STATE OF COLORADO

Gagnon - DNR, Nikie <nikie.gagnon@state.co.us>

Re: Tucson South Resource M-2004-044, Incomplete Application

1 message

Wyatt WEBSTER <wyatt.webster@amrize.com> Mon, Oct 20, 2025 at 9:27 AM
To: "Gagnon - DNR, Nikie" <nikie.gagnon@state.co.us>

Nikie,

Attached is the Civil Resources stability response for Tucson South. In lieu of sending additional structure agreements for the following, will you accept the stability response instead?

Western Midstream, gas line, PO Box 173779, Denver, CO 80212

Mountain Water Users, water line, PO Box 485, Brighton, CO 80601

Weld County Public Works, CR 23.5 & CR 2.75, 1111 H St. Greeley, CO 80631

CR Letter_Amrize SO Stability Response_10162025.pdf

Thank you,

Wyatt Webster
Land Manager
wyatt.webster@amrize.com

Amrize
1687 Cole Blvd., Suite 300, Golden, United States, 80401
T: (702) 379-4623
Amrize | LinkedIn | Facebook

AMRIZE
BUILD YOUR AMBITION

On Wed, Oct 1, 2025 at 4:45 PM Gagnon - DNR, Nikie <nikie.gagnon@state.co.us> wrote:

> Follow-up - Did you mail the financial affidavit for Travis Smith to Sara? We cannot accept copies of those.
>
> On Wed, Oct 1, 2025 at 1:39 PM Wyatt WEBSTER <wyatt.webster@amrize.com> wrote:
>
>> Nikie,
>>
>> I mistakenly omitted the conveyor portion when sending out structure agreements. I updated the full submittal (attached) with the 10 new structure owners. I'm currently working with Tetra Tech to complete the Geotechnical Stability Exhibit since I'll most likely get little to no structure agreements back.
>>
>> Thank you,
>>
>> **Wyatt Webster**
>> **Land Manager**
>> **wyatt.webster@amrize.com**
>>
>> **Amrize**
>> 1687 Cole Blvd., Suite 300, Golden, United States, 80401

October 16, 2025

Ms. Nikie Gagnon
Division of Reclamation, Mines, and Safety
1313 Sherman Street, Room 215
Denver, Colorado 80203

RE: Tucson South Resource, Permit No. M-2004-044, Geotechnical Stability Exhibit

Dear Ms. Gagnon:

Amrize West Central Inc. (Amrize) requested that Civil Resources, LLC (CR) review the geotechnical stability exhibits that were submitted for the Tucson South Resource mine (the Site) Amendment 1(AM1) and Amendment 2(AM2). In addition to this review, CR updated the structure owner maps submitted with AM2 to reflect structures currently in place within 200 feet of the permit boundary.

Since the approval of AM2, there has been the removal of multiple structures including structures owned by the applicant and oil and gas structures removed by the energy companies. Additionally, some of the structures have changed ownership. These changes have been included in the attached structure maps. A review of aerial imagery (Google Earth) does not show any additional structures, other than those associated with the mining operation and owned by the applicant, have been constructed within 200 feet of the permit boundary.

CR has observed mining and reclamation activities since the approval of AM2 and has received written verification from the miner that all conditions of AM2 have been adhered to(refer attached Amrize letter dated October 8, 2025). Since all portions of the approved permit have been adhered to and no additional structures have been constructed within the approved mine offsets, the approved stability analysis are still valid.

If there are any questions, please do not hesitate to contact me at KyleR@civilresources.com or via phone (303)833-1416 ext 210.

CIVIL RESOURCES, LLC

Kyle Regan, P.G.

Encl:
Amrize Letter Dated October 8, 2025
Structure Maps
TetraTech Stability Analysis (2019)
Civil Resources Stability Analysis (2021)

J:\Aggregate Industries-297\Tucson South Permit Support\2021 amendment\DRMS\DRMS Responses\Adequacy Review 2\Adequacy 2 response.doc

October 8, 2025

Civil Resources, LLC
Attn: Gary Linden & Kyle Regan
8308 Colorado Blvd., Suite 200
Firestone, CO 80504

RE: Tucson South Gravel Mine, M-2004-044
Tucson South Succession of Operator Stability Analysis

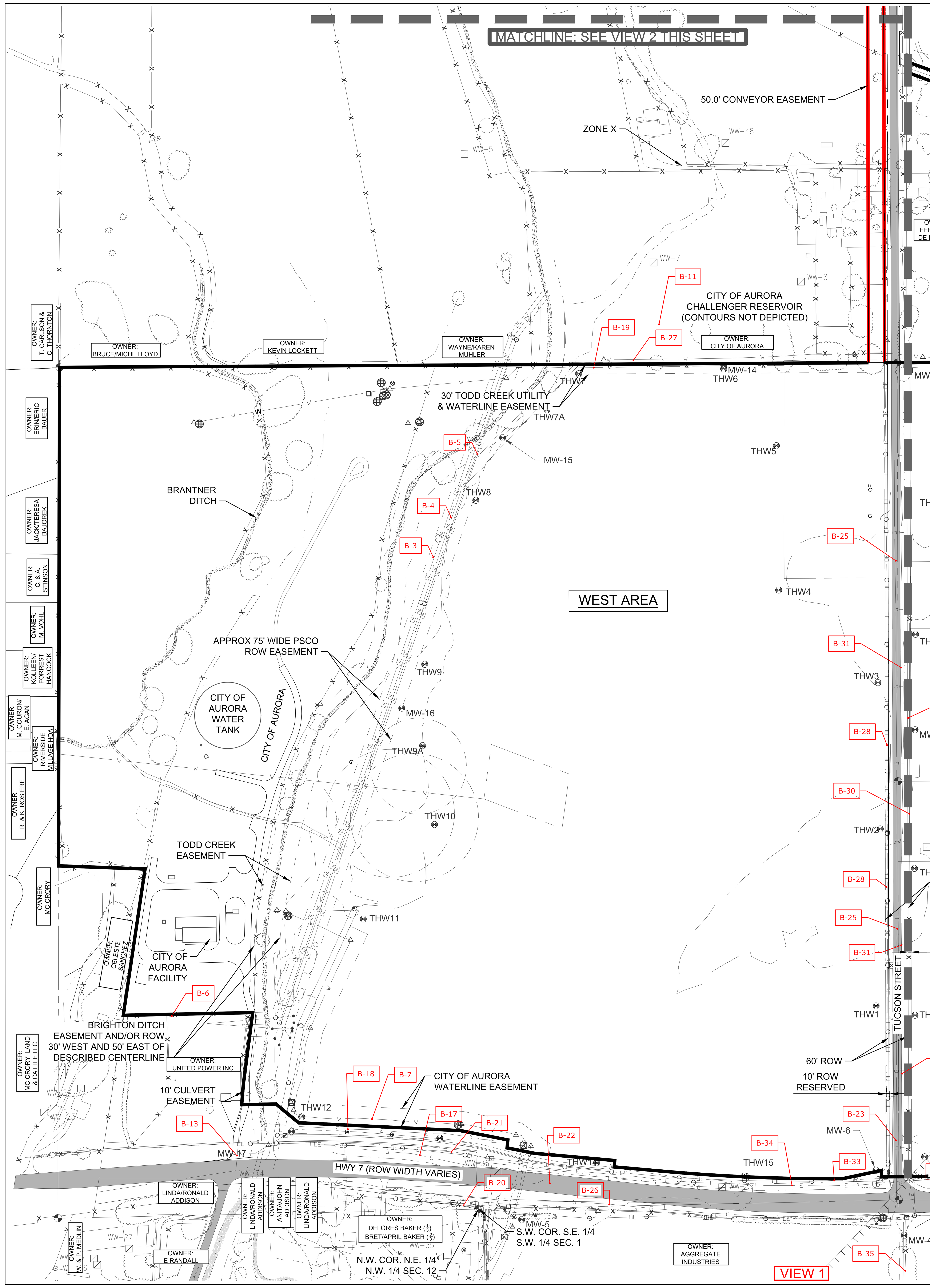
Mr. Linden,

The mining that has occurred in both Phase 1 and Phase 2 of the Tucson South Gravel Mine has adhered to all portions of the DRMS 112 Permit Amendment received September, 9th 2021. This adherence includes, but is not limited to, continuous dewatering, accurate slurry wall construction, meeting or exceeding all offsets from structures as called for in the 2019 Tetra Tech Stability Analysis, and all mining and reclamation activities performed as they were designed and where they were intended to be performed.

Should you have any questions or need additional information, please feel free to contact me at 702-379-4623 or by email at wyatt.webster@holcim.com. Thank you.

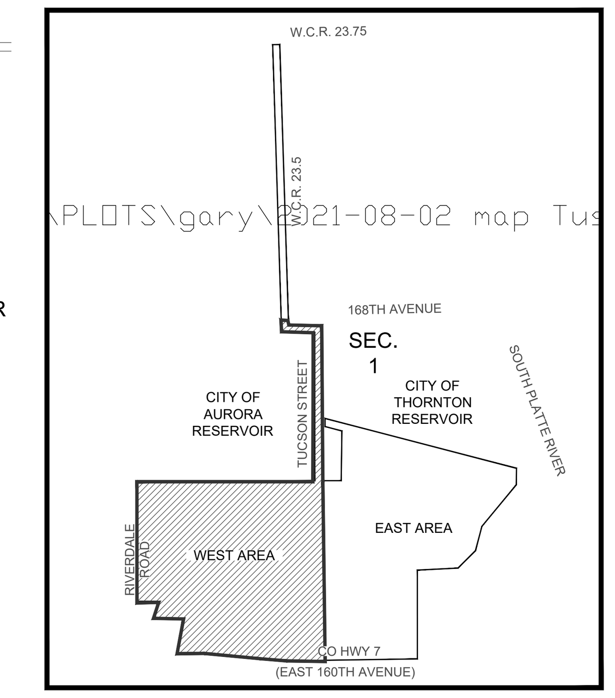
Sincerely,

Wyatt R. Webster
Environmental & Land Manager



LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE EXISTING ELECTRIC LINE
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- MW-1 MONITORING WELL LOCATION WITH WELL ID #
- WW-10 WATER WELL LOCATION WITH WELL ID #
- EXISTING TREES
- UTILITY POLE
- SECTION CORNER MONUMENT



NORTH

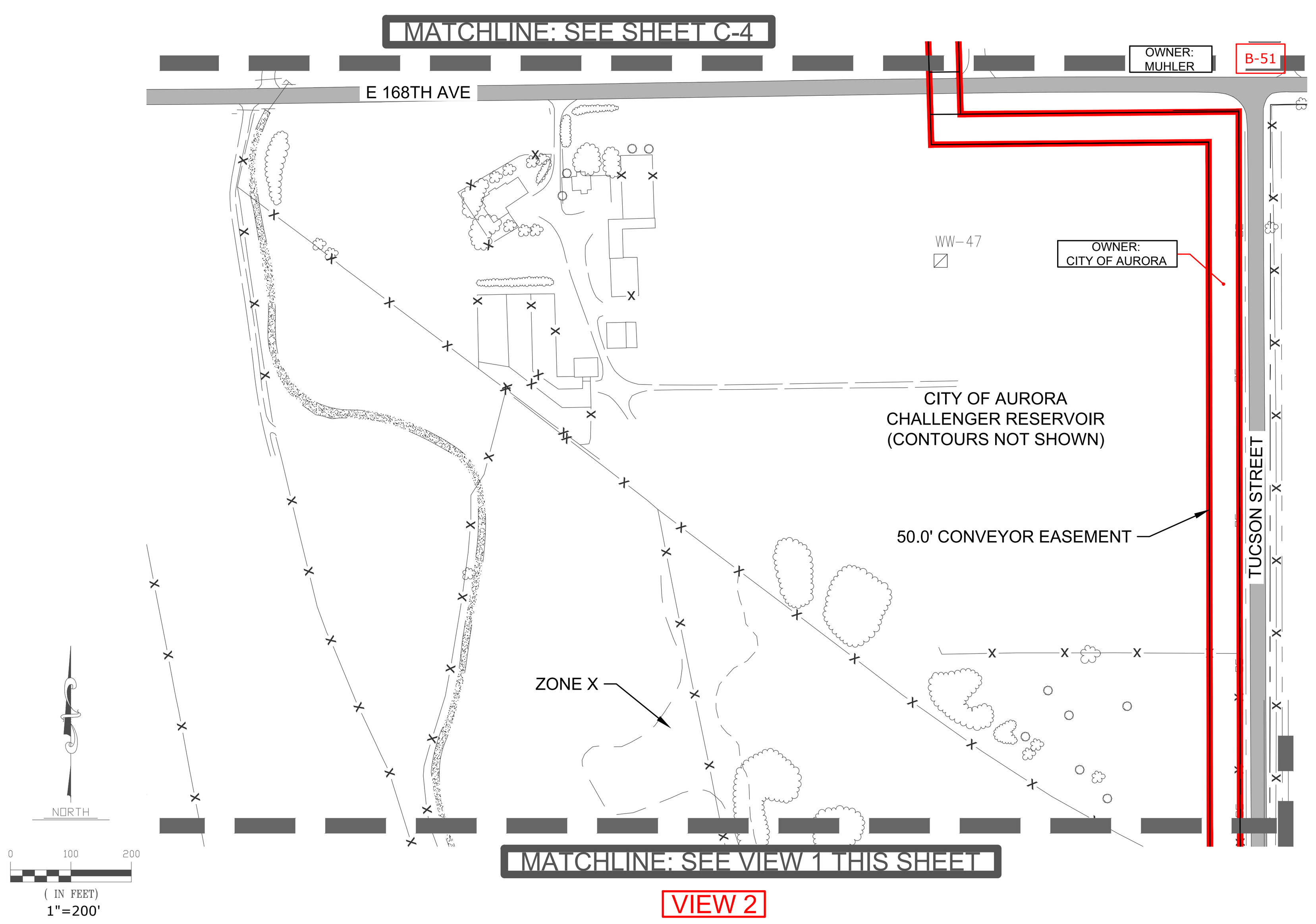
PERMIT KEY MAP

NTS

STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS	RECOMENDED OFFSET PER STABILITY ANALYSES (FT)*	STRUCTURE AGREEMENT OR MHFCD OFFSET (FT)	ACTUAL OFFSET FROM MINING LIMITS (FT)**
STRUCTURES TO BE REMOVED OR ABANDONED						
B-3	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1800 LARIMER ST. DENVER, CO 80202	68	--	75 min
B-4	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1800 LARIMER ST. DENVER, CO 80202	68	--	75 min
B-5	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1800 LARIMER ST. DENVER, CO 80202	68	--	75 min
B-6	ELECTRICAL SUBSTATION	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	45	--	511
B-7	WATERLINE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	72	60	83 min
B-9	BRIGHTON DITCH	BRIGHTON DITCH COMPANY	3286 WELD COUNTY RD 23, FT. LUPTON, CO 80621	45	--	90 min
B-11	CHALLENGER RESERVOIR	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	45	--	176
B-13	SHARED ACCESS	KATHLEEN BLOOM, DELORES, APRIL, AND BRETT BAKER, CITY OF AURORA	BLOOM: 12500 E. 160 AVE.,BRIGHTON, CO 80620; AURORA 15151 E ALAMEDA PKWY AURORA, CO 80012	106	--	200
B-17	GAS LINE	XCEL	2070 S. VALENTINA ST, DENVER, CO 80231	106	--	189
B-18	UNDERGROUND ELECTRIC	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	133
B-19	WATER LINE	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	10450 E. 159th CT., BRIGHTON, CO 80602	45	20	55
B-20	FENCE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	106	--	257
B-21	FENCE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	106	--	174
B-22	STATE HIGHWAY 7	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	106	--	185
B-23	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401		--	
B-24	TELEPHONE LINE	LUMEN TECHNOLOGIES	100 CENTURY LINK DRIVE, MONROE LA 71203	106	--	257
B-25	TUCSON STREET	ADAMS COUNTY	4430 S. ADAMS PARKWAY BRIGHTON, CO 80601	44	--	71
B-26	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	106	--	129
B-27	WATER LINE	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	10450 E. 159th CT., BRIGHTON, CO 80602	45	20	55
B-28	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	44	--	53
B-30	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	44	--	122
B-31	TELEPHONE LINE	LUMEN TECHNOLOGIES	100 CENTURY LINK DRIVE, MONROE LA 71203	44	--	80
B-32	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	186
B-33	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	111
B-34	UNDERGROUND ELECTRIC	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	106	--	128
B-35	FENCE	SAN MARTIN CABALLERO, LLC	333 EAST 76TH AVE., DENVER, CO 80229-6209	106	--	600

* Offset is selected from nearest feature analyzed in stability analyses

** Actual offset is measured from the feature to the mine limit



1" = 200'

811 Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING WEST AREA

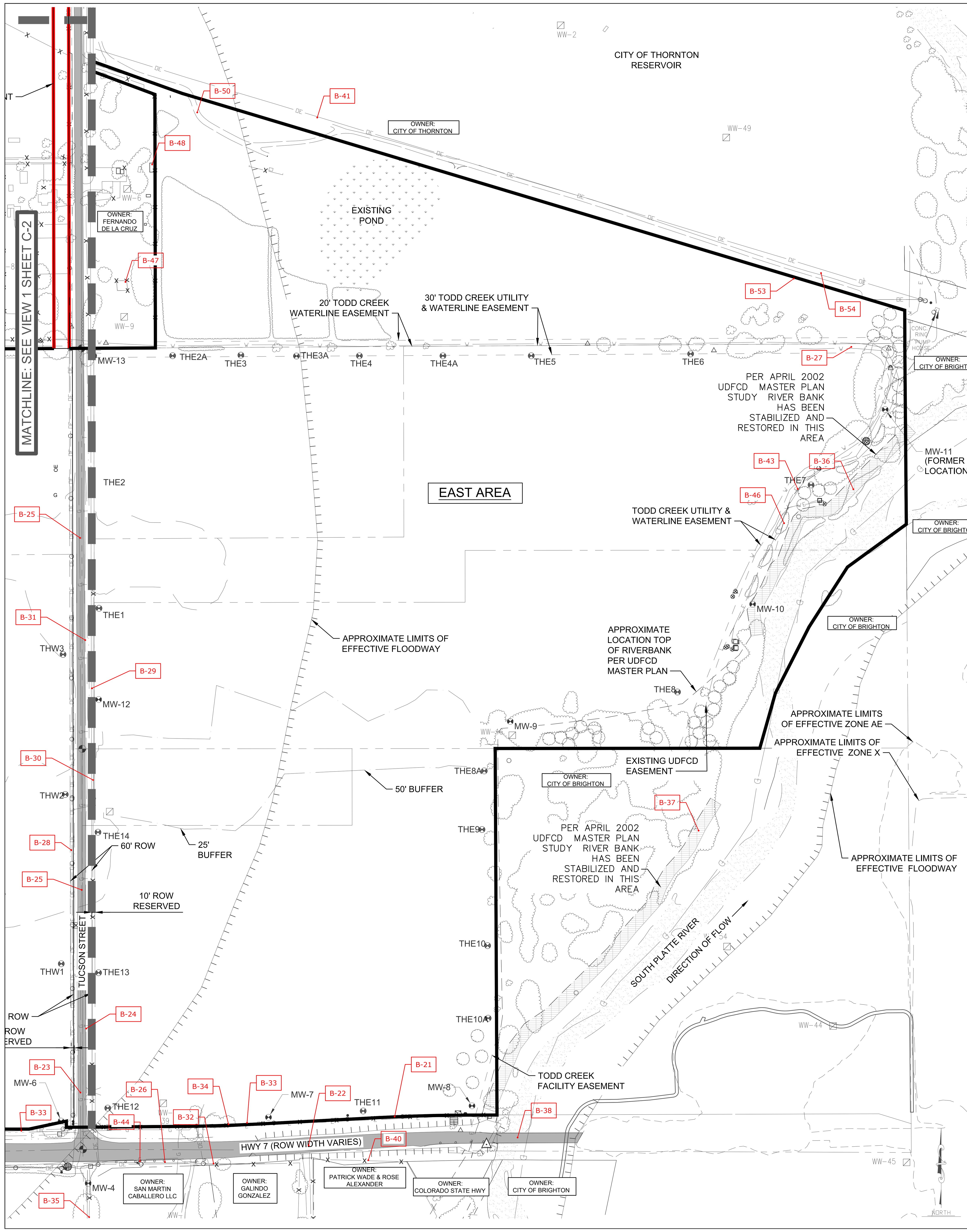
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED / AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-3 EXHIBIT C MINING PLAN MAP.dwg

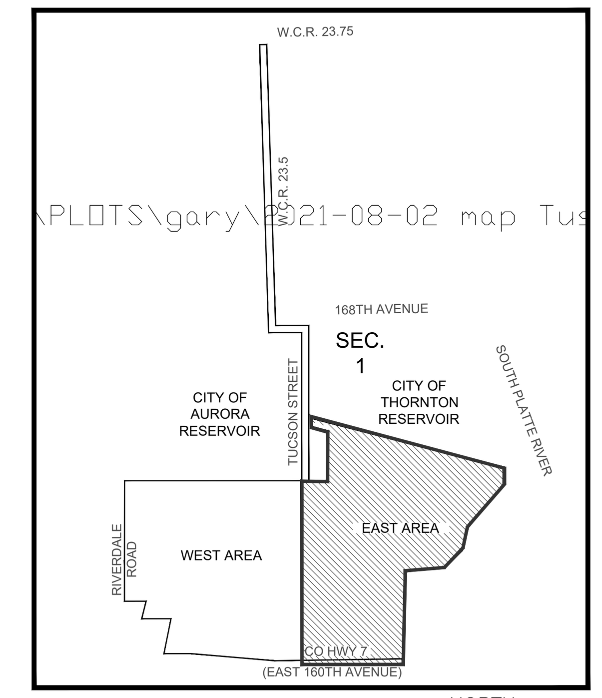
EXHIBIT C
PRE-MINING PLAN
WEST AREA

SHEET: C-2



LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- x x x x EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE EXISTING ELECTRIC LINE
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- 4900 PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NHWL NORMAL HIGH WATER LINE
- PROPOSED COTTONWOOD TREE (LOCATIONS SUBJECT TO CHANGE)
- PROPOSED SHRUB BEDS (LOCATIONS SUBJECT TO CHANGE)



PERMIT KEY MAP

NTS

STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS	RECOMENDED OFFSET PER STABILITY ANALYSES (FT)*	STRUCTURE AGREEMENT OR MHFCD OFFSET (FT)	ACTUAL OFFSET FROM MINING LIMITS (FT)**
STRUCTURES TO BE REMOVED						
B-21	FENCE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	35	--	55
B-22	STATE HIGHWAY 7	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	35	--	133
B-23	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	35	--	104
B-24	TELEPHONE LINE	LUMEN TECHNOLOGIES	100 CENTURY LINK DRIVE, MONROE LA 71203	35	--	81
B-25	TUCSON STREET	ADAMS COUNTY	4430 S. ADAMS PARKWAY BRIGHTON, CO 80601	35	--	84
B-26	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	35	--	158
B-27	WATER LINE	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	10450 E. 159th CT., BRIGHTON, CO 80602	35	20	200
B-28	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1123 W. 3RD AVE. BRIGHTON, CO 80602	35	--	126
B-29	FENCE	AMRIZE	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	35	--	56
B-30	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	35	--	57
B-31	TELEPHONE LINE	LUMEN TECHNOLOGIES	100 CENTURY LINK DRIVE, MONROE LA 71203	35	--	81
B-32	OVERHEAD ELECTRIC POWER POLES	PUBLIC SERVICE COMPANY OF COLORADO	1123 W. 3RD AVE. BRIGHTON, CO 80602	35	--	176
B-33	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	35	--	51
B-34	UNDERGROUND ELECTRIC	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	35	--	58
B-35	FENCE	SAN MARTIN CABALLERO, LLC	333 EAST 76TH AVE., DENVER, CO 80229-6209	--	--	250
B-36	RIVERBANK STABILIZATION	MILE HIGH FLOOD CONTROL DISTRICT	2480 W. 26TH AVE., SUITE 156B, DENVER, CO 80211	44	200	200 min
B-37	RIVERBANK STABILIZATION	MILE HIGH FLOOD CONTROL DISTRICT	2480 W. 26TH AVE., SUITE 156B, DENVER, CO 80211	44	200	200 min
B-38	HIGHWAY 7 BRIDGE	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	--	--	338
B-39	THORNTON RESERVOIR	CITY OF THORNTON	9500 CIVIC CENTER DR., THORNTON, CO 80229-4326	--	--	335
B-40	FENCELINE	GUNN WADE PATRICK AND ALEXANDER BRANDY ROSE	13200 E 160TH AVE, BRIGHTON, CO 80602	--	--	176
B-41	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	776
B-42	168TH STREET	ADAMS COUNTY	4430 S. ADAMS PARKWAY BRIGHTON, CO 80601	--	--	2350
B-43	WATERLINE, PUMP HOUSE AND APPURTENANCES	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	10450 E. 159th CT., BRIGHTON, CO 80602	--	20	143
B-44	GUARDRAIL	COLORADO DEPT. OF TRANSPORTATION	2829 WEST HOWARD PLACE DENVER, CO 80204	35	--	162
B-46	UNDERGROUND ELECTRIC	TODD CREEK FARMS METROPOLITAN DIST. NO. 1	10450 E. 159th CT., BRIGHTON, CO 80602	--	20	173
B-47	PRIVATE RESIDENCE AND OUTBUILDINGS	FERNANDO ARMANDO DE LA CRUZ BRECEDA	16400 TUCSON STREET, BRIGHTON, CO 80601	--	--	292
B-48	PRIVATE RESIDENCE AND OUTBUILDINGS	FERNANDO ARMANDO DE LA CRUZ BRECEDA	16400 TUCSON STREET, BRIGHTON, CO 80601	--	--	675
B-50	ACCESS ROAD	AMRIZE	1687 COLE BLVD. SUITE 300, GOLDEN, CO 80401	--	--	839
B-52	FENCELINE	JESENIA LANDA & LUNA GARCES	4210 E. 100TH AVE, THORNTON, CO 80229	--	--	176
B-53	FENCE	CITY OF THORNTON	9500 CIVIC CENTER DR., THORNTON, CO 80229-4326	--	--	315
B-54	GRAVEL ROAD	CITY OF THORNTON	9500 CIVIC CENTER DR., THORNTON, CO 80229-4326	--	--	320

* Offset is selected from nearest feature analyzed in stability analyses

** Actual offset is measured from the feature to the mie limit

811 Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING EAST AREA

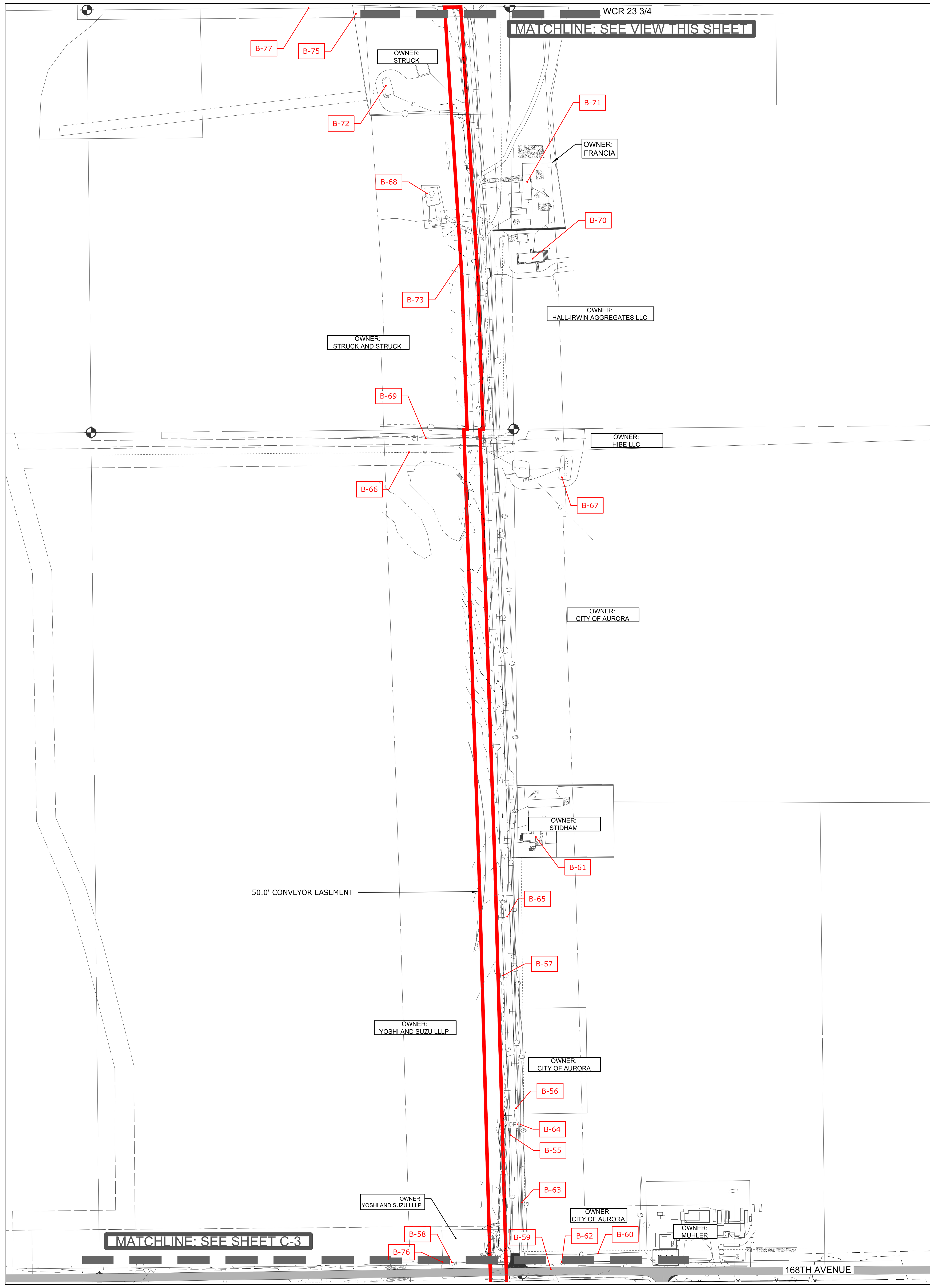
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI
CHECKED BY: GL
DATE: AUGUST 21
SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-3 EXHIBIT C MINING PLAN MAP.dwg

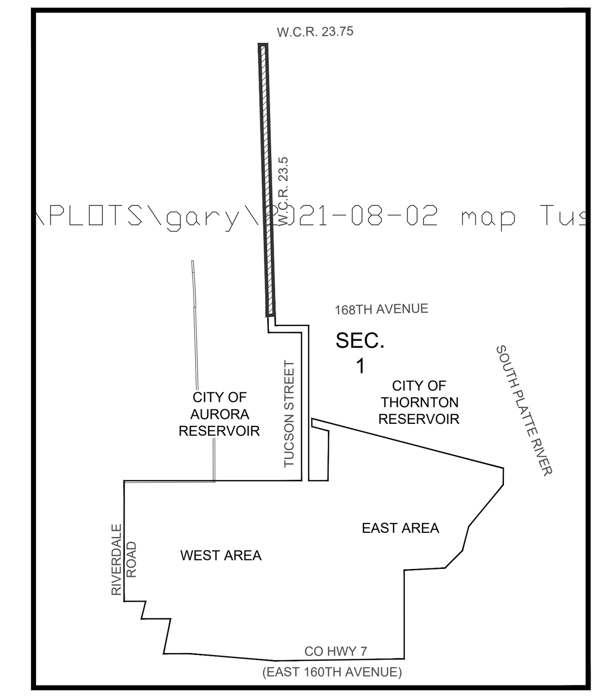
EXHIBIT C
PRE-MINING EAST AREA

SHEET: C-3



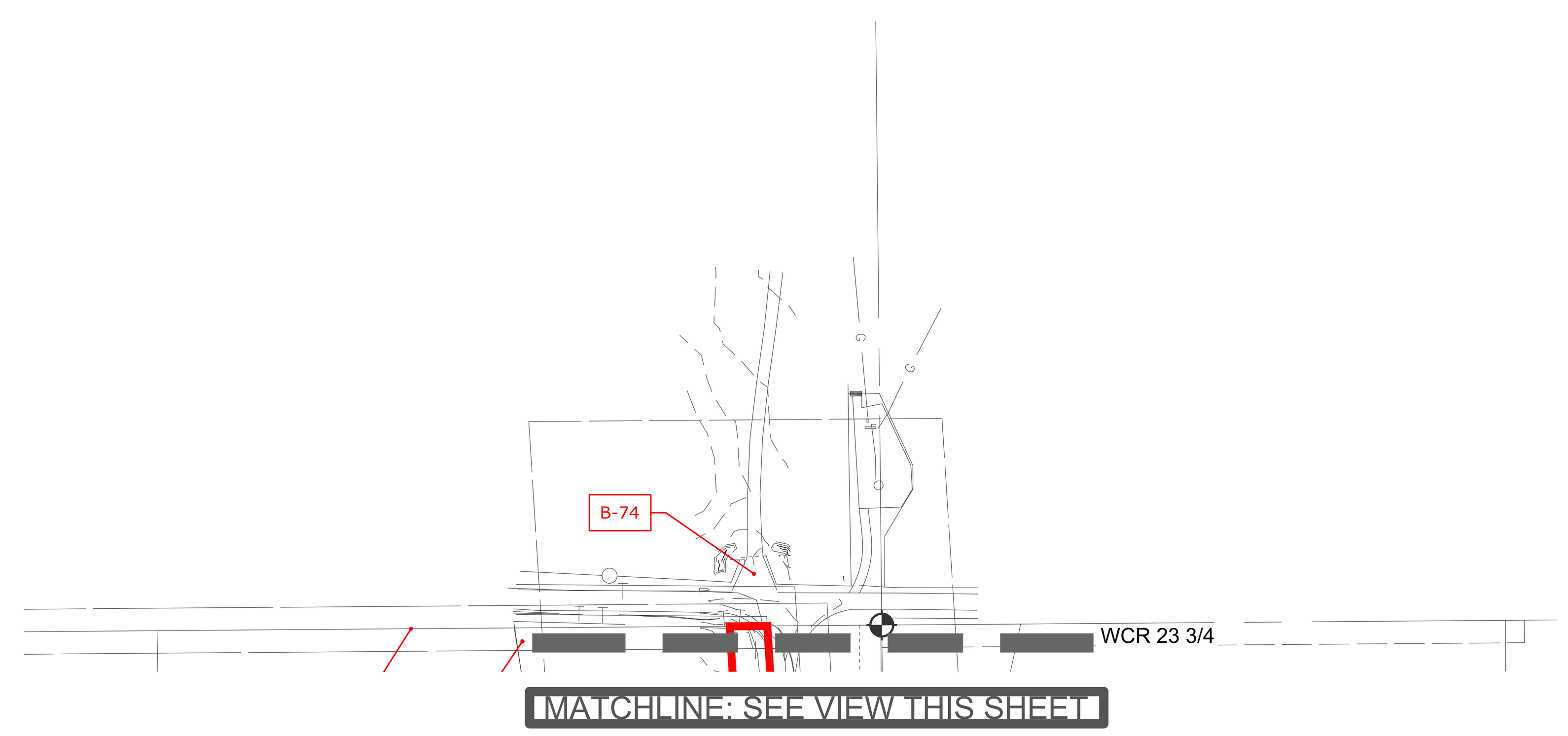
LEGEND:

MINE PERMIT BOUNDARY	
TRACT BOUNDARY	
EFFECTIVE FLOODWAY	
EFFECTIVE ZONE AE	
EFFECTIVE ZONE X	
PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN	
EXISTING EDGE OF WATER	
EXISTING 2' CONTOURS	4900
EXISTING FENCE	x
EXISTING EDGE OF ROAD	
EXISTING ELECTRIC LINE	UE
EXISTING OVERHEAD ELECTRIC LINE	OE
EXISTING GAS LINE	G
EXISTING WATER LINE	W
EXISTING TELEPHONE LINE	OT
EXISTING ASPHALT ROAD	
EXISTING SOUTH PLATTE RIVER	
MONITORING WELL LOCATION WITH WELL ID #	MW-1
WATER WELL LOCATION WITH WELL ID #	WW-10
EXISTING TREES	
UTILITY POLE	
SECTION CORNER MONUMENT	



PERMIT KEY MAP
NORTH
NTS

STRUCTURE ID	STRUCTURE DESCRIPTION	OWNER	ADDRESS	RECOMENDED OFFSET PER STABILITY ANALYSES (FT)	STRUCTURE AGREEMENT OR MHFCD OFFSET (FT)	ACTUAL OFFSET FROM MINING LIMITS (FT)
B-51	PRIVATE RESIDENCE AND OUTBUILDINGS	CRISTOFER MUHLER	11585 WELD COUNTY RD 2, BRIGHTON, CO 80603	--	--	2405
B-55	GAS LINE	XCEL	414 NICOLLET MALL MINNEAPOLIS, MN 55401	--	--	2,400
B-56	TELEPHONE LINE	LUMEN	100 CENTURY LINK DRIVE, MONROE LA 71203	--	--	2,400
B-57	TELEPHONE LINE	LUMEN	100 CENTURY LINK DRIVE, MONROE LA 71203	--	--	2,400
B-58	WATER LINE	MOUNTAIN VIEW WATER USERS	P.O. BOX 485 BRIGHTON, CO 80601	--	--	2,400
B-59	GAS LINE	WESTERN MIDSTREAM	PO BOX 173779, DENVER, CO 80212	--	--	2,400
B-60	GAS LINE	WESTERN MIDSTREAM	PO BOX 173779, DENVER, CO 80212	--	--	2,420
B-61	PRIVATE RESIDENCE AND OUTBUILDINGS	KYLE L STIDHAM	186 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	3,700
B-62	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	2,410
B-63	FENCE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	2,410
B-64	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	2,400
B-65	WELD COUNTY ROAD 23.5	WELD COUNTY DEPT OF PUBLIC WORKS	1111 H ST., GREELEY, CO 80631	--	--	2,400
B-66	WATER LINE	CITY OF AURORA	15151 E. ALAMEDA PKWY, AURORA, CO 80012	--	--	4,950
B-67	TANK BATTERY	PDC ENERGY	1775 SHERMAN STREET, STE. 3000, DENVER, CO	--	--	4,900
B-68	TANK BATTERY	PDC ENERGY	1775 SHERMAN STREET, STE. 3000, DENVER, CO	--	--	5,750
B-69	OVERHEAD ELECTRIC POWER POLES	UNITED POWER, INC	500 COOPERATIVE WAY, BRIGHTON, CO 80603	--	--	5,000
B-70	PRIVATE RESIDENCE AND OUTBUILDINGS	TWX COLORADO LLC	634 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	5,600
B-71	PRIVATE RESIDENCE AND OUTBUILDINGS	JAIME MEJIA FRANCIA	636 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	5,750
B-72	PRIVATE RESIDENCE AND OUTBUILDINGS	TOBY L STRUCK	527 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	6,150
B-73	FENCE	JAMES AND DOROTHY STRUCK	527 COUNTY ROAD 23.5, BRIGHTON, CO 80603	--	--	6,630
B-74	GRAVEL ROAD	CITY OF WESTMINSTER C/O DIR. OF PUBLIC WRKS	4800 W 92ND AVE, WESTMINSTER, CO 80031	--	--	6,550
B-75	WELD COUNTY ROAD 2.75	WELD COUNTY DEPT OF PUBLIC WORKS	1111 H ST., GREELEY, CO 80631	--	--	6,500
B-76	FENCE	YOSHI AND SUZU LLLP	PX BOX 508, BRIGHTON, CO 80601	--	--	6,500
B-77	FENCE	CITY OF WESTMINSTER	6575 W 88TH AVE, WESTMINSTER, CO 80031	--	--	6,500



Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AMRIZE
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING WELD COUNTY CONVEYOR

REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: C-4.dwg

EXHIBIT C
PRE-MINING PLAN
WELD COUNTY
CONVEYOR AREA

SHEET: C-4

TETRA TECH

MEMO

To:	Christine Felz, Aggregate Industries, Inc.
From:	Derek Foster, PE, Tetra Tech July 3, 2019
Updated:	Jeffrey Butson PE, Tetra Tech November 8, 2019
Subject:	Slope Stability and Setback Updates, July 3, 2019; Tetra Tech Job No. 200-23514-18004

The memo describes the updated analysis performed to evaluate the minimum setback distance between the proposed mine limit and identified critical manmade structures near the site as required per the Mine Land Reclamation Board (MLRB) Construction Materials Rules 6.3.12(b) and 6.4.19(b) and the memorandum from the DRMS dated May 16, 2018[1]. This slope stability analysis was not performed to evaluated the stability of highwalls, proposed mine slopes, proposed reclamation slopes, or infrastructure owned by Aggregate Industries. The setbacks reported in this memo represent the minimum setback based on the physical and geotechnical input parameters for each model. The required setback may be greater based on regulatory requirements.

1.0 SITE LAYOUT

The Tucson South Mine is comprised of approximately 250 acres, located a half-mile west of the City of Brighton, Colorado. The site lies within the south half of Section 1 and the northwest quarter of Section 12 in Township 1 South, Range 67, West of the 6th Principal Meridian. Land use around the site is aggregate mining, residential, and agricultural. Tucson Street, a paved north-south road, bisects the proposed East and West Pits of the mine. Colorado Highway 7 (E 160th Avenue) separates the proposed East and West Pits from the proposed Southwest Pit. The South Platte River forms the eastern border for the proposed mine and the Brighton Ditch forms the western border of the proposed mine.

2.0 GEOLOGY

The site is in the alluvial valley of the South Platte River. Geologic mapping indicates that the mine is located on an alluvial terrace corresponding with the Piney Creek and Post Piney Creek alluvium[2]. The bedrock underlying the alluvium may be the Arapahoe Formation, which consists of claystone and sandstones.

A total of 130 boreholes have been drilled on the site. Drilling logs indicate the general subsurface profile consists of an average of three feet (one to ten feet) of silty sand overburden, overlying an average of 23 feet (five to 46 feet) of sand and gravel, overlying the bedrock. A mud lens was found in the area, mainly in the West and Southwest Pits of the proposed mine. Groundwater was encountered while drilling in 2004 at depths between eight and 12 feet below the ground surface. Monitoring well readings from December 2003 to August 2004 have water levels between four and 16 feet below ground surface.

---

[1] Cazier, T. (2018, May 16). Re: Factors of Safety for Slope Stability/Geotechnical Analyses Associated with Mining Operations. Denver, CO: Division of Reclamation, Mining and Safety Minerals Program.
[2] Trimble, E. D., & Machette, N. M. (1979). Geologic Map of the Greater Denver Area, Front Range Urban Corridor, Colorado. USGS Map I-856-H, Version 1.1.

3.0 PREVIOUS EVALUATIONS

A slope stability evaluation was performed by Tetra Tech for the Tucson South mine in November 2004[3]. The evaluation used the (previously required) required minimum factor of safety value of 1.0 and analyzed sections for a total of 14 critical structures surrounding the Tucson South mine. A seismic analysis was not required by the DRMS as part of the slope stability analysis in 2004. The 2004 evaluation was used as the basis for an updated slope stability analysis performed by Tetra Tech in 2018.

In preparation of an amendment to the Tucson South permit application in 2018 Tetra Tech performed an updated slope stability analysis. Critical structures within 200 feet of the mine in 2018 were reevaluated and seven manmade structures were identified as requiring slope stability analysis. A memorandum dated November 9, 2018[4] describes the results of the analysis that was prepared and submitted to Aggregate Industries for their use.

A slope stability analysis preformed in February of 2019 to determine required minimum setbacks from permanent manmade structures around the Tucson South Mine if mine highwalls were excavated at a slope of 0.5H:1V and not reclamation slopes were not constructed concurrently.

4.0 STABILITY ANALYSIS JUNE 2019

This updated stability analysis was performed using GeoStudio 2018 (*Slope/W Define)* computer software[5]. The software is capable of computing factors of safety for a range of materials using finite element analysis. Spencer's method of slices[6] was used to calculate the safety factor for the individual failure surfaces.

Several assumptions were made for the models including:

- Surficial geology was modeled based on stability models and borehole data from 2004.
- Geologic layers are generally horizontal in the subsurface.
- The highwall will be concurrently reclaimed, or mined only at 3H:1V slopes
- The West and East pits will be mined after the slurry wall is installed and will be dewatered as needed.
- The slurry wall (designed by others) will be keyed into bedrock.
- No excess pore pressure build up will occur within the soil strata.
- No slurry wall will be constructed around the South pit.
- The South pit will be wet mined.
- The slurry wall is setback a minimum of 20 feet from the crest of the mine slope/reclamation slope.
- The slurry wall will be constructed a minimum of 15 feet from any structure or easement.

Both a reclamation slope and a mine slope were considered during this stability analysis for each section analyzed in February 2018. A reclamation slope is a slope built of fill material, typically overburden found at the site, used to stabilize the mine highwall. A mine slope is a slope cut at a stable grade leaving the native material in place. The grade modeled for both the reclamation slope and the mine slope was a 3H:1V. The highwall, from the February study, is assumed to be 0.5H:1V.

---

[3] Goss, C. (2004, November 22). RE: Revised Tucson South Proposed Gravel Mine Slope Stability Analysis; Tetra Tech RMC Job No. 19-3919.019.00. (T. M. Refer, Ed.) Longmont, CO: Tetra Tech.
[4] Franke, M. (2018, November 9). RE: Updated Tucson South Proposed Gravel Mine Slope Stability Analysis; Tetra Tech Job No. 200-23514-18004. (Bolduc, J, Ed.) Longmont, CO: Tetra Tech.
[5] GEO-SLOPE International, Ltd. (2014). SLOPE/W 2012. December 2014 Release.
[6] Spencer, E., 1967. *A Method of Analysis of the Stability of Embankments Assuming Parallel Inter-Slice Forces."* Geotechnique, Vol. XVII, No. 1, pp. 11-26.

4.1 ANALYZED SECTIONS

Critical manmade structures within 200 feet of proposed mining were modeled during this evaluation. A critical structure is defined by the DRMS as a manmade structure that poses a potential human safety risk, major environmental impact, and major repair cost if the slope were to fail[1]. A mud lens was modeled in sections evaluated where a mud lens was present at the site based on borehole information prepared for the 2004 evaluation. The cross sections and profiles were created using Figures 1 to 6. These figures show the proposed site layout and locations to critical structures, easements, and the topography in the area. Sections were created at each of the critical structures in the vicinity, and the estimated depth to bedrock from the subsurface study was used to create the profile for the slope stability analysis. The eleven (11) critical manmade structures were identified within 200 feet of the proposed Tucson South, East, and West Pit mine boundaries were:

- Tucson St.
- Colorado Highway 7 (E 160th Avenue)
- Power poles to the west of the proposed West Pit boundary
- South Platte River
- Gas well to the west of the proposed West Pit boundary
- Todd Creek waterline north of the proposed mine boundary
- Brighton Ditch
- Brighton Return Ditch
- A gravel road and building to the west of the South pit
- Challenger Pit to the north of the West pit
- City of Aurora waterline

A total of fifteen (15) slope stability models were prepared to evaluate the risk of damage to critical manmade structures for this evaluation as shown on Figure 1. Below is a description of the 15 model sections:

Section A – Tucson St. Setback from the West Mine Pit
Section A, (static analysis Figures A-1; seismic analysis Figures A-2) evaluated the proposed setback from the Tucson St. easement from the West Pit boundary. A 500 psf load was applied to the road to represent live traffic loads. A mud lens was present and modeled based on previous studies in the area. The area is modeled with high water table assuming wet season. The model includes the transmission lines adjacent to the road as the critical structure.

Section B – Tucson St. Setback from the East Mine Pit
Section B (static analysis Figures B-1; seismic analysis Figures B-2) evaluated the proposed setback from the Tucson St. easement from the East Pit boundary. A 500 psf load was applied to the road to represent live traffic loads. No mud lens was modeled based on previous studies in the area[7]. The model uses the edge of the Right of Way as the critical location.

Section C – South Platte River
Section C (static analysis Figures C-1; seismic analysis Figures C-2) evaluated the proposed setback for the South Platte River from the East Pit boundary. The section is modeled where the South Platte River comes closest to the proposed mine boundary. A mud lens is not modeled based on the information available from previous studies in the area[7]. The proposed slurry wall is modeled 20 feet from the river bank. This alignment should be verified by the slurry wall designer. Offset regulations may dictate a greater minimum setback. The model uses the edge of the riverbank as the critical structure.

Section D – Pipeline (North Side of East Cell)
Section D (static analysis Figures D-1; seismic analysis Figures D-2) evaluated the proposed setback for the Todd Creek waterline (pipeline) north of the proposed East and West Pit boundaries. A mud lens is not modeled based on the information available from previous studies in the area[7]. The proposed slurry wall alignment is modeled 15 feet inside of the existing easement. The model identifies the pipeline as the critical structure with the setback measured from the edge of the easement. An agreement with the Todd Creek Metropolitan Water District included in the DRMS application allows for a lesser setback than estimated in the models.

Section E – Gas Well West of the Proposed West Pit Boundary
Section E (static analysis Figures E-1; seismic analysis Figures E-2) evaluated the proposed setback for an existing gas well to the west of the proposed West Pit boundary. A mud lens is modeled based on previous studies in the area[7]. The aggregate layer is noticeably thinner in this area. The weight of a tank in the area is simulated by a 3,000 psf load. The proposed slurry wall is modeled 15 feet from the edge of a gravel apron for the well. The water table on the west side of the slurry wall was modeled at approximately seven feet below ground surface. The water table was not modeled above the mud lens on the east side of the slurry wall since the pit is assumed to be dewatered. The gravel apron was the critical location in the model.

Section F – Power Poles to the West of the Proposed West Pit Boundary
Section F (static analysis Figures F-1; seismic analysis Figures F-2) evaluated the proposed setback for the power poles to the west of the proposed West Pit boundary. The closest power pole to the proposed mine boundary was modeled. A mud lens was present and modeled based on previous studies in the area[7]. The proposed slurry wall is modeled. The overburden is assumed to be approximately constant in thickness. The existing grade at the location would prevent the cutting of a mine slope, only a reclamation slope was considered for this cross section.

Section G – Brighton Ditch
Section G (static analysis Figures G-1; seismic analysis Figures G-2) evaluated the proposed setback for the Brighton Ditch to the west of the proposed West Pit boundary. The section of the ditch closest to the proposed mine boundary was modeled. The proposed slurry wall is modeled 15 feet inside of the affected land boundary. The overburden is assumed to be approximately constant in thickness. The existing grade at the location would prevent the cutting of a mine slope, only a reclamation slope was considered for this cross section. A mud lens is not modeled based on previous studies in the area[7]. The setback presented is measured from the affected land boundary.

Section H – Highway 7 from North Cell (East)
Section H (static analysis Figures H-1; seismic analysis Figures H-2) evaluated the proposed setback for Highway 7 to the south of the proposed East pit boundary. A mud lens is not modeled based on previous studies in the area[7]. The proposed slurry wall is modeled. A 500 psf load was modeled to simulate traffic on Highway 7. A power pole adjacent to Highway 7 is used as the critical structure for the setback. Right-of-way requirements may increase the required offset for this section.

