J&T Consulting, Inc.

June 21, 2024

Mr. Brock Bowles
Environmental Protection Specialist
State of Colorado
Division of Reclamation, Mining, and Safety
Physical Address:
1313 Sherman Street, Room 215
Denver, CO 80203
Mailing Address:
Division of Reclamation, Mining and Safety, Room 215
1001 East 62nd Avenue
Denver, CO 80216

RE: Ogilvy River Farm Pit (Permit No. M-2024-006)
Adequacy Review #1

Dear Mr. Bowles,

Ogilvy River Farm, LLC has received the Division's Adequacy Review #1 letter dated April 26, 2024. Below are the comments and the corresponding responses that we have provided to address the comments.

Comments

6.4.4 Exhibit D - Mining Plan

1. The chart on page D1 shows that 45.06 acres will be mined, 2.34 acres as roads the remaining 24.51 acres as disturbed. Can you describe how the 24.51 acres will be disturbed? The type of disturbance in this area needs to be described in clear detail because of its proximity to the South Platte River.

Response: The chart on page D1 has been updated to show where disturbed acres are located. The disturbed areas will be adjacent to the mining slopes, and the area where the scale/scale house will be located adjacent to the access road. The majority of the area south of the existing road will not be disturbed adjacent to the South Platte River.

2. The mining plan shows that the mining faces will be mined to 2h:1v. After mining is complete, the mining faces will be backfilled to 4.5h:1v. Where is the backfill material coming from? What is the volume of the backfill material?

Response: The backfill material will come from the overburden and clay that is at the site. Per the soil boring logs and volume calculations there is enough material on-site that can be used for the construction of the reclaimed slopes. The total volume of the backfill material is 1,146,176 cubic yards.

6.4.6 Exhibit F – Reclamation Plan Map

3. The area south of the access road is shown as being topsoiled and seeded, although no mine related disturbance is proposed in this area. Please clarify why this area is being topsoiled and seeded.

Response: The acreage has been updated to show where disturbed acres are located and the majority of the area south of the existing road will not be disturbed adjacent to the South Platte River. Exhibit F1 – Reclamation Plan Map and Exhibit F2 – Reclamation Plan Seeding Map have been updated to reflect the updated area to be topsoiled and seeded. The Final Land Use table in Exhibit E has also been updated to reflect this change.

4. The area south of the access road is shown as being completely covered with topsoil and seeded. Exhibit C1 shows that a large portion of the area contains buildings, paddocks, driveways, and easements. Are all these areas intended to be topsoiled also?

Response: The acreage has been updated to show where disturbed acres are located and the majority of the area south of the existing road will not be disturbed. The area adjacent to the existing paddocks, driveway, and easements will not be topsoiled and seeded. Exhibit F1 – Reclamation Plan Map and Exhibit F2 – Reclamation Plan Seeding Map have been updated to reflect the updated area to be topsoiled and seeded.

6.4.7 Exhibit G – Water Information

5. The text on page G-1 states that the reservoir surface area will be 44.71 once reclamation is complete. The chart on page E-1 shows that the water surface area will be 37.63 for final land use. Please clarify the final surface water area of the reservoir.

Response: The final surface water area of the reservoir will be 37.63 acres. The text on page G-1 has been updated to match the chart on page E-1.

6. The Piezometer Location Map was not included with the application. Please submit the Piezometer Location Map for review.

Response: The piezometer location map has been included with the attachments to this letter.

7. The baseline data provided from SGS Laboratories test results are for MW-1 and MW-3, not MW-1 and MW-4 as suggested in the Operators plan for establishing baseline. Please clarify as needed.

Response: The operator's plan has been updated and all monitor wells will be included for establishing the baseline information.

8. The results also show that the water tested was not filtered as required by Reg. 41. Benchmark concentrations for metals listed in Reg. 41 are for dissolved metal concentrations, not total metals. Therefore, the results provided from November 17,

2023, are not suitable for comparison to the standards in Reg. 41 and will not contribute to the necessary 5 consecutive quarters of required testing to establish baseline.

Response: The SGS samples were filtered for the dissolved metals testing. See updated information from SGS regarding the samples.

9. The Division suggests that to better establish baseline the Operator should sample all four monitoring wells for a minimum of 5 consecutive quarters and have the samples filtered as required before testing for the specified analytes from Tables 1-4 of Reg. 41.

Response: The operators plan has been updated and all monitor wells will be included for establishing the baseline information. When obtaining a monitor well sample typically at least 3 well volumes will be taken from the well to make sure a true groundwater sample is obtained. During the purging time, measuring pH, temperature, EC will occur at different times until stabilization occurs. Then the sample will be collected and placed in the lab provided bottle(s) for unfiltered samples. The sample will then be filtered prior to placement into the lab bottle(s) for SGS to run the testing on for the dissolved metals from Table 41. Sampling and collection of the groundwater from the monitor wells will reference the USGS National Field Manual for Collecting Water Quality Data Chapter A.4 Collection of Water Quality Samples and EPA Region 9 Groundwater Sampling Guide. The plan has been updated to include the process discussed in the response to Comment 10 below for collection of the samples.

10. The Operator should be required to collect water levels of the monitoring wells monthly and collect analytical data quarterly before and after establishing the baseline. This plan should be maintained until baseline data is provided and approved by DRMS and any proposed modifications to this sampling plan are approved by DRMS

Response: Ogilvy River Farm, LLC commits to collect water levels in the monitoring wells monthly and collecting analytical data quarterly for the water quality baseline information. This plan will be maintained to establish baseline data and submit to the DRMS for approval as well as during the operation of the mine.

11. The Operator should provide graphs to accompany a data table showing the depth of water versus time.

Response: Ogilvy River Farm, LLC commits to providing graphs to accompany the data table showing the depth of groundwater versus time.

12. The Operator should clarify if the samples are filtered in the lab by SGS Laboratories.

Response: The updated information is included from SGS clarifying the samples thus far were filtered for the dissolved metals testing. The operator's plan has been updated where the samples will be filtered in the field prior to delivery of the samples to SGS laboratories.

13. The Division suggests that the Operator uses the northwest monitoring well as a background water quality sampling location and the remaining three monitoring wells as points of compliance (POC) for the long-term groundwater monitoring plan. The Division is open to reducing the number of POC wells for the operation over time if a subsequent request, submitted as a Technical Revision, and supported by the provided data is approved by the Division.

Response: Ogilvy River Farm, LLC commits to using the northwest monitoring well as a background water quality sampling location after the baseline data is established. Ogilvy River Farm, LLC commits to using the remaining three monitoring wells as points of compliance for the long-term monitoring plan.

6.4.8 Exhibit H – Wildlife Information

14. The very western portion of the pit area is within ½ mile radius of a bald eagle's nest. The text states that no activity should occur in this area from December 1 through July 31. Activity proposed during this time requires prior consultation with CPW and/or USFWS. Will slurry wall construction and mine development take place outside of this timeframe to protect the bald eagle's nest?

Response: Slurry wall construction and mine development are currently planned to take place outside of this timeframe. Consultation with CPW and/or USFWS will occur prior to slurry wall construction and mine development if those activities are contemplated to take place within the December 1st through July 31st timeframe. Ecological Resource Consultants (ERC) would assist with consultation with CPW and/or USFWS.

15. The southern end of the permit area is within the 1/3 mile radius of a red-tailed hawk nest. It is recommended that no activity occurs within this area February 15 through July 15. Any ongoing activities need to happen outside of this time period. Activity proposed during this time requires prior consultation with CPW. Will slurry wall construction and mine development take place outside of this timeframe to protect the red-tailed hawk's nest?

Response: Slurry wall construction and mine development are currently planned to take place outside of this timeframe. Consultation with CPW will occur prior to slurry wall construction and mine development if those activities are contemplated to take place within the February 15th through July 15th timeframe. Ecological Resource Consultants (ERC) would assist with consultation with CPW.

6.4.12 Exhibit L – Reclamation Costs

16. A cost estimate was not completed at this time because a significant amount of information needed to complete an estimate was requested in this adequacy review. A cost estimate will be completed when the information is received, and J&T Consulting will have an opportunity to review/comment on it.

Response: Acknowledged. Exhibit L has been updated to reflect the revised reclaimed areas taking into account the undisturbed areas.

6.4.19 Exhibit S – Permanent Man-made Structures

17. A setback of 59 feet from the mining limit to the gravel road was demonstrated as meeting the MLRB requirements for Case SS-2. Can you clarify the distance from the mining limit to the irrigation canal?

Response: Yes, the distance from the mining limit to the irrigation canal is 73 feet.

18. A setback of 39 feet from the mining limit to the gravel road was demonstrated as meeting the MLRB requirements for Case SS-3. Can you clarify the distance from the mining limit to the fence line?

Response: Yes, the distance from the mining limit to the fence line is 57 feet.

19. A setback of 36 feet from the mining limit to the gravel road was demonstrated as meeting the MLRB requirements for Case SS-4. Can you clarify the distance from the mining limit to the fence line?

Response: Yes, the distance from the mining limit to the fence line is 54 feet.

20. A setback of 59 feet from the mining limit to the gravel road was demonstrated as meeting the MLRB requirements for Case SS-2 during mining conditions. The reclaimed condition proposes a 45-foot setback. How will a 45-foot setback be achieved if a 59-foot setback is required for mining?

Response: The setback should be 59 feet for both the mining and reclamation conditions. The proposed setback shown in the report text for the reclaimed condition should have stated 59 feet to match the mining setback. The stability analysis used a setback of 59 feet at this location for both mining and reclamation conditions. The report has been updated.

Ogilvy River Farm, LLC appreciates your consideration of this adequacy review response.

Please feel free to contact me with any questions or comments.

Sincerely,

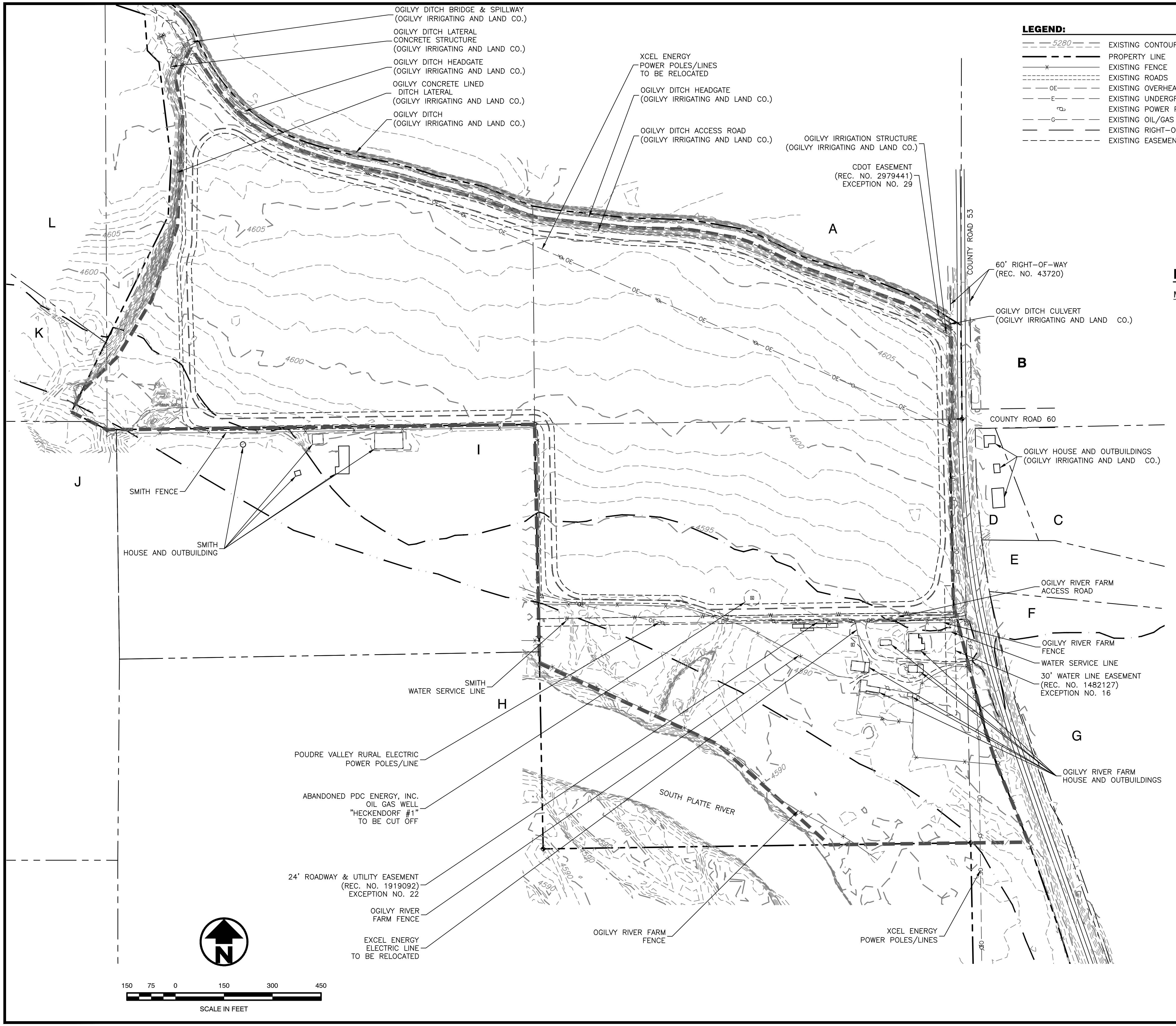
J.C. York

J.C. York, P.E.
J&T Consulting, Inc.

Attachments:

1. Updated Exhibit C1 and C2 Maps
2. Updated Exhibit D
3. Updated Exhibit E
4. Updated Exhibit F1 and F2 Maps
5. Updated Exhibit G
6. Piezometer Location Map
7. Updated Groundwater Monitor Well Readings and Charts
8. Updated Groundwater Quality Testing Readings
9. Updated Exhibit H
10. Updated Exhibit L
11. Exhibit S and Slope Stability Report

P:\22032 Todd Bean Gravel Property\Drawings\Plan Sheets\Mining Plan\JT-Bean-Mining.dwg, 1 Exhibit C1 - Pre Mining Plan, 6/18/2024 3:05:29 PM



LEGEND:

5280	EXISTING CONTOURS		SECTION LINE
	PROPERTY LINE		EXISTING 100 YR FLOODPLAIN
X	EXISTING FENCE		EXISTING 100 YR FLOODWAY
	EXISTING ROADS		PERMIT BOUNDARY
OE	EXISTING OVERHEAD ELECTRIC		MINING LIMIT
E	EXISTING UNDERGROUND ELECTRIC		SLURRY WALL
	EXISTING POWER POLE		STOCKPILE AREA
G	EXISTING OIL/GAS LINE	A	PROPERTY OWNER MAP ID
	EXISTING RIGHT-OF-WAY	B-1	SOIL BORING LOCATION
	EXISTING EASEMENT	MW-1	MONITORING WELL LOCATION

PROPERTY OWNERS WITHIN 200 FEET

MAP ID	NAME/ADDRESS	ASSESSORS ID NO.
A	STEPHEN & LUANN ZEHNADER 29251 COUNTY ROAD 53 GREEEY, CO 80631	096305400002
B	CLA TRUST 1804 SEASHELL CT WINDSOR, CO 80550	096304300019
C	JAKE & VICKIE MILLER 26150 COUNTY ROAD 60 GREELEY, CO 80631	096309000012
D	OGILVY IRRIGATING & LAND CO 26002 COUNTY ROAD 60 GREELEY, CO 80631	096309000012
E	ABLUDUCYN LAND LLC 28904 COUNTY ROAD 53 GREELEY, CO 80631	096309000089
F	TERRY & ROBERTA VIDER 28900 COUNTY ROAD 53 GREELEY, CO 80631	096309000090
G	OGILVY RIVER FARM LLC 1695 COLORADO PKWY EATON, CO 80615	096309200006
H	LOWER LATHAM RESERVOIR COMPANY 8209 W 20TH ST, STE A GREELEY, CO 80634	096308000024
I	ROBERTA SMITH 28879 COUNTY ROAD 53 GREELEY, CO 80631	096308000026
J	RONALD & MARSHA BAKER LIVING TRUST 28806 COUNTY ROAD 51 GREELEY, CO 80631	096308000027
K	SCOUT ISLAND FARMS LLC C/O MARK KROSS PO BOX 766 WINDSOR, CO 80528	096305000037
L	CORPORATION OF THE PRESIDING BISHOP 50 E NORTH TEMPLE, FL 22 SALT LAKE CITY, UT 84150	096305300055

VEGETATION:

ALL AREAS WITHIN THE PERMIT BOUNDARY ARE CURRENTLY AGRICULTURAL CROP AND PASTURE LAND, GRAVEL ROADS, OR BUILDINGS.

NOTE:

OGILVY RIVER FARM, LLC IS THE SURFACE AND SUBSURFACE OWNER WITHIN THE PERMIT AREA.

PERMIT AREA = 71.91 AC

MINING AREA = 45.06 AC

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Ogilvy River Farm Pit

Exhibit C1 - Pre Mining Plan

Ogilvy River Farm, LLC.

REVISIONS

No	Date	By	Chk	Description
1	6.17.24	TPY	JCY	Adequacy Review 1

J&T CONSULTING

J.C. York

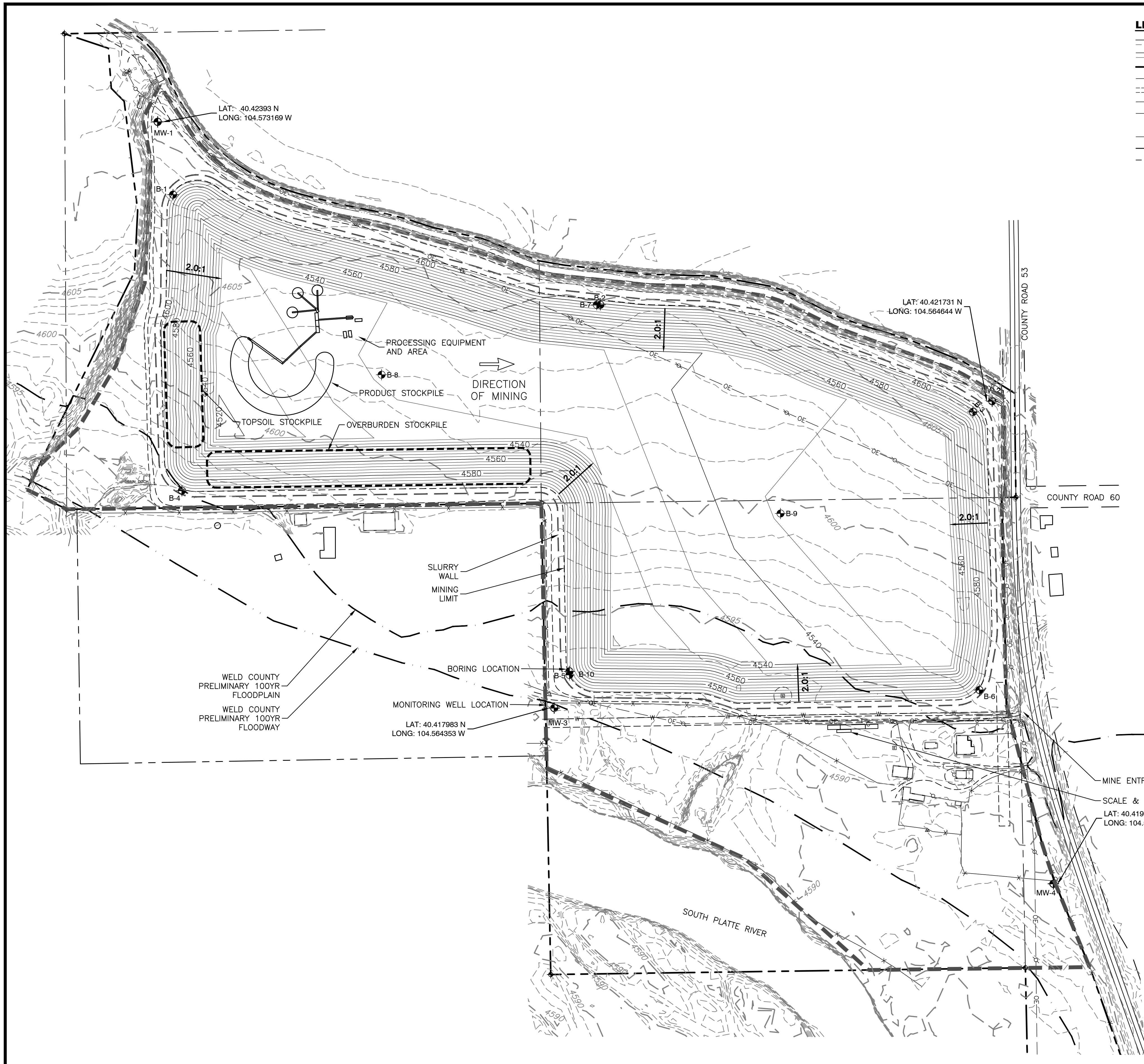
Job #	22032
Date	02.22.24
Drawn By	KJL/TWT
Designed By	TPY
Checked By	JCY
File	JT-Bean-Mining.dwg
Scale	As Shown

Sheet: 1 Of: 2

P:\22032 Todd Bean Gravel Property\Drawings\Plan Sheets\Mining Plan\JT-Bean-Mining.dwg, 2 Exhibit C2 - Mining Plan Map, 6/18/2024 3:05:31 PM

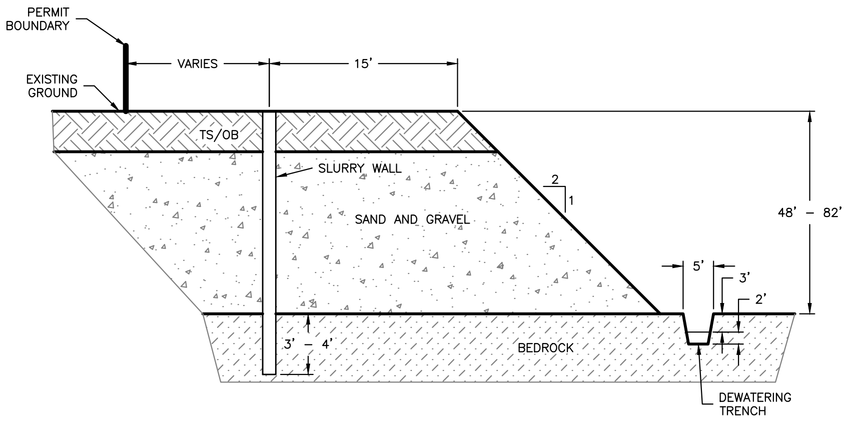
LEGEND:

5280	EXISTING CONTOURS
5280	PROPOSED CONTOURS
	PROPERTY LINE
x	EXISTING FENCE
	EXISTING ROADS
OE	EXISTING OVERHEAD ELECTRIC
E	EXISTING UNDERGROUND ELECTRIC
	EXISTING POWER POLE
G	EXISTING OIL/GAS LINE
	EXISTING RIGHT-OF-WAY
	EXISTING EASEMENT
	SECTION LINE
	EXISTING 100 YR FLOODPLAIN
	EXISTING 100 YR FLOODWAY
	PERMIT BOUNDARY
	MINING LIMIT
	SLURRY WALL
	STOCKPILE AREA
A	PROPERTY OWNER MAP ID
B-1	SOIL BORING LOCATION
MW-1	MONITORING WELL LOCATION



PERMIT AREA = 71.91 AC
MINING AREA = 45.06 AC

150 75 0 150 300 450
SCALE IN FEET



TYPICAL MINING SECTION
N.T.S.

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www.jt-consulting.com

Ogilvy River Farm Pit
Exhibit C2 - Mining Plan Map

Ogilvy River Farm, LLC.

REVISIONS

No	Date	By	Chk	Description
1	6.17.24	TPY	JCY	Adequacy Review 1

J&T CONSULTING
J.C. York

Job #	22032
Date	02.22.24
Drawn By	KJL/TWT
Designed By	TPY
Checked By	JCY
File	JT-Bean-Mining.dwg
Scale	As Shown

Sheet: 2 Of: 2

EXHIBIT D

Mining Plan

Mining Limits

Ogilvy River Farm, LLC proposes to mine in the land located in the Southeast ½ of the Southeast ¼ of Section 5, Township 5 North, Range 64 West of the 6th Principal Meridian and the Northeast ¼ of the Northeast ¼ of Section 8, Township 5 North, Range 64 West of the 6th Principal Meridian, in Weld County, Colorado.

The proposed mining site is located approximately 1,500 feet south of WCR 60½, is adjacent to WCR 53 on the side, and is adjacent to the South Platte River on the south side of the site. WCR 53 is immediately adjacent to the east side of the permit boundary and the South Platte River is immediately adjacent to the south side of the permit boundary. Access to the site will be located at the east side of the permit boundary off of WCR 53. The dominant land use surrounding the property is agricultural and industrial.

The permit boundary will encompass approximately 71.91 acres which will all be affected acreage, and approximately 45.06 acres being mined. The remaining area will consist of access roads/scale/scale house, and disturbed/undisturbed land. The following table depicts the different affected acreage:

Affected Acreage	**Mining Plan Area (acres)**
Mined Area	45.06
Access Roads / Scale / Scale House	3.29
Disturbed Land Adjacent to Mining Slopes and Scale/Scale House	7.78
Undisturbed Land	15.78
TOTAL	**71.91**

Various setbacks from adjacent roads, adjacent structures, and oil and gas infrastructure will be maintained as mining occurs. All setbacks specified in the surface use agreements with the oil/gas companies will be followed. The final executed agreements are expected to be obtained in the near future and will be forwarded to the Division when they are available. A minimum 200-foot setback from any existing oil/gas facility will be maintained until that time. See Exhibit C, Mining Plan Map, and the Slope Stability Report for the mining limit configuration and information on setbacks and their locations. The abandoned wells would be cutoff after mining has reached the bedrock surface or the reclaimed slope surface where a new cap and any additional concrete for the existing plug would be needed. Petroleum Development Corporation (PDC) is the leaseholder and operator of the existing abandoned wells. Discussions with PDC have indicated they would cut down the existing casings as mining occurs. We have also worked with McCarty Engineering, LLC to provide this service at other mining permit locations for other operators. If PDC does not want to perform this work then McCarty Engineering, LLC would be contacted to do it. They are licensed and bonded to obtain approvals from the COGCC to do these types of re-plug services on abandoned oil and gas wells.

Products

Sand and gravel will be the primary product produced from the Ogilvy River Farm Pit. The principal intended use for the sand and gravel is for road base and construction aggregates.

Subsurface drilling and testing have verified that the Ogilvy River Farm Pit property contains a significant commercial deposit of sand and gravel. The depth of interbedded sandy clays at the surface range from 1 to 11 feet. The thickness of the aggregate material ranges from 46 to 81.5 feet where bedrock contact occurs.

Mining Methods

The deposit will be dry mined after a slurry wall is constructed around the perimeter of the mining area. Mining will not expose groundwater prior to the slurry wall being constructed. Design specifications for the slurry wall and quality control procedures used during construction will ensure that the reclaimed reservoir meets State Engineer's Office (SEO) performance standards. Dewatering trenches will be excavated around the perimeter of the mining area prior to mining operations commencing. The depth of the ditches will vary as the mining progresses deeper into the alluvium in order to maintain the groundwater level below the bottom of the active mining surface, and therefore minimize the exposed groundwater surface area. The dewatering ditches will flow to a collection pond, from which the water will be pumped and discharged where it will reach the South Platte River.

The equipment and facilities may include, but are not limited to the following:

Scaling Equipment

A scale house and scale will be used to weigh trucks and product leaving the pit. The dimensions of the scale house are 40’ x 12’ and the scale will be 70’ by 10’. The scale house will be founded on typical trailer type jacks and tiedowns on top of concrete pads with minimal rebar to provide reinforcement. The scale will also be founded on concrete pads with reinforcement where load cells are located for the scale. These foundations would be removed once the pit is fully mined.

Processing Equipment

Screens, wash plant, crusher, conveyors, stackers, and other miscellaneous processing equipment. All processing equipment will be mobile and temporary without fixed foundations. Washing will occur at the wash plant and excess water from the washing will be recycled to the wash water ponds within the processing area, there will be a sedimentation pond that will receive the excess water first and then and overflow from the sedimentation pond to the clear water pond for re-using the water and pumping back to the wash plant.

Earth Moving Equipment

Dozers, loaders, scrapers, excavators, and compactors will be used for mining and earth moving operations.

Haul Roads and Access Roads

Haul roads will be graded and constructed using the existing pit run where needed outside the processing area in order to move material from the mine using haul trucks, loaders, or scrapers. These roads will be mined and removed as the mining is completed.

Access roads to the processing plant will be constructed with aggregates made at the site where the entrance to the permit boundary is located to the scale house and through the scaling area until the access reaches the stockpile locations. The roads around the stockpiles will be constructed from the existing pit run similar to the haul roads.

Miscellaneous Equipment

Dewatering pumps, electrical trailer, generator trailer, small portable generators and watering trucks will be used as needed.

As mining progresses, topsoil and overburden will be stripped to expose the aggregate product below. Topsoil will be stripped and salvaged from areas where overburden material will be stockpiled. All soil and overburden material will be used on-site for reclamation; so long-term stockpiling of these materials is not anticipated. Overburden stockpiles will be located within the proposed mining area. See the attached mining plan in Exhibit C for the stockpile locations.

Mining of the aggregate will progress down to the underlying bedrock. Since reclamation will occur concurrently with mining, it is not anticipated that overburden material will be stockpiled long-term prior to use in production of road base. During mining, the mining the face will have a 2H:1V slope to bedrock or the bottom of the future reclaimed reservoir. The processed aggregate material will be temporarily stockpiled near the portable processing plant.

Recommendations for monitoring of slope stability, including, conducting a visual inspection of the excavated slopes on a weekly basis for the duration of mining, conducting a visual inspection after a major precipitation event that has saturated the ground using the same procedures, contacting qualified personnel to evaluate and recommend remediation work to stabilize the area in the event a visual inspection detects signs of potential slope failure, and if no visible signs of slope failure are detected during mining, reducing visual inspections to once every six months after mining completion, or after every major precipitation event.

All local, State, and Federal rules and regulations will be followed for the storage and handling of any fuel for the facilities.

Topsoil Handling Plan

As stated previously the topsoil will be stripped to expose the aggregate product underlying the topsoil. The topsoil will be stripped using scrapers and stockpiled in the topsoil stockpile as depicted in Exhibit C. Topsoil will be stripped and salvaged from areas where overburden material will be stockpiled. The volume of topsoil is approximately 90,000 cubic yards. The depth of the topsoil is approximately twelve inches over the majority of the mining area. The topsoil will be stripped and stockpiled prior to mining operations. The height of the topsoil stockpile will be approximately 15 feet.

Mine Phasing

Ogilvy River Farm, LLC anticipates mining and reclaiming the 55.78-acre Ogilvy River Farm Pit progressing as shown on the Mining Plan Map. The overall time required to complete the mining and reclamation is estimated to be 5 years 6 months based on an average rate of 650,000 tons per year. The initial production is expected to be 300,000 tons per year with the maximum production expected to be 1,000,000 tons per year. However, it is possible that due to demand fluctuations, mining could progress slower than anticipated and additional time may be required for mining and reclamation of the site.

The mining will progress beginning at the outer edge where material will be moved toward the interior such that the mining slope can be established. The mining slope will be established for the entire perimeter in 3 to 6 feet intervals.

Dewatering

Dewatering trenches will be placed along the perimeter of each mining area. The dewatering trench around the perimeter of the phase being mined will be placed at the toe of the mining slope. As the phase is mined deeper the dewatering trench will be lowered and moved laterally along the mining slope toward the center of that phase. Slurry walls are anticipated to be installed around the perimeter of prior to exposing groundwater and mining will continue to commence in those phases and it is expected minimal dewatering will be required after the slurry walls are installed due to the slurry walls cutting off groundwater infiltration into the pit. Ogilvy River Farm, LLC will have an approved substitute water supply plan and well permit prior to exposing groundwater. The substitute supply plan will be updated annually to account for water that is consumed due to exposing groundwater by the mining operation.

