Grover Hollingsworth and Associates, Inc.

November 15, 2016
GH17563-G

A and T Development LLC
c/o Pacific Crest Consultants
23622 Calabasas Road, #100
Calabasas, California 91302

Subject: Response to City Correction Letter and Revised Basement Wall Designs, Proposed Residential Development; PT NE ¼ Sec 7, T1S, R14W (ARB 23), 1830 N. Blue Heights Drive, Los Angeles, California.

Reference: Reports by Grover-Hollingsworth and Associates, Inc.: Geologic and Soils Engineering Exploration, Proposed Single-Family Dwelling, Swimming Pool and Retaining Walls, dated August 4, 2016.

City of Los Angeles: Correction Letter, dated September 13, 2016 (Log #94559).

Gentlemen:

This report presents our response to the above-referenced City correction letter. We have been provided extended topographic covered in the vicinity of the subject property. That topography has been added to our Geologic Map. Our sections A through C have been revised and Geologic Section D has been created. The slope stability calculations for the slope above the private street have been revised based upon the additional information recently obtained and the decision to trim the roadcut to 1:1. Our responses to the City's correction letter are presented below on an item-by-item basis.

***Item 1**: Provide a geologic map that shows and labels all portions of the proposed project area including the limits of all proposed private street improvements. Where the proposed private street improvements are located on other than the subject property, provide appropriate legal descriptions and site addresses.*

Response: The issue of the timing of the private street report has been discussed with the reviewers by Penny Flinn. We understand that the City is willing to condition permitting the residence on future approval of a private street report. Our firm will perform exploration and mapping along the private street once the plan is completed.

***Item 2:** Provide a geologic map that is based upon the conceptual grading or site development plans, to illustrate all proposed and existing contours relative to the planned grading and/or construction, along with all off-site slopes and conditions which could adversely affect the stability or safety of the site (7006.3.2). Provide topography for all offsite areas (including the roadway area from Sunset Plaza Drive to the main portion of the lot) above and below the proposed improvements from McLeod Drive to Viewmont Drive. Show and label the location and limits of the recommended options for 1:1 cut slopes and impact wall with 5 feet of freeboard along the uphill side of the private roadway (entire length). Show and label the location and limits of the recommended removal of the thin wedge of uncertified fill.*

Response: The top of the proposed 1:1 trim is shown on the enclosed geologic map and sections A, B and D. It should be noted that minimum required trim is lower on Section B than Section A. We have shown the maximum extent of the cut on the Geologic Map and the minimum extent on the sections as this results in more conservative stability analyses. The extent of the slough wall required in the vicinity of Section C is shown on the Geologic Map. The slough wall is necessitated by the talus deposit. If the talus is removed and the slope trimmed to 1:1 after talus removal, the slough wall could be eliminated.

***Item 3:** Provide additional geological cross sections illustrating existing and proposed grades and structures along the entire length of the proposed private road improvements to demonstrate safe and stable access. Please clarify the meaning of the notes indicating approximate height upslope of Blue Heights Drive (approx. Vertical height, approx. cut slope height, etc.?) Why wasn't the slope area with "Approx. 30' High" analyzed as the highest slope height?*

Response: We have prepared Section D to depict conditions above the northern portion of the planned development. We currently anticipate that the 1:1 trim above or east of Blue Heights Drive will be extended north of the site along the private street. As discussed above, a separate private street report will be issued once the plan is complete. A stability analysis for Section D is included.

Item 4: *Identify all non-conforming conditions and provide recommendations to bring the entire site into conformance with the current Code standard (7005.9). As described in the text of the referenced report, cut slopes were excavated on the subject site to lower the height of the existing offsite walls to the south and west. Show the location of all existing cut slopes on the geologic map and cross sections and determine if they are currently code conforming.*

Note: This shall include but not be limited to removal and/or support of all existing non-conforming graded slopes. Please be aware that all existing graded slopes steeper than 2H:1V will be considered as non-conforming. The Department will allow cut slopes evaluated as stable with the required minimum factor of safety of 1.5 for gross and surficial stability and exposing Hazard-free geology, up to a maximum horizontal to vertical slope gradient of 1.5H:1V (33 degrees) on private property and up to a maximum horizontal to vertical slope gradient of 1H:1V (45 degrees) for street cuts.

Response: The area of the apparent cut slope is shown on Section B. The cut conforms with the allowable slope gradient. We believe that the other areas where bedrock is exposed are natural outcrops and not the result of grading for offsite retaining walls. The only other non-conforming condition is the presence of cast fill near the street. That fill should be removed and recompacted upslope of the planned retaining walls and should be removed from the slope downslope of those walls.

Item 5: *As depicted in sections A and B, it does not appear that the proposed residence and bowling alley have the required building setbacks for slopes steeper than 1:1 from the plane drawn tangent to the slope at an angle of 45 degrees to the horizontal. Provide recommendations and revise the plan(s) and cross section(s) for providing the required building setback from the toe of the ascending slope as specified by Code Section 1808.7.1.*

Notes: Please be informed that the Department does not allow a reduction in building setback, for new buildings. The required setback of 15 feet may be partitioned into two

levels using two retaining walls, provided the lower retaining wall is located a minimum clearance from the building of 5 feet.

Response: The over-steepened cut slope above Blue Heights Drive will be trimmed to a 1:1 gradient as shown on sections A, B and D. Therefore, the building will have the required setback to the ascending slope. The slope trimming has been agreed to by the offsite property owner.

Item 6: *Provide a stability evaluation for the slopes above and below the proposed private roadway improvements.*

Response: We have revised sections A and B to reflect the trim above the roadway and have created Section D. The stability analyses provided in XSTABL files 17563A4, 17563A4S, 17563B4. 17563B48, 17563D1, 17563D1S, 17563D2 and 17563D2S indicate that the trimmed cut slope above Blue Heights Drive will have the required safety factor. We previously analyzed the slope below the road and the planned trim reduces the overall steepness of the entire slope.

Item 7: *The consultants indicate that the west-facing slopes above Blue Heights Drive (Section A) and kinematic analysis for west facing slopes do not have the required Code conforming factors of safety. Provide recommendations supported by analysis to stabilize the non-Code conforming slopes. Show the limits of the slopes with the less than Code conforming factors of safety.*

Response: We have re-analyzed the kinematic stability of the cut above Blue Height Drive with the 1:1 trim. The west-facing trimmed slope will be kinematically stable. The only slope which is potentially kinematically unstable if trimmed to 1:1 is the south-facing slope. It is unlikely however that the planes that create an unstable wedge will intersect. In addition, a slough wall will likely be provided at the toe of this slope.

Item 8: *Provide complete recommendations for temporary shoring and basement retaining walls to include surcharge pressures from the cut slopes above Blue Heights Drive.*

Response: Analyses along sections A and B for the highest walls indicate that the trimmed cut slope above Blue Heights Drive does not surcharge the shoring (XSTABL File 17563A6 and 17563B5).

Item 9: *Provide recommendations for traffic surcharge on cantilever and restrained walls in accordance with Information Bulletin P/BC 2014-141.*

Response: As stated on page 28 of our report, shoring and permanent walls should be designed for a traffic surcharge of 100 pounds per square foot over the upper 10 feet of the shoring or permanent wall.

Conclusions and recommendations presented in the above-referenced report remain applicable.

Please call this office with any questions. This report and our exploration are subject to the following Notice.

NOTICE

General Conditions

In the event of any changes in the design or location of any structure, as outlined in this report, the conclusions and recommendations contained herein may not be considered valid unless the changes are reviewed by us and our conclusions and recommendations are modified or reaffirmed after such review.

The subsurface conditions, excavation characteristics, and geologic structure and contacts described herein and shown on the cross sections have been projected from excavations on the site, as indicated and should in no way be construed to reflect any variations which may occur between or away from these excavations or which may result from changes in subsurface conditions. The projection of geologic contacts is based on available data and experience and should not be considered exact.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site.

If conditions encountered during construction appear to differ from those disclosed herein, notify us immediately so we may consider the need for modifications. Compliance with the design concepts, specifications or recommendations during construction requires our review during the course of construction.

EXPLORATION WAS PERFORMED ONLY ON A PORTION OF THE SITE, IT CANNOT BE CONSIDERED AS INDICATIVE OF THE PORTIONS OF THE SITE NOT EXPLORED.

This report is issued and made for your sole use and benefit. This report is not transferable. The intent of this report is to advise our client on geotechnical matters involving the proposed improvements. It should be understood that the geotechnical consulting provided and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspect of the project, should be reported to this office in a timely fashion. Any liability in connection herewith shall not exceed our fee for the exploration.

Geotechnical engineering is characterized by uncertainty. Geotechnical engineering is often described as an inexact science or art. Conclusions and recommendations presented herein are partly based upon the evaluations of technical information gathered, partly on experience, and partly on professional judgment. The conclusions and recommendations presented should be considered "advice." Other consultants could arrive at different conclusions and recommendations. No warranty, expressed or implied, is made or intended in connection with the above exploration or by the furnishing of this report or by any other oral or written statement.

Respectfully submitted,

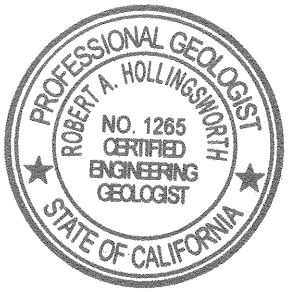
MARTIN E. LIEURANCE
Project Geologist/Engineer

ROBERT A. HOLLINGSWORTH
G.E. 2022/E.G. 1265

MEL:RAH:mel:dl

Enc: City of Los Angeles Correction Letter (dated September 13, 2016) (3 sheets)
Geologic Map
Sections A thru D
Calculations Sheets (62)

xc: (6) Addressee



CITY OF LOS ANGELES
CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK BUSH
GENERAL MANAGER

GEOLOGY AND SOILS REPORT CORRECTION LETTER

September 13, 2016

LOG # 94559
SOILS/GEOLOGY FILE - 2
LAN

A and T Development LLC
c/o Pacific Crest Consultants
23622 Calabasas Road, #100
Calabasas, CA 91302

LEGAL DESCRIPTION: PT NE 1/4 SEC 7 T1S R14W (Arb. 23)
LOCATION: 1830 N. Blue Heights Drive

CURRENT REFERENCE REPORT/LETTER	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Geology/Soils Report	GH17563-G	08/04/2016	Grover Hollingsworth
Oversized Documents	"	"	"

The Grading Division of the Department of Building and Safety has reviewed the referenced report that provides recommendations for the proposed 4+ story single family residence, ramp/parking structural decks, bowling alley, garage, pool, decks, retaining walls, private street improvements (road widening) with either 1:1 up slope road cuts or impact wall with 5 foot of freeboard. The subject property consists of a flag lot with a narrow strip of land that extends from Sunset Plaza Drive to the main portion of the subject property located on the south and west sides of Blue Heights Drive. It appears that three lots own portions of the private road that extends from Sunset Plaza Drive where private street improvements are proposed.

The subject property is located on an approximately 200 foot high south and west facing slopes between unimproved McLeod Drive and Viewmont Drive. According to the consultants, overall slope gradient is between 1.5H:1V to 1.25H:1V with slope gradients between 3H:1V and near vertical. The cross sections appear to depict slope gradients as steep as 79 degrees along the northern side of the private street cut. The earth materials at the subsurface exploration locations consist of up to 2 feet of uncertified fill underlain by up to 3 feet of natural residual soil and 1.5 feet of highly weathered granite over granite bedrock. The consultants recommend to support the proposed structures on conventional and/or drilled-pile foundations bearing on competent bedrock.

The site is located in a designated seismically induced landslide hazard zone as shown on the Seismic Hazard Zones map issued by the State of California.

The review of the subject report cannot be completed because the stability or safety of the proposed development cannot be determined at this time. The review will be continued upon submittal of an addendum to the reports which includes, but need not be limited to, the following:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2014 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. Provide a geologic map that shows and labels all portions of the proposed project area including the limits of all proposed private street improvements. Where the proposed private street improvements are located on other than the subject property, provide appropriate legal descriptions and site addresses.

2. Provide a geologic map that is based upon the conceptual grading or site development plans, to illustrate all proposed and existing contours relative to the planned grading and/or construction, along with all off-site slopes and conditions which could adversely affect the stability or safety of the site (7006.3.2). Provide topography for all offsite areas (including the roadway area from Sunset Plaza Drive to the main portion of the lot) above and below the proposed improvements from McLeod Drive to Viewmont Drive. Show and label the location and limits of the recommended options for 1:1 cut slopes and impact wall with 5 feet of freeboard along the uphill side of the private roadway (entire length). Show and label the location and limits of the recommended removal of the thin wedge of uncertified fill.

3. Provide additional geological cross sections illustrating existing and proposed grades and structures along the entire length of the proposed private road improvements to demonstrate safe and stable access. Please clarify the meaning of the notes indicating approximate height upslope of Blue Heights Drive (approx. vertical height, approx. cut slope height, etc.?). Why wasn't the slope area with "Approx. 30' High" analyzed as the highest slope height?

4. Identify all non-conforming conditions and provide recommendations to bring the entire site into conformance with the current Code standard (7005.9). As described in the text of the referenced report, cut slopes were excavated on the subject site to lower the height of the existing offsite walls to the south and west. Show the location of all existing cut slopes on the geologic map and cross sections and determine if they are currently code conforming.

   Note: This shall include but not be limited to removal and/or support of all existing non-conforming graded slopes. Please be aware that all existing graded slopes steeper than 2H:1V will be considered as non-conforming. The Department will allow cut slopes evaluated as stable with the required minimum factor of safety of 1.5 for gross and surficial stability and exposing hazard-free geology, up to a maximum horizontal to vertical slope gradient of 1.5H:1V (33 degrees) on private property and up to a maximum horizontal to vertical slope gradient of 1H:1V (45 degrees) for street cuts.

5. As depicted in sections A and B, it does not appear that the proposed residence and bowling alley have the required building setbacks for slopes steeper than 1:1 from the plane drawn tangent to the slope at an angle of 45 degrees to the horizontal. Provide recommendations and revise the plan(s) and cross section(s) for providing the required building setback from the toe of the ascending slope as specified by Code Section 1808.7.1.

Notes: Please be informed that the Department does not allow a reduction in building setback, for new buildings. The required setback of 15 feet may be partitioned into two levels using two retaining walls, provided the lower retaining wall is located a minimum clearance from the building of 5 feet.

6. Provide a stability evaluation for the slopes above and below the proposed private roadway improvements.

7. The consultants indicate that the west-facing cut slopes above Blue Heights Drive (Section A) and kinematic analysis for west facing slopes do not have the required Code conforming factors of safety. Provide recommendations supported by analysis to stabilize the non-Code conforming slopes. Show the limits of the slopes with the less than Code conforming factors of safety.

8. Provide complete recommendations for temporary shoring and basement retaining walls to include surcharge pressures from the cut slopes above Blue Heights Drive.

9. Provide recommendations for traffic surcharge on cantilever and restrained walls in accordance with Information Bulletin P/BC 2014-141.

The geologist and soils engineer shall prepare a report containing the corrections indicated in this letter. The report shall be in the form of an itemized response. It is recommended that once all correction items have been addressed in a response report, to contact the report review engineer and/or geologist to schedule a verification appointment to demonstrate compliance with all the corrections.

