BURNCO Colorado LLC
10100 Dallas Street
Henderson, CO
80640

Phone: 970 356 7523
burnco.com

April 11, 2025

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

RE: Nissen Permit M2003-001 – AM01 Adequacy Review-2 Response

Dear Ms. Gagnon:

This letter is BURNCO's response to the preliminary adequacy review-2 dated April 8, 2025, for the Nissen Mine Amendment AM1. The italicized items are the DRMS comment, and the bold text are the BURNCO responses:

6. The Mining Plan states material mined will be transported by conveyor or haul truck to the processing area in the amendment area. This will require crossing an irrigation ditch owned by the Plumb Irrigation Company. Please update the mine plan to describe any necessary improvements to the existing gravel road along the west side of the amendment area and the bridge crossing the ditch.

BURNCO: See Attachment 6 for Exhibit D that has been updated to address these items. See item #5 above for details. BURNCO has been in discussions with the Plumb Irrigation Company to execute a conveyor crossing agreement which we expect to be completed by March 31, 2025.

Additional Comment: *Please submit a copy of the executed conveyor crossing agreement to the Division.*

BURNCO: BURNCO has been in contact with the Plumb Irrigation Company and is awaiting a draft agreement from them. BURNCO will not construct the ditch conveyor crossing until an agreement with the ditch company is executed.

Rule 6.4.19 Exhibit S – Permanent Man-Made Structures

Where the affected lands are within two hundred (200) feet of any significant, valuable, and permanent man-made structure, the applicant shall provide a notarized agreement between the applicant and the person(s) having an interest in the structure.

BURNCO: See Attachment 3 for the Proof of Mailing of Structure Agreements to the structure owners within 200 feet of the affected area. Mr. Borys is the only structure owner to return the executed structure agreement, and his agreement is included in Attachment 3. The concrete irrigation channel (e. above) is a private lateral. The Tricycle Lane parcel has been "dried up" and the lateral filled with dirt in order to

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prevent its use where the lateral enters the Tricycle Lane parcel from the west. The site will not be mined therefore no negative impacts due to mining will occur to structures surrounding the amendment parcel. A 2023 slope stability report showing no negative impacts to surrounding structures has been performed on the original permit boundary and was included in the original application submittal.

Additional Comment: *The Division acknowledges the referenced 2023 Slope Stability report submitted for the Succession of Operator application (SO3) which transferred the permit from Bestway to Burnco. The report addressed the existing permit area, however, it does not address all of the structures within 200 feet of the proposed amendment area. Therefore, per Rule 6.4.19(b), please provide an engineering evaluation that demonstrates that all structures within 200 feet of the affected lands shall not be damaged by activities at the mining operation.*

BURNCO: See Attachment A for a revised Slope Stability Analysis dated April 9, 2025 that also addresses the structures within 200 ft of the amendment AM1 area. This area will not be mined, however processing, stockpiling and loaders and haul trucks will be active in the amendment AM1 area. The site poses no risk to surrounding structures as the excavation will be two (2) feet or less.

Finally, regarding your email dated 4/9/2025, Exhibit M has been revised to reflect that the air permit is currently under revision to incorporate the revised permit boundary. The application was submitted in September 2024 in conjunction with the DRMS submittal. See Attachment B for the revised Exhibit M.

Sincerely,

Joel Bolduc

Joel Bolduc
BURNCO Colorado, LLC
US Land and Resource Manager
Phone: 303-913-6583
Email: joel.bolduc@burnco.com

Attachment A – April 9, 2025 Stability Analysis

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Attachment A

April 9, 2025 Stability Analysis

April 9, 2025

Mr. Joel Bolduc
Land and Resource Manager
BURNCO, LLC
10100 Dallas Street
Henderson, CO 80640

Re: Stability Analyses, Nissen Farms Gravel Mine (DRMS Permit No. M-2003-001), Weld County, Colorado, Amendment , Adequacy Review 2

Dear Mr. Bolduc:

This stability analyses letter has been prepared in support of Amendment AM1 for the Nissen Gravel Mine and to meet 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). This letter describes the project and slope stability analyses utilized to evaluate the minimum distance between the permit boundary and adjacent structures to avoid damage to the structure.

The site is located in the South Platte River Valley upstream of its confluence with the Cache La Poudre River, east of Greeley, Colorado, along Weld County Parkway. More specifically, the site occupies 134 acres in the South Half of Section 12, Township 5 North, Range 65 West of the 6th Principal Meridian. Amendment AM1 proposes to add 27 acres south of the site for a plant processing area (no mining).

PREVIOUS STABILITY ANALYSES and REVISED MINE PLAN

Previous stability analyses were performed when the mine was originally permitted. The previous analyses are presented in Attachment A. The previous analyses modeled a 46-foot high, vertical high wall located 55-feet interior to the site slurry wall with the nearest structure (not owned by the miner) 20-feet exterior to the slurry wall. The previous analyses also modeled unmined areas interior to the slurry wall which provided access to site oil/gas wells, associated pipe lines and related oil/gas facilities. These interior wells have been plugged and abandoned and the related gas/oil infrastructure facilities have been removed from the site.

As a result of the removal of these interior structures, BURNCO LLC. (BURNCO) plans to mine the site as one cell to be reclaimed as a reservoir. Exterior mine slopes will be mined at slope of 3 horizontal to 1 vertical (3h:1v) with a mine limit 20 feet from the slurry wall. The stability analyses discussed herein (Attachment B) show that known structures within 200-feet of the mine limit will be stable.

GEOLOGY

The Mine Site is located in the alluvial valley of the South Platte River. Regional geologic mapping at the site (Smith, et al, 1972) indicates the mine lies on the recent alluvial terrace of the South Platte River. Other regional geologic mapping approximately 3,000 feet west of the site (Colton, 1978) indicates this terrace corresponds with the Post Piney Creek Alluvium. The mapping indicates the bedrock underlying the alluvium is most likely claystone, sandstones, siltstones, and possibly coal of the Laramie Formation.

GEOTECHNICAL CONDITIONS

Data for these analyses were extracted from eight (8) exploratory borings drilled at the site in January 2000 by Terracon (2000). For reference a test Boring Map showing the boring locations with corresponding overburden and sand and gravel thickness is included as part of the original analyses in Attachment A. The Terracon logs indicate that the general subsurface profile across the site consists of approximately two (2) to five (5) of overburden silty sand overlying

approximately 34.5 to 44 feet of sand and gravel on top of claystone bedrock. The logs indicate the borings encountered approximately one and a half (1.5) to seven (7) feet of weathered claystone. However, the bedrock was not sampled and was presumably logged from cuttings. Based on our experience and observations made during construction of the slurry wall, the bedrock weathered zones tend not to exceed three feet. In addition, sandy clay overburden was encountered during slurry wall construction. The total thickness of the alluvial deposit ranged from approximately 34.5 to 46 feet. Groundwater was encountered in the borings at depths ranging from approximately four (4) to twelve (12) feet below the ground surface.

From a geotechnical standpoint, the sand and gravel make up most of the mine slope. The sand and gravel are generally strong and stable when dewatered.

STRUCTURES WITH 200 FEET OF DISTURBED AREAS

The known, permanent, man-made structures within 200 feet of the proposed mine limits that are not owned by the miner are listed below.

1. The Plumb Ditch on the south and east parts of the mine. This ditch is approximately 40 feet from the mine limits at its closest point on the southwest part of the mine.
2. Fences encroaching to within approximately 40 feet from the mine limits.
3. An unnamed ditch approximately 45 feet from the mine limit on the southeast part of the mine.
4. A water turn-out structure on the south part of the site approximately 40 feet from the mine limits.
5. Farm buildings southwest of the mine (Borys property) approximately 180 feet from the mine limit.
6. Weld County Parkway approximately 125 feet southwest of the mine limit.
7. A gas line approximately 45 feet to the east of the mine limit. This gas line may be abandoned following the plugging and abandonment of area gas/oil wells.
8. An unnamed ditch approximately 45 feet east of the mine limit.
9. A farm road approximately 45 feet from the north mine limit.
10. Overhead utility lines approximately 45 feet from the north mine limit.
11. A farm road approximately 50 feet from the west mine limit.

These structures are closest to the planned mine limits and will be stable per the stability analyses described herein. All other known structures are at greater distances and, therefore, will also be stable.

STABILITY ANALYSES

Division of Reclamation and Mining Safety (DRMS) drafted a policy regarding stability analyses of neighboring structures. The policy summarizes adequate factors of safety (FOS) for non-critical and critical structures. Most of the structures at the Nissen Farms Mine are considered critical structures. The FOS are for both static and seismic (ground accelerations from an earthquake) stability analyses are listed in the DRMS policy. For generalized strength assumptions and critical structures, an FOS of 1.5 is considered sufficient for static conditions and an FOS of 1.3 is considered suitable for seismic conditions.

The stability of structures within 200 feet of the proposed mining limits was evaluated at the most critical representative section under anticipated loading conditions as discussed below. The GALENA computer program was used for the analysis. The method for selecting the critical failure surface for each analyzed loading condition was the following. The Simplified Bishop's Method of Analysis was used to find the critical failure surface by randomly searching 22,001 trial failure circles over a broad range of the slope surface and at the structure in question to evaluate the lowest FOS. Both static stability under anticipated mining conditions and seismic stability under peak ground acceleration (PGA) loads were performed. Seismic loading was obtained from the U.S.G.S. Unified Hazard Tool attached to this report. Review of the Hazard Tool indicated a maximum horizontal acceleration of 0.0715g with a return period of 2,475 years for the site.

The most critical cross section location was selected and analyzed as described below.

- Plumb Ditch Section: This section is on the southwest corner of the mine where the Plumb Ditch is at its closest (~40 feet) to the mine limit. This section was conservatively analyzed with five (5) feet of sandy clay overburden overlying forty-one (41) feet of sand and gravel on top of claystone bedrock. A low permeability slurry wall is modelled 20 feet from the mine limit. The top three (3) feet of the claystone was modelled at residual strength reflecting the weathered nature at the top of the claystone. Unweathered claystone was modelled below the top 3 feet. This section was modeled for static conditions, static with a surcharge load, seismic conditions, and seismic with a surcharge load. As discussed below, all FOS required by the DRMS were met. The surcharge load modelled was a 10-foot high stockpile with a contact pressure of 1,200 pounds per square foot (psf).

- Amendment 1 Area – Tricycle Lane Property (TLP). The TLP area will have the topsoil stripped, which will be approximately one to two feet. The site poses no risk to surrounding structures as the excavation will be two (2) feet or less.

MATERIAL PROPERTIES

The material index and engineering strengths assumed in this slope stability report are discussed below.

Overburden

The strength properties for the in-situ overburden were based on our experience at similar sites and engineering judgment; the following parameters have been used to model the overburden.

Unit Weight (pcf)	*Cohesion C' psf*	*Friction Angle Φ'°*
114	50	26

Alluvial Sand and Gravel

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

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

Bedrock

Bedrock below the alluvium is claystone and sandstone. We conservatively modeled Claystone because it is weaker than sandstone. 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 because 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 site investigations, the residual strength claystone was modeled in a 3-foot thick, weathered layer overlying the peak strength bedrock as follows:

Unit Weight (pcf)	*Cohesion C' psf*	*Friction Angle Φ' °*
Peak = 124 Residual = 110	Peak = 100 Residual = 0	Peak = 26 Residual = 14

Soil-Bentonite Slurry Wall

The proposed slurry wall will consist of a mix of the overburden, alluvial sand, and imported bentonite. The resulting mix will produce a non-Newtonian fluid with some shear strength characteristics based on a reduced friction angle of the overlying overburden. Based on engineering judgment, we modeled the slurry wall as follows:

Unit Weight (pcf)	*Cohesion C' psf*	*Friction Angle Φ' °*
110	0	0

STABILITY ANALYSES RESULTS

The stability analyses assumed the mining will be per the mine plan. The plan includes dry mining in the mine cell as the water level in these cells are controlled by slurry walls. Exterior mine slopes in the slurry wall lined cells will not exceed 3h:1v.

Setbacks listed in Table 1 (below) indicate the setback from the structure to the mining limits.

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

TABLE 1 - SLOPE STABILITY RESULTS AND SETBACKS

Section	Location	Critical Structure	Structure Setback From Mine Limit (ft)	Static Factor of Safety at Structure	Seismic Factor of Safety at Structure (0.072g horizontal)	DRMS Draft FOS Requirement Static/Seismic
1	Mine Cell with slurry wall (20', 3h:1v)	Plumb Ditch	40	1.98	1.54	1.5/1.3
1	Mine Cell with slurry wall (20', 3h:1v) and 1,200 psf surcharge	Plumb Ditch	40	1.89	1.50	1.5/1.3

CONCLUSIONS

The Plumb Ditch is the nearest structure to the mine and is stable based on the Factors of Safety listed in the table above. The Plumb Ditch section analyzed was under conservative conditions. All other structures in the area are located at or at greater the 40-feet from the mine limit. Factors of Safety on other neighboring structures will be greater than those summarized in the Table above.

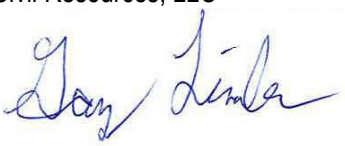
LIMITATIONS

Our review is based on regional geologic mapping, present mining plans, and borehole data by others. Stability analyses were performed using typical strength parameters for the various strata in the critical sections. Should the mining plans change or subsurface conditions vary from those portrayed in this letter, we should be contacted in order to re-evaluate the potential affects on permanent man-made structures. Stability analyses were run at the structure in question and were not on failure surfaces closer to the mine limit.

Please call with any questions or comments.

Sincerely,

Civil Resources, LLC



Gary Linden, P.G.
Senior Engineering Geologist

Attachments:

Attachment A Tetra Tech RMC Stability Analyses, March 21, 2003

Attachment B U.S.G.S. Uniform Hazard Tool Earthquake Acceleration and Galena Model Outputs

REFERENCES

Colton, R.B., 1978, "Geologic Map of the Boulder-Fort Collins-Greeley Area, Colorado," U.S.G.S. Map I-855G.

Smith, Schneider, and Petri, "Groundwater, South Platte River Basin," U.S.G.S. Water Supply Paper 1658.

Terracon, 2000, "Geotechnical Engineering Report, Gravel Exploration East 18th Street, Greeley, Colorado," Terracon Project No. 21995159.


Holly Ave
South Platte River
South Platte River
Nissen
CRITICAL SECTION
AM1 AREA (TLP), 1 TO 2 FEET OF EXCAVATION
58
58
58
Google Earth
2000 ft
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Attachment A
2003 Stability Analyses

TETRA TECH RMC

March 21, 2003

Mr. Jeff Gregg
Hall-Irwin Corporation
P.O. Box 2150
Greeley, Colorado 80632

Re: Hall-Irwin Corporation, Nissen Farms, Weld County, Colorado, Stability Analysis as Required by the Division of Minerals and Geology for Permanent Structures Within 200 Feet of the Mined Area; Tetra Tech RMC Job No. 80-0636.141.00

Dear Mr. Gregg:

This letter has been prepared to address Mine 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 Nissen Farms aggregate mine.

The proposed mine will occupy 89 acres in the South Half of Section 12, Township 5 North, Range 65 West of the 6th Principal Meridian in Weld County, Colorado. The site is in the alluvial valley of the South Platte River near its confluence with the Cache la Poudre River. The South Platte River meanders around the west and north sides of the proposed mine. Weld County Road 58 is south of the mine. Land use in the area is mostly agricultural and rural residential. Numerous gas wells are also present in the area.

The Mining Plan (attached for reference) for the project is to mine the site in a total of six phases ranging from approximately 5.9 to 21.3 acres in size. A slurry wall will be constructed around the mine perimeter. The mine will be reclaimed as three ponds, all within the slurry wall perimeter. Certain interior parts of the mine will not be mined in order to leave access for vehicles and pipelines to site gas wells and tank batteries. For our analyses, we have assumed that the mine highwalls on the perimeter of each pond will be vertical. Actual highwalls will likely be less than, but near vertical. Overburden stockpiles may be placed 10 feet from the perimeter of the mined areas.

GEOLOGIC STRATA

The mine site is located in the alluvial valley of the South Platte River. Geologic mapping at the site (Smith, et al., 1972)[1] indicates the mine is on the recent alluvial terrace of the South Platte River.

[1] Smith, Schneider, and Petri, 1967, "*Groundwater, South Platte River Basin*," USGS Water Supply Paper 1658.

1900 S. Sunset Street, Suite 1-F, Longmont, CO 80501
Tel 303.772.5282 Fax 303.665.6959
www.ttrmc.com

Geologic mapping approximately 3,000 feet west of the site by Colton (1978)[2] indicates this terrace corresponds with the Post Piney Creek Alluvium. The mapping indicates the bedrock underlying the alluvium is most likely claystones, sandstones, and possibly coal of the Laramie Formation.