Section I – Highway 7 from South Cell
Section I (static analysis Figures I-1; seismic analysis Figures I-2) evaluated the proposed setback for Highway 7 and a power line to the north of the proposed South pit boundary. A mud lens was present and modeled based on previous studies in the area[7].A slurry wall will not be constructed around the cell and is not modeled. A steady state phreatic surface was modeled along the top of the mud seam, and daylights along the cut slope to model open pit dewatering. A 2H:1V mine slope was modeled to increase yield from the pit, the reclamation slope remained at 3H:1V. A 500 psf load was modeled to simulate traffic on the Highway 7. A 200 psf load was modeled to simulate the weight of a screening berm on the north side of the South Cell.

Section J – Brighton Return Ditch
Section J (static analysis Figures J-1; seismic analysis Figures J-2) evaluated the proposed setback for the Brighton Return Ditch to the southwest of the proposed South pit boundary. A mud lens was present and modeled based on previous studies in the area[7]. A slurry wall will not be constructed around the cell and is not modeled. A steady state phreatic surface was modeled along the top of the mud seam, and daylights along the cut slope to model open pit dewatering. A 2H:1V mine slope was modeled to increase yield from the pit, the reclamation slope remained at 3H:1V. In order to comply with regulatory stability requirements, without increasing mine setback limits, the phreatic surface must be dewatered as to not seep down the face of the mine slope. The ditch was modeled with approximately five feet of water.

Section K – Gravel Road and Waterline
Section K (static analysis Figures K-1; seismic analysis Figures K-2) evaluated the proposed setback for a building and gravel road and waterline to the west of the proposed South pit boundary. A mud lens was present and modeled based on previous studies in the area[7].A slurry wall will not be constructed around the cell and is not modeled. A steady state phreatic surface was modeled along the top of the mud seam, and daylights along the cut slope to model open pit dewatering. A 2H:1V mine slope was modeled to increase yield from the pit, the reclamation slope remained at 3H:1V. The waterline adjacent to the gravel road is the critical structure. A 3000

psf load is modeled to simulate the weight of the building. The setback presented is measured from the edge of the water utility easement.

Section L – Challenger Pit
Section L (static analysis Figures L-1; seismic analysis Figures L-2) evaluated the proposed setback for the Challenger Pit to the north of the proposed West pit boundary. A mud lens was present and modeled based on previous studies in the area[7]. A slurry wall is modeled for the proposed Tucson South pit and the existing Challenger Pit. The water table is modeled 13 feet below ground surface. The setbacks presented are measured from the edge of the utility easements. Offset regulations may dictate a different minimum setback.

Section M – Pipeline (East Side of East Cell)
Section M (static analysis Figures M-1; seismic analysis Figures M-2) evaluated the proposed setback for the Todd Creek waterline (pipeline) to the east of the proposed East pit boundary. The pipeline comes closer to the property in this area. A mud lens is not modeled based on previous studies in the area[7]. The proposed slurry wall is modeled. The presented setbacks are measured from the edge of the utility easement. An agreement with the Todd Creek Metropolitan Water District included in the DRMS application allows for a lesser setback than estimated in the models

Section N – Highway 7 from North Cell (West)
Section N (static analysis Figures N-1; seismic analysis Figures N-2) evaluated the proposed setback for Highway 7 to the south of the proposed West pit boundary. A mud lens was present and modeled based on previous studies in the area[7].The proposed slurry wall is modeled. A 500 psf load was modeled to simulate traffic on the Highway 7. A transmission line adjacent to Highway 7 is the critical structure which the setback presented is measured from. The model assumes a screening berm is located between the road and the mine and the slurry wall is not constructed under the berm.

Section O – City of Aurora Water Line
Section O (static analysis Figures O-1; seismic analysis Figures O-2) evaluated the proposed setback for the Aurora waterline to the south of the proposed West pit boundary. A mud lens was present and modeled based on previous studies in the area[7]. The proposed slurry wall is modeled. A 200 psf load was modeled to simulate the weight of a screening berm on the south side of the West Cell. The model assumes that the slurry wall is not constructed under the screening berm. The waterline is the critical structure and where the setback is measured from.

4.2 INPUT PARAMETERS

Each section was modeled to resemble the existing site topography based on the site survey referenced on the Tucson South Resource Pre-Mining and Mining Plan Maps. Material thicknesses were modeled based on a geotechnical investigation perforemed at the site in 2004. In general, the sand and gravel were thinner on the west side of the site. The materials were generally assumed to be horizontal in the subsurface. A three-foot thick weathered claystone bedrock layer was modeled based on a letter from Allen Sorenson to Kate Pickford dated March 6, 2003[7]. The sections modeled should not be used as an estimation of the aggregate resource.

The input parameters for each of the materials used were those required for the 2004 analysis and are based on a memo from Allen Sorenson to Larry Oehler, dated August 29, 2004[8]. A reclamation slope fill material was added for this revised analysis. The material properties are presented in Table 1. All materials were modeled using the Mohr/Coulomb framework.

[7] Sorenson, A. (2003, March 6). RE: Pit Wall Stability Analysis, Irwin Corporation, Bernhardt Resource Gravel Pie, Permit No. M-2002-120. Denver, CO.
[8] Sorenson, A. (2004, August 29). RE: Reclamation Cost Estimate and Pit Wall Stability Analysis, Aggregate Industries, Tucson South Resource Gravel Pit, File No. M-2004-044.

Table 1: Material parameters used in the slope stability models[8].

Material	Moist Unit Weight (pcf)	Saturated Unit Weight (pcf)	Effective Cohesion c' (psf)	Effective Friction Angle ϕ' (degrees)
Overburden	114	126	50	28
Sand & Gravel	130	137	0	35
Weathered Claystone Bedrock (residual strength)	124	134	0	14
Claystone Bedrock (peak strength)	124	134	100	28
Mud Lens	114	126	50	28
Slurry Wall	110	122	0	0
Reclamation Slope Fill	119	126	25	26

**pcf= pounds per cubic foot; psf= pounds per square foot*

A seismic analysis was also performed for each of the sections described above as required by the DRMS. The seismic analysis accounts for the effects of horizontal acceleration experienced during an earthquake. The horizontal acceleration used was 0.067 g. The value was obtained from a U.S. Seismic Design map of the area[9]. The U.S. Seismic Design Maps program considers the soil classification and location of the site. For the Tucson South site, Site Class D – Stiff Soil was used.

Other applicable DRMS requirements that were used are as follows:

- The minimum factor of safety for the static analysis is 1.5.
- The minimum factor of safety for the seismic analysis is 1.3.

The scenarios were modeled with entry/exit geometry for currently proposed setbacks. The setbacks were adjusted as needed to reach the minimum required factor of safety in each case.

4.3 MODEL RESULTS

The model results are given in Table 2. Detailed model results and a comparison with previous slope stability modeling is included in Appendix A. The setbacks listed are the minimum setbacks required. Resulting sections from the model are presented in Figures. It should be noted that the setback requirement for model J is dependent on the reduced phreatic surface in the soils behind the mine cut, care should be given to the dewatering process chosen in the South Pit.

[9] U.S. Geological Survey. (2017, July 27). U.S. Seismic Design Maps. U.S. Geological Survey.

Model	Mine Slope			Reclamation Slope			Highwall			Object measured from
	Factor of Safety		Setback (ft)	Factor of Safety		Setback (ft)	Factor of Safety		Setback (ft)	
	Static (1.5 min)	Seismic (1.3 min)		Static (1.5 min)	Seismic (1.3 min)		Static (1.5 min)	Seismic (1.3 min)		
A-Tucson St. West Power Pole	1.68	1.31	35	1.64	1.34	44	1.76	1.30	110	Power Pole
B-Tucson St. East	2.17	1.67	35	1.91	1.49	35	1.71	1.41	65	Edge of ROW
C-South Platte River	2.13	1.63	44	1.89	1.46	44	1.87	1.32	120	Edge of Riverbank
D-Pipeline	2.09	1.65	35	1.73	1.37	35	1.86	1.33	175	Pipeline easement
E-Fence near gas well	2.08	1.49	56	2.10	1.52	56	1.72	1.31	65	Gas Well
F-Power Pole	(1)'			1.89	1.41	68	1.75	1.39	100	Power Pole
G-Brighton Ditch	(1)'			1.93	1.53	35	1.69	1.38	90	Affected Land Boundary
H-Highway 7 North	2.00	1.56	35	1.77	1.38	35	1.81	1.32	105	Power Pole
I-Highway 7 South	2.31	1.67	86	2.72	1.86	86	1.63	1.33	90	Power Pole (assume 20' offset from toe of berm) *2:1 mine slope with dewatered pit
J-Brighton Return Ditch	1.58	1.32	51	1.81	1.35	51	1.68	1.32	105	Brighton Ditch Easement Boundary *2:1 mine slope with lowered phreatic surface
K-South Cell Gravel Road	2.19	1.53	30	2.59	1.75	30	1.67	1.32	75	Edge of Waterline Easement *2:1 mine slope with dewatered pit
L-Challenger Pit	2.24	1.75	45	1.97	1.52	45	1.81	1.34	185	Edge of utility easements
M-East Cell Pipeline	2.37	1.76	52	2.22	1.66	52	2.08	1.53	120	Todd Creek Pipeline easement
N-Highway 7 northwest	3.13	2.19	106	3.07	2.16	106	1.93	1.37	110	Power Pole (assume screening berm between mine and pole)
O-City of Aurora Pipeline	2.76	1.88	72	2.61	1.79	72	1.90	1.37	80	City water line (assume screening berm between mine and waterline)

(1)- Existing geometry prevents a mine slope from being cut at a 3H:1V

5.0 LIMITATIONS

The findings presented in this memorandum are based on information from previous geotechnical investigations at the site and strength parameters of the modeled materials provided by the Colorado Division of Minerals and Geology in 2004. Tetra Tech should be contacted if the mining plans change or if the subsurface conditions vary from the descriptions here as reevaluation may be necessary to the investigate potential effects of the changes on the factors of safety for the critical structures determined in this evaluation. Factors of safety for this evaluation were limited to effects at the critical manmade structures and were not an evaluation of the mining highwall and/or reclamation slopes.

Please do not hesitate to contact us with any questions or comments.

Sincerely,

Jeffrey Butson, PE
Project Engineer
Tetra Tech
1900 S Sunset St, Ste 1-E
Longmont, CO 80501
720-864-4566
Jeff.Butson@tetratech.com

REVISION HISTORY

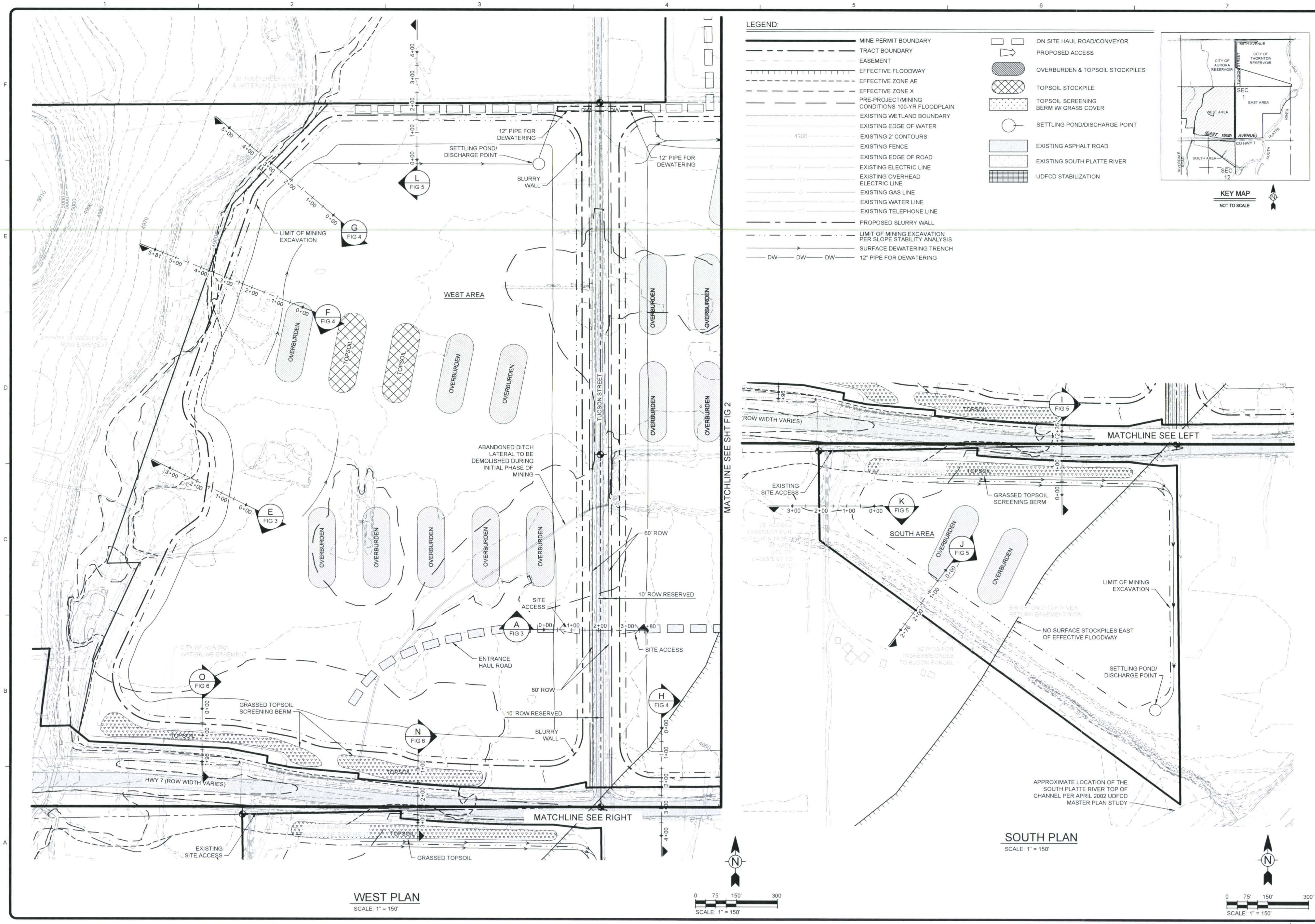
9/16/2019

- Revised offset table
- Revised CAD cross section exhibits to add more detail
- Revised Slope/W cross section exhibit to add more detailed dimensions
    - Computer analysis changed for Section M only
    - Computer analysis not changed for all other cross sections

11/8/2019

- Revised Figure 1 for amended project phasing

FIGURES



TETRA TECH
www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVEW RESPONSE	TH

AGGREGATE INDUSTRIES - WCR, INC.
TUCSON SOUTH RESOURCE

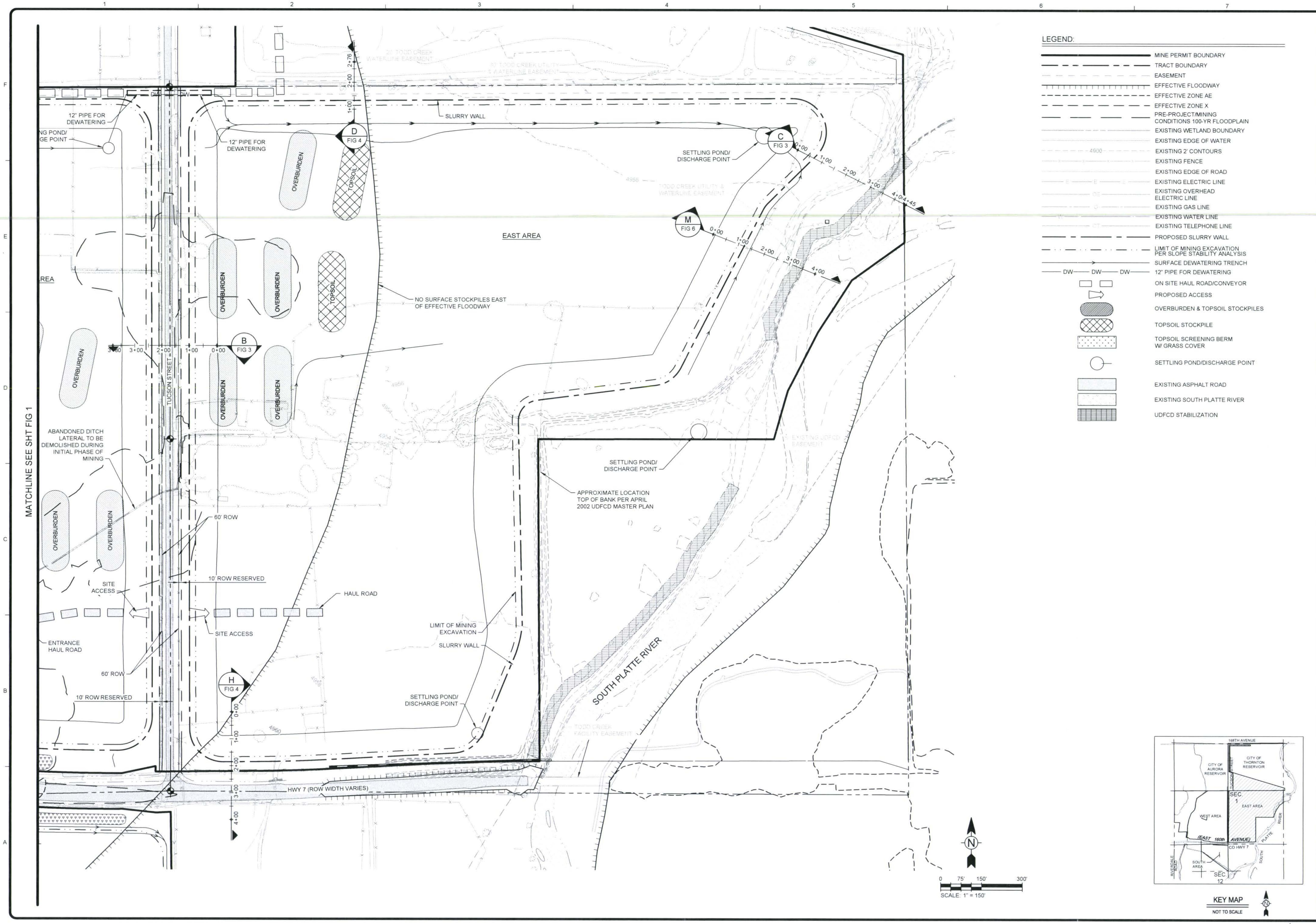
STABILITY ANALYSIS PLAN

Project No.: 200-23514-18004
Designed By: DF
Drawn By: CFW
Checked By: PH

FIG 1
EXHIBIT

Bar Measures 1 inch

11/7/2019 11:47:03 AM - P:\23514\133-23514-17005\CAD\SHEETFILES\SLOPE STABILITY ANALYSIS\FIG 1 STABILITY ANALYSIS CROSS SECTIONS.DWG - ANDRYAUSKAS, JEREMY



TETRA TECH
www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVEW RESPONSE	TH

AGGREGATE INDUSTRIES - WCR, INC.
TUCSON SOUTH RESOURCE

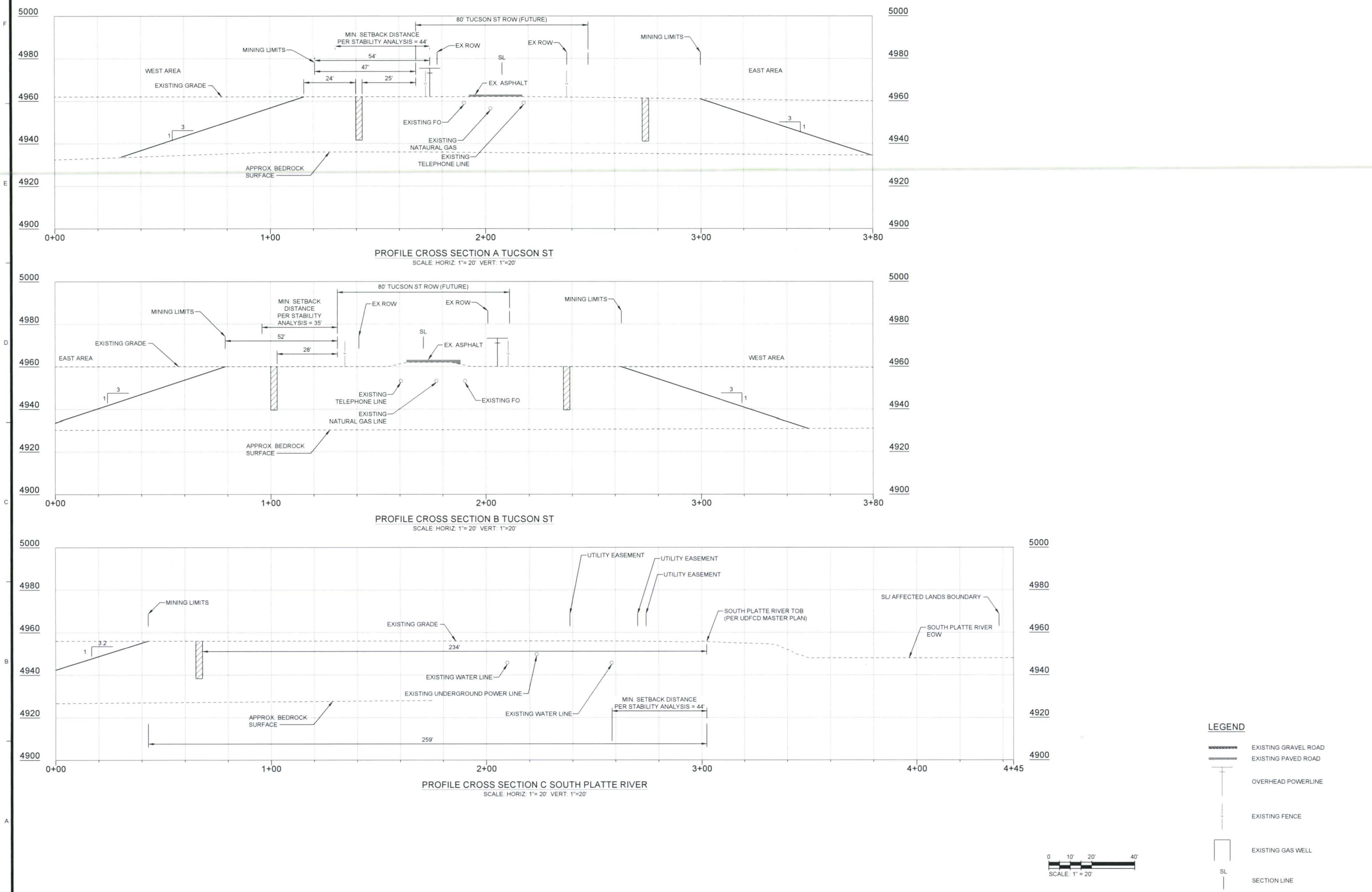
STABILITY ANALYSIS PLAN

Project No.:	200-23514-18004
Designed By:	DF
Drawn By:	CFW
Checked By:	PH

FIG 2
EXHIBIT

Bar Measures 1 inch

11/7/2019 11:47:13 AM - P:\23514\133-23514-17005\CADD\SHEETFILES\SLOPE STABILITY ANALYSIS\FIG 1 STABILITY ANALYSIS CROSS SECTIONS.DWG - ANDRYAUSKAS, JEREMY



TETRA TECH
www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVIEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVIEW RESPONSE	TH

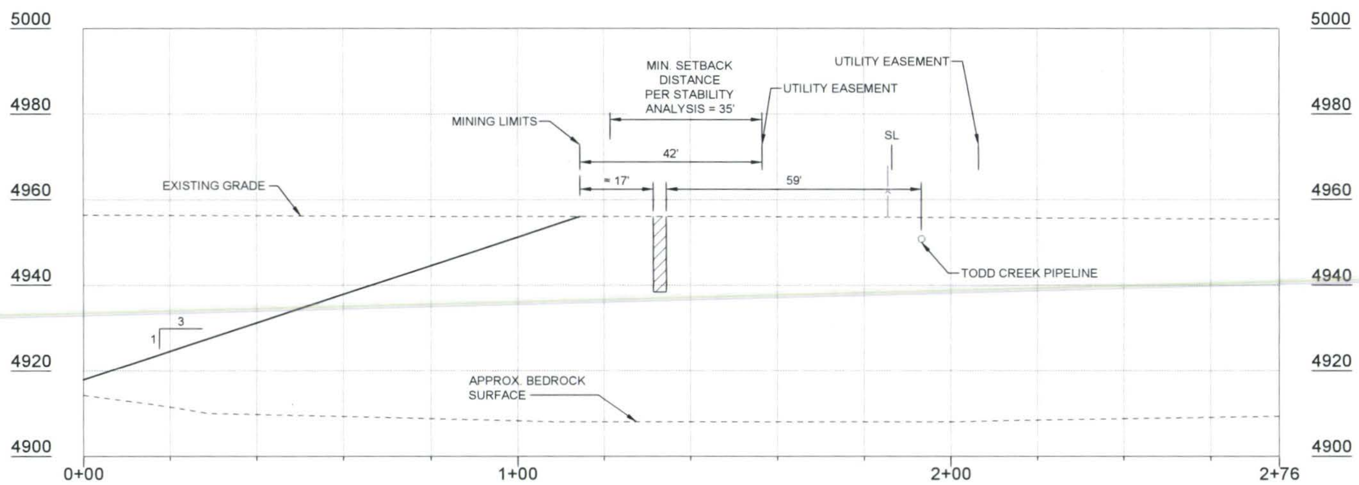
AGGREGATE INDUSTRIES - WCR, INC.
TUCSON SOUTH RESOURCE

STABILITY ANALYSIS CROSS SECTIONS

Project No.:	200-23514-18004
Designed By:	DF
Drawn By:	CFW
Checked By:	PH

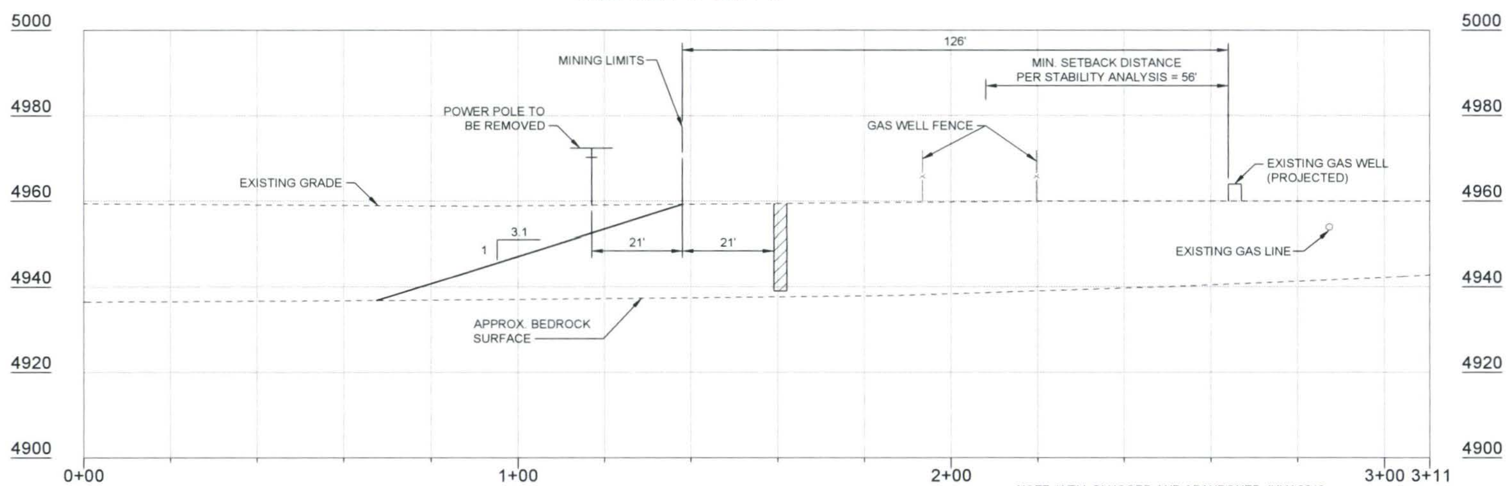
FIG 3
EXHIBIT

Bar Measures 1 inch



PROFILE CROSS SECTION D TODD CREEK PLIPELINE

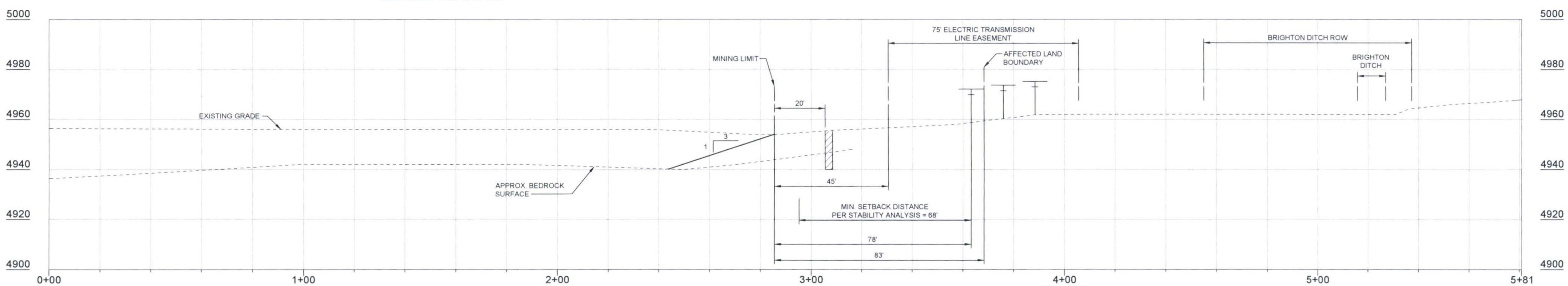
SCALE: HORIZ: 1"= 20' VERT: 1"=20'



NOTE: WELL PLUGGED AND ABANDONED JULY 2019

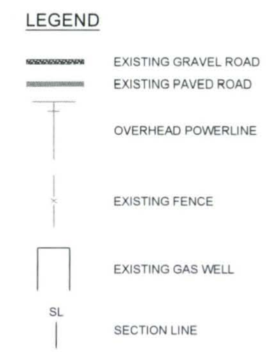
PROFILE CROSS SECTION E GAS WELL

SCALE: HORIZ: 1"= 20' VERT: 1"=20'



PROFILE CROSS SECTION F POWER POLE

SCALE: HORIZ: 1"= 20' VERT: 1"=20'



0 10' 20' 40'

SCALE: 1" = 20'

TETRA TECH

www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVIEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVIEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVIEW RESPONSE	TH

AGGREGATE INDUSTRIES - WCR, INC.

TUCSON SOUTH RESOURCE

STABILITY ANALYSIS CROSS SECTIONS

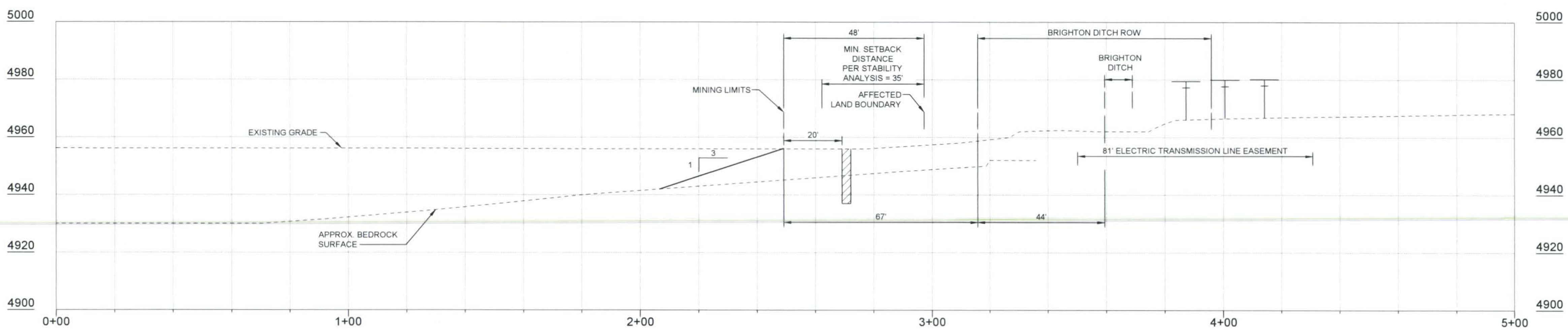
Project No.:	200-23514-18004
Designed By:	DF
Drawn By:	CFW
Checked By:	PH

FIG 4

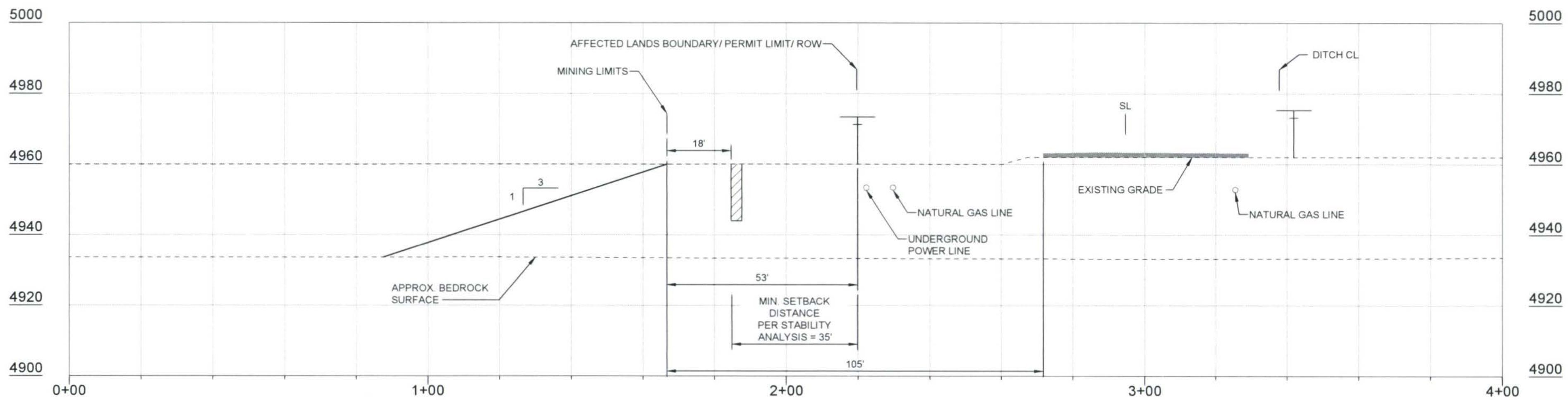
EXHIBIT

Bar Measures 1 inch

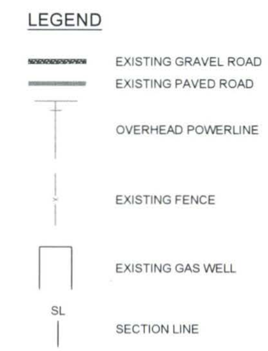
11/7/2019 11:48:37 AM - P:\23514\133-23514-17005\CAD\SHEETFILES\SLOPE STABILITY ANALYSIS\FIG 1 STABILITY ANALYSIS CROSS SECTIONS.DWG - ANDRYAUSKAS, JEREMY

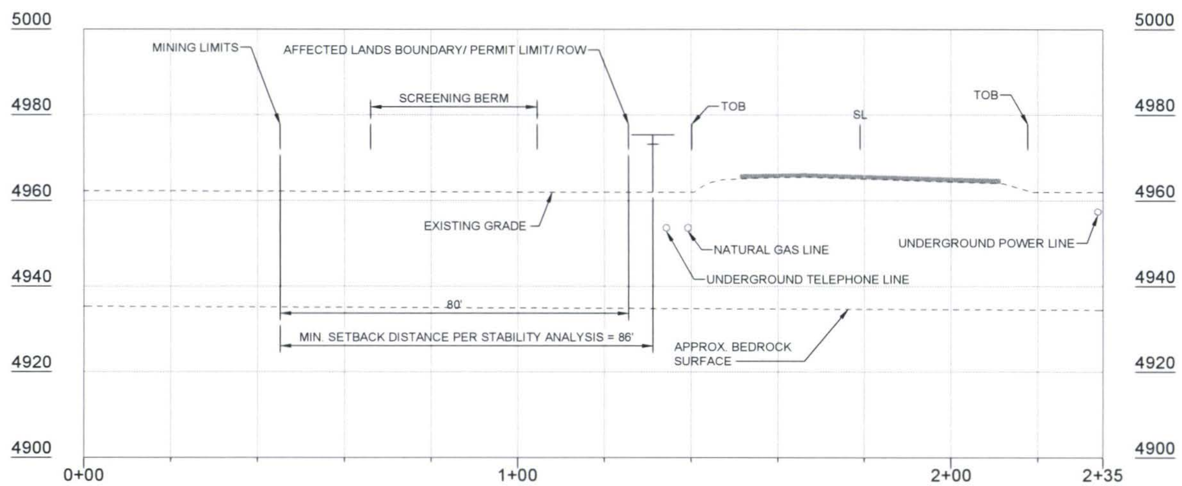


PROFILE CROSS SECTION G BRIGHTON DITCH
SCALE: HORIZ: 1"= 20' VERT: 1"=20'

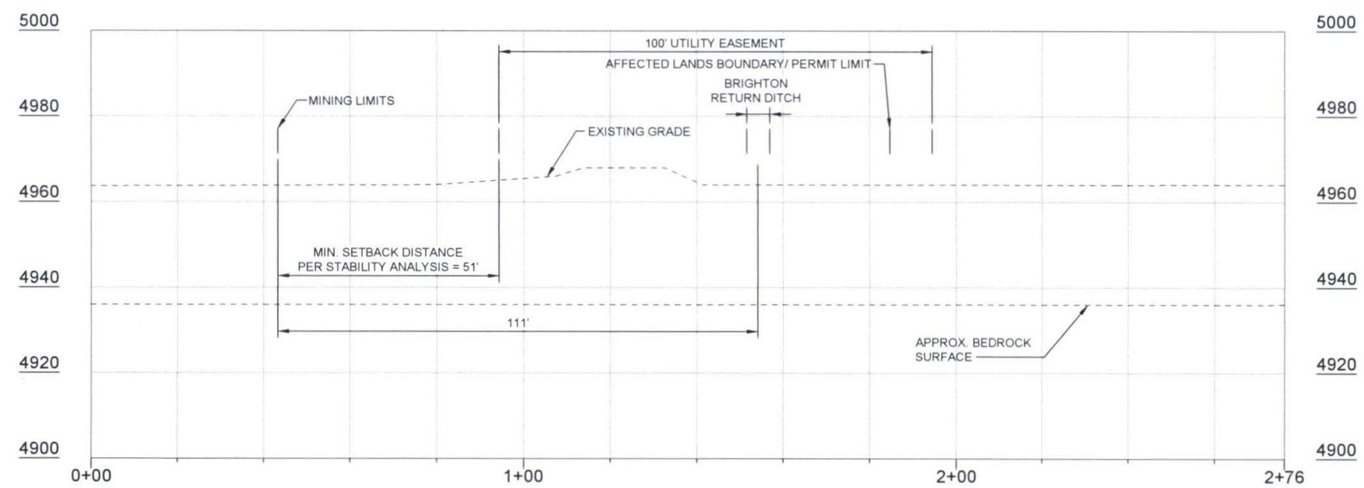


PROFILE CROSS SECTION H HIGHWAY 7 NORTH
SCALE: HORIZ: 1"= 20' VERT: 1"=20'





PROFILE CROSS SECTION I HIGHWAY 7 SOUTH
SCALE: HORIZ: 1"= 20' VERT: 1"=20'



PROFILE CROSS SECTION J BRIGHTON RETURN DITCH
SCALE: HORIZ: 1"= 20' VERT: 1"=20'

0 10' 20' 40'
SCALE: 1" = 20'

TETRA TECH
www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVEW RESPONSE	TH

AGGREGATE INDUSTRIES - WCR, INC.

TUCSON SOUTH RESOURCE

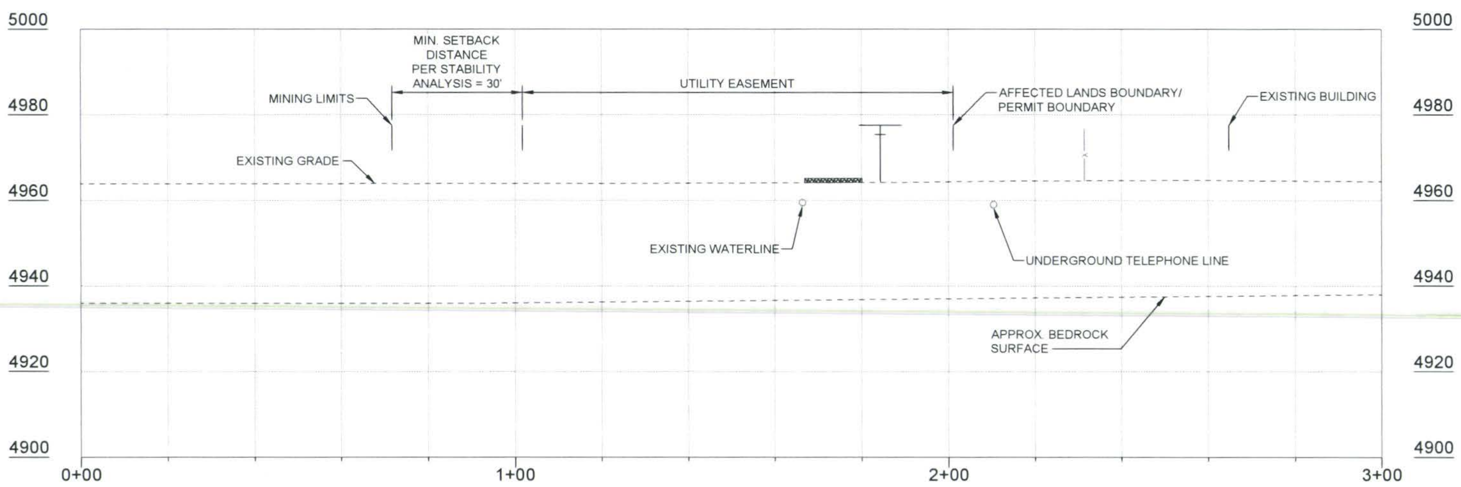
STABILITY ANALYSIS CROSS SECTIONS

Project No.:	200-23514-18004
Designed By:	DF
Drawn By:	CFW
Checked By:	PH

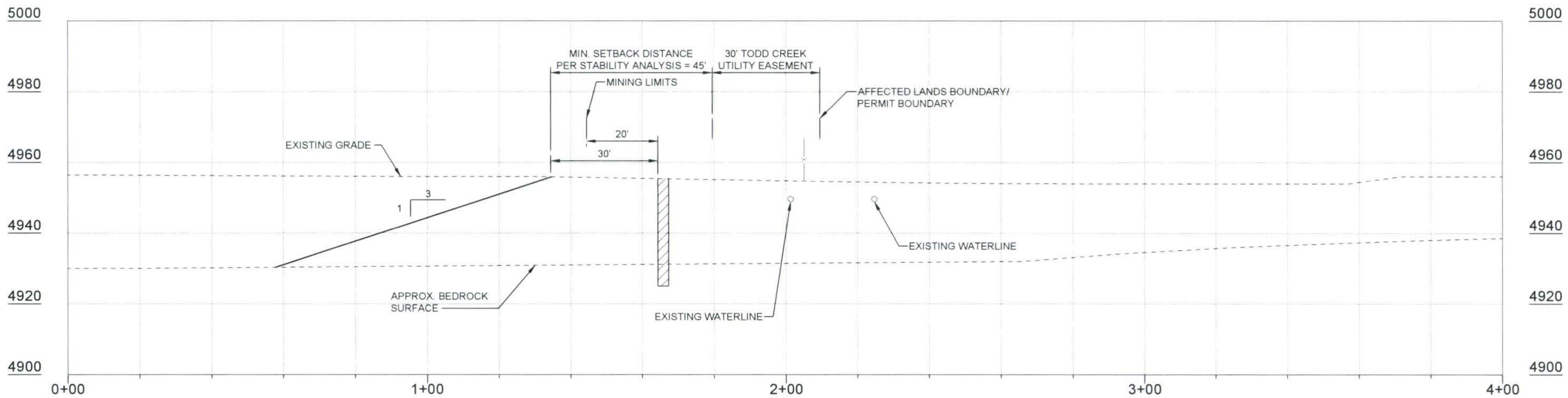
FIG 5

EXHIBIT

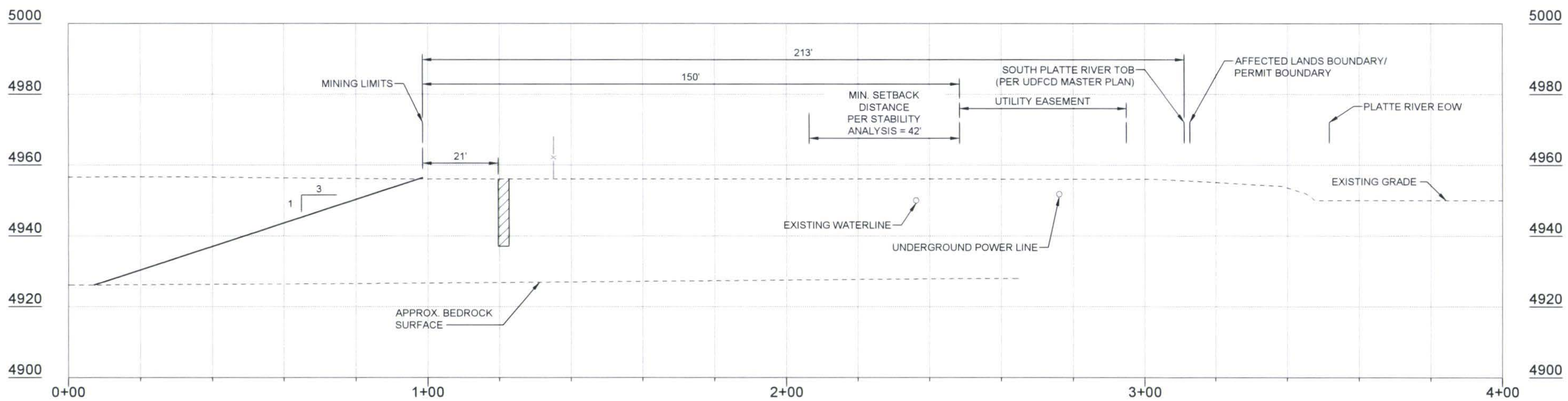
Bar Measures 1 inch



PROFILE CROSS SECTION K POWER POLE & GRAVEL ROAD
SCALE: HORIZ: 1"= 20' VERT: 1"=20'

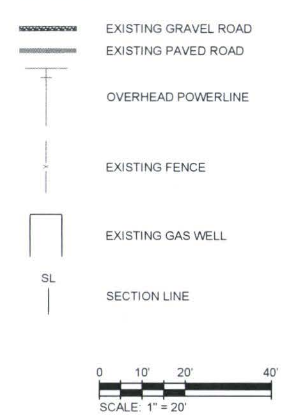


PROFILE CROSS SECTION L CHALLENGER PIT
SCALE: HORIZ: 1"= 20' VERT: 1"=20'



PROFILE CROSS SECTION M TODD CREEK PIPELINE
SCALE: HORIZ: 1"= 20' VERT: 1"=20'

LEGEND



TETRA TECH
www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVEW RESPONSE	TH

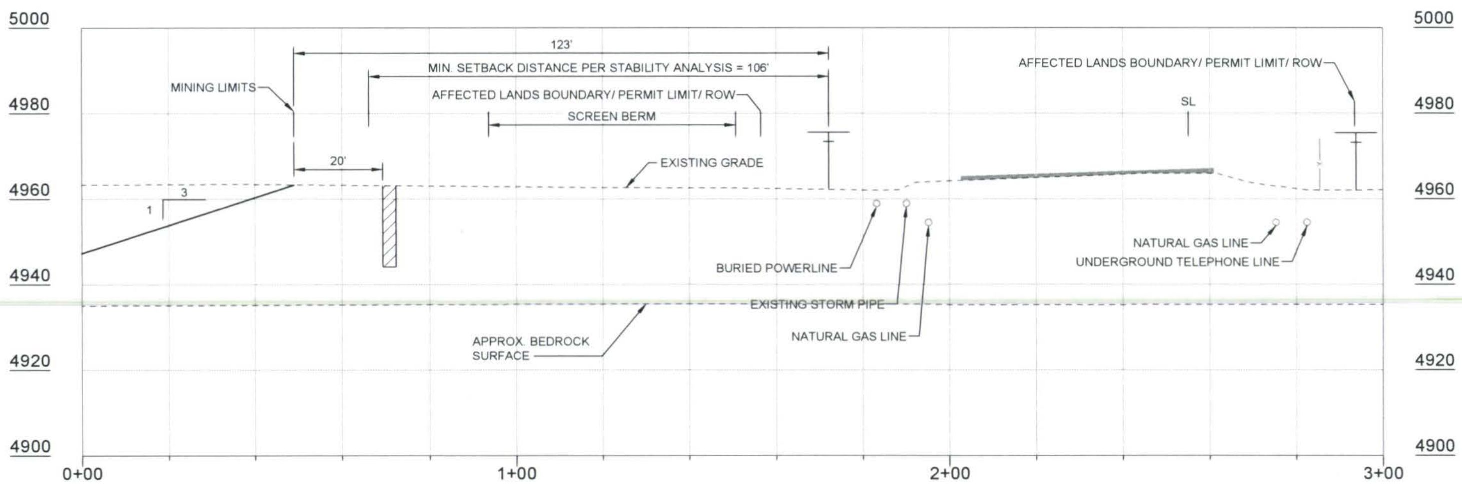
AGGREGATE INDUSTRIES - WCR, INC.
TUCSON SOUTH RESOURCE

STABILITY ANALYSIS CROSS SECTIONS

Project No.:	200-23514-18004
Designed By:	DF
Drawn By:	CFW
Checked By:	PH

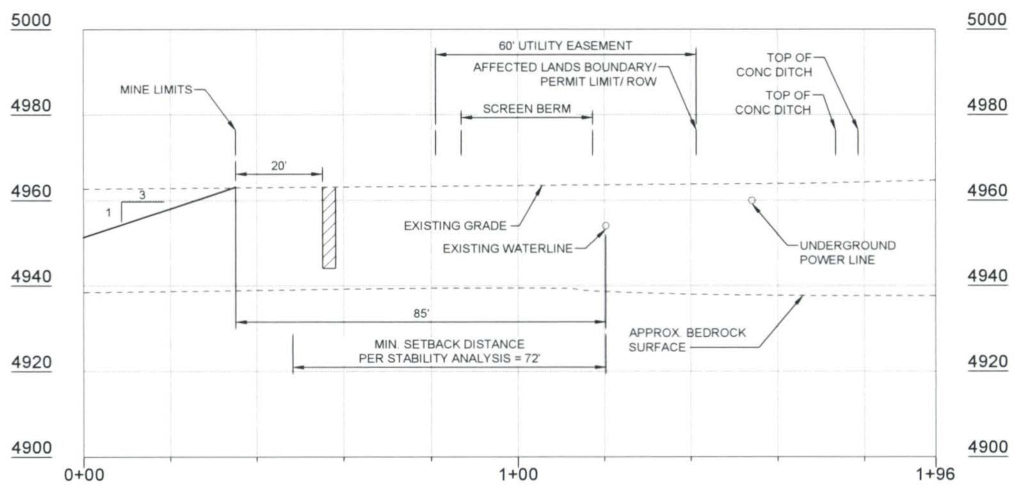
FIG 6
EXHIBIT
Bar Measures 1 inch

11/7/2019 11:50:37 AM - P:\23514\133-23514-17005\CAD\SHEETFILES\SLOPE STABILITY ANALYSIS\FIG 1 STABILITY ANALYSIS CROSS SECTIONS.DWG - ANDRYAUSKAS, JEREMY



PROFILE CROSS SECTION N HIGHWAY 7 NORTHWEST

SCALE: HORIZ: 1"= 20' VERT: 1"=20'



PROFILE CROSS SECTION O

SCALE: HORIZ: 1"= 20' VERT: 1"=20'

LEGEND

- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- OVERHEAD POWERLINE
- EXISTING FENCE
- EXISTING GAS WELL
- SL — SECTION LINE

0 10' 20' 40'
SCALE: 1" = 20'

TETRA TECH
www.tetratech.com
1900 S. Sunset St., Ste. 1-E
Longmont, CO 80501
Phone: (303) 772-5282

MARK	DATE	DESCRIPTION	BY
1	7/8/19	FIRST ADEQUACY REVEW RESPONSE	TH
2	9/16/19	SECOND ADEQUACY REVEW RESPONSE	TH
3	11/8/19	THIRD ADEQUACY REVEW RESPONSE	TH

AGGREGATE INDUSTRIES - WCR, INC.

