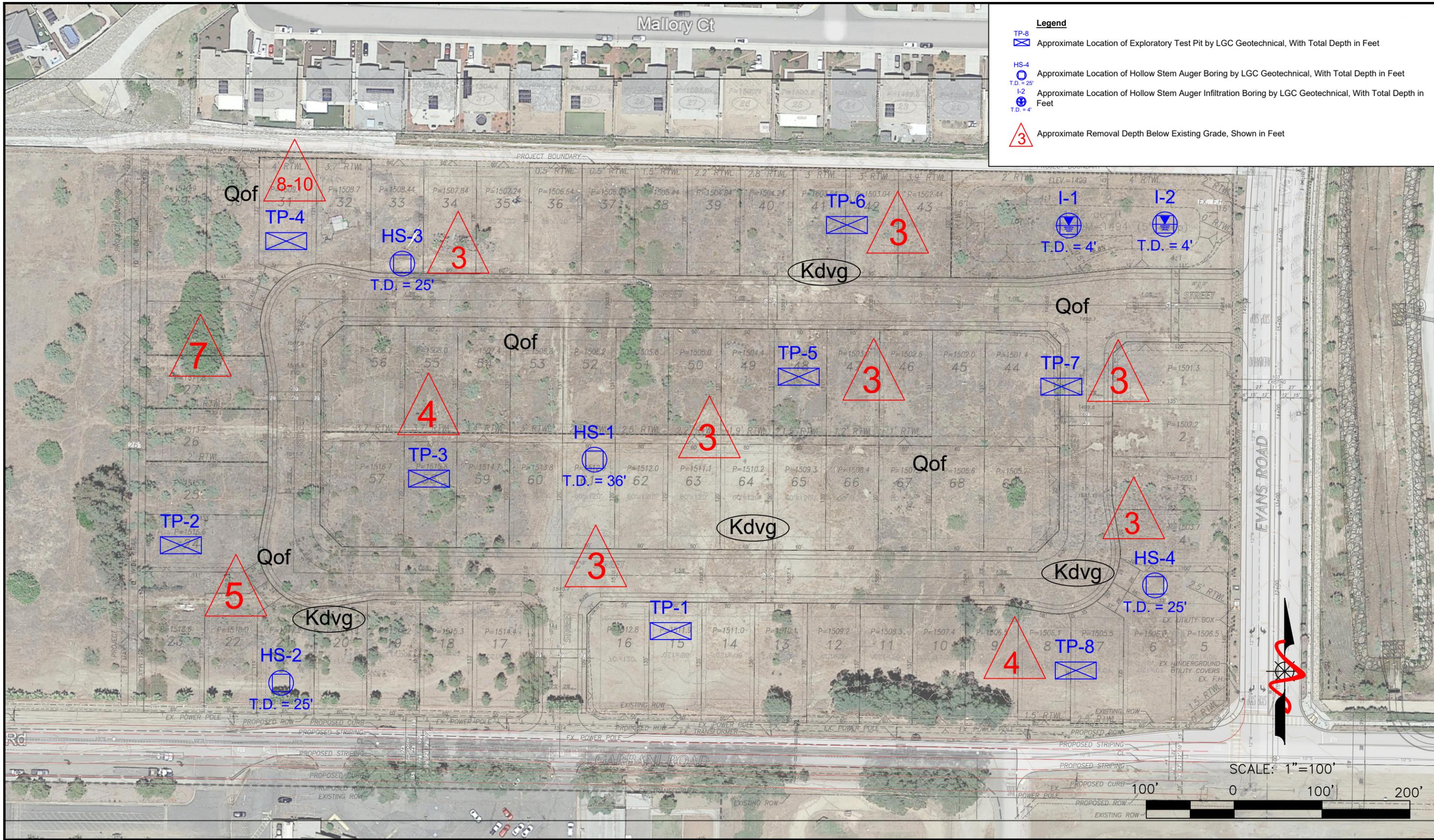
Legend

TP-8 — Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth in Feet

HS-4 / T.D. = 25' — Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet

I-2 / T.D. = 4' — Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet

3 — Approximate Removal Depth Below Existing Grade, Shown in Feet

SCALE: 1" = 100'
100'   0   100'   200'

LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

PROJECT NAME	Brightsky - Garbani
PROJECT NO.	22235-01
ENG. / GEOL.	DJB
SCALE	1" = 100'
DATE	January 2023