Data for this analysis was extracted from eight exploratory borings drilled at the site in January 2000 by Terracon (2000).[3] For reference we have attached a Test Boring Map showing boring locations with corresponding overburden and sand and gravel thickness. The logs indicate that the general subsurface profile consists of approximately two to five feet of overburden silty sand overlying approximately 34.5 to 44 feet of sand and gravel on top of claystone bedrock. The logs indicate the borings encountered approximately one and one half to seven feet of weathered claystone. However, the bedrock was not sampled and was presumably logged from cuttings. Based on our experience, we expect local sandy clay overburden will also be encountered at the site. The total thickness of the alluvial deposit encountered in the borings ranges from approximately 37 to 46 feet. Groundwater depths in the mine area at the time of drilling ranged from approximately four to 12 feet below the ground surface.

From a geotechnical standpoint, the sand and gravel will form most of the mine slope. These soils are generally strong and stable, particularly when dewatered.

STRUCTURES WITH 200 FEET OF DISTURBED AREAS

Structures in the area and at the site are ditches, Weld County Road 58, and gas wells with associated pipelines and tank batteries. Some of the gas wells, tank batteries, and gas lines are within the mine area perimeter. Mining will not encroach within 75 feet of these structures before Hall-Irwin enters into agreements with the owners of these structures regarding future use and possible relocation.

All known, permanent, man-made structures within 200 feet of the mined area are listed below:

- Two gas wells, three tank batteries, and associated pipelines and access roads within the mine perimeter near Phases 1, 2, 3, and 4. All of these structures will be located on berms between the mine phases with minimum setbacks of 75 feet from actual mining.
- Gas pipeline approximately 90 feet to the east of the mine.
- The Plumb irrigation ditch approximately 90 feet to the south of the mine at its closest point.
- A gas well approximately 130 feet southwest of the mine.
- A gas pipeline approximately 80 feet (at its closest point) southwest, west, northwest, and north of the mine.

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2 Colton, R.B., 1978, "*Geologic Map of the Boulder-Ft. Collins-Greeley Area, Colorado*," USGS Map I-855G.

3 Terracon, 2000, "*Geotechnical Engineering Report, Gravel Exploration East 18th Street, Greeley, Colorado*," Terracon Project No. 21995159.

- A farm/gas well access road approximately 95 feet (at its closest point) west, northwest, and north of the mine.
- Weld County Road 58 approximately 165 feet southwest of the mine.
- A gas well approximately 160 feet northwest of the mine.
- A tank battery approximately 130 feet northwest of the mine.
- A tank battery approximately 130 feet north of the mine.
- Farm buildings approximately 150 feet (at the closest point) southwest of the mine.
- An un-named ditch approximately 90 feet (at its closest point) south and east of the mine.

STABILITY ANALYSES

We performed stability analyses in order to evaluate potential for damage to existing permanent structures due to mine highwall slope failures. The scenarios modeled were along the mine perimeter with a slurry wall and on the mine interior berms (near Phases 1, 2, 3, and 4) without a slurry wall. Analyses were performed with the XSTABL computer program. We analyzed the most critical soil profile based on exploratory boring data and the mining plan. For this critical slope, we modeled five feet of sandy clay overlying 41 feet of sand and gravel on top of claystone. As required by the Colorado Division of Minerals and Geology (DMG) a vertical perimeter slope was modeled in the analysis. At the mine perimeter, slurry walls were modeled 55 feet from the top of the perimeter mine slope. In addition, a 20-foot construction buffer was incorporated between the slurry wall and nearby structures to allow sufficient space for slurry wall construction. For the interior berm profiles where no slurry wall is present, we modeled a 55-foot setback between the structure and the perimeter mine slope. Groundwater levels on the profiles were inputted to portray site dewatering when nearby ditches carry water. Both of the above-mentioned profiles were analyzed with and without a simulated stockpile surcharge. The surcharge was modeled 10 feet from the top of the mine highwall over a width of 20 feet with a surcharge pressure of 1,200 psf.

No laboratory strength tests were performed on soils at the site. The soil strength parameters used were based on typical values for the anticipated soils and our experience at other sites in the area. Weathered bedrock was analyzed at residual strength as required by the DMG. The inputted parameters were:

Material	*Moist Unit Weight (pcf)*	*Saturated Unit Weight (pcf)*	*Effective Cohesion (pcf)*	*Effective Friction Angle (degrees)*
Overburden silty sand/ sandy clay	114	126	50	26
Slurry walls	110	122	0	26
Sand and gravel	130	137	0	35
Bedrock	124	134	100	26
Weathered bedrock	110	122	0	14

Stability analyses were run on 400 randomly generated circles generated at the mine excavation and highwall, as well as the nearby permanent structure. The Simplified Bishop Method was used to estimate the factor of safety on the most critical surface. The modeling of the residual strength bedrock is conservative, thus the DMG considers a Factor of Safety of one or greater to be sufficient. Input files and graphic profiles of each analyses are attached.

Following are the four scenarios modeled and the resulting factors of safety:

- ***Scenario 1:*** This scenario was modeled to simulate conditions along the mine perimeter. The mine highwall was modeled as described above with the slurry wall 55 feet from the top of the mine slope and the Plumb Ditch another 20 feet beyond the slurry wall. The ground surface elevation rose beyond the ditch based on the site topographic survey. The resulting Factor of Safety at the ditch was 1.24.

- ***Scenario 2:*** This scenario was identical to Scenario 1 with the exception that the surcharge load simulating a stockpile was added 10 feet from the perimeter of the mine. The resulting load was on the resisting side of the failure circle resulting in a Factor of Safety at the ditch of 1.37.

- ***Scenario 3:*** This scenario was modeled to simulate conditions on the interior berms of the mine where gas wells, pipelines, tank batteries, and access roads will be present. In this scenario, no slurry wall was modeled and the failure surfaces were run from structures located 55 feet away from the mine highwall. The resultant Factor of Safety was 1.05.

- ***Scenario 4:*** This scenario was identical to Scenario 3 with the exception that a surcharge load was added to the analysis to simulate a stockpile 10 feet from the top of the highwall. Again the resultant load was on the resisting side of the failure circle and the resulting Factor of Safety at the structure was 1.16.

The mine plan incorporates minimum setbacks accounted for in our stability analysis. Based on our analysis, mining should not pose a hazard to nearby permanent structures.

LIMIATIONS

Our review is based on regional geologic mapping, present mining plans, bore hole data, and stability analyses using typical strength parameters for the various strata in the critical section. Should the mining plans change or subsurface conditions vary from those portrayed in this letter, we should be contacted in order to re-evaluate the potential affects on permanent man-made structures. Stability analyses were run at the structure in question and were not run on failure surfaces closer to the highwall. Factors of Safety at and closer to the highwall will be less than those calculated at the permanent man made structures.
Please call with any questions or comments.

Sincerely,

TETRA TECH RMC, INC.

Gary Linden, R.G.
Engineering Geologist

Attachments: Boring Locations and Subsurface Data (reduced 11x17)
Input Files and Graphic Profiles of Stability Analysis

cc: Danna Ortiz, Tetra Tech RMC (with Attachments)

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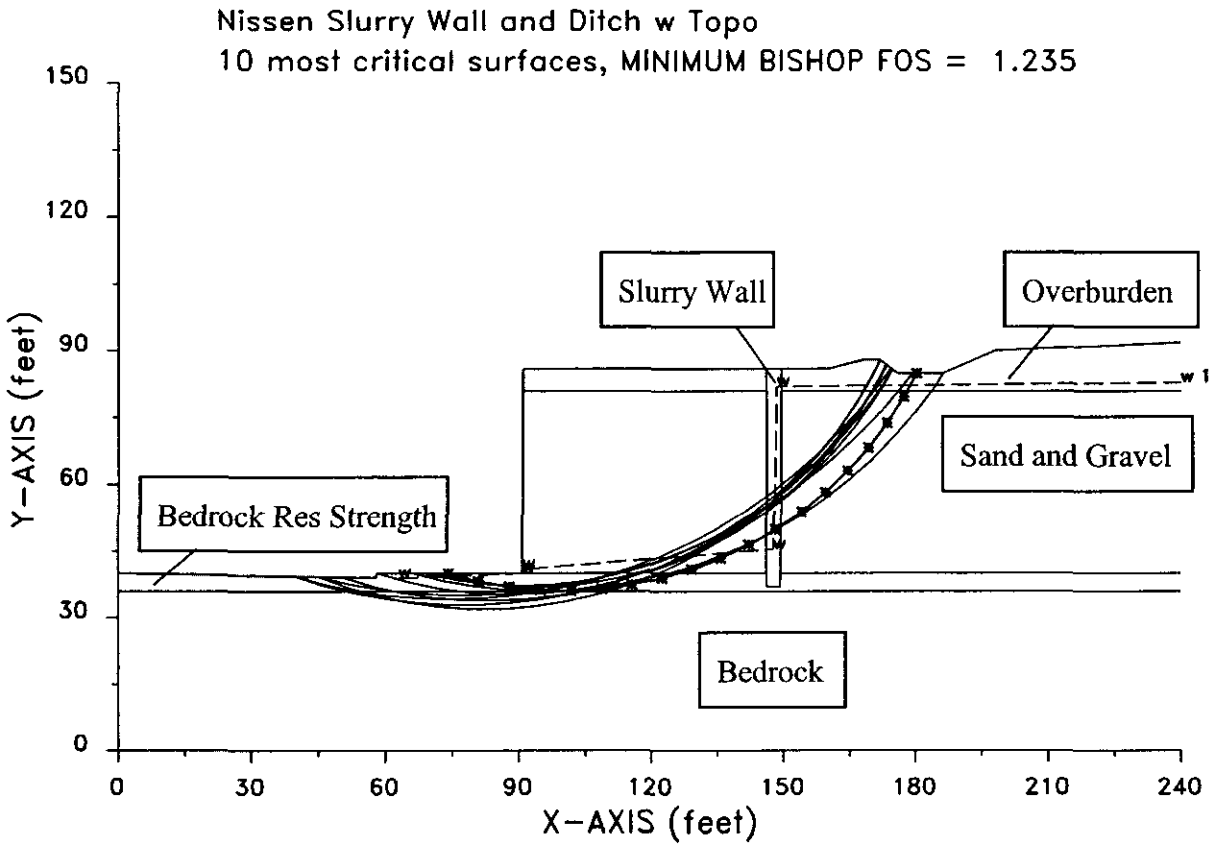

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168.0 88.0 172.0 88.0 1
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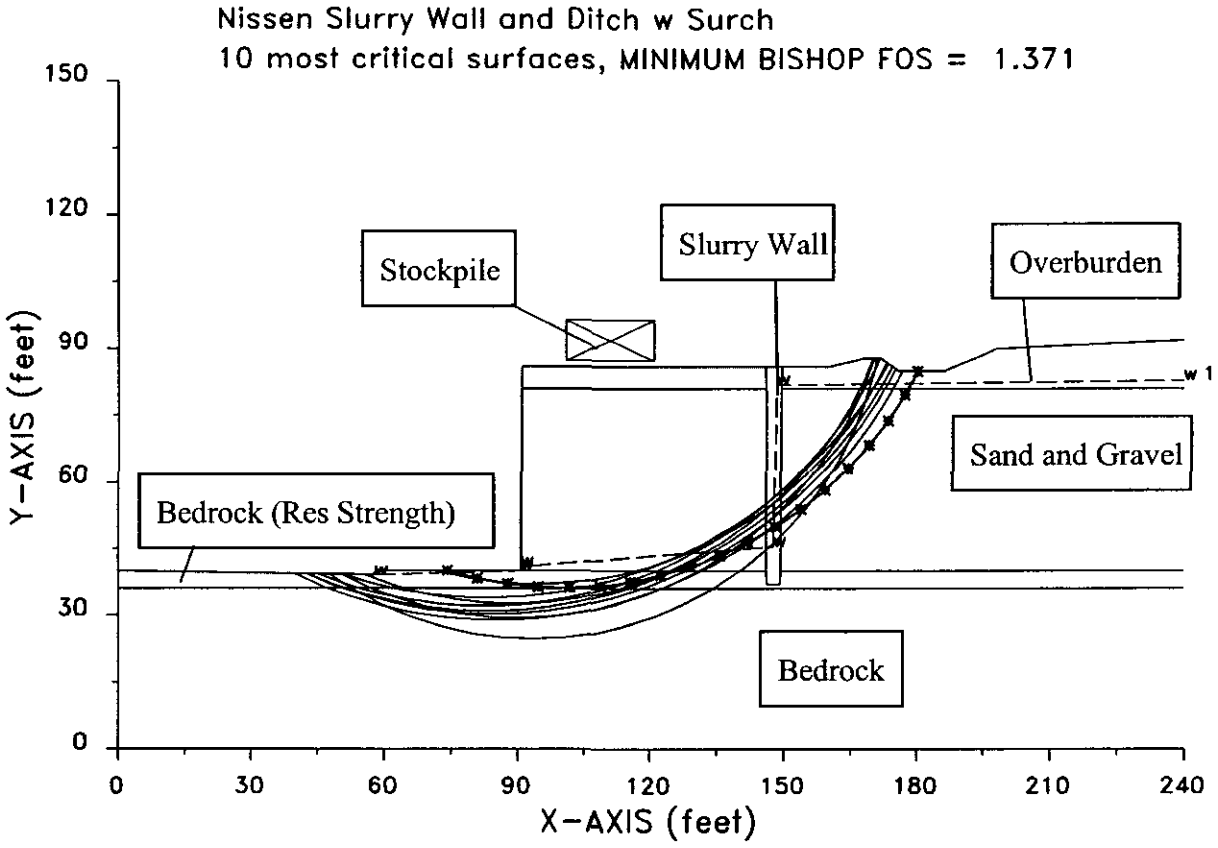