TUCSON SOUTH RESOURCE

STABILITY ANALYSIS CROSS SECTIONS

Project No.:	200-23514-18004
Designed By:	DF
Drawn By:	CFW
Checked By:	PH

FIG 7

EXHIBIT

Bar Measures 1 inch

APPENDIX A

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - WEST SIDE TUCSON STREET

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28	1
	Mud Lens	Mohr-Coulomb	126	50	28	1
	Overburden	Mohr-Coulomb	126	50	28	1
	Sand and Gravel	Mohr-Coulomb	137	0	35	1
	Slurry Wall	Mohr-Coulomb	122	0	0	1
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14	1

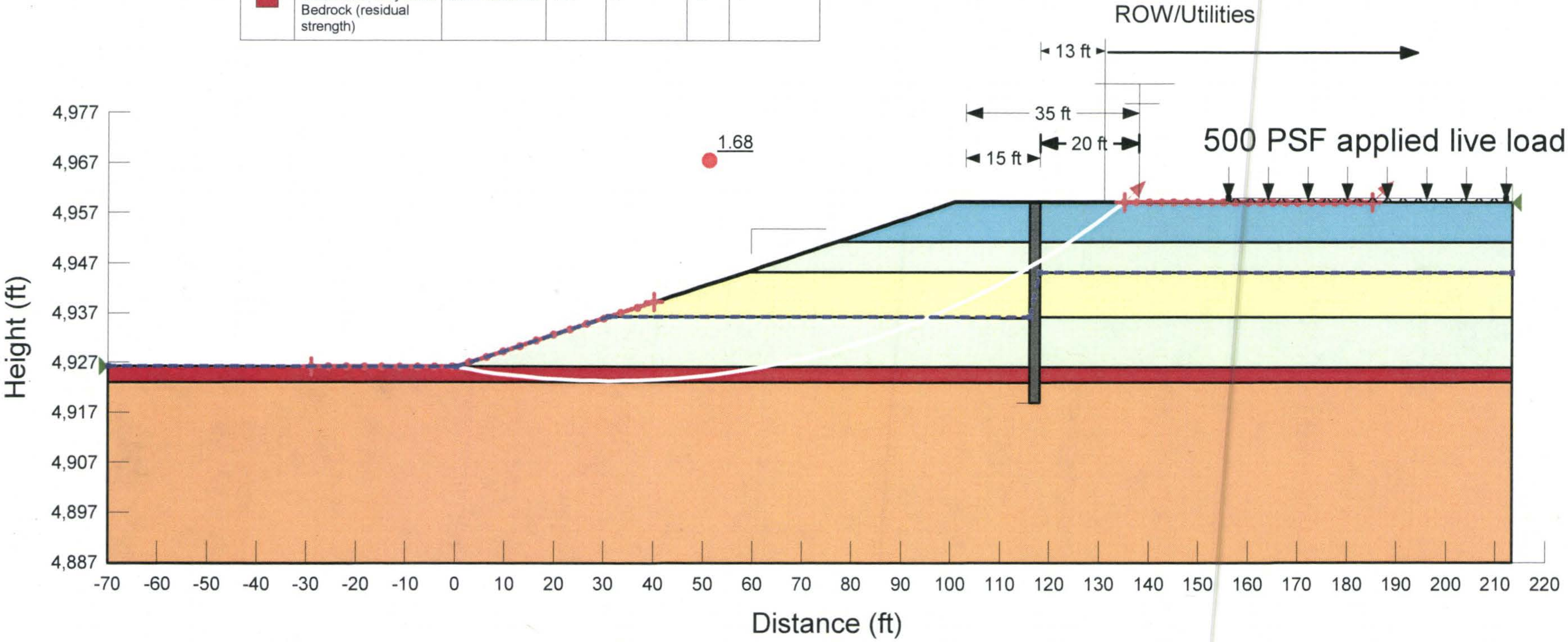


Figure A-1 - Static Analysis with Low Phreatic Surface

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - WEST SIDE TUCSON STREET

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28	1
	Fill	Mohr-Coulomb	126	25	26	1
	Mud Lens	Mohr-Coulomb	126	50	28	1
	Overburden	Mohr-Coulomb	126	50	28	1
	Sand and Gravel	Mohr-Coulomb	137	0	35	1
	Slurry Wall	Mohr-Coulomb	122	0	0	1
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14	1

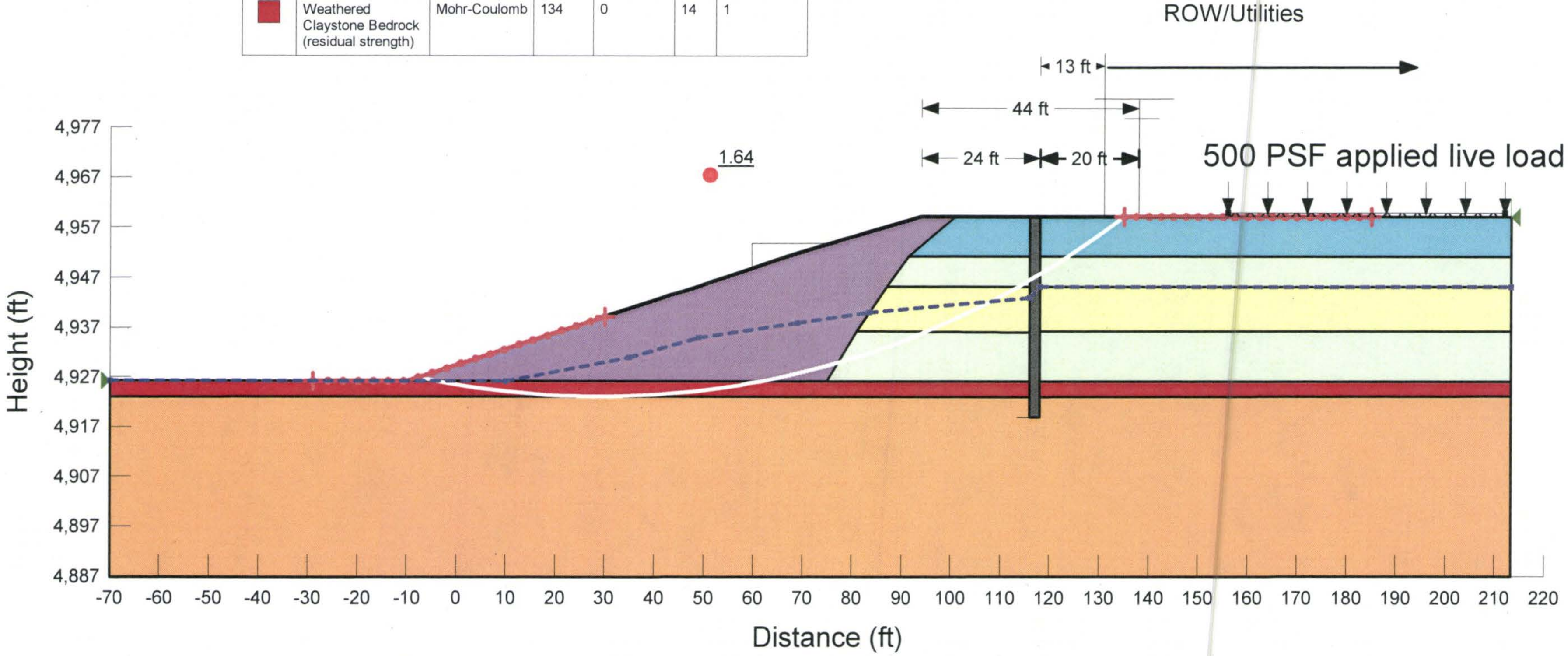


Figure A-1 - Static Analysis with Low Phreatic Surface

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - WEST SIDE TUCSON STREET

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28	1
	Mud Lens	Mohr-Coulomb	126	50	28	1
	Overburden	Mohr-Coulomb	126	50	28	1
	Sand and Gravel	Mohr-Coulomb	137	0	35	1
	Slurry Wall	Mohr-Coulomb	122	0	0	1
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14	1

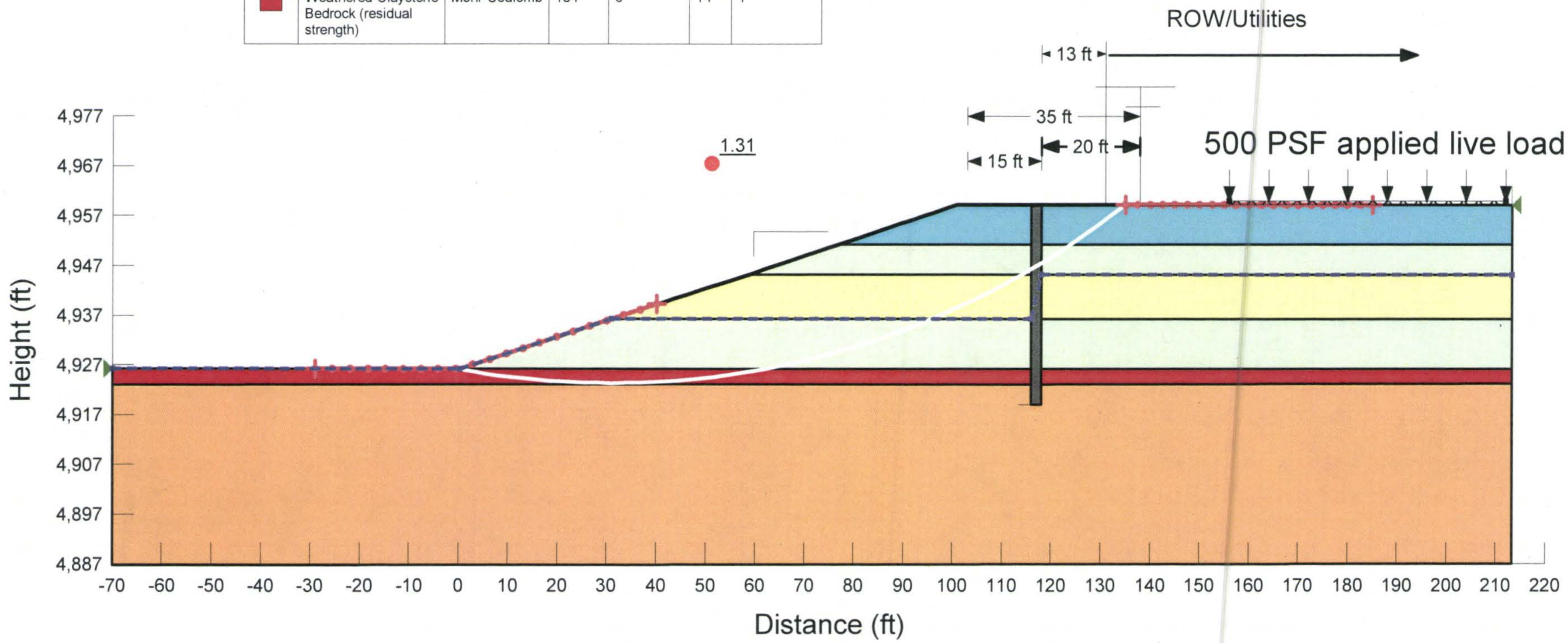


Figure A-2 - Pseudostatic Analysis with Low Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - WEST SIDE TUCSON STREET

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28	1
	Fill	Mohr-Coulomb	126	25	26	1
	Mud Lens	Mohr-Coulomb	126	50	28	1
	Overburden	Mohr-Coulomb	126	50	28	1
	Sand and Gravel	Mohr-Coulomb	137	0	35	1
	Slurry Wall	Mohr-Coulomb	122	0	0	1
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14	1

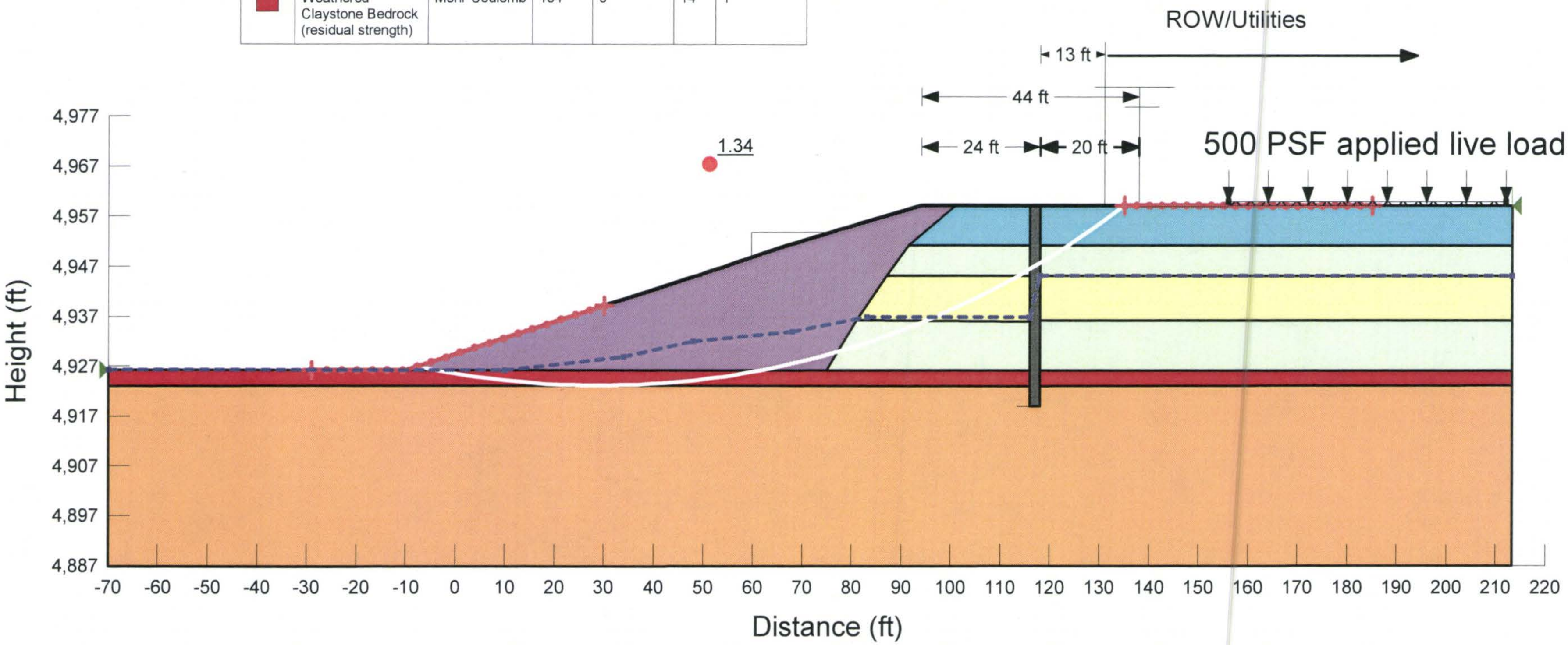


Figure A-2 - Pseudostatic Analysis with Low Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - EAST SIDE TUCSON STREET

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

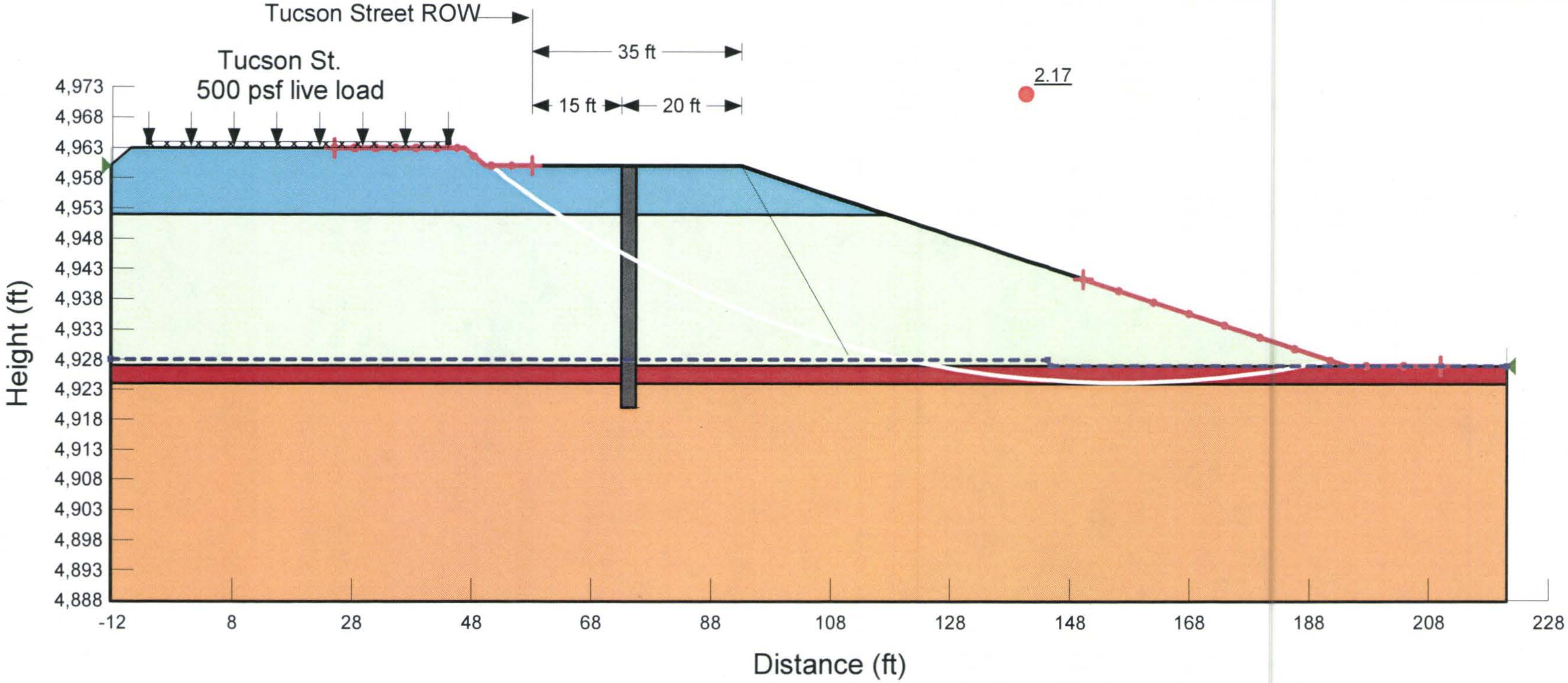


Figure B-1 -Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - EAST SIDE TUCSON STREET

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

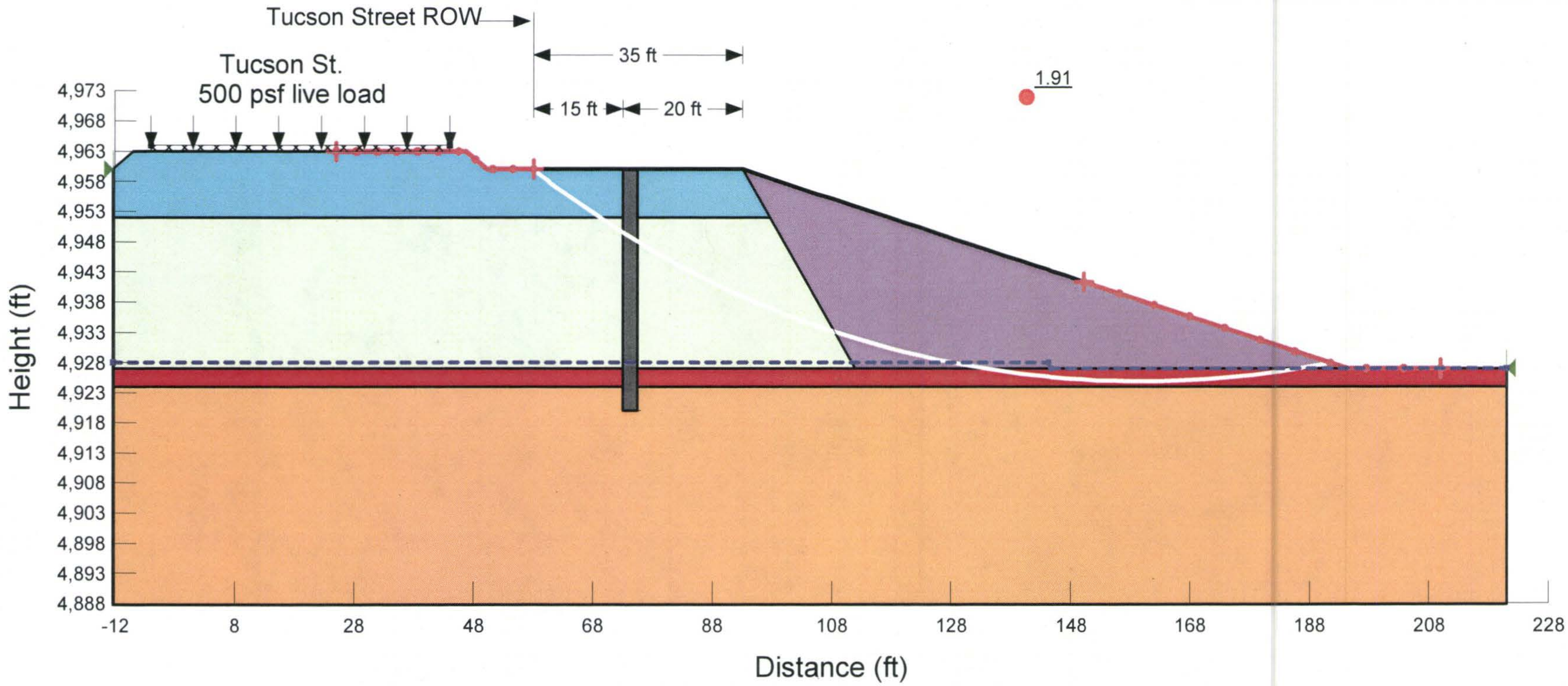


Figure B-1 -Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - EAST SIDE TUCSON STREET

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

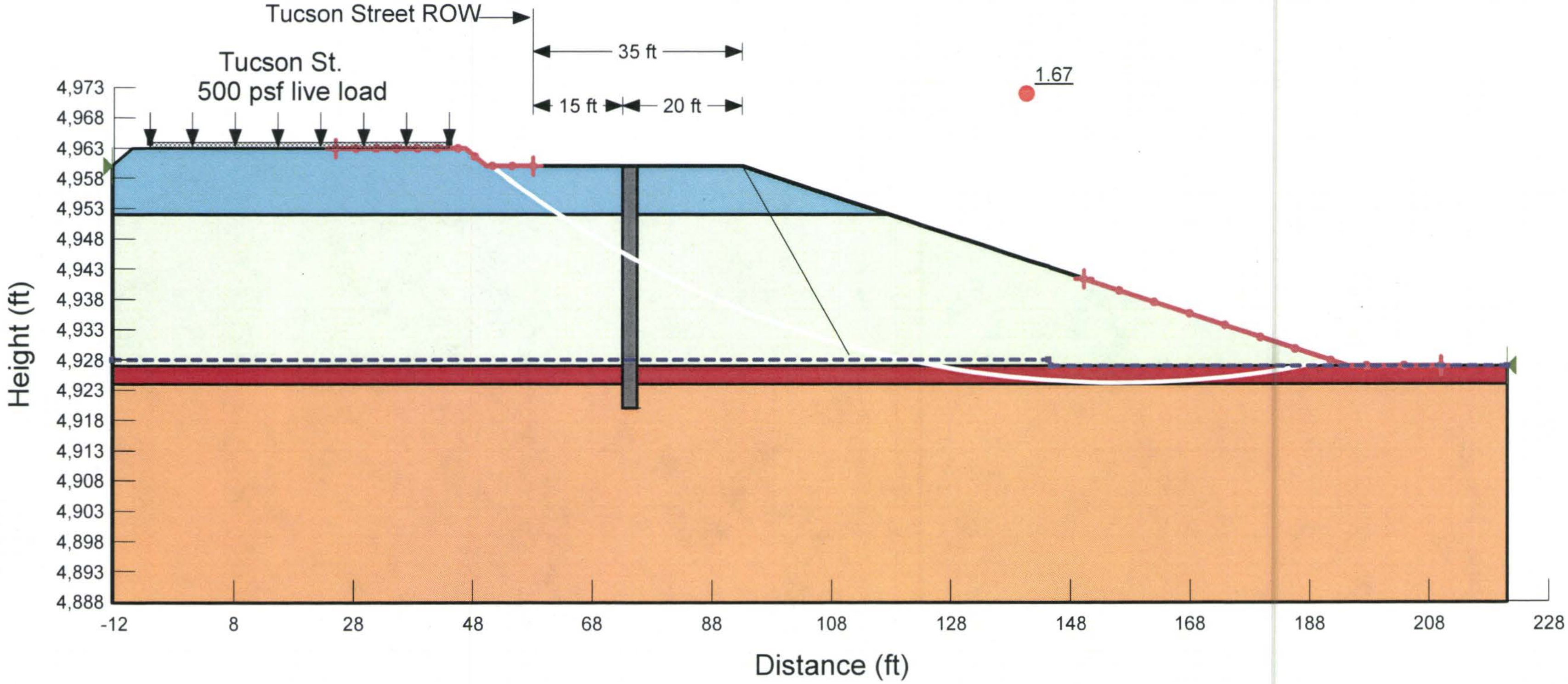


Figure B-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - EAST SIDE TUCSON STREET

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

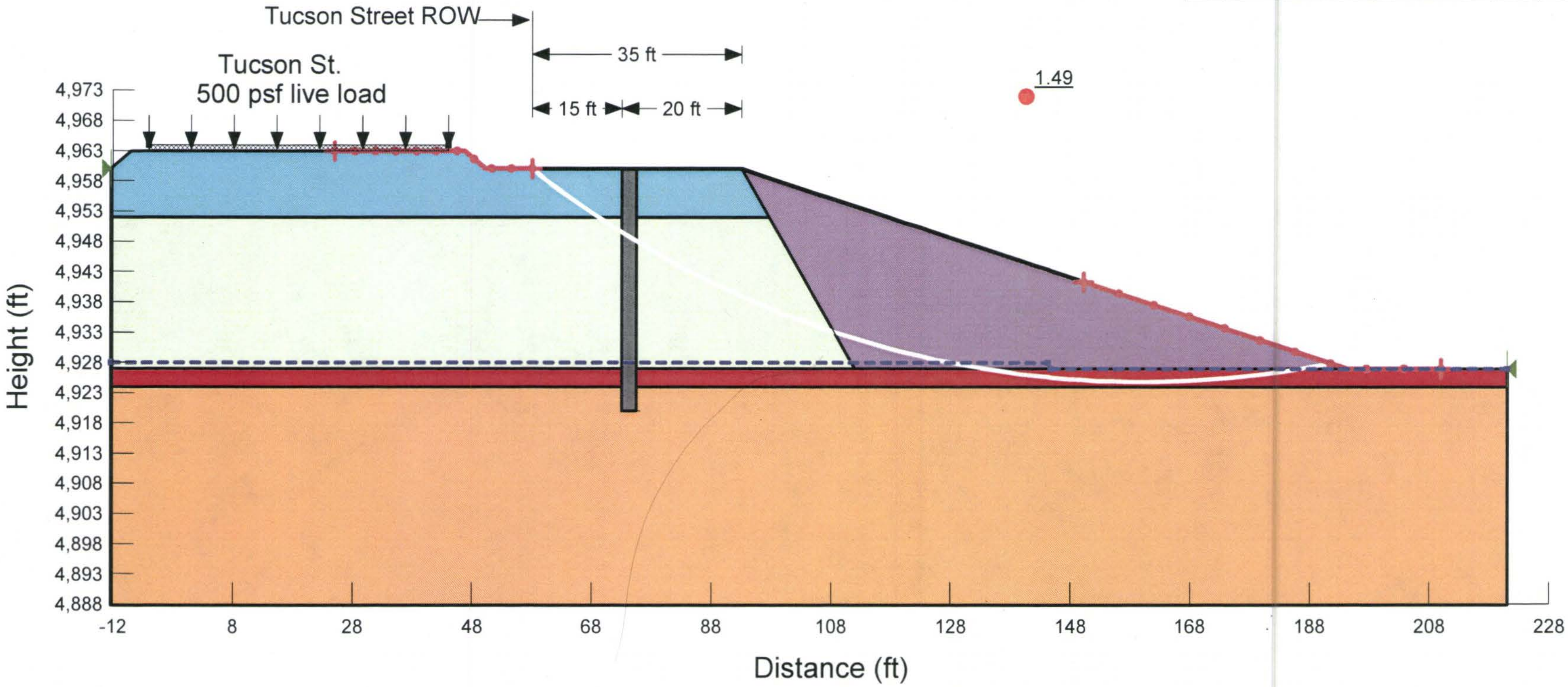


Figure B-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - SOUTH PLATTE RIVER

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

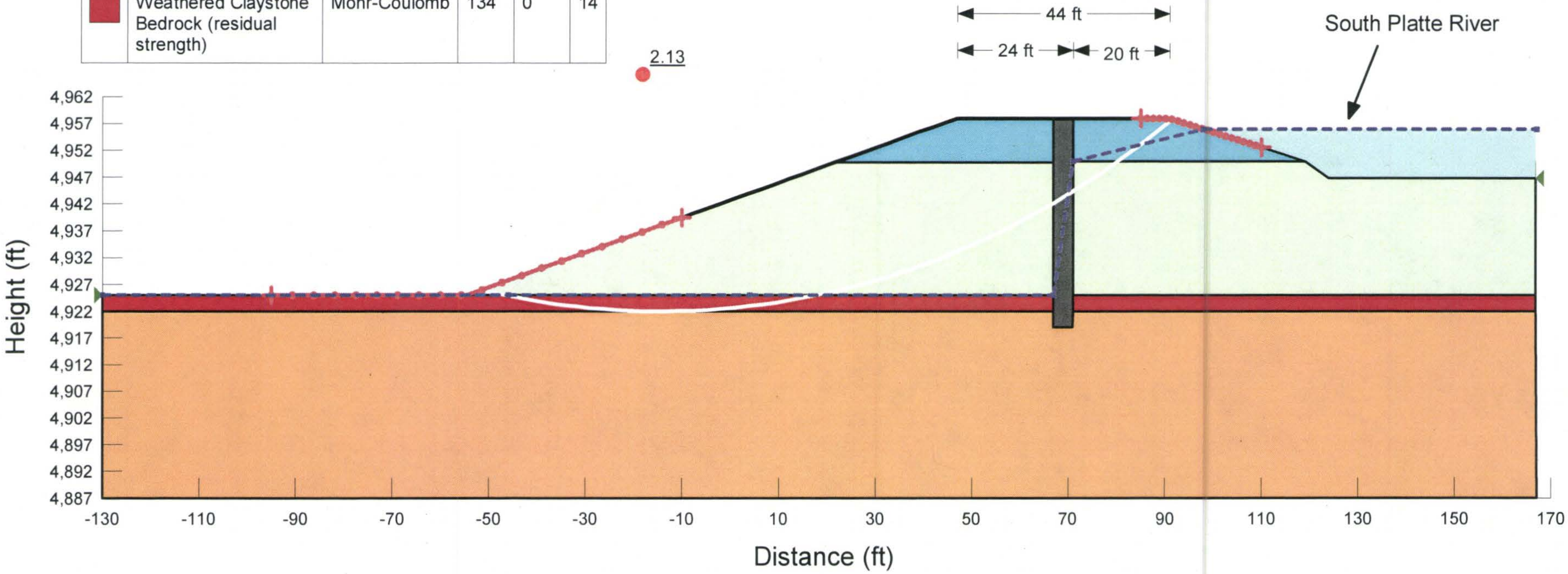


Figure C-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - SOUTH PLATTE RIVER

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

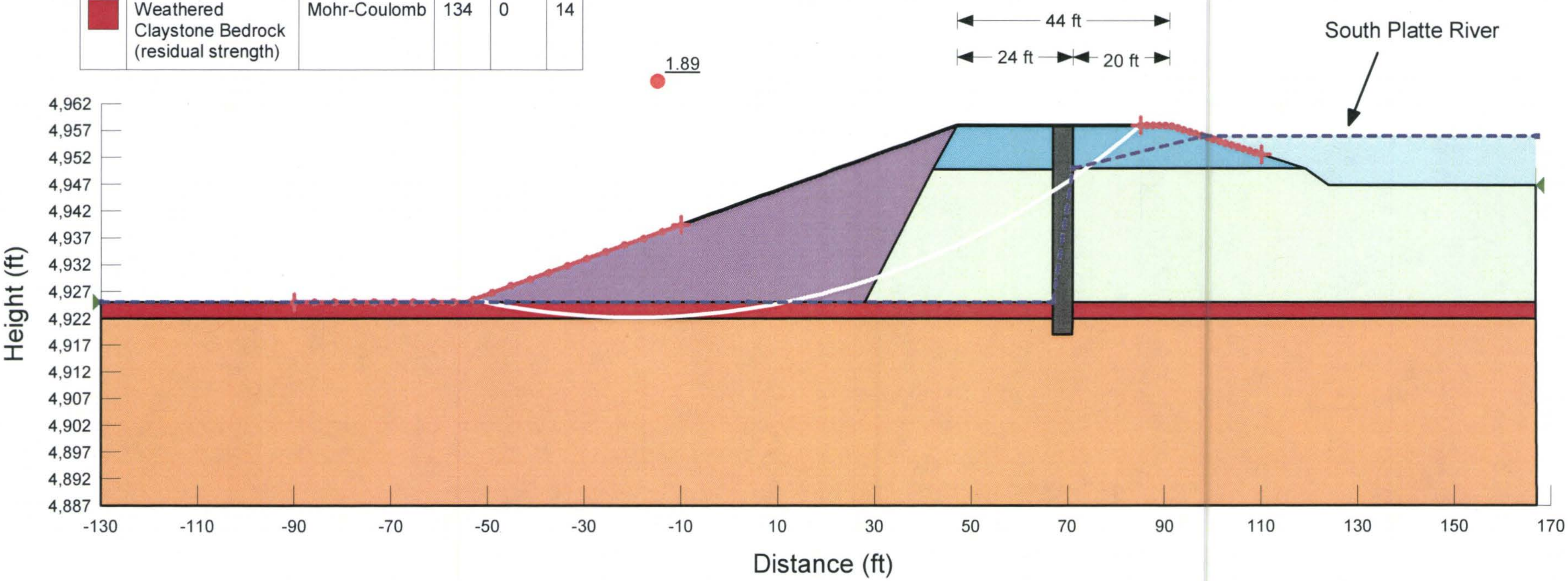


Figure C-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - SOUTH PLATTE RIVER

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

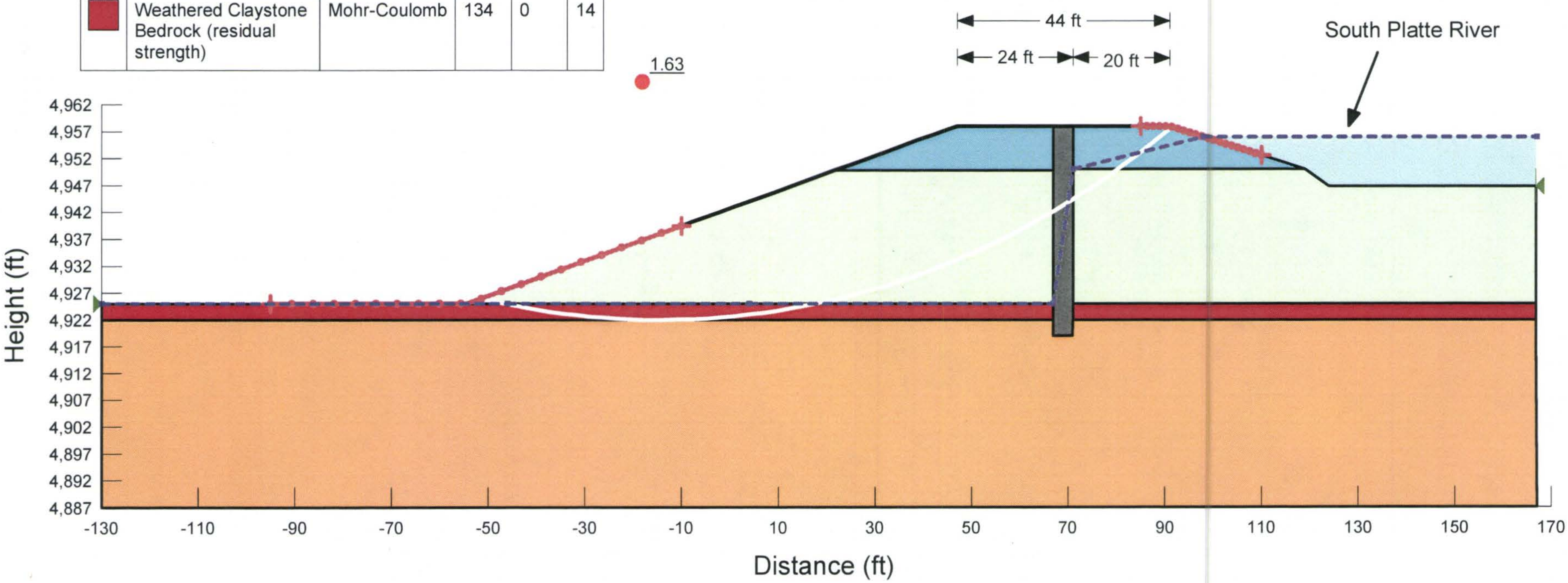


Figure C-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - SOUTH PLATTE RIVER

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

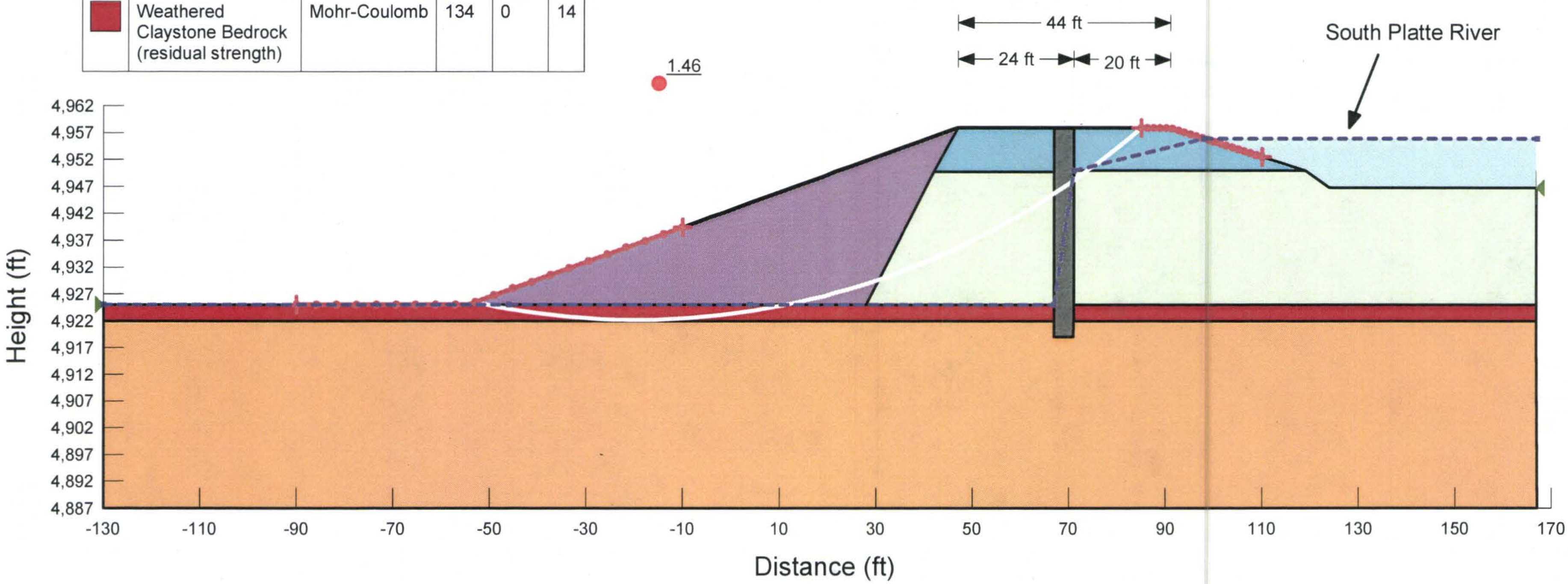


Figure C-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (NORTH SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

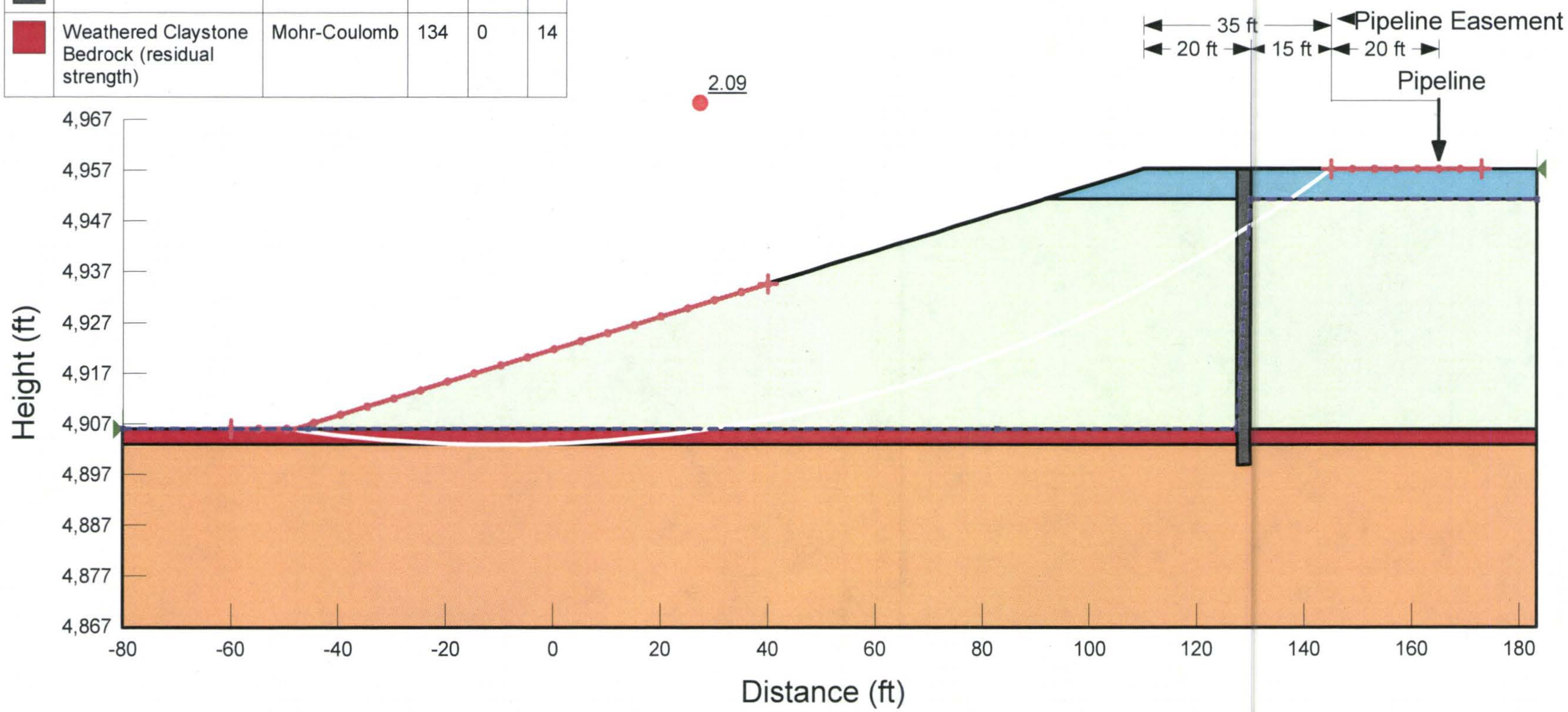


Figure D-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (NORTH SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

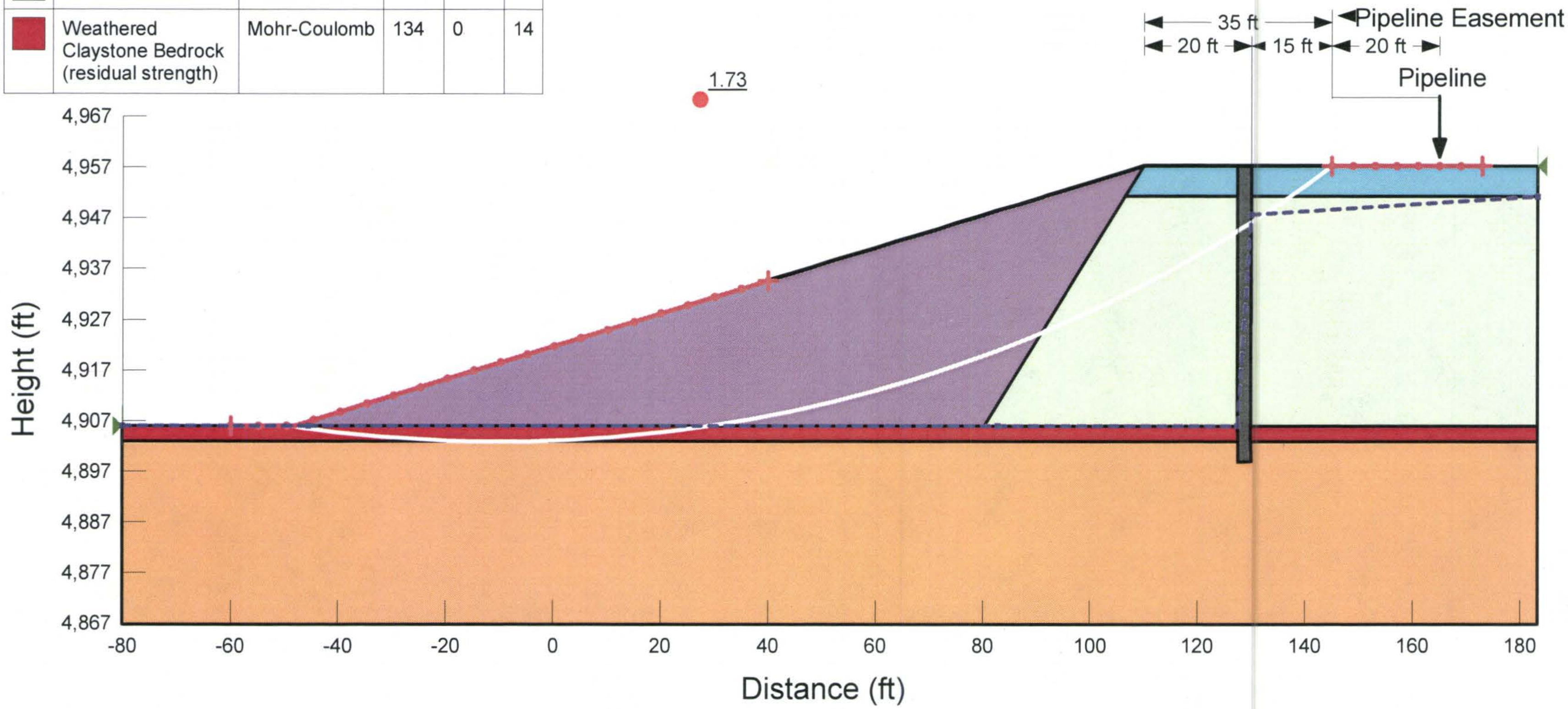


Figure D-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (NORTH SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

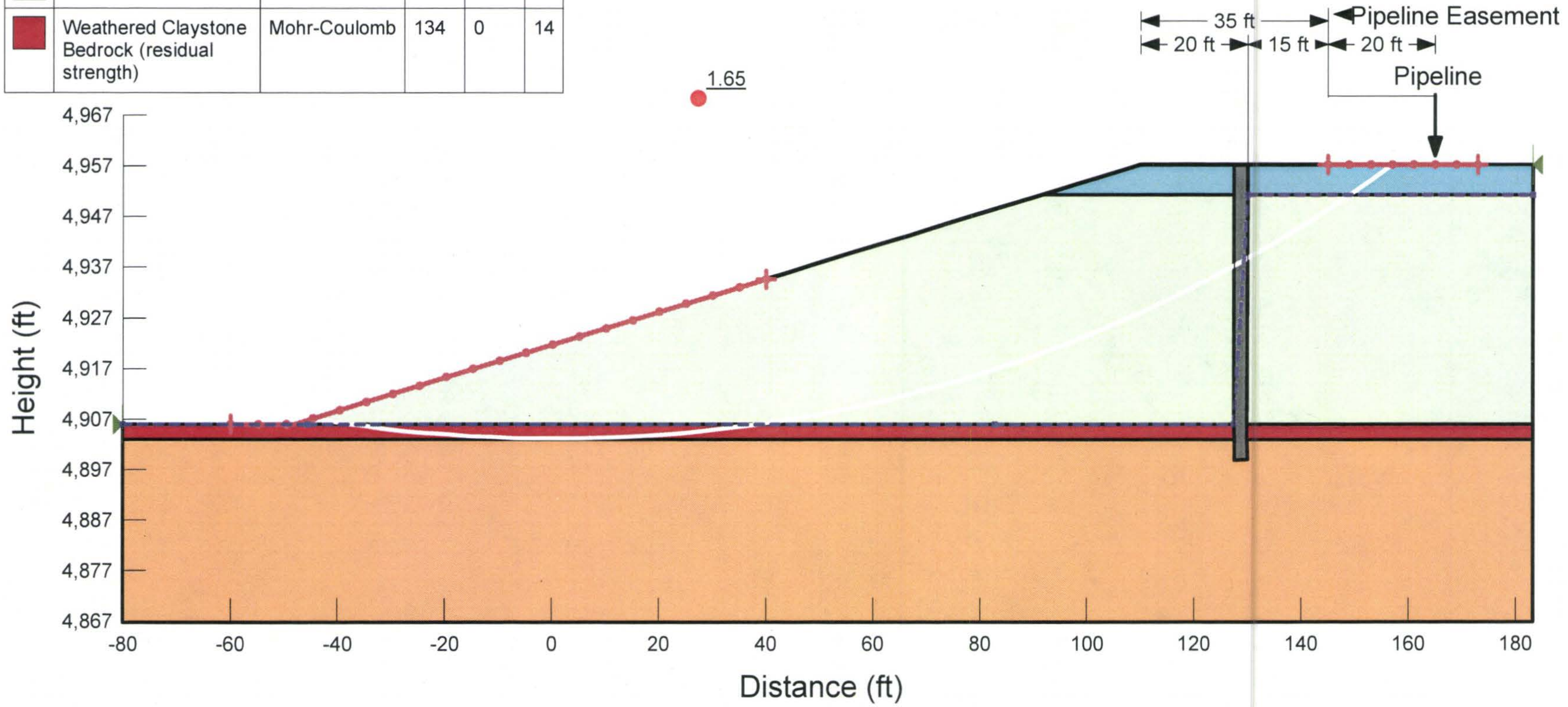


Figure D-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (NORTH SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