CASEY LEE JENSEN
Engineering Geologist Associate II

DAN L. STOICA
Geotechnical Engineer I

CLJ/DLS:clj/dls
Log No. 94559
213-482-0480

cc: Steve Kaali, Pacific Crest Consultants, Applicant
Grover Hollingsworth and Associates, Project Consultant
LA District Office

LEGEND

TP-1	NUMBER AND APPROXIMATE LOCATION OF TEST PIT BY GROVER-HOLLINGSWORTH
45	STRIKE AND DIP OF FOLIATION PLANE
32	STRIKE AND DIP OF JOINT PLANE
	STRIKE OF VERTICAL JOINT PLANE
18	STRIKE AND DIP OF VEIN
Kg	CRETACEOUS GRANITE
80	APPROXIMATE LOCATION OF FAULT AND DIP
	APPROXIMATE GEOLOGIC CONTACT
	EXTENTS OF PROPOSED BASEMENT
	EXTENTS OF PROPOSED FIRST FLOOR
	EXTENTS OF PROPOSED SECOND FLOOR

NOTE ON TOPOGRAPHY

CONTOURS UPSLOPE OF BLUE HEIGHTS DRIVE ARE DISPLAYED AT 1 FOOT INTERVALS

CONTOURS DOWNSLOPE OF BLUE HEIGHTS DRIVE ARE DISPLAYED AT 2 FOOT INTERVALS

APN: 5558-015-019

NORTH

10 0 10 20 30 40 50

SCALE 1" = 16'

1830 N. Blue Heights Drive
Los Angeles, California
GEOLOGIC MAP

Grover-Hollingsworth and Associates, Inc.
Geotechnical Consultants

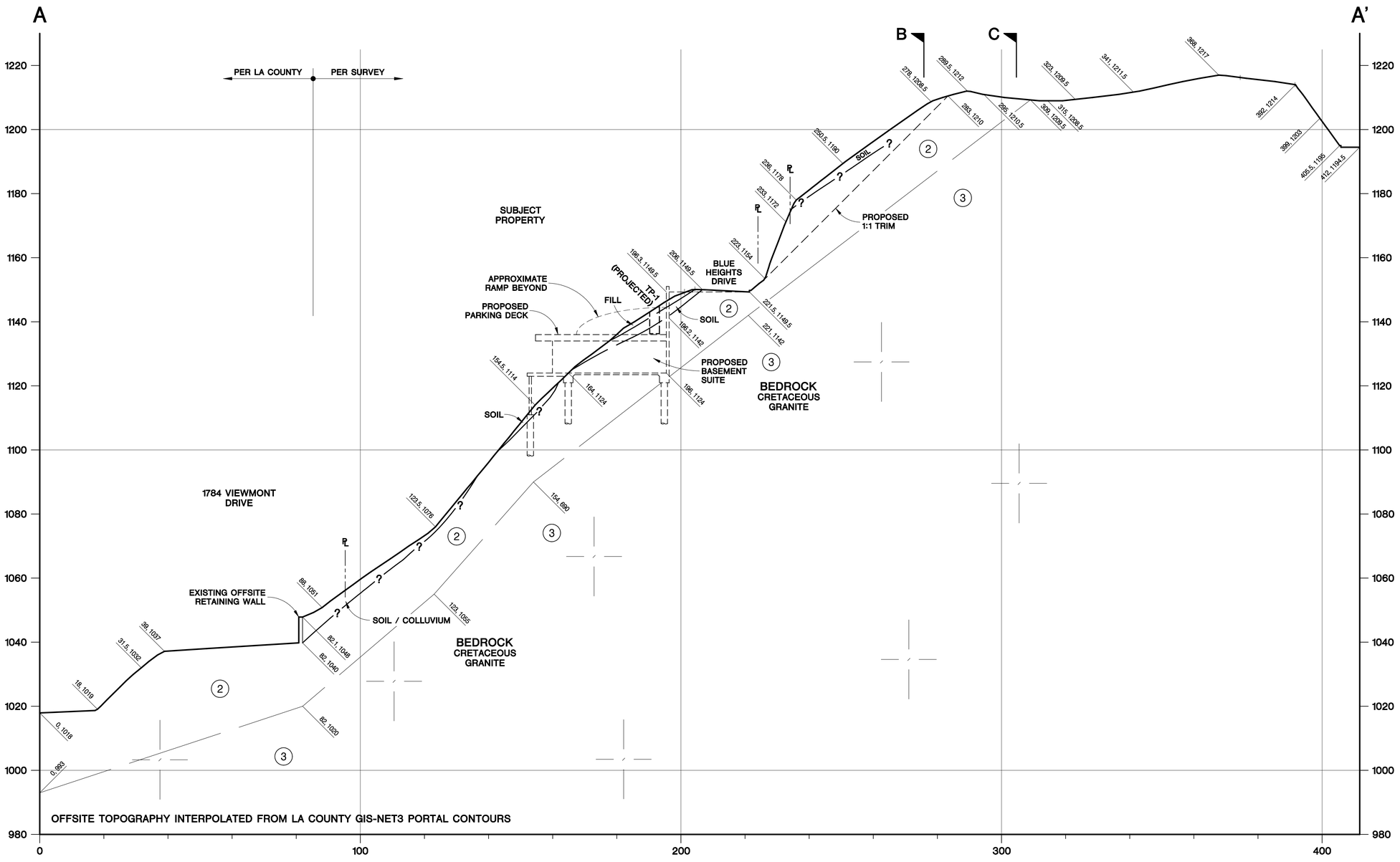
REV. 11-2016

BY MEL DATE 07-2016 CLIENT A&T DEVELOPMENT, LLC

REF. SURVEY BY M&G GH 17563-G

CIVIL ENGINEERING SUBJECT GEOLOGIC MAP

BLUE HEIGHTS-5.DWG



SECTION A-A'

1830 N. Blue Heights Drive
Los Angeles, California
GEOLOGIC SECTION A

10 0 10 20 30 40 50

SCALE 1" = 16'

Grover-Hollingsworth and Associates, Inc.
Geotechnical Consultants

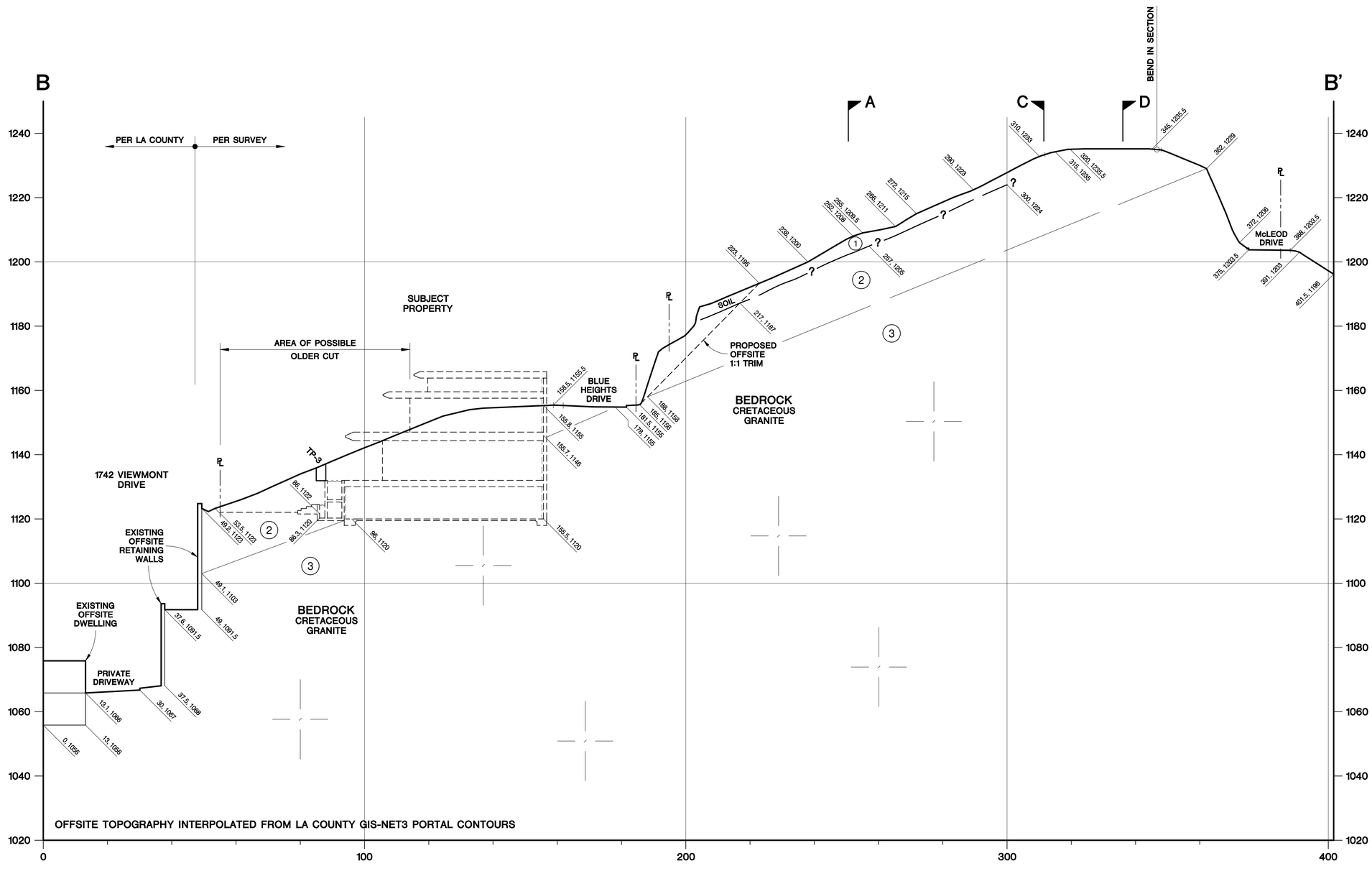
REV. 11-2016

BY MEL DATE 07-2016 CLIENT A&T DEVELOPMENT, LLC

REF. GEOLOGIC MAP GH 17563-G

SUBJECT GEOLOGIC SECTION A

BLUE HEIGHTS-5.DWG



OFFSITE TOPOGRAPHY INTERPOLATED FROM LA COUNTY GIS-NET3 PORTAL CONTOURS

SECTION B-B'

1830 N. Blue Heights Drive
Los Angeles, California

GEOLOGIC SECTION B

10 0 10 20 30 40 50

SCALE 1" = 16'

Grover-Hollingsworth and Associates, Inc.
Geotechnical Consultants

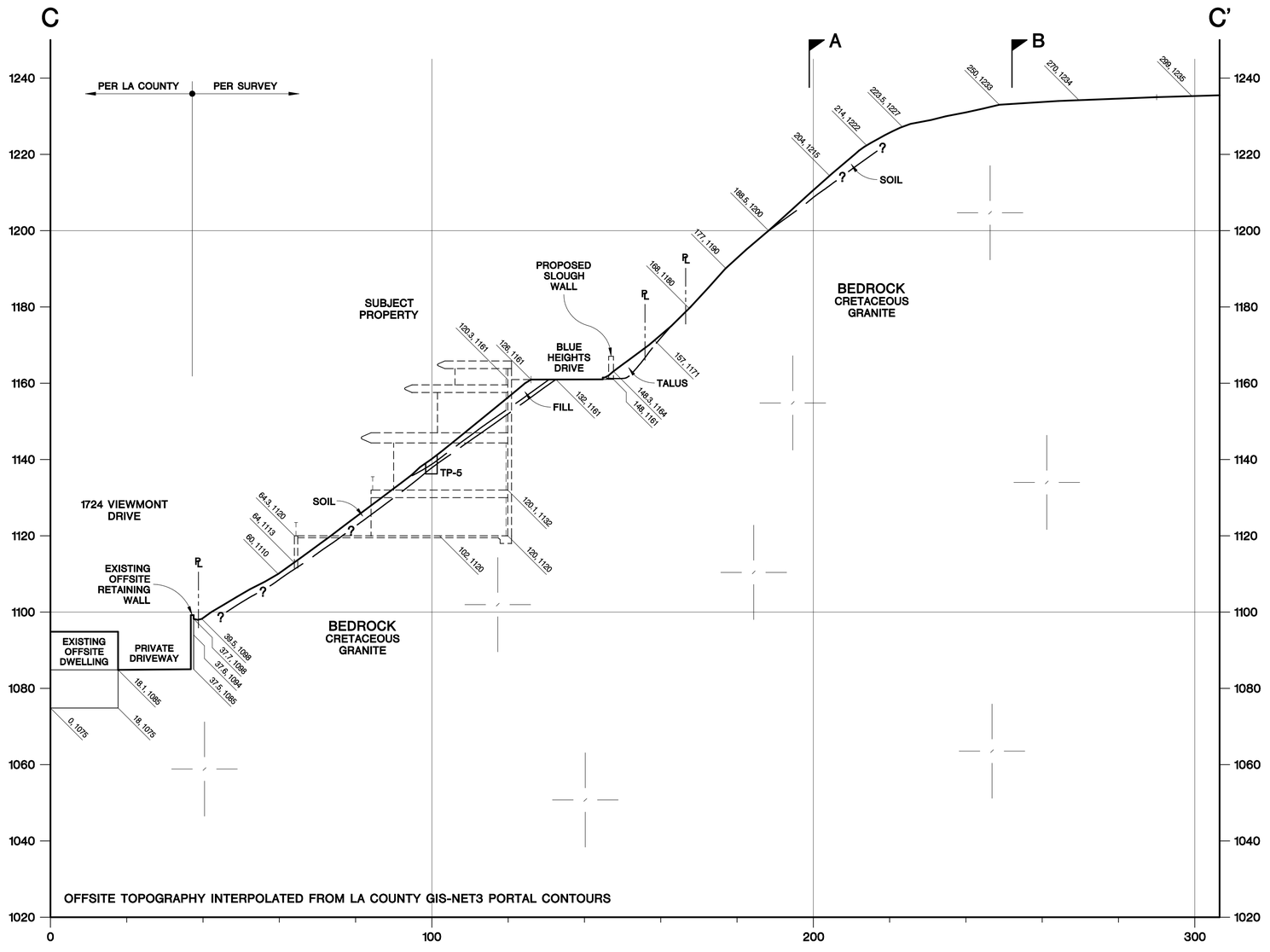
REV. 11-2016

BY MEL DATE 07-2016 CLIENT A&T DEVELOPMENT, LLC

REF. GEOLOGIC MAP GH 17563-G

SUBJECT GEOLOGIC SECTION B

BLUE HEIGHTS-5.DWG



SECTION C-C'

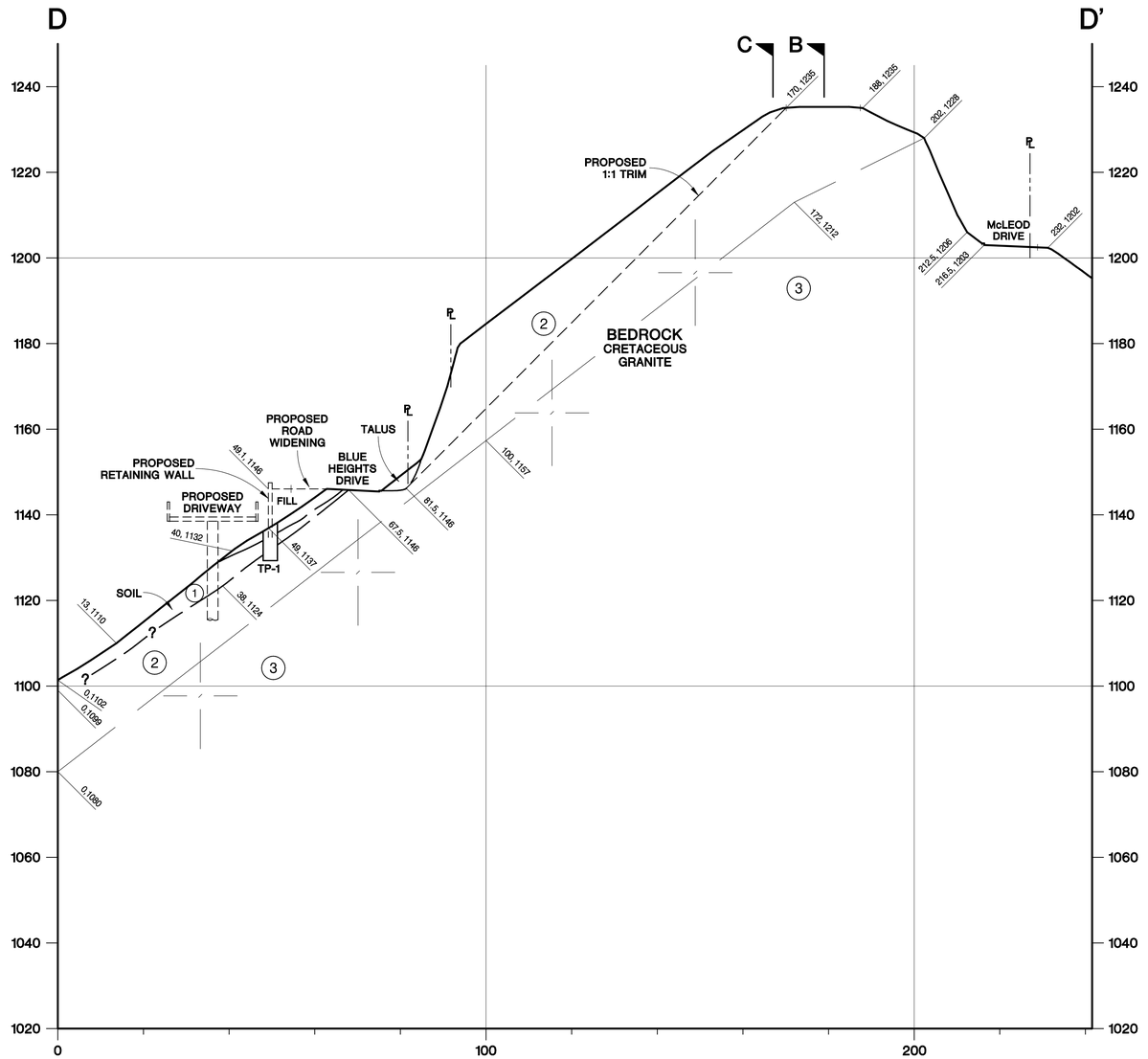
1830 N. Blue Heights Drive
Los Angeles, California