Explosives

Explosives will not be used during mining.

EXHIBIT E

Reclamation Plan

Lined water storage reservoirs will be the final reclaimed use for the Ogilvy River Farm Pit. Portions of mining area will be reclaimed as “native” areas, which will be re-seeded with native vegetation. The mining area will be reclaimed as a water storage reservoir. The remaining area within the proposed permit boundary will consist of reservoir shoreline, unimproved access roads around the reservoirs, and reclaimed vegetated land.

Final Land Use	**Reclamation Plan Area (acres)**
Reservoir Water Surface	37.63
Access Roads	3.15
Reclaimed Vegetated Land (Disturbed Land and Slopes above Reservoir Water Surface)	15.35
Undisturbed Land	15.78
TOTAL	**71.91**

Water Storage Reservoir

In general, the mining limits will be mined down to the shale/claystone/sandstone bedrock. The relatively impermeable bedrock will make the bottom of the reservoir. The reservoir will be separated from the surrounding alluvial aquifer by the slurry wall liner system as detailed in the cross-section shown on the Reclamation Plan Map. The slurry wall liner will be keyed into the bedrock material and extend upward through the height of the alluvium to three feet above the reclaimed normal water surface elevation. Design specifications and quality control procedures used during the construction of the slurry wall liner and clay liner will ensure that the reservoir meets the State Engineer's Office (SEO) performance standards for permeability.

All reservoir slopes will be reclaimed to at least 4.5H:1V final grade. Since reclamation will be concurrent with mining, most soil, overburden, and bedrock material excavated during mining will be used almost immediately. Scrapers and dozers and compactors will be used to shape the reclaimed slope material along the reservoir perimeters to achieve the final grade. Upon placing the backfill material, 95 percent compaction will be achieved to ensure adequate integrity of the liner, backfilled areas for haul/access roads and recharge pond areas that are not within the future water storage/reservoir footprint. Final reclamation by capping with topsoil and re-vegetating above the expected reservoir water level will follow grading operations as well as backfilled areas that will not be haul/access roads to minimize the amount of disturbance at any one time.

Recommendations for monitoring of slope stability, including, conducting a visual inspection of the excavated slopes on a weekly basis for the duration of mining, conducting a visual inspection after a major precipitation event that has saturated the ground using the same procedures, contacting qualified personnel to evaluate and recommend remediation work to stabilize the area in the event a visual inspection detects signs of potential slope failure, and if no visible signs of slope failure are detected during mining, reducing visual inspections to once every six months after mining completion, or after every major precipitation event.

During reclamation activities, inlet and outlet facilities for the reservoir will be designed and installed once the operational criteria of the proposed reservoir have been identified by an end user.

Reclamation Measures/Materials Handling

Backfilling will be done to provide stabilized shorelines around the reservoir and to minimize erosion. The backfill material will consist of gravel, overburden, clay, and topsoil from on-site materials. There will not be known toxic or hazardous materials in the backfill material. Additionally, it is not likely that acid forming or toxic materials will be encountered during mining. The mining will not leave high walls on the property. In addition, there will be no auger holes, excavations, or shafts left on the property. The auger holes for the gravel investigation were backfilled with native gravel and soil cuttings from the drilling. The auger holes that were not backfilled were the four monitor wells that were constructed and permitted as permanent monitoring wells to monitor groundwater at the north, east, west, and south sides of the permit boundary. Monitor wells will remain on the property so the end user may continue to monitor levels of the groundwater elevations.

Topsoil will be placed to finalize the grading such that seeding can occur. The topsoil will be placed at all disturbed areas and on the mining slope to an elevation matching the expected reservoir water level.

Topsoiling

Approximately the top twelve inches of soil on the property is classified as topsoil. This layer includes the root zone of grasses and crops, which will be stripped and stockpiled separately. Topsoil will be re-handled as little as possible and a Technical Revision will be submitted prior to re-locating topsoil stockpiles. By using concurrent reclamation techniques, the topsoil is not expected to remain in stockpiles for more than one to five years. If the stockpile remains more than one growing season, it will be seeded with a fast-growing vegetative cover to prevent erosion. All topsoil will be retained on-site to reclaim the reservoir shoreline, and other areas disturbed by mining activities. Where required, topsoil will be replaced to a depth of twelve inches. Prior to placing topsoil uneven areas and low spots will be graded to subgrade elevation, in addition debris, roots, branches, stones, in excess of 2 inch in size will be removed. Scarify surface to depth of 8 inches where topsoil is to be placed for a roughened condition to assist in eliminating erosion. Scarify/cultivate in areas where equipment used for hauling and spreading topsoil has compacted subsoil. Place topsoil during dry weather and on dry unfrozen subgrade. Remove vegetable matter and foreign non-organic material from topsoil while spreading. Grade topsoil to eliminate rough, low or soft areas.

Revegetation

As mining operations are completed, areas for reclamation will be graded and shaped for revegetation. Runoff or excess water from adjacent areas will not be allowed to flow over slopes being graded and seeded. If needed, berms or channels will be constructed to divert excess water and convey it in a safe and non-erosive manner.

For disturbed areas, the reclamation plan includes re-vegetating with appropriate seed mixes to minimize erosion and re-establish natural terrain. A proper seedbed is firm and free of competing vegetation. Correct firmness is when an adult footprint is only slightly visible on the prepared bed prior to the seeding operation. The seedbed can be firmed, if needed, by pulling a commercial or homemade packer or roller. A firm seedbed is essential for proper seeding depth prior to using the mechanical seeder or broadcasting seed. Apply seed evenly in two intersecting directions. Rake in lightly. Apply seed at the vendor's recommended bulk seed rate/acre according to the quantity of PLS contained in their bulk seed to achieve the specified PLS/acre rate utilizing a mechanical seeder. Where access is limited and seed is applied by hand broadcasting, apply the seed mix at twice the PLS rate per acre and rake in once broadcasting in completed. Do not seed areas in excess of that which can be mulched on same day. Do not sow immediately following rain, when ground is too dry, or when winds are over 10 mph. Immediately following seeding, apply mulch to thickness of 1/4 inch.

The seed mixture below was selected as recommended by the DRMS for this climate zone (Dryland Quick Establishment, elevation less than 8,000 feet). Reservoir side slopes below the anticipated reservoir water level will not be seeded. The proposed seed mix is shown in the following table.

Reclamation and Temporary Stockpile Seed Mix

Seed Mix	Species	Scientific Name	Application Rate * (#PLS/acre)
Grasses	Intermediate Wheatgrass	*Thinopyrum intermedium*	2.50
	Slender Wheatgrass	*Elymus trachycaulus,*	2.00
	Pubescent Wheatgrass	*Thinopyrum intermedium*	3.00
	Russian Wildrye	*Psathyrostachys juncea*	3.00
	Western Wheatgrass	*Pascoprum smithii*	2.00
	Sand Dropseed	*Sporobolus cryptandrus*	0.25
*Application rate is for drilling the seed. If seed is to be broadcast, the application rate will be doubled.			

The seed mix for final reclamation as described above does not require fertilizer per the information provided by the DRMS. The seeded areas will be covered with dead crop litter from sorghum or milo crop forage, or with straw mulch at a rate of 2,000 pounds per acre. Ideal seeding dates for Colorado are November 1 to May 1, when the soil is not frozen. Grasses should be seeded when soil moisture and temperature are optimum for germination. Grasses are designated either "cool" or "warm" season based on their growth cycle. Cool-season grasses can be planted when temperatures are cooler and day lengths are short. Warm-season grasses need warmer temperatures and longer day lengths to grow. Refer to Weld County's seeding recommendations as a resource for time frames outside of the ideal seeding times at www.weld.gov/Government/Departments/Public-Works/Weed-Management/Controlling-Weeds/Reseeding.

If a significant invasion of noxious weeds occurs after seeding, the weeds will be mowed before they can go to seed. The areas will be mowed periodically for additional control as needed. Mechanical control will be used as a first priority. Chemical methods will only be used if no other alternative produces acceptable results. See Exhibit J for specifics of the weed control plan.

For temporary earthen stockpiles, the reclamation plan includes re-vegetating with appropriate seed mixes to minimize erosion and establish more rapidly to stabilize the stockpiles. If a temporary earthen stockpile remains more than one growing season, it will be seeded with the seed mix above to prevent erosion.

Water – General Requirement

To minimize the effect on the prevailing hydrologic balance, Ogilvy River Farm, LLC will:

a. Comply with all applicable Colorado water laws.

b. Comply with all applicable Federal and State water quality laws and regulations.

c. Comply with all Federal and State requirements for dredge and fill.

d. Re-grade and backfill all sediment and siltation structures after mining is completed.

e. Monitor groundwater levels adjacent to the site and mitigate any damage to adjacent wells that dewatering activities may have. (See Exhibit G)

Groundwater – Specific Requirements

The operation will not affect groundwater quality on or off the site. The operation will comply with State groundwater quality standards.

The mining and reclamation may affect the groundwater table surrounding the mine site. The proposed mitigation efforts to minimize these impacts are ditches in necessary areas to maintain groundwater levels during the mining, and a perimeter drain if needed to convey groundwater around the lined reservoir after the pit side liner is installed. A ground water model by McGrane Water Engineering, LLC has also been provided and the results indicate that water levels will be affected by +/-1 to 3 ft and the wells within the predicted water level change are in the mounded area so the overall impact of the slurry wall and clay liner will be insignificant and not noticeable because the depth to groundwater is greater than 30 feet at those well locations. Ogilvy River Farm, LLC proposes that they monitor groundwater levels through both interior (within phases of the mining) and exterior (outside the slurry wall lining) monitoring wells that they have installed, or have access to before, during, and after the mining and reclamation is complete so that impacts to the groundwater table, from this mining operation, can be identified and addressed. It is the intent of Ogilvy River Farm, LLC to operate responsibly and to mitigate any damage to wells that is directly attributable to the mining and reclamation of this site.

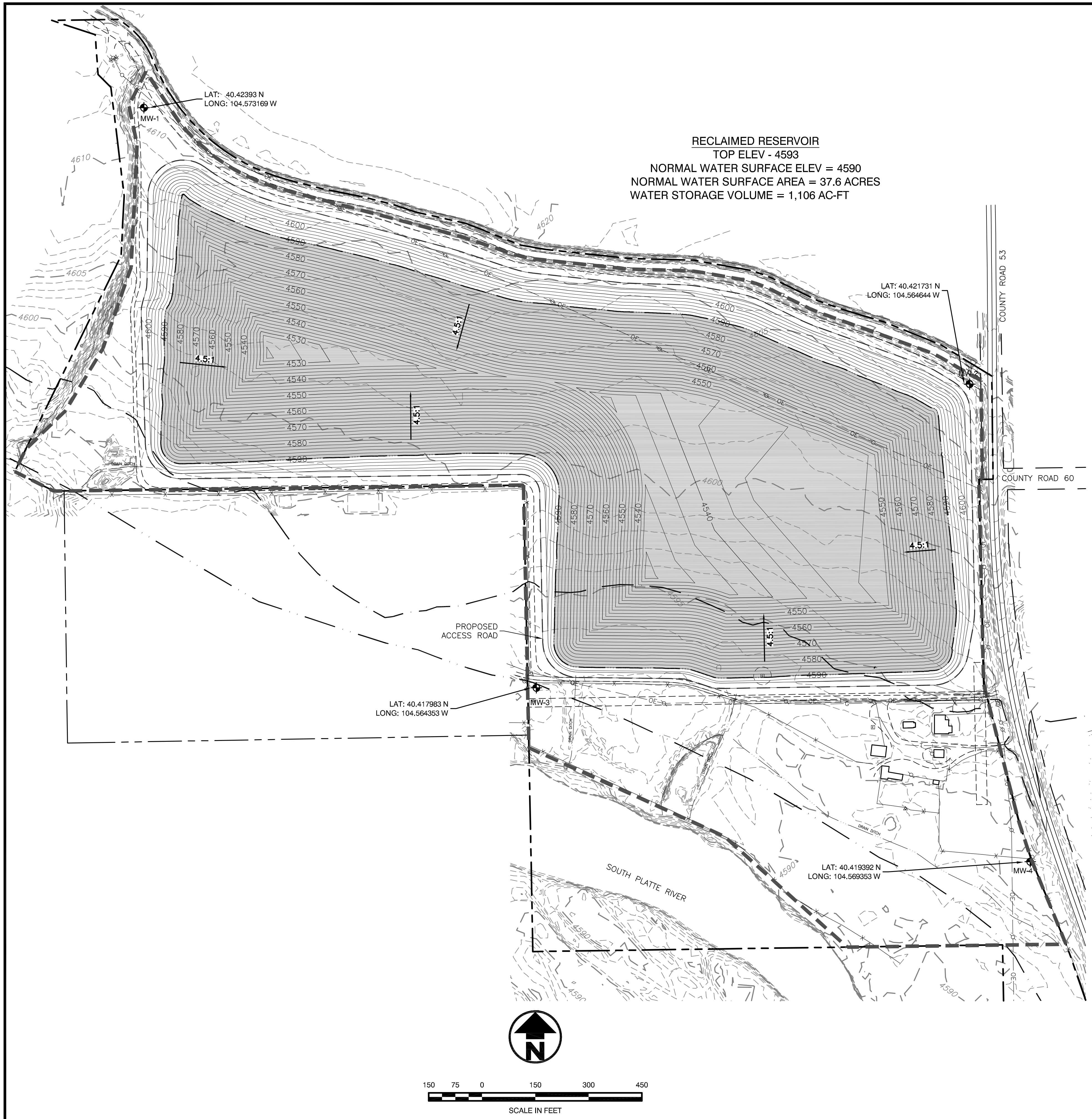
Reclamation – Approximate Time Table

The initial proposed rate of production for the mine is 300,000 tons per year and the maximum proposed rate of production for the mine is 1,000,000 tons per year. The total time frame to mine all phases assuming an average production rate of 650,000 tons per year is approximately 5 years and 6 months. The following table shows the approximate time frame to finish each phase of mining assuming an average production rate of 650,000 tons per year:

Acreage	Time Frame to Complete and Reclaim Phase 1a and Phase 1
71.91 acres	5 years and 6 months

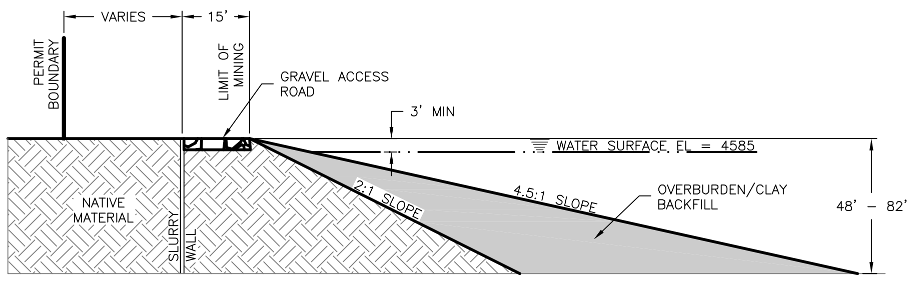
The assumed annual production rate is 300,000 tons initially to 1,000,000 tons maximum for processed material leaving the mine each year. The size and area of reclamation varies but generally consists of the outside mining slope being reclaimed at a 4.5H:1V slope with the addition of clay, overburden, topsoil, and revegetation. For more information on sequencing and size of the reclamation activities refer to Exhibit L financial warranty calculations.

P:\22032 Todd Bean Gravel Property\Drawings\Plan Sheets\Reclamation Plan\JT-Bean Rec.dwg, 1 Exhibit F1 - Reclamation Plan Map, 6/13/2024 9:52:31 AM


RECLAIMED RESERVOIR
TOP ELEV - 4593
NORMAL WATER SURFACE ELEV = 4590
NORMAL WATER SURFACE AREA = 37.6 ACRES
WATER STORAGE VOLUME = 1,106 AC-FT

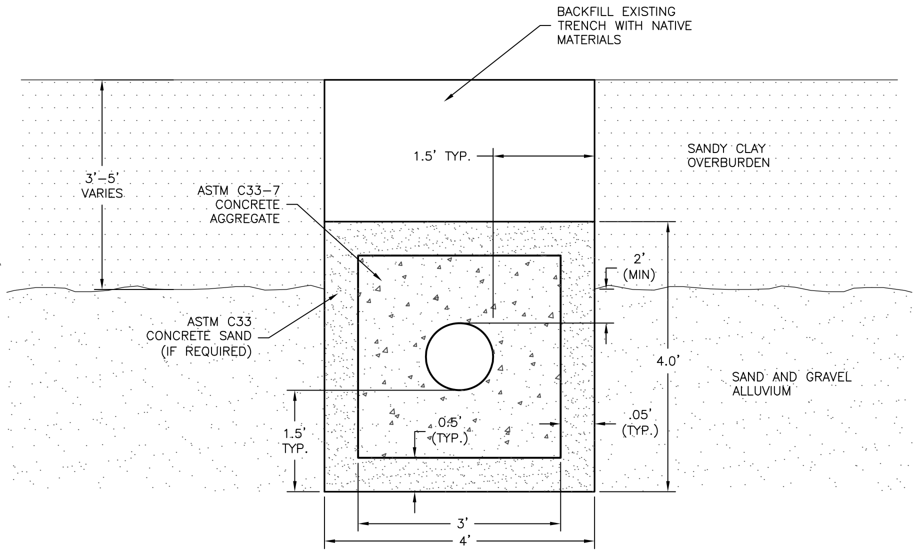
LEGEND:

5280	EXISTING CONTOURS
5280	PROPOSED CONTOURS
	PROPERTY LINE
X	EXISTING FENCE
	EXISTING ROADS
OE	EXISTING OVERHEAD ELECTRIC
E	EXISTING UNDERGROUND ELECTRIC
	EXISTING POWER POLE
G	EXISTING OIL/GAS LINE
	EXISTING RIGHT-OF-WAY
	SECTION LINE
	EXISTING 100 YR FLOODPLAIN
	EXISTING 100 YR FLOODWAY
	PERMIT BOUNDARY
	MINING LIMIT
	SLURRY WALL
▨	WATER SURFACE



TYPICAL RECLAMATION SECTION

N.T.S.



PERIMETER GROUNDWATER DRAIN (TYPICAL SECTION IF REQUIRED)

N.T.S.

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222
www.j-tconsulting.com

Ogilvy River Farm Pit

Exhibit F1 - Reclamation Plan Map

Ogilvy River Farm, LLC.

REVISIONS

No	Date	By	Chk	Description
1	6.13.24	TPY	JCY	Adequacy Reivew 1 Response

J&T CONSULTING

J.C. York

Job #	22032
Date	02.22.24
Drawn By	TPY
Designed By	TPY
Checked By	JCY
File	JT-Bean Rec.dwg
Scale	As Shown

Sheet: 1 Of: 2

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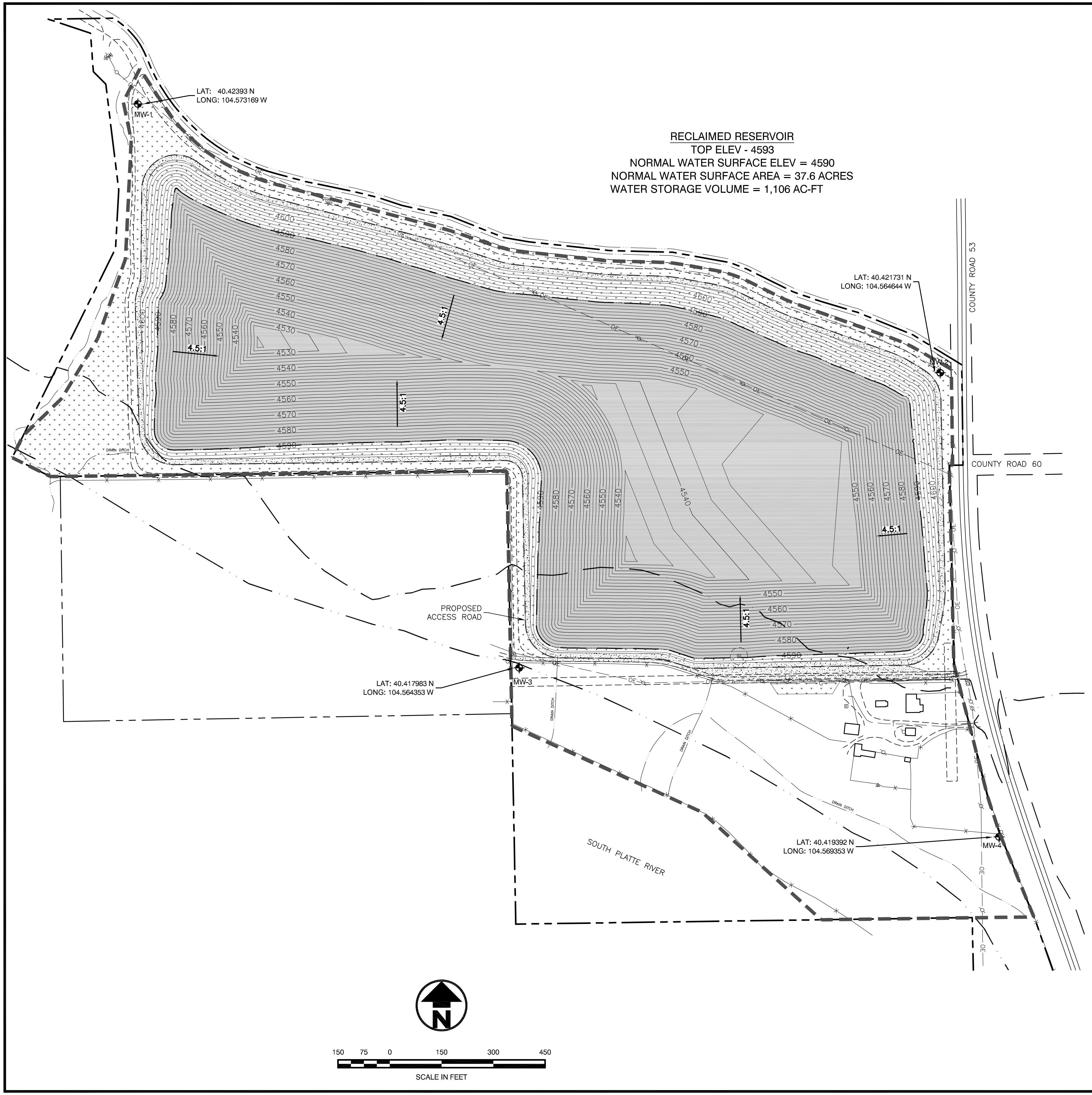

RECLAIMED RESERVOIR
TOP ELEV - 4593
NORMAL WATER SURFACE ELEV = 4590
NORMAL WATER SURFACE AREA = 37.6 ACRES
WATER STORAGE VOLUME = 1,106 AC-FT

LEGEND:

EXISTING CONTOURS	SECTION LINE
PROPOSED CONTOURS	EXISTING 100 YR FLOODPLAIN
PROPERTY LINE	EXISTING 100 YR FLOODWAY
EXISTING FENCE	PERMIT BOUNDARY
EXISTING ROADS	MINING LIMIT
EXISTING OVERHEAD ELECTRIC	SLURRY WALL
EXISTING UNDERGROUND ELECTRIC	WATER SURFACE
EXISTING POWER POLE	SCARIFY, TOPSOIL SEED AREAS
EXISTING OIL/GAS LINE	GRAVEL ACCESS ROADS
EXISTING RIGHT-OF-WAY	

NOTE:

ALL DISTURBED AREAS OUTSIDE OF THE WATER SURFACE WILL BE SEEDED AND MULCHED, WITH THE EXCEPTION OF THE ACCESS ROADS, WHICH WILL BE GRAVEL SURFACED.

RECLAIMED AREA TABULATION:

WATER SURFACE = 37.63 AC
GRAVEL ACCESS ROAD = 3.15 AC
DISTURBED AREAS: SCARIFY, TOPSOIL, SEED AREA = 15.35 AC
UNDISTURBED AREAS = 15.78 AC
TOTAL AREA = 71.91 AC

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Ogilvy River Farm Pit

Exhibit F2 - Reclamation Plan
Seedoing Map

Ogilvy River Farm, LLC.

REVISIONS

No	Date	By	Chk	Description
1	6.13.24	TPY	JCY	Adequacy Reivew 1 Response

J&T CONSULTING

J.C. York

Job #	22032
Date	02.22.24
Drawn By	TPY
Designed By	TPY
Checked By	JCY
File	JT-Bean Rec.dwg
Scale	As Shown

Sheet: 2 Of: 2

EXHIBIT G

Water Information

Introduction

The Ogilvy River Farm Pit mining site is located in the Southeast ½ of the Southeast ¼ of Section 5, Township 5 North, Range 64 West of the 6th Principal Meridian and the Northeast ¼ of the Northeast ¼ of Section 8, Township 5 North, Range 64 West of the 6th Principal Meridian, in Weld County, Colorado. The proposed mining site is located approximately 1,500 feet south of WCR 60½, is adjacent to WCR 53 on the side, and is adjacent to the South Platte River on the south side of the site. WCR 53 is immediately adjacent to the east side of the permit boundary and the South Platte River is immediately adjacent to the south side of the permit boundary. Access to the site will be located at the east side of the permit boundary off of WCR 53. The dominant land use surrounding the property is agricultural and industrial. The operation will consist of sand and gravel production and will not impact the South Platte River in the form of depletions due to a slurry wall that will be installed prior to mining. Mining of the Ogilvy River Farm Pit site will last for approximately 5 years and 6 months. Once reclamation is complete, the water storage reservoir will be created with a total surface area being 37.63 acres.

The depth to groundwater ranges from 3 to 24 feet within the permit boundary (measured in MW-1 through MW-4, See the attached piezometer measurements table). The site will be mined down to a depth of 68 to 85 feet thus exposing groundwater to the atmosphere. This exposed groundwater, along with the operational losses associated with the extraction of sand and gravel deposits, will impact the South Platte alluvial aquifer. These impacts will cause river depletions that must be augmented. Groundwater will be exposed during the mining once the mining depths reach an elevation of approximately 4581 feet.

To enable dry mining at the Ogilvy River Farm Pit mining site, there will be dewatering trenches around the bottom of the mining slope. These dewatering trenches will change in length throughout mining. The maximum length will occur when the cell is completely mined, but before the reclamation has begun. The maximum size of dewatering trench will be 6,500 feet long and 5 feet wide, or 0.75 acres of exposed surface area. The water will be pumped into dewatering ditch, which traverses the site and ultimately into the South Platte River.

As mining progresses, the dewatering trenches will shift to account for additional groundwater being exposed. The gravel pit will have a slurry wall liner constructed prior to the commencing of mining.

Water Requirements

Water use at the Ogilvy River Farm Pit mining site will include evaporation from exposed groundwater, dust control of haul roads and stockpiles, water for the wash plant (i.e. wash screen for concrete rock and sand) and water retained in material removed from the site.

Evaporative Loss

Evaporative losses are dependent on the exposed water surface area, which may shift throughout the mining operation, but will not exceed the maximum. Exposed surface area at the Ogilvy River Farm Pit mining site will include groundwater exposed in the dewatering trenches.

The maximum exposed surface area at the site during mining is estimated at 0.75 acres. Ogilvy River Farm, LLC plans to keep the site dewatered throughout the life of the mine.

Evaporation data was taken from NOAA Technical Report NWS 33, Evaporation Atlas for the 48 Contiguous United States. The annual gross evaporation was determined to be 45 inches for this location. Monthly evaporation percentages are established by guidelines set by the State Engineer's Office. To determine precipitation, data from the National Weather Service for Greeley, CO (UNC) (1967-2023) was used. The long-term average precipitation at the Ogilvy River Farm Pit mining site is estimated at 14.26 inches. Effective precipitation is calculated as 70% of the total precipitation. The net evaporation is the difference between gross annual evaporation and effective precipitation. The resulting net evaporation is 35.02 inches or 2.92 feet.

The maximum annual evaporative loss from the 0.75 acres is 2.19 ac-ft.

Operational Loss

The average annual production from the Ogilvy River Farm Pit mining site is estimated at 650,000 tons. Using 4% moisture content, (2% for moisture in the product and 2% for water used to wash), the total associated consumptive use for water retained in the material mined and water used for washing is 19.1 ac-ft.

Dust control use is 10,000 gal/day, 6 days/week, 4 weeks/month for 10 months of the year. This equates to 7.4 ac-ft.

Maximum annual operational loss is estimated to be 26.5 ac-ft.

Consumptive Use

The maximum annual consumptive use (operational loss + evaporation loss) at this site during the mining operation is estimated to be 28.69 ac-ft.

Replacement Water

The replacement of consumptive uses at the site will be accounted for in a substitute water supply plan (SWSP) approved by the State Engineer. The SWSP will be obtained prior to any mining activities occurring that expose groundwater.

Surrounding Water Rights

The attached Figure 1 Well Permits in the Ogilvy River Farm Pit – Groundwater Evaluation by McGrane Engineering, LLC shows the permitted wells within 600 feet of the mining limits and permitted wells within the boundaries of the groundwater model/evaluation. The well information and locations were obtained from the Division of Water Resources online mapping well permit locator. This well and water rights information was cross checked with the State's CDSS. Between the sources, all permitted and decreed wells are included. Table G-1 below is a corresponding list of wells as numbered in the Ogilvy River Farm Pit – Groundwater Evaluation by McGrane Engineering, LLC that is attached that are within 600 or more feet of the mining limits that were within the 1 to 3 foot mounding area on the north and east side of the pit.

Table G-1 - Permitted and Decreed Wells Within 600 Feet or Area of 1-3 foot mounding not owned by Ogilvy River Farm, LLC								
Map ID	**Permit No**	**Structure ID**	**Well Name**	**Owner**	**Address**	**City**	**State**	**Zip Code**
1	11749		Domestic Well	John Sitzman	Route 4 Box 156	Greeley	CO	80631
2	126287		Domestic Well	Martin Cabrera Orozco	26347 CR 60½	Greeley	CO	80631
3	127910		Domestic Well	Charles L. and Lorene Achziger	29358 Hwy 37	Greeley	CO	80631
4	127911		Domestic Well	William and Jaimi Carlsen	26358 CR 60½	Greeley	CO	80631
5	126291-A		Domestic Well	Rodger and Beth Short	26333 CR 60½	Greeley	CO	80631
6	13379 - R	0105430 - Achziger Well - 13379	Achziger Well 13379	Steven A. and Loann Zehnder	2365 CR 23	Fort Lupton	CO	80621
7	13968 - R	0105276 – Pfeif Well 1 - 13968	Pfeif Well 1 - 13968	Church of Jesus Christ of Latter-Day Saints	139 E S Temple St Ste 110	Salt Lake City	UT	84111-1103
8	55039-F	0106353 - Donily Well 1	Donily Well #1	Arluducyn Land, LLC	P.O. Box 97	Kersey	CO	80644
9	6383 - R	0105429 - Achziger Well #1-6383	Achziger Well #1-6383	Charles and Mary Achziger	Route 1 Box 163	Greeley	CO	80631

At the time of SWSP application/approval, a new gravel pit well permit will be applied for/obtained to include the evaporative and operational losses from the property. If the proposed use of groundwater at the Ogilvy River Farm Pit mining site results in material injury to surrounding wells, Ogilvy River Farm, LLC will ensure that all necessary measures are taken to address the issues.

Water Quality

An NPDES permit will be obtained from the Water Quality Control Division at the Colorado Department of Public Health & Environment for the Ogilvy River Farm Pit mining site prior to discharging any groundwater that is dewatered from the site. This permit will be kept current and amended as necessary to ensure that any water discharged from the site will meet the permitted water quality standards.

Impacts to Groundwater/Hydrologic Balance

Ogilvy River Farm, LLC will monitor the groundwater levels surrounding the site and provide groundwater recharge if necessary via perimeter ditches/ponds. Ogilvy River Farm, LLC will construct these ditches/ponds in the locations where direct discharge to an existing adjacent irrigation lateral is not available to ensure that stabilized groundwater levels are maintained. They will discharge dewatering flows into existing adjacent irrigation laterals where possible to limit the disturbance to the surrounding land. A slurry wall liner is proposed around the mine and will likely be installed prior to the mining starting.