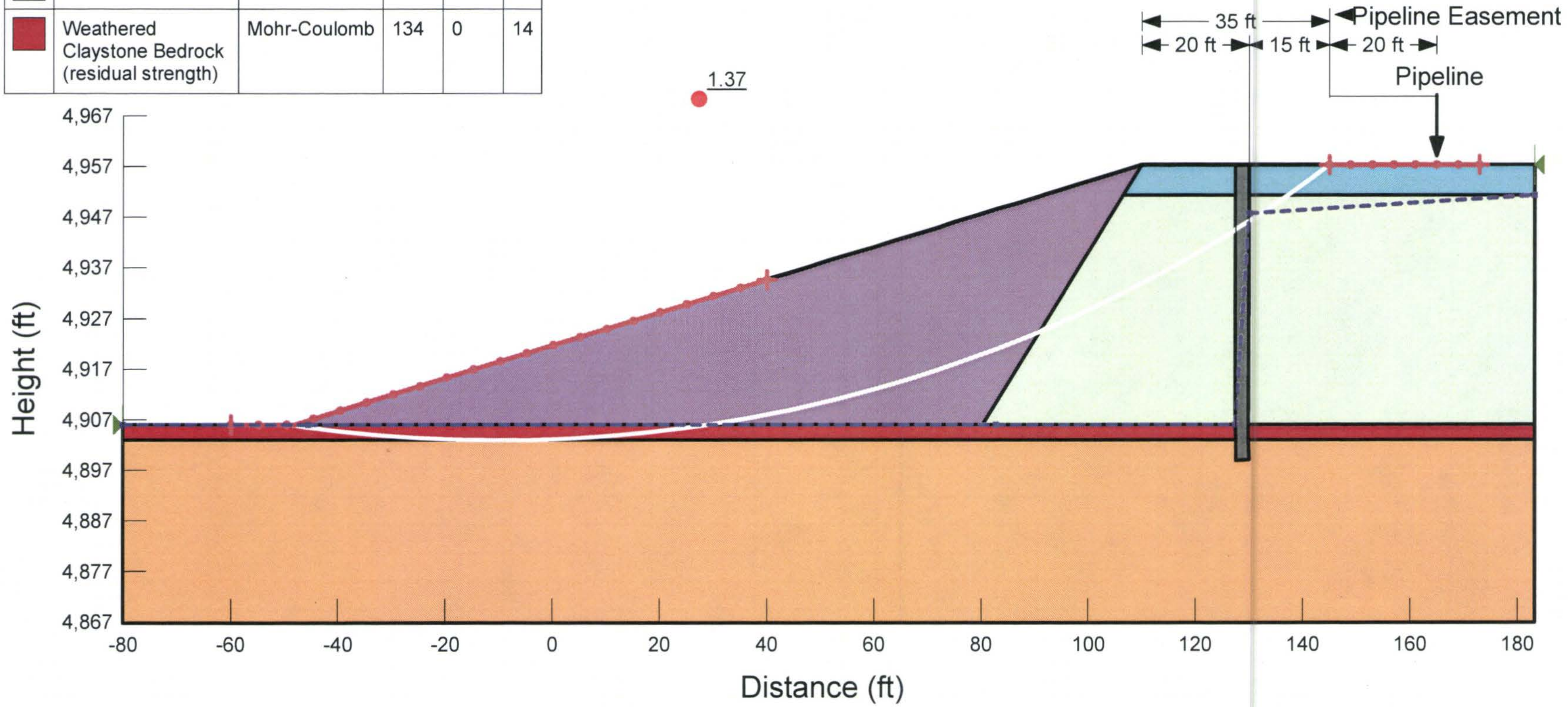


Figure D-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GAS WELL/FENCE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

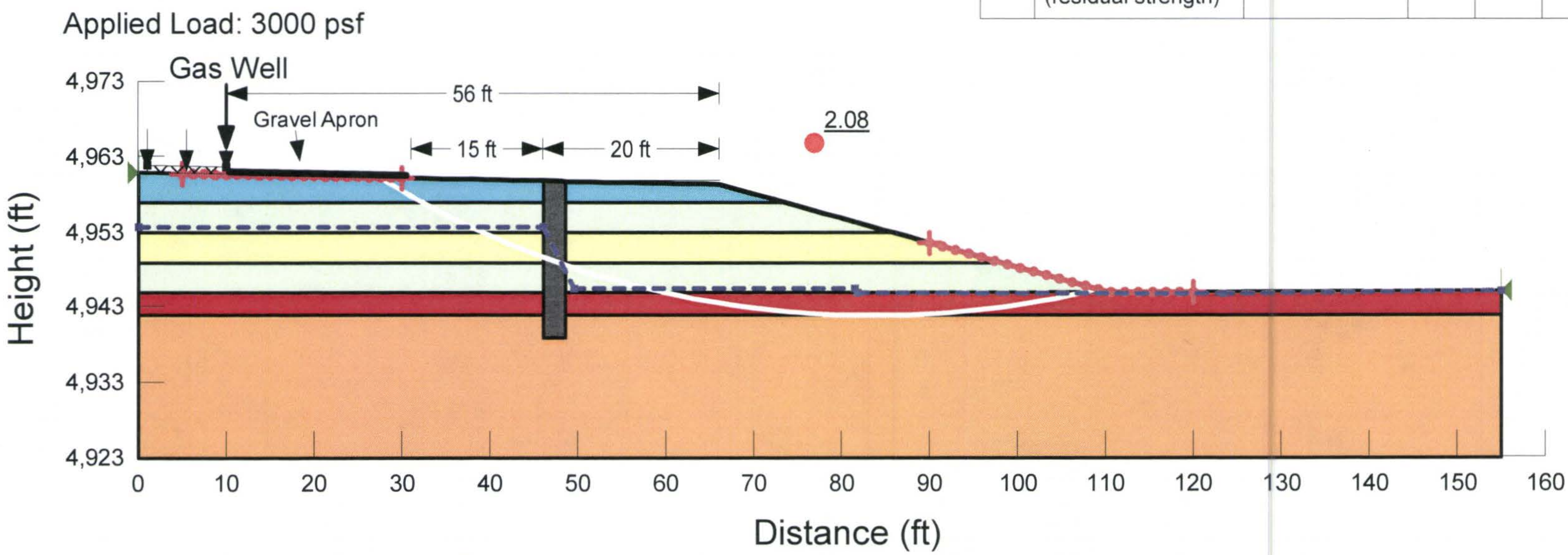


Figure E-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GAS WELL/FENCE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

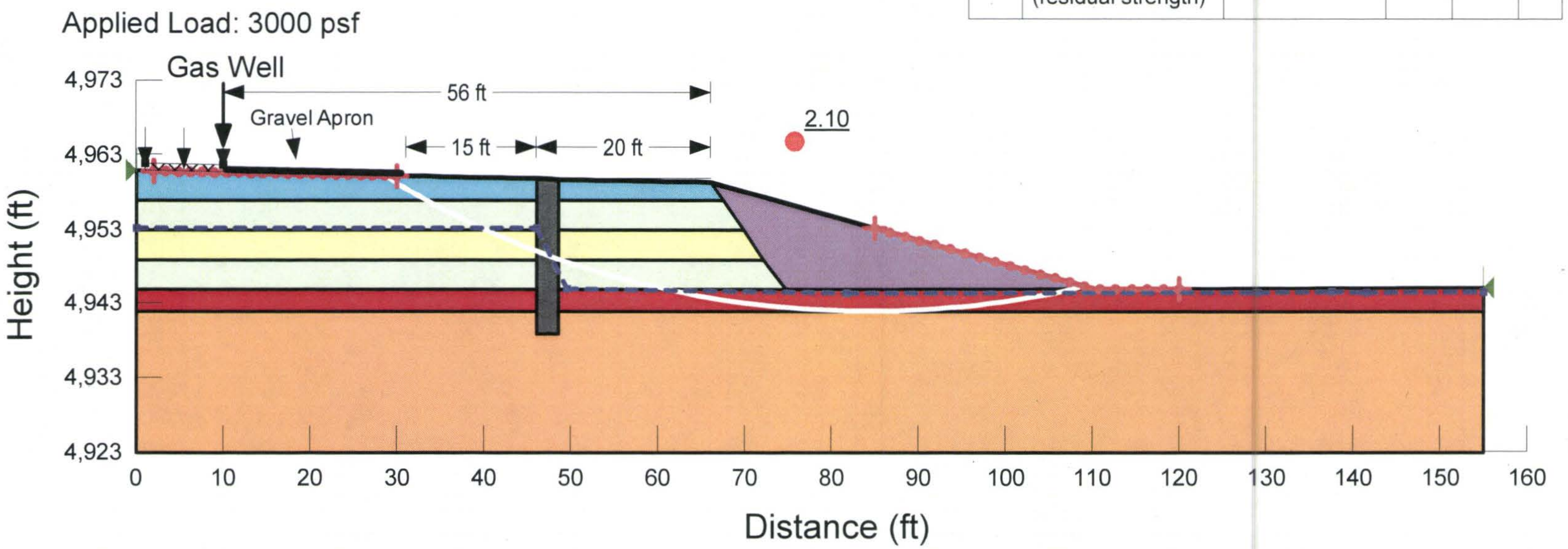


Figure E-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GAS WELL/FENCE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

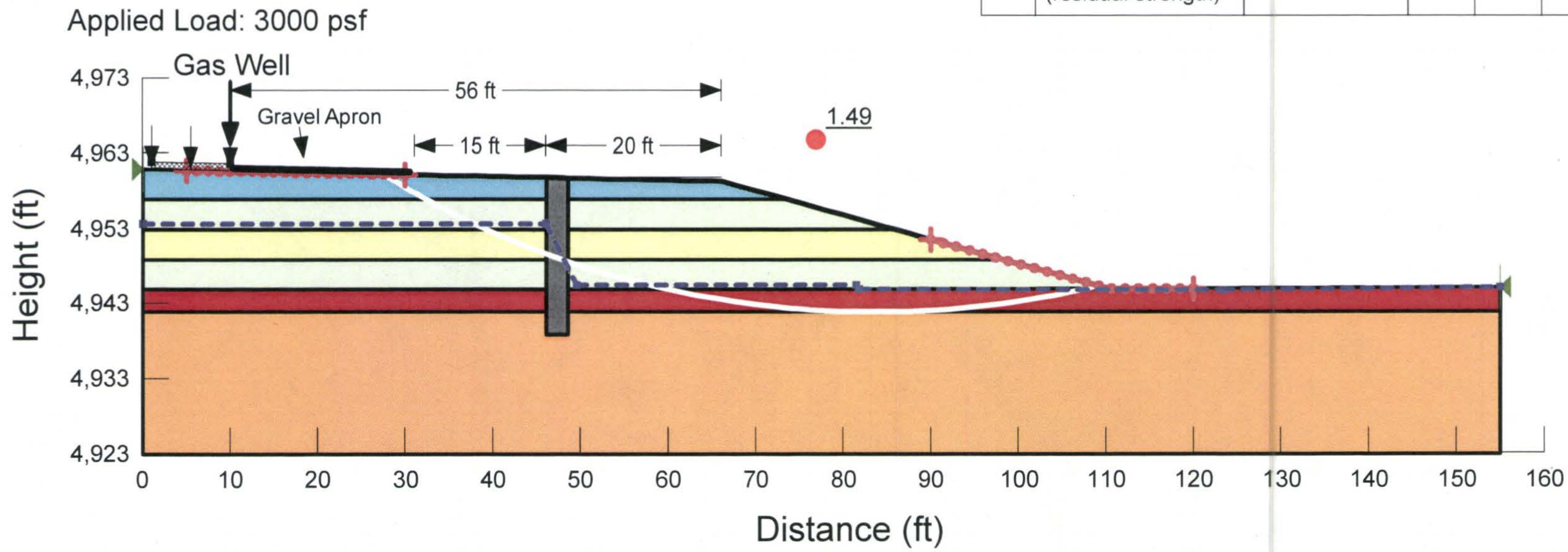


Figure E-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GAS WELL/FENCE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

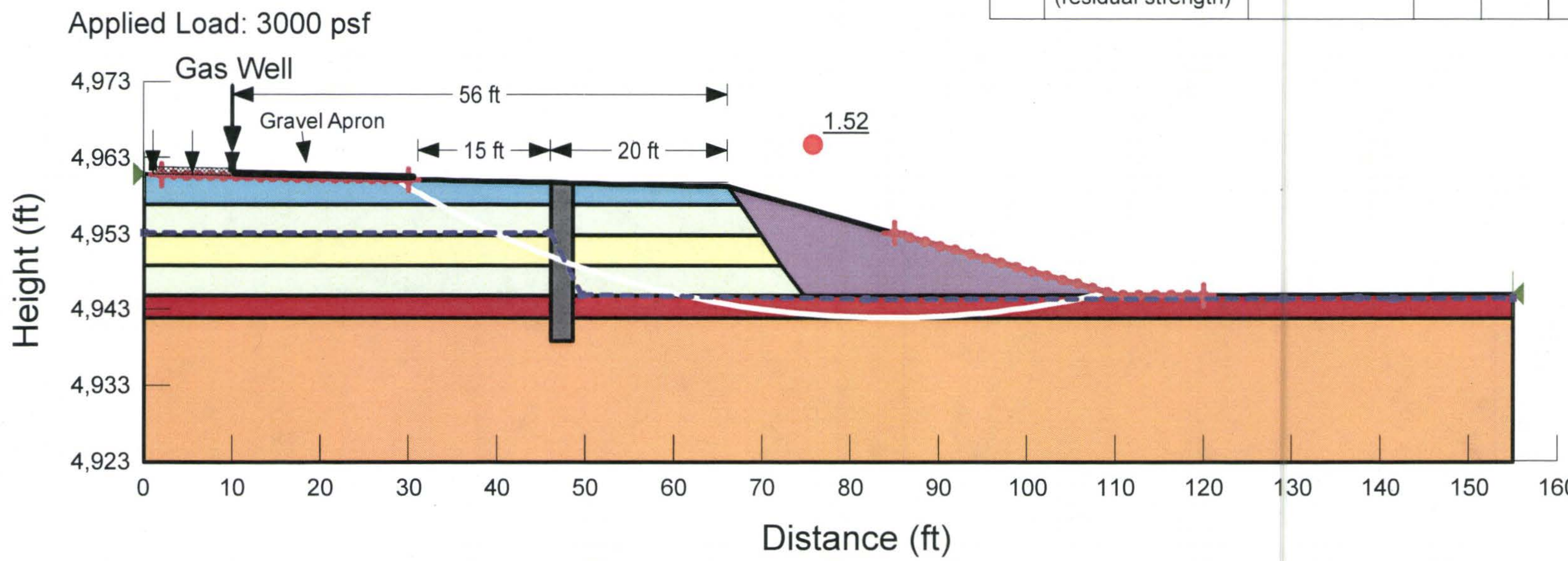


Figure E-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - POWER POLES

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

Utility Easement

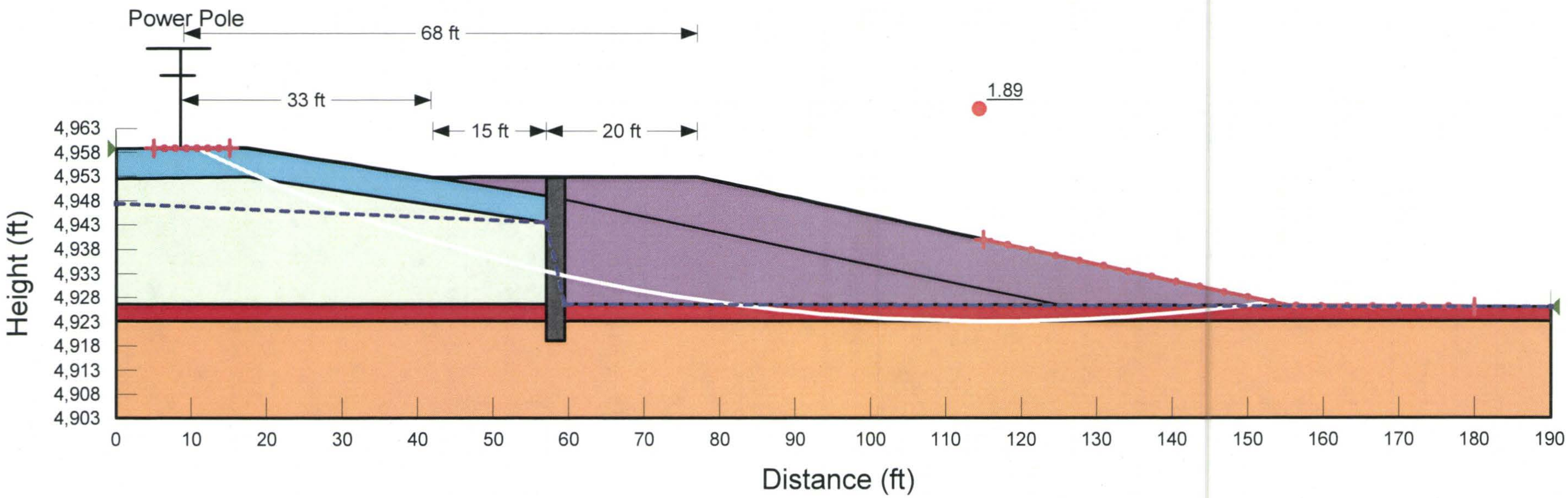


Figure F-1- Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - POWER POLES

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

Utility Easement

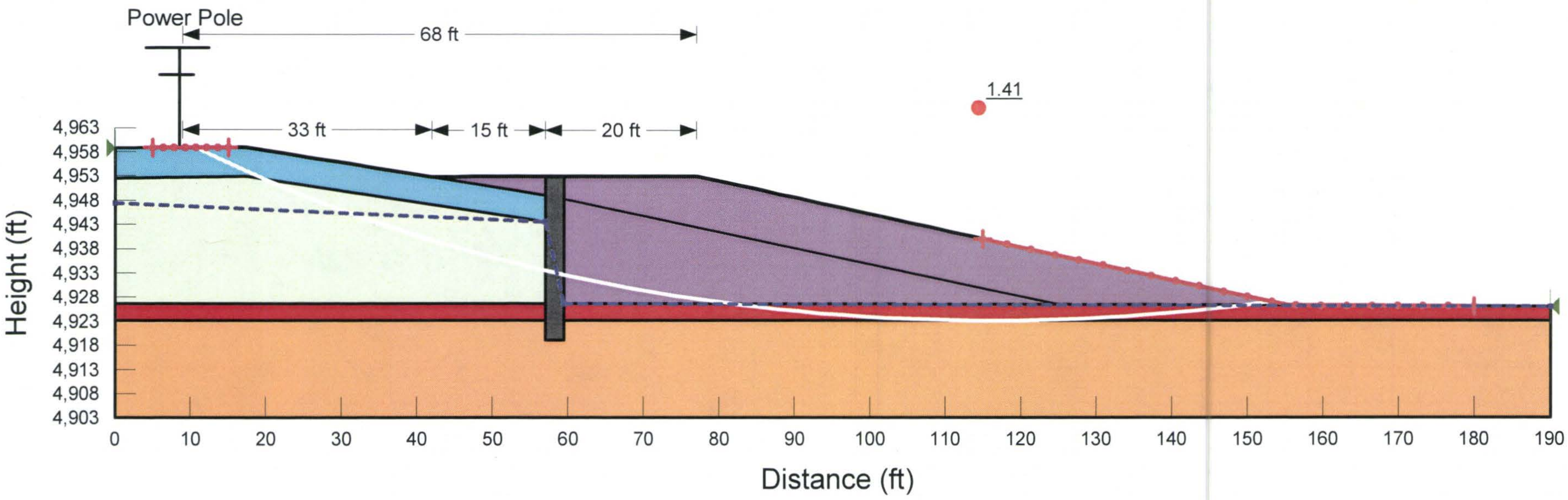


Figure F-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - BRIGHTON DITCH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

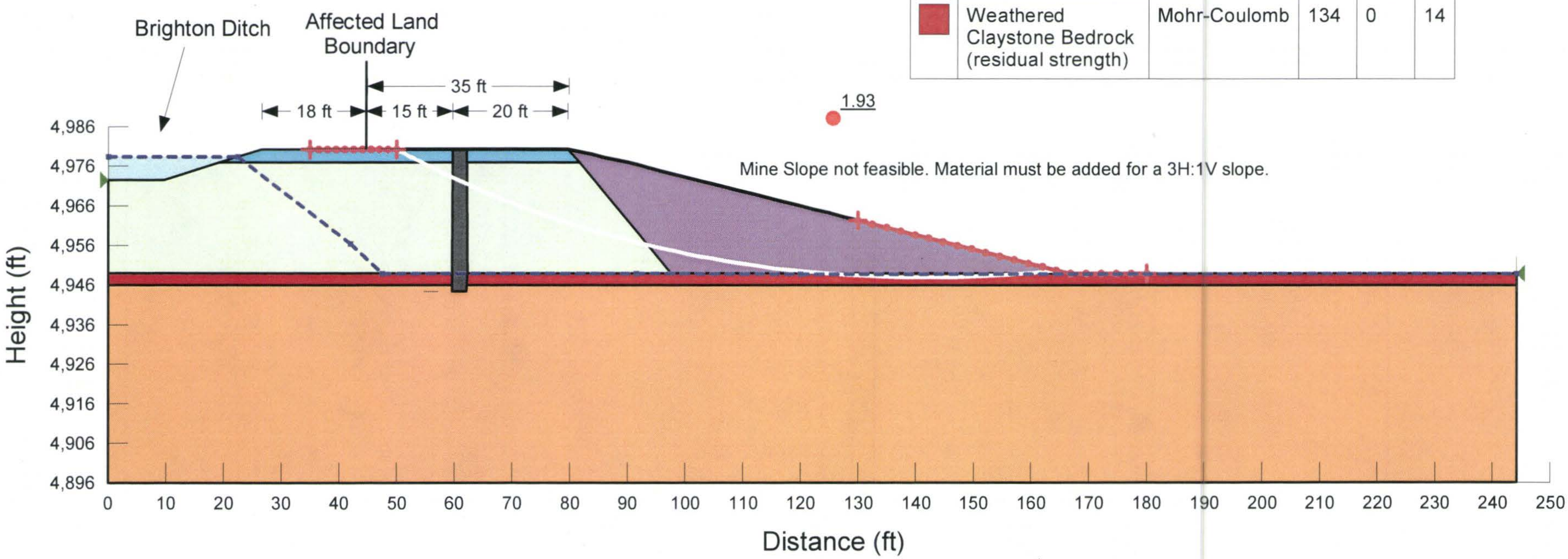


Figure G-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - BRIGHTON DITCH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

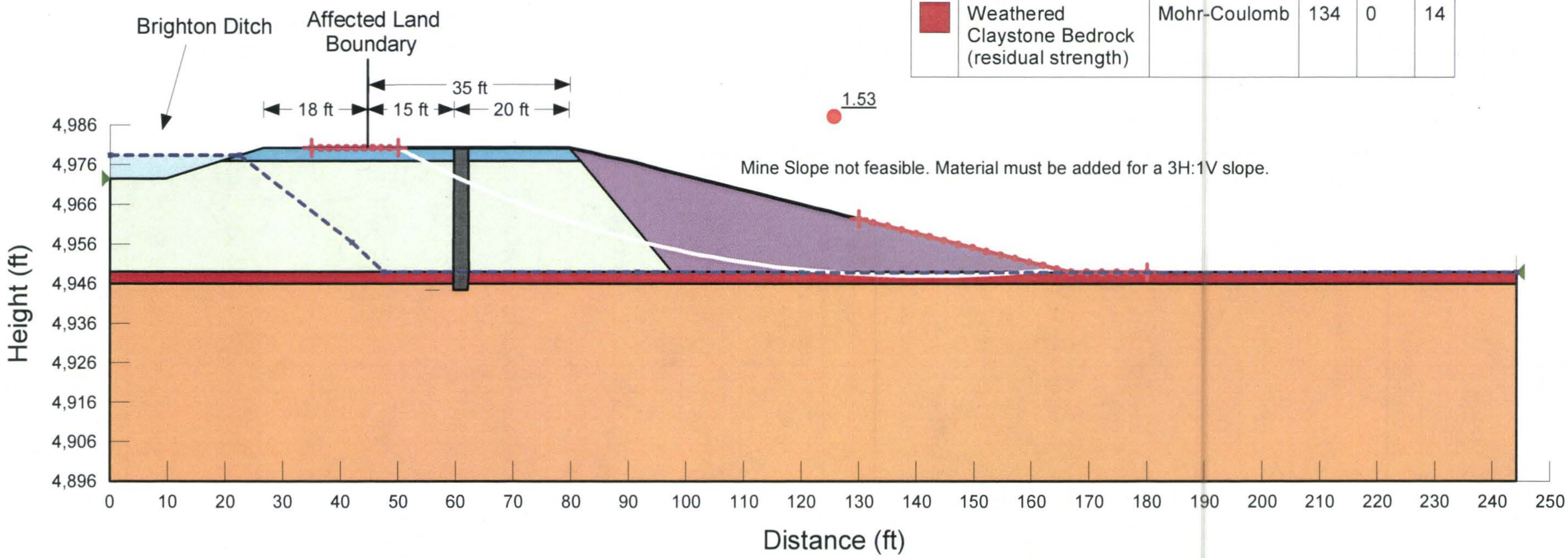


Figure G-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELL (EAST)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

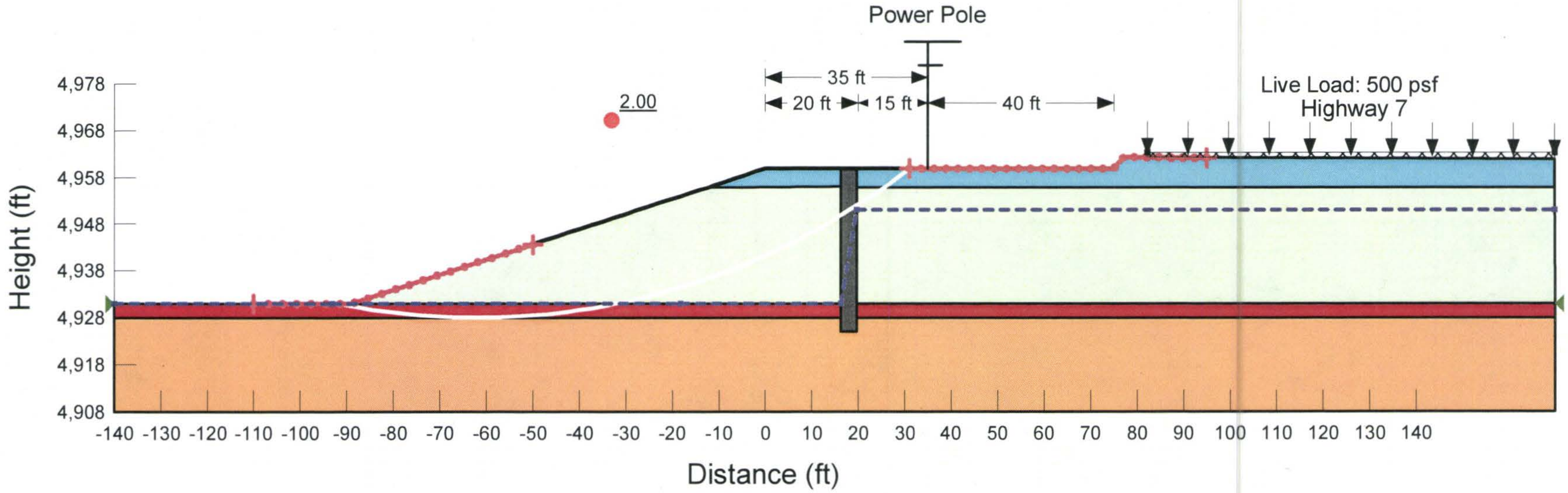


Figure H-1 - Static Analysis

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELL (EAST)

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

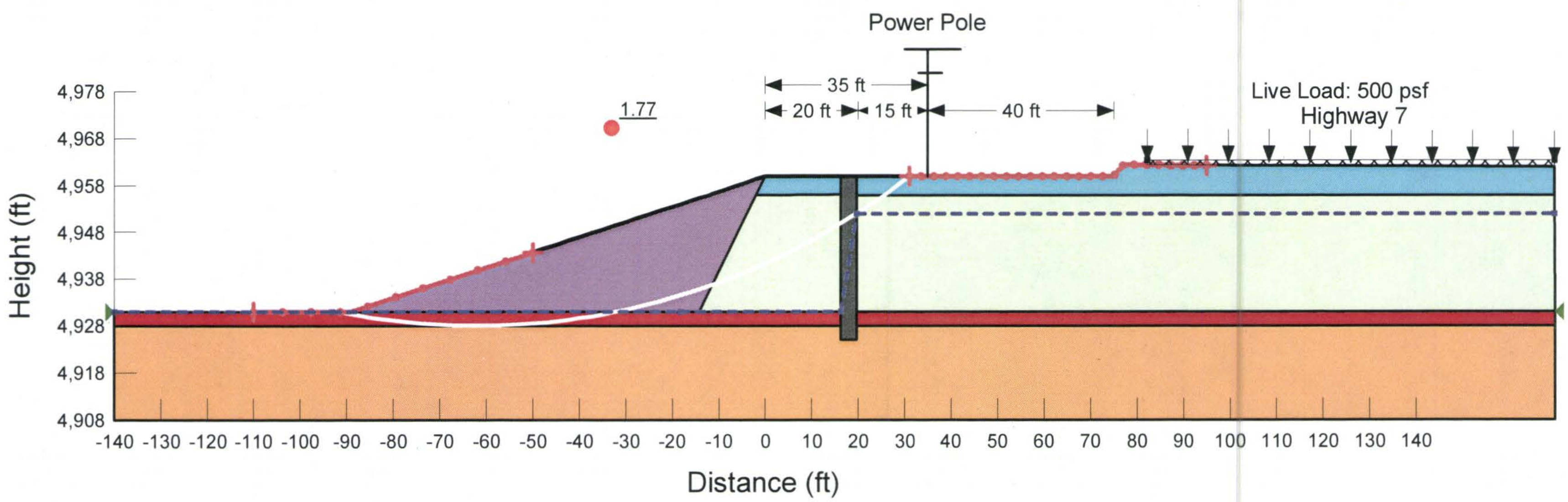


Figure H-1 - Static Analysis

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELL (EAST)

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

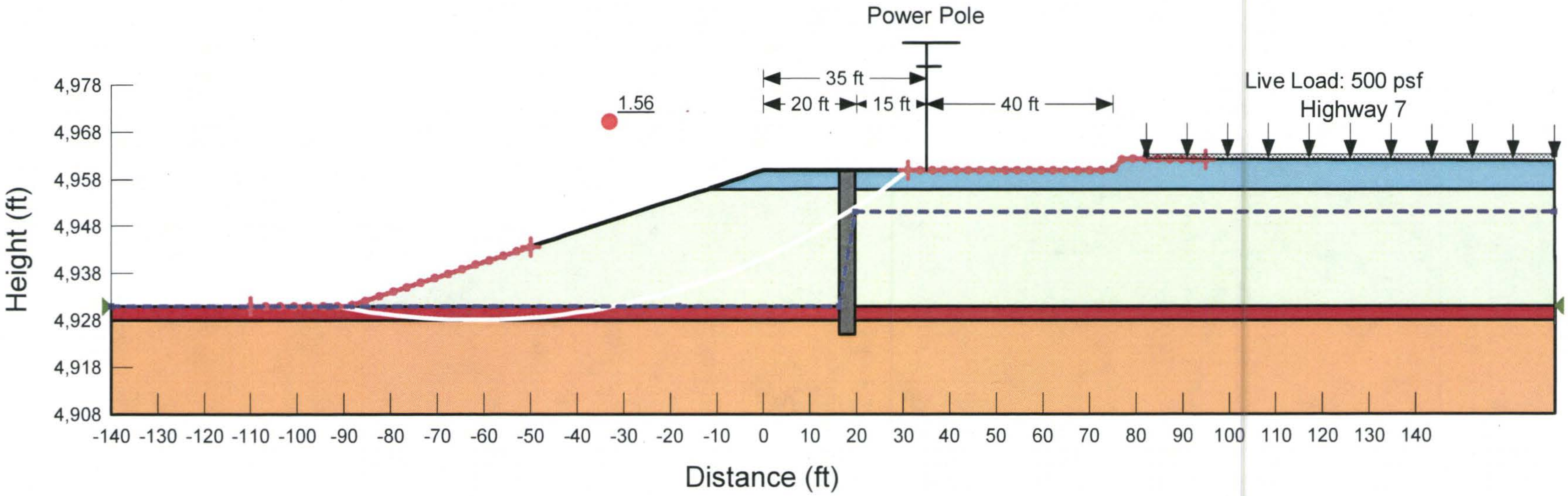


Figure H-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELL (EAST)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

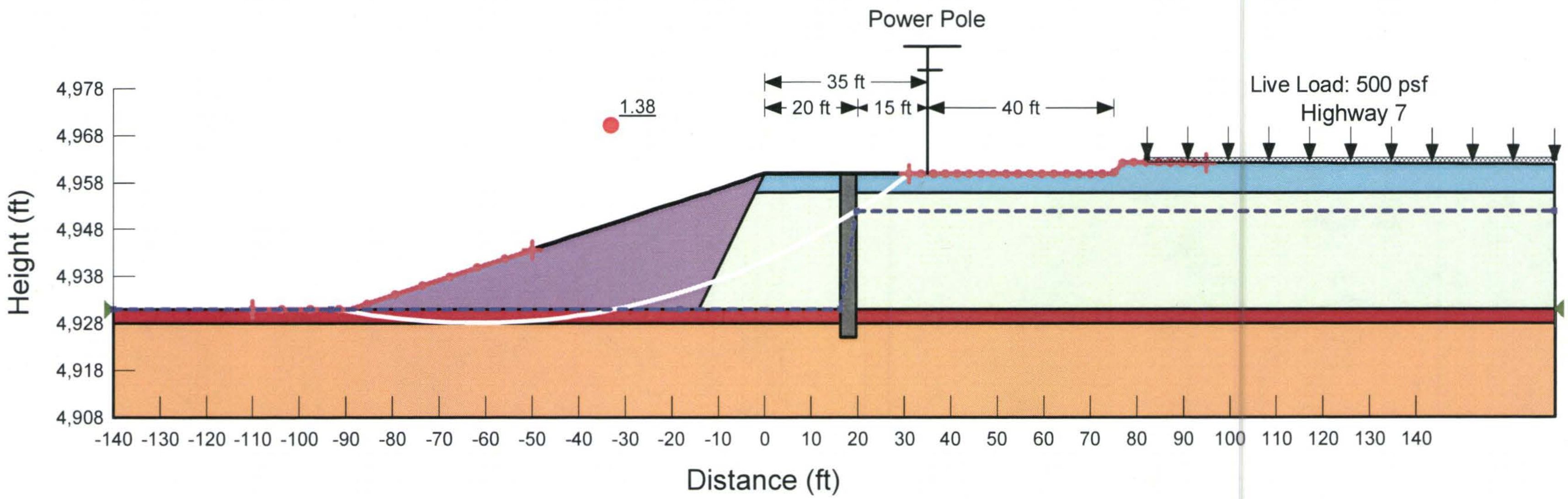


Figure H-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM SOUTH CELL

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

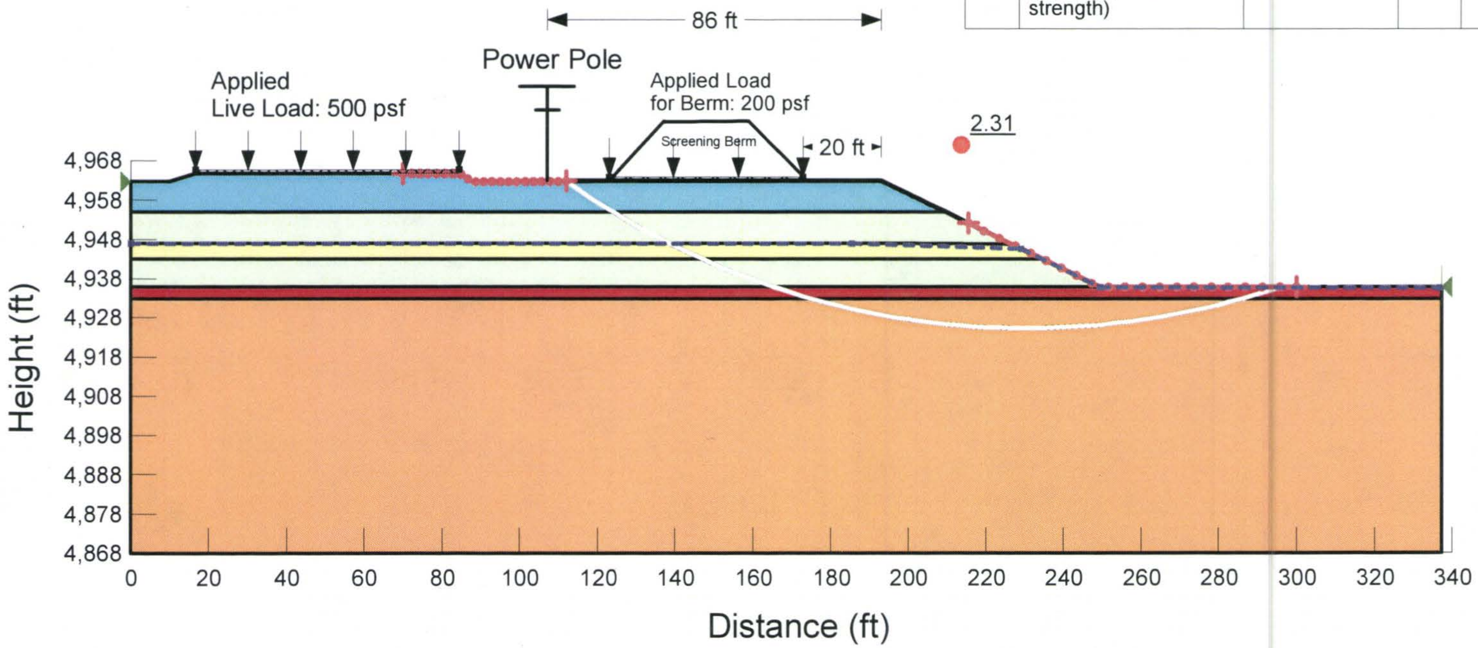


Figure I-1 - Static Analysis with High Phreatic Surface

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM SOUTH CELL

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

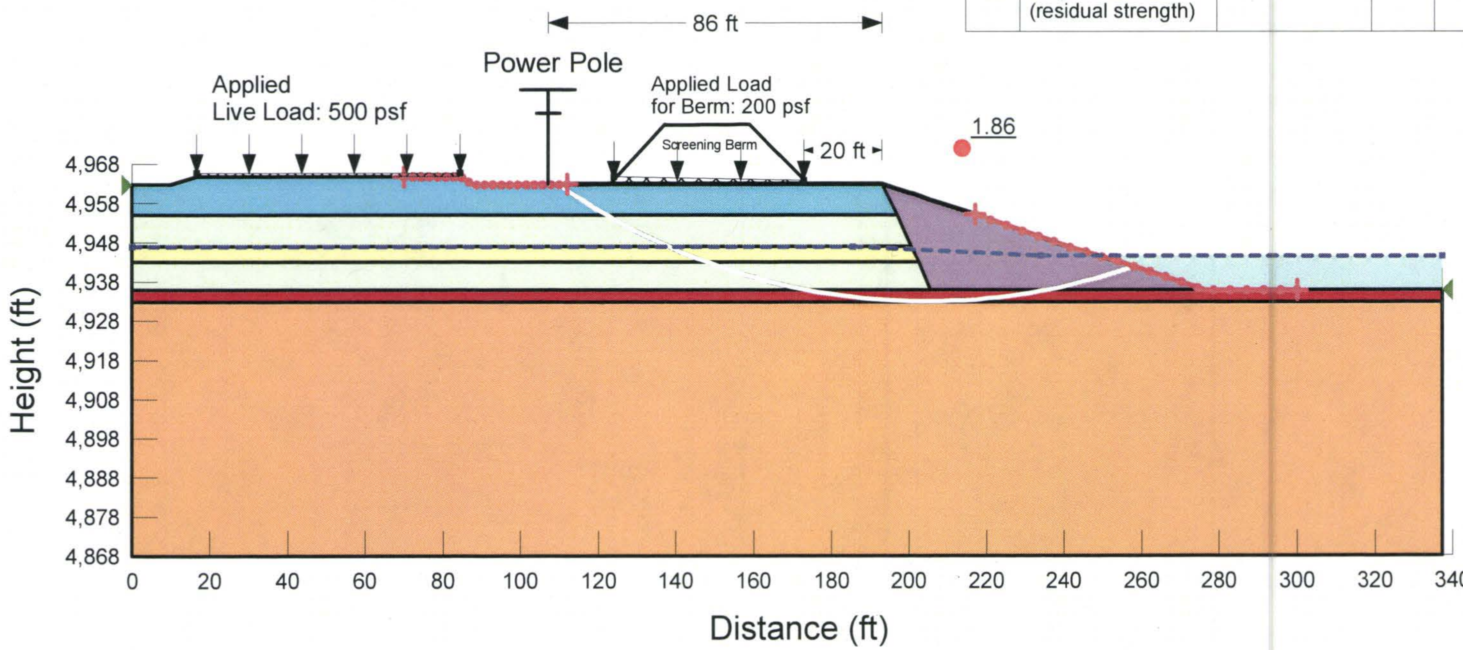


Figure I-2 - Pseudostatic Analysis with High Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM SOUTH CELL

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

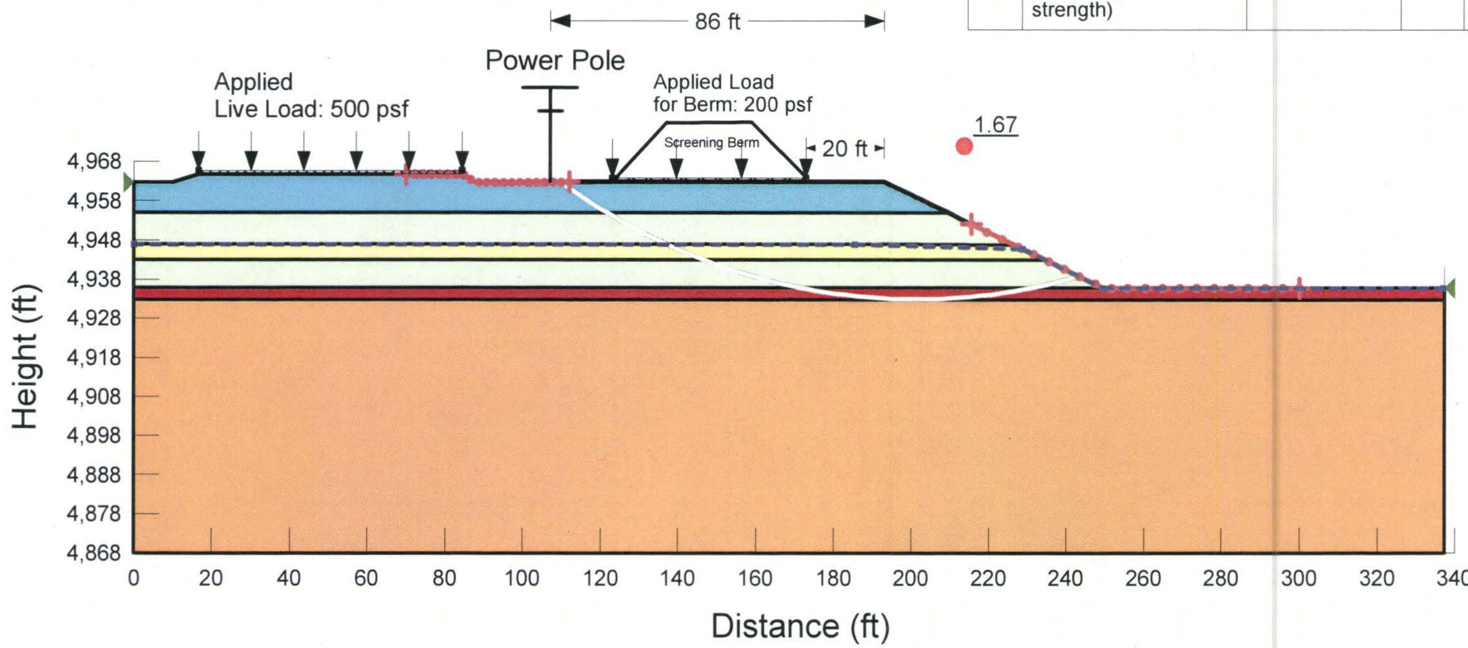


Figure I-2 - Pseudostatic Analysis with High Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM SOUTH CELL

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

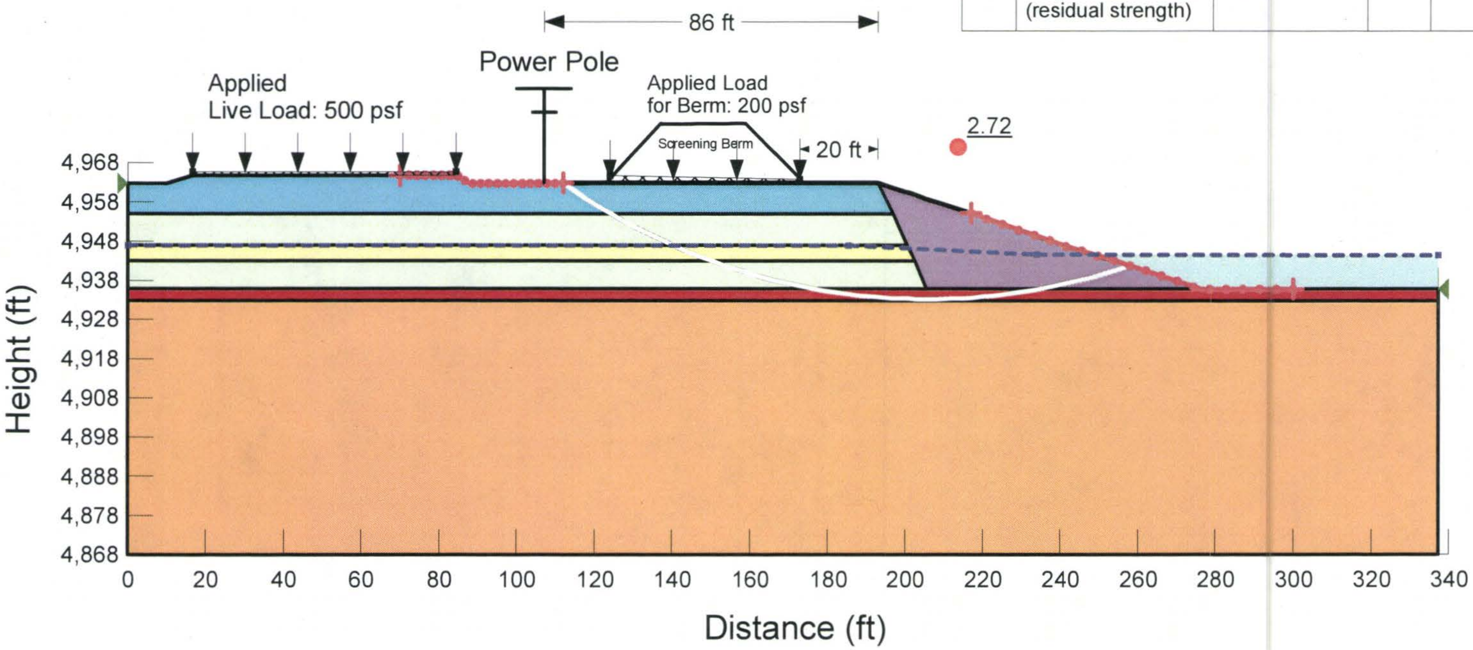


Figure I-1 - Static Analysis with High Phreatic Surface

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - BRIGHTON RETURN DITCH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