GEOLOGIC SECTION C

10 0 10 20 30 40 50
SCALE 1" = 16'

Grover-Hollingsworth and Associates, Inc.
Geotechnical Consultants
REV. 11-2016
BY MEL DATE 07-2016 CLIENT A&T DEVELOPMENT, LLC
REF. GEOLOGIC MAP GH 17563-G
SUBJECT GEOLOGIC SECTION C

BLUE HEIGHTS-5.DWG



SECTION D-D'

1830 N. Blue Heights Drive
Los Angeles, California

GEOLOGIC SECTION D

10 0 10 20 30 40 50

SCALE 1" = 16'

Grover-Hollingsworth and Associates, Inc.
Geotechnical Consultants

REV. 11-2016

BY MEL DATE 07-2016 CLIENT A&T DEVELOPMENT, LLC

REF. GEOLOGIC MAP GH 17563-G

SUBJECT GEOLOGIC SECTION D

BLUE HEIGHTS-5.DWG

XSTABL File: 17563A4 11-10-16 15:33

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*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 - 99         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.203                96 - 1710    *
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Problem Description : A&T A ABOVE ROAD CIRCULAR STATIC

SEGMENT BOUNDARY COORDINATES

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24 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1018.0	18.0	1019.0	2
2	18.0	1019.0	31.5	1032.0	2
3	31.5	1032.0	39.0	1037.0	2
4	39.0	1037.0	82.0	1040.0	2
5	82.0	1040.0	82.1	1048.0	1
6	82.1	1048.0	88.0	1051.0	1
7	88.0	1051.0	123.5	1076.0	1
8	123.5	1076.0	154.5	1114.0	2
9	154.5	1114.0	164.0	1124.0	2
10	164.0	1124.0	196.0	1124.0	2
11	196.0	1124.0	196.2	1142.0	2
12	196.2	1142.0	196.3	1149.5	1
13	196.3	1149.5	206.0	1149.5	1
14	206.0	1149.5	221.5	1149.5	2
15	221.5	1149.5	223.0	1154.0	2
16	223.0	1154.0	283.0	1210.0	2
17	283.0	1210.0	289.5	1212.0	2
18	289.5	1212.0	295.0	1210.5	2
19	295.0	1210.5	309.0	1209.5	2
20	309.0	1209.5	315.0	1208.5	3
21	315.0	1208.5	341.0	1211.5	3
22	341.0	1211.5	368.0	1217.0	3
23	368.0	1217.0	392.0	1214.0	3
24	392.0	1214.0	399.0	1203.0	3

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	82.0	1040.0	123.5	1076.0	2
2	196.2	1140.0	206.0	1149.5	2
3	.0	993.0	82.0	1020.0	3
4	82.0	1020.0	123.0	1055.0	3
5	123.0	1055.0	154.0	1092.0	3
6	154.0	1092.0	196.1	1122.0	3
7	196.1	1122.0	221.0	1142.0	3
8	221.0	1142.0	233.0	1154.0	3
9	233.0	1154.0	315.0	1208.5	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

800 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 2 points equally spaced along the ground surface between x = 221.5 ft
and x = 223.0 ft

Each surface terminates between x = 250.0 ft

and x = 390.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1140.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****

-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

****

Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.

****

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 14 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	221.50	1149.50
2	227.57	1152.99
3	233.55	1156.62
4	239.45	1160.39
5	245.26	1164.30
6	250.97	1168.35

7	256.58	1172.53
8	262.09	1176.85
9	267.50	1181.29
10	272.80	1185.87
11	277.99	1190.57
12	283.06	1195.39
13	286.89	1199.20
14	286.89	1211.20

**** Simplified BISHOP FOS = 1.955 ****

The following is a summary of the TEN most critical surfaces

Problem Description : A&T A ABOVE ROAD CIRCULAR STATIC

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.955	78.03	1406.25	294.11	221.50	286.89	3.601E+07
2.	1.976	47.22	1477.89	371.77	221.50	293.06	5.698E+07
3.	1.980	88.00	1383.35	269.27	221.50	283.43	2.937E+07
4.	1.991	51.73	1435.26	332.39	221.50	285.16	3.756E+07
5.	1.995	54.95	1429.02	325.38	221.50	284.53	3.600E+07
6.	2.002	-6.73	1521.75	436.65	221.50	287.92	5.274E+07
7.	2.005	192.14	1264.38	114.61	223.00	286.21	1.530E+07
8.	2.009	-39.07	1597.88	518.60	221.50	292.54	7.517E+07
9.	2.018	-13.67	1524.96	443.03	221.50	286.40	5.066E+07
10.	2.022	166.86	1316.00	171.45	223.00	292.37	2.587E+07

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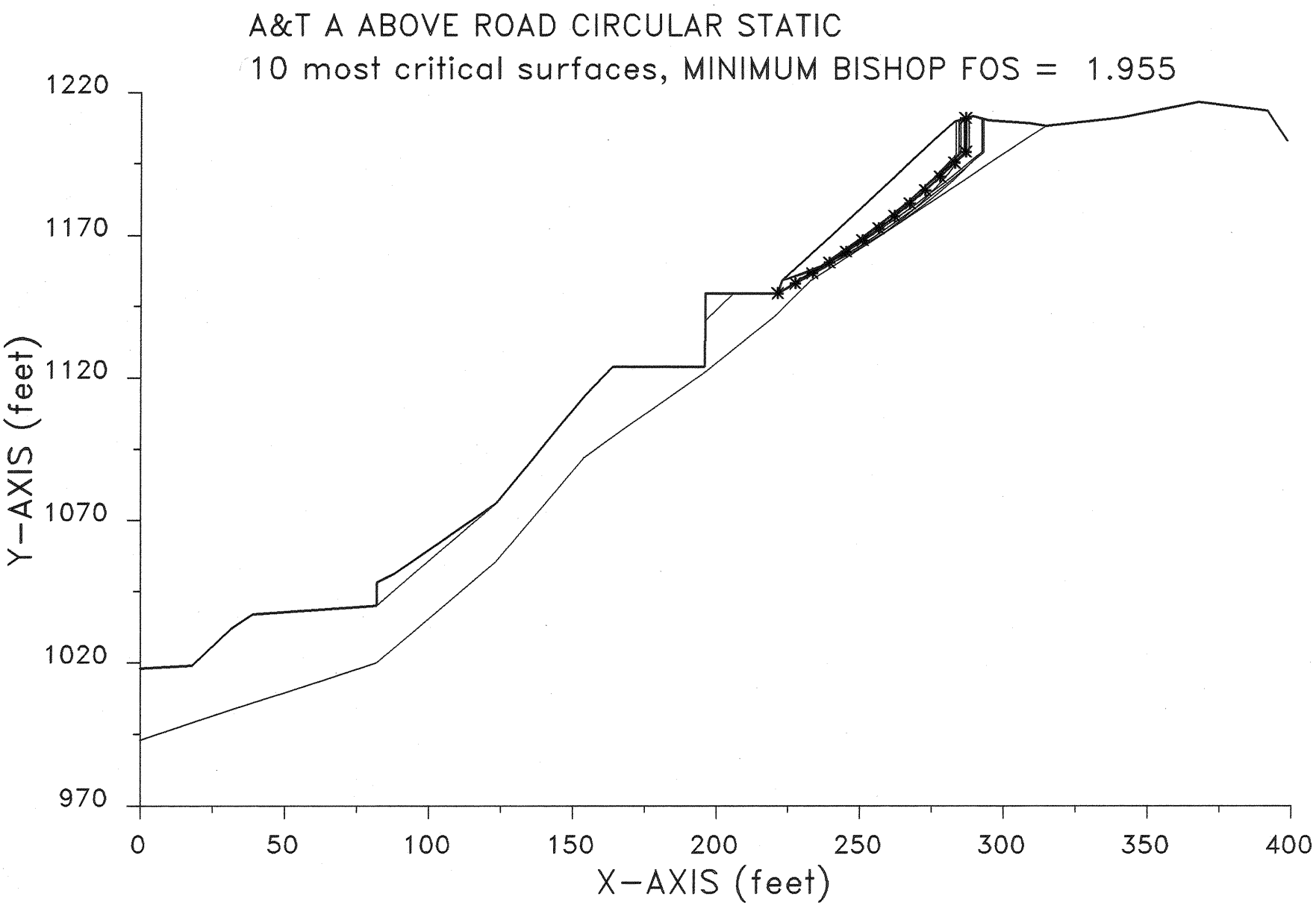
17563A4 11-10-16 15:33