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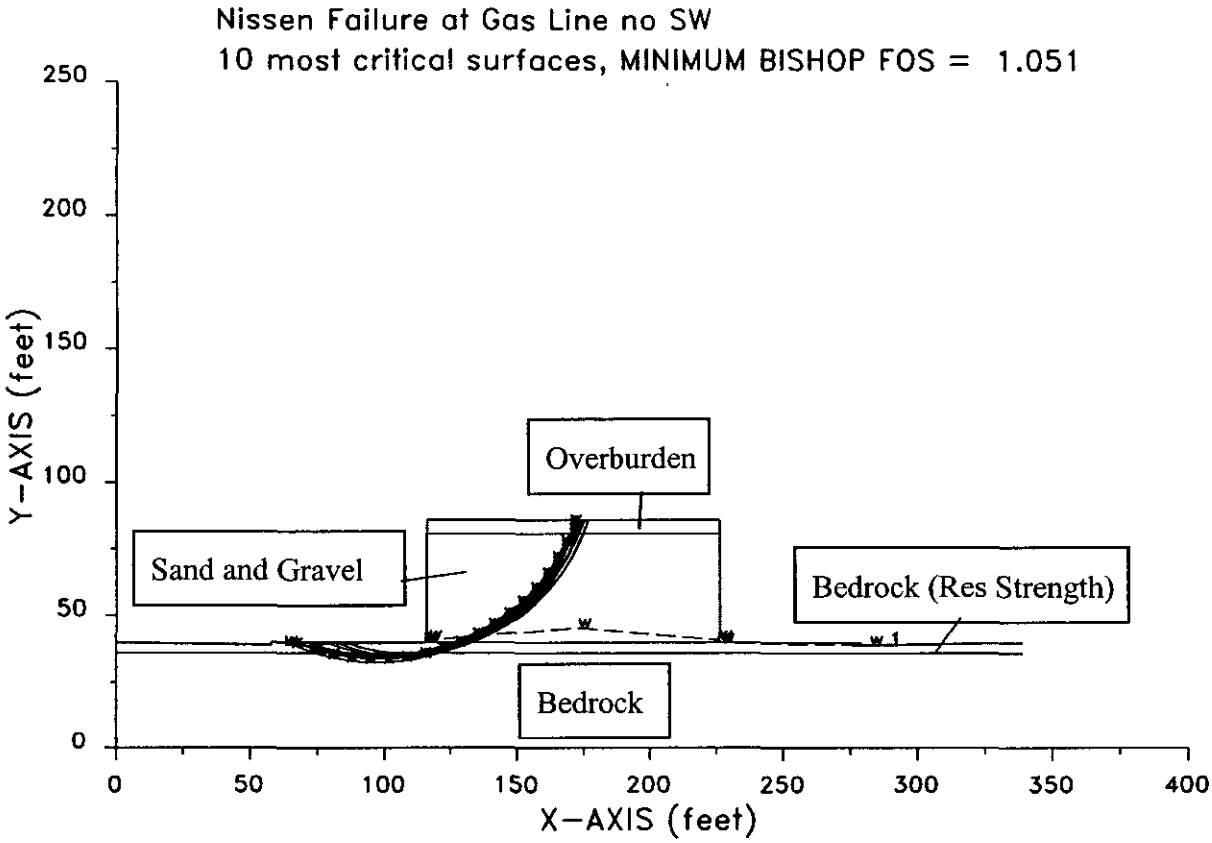
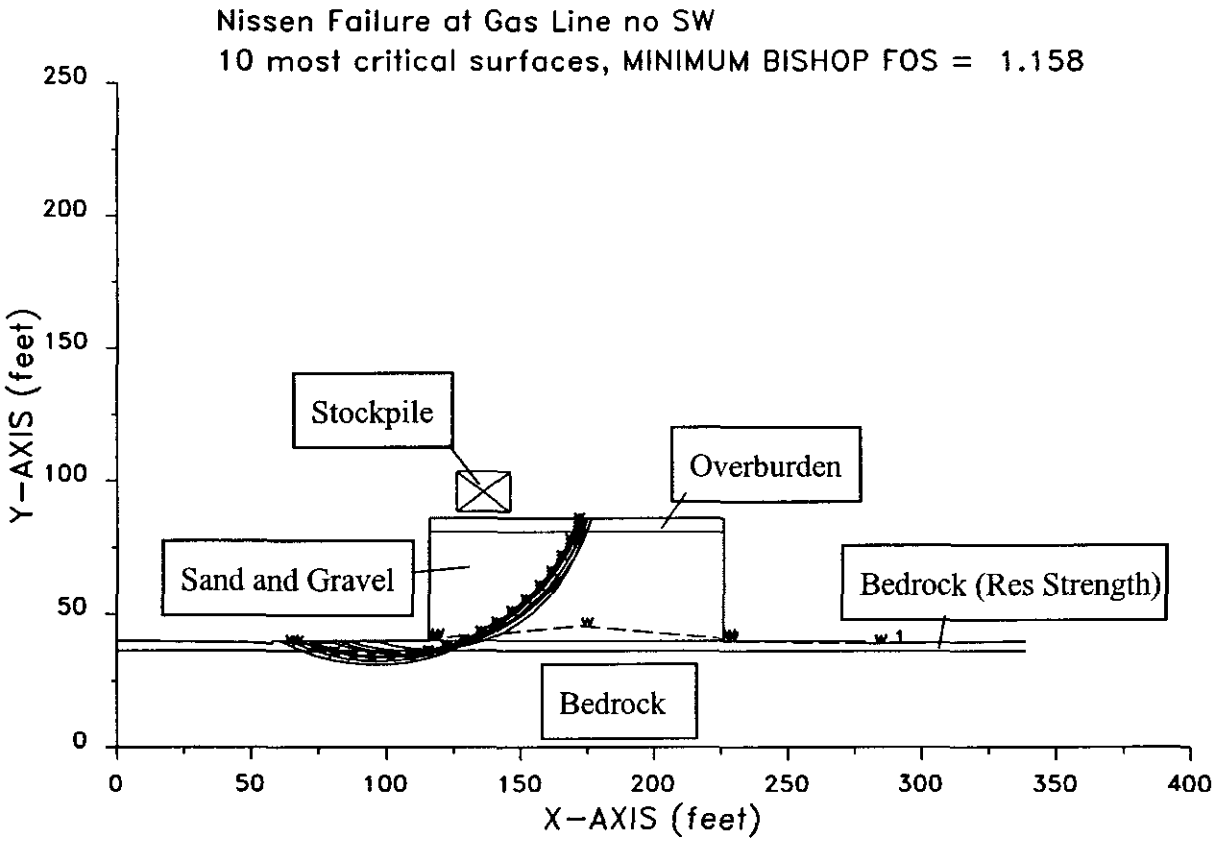
     91.0       86.0       146.0        86.0   1
    146.0       86.0       150.0        86.0   4
    150.0       86.0       160.0        86.0   1
    160.0       86.0       168.0        88.0   1
    168.0       88.0       172.0        88.0   1
    172.0       88.0       176.0        85.0   1
    176.0       85.0       186.0        85.0   1
    186.0       85.0       198.0        90.0   1
    198.0       90.0       240.0        92.0   1
    146.0       86.0       146.1        81.0   1
    146.1       81.0       146.2        40.0   2
    146.2       40.0       146.3        37.0   5
    146.3       37.0       149.3        37.0   5
    149.3       37.0       149.4        40.0   5
    149.4       40.0       149.5        81.0   2
    149.5       81.0       149.6        86.0   1
     90.9       81.0       146.1        81.0   2
    149.5       81.0       240.0        81.0   2
     90.8       40.0       146.2        40.0   5
    149.4       40.0       240.0        40.0   5
      .0        36.0       240.0        36.0   3
SOIL
  5
  114.0    126.0      50.0    26.00     .000        .0    1
  130.0    137.0       .0     35.00     .000        .0    1
  124.0    134.0     100.0    26.00     .000        .0    1
  110.0    122.0       .0     26.00     .000        .0    1
  110.0    122.0       .0     14.00     .000        .0    1
WATER
  1       62.40
     6
        58.0        39.0
        90.8        40.0
        90.9        41.0
       147.8        45.5
       148.5        82.0
       240.0        83.0
LOADS
  1
      101.0       121.0      1200.0        90.0
CIRCL2
    20       20
     40.0       90.0       170.0       190.0
       .0        7.0          .0          .0
```

GASNOSL4 3-21-** 11:31

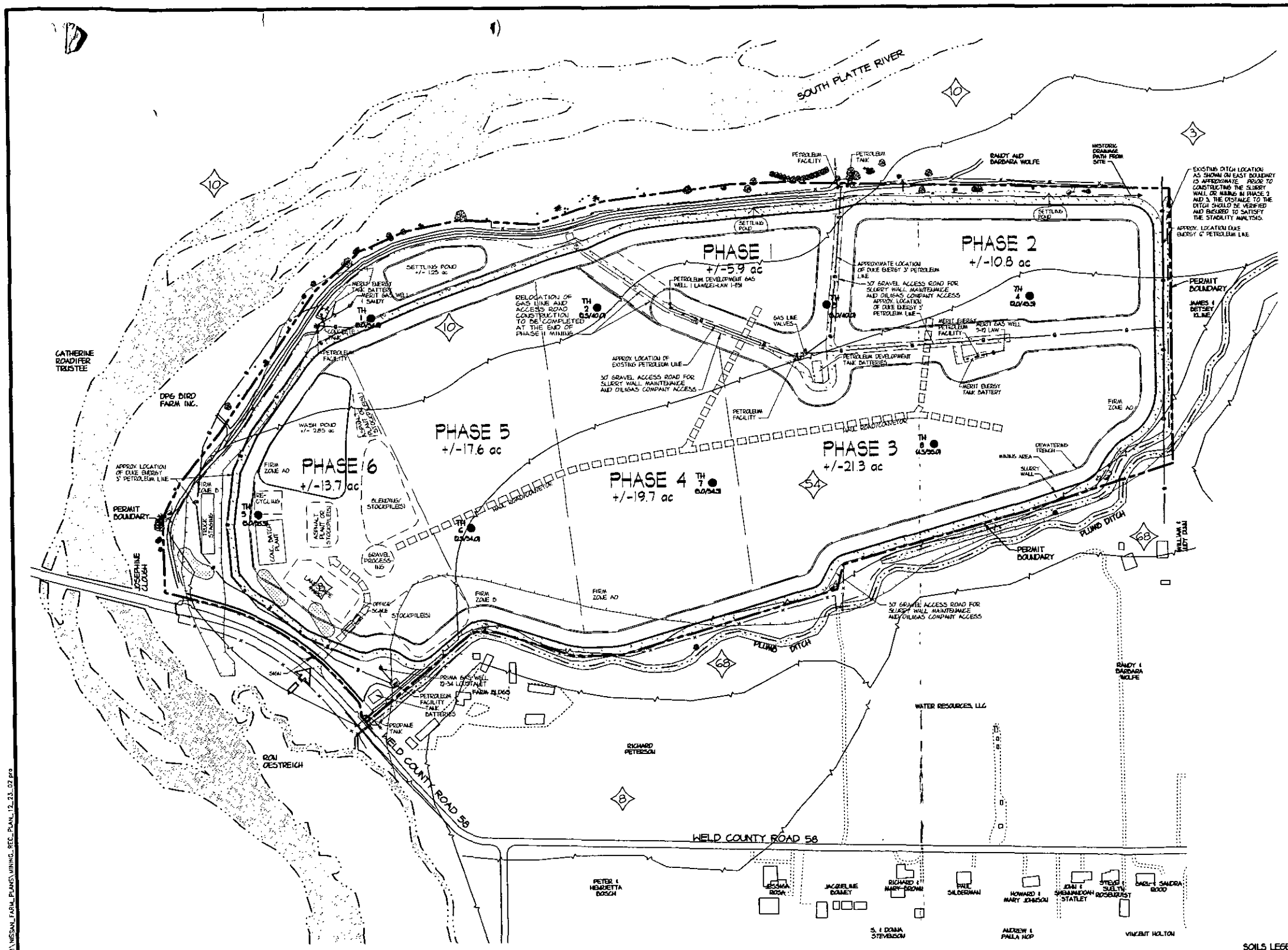


```
♠
PROFIL                                   FILE: GASNOSL4   3-21-**   11:31    ft
Nissen Failure at Gas Line no SW
    14      11
      .0       40.0       58.0       39.0   4
     58.0      39.0       58.1       40.0   4
     58.1      40.0      115.8       40.0   4
    115.8      40.0      115.9       81.0   2
    115.9      81.0      116.0       86.0   1
    116.0      86.0      226.0       86.0   1
    226.0      86.0      226.1       81.0   1
    226.1      81.0      226.2       40.0   2
    226.2      40.0      278.9       40.0   4
    278.9      40.0      279.0       39.0   4
    279.0      39.0      339.0       40.0   4
    115.9      81.0      226.1       81.0   2
    115.8      40.0      226.2       40.0   4
      .0       36.0      339.0       36.0   3
SOIL
  4
  114.0    126.0      50.0    26.00     .000        .0    1
  130.0    137.0       .0     35.00     .000        .0    1
  124.0    134.0     100.0    26.00     .000        .0    1
  110.0    122.0       .0     14.00     .000        .0    1
WATER
  1       62.40
    7
       63.0        39.0
      115.9        40.0
      116.9        41.0
      172.8        45.5
      226.1        41.0
      227.1        40.0
      282.6        39.0
CIRCL2
    20      20
     50.0      117.0      171.0      181.0
       .0        7.0         .0         .0
```

GASNOSL5 3-21-** 12:13