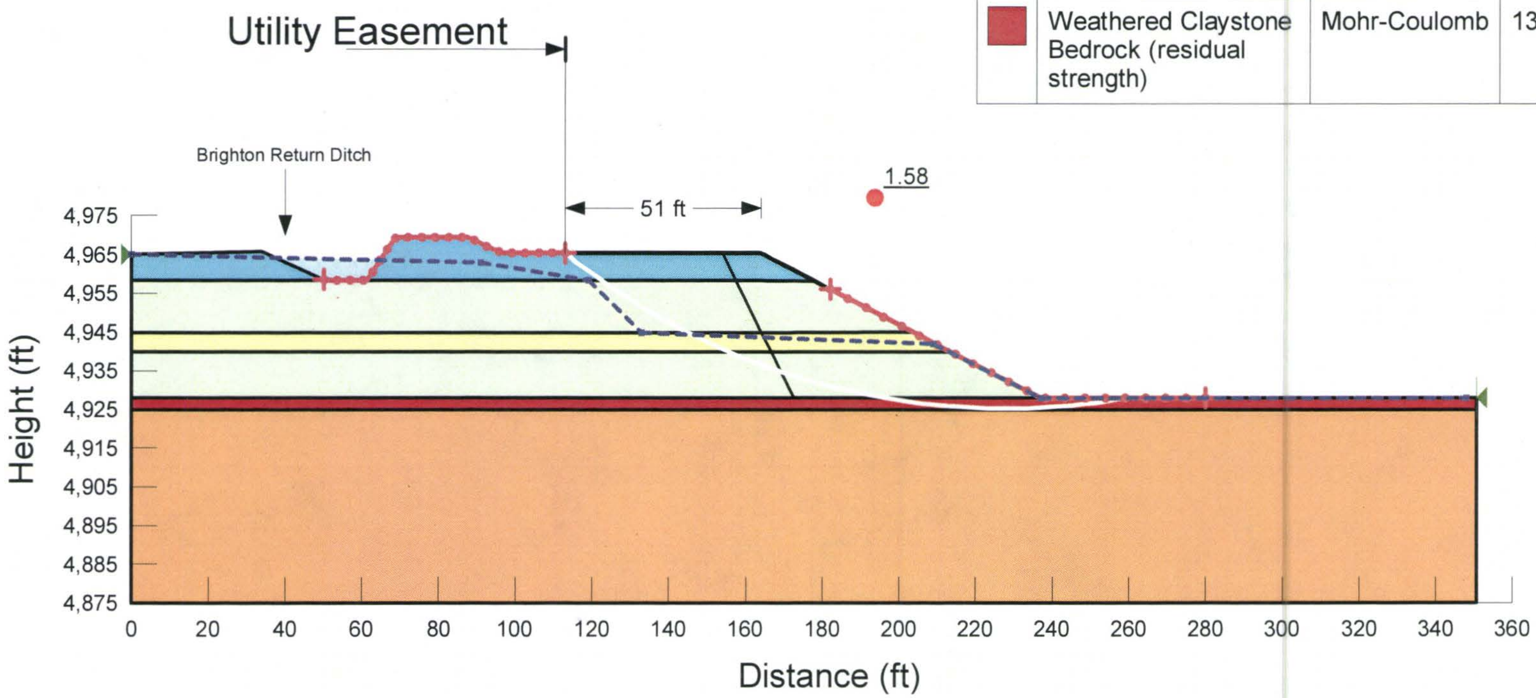


Figure J-1 - Static Analysis

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - BRIGHTON RETURN DITCH

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

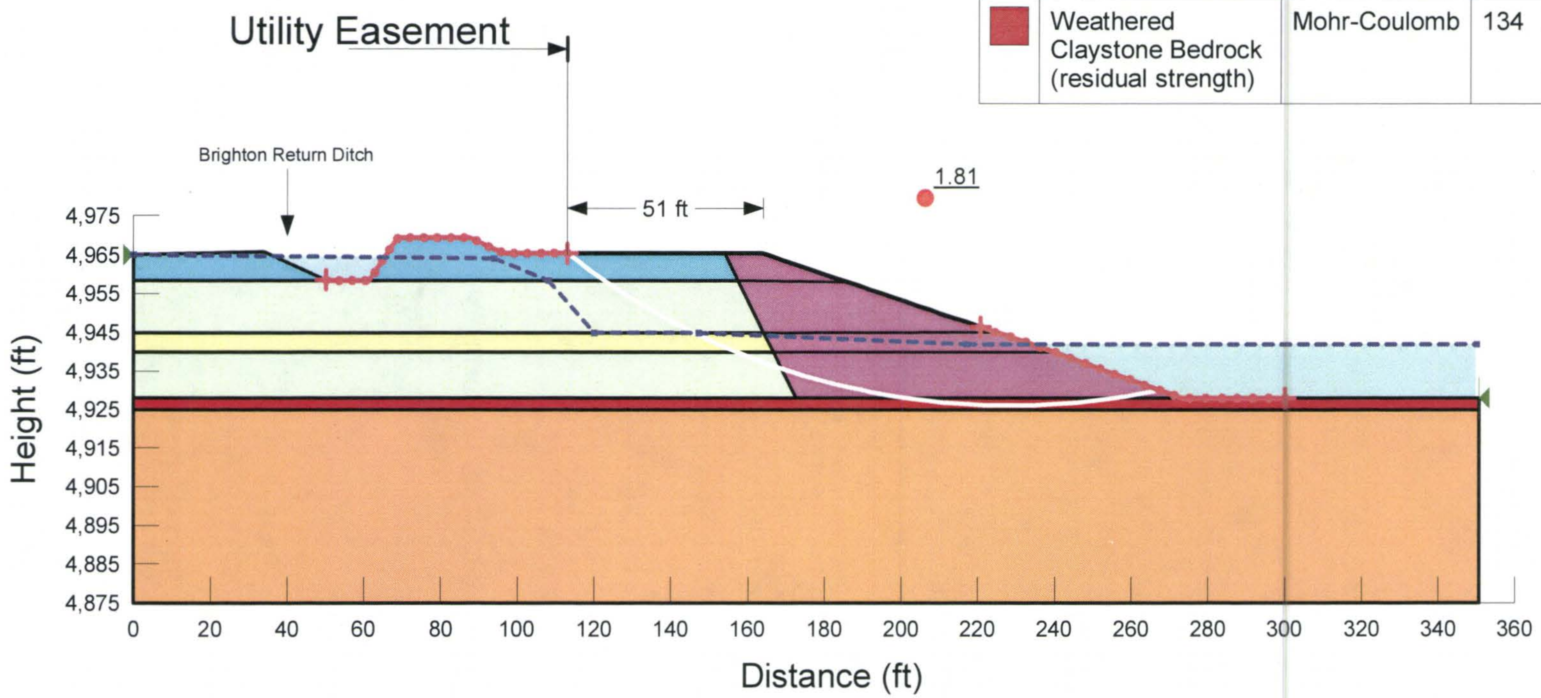


Figure J-1 - Static Analysis

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - BRIGHTON RETURN DITCH

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

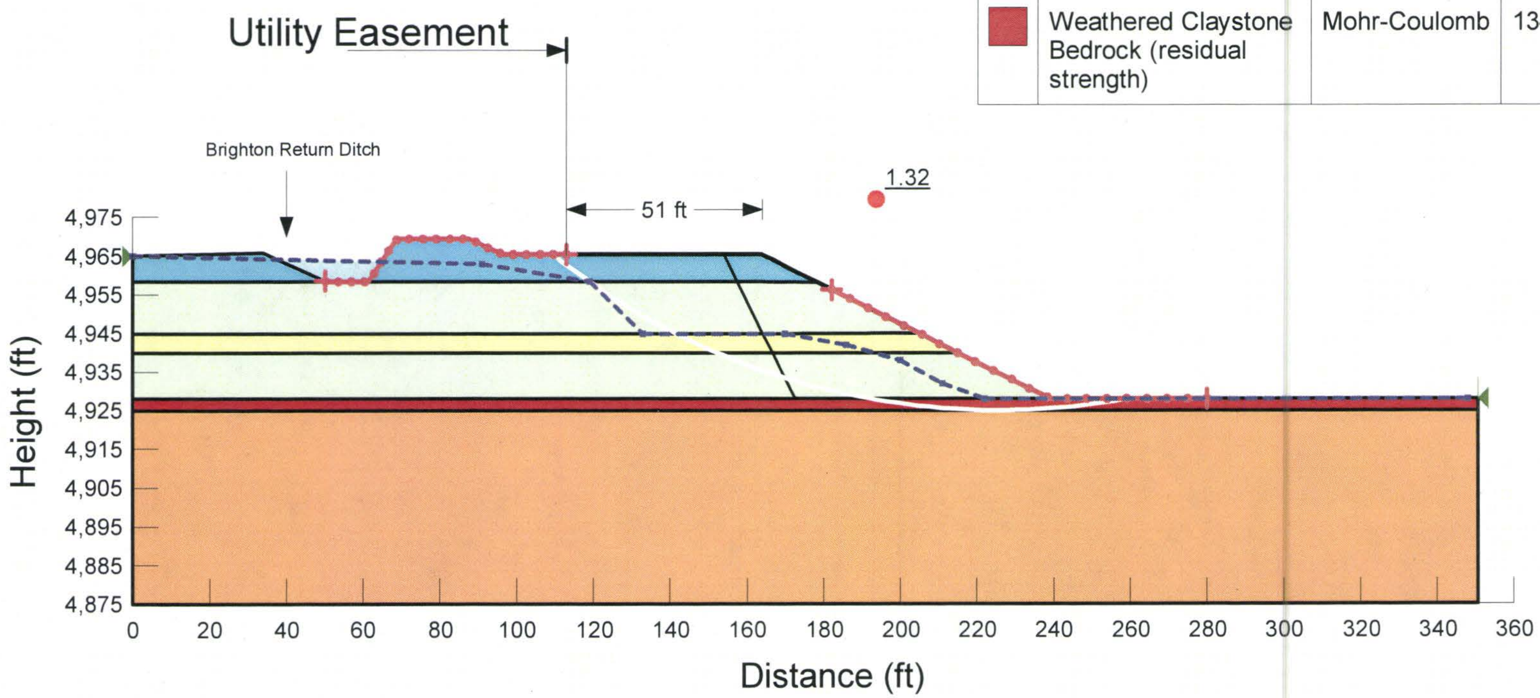


Figure J-2 - Pseudostatic Analysis with Mine Slope- Lowered Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - BRIGHTON RETURN DITCH

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

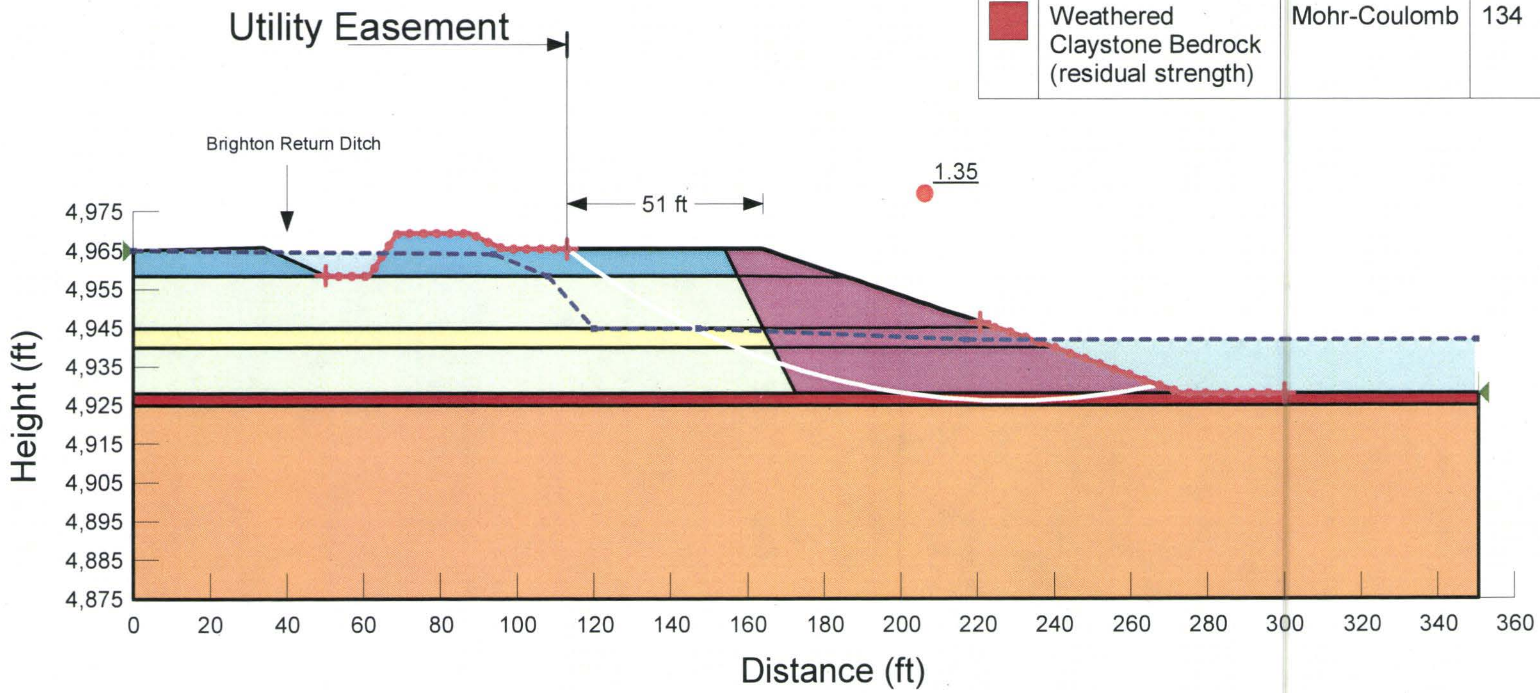


Figure J-2 - Pseudostatic Analysis with Mine Slope- Lowered Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GRAVEL ROAD/BUILDING

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

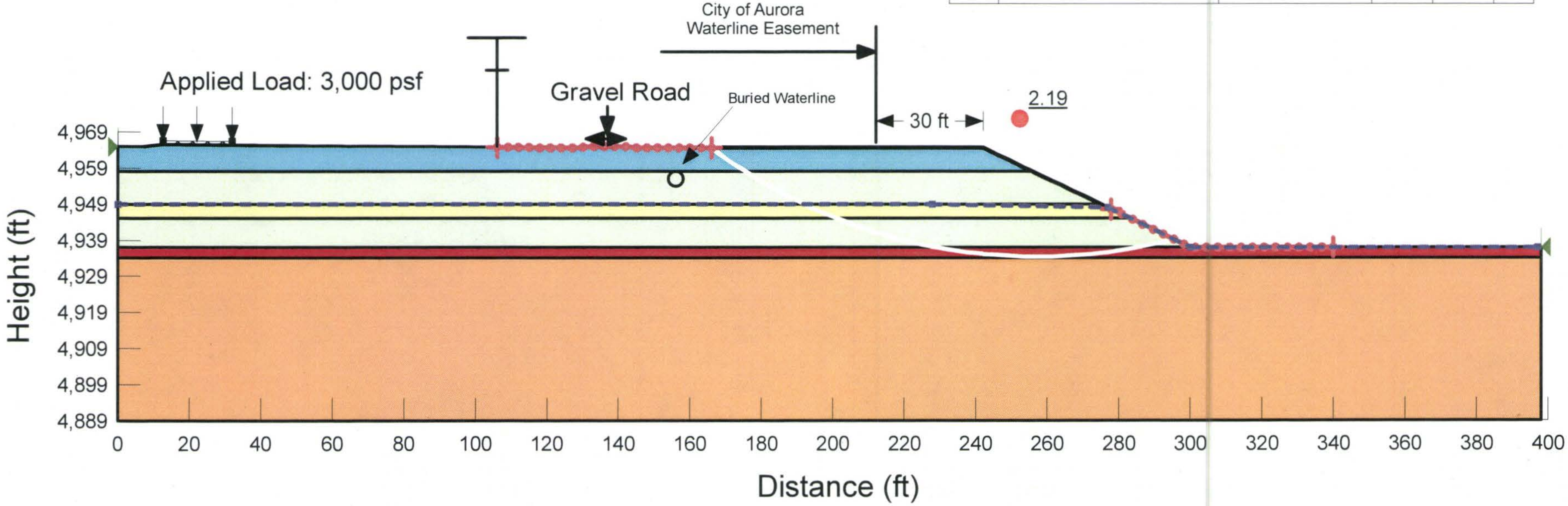


Figure K-1 - Static Analysis with High Phreatic Surface

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GRAVEL ROAD/BUILDING

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

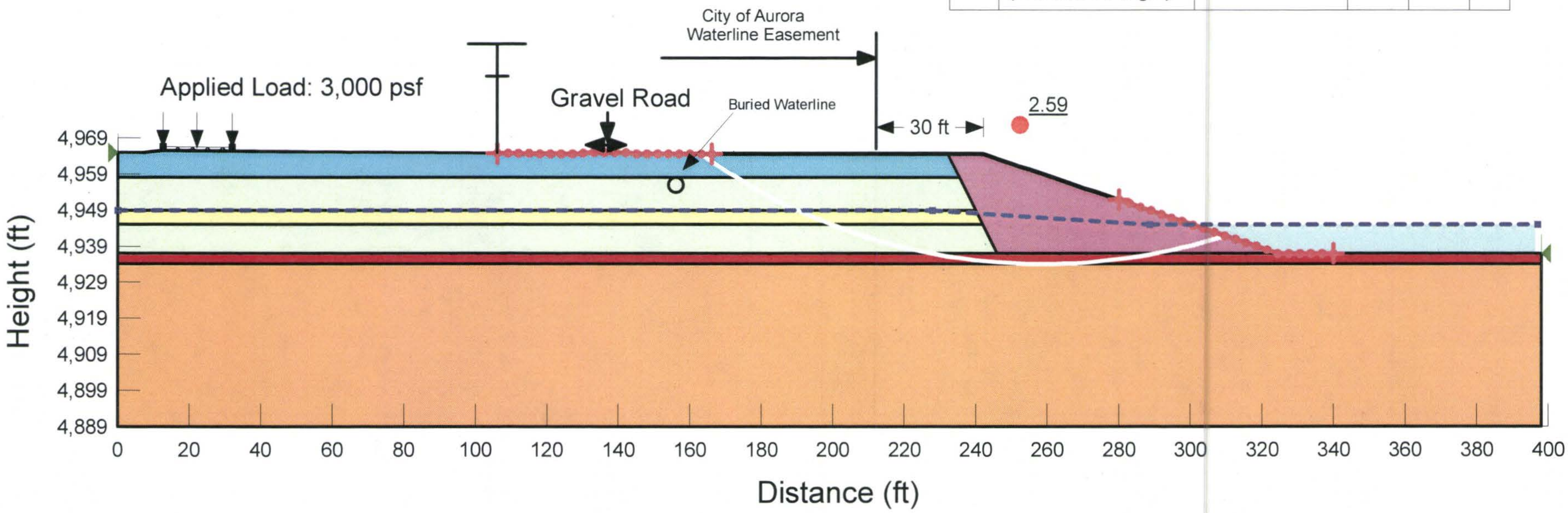


Figure K-1 - Static Analysis with High Phreatic Surface

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GRAVEL ROAD/BUILDING

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

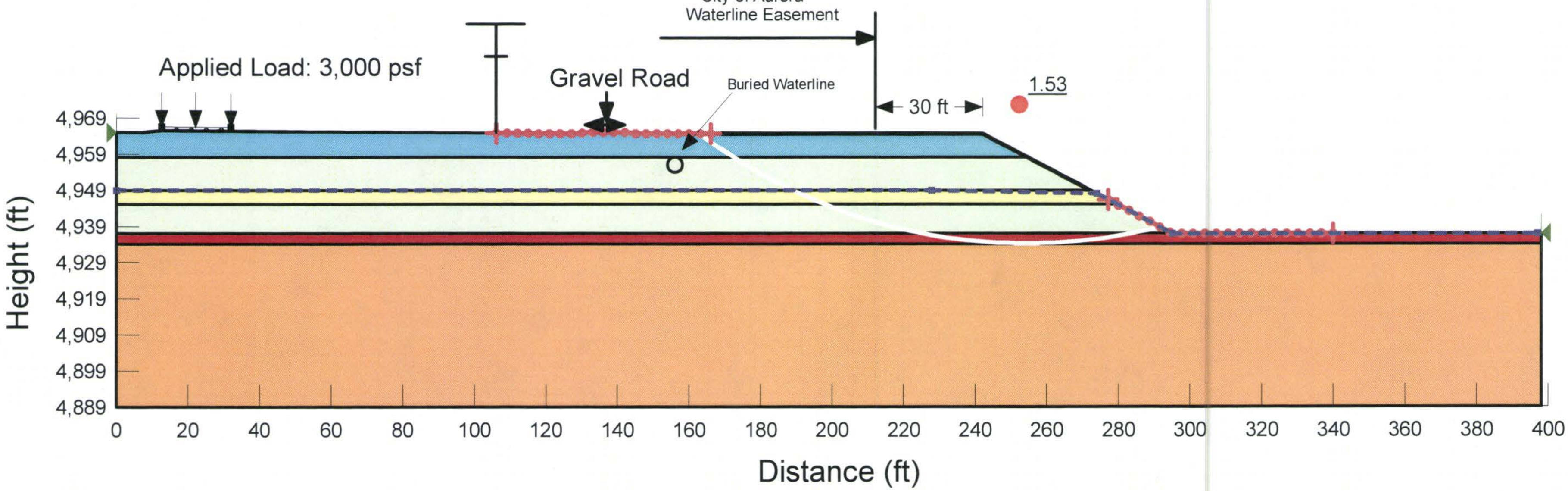


Figure K-2 - Pseudostatic Analysis with High Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - GRAVEL ROAD/BUILDING

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

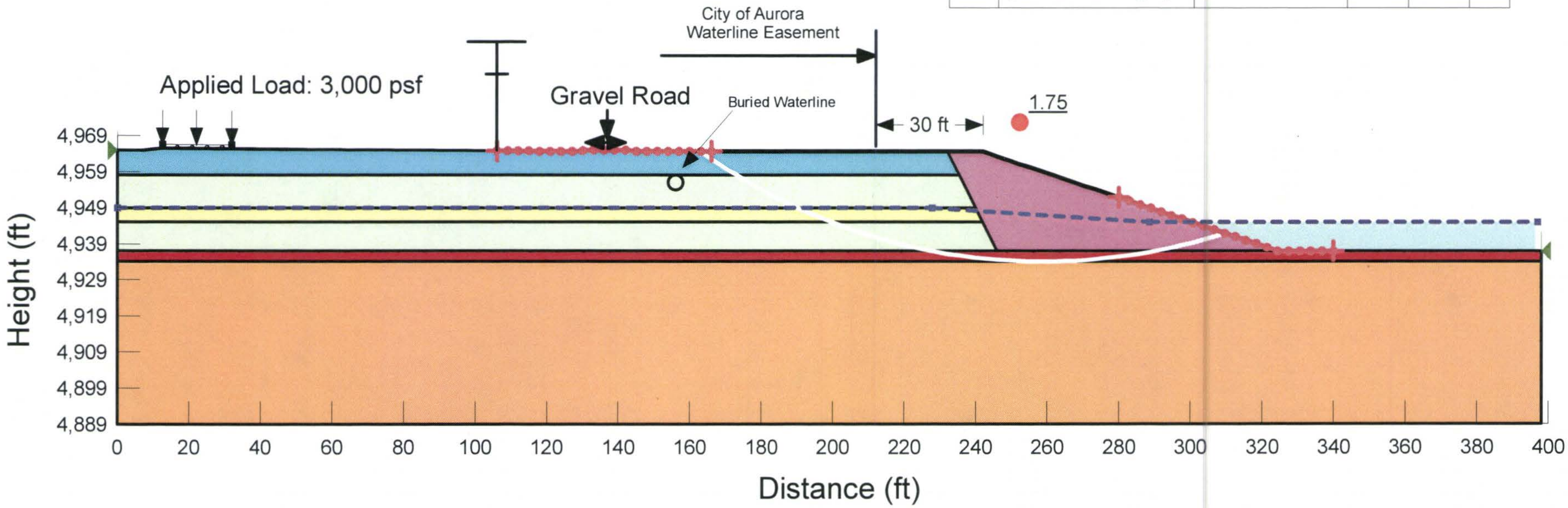


Figure K-2 - Pseudostatic Analysis with High Phreatic Surface

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CHALLENGER PIT

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Reclamation Slope Fill	Mohr-Coulomb	126	25	26
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

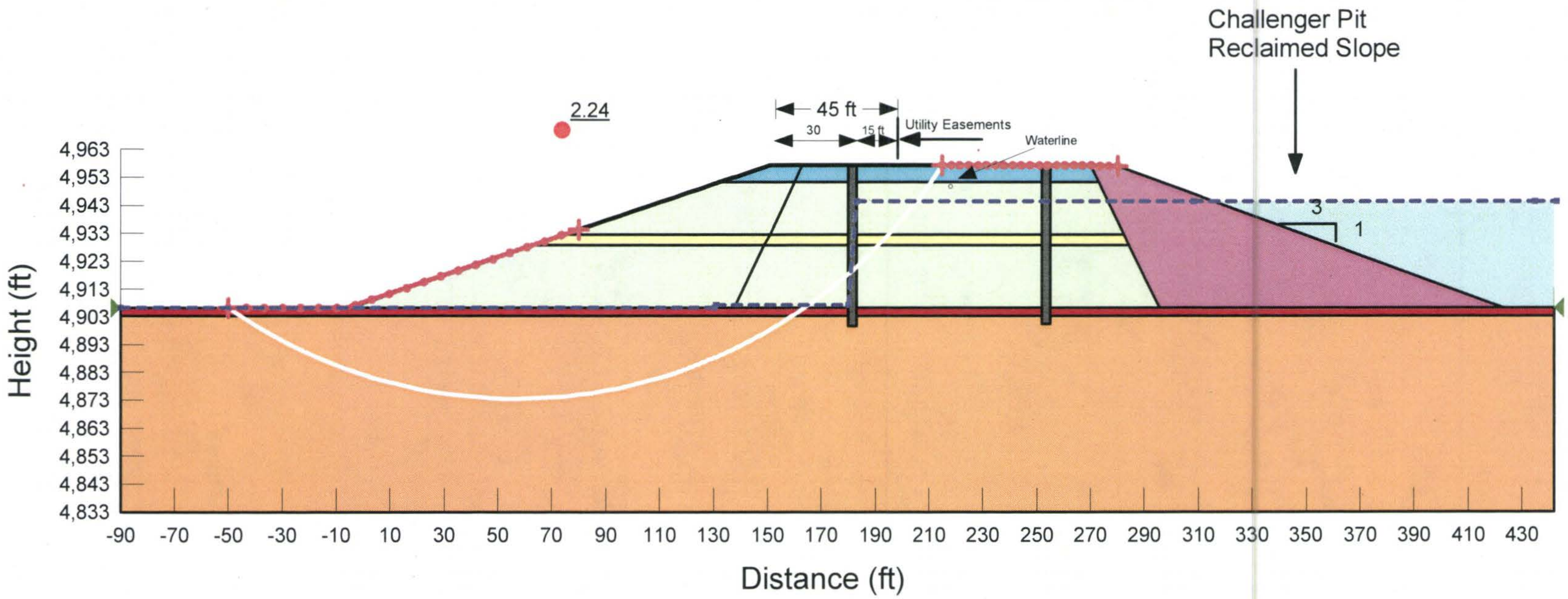


Figure L-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CHALLENGER PIT

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Reclamation Slope Fill	Mohr-Coulomb	126	25	26
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

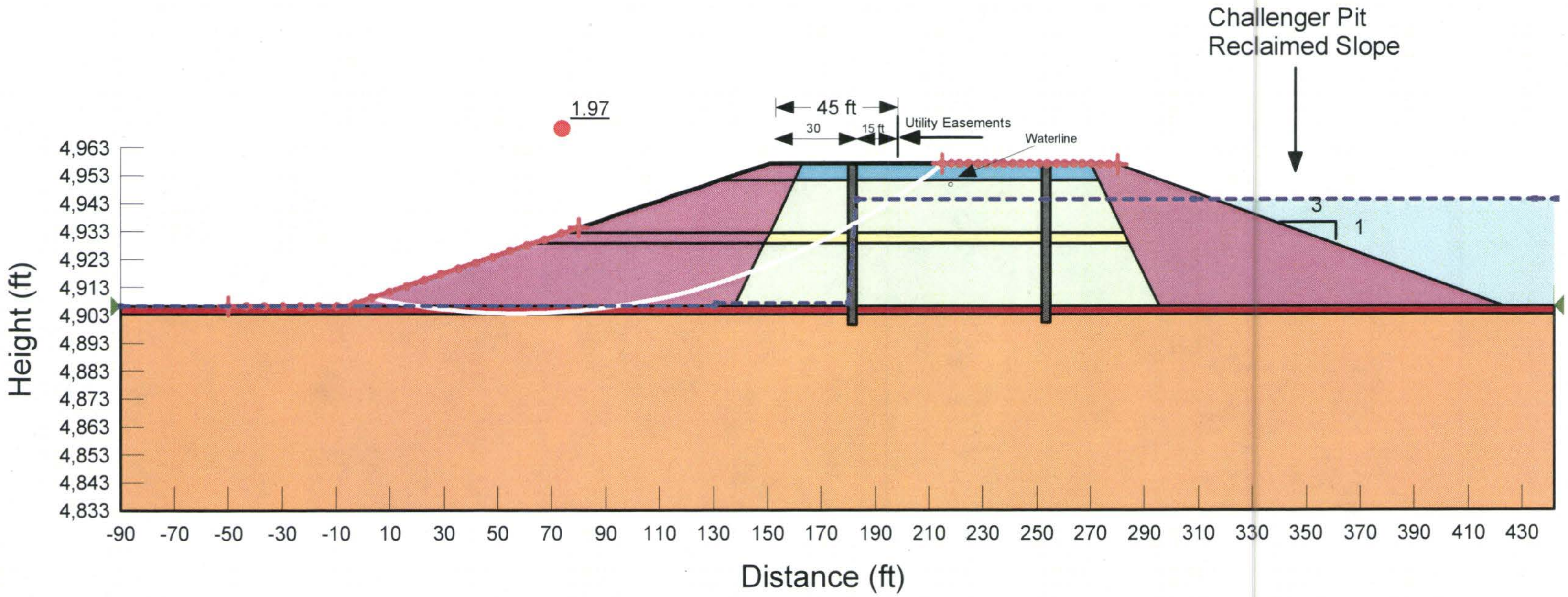


Figure L-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CHALLENGER PIT

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Reclamation Slope Fill	Mohr-Coulomb	126	25	26
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

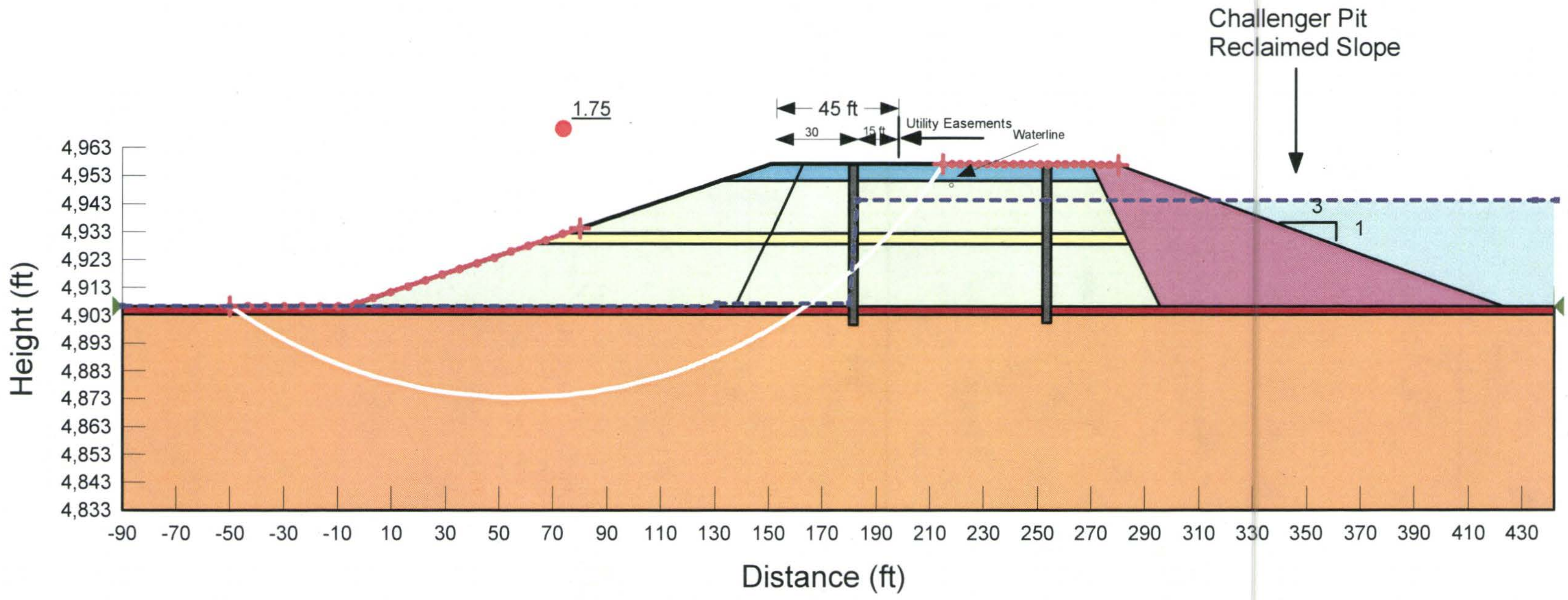


Figure L2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CHALLENGER PIT

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Reclamation Slope Fill	Mohr-Coulomb	126	25	26
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

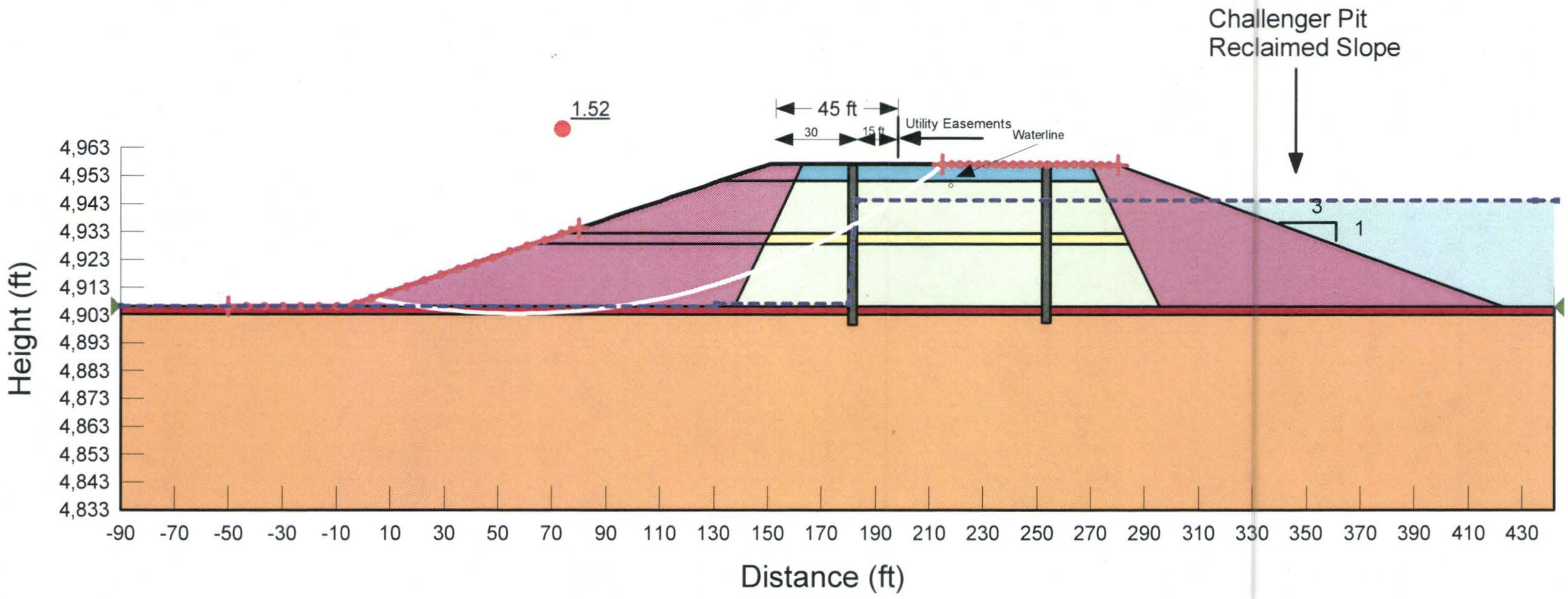


Figure L2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (EAST SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

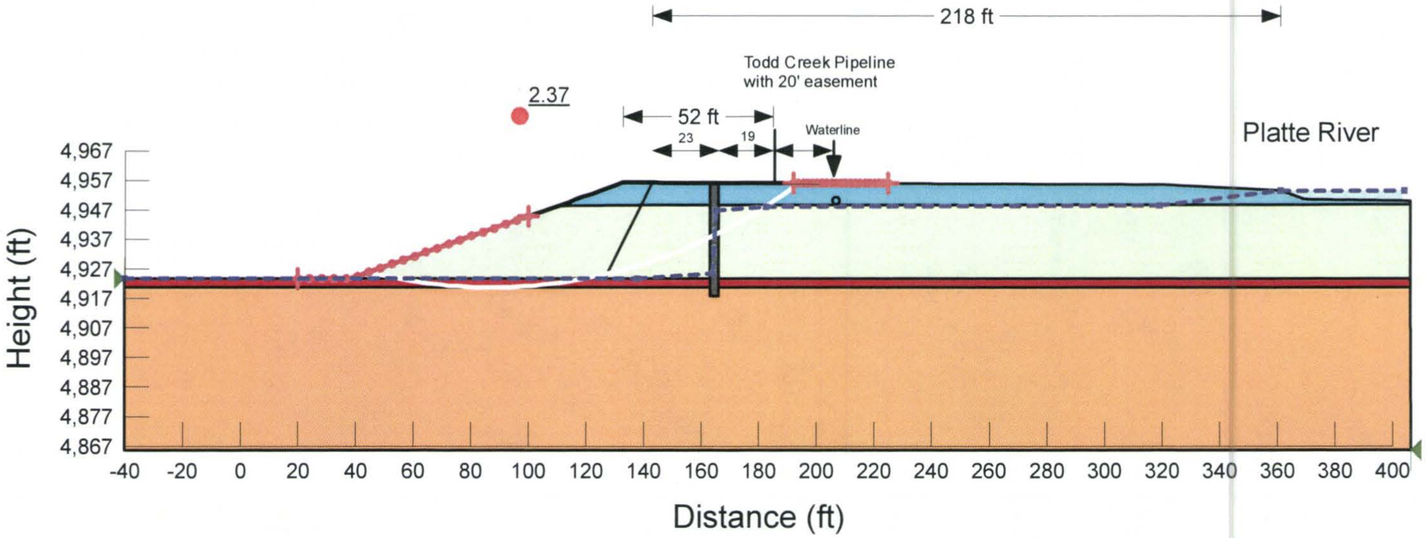


Figure M-1- Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (EAST SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Reclamation Slope Fill	Mohr-Coulomb	126	25	26
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

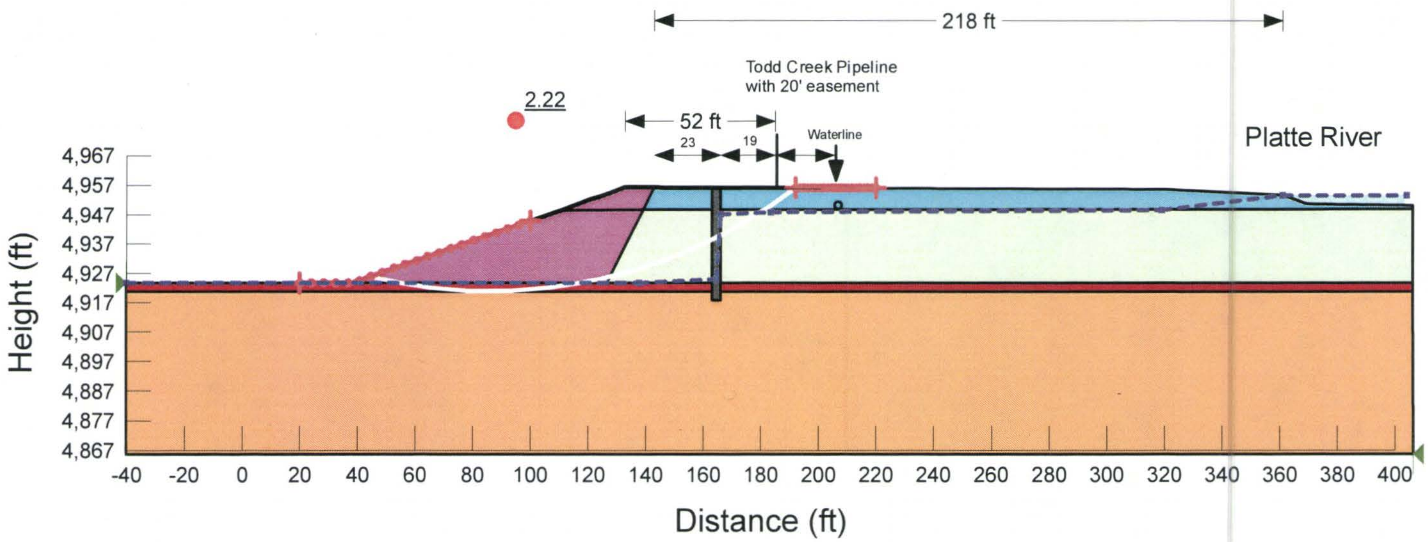


Figure M-1- Static Analysis

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (EAST SIDE OF EAST CELL)

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

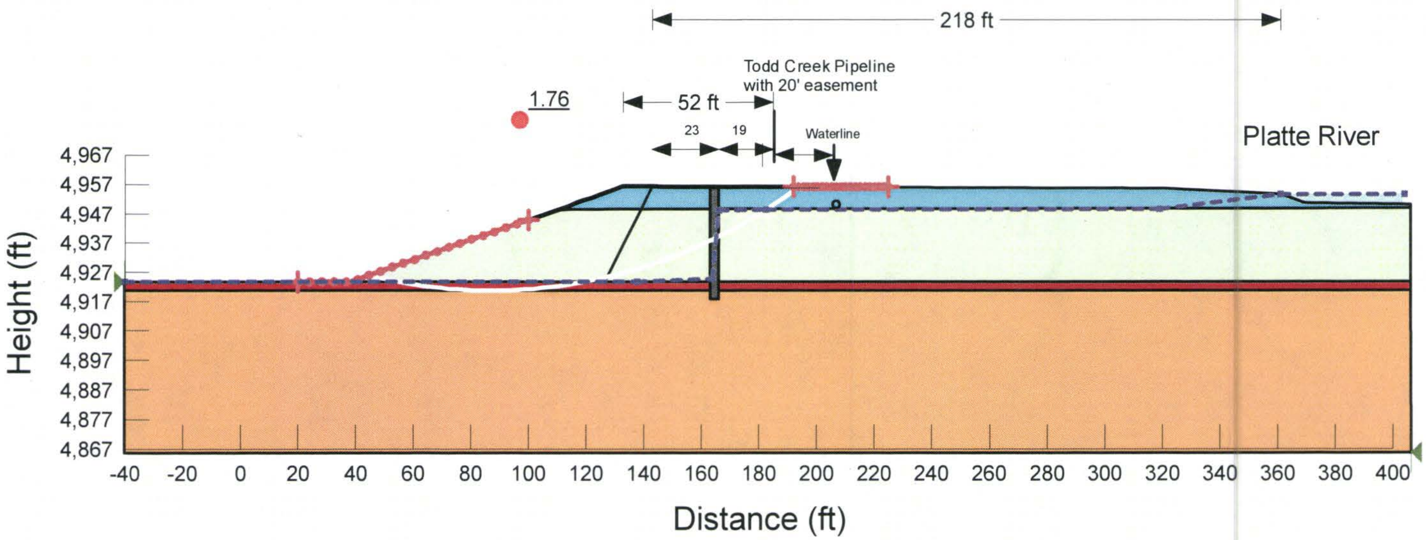


Figure M-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - PIPELINE (EAST SIDE OF EAST CELL)

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Overburden	Mohr-Coulomb	126	50	28
	Reclamation Slope Fill	Mohr-Coulomb	126	25	26
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

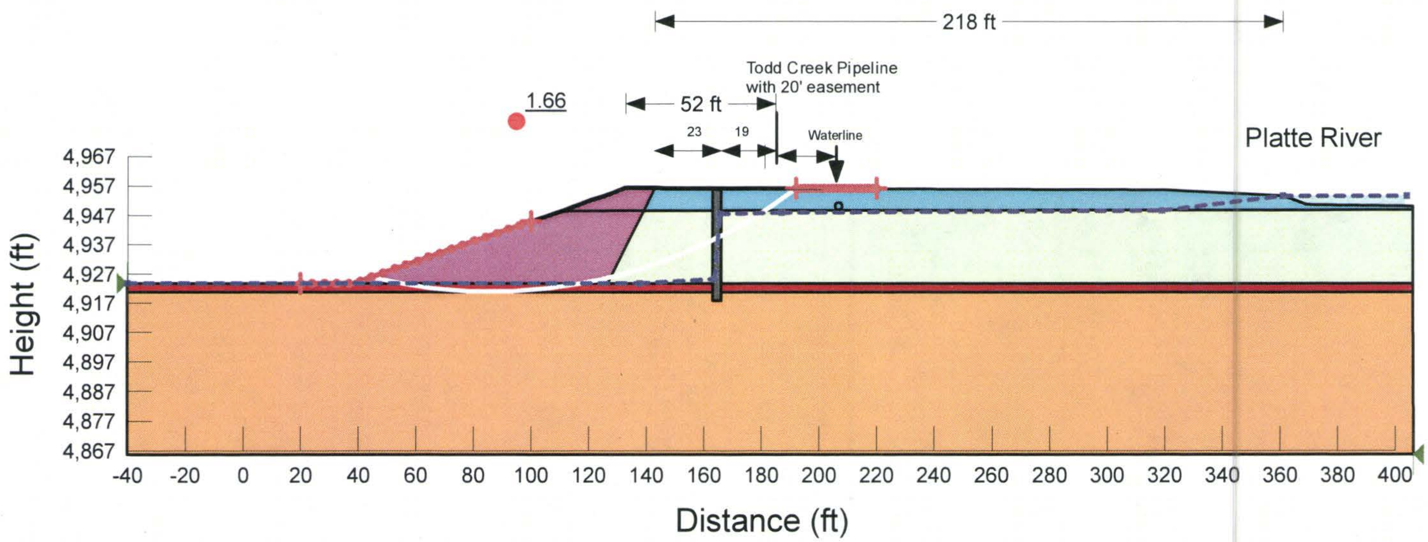


Figure M-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELLS - WEST

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

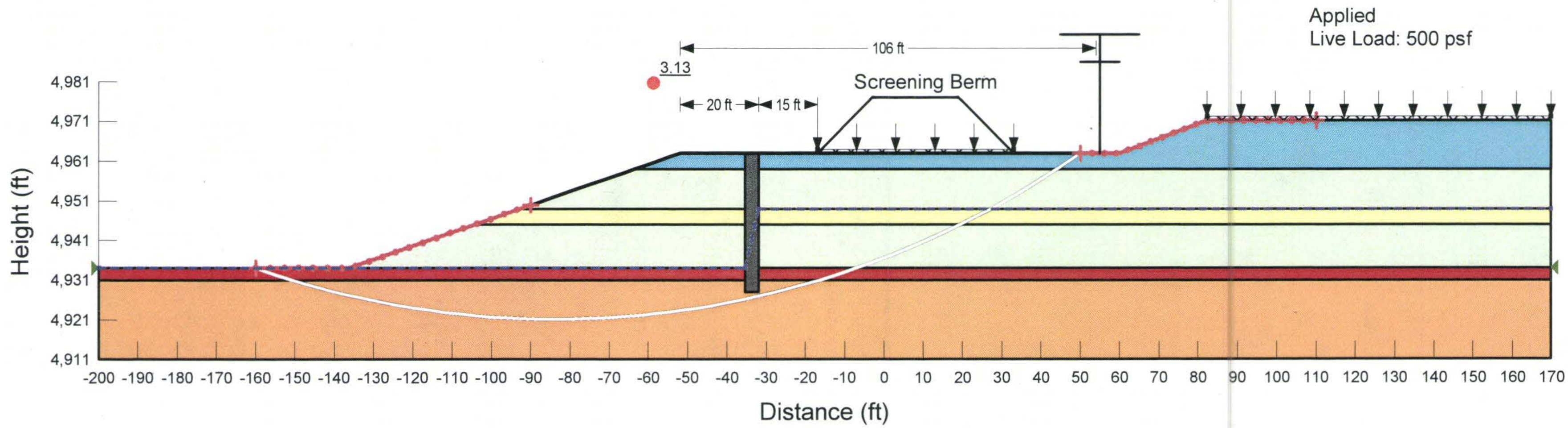


Figure N-1- Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELLS - WEST

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

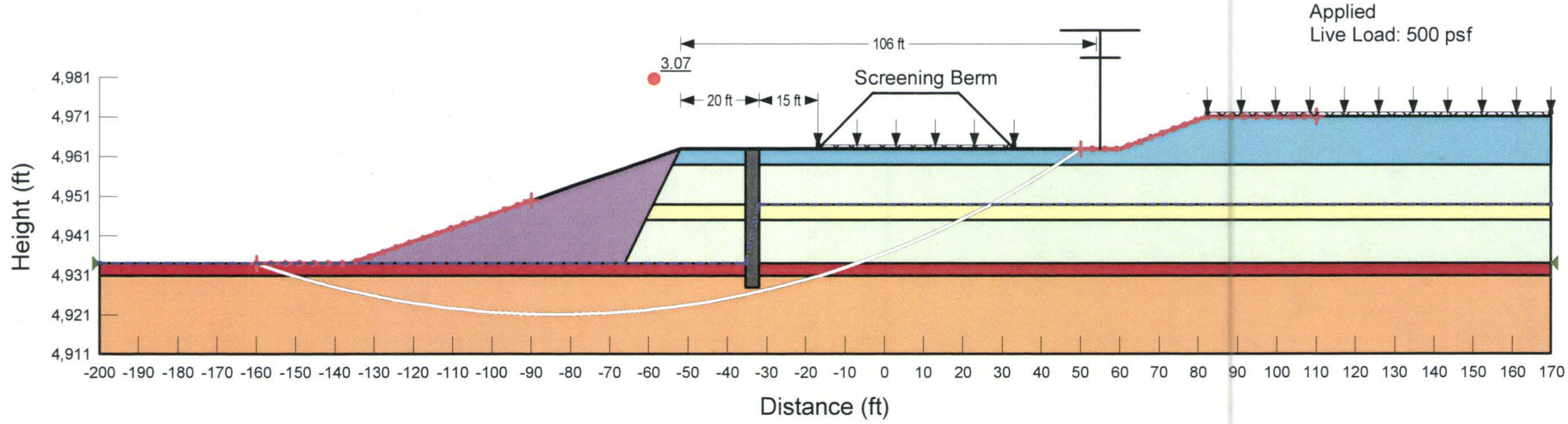


Figure N-1- Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELLS - WEST

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

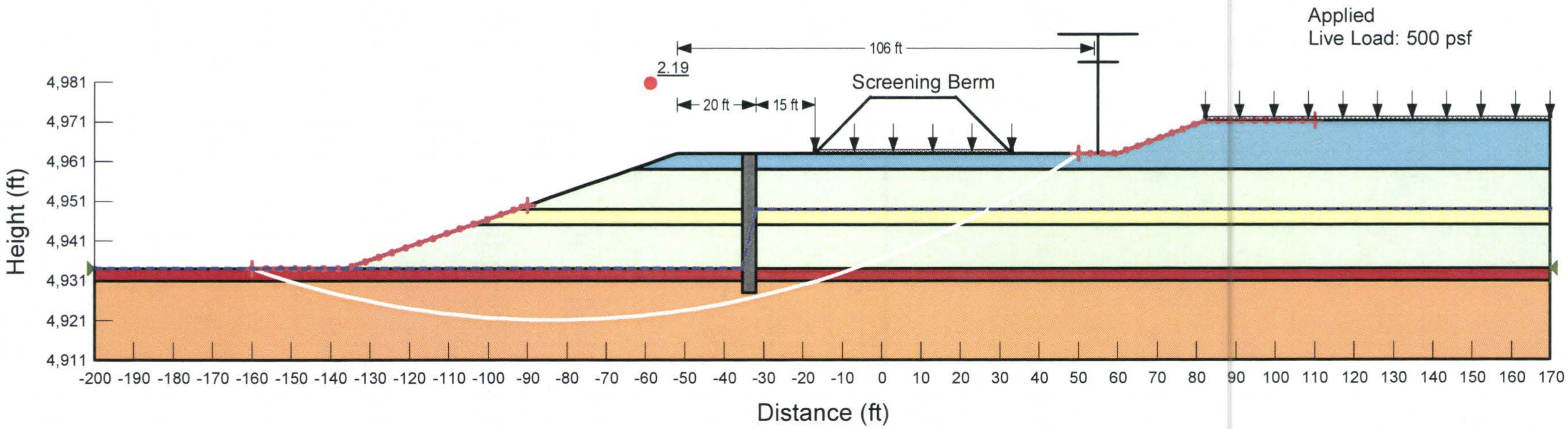


Figure N-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - HIGHWAY 7 FROM NORTH CELLS - WEST