XSTABL File: 17563A4S 11-10-16 15:34

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*              X S T A B L                *
*                                         *
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*******************************************
```

Problem Description : A&T A ABOVE ROAD CIRCULAR SEISMIC

SEGMENT BOUNDARY COORDINATES

---

24 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1018.0	18.0	1019.0	2
2	18.0	1019.0	31.5	1032.0	2
3	31.5	1032.0	39.0	1037.0	2
4	39.0	1037.0	82.0	1040.0	2
5	82.0	1040.0	82.1	1048.0	1
6	82.1	1048.0	88.0	1051.0	1
7	88.0	1051.0	123.5	1076.0	1
8	123.5	1076.0	154.5	1114.0	2
9	154.5	1114.0	164.0	1124.0	2
10	164.0	1124.0	196.0	1124.0	2
11	196.0	1124.0	196.2	1142.0	2
12	196.2	1142.0	196.3	1149.5	1
13	196.3	1149.5	206.0	1149.5	1
14	206.0	1149.5	221.5	1149.5	2
15	221.5	1149.5	223.0	1154.0	2
16	223.0	1154.0	283.0	1210.0	2
17	283.0	1210.0	289.5	1212.0	2
18	289.5	1212.0	295.0	1210.5	2
19	295.0	1210.5	309.0	1209.5	2
20	309.0	1209.5	315.0	1208.5	3
21	315.0	1208.5	341.0	1211.5	3
22	341.0	1211.5	368.0	1217.0	3
23	368.0	1217.0	392.0	1214.0	3
24	392.0	1214.0	399.0	1203.0	3

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	82.0	1040.0	123.5	1076.0	2
2	196.2	1140.0	206.0	1149.5	2
3	.0	993.0	82.0	1020.0	3
4	82.0	1020.0	123.0	1055.0	3
5	123.0	1055.0	154.0	1092.0	3
6	154.0	1092.0	196.1	1122.0	3
7	196.1	1122.0	221.0	1142.0	3
8	221.0	1142.0	233.0	1154.0	3
9	233.0	1154.0	315.0	1208.5	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A horizontal earthquake loading coefficient of .296 has been assigned

A vertical earthquake loading coefficient of .000 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

800 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 2 points equally spaced
along the ground surface between x = 221.5 ft
and x = 223.0 ft

Each surface terminates between x = 250.0 ft
and x = 390.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 1140.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

7.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter. In such
cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 15 coordinate points

Point	x-surf	y-surf

No.	(ft)	(ft)
1	221.50	1149.50
2	227.65	1152.84
3	233.74	1156.29
4	239.76	1159.86
5	245.72	1163.54
6	251.60	1167.34
7	257.41	1171.24
8	263.15	1175.25
9	268.81	1179.37
10	274.39	1183.60
11	279.89	1187.93
12	285.31	1192.36
13	290.64	1196.89
14	293.06	1199.03
15	293.06	1211.03

**** Simplified BISHOP FOS = 1.206 ****

The following is a summary of the TEN most critical surfaces

Problem Description : A&T A ABOVE ROAD CIRCULAR SEISMIC

	FOS (BISHOP)	Circle x-coord (ft)	Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.206	47.22	1477.89	371.77	221.50	293.06	4.872E+07
2.	1.223	78.03	1406.25	294.11	221.50	286.89	3.075E+07
3.	1.225	-39.07	1597.88	518.60	221.50	292.54	6.435E+07
4.	1.235	74.49	1446.54	331.43	221.50	294.46	4.812E+07
5.	1.242	-148.55	1809.99	757.09	221.50	297.58	1.121E+08
6.	1.246	-192.47	1879.82	839.49	221.50	297.71	1.243E+08
7.	1.247	-6.73	1521.75	436.65	221.50	287.92	4.513E+07
8.	1.250	51.73	1435.26	332.39	221.50	285.16	3.214E+07
9.	1.251	88.00	1383.35	269.27	221.50	283.43	2.513E+07
10.	1.255	166.86	1316.00	171.45	223.00	292.37	2.237E+07

* * * END OF FILE * * *

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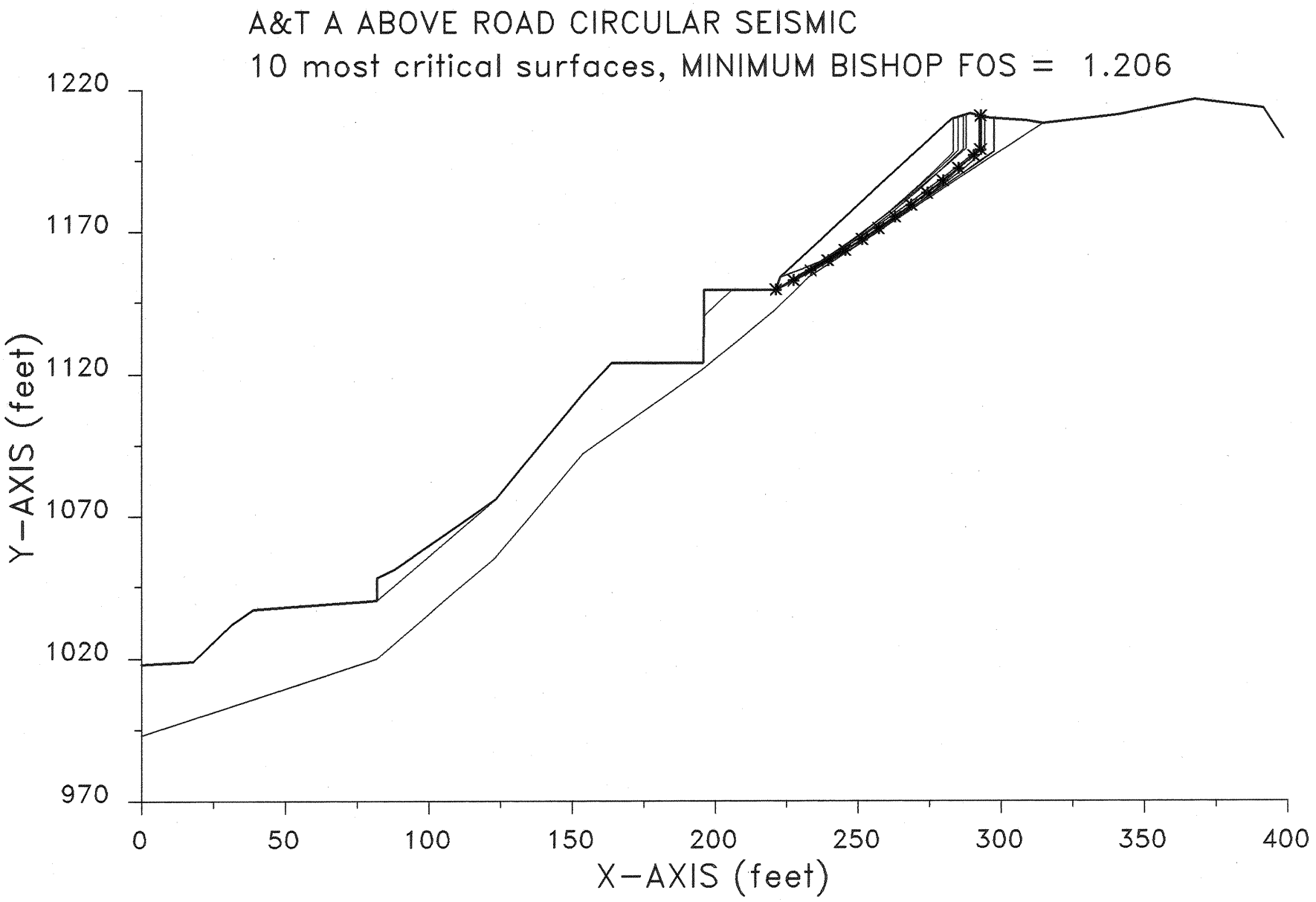

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Problem Description : A&T A BASEMENT REINFORCED SHORING

SEGMENT BOUNDARY COORDINATES

---

24 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1018.0	18.0	1019.0	2
2	18.0	1019.0	31.5	1032.0	2
3	31.5	1032.0	39.0	1037.0	2
4	39.0	1037.0	82.0	1040.0	2
5	82.0	1040.0	82.1	1048.0	1
6	82.1	1048.0	88.0	1051.0	1
7	88.0	1051.0	123.5	1076.0	1
8	123.5	1076.0	154.5	1114.0	2
9	154.5	1114.0	164.0	1124.0	2
10	164.0	1124.0	196.0	1124.0	2
11	196.0	1124.0	196.2	1142.0	2
12	196.2	1142.0	196.3	1149.5	1
13	196.3	1149.5	206.0	1149.5	1
14	206.0	1149.5	221.5	1149.5	2
15	221.5	1149.5	223.0	1154.0	2
16	223.0	1154.0	283.0	1210.0	2
17	283.0	1210.0	289.5	1212.0	2
18	289.5	1212.0	295.0	1210.5	2
19	295.0	1210.5	309.0	1209.5	2
20	309.0	1209.5	315.0	1208.5	3
21	315.0	1208.5	341.0	1211.5	3
22	341.0	1211.5	368.0	1217.0	3
23	368.0	1217.0	392.0	1214.0	3
24	392.0	1214.0	399.0	1203.0	3

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	82.0	1040.0	123.5	1076.0	2
2	196.2	1140.0	206.0	1149.5	2
3	.0	993.0	82.0	1020.0	3
4	82.0	1020.0	123.0	1055.0	3
5	123.0	1055.0	154.0	1092.0	3
6	154.0	1092.0	196.1	1122.0	3
7	196.1	1122.0	221.0	1142.0	3
8	221.0	1142.0	233.0	1154.0	3
9	233.0	1154.0	315.0	1208.5	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

REINFORCED SLOPE ANALYSIS

The analysis will be performed to determine the critical surface that requires the largest amount of reinforcing force to satisfy:

Minimum (required) FOS = 1.250
Resultant at Elevation = 1130.00 feet

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 196.0 ft
and x = 196.0 ft

Each surface terminates between x = 205.0 ft
and x = 390.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1120.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

10.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****
Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	196.00	1124.00
2	200.58	1132.89
3	202.61	1137.50
4	202.61	1149.50

****
** Maximum Required Reinforcement Force = 2.8617E+03 (lb) **
** Simplified BISHOP FOS = 1.250 (for above reinforcement) **
****

The following is a summary of the TEN most critical surfaces

Problem Description : A&T A BASEMENT REINFORCED SHORING

REINFORCING FORCES calculated for minimum FOS = 1.250 and
reinforcing force resultant at elevation = 1130.00 feet

	Reinf. Force (lb)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2862.	86.91	1185.80	125.4	196.0	202.6	2.279E+06
2.	2854.	120.81	1169.69	88.0	196.0	202.7	1.622E+06
3.	2849.	-36.14	1250.21	264.2	196.0	202.8	4.923E+06
4.	2849.	108.11	1173.42	100.8	196.0	202.3	1.768E+06
5.	2842.	140.72	1158.81	65.3	196.0	202.5	1.175E+06
6.	2841.	77.41	1187.44	134.5	196.0	202.3	2.339E+06
7.	2841.	-54.37	1251.38	280.9	196.0	202.4	4.953E+06
8.	2840.	-322.65	1384.71	580.5	196.0	202.6	1.041E+07
9.	2840.	108.69	1177.42	102.4	196.0	202.9	1.942E+06
10.	2833.	137.20	1159.31	68.6	196.0	202.2	1.192E+06

* * * END OF FILE * * *

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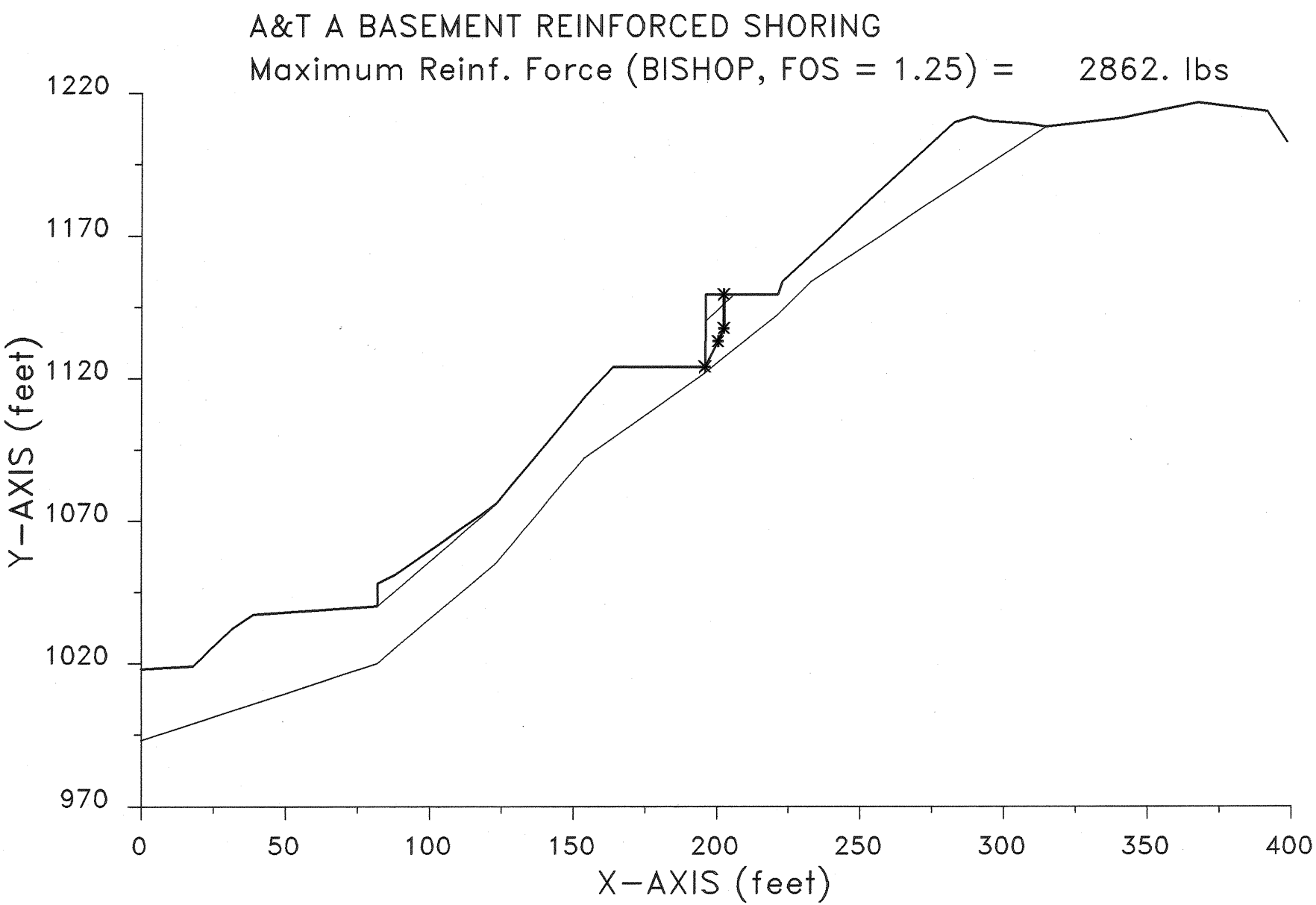

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*******************************************
```

Problem Description : A&T SEC B ROAD CUT CIRCULAR STATIC

SEGMENT BOUNDARY COORDINATES

---

33 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1056.0	13.0	1056.0	3
2	13.0	1056.0	13.1	1066.0	3
3	13.1	1066.0	30.0	1067.0	3
4	30.0	1067.0	37.0	1068.0	3
5	37.0	1068.0	37.1	1091.5	3
6	37.1	1091.5	49.0	1091.5	3
7	49.0	1091.5	49.1	1103.0	3
8	49.1	1103.0	49.3	1123.0	2
9	49.3	1123.0	53.5	1123.0	2
10	53.5	1123.0	82.0	1122.0	2
11	82.0	1122.0	82.3	1120.0	2
12	82.3	1120.0	96.0	1120.0	2
13	96.0	1120.0	155.5	1120.0	3
14	155.5	1120.0	155.7	1146.0	3
15	155.7	1146.0	155.8	1155.0	2
16	155.8	1155.0	158.5	1155.5	2
17	158.5	1155.5	178.0	1155.0	2
18	178.0	1155.0	181.5	1155.0	3
19	181.5	1155.0	185.0	1156.0	3
20	185.0	1156.0	188.0	1158.0	3
21	188.0	1158.0	217.0	1187.0	2
22	217.0	1187.0	223.0	1195.0	1
23	223.0	1195.0	252.0	1208.0	1
24	252.0	1208.0	255.0	1209.5	1
25	255.0	1209.5	268.0	1211.0	1
26	268.0	1211.0	272.0	1215.0	1

27	272.0	1215.0	310.0	1233.0	1
28	310.0	1233.0	320.0	1235.5	1
29	320.0	1235.5	345.0	1235.5	2
30	345.0	1235.5	362.0	1229.0	2
31	362.0	1229.0	372.0	1206.0	3
32	372.0	1206.0	375.0	1203.5	3
33	375.0	1203.5	391.0	1203.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	217.0	1187.0	257.0	1205.0	2
2	257.0	1205.0	320.0	1235.5	2
3	49.1	1103.0	96.0	1120.0	3
4	155.7	1146.0	181.5	1155.0	3
5	188.0	1158.0	362.0	1229.0	2

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

BOUNDARY LOADS
---

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)

1	88.0	155.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

800 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 2 points equally spaced along the ground surface between x = 185.0 ft
and x = 188.0 ft

Each surface terminates between x = 200.0 ft
and x = 330.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1140.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****
Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 9 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	188.00	1158.00
2	195.71	1160.12
3	203.16	1163.06
4	210.24	1166.78
5	216.88	1171.24
6	223.00	1176.39
7	228.53	1182.17
8	232.42	1187.22
9	232.42	1199.22

**** Simplified BISHOP FOS = 2.145 ****

The following is a summary of the TEN most critical surfaces

Problem Description : A&T SEC B ROAD CUT CIRCULAR STATIC

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.145	172.23	1230.51	74.21	188.00	232.42	6.470E+06
2.	2.147	173.40	1234.38	77.76	188.00	236.45	7.961E+06
3.	2.147	176.40	1228.74	71.68	188.00	235.76	7.334E+06
4.	2.151	171.09	1236.33	81.52	185.00	237.94	9.429E+06
5.	2.152	173.81	1230.47	75.31	185.00	236.73	8.562E+06
6.	2.152	172.89	1230.20	75.18	185.00	235.37	8.110E+06
7.	2.153	174.56	1227.83	72.59	185.00	235.54	7.992E+06
8.	2.157	168.27	1235.67	81.41	185.00	234.13	8.112E+06
9.	2.158	165.86	1247.51	93.49	185.00	239.94	1.114E+07
10.	2.159	165.82	1240.36	86.51	185.00	234.80	8.684E+06

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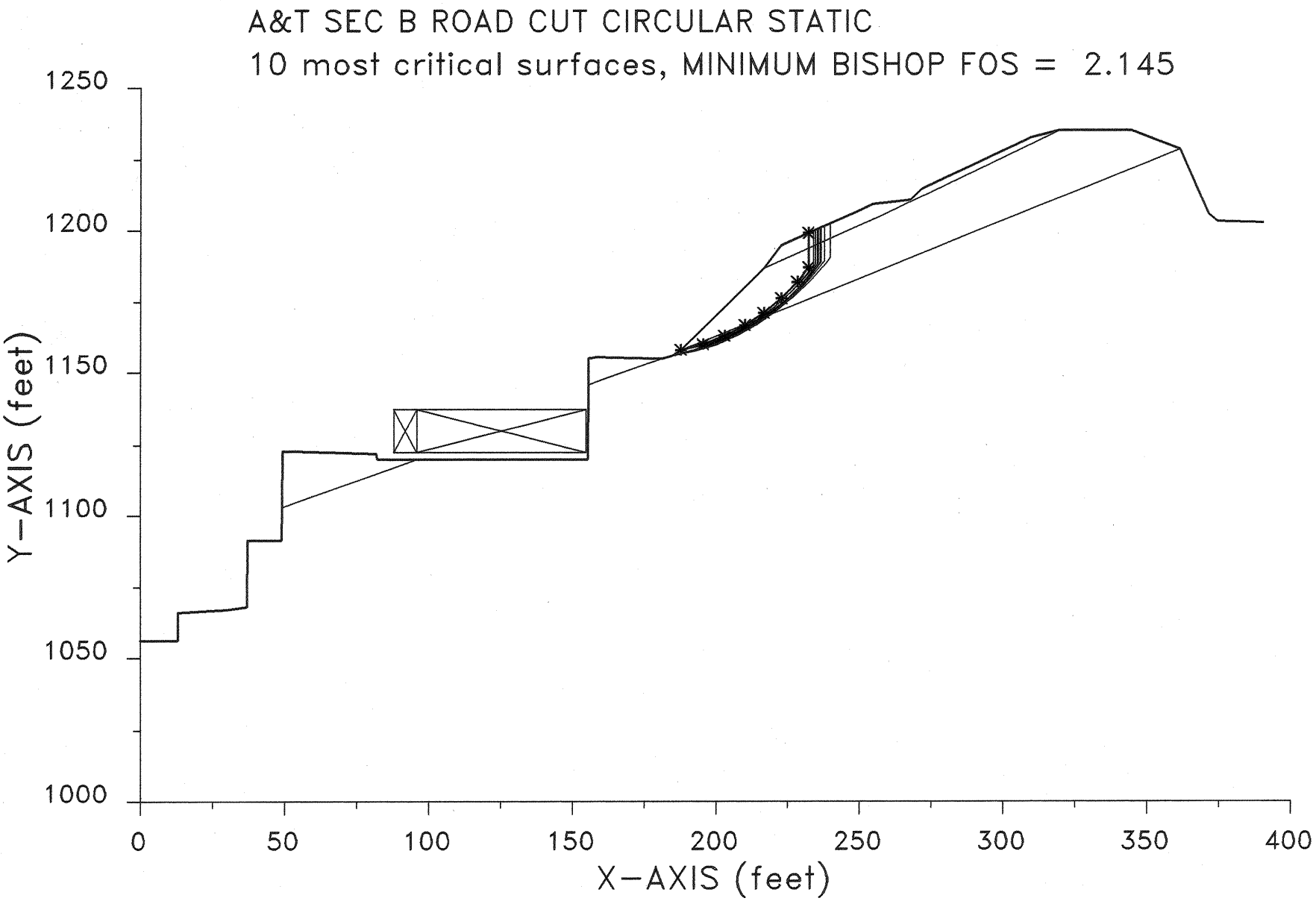

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*******************************************
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Problem Description : A&T SEC B ROAD CUT CIRCULAR SEISMIC

SEGMENT BOUNDARY COORDINATES

---

33 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1056.0	13.0	1056.0	3
2	13.0	1056.0	13.1	1066.0	3
3	13.1	1066.0	30.0	1067.0	3
4	30.0	1067.0	37.0	1068.0	3
5	37.0	1068.0	37.1	1091.5	3
6	37.1	1091.5	49.0	1091.5	3
7	49.0	1091.5	49.1	1103.0	3
8	49.1	1103.0	49.3	1123.0	2
9	49.3	1123.0	53.5	1123.0	2
10	53.5	1123.0	82.0	1122.0	2
11	82.0	1122.0	82.3	1120.0	2
12	82.3	1120.0	96.0	1120.0	2
13	96.0	1120.0	155.5	1120.0	3
14	155.5	1120.0	155.7	1146.0	3
15	155.7	1146.0	155.8	1155.0	2
16	155.8	1155.0	158.5	1155.5	2
17	158.5	1155.5	178.0	1155.0	2
18	178.0	1155.0	181.5	1155.0	3
19	181.5	1155.0	185.0	1156.0	3
20	185.0	1156.0	188.0	1158.0	3
21	188.0	1158.0	217.0	1187.0	2
22	217.0	1187.0	223.0	1195.0	1
23	223.0	1195.0	252.0	1208.0	1
24	252.0	1208.0	255.0	1209.5	1
25	255.0	1209.5	268.0	1211.0	1
26	268.0	1211.0	272.0	1215.0	1