```
PROFIL                                   FILE: GASNOSL5   3-21-**   11:52     ft
Nissen Failure at Gas Line no SW
    14 ?    11
       .0        40.0        58.0        39.0    4
     58.0        39.0        58.1        40.0    4
     58.1        40.0       115.8        40.0    4
    115.8        40.0       115.9        81.0    2
    115.9        81.0       116.0        86.0    1
    116.0        86.0       226.0        86.0    1
    226.0        86.0       226.1        81.0    1
    226.1        81.0       226.2        40.0    2
    226.2        40.0       278.9        40.0    4
    278.9        40.0       279.0        39.0    4
    279.0        39.0       339.0        40.0    4
    115.9        81.0       226.1        81.0    2
    115.8        40.0       226.2        40.0    4
       .0        36.0       339.0        36.0    3
SOIL
  4
  114.0    126.0      50.0    26.00     .000        .0    1
  130.0    137.0       .0     35.00     .000        .0    1
  124.0    134.0     100.0    26.00     .000        .0    1
  110.0    122.0       .0     14.00     .000        .0    1
WATER
  1       62.40
    7
       63.0        39.0
      115.9        40.0
      116.9        41.0
      172.8        45.5
      226.1        41.0
      227.1        40.0
      282.6        39.0
LOADS
  1
      126.0       146.0      1200.0        90.0
CIRCL2
    20      20
     50.0      117.0      171.0      181.0
       .0        7.0         .0         .0
```



North

1"=200'

100 0 200

DATE PREPARED:
March 21, 2003

LEGEND

- PERMIT BOUNDARY
- PROPERTY BOUNDARY
- EXISTING EASEMENT
- 6 EXISTING GAS LINE
- EXISTING OIL/GAS WELL
- EXISTING OIL/GAS PRODUCTION FACILITY
- E EXISTING ELECTRIC LINE
- X EXISTING FENCE
- 100 YEAR FLOODPLAIN LIMITS
- RIVER/IRRIGATION DITCH
- EXISTING DITCH
- EXISTING STRUCTURES
- EXISTING ACCESS ROAD
- TREE
- PROPOSED GRASS COVERED BERM
- PROPOSED MONITORING WELLS
- DISCHARGE POINT
- HAUL ROAD/CONVEYOR
- PROPOSED ACCESS
- DEWATERING TRENCH
- LIMITS OF MINING
- SLURRY WALL
- TEMPORARY STORAGE PILES
- SOILS CLASSIFICATION BOUNDARY
- SOIL CLASSIFICATION BY U.S. SCS MAP
- TESTHOLE NUMBER
- NUMBER OF FEET OF OVERBURDEN/SILTY SAND
- NUMBER OF FEET OF GRAVEL RESOURCE

SOILS LEGEND:

- 3 ARGIUTOLLS-ROCK OUTCROP COMPLEX, 0 TO 3 PERCENT SLOPES
- 8 ASCALON-BUSHMAN-CURADITH COMPLEX, 3 TO 15 PERCENT SLOPES
- 10 AVAR-MANZANOLA COMPLEX, 0 TO 3 PERCENT SLOPES
- 54 PLATNER LOAM, 0 TO 3 PERCENT SLOPES
- 68 TREON FINE SANDY LOAM, 3 TO 20 PERCENT SLOPES

TETRA TECH RMC
1900 S. SUNSET ST., SUITE 1-F, LONGMONT, CO 80501
TEL 303.772.5282 METRO 303.665.6283 FAX 303.665.6959

REVISIONS

NO	DESCRIPTION	DATE	BY

NISSEN FARM RESOURCE, WELD COUNTY, COLORADO
MLRB 112 PERMIT
SOILS EXPLORATORY BORING LOCATIONS
HALL-IRWIN CORPORATION

DESIGNED BY: KGF
DRAWN BY: MAN
CHECKED BY: GL

JOB NUMBER: 80-0636.141.00

SHEET: 1 of 1

PLOTTED: Fri, May 09 11:36:34 2003 R:\0636_141\NISSAN_FARM_PLANS\MINING_REC_PLAN_12-23-02.prz

You must post sufficient Notices at the location of the proposed mine site to clearly identify the site as the location of a proposed mining operation. The following is a sample of the Notice required for Rule 1.6.2(1)(b) that you may wish to use.

NOTICE

This site is the location of a proposed construction materials operation. (Name of the Applicant/Operator) _____, whose address and phone number is (Address and Phone Number of the Applicant/Operator) _____, has applied for a Reclamation Permit with the Colorado Mined Land Reclamation Board. Anyone wishing to comment on the application may view the application at the (County Name) _____County Clerk or Recorder's Office, (Clerk or Recorder's Office Address) _____, and should send comments prior to the end of the public comment period to the Division of Minerals and Geology, 1313 Sherman St, Room 215, Denver, Colorado 80203.

Certification:

I, Jeff Gregg, hereby certify that I posted a sign containing the above notice for the proposed permit area known as the (Name of Operation) Nissen Farm Res., on (Date Posted) December 23, 2002, _____.

SIGNATURE

5/8/03
DATE

Attachment B
Stability Analyses

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new USGS Earthquake Hazard Toolbox for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

Input

Edition

Conterminous U.S. 2014 (v4.0.x)

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

40.41

Time Horizon

Return period in years

2475

Longitude

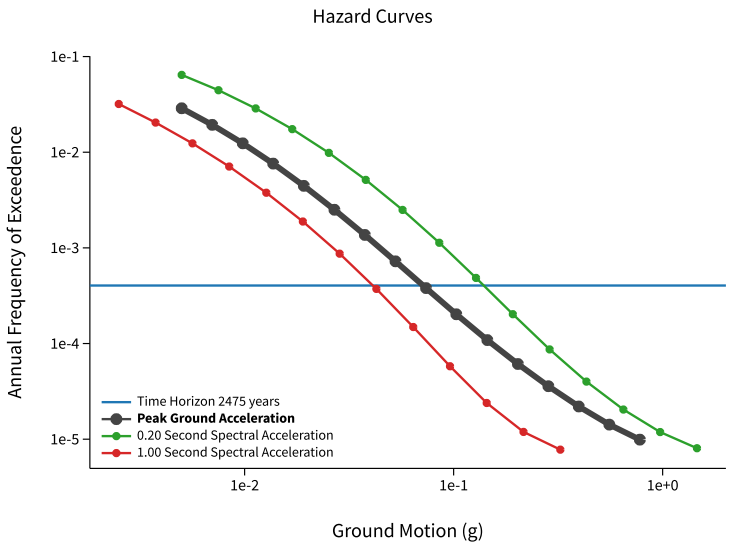
Decimal degrees, negative values for western longitudes

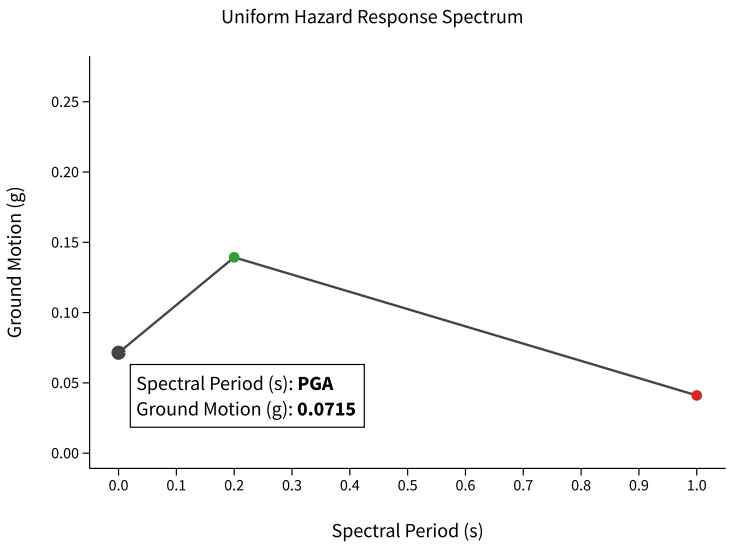
-104.609

Site Class

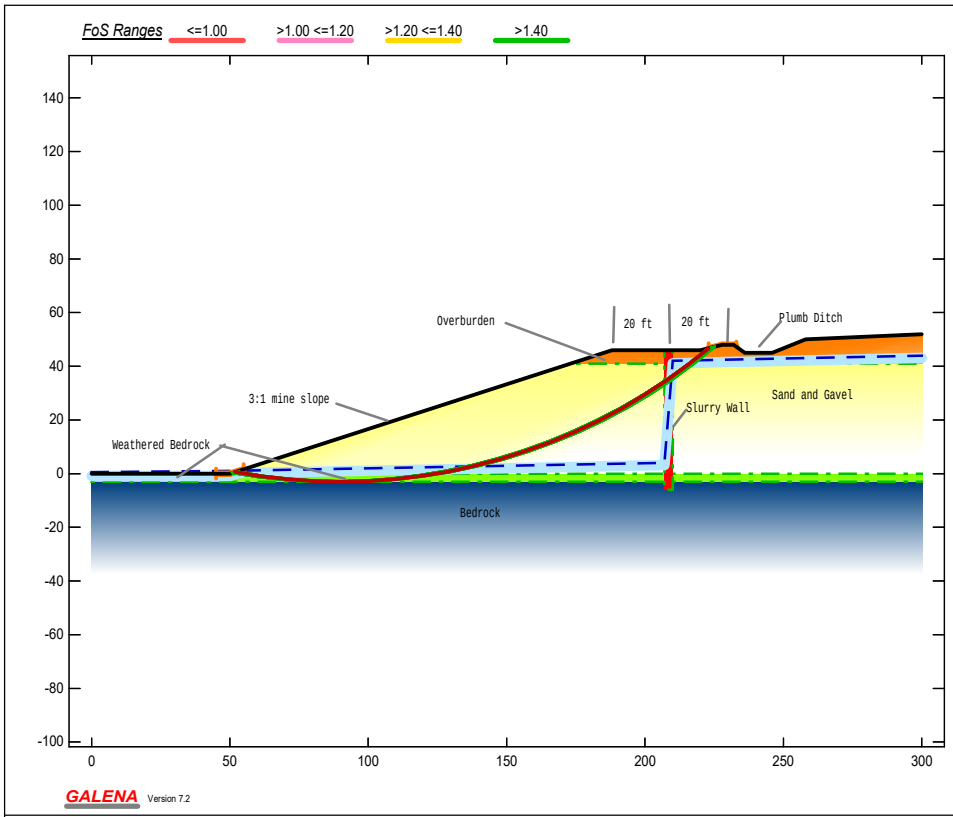
760 m/s (B/C boundary)

Hazard Curve





View Raw Data



Material Keys

1: Overburden
2: Sand and Gravel
3: weathered bedrock
4: unweathered bedrock
5: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.98

Project BURNCO, Nissen Change of Operator
Southwest, Plumb Ditch, Static

File: J:\Bestway-213\nissen\Stability\Static Plumb Ditch.gmf

Edited: 11 May 2023 *Processed:* 11 May 2023

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: BURNCO, Nissen Change of Operator
File: J:\Bestway-213\nissen\Stability\Static Plumb Ditch.gmf
Processed: 11 May 2023 13:35:39

DATA: Analysis 1 - Southwest, Plumb Ditch, Static

Material Properties (5 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	26.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - weathered bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	14.0	110.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - unweathered bedrock

Cohesion	Phi	UnitWeight	Ru
100.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (5 profiles)

Profile: 1 (4 points) Material beneath: 1 - Overburden

0.00	60.00	207.00	60.00	210.00	60.00	300.00	60.00

Profile: 2 (4 points) Material beneath: 2 - Sand and Gravel

0.00	41.00	207.00	41.00	210.00	41.00	300.00	41.00

Profile: 3 (4 points) Material beneath: 3 - weathered bedrock

0.00	0.00	207.00	0.00	210.00	0.00	300.00	0.00

Profile: 4 (4 points) Material beneath: 4 - unweathered bedrock

0.00	-3.00	207.00	-3.00	210.00	-3.00	300.00	-3.00

Profile: 5 (5 points) Material within: 5 - Slurry Wall

207.00	60.00	210.00	60.00	210.00	-6.00	207.00	-6.00	207.00	60.00

Slope Surface (11 points)

0.00	0.00	50.00	0.00	173.00	41.00	188.00	46.00	220.00	46.00
228.00	48.00	232.00	48.00	236.00	45.00	246.00	45.00	258.00	50.00
300.00	52.00								

Phreatic Surface (5 points)

```
      0.00        0.50          50.00        1.00         207.00        4.00
210.00       42.00         300.00       44.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:      50.00      YL:       0.00      XR:     228.00      YR:
48.00
      Centre:  XC:      90.74      YC:     202.95                  Radius:  R:
207.00

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             10.00      10.00      10.00
Trial positions within range:     20         10         110

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
--  --  --  --  --  --  --  --  --  --  --  -

RESULTS: Analysis  1 - Southwest, Plumb Ditch, Static

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.112

Analysis Summary
================
There were:  22001 successful analyses from a total of 22001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.98
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1        51.84        0.61      223.00       46.75       89.97      199.73
202.73     1.976   <-- Critical Surface
   2        51.84        0.61      223.00       46.75       89.94      199.83
202.83     1.977
   3        51.84        0.61      223.00       46.75       89.91      199.93
202.92     1.978
   4        51.32        0.44      223.00       46.75       88.80      202.85
205.85     1.979
   5        51.84        0.61      223.00       46.75       90.02      199.53
202.55     1.979
   6        51.84        0.61      223.00       46.75       89.89      200.03
203.01     1.979
   7        51.32        0.44      223.00       46.75       88.78      202.95
205.94     1.979
   8        51.84        0.61      223.00       46.75       89.86      200.12
203.10     1.980
   9        51.84        0.61      223.00       46.75       89.99      199.63
202.64     1.980
  10        51.32        0.44      223.00       46.75       88.75      203.05
206.04     1.980
  11        51.84        0.61      223.00       46.75       89.83      200.22
203.19     1.980
  12        50.79        0.26      223.00       46.75       87.64      205.96
208.97     1.981
```

13	51.32	0.44	223.00	46.75	88.72	203.14
206.13	1.981					
14	51.84	0.61	223.00	46.75	89.81	200.32
203.28	1.981					
15	50.79	0.26	223.00	46.75	87.62	206.06
209.06	1.981					
16	51.32	0.44	223.00	46.75	88.86	202.65
205.67	1.981					
17	51.32	0.44	223.00	46.75	88.70	203.24
206.22	1.982					
18	51.32	0.44	223.00	46.75	88.83	202.75
205.76	1.982					
19	51.84	0.61	223.00	46.75	89.78	200.42
203.38	1.982					
20	50.79	0.26	223.00	46.75	87.59	206.16
209.16	1.982					
21	51.32	0.44	223.00	46.75	88.67	203.34
206.31	1.982					
22	51.84	0.61	223.00	46.75	89.75	200.52
203.47	1.983					
23	50.79	0.26	223.00	46.75	87.56	206.25
209.25	1.983					
24	51.32	0.44	223.00	46.75	88.65	203.44
206.40	1.983					
25	51.84	0.61	223.00	46.75	89.73	200.62
203.56	1.984					
26	50.79	0.26	223.00	46.75	87.54	206.35
209.34	1.984					
27	51.84	0.61	224.11	47.03	90.14	201.38
204.39	1.984					
28	51.32	0.44	223.00	46.75	88.62	203.54
206.50	1.984					
29	50.79	0.26	223.00	46.75	87.67	205.86
208.88	1.984					
30	50.79	0.26	223.00	46.75	87.51	206.45
209.43	1.984					
31	51.84	0.61	223.00	46.75	89.70	200.72
203.65	1.984					
32	51.32	0.44	224.11	47.03	88.98	204.50
207.50	1.984					
33	51.84	0.61	224.11	47.03	90.11	201.48
204.48	1.985					
34	51.84	0.61	223.00	46.75	90.05	199.44
202.46	1.985					
35	51.32	0.44	223.00	46.75	88.59	203.63
206.59	1.985					
36	50.79	0.26	223.00	46.75	87.48	206.55
209.52	1.985					
37	51.84	0.61	223.00	46.75	89.67	200.81
203.74	1.985					
38	51.32	0.44	224.11	47.03	88.95	204.60
207.60	1.985					
39	51.84	0.61	224.11	47.03	90.08	201.58
204.57	1.985					
40	51.32	0.44	223.00	46.75	88.57	203.73
206.68	1.986					
41	50.79	0.26	223.00	46.75	87.70	205.76
208.79	1.986					
42	50.79	0.26	223.00	46.75	87.46	206.65
209.61	1.986					
43	51.84	0.61	223.00	46.75	89.65	200.91
203.83	1.986					

44	51.32	0.44	224.11	47.03	88.92	204.69	207.69	1.986
45	52.37	0.79	225.22	47.31	91.44	200.00	203.01	1.986
46	51.84	0.61	224.11	47.03	90.06	201.67	204.66	1.986
47	51.32	0.44	223.00	46.75	88.54	203.83	206.77	1.986
48	50.79	0.26	223.00	46.75	87.43	206.74	209.71	1.986
49	51.32	0.44	223.00	46.75	88.88	202.55	205.58	1.987
50	51.84	0.61	223.00	46.75	89.62	201.01	203.93	1.987
51	51.32	0.44	224.11	47.03	88.90	204.79	207.78	1.987
52	52.37	0.79	225.22	47.31	91.42	200.10	203.10	1.987
53	51.84	0.61	224.11	47.03	90.03	201.77	204.75	1.987
54	51.32	0.44	223.00	46.75	88.51	203.93	206.86	1.987
55	51.84	0.61	223.00	46.75	90.07	199.34	202.37	1.987
56	50.79	0.26	224.11	47.03	87.79	207.71	210.72	1.987
57	50.79	0.26	223.00	46.75	87.40	206.84	209.80	1.987
58	51.84	0.61	223.00	46.75	89.60	201.11	204.02	1.987
59	51.32	0.44	224.11	47.03	88.87	204.89	207.87	1.988
60	52.37	0.79	225.22	47.31	91.39	200.20	203.19	1.988
61	51.84	0.61	224.11	47.03	90.01	201.87	204.84	1.988
62	51.32	0.44	223.00	46.75	88.49	204.03	206.95	1.988
63	50.79	0.26	224.11	47.03	87.76	207.80	210.81	1.988
64	50.79	0.26	223.00	46.75	87.38	206.94	209.89	1.988
65	52.37	0.79	224.11	47.03	91.09	199.04	202.00	1.988
66	51.32	0.44	224.11	47.03	89.03	204.30	207.32	1.988
67	51.84	0.61	223.00	46.75	89.57	201.21	204.11	1.988
68	51.32	0.44	224.11	47.03	88.84	204.99	207.96	1.988
69	52.37	0.79	225.22	47.31	91.37	200.30	203.28	1.988
70	51.84	0.61	225.22	47.31	90.28	203.13	206.13	1.988
71	51.32	0.44	223.00	46.75	88.46	204.13	207.05	1.989
72	50.79	0.26	224.11	47.03	87.74	207.90	210.90	1.989
73	51.84	0.61	224.11	47.03	89.98	201.97	204.94	1.989
74	50.79	0.26	223.00	46.75	87.35	207.04	209.98	1.989

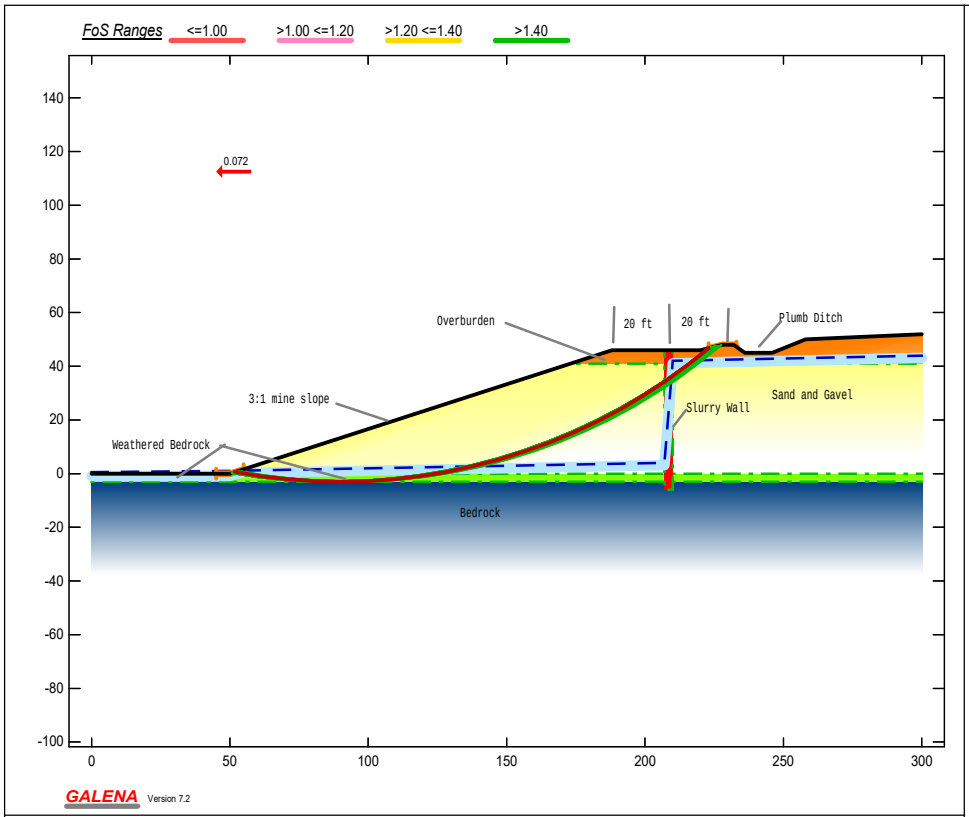
```
  75        51.84        0.61      224.11       47.03       90.16      201.28
204.29     1.989
  76        52.37        0.79      224.11       47.03       91.06      199.14
202.09     1.989
  77        51.32        0.44      224.11       47.03       88.82      205.09
208.06     1.989
  78        51.84        0.61      223.00       46.75       89.54      201.31
204.20     1.989
  79        51.32        0.44      223.00       46.75       88.91      202.46
205.49     1.989
  80        51.32        0.44      224.11       47.03       89.00      204.40
207.41     1.989
  81        51.32        0.44      223.00       46.75       88.43      204.22
207.14     1.989
  82        50.79        0.26      224.11       47.03       87.71      208.00
210.99     1.989
  83        50.79        0.26      223.00       46.75       87.33      207.13
210.07     1.989
  84        51.84        0.61      225.22       47.31       90.26      203.22
206.22     1.989
  85        52.37        0.79      225.22       47.31       91.34      200.40
203.38     1.989
  86        51.84        0.61      224.11       47.03       89.95      202.07
205.03     1.989
  87        51.84        0.61      223.00       46.75       90.10      199.24
202.28     1.989
  88        52.37        0.79      224.11       47.03       91.03      199.24
202.18     1.990
  89        51.32        0.44      224.11       47.03       88.79      205.18
208.15     1.990
  90        51.84        0.61      223.00       46.75       89.52      201.40
204.29     1.990
  91        50.79        0.26      223.00       46.75       87.30      207.23
210.17     1.990
  92        50.79        0.26      224.11       47.03       87.68      208.10
211.08     1.990
  93        51.32        0.44      223.00       46.75       88.41      204.32
207.23     1.990
  94        51.84        0.61      225.22       47.31       90.23      203.32
206.31     1.990
  95        51.84        0.61      224.11       47.03       89.93      202.17
205.12     1.990
  96        52.37        0.79      225.22       47.31       91.31      200.50
203.47     1.990
  97        52.37        0.79      224.11       47.03       91.01      199.34
202.28     1.990
  98        51.32        0.44      224.11       47.03       88.76      205.28
208.24     1.991
  99        51.32        0.44      225.22       47.31       89.12      206.24
209.25     1.991