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

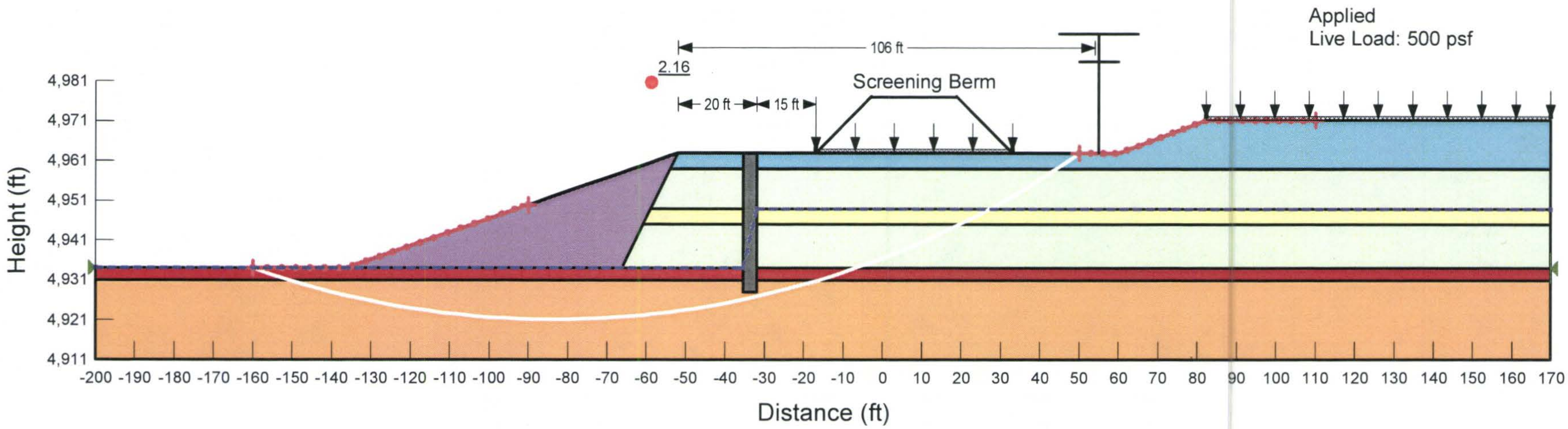


Figure N-2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CITY OF AURORA WATERLINE

TETRA TECH

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

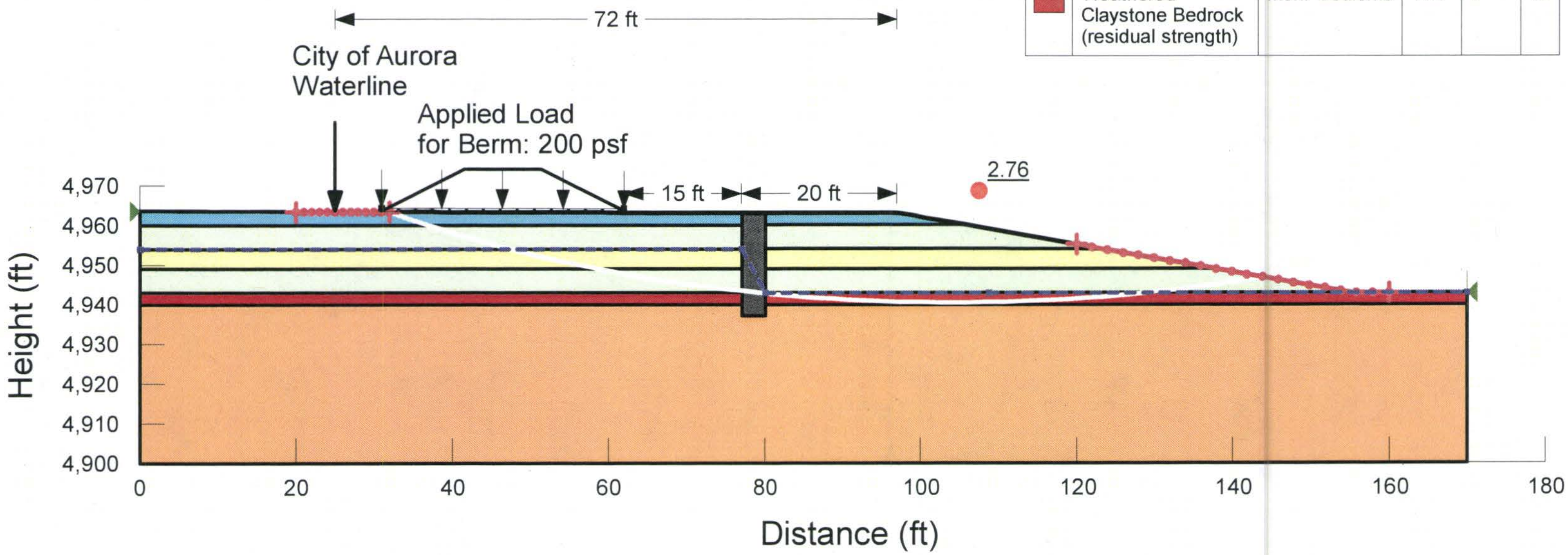


Figure O-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CITY OF AURORA WATERLINE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

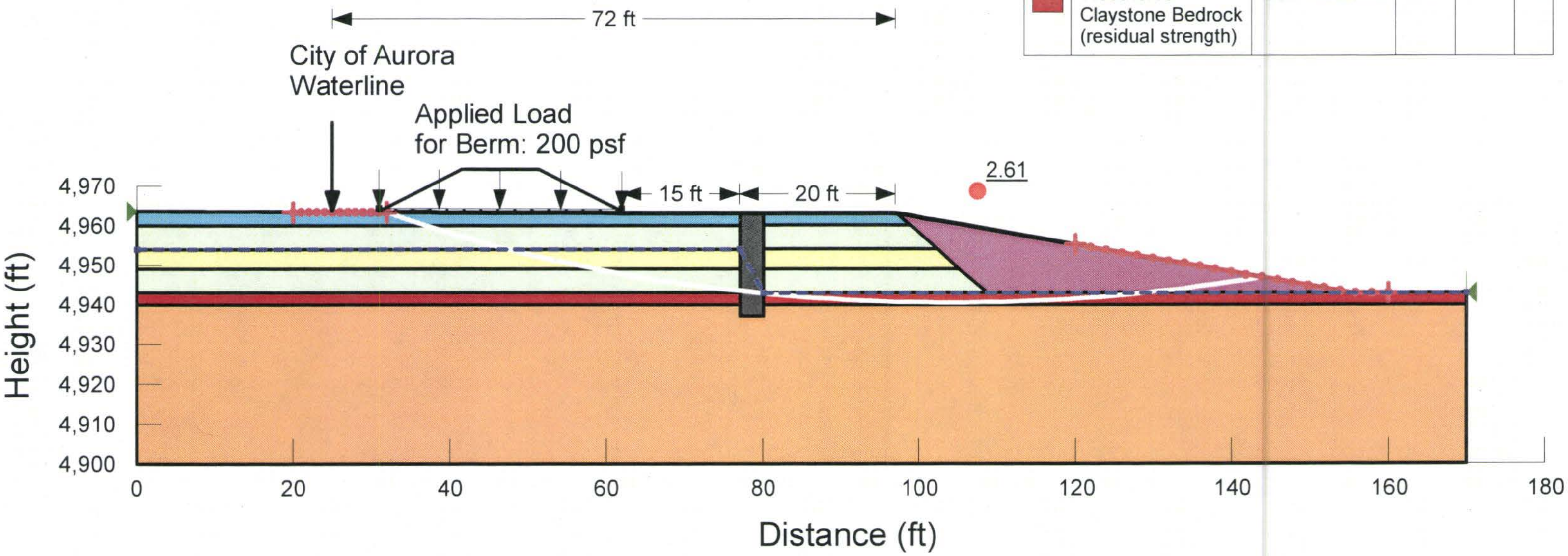


Figure O-1 - Static Analysis

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CITY OF AURORA WATERLINE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

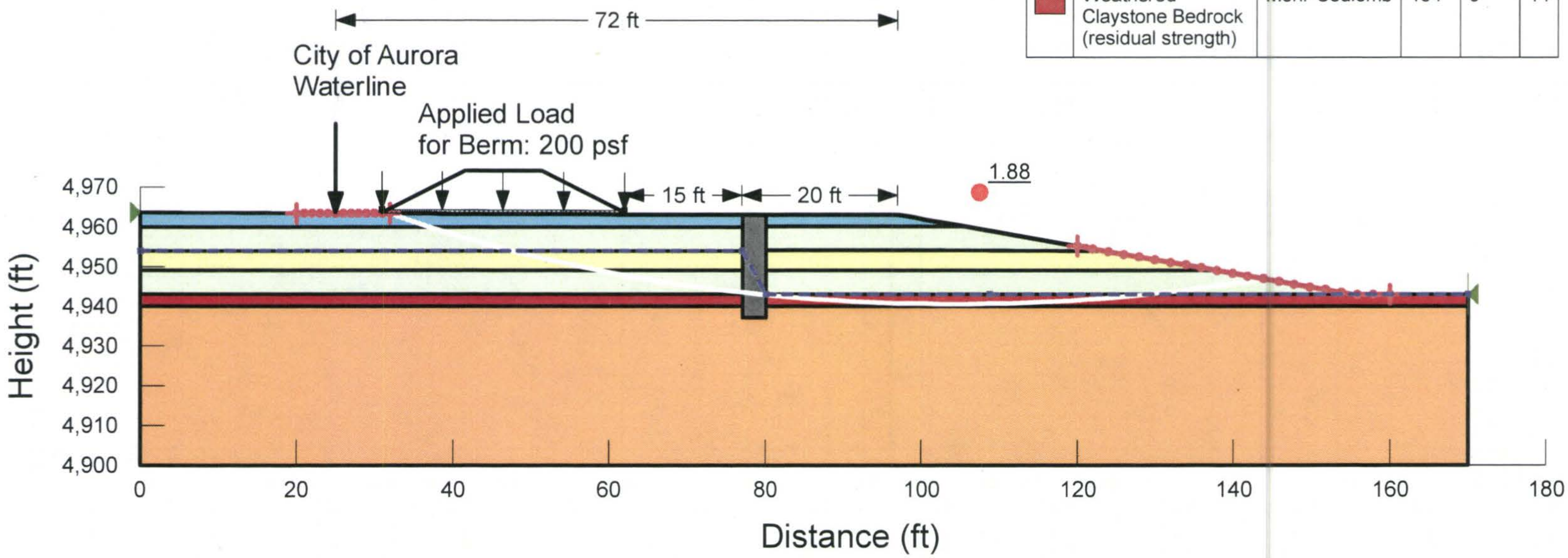


Figure O2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

TETRA TECH

TUCSON SOUTH PROPOSED GRAVEL MINE STABILITY ANALYSIS
SLOPE STABILITY ANALYSIS - CITY OF AURORA WATERLINE

			(pcf)	(psf)	(°)
	Claystone Bedrock (peak strength)	Mohr-Coulomb	134	100	28
	Fill	Mohr-Coulomb	126	25	26
	Mud Lens	Mohr-Coulomb	126	50	28
	Overburden	Mohr-Coulomb	126	50	28
	Sand and Gravel	Mohr-Coulomb	137	0	35
	Slurry Wall	Mohr-Coulomb	122	0	0
	Weathered Claystone Bedrock (residual strength)	Mohr-Coulomb	134	0	14

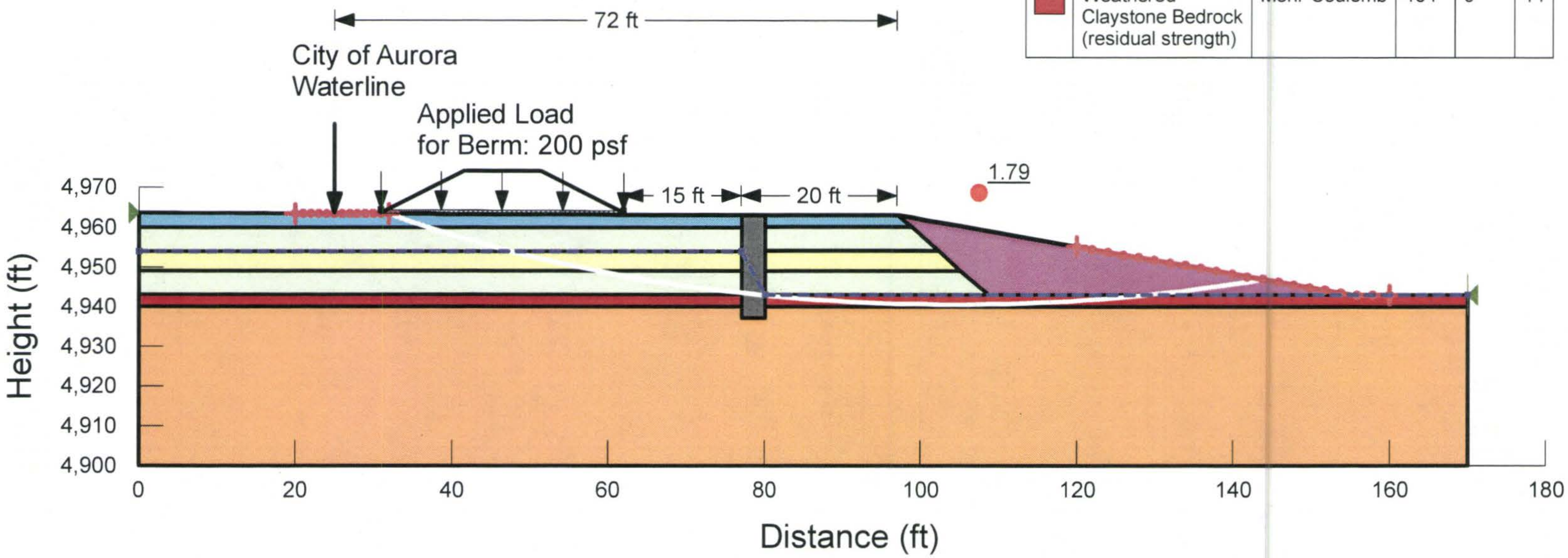


Figure O2 - Pseudostatic Analysis

Horizontal Acceleration Coefficient: 0.067g

December 14, 2021

Mr. Paul Conrad
Aggregate Industries-WCR
1687 Cole Blvd., Suite 300
Golden, CO 80401

Re: Stability Analyses, Tucson South Amendment 2, DRMS Permit NO. M-2004-044

Dear Mr. Conrad:

This letter has been prepared to address the Mined Land Reclamation Board (MLRB) Construction Materials Rule 6, Section 4, Subsection 19, Exhibit S - Permanent Man-Made Structures (6.4.19, Exhibit S) for the proposed Tucson South Amendment 2 of the Tucson South Mine located in Weld and Adams Counties, Colorado. Previous analyses regarding structure offsets at the mine cells were performed by Tetra Tech (2019, Amendment 1). The analyses performed herein address stability along the Amendment 2 conveyor alignment. Additionally, we have performed rapid drawdown analyses on the west and east cells located along Tucson Street.

The site is located both north and south of the intersection of 168th Street and Tucson Street in Adams and Weld Counties, Colorado. More specifically, the site is within part of Section 1, Township 1 South, and within part of Section 36 Township 1 North. Both sections are in Range 67 West of the 6th Principal Meridian. Land uses in the area include agricultural, oil and gas production, active gravel mines, gravel mines reclaimed as below grade reservoirs, and residential housing.

The south part of the site will be mined in two cells referred to as West and East cells. A conveyor will transfer mine products from the mine to the Wattenberg Lakes Mine located approximately 1.5 miles north of the Tucson South Mine. The majority of the conveyor route passes along unmined, nearly flat land that will not be subject to stability failure. However, part of the conveyor will be located near the top of the clay liner which was constructed at the below grade, City of Aurora, Challenger Reservoir. Review of the final grades of the reservoir, indicates the liner slopes approximately 3 horizontal to 1 vertical (3h:1v) and is approximately 30 feet in height.

Based on the original Tetra Tech (2019) analyses and the stability analyses discussed herein, the mine and conveyor route will be stable.

GEOLOGY

The Site is located approximately 25 miles east of the eastern flank of the Rocky Mountain Front Range. Younger sedimentary strata dip eastward off the Pre-Cambrian igneous and metamorphic rocks that form the core of the Front Range into the Denver Structural Basin. The Denver Basin is an asymmetrical downwarp of sedimentary strata with a steeply dipping west limb and a gently dipping east limb.

Bedrock does not crop out at the site, however regional geologic mapping of the area (Trimble and Machette, 1979) indicates the near surface bedrock at the site is most likely the Denver Formation. Trimble and Machette (1979) describes the Denver Formation as claystone, siltstone, and sandstone. The regional mapping indicates the bedrock is overlain by the Post Piney Creek and Piney Creek Alluviums. Trimble and Machette (1979) describes these alluvial deposits as sandy to gravelly alluvium.

GEOTECHNICAL CONDITIONS

Based on the site investigations, the natural site stratigraphy generally consists of four main units: 1) Overburden generally consisting of sandy clay and clayey and silty sands; 2) sand and gravel alluvial deposits that underlie the overburden and overlie the bedrock; 3) a mud lens locally interbedded within the sand and gravel; and 4) bedrock usually consisting of claystone, sandy claystone with local areas of sandstone. These units are described in more detail below.

Overburden Unit
The overburden at the site typically ranges from sandy clay to clayey sand locally grading to silty sand. This unit ranges from approximately 0.5 to 6 feet in thickness. This unit is usually slightly moist to moist, very stiff to hard or medium dense to dense with the top 6 inches containing significant organics. Of the samples tested, the percent passing the No. 200 sieve ranged from 29.0% to 88.2%. Atterberg Limits testing resulted in Liquid Limits of 22 to 68 and Plasticity Indices of 4 to 47.

Sand & Gravel Unit
The sand and gravel is present throughout the site usually underlying the overburden and overlying the bedrock. Locally, this unit is present at the ground surface on the west part of the west cell. This unit typically consists of gravelly, fine to coarse grained sand locally grading to sandy gravel. Where gravels were encountered, the size was typically ¼ to 3 inches. This unit is typically medium dense to dense but is also locally loose. This deposit ranges in thickness from approximately 8 feet to 50 feet. The sands are clean with fines content (silt and clay) generally considered to be on the order of approximately 2 to 6 percent. Local clay to clayey lenses were also logged within the deposit.

Mud Lens Unit
The mud lens typically ranges from fine silty sand to sandy clayey silt, to silty clay. This unit is most common west of Tucson Street but also is found on the east side of the street. It is commonly interbedded within the sand and gravel unit.

Bedrock
The bedrock encountered in the exploratory borings was generally weathered in the upper one to two feet typically becoming harder in unweathered zones. The bedrock consisted of claystone or sandy claystone locally grading to silty, fine to medium grained, sandstone with local claystone seams. For the claystone samples, the percent passing the 200-sieve ranged from 51.7 to 95 percent. For the sandstone samples, the percent passing the minus No. 200 sieve ranges from approximately 11.4% to 29.2%.

Groundwater
Groundwater was encountered in all the borings at approximately 5 to 13 feet below ground surface at the time of drilling. The groundwater levels will vary seasonally and will typically rise during the irrigation season. Groundwater will be controlled with the proposed below grade slurry wall. After slurry wall construction, groundwater mounding is anticipated on the upgradient (west and south) side of the site, and a groundwater shadow (deeper water table) is anticipated on the downgradient (north and east) side the site. An underdrain has been designed around the west slurry wall to mitigate mounding and shadowing effects.

STRUCTURES WITHIN 200 FEET OF MINED AEAS
Structures within 200 feet of the mine limits are listed in Exhibit S of the DRMS Amendment. As mentioned above, stability analyses addressing off set from the mining were performed by Tetra Tech (2019) in the previous amendment. The purpose of this stability analysis is to evaluate the stability along the conveyor route and rapid drawdown at the reclaimed Tucson South Reservoirs.

STABILITY ANALYSES
Division of Reclamation and Mining Safety (DRMS) staff drafted a policy regarding stability analyses of neighboring structures. The draft summarizes adequate factors of safety (FOS) for non-critical and critical structures. All the structures considered in this analysis are considered critical structures. The FOS are for both static and seismic (from an

earthquake) stability analyses. For generalized strength assumptions and critical structures, a FOS of 1.5 is considered sufficient for static conditions and a FOS of 1.3 is considered suitable for seismic conditions.

The DRMS has not adapted a FOS for the rapid drawdown analysis. The geotechnical practice in the area is to require a FOS of 1.2 for rapid drawdown. This FOS evolved from the State Engineers Office (SEO), Dam Safety Branch (DSB) which required a 1.2 FOS for a rapid drawdown event at a jurisdictional dam.

The stability analyses performed herein were performed on cross sections described below and shown on Figures 1, 2, and 3. The sections were analyzed under anticipated loading conditions. The computer program XSTABL was used for the analysis. The method for selecting the critical failure surface for each analyzed loading condition is the following. The Modified Bishop's Method of Analysis is used to find the critical failure surface by randomly searching with 20 termination points and 20 initiation points (400 failure circles) with 7-foot line segments over the slope surface and at the structure in question to determine the lowest factor of safety. Both static stability under anticipated conditions and seismic stability under peak ground acceleration loads were performed for the three (3) sections along the conveyor. A maximum horizontal acceleration of 0.067g was used at the site. For the two (2) sections analyzed for rapid drawdown, the section was modeled high water levels (high pore pressure) within the reclamation slope to mimic a rapid drawdown event.

The cross-section locations were selected and analyzed as described below. The sections met adequate FOS as summarized below in Table 1. The section locations are shown on Figure 1, 2 and 3.

- West Cell Rapid Drawdown

  This section evaluated the proposed setback from the Tucson Street easement from the West Cell boundary with a compacted reclamation slope. A 500 psf load was applied to the road to mimic live traffic loads. A mud lens was modeled based on actual findings in the area. Outside of the slurry wall, the area was modeled with a high-water table assuming the wet season. Inside the slurry wall the area was modeled with a high-water table within the reclamation slope to mimic rapid draw down conditions. Potential failure surfaces were drawn from the edge of the Tucson Street easement. The location of this section is shown on Figure 1.

- East Cell Rapid Drawdown

  This section evaluated the proposed setback from the Tucson Street easement from the East Cell boundary with a compacted reclamation slope. A 500 psf load was applied to the road to mimic live traffic loads. No mud lens was modeled based on actual findings in the area. Outside of the slurry wall, the area was modeled with a high-water table assuming the wet season. Inside the slurry wall the area was modeled with a high-water table within the reclamation slope to mimic rapid draw down conditions. Potential failure surfaces were drawn from the edge of the Tucson Street easement. The location of this section is shown on Figure 2.

- Challenger Clay Liner:

  This section is on the east side of the Challenger Reservoir considers the tallest section adjacent to the conveyor. The stability analysis for this section assumes a mine highwall sloped at 0.5 horizontal to 1 vertical (0.5h:1v). The clay liner slopes 3h:1v. The overburden was modeled at 4 feet thick. The underlying sand and gravel was modeled at 26 feet thick with a 4 feet thick interlensed mud lens. One foot of residual strength bedrock was modeled over unweathered bedrock. A 500 psf surcharge was modeled at the top of the liner near the conveyor to mimic the conveyor and traffic loading of maintenance vehicles. Potential failure circles covered the clay liner slope. The location of this section is shown on Figure 1.

- <u>C Muhler</u>

  This section is on the northeast side of the Challenger Reservoir considers the tallest section adjacent to the conveyor and near the Muhler property. The stability analysis for this section assumes a mine highwall sloped at 0.5 horizontal to 1 vertical (0.5h:1v). The clay liner slopes 3h:1v. The overburden was modeled at 4 feet thick. The underlying sand and gravel was modeled at 26 feet thick with a 4 feet thick interlensed mud lens. One foot of residual strength bedrock was modeled over unweathered bedrock. A 500 psf surcharge was modeled at the top of the liner near the conveyor to mimic the conveyor and traffic loads. Potential failure surfaces were drawn from the edge of the Muhler property. The location of this section is shown on Figure 1.

- <u>North Conveyor</u>

  This section is on the west side of Weld County Road (WCR) 23.5. The area of this section is nearly flat with no mine highwall present in the area. The overburden was modeled at 4 feet thick. The underlying sand and gravel was modeled at 26 feet thick with a 4 feet thick interlensed mud lens. One foot of residual strength bedrock was modeled over unweathered bedrock. A 500 psf surcharge was modeled at the road and near the conveyor. Potential failure circles were drawn from the utility corridor along the west side WCR 23.5. The location of this section is shown on Figure 3.

<u>MATERIAL PROPERTIES</u>

The material index and engineering strengths assumed in this slope stability report match those used in the Tetra Tech (2019) analyses and are discussed below.

Overburden

The strength properties for the in situ sandy clay to silty to clayey sand overburden were based on field testing data and on our engineering judgment; the following parameters have been used to model the overburden.

Moist Unit Weight (pcf)	***Saturated Unit Weight (pcf)***	***Cohesion C' psf***	***Friction Angle Φ'***
114	126	50	28

Alluvial Sand and Gravel

The sand and gravel is generally a medium to coarse-grained sand that is medium dense to dense and locally gravelly. The alluvial sand and gravel was modeled as follows:

Moist Unit Weight (pcf)	***Saturated Unit Weight (pcf)***	***Cohesion C' psf***	***Friction Angle Φ'***
130	137	0	35

Mud Lens

The strength properties for the mud lens was based on field testing data and on our engineering judgment; the following parameters have been used to model the overburden.

Moist Unit Weight (pcf)	***Saturated Unit Weight (pcf)***	***Cohesion C' psf***	***Friction Angle Φ'***
114	126	50	28

Bedrock

Bedrock below the alluvium is predominately sandy claystone with local claystone and sandstone. Sandstone is typically stronger than claystone. Claystone is generally a weak bedrock. To be conservative, we modeled the bedrock as claystone. For the claystone bedrock, two potential strength conditions were considered. These strength conditions are referred to as: 1) peak strength, and 2) residual strength.

Peak strength is the maximum shear strength the claystone bedrock exhibits. The shear strength is made up of both cohesion (diagenetic bonding) and internal friction. Under short-term conditions for unsheared claystone, peak strength governs behavior. If a sheared surface or sheared zone is present within claystone as a result of faulting, slippage between beds due to folding, past shrink-swell behavior, stress relief, weathering, or from a landslide, the cohesion along the sheared surface is reduced to zero, and the angle of internal friction is decreased, due to alignment of clay minerals parallel to the shear plane. Under these conditions a claystone exhibits its lowest strength known as residual strength. Residual strength bedrock occurs in discrete zones, parallel with the sheared surface or zone, whereas fully softened strength occurs over a broader area (not used in this modeling). Based on data from other recent projects and engineering judgment, the residual strength claystone was modeled in a one-foot-thick layer overlying the peak strength bedrock as follows:

Moist Unit Weight (pcf)	***Saturated Unit Weight (pcf)***	***Cohesion C' psf***	***Friction Angle Φ'***
Peak = 124 Residual = 124	Peak = 134 Residual = 134	Peak = 100 Residual = 0	Peak = 28 Residual = 14

STABILITY ANALYSES RESULTS

The factor of safety shown below in Table 1 is the minimum factor of safety of the conditions listed above.

TABLE 1 - SLOPE STABILITY RESULTS AND SETBACKS

Section	Critical Structure	Static Factor of Safety at Structure	Seismic Factor of Safety at Structure (0.067g horizontal)	Rapid Drawdown Factor of Safety at Structure	DRMS FOS Requirement Static/Seismic	DSB FOS Requirement
West Cell	Tucson St Easement	NA	NA	1.4	NA	1.2
East Cell	Tucson St Easement	NA	NA	1.4	NA	1.2
Challenger Liner	Clay Liner	1.6	1.3	NA	1.5/1.3	NA
C Muhler	Property Line	3.9	2.5	NA	1.5/1.3	NA
North Conveyor	Utilities on WCR 23.5	3.3	2.9	NA	1.5/1.3	NA

CONCLUSIONS

Based on the Factors of Safety listed in the table above and the previous analyses performed by Tetra Tech (2019), neither the mine nor the conveyor will be a hazard to nearby structures provided the mine plan is followed and loading and subsurface conditions are as modeled.

LIMITATIONS

Our review is based on regional geologic mapping, present mining and conveyor plans, and in part borehole data by others. Stability analyses were performed using typical strength parameters for the various strata in the critical sections. Should the mining or conveyor plans change, or subsurface conditions vary from those portrayed in this letter, we should be contacted to re-evaluate the potential affects on permanent man-made structures. The rapid drawdown analyses addressed herein are for structures as described herein. Further rapid drawdown analyses will be required when designing the final reservoir slopes.

Please call with any questions or comments.

Sincerely,

Civil Resources, LLC

Gary Linden, P.G.
Senior Engineering Geologist

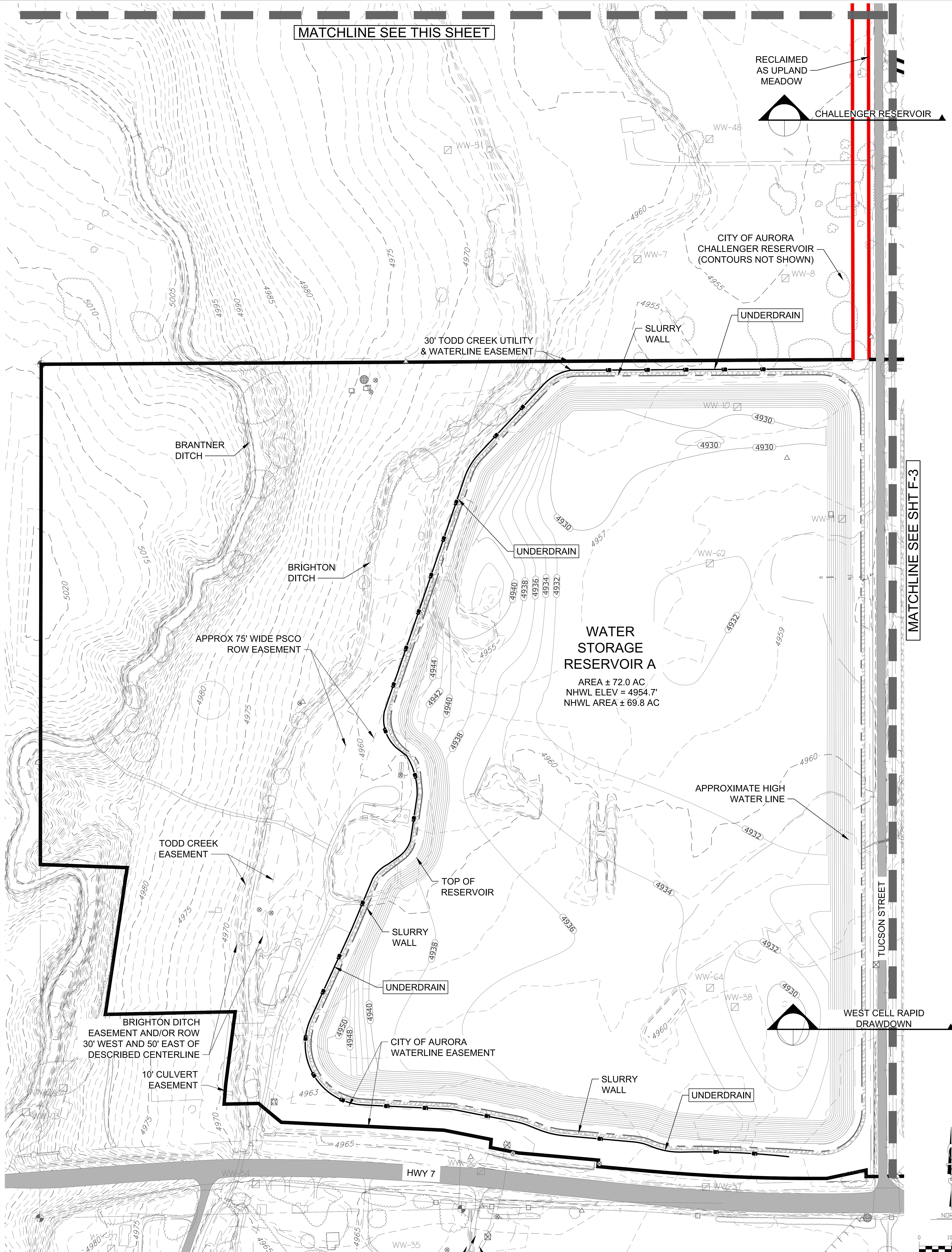
Attachments: Figures 1,2, and 3 – Site Drawings showing locations of sections.
XSTABL Model Input and Output Files

Reference:

Tetra Tech, 2019. Slope Stability and Setback Updates, July 3, 2019: Tetra Tech Job No. 200-23514-18004

Trimble, D.E. and Machette, M.N.; "Geologic Map of the Greater Denver Area, Front Range Urban Corridor, Colorado"; U.S.G.S. Map I-856-H.

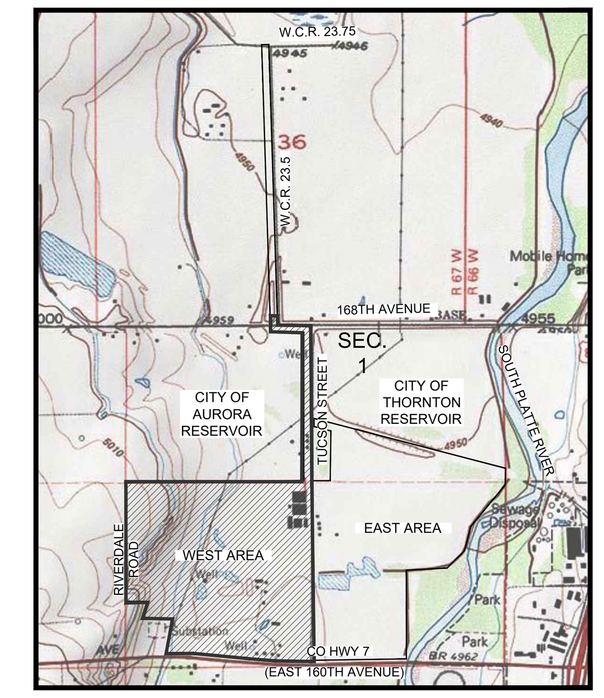
J:\Aggregate Industries-297\Tucson South Permit Support\2021 amendment\Exhibit S\Revised Stability per DRMS\Tucson South Stability analysis.doc



VIEW 1

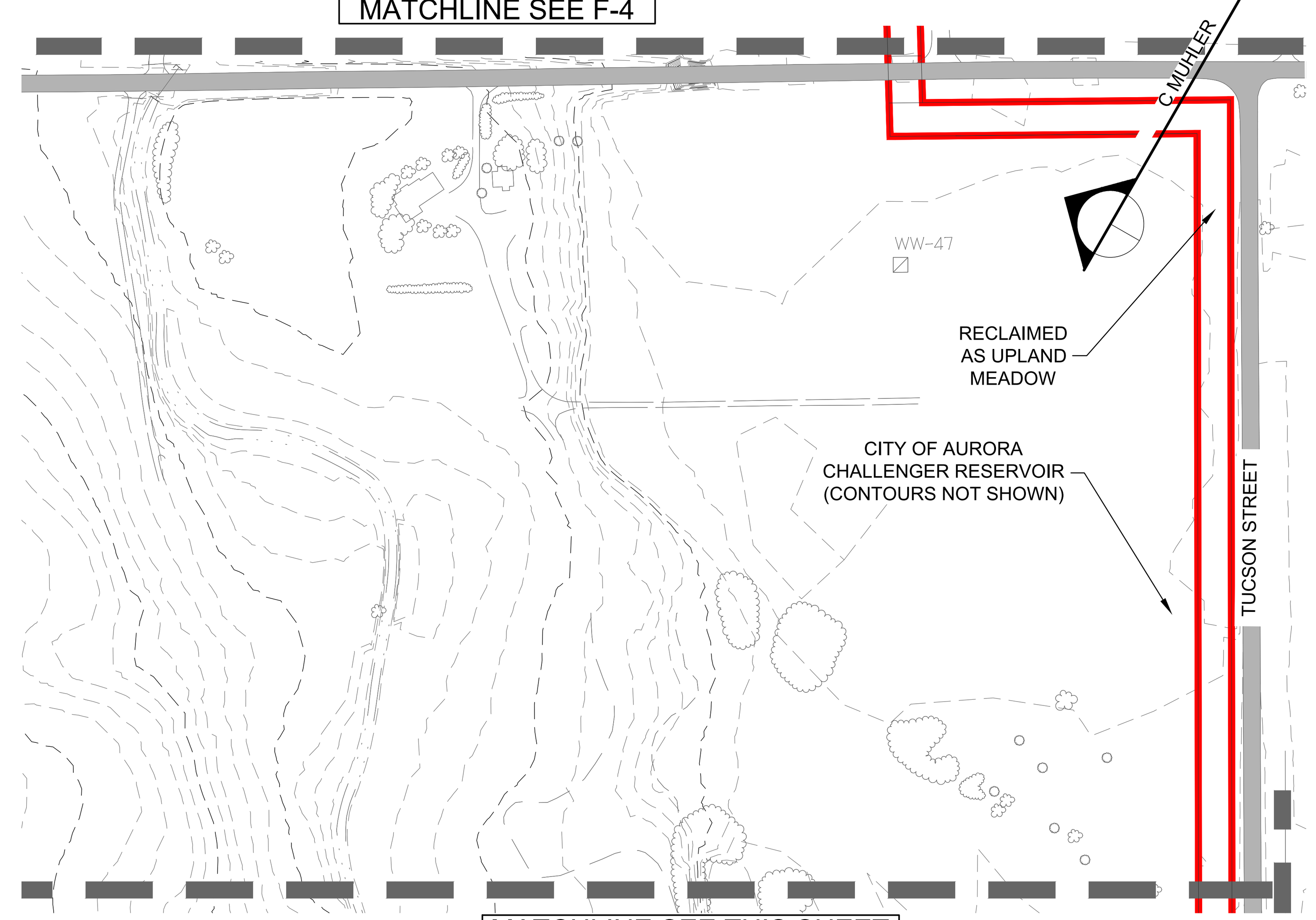
LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- x EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE EXISTING ELECTRIC LINE
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- UD PROPOSED UNDERDRAIN
- PROPOSED SLURRY WALL
- 4900 PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NHWL NORMAL HIGH WATER LINE
- NAME STABILITY ANALYSIS SECTION



PERMIT KEY MAP

NTS



VIEW 2

811 Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE EXHIBIT F WEST AREA RECLAMATION PLAN

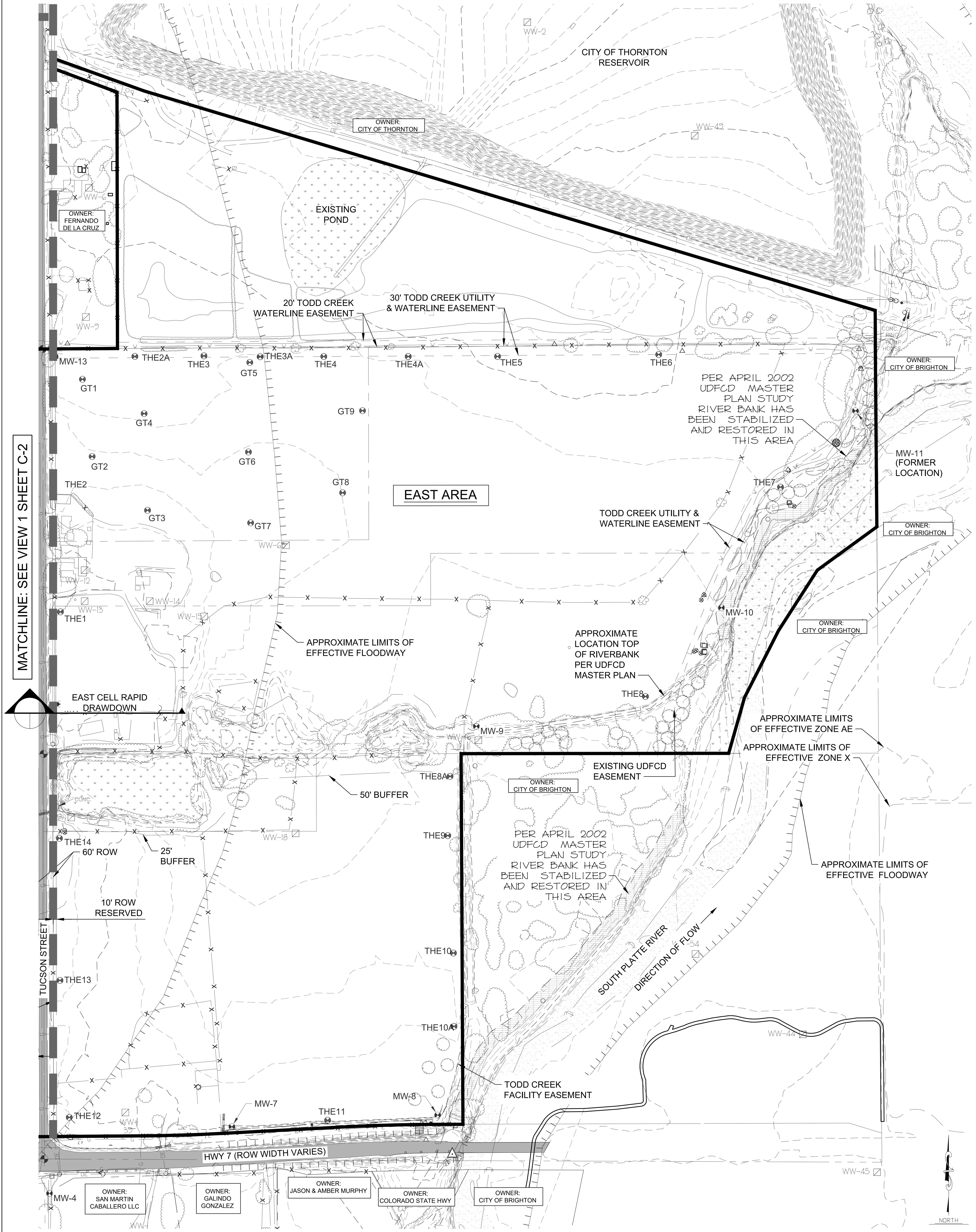
REVISIONS

NO.	DESCRIPTION	DATE
1	ADEQUACY 2	12/15/21

DRAWN BY: CAI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: EXHIBIT F EAST AREA SECT.dwg

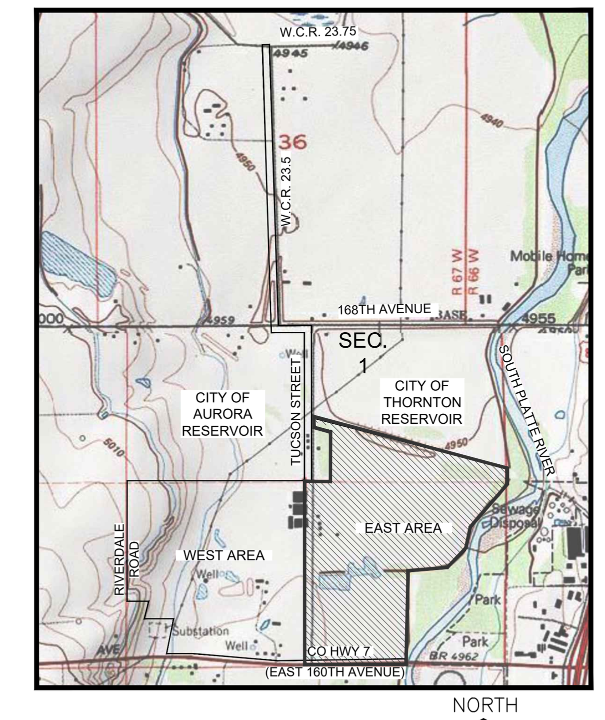
STABILITY ANALYSIS SECTIONS

SHEET: 1



LEGEND:

- MINE PERMIT BOUNDARY
- TRACT BOUNDARY
- EFFECTIVE FLOODWAY
- EFFECTIVE ZONE AE
- EFFECTIVE ZONE X
- PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN
- EXISTING EDGE OF WATER
- 4900 EXISTING 2' CONTOURS
- x EXISTING FENCE
- EXISTING EDGE OF ROAD
- UE EXISTING ELECTRIC LINE
- OE EXISTING OVERHEAD ELECTRIC LINE
- G EXISTING GAS LINE
- W EXISTING WATER LINE
- OT EXISTING TELEPHONE LINE
- PROPOSED SLURRY WALL
- 4900 PROPOSED 2' CONTOURS
- RESERVOIR ACCESS ROAD
- EXISTING ASPHALT ROAD
- EXISTING SOUTH PLATTE RIVER
- RESERVOIR ACCESS ROAD
- NHWL NORMAL HIGH WATER LINE
- PROPOSED COTTONWOOD TREE (LOCATIONS SUBJECT TO CHANGE)
- PROPOSED SHRUB BEDS (LOCATIONS SUBJECT TO CHANGE)
- NAME STABILITY ANALYSIS SECTION



PERMIT KEY MAP

NTS

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING EAST AREA

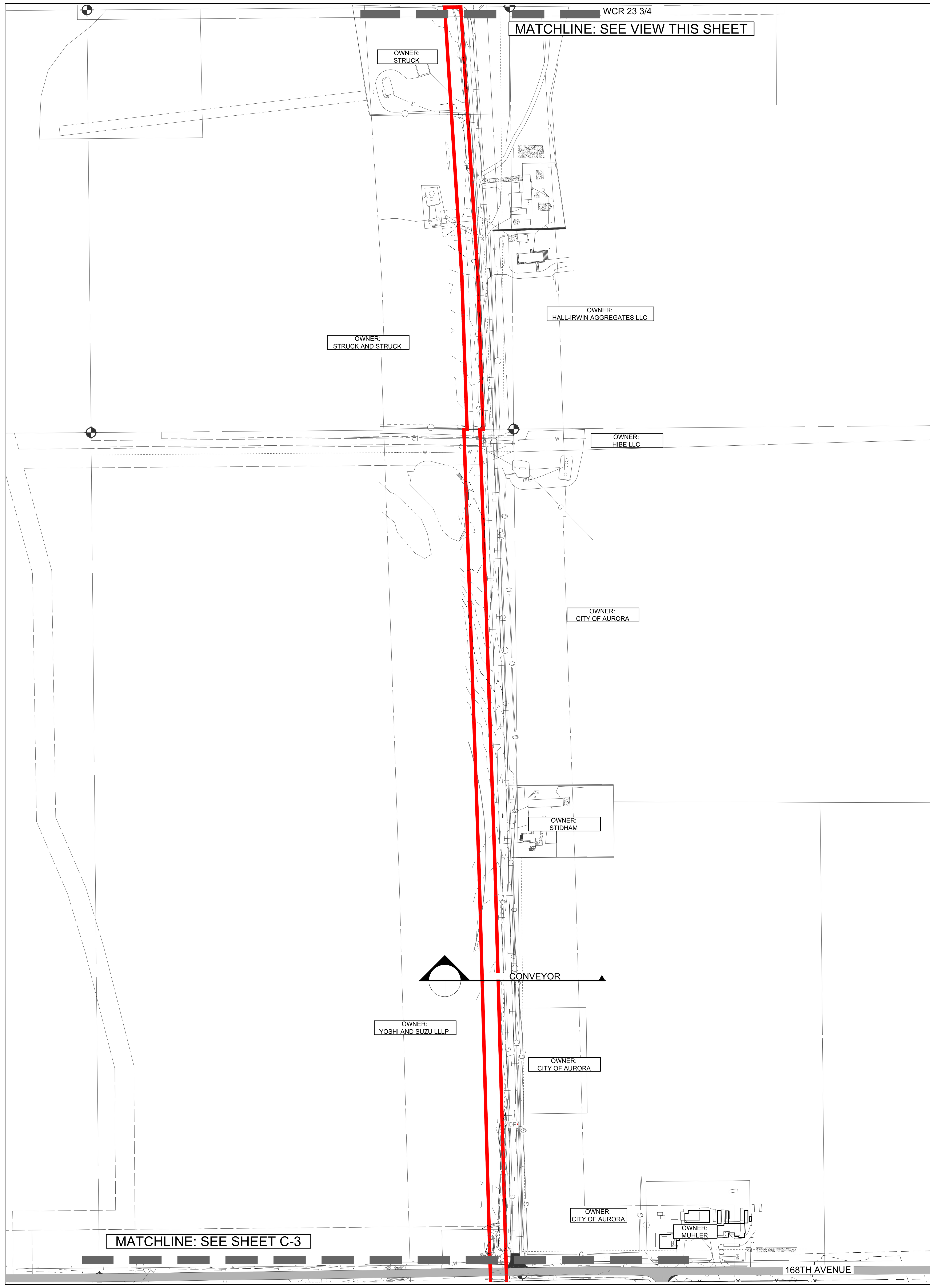
REVISIONS

NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21
2	ADEQUACY 2	12/15/21

DRAWN BY: CI — DATE: AUGUST 21
CHECKED BY: GL — SCALE: AS NOTED / AS NOTED
JOB NO.: 297.001.09
DWG NAME: SECTION STABILITY ANALYSIS 2.dwg