To summarize the mitigation process, as the mining/dewatering occurs, Ogilvy River Farm, LLC will monitor the groundwater levels adjacent to mine as the mining progresses. If groundwater levels drop to a level that prevents an adjacent well from performing acceptably, according to that well's owner, Ogilvy River Farm, LLC will either implement a groundwater recharge ditch/pond near the well in order to raise the groundwater level in the vicinity of the well and hence return it's operation to acceptable standards, or will negotiate an agreement with that well owner to replace the well or provide replacement water via other means until the mining and reclamation activities are concluded but it is not anticipated that any groundwater levels will drop since the slurry wall will be installed prior to exposing groundwater.

Groundwater wells that are not owned by Ogilvy River Farm, LLC are potentially located within 600 feet of the mining limits. The exact physical location of these wells will be determined during the SWSP and well permit application processes. If wells are found to be within 600 feet of the mining limits, Ogilvy River Farm, LLC will either obtain a well waiver from the owner of the well, or provide an agreement with the well owner that Ogilvy River Farm, LLC will mitigate and material damage to the well that is directly attributable to the mining and reclamation of the site.

All other wells within 600 feet of the mining limits are either owned by Ogilvy River Farm, LLC, or are monitoring wells therefore groundwater impacts to these wells do not need to be addressed.

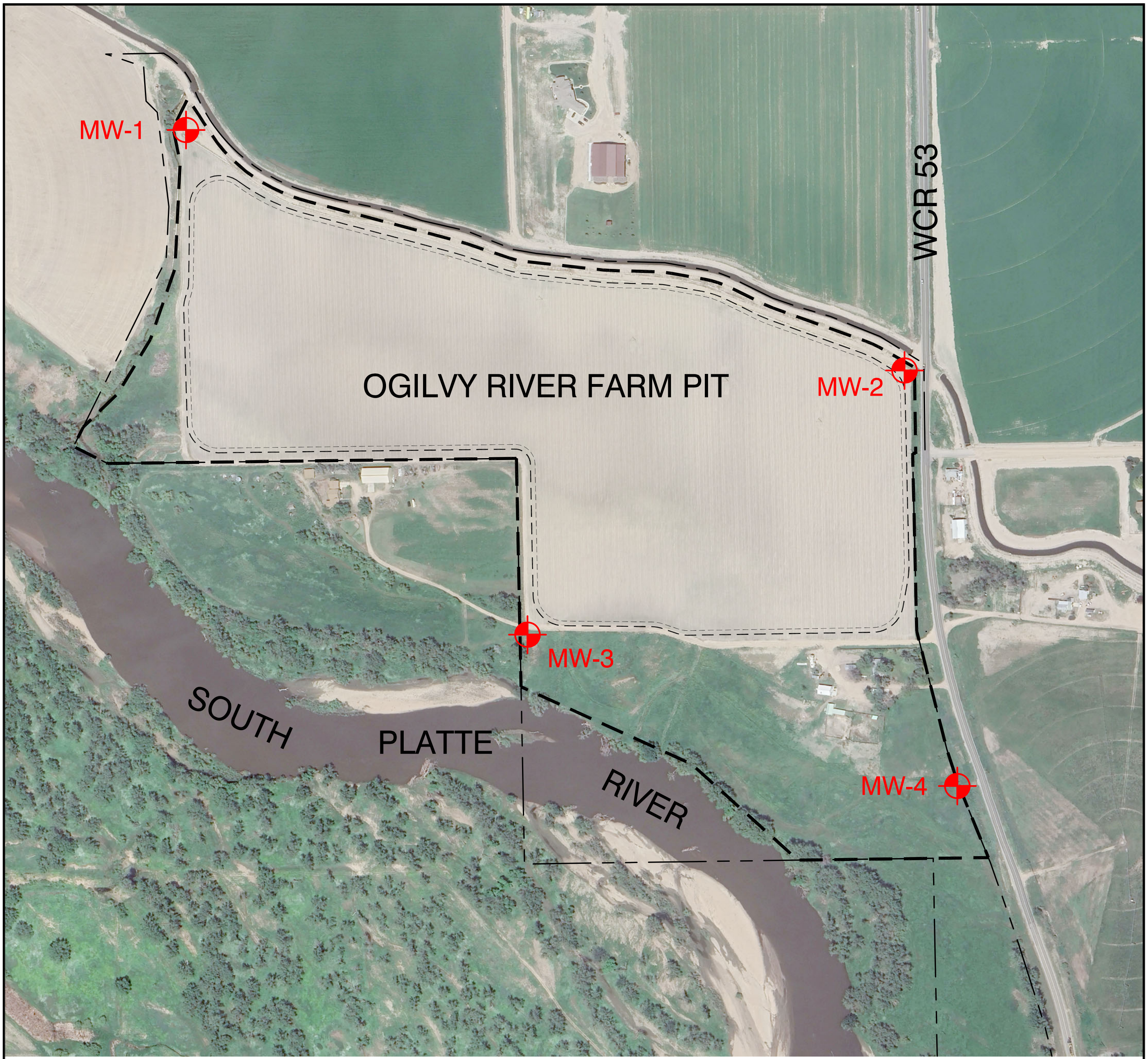
See the attached Piezometer Location Map, and Piezometer Data Summary, which show the locations of monitoring wells around the perimeter of the site that Ogilvy River Farm, LLC has either installed or has access to, and the groundwater level data that has been collected for each well. The groundwater monitoring data will be provided for what has been done to date with this permit application and then submitted in the annual report for the pit to the DRMS after approval of the permit application.

Groundwater Quality Monitoring Plan

The majority of the mining operations at this site will be within the slurry wall lined area. The areas outside of the slurry wall will be limited to the scale house and haul roads for trucks coming into and out of the pit, which are not likely to affect groundwater quality.

To establish pre-mining groundwater quality at the site Ogilvy River Farm, LLC will have two monitor wells sampled quarterly. The upgradient monitor well that will be sampled is MW-1 and the downgradient monitor well that will be sampled is MW-4. The samples will be taken by a qualified consultant and then tested by SGS Laboratories for the analytes listed in Tables 1-4 of the "Basic Standards for Groundwater."

The quarterly sampling will continue until 5 quarters of data has been established. Once the baseline has been established, we would recommend annual sampling to monitor the groundwater quality. The groundwater quality sampling data will be provided for what has been done to date with this permit application/adequacy review and then submitted in the annual report for the pit to the DRMS after approval of the permit application. Ogilvy River Farm, LLC will notify the DRMS within 7 days of receiving a lab report that indicates any of the standards set forth in Tables 1-4 have been exceeded. If a lab report shows an exceedance, a new sample will be taken to verify exceedance or discount potential lab contamination.



LEGEND

- — — PROPERTY LINE
- - - - MINING LIMIT
- - - - SLURRY WALL
- — — PERMIT BOUNDARY
- ⊕ MW-1 PIEZOMETER LOCATION

500 250 0 00

SCALE IN FEET

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
303-857-6222

Ogilvy River Farm, LLC
Ogilvy River Farm Pit
Piezometer Location Map

Date:	6.10.24
Job No:	22032
Drawn:	TPY
Scale:	1" = 500'
Sheet: 1	Of: 1

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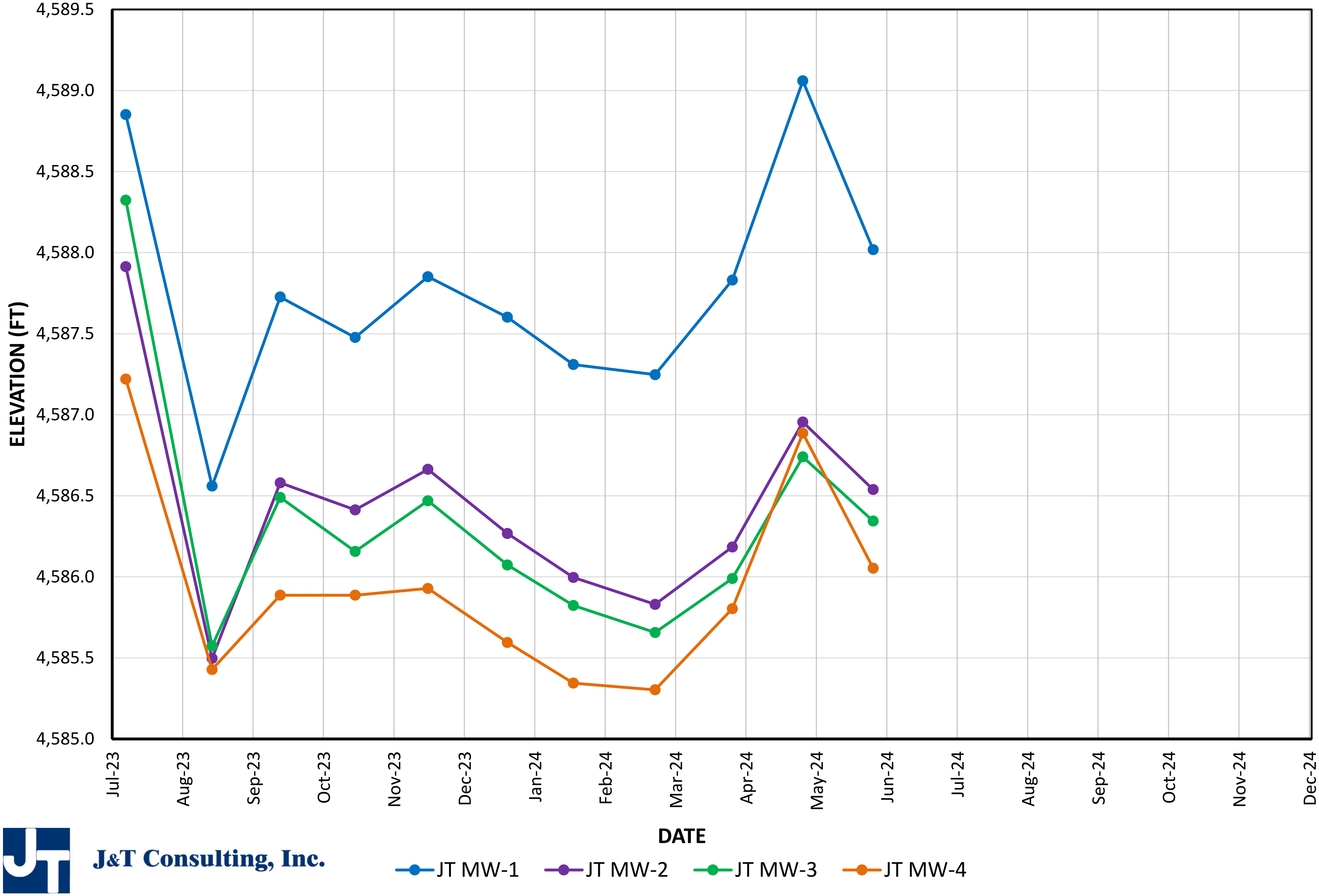
Ogilvy River Farm Pit - Monitor Well Readings

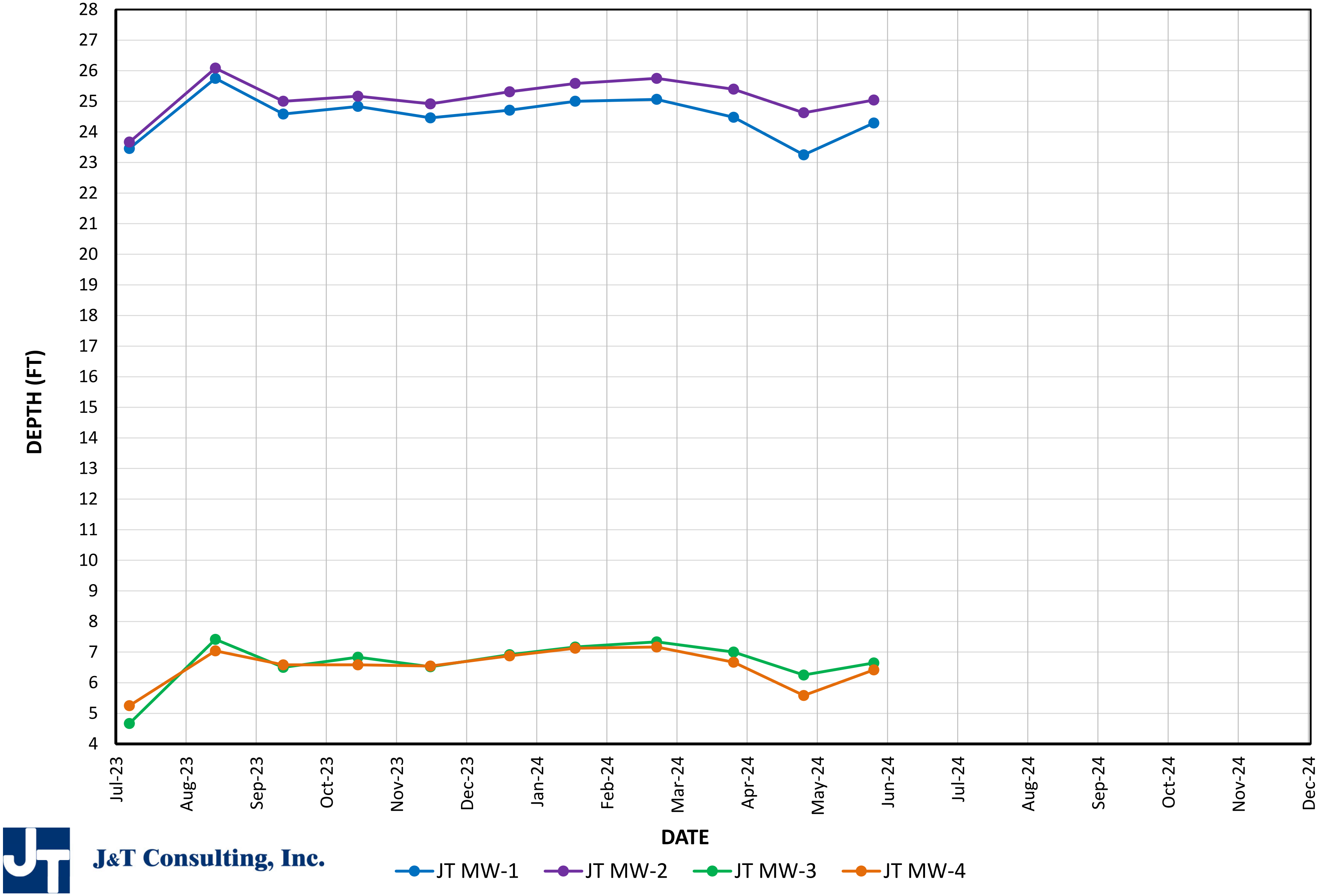
Well Designation	**JT MW-1**			**JT MW-2**			**JT MW-3**			**JT MW-4**		
Description	Northwest Side			Northeast Side			Southwest Side			Southeast Side		
Top of Well Elevation (ft)	4612.31			4611.58			4592.99			4592.47		
Ground Elevation (ft)	4610.25			4609.27			4591.01			4590.66		
Date	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)
July 7, 2023	23.46	21.40	4588.85	23.67	21.36	4587.91	4.67	2.86	4588.32	5.25	3.44	4587.22
August 14, 2023	25.75	23.69	4586.56	26.08	23.77	4585.50	7.42	5.61	4585.57	7.04	5.23	4585.43
September 13, 2023	24.58	22.52	4587.73	25.00	22.69	4586.58	6.50	4.69	4586.49	6.58	4.77	4585.89
October 16, 2023	24.83	22.77	4587.48	25.17	22.86	4586.41	6.83	5.02	4586.16	6.58	4.77	4585.89
November 17, 2023	24.46	22.40	4587.85	24.92	22.61	4586.66	6.52	4.71	4586.47	6.54	4.73	4585.93
December 22, 2023	24.71	22.65	4587.60	25.31	23.00	4586.27	6.92	5.11	4586.07	6.88	5.06	4585.60
January 20, 2024	25.00	22.94	4587.31	25.58	23.27	4586.00	7.17	5.36	4585.82	7.13	5.31	4585.35
February 25, 2024	25.06	23.00	4587.25	25.75	23.44	4585.83	7.33	5.52	4585.66	7.17	5.36	4585.30
March 30, 2024	24.48	22.42	4587.83	25.40	23.09	4586.18	7.00	5.19	4585.99	6.67	4.86	4585.80
April 30, 2024	23.25	21.19	4589.06	24.63	22.32	4586.96	6.25	4.44	4586.74	5.58	3.77	4586.89
May 31, 2024	24.29	22.23	4588.02	25.04	22.73	4586.54	6.65	4.84	4586.34	6.42	4.61	4586.05
June 30, 2024												
July 31, 2024												
August 31, 2024												
September 30, 2024												
October 31, 2024												
November 30, 2024												
December 31, 2024												
Minimum	23.25	21.19	4586.56	23.67	21.36	4585.50	4.67	2.86	4585.57	5.25	3.44	4585.30
Maximum	25.75	23.69	4589.06	26.08	23.77	4587.91	7.42	5.61	4588.32	7.17	5.36	4587.22
Average	24.53	22.47	4587.78	25.14	22.83	4586.44	6.66	4.85	4586.33	6.53	4.72	4585.94

Ogilvy River Farm Pit Monitor Wells
Elevation of Groundwater

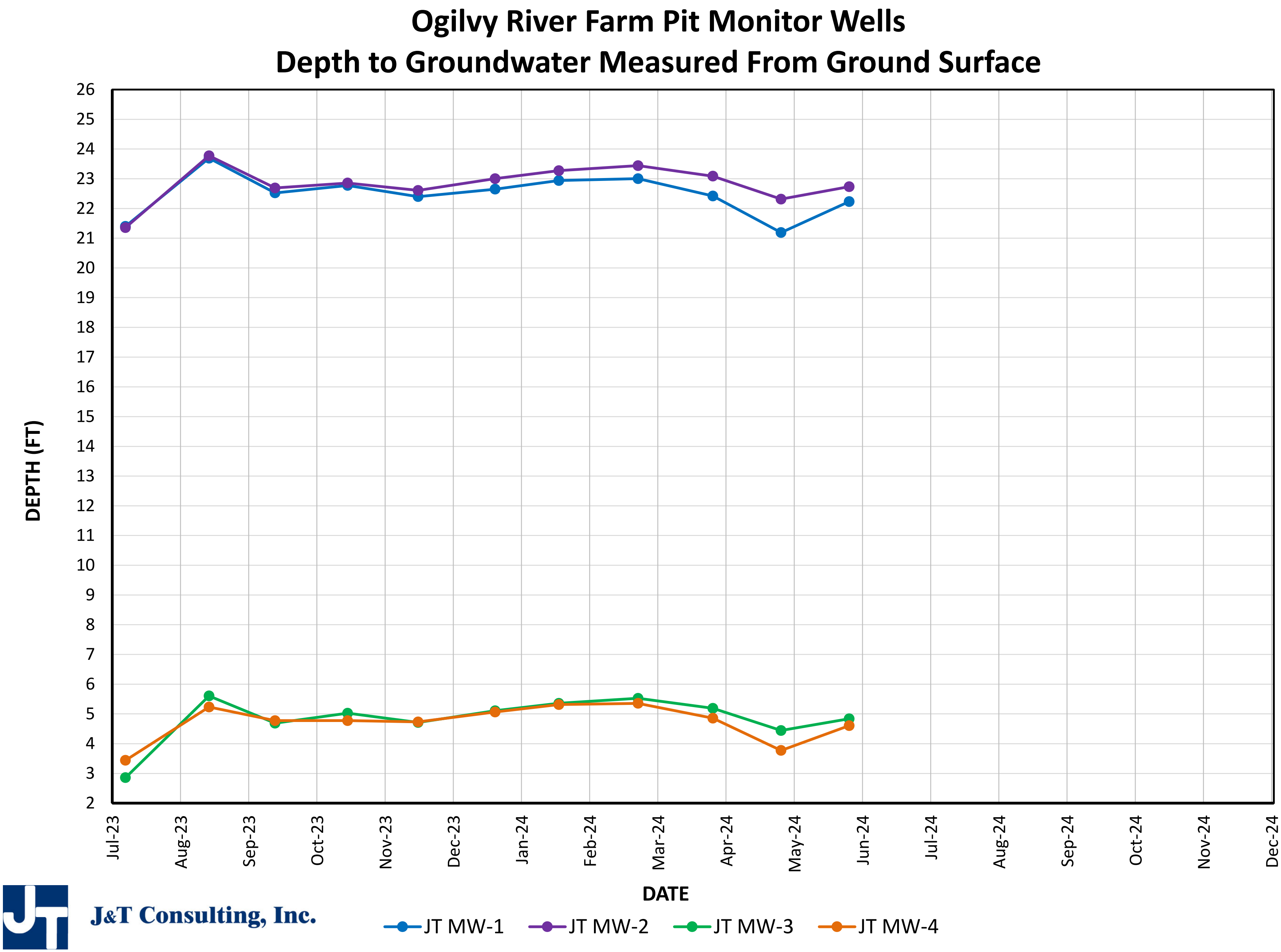


J&T Consulting, Inc.

Ogilvy River Farm Pit Monitor Wells
Depth to Groundwater Measured From Top of Well



J&T Consulting, Inc.



J&T Consulting, Inc.

Report of Analysis

Client Sample ID: OGILVY RIVER FARM PIT (MW-1)
Lab Sample ID: DA62542-1
Matrix: AQ - Ground Water
Project: Material Sites WQ Testing

Date Sampled: 03/01/24
Date Received: 03/01/24
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
9056A							
Fluoride	0.35	0.20	mg/l	2	03/01/24 20:49	MB	SW846 9056A
Chloride	167	5.0	mg/l	10	03/01/24 21:03	MB	SW846 9056A
Nitrogen, Nitrite [a]	< 0.20	0.20	mg/l	50	03/02/24 16:32	MB	SW846 9056A
Nitrogen, Nitrate	11.9	0.50	mg/l	50	03/02/24 16:32	MB	SW846 9056A
Sulfate	443	25	mg/l	50	03/02/24 16:32	MB	SW846 9056A
9056A NO2 + NO3O							
Nitrogen, Nitrate + Nitrite [b]	11.9	0.70	mg/l	1	03/02/24 16:32	MB	SW846 9056A
Solids, Total Dissolved	1380	10	mg/l	1	03/04/24 07:00	JW	SM 2540C-2011

(a) Elevated detection limit due to matrix interference.
(b) Calculated as: (Nitrogen, Nitrate) + (Nitrogen, Nitrite)

RL = Reporting Limit

Report of Analysis

Client Sample ID: OGILVY RIVER FARM PIT (MW-1)
Lab Sample ID: DA62542-1F
Matrix: AQ - Groundwater Filtered
Project: Material Sites WQ Testing

Date Sampled: 03/01/24
Date Received: 03/01/24
Percent Solids: n/a

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	< 100	100	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Antimony	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Arsenic	< 25	25	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Barium	59.0	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Beryllium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Boron	253	50	ug/l	1	03/12/24	03/19/24	CDL	SW846 6010C [3]	SW846 3010A [4]
Cadmium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Cobalt	< 5.0	5.0	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Copper	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Iron	< 70	70	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Lead	< 50	50	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Manganese	119	5.0	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Mercury	< 0.10	0.10	ug/l	1	03/13/24	03/13/24	CDL	SW846 7470A [1]	SW846 7470A [5]
Molybdenum	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Nickel	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Selenium	< 50	50	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Silver	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Thallium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Uranium	52.4	50	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Vanadium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Zinc	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA17745
(2) Instrument QC Batch: MA17751
(3) Instrument QC Batch: MA17763
(4) Prep QC Batch: MP39056
(5) Prep QC Batch: MP39057

RL = Reporting Limit

Report of Analysis

Client Sample ID: OGILVY RIVER FARM PIT (MW-1)
Lab Sample ID: DA62542-1FC
Matrix: AQ - Groundwater Filtered
Project: Material Sites WQ Testing

Date Sampled: 03/01/24
Date Received: 03/01/24
Percent Solids: n/a

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Lithium [a]	80.4	10	ug/l	1	03/07/24	03/08/24	ALA	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: L:MA27325
(2) Prep QC Batch: L:MP27849

(a) Analysis performed at SGS Scott, LA.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	OGILVY RIVER FARM PIT (MW-4)			
Lab Sample ID:	DA62542-2		**Date Sampled:**	03/01/24
Matrix:	AQ - Ground Water		**Date Received:**	03/01/24
			Percent Solids:	n/a
Project:	Material Sites WQ Testing			

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
9056A							
Fluoride	0.21	0.20	mg/l	2	03/01/24 21:17	MB	SW846 9056A
Chloride	89.6	5.0	mg/l	10	03/01/24 21:31	MB	SW846 9056A
Nitrogen, Nitrite [a]	< 0.0080	0.0080	mg/l	2	03/01/24 21:17	MB	SW846 9056A
Nitrogen, Nitrate	11.7	0.50	mg/l	50	03/02/24 16:46	MB	SW846 9056A
Sulfate	454	25	mg/l	50	03/02/24 16:46	MB	SW846 9056A
9056A NO2 + NO3O							
Nitrogen, Nitrate + Nitrite [b]	11.7	0.51	mg/l	1	03/02/24 16:46	MB	SW846 9056A
Solids, Total Dissolved	1170	10	mg/l	1	03/04/24 07:00	JW	SM 2540C-2011

(a) Elevated detection limit due to matrix interference.
(b) Calculated as: (Nitrogen, Nitrate) + (Nitrogen, Nitrite)

RL = Reporting Limit

Report of Analysis

Client Sample ID: OGILVY RIVER FARM PIT (MW-4)
Lab Sample ID: DA62542-2F
Matrix: AQ - Groundwater Filtered
Date Sampled: 03/01/24
Date Received: 03/01/24
Percent Solids: n/a
Project: Material Sites WQ Testing

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Aluminum	< 100	100	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Antimony	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Arsenic	< 25	25	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Barium	24.2	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Beryllium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Boron	260	50	ug/l	1	03/12/24	03/19/24	CDL	SW846 6010C [3]	SW846 3010A [4]
Cadmium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Cobalt	< 5.0	5.0	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Copper	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Iron	< 70	70	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Lead	< 50	50	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Manganese	47.4	5.0	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Mercury	< 0.10	0.10	ug/l	1	03/13/24	03/13/24	CDL	SW846 7470A [1]	SW846 7470A [5]
Molybdenum	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Nickel	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Selenium	< 50	50	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Silver	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Thallium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Uranium	52.7	50	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Vanadium	< 10	10	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]
Zinc	< 30	30	ug/l	1	03/12/24	03/14/24	CDL	SW846 6010C [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA17745
(2) Instrument QC Batch: MA17751
(3) Instrument QC Batch: MA17763
(4) Prep QC Batch: MP39056
(5) Prep QC Batch: MP39057

RL = Reporting Limit

Report of Analysis

Client Sample ID: OGILVY RIVER FARM PIT (MW-4)
Lab Sample ID: DA62542-2FC
Matrix: AQ - Groundwater Filtered
Date Sampled: 03/01/24
Date Received: 03/01/24
Percent Solids: n/a
Project: Material Sites WQ Testing

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Lithium [a]	36.7	10	ug/l	1	03/07/24	03/08/24	ALA	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: L:MA27325
(2) Prep QC Batch: L:MP27849

(a) Analysis performed at SGS Scott, LA.