Critical Failure Surface (circle 1)
-------------------------
Intersects:  XL:      51.84      YL:       0.61      XR:     223.00      YR:
46.75
    Centre:  XC:      89.97      YC:     199.73                  Radius:  R:
202.73
Generated failure surface: (20 points)
     51.84      0.61           61.37     -0.98           70.95     -2.11
80.58     -2.79           90.24     -3.00
     99.89     -2.76          109.52     -2.06          119.10     -0.90
128.62      0.72          138.05      2.78
```

```
    147.38      5.30          156.57      8.25          165.61     11.64
174.48     15.45          183.16     19.69
    191.62     24.33          199.86     29.37          207.85     34.79
215.57     40.59          223.00     46.75

Slice Geometry and Properties - Critical Failure Surface (circle 1,  44 slices)
-----------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force         Stress   Factor
  1       51.84      0.45    -9.5     1.34     1.36     2       0.00    35.0
58.41       46.28         58.14    1.08
  2       53.18      2.94    -9.5     2.34     2.37     2       0.00    35.0
381.74      131.40        169.99    1.08
  3       55.52      7.51    -9.5     2.92     2.96     3       0.00    14.0
962.50      254.59        334.63    1.04
  4       58.44     11.78    -9.5     2.92     2.96     3       0.00    14.0
1489.24      355.06        518.04    1.04
  5       61.37     28.03    -6.7     4.79     4.83     3       0.00    14.0
3522.92      759.66        743.60    1.02
  6       66.16     38.41    -6.7     4.79     4.83     3       0.00    14.0
4817.88      958.07       1017.18    1.02
  7       70.95     48.47    -4.0     4.82     4.83     3       0.00    14.0
6082.04     1122.08       1272.18    1.01
  8       75.77     57.83    -4.0     4.82     4.83     3       0.00    14.0
7266.10     1251.67       1520.01    1.01
  9       80.58     65.90    -1.3     4.77     4.77     3       0.00    14.0
8295.89     1329.27       1745.08    1.00
 10       85.35     73.98    -1.3     4.77     4.77     3       0.00    14.0
9336.04     1388.22       1963.94    1.00
 11       90.12     83.72     1.4     4.89     4.89     3       0.00    14.0
10595.73     1451.26       2162.46    1.00
 12       95.00     91.08     1.4     4.89     4.89     3       0.00    14.0
11564.58     1442.29       2359.80    1.00
 13       99.89     96.37     4.2     4.81     4.83     3       0.00    14.0
12279.88     1380.78       2529.85    0.99
 14      104.70    102.41     4.2     4.81     4.83     3       0.00    14.0
13098.50     1302.75       2698.18    0.99
 15      109.52    107.38     6.9     4.79     4.83     3       0.00    14.0
13790.52     1190.20       2837.92    0.99
 16      114.31    112.26     6.9     4.79     4.83     3       0.00    14.0
14480.16     1043.11       2979.19    0.99
 17      119.10    129.01     9.6     5.29     5.37     3       0.00    14.0
16723.12      945.00       3096.13    0.99
 18      124.40    106.23     9.6     4.22     4.29     2       0.00    35.0
13809.98      562.49       3091.01    0.96
 19      128.62    114.96    12.4     4.47     4.57     2       0.00    35.0
14944.53      382.00       3111.95    0.95
 20      133.09    117.24    12.4     4.47     4.57     2       0.00    35.0
15240.66      127.33       3169.49    0.95
 21      137.55    131.11    14.8     4.91     5.08     2       0.00    35.0
17044.62        0.00       3172.92    0.95
 22      142.47    132.65    15.1     4.91     5.09     2       0.00    35.0
17244.61        0.00       3204.81    0.95
 23      147.38    124.97    17.8     4.60     4.83     2       0.00    35.0
16246.26        0.00       3173.51    0.94
 24      151.97    125.22    17.8     4.60     4.83     2       0.00    35.0
16279.18        0.00       3179.94    0.94
 25      156.57    122.87    20.5     4.52     4.83     2       0.00    35.0
15972.82        0.00       3119.24    0.94
 26      161.09    122.02    20.5     4.52     4.83     2       0.00    35.0
15862.80        0.00       3097.75    0.94
```

```
 27      165.61     98.73    23.3     3.69     4.02     2       0.00    35.0
12834.76        0.00      3014.31    0.94
 28      169.31     97.41    23.3     3.69     4.02     2       0.00    35.0
12663.02        0.00      2973.98    0.94
 29      173.00     38.64    23.3     1.48     1.61     2       0.00    35.0
5017.19         0.00      2942.31    0.94
 30      174.48    111.53    26.0     4.34     4.83     2       0.00    35.0
14414.99        0.00      2832.76    0.95
 31      178.82    108.63    26.0     4.34     4.83     2       0.00    35.0
13936.64        0.00      2738.76    0.95
 32      183.16    117.10    28.7     4.84     5.52     2       0.00    35.0
14897.58        0.00      2576.07    0.95
 33      188.00     82.14    28.7     3.62     4.13     2       0.00    35.0
10388.72        0.00      2400.51    0.95
 34      191.62     84.06    31.5     4.12     4.83     2       0.00    35.0
10598.92        0.00      2115.31    0.96
 35      195.74     73.69    31.5     4.12     4.83     2       0.00    35.0
9250.18         0.00      1846.13    0.96
 36      199.86     55.06    34.2     3.57     4.32     2       0.00    35.0
6872.10         0.00      1551.50    0.97
 37      203.43     46.40    34.2     3.57     4.32     2       0.00    35.0
5746.55         0.00      1297.39    0.97
 38      207.00      9.73    34.2     0.85     1.02     2       0.00    35.0
1180.36         0.00      1124.09    0.97
 39      207.85     17.82    36.9     1.68     2.11     2       0.00    35.0
2147.56         0.00      1006.97    0.99
 40      209.53     26.59    36.9     3.02     3.77     2       0.00    35.0
3214.80     1138.41       904.84    0.99
 41      212.55     19.75    36.9     3.02     3.77     2       0.00    35.0
2325.52      620.30       643.22    0.99
 42      215.57      8.79    39.6     1.90     2.47     1      50.00    26.0
1002.33      118.23       428.19    1.08
 43      217.47      7.05    39.6     2.53     3.29     1      50.00    26.0
803.91        0.00       246.18    1.08
 44      220.00      2.60    39.6     3.00     3.90     1      50.00    26.0
296.83        0.00        64.74    1.08
                 --------                  -------                          -------
---
     X-S Area:    3160.52    Path Length:    183.45              X-S Weight:
404982.75
```



Project BURNCO, Nissen Change of Operator
Southwest, Plumb Ditch, Seismic

File: J:\Bestway-213\nissen\Stability\Seismic Plumb Ditch.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: weathered bedrock
4: unweathered bedrock
5: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.54

Edited: 11 May 2023 *Processed:* 11 May 2023

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: BURNCO, Nissen Change of Operator
File: J:\Bestway-213\nissen\Stability\Seismic Plumb Ditch.gmf
Processed: 11 May 2023 13:38:17

DATA: Analysis 1 - Southwest, Plumb Ditch, Seismic

Material Properties (5 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	26.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - weathered bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	14.0	110.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - unweathered bedrock

Cohesion	Phi	UnitWeight	Ru
100.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (5 profiles)

Profile: 1 (4 points) Material beneath: 1 - Overburden

0.00	60.00	207.00	60.00	210.00	60.00	300.00	60.00

Profile: 2 (4 points) Material beneath: 2 - Sand and Gravel

0.00	41.00	207.00	41.00	210.00	41.00	300.00	41.00

Profile: 3 (4 points) Material beneath: 3 - weathered bedrock

0.00	0.00	207.00	0.00	210.00	0.00	300.00	0.00

Profile: 4 (4 points) Material beneath: 4 - unweathered bedrock

0.00	-3.00	207.00	-3.00	210.00	-3.00	300.00	-3.00

Profile: 5 (5 points) Material within: 5 - Slurry Wall

207.00	60.00	210.00	60.00	210.00	-6.00	207.00	-6.00	207.00	60.00

Slope Surface (11 points)

0.00	0.00	50.00	0.00	173.00	41.00	188.00	46.00	220.00	46.00
228.00	48.00	232.00	48.00	236.00	45.00	246.00	45.00	258.00	50.00
300.00	52.00								

Phreatic Surface (5 points)

```
      0.00        0.50          50.00        1.00         207.00        4.00
210.00       42.00         300.00       44.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:      50.00      YL:       0.00      XR:     228.00      YR:
48.00
      Centre:  XC:      90.74      YC:     202.95                  Radius:  R:
207.00

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.072

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             10.00      10.00      10.00
Trial positions within range:     20         10        110

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
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RESULTS: Analysis  1 - Southwest, Plumb Ditch, Seismic

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.648

Analysis Summary
================
There were:  22001 successful analyses from a total of 22001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.54
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1        51.84        0.61      223.00       46.75       89.97      199.73
202.73     1.539   <-- Critical Surface
   2        51.84        0.61      223.00       46.75       89.94      199.83
202.83     1.539
   3        51.84        0.61      223.00       46.75       89.91      199.93
202.92     1.540
   4        51.84        0.61      223.00       46.75       89.89      200.03
203.01     1.541
   5        51.84        0.61      223.00       46.75       90.02      199.53
202.55     1.541
   6        51.32        0.44      223.00       46.75       88.80      202.85
205.85     1.541
   7        51.84        0.61      223.00       46.75       89.86      200.12
203.10     1.541
   8        51.32        0.44      223.00       46.75       88.78      202.95
205.94     1.542
   9        51.84        0.61      223.00       46.75       89.99      199.63
202.64     1.542
  10        51.84        0.61      223.00       46.75       89.83      200.22
203.19     1.542
```

11	51.32	0.44	223.00	46.75	88.75	203.05
206.04	1.542					
12	51.84	0.61	223.00	46.75	89.81	200.32
203.28	1.543					
13	51.32	0.44	223.00	46.75	88.72	203.14
206.13	1.543					
14	50.79	0.26	223.00	46.75	87.64	205.96
208.97	1.543					
15	51.32	0.44	223.00	46.75	88.86	202.65
205.67	1.543					
16	51.84	0.61	223.00	46.75	89.78	200.42
203.38	1.543					
17	50.79	0.26	223.00	46.75	87.62	206.06
209.06	1.543					
18	51.32	0.44	223.00	46.75	88.70	203.24
206.22	1.543					
19	51.84	0.61	224.11	47.03	90.14	201.38
204.39	1.543					
20	51.32	0.44	223.00	46.75	88.83	202.75
205.76	1.543					
21	52.37	0.79	225.22	47.31	91.44	200.00
203.01	1.544					
22	51.84	0.61	223.00	46.75	89.75	200.52
203.47	1.544					
23	50.79	0.26	223.00	46.75	87.59	206.16
209.16	1.544					
24	51.32	0.44	223.00	46.75	88.67	203.34
206.31	1.544					
25	51.84	0.61	224.11	47.03	90.11	201.48
204.48	1.544					
26	51.32	0.44	224.11	47.03	88.98	204.50
207.50	1.544					
27	52.37	0.79	225.22	47.31	91.42	200.10
203.10	1.544					
28	51.84	0.61	223.00	46.75	89.73	200.62
203.56	1.545					
29	50.79	0.26	223.00	46.75	87.56	206.25
209.25	1.545					
30	51.32	0.44	223.00	46.75	88.65	203.44
206.40	1.545					
31	51.84	0.61	224.11	47.03	90.08	201.58
204.57	1.545					
32	51.32	0.44	224.11	47.03	88.95	204.60
207.60	1.545					
33	50.79	0.26	223.00	46.75	87.54	206.35
209.34	1.545					
34	52.37	0.79	225.22	47.31	91.39	200.20
203.19	1.545					
35	51.84	0.61	223.00	46.75	89.70	200.72
203.65	1.545					
36	51.32	0.44	223.00	46.75	88.62	203.54
206.50	1.545					
37	51.84	0.61	224.11	47.03	90.06	201.67
204.66	1.545					
38	51.32	0.44	224.11	47.03	88.92	204.69
207.69	1.546					
39	50.79	0.26	223.00	46.75	87.67	205.86
208.88	1.546					
40	50.79	0.26	223.00	46.75	87.51	206.45
209.43	1.546					
41	51.84	0.61	223.00	46.75	90.05	199.44
202.46	1.546					

42	51.84	0.61	223.00	46.75	89.67	200.81	203.74	1.546
43	51.32	0.44	223.00	46.75	88.59	203.63	206.59	1.546
44	52.37	0.79	225.22	47.31	91.37	200.30	203.28	1.546
45	51.84	0.61	224.11	47.03	90.03	201.77	204.75	1.546
46	51.84	0.61	225.22	47.31	90.28	203.13	206.13	1.546
47	51.32	0.44	224.11	47.03	88.90	204.79	207.78	1.546
48	50.79	0.26	223.00	46.75	87.48	206.55	209.52	1.546
49	51.32	0.44	223.00	46.75	88.57	203.73	206.68	1.546
50	51.84	0.61	223.00	46.75	89.65	200.91	203.83	1.546
51	52.37	0.79	224.11	47.03	91.09	199.04	202.00	1.546
52	52.37	0.79	225.22	47.31	91.34	200.40	203.38	1.546
53	51.84	0.61	224.11	47.03	90.01	201.87	204.84	1.547
54	51.84	0.61	225.22	47.31	90.26	203.22	206.22	1.547
55	50.79	0.26	224.11	47.03	87.79	207.71	210.72	1.547
56	51.32	0.44	224.11	47.03	88.87	204.89	207.87	1.547
57	50.79	0.26	223.00	46.75	87.46	206.65	209.61	1.547
58	50.79	0.26	223.00	46.75	87.70	205.76	208.79	1.547
59	51.32	0.44	223.00	46.75	88.54	203.83	206.77	1.547
60	51.84	0.61	223.00	46.75	89.62	201.01	203.93	1.547
61	52.37	0.79	224.11	47.03	91.06	199.14	202.09	1.547
62	52.37	0.79	225.22	47.31	91.31	200.50	203.47	1.547
63	51.84	0.61	224.11	47.03	89.98	201.97	204.94	1.547
64	50.79	0.26	224.11	47.03	87.76	207.80	210.81	1.547
65	51.84	0.61	225.22	47.31	90.23	203.32	206.31	1.547
66	51.32	0.44	224.11	47.03	88.84	204.99	207.96	1.547
67	50.79	0.26	223.00	46.75	87.43	206.74	209.71	1.547
68	51.32	0.44	224.11	47.03	89.03	204.30	207.32	1.547
69	51.84	0.61	224.11	47.03	90.16	201.28	204.29	1.547
70	51.32	0.44	223.00	46.75	88.88	202.55	205.58	1.548
71	52.37	0.79	226.33	47.58	91.59	201.75	204.75	1.548
72	51.32	0.44	223.00	46.75	88.51	203.93	206.86	1.548

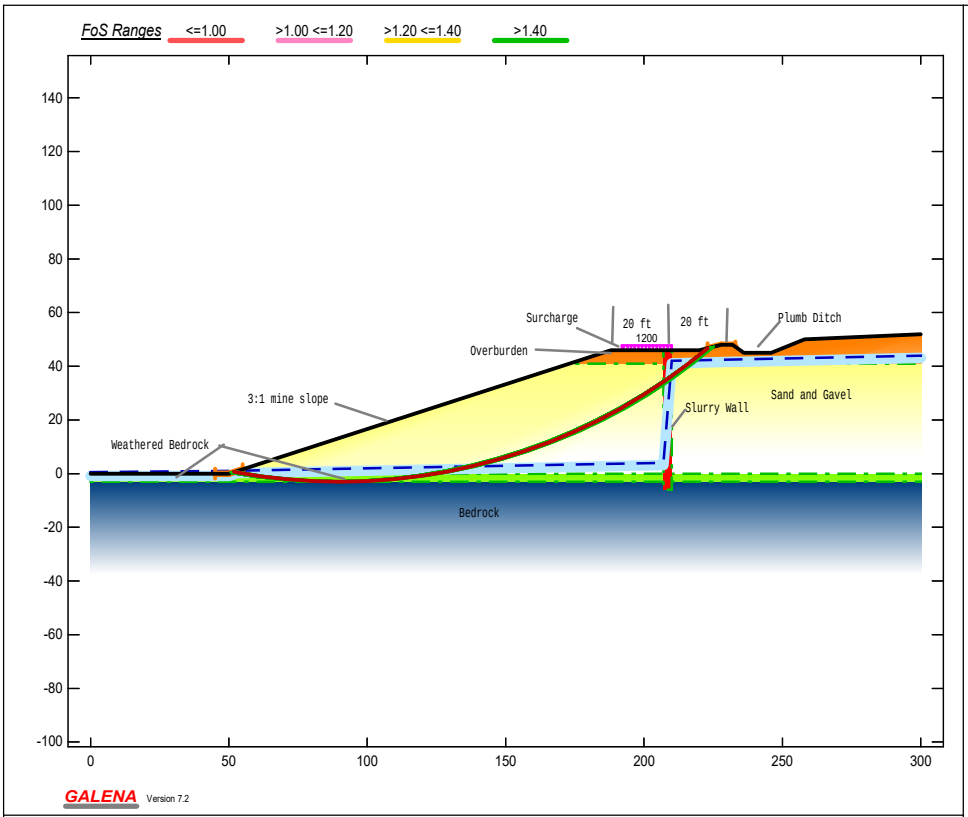
```
  73        51.84        0.61      223.00       46.75       90.07      199.34
202.37     1.548
  74        51.84        0.61      223.00       46.75       89.60      201.11
204.02     1.548
  75        52.37        0.79      224.11       47.03       91.03      199.24
202.18     1.548
  76        52.37        0.79      225.22       47.31       91.29      200.59
203.56     1.548
  77        52.89        0.96      226.33       47.58       92.65      199.02
202.00     1.548
  78        50.79        0.26      224.11       47.03       87.74      207.90
210.90     1.548
  79        51.84        0.61      224.11       47.03       89.95      202.07
205.03     1.548
  80        50.79        0.26      223.00       46.75       87.40      206.84
209.80     1.548
  81        51.84        0.61      225.22       47.31       90.20      203.42
206.40     1.548
  82        51.32        0.44      224.11       47.03       88.82      205.09
208.06     1.548
  83        51.32        0.44      225.22       47.31       89.12      206.24
209.25     1.548
  84        51.32        0.44      223.00       46.75       88.49      204.03
206.95     1.548
  85        52.37        0.79      226.33       47.58       91.56      201.85
204.84     1.548
  86        51.32        0.44      224.11       47.03       89.00      204.40
207.41     1.548
  87        51.84        0.61      223.00       46.75       89.57      201.21
204.11     1.548
  88        52.37        0.79      225.22       47.31       91.47      199.90
202.92     1.548
  89        52.37        0.79      224.11       47.03       91.01      199.34
202.28     1.548
  90        52.37        0.79      225.22       47.31       91.26      200.69
203.65     1.548
  91        50.79        0.26      224.11       47.03       87.71      208.00
210.99     1.548
  92        52.89        0.96      226.33       47.58       92.62      199.11
202.09     1.549
  93        51.84        0.61      224.11       47.03       89.93      202.17
205.12     1.549
  94        50.79        0.26      223.00       46.75       87.38      206.94
209.89     1.549
  95        51.32        0.44      224.11       47.03       88.79      205.18
208.15     1.549
  96        51.84        0.61      225.22       47.31       90.18      203.52
206.50     1.549
  97        51.84        0.61      225.22       47.31       90.31      203.03
206.04     1.549
  98        51.32        0.44      225.22       47.31       89.09      206.34
209.34     1.549
  99        52.89        0.96      227.44       47.86       92.90      200.37
203.38     1.549