Geotechnical Boring Log Borehole LGC-HS-1

Date: 1/12/2023	**Drilling Company:** 2R Drilling, Inc.
Project Name: Brightsky - Garbani	**Type of Rig:** CME 75
Project Number: 22235-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1508' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By HPB
Sampled By HPB
Checked By DJB

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0		B-1					**@0' to 5' - Quaternary Older Alluvium (Qof):** @0'- Sandy SILT: light yellowish brown, moist; rootlets	MD -#200 EI CR
1505			R-1	10 11 11	106.4	7.0	CL/SC	@2.5'- Sandy CLAY/Clayey SAND: reddish brown, slightly moist, verystiff/medium dense	
	5		R-2	50/5"	114.1	4.3		**@5' to T.D. - Granodiorite to Tonalite (Kdvg):** @5'- Silty SAND with Gravel: brown, dry, very dense	
								Soil 1	
1500			R-3	50/1"	109.7	1.8	SP	@7.5'- SAND: light yellowish brown, dry, very dense	
								Soil 2	
	10		R-4	50/1"	110.3	1.7	SP-SM	@10'- SAND with Silt: light yellowish brown, dry, very dense	
1495									
	15		SPT-1	50/3"		8.9	SM	@15'- Silty SAND: pale brown, moist, very dense	
1490		▽						@19'- Groundwater encountered.	
	20		R-5	34 50/6"	122.9	6.3	SP-SM to CL	@20'- SAND with Silt to Sandy CLAY: light grayish brown, slightly moist/dry, very dense/hard	
1485									
	25		SPT-2	50/6"		15.5	SC	@25'- Clayey SAND: grayish brown, wet, very dense	
1480									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:
B   BULK SAMPLE
R   RING SAMPLE (CA Modified Sampler)
G   GRAB SAMPLE
SPT   STANDARD PENETRATION TEST SAMPLE
▽   GROUNDWATER TABLE

TEST TYPES:
DS   DIRECT SHEAR
MD   MAXIMUM DENSITY
SA   SIEVE ANALYSIS
S&H   SIEVE AND HYDROMETER
EI   EXPANSION INDEX
CN   CONSOLIDATION
CR   CORROSION
AL   ATTERBERG LIMITS
CO   COLLAPSE/SWELL
RV   R-VALUE
-#200   % PASSING # 200 SIEVE

Geotechnical Boring Log Borehole LGC-HS-1

Date: 1/12/2023	**Drilling Company:** 2R Drilling, Inc.
Project Name: Brightsky - Garbani	**Type of Rig:** CME 75
Project Number: 22235-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1508' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By HPB
Sampled By HPB
Checked By DJB

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-6	50/2.5"	116.2	22.0	SM	@30'- Silty SAND with Gravel: olive brown, wet, very dense	
1475									
	35		SPT-3	50/0.5"		11.4		@35'- Silty SAND: grayish brown, moist, very dense	
1470								Total Depth = 36' Groundwater Encountered at Approximately 19' Backfilled with Cuttings on 1/12/2023	
	40								
1465									
	45								
1460									
	50								
1455									
	55								
1450									
	60								

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:
B — BULK SAMPLE
R — RING SAMPLE (CA Modified Sampler)
G — GRAB SAMPLE
SPT — STANDARD PENETRATION TEST SAMPLE

GROUNDWATER TABLE

TEST TYPES:
DS — DIRECT SHEAR
MD — MAXIMUM DENSITY
SA — SIEVE ANALYSIS
S&H — SIEVE AND HYDROMETER
EI — EXPANSION INDEX
CN — CONSOLIDATION
CR — CORROSION
AL — ATTERBERG LIMITS
CO — COLLAPSE/SWELL
RV — R-VALUE
-#200 — % PASSING # 200 SIEVE

LGC Geotechnical, Inc.