RL = Reporting Limit

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	RL	IDL	MDL	MB raw	final
Aluminum	100	46	15	1.4	<100
Antimony	30	14	6.8	-9.9	<30
Arsenic	25	22	4.6	3.1	<25
Barium	10	.3	1.3	-0.10	<10
Beryllium	10	1	1.3	0.0	<10
Boron	50	3.3	6.3	-3.9	<50
Cadmium	10	1.9	1.3	-0.10	<10
Calcium	400	6.6	50		
Chromium	10	1.1	1.3	0.10	<10
Cobalt	5.0	2.7	.63	0.30	<5.0
Copper	10	4.6	1.3	-1.4	<10
Iron	70	8.9	12	0.30	<70
Lead	50	13	6.3	4.2	<50
Lithium	5.0	.6	1.3		
Magnesium	200	50	25		
Manganese	5.0	.5	.63	0.50	<5.0
Molybdenum	10	8.5	2.8	-0.10	<10
Nickel	30	6.2	3.8	0.40	<30
Phosphorus	100	91	16		
Potassium	1000	84	130		
Selenium	50	30	22	20.5	<50
Silicon	200	41	150		
Silver	30	.6	3.8	-0.10	<30
Sodium	400	13	50		
Strontium	5.0	.1	.63		
Thallium	10	17	4.3	2.1	<10
Tin	60	41	51		
Titanium	10	.5	1.3		
Uranium	50	3.9	8.5	-5.4	<50
Vanadium	10	.9	1.3	-0.10	<10
Zinc	30	9	3.8	9.9	<30

Associated samples MP39056: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	RL	IDL	MDL	MB raw	final

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	DA61679-1F Original	MS	Spikelot ICPALL5	% Rec	QC Limits
Aluminum	0.00	1010	1000	101.0	75-125
Antimony	0.0	98.1	100	98.1	75-125
Arsenic	0.0	211	200	105.5	75-125
Barium	0.0	414	400	103.5	75-125
Beryllium	0.0	105	100	105.0	75-125
Boron	0.0	409	400	102.5	75-125
Cadmium	0.0	102	100	102.0	75-125
Calcium					
Chromium	0.0	105	100	105.0	75-125
Cobalt	0.0	104	100	104.0	75-125
Copper	0.0	105	100	105.0	75-125
Iron	15.6	1040	1000	102.4	75-125
Lead	0.0	201	200	100.5	75-125
Lithium					
Magnesium					
Manganese	0.80	210	200	104.5	75-125
Molybdenum	0.0	102	100	102.0	75-125
Nickel	0.0	101	100	101.0	75-125
Phosphorus					
Potassium					
Selenium	0.0	215	200	107.5	75-125
Silicon					
Silver	0.0	41.6	40	104.0	75-125
Sodium	anr				
Strontium					
Thallium	0.0	199	200	99.5	75-125
Tin					
Titanium					
Uranium	0.0	209	200	104.5	75-125
Vanadium	0.0	104	100	104.0	75-125
Zinc	15.8	125	100	109.2	75-125

Associated samples MP39056: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	DA61679-1F Original MS	Spikelot ICPALL5	% Rec	QC Limits

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	DA61679-1F Original	MSD	Spikelot ICPALL5	% Rec	MSD RPD	QC Limit
Aluminum	0.00	1020	1000	102.0	1.0	20
Antimony	0.0	106	100	106.0	7.7	20
Arsenic	0.0	218	200	109.0	3.3	20
Barium	0.0	415	400	103.8	0.2	20
Beryllium	0.0	106	100	106.0	0.9	20
Boron	0.0	413	400	103.5	1.0	20
Cadmium	0.0	104	100	104.0	1.9	20
Calcium						
Chromium	0.0	107	100	107.0	1.9	20
Cobalt	0.0	106	100	106.0	1.9	20
Copper	0.0	107	100	107.0	1.9	20
Iron	15.6	1060	1000	104.4	1.9	20
Lead	0.0	206	200	103.0	2.5	20
Lithium						
Magnesium						
Manganese	0.80	211	200	105.0	0.5	20
Molybdenum	0.0	107	100	107.0	4.8	20
Nickel	0.0	101	100	101.0	0.0	20
Phosphorus						
Potassium						
Selenium	0.0	218	200	109.0	1.4	20
Silicon						
Silver	0.0	41.8	40	104.5	0.5	20
Sodium	anr					
Strontium						
Thallium	0.0	195	200	97.5	2.0	20
Tin						
Titanium						
Uranium	0.0	218	200	109.0	4.2	20
Vanadium	0.0	106	100	106.0	1.9	20
Zinc	15.8	111	100	95.2	11.9	20

Associated samples MP39056: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	DA61679-1F Original MSD	Spikelot ICPALL5	% Rec	MSD RPD	QC Limit

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056 Methods: SW846 6010C
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 03/12/24

Metal	BSP Result	Spikelot ICPALL5	% Rec	QC Limits
Aluminum	995	1000	99.5	80-120
Antimony	102	100	102.0	80-120
Arsenic	220	200	110.0	80-120
Barium	415	400	103.8	80-120
Beryllium	106	100	106.0	80-120
Boron	407	400	102.0	80-120
Cadmium	104	100	104.0	80-120
Calcium				
Chromium	105	100	105.0	80-120
Cobalt	106	100	106.0	80-120
Copper	106	100	106.0	80-120
Iron	1040	1000	104.0	80-120
Lead	209	200	104.5	80-120
Lithium				
Magnesium				
Manganese	213	200	106.5	80-120
Molybdenum	104	100	104.0	80-120
Nickel	101	100	101.0	80-120
Phosphorus				
Potassium				
Selenium	219	200	109.5	80-120
Silicon				
Silver	41.5	40	103.8	80-120
Sodium	anr			
Strontium				
Thallium	203	200	101.5	80-120
Tin				
Titanium				
Uranium	209	200	104.5	80-120
Vanadium	106	100	106.0	80-120
Zinc	109	100	109.0	80-120

Associated samples MP39056: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	BSP Result	Spikelot ICPALL5	% Rec	QC Limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	DA61679-1F Original	SDL 1:5	%DIF	QC Limits
Aluminum	0.00	0.00	NC	0-10
Antimony	0.00	0.00	NC	0-10
Arsenic	0.00	0.00	NC	0-10
Barium	0.00	0.00	NC	0-10
Beryllium	0.00	0.00	NC	0-10
Boron	0.00	0.00	NC	0-10
Cadmium	0.00	0.00	NC	0-10
Calcium				
Chromium	0.00	0.00	NC	0-10
Cobalt	0.00	0.00	NC	0-10
Copper	0.00	0.00	NC	0-10
Iron	15.6	0.00	23.7 (a)	0-10
Lead	0.00	0.00	NC	0-10
Lithium				
Magnesium				
Manganese	0.800	0.00	100.0(a)	0-10
Molybdenum	0.00	0.00	NC	0-10
Nickel	0.00	0.00	NC	0-10
Phosphorus				
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium	anr			
Strontium				
Thallium	0.00	0.00	NC	0-10
Tin				
Titanium				
Uranium	0.00	0.00	NC	0-10
Vanadium	0.00	0.00	NC	0-10
Zinc	15.8	0.00	10.1 (a)	0-10

Associated samples MP39056: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39056
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/12/24

Metal	DA61679-1F Original	SDL 1:5	%DIF	QC Limits

(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39057
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/13/24

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.10	.015	.05	0.0087	<0.10

Associated samples MP39057: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39057
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/13/24

Metal	DA62542-4F Original	MS	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.0	1.1	1	110.0	75-125

Associated samples MP39057: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39057 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 03/13/24

Metal	DA62542-4F Original	MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.0	1.1	1	110.0	0.0	20

Associated samples MP39057: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

QC Batch ID: MP39057
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/13/24

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	1.0	1	100.0	80-120

Associated samples MP39057: DA62542-1F, DA62542-2F, DA62542-3F, DA62542-4F, DA62542-5F, DA62542-6F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Bromide	GP36124/GN62778	0.050	0.0	mg/l	0.5	0.474	94.8	90-110%
Chloride	GP36124/GN62778	0.50	0.0	mg/l	5	4.71	94.2	90-110%
Fluoride	GP36124/GN62778	0.10	0.0	mg/l	1	0.951	95.1	90-110%
Nitrogen, Nitrate	GP36124/GN62778	0.010	0.0	mg/l	0.1	0.0923	92.3	90-110%
Nitrogen, Nitrate	GP36126/GN62780	0.010	0.0	mg/l	0.1	0.0985	98.5	90-110%
Nitrogen, Nitrite	GP36124/GN62778	0.0040	0.0	mg/l	0.05	0.0508	101.6	90-110%
Nitrogen, Nitrite	GP36126/GN62780	0.0040	0.0	mg/l	0.05	0.0525	105.0	90-110%
Solids, Total Dissolved	GN62770	10	0.0	mg/l	250	241	96.4	90-110%
Sulfate	GP36124/GN62778	0.50	0.0	mg/l	5	4.75	95.0	90-110%

Associated Samples:
Batch GN62770: DA62542-1, DA62542-2, DA62542-3, DA62542-4, DA62542-5, DA62542-6
Batch GP36124: DA62542-1, DA62542-2, DA62542-3, DA62542-4, DA62542-5, DA62542-6
Batch GP36126: DA62542-1, DA62542-2, DA62542-3
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Solids, Total Dissolved	GN62770	DA62542-6	mg/l	723	748	3.4	0-5.44%

Associated Samples:
Batch GN62770: DA62542-1, DA62542-2, DA62542-3, DA62542-4, DA62542-5, DA62542-6
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Bromide	GP36124/GN62778	DA62422-1	mg/l	0.0	12.5	12.0	96.0	80-120%
Chloride	GP36124/GN62778	DA62422-1	mg/l	302	125	416	91.2	80-120%
Fluoride	GP36124/GN62778	DA62422-1	mg/l	0.0	25	24.5	98.0	80-120%
Nitrogen, Nitrate	GP36124/GN62778	DA62422-1	mg/l	1.7	2.5	3.9	88.0	80-120%
Nitrogen, Nitrate	GP36126/GN62780	DA62560-6	mg/l	2.4	2.5	4.8	96.0	80-120%
Nitrogen, Nitrite	GP36124/GN62778	DA62422-1	mg/l	0.0	1.25	1.0	80.0	80-120%
Nitrogen, Nitrite	GP36126/GN62780	DA62560-6	mg/l	0.25	1.25	1.4	92.0	80-120%
Sulfate	GP36124/GN62778	DA62422-1	mg/l	287	125	405	94.4	80-120%

Associated Samples:
Batch GP36124: DA62542-1, DA62542-2, DA62542-3, DA62542-4, DA62542-5, DA62542-6
Batch GP36126: DA62542-1, DA62542-2, DA62542-3
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA62542
Account: JTCOCOW - J&T Consulting
Project: Material Sites WQ Testing

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Bromide	GP36124/GN62778	DA62422-1	mg/l	0.0	12.5	12.1	0.8	20%
Chloride	GP36124/GN62778	DA62422-1	mg/l	302	125	418	0.5	20%
Fluoride	GP36124/GN62778	DA62422-1	mg/l	0.0	25	24.8	1.2	20%
Nitrogen, Nitrate	GP36124/GN62778	DA62422-1	mg/l	1.7	2.5	4.0	2.5	20%
Nitrogen, Nitrate	GP36126/GN62780	DA62560-6	mg/l	2.4	2.5	4.7	2.1	20%
Nitrogen, Nitrite	GP36124/GN62778	DA62422-1	mg/l	0.0	1.25	1.0	0.0	20%
Nitrogen, Nitrite	GP36126/GN62780	DA62560-6	mg/l	0.25	1.25	1.4	0.0	20%
Sulfate	GP36124/GN62778	DA62422-1	mg/l	287	125	407	0.5	20%

Associated Samples:
Batch GP36124: DA62542-1, DA62542-2, DA62542-3, DA62542-4, DA62542-5, DA62542-6
Batch GP36126: DA62542-1, DA62542-2, DA62542-3
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits

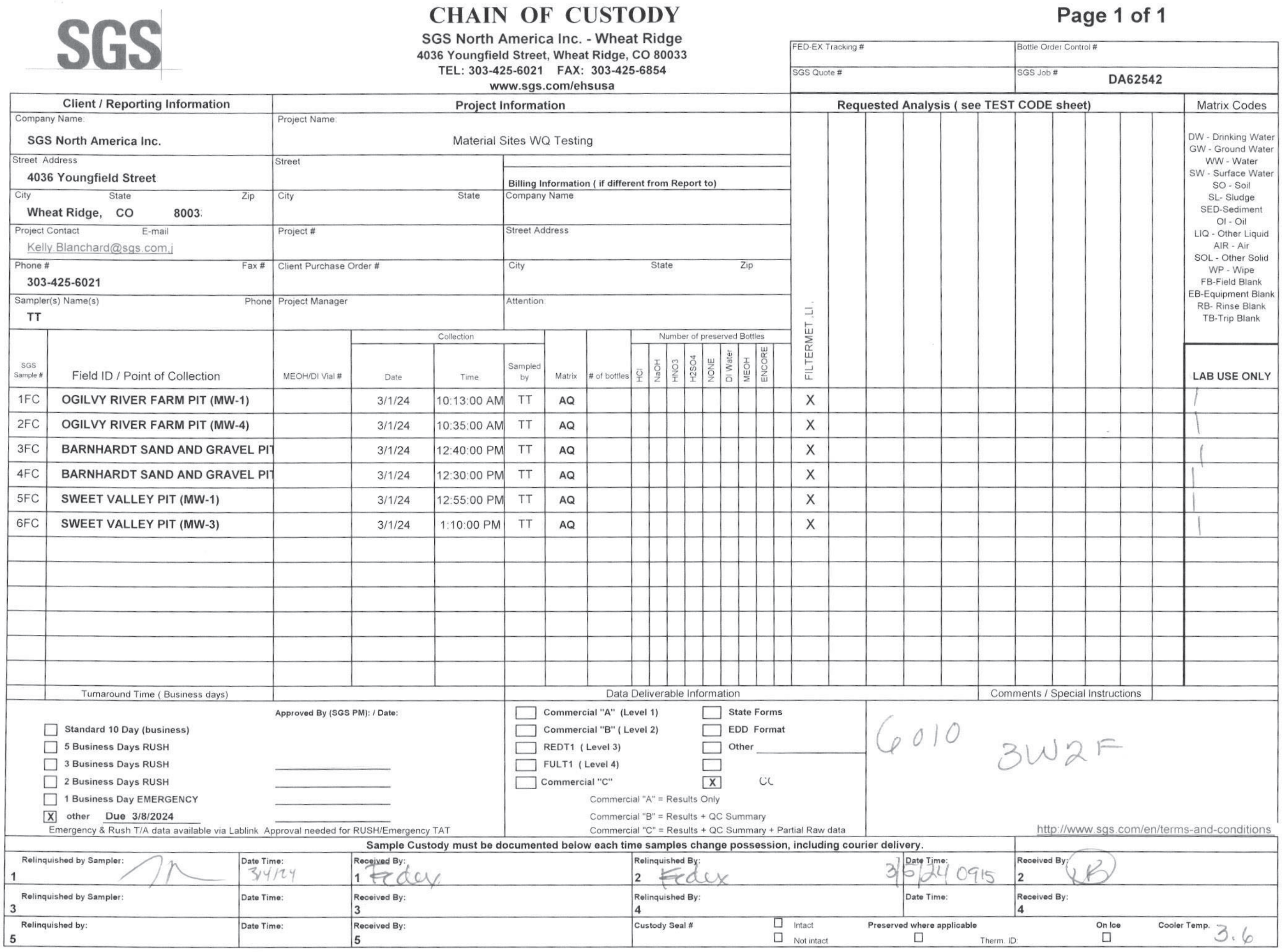
Misc. Forms

Custody Documents and Other Forms

(SGS Scott, LA)

Includes the following where applicable:

- Chain of Custody



CHAIN OF CUSTODY

Page 1 of 1

SGS North America Inc. - Wheat Ridge
4036 Youngfield Street, Wheat Ridge, CO 80033
TEL: 303-425-6021 FAX: 303-425-6854
www.sgs.com/ehsusa

FED-EX Tracking #
Bottle Order Control #
SGS Quote #
SGS Job # DA62542

Client / Reporting Information

Company Name: **SGS North America Inc.**
Street Address: **4036 Youngfield Street**
City: **Wheat Ridge,** State: **CO** Zip: **8003**
Project Contact E-mail: Kelly.Blanchard@sgs.com.j
Phone #: **303-425-6021** Fax #
Sampler(s) Name(s): **TT** Phone

Project Information

Project Name: Material Sites WQ Testing
Street
City State
Project #
Client Purchase Order #
Project Manager

Billing Information (if different from Report to)

Company Name
Street Address
City State Zip
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes
DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	FILTERMET ,LI	LAB USE ONLY
1FC	**OGILVY RIVER FARM PIT (MW-1)**		3/1/24	10:13:00 AM	TT	**AQ**										X	
2FC	**OGILVY RIVER FARM PIT (MW-4)**		3/1/24	10:35:00 AM	TT	**AQ**										X	
3FC	**BARNHARDT SAND AND GRAVEL PI**		3/1/24	12:40:00 PM	TT	**AQ**										X	
4FC	**BARNHARDT SAND AND GRAVEL PI**		3/1/24	12:30:00 PM	TT	**AQ**										X	
5FC	**SWEET VALLEY PIT (MW-1)**		3/1/24	12:55:00 PM	TT	**AQ**										X	
6FC	**SWEET VALLEY PIT (MW-3)**		3/1/24	1:10:00 PM	TT	**AQ**										X	

Turnaround Time (Business days)

Approved By (SGS PM): / Date:

- ☐ Standard 10 Day (business)
- ☐ 5 Business Days RUSH
- ☐ 3 Business Days RUSH
- ☐ 2 Business Days RUSH
- ☐ 1 Business Day EMERGENCY
- ☒ other Due 3/8/2024

Emergency & Rush T/A data available via Lablink Approval needed for RUSH/Emergency TAT

Data Deliverable Information

- ☐ Commercial "A" (Level 1)
- ☐ Commercial "B" (Level 2)
- ☐ REDT1 (Level 3)
- ☐ FULT1 (Level 4)
- ☐ Commercial "C"
- ☐ State Forms
- ☐ EDD Format
- ☐ Other
- ☐
- ☒ CC

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

6010 3W2F

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	3/4/24	1 Fedex	2 Fedex	3/5/24 0915	2 KB

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
3		3	4		4

Relinquished by:	Date Time:	Received By:	Custody Seal #		Preserved where applicable	On Ice	Cooler Temp.
5		5		☐ Intact ☐ Not intact	☐ Therm. ID:	☐	3.6

DA62542: Chain of Custody
Page 1 of 3
SGS Scott, LA

ORIGIN ID:DENA (303) 425-6021
ATT: TERRI MCNULTY
SGS - WHEAT RIDGE
4036 YOUNGFIELD STREET

WHEAT RIDGE, CO 80033
UNITED STATES US

SHIP DATE: 04MAR24
ACTWGT: 50.00 LB MAN
CAD: 0859493/CAFE3755

BILL SENDER

TO **SAMPLE RECEIVING**
ACCUTEST LOUISIANA
500 AMBASSADOR CAFFERY DRIVE

SCOTT LA 70583

INV:
PO: REF:
DEPT:

58SC2/8538/AED7

FedEx
Express
E

J233023051201uv

TRK# 0201 **6466 4897 7174**

TUE - 05 MAR 10:30A
PRIORITY OVERNIGHT

XH LFTA

70583
LA-US **LFT**

Part # 156148-434 MTW EXP 04/23

SGS Sample Receipt Summary

Job Number: da62542 **Client:** SGS NORTH AMERICA **Project:** MATERIALS SITE WQ TESTING

Date / Time Received: 3/5/2024 9:15:00 AM **Delivery Method:** FEDEX **Airbill #'s:** 646648977174

Cooler Temps (Raw Measured) °C: Cooler 1: (3.6);

Cooler Temps (Corrected) °C: Cooler 1: (3.6);

Cooler Security	Y	N		Y	N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	N
1. Temp criteria achieved:	☑	☐

2. Cooler temp verification:
3. Cooler media: Ice (direct contact)
4. No. Coolers: 1

Quality Control Preservatio	Y	N	N/A
1. Trip Blank present / cooler:	☐	☐	☑
2. Trip Blank listed on COC:	☐	☐	☑
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☐	☐	☑

Sample Integrity - Documentation	Y	N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐

3. Condition of sample: Intact

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Test Strip Lot #s: pH 1-12: pH 12+: Other: (Specify)

Comments NP metals (6-250ml bottles) expired upon receipt. Samples taken 3/1/2024 between 10:13-13:10

SM089-03
Rev. Date 12/7/17

Metals Analysis

QC Data Summaries

(SGS Scott, LA)

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA62542
Account: ALMS - SGS Wheat Ridge, CO
Project: JTCOCOW: Material Sites WQ Testing

QC Batch ID: MP27849 Methods: SW846 6010C
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 03/07/24

Metal	RL	IDL	MDL	MB raw	final
Aluminum	100	13	25		
Antimony	6.0	2	3.6		
Arsenic	10	2.4	8.6		
Barium	10	.36	1.7		
Beryllium	4.0	.06	.9		
Boron	100	.72	42		
Cadmium	5.0	.14	.9		
Calcium	100	3.8	32		
Chromium	10	.39	1.2		
Cobalt	10	.26	1.1		
Copper	10	.77	2.8		
Iron	100	2.9	18		
Lead	10	1.4	3.7		
Lithium	10	2.4	4.3	1.5	<10
Magnesium	100	22	40		
Manganese	10	.11	.9		
Molybdenum	10	.16	1.7		
Nickel	10	.29	1.5		
Potassium	500	50	120		
Selenium	10	1.5	4.3		
Silver	10	.57	3.7		
Sodium	500	20	120		
Strontium	10	.1	3		
Thallium	10	1.5	4.6		
Tin	10	.74	1.7		
Titanium	10	.41	.8		
Vanadium	10	.39	1.5		
Zinc	20	.18	12		

Associated samples MP27849: DA62542-1FC, DA62542-2FC, DA62542-3FC, DA62542-4FC, DA62542-5FC, DA62542-6FC

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: ALMS - SGS Wheat Ridge, CO
Project: JTCOCOW: Material Sites WQ Testing

QC Batch ID: MP27849
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/07/24

Metal	LA98821-13 Original	MS	Spikelot ICPSPIKE1	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	anr				
Barium	anr				
Beryllium					
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt	anr				
Copper	anr				
Iron	anr				
Lead	anr				
Lithium	0.0	1740	2000	87.0	75-125
Magnesium					
Manganese	anr				
Molybdenum					
Nickel	anr				
Potassium					
Selenium	anr				
Silver	anr				
Sodium					
Strontium					
Thallium					
Tin	anr				
Titanium					
Vanadium					
Zinc	anr				

Associated samples MP27849: DA62542-1FC, DA62542-2FC, DA62542-3FC, DA62542-4FC, DA62542-5FC, DA62542-6FC

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA62542
Account: ALMS - SGS Wheat Ridge, CO
Project: JTCOCOW: Material Sites WQ Testing

QC Batch ID: MP27849
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/07/24

Metal	LA98821-13 Original	MSD	Spikelot ICPSPIKE1	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium						
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron	anr					
Lead	anr					
Lithium	0.0	1740	2000	87.0	0.0	20
Magnesium						
Manganese	anr					
Molybdenum						
Nickel	anr					
Potassium						
Selenium	anr					
Silver	anr					
Sodium						
Strontium						
Thallium						
Tin	anr					
Titanium						
Vanadium						
Zinc	anr					

Associated samples MP27849: DA62542-1FC, DA62542-2FC, DA62542-3FC, DA62542-4FC, DA62542-5FC, DA62542-6FC

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA62542
Account: ALMS - SGS Wheat Ridge, CO
Project: JTCOCOW: Material Sites WQ Testing

QC Batch ID: MP27849
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/07/24

Metal	BSP Result	Spikelot ICPSPIKE1	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron	anr			
Lead	anr			
Lithium	915	1000	91.5	80-120
Magnesium				
Manganese	anr			
Molybdenum				
Nickel	anr			
Potassium				
Selenium	anr			
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin	anr			
Titanium				
Vanadium				
Zinc	anr			

Associated samples MP27849: DA62542-1FC, DA62542-2FC, DA62542-3FC, DA62542-4FC, DA62542-5FC, DA62542-6FC

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: DA62542
Account: ALMS - SGS Wheat Ridge, CO
Project: JTCOCOW: Material Sites WQ Testing

QC Batch ID: MP27849
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 03/07/24

Metal	LA98821-13 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron	anr			
Lead	anr			
Lithium	0.00	13.2	NC	0-10
Magnesium				
Manganese	anr			
Molybdenum				
Nickel	anr			
Potassium				
Selenium	anr			
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin	anr			
Titanium				
Vanadium				
Zinc	anr			

Associated samples MP27849: DA62542-1FC, DA62542-2FC, DA62542-3FC, DA62542-4FC, DA62542-5FC, DA62542-6FC

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

EXHIBIT H

Wildlife Information

The project area was surveyed for general wildlife habitat by Ecological Resource Consultants (ERC). The Screening Report for Federal and State Listed Threatened and Endangered Species from ERC is attached which describes the wildlife habitat present on the site and the common species that may be found in the habitat area.

ERC has conducted this screening for federal and state listed threatened and endangered species and general wildlife for the approximately 98.2-acre survey area. The following provides key items identified as part of this report:

1. Three primary land use class/vegetation cover types exist within the survey area. Habitat within the survey area is characterized as the Ruderal Smooth Brome Grassland (24%), Plains Cottonwood / Narrowleaf Willow Riparian Woodland (14%), and Row Crop Cultural Formation. Open water habitat within the South Platte River channel accounts for the remaining 8% of the total cover. Historic land use for agricultural practices has led to degradation of the native vegetation community.

2. Generally, there are features on the survey area and the surrounding area that provide general habitat for local songbirds, raptors, and small to mid-size mammals. However, habitat within the survey area is somewhat degraded and of lower ecological value from a wildlife perspective due to historic and current land use for agriculture, which has restricted overall growth and establishment of vegetation. The South Platte River and adjacent cottonwood riparian community provides suitable habitat for wildlife species and MBTA species. Although the South Platte River riparian corridor is not protected within the survey area, ERC recommends taking measures to avoid impacting these areas.

3. No non-raptor migratory bird nests were observed within the survey area. However, prior to vegetation removal a nest survey should be completed to ensure that no nests have become established within the survey area and active nests, if any, are not disturbed.

4. One active red-tailed hawk nest was identified approximately 200 feet south of the survey area. The survey area is subject to CPW red-tailed hawk nesting site recommended restricted use. The active nest site buffer creates a 1/3-mile radius that extends across a majority of the southern end of the survey area in which no activity should occur from February 15 through July 15. Construction activities and surface occupancy may begin after the nest is no longer occupied. CPW recommends beginning any ongoing operation as close to the active nest site as practicable to allow raptors returning to the nest site to assess their level of tolerance to the continuing operations. Nest site trees may also be removed outside of breeding season while the nest is unoccupied and with the permission of the landowner. Activities proposed during the active breeding season while the nest is occupied will require consultation with CPW prior to beginning.

5. One bald eagle nest site was identified approximately 2,000 feet west of the survey area. The survey area is subject to CPW and USFWS bald eagle nesting site recommended restrictions. The active nest site creates a 1/2-mile radius that extends across the far

western portion of the survey area in which no activity should occur from December 1 through July 31; however, the survey area is outside of the ¼-mile surface occupancy restriction and features (pits, well, dwellings, etc.) are permitted to be constructed this area if they are placed there outside of the December 1 to July 31 timeframe. Activity proposed during this time frame will require prior consultation with CPW and possibly USFWS.

6. No federally listed threatened and endangered species and/or habitat protected under the ESA were identified within the survey area. The survey area is not within designated critical habitat of any federally listed species. The vegetation community and features within the survey area were investigated as potential habitat for federally listed species. Any future land use changes will result in No Take on any federal listed species, their habitats, or proposed or designated critical habitat.

7. No State listed threatened or endangered species and/or habitat protected by CPW under Colorado Statute Title 33 were identified within the survey area. The vegetation communities within the survey area were investigated as potential habitat for state listed species. Any future land use changes will have no effect on any state listed species, their habitats, or proposed or designated critical habitat.

The Screening Report for Federal and State Listed Threatened and Endangered Species prepared by Ecological Resource Consultants, Inc. includes the following recommendations regarding migratory birds and raptor nest sites in the survey area:

a. Based- upon literature review and an onsite assessment of the survey area, ERC has determined that some migratory birds likely utilize the survey area. These birds, their eggs, and active nests are protected under the MBTA and take or possession of these resources is prohibited. Active nests must become inactive prior to destruction of the nest without a USFWS permit. Five (5) inactive non-raptor migratory bird nests were observed within the survey area. The nesting season in Colorado for non-raptor migratory birds occurs between April 1 and August 31 (CPW 2020). Seasonal MBTA non-raptor bird nesting activity status can vary seasonally and from year to year, therefore nesting surveys should be conducted no more than 7-10 days prior any future land use changes to ensure active nests are not disturbed during nesting season.

b. Raptor (non-eagle) migratory bird nest sites are further protected by CPW guidelines. CPW has established recommended buffer zones and seasonal activity restrictions for a variety of Colorado raptors. Three (3) inactive raptor nests were observed and no CPW mapped raptor nest protection zones are located within the survey area (CPW 2022a). Inactive raptor nest sites have no regulatory restriction and do not require further agency coordination; however nest activity status can vary seasonally and from year-to-year. Future land use changes may require additional nest surveys (generally between February 1 and September 15 (CPW 2020)) to determine activity status within ½ to ¼ mile of the survey area to ensure compliance with CPW recommendations.

c. Eagle nest sites are protected under Bald and Golden Eagle Act, further restricting destruction of any nest without a permit. No eagle nests sites were observed and no CPW nest sites eagle nests sites, communal roost sites, or winter roost sites are mapped on or within the vicinity of the survey area. Inactive eagle nest sites require further agency coordination even when nests are unoccupied as nest activity status can vary seasonally and from year-to-year. Future land use changes may require additional nest surveys (generally to be conducted between December 1 and July 31 (CPW 2020)) to determine activity status within ½ to ¼ mile of the survey area to ensure compliance with CPW recommendations.

Regarding construction activities within the 1/2-mile radius of a bald eagle's nesting site, consultation with CPW and/or USFWS will occur prior to slurry wall construction and mine development if those activities are contemplated to take place within the December 1st through July 31st timeframe. ERC would assist with consultation with CPW and/or USFWS.

Regarding construction activities within the 1/3-mile radius of a red-tailed hawk's nesting site, consultation with CPW will occur prior to slurry wall construction and mine development if those activities are contemplated to take place within the February 15th through July 15th timeframe. ERC would assist with consultation with CPW.

Attached is ERC's Screening Report for Federal and State Listed Threatened and Endangered Species.

EXHIBIT L

Reclamation Cost

A phased and cumulative bonding approach is proposed for the Ogilvy River Farm Pit mining site operation. The financial warranty required for each phase is the warranty required to completely reclaim that phase.

Direct costs related to the construction of the reclamation components that have been included in the financial warranty calculations include: Scarifying disturbed ground surfaces, re-applying topsoil over disturbed areas, revegetating disturbed areas, dewatering the full pit, slurry wall liner construction, and contractor mobilization. The slurry wall liner construction costs have been broken down further to include costs for different depths to bedrock as provided from the DRMS on previous 112 applications.

Overhead, profit, and project management costs were then calculated and added to the direct construction costs to arrive at the required financial warranty for each phase.

As each new phase is started, the financial warranty for that phase will be posted with the Division. When a phase has been reclaimed, inspected, and accepted by the Division, the associated financial warranty for that phase can then be reduced/released to 20% of the financial warranty required for that phase.

Please see the attached calculations for details of the costs and quantities used to determine the financial warranty required for each phase of mining.

The following table summarizes the financial warranty required for each phase, and the cumulative financial warranty that will be provided during any given phase.

Reclamation Cost Summary

Phase	Additional Financial Warranty Required	Cumulative Financial Warranty
1a	$222,523	$222,523
1	$3,377,836	$3,600,359

Summary of Unit Costs

Direct costs			
Re-applying topsoil 12" thick		$1,800.00	/ acre
Revegetating disturbed area		$1,000.00	/ acre
Dewatering full pit		$400.00	/ million gallons
Phase 1 Slurry Wall Cost		$392.00	/ linear foot
(0-50 ft @ $4/ft - 51-70 ft @ $7/ft - 71-95 ft @ $13/ft)			
Scarifying Ground		$200	/ acre
Mobilization		$2,500	lump sum
Overhead and Profit Costs			
Liability insurance		1.55%	of direct cost
Performance bond		1.05%	of direct cost
Profit		10.00%	of direct cost
	Total Overhead Cost	12.60%	of direct cost
Project Management			
Engineering and bidding		4.25%	of direct cost
Management and administration		5.00%	of direct cost
	Total Additional Cost	9.25%	of direct cost

J&T Consulting, Inc.

Ogilvy River Farm, LLC

Ogilvy River Farm Pit
6/17/2024

Reclamation Bond Quantities and Costs

22032 Ogilvy River Farm Pit Rec Bond Calcs

Phase 1a - 71.91 acres (56.13 acres Total Disturbed Area)(Prior to Exposing Groundwater)

Reclamation Operation	Quantity	Unit	Unit Cost	Cost
Scarifying - Topsoil/OB Stockpile, Access Road, Plant Site Areas, Loadout Area, Scale	56.13	ac	$ 200	$ 11,226
Topsoil Placement - Topsoil/OB Stockpile, Access Road, Plant Site Areas, Loadout Area, Scale	56.13	ac	$ 1,800	$ 101,034
Revegetate - Topsoil/OB Stockpile, Access Road, Plant Site Areas, Loadout Area, Scale	56.13	ac	$ 1,000	$ 56,130
Removal of foundations for Scale House and Scale	50	cy	$ 200.00	$ 10,000
Mobilization	1.0	ls	$ 2,500	$ 2,500
			Subtotal Direct Cost	$ 180,890
			Total Direct Cost	$ 180,890
			Overhead and Profit Cost (12.60%)	$ 22,792
			Contract Cost	$ 203,682
			Project Management (9.25%)	$ 18,841
Total Required Financial Warranty For Phase 1a				***$ 222,523***

Phase 1 - 71.91 acres

Reclamation Operation	Quantity	Unit	Unit Cost	Cost
Slurry Wall for Phase 1	6,839	lf	$ 392.00	$ 2,680,888
Removal of Soil from Sediment Ponds and Removal of Berms for Sediment Ponds	16,000	cy	$ 2.00	$ 32,000
Dewatering of Pit for Phase 1	358	mg	$ 400	$ 143,364
Credit for Water Surface - Scarifying - Topsoil/OB Stockpile, Access Road, Plant Site Areas, Loadout Area, Scale	(37.63)	ac	$ 200	$ (7,526)
Credit Water Surface - Topsoil Placement - Topsoil/OB Stockpile, Access Road, Plant Site Areas, Loadout Area, Scale	(37.63)	ac	$ 1,800	$ (67,734)
Credit Water Surface - Revegetate - Topsoil/OB Stockpile, Access Road, Plant Site Areas, Loadout Area, Scale	(37.63)	ac	$ 1,000	$ (37,630)
Mobilization	1.0	ls	$ 2,500	$ 2,500
			Subtotal Direct Cost	$ 2,745,862
			Total Direct Cost	$ 2,745,862
			Overhead and Profit Cost (12.60%)	$ 345,979
			Contract Cost	$ 3,091,841
			Project Management (9.25%)	$ 285,995
Additional Financial Warranty Required For Phase 1				***$ 3,377,836***
Cummulative Financial Warranty Required For Phase 1a-1				***$ 3,600,359***

EXHIBIT S

Permanent Man-Made Structures within 200 Ft of the Affected Land

1. Power Lines/Poles
2. Phone Lines/Poles
3. Oil and Gas Lines
4. Fences/Structures
5. Improved Roads
6. Irrigation Channels/Ditches/Pipelines
7. Water Pipelines

Ogilvy River Farm, LLC believes that the mining operation, as proposed, will not adversely affect the permanent, man-made structures located within 200 feet of the east, north, and southeast side of the permit boundary. The structures, fences, and drainage ditches on the south side of the site, located within the mining limits will require removal. However, the applicant still anticipates providing evidence of agreements for compensation with the appropriate structure owners or an engineering evaluation (see attached slope stability report) that adequately demonstrates that the proposed mining and reclamation operations will not result in damage to the structures.