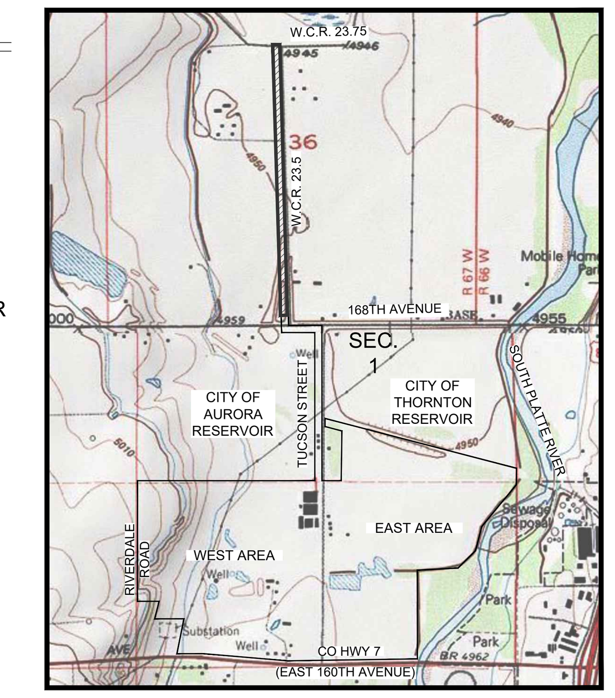
STABILITY ANALYSIS SECTION

SHEET: 2

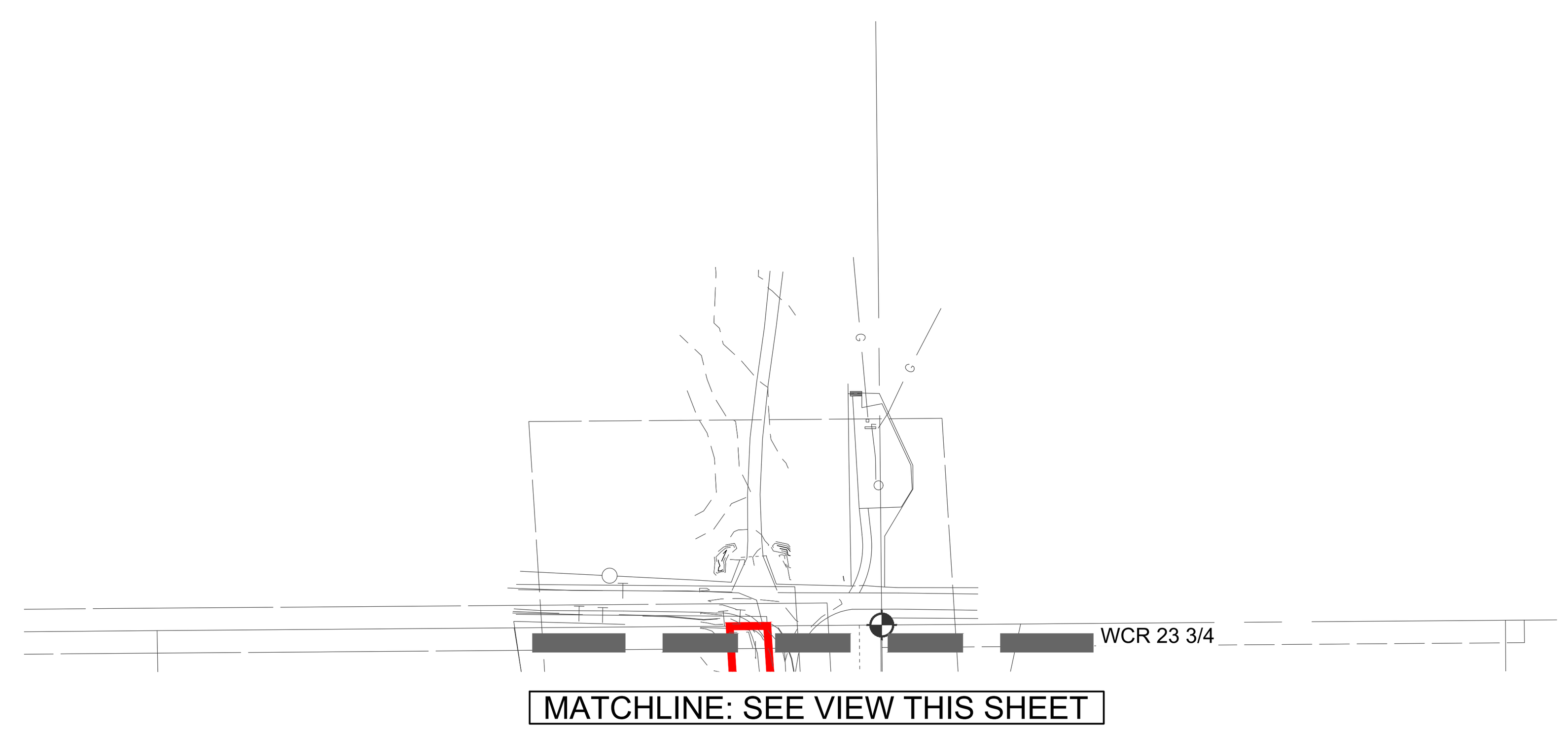


LEGEND:

MINE PERMIT BOUNDARY	EXISTING OVERHEAD ELECTRIC LINE (OE)	TRACT BOUNDARY	EXISTING GAS LINE (G)
EFFECTIVE FLOODWAY	EXISTING WATER LINE (W)	EFFECTIVE ZONE AE	EXISTING TELEPHONE LINE (OT)
EFFECTIVE ZONE X	EXISTING ASPHALT ROAD	PRE-PROJECT/MINING CONDITIONS 100-YR FLOODPLAIN	EXISTING SOUTH PLATTE RIVER
EXISTING EDGE OF WATER	MONITORING WELL LOCATION WITH WELL ID # (MW-1)	EXISTING 2' CONTOURS (4900)	WATER WELL LOCATION WITH WELL ID # (WW-ID)
EXISTING FENCE	EXISTING TREES	EXISTING EDGE OF ROAD	UTILITY POLE
EXISTING ELECTRIC LINE (UE)	SECTION CORNER MONUMENT	STABILITY ANALYSIS SECTION (NAME)	



PERMIT KEY MAP
NTS
NORTH



811 Know what's below. Call before you dig.

CIVIL RESOURCES
8308 COLORADO BLVD
SUITE 200
FIRESTONE, CO 80504
303.833.1416
WWW.CIVILRESOURCES.COM

AGGREGATE INDUSTRIES
1687 COLE BLVD, STE 300
GOLDEN, COLORADO 80401
303-648-1175(P)

TUCSON SOUTH RESOURCE
EXHIBIT C
PRE-MINING WELD COUNTY CONVEYOR

REVISIONS

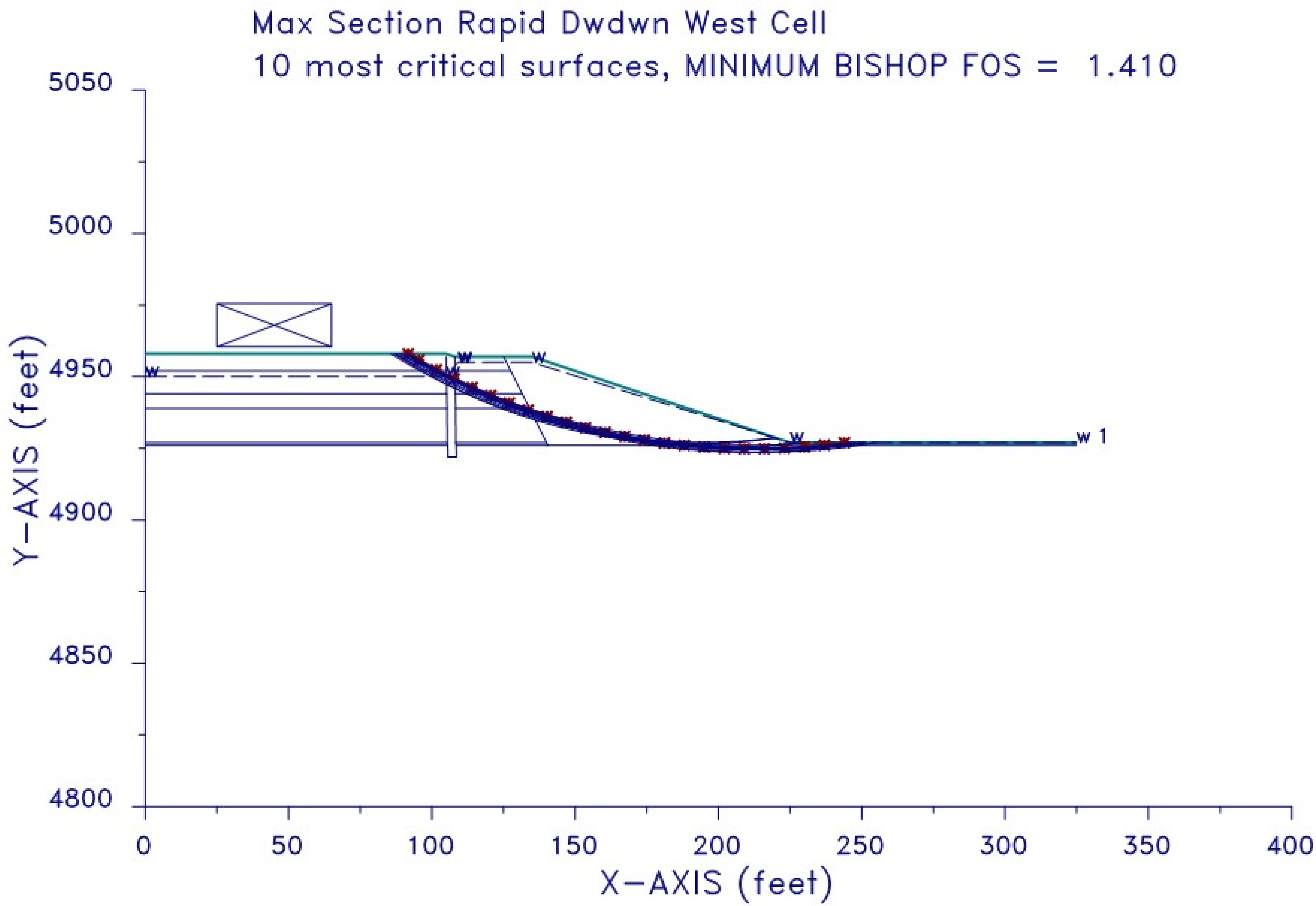
NO.	DESCRIPTION	DATE
1	PRELIM ADEQUACY	12/01/21
2	ADEQUACY 2	12/15/21

DRAWN BY: CI DATE: AUGUST 21
CHECKED BY: GL SCALE: AS NOTED
AS NOTED
JOB NO.: 297.001.09
DWG NAME: SECTION STABILITY ANALYSIS 3.dwg

STABILITY ANALYSIS SECTION

SHEET: 3

WTSRDD 12-08-21 39:30



```
PROFIL                                    FILE: WTSRDD    12-08-21   39:30    ft
Max Section Rapid Dwdwn West Cell
    37       6
       .0     4958.0      105.0     4958.0   1
    105.0     4958.0      108.0     4957.0   7
    108.0     4957.0      125.0     4957.0   1
    125.0     4957.0      135.0     4957.0   6
    135.0     4957.0      225.0     4927.0   6
    225.0     4927.0      325.0     4927.0   4
    105.0     4957.0      105.1     4952.0   1
    108.0     4957.0      108.1     4952.0   7
    125.0     4957.0      127.5     4952.0   1
       .0     4952.0      105.1     4952.0   2
    108.1     4952.0      127.5     4952.0   2
    105.1     4952.0      105.2     4944.0   3
    108.1     4952.0      108.2     4944.0   7
    127.5     4952.0      131.5     4944.0   3
       .0     4944.0      105.2     4944.0   3
    108.2     4944.0      131.5     4944.0   3
    105.2     4944.0      105.3     4939.0   3
    108.2     4944.0      108.3     4939.0   7
    131.5     4944.0      134.0     4939.0   3
       .0     4939.0      105.3     4939.0   2
    108.3     4939.0      134.0     4939.0   2
    105.3     4939.0      105.4     4927.0   2
    108.3     4939.0      108.4     4927.0   7
    134.0     4939.0      140.0     4927.0   2
       .0     4927.0      105.4     4927.0   4
    108.4     4927.0      140.0     4927.0   4
    105.4     4927.0      105.5     4926.0   4
    108.4     4927.0      108.5     4926.0   7
    140.0     4927.0      140.5     4926.0   4
    225.0     4927.0      225.5     4926.0   4
       .0     4926.0      105.5     4926.0   5
    108.5     4926.0      140.5     4926.0   5
    140.5     4926.0      225.0     4926.0   5
    225.0     4926.0      325.0     4926.0   5
    105.5     4926.0      105.6     4922.0   5
    108.5     4926.0      108.6     4922.0   7
    105.6     4922.0      108.6     4922.0   5
SOIL
  7
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
  118.0    124.0        .0      .00     .000        .0    1
WATER
```

```
  1       62.40
     7
          .0      4950.0
       105.0      4950.0
       109.0      4955.0
       109.4      4955.0
       135.0      4955.0
       225.0      4927.0
       325.0      4927.0
LOADS
  1
        25.0        65.0       500.0          .0
CIRCL2
    20      20
    220.0      255.0       80.0       92.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: WTSRDD   12-08-21   39:30

```
****************************************
*              X S T A B L             *
*                                      *
*        Slope Stability Analysis      *
*               using the              *
*            Method of Slices          *
*                                      *
*        Copyright (C) 1992 - 2002     *
*   Interactive Software Designs, Inc. *
*        Moscow, ID 83843, U.S.A.      *
*                                      *
*          All Rights Reserved         *
*                                      *
*  Ver. 5.206                96 - 1952 *
****************************************
```

Problem Description : Max Section Rapid Dwdwn West Cell

SEGMENT BOUNDARY COORDINATES
----

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4958.0	105.0	4958.0	1
2	105.0	4958.0	108.0	4957.0	7
3	108.0	4957.0	125.0	4957.0	1
4	125.0	4957.0	135.0	4957.0	6
5	135.0	4957.0	225.0	4927.0	6
6	225.0	4927.0	325.0	4927.0	4

31 SUBSURFACE boundary segments

Segment   x-left   y-left   x-right   y-right

Soil Unit Below Segment	No.	(ft)	(ft)	(ft)	(ft)
1	1	105.0	4957.0	105.1	4952.0
7	2	108.0	4957.0	108.1	4952.0
1	3	125.0	4957.0	127.5	4952.0
2	4	.0	4952.0	105.1	4952.0
2	5	108.1	4952.0	127.5	4952.0
3	6	105.1	4952.0	105.2	4944.0
7	7	108.1	4952.0	108.2	4944.0
3	8	127.5	4952.0	131.5	4944.0
3	9	.0	4944.0	105.2	4944.0
3	10	108.2	4944.0	131.5	4944.0
3	11	105.2	4944.0	105.3	4939.0
7	12	108.2	4944.0	108.3	4939.0
3	13	131.5	4944.0	134.0	4939.0
2	14	.0	4939.0	105.3	4939.0
2	15	108.3	4939.0	134.0	4939.0
2	16	105.3	4939.0	105.4	4927.0
7	17	108.3	4939.0	108.4	4927.0
2	18	134.0	4939.0	140.0	4927.0
4	19	.0	4927.0	105.4	4927.0
4	20	108.4	4927.0	140.0	4927.0
4	21	105.4	4927.0	105.5	4926.0
7	22	108.4	4927.0	108.5	4926.0
4	23	140.0	4927.0	140.5	4926.0
4	24	225.0	4927.0	225.5	4926.0

25	.0	4926.0	105.5	4926.0	5
26	108.5	4926.0	140.5	4926.0	5
27	140.5	4926.0	225.0	4926.0	5
28	225.0	4926.0	325.0	4926.0	5
29	105.5	4926.0	105.6	4922.0	5
30	108.5	4926.0	108.6	4922.0	7
31	105.6	4922.0	108.6	4922.0	5

ISOTROPIC Soil Parameters
----

7 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Parameter Ru	Pressure Constant (psf)	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0	28.00	.000	.0	1
6	119.0	126.0	25.0	26.00	.000	.0	1
7	118.0	124.0	.0	.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 7 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4950.00
2	105.00	4950.00
3	109.00	4955.00
4	109.40	4955.00
5	135.00	4955.00
6	225.00	4927.00
7	325.00	4927.00

BOUNDARY LOADS
----

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	25.0	65.0	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.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 220.0 ft

and x = 255.0 ft

Each surface terminates between x = 80.0 ft
and x = 92.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

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 := -5.0 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	243.95	4927.00
2	237.00	4926.16
3	230.03	4925.53
4	223.04	4925.10
5	216.04	4924.88
6	209.04	4924.87
7	202.05	4925.07
8	195.06	4925.48

9	188.08	4926.09
10	181.13	4926.91
11	174.21	4927.93
12	167.32	4929.17
13	160.47	4930.60
14	153.66	4932.24
15	146.91	4934.08
16	140.21	4936.12
17	133.58	4938.36
18	127.02	4940.79
19	120.53	4943.42
20	114.12	4946.24
21	107.80	4949.25
22	101.57	4952.44
23	95.44	4955.82
24	91.76	4958.00

**** Simplified BISHOP FOS = 1.410 ****

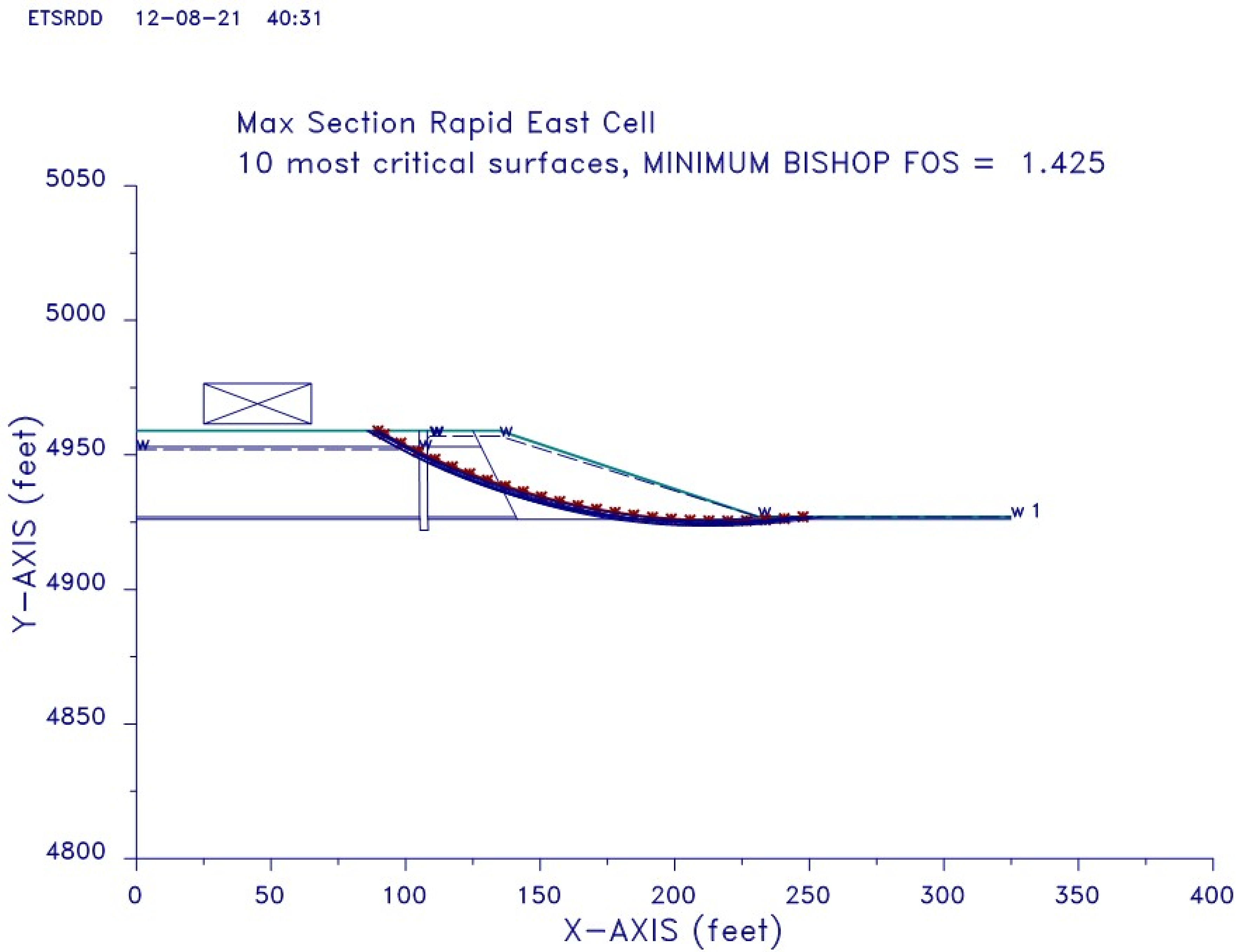
The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Rapid Dwdwn West Cell

	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.	1.410	212.22	5160.22	235.37	243.95	91.76	1.618E+07
2.	1.429	216.46	5173.85	249.30	251.32	91.88	1.725E+07
3.	1.443	219.87	5202.10	276.90	251.32	89.03	1.849E+07
4.	1.456	215.35	5185.07	260.09	247.63	88.63	1.832E+07
5.	1.463	203.23	5149.17	223.69	229.21	87.22	1.639E+07
6.	1.468	210.59	5148.34	224.73	249.47	91.21	1.755E+07
7.	1.470	191.79	5117.61	191.04	220.00	86.85	1.360E+07
8.	1.482	215.00	5166.76	243.07	255.00	90.68	1.869E+07

9.	1.483	194.36	5133.13	206.06	220.00	85.69	1.434E+07
10.	1.485	211.82	5172.81	248.14	245.79	87.61	1.867E+07

* * * END OF FILE * * *



ETSRDD 12-08-21 40:31
Max Section Rapid East Cell
10 most critical surfaces, MINIMUM BISHOP FOS = 1.425
Y-AXIS (feet)
X-AXIS (feet)
5050
5000
4950
4900
4850
4800
0
50
100
150
200
250
300
350
400
W
W
W
W
W
W 1

```
PROFIL                                    FILE: ETSRDD    12-08-21   40:31    ft
Max Section Rapid East Cell
    25       6
       .0     4959.0      105.0     4959.0   1
    105.0     4959.0      108.0     4959.0   7
    108.0     4959.0      125.0     4959.0   1
    125.0     4959.0      135.0     4959.0   6
    135.0     4959.0      231.0     4927.0   6
    231.0     4927.0      325.0     4927.0   4
    105.0     4959.0      105.1     4953.0   1
    108.0     4959.0      108.1     4953.0   7
    125.0     4959.0      128.0     4953.0   1
       .0     4953.0      105.1     4953.0   2
    108.1     4953.0      128.0     4953.0   2
    105.1     4953.0      105.2     4927.0   2
    108.1     4953.0      108.2     4927.0   7
    128.0     4953.0      141.0     4927.0   2
       .0     4927.0      105.2     4927.0   4
    108.2     4927.0      141.0     4927.0   4
    105.2     4927.0      105.3     4926.0   4
    108.2     4927.0      108.3     4926.0   7
    141.0     4927.0      141.5     4926.0   4
       .0     4926.0      105.3     4926.0   5
    108.3     4926.0      141.5     4926.0   5
    141.5     4926.0      325.0     4926.0   5
    105.3     4926.0      105.4     4922.0   5
    108.3     4926.0      108.4     4922.0   7
    105.4     4922.0      108.4     4922.0   5
SOIL
  7
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
  118.0    124.0        .0      .00     .000        .0    1
WATER
  1       62.40
     7
          .0      4952.0
       105.0      4952.0
       109.0      4957.0
       109.4      4957.0
       135.0      4957.0
       231.0      4927.0
       325.0      4927.0
LOADS
  1
        25.0        65.0       500.0          .0
```

```
CIRCL2
    20      20
    220.0      255.0        80.0        90.0
   4900.0        7.0        -5.0       -45.0
```

XSTABL File: ETSRDD   12-08-21   40:31

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*               using the               *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.206                96 - 1952  *
*****************************************
```

Problem Description : Max Section Rapid East Cell

SEGMENT BOUNDARY COORDINATES
----

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4959.0	105.0	4959.0	1
2	105.0	4959.0	108.0	4959.0	7
3	108.0	4959.0	125.0	4959.0	1
4	125.0	4959.0	135.0	4959.0	6
5	135.0	4959.0	231.0	4927.0	6
6	231.0	4927.0	325.0	4927.0	4

19 SUBSURFACE boundary segments

Segment   x-left   y-left   x-right   y-right

No.	(ft)	(ft)	(ft)	(ft)	Soil Unit Below Segment
1	105.0	4959.0	105.1	4953.0	1
2	108.0	4959.0	108.1	4953.0	7
3	125.0	4959.0	128.0	4953.0	1
4	.0	4953.0	105.1	4953.0	2
5	108.1	4953.0	128.0	4953.0	2
6	105.1	4953.0	105.2	4927.0	2
7	108.1	4953.0	108.2	4927.0	7
8	128.0	4953.0	141.0	4927.0	2
9	.0	4927.0	105.2	4927.0	4
10	108.2	4927.0	141.0	4927.0	4
11	105.2	4927.0	105.3	4926.0	4
12	108.2	4927.0	108.3	4926.0	7
13	141.0	4927.0	141.5	4926.0	4
14	.0	4926.0	105.3	4926.0	5
15	108.3	4926.0	141.5	4926.0	5
16	141.5	4926.0	325.0	4926.0	5
17	105.3	4926.0	105.4	4922.0	5
18	108.3	4926.0	108.4	4922.0	7
19	105.4	4922.0	108.4	4922.0	5

ISOTROPIC Soil Parameters
----

7 Soil unit(s) specified

Soil Unit Weight Cohesion Friction Pore Pressure Water

```
          Unit  Moist    Sat.  Intercept   Angle  Parameter
Constant  Surface
           No.  (pcf)   (pcf)    (psf)     (deg)      Ru
(psf)      No.

            1   114.0   126.0      50.0
28.00      .000         .0      1
            2   130.0   137.0        .0
35.00      .000         .0      1
            3   114.0   126.0      50.0
28.00      .000         .0      1
            4   124.0   134.0        .0
14.00      .000         .0      1
            5   124.0   134.0     100.0
28.00      .000         .0      1
            6   119.0   126.0      25.0
26.00      .000         .0      1
            7   118.0
124.0        .0      .00      .000         .0      1
```

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 7 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4952.00
2	105.00	4952.00
3	109.00	4957.00
4	109.40	4957.00
5	135.00	4957.00
6	231.00	4927.00
7	325.00	4927.00

BOUNDARY LOADS
----

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	25.0	65.0	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.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 220.0 ft and x = 255.0 ft

Each surface terminates between x = 80.0 ft and x = 90.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 4900.0 ft

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 := -5.0 degrees

Factors of safety have been calculated by the :

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

The most critical circular failure surface
is specified by 25 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	247.63	4927.00
2	240.66	4926.34
3	233.68	4925.86
4	226.69	4925.57
5	219.69	4925.46
6	212.69	4925.54
7	205.69	4925.80
8	198.71	4926.24
9	191.73	4926.87
10	184.78	4927.68
11	177.85	4928.67
12	170.95	4929.84
13	164.08	4931.20
14	157.25	4932.73
15	150.47	4934.45
16	143.73	4936.34
17	137.04	4938.41
18	130.41	4940.65
19	123.84	4943.06
20	117.33	4945.65
21	110.90	4948.41
22	104.54	4951.34
23	98.26	4954.43
24	92.06	4957.69
25	89.72	4959.00

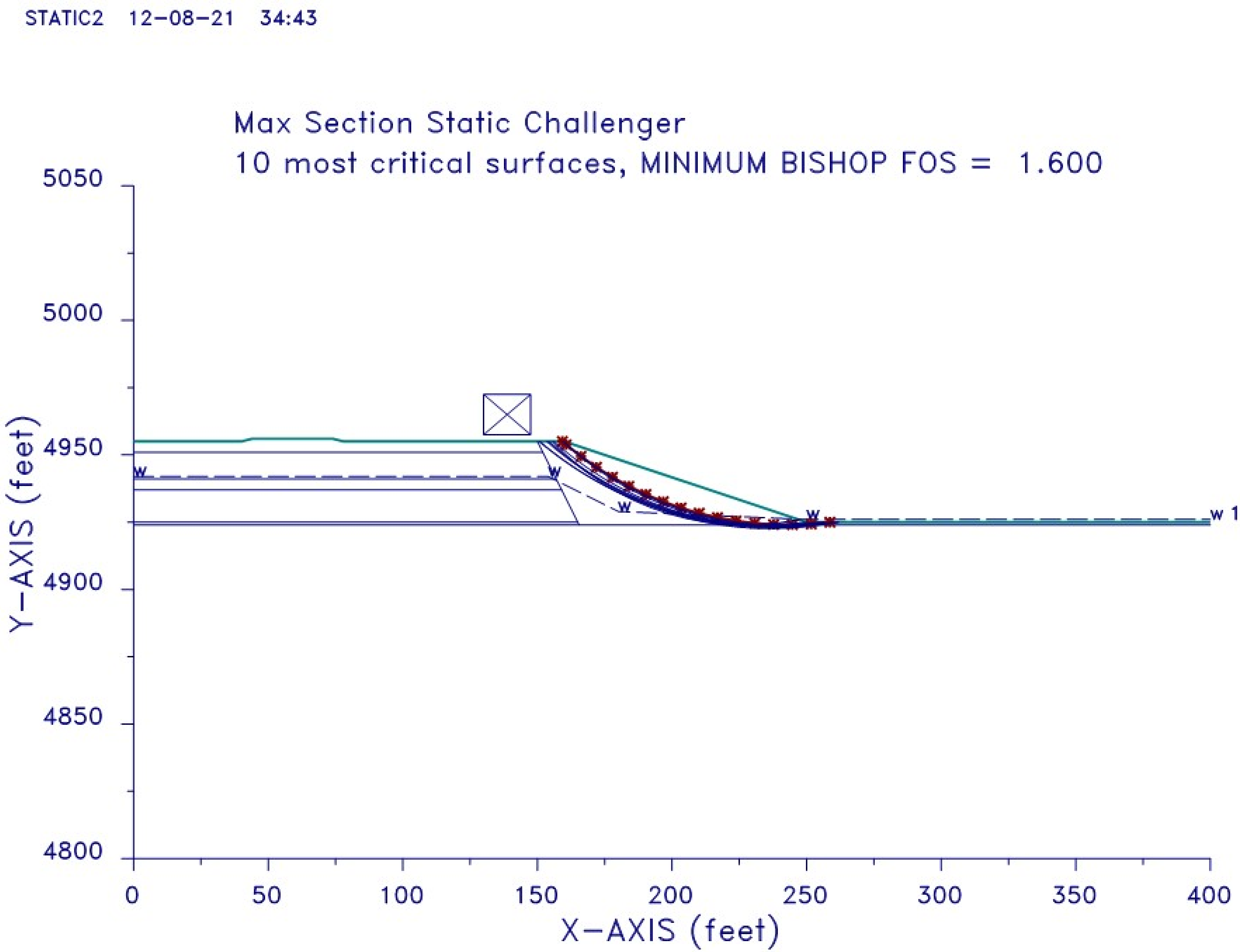
**** Simplified BISHOP FOS = 1.425 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Rapid East Cell

	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.	1.425	219.03	5192.18	266.72	247.63	89.72	1.979E+07
2.	1.452	212.09	5161.32	236.48	243.95	89.76	1.922E+07
3.	1.463	216.38	5174.47	249.92	251.32	89.87	2.041E+07
4.	1.476	219.95	5201.34	276.13	251.32	87.52	2.170E+07
5.	1.498	210.43	5149.34	225.74	249.47	89.30	2.050E+07
6.	1.506	215.00	5166.76	243.08	255.00	88.89	2.172E+07
7.	1.508	204.72	5152.71	227.24	231.05	85.99	1.932E+07
8.	1.515	211.90	5172.19	247.52	245.79	86.29	2.156E+07
9.	1.529	214.66	5185.17	260.51	249.47	85.42	2.274E+07
10.	1.532	211.62	5166.18	242.16	249.47	86.42	2.216E+07

* * * END OF FILE * * *


STATIC2 12-08-21 34:43
Max Section Static Challenger
10 most critical surfaces, MINIMUM BISHOP FOS = 1.600
5050
5000
4950
4900
4850
4800
Y-AXIS (feet)
0
50
100
150
200
250
300
350
400
X-AXIS (feet)
W
W
W
W
W 1

```
PROFIL                                    FILE: STATIC2   12-08-21   34:43    ft
Max Section Static Challenger
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0      130.0      160.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: STATIC2   12-08-21   34:43

```
****************************************
*             X S T A B L              *
*                                      *
*       Slope Stability Analysis       *
*              using the               *
*           Method of Slices           *
*                                      *
*       Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc. *
*       Moscow, ID 83843, U.S.A.       *
*                                      *
*          All Rights Reserved         *
*                                      *
*  Ver. 5.206              96 - 1952   *
****************************************
```

Problem Description : Max Section Static Challenger

SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
----

6 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	Pressure Constant (psf)	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

```
28.00      .000         .0      1
            6   119.0   126.0      25.0
26.00      .000         .0      1


           1 Water surface(s) have been specified

          Unit weight of water =    62.40  (pcf)


          Water Surface No.  1 specified by  5 coordinate points

          **********************************
                   PHREATIC SURFACE,
          **********************************

            Point      x-water     y-water
             No.         (ft)        (ft)

              1            .00     4942.00
              2         154.00     4942.00
              3         180.00     4929.00
              4         250.00     4926.00
              5         400.00     4926.00


          ---------------
          BOUNDARY LOADS
          ---------------

              1 load(s) specified


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

            1          130.0        147.5
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.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = 130.0 ft
and x = 160.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

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 := -5.0 degrees

Factors of safety have been calculated by the :

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

The most critical circular failure surface
is specified by 17 coordinate points

Point x-surf y-surf

No.	(ft)	(ft)
1	258.68	4925.00
2	251.72	4924.34
3	244.72	4924.06
4	237.72	4924.16
5	230.74	4924.64
6	223.79	4925.50
7	216.90	4926.73
8	210.09	4928.34
9	203.37	4930.31
10	196.77	4932.64
11	190.31	4935.33
12	184.00	4938.37
13	177.87	4941.74
14	171.93	4945.44
15	166.19	4949.46
16	160.69	4953.78
17	159.30	4955.00

**** Simplified BISHOP FOS = 1.600 ****

The following is a summary of the TEN most critical surfaces

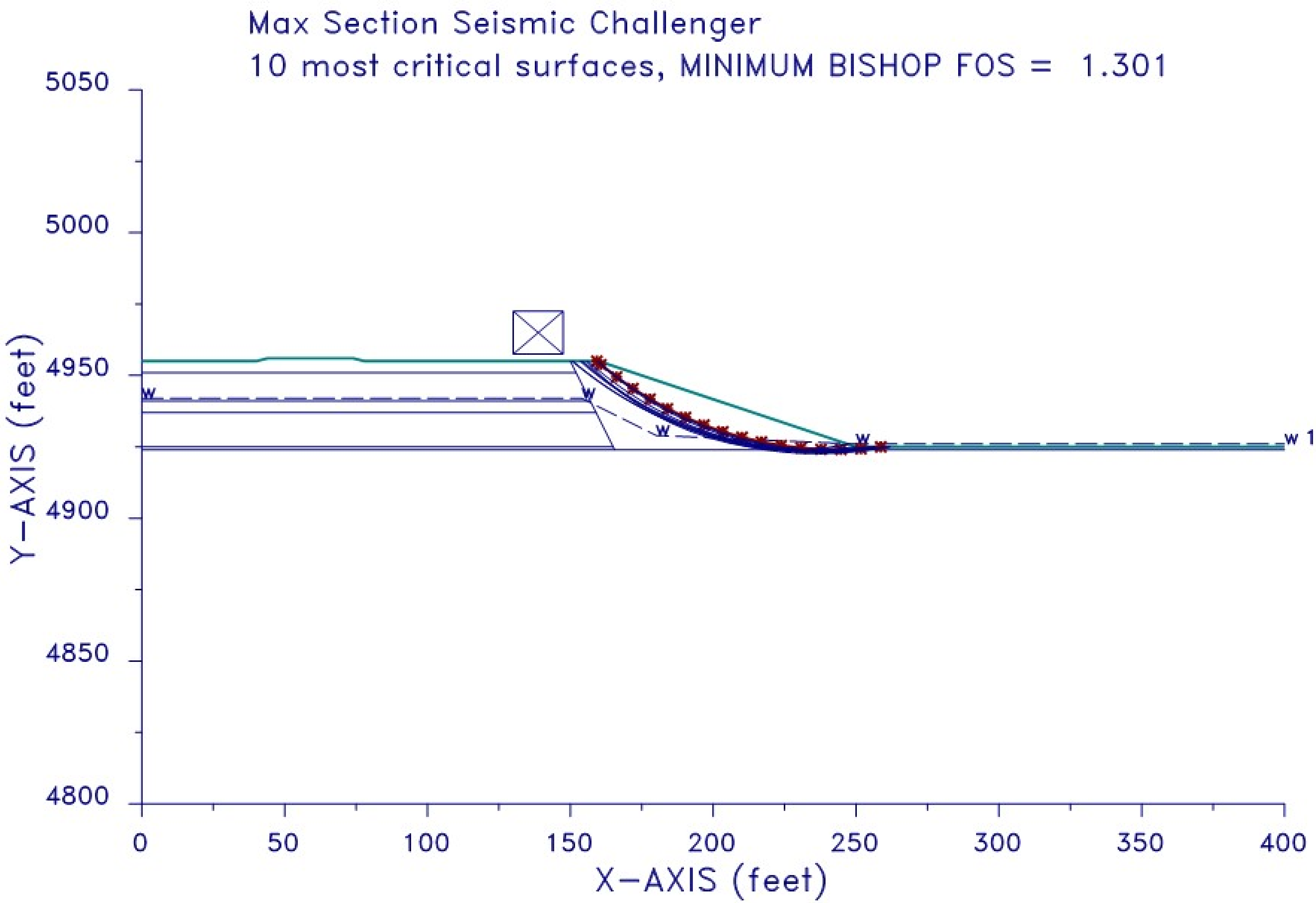
Problem Description : Max Section Static Challenger

	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.	1.600	243.05	5053.08	129.03	258.68	159.30	4.711E+06
2.	1.622	235.28	5046.65	122.56	250.26	153.98	5.711E+06
3.	1.659	239.08	5040.58	116.89	256.58	159.43	4.817E+06
4.	1.668	227.21	5021.92	98.00	247.11	155.72	4.904E+06
5.	1.682	242.64	5048.51	124.99	261.84	159.74	5.013E+06
6.	1.682	236.01	5047.90	124.28	254.47	153.52	6.249E+06
7.	1.704	236.70	5057.04	133.53	256.58		

```
150.62  7.194E+06
           8.   1.707    239.76  5048.50   125.46   261.84
156.13  6.085E+06
           9.   1.722    236.18  5041.94   119.29   259.74
154.60  6.451E+06
          10.   1.724    237.35  5056.36   133.25   259.74
150.95  7.399E+06
```

* * * END OF FILE * * *

SEISMIC2 12-08-21 34:46



```
PROFIL                                   FILE: SEISMIC2  12-08-21   34:46    ft
Max Section Seismic Challenger
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
EQUAKE
   .067     .000
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0      130.0      160.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: SEISMIC2 12-08-21   34:46

```
*******************************************
*               X S T A B L               *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*           Method of Slices              *
*                                         *
*        Copyright (C) 1992 - 2002        *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.206                 96 - 1952   *
*******************************************
```

Problem Description : Max Section Seismic Challenger

SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
----

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Parameter Ru	Pressure Constant (psf)	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

28.00 .000 .0 1
6 119.0 126.0 25.0
26.00 .000 .0 1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	154.00	4942.00
3	180.00	4929.00
4	250.00	4926.00
5	400.00	4926.00

A horizontal earthquake loading coefficient
of .067 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	130.0	147.5	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.

20 Surfaces initiate from each of 20 points equally
spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = 130.0 ft
and x = 160.0 ft

Unless further limitations were imposed, the minimum
elevation
at which a surface extends is y = 4900.0 ft

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 := -5.0 degrees

Factors of safety have been calculated by the :

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

The most critical circular failure surface is specified by 17 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	258.68	4925.00
2	251.72	4924.34
3	244.72	4924.06
4	237.72	4924.16
5	230.74	4924.64
6	223.79	4925.50
7	216.90	4926.73
8	210.09	4928.34
9	203.37	4930.31
10	196.77	4932.64
11	190.31	4935.33
12	184.00	4938.37
13	177.87	4941.74
14	171.93	4945.44
15	166.19	4949.46
16	160.69	4953.78
17	159.30	4955.00

**** Simplified BISHOP FOS = 1.301 ****

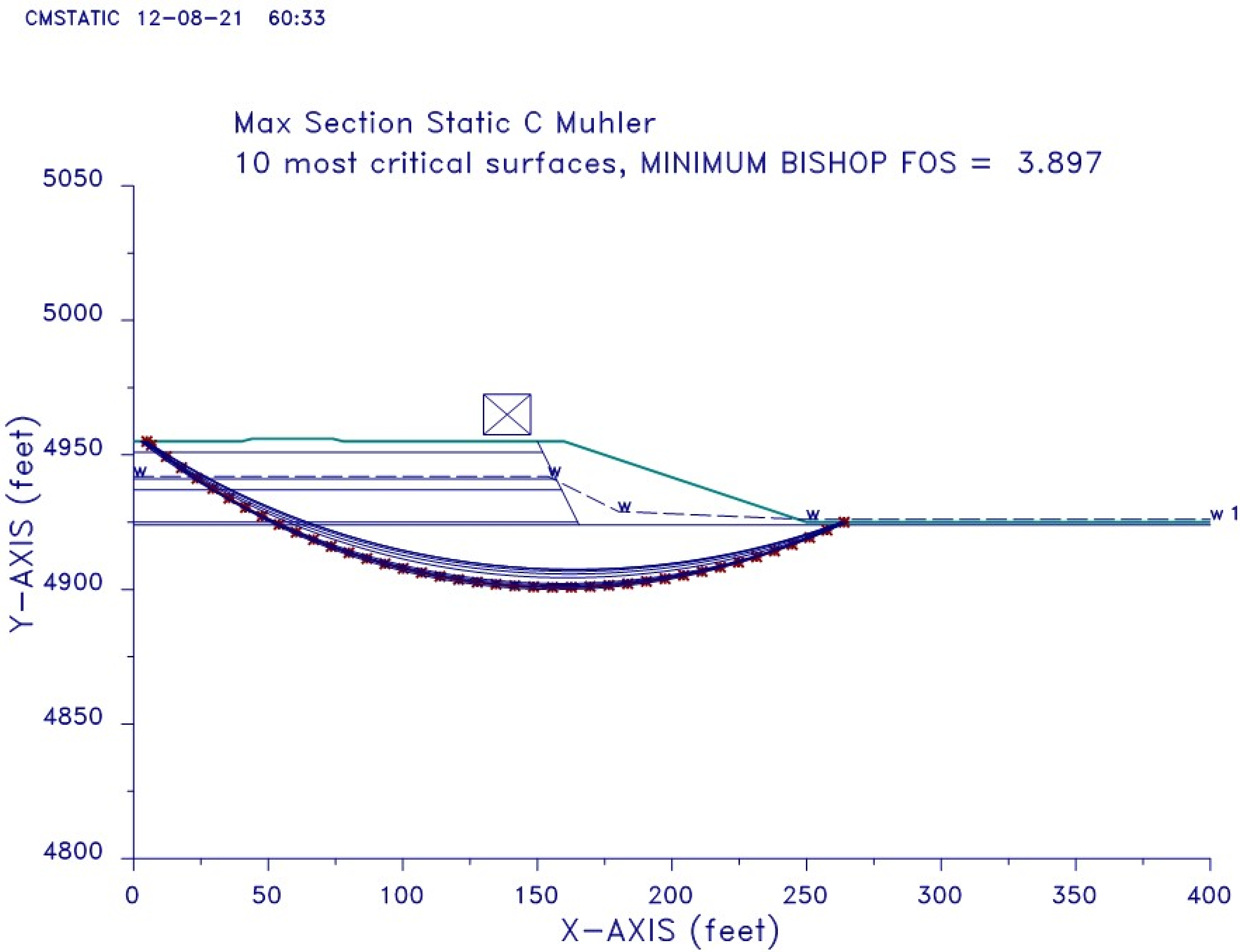
The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Seismic Challenger

	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.	1.301	243.05	5053.08	129.03	258.68	159.30	4.614E+06
2.	1.318	235.28	5046.65	122.56	250.26	153.98	5.596E+06
3.	1.351	239.08	5040.58	116.89	256.58		

```
159.43  4.723E+06
           4.   1.359    227.21  5021.92    98.00   247.11
155.72  4.810E+06
           5.   1.368    236.01  5047.90   124.28   254.47
153.52  6.131E+06
           6.   1.368    242.64  5048.51   124.99   261.84
159.74  4.917E+06
           7.   1.381    236.70  5057.04   133.53   256.58
150.62  7.060E+06
           8.   1.387    239.76  5048.50   125.46   261.84
156.13  5.972E+06
           9.   1.397    237.35  5056.36   133.25   259.74
150.95  7.264E+06
          10.   1.398    236.18  5041.94   119.29   259.74
154.60  6.333E+06
```

* * * END OF FILE * * *


CMSTATIC 12-08-21 60:33
Max Section Static C Muhler
10 most critical surfaces, MINIMUM BISHOP FOS = 3.897
5050
5000
4950
4900
4850
4800
Y-AXIS (feet)
0
50
100
150
200
250
300
350
400
X-AXIS (feet)
W
W
W
W
W 1

```
PROFIL                                    FILE: CMSTATIC  12-08-21   60:32    ft
Max Section Static C Muhler
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0         .0        5.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: CMSTATIC 12-08-21 60:33

```
****************************************
*             X S T A B L              *
*                                      *
*       Slope Stability Analysis       *
*              using the               *
*           Method of Slices           *
*                                      *
*       Copyright (C) 1992 - 2002      *
*   Interactive Software Designs, Inc. *
*       Moscow, ID 83843, U.S.A.       *
*                                      *
*          All Rights Reserved         *
*                                      *
*  Ver. 5.206              96 - 1952   *
****************************************
```

Problem Description : Max Section Static C Muhler

SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
----

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Parameter Ru	Pressure Constant (psf)	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

28.00 .000 .0 1
6 119.0 126.0 25.0
26.00 .000 .0 1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	154.00	4942.00
3	180.00	4929.00
4	250.00	4926.00
5	400.00	4926.00

BOUNDARY LOADS
----

1 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	130.0	147.5	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.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = .0 ft
and x = 5.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4900.0 ft

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 := -5.0 degrees

Factors of safety have been calculated by the :

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

The most critical circular failure surface
is specified by 41 coordinate points

Point x-surf y-surf

No.	(ft)	(ft)
1	263.95	4925.00
2	257.60	4922.05
3	251.17	4919.29
4	244.66	4916.71
5	238.08	4914.31
6	231.44	4912.11
7	224.73	4910.10
8	217.97	4908.28
9	211.16	4906.66
10	204.31	4905.24
11	197.42	4904.01
12	190.49	4902.98
13	183.54	4902.15
14	176.57	4901.52
15	169.59	4901.09
16	162.59	4900.86
17	155.59	4900.83
18	148.59	4901.00
19	141.60	4901.37
20	134.63	4901.95
21	127.67	4902.72
22	120.74	4903.70
23	113.84	4904.87
24	106.97	4906.24
25	100.15	4907.80
26	93.37	4909.57
27	86.65	4911.52
28	79.99	4913.67
29	73.39	4916.01
30	66.86	4918.54
31	60.41	4921.25
32	54.04	4924.15
33	47.75	4927.23
34	41.56	4930.48
35	35.46	4933.92
36	29.46	4937.53
37	23.57	4941.31
38	17.79	4945.25
39	12.12	4949.37
40	6.58	4953.64
41	4.91	4955.00

**** Simplified BISHOP FOS = 3.897 ****

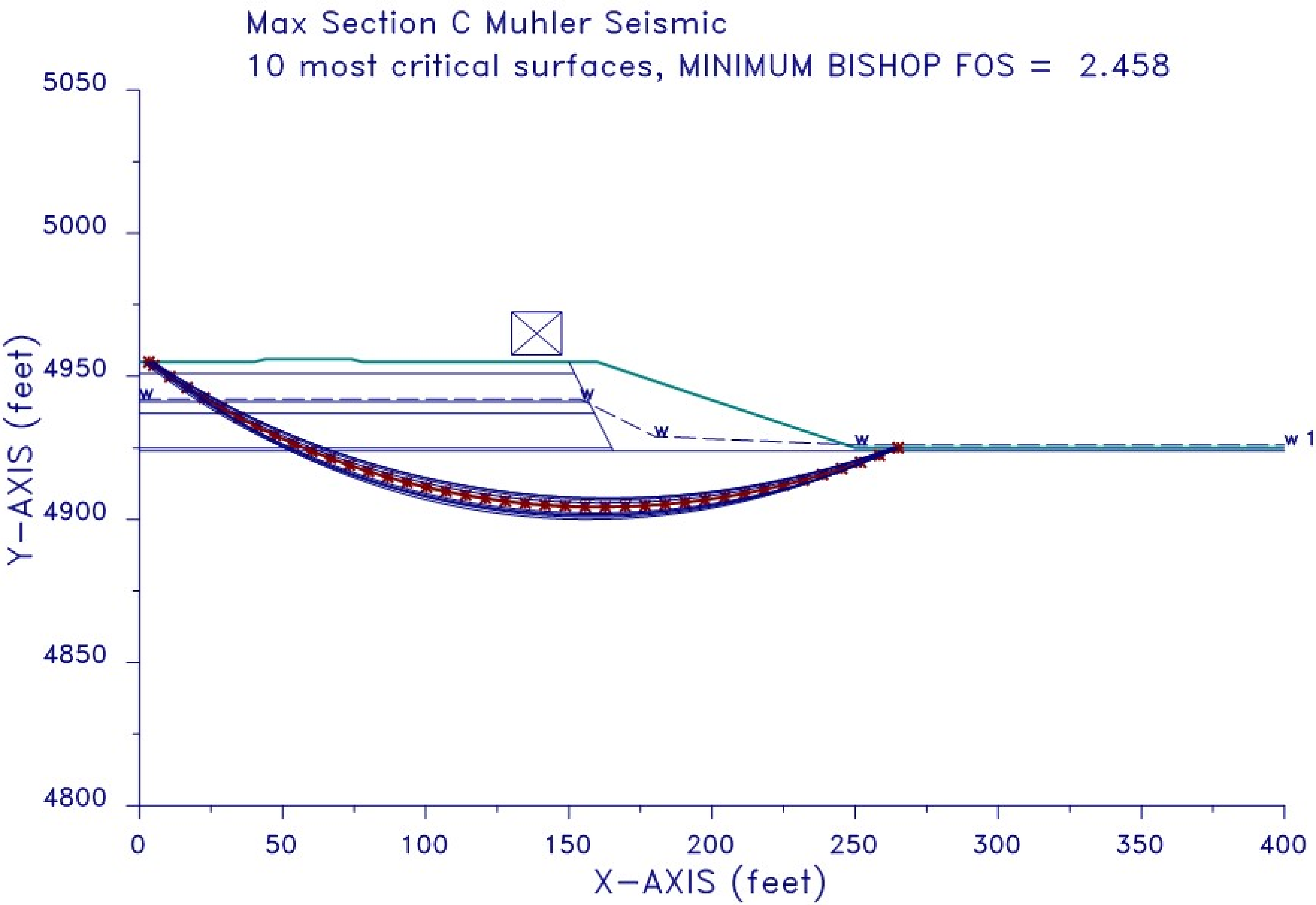
The following is a summary of the TEN most critical surfaces

Problem Description : Max Section Static C Muhler

	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.	3.897	158.13	5144.47	243.65	263.95	4.91	1.136E+08
2.	3.899	161.15	5175.88	271.53	265.00	3.33	1.195E+08
3.	3.902	164.21	5199.17	291.75	263.95	4.53	1.204E+08
4.	3.910	158.86	5159.80	257.68	265.00	2.88	1.183E+08
5.	3.910	163.70	5196.39	288.95	262.89	4.98	1.189E+08
6.	3.913	162.12	5184.89	279.12	263.95	3.56	1.195E+08
7.	3.917	162.91	5190.54	283.75	262.89	4.49	1.186E+08
8.	3.918	158.24	5156.23	254.69	265.00	2.55	1.183E+08
9.	3.922	156.75	5137.74	237.75	262.89	4.85	1.124E+08
10.	3.929	157.24	5144.66	243.75	262.89	4.13	1.137E+08

* * * END OF FILE * * *

CMSEIS 12-08-21 60:56



```
PROFIL                                    FILE: CMSEIS    12-08-21   60:56    ft
Max Section C Muhler Seismic
    18       8
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   6
    160.0     4955.0      250.0     4925.0   6
    250.0     4925.0      400.0     4925.0   4
    150.0     4955.0      152.0     4951.0   1
       .0     4951.0      152.0     4951.0   2
    152.0     4951.0      157.0     4941.0   2
       .0     4941.0      157.0     4941.0   3
    157.0     4941.0      159.0     4937.0   3
       .0     4937.0      159.0     4937.0   2
    159.0     4937.0      165.0     4925.0   2
       .0     4925.0      165.0     4925.0   4
    165.0     4925.0      165.5     4924.0   4
       .0     4924.0      400.0     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     5
          .0      4942.0
       154.0      4942.0
       180.0      4929.0
       250.0      4926.0
       400.0      4926.0
EQUAKE
   .067     .000
LOADS
  1
       130.0       147.5       500.0          .0
CIRCL2
    20      20
    245.0      265.0         .0        5.0
   4900.0        7.0       -5.0      -45.0
```

XSTABL File: CMSEIS   12-08-21   60:56

```
*****************************************
*              X S T A B L              *
*                                       *
*       Slope Stability Analysis        *
*              using the                *
*           Method of Slices            *
*                                       *
*       Copyright (C) 1992 - 2002       *
*   Interactive Software Designs, Inc.  *
*       Moscow, ID 83843, U.S.A.        *
*                                       *
*         All Rights Reserved           *
*                                       *
*  Ver. 5.206                96 - 1952  *
*****************************************
```

Problem Description : Max Section C Muhler Seismic

SEGMENT BOUNDARY COORDINATES
----

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	6
7	160.0	4955.0	250.0	4925.0	6
8	250.0	4925.0	400.0	4925.0	4

10 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	150.0	4955.0	152.0	4951.0	1
2	.0	4951.0	152.0	4951.0	2
3	152.0	4951.0	157.0	4941.0	2
4	.0	4941.0	157.0	4941.0	3
5	157.0	4941.0	159.0	4937.0	3
6	.0	4937.0	159.0	4937.0	2
7	159.0	4937.0	165.0	4925.0	2
8	.0	4925.0	165.0	4925.0	4
9	165.0	4925.0	165.5	4924.0	4
10	.0	4924.0	400.0	4924.0	5

ISOTROPIC Soil Parameters
----

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Parameter Ru	Pressure Constant (psf)	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0				

```
28.00      .000         .0      1
            6   119.0   126.0      25.0
26.00      .000         .0      1
```

1 Water surface(s) have been specified

Unit weight of water =   62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

```
**********************************
         PHREATIC SURFACE,
**********************************
```

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	154.00	4942.00
3	180.00	4929.00
4	250.00	4926.00
5	400.00	4926.00

A horizontal earthquake loading coefficient
of   .067 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	130.0	147.5	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.