27	272.0	1215.0	310.0	1233.0	1
28	310.0	1233.0	320.0	1235.5	1
29	320.0	1235.5	345.0	1235.5	2
30	345.0	1235.5	362.0	1229.0	2
31	362.0	1229.0	372.0	1206.0	3
32	372.0	1206.0	375.0	1203.5	3
33	375.0	1203.5	391.0	1203.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	217.0	1187.0	257.0	1205.0	2
2	257.0	1205.0	320.0	1235.5	2
3	49.1	1103.0	96.0	1120.0	3
4	155.7	1146.0	181.5	1155.0	3
5	188.0	1158.0	362.0	1229.0	2

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A horizontal earthquake loading coefficient of .296 has been assigned

A vertical earthquake loading coefficient of .000 has been assigned

---

BOUNDARY LOADS
---

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	88.0	155.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

800 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 2 points equally spaced along the ground surface between x = 185.0 ft
and x = 188.0 ft

Each surface terminates between x = 200.0 ft
and x = 330.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1140.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****

Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 12 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	188.00	1158.00
2	195.64	1160.36
3	203.14	1163.16
4	210.46	1166.39
5	217.58	1170.03
6	224.48	1174.08
7	231.13	1178.53
8	237.52	1183.34
9	243.61	1188.52
10	249.40	1194.05
11	250.66	1195.40
12	250.66	1207.40

**** Simplified BISHOP FOS = 1.353 ****

The following is a summary of the TEN most critical surfaces

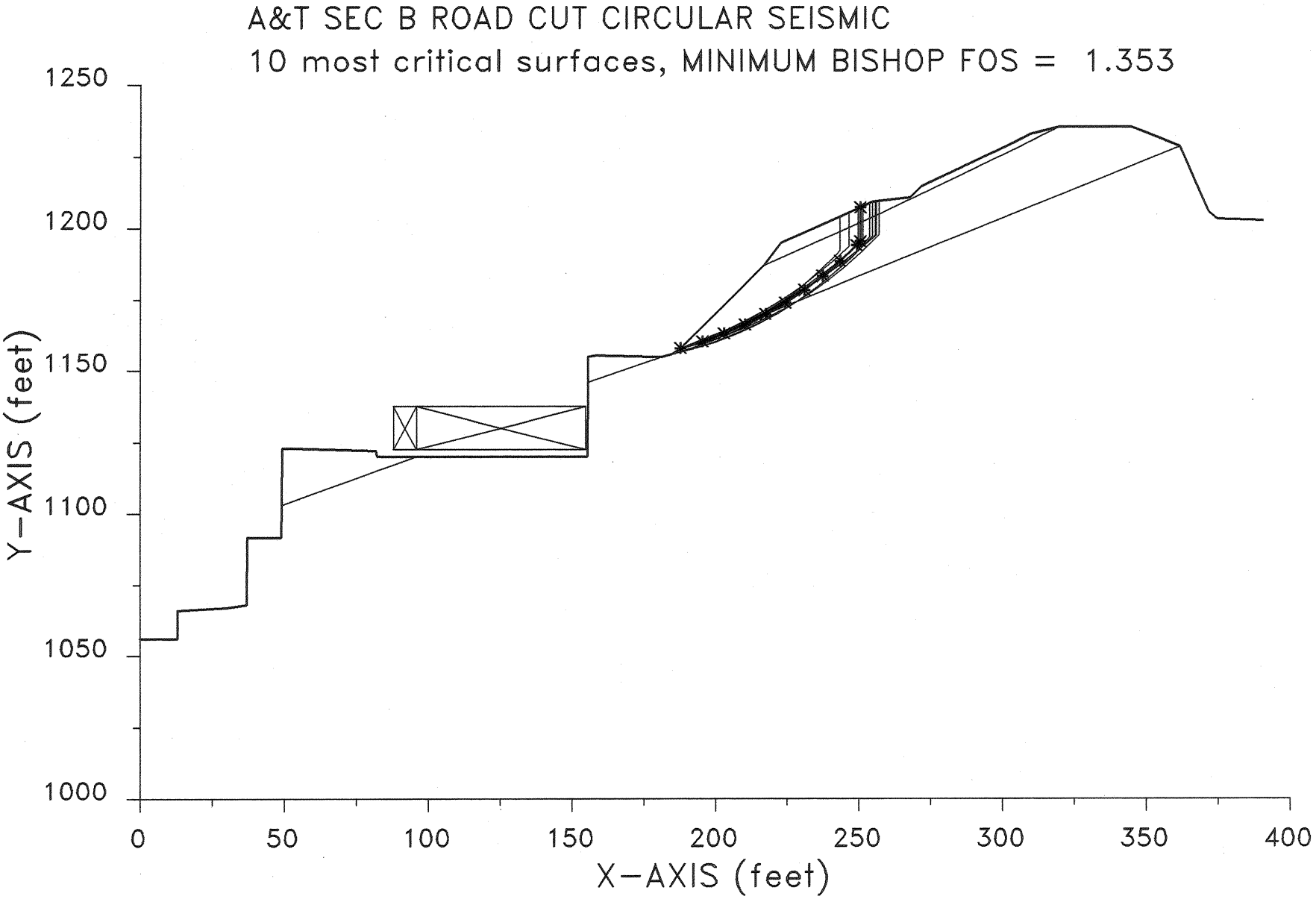
Problem Description : A&T SEC B ROAD CUT CIRCULAR SEISMIC

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.353	150.98	1291.37	138.42	188.00	250.66	1.711E+07
2.	1.355	156.42	1271.48	117.79	188.00	243.44	1.215E+07
3.	1.356	156.17	1284.25	131.45	185.00	254.76	1.951E+07
4.	1.357	132.78	1323.19	174.17	188.00	251.46	2.094E+07
5.	1.357	131.78	1332.02	182.87	188.00	255.73	2.437E+07
6.	1.357	147.96	1291.00	139.99	185.00	249.77	1.785E+07
7.	1.358	158.78	1278.44	125.21	185.00	253.72	1.837E+07
8.	1.358	136.76	1308.53	159.01	188.00	246.53	1.692E+07

9.	1.361	157.42	1291.21	136.68	188.00	257.11	2.047E+07
10.	1.362	120.31	1352.83	206.25	188.00	256.13	2.724E+07

* * * END OF FILE * * *

17563B4S 11-10-16 15:54



XSTABL File: 17563B5 11-11-16 11:04

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*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*           Method of Slices            *
*                                       *
*         Copyright (C) 1992 - 99       *
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*                                       *
*  Ver. 5.203                 96 - 1710 *
*****************************************
```

Problem Description : A&T B BASEMENT SHORING REINFORCED

SEGMENT BOUNDARY COORDINATES

---

33 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1056.0	13.0	1056.0	3
2	13.0	1056.0	13.1	1066.0	3
3	13.1	1066.0	30.0	1067.0	3
4	30.0	1067.0	37.0	1068.0	3
5	37.0	1068.0	37.1	1091.5	3
6	37.1	1091.5	49.0	1091.5	3
7	49.0	1091.5	49.1	1103.0	3
8	49.1	1103.0	49.3	1123.0	2
9	49.3	1123.0	53.5	1123.0	2
10	53.5	1123.0	82.0	1122.0	2
11	82.0	1122.0	82.3	1120.0	2
12	82.3	1120.0	96.0	1120.0	2
13	96.0	1120.0	155.5	1120.0	3
14	155.5	1120.0	155.7	1146.0	3
15	155.7	1146.0	155.8	1155.0	2
16	155.8	1155.0	158.5	1155.5	2
17	158.5	1155.5	178.0	1155.0	2
18	178.0	1155.0	181.5	1155.0	3
19	181.5	1155.0	185.0	1156.0	3
20	185.0	1156.0	188.0	1158.0	3
21	188.0	1158.0	217.0	1187.0	2
22	217.0	1187.0	223.0	1195.0	1
23	223.0	1195.0	252.0	1208.0	1
24	252.0	1208.0	255.0	1209.5	1
25	255.0	1209.5	268.0	1211.0	1
26	268.0	1211.0	272.0	1215.0	1

27	272.0	1215.0	310.0	1233.0	1
28	310.0	1233.0	320.0	1235.5	1
29	320.0	1235.5	345.0	1235.5	2
30	345.0	1235.5	362.0	1229.0	2
31	362.0	1229.0	372.0	1206.0	3
32	372.0	1206.0	375.0	1203.5	3
33	375.0	1203.5	391.0	1203.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	217.0	1187.0	257.0	1205.0	2
2	257.0	1205.0	320.0	1235.5	2
3	49.1	1103.0	96.0	1120.0	3
4	155.7	1146.0	181.5	1155.0	3
5	188.0	1158.0	362.0	1229.0	2

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

REINFORCED SLOPE ANALYSIS

The analysis will be performed to determine the critical surface that requires the largest amount of reinforcing force to satisfy:

Minimum (required) FOS = 1.250

Resultant at Elevation = 1132.00 feet

BOUNDARY LOADS
---

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	88.0	155.0	500.0	.0

NOTE - Intensity is specified as a uniformly distributed force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 155.5 ft
and x = 155.5 ft

Each surface terminates between x = 160.0 ft
and x = 330.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1110.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

12.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

```
**********************************************************************
   --  WARNING  --  WARNING  --  WARNING  --  WARNING  --  (# 48)
**********************************************************************
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter.  In such
cases, this effect can only be eliminated by reducing the "c" value.
**********************************************************************
```

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 5 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	155.50	1120.00
2	161.13	1130.60
3	165.27	1141.86
4	165.58	1143.32
5	165.58	1155.32

```
**********************************************************************
**  Maximum Required Reinforcement Force = 2.7135E+03  (lb)      **
**  Simplified BISHOP FOS =  1.250   (for above reinforcement)   **
**********************************************************************
```

The following is a summary of the TEN most critical surfaces

Problem Description : A&T B BASEMENT SHORING REINFORCED

REINFORCING FORCES calculated for minimum FOS = 1.250 and
reinforcing force resultant at elevation = 1132.00 feet

==========

	Reinf. Force (lb)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2713.	80.95	1166.41	87.8	155.5	165.6	3.518E+06
2.	2701.	56.53	1178.61	115.0	155.5	165.9	4.703E+06
3.	2660.	19.77	1198.54	156.8	155.5	166.5	6.641E+06
4.	2637.	59.11	1175.06	111.0	155.5	165.4	4.355E+06

5.	2604.	16.62	1195.46	158.1	155.5	165.8	6.336E+06
6.	2589.	-6.03	1214.53	187.2	155.5	167.0	8.198E+06
7.	2572.	61.18	1172.91	108.1	155.5	165.1	4.144E+06
8.	2566.	81.34	1170.87	89.9	155.5	166.8	3.956E+06
9.	2540.	-21.99	1212.66	200.2	155.5	165.8	8.005E+06
10.	2530.	67.61	1178.88	105.8	155.5	167.1	4.736E+06

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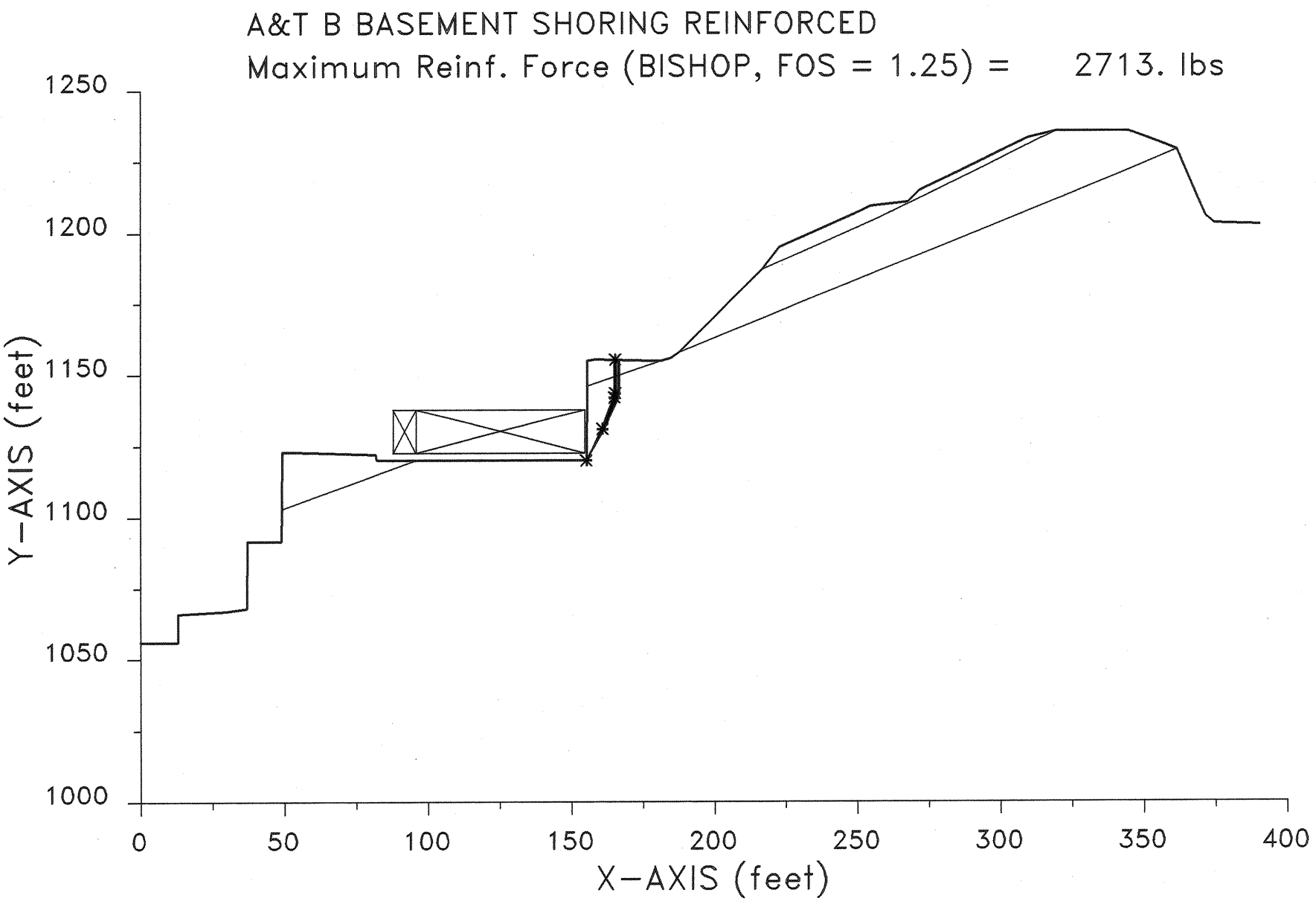

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*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 - 99         *
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*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.203                 96 - 1710   *
*******************************************
```

Problem Description : A&T SEC D BELOW ROAD STATIC

SEGMENT BOUNDARY COORDINATES
---

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1102.0	13.0	1110.0	1
2	13.0	1110.0	40.0	1132.0	1
3	40.0	1132.0	49.0	1137.0	1
4	49.0	1137.0	49.1	1146.0	1
5	49.1	1146.0	67.5	1146.0	1
6	67.5	1146.0	81.5	1146.0	2
7	81.5	1146.0	170.0	1235.0	2
8	170.0	1235.0	188.0	1235.0	2
9	188.0	1235.0	202.0	1228.0	2
10	202.0	1228.0	212.5	1206.0	3
11	212.5	1206.0	216.5	1203.0	3
12	216.5	1203.0	232.0	1202.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1099.0	38.0	1124.0	2
2	38.0	1124.0	67.5	1146.0	2
3	.0	1080.0	100.0	1157.0	3
4	100.0	1157.0	172.0	1212.0	3
5	172.0	1212.0	202.0	1228.0	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = .0 ft
and x = .0 ft

Each surface terminates between x = 60.0 ft
and x = 220.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1100.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