There is an abandoned PDC Energy, Inc. oil/gas well and an oil/gas line located within the mining limits and within the permit boundary. Ogilvy River Farm, LLC is pursuing agreements with PDC Energy, Inc. to develop a surface use agreement as required to address removal of the oil/gas well and the oil/gas line. PDC Energy, Inc. is the only oil/gas lessee that will be affected by the mining.

The list of structure owners and structures are as follows (please refer to the mining plan maps for the specific locations):

Lower Latham Reservoir Company
Fence

Northern Weld County Water District
Water Line and Water Meter

Ogilvy Irrigating & Land Co.
Sheds, House, and Irrigation Ditch

PDC Energy
Oil/Gas Well
Oil/Gas Line

Roberta Smith

House, Outbuildings, Septic System, Propane Tank, Water Line, Irrigation Well, Mail Box, and Fence

Xcel Energy

Power Lines/Poles

Poudre Valley Rural Electric

Power Lines/Poles

SLOPE STABILITY REPORT

FOR THE
OGILVY RIVER FARM PIT
WELD COUNTY, COLORADO

FEBRUARY 2024
REVISED JUNE 2024

PREPARED FOR:

OGILVY RIVER FARM, LLC.
801 8TH STREET, SUITE 220J
GREELEY, CO 80631
(970) 353-9195

PREPARED BY:

J&T Consulting, Inc.

305 DENVER AVENUE – SUITE D
FORT LUPTON, CO 80621
PHONE: (303) 857-6222

CERTIFICATION:

I hereby certify this slope stability analysis for Ogilvy River Farm, LLC., the Ogilvy River Farm Pit, located in Weld County, Colorado was prepared by me or under my direct supervision.

JAMES C. YORK
36846
6.13.24

James C. York
Registered Professional Engineer
State of Colorado No. 36846

Table of Contents

INTRODUCTION

Ogilvy River Farm, LLC., proposes to mine the property located in the south 1/2 of the southeast 1/4 of Section 5, and the northeast 1/4 of the northeast 1/4 of Section 8, Township 5 North, Range 64 West of the 6th Principal Meridian, in Weld County, Colorado. The property is bounded by private property on the south, west, and north sides, and Weld County Road 53 on the east site. The South Platte River runs through the southern portion of the property. The proposed mining operation will extract gravel reserves from locations adjacent to man-made structures. The rules and regulations of the Division of Reclamation, Mining, and Safety (DRMS) require that any mining within a 200-foot setback of a man-made structure show thorough engineering analysis that the proposed mining will not cause damage to the structure. The accepted method of demonstrating this is through a slope stability analysis. This report contains an overview of the methodology used in the analysis of the mining slopes and their estimated effect on all man-made structures. Recommendations regarding acceptable setbacks from man-made structures have also been included.

OVERVIEW

The DRMS mining plan proposes that the property will be mined in a single pit, and reclaimed as a water storage reservoir. The mining will occur at 2H:1V slopes. The reservoir will be reclaimed by backfilling the mining slopes with overburden/clay soils at 4.5H:1V slopes, and will cover an estimated 37.63 surface acres when full. The actual surface area will depend on the final configuration of the reservoir after reclamation is complete.

GEOTECHNICAL DATA

Exploratory borings and monitoring wells were done on the site by Cesare, Inc. / CMT Technical Services. Logs of the borings and monitoring wells used to estimate the soil types and thicknesses for this study are included in Appendix D. J&T Consulting, Inc. (JT) estimated soil strength parameters based on the information from the boring and monitor well logs and other stability analyses that have been performed on gravel mining operations along the Front Range. Table 1, on the following page, represents a summary of the soil strength parameters that were used in this stability analysis.

Table 1 – Soil Properties

Description	Max dry density (pcf)	Saturated Density (pcf)	Cohesion (psf)	Internal Friction Angle
Clay	100	115	50	25
Sand and Gravel	115	130	10	35
Weathered Claystone Bedrock	110	120	1000	0
Stable Claystone Bedrock	120	135	3000	0
Slurry Wall	100	110	0	45

DESIGN ANALYSIS AND CRITERIA

The proposed mining slopes were analyzed using Clover Technologies Galena Slope Stability Analysis System, version 7.2. Galena was designed to analyze the slope stability of earth embankments subjected to several critical situations that may occur during the life of the embankment. For this project, six cases were identified as critical during the mining operation. Static and pseudo-static conditions were analyzed in each case.

Pseudo-static peak acceleration factors (peak horizontal acceleration, or PHA) were taken from USGS information for the western United States. The 2% probability of exceedance in 50 years (the most conservative) was used. The USGS peak acceleration map is included in Appendix E. A peak acceleration factor of 0.09 x gravity was taken from this data. A conservative earthquake loading coefficient of 0.50 x PHA is often used for slope stability analyses (50% of PHA). We used an even more conservative approach and used 70% of the PHA for this area for our earthquake loading coefficient. Hence, 0.70 x 0.09 = 0.063.

All mining side slopes will be 2H:1V, and all reclaimed slopes will be 4.5H:1V.

The locations of the cases are shown on the case location map included in Appendix A.

Case SS-1 – Gravel Road and Irrigation Ditch West of Pit.

The mining operation is adjacent to an irrigation ditch and gravel road on the west side of the pit. The proposed setback for mining is 35 feet from the gravel road. The mining depth was assumed to be 79 feet in this area based on bore log information.

Case SS-2 – Gravel Road and Irrigation Ditch North of Pit.

The mining operation is adjacent to a gravel road and irrigation ditch on the north side of the pit. The proposed setback for mining is 59 feet from the gravel road. The mining depth was assumed to be 77 feet in this area based on bore log information.

Case SS-3 – Gravel Road, Fence, Buildings, Propane Tank, Irrigation Well, and Septic System South of Pit.

The mining operation is adjacent to a gravel road, fence, buildings, propane tank, irrigation well, and septic system on the south side of the pit. The mining depth was assumed to be 74 feet in this area based on bore log information.

2 sub-cases were analyzed at this location:

- **Case SS-3A – Gravel Road**
    - A proposed setback for mining of 39 feet from the gravel road. This case analyzed the factors of safety (static & pseudo static) for failure slices that affected the gravel road (the closest man-made structure).
- **Case SS-3B – Shop Building**
    - A proposed setback for mining of 67 feet from the shop building. This case analyzed the factors of safety for failure slices that affected the shop building on the property to the south. This is the closest building south of the mining limit, and was considered as the maximum loading present south of the mining limit. The other buildings, propane tank, irrigation well, and septic system are the same distance or further away from the mining limit. The shop building was assumed to have dimensions of 90 feet long by 50 feet wide with a total maximum weight of 200,000 pounds when farm equipment is parked in the building, per information supplied by the land owner Roberta Smith. This information was used to determine a soil bearing pressure of 45 pounds per square-foot over the footprint of the building. This bearing pressure was included in the model as a distributed load over the floor of the building.
- In both sub-cases wheel loads for a fully loaded Volvo A45G (45-ton capacity) haul truck were placed on the gravel road. The maximum loaded wheel loads were determined to be at the rear axle, and were calculated to be 56,500 pounds per the manufacturer's information for the haul truck. The manufacturer's product information sheets showing the haul truck dimension and fully loaded weight information are included in Appendix F.

Case SS-4 – Gravel Road and Fence West of Pit.

The mining operation is adjacent to a gravel road and fence on the west side of the pit. The proposed setback for mining is 36 feet from the gravel road. The mining depth was assumed to be 66 feet in this area based on bore log information.

Case SS-5 – Fence, Power Pole, Road, and Buildings East of Pit

The mining operation is adjacent to a fence, power pole, road, and buildings on the east side of the pit. The proposed setback for mining is 39 feet from the fence/power pole. The mining depth was assumed to be 56 feet in this area based on bore log information.

Case SS-6 – Access Road Easement, Gravel Road, Water Line, Telephone Line, Power Poles, Gas Line, Water Meter, and Mail Box South of Pit

The mining operation is adjacent to an access road easement, gravel road, water line, telephone line, power poles, gas line, water meter, and mail box, on the south side of the pit. The proposed setback for mining is 35 feet from the access road easement. The water meter and mail box are more than 100 feet away from the mining limit so the failure surfaces were calculated to the access road easement since it is closer to the mining limits, and as such lower factors of safety are present there. The other man-made structures are also further away from the mining limits and are shown on the cross-section located in Appendix B. The mining depth was assumed to be 51 feet in this area based on bore log information.

The cross-sections located in Appendix B show the soil strata, soil properties, the phreatic surface associated with each case (blue line), the geometry used in the mining/reclamation, the locations of the man-made structures adjacent to the mining slopes, and the most critical failure surface calculated by the model (red line).

METHODOLOGY

The mining embankment configuration shown in the computer analysis represents the estimated conditions for this site. If mining conditions differ from the estimated conditions, the slope stability will need to be re-evaluated on a case-by-case basis. The Bishop Method was used in the computer analysis for determining safety factors. The procedure searches for circular shear failures and automatically searches for the lowest safety factor. 20,000 separate failure surfaces were analyzed for each case. The required minimum safety factors are based on the policy of the Mined Land Reclamation Board (MLRB) for Factors of Safety for Slope Stability / Geotechnical Analyses.

All cases were analyzed using mining condition geometry to determine the factor of safety for each case with the steeper mining slopes. Case SS-2, which is the deepest location that is adjacent to a critical structure (80 feet depth of reclamation slope), was analyzed to determine the minimum factor of safety for all reclaimed slopes.

SLOPE STABILITY RESULTS

When estimated soil strength parameters are used, the MLRB requires minimum safety factors of 1.50 for static condition analyses and 1.30 for pseudo-static (earthquake loading) condition analyses for embankments adjacent to critical structures. The calculated factors of safety are within the design criteria specified for this project and can be considered indicators of the mining slope performance under the various conditions. The results of the static condition and pseudo-static condition slope stability analyses are shown in Tables 2, 3, & 4 below.

Table 2: Mining Conditions
Static Condition Slope Stability Analysis Results

Description	Calculated Factor of Safety	Required Minimum Factor of Safety
Case SS-1 –Gravel Road & Irrigation Ditch West of Pit – Static	1.70	1.50
Case SS-2 –Gravel Road, and Irrigation Ditch North of Pit – Static	1.75	1.50
Case SS-3A – Gravel Road South of Pit – Static	1.57	1.50
Case SS-3B – Shop Building South of Pit – Static	1.59	1.50
Case SS-4 – Gravel Road & Fence West of Pit – Static	1.83	1.50
Case SS-5 – Fence, Power Pole, Road, and Buildings East of Pit – Static	1.85	1.50
Case SS-6 – Access Road Easement, Gravel Road, Water Line, Telephone Line, Power Poles, Gas Line, Water Meter, and Mail Box South of Pit – Static	1.92	1.50

Table 3: Mining Conditions
Pseudo-Static Condition Slope Stability Analysis Results

Description	Calculated Factor of Safety	Required Minimum Factor of Safety
Case SS-1 – Irrigation Ditch & Gravel Road West of Pit – Pseudo-Static	1.44	1.30
Case SS-2 –Gravel Road, and Irrigation Ditch North of Pit – Pseudo-Static	1.47	1.30
Case SS-3A – Gravel Road South of Pit – Pseudo-Static	1.36	1.30
Case SS-3B – Shop Building South of Pit – Pseudo-Static	1.38	1.30
Case SS-4 – Gravel Road & Fence West of Pit – Pseudo-Static	1.55	1.30
Case SS-5 – Fence, Power Pole, Road, and Buildings East of Pit – Pseudo-Static	1.56	1.30
Case SS-6 – Access Road Easement, Gravel Road, Water Line, Telephone Line, Power Poles, Gas Line, Water Meter, and Mail Box South of Pit – Pseudo-Static	1.61	1.30

Table 4: Reclaimed Conditions
Static & Pseudo-Static Condition Slope Stability Analysis Results

Description	Calculated Factor of Safety	Required Minimum Factor Of Safety
Case SS-2 –Gravel Road, and Irrigation Ditch North of Pit – Static	1.57	1.50
Case SS-2 –Gravel Road, and Irrigation Ditch North of Pit – Pseudo-Static	1.52	1.30

The Galena analysis output files are included in Appendix C for all cases.

CONCLUSIONS AND RECOMMENDATIONS

Mining Conditions:

Case SS-1 – At a setback of 35 feet, the lowest resulting static condition safety factor of 1.70 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.44 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 35 feet from the gravel road is satisfactory.

Case SS-2 – At a setback of 59 feet, the lowest resulting static condition safety factor of 1.75 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.47 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 59 feet from the gravel road is satisfactory.

Case SS-3A – At a setback of 39 feet, the lowest resulting static condition safety factor of 1.57 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.36 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 39 feet from the gravel road is satisfactory.

Case SS-3B – At a setback of 67 feet, the lowest resulting static condition safety factor of 1.59 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.38 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 67 feet from the shop building is satisfactory.

Case SS-4 – At a setback of 36 feet, the lowest resulting static condition safety factor of 1.83 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.55 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 36 feet from the gravel road is satisfactory.

Case SS-5 – At a setback of 39 feet, the lowest resulting static condition safety factor of 1.85 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.56 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 39 feet from the fence/power pole is satisfactory.

Case SS-6 – At a setback of 35 feet, the lowest resulting static condition safety factor of 1.92 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.61 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 35 feet from the access road easement is satisfactory.

Reclaimed Conditions:

Case SS-2 – At a setback of 59 feet, the lowest resulting static condition safety factor of 1.57 exceeds the MLRB minimum requirement of 1.50 for an embankment adjacent to a critical structure. The lowest resulting pseudo-static condition safety factor of 1.52 exceeds the MLRB minimum requirement of 1.30 for an embankment adjacent to a critical structure subject to earthquake loading. The proposed setback of 59 feet from the gravel road is satisfactory.

The following recommendations for monitoring of slope stability should be followed:

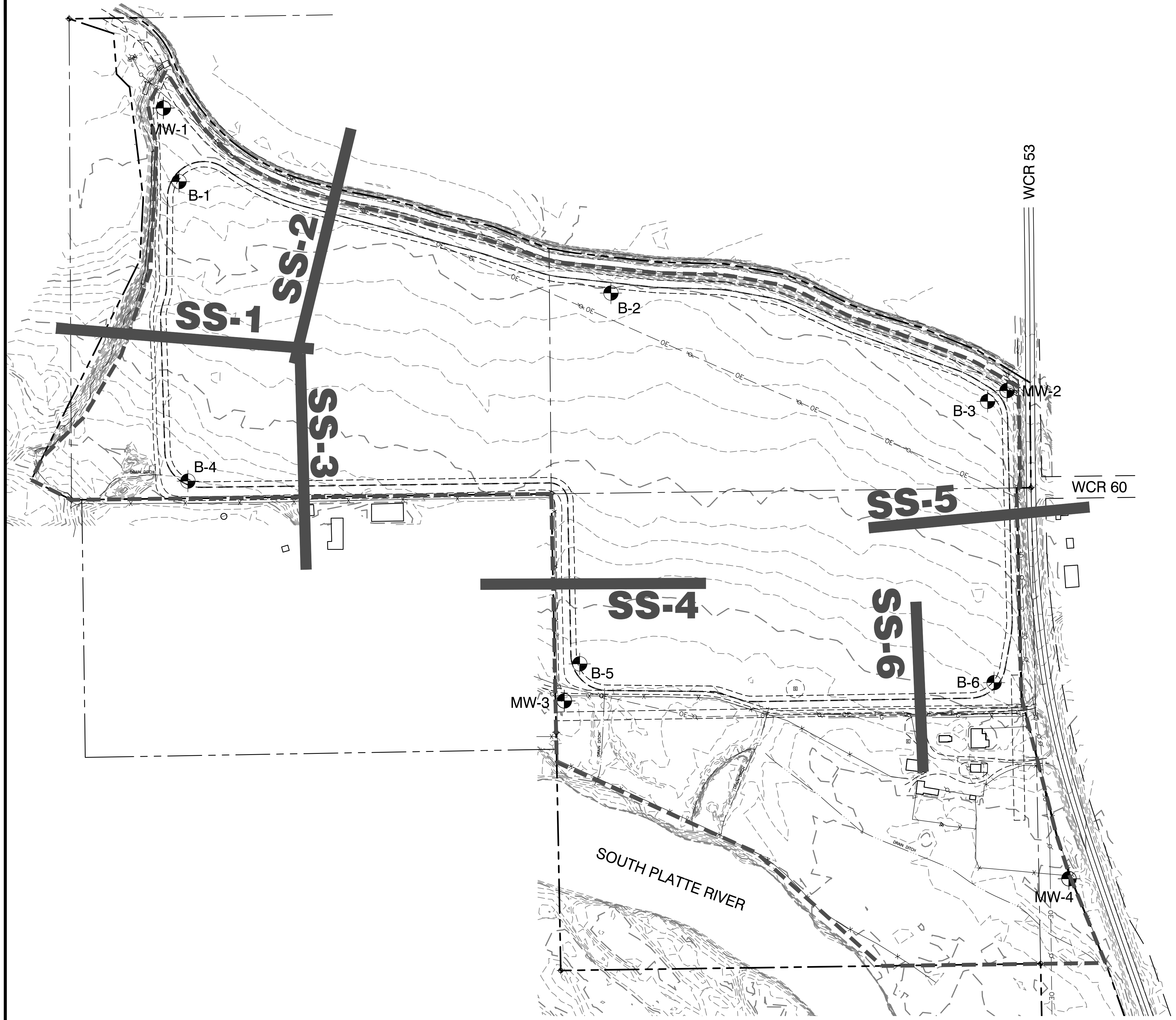
1. A visual inspection of the excavated slopes should be done on a weekly basis for the duration of mining. This inspection should consist of walking the existing ground and looking for any signs of stress cracks or other potential signs of slope failure. Some minor sloughing of slopes is expected on any mine site. The intent of this inspection is to locate potential major slope failures that could potentially extend back into a structure.

2. A visual inspection should be done after a major precipitation event that has saturated the ground using the same procedures. A major precipitation event would be defined as a storm that produces an intensity level reached once in 50 years on the average.

3. If a visual inspection detects signs of a potential slope failure, qualified personnel should be contacted to evaluate and recommend remediation work to stabilize the area.

4. If no visible signs of slope failure are detected during mining, then the inspection period could be reduced to once per 6 months after mining completion, or after every major precipitation event.

APPENDIX A



LEGEND:

— — — —	EXISTING CONTOURS
——— - ———	PROPERTY LINE
- - - - - -	MINING LIMIT
— — — —	SLURRY WALL
⊕ B-1	BORING LOCATION
⊕ MW-1	MONITORING WELL LOCATION
▬ SS-1	SLOPE STABILITY CASE LOCATION

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222
www.j-tconsulting.com

Ogilvy River Farm Pit

Slope Stability Case Location Map

Ogilvy River Farm, LLC

REVISIONS

No	Date	By	Chk	Description

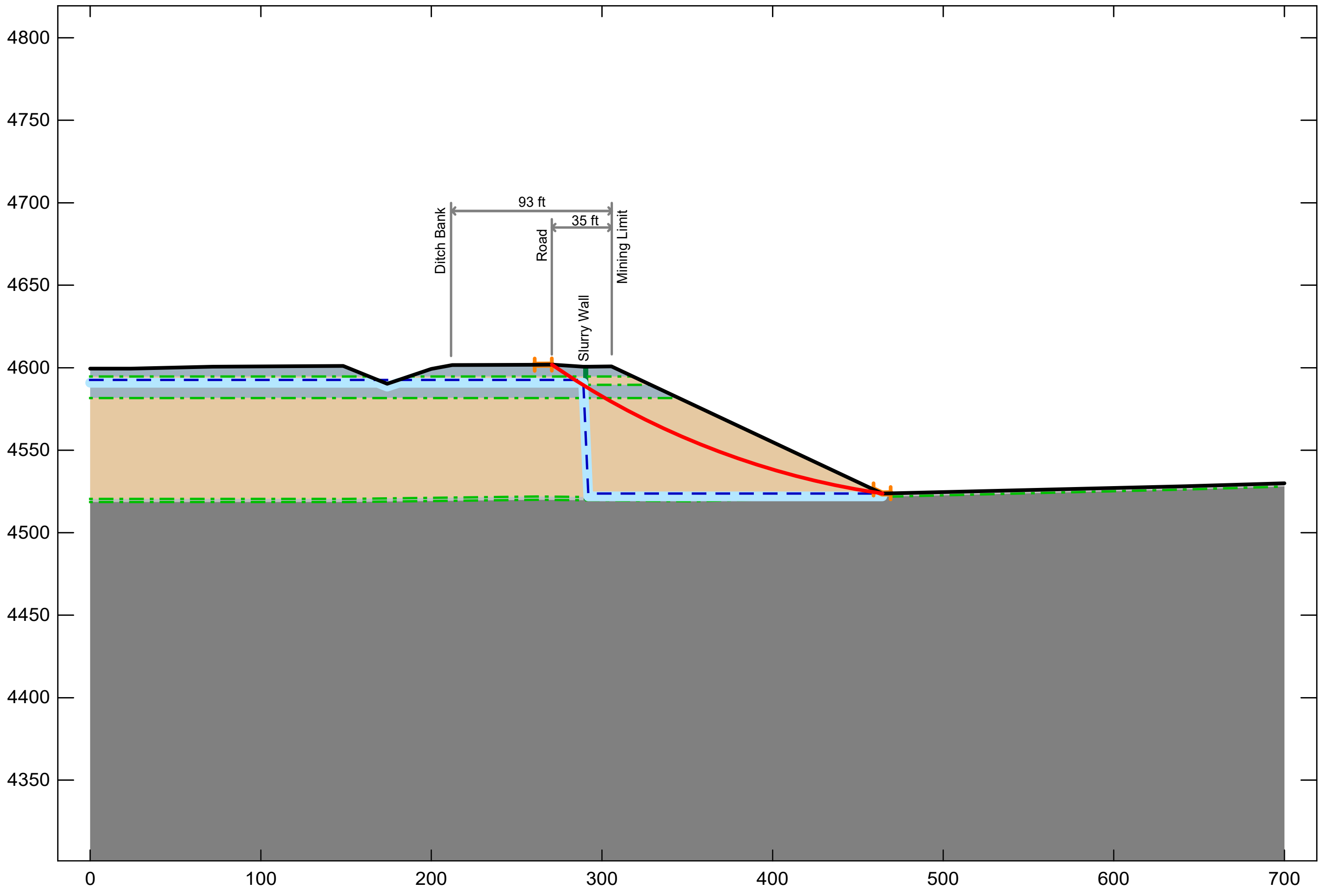
Job #	22032
Date	02.23.24
Drawn By	TWT
Designed By	TPY
Checked By	JCY
File	JT-Bean-SS.dwg
Scale	As Shown

Sheet: **1** Of: **1**

P:\22032 Todd Bean Gravel Property\Drawings\Plan Sheets\Slope Stability\JT-Bean-SS.dwg, Slope Stability Case Location Map, 2/23/2024 10:21:15 AM

APPENDIX B

Mining Conditions



GALENA Version 7.2

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Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Đ

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Đ

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Đ

5: Slurry Wall (c:0 ø:45 g:100) Sat Đ

6: Clay (c:50 ø:25 g:100) Sat Đ

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.70

Edited: 13 Jun 2024

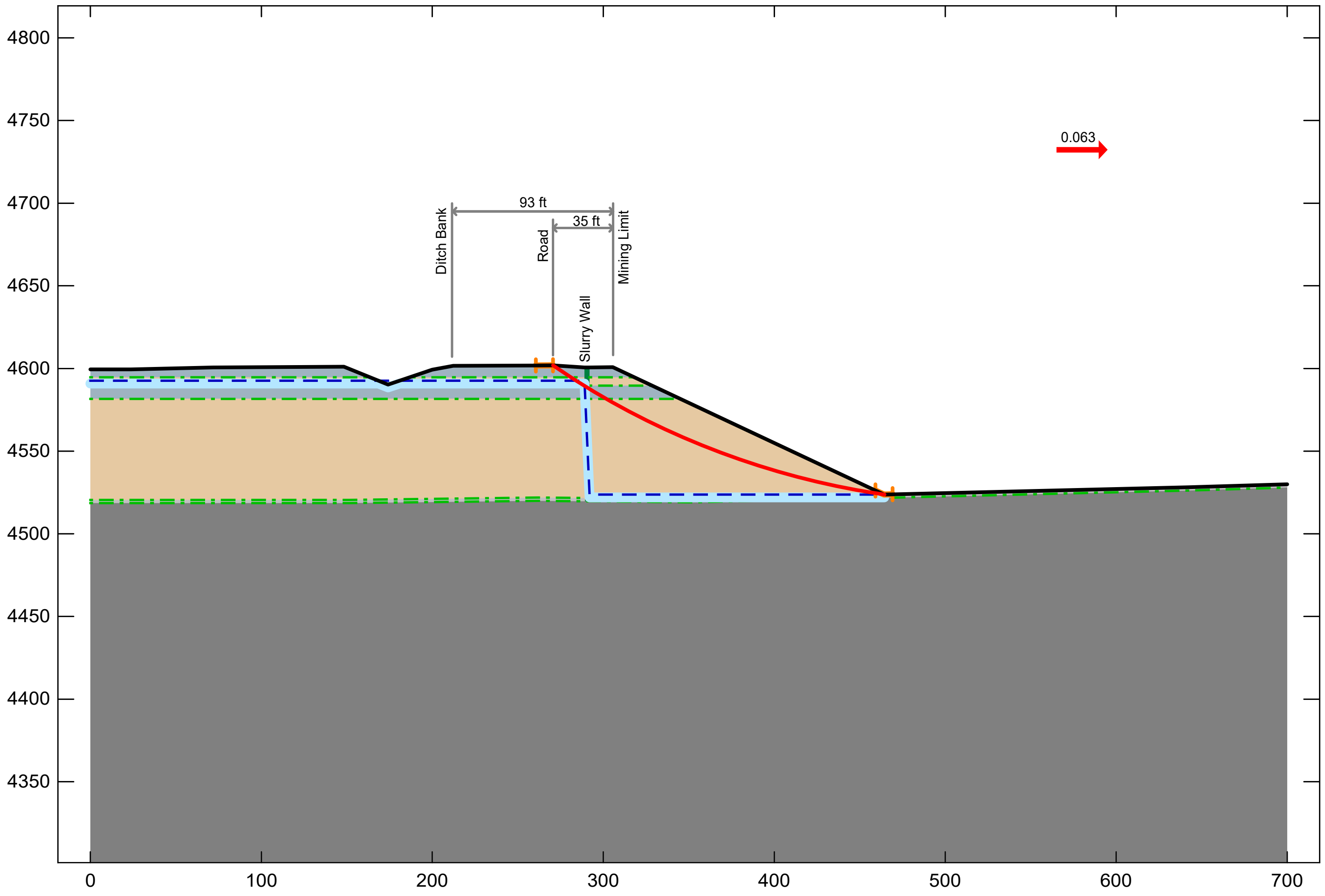
Processed: 13 Jun 2024

J&T Consulting, Inc.

Project Ogilvy River Farm

Slope Stability - Case SS-1 Mining Slope - Static

File: C:\Galena Models\O.R.F. Pit-SS1-Mining.gmf



Material Keys

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3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) ▬ Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) ▬ Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) ▬ Sat Ð

6: Clay (c:50 ø:25 g:100) ▬ Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.44

GALENA Version 7.2

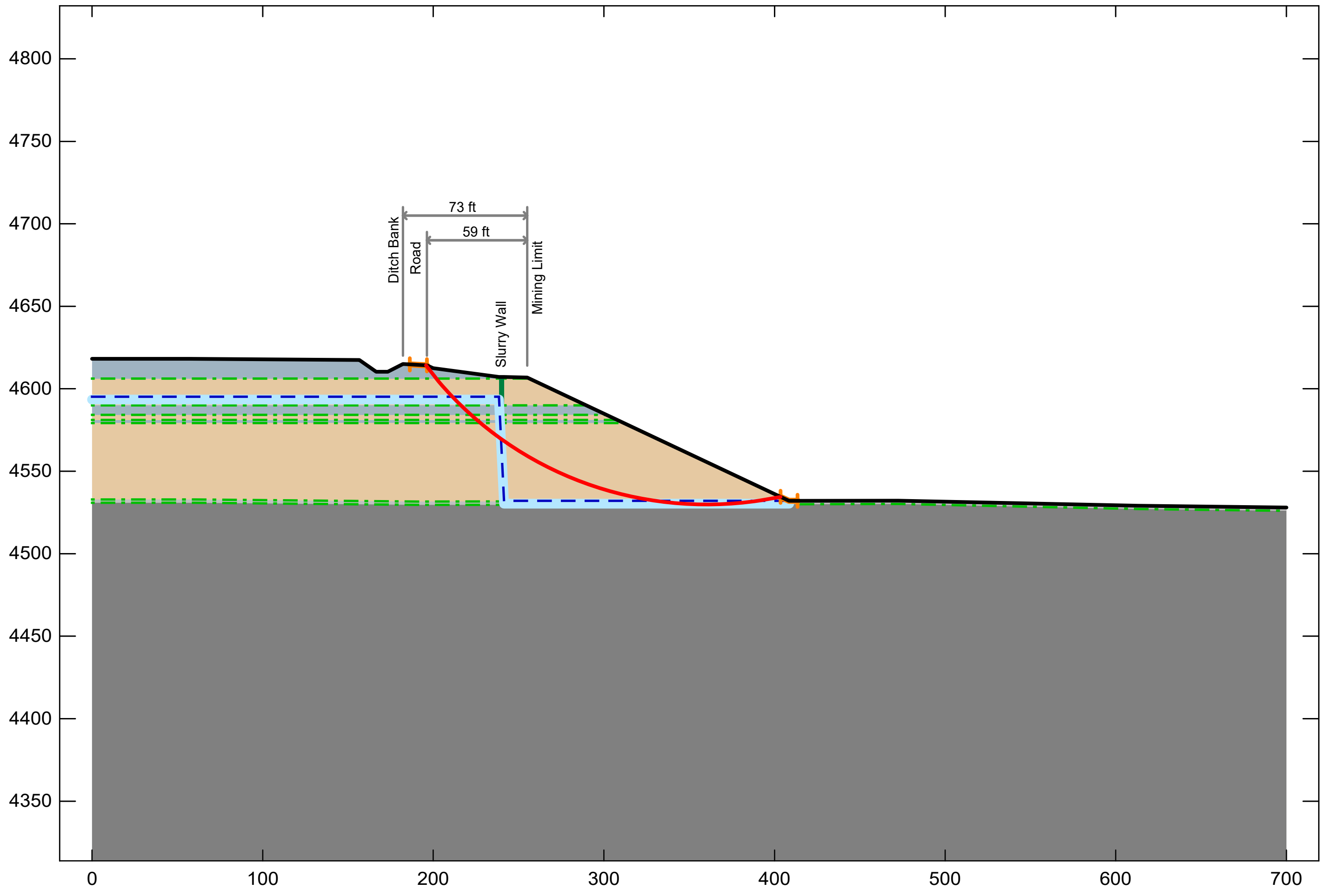
Licensed to: J & T Consulting

Edited: 13 Jun 2024
Processed: 13 Jun 2024

Project Ogilvy River Farm
Slope Stability - Case SS-1 Mining Slope - Pseudo Static

File: C:\Galena Models\O.R.F. Pit-SS1-EQ-Mining.gmf

J&T Consulting, Inc.