Critical Failure Surface (circle 1)
-------------------------
Intersects:  XL:      51.84      YL:       0.61      XR:     223.00      YR:
46.75
    Centre:  XC:      89.97      YC:     199.73                 Radius:  R:
202.73
Generated failure surface: (20 points)
```

```
     51.84      0.61           61.37     -0.98           70.95     -2.11
80.58     -2.79           90.24     -3.00
     99.89     -2.76           109.52     -2.06          119.10     -0.90
128.62      0.72           138.05      2.78
    147.38      5.30           156.57      8.25          165.61     11.64
174.48     15.45           183.16     19.69
    191.62     24.33           199.86     29.37          207.85     34.79
215.57     40.59           223.00     46.75

Slice Geometry and Properties - Critical Failure Surface (circle 1,  44 slices)
-----------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------
PoreWater      Normal    Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi
Weight      Force         Stress   Factor
  1       51.84      0.45    -9.5     1.34     1.36     2       0.00    35.0
58.41       46.28         58.58    1.10
  2       53.18      2.94    -9.5     2.34     2.37     2       0.00    35.0
381.74      131.40        172.07    1.10
  3       55.52      7.51    -9.5     2.92     2.96     3       0.00    14.0
962.50      254.59        336.16    1.04
  4       58.44     11.78    -9.5     2.92     2.96     3       0.00    14.0
1489.24      355.06        520.49    1.04
  5       61.37     28.03    -6.7     4.79     4.83     3       0.00    14.0
3522.92      759.66        746.13    1.03
  6       66.16     38.41    -6.7     4.79     4.83     3       0.00    14.0
4817.88      958.07       1020.73    1.03
  7       70.95     48.47    -4.0     4.82     4.83     3       0.00    14.0
6082.04     1122.08       1274.83    1.01
  8       75.77     57.83    -4.0     4.82     4.83     3       0.00    14.0
7266.10     1251.67       1523.22    1.01
  9       80.58     65.90    -1.3     4.77     4.77     3       0.00    14.0
8295.89     1329.27       1746.27    1.00
 10       85.35     73.98    -1.3     4.77     4.77     3       0.00    14.0
9336.04     1388.22       1965.30    1.00
 11       90.12     83.72     1.4     4.89     4.89     3       0.00    14.0
10595.73     1451.26       2160.86    1.00
 12       95.00     91.08     1.4     4.89     4.89     3       0.00    14.0
11564.58     1442.29       2357.94    1.00
 13       99.89     96.37     4.2     4.81     4.83     3       0.00    14.0
12279.88     1380.78       2524.05    0.99
 14      104.70    102.41     4.2     4.81     4.83     3       0.00    14.0
13098.50     1302.75       2691.90    0.99
 15      109.52    107.38     6.9     4.79     4.83     3       0.00    14.0
13790.52     1190.20       2826.88    0.99
 16      114.31    112.26     6.9     4.79     4.83     3       0.00    14.0
14480.16     1043.11       2967.42    0.99
 17      119.10    129.01     9.6     5.29     5.37     3       0.00    14.0
16723.12      945.00       3078.84    0.99
 18      124.40    106.23     9.6     4.22     4.29     2       0.00    35.0
13809.98      562.49       3044.04    0.94
 19      128.62    114.96    12.4     4.47     4.57     2       0.00    35.0
14944.53      382.00       3051.17    0.93
 20      133.09    117.24    12.4     4.47     4.57     2       0.00    35.0
15240.66      127.33       3106.43    0.93
 21      137.55    131.11    14.8     4.91     5.08     2       0.00    35.0
17044.62        0.00       3097.47    0.92
 22      142.47    132.65    15.1     4.91     5.09     2       0.00    35.0
17244.61        0.00       3127.28    0.92
 23      147.38    124.97    17.8     4.60     4.83     2       0.00    35.0
16246.26        0.00       3083.86    0.92
 24      151.97    125.22    17.8     4.60     4.83     2       0.00    35.0
16279.18        0.00       3090.11    0.92
```

```
 25      156.57    122.87    20.5     4.52     4.83     2       0.00    35.0
15972.82        0.00      3018.62    0.91
 26      161.09    122.02    20.5     4.52     4.83     2       0.00    35.0
15862.80        0.00      2997.83    0.91
 27      165.61     98.73    23.3     3.69     4.02     2       0.00    35.0
12834.76        0.00      2905.07    0.91
 28      169.31     97.41    23.3     3.69     4.02     2       0.00    35.0
12663.02        0.00      2866.20    0.91
 29      173.00     38.64    23.3     1.48     1.61     2       0.00    35.0
5017.19         0.00      2835.68    0.91
 30      174.48    111.53    26.0     4.34     4.83     2       0.00    35.0
14414.99        0.00      2718.83    0.91
 31      178.82    108.63    26.0     4.34     4.83     2       0.00    35.0
13936.64        0.00      2628.61    0.91
 32      183.16    117.10    28.7     4.84     5.52     2       0.00    35.0
14897.58        0.00      2462.20    0.91
 33      188.00     82.14    28.7     3.62     4.13     2       0.00    35.0
10388.72        0.00      2294.39    0.91
 34      191.62     84.06    31.5     4.12     4.83     2       0.00    35.0
10598.92        0.00      2013.31    0.92
 35      195.74     73.69    31.5     4.12     4.83     2       0.00    35.0
9250.18         0.00      1757.11    0.92
 36      199.86     55.06    34.2     3.57     4.32     2       0.00    35.0
6872.10         0.00      1470.38    0.92
 37      203.43     46.40    34.2     3.57     4.32     2       0.00    35.0
5746.55         0.00      1229.56    0.92
 38      207.00      9.73    34.2     0.85     1.02     2       0.00    35.0
1180.36         0.00      1065.32    0.92
 39      207.85     17.82    36.9     1.68     2.11     2       0.00    35.0
2147.56         0.00       950.16    0.93
 40      209.53     26.59    36.9     3.02     3.77     2       0.00    35.0
3214.80    1138.41         870.81    0.93
 41      212.55     19.75    36.9     3.02     3.77     2       0.00    35.0
2325.52     620.30         616.21    0.93
 42      215.57      8.79    39.6     1.90     2.47     1      50.00    26.0
1002.33     118.23         405.95    1.03
 43      217.47      7.05    39.6     2.53     3.29     1      50.00    26.0
803.91        0.00       230.12    1.03
 44      220.00      2.60    39.6     3.00     3.90     1      50.00    26.0
296.83        0.00        57.04    1.03
                 --------                  -------                          -------
---
     X-S Area:    3160.52    Path Length:    183.45              X-S Weight:
404982.75
```



Material Keys

1: Overburden
2: Sand and Gravel
3: weathered bedrock
4: unweathered bedrock
5: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.89

Project BURNCO, Nissen Change of Operator
Southwest, Plumb Ditch, Static with Surcharge

File: J:\Bestway-213\nissen\Stability\Surcharge Static Plumb Ditch.gmf

Edited: 11 May 2023 *Processed:* 11 May 2023

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

Project: BURNCO, Nissen Change of Operator
File: J:\Bestway-213\nissen\Stability\Surcharge Static Plumb Ditch.gmf
Processed: 11 May 2023 14:15:37

DATA: Analysis 1 - Southwest, Plumb Ditch, Static with Surcharge

Material Properties (5 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden

Cohesion	Phi	UnitWeight	Ru
50.00	26.0	114.00	Auto

Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel

Cohesion	Phi	UnitWeight	Ru
0.00	35.0	130.00	Auto

Material: 3 (Mohr-Coulomb Isotropic) - weathered bedrock

Cohesion	Phi	UnitWeight	Ru
0.00	14.0	110.00	Auto

Material: 4 (Mohr-Coulomb Isotropic) - unweathered bedrock

Cohesion	Phi	UnitWeight	Ru
100.00	26.0	124.00	Auto

Material: 5 (Mohr-Coulomb Isotropic) - Slurry Wall

Cohesion	Phi	UnitWeight	Ru
0.00	0.0	110.00	Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (5 profiles)

Profile: 1 (4 points) Material beneath: 1 - Overburden

0.00	60.00	207.00	60.00	210.00	60.00	300.00	60.00

Profile: 2 (4 points) Material beneath: 2 - Sand and Gravel

0.00	41.00	207.00	41.00	210.00	41.00	300.00	41.00

Profile: 3 (4 points) Material beneath: 3 - weathered bedrock

0.00	0.00	207.00	0.00	210.00	0.00	300.00	0.00

Profile: 4 (4 points) Material beneath: 4 - unweathered bedrock

0.00	-3.00	207.00	-3.00	210.00	-3.00	300.00	-3.00

Profile: 5 (5 points) Material within: 5 - Slurry Wall

207.00	60.00	210.00	60.00	210.00	-6.00	207.00	-6.00	207.00	60.00

Slope Surface (11 points)

0.00	0.00	50.00	0.00	173.00	41.00	188.00	46.00	220.00	46.00
228.00	48.00	232.00	48.00	236.00	45.00	246.00	45.00	258.00	50.00
300.00	52.00								

Phreatic Surface (5 points)

```
      0.00        0.50          50.00        1.00         207.00        4.00
210.00       42.00         300.00       44.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:      50.00      YL:       0.00      XR:     228.00      YR:
48.00
      Centre:  XC:      90.74      YC:     202.95                  Radius:  R:
207.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       192.00     1200.0         210.00     1200.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00      10.00
Trial positions within range:      20         10         110

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RESULTS: Analysis  1 - Southwest, Plumb Ditch, Static with Surcharge