11.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := 25.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 23 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	.00	1102.00
2	10.76	1104.30
3	21.43	1106.98
4	31.99	1110.03
5	42.45	1113.45
6	52.78	1117.24
7	62.96	1121.38
8	73.00	1125.89
9	82.87	1130.74
10	92.57	1135.94
11	102.07	1141.48
12	111.38	1147.34
13	120.47	1153.53
14	129.34	1160.04
15	137.97	1166.86
16	146.36	1173.97
17	154.50	1181.38
18	162.36	1189.06
19	169.96	1197.02
20	177.27	1205.24
21	184.28	1213.72
22	190.48	1221.76
23	190.48	1233.76

**** Simplified BISHOP FOS = 2.042 ****

The following is a summary of the TEN most critical surfaces

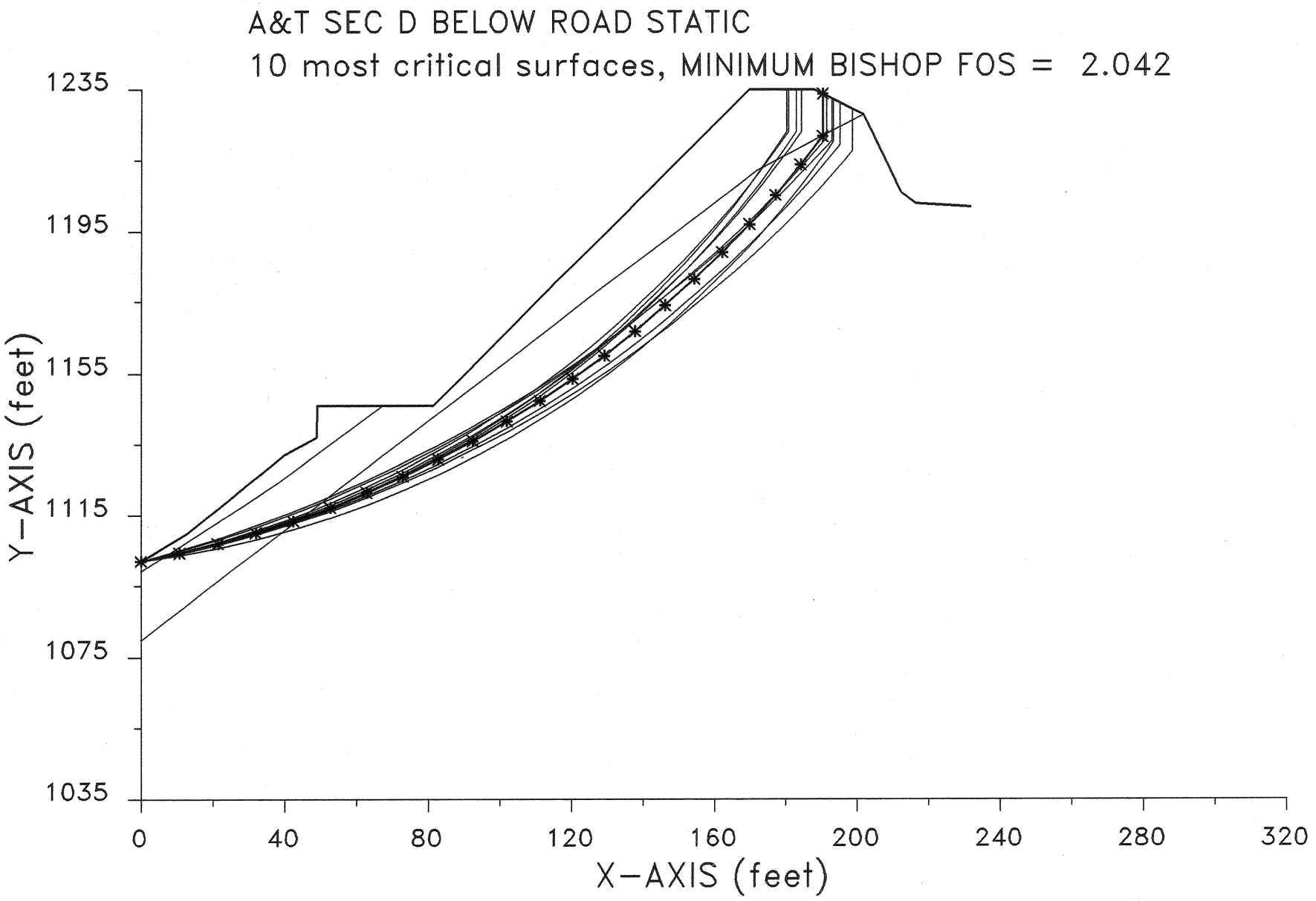
Problem Description : A&T SEC D BELOW ROAD STATIC

FOS	Circle Center	Radius	Initial	Terminal	Resisting

	(BISHOP)	x-coord (ft)	y-coord (ft)	(ft)	x-coord (ft)	x-coord (ft)	Moment (ft-lb)
1.	2.042	-59.98	1408.76	312.57	.00	190.48	2.301E+08
2.	2.044	-36.42	1378.89	279.28	.00	193.41	2.395E+08
3.	2.047	-58.32	1392.13	295.94	.00	184.47	1.949E+08
4.	2.049	-48.93	1374.93	277.28	.00	182.96	1.854E+08
5.	2.051	-60.42	1423.79	327.42	.00	195.30	2.655E+08
6.	2.060	-91.81	1463.09	372.58	.00	191.57	2.536E+08
7.	2.060	-48.30	1368.88	271.22	.00	180.28	1.731E+08
8.	2.064	-60.36	1387.85	292.15	.00	180.80	1.777E+08
9.	2.068	-62.38	1438.04	341.78	.00	198.79	2.944E+08
10.	2.071	-104.88	1489.10	401.05	.00	192.96	2.726E+08

* * * END OF FILE * * *

17563D1 11-11-16 11:12



XSTABL File: 17563D1S 11-11-16 11:13

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*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 - 99         *
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*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.203                96 - 1710    *
*******************************************
```

Problem Description : A&T SEC D BELOW ROAD SEISMIC

SEGMENT BOUNDARY COORDINATES

---

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1102.0	13.0	1110.0	1
2	13.0	1110.0	40.0	1132.0	1
3	40.0	1132.0	49.0	1137.0	1
4	49.0	1137.0	49.1	1146.0	1
5	49.1	1146.0	67.5	1146.0	1
6	67.5	1146.0	81.5	1146.0	2
7	81.5	1146.0	170.0	1235.0	2
8	170.0	1235.0	188.0	1235.0	2
9	188.0	1235.0	202.0	1228.0	2
10	202.0	1228.0	212.5	1206.0	3
11	212.5	1206.0	216.5	1203.0	3
12	216.5	1203.0	232.0	1202.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1099.0	38.0	1124.0	2
2	38.0	1124.0	67.5	1146.0	2
3	.0	1080.0	100.0	1157.0	3
4	100.0	1157.0	172.0	1212.0	3
5	172.0	1212.0	202.0	1228.0	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A horizontal earthquake loading coefficient of .296 has been assigned

A vertical earthquake loading coefficient of .000 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = .0 ft
and x = .0 ft

Each surface terminates between x = 60.0 ft
and x = 220.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1100.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

11.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := 25.0 degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	.00	1102.00
2	10.78	1104.21
3	21.47	1106.78
4	32.07	1109.71
5	42.57	1113.00
6	52.95	1116.63
7	63.21	1120.61
8	73.32	1124.94
9	83.29	1129.60
10	93.09	1134.59
11	102.72	1139.91
12	112.16	1145.55
13	121.41	1151.50
14	130.45	1157.77
15	139.28	1164.33
16	147.89	1171.18
17	156.25	1178.32
18	164.38	1185.74
19	172.25	1193.42
20	179.85	1201.37
21	187.19	1209.56
22	194.25	1218.00
23	195.30	1219.35
24	195.30	1231.35

**** Simplified BISHOP FOS = 1.251 ****

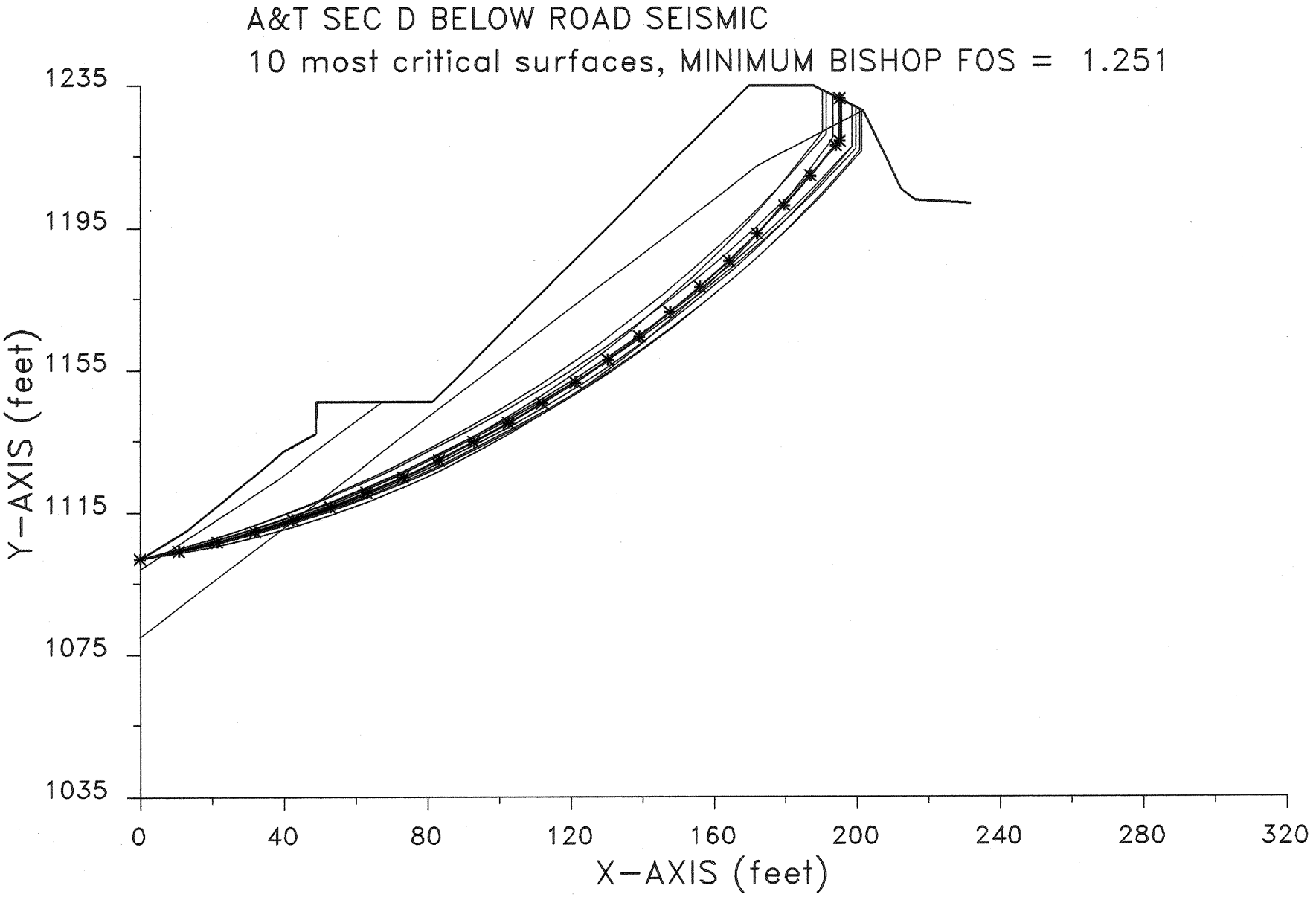
The following is a summary of the TEN most critical surfaces

Problem Description : A&T SEC D BELOW ROAD SEISMIC

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.251	-60.42	1423.79	327.42	.00	195.30	2.298E+08
2.	1.254	-62.38	1438.04	341.78	.00	198.79	2.554E+08
3.	1.255	-84.73	1476.26	383.73	.00	198.72	2.692E+08
4.	1.256	-59.98	1408.76	312.57	.00	190.48	1.989E+08
5.	1.257	-83.74	1478.62	385.81	.00	199.83	2.776E+08
6.	1.257	-98.45	1488.79	399.12	.00	195.77	2.540E+08
7.	1.258	-36.42	1378.89	279.28	.00	193.41	2.077E+08
8.	1.259	-57.14	1435.61	338.47	.00	200.85	2.672E+08
9.	1.259	-62.27	1446.38	349.96	.00	201.38	2.748E+08
10.	1.261	-91.81	1463.09	372.58	.00	191.57	2.191E+08

* * * END OF FILE * * *

17563D1S 11-11-16 11:13



XSTABL File: 17563D2 11-11-16 11:15

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 - 99         *
*    Interactive Software Designs, Inc.   *
*         Moscow, ID 83843, U.S.A.        *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.203                96 - 1710    *
*******************************************
```

Problem Description : A&T SEC D ABOVE ROAD STATIC

SEGMENT BOUNDARY COORDINATES

---

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1102.0	13.0	1110.0	1
2	13.0	1110.0	40.0	1132.0	1
3	40.0	1132.0	49.0	1137.0	1
4	49.0	1137.0	49.1	1146.0	1
5	49.1	1146.0	67.5	1146.0	1
6	67.5	1146.0	81.5	1146.0	2
7	81.5	1146.0	170.0	1235.0	2
8	170.0	1235.0	188.0	1235.0	2
9	188.0	1235.0	202.0	1228.0	2
10	202.0	1228.0	212.5	1206.0	3
11	212.5	1206.0	216.5	1203.0	3
12	216.5	1203.0	232.0	1202.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1099.0	38.0	1124.0	2
2	38.0	1124.0	67.5	1146.0	2
3	.0	1080.0	100.0	1157.0	3
4	100.0	1157.0	172.0	1212.0	3
5	172.0	1212.0	202.0	1228.0	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 81.5 ft
and x = 81.5 ft

Each surface terminates between x = 90.0 ft
and x = 220.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1140.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

6.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

```
---------------------

  The first segment of each failure surface will be inclined
  within the angular range defined by :

        Lower angular limit :=   -45.0 degrees
        Upper angular limit :=  (slope angle - 5.0) degrees



**********************************************************************
   --  WARNING  --  WARNING  --  WARNING  --  WARNING  --  (# 48)
**********************************************************************
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter.  In such
cases, this effect can only be eliminated by reducing the "c" value.
**********************************************************************

   ------------------------------------------------------------
   USER SELECTED option to maintain strength greater than zero
   ------------------------------------------------------------


   ************************************************************
   **     Factor of safety calculation for surface #   210    **
   **     failed to converge within FIFTY iterations          **
   **                                                         **
   **    The last calculated value of the FOS was    .0018    **
   **    This will be ignored for final summary of results    **
   ************************************************************


Circular surface (FOS=   .0018) is defined by: xcenter =     62.85
ycenter =   1173.29   Init. Pt. =     81.50   Seg. Length =   6.00
-------------------------------------------------------------------


   ************************************************************
   **     Factor of safety calculation for surface #   341    **
   **     failed to converge within FIFTY iterations          **
   **                                                         **
   **    The last calculated value of the FOS was    .0016    **
   **    This will be ignored for final summary of results    **
   ************************************************************


Circular surface (FOS=   .0016) is defined by: xcenter =     63.16
ycenter =   1173.38   Init. Pt. =     81.50   Seg. Length =   6.00
-------------------------------------------------------------------


   Factors of safety have been calculated by the :

   * * * * *   SIMPLIFIED BISHOP METHOD   * * * * *
```

The most critical circular failure surface
is specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	81.50	1146.00
2	87.21	1147.85
3	92.84	1149.91
4	98.40	1152.17
5	103.88	1154.62
6	109.26	1157.27
7	114.55	1160.11
8	119.73	1163.14
9	124.79	1166.35
10	129.74	1169.74
11	134.57	1173.31
12	139.27	1177.04
13	143.82	1180.94
14	148.24	1185.01
15	152.51	1189.22
16	156.62	1193.59
17	160.58	1198.10
18	164.37	1202.75
19	167.99	1207.53
20	171.44	1212.44
21	174.71	1217.47
22	177.80	1222.62
23	178.02	1223.00
24	178.02	1235.00

**** Simplified BISHOP FOS = 1.886 ****

****
** **
** Out of the 400 surfaces generated and analyzed by XSTABL, **
** 2 surfaces were found to have MISLEADING FOS values. **
** **
****