20 Surfaces initiate from each of 20 points equally
spaced
along the ground surface between x = 245.0 ft
and x = 265.0 ft

Each surface terminates between x = .0 ft
and x = 5.0 ft

Unless further limitations were imposed, the minimum
elevation
at which a surface extends is y = 4900.0 ft

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 := -5.0 degrees

Factors of safety have been calculated by the :

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

The most critical circular failure surface
is specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	265.00	4925.00
2	258.50	4922.41
3	251.93	4919.98
4	245.30	4917.73
5	238.62	4915.64
6	231.89	4913.73
7	225.11	4912.00
8	218.28	4910.44
9	211.42	4909.05
10	204.53	4907.85
11	197.60	4906.82
12	190.65	4905.97
13	183.69	4905.30
14	176.70	4904.81
15	169.71	4904.50
16	162.71	4904.37
17	155.71	4904.42
18	148.71	4904.65
19	141.73	4905.06
20	134.75	4905.65
21	127.79	4906.42
22	120.86	4907.37
23	113.95	4908.50
24	107.07	4909.81
25	100.23	4911.29
26	93.43	4912.95
27	86.68	4914.79
28	79.97	4916.80
29	73.32	4918.98
30	66.73	4921.33
31	60.20	4923.85
32	53.73	4926.54
33	47.34	4929.39
34	41.02	4932.41
35	34.79	4935.59
36	28.64	4938.92
37	22.57	4942.42
38	16.60	4946.07
39	10.72	4949.88
40	4.95	4953.83
41	3.33	4955.00

**** Simplified BISHOP FOS = 2.458 ****

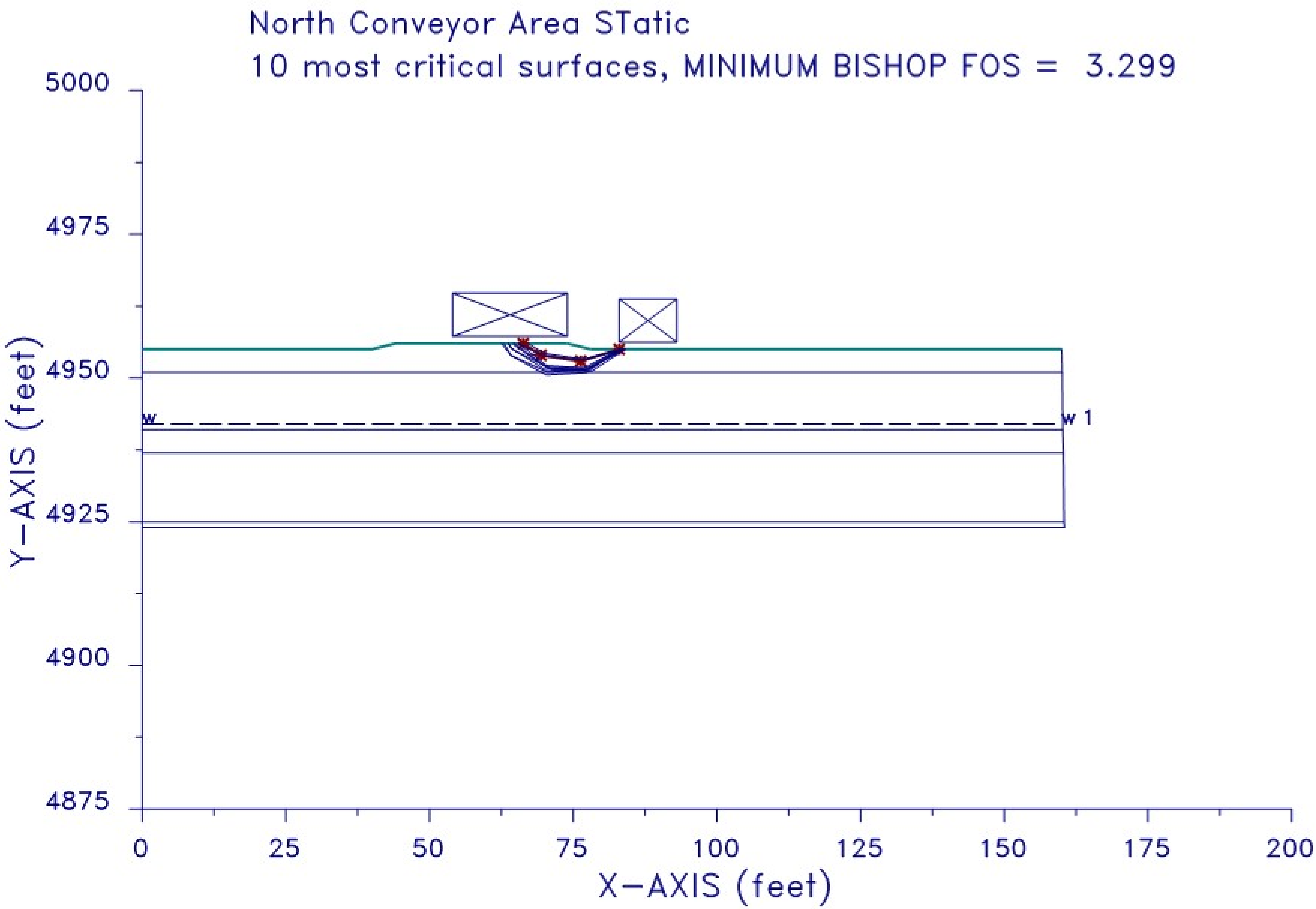
The following is a summary of the TEN most critical surfaces

Problem Description : Max Section C Muhler 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.	2.458	161.15	5175.88	271.53	265.00	3.33	1.183E+08
2.	2.462	158.13	5144.47	243.65	263.95	4.91	1.124E+08
3.	2.463	158.86	5159.80	257.68	265.00	2.88	1.171E+08
4.	2.464	164.21	5199.17	291.75	263.95	4.53	1.192E+08
5.	2.465	162.12	5184.89	279.12	263.95	3.56	1.183E+08
6.	2.466	158.24	5156.23	254.69	265.00	2.55	1.171E+08
7.	2.468	163.70	5196.39	288.95	262.89	4.98	1.177E+08
8.	2.470	162.91	5190.54	283.75	262.89	4.49	1.173E+08
9.	2.475	157.67	5156.60	255.27	265.00	1.34	1.185E+08
10.	2.475	156.75	5137.74	237.75	262.89	4.85	1.112E+08

* * * END OF FILE * * *

CONVSTAT 12-08-21 63:27



```
PROFIL                                   FILE: CONVSTAT  12-08-21   63:27    ft
North Conveyor Area STatic
    16       6
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   1
    160.0     4955.0      160.1     4951.0   1
       .0     4951.0      160.1     4951.0   2
    160.1     4951.0      160.2     4941.0   2
       .0     4941.0      160.2     4941.0   3
    160.2     4941.0      160.3     4937.0   3
       .0     4937.0      160.3     4937.0   2
    160.3     4937.0      160.4     4925.0   2
       .0     4925.0      160.4     4925.0   4
    160.4     4925.0      160.5     4924.0   4
       .0     4924.0      160.5     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     2
          .0      4942.0
       160.0      4942.0
LOADS
  2
        54.0        74.0       500.0          .0
        83.0        93.0       500.0          .0
CIRCL2
    20      20
     83.0       93.0       54.0       74.0
   4930.0        7.0       -5.0      -45.0
```

XSTABL File: CONVSTAT 12-08-21   63:27

```
****************************************
*              X S T A B L             *
*                                      *
*        Slope Stability Analysis      *
*               using the              *
*            Method of Slices          *
*                                      *
*        Copyright (C) 1992 - 2002     *
*   Interactive Software Designs, Inc. *
*        Moscow, ID 83843, U.S.A.      *
*                                      *
*          All Rights Reserved         *
*                                      *
*  Ver. 5.206              96 - 1952   *
****************************************
```

Problem Description : North Conveyor Area STatic

SEGMENT BOUNDARY COORDINATES
----

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	1

10 SUBSURFACE boundary segments

Segment   x-left   y-left   x-right   y-right

Segment No.	(ft)	(ft)	(ft)	(ft)	Soil Unit Below Segment
1	160.0	4955.0	160.1	4951.0	1
2	.0	4951.0	160.1	4951.0	2
3	160.1	4951.0	160.2	4941.0	2
4	.0	4941.0	160.2	4941.0	3
5	160.2	4941.0	160.3	4937.0	3
6	.0	4937.0	160.3	4937.0	2
7	160.3	4937.0	160.4	4925.0	2
8	.0	4925.0	160.4	4925.0	4
9	160.4	4925.0	160.5	4924.0	4
10	.0	4924.0	160.5	4924.0	5

ISOTROPIC Soil Parameters
----

6 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Parameter Ru	Pressure Constant (psf)	Water Surface No.
1	114.0	126.0	50.0	28.00	.000	.0	1
2	130.0	137.0	.0	35.00	.000	.0	1
3	114.0	126.0	50.0	28.00	.000	.0	1
4	124.0	134.0	.0	14.00	.000	.0	1
5	124.0	134.0	100.0	28.00	.000	.0	1
6	119.0	126.0	25.0	26.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	160.00	4942.00

BOUNDARY LOADS
----

2 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	54.0	74.0	500.0	.0
2	83.0	93.0	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.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 83.0 ft
and x = 93.0 ft

Each surface terminates between x = 54.0 ft
and x = 74.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4930.0 ft

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 := -5.0 degrees

```
*************************************************************
**     Factor of safety calculation for surface #     2     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-491.3621     **
**    This will be ignored for final summary of results     **
*************************************************************
```

Circular surface (FOS=********) is defined by: xcenter = 81.73
ycenter = 4972.10 Init. Pt. = 93.00 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 3 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was -32.2896 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=-32.2896) is defined by: xcenter = 84.00
ycenter = 4988.14 Init. Pt. = 93.00 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 6 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was -35.7350 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=-35.7350) is defined by: xcenter = 82.80
ycenter = 4976.72 Init. Pt. = 93.00 Seg. Length = 7.00

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

*************************************************************
          **     Factor of safety calculation for surface #     8
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -32.7246
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-32.7246) is defined by: xcenter =
83.15
      ycenter =   4979.69   Init. Pt. =     93.00   Seg. Length =
7.00
      ----------------------------------------------------------------
--------

*************************************************************
          **     Factor of safety calculation for surface #    11
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  52.8740
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= 52.8740) is defined by: xcenter =
80.82
      ycenter =   4967.11   Init. Pt. =     93.00   Seg. Length =
7.00
      ----------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    16
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.5318
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-15.5318) is defined by: xcenter =
84.58
      ycenter =   4987.12   Init. Pt. =     93.00   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    19
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -8.0779
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS= -8.0779) is defined by: xcenter =
82.97
      ycenter =   4960.19   Init. Pt. =     93.00   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    20
**
```

** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was 39.6022
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS= 39.6022) is defined by: xcenter =
81.78
ycenter = 4983.78 Init. Pt. = 93.00 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 21
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -11.0770
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS=-11.0770) is defined by: xcenter =
82.38
ycenter = 4960.57 Init. Pt. = 92.47 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 22
**
** failed to converge within FIFTY iterations
**
**
**

```
          **    The last calculated value of the FOS was  21.5112
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 21.5112) is defined by: xcenter =
78.45
      ycenter =   4965.72   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    23
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -32.0946
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-32.0946) is defined by: xcenter =
82.14
      ycenter =   4971.45   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    25
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  53.5767
**
          **    This will be ignored for final summary of results
**
```

****

Circular surface (FOS= 53.5767) is defined by: xcenter = 80.65
ycenter = 4967.47 Init. Pt. = 92.47 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 29 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 56.7196 **
** This will be ignored for final summary of results **

****

Circular surface (FOS= 56.7196) is defined by: xcenter = 80.99
ycenter = 4972.20 Init. Pt. = 92.47 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 31 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 47.7356 **
** This will be ignored for final summary of results **

****

```
      Circular surface (FOS= 47.7356) is defined by: xcenter =
79.95
      ycenter =   4963.75   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    35
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -39.4037
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-39.4037) is defined by: xcenter =
83.24
      ycenter =   4983.77   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    37
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -14.4923
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-14.4923) is defined by: xcenter =
82.12
      ycenter =   4960.96   Init. Pt. =     92.47   Seg. Length =
7.00
```

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

************************************************************
          **     Factor of safety calculation for surface #    38
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  76.3719
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= 76.3719) is defined by: xcenter =
80.19
      ycenter =   4962.49   Init. Pt. =     92.47   Seg. Length =
7.00
      ---------------------------------------------------------------
--------

************************************************************
          **     Factor of safety calculation for surface #    40
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -20.8987
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-20.8987) is defined by: xcenter =
82.49
      ycenter =   4971.54   Init. Pt. =     92.47   Seg. Length =
7.00
      ---------------------------------------------------------------
--------
```

```
***************************************************************
          **     Factor of safety calculation for surface #    42
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  51.4481
**
          **    This will be ignored for final summary of results
**
***************************************************************

      Circular surface (FOS= 51.4481) is defined by: xcenter =
79.79
      ycenter =   4962.50   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


***************************************************************
          **     Factor of safety calculation for surface #    45
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.3123
**
          **    This will be ignored for final summary of results
**
***************************************************************

      Circular surface (FOS= -7.3123) is defined by: xcenter =
83.18
      ycenter =   4969.46   Init. Pt. =     91.95   Seg. Length =
7.00
      ------------------------------------------------------------
--------


***************************************************************
          **     Factor of safety calculation for surface #    47
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  96.3648
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= 96.3648) is defined by: xcenter =
80.23
      ycenter =   4961.77   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    48
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  48.4674
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= 48.4674) is defined by: xcenter =
80.28
      ycenter =   4965.85   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    50
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -9.0601
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= -9.0601) is defined by: xcenter =
82.39
      ycenter =   4961.68   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    53
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  21.4756
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 21.4756) is defined by: xcenter =
80.94
      ycenter =   4989.61   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    54
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -23.2765
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS=-23.2765) is defined by: xcenter =
81.47
      ycenter =   4960.68   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    55
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.8217
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= -9.8217) is defined by: xcenter =
82.29
      ycenter =   4961.95   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    56
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -13.3030
**
          **    This will be ignored for final summary of results
**

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

```
      Circular surface (FOS=-13.3030) is defined by: xcenter =
81.94
      ycenter =   4962.40   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    59
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  33.5809
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 33.5809) is defined by: xcenter =
79.14
      ycenter =   4962.88   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    63
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -14.7837
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS=-14.7837) is defined by: xcenter =
83.55
      ycenter =   4983.84   Init. Pt. =     91.42   Seg. Length =
7.00
```

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


************************************************************
          **      Factor of safety calculation for surface #    65
**
          **      failed to converge within FIFTY iterations
**
          **
**
          **     The last calculated value of the FOS was  -6.5802
**
          **     This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS= -6.5802) is defined by: xcenter =
82.55
      ycenter =   4960.48   Init. Pt. =     91.42   Seg. Length =
7.00
      ----------------------------------------------------------
--------


************************************************************
          **      Factor of safety calculation for surface #    69
**
          **      failed to converge within FIFTY iterations
**
          **
**
          **     The last calculated value of the FOS was  28.8818
**
          **     This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS= 28.8818) is defined by: xcenter =
78.80
      ycenter =   4962.94   Init. Pt. =     91.42   Seg. Length =
7.00
      ----------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #    70
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -6.8699
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS= -6.8699) is defined by: xcenter =
82.53
      ycenter =   4962.50   Init. Pt. =     91.42   Seg. Length =
7.00
      -----------------------------------------------------------
--------



************************************************************
          **     Factor of safety calculation for surface #    72
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -10.7286
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-10.7286) is defined by: xcenter =
81.85
      ycenter =   4960.69   Init. Pt. =     91.42   Seg. Length =
7.00
      -----------------------------------------------------------
--------



************************************************************
          **     Factor of safety calculation for surface #    75
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  60.0299
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 60.0299) is defined by: xcenter =
80.17
      ycenter =   4966.11   Init. Pt. =     91.42   Seg. Length =
7.00
      ---------------------------------------------------------------
--------



*************************************************************
          **     Factor of safety calculation for surface #    76
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  27.5180
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 27.5180) is defined by: xcenter =
78.63
      ycenter =   4962.84   Init. Pt. =     91.42   Seg. Length =
7.00
      ---------------------------------------------------------------
--------



*************************************************************
          **     Factor of safety calculation for surface #    79
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was -12.9345
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-12.9345) is defined by: xcenter =
81.65
      ycenter =   4961.06   Init. Pt. =     91.42   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    81
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.1571
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-15.1571) is defined by: xcenter =
81.19
      ycenter =   4960.20   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    82
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  24.3380
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS= 24.3380) is defined by: xcenter =
79.67
      ycenter =   4970.89   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


***********************************************************
          **     Factor of safety calculation for surface #    85
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -18.8957
**
          **    This will be ignored for final summary of results
**
***********************************************************

      Circular surface (FOS=-18.8957) is defined by: xcenter =
81.00
      ycenter =   4960.16   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


***********************************************************
          **     Factor of safety calculation for surface #    88
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -17.7468
**
          **    This will be ignored for final summary of results
**
***********************************************************
```

Circular surface (FOS=-17.7468) is defined by: xcenter =
81.37
ycenter = 4964.97 Init. Pt. = 90.89 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 95
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -4.6070
**
** This will be ignored for final summary of results
**
****

Circular surface (FOS= -4.6070) is defined by: xcenter =
82.65
ycenter = 4964.44 Init. Pt. = 90.89 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 96
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -12.6784
**
** This will be ignored for final summary of results
**
****

Circular surface (FOS=-12.6784) is defined by: xcenter =
82.32
ycenter = 4972.60 Init. Pt. = 90.89 Seg. Length =
7.00

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


*************************************************************
          **     Factor of safety calculation for surface #    97
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -26.6447
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-26.6447) is defined by: xcenter =
80.84
      ycenter =   4962.63   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   100
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -26.0670
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-26.0670) is defined by: xcenter =
80.77
      ycenter =   4960.52   Init. Pt. =     90.89   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   101
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  29.6304
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS= 29.6304) is defined by: xcenter =
79.19
      ycenter =   4964.38   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   102
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -14.3478
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-14.3478) is defined by: xcenter =
81.01
      ycenter =   4960.49   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   104
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.4626
**
          **    This will be ignored for final summary of results
**
*************************************************************


      Circular surface (FOS=-15.4626) is defined by: xcenter =
82.60
      ycenter =   4979.68   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   106
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -22.7825
**
          **    This will be ignored for final summary of results
**
*************************************************************


      Circular surface (FOS=-22.7825) is defined by: xcenter =
81.44
      ycenter =   4969.98   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   110
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was-543.7020
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
79.87
      ycenter =   4960.58   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   111
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  45.2305
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 45.2305) is defined by: xcenter =
81.90
      ycenter =   4990.61   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   112
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.8798
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS= -5.8798) is defined by: xcenter =
82.00
      ycenter =   4963.45   Init. Pt. =     90.37   Seg. Length =
7.00
      ---------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   113
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -65.5261
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-65.5261) is defined by: xcenter =
80.69
      ycenter =   4967.06   Init. Pt. =     90.37   Seg. Length =
7.00
      ---------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   114
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was*********
**
          **    This will be ignored for final summary of results
**
*************************************************************
```

Circular surface (FOS=********) is defined by: xcenter = 82.22
ycenter = 4987.15 Init. Pt. = 90.37 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 115 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was -18.0873 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=-18.0873) is defined by: xcenter = 81.25
ycenter = 4965.30 Init. Pt. = 90.37 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 122 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 30.2146 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 30.2146) is defined by: xcenter = 81.68
ycenter = 4993.21 Init. Pt. = 89.84 Seg. Length = 7.00

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

*************************************************************
          **     Factor of safety calculation for surface #   124
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  60.2213
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= 60.2213) is defined by: xcenter =
79.24
      ycenter =   4960.72   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------

*************************************************************
          **     Factor of safety calculation for surface #   125
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -25.2789
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-25.2789) is defined by: xcenter =
81.30
      ycenter =   4972.19   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------
```

```
*************************************************************
          **     Factor of safety calculation for surface #   130
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  73.5744
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 73.5744) is defined by: xcenter =
79.75
      ycenter =   4965.90   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   131
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  26.8843
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 26.8843) is defined by: xcenter =
79.74
      ycenter =   4971.98   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   132
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  21.4034
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 21.4034) is defined by: xcenter =
78.47
      ycenter =   4961.76   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------



*************************************************************
          **     Factor of safety calculation for surface #   133
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-211.8828
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS=********) is defined by: xcenter =
82.74
      ycenter =   4992.92   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------



*************************************************************
          **     Factor of safety calculation for surface #   136
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -5.2738
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= -5.2738) is defined by: xcenter =
81.99
      ycenter =   4966.40   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   138
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -79.1132
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-79.1132) is defined by: xcenter =
79.82
      ycenter =   4960.88   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   148
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -4.6713
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS= -4.6713) is defined by: xcenter =
81.43
      ycenter =   4961.62   Init. Pt. =     89.32   Seg. Length =
7.00
      -----------------------------------------------------------
--------

*************************************************************
          **     Factor of safety calculation for surface #   154
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 106.3962
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=106.3962) is defined by: xcenter =
79.22
      ycenter =   4961.74   Init. Pt. =     89.32   Seg. Length =
7.00
      -----------------------------------------------------------
--------

*************************************************************
          **     Factor of safety calculation for surface #   158
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.1744
**
          **    This will be ignored for final summary of results
**
*************************************************************
```

Circular surface (FOS= -7.1744) is defined by: xcenter =
81.20
ycenter = 4964.20 Init. Pt. = 89.32 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 159
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -10.5140
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS=-10.5140) is defined by: xcenter =
80.84
ycenter = 4961.06 Init. Pt. = 89.32 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 160
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -31.0110
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS=-31.0110) is defined by: xcenter =
80.01
ycenter = 4960.72 Init. Pt. = 89.32 Seg. Length =
7.00

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

************************************************************
          **     Factor of safety calculation for surface #   161
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -74.5634
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-74.5634) is defined by: xcenter =
79.68
      ycenter =   4961.96   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------

************************************************************
          **     Factor of safety calculation for surface #   162
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -50.0083
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-50.0083) is defined by: xcenter =
79.78
      ycenter =   4961.60   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   164
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -47.1210
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-47.1210) is defined by: xcenter =
80.87
      ycenter =   4970.37   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   167
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -12.8982
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-12.8982) is defined by: xcenter =
80.84
      ycenter =   4965.74   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   168
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  38.3386
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 38.3386) is defined by: xcenter =
78.54
      ycenter =   4960.47   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------



*************************************************************
          **     Factor of safety calculation for surface #   170
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-172.6040
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS=********) is defined by: xcenter =
79.24
      ycenter =   4960.19   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------



*************************************************************
          **     Factor of safety calculation for surface #   182
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was  -4.6110
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= -4.6110) is defined by: xcenter =
81.08
      ycenter =   4962.03   Init. Pt. =     88.26   Seg. Length =
7.00
      -----------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   188
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -87.8898
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-87.8898) is defined by: xcenter =
80.32
      ycenter =   4966.33   Init. Pt. =     88.26   Seg. Length =
7.00
      -----------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   190
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -10.8499
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS=-10.8499) is defined by: xcenter =
81.00
      ycenter =   4966.25   Init. Pt. =     88.26   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   198
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  73.6869
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 73.6869) is defined by: xcenter =
80.22
      ycenter =   4967.75   Init. Pt. =     88.26   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   203
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  28.0646
**
          **    This will be ignored for final summary of results
**

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

Circular surface (FOS= 28.0646) is defined by: xcenter =
78.29
ycenter = 4960.17 Init. Pt. = 87.74 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 210
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was 22.7284
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS= 22.7284) is defined by: xcenter =
77.85
ycenter = 4960.08 Init. Pt. = 87.74 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 213
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -26.5968
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS=-26.5968) is defined by: xcenter =
79.85
ycenter = 4961.31 Init. Pt. = 87.74 Seg. Length =
7.00

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


*************************************************************
          **      Factor of safety calculation for surface #   216
**
          **      failed to converge within FIFTY iterations
**
          **
**
          **     The last calculated value of the FOS was -18.5190
**
          **     This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS=-18.5190) is defined by: xcenter =
80.00
      ycenter =   4961.54   Init. Pt. =     87.74   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **      Factor of safety calculation for surface #   217
**
          **      failed to converge within FIFTY iterations
**
          **
**
          **     The last calculated value of the FOS was  -5.8326
**
          **     This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= -5.8326) is defined by: xcenter =
80.66
      ycenter =   4961.36   Init. Pt. =     87.74   Seg. Length =
7.00
      -----------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   219
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  25.9148
**
          **    This will be ignored for final summary of results
**

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

```
      Circular surface (FOS= 25.9148) is defined by: xcenter =
78.11
      ycenter =   4960.13   Init. Pt. =     87.74   Seg. Length =
7.00
      -----------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   251
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  43.2226
**
          **    This will be ignored for final summary of results
**

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

```
      Circular surface (FOS= 43.2226) is defined by: xcenter =
80.86
      ycenter =   4974.63   Init. Pt. =     86.68   Seg. Length =
7.00
      -----------------------------------------------------------
--------
```

```
          Factors of safety have been calculated by the :

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

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

     Point      x-surf      y-surf
      No.        (ft)        (ft)

       1         83.00     4955.00
       2         76.31     4952.95
       3         69.38     4953.95
       4         66.30     4956.00

****  Simplified BISHOP FOS =   3.299  ****
```

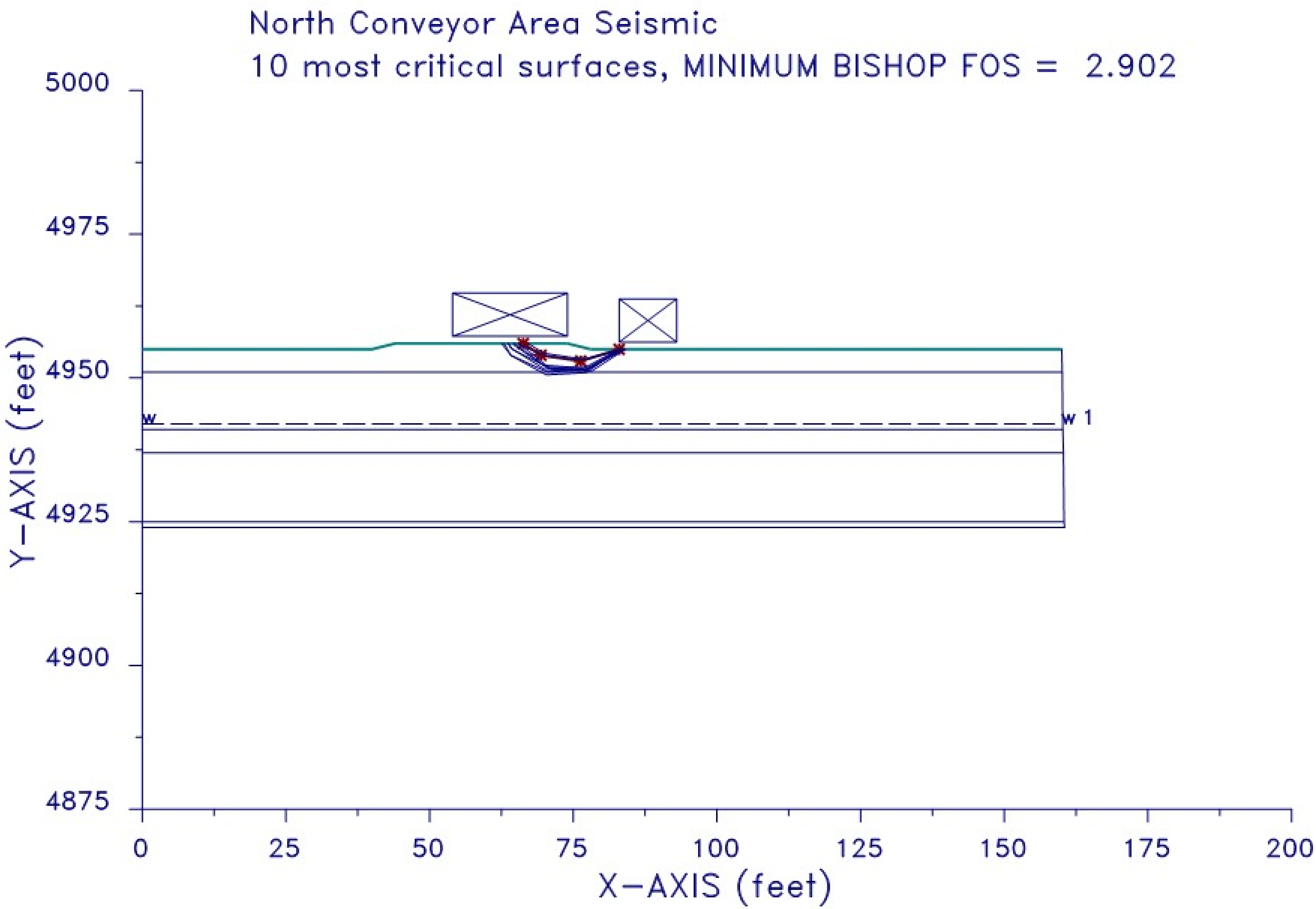
```
*****************************************************************
***
          **
**
          **  Out of the    400 surfaces generated and analyzed
by XSTABL,  **
          **       85 surfaces were found to have MISLEADING FOS
values.    **
          **
**

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

```
          The following is a summary of the TEN most critical
surfaces

          Problem Description : North Conveyor Area STatic

                 FOS      Circle Center    Radius  Initial
Terminal  Resisting
              (BISHOP)  x-coord  y-coord           x-coord  x-
coord    Moment
                          (ft)     (ft)     (ft)     (ft)
(ft)    (ft-lb)

           1.   3.299     75.08  4968.88    15.98    83.00
66.30  7.487E+04
```

2.	3.340	74.23	4964.01	12.58	83.00	64.75	8.391E+04
3.	3.612	73.66	4963.84	12.86	83.00	63.72	9.941E+04
4.	3.627	75.89	4970.45	17.23	83.53	67.17	7.371E+04
5.	3.715	74.44	4963.66	12.56	83.53	64.59	9.270E+04
6.	3.817	75.14	4972.15	19.09	83.53	65.49	9.763E+04
7.	4.000	75.19	4962.27	11.47	84.05	65.64	8.558E+04
8.	4.262	73.23	4965.51	14.71	83.53	62.53	1.316E+05
9.	4.287	74.23	4966.51	15.13	84.05	63.71	1.192E+05
10.	4.379	73.09	4962.95	12.71	83.00	62.98	1.263E+05

* * * END OF FILE * * *

CONVSEI 12-08-21 62:54



```
PROFIL                                    FILE: CONVSEI   12-08-21   62:54    ft
North Conveyor Area Seismic
    16       6
       .0     4955.0       40.0     4955.0   1
     40.0     4955.0       44.0     4956.0   1
     44.0     4956.0       74.0     4956.0   1
     74.0     4956.0       78.0     4955.0   1
     78.0     4955.0      150.0     4955.0   1
    150.0     4955.0      160.0     4955.0   1
    160.0     4955.0      160.1     4951.0   1
       .0     4951.0      160.1     4951.0   2
    160.1     4951.0      160.2     4941.0   2
       .0     4941.0      160.2     4941.0   3
    160.2     4941.0      160.3     4937.0   3
       .0     4937.0      160.3     4937.0   2
    160.3     4937.0      160.4     4925.0   2
       .0     4925.0      160.4     4925.0   4
    160.4     4925.0      160.5     4924.0   4
       .0     4924.0      160.5     4924.0   5
SOIL
  6
  114.0    126.0      50.0    28.00     .000        .0    1
  130.0    137.0        .0    35.00     .000        .0    1
  114.0    126.0      50.0    28.00     .000        .0    1
  124.0    134.0        .0    14.00     .000        .0    1
  124.0    134.0     100.0    28.00     .000        .0    1
  119.0    126.0      25.0    26.00     .000        .0    1
WATER
  1       62.40
     2
          .0      4942.0
       160.0      4942.0
EQUAKE
   .067     .000
LOADS
  2
        54.0        74.0       500.0          .0
        83.0        93.0       500.0          .0
CIRCL2
    20      20
     83.0       93.0       54.0       74.0
   4930.0        7.0       -5.0      -45.0
```

XSTABL File: CONVSEI   12-08-21   62:54

```
******************************************
*              X S T A B L               *
*                                        *
*        Slope Stability Analysis        *
*               using the                *
*            Method of Slices            *
*                                        *
*        Copyright (C) 1992 - 2002       *
*   Interactive Software Designs, Inc.   *
*        Moscow, ID 83843, U.S.A.        *
*                                        *
*          All Rights Reserved           *
*                                        *
*  Ver. 5.206                96 - 1952   *
******************************************
```

Problem Description : North Conveyor Area Seismic

SEGMENT BOUNDARY COORDINATES
----

6 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	4955.0	40.0	4955.0	1
2	40.0	4955.0	44.0	4956.0	1
3	44.0	4956.0	74.0	4956.0	1
4	74.0	4956.0	78.0	4955.0	1
5	78.0	4955.0	150.0	4955.0	1
6	150.0	4955.0	160.0	4955.0	1

10 SUBSURFACE boundary segments

Segment   x-left   y-left   x-right   y-right

```
Soil Unit
             No.      (ft)      (ft)       (ft)      (ft)
Below Segment

              1       160.0    4955.0      160.1    4951.0
1
              2          .0    4951.0      160.1    4951.0
2
              3       160.1    4951.0      160.2    4941.0
2
              4          .0    4941.0      160.2    4941.0
3
              5       160.2    4941.0      160.3    4937.0
3
              6          .0    4937.0      160.3    4937.0
2
              7       160.3    4937.0      160.4    4925.0
2
              8          .0    4925.0      160.4    4925.0
4
              9       160.4    4925.0      160.5    4924.0
4
             10          .0    4924.0      160.5    4924.0
5
```

```
          --------------------------
          ISOTROPIC Soil Parameters
          --------------------------

           6 Soil unit(s) specified

          Soil   Unit Weight   Cohesion  Friction    Pore
Pressure      Water
          Unit  Moist    Sat.  Intercept   Angle  Parameter
Constant  Surface
           No.  (pcf)   (pcf)    (psf)     (deg)      Ru
(psf)      No.

            1   114.0   126.0      50.0
28.00      .000         .0      1
            2   130.0   137.0        .0
35.00      .000         .0      1
            3   114.0   126.0      50.0
28.00      .000         .0      1
            4   124.0   134.0        .0
14.00      .000         .0      1
            5   124.0   134.0     100.0
28.00      .000         .0      1
            6   119.0   126.0      25.0
26.00      .000         .0      1
```

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	4942.00
2	160.00	4942.00

A horizontal earthquake loading coefficient
of .067 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

BOUNDARY LOADS
----

2 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	54.0	74.0	500.0	.0
2	83.0	93.0	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.

20 Surfaces initiate from each of 20 points equally spaced
along the ground surface between x = 83.0 ft
and x = 93.0 ft

Each surface terminates between x = 54.0 ft
and x = 74.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 4930.0 ft

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 := -5.0 degrees

****
** Factor of safety calculation for surface # 2 **
** failed to converge within FIFTY iterations **
** **

```
          **    The last calculated value of the FOS was  25.6625
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 25.6625) is defined by: xcenter =
81.73
      ycenter =   4972.10   Init. Pt. =     93.00   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #     3
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -99.6076
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-99.6076) is defined by: xcenter =
84.00
      ycenter =   4988.14   Init. Pt. =     93.00   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #     6
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 168.9250
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS=168.9250) is defined by: xcenter =
82.80
      ycenter =   4976.72   Init. Pt. =     93.00   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #     8
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was*********
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
83.15
      ycenter =   4979.69   Init. Pt. =     93.00   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    16
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -21.7026
**
          **    This will be ignored for final summary of results
**

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

Circular surface (FOS=-21.7026) is defined by: xcenter =
84.58
ycenter = 4987.12 Init. Pt. = 93.00 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 19
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -11.4507
**
** This will be ignored for final summary of results
**
****

Circular surface (FOS=-11.4507) is defined by: xcenter =
82.97
ycenter = 4960.19 Init. Pt. = 93.00 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 21
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -18.5791
**
** This will be ignored for final summary of results
**
****

Circular surface (FOS=-18.5791) is defined by: xcenter =
82.38
ycenter = 4960.57 Init. Pt. = 92.47 Seg. Length =
7.00

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

************************************************************
          **      Factor of safety calculation for surface #    23
**
          **      failed to converge within FIFTY iterations
**
          **
**
          **     The last calculated value of the FOS was 132.2947
**
          **     This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=132.2947) is defined by: xcenter =
82.14
      ycenter =   4971.45   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------------
--------

************************************************************
          **      Factor of safety calculation for surface #    35
**
          **      failed to converge within FIFTY iterations
**
          **
**
          **     The last calculated value of the FOS was*********
**
          **     This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
83.24
      ycenter =   4983.77   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------------
--------
```

```
*************************************************************
          **     Factor of safety calculation for surface #    37
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -31.1527
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-31.1527) is defined by: xcenter =
82.12
      ycenter =   4960.96   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    40
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -94.9390
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-94.9390) is defined by: xcenter =
82.49
      ycenter =   4971.54   Init. Pt. =     92.47   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    45
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.7822
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= -9.7822) is defined by: xcenter =
83.18
      ycenter =   4969.46   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    50
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -13.8099
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-13.8099) is defined by: xcenter =
82.39
      ycenter =   4961.68   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    54
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was-154.8900
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
81.47
      ycenter =   4960.68   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    55
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -15.7191
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-15.7191) is defined by: xcenter =
82.29
      ycenter =   4961.95   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    56
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -27.4385
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS=-27.4385) is defined by: xcenter =
81.94
      ycenter =   4962.40   Init. Pt. =     91.95   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    63
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -20.5845
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS=-20.5845) is defined by: xcenter =
83.55
      ycenter =   4983.84   Init. Pt. =     91.42   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #    65
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -8.6785
**
          **    This will be ignored for final summary of results
**

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

Circular surface (FOS= -8.6785) is defined by: xcenter = 82.55
ycenter = 4960.48 Init. Pt. = 91.42 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 70 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was -9.4549 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= -9.4549) is defined by: xcenter = 82.53
ycenter = 4962.50 Init. Pt. = 91.42 Seg. Length = 7.00

****
** Factor of safety calculation for surface # 72 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was -17.7511 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=-17.7511) is defined by: xcenter = 81.85
ycenter = 4960.69 Init. Pt. = 91.42 Seg. Length = 7.00

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

*************************************************************
          **     Factor of safety calculation for surface #    79
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -25.0479
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-25.0479) is defined by: xcenter =
81.65
      ycenter =   4961.06   Init. Pt. =     91.42   Seg. Length =
7.00
      -----------------------------------------------------------------
--------

*************************************************************
          **     Factor of safety calculation for surface #    81
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -33.5991
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-33.5991) is defined by: xcenter =
81.19
      ycenter =   4960.20   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------------
--------
```

```
*************************************************************
          **     Factor of safety calculation for surface #    85
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -59.3029
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-59.3029) is defined by: xcenter =
81.00
      ycenter =   4960.16   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    88
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -63.4378
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-63.4378) is defined by: xcenter =
81.37
      ycenter =   4964.97   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    95
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.6079
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= -5.6079) is defined by: xcenter =
82.65
      ycenter =   4964.44   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    96
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -20.9915
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS=-20.9915) is defined by: xcenter =
82.32
      ycenter =   4972.60   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #    97
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was 545.1580
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=545.1580) is defined by: xcenter =
80.84
      ycenter =   4962.63   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   100
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-569.9694
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
80.77
      ycenter =   4960.52   Init. Pt. =     90.89   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   102
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -30.4013
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS=-30.4013) is defined by: xcenter =
81.01
      ycenter =   4960.49   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   104
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -23.6176
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-23.6176) is defined by: xcenter =
82.60
      ycenter =   4979.68   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   106
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-115.0629
**
          **    This will be ignored for final summary of results
**

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

```
      Circular surface (FOS=********) is defined by: xcenter =
81.44
      ycenter =   4969.98   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   110
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  28.8068
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 28.8068) is defined by: xcenter =
79.87
      ycenter =   4960.58   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   111
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  23.5574
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS= 23.5574) is defined by: xcenter =
81.90
      ycenter =   4990.61   Init. Pt. =     90.37   Seg. Length =
7.00
```

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

*************************************************************
          **     Factor of safety calculation for surface #   112
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.6263
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= -7.6263) is defined by: xcenter =
82.00
      ycenter =   4963.45   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------

*************************************************************
          **     Factor of safety calculation for surface #   113
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  40.1552
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= 40.1552) is defined by: xcenter =
80.69
      ycenter =   4967.06   Init. Pt. =     90.37   Seg. Length =
7.00
      ------------------------------------------------------------
--------
```

```
************************************************************
          **     Factor of safety calculation for surface #   114
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  49.8032
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS= 49.8032) is defined by: xcenter =
82.22
      ycenter =   4987.15   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   115
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -61.9946
**
          **    This will be ignored for final summary of results
**

************************************************************


      Circular surface (FOS=-61.9946) is defined by: xcenter =
81.25
      ycenter =   4965.30   Init. Pt. =     90.37   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   125
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was-136.8815
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
81.30
      ycenter =   4972.19   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   133
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was 107.2427
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=107.2427) is defined by: xcenter =
82.74
      ycenter =   4992.92   Init. Pt. =     89.84   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   136
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

** The last calculated value of the FOS was -6.4988
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS= -6.4988) is defined by: xcenter =
81.99
ycenter = 4966.40 Init. Pt. = 89.84 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 138
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was 40.2756
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS= 40.2756) is defined by: xcenter =
79.82
ycenter = 4960.88 Init. Pt. = 89.84 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 148
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was -5.7276
**
** This will be ignored for final summary of results
**

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

      Circular surface (FOS= -5.7276) is defined by: xcenter =
81.43
      ycenter =   4961.62   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


***************************************************************
          **     Factor of safety calculation for surface #   158
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -9.8860
**
          **    This will be ignored for final summary of results
**

***************************************************************

      Circular surface (FOS= -9.8860) is defined by: xcenter =
81.20
      ycenter =   4964.20   Init. Pt. =     89.32   Seg. Length =
7.00
      ------------------------------------------------------------
--------


***************************************************************
          **     Factor of safety calculation for surface #   159
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -17.6853
**
          **    This will be ignored for final summary of results
**

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

Circular surface (FOS=-17.6853) is defined by: xcenter =
80.84
ycenter = 4961.06 Init. Pt. = 89.32 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 160
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was 194.5803
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS=194.5803) is defined by: xcenter =
80.01
ycenter = 4960.72 Init. Pt. = 89.32 Seg. Length =
7.00

****
** Factor of safety calculation for surface # 161
**
** failed to converge within FIFTY iterations
**
**
**
** The last calculated value of the FOS was 37.9370
**
** This will be ignored for final summary of results
**

****

Circular surface (FOS= 37.9370) is defined by: xcenter =
79.68
ycenter = 4961.96 Init. Pt. = 88.79 Seg. Length =
7.00

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


*************************************************************
          **     Factor of safety calculation for surface #   162
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  53.2161
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 53.2161) is defined by: xcenter =
79.78
      ycenter =   4961.60   Init. Pt. =     88.79   Seg. Length =
7.00
      ----------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   164
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  91.1507
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 91.1507) is defined by: xcenter =
80.87
      ycenter =   4970.37   Init. Pt. =     88.79   Seg. Length =
7.00
      ----------------------------------------------------------------
--------
```

```
*************************************************************
          **     Factor of safety calculation for surface #   167
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -24.4608
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS=-24.4608) is defined by: xcenter =
80.84
      ycenter =   4965.74   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   170
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  32.4792
**
          **    This will be ignored for final summary of results
**

*************************************************************


      Circular surface (FOS= 32.4792) is defined by: xcenter =
79.24
      ycenter =   4960.19   Init. Pt. =     88.79   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   182
**
```

```
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -5.6056
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= -5.6056) is defined by: xcenter =
81.08
      ycenter =   4962.03   Init. Pt. =     88.26   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   188
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  40.0811
**
          **    This will be ignored for final summary of results
**
*************************************************************

      Circular surface (FOS= 40.0811) is defined by: xcenter =
80.32
      ycenter =   4966.33   Init. Pt. =     88.26   Seg. Length =
7.00
      -----------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   190
**
          **     failed to converge within FIFTY iterations
**
          **
**
```

```
          **    The last calculated value of the FOS was -17.1558
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=-17.1558) is defined by: xcenter =
81.00
      ycenter =   4966.25   Init. Pt. =     88.26   Seg. Length =
7.00
      ------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   213
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was1458.1360
**
          **    This will be ignored for final summary of results
**

*************************************************************

      Circular surface (FOS=********) is defined by: xcenter =
79.85
      ycenter =   4961.31   Init. Pt. =     87.74   Seg. Length =
7.00
      ------------------------------------------------------------
--------


*************************************************************
          **     Factor of safety calculation for surface #   216
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was -63.5938
**
          **    This will be ignored for final summary of results
**
```

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

      Circular surface (FOS=-63.5938) is defined by: xcenter =
80.00
      ycenter =   4961.54   Init. Pt. =     87.74   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   217
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  -7.5062
**
          **    This will be ignored for final summary of results
**

************************************************************

      Circular surface (FOS= -7.5062) is defined by: xcenter =
80.66
      ycenter =   4961.36   Init. Pt. =     87.74   Seg. Length =
7.00
      -----------------------------------------------------------
--------


************************************************************
          **     Factor of safety calculation for surface #   251
**
          **     failed to converge within FIFTY iterations
**
          **
**
          **    The last calculated value of the FOS was  24.1885
**
          **    This will be ignored for final summary of results
**

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

Circular surface (FOS= 24.1885) is defined by: xcenter = 80.86
ycenter = 4974.63 Init. Pt. = 86.68 Seg. Length = 7.00

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	83.00	4955.00
2	76.31	4952.95
3	69.38	4953.95
4	66.30	4956.00

**** Simplified BISHOP FOS = 2.902 ****

****

** **

** Out of the 400 surfaces generated and analyzed by XSTABL, **

** 57 surfaces were found to have MISLEADING FOS values. **

** **

****

The following is a summary of the TEN most critical surfaces

Problem Description : North Conveyor Area 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.	2.902	75.08	4968.88	15.98	83.00	66.30	7.458E+04
2.	2.903	74.23	4964.01	12.58	83.00	64.75	8.357E+04
3.	3.097	73.66	4963.84	12.86	83.00	63.72	9.901E+04
4.	3.182	75.89	4970.45	17.23	83.53	67.17	7.347E+04
5.	3.184	74.44	4963.66	12.56	83.53	64.59	9.236E+04
6.	3.320	75.14	4972.15	19.09	83.53	65.49	9.732E+04
7.	3.408	75.19	4962.27	11.47	84.05	65.64	8.529E+04
8.	3.550	73.23	4965.51	14.71	83.53	62.53	1.311E+05
9.	3.585	74.23	4966.51	15.13	84.05	63.71	1.188E+05
10.	3.689	73.09	4962.95	12.71	83.00	62.98	1.258E+05

* * * END OF FILE * * *