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   2.028

Analysis Summary
================
There were:  22001 successful analyses from a total of 22001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.89
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1        51.84        0.61      223.00       46.75       89.97      199.73
202.73     1.892   <-- Critical Surface
   2        51.84        0.61      223.00       46.75       89.94      199.83
202.83     1.893
   3        51.84        0.61      223.00       46.75       89.91      199.93
202.92     1.894
   4        51.84        0.61      223.00       46.75       90.02      199.53
202.55     1.894
   5        51.84        0.61      223.00       46.75       89.89      200.03
203.01     1.894
   6        51.32        0.44      223.00       46.75       88.80      202.85
205.85     1.895
   7        51.84        0.61      223.00       46.75       89.86      200.12
203.10     1.895
   8        51.84        0.61      223.00       46.75       89.99      199.63
202.64     1.895
   9        51.32        0.44      223.00       46.75       88.78      202.95
205.94     1.896
```

10	51.84	0.61	223.00	46.75	89.83	200.22
203.19	1.896					
11	51.32	0.44	223.00	46.75	88.75	203.05
206.04	1.896					
12	51.84	0.61	223.00	46.75	89.81	200.32
203.28	1.897					
13	51.32	0.44	223.00	46.75	88.72	203.14
206.13	1.897					
14	51.84	0.61	223.00	46.75	89.78	200.42
203.38	1.897					
15	51.32	0.44	223.00	46.75	88.86	202.65
205.67	1.897					
16	50.79	0.26	223.00	46.75	87.64	205.96
208.97	1.898					
17	51.32	0.44	223.00	46.75	88.83	202.75
205.76	1.898					
18	51.32	0.44	223.00	46.75	88.70	203.24
206.22	1.898					
19	51.84	0.61	223.00	46.75	89.75	200.52
203.47	1.898					
20	50.79	0.26	223.00	46.75	87.62	206.06
209.06	1.898					
21	51.32	0.44	223.00	46.75	88.67	203.34
206.31	1.899					
22	51.84	0.61	223.00	46.75	89.73	200.62
203.56	1.899					
23	50.79	0.26	223.00	46.75	87.59	206.16
209.16	1.899					
24	51.32	0.44	223.00	46.75	88.65	203.44
206.40	1.899					
25	51.84	0.61	223.00	46.75	89.70	200.72
203.65	1.899					
26	50.79	0.26	223.00	46.75	87.56	206.25
209.25	1.900					
27	51.84	0.61	223.00	46.75	90.05	199.44
202.46	1.900					
28	51.32	0.44	223.00	46.75	88.62	203.54
206.50	1.900					
29	51.84	0.61	223.00	46.75	89.67	200.81
203.74	1.900					
30	50.79	0.26	223.00	46.75	87.54	206.35
209.34	1.900					
31	50.79	0.26	223.00	46.75	87.67	205.86
208.88	1.901					
32	51.32	0.44	223.00	46.75	88.59	203.63
206.59	1.901					
33	50.79	0.26	223.00	46.75	87.51	206.45
209.43	1.901					
34	51.84	0.61	223.00	46.75	89.65	200.91
203.83	1.901					
35	51.32	0.44	223.00	46.75	88.57	203.73
206.68	1.901					
36	51.84	0.61	224.11	47.03	90.14	201.38
204.39	1.901					
37	50.79	0.26	223.00	46.75	87.48	206.55
209.52	1.902					
38	51.84	0.61	223.00	46.75	89.62	201.01
203.93	1.902					
39	51.84	0.61	223.00	46.75	90.07	199.34
202.37	1.902					
40	50.79	0.26	223.00	46.75	87.70	205.76
208.79	1.902					

41	51.32	0.44	223.00	46.75	88.54	203.83	206.77	1.902
42	51.84	0.61	224.11	47.03	90.11	201.48	204.48	1.902
43	51.32	0.44	223.00	46.75	88.88	202.55	205.58	1.902
44	50.79	0.26	223.00	46.75	87.46	206.65	209.61	1.902
45	51.84	0.61	223.00	46.75	89.60	201.11	204.02	1.902
46	51.32	0.44	224.11	47.03	88.98	204.50	207.50	1.903
47	51.32	0.44	223.00	46.75	88.51	203.93	206.86	1.903
48	51.84	0.61	224.11	47.03	90.08	201.58	204.57	1.903
49	50.79	0.26	223.00	46.75	87.43	206.74	209.71	1.903
50	51.84	0.61	223.00	46.75	89.57	201.21	204.11	1.903
51	51.32	0.44	224.11	47.03	88.95	204.60	207.60	1.903
52	51.32	0.44	223.00	46.75	88.49	204.03	206.95	1.903
53	50.79	0.26	223.00	46.75	87.40	206.84	209.80	1.904
54	51.84	0.61	224.11	47.03	90.06	201.67	204.66	1.904
55	51.84	0.61	223.00	46.75	89.54	201.31	204.20	1.904
56	51.84	0.61	223.00	46.75	90.10	199.24	202.28	1.904
57	51.32	0.44	224.11	47.03	88.92	204.69	207.69	1.904
58	51.32	0.44	223.00	46.75	88.46	204.13	207.05	1.904
59	50.79	0.26	223.00	46.75	87.38	206.94	209.89	1.904
60	51.32	0.44	223.00	46.75	88.91	202.46	205.49	1.904
61	51.84	0.61	224.11	47.03	90.03	201.77	204.75	1.904
62	51.84	0.61	223.00	46.75	89.52	201.40	204.29	1.905
63	52.37	0.79	224.11	47.03	91.09	199.04	202.00	1.905
64	51.32	0.44	224.11	47.03	88.90	204.79	207.78	1.905
65	51.32	0.44	223.00	46.75	88.43	204.22	207.14	1.905
66	50.79	0.26	223.00	46.75	87.35	207.04	209.98	1.905
67	51.84	0.61	224.11	47.03	90.01	201.87	204.84	1.905
68	51.84	0.61	223.00	46.75	89.49	201.50	204.39	1.905
69	52.37	0.79	224.11	47.03	91.06	199.14	202.09	1.905
70	52.37	0.79	225.22	47.31	91.44	200.00	203.01	1.905
71	51.32	0.44	224.11	47.03	88.87	204.89	207.87	1.906

72	51.32	0.44	223.00	46.75	88.41	204.32	207.23	1.906
73	50.79	0.26	223.00	46.75	87.33	207.13	210.07	1.906
74	50.79	0.26	224.11	47.03	87.79	207.71	210.72	1.906
75	51.84	0.61	224.11	47.03	89.98	201.97	204.94	1.906
76	51.84	0.61	224.11	47.03	90.16	201.28	204.29	1.906
77	51.84	0.61	223.00	46.75	90.13	199.14	202.18	1.906
78	51.84	0.61	223.00	46.75	89.46	201.60	204.48	1.906
79	52.37	0.79	224.11	47.03	91.03	199.24	202.18	1.906
80	51.32	0.44	224.11	47.03	89.03	204.30	207.32	1.906
81	52.37	0.79	225.22	47.31	91.42	200.10	203.10	1.906
82	51.32	0.44	224.11	47.03	88.84	204.99	207.96	1.906
83	51.32	0.44	223.00	46.75	88.38	204.42	207.32	1.906
84	50.79	0.26	223.00	46.75	87.30	207.23	210.17	1.906
85	50.79	0.26	224.11	47.03	87.76	207.80	210.81	1.906
86	51.32	0.44	223.00	46.75	88.94	202.36	205.39	1.906
87	51.84	0.61	224.11	47.03	89.95	202.07	205.03	1.907
88	51.84	0.61	223.00	46.75	89.44	201.70	204.57	1.907
89	52.37	0.79	224.11	47.03	91.01	199.34	202.28	1.907
90	51.32	0.44	223.00	46.75	88.35	204.52	207.41	1.907
91	51.32	0.44	224.11	47.03	88.82	205.09	208.06	1.907
92	50.79	0.26	223.00	46.75	87.27	207.33	210.26	1.907
93	52.37	0.79	225.22	47.31	91.39	200.20	203.19	1.907
94	51.32	0.44	224.11	47.03	89.00	204.40	207.41	1.907
95	50.79	0.26	224.11	47.03	87.74	207.90	210.90	1.907
96	50.79	0.26	223.00	46.75	87.72	205.67	208.70	1.907
97	51.84	0.61	224.11	47.03	89.93	202.17	205.12	1.907
98	51.84	0.61	223.00	46.75	89.41	201.80	204.66	1.907
99	50.79	0.26	223.00	46.75	87.25	207.43	210.35	1.908

Critical Failure Surface (circle 1)

Intersects: XL: 51.84 YL: 0.61 XR: 223.00 YR: 46.75

Centre: XC: 89.97 YC: 199.73 Radius: R: 202.73

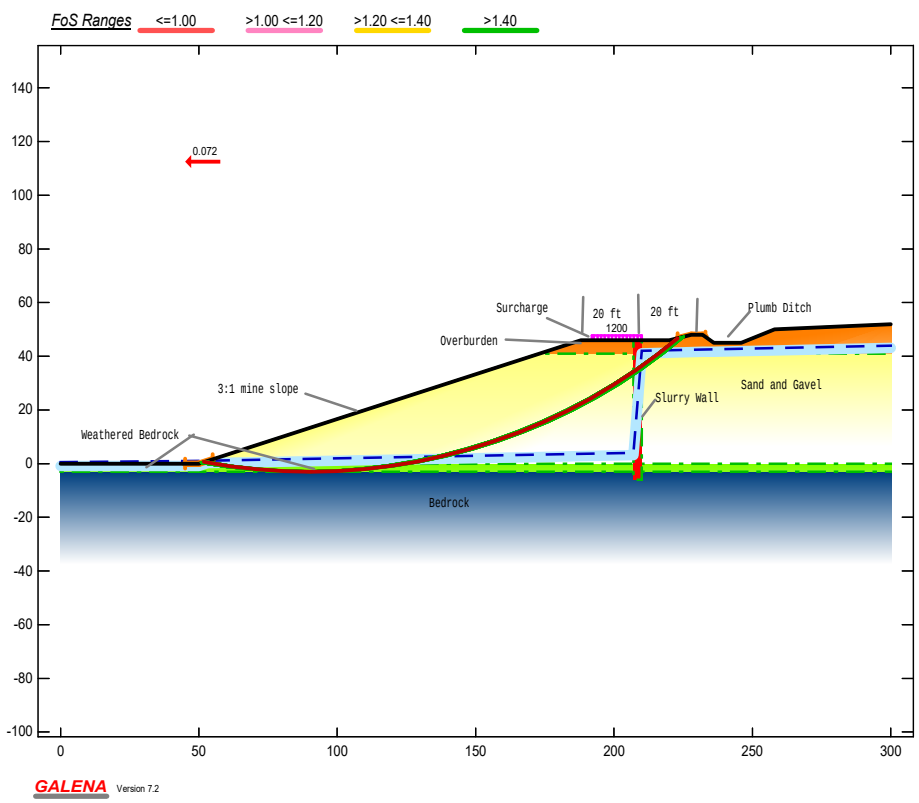
Generated failure surface: (20 points)

51.84	0.61	61.37	-0.98	70.95	-2.11	80.58	-2.79	90.24	-3.00
99.89	-2.76	109.52	-2.06	119.10	-0.90	128.62	0.72	138.05	2.78
147.38	5.30	156.57	8.25	165.61	11.64	174.48	15.45	183.16	19.69
191.62	24.33	199.86	29.37	207.85	34.79	215.57	40.59	223.00	46.75

Slice Geometry and Properties - Critical Failure Surface (circle 1, 44 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	51.84	0.45	-9.5	1.34	1.36	2	0.00	35.0	58.41	46.28	58.21	1.08
2	53.18	2.94	-9.5	2.34	2.37	2	0.00	35.0	381.74	131.40	170.31	1.08
3	55.52	7.51	-9.5	2.92	2.96	3	0.00	14.0	962.50	254.59	334.87	1.04
4	58.44	11.78	-9.5	2.92	2.96	3	0.00	14.0	1489.24	355.06	518.42	1.04
5	61.37	28.03	-6.7	4.79	4.83	3	0.00	14.0	3522.92	759.66	743.99	1.02
6	66.16	38.41	-6.7	4.79	4.83	3	0.00	14.0	4817.88	958.07	1017.74	1.02
7	70.95	48.47	-4.0	4.82	4.83	3	0.00	14.0	6082.04	1122.08	1272.59	1.01
8	75.77	57.83	-4.0	4.82	4.83	3	0.00	14.0	7266.10	1251.67	1520.51	1.01
9	80.58	65.90	-1.3	4.77	4.77	3	0.00	14.0	8295.89	1329.27	1745.26	1.00
10	85.35	73.98	-1.3	4.77	4.77	3	0.00	14.0	9336.04	1388.22	1964.15	1.00
11	90.12	83.72	1.4	4.89	4.89	3	0.00	14.0	10595.73	1451.26	2162.21	1.00
12	95.00	91.08	1.4	4.89	4.89	3	0.00	14.0	11564.58	1442.29	2359.51	1.00
13	99.89	96.37	4.2	4.81	4.83	3	0.00	14.0	12279.88	1380.78	2528.94	0.99
14	104.70	102.41	4.2	4.81	4.83	3	0.00	14.0	13098.50	1302.75	2697.19	0.99
15	109.52	107.38	6.9	4.79	4.83	3	0.00	14.0	13790.52	1190.20	2836.18	0.99
16	114.31	112.26	6.9	4.79	4.83	3	0.00	14.0	14480.16	1043.11	2977.34	0.99
17	119.10	129.01	9.6	5.29	5.37	3	0.00	14.0	16723.12	945.00	3093.41	0.99
18	124.40	106.23	9.6	4.22	4.29	2	0.00	35.0	13809.98	562.49	3083.55	0.95
19	128.62	114.96	12.4	4.47	4.57	2	0.00	35.0	14944.53	382.00	3102.27	0.95
20	133.09	117.24	12.4	4.47	4.57	2	0.00	35.0	15240.66	127.33	3159.44	0.95
21	137.55	131.11	14.8	4.91	5.08	2	0.00	35.0	17044.62	0.00	3160.86	0.94
22	142.47	132.65	15.1	4.91	5.09	2	0.00	35.0	17244.61	0.00	3192.41	0.94
23	147.38	124.97	17.8	4.60	4.83	2	0.00	35.0	16246.26	0.00	3159.13	0.94

```
 24      151.97    125.22    17.8     4.60     4.83     2       0.00    35.0
16279.18        0.00      3165.53    0.94
 25      156.57    122.87    20.5     4.52     4.83     2       0.00    35.0
15972.82        0.00      3103.04    0.94
 26      161.09    122.02    20.5     4.52     4.83     2       0.00    35.0
15862.80        0.00      3081.67    0.94
 27      165.61     98.73    23.3     3.69     4.02     2       0.00    35.0
12834.76        0.00      2996.67    0.94
 28      169.31     97.41    23.3     3.69     4.02     2       0.00    35.0
12663.02        0.00      2956.57    0.94
 29      173.00     38.64    23.3     1.48     1.61     2       0.00    35.0
5017.19         0.00      2925.09    0.94
 30      174.48    111.53    26.0     4.34     4.83     2       0.00    35.0
14414.99        0.00      2814.29    0.94
 31      178.82    108.63    26.0     4.34     4.83     2       0.00    35.0
13936.64        0.00      2720.90    0.94
 32      183.16    117.10    28.7     4.84     5.52     2       0.00    35.0
14897.58        0.00      2557.55    0.95
 33      188.00     82.14    28.7     3.62     4.13     2       0.00    35.0
10388.72        0.00      2383.25    0.95
 34      191.62     84.06    31.5     4.12     4.83     2       0.00    35.0
10598.92        0.00      2987.75    0.96
 35      195.74     73.69    31.5     4.12     4.83     2       0.00    35.0
9250.18         0.00      2810.05    0.96
 36      199.86     55.06    34.2     3.57     4.32     2       0.00    35.0
6872.10         0.00      2497.14    0.97
 37      203.43     46.40    34.2     3.57     4.32     2       0.00    35.0
5746.55         0.00      2245.21    0.97
 38      207.00      9.73    34.2     0.85     1.02     2       0.00    35.0
1180.36         0.00      2073.39    0.97
 39      207.85     17.82    36.9     1.68     2.11     2       0.00    35.0
2147.56         0.00      1936.57    0.98
 40      209.53     26.59    36.9     3.02     3.77     2       0.00    35.0
3214.80    1138.41        1045.27    0.98
 41      212.55     19.75    36.9     3.02     3.77     2       0.00    35.0
2325.52     620.30         638.78    0.98
 42      215.57      8.79    39.6     1.90     2.47     1      50.00    26.0
1002.33     118.23         424.56    1.07
 43      217.47      7.05    39.6     2.53     3.29     1      50.00    26.0
803.91       0.00         243.56    1.07
 44      220.00      2.60    39.6     3.00     3.90     1      50.00    26.0
296.83       0.00          63.49    1.07
               --------                    -------                          -------
---
     X-S Area:    3160.52    Path Length:    183.45              X-S Weight:
404982.75
```



Project BURNCO, Nissen Change of Operator
Southwest, Plumb Ditch, Seismic with Surcharge

File: J:\Bestway-213\nissen\Stability\Surcharge Seismic Plumb Ditch.gmf

Material Keys

1: Overburden
2: Sand and Gravel
3: weathered bedrock
4: unweathered bedrock
5: Slurry Wall

Analysis 1

Multiple Stability Analysis
Method: Bishop Simplified
Surface: Circular

Results

Critical Factor of Safety: 1.50

Edited: 11 May 2023 *Processed:* 11 May 2023

Civil Resources

GALENA 7.2 Analysis Results Version: 7.2.1.05 Licensee: Civil Resources

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Project: BURNCO, Nissen Change of Operator
File: J:\Bestway-213\nissen\Stability\Surcharge Seismic Plumb Ditch.gmf
Processed: 11 May 2023 14:07:12

DATA: Analysis 1 - Southwest, Plumb Ditch, Seismic with Surcharge

Material Properties (5 materials)

Material: 1 (Mohr-Coulomb Isotropic) - Overburden
Cohesion Phi UnitWeight Ru
50.00 26.0 114.00 Auto
Material: 2 (Mohr-Coulomb Isotropic) - Sand and Gravel
Cohesion Phi UnitWeight Ru
0.00 35.0 130.00 Auto
Material: 3 (Mohr-Coulomb Isotropic) - weathered bedrock
Cohesion Phi UnitWeight Ru
0.00 14.0 110.00 Auto
Material: 4 (Mohr-Coulomb Isotropic) - unweathered bedrock
Cohesion Phi UnitWeight Ru
100.00 26.0 124.00 Auto
Material: 5 (Mohr-Coulomb Isotropic) - Slurry Wall
Cohesion Phi UnitWeight Ru
0.00 0.0 110.00 Auto

Water Properties

Unit weight of water: 62.400 Unit weight of water/medium above ground: 62.400

Material Profiles (5 profiles)

Profile: 1 (4 points) Material beneath: 1 - Overburden
0.00 60.00 207.00 60.00 210.00 60.00
300.00 60.00
Profile: 2 (4 points) Material beneath: 2 - Sand and Gravel
0.00 41.00 207.00 41.00 210.00 41.00
300.00 41.00
Profile: 3 (4 points) Material beneath: 3 - weathered bedrock
0.00 0.00 207.00 0.00 210.00 0.00
300.00 0.00
Profile: 4 (4 points) Material beneath: 4 - unweathered bedrock
0.00 -3.00 207.00 -3.00 210.00 -3.00
300.00 -3.00
Profile: 5 (5 points) Material within: 5 - Slurry Wall
207.00 60.00 210.00 60.00 210.00 -6.00
207.00 -6.00 207.00 60.00

Slope Surface (11 points)

0.00 0.00 50.00 0.00 173.00 41.00
188.00 46.00 220.00 46.00
228.00 48.00 232.00 48.00 236.00 45.00
246.00 45.00 258.00 50.00
300.00 52.00

Phreatic Surface (5 points)