The following is a summary of the TEN most critical surfaces

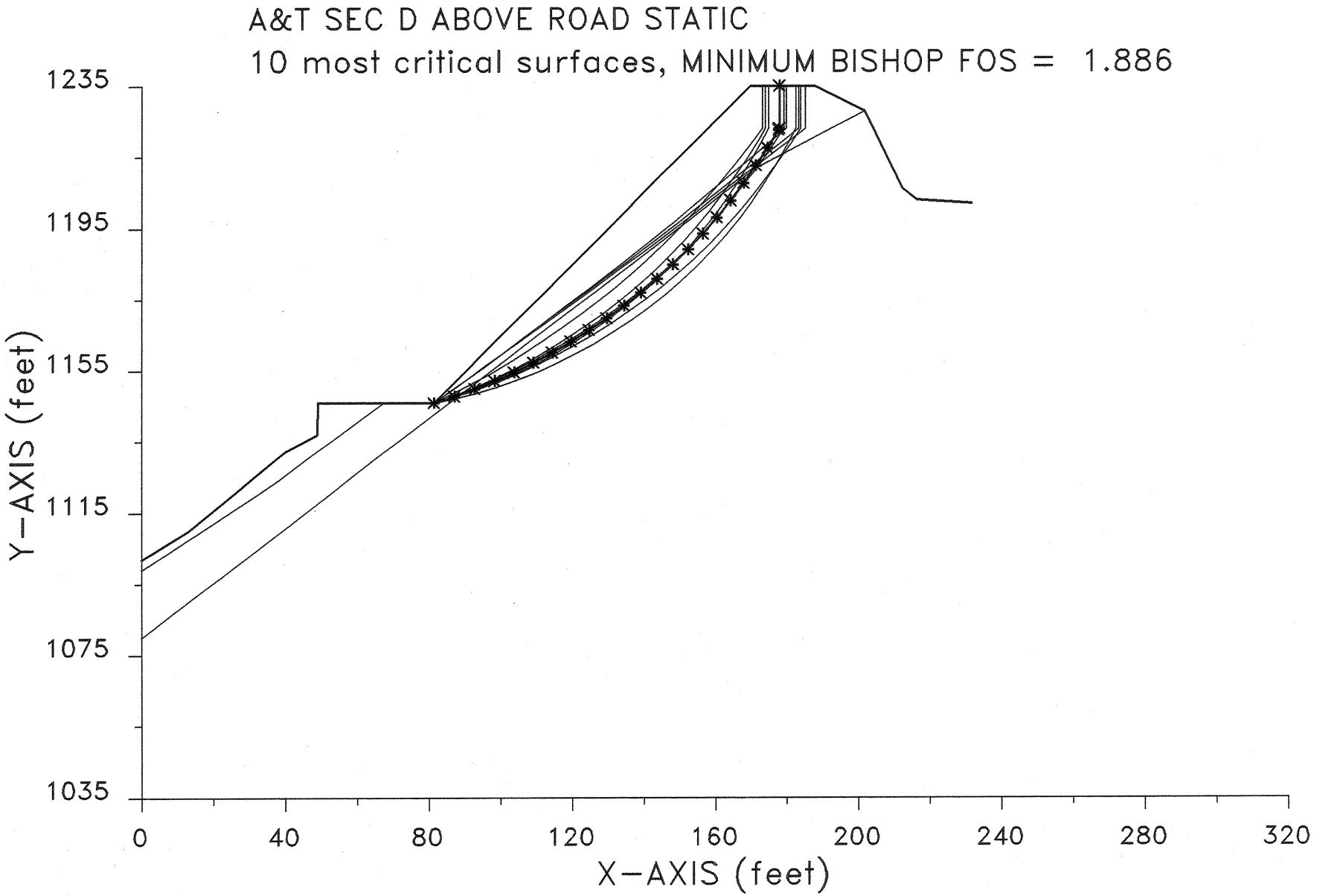
Problem Description : A&T SEC D ABOVE ROAD STATIC

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.886	32.55	1306.35	167.65	81.50	178.02	5.403E+07
2.	1.887	-726.32	2279.96	1392.28	81.50	179.92	2.642E+08
3.	1.890	43.13	1287.87	146.97	81.50	174.97	4.605E+07
4.	1.890	26.60	1306.26	169.41	81.50	174.12	4.771E+07
5.	1.890	23.96	1319.62	182.91	81.50	179.24	5.885E+07

6.	1.901	35.34	1313.98	174.21	81.50	183.89	6.553E+07
7.	1.909	-1617.55	3543.33	2938.36	81.50	185.25	6.423E+08
8.	1.910	-1472.41	3309.18	2663.45	81.50	183.46	5.519E+08
9.	1.912	55.16	1285.59	142.05	81.50	182.67	5.724E+07
10.	1.914	-20.88	1361.16	238.27	81.50	173.25	5.522E+07