Geotechnical Boring Log Borehole LGC-HS-2

Date: 1/12/2023	**Drilling Company:** 2R Drilling, Inc.
Project Name: Brightsky - Garbani	**Type of Rig:** CME 75
Project Number: 22235-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1516' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By HPB
Sampled By HPB
Checked By DJB

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
1515	0							**@0' to 7.5' - Quaternary Older Alluvium (Qof):** @0'- Sandy SILT: yellowish brown to reddish brown, moist	
			R-1	7 / 7 / 7	96.0	8.7	ML	@2.5'- Sandy SILT: reddish brown, slightly moist, stiff	
1510	5		R-2	9 / 9 / 15	112.8	7.5	SC	@5'- Clayey SAND: brown, slightly moist, medium dense **@7.5' to T.D. - Granodiorite to Tonalite (Kdvg):** Soil 1	CO
			R-3	50/4"	115.9	5.2	SP-SM	@7.5'- SAND to SAND with Silt: reddish brown, slightly moist, very dense Soil 2	
1505	10		R-4	50/6"	111.8	5.3	SM	@10'- Silty SAND: light reddish brown, slightly moist, very dense	
1500	15		SPT-1	50/3"		4.1		@15'- Silty SAND: light brown. dry, very dense	
1495	20	▽	R-5	50/1"	110.8	7.4	SM/ML	@20'- Silty SAND/Sandy SILT: light brown, slightly moist, very dense/hard @21.5'- Groundwater Encountered	
1490	25		SPT-2	35 / 50/5"		8.4	SM	@25'- Silty SAND: brown, moist, very dense Total Depth = 25' Groundwater Encountered at Approximately 21.5' Backfilled with Cuttings on 1/12/2023	
	30								

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

LGC Geotechnical, Inc.

SAMPLE TYPES:
B   BULK SAMPLE
R   RING SAMPLE (CA Modified Sampler)
G   GRAB SAMPLE
SPT   STANDARD PENETRATION
      TEST SAMPLE

▽   GROUNDWATER TABLE

TEST TYPES:
DS   DIRECT SHEAR
MD   MAXIMUM DENSITY
SA   SIEVE ANALYSIS
S&H   SIEVE AND HYDROMETER
EI   EXPANSION INDEX
CN   CONSOLIDATION
CR   CORROSION
AL   ATTERBERG LIMITS
CO   COLLAPSE/SWELL
RV   R-VALUE
-#200   % PASSING # 200 SIEVE

Geotechnical Boring Log Borehole LGC-HS-3

Date: 1/12/2023	**Drilling Company:** 2R Drilling, Inc.
Project Name: Brightsky - Garbani	**Type of Rig:** CME 75
Project Number: 22235-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1508' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By HPB
Sampled By HPB
Checked By DJB

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 2.5' - Quaternary Older Alluvium (Qof):** @0'- Sandy SILT with Gravel: yellowish brown to reddish brown, moist	
1505			R-1	21 21 19	111.0	10.5	SM	**@2.5' to T.D. - Granodiorite to Tonalite (Kdvg):** @2.5'- Silty SAND: brown, moist, dense	
	5		R-2	38 50/3"	111.7	8.7	SP-SM	@5'- SAND to SAND with Silt: reddish brown, moist, very dense	
1500			R-3	50/2"	107.1	6.3	SM	@7.5'- Silty SAND: yellowish brown, slightly moist, very dense	*Soil 1 / Soil 2*
	10		R-4	50/1"	109.3	2.9	SP-SM	@10'- SAND to Silty SAND: light olive brown, dry, very dense	
1495									
	15		SPT-1	50/5"		5.0	SM	@15'- Silty SAND: pale yellowish brown, slightly moist, very dense	
1490									
	20		R-5	50/1"	114.3	2.1		@20'- Silty SAND with Gravel: light brown, dry, very dense	
1485									
	25		SPT-2	50/1"		2.9	SP-SM	@25'- SAND with Silt: pale grayish brown, dry, very dense	
								Total Depth = 25' Groundwater Not Encountered Backfilled with Cuttings on 1/12/2023	
1480									
	30								

SAMPLE TYPES:
B   BULK SAMPLE
R   RING SAMPLE (CA Modified Sampler)
G   GRAB SAMPLE
SPT   STANDARD PENETRATION TEST SAMPLE

⬇ GROUNDWATER TABLE

TEST TYPES:
DS   DIRECT SHEAR
MD   MAXIMUM DENSITY
SA   SIEVE ANALYSIS
S&H   SIEVE AND HYDROMETER
EI   EXPANSION INDEX
CN   CONSOLIDATION
CR   CORROSION
AL   ATTERBERG LIMITS
CO   COLLAPSE/SWELL
RV   R-VALUE
-#200   % PASSING # 200 SIEVE

LGC Geotechnical, Inc.