Material Keys

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3: Weathered Claystone Bedrock
(c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.75

GALENA Version 7.2

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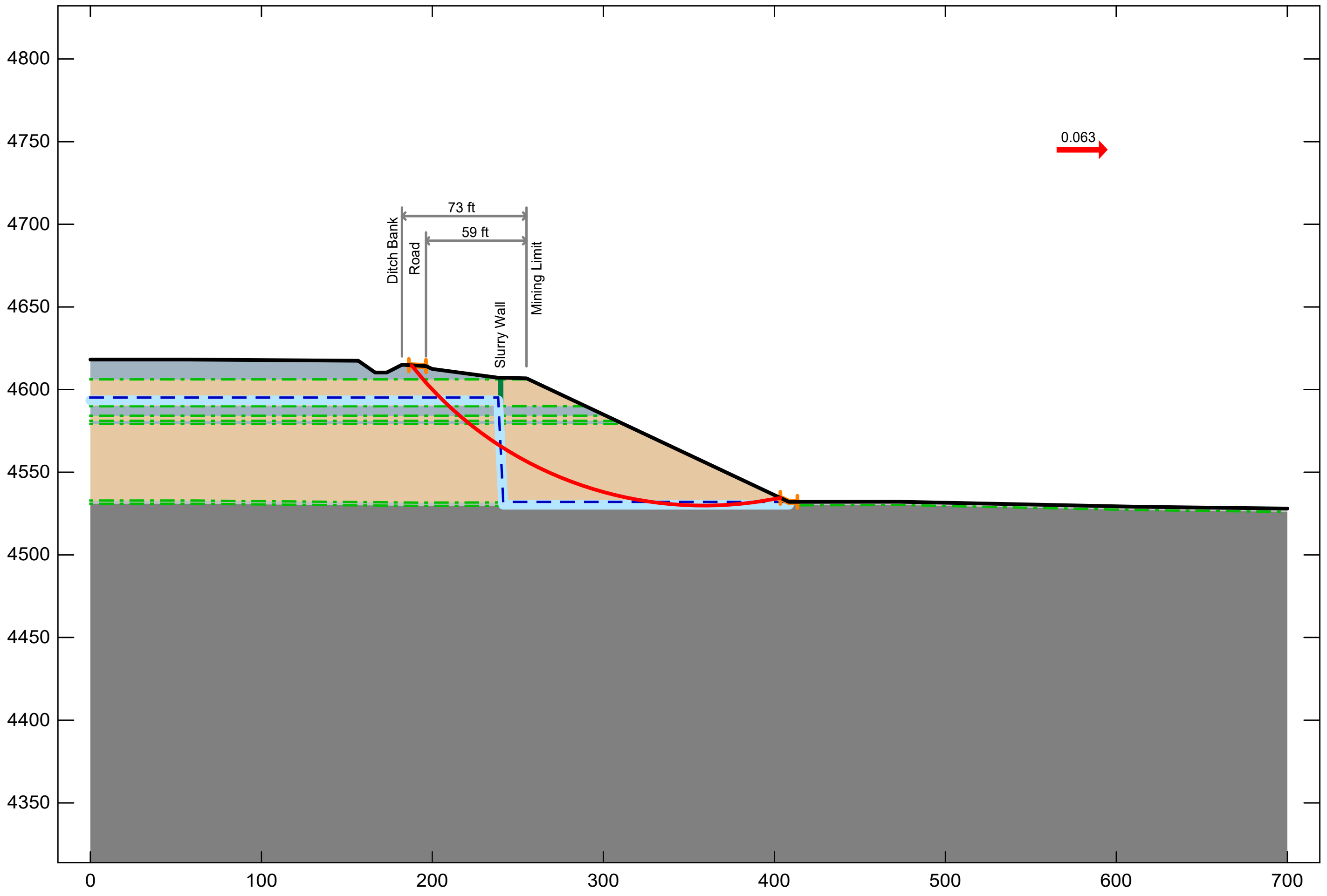
Project Ogilvy River Farm Pit
Slope Stability - Case SS-2 Mining Slope - Static

File: C:\Galena Models\O.R.F. Pit-SS2-Mining.gmf

Edited: 13 Jun 2024
Processed: 13 Jun 2024

J&T Consulting, Inc.



GALENA Version 7.2

Licensed to: J & T Consulting

Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

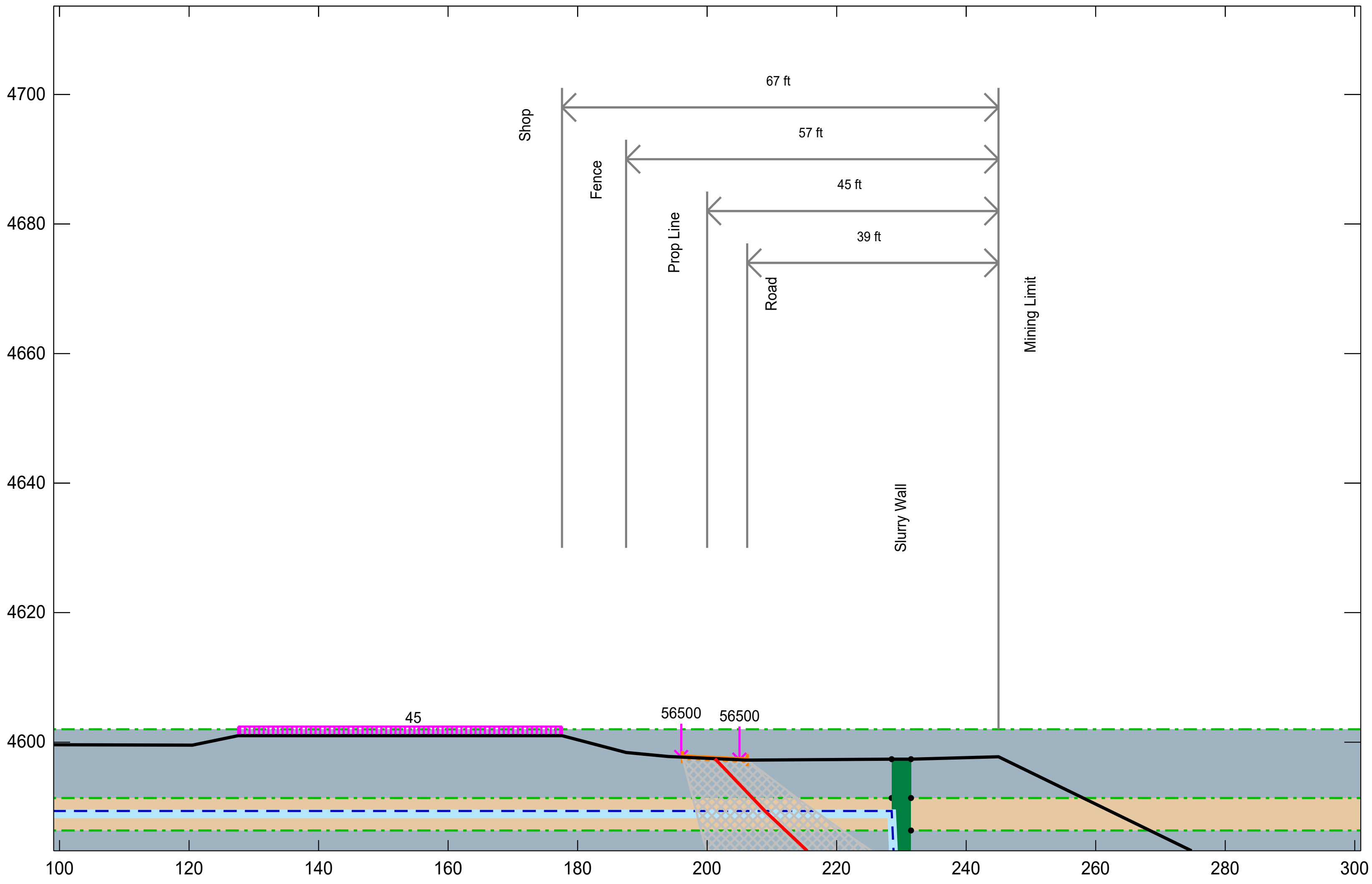
Critical Factor of Safety:	1.47

Project Ogilvy River Farm Pit
Slope Stability - Case SS-2 Mining Slope - Pseudo Static

File: C:\Galena Models\O.R.F. Pit-SS2-EQ-Mining.gmf

Edited:	13 Jun 2024
Processed:	13 Jun 2024

J&T Consulting, Inc.



Project Ogilvy River Farm

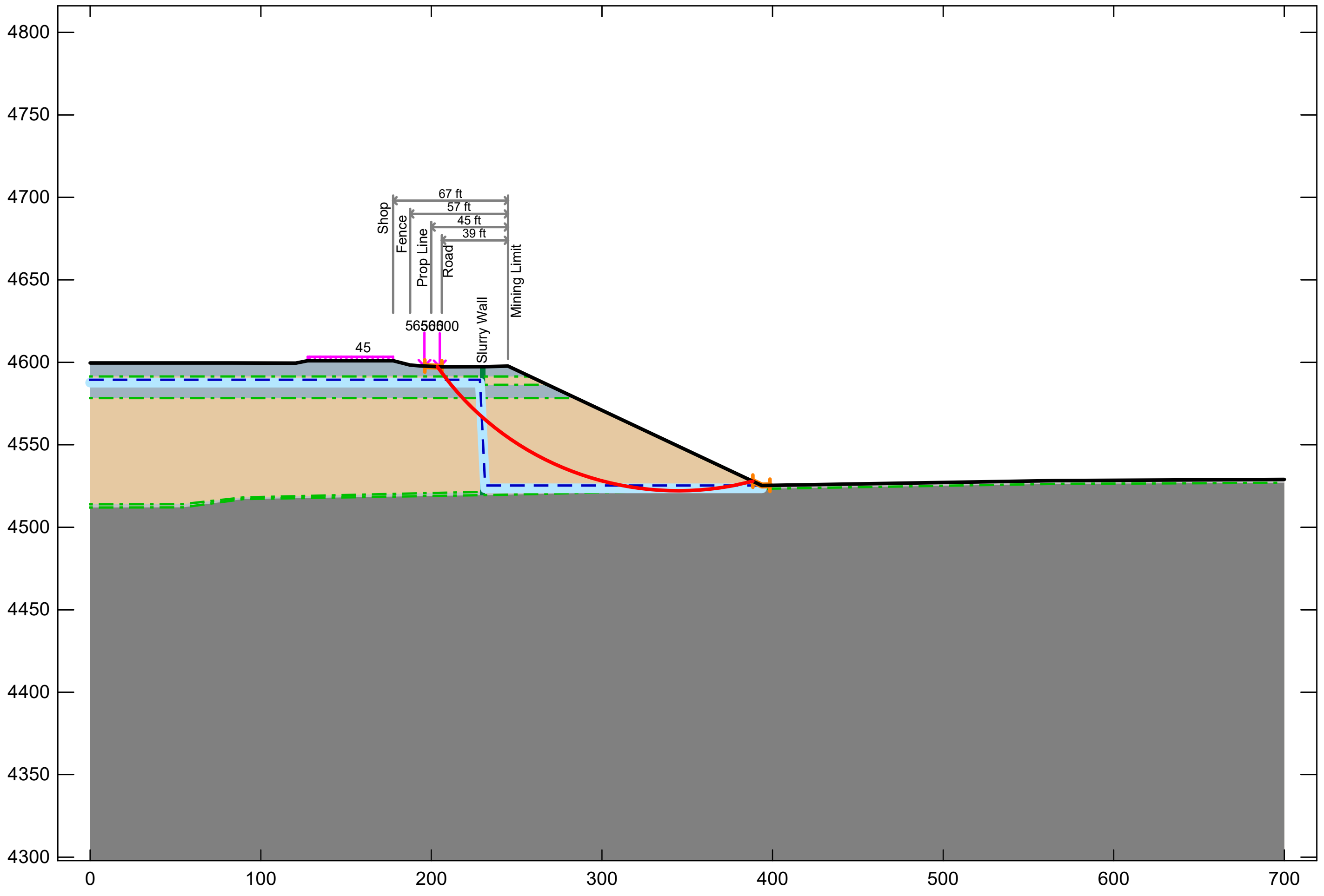
Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Road

Analysis 1

GALENA Version 7.2

File: C:\Galena Models\O.R.F. Pit-SS3-Mining-Bearing-to-Road.gmf

Analysis Parameter Enlargement



GALENA Version 7.2

Licensed to: J & T Consulting

Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

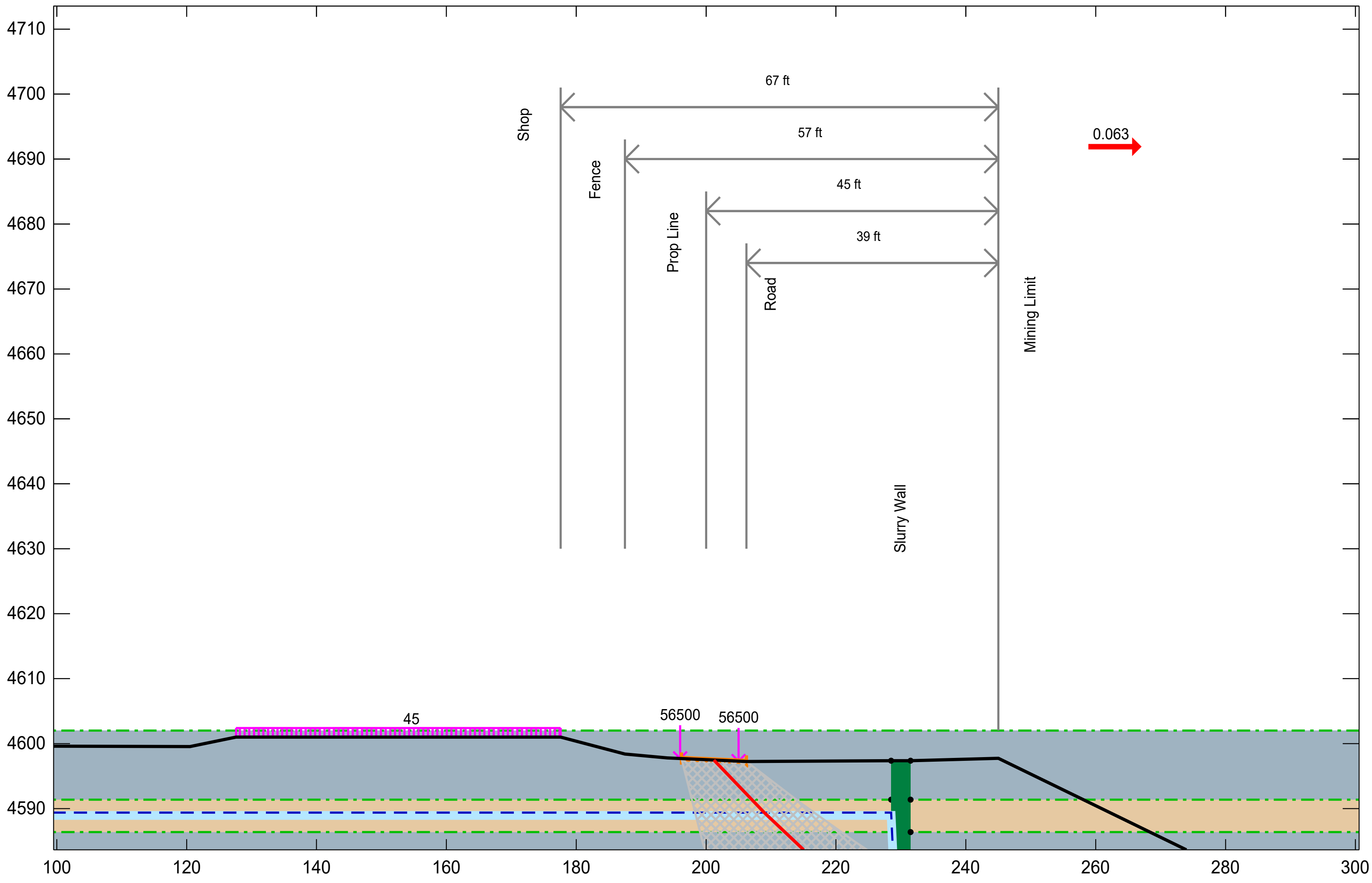
Critical Factor of Safety: 1.57

Edited: 12 Jun 2024
Processed: 12 Jun 2024

J&T Consulting, Inc.

Project Ogilvy River Farm
Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Road

File: C:\Galena Models\O.R.F. Pit-SS3-Mining-Bearing-to-Road.gmf



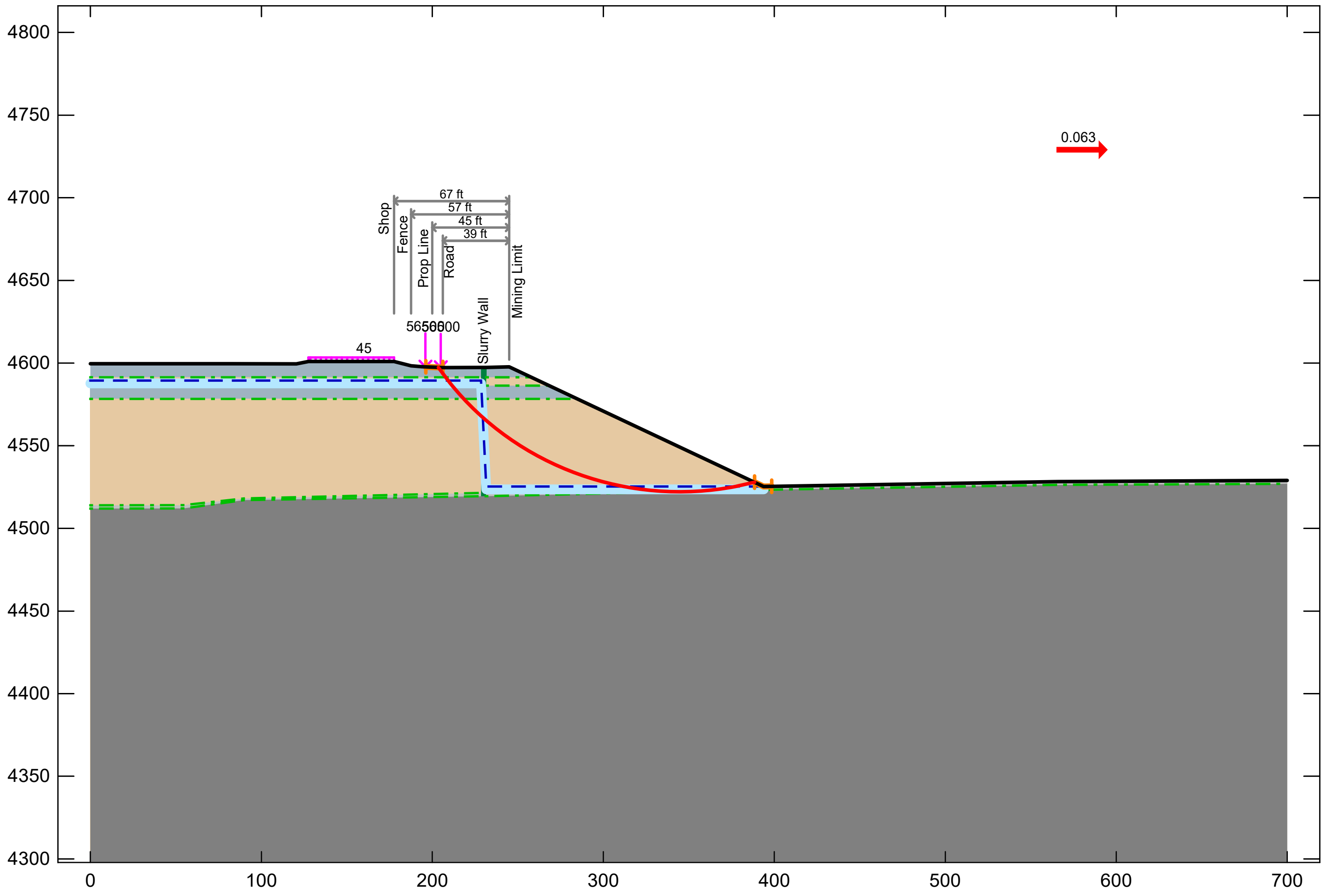
Project Ogilvy River Farm
Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Road

Analysis 1

GALENA Version 7.2

File: C:\Galena Models\O.R.F. Pit-SS3-EQ-Mining-Bearing-to-Road.gmf

Analysis Parameter Enlargement



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.36

GALENA Version 7.2

Licensed to: J & T Consulting

Project Ogilvy River Farm

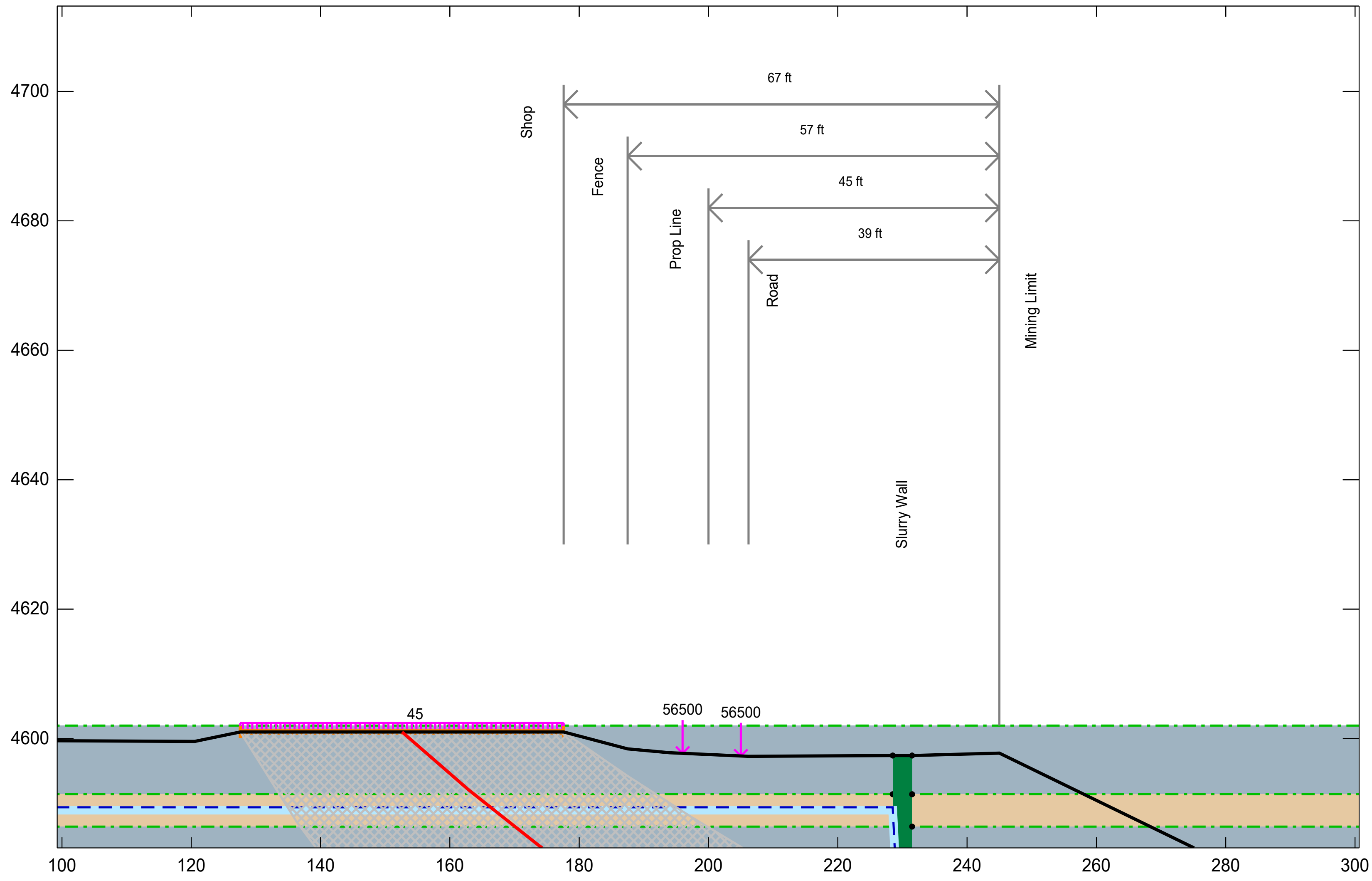
Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Road

File: C:\Galena Models\O.R.F. Pit-SS3-EQ-Mining-Bearing-to-Road.gmf

Edited: 12 Jun 2024

Processed: 12 Jun 2024

J&T Consulting, Inc.



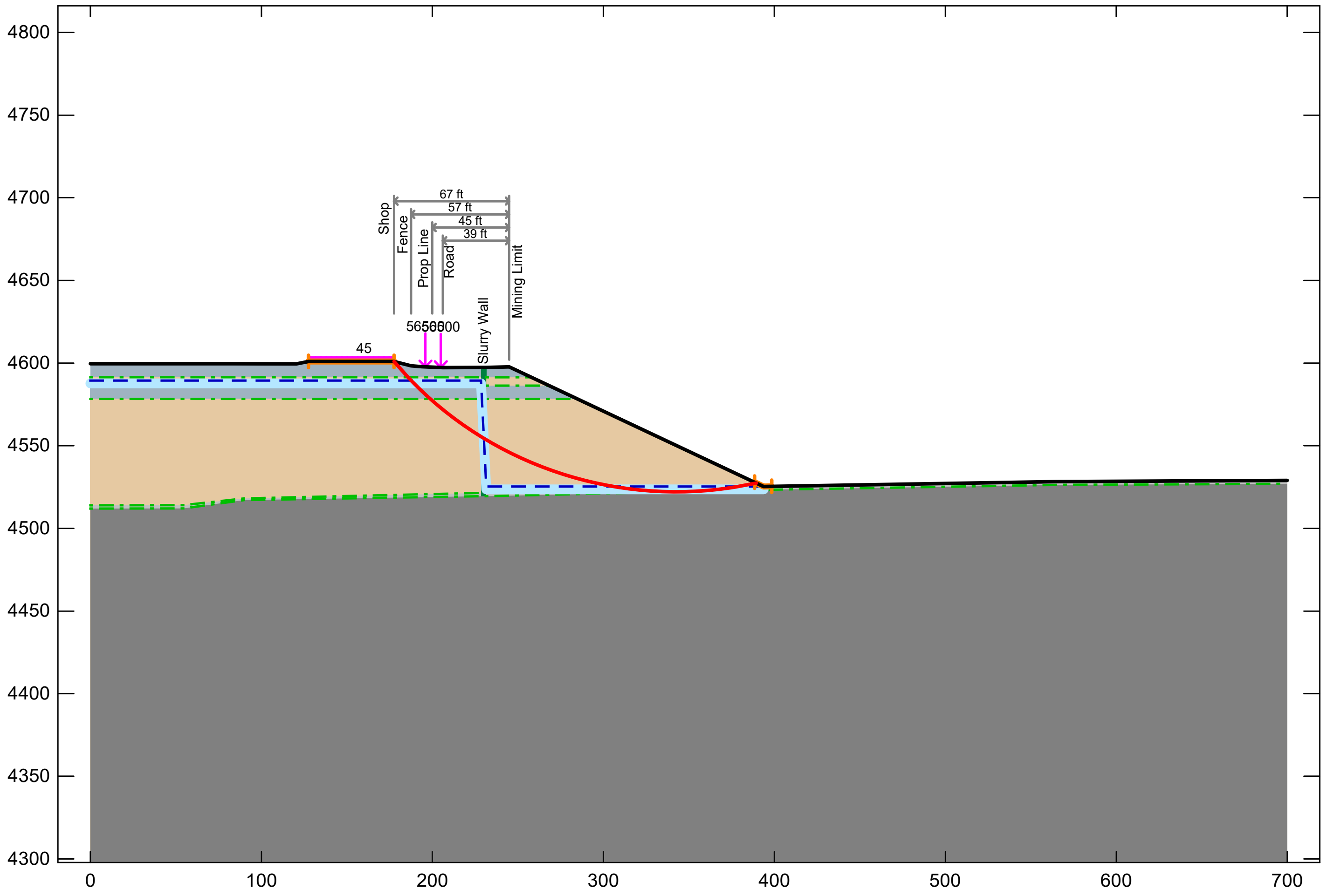
Project Ogilvy River Farm
Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Shop

Analysis 1

GALENA Version 7.2

File: C:\Galena Models\O.R.F. Pit-SS3-Mining-Bearing-to-Bldg.gmf

Analysis Parameter Enlargement



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety:	1.59

GALENA Version 7.2

Licensed to: J & T Consulting

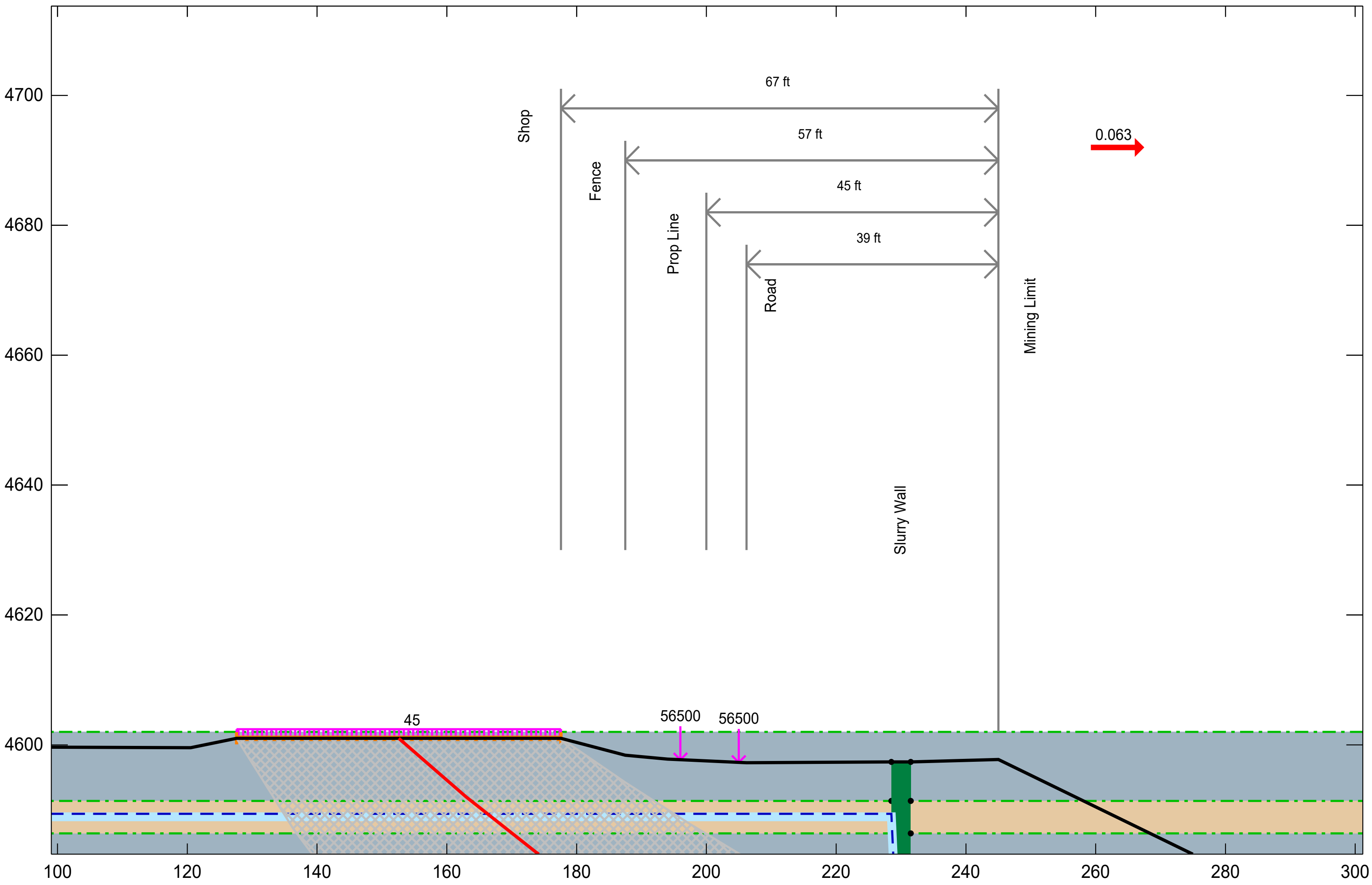
Project Ogilvy River Farm

Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Shop

File: C:\Galena Models\O.R.F. Pit-SS3-Mining-Bearing-to-Bldg.gmf

Edited: 12 Jun 2024
Processed: 12 Jun 2024

J&T Consulting, Inc.