* * * END OF FILE * * *

17563D2 11-11-16 11:15



XSTABL File: 17563D2S 11-11-16 11:15

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*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 - 99         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.203                 96 - 1710   *
*******************************************
```

Problem Description : A&T SEC D ABOVE ROAD SEISMIC

SEGMENT BOUNDARY COORDINATES

---

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1102.0	13.0	1110.0	1
2	13.0	1110.0	40.0	1132.0	1
3	40.0	1132.0	49.0	1137.0	1
4	49.0	1137.0	49.1	1146.0	1
5	49.1	1146.0	67.5	1146.0	1
6	67.5	1146.0	81.5	1146.0	2
7	81.5	1146.0	170.0	1235.0	2
8	170.0	1235.0	188.0	1235.0	2
9	188.0	1235.0	202.0	1228.0	2
10	202.0	1228.0	212.5	1206.0	3
11	212.5	1206.0	216.5	1203.0	3
12	216.5	1203.0	232.0	1202.0	3

5 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	1099.0	38.0	1124.0	2
2	38.0	1124.0	67.5	1146.0	2
3	.0	1080.0	100.0	1157.0	3
4	100.0	1157.0	172.0	1212.0	3
5	172.0	1212.0	202.0	1228.0	3

A CRACKED ZONE HAS BEEN SPECIFIED

Depth of crack below ground surface = 12.00 (feet)
Maximum depth of water in crack = .00 (feet)
Unit weight of water in crack = 62.40 (pcf)

Failure surfaces will have a vertical side equal to the specified depth of crack and be affected by a hydrostatic force according to the specified depth of water in the crack

---
ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	120.0	60.0	42.00	.000	.0	0
2	140.0	140.0	510.0	45.00	.000	.0	0
3	145.0	145.0	900.0	45.00	.000	.0	0

A horizontal earthquake loading coefficient of .296 has been assigned

A vertical earthquake loading coefficient of .000 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

400 Surfaces initiate from each of 1 points equally spaced along the ground surface between x = 81.5 ft
and x = 81.5 ft

Each surface terminates between x = 90.0 ft
and x = 220.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 1140.0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

6.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****
Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 24 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	81.50	1146.00
2	86.39	1149.47
3	91.28	1152.96
4	96.15	1156.45
5	101.02	1159.96
6	105.89	1163.47
7	110.74	1167.00
8	115.59	1170.53
9	120.43	1174.07
10	125.27	1177.63
11	130.10	1181.19
12	134.92	1184.76
13	139.73	1188.35
14	144.53	1191.94

15	149.33	1195.54
16	154.12	1199.15
17	158.91	1202.77
18	163.68	1206.41
19	168.45	1210.05
20	173.21	1213.70
21	177.97	1217.36
22	182.71	1221.03
23	185.25	1223.00
24	185.25	1235.00

**** Simplified BISHOP FOS = 1.159 ****

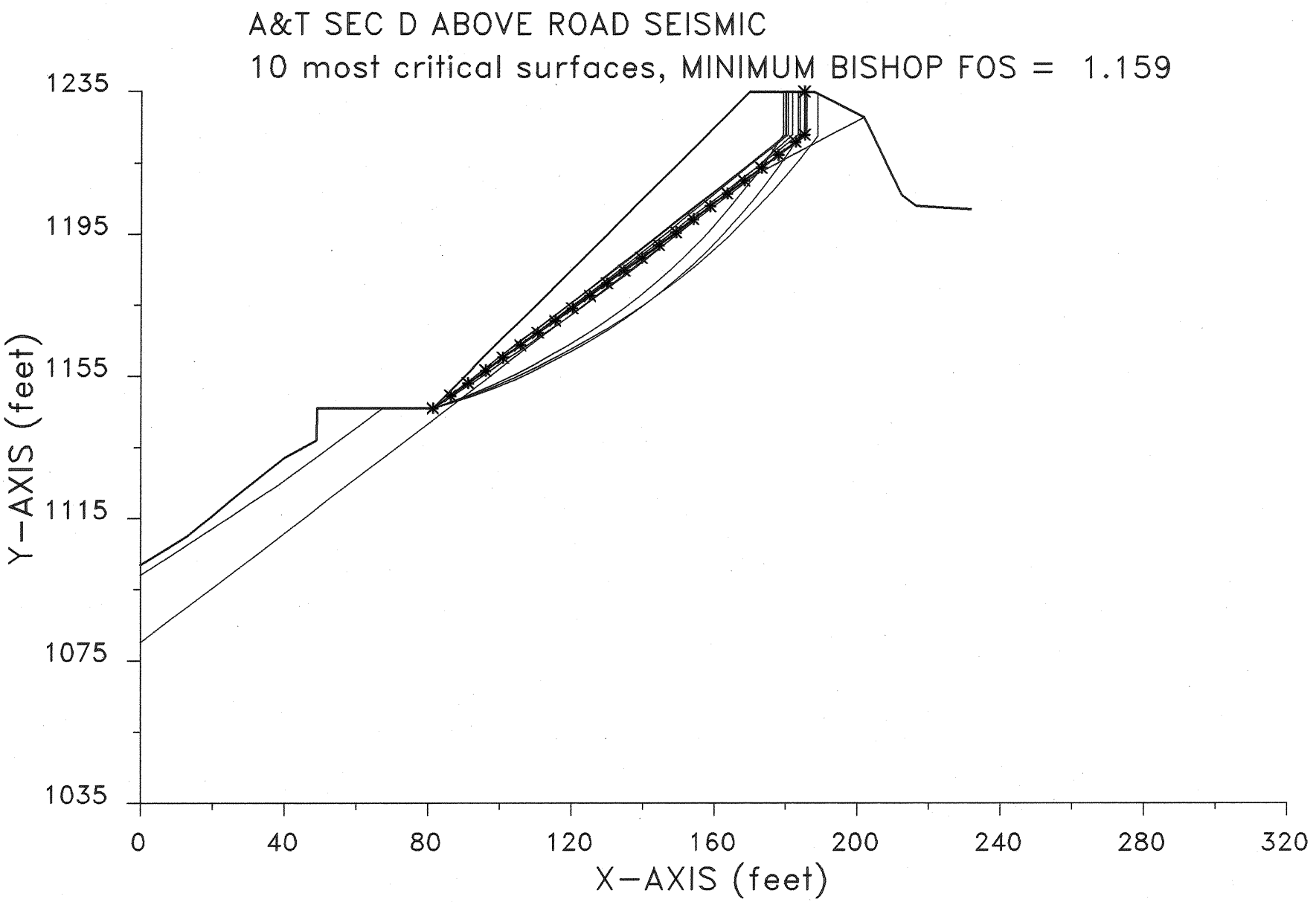
The following is a summary of the TEN most critical surfaces

Problem Description : A&T SEC D ABOVE ROAD SEISMIC

	FOS (BISHOP)	Circle Center x-coord (ft)	y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.159	-1617.55	3543.33	2938.36	81.50	185.25	5.433E+08
2.	1.166	-1472.41	3309.18	2663.45	81.50	183.46	4.670E+08
3.	1.167	-726.32	2279.96	1392.28	81.50	179.92	2.233E+08
4.	1.169	-3416.96	5993.37	5977.98	81.50	185.79	1.108E+09
5.	1.199	-288.39	1731.86	692.86	81.50	181.84	1.359E+08
6.	1.206	-3375.89	5698.48	5716.52	81.50	180.60	8.975E+08
7.	1.212	-3438.93	5757.41	5801.60	81.50	180.11	8.954E+08
8.	1.224	23.96	1319.62	182.91	81.50	179.24	5.052E+07
9.	1.225	35.34	1313.98	174.21	81.50	183.89	5.645E+07
10.	1.227	18.72	1347.45	211.01	81.50	188.81	7.261E+07

* * * END OF FILE * * *

17563D2S 11-11-16 11:15



MAPPED ATTITUDES

OF

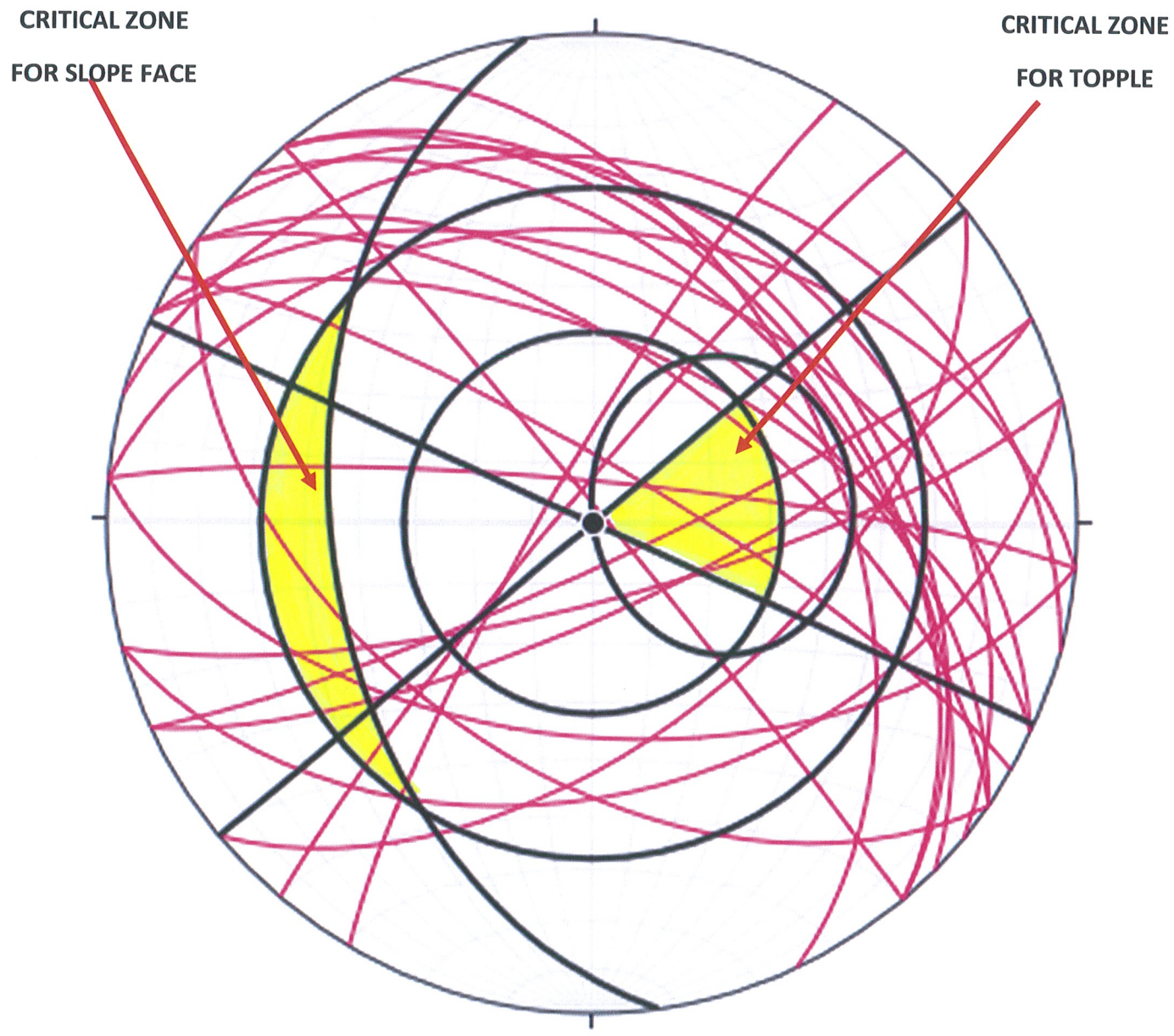
Area 1

MAPPED ATTITUDES		DIP DIRECTION	DIP
1	*	65	46
2	~	30	80
3	**	165	44
4	*	50	41
5		35	54
6		215	49
7		5	83
8	*	45	47
9	**	155	75
10		25	60
11		165	77
12	*	5	40
13		50	88
14		35	90
15	**	25	47
16		310	85
17	*	50	44
18		185	54
19	**	15	27
20	*	40	35
21		300	82
22	~	155	83
23		140	55
24		35	62
Foliation=* Vein=** Fault=~			

GREAT CIRCLE PLOT

OF

Area 1



SLOPE FACE	
DIP DIRECTION	DIP ANGLE
262	45

Grover-Hollingsworth and Associates, Inc.

Project Name:
A & T Development, LLC
Blue Heights Drive, Los Angeles

Project No.
GH17563-G
Date: 11/2016

Rapid Wedge Failure Analysis Input Data

(GR) Density of Rock = 145 lb(f)/ft ^{3}
(H) Height of Crest Above Intersection = 45 ft

Plane 1 : (D1) Dip Value = 77 °
(E1) Dip Direction = 165 °
Plane 2 : (D2) Dip Value = 54 °
(E2) Dip Direction = 185 °
Plane 3 : (D3) Dip Value = 45 °
(E3) Dip Direction = 262 °
Plane 4 : (D4) Dip Value = 45 °
(E4) Dip Direction = 262 °

Plane 1 : (C1) Cohesion = 0 lb(f)/ft ^{2}
(P1) Friction Angle = 36 °
Plane 2 : (C2) Cohesion = 0 lb(f)/ft ^{2}
(P2) Friction Angle = 36 °

Water Pressure : Dry Slope

The slope face DOES NOT hang over the toe of the slope.

Rapid Wedge Failure Analysis Output Data

(F) Factor of Safety = 3.75
Water Pressure = 0 lb(f)/ft ^{2}

THERE IS CONTACT ON BOTH PLANES.

Rapid Wedge Failure Analysis Input Data

(GR) Density of Rock = 145 lb(f)/ft ³
(H) Height of Crest Above Intersection = 45 ft

Plane 1 : (D1) Dip Value = 54 °
(E1) Dip Direction = 185 °
Plane 2 : (D2) Dip Value = 83 °
(E2) Dip Direction = 155 °
Plane 3 : (D3) Dip Value = 45 °
(E3) Dip Direction = 262 °
Plane 4 : (D4) Dip Value = 45 °
(E4) Dip Direction = 262 °

Plane 1 : (C1) Cohesion = 0 lb(f)/ft ²
(P1) Friction Angle = 36 °
Plane 2 : (C2) Cohesion = 0 lb(f)/ft ²
(P2) Friction Angle = 36 °

Water Pressure : Dry Slope

The slope face DOES NOT hang over the toe of the slope.

Rapid Wedge Failure Analysis Output Data

(F) Factor of Safety = 2.32
Water Pressure = 0 lb(f)/ft ²

THERE IS CONTACT ON BOTH PLANES.

MAPPED ATTITUDES

OF

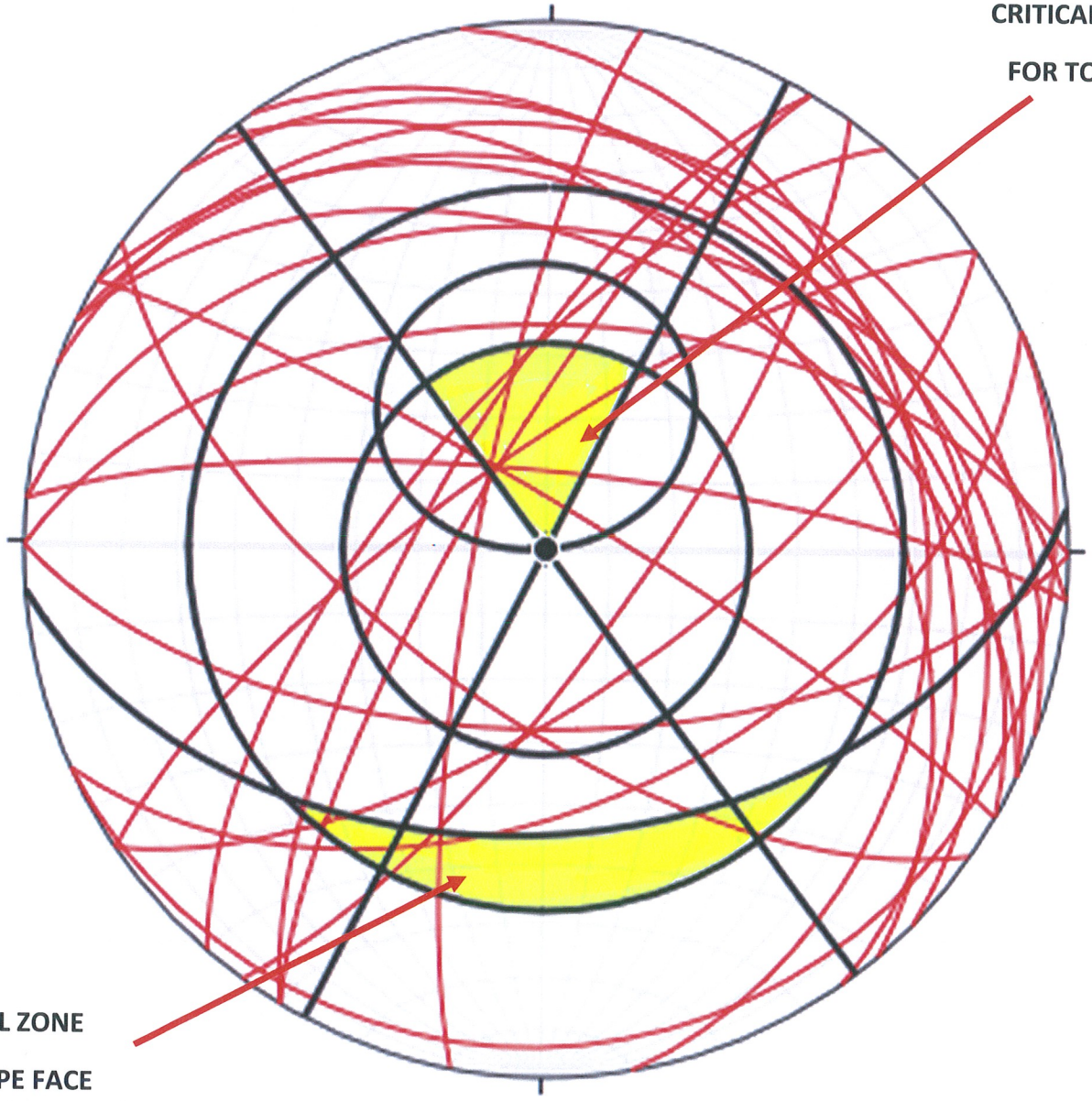
Area 2

MAPPED ATTITUDES		DIP DIRECTION	DIP
22	*	155	83
25	~	30	7
26		215	65
27		300	77
28	*	25	30
29		180	62
30		325	75
31	*	45	25
32		300	71
33		155	50
34	*	20	22
35	*	30	34
36		25	90
37		280	79
38	*	25	42
39		310	67
40		145	67
41	**	80	28
42	*	55	29
64	*	50	39
65	~	125	75
66		35	90
67		05	78
68	*	05	39
69	*	0	55
Foliation=* Vein=** Fault=~			

GREAT CIRCLE PLOT

OF

Area 2



SLOPE FACE	
DIP DIRECTION	DIP ANGLE
175	45

Grover-Hollingsworth and Associates, Inc.

Project Name:
A & T Development, LLC
Blue Heights Drive, Los Angeles

Project No.
GH17563-G
Date: 11/2016

Rapid Wedge Failure Analysis Input Data

(GR) Density of Rock = 145 lb(f)/ft ³
(H) Height of Crest Above Intersection = 45 ft

Plane 1 : (D1) Dip Value = 77 °
(E1) Dip Direction = 300 °
Plane 2 : (D2) Dip Value = 67 °
(E2) Dip Direction = 145 °
Plane 3 : (D3) Dip Value = 45 °
(E3) Dip Direction = 175 °
Plane 4 : (D4) Dip Value = 45 °
(E4) Dip Direction = 175 °

Plane 1 : (C1) Cohesion = 0 lb(f)/ft ²
(P1) Friction Angle = 36 °
Plane 2 : (C2) Cohesion = 0 lb(f)/ft ²
(P2) Friction Angle = 36 °

Water Pressure : Dry Slope

The slope face DOES NOT hang over the toe of the slope.

Rapid Wedge Failure Analysis Output Data

(F) Factor of Safety = 2.96
Water Pressure = 0 lb(f)/ft ²

THERE IS CONTACT ON BOTH PLANES.

Rapid Wedge Failure Analysis Input Data

(GR) Density of Rock = 145 lb(f)/ft ^{3}
(H) Height of Crest Above Intersection = 45 ft

Plane 1 : (D1) Dip Value = 50 °
(E1) Dip Direction = 155 °
Plane 2 : (D2) Dip Value = 79 °
(E2) Dip Direction = 280 °
Plane 3 : (D3) Dip Value = 45 °
(E3) Dip Direction = 175 °
Plane 4 : (D4) Dip Value = 45 °
(E4) Dip Direction = 175 °

Plane 1 : (C1) Cohesion = 0 lb(f)/ft ^{2}
(P1) Friction Angle = 36 °
Plane 2 : (C2) Cohesion = 0 lb(f)/ft ^{2}
(P2) Friction Angle = 36 °

Water Pressure : Dry Slope

The slope face DOES NOT hang over the toe of the slope.

Rapid Wedge Failure Analysis Output Data

(F) Factor of Safety = 1.35
Water Pressure = 0 lb(f)/ft ^{2}

THERE IS CONTACT ON BOTH PLANES.

Rapid Wedge Failure Analysis Input Data

(GR) Density of Rock = 145 lb(f)/ft ³
(H) Height of Crest Above Intersection = 45 ft

Plane 1 : (D1) Dip Value = 50 °
(E1) Dip Direction = 155 °
Plane 2 : (D2) Dip Value = 75 °
(E2) Dip Direction = 125 °
Plane 3 : (D3) Dip Value = 45 °
(E3) Dip Direction = 175 °
Plane 4 : (D4) Dip Value = 45 °
(E4) Dip Direction = 175 °

Plane 1 : (C1) Cohesion = 0 lb(f)/ft ²
(P1) Friction Angle = 36 °
Plane 2 : (C2) Cohesion = 0 lb(f)/ft ²
(P2) Friction Angle = 36 °

Water Pressure : Dry Slope

The slope face DOES NOT hang over the toe of the slope.

Rapid Wedge Failure Analysis Output Data

(F) Factor of Safety = 2.31
Water Pressure = 0 lb(f)/ft ²

THERE IS CONTACT ON BOTH PLANES.

MAPPED ATTITUDES

OF

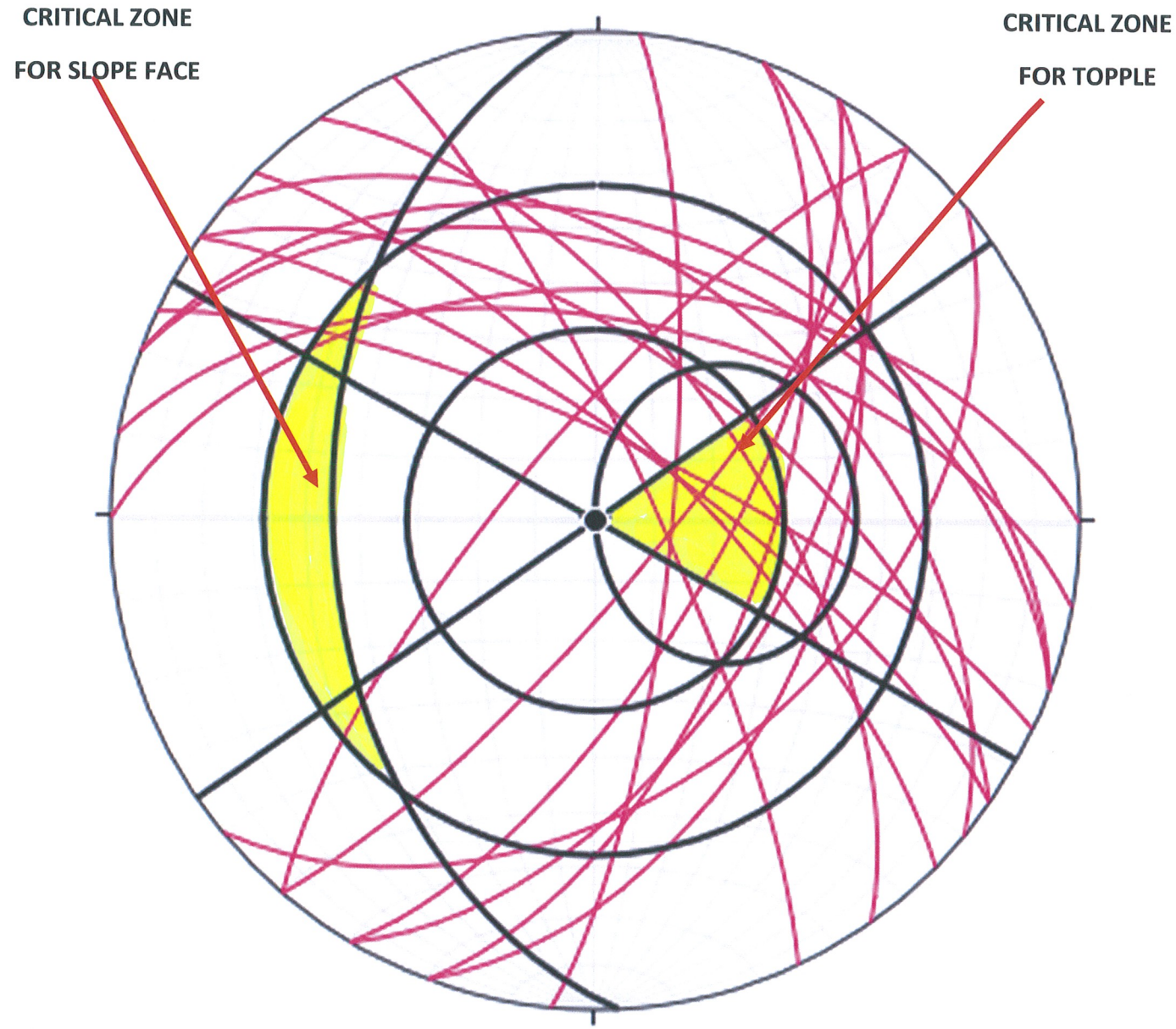
Area 3

MAPPED ATTITUDES		DIP DIRECTION	DIP
43	**	45	75
44	*	55	63
45		130	79
46	*	20	39
47		25	76
48		140	45
49	**	310	76
50	*	0	51
51	**	120	69
52	*	40	47
53		50	90
54		65	90
55		35	76
56		110	61
57	*	20	44
58		95	77
59	*	35	61
60		120	56
61	*	10	56
62		65	80
63		110	49
Foliation=* Vein=** Fault=~			

GREAT CIRCLE PLOT

OF

Area 3



SLOPE FACE	
DIP DIRECTION	DIP ANGLE
267	45

Grover-Hollingsworth and Associates, Inc.

Project Name:
A & T Development, LLC
Blue Heights Drive, Los Angeles

Project No.
GH17563-G
Date: 11/2016

Rapid Wedge Failure Analysis Input Data

(GR) Density of Rock = 145 lb(f)/ft ³
(H) Height of Crest Above Intersection = 45 ft

Plane 1 : (D1) Dip Value = 76 °
(E1) Dip Direction = 25 °
Plane 2 : (D2) Dip Value = 51 °
(E2) Dip Direction = 360 °
Plane 3 : (D3) Dip Value = 45 °
(E3) Dip Direction = 267 °
Plane 4 : (D4) Dip Value = 45 °
(E4) Dip Direction = 267 °

Plane 1 : (C1) Cohesion = 0 lb(f)/ft ²
(P1) Friction Angle = 36 °
Plane 2 : (C2) Cohesion = 0 lb(f)/ft ²
(P2) Friction Angle = 36 °

Water Pressure : Dry Slope

The slope face DOES NOT hang over the toe of the slope.

Rapid Wedge Failure Analysis Output Data

(F) Factor of Safety = 2.95
Water Pressure = 0 lb(f)/ft ²

THERE IS CONTACT ON BOTH PLANES.