Geotechnical Boring Log Borehole LGC-HS-4

Date: 1/12/2023	**Drilling Company:** 2R Drilling, Inc.
Project Name: Brightsky - Garbani	**Type of Rig:** CME 75
Project Number: 22235-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~1502' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By HPB
Sampled By HPB
Checked By DJB

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 2.5' - Quaternary Older Alluvium (Qof):**	
1500			R-1	10 14 50/4"	120.6	9.3	ML-SM	@0'- Sandy SILT with Gravel: yellowish brown to reddish brown, moist; organics; rootlets	
								@2.5' to T.D. - Granodiorite to Tonalite (Kdvg):	
	5		R-2	50/2"	100.5	2.6	SM	@2.5'- SILT to Silty SAND with Gravel: brown, slightly moist/moist, hard/very dense	
								@5'- Silty SAND with Gravel: light brown, dry, very dense	
1495			R-3	50/2"	106.5	3.1	SM	@7.5'- SAND with Silt: light brown, dry, very dense	Soil 1
	10		R-4	50/2"	112.1	2.2	SM	@10'- Silty SAND: light brown, dry, very dense	Soil 2
1490									
	15		SPT-1	50/0.5"		3.2		@15'- Silty SAND with Gravel: yellowish brown, dry, very dense	
1485									
	20		R-5	50/1"	106.8	5.0		@20'- Silty SAND with Gravel: brown, slightly moist, very dense	
1480									
	25		SPT-2	50/2"		2.5		@25'- Silty SAND: pale brown, dry, very dense	
								Total Depth = 25'	
1475								Groundwater Not Encountered	
								Backfilled with Cuttings on 1/12/2023	
	30								

SAMPLE TYPES:
B   BULK SAMPLE
R   RING SAMPLE (CA Modified Sampler)
G   GRAB SAMPLE
SPT STANDARD PENETRATION
     TEST SAMPLE

☒ GROUNDWATER TABLE

TEST TYPES:
DS   DIRECT SHEAR
MD   MAXIMUM DENSITY
SA   SIEVE ANALYSIS
S&H   SIEVE AND HYDROMETER
EI   EXPANSION INDEX
CN   CONSOLIDATION
CR   CORROSION
AL   ATTERBERG LIMITS
CO   COLLAPSE/SWELL
RV   R-VALUE
-#200 % PASSING # 200 SIEVE

LGC Geotechnical, Inc.

Last Edited: 1/25/2023

3.3 *STANDARD PENETRATION TEST (SPT)*

The Standard Penetration Test (SPT) obtains a disturbed sample of soil for visual identification and description, and/or laboratory testing (particle size analysis, plasticity index). The number of hammer blows required to drive the 12^k sampler, is referred to as N value. When corrected for the SPT hammer's energy efficiency, it becomes N_{60}. This can be used to determine the apparent density of a granular soil. Empirical relationships to approximate the soil friction angle (ϕ) and density are shown in Table 3-1.

Table 3-1. Properties Granular Soils

Apparent Density	Relative Density (%)	SPT, N_{60} (blows/ft)	Friction Angle, Ø (deg)	Unit Weight (pcf)	
				Moist	Submerged
Very Loose	0-15	$N_{60} < 5$	<28	<100	<60
Loose	16-35	$5 \leq N_{60} < 10$	28-30	95-125	55-65
Medium Dense	36-65	$10 \leq N_{60} < 30$	31-36	110-130	60-70
Dense	66-85	$30 \leq N_{60} < 50$	37-41	110-140	65-85
Very Dense	86-100	$N_{60} \geq 50$	>41	>130	>75

Note that both the LOTB and BR report the SPT blow count observed in the field as the N value, not N_{60} as used above to determine the apparent density descriptor. The reader is encouraged to read the Logging Manual on Apparent Density and Appendix A.8 on SPT prior to using Table 3-1. Note: there are a variety of correction factors that can be applied to the N value such as for overburden pressure. It is important to know what, if any, correction factors have been applied to the N value for the correct interpretation of Table 3-1.

The Division of Engineering Services, Office of Geotechnical Services has prepared a summary of "simplified typical soil values." For average trench conditions, the Engineer will find the data very useful to establish basic properties or evaluate data submitted by the contractor. Table 3-2 lists approximate values.