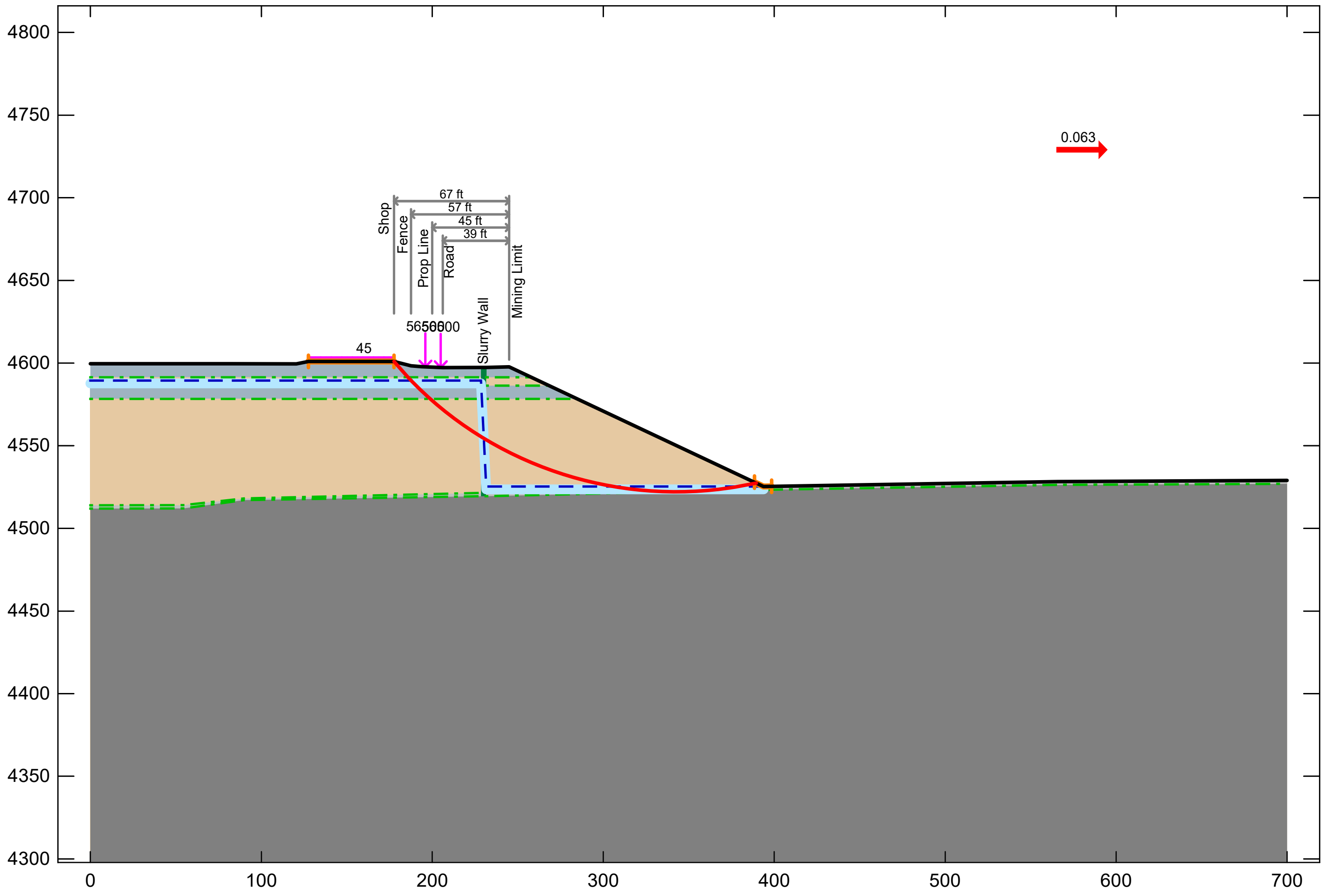
Project Ogilvy River Farm
Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Shop

Analysis 1

GALENA Version 7.2

File: C:\Galena Models\O.R.F. Pit-SS3-EQ-Mining-Bearing-to-Bldg.gmf

Analysis Parameter Enlargement



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) 🟫 Sat Đ

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) ⬜ Sat Đ

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) ⬛ Sat Đ

5: Slurry Wall (c:0 ø:45 g:100) 🟩 Sat Đ

6: Clay (c:50 ø:25 g:100) 🟦 Sat Đ

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.38

GALENA Version 7.2

Licensed to: J & T Consulting

Project Ogilvy River Farm

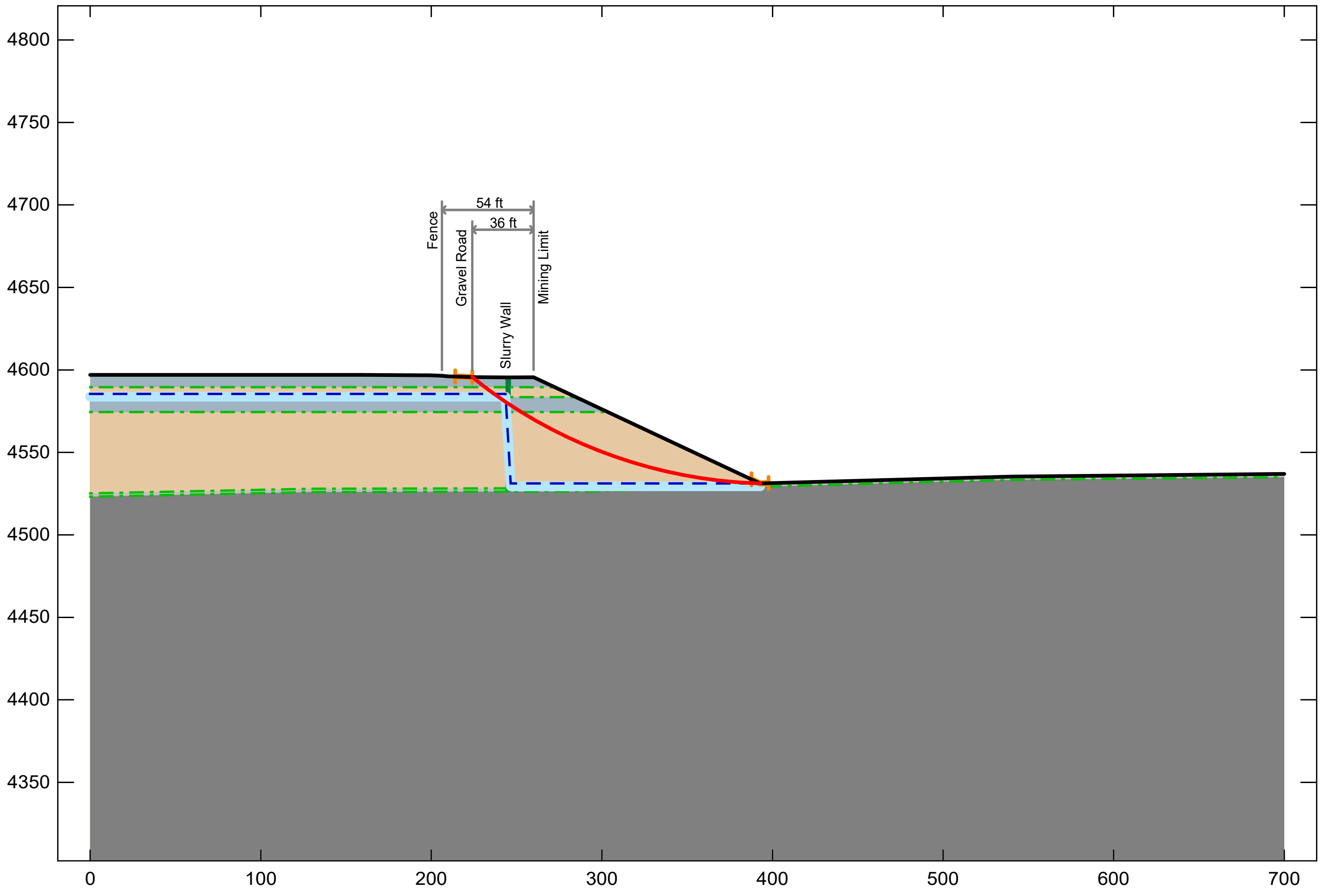
Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Shop

File: C:\Galena Models\O.R.F. Pit-SS3-EQ-Mining-Bearing-to-Bldg.gmf

Edited: 12 Jun 2024

Processed: 12 Jun 2024

J&T Consulting, Inc.



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.83

GALENA Version 7.2

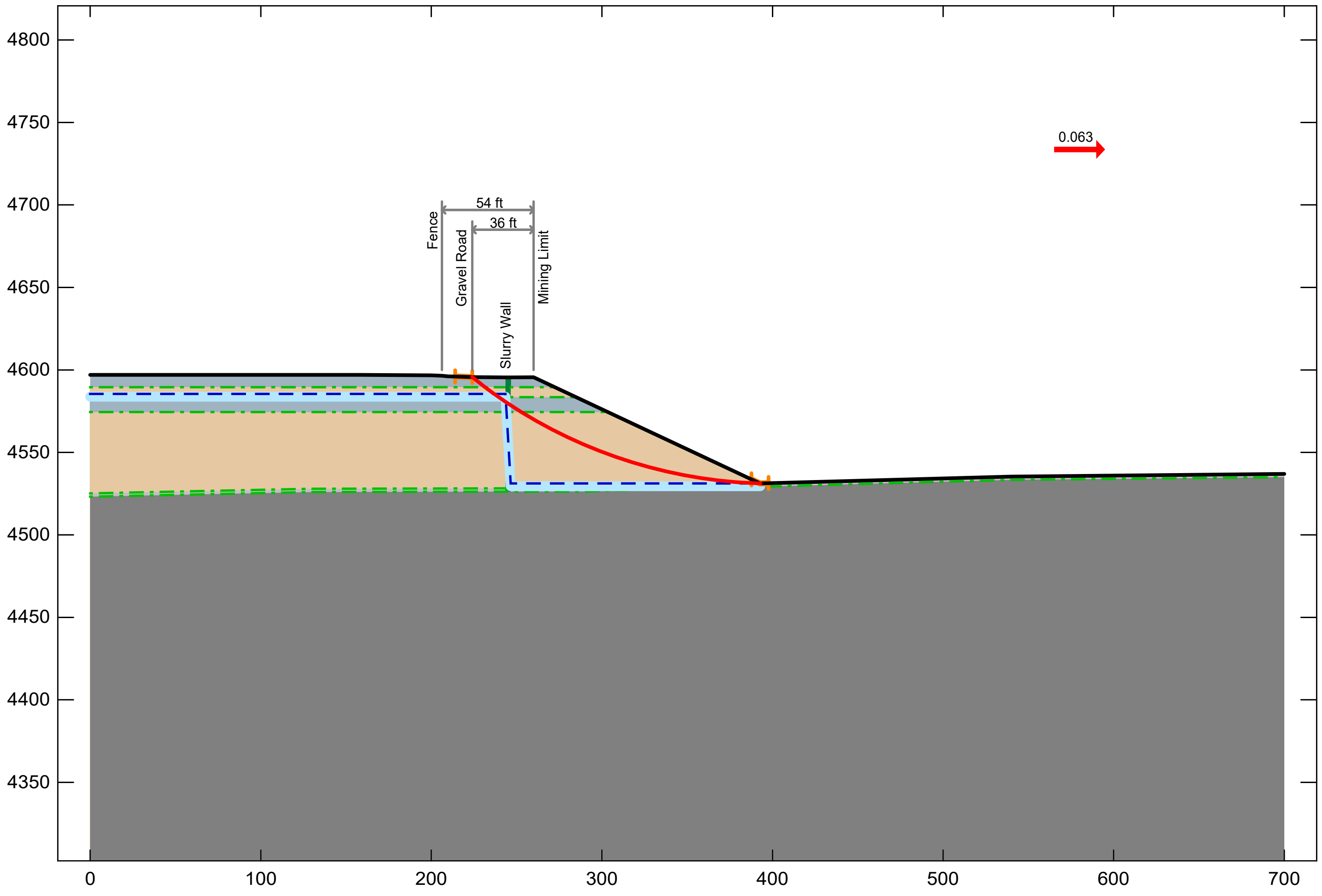
Licensed to: J & T Consulting

Project Ogilvy River Farm
Slope Stability - Case SS-4 Mining Slope - Static

File: C:\Galena Models\O.R.F. Pit-SS4-Mining.gmf

Edited: 13 Jun 2024
Processed: 13 Jun 2024

J&T Consulting, Inc.



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) ▬ Sat Ð

3: Weathered Claystone Bedrock
(c:1000 ø:0 g:110) ▬ Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) ▬ Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) ▬ Sat Ð

6: Clay (c:50 ø:25 g:100) ▬ Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety:	1.55

GALENA Version 7.2

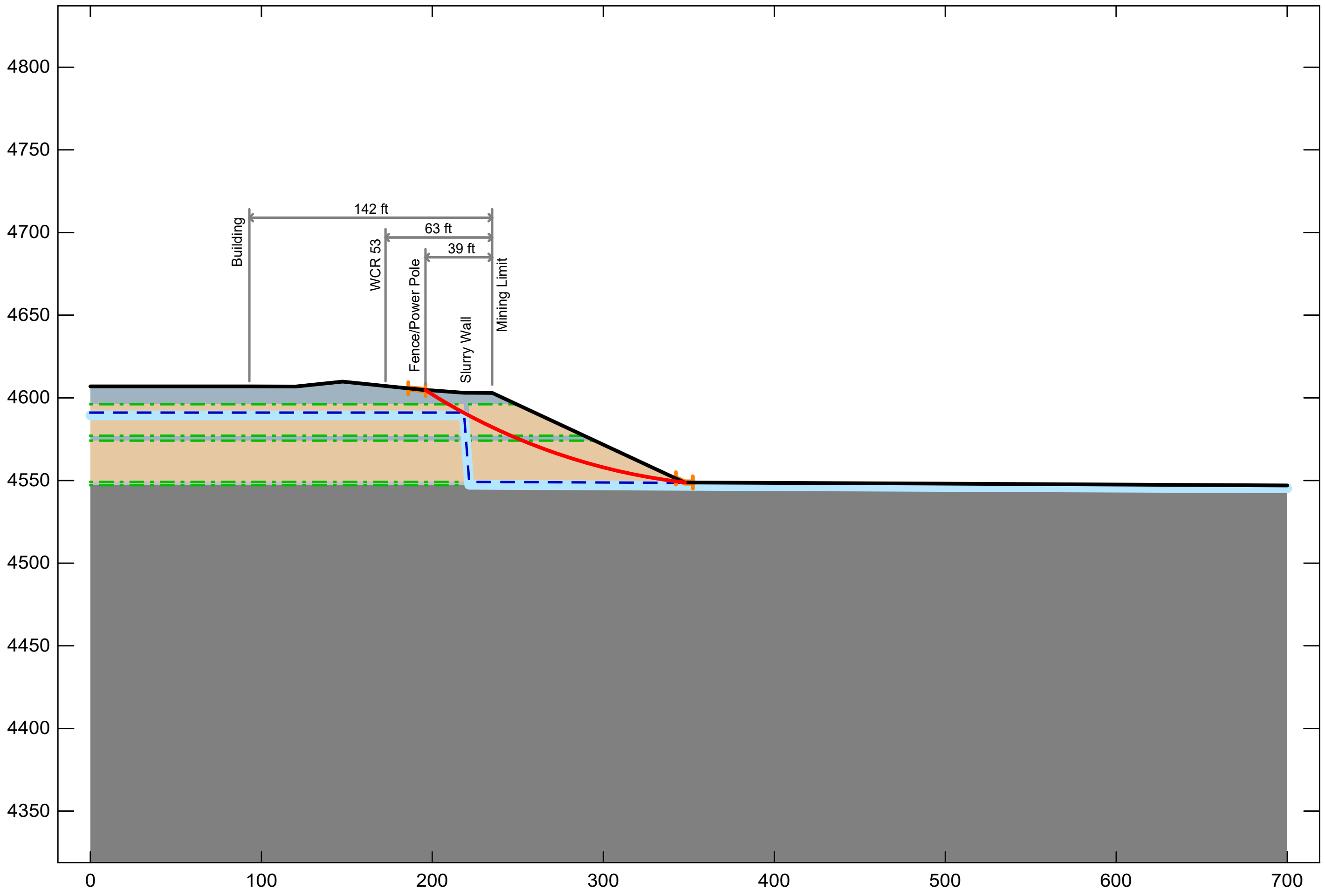
Licensed to: J & T Consulting

Project Ogilvy River Farm
Slope Stability - Case SS-4 Mining Slope - Pseudo Static

File: C:\Galena Models\O.R.F. Pit-SS4-EQ-Mining.gmf

Edited: 13 Jun 2024
Processed: 13 Jun 2024

J&T Consulting, Inc.



GALENA Version 7.2

Licensed to: J & T Consulting

Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) ▬ Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) ▬ Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) ▬ Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) ▬ Sat Ð

6: Clay (c:50 ø:25 g:100) ▬ Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

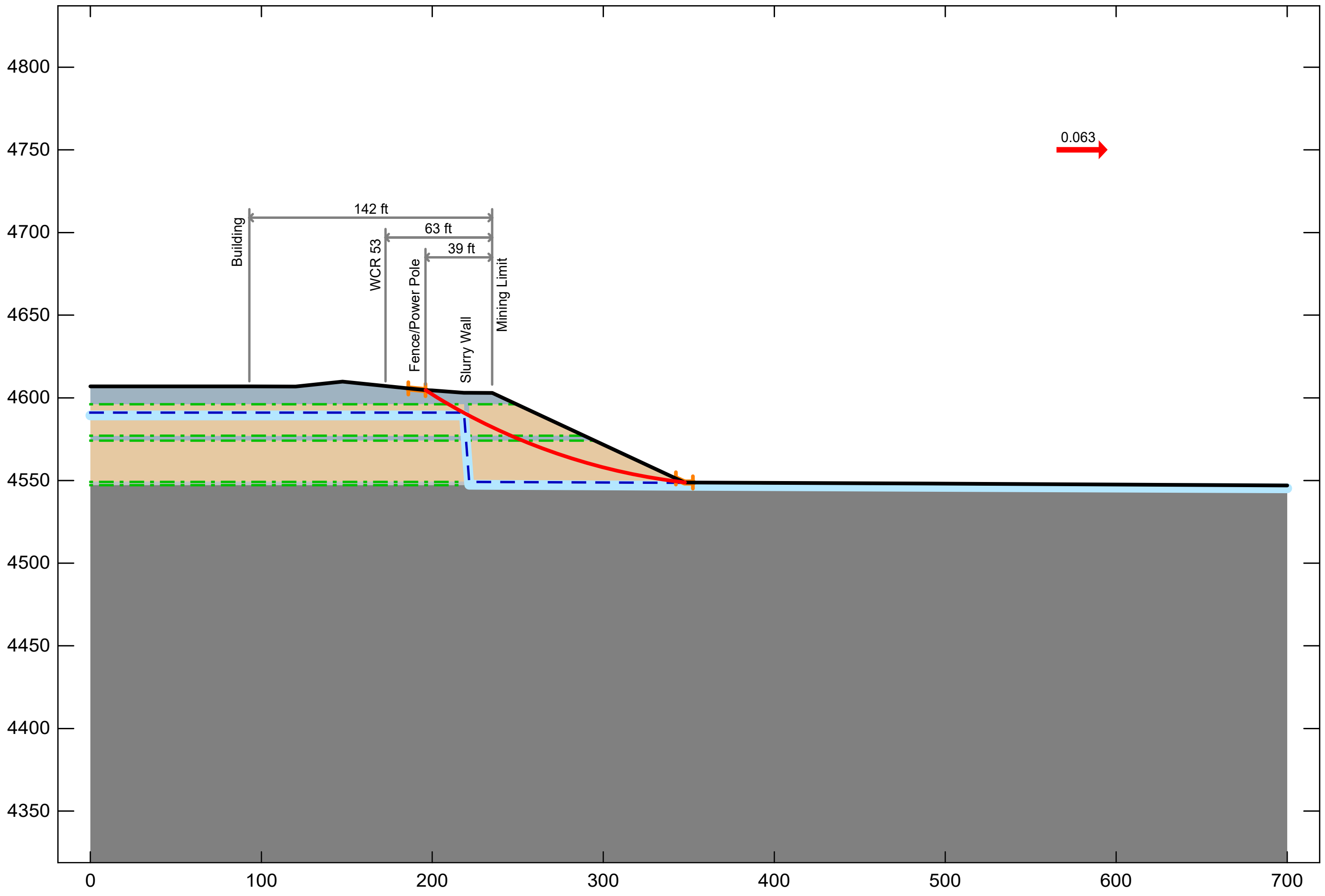
Critical Factor of Safety: 1.85

Project Ogilvy River Farm
Slope Stability - Case SS-5 Mining Slope - Static

File: C:\Galena Models\O.R.F. Pit-SS5-Mining.gmf

Edited: 13 Jun 2024
Processed: 13 Jun 2024

J&T Consulting, Inc.



GALENA Version 7.2

Licensed to: J & T Consulting

Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.56

Project Ogilvy River Farm

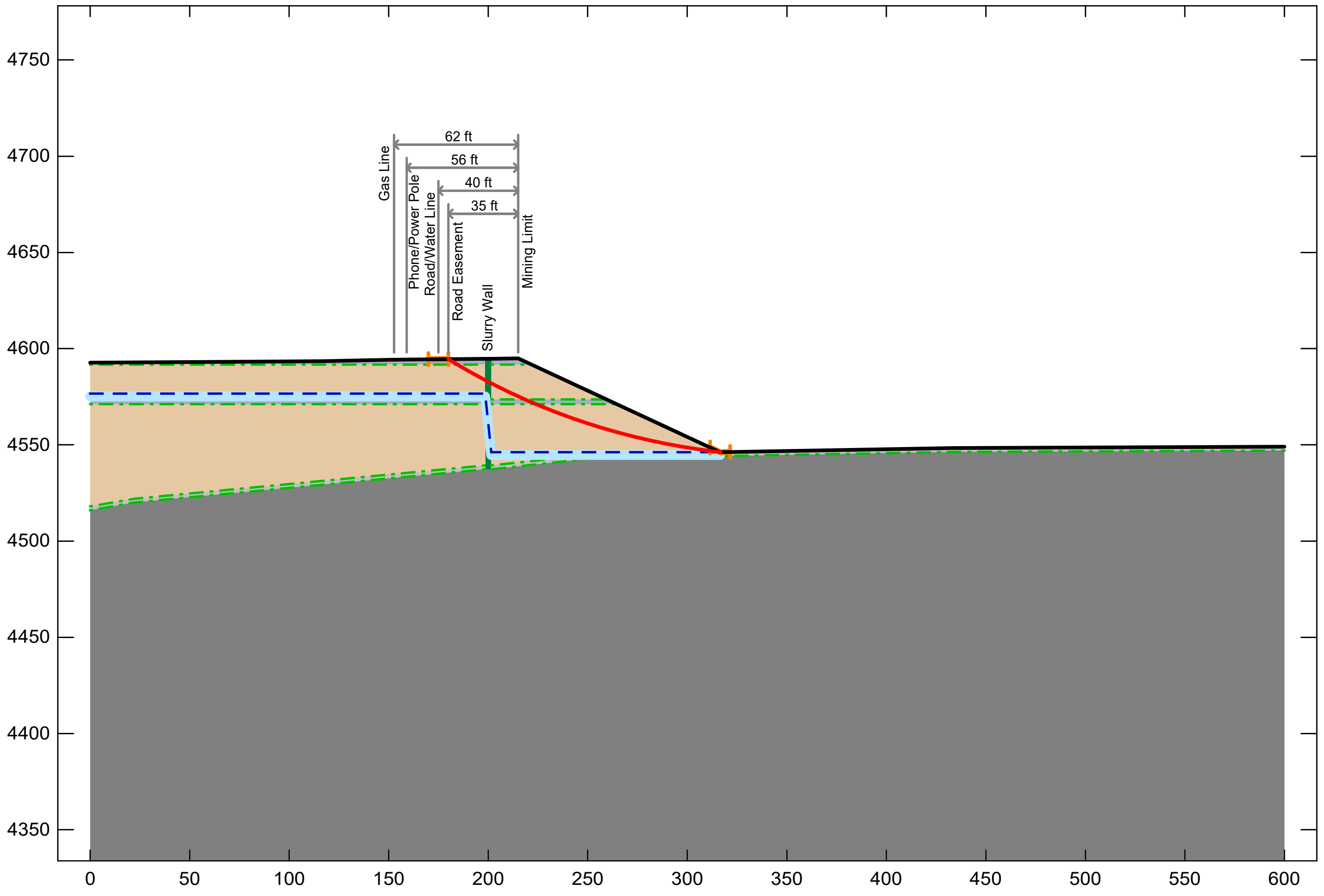
Slope Stability - Case SS-5 Mining Slope - Pseudo Static

File: C:\Galena Models\O.R.F. Pit-SS5-EQ-Mining.gmf

Edited: 13 Jun 2024

Processed: 13 Jun 2024

J&T Consulting, Inc.



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Đ

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Đ

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Đ

5: Slurry Wall (c:0 ø:45 g:100) Sat Đ

6: Clay (c:50 ø:25 g:100) Sat Đ

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.92

GALENA Version 7.2

Licensed to: J & T Consulting

Project Ogilvy River Farm

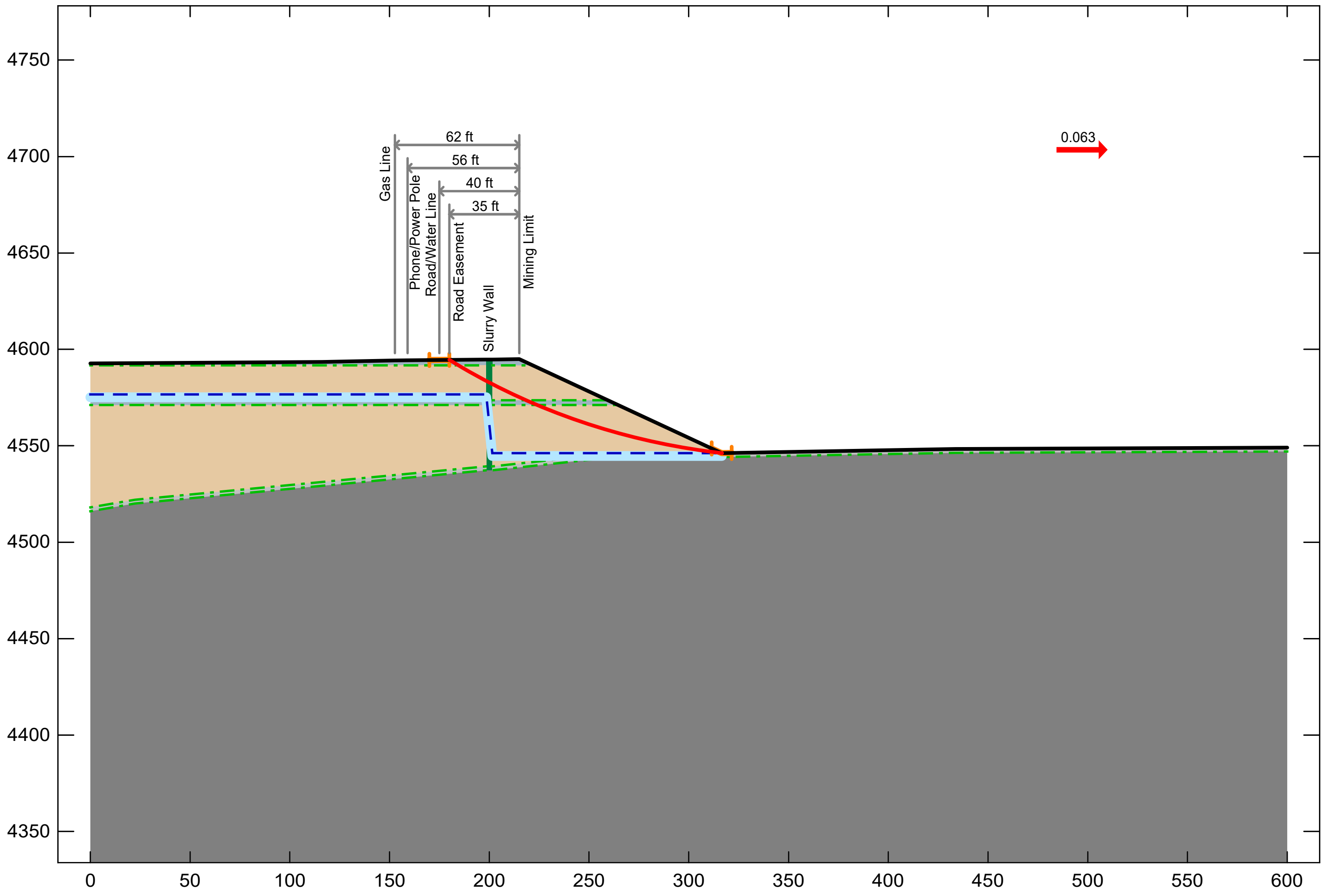
Slope Stability - Case SS-6 Mining Slope - Static

File: C:\Galena Models\O.R.F. Pit-SS6-Mining.gmf

Edited: 13 Jun 2024

Processed: 13 Jun 2024

J&T Consulting, Inc.



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Đ

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Đ

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Đ

5: Slurry Wall (c:0 ø:45 g:100) Sat Đ

6: Clay (c:50 ø:25 g:100) Sat Đ

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.61

GALENA Version 7.2

Licensed to: J & T Consulting

Project Ogilvy River Farm

Slope Stability - Case SS-6 Mining Slope - Pseudo Static

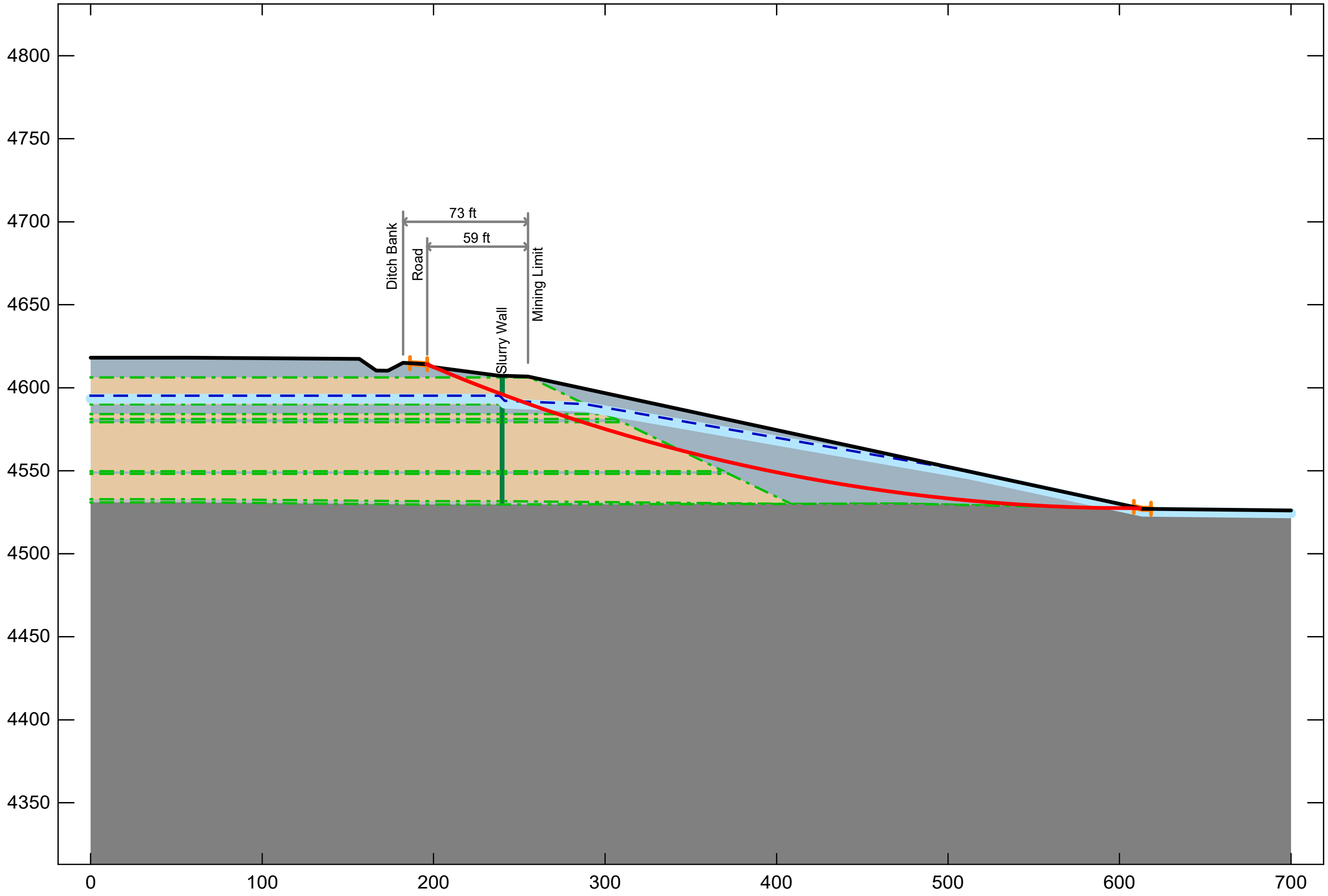
File: C:\Galena Models\O.R.F. Pit-SS6-EQ-Mining.gmf

Edited: 13 Jun 2024

Processed: 13 Jun 2024

J&T Consulting, Inc.