```
      0.00        0.50          50.00        1.00         207.00        4.00
210.00       42.00         300.00       44.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:      50.00      YL:       0.00      XR:     228.00      YR:
48.00
      Centre:  XC:      90.74      YC:     202.95                 Radius:  R:
207.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       192.00     1200.0         210.00     1200.0

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.072

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:             10.00      10.00      10.00
Trial positions within range:     20         10         110

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RESULTS: Analysis  1 - Southwest, Plumb Ditch, Seismic with Surcharge

Bishop Simplified Method of Analysis - Circular Failure Surface
---------------------------------------------------------------
Critical Failure Surface Search using Multiple Circle Generation Techniques

Initial failure surface approximation - Factor of Safety:   1.611

Analysis Summary
================
There were:  22001 successful analyses from a total of 22001 trial failure surfaces

Critical (minimum) Factor of Safety:  1.50
==========================================

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre
Radius      FoS
   1        51.84        0.61      223.00       46.75       89.97      199.73
202.73     1.504   <-- Critical Surface
   2        51.84        0.61      223.00       46.75       89.94      199.83
202.83     1.504
   3        51.84        0.61      223.00       46.75       89.91      199.93
202.92     1.505
   4        51.84        0.61      223.00       46.75       90.02      199.53
202.55     1.506
   5        51.84        0.61      223.00       46.75       89.89      200.03
203.01     1.506
   6        51.84        0.61      223.00       46.75       89.86      200.12
203.10     1.506
   7        51.32        0.44      223.00       46.75       88.80      202.85
205.85     1.506
```

8	51.84	0.61	223.00	46.75	89.99	199.63	202.64	1.507
9	51.84	0.61	223.00	46.75	89.83	200.22	203.19	1.507
10	51.32	0.44	223.00	46.75	88.78	202.95	205.94	1.507
11	51.84	0.61	223.00	46.75	89.81	200.32	203.28	1.507
12	51.32	0.44	223.00	46.75	88.75	203.05	206.04	1.508
13	51.84	0.61	223.00	46.75	89.78	200.42	203.38	1.508
14	51.32	0.44	223.00	46.75	88.72	203.14	206.13	1.508
15	51.32	0.44	223.00	46.75	88.86	202.65	205.67	1.508
16	51.84	0.61	223.00	46.75	89.75	200.52	203.47	1.509
17	50.79	0.26	223.00	46.75	87.64	205.96	208.97	1.509
18	51.32	0.44	223.00	46.75	88.70	203.24	206.22	1.509
19	51.32	0.44	223.00	46.75	88.83	202.75	205.76	1.509
20	50.79	0.26	223.00	46.75	87.62	206.06	209.06	1.509
21	51.84	0.61	223.00	46.75	89.73	200.62	203.56	1.509
22	51.32	0.44	223.00	46.75	88.67	203.34	206.31	1.509
23	50.79	0.26	223.00	46.75	87.59	206.16	209.16	1.510
24	51.84	0.61	224.11	47.03	90.14	201.38	204.39	1.510
25	51.32	0.44	223.00	46.75	88.65	203.44	206.40	1.510
26	51.84	0.61	223.00	46.75	89.70	200.72	203.65	1.510
27	51.84	0.61	223.00	46.75	90.05	199.44	202.46	1.510
28	50.79	0.26	223.00	46.75	87.56	206.25	209.25	1.510
29	51.84	0.61	224.11	47.03	90.11	201.48	204.48	1.510
30	51.32	0.44	223.00	46.75	88.62	203.54	206.50	1.510
31	51.84	0.61	223.00	46.75	89.67	200.81	203.74	1.510
32	50.79	0.26	223.00	46.75	87.54	206.35	209.34	1.511
33	51.84	0.61	224.11	47.03	90.08	201.58	204.57	1.511
34	51.32	0.44	223.00	46.75	88.59	203.63	206.59	1.511
35	51.84	0.61	223.00	46.75	89.65	200.91	203.83	1.511
36	51.32	0.44	224.11	47.03	88.98	204.50	207.50	1.511
37	50.79	0.26	223.00	46.75	87.67	205.86	208.88	1.511
38	52.37	0.79	225.22	47.31	91.44	200.00	203.01	1.511

39	50.79	0.26	223.00	46.75	87.51	206.45	209.43	1.511
40	51.32	0.44	223.00	46.75	88.57	203.73	206.68	1.512
41	51.84	0.61	224.11	47.03	90.06	201.67	204.66	1.512
42	51.84	0.61	223.00	46.75	89.62	201.01	203.93	1.512
43	51.32	0.44	224.11	47.03	88.95	204.60	207.60	1.512
44	51.84	0.61	223.00	46.75	90.07	199.34	202.37	1.512
45	52.37	0.79	225.22	47.31	91.42	200.10	203.10	1.512
46	50.79	0.26	223.00	46.75	87.48	206.55	209.52	1.512
47	51.32	0.44	223.00	46.75	88.54	203.83	206.77	1.512
48	52.37	0.79	224.11	47.03	91.09	199.04	202.00	1.512
49	51.84	0.61	224.11	47.03	90.03	201.77	204.75	1.512
50	51.32	0.44	224.11	47.03	88.92	204.69	207.69	1.512
51	51.84	0.61	223.00	46.75	89.60	201.11	204.02	1.512
52	51.32	0.44	223.00	46.75	88.88	202.55	205.58	1.512
53	50.79	0.26	223.00	46.75	87.70	205.76	208.79	1.512
54	50.79	0.26	223.00	46.75	87.46	206.65	209.61	1.513
55	52.37	0.79	225.22	47.31	91.39	200.20	203.19	1.513
56	51.32	0.44	223.00	46.75	88.51	203.93	206.86	1.513
57	52.37	0.79	224.11	47.03	91.06	199.14	202.09	1.513
58	51.84	0.61	224.11	47.03	90.01	201.87	204.84	1.513
59	51.32	0.44	224.11	47.03	88.90	204.79	207.78	1.513
60	51.84	0.61	223.00	46.75	89.57	201.21	204.11	1.513
61	50.79	0.26	223.00	46.75	87.43	206.74	209.71	1.513
62	52.37	0.79	225.22	47.31	91.37	200.30	203.28	1.513
63	51.32	0.44	223.00	46.75	88.49	204.03	206.95	1.513
64	51.32	0.44	224.11	47.03	88.87	204.89	207.87	1.513
65	51.84	0.61	224.11	47.03	89.98	201.97	204.94	1.513
66	52.37	0.79	224.11	47.03	91.03	199.24	202.18	1.513
67	51.84	0.61	223.00	46.75	89.54	201.31	204.20	1.513
68	51.84	0.61	224.11	47.03	90.16	201.28	204.29	1.514
69	50.79	0.26	223.00	46.75	87.40	206.84	209.80	1.514

70	51.84	0.61	223.00	46.75	90.10	199.24	202.28	1.514
71	50.79	0.26	224.11	47.03	87.79	207.71	210.72	1.514
72	52.37	0.79	225.22	47.31	91.34	200.40	203.38	1.514
73	51.32	0.44	223.00	46.75	88.46	204.13	207.05	1.514
74	51.84	0.61	225.22	47.31	90.28	203.13	206.13	1.514
75	51.32	0.44	224.11	47.03	89.03	204.30	207.32	1.514
76	51.32	0.44	224.11	47.03	88.84	204.99	207.96	1.514
77	51.84	0.61	224.11	47.03	89.95	202.07	205.03	1.514
78	51.84	0.61	223.00	46.75	89.52	201.40	204.29	1.514
79	52.37	0.79	224.11	47.03	91.01	199.34	202.28	1.514
80	50.79	0.26	223.00	46.75	87.38	206.94	209.89	1.514
81	51.32	0.44	223.00	46.75	88.91	202.46	205.49	1.514
82	50.79	0.26	224.11	47.03	87.76	207.80	210.81	1.514
83	51.32	0.44	223.00	46.75	88.43	204.22	207.14	1.514
84	52.37	0.79	225.22	47.31	91.31	200.50	203.47	1.514
85	51.84	0.61	225.22	47.31	90.26	203.22	206.22	1.515
86	51.32	0.44	224.11	47.03	88.82	205.09	208.06	1.515
87	51.84	0.61	224.11	47.03	89.93	202.17	205.12	1.515
88	51.84	0.61	223.00	46.75	89.49	201.50	204.39	1.515
89	52.37	0.79	224.11	47.03	90.98	199.44	202.37	1.515
90	50.79	0.26	223.00	46.75	87.35	207.04	209.98	1.515
91	51.32	0.44	224.11	47.03	89.00	204.40	207.41	1.515
92	50.79	0.26	224.11	47.03	87.74	207.90	210.90	1.515
93	51.32	0.44	223.00	46.75	88.41	204.32	207.23	1.515
94	52.37	0.79	225.22	47.31	91.29	200.59	203.56	1.515
95	51.32	0.44	224.11	47.03	88.79	205.18	208.15	1.515
96	51.84	0.61	225.22	47.31	90.23	203.32	206.31	1.515
97	51.84	0.61	224.11	47.03	89.90	202.27	205.21	1.515
98	51.84	0.61	223.00	46.75	89.46	201.60	204.48	1.515
99	50.79	0.26	223.00	46.75	87.33	207.13	210.07	1.515

Critical Failure Surface (circle 1)

Intersects: XL: 51.84 YL: 0.61 XR: 223.00 YR: 46.75
Centre: XC: 89.97 YC: 199.73 Radius: R: 202.73
Generated failure surface: (20 points)

51.84	0.61	61.37	-0.98	70.95	-2.11	80.58	-2.79	90.24	-3.00
99.89	-2.76	109.52	-2.06	119.10	-0.90	128.62	0.72	138.05	2.78
147.38	5.30	156.57	8.25	165.61	11.64	174.48	15.45	183.16	19.69
191.62	24.33	199.86	29.37	207.85	34.79	215.57	40.59	223.00	46.75

Slice Geometry and Properties - Critical Failure Surface (circle 1, 44 slices)

Slice	X-S	Base						PoreWater	Normal	Test
	X-Left	Area	Angle	Width	Length	Matl	Cohesion	Phi	Weight	Force	Stress	Factor
1	51.84	0.45	-9.5	1.34	1.36	2	0.00	35.0	58.41	46.28	58.63	1.10
2	53.18	2.94	-9.5	2.34	2.37	2	0.00	35.0	381.74	131.40	172.29	1.10
3	55.52	7.51	-9.5	2.92	2.96	3	0.00	14.0	962.50	254.59	336.32	1.04
4	58.44	11.78	-9.5	2.92	2.96	3	0.00	14.0	1489.24	355.06	520.75	1.04
5	61.37	28.03	-6.7	4.79	4.83	3	0.00	14.0	3522.92	759.66	746.40	1.03
6	66.16	38.41	-6.7	4.79	4.83	3	0.00	14.0	4817.88	958.07	1021.10	1.03
7	70.95	48.47	-4.0	4.82	4.83	3	0.00	14.0	6082.04	1122.08	1275.10	1.01
8	75.77	57.83	-4.0	4.82	4.83	3	0.00	14.0	7266.10	1251.67	1523.56	1.01
9	80.58	65.90	-1.3	4.77	4.77	3	0.00	14.0	8295.89	1329.27	1746.39	1.00
10	85.35	73.98	-1.3	4.77	4.77	3	0.00	14.0	9336.04	1388.22	1965.44	1.00
11	90.12	83.72	1.4	4.89	4.89	3	0.00	14.0	10595.73	1451.26	2160.70	1.00
12	95.00	91.08	1.4	4.89	4.89	3	0.00	14.0	11564.58	1442.29	2357.75	1.00
13	99.89	96.37	4.2	4.81	4.83	3	0.00	14.0	12279.88	1380.78	2523.44	0.99
14	104.70	102.41	4.2	4.81	4.83	3	0.00	14.0	13098.50	1302.75	2691.24	0.99
15	109.52	107.38	6.9	4.79	4.83	3	0.00	14.0	13790.52	1190.20	2825.73	0.99
16	114.31	112.26	6.9	4.79	4.83	3	0.00	14.0	14480.16	1043.11	2966.19	0.99
17	119.10	129.01	9.6	5.29	5.37	3	0.00	14.0	16723.12	945.00	3077.03	0.99
18	124.40	106.23	9.6	4.22	4.29	2	0.00	35.0	13809.98	562.49	3039.20	0.94
19	128.62	114.96	12.4	4.47	4.57	2	0.00	35.0	14944.53	382.00	3044.92	0.93
20	133.09	117.24	12.4	4.47	4.57	2	0.00	35.0	15240.66	127.33	3099.95	0.93
21	137.55	131.11	14.8	4.91	5.08	2	0.00	35.0	17044.62	0.00	3089.75	0.92

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 22      142.47    132.65    15.1     4.91     5.09     2       0.00    35.0
17244.61        0.00      3119.34    0.92
 23      147.38    124.97    17.8     4.60     4.83     2       0.00    35.0
16246.26        0.00      3074.73    0.91
 24      151.97    125.22    17.8     4.60     4.83     2       0.00    35.0
16279.18        0.00      3080.96    0.91
 25      156.57    122.87    20.5     4.52     4.83     2       0.00    35.0
15972.82        0.00      3008.42    0.91
 26      161.09    122.02    20.5     4.52     4.83     2       0.00    35.0
15862.80        0.00      2987.70    0.91
 27      165.61     98.73    23.3     3.69     4.02     2       0.00    35.0
12834.76        0.00      2894.04    0.91
 28      169.31     97.41    23.3     3.69     4.02     2       0.00    35.0
12663.02        0.00      2855.32    0.91
 29      173.00     38.64    23.3     1.48     1.61     2       0.00    35.0
5017.19         0.00      2824.92    0.91
 30      174.48    111.53    26.0     4.34     4.83     2       0.00    35.0
14414.99        0.00      2707.38    0.91
 31      178.82    108.63    26.0     4.34     4.83     2       0.00    35.0
13936.64        0.00      2617.54    0.91
 32      183.16    117.10    28.7     4.84     5.52     2       0.00    35.0
14897.58        0.00      2450.81    0.91
 33      188.00     82.14    28.7     3.62     4.13     2       0.00    35.0
10388.72        0.00      2283.78    0.91
 34      191.62     84.06    31.5     4.12     4.83     2       0.00    35.0
10598.92        0.00      2851.79    0.91
 35      195.74     73.69    31.5     4.12     4.83     2       0.00    35.0
9250.18         0.00      2682.18    0.91
 36      199.86     55.06    34.2     3.57     4.32     2       0.00    35.0
6872.10         0.00      2373.99    0.92
 37      203.43     46.40    34.2     3.57     4.32     2       0.00    35.0
5746.55         0.00      2134.48    0.92
 38      207.00      9.73    34.2     0.85     1.02     2       0.00    35.0
1180.36         0.00      1971.13    0.92
 39      207.85     17.82    36.9     1.68     2.11     2       0.00    35.0
2147.56         0.00      1833.56    0.93
 40      209.53     26.59    36.9     3.02     3.77     2       0.00    35.0
3214.80      1138.41      1005.71    0.93
 41      212.55     19.75    36.9     3.02     3.77     2       0.00    35.0
2325.52       620.30       613.55    0.93
 42      215.57      8.79    39.6     1.90     2.47     1      50.00    26.0
1002.33       118.23       403.73    1.02
 43      217.47      7.05    39.6     2.53     3.29     1      50.00    26.0
803.91          0.00       228.52    1.02
 44      220.00      2.60    39.6     3.00     3.90     1      50.00    26.0
296.83          0.00        56.27    1.02
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     X-S Area:    3160.52    Path Length:    183.45              X-S Weight:
404982.75
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BURNCO Colorado LLC
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Henderson, CO
80640

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Attachment B

Exhibit M – Other Permits

EXHIBIT M – OTHER PERMITS AND LICENSES

The information provided in this Exhibit is intended to satisfy the requirements outlined in Section 6.4.13 of the Colorado Mined Land Reclamation Board Construction Material Rules and Regulations:

The Operator has all appropriate permits:

- AIR PERMIT 14WE1415F (CURRENTLY UNDER REVISION)
- STORMWATER PERMIT COG502166
- WELD COUNTY USR 1435 (TO BE REVISED)