Reclamation Conditions



Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock
(c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.57

GALENA Version 7.2

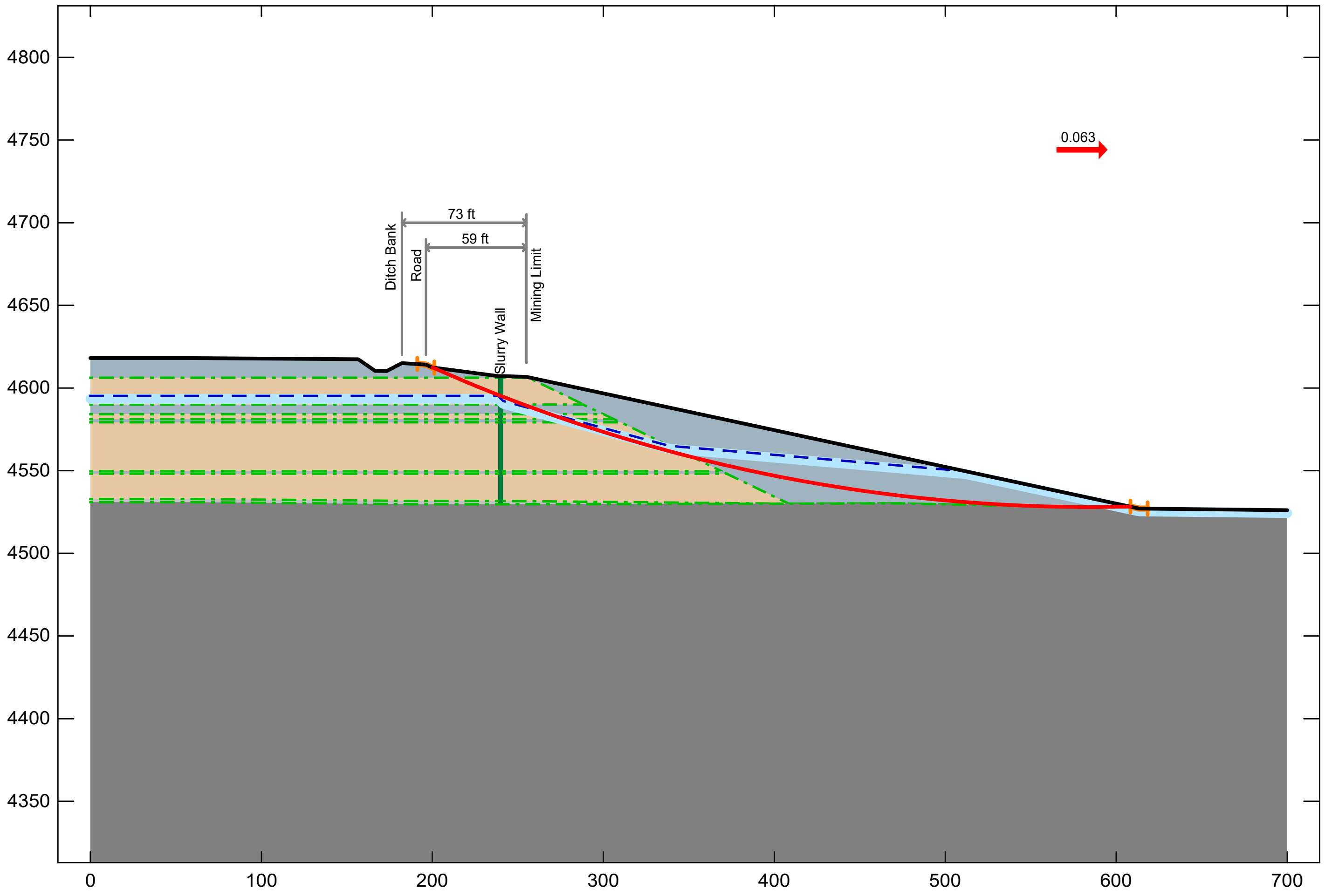
Licensed to: J & T Consulting

Project Ogilvy River Farm Pit
Slope Stability - Case SS-2 Reclamation Slope - Static

File: C:\Galena Models\O.R.F. Pit-SS2-Reclamation.gmf

Edited: 13 Jun 2024
Processed: 13 Jun 2024

J&T Consulting, Inc.



GALENA Version 7.2

Licensed to: J & T Consulting

Material Keys

2: Sand and Gravel (c:10 ø:35 g:115) Sat Ð

3: Weathered Claystone Bedrock (c:1000 ø:0 g:110) Sat Ð

4: Stable Claystone Bedrock (c:3000 ø:0 g:120) Sat Ð

5: Slurry Wall (c:0 ø:45 g:100) Sat Ð

6: Clay (c:50 ø:25 g:100) Sat Ð

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety:	1.52

Project Ogilvy River Farm Pit
Slope Stability - Case SS-2 Reclamation Slope - Pseudo Static

File: C:\Galena Models\O.R.F. Pit-SS2-EQ-Reclamation.gmf

Edited: 13 Jun 2024
Processed: 13 Jun 2024

J&T Consulting, Inc.

APPENDIX C

Mining Conditions

```
DATA: Analysis  1 - Slope Stability - Case SS-1 Mining Slope - Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4602.00         700.00     4602.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4594.65         289.00     4594.65
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    289.00     4600.65         292.00     4600.65
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    292.00     4594.65         700.00     4594.65
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4589.64         289.00     4589.64
Profile:  6 (2 points)   Material beneath:  6 - Clay
    292.00     4589.64         700.00     4589.64
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4581.65         289.00     4581.65
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    292.00     4581.65         700.00     4581.65
Profile:  9 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4520.54         151.32     4520.54         261.81     4521.97         289.00     4521.68
Profile: 10 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    292.00     4521.68         352.00     4521.04         464.16     4523.81         641.71     4528.21         700.00
  4530.00
Profile: 11 (9 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4518.54         151.32     4518.54         261.81     4519.97         289.00     4519.68         292.00
  4519.68
    352.00     4519.04         464.16     4521.81         641.71     4526.21         700.00     4528.00

Slope Surface (15 points)
-------------
      0.00     4599.47          23.78     4599.47          71.72     4600.62         148.28     4601.06         174.18
  4590.29
    200.00     4599.28         212.27     4601.66         260.30     4601.76         270.60     4601.86         289.00
  4600.65
    292.00     4600.65         305.57     4600.85         464.16     4523.81         641.71     4528.21         700.00
  4530.00

Phreatic Surface (4 points)
----------------
      0.00     4592.65         289.00     4592.65         292.00     4523.81         464.16     4523.81

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     265.60      YL:    4601.81      XR:     464.16      YR:    4523.81
      Centre:  XC:     467.40      YC:    4823.79                  Radius:  R:     300.00

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     300.00
Trial positions within range:      20         20         50

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

```
RESULTS: Analysis  1 - Slope Stability - Case SS-1 Mining Slope - 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:   1.792

Analysis Summary

There were:  14935 successful analyses from a total of 20001 trial failure surfaces
             5066 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.70


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS    <-- Critical
   1       270.60     4601.86      464.42     4523.82      531.00     4968.86      450.00     1.699   <-- Critical
Surface
   2       270.60     4601.86      463.90     4523.94      530.92     4968.92      450.00     1.699
   3       270.60     4601.86      463.37     4524.19      530.61     4969.14      450.00     1.700
   4       270.60     4601.86      462.84     4524.45      530.29     4969.37      450.00     1.700
   5       270.60     4601.86      462.32     4524.71      529.97     4969.59      450.00     1.701
   6       270.60     4601.86      464.42     4523.82      528.65     4963.02      443.88     1.701
   7       270.60     4601.86      463.90     4523.94      528.57     4963.08      443.88     1.701
   8       270.60     4601.86      461.79     4524.96      529.66     4969.81      450.00     1.701
   9       270.60     4601.86      463.37     4524.19      528.26     4963.30      443.88     1.701
  10       270.07     4601.85      464.42     4523.82      530.32     4968.96      450.00     1.701
  11       270.07     4601.85      463.90     4523.94      530.25     4969.02      450.00     1.702
  12       270.60     4601.86      462.84     4524.45      527.94     4963.53      443.88     1.702
  13       270.60     4601.86      461.27     4525.22      529.34     4970.04      450.00     1.702
  14       270.07     4601.85      463.37     4524.19      529.93     4969.24      450.00     1.702
  15       270.60     4601.86      464.42     4523.82      521.58     4945.47      425.51     1.702
  16       270.60     4601.86      462.32     4524.71      527.62     4963.75      443.88     1.702
  17       270.60     4601.86      463.90     4523.94      521.50     4945.53      425.51     1.702
  18       270.60     4601.86      464.42     4523.82      526.29     4957.18      437.76     1.703
  19       270.60     4601.86      463.90     4523.94      526.21     4957.23      437.76     1.703
  20       270.60     4601.86      461.79     4524.96      527.31     4963.98      443.88     1.703
  21       270.60     4601.86      460.74     4525.47      529.02     4970.26      450.00     1.703
  22       270.07     4601.85      462.84     4524.45      529.61     4969.47      450.00     1.703
  23       270.60     4601.86      463.37     4524.19      521.19     4945.76      425.51     1.703
  24       270.60     4601.86      463.37     4524.19      525.90     4957.46      437.76     1.703
  25       270.07     4601.85      464.42     4523.82      527.98     4963.12      443.88     1.703
  26       270.07     4601.85      462.32     4524.71      529.29     4969.69      450.00     1.703
  27       270.07     4601.85      463.90     4523.94      527.90     4963.18      443.88     1.704
  28       270.60     4601.86      461.27     4525.22      526.99     4964.20      443.88     1.704
  29       270.60     4601.86      460.21     4525.73      528.70     4970.49      450.00     1.704
```

30	270.60	4601.86	462.84	4524.45	520.88	4945.98	425.51	1.704
31	270.60	4601.86	462.84	4524.45	525.59	4957.68	437.76	1.704
32	270.07	4601.85	461.79	4524.96	528.98	4969.92	450.00	1.704
33	270.60	4601.86	462.32	4524.71	525.27	4957.91	437.76	1.704
34	270.07	4601.85	463.37	4524.19	527.58	4963.40	443.88	1.704
35	270.60	4601.86	462.32	4524.71	520.56	4946.21	425.51	1.704
36	270.60	4601.86	460.74	4525.47	526.67	4964.43	443.88	1.704
37	270.60	4601.86	459.69	4525.98	528.38	4970.71	450.00	1.704
38	270.60	4601.86	464.42	4523.82	519.22	4939.61	419.39	1.705
39	270.60	4601.86	464.42	4523.82	523.94	4951.33	431.63	1.705
40	270.60	4601.86	461.79	4524.96	524.96	4958.13	437.76	1.705
41	270.07	4601.85	461.27	4525.22	528.66	4970.14	450.00	1.705
42	270.60	4601.86	463.90	4523.94	519.13	4939.67	419.39	1.705
43	270.60	4601.86	463.90	4523.94	523.86	4951.39	431.63	1.705
44	270.07	4601.85	464.42	4523.82	525.63	4957.27	437.76	1.705
45	270.07	4601.85	463.90	4523.94	525.55	4957.33	437.76	1.705
46	270.07	4601.85	462.84	4524.45	527.27	4963.63	443.88	1.705
47	270.60	4601.86	460.21	4525.73	526.36	4964.65	443.88	1.705
48	270.60	4601.86	459.16	4526.24	528.06	4970.93	450.00	1.705
49	270.60	4601.86	461.27	4525.22	524.64	4958.36	437.76	1.705
50	270.60	4601.86	463.37	4524.19	523.54	4951.61	431.63	1.705
51	270.60	4601.86	463.37	4524.19	518.83	4939.90	419.39	1.705
52	270.07	4601.85	461.79	4524.96	526.63	4964.08	443.88	1.705
53	270.07	4601.85	463.37	4524.19	525.23	4957.56	437.76	1.705
54	270.07	4601.85	462.32	4524.71	526.95	4963.85	443.88	1.705
55	270.60	4601.86	462.84	4524.45	523.23	4951.84	431.63	1.706
56	270.60	4601.86	462.32	4524.71	518.21	4940.35	419.39	1.706
57	270.60	4601.86	459.69	4525.98	526.04	4964.87	443.88	1.706
58	270.60	4601.86	460.74	4525.47	524.33	4958.58	437.76	1.706
59	270.60	4601.86	462.84	4524.45	518.52	4940.13	419.39	1.706
60	270.07	4601.85	461.27	4525.22	526.32	4964.30	443.88	1.706
61	270.07	4601.85	460.74	4525.47	528.34	4970.37	450.00	1.706
62	270.07	4601.85	464.42	4523.82	523.28	4951.42	431.63	1.706
63	270.60	4601.86	462.32	4524.71	522.92	4952.06	431.63	1.706
64	270.07	4601.85	462.84	4524.45	524.92	4957.78	437.76	1.706
65	270.07	4601.85	463.90	4523.94	523.20	4951.48	431.63	1.706
66	270.60	4601.86	463.90	4523.94	516.77	4933.81	413.27	1.706
67	270.60	4601.86	461.79	4524.96	517.90	4940.58	419.39	1.706
68	270.07	4601.85	460.21	4525.73	528.02	4970.59	450.00	1.707
69	270.60	4601.86	461.79	4524.96	522.61	4952.29	431.63	1.707
70	270.60	4601.86	459.16	4526.24	525.72	4965.10	443.88	1.707
71	269.55	4601.85	464.42	4523.82	529.65	4969.06	450.00	1.707
72	270.60	4601.86	460.21	4525.73	524.01	4958.81	437.76	1.707
73	269.55	4601.85	463.90	4523.94	529.57	4969.12	450.00	1.707
74	270.07	4601.85	462.32	4524.71	524.60	4958.01	437.76	1.707
75	270.60	4601.86	463.37	4524.19	516.46	4934.03	413.27	1.707
76	270.07	4601.85	463.37	4524.19	522.88	4951.70	431.63	1.707
77	270.60	4601.86	461.27	4525.22	517.59	4940.81	419.39	1.707
78	270.60	4601.86	461.27	4525.22	522.29	4952.51	431.63	1.707

```
  79       270.60     4601.86      464.42     4523.82      516.86     4933.74      413.27     1.707
  80       270.07     4601.85      459.69     4525.98      527.70     4970.81      450.00     1.707
  81       270.07     4601.85      460.74     4525.47      526.00     4964.53      443.88     1.707
  82       270.60     4601.86      459.69     4525.98      523.69     4959.03      437.76     1.707
  83       270.60     4601.86      462.84     4524.45      516.16     4934.26      413.27     1.707
  84       269.55     4601.85      463.37     4524.19      529.25     4969.34      450.00     1.707
  85       270.07     4601.85      461.79     4524.96      524.29     4958.23      437.76     1.707
  86       270.07     4601.85      464.42     4523.82      520.93     4945.56      425.51     1.707
  87       270.07     4601.85      462.84     4524.45      522.57     4951.93      431.63     1.707
  88       270.60     4601.86      460.74     4525.47      521.98     4952.74      431.63     1.708
  89       270.60     4601.86      460.74     4525.47      517.27     4941.03      419.39     1.708
  90       270.07     4601.85      463.90     4523.94      520.84     4945.62      425.51     1.708
  91       269.55     4601.85      464.42     4523.82      527.31     4963.22      443.88     1.708
  92       270.07     4601.85      460.21     4525.73      525.68     4964.75      443.88     1.708
  93       269.55     4601.85      463.90     4523.94      527.23     4963.27      443.88     1.708
  94       270.60     4601.86      462.32     4524.71      515.85     4934.49      413.27     1.708
  95       269.55     4601.85      462.84     4524.45      528.94     4969.57      450.00     1.708
  96       270.07     4601.85      461.27     4525.22      523.97     4958.46      437.76     1.708
  97       270.07     4601.85      462.32     4524.71      522.26     4952.16      431.63     1.708
  98       270.60     4601.86      459.16     4526.24      523.38     4959.26      437.76     1.708
  99       270.60     4601.86      460.21     4525.73      516.96     4941.26      419.39     1.708

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     270.60      YL:    4601.86      XR:     464.42      YR:    4523.82
    Centre:  XC:     531.00      YC:    4968.86                 Radius:  R:     450.00
Generated failure surface: (20 points)
    270.60   4601.86          279.73   4595.55          289.01   4589.47          298.44   4583.61          308.01
4578.00
    317.72   4572.62          327.56   4567.48          337.52   4562.58          347.60   4557.94          357.78
4553.54
    368.08   4549.39          378.47   4545.50          388.96   4541.87          399.53   4538.50          410.19
4535.38
    420.91   4532.54          431.71   4529.96          442.56   4527.64          453.47   4525.59          464.42
4523.82

Slice Geometry and Properties - Critical Failure Surface (circle 1,  42 slices)
--------------------------------------------------------
Slice               X-S     ------------------- Base ---------------------                 PoreWater      Normal
Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi       Weight       Force         Stress
Factor
  1      270.60      6.52    34.7     4.56     5.55     6      50.00    25.0       651.75        0.00         102.91
1.02
  2      275.16     19.55    34.6     4.56     5.55     6      50.00    25.0      1954.79        0.00         342.85
1.02
  3      279.73      8.40    33.2     1.37     1.64     6      50.00    25.0       839.71        0.00         501.92
1.01
  4      281.10     22.64    33.2     3.05     3.65     2      10.00    35.0      2310.04        0.00         592.91
```

```
0.94
  5      284.16      44.42     33.2     4.59     5.49     2     10.00    35.0     4787.59     515.65      837.66
0.94
  6      288.75      39.11     31.9     3.25     3.83     5      0.00    45.0     3911.47       0.00      879.91
0.86
  7      292.00      97.17     31.8     6.44     7.58     6     50.00    25.0    10201.25       0.00     1337.42
1.01
  8      298.44      60.72     30.4     3.35     3.88     6     50.00    25.0     6323.22       0.00     1611.92
1.00
  9      301.79      76.67     30.4     3.78     4.38     2     10.00    35.0     8013.77       0.00     1704.25
0.93
 10      305.57      52.64     30.4     2.44     2.83     2     10.00    35.0     5554.87       0.00     1827.83
0.93
 11      308.01     105.96     29.0     4.85     5.55     2     10.00    35.0    11324.76       0.00     1896.76
0.93
 12      312.87     107.57     29.0     4.85     5.55     2     10.00    35.0    11681.74       0.00     1956.70
0.93
 13      317.72     110.27     27.6     4.92     5.55     2     10.00    35.0    12092.05       0.00     2020.40
0.93
 14      322.64     111.16     27.6     4.92     5.55     2     10.00    35.0    12194.16       0.00     2037.56
0.93
 15      327.56      24.72     26.2     1.09     1.21     2     10.00    35.0     2712.32       0.00     2068.35
0.93
 16      328.65     100.73     26.2     4.44     4.94     2     10.00    35.0    11124.30       0.00     2083.12
0.93
 17      333.08     100.84     26.2     4.44     4.94     2     10.00    35.0    11280.54       0.00     2112.50
0.93
 18      337.52      86.01     24.8     3.79     4.17     2     10.00    35.0     9734.06       0.00     2156.69
0.93
 19      341.31      85.65     24.8     3.79     4.17     2     10.00    35.0     9797.94       0.00     2170.87
0.93
 20      345.09      56.34     24.8     2.50     2.75     2     10.00    35.0     6479.41       0.00     2174.92
0.93
 21      347.60     113.93     23.3     5.09     5.55     2     10.00    35.0    13101.93       0.00     2181.17
0.92
 22      352.69     112.52     23.3     5.09     5.55     2     10.00    35.0    12940.01       0.00     2154.11
0.92
 23      357.78     111.88     21.9     5.15     5.55     2     10.00    35.0    12865.70       0.00     2141.61
0.92
 24      362.93     109.68     21.9     5.15     5.55     2     10.00    35.0    12612.79       0.00     2099.48
0.92
 25      368.08     108.11     20.5     5.20     5.55     2     10.00    35.0    12432.76       0.00     2070.74
0.93
 26      373.28     105.10     20.5     5.20     5.55     2     10.00    35.0    12086.44       0.00     2012.93
0.93
 27      378.47     102.60     19.1     5.24     5.55     2     10.00    35.0    11799.20       0.00     1967.38
0.93
 28      383.72      98.77     19.1     5.24     5.55     2     10.00    35.0    11358.38       0.00     1893.88
0.93
```

```
 29      388.96    95.32    17.7     5.29     5.55     2      10.00    35.0    10961.88        0.00      1830.93
0.93
 30      394.25    90.66    17.7     5.29     5.55     2      10.00    35.0    10425.71        0.00      1741.30
0.93
 31      399.53    86.25    16.3     5.33     5.55     2      10.00    35.0     9918.84        0.00      1660.53
0.93
 32      404.86    80.76    16.3     5.33     5.55     2      10.00    35.0     9286.89        0.00      1554.63
0.93
 33      410.19    75.37    14.9     5.36     5.55     2      10.00    35.0     8668.01        0.00      1455.38
0.93
 34      415.55    69.03    14.9     5.36     5.55     2      10.00    35.0     7938.85        0.00      1332.88
0.93
 35      420.91    62.69    13.5     5.40     5.55     2      10.00    35.0     7209.03        0.00      1214.65
0.94
 36      426.31    55.51    13.5     5.40     5.55     2      10.00    35.0     6383.25        0.00      1075.36
0.94
 37      431.71    48.19    12.0     5.43     5.55     2      10.00    35.0     5542.22        0.00       937.56
0.94
 38      437.13    40.17    12.0     5.43     5.55     2      10.00    35.0     4619.48        0.00       781.27
0.94
 39      442.56    31.90    10.6     5.45     5.55     2      10.00    35.0     3668.90        0.00       623.39
0.94
 40      448.01    23.04    10.6     5.45     5.55     2      10.00    35.0     2649.08        0.00       449.82
0.94
 41      453.47    13.61     9.2     5.35     5.42     2      10.00    35.0     1565.12        0.00       273.54
0.95
 42      458.81     4.34     9.2     5.61     5.68     2      10.00    35.0      498.57        0.00        82.43
0.95
                 --------                   -------                            ----------
     X-S Area:    2956.53    Path Length:    210.86               X-S Weight:   331502.81
```

```
DATA: Analysis  1 - Slope Stability - Case SS-1 Mining Slope - Pseudo Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4602.00         700.00     4602.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4594.65         289.00     4594.65
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    289.00     4600.65         292.00     4600.65
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    292.00     4594.65         700.00     4594.65
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4589.64         289.00     4589.64
Profile:  6 (2 points)   Material beneath:  6 - Clay
    292.00     4589.64         700.00     4589.64
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4581.65         289.00     4581.65
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    292.00     4581.65         700.00     4581.65
Profile:  9 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4520.54         151.32     4520.54         261.81     4521.97         289.00     4521.68
Profile: 10 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    292.00     4521.68         352.00     4521.04         464.16     4523.81         641.71     4528.21         700.00
  4530.00
Profile: 11 (9 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4518.54         151.32     4518.54         261.81     4519.97         289.00     4519.68         292.00
  4519.68
    352.00     4519.04         464.16     4521.81         641.71     4526.21         700.00     4528.00

Slope Surface (15 points)
-------------
      0.00     4599.47          23.78     4599.47          71.72     4600.62         148.28     4601.06         174.18
  4590.29
    200.00     4599.28         212.27     4601.66         260.30     4601.76         270.60     4601.86         289.00
  4600.65
    292.00     4600.65         305.57     4600.85         464.16     4523.81         641.71     4528.21         700.00
  4530.00

Phreatic Surface (4 points)
----------------
      0.00     4592.65         289.00     4592.65         292.00     4523.81         464.16     4523.81

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     265.60      YL:    4601.81      XR:     464.16      YR:    4523.81
      Centre:  XC:     467.40      YC:    4823.79            Radius:  R:     300.00

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     300.00
Trial positions within range:      20         20         50
```

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

RESULTS: Analysis  1 - Slope Stability - Case SS-1 Mining Slope - Pseudo 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:   1.522

Analysis Summary

There were:  14935 successful analyses from a total of 20001 trial failure surfaces
             5066 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.44


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       270.60     4601.86      464.42     4523.82      531.00     4968.86      450.00     1.443   <-- Critical
Surface
   2       270.60     4601.86      463.90     4523.94      530.92     4968.92      450.00     1.443
   3       270.60     4601.86      463.37     4524.19      530.61     4969.14      450.00     1.443
   4       270.60     4601.86      462.84     4524.45      530.29     4969.37      450.00     1.443
   5       270.60     4601.86      462.32     4524.71      529.97     4969.59      450.00     1.444
   6       270.60     4601.86      461.79     4524.96      529.66     4969.81      450.00     1.444
   7       270.60     4601.86      464.42     4523.82      528.65     4963.02      443.88     1.444
   8       270.60     4601.86      463.90     4523.94      528.57     4963.08      443.88     1.444
   9       270.07     4601.85      464.42     4523.82      530.32     4968.96      450.00     1.445
  10       270.07     4601.85      463.90     4523.94      530.25     4969.02      450.00     1.445
  11       270.60     4601.86      463.37     4524.19      528.26     4963.30      443.88     1.445
  12       270.60     4601.86      461.27     4525.22      529.34     4970.04      450.00     1.445
  13       270.07     4601.85      463.37     4524.19      529.93     4969.24      450.00     1.445
  14       270.60     4601.86      462.84     4524.45      527.94     4963.53      443.88     1.445
  15       270.60     4601.86      462.32     4524.71      527.62     4963.75      443.88     1.445
  16       270.60     4601.86      460.74     4525.47      529.02     4970.26      450.00     1.445
  17       270.07     4601.85      462.84     4524.45      529.61     4969.47      450.00     1.445
  18       270.60     4601.86      461.79     4524.96      527.31     4963.98      443.88     1.446
  19       270.07     4601.85      462.32     4524.71      529.29     4969.69      450.00     1.446
  20       270.60     4601.86      460.21     4525.73      528.70     4970.49      450.00     1.446
  21       270.60     4601.86      464.42     4523.82      521.58     4945.47      425.51     1.446
  22       270.60     4601.86      464.42     4523.82      526.29     4957.18      437.76     1.446
  23       270.60     4601.86      463.90     4523.94      521.50     4945.53      425.51     1.446
  24       270.60     4601.86      463.90     4523.94      526.21     4957.23      437.76     1.446
  25       270.60     4601.86      461.27     4525.22      526.99     4964.20      443.88     1.446
```

26	270.07	4601.85	464.42	4523.82	527.98	4963.12	443.88	1.446
27	270.07	4601.85	461.79	4524.96	528.98	4969.92	450.00	1.446
28	270.07	4601.85	463.90	4523.94	527.90	4963.18	443.88	1.446
29	270.60	4601.86	463.37	4524.19	525.90	4957.46	437.76	1.446
30	270.60	4601.86	463.37	4524.19	521.19	4945.76	425.51	1.446
31	270.60	4601.86	459.69	4525.98	528.38	4970.71	450.00	1.446
32	270.60	4601.86	462.84	4524.45	525.59	4957.68	437.76	1.447
33	270.07	4601.85	461.27	4525.22	528.66	4970.14	450.00	1.447
34	270.60	4601.86	460.74	4525.47	526.67	4964.43	443.88	1.447
35	270.07	4601.85	463.37	4524.19	527.58	4963.40	443.88	1.447
36	270.60	4601.86	462.84	4524.45	520.88	4945.98	425.51	1.447
37	270.60	4601.86	462.32	4524.71	525.27	4957.91	437.76	1.447
38	270.60	4601.86	459.16	4526.24	528.06	4970.93	450.00	1.447
39	270.07	4601.85	462.84	4524.45	527.27	4963.63	443.88	1.447
40	270.60	4601.86	460.21	4525.73	526.36	4964.65	443.88	1.447
41	270.60	4601.86	461.79	4524.96	524.96	4958.13	437.76	1.447
42	270.60	4601.86	462.32	4524.71	520.56	4946.21	425.51	1.447
43	270.07	4601.85	464.42	4523.82	525.63	4957.27	437.76	1.447
44	270.07	4601.85	461.79	4524.96	526.63	4964.08	443.88	1.448
45	270.07	4601.85	463.90	4523.94	525.55	4957.33	437.76	1.448
46	270.60	4601.86	461.27	4525.22	524.64	4958.36	437.76	1.448
47	270.07	4601.85	462.32	4524.71	526.95	4963.85	443.88	1.448
48	270.07	4601.85	460.74	4525.47	528.34	4970.37	450.00	1.448
49	270.60	4601.86	464.42	4523.82	523.94	4951.33	431.63	1.448
50	270.60	4601.86	459.69	4525.98	526.04	4964.87	443.88	1.448
51	270.60	4601.86	463.90	4523.94	523.86	4951.39	431.63	1.448
52	270.07	4601.85	461.27	4525.22	526.32	4964.30	443.88	1.448
53	270.60	4601.86	464.42	4523.82	519.22	4939.61	419.39	1.448
54	270.07	4601.85	463.37	4524.19	525.23	4957.56	437.76	1.448
55	270.60	4601.86	463.90	4523.94	519.13	4939.67	419.39	1.448
56	270.60	4601.86	463.37	4524.19	523.54	4951.61	431.63	1.448
57	270.07	4601.85	460.21	4525.73	528.02	4970.59	450.00	1.448
58	270.60	4601.86	460.74	4525.47	524.33	4958.58	437.76	1.448
59	270.60	4601.86	459.16	4526.24	525.72	4965.10	443.88	1.448
60	270.60	4601.86	462.84	4524.45	523.23	4951.84	431.63	1.448
61	270.07	4601.85	462.84	4524.45	524.92	4957.78	437.76	1.448
62	270.60	4601.86	463.37	4524.19	518.83	4939.90	419.39	1.449
63	270.07	4601.85	459.69	4525.98	527.70	4970.81	450.00	1.449
64	269.55	4601.85	464.42	4523.82	529.65	4969.06	450.00	1.449
65	269.55	4601.85	463.90	4523.94	529.57	4969.12	450.00	1.449
66	270.60	4601.86	462.32	4524.71	518.21	4940.35	419.39	1.449
67	270.60	4601.86	460.21	4525.73	524.01	4958.81	437.76	1.449
68	270.07	4601.85	464.42	4523.82	523.28	4951.42	431.63	1.449
69	270.60	4601.86	462.32	4524.71	522.92	4952.06	431.63	1.449
70	270.07	4601.85	463.90	4523.94	523.20	4951.48	431.63	1.449
71	270.60	4601.86	462.84	4524.45	518.52	4940.13	419.39	1.449
72	270.07	4601.85	462.32	4524.71	524.60	4958.01	437.76	1.449
73	270.07	4601.85	460.74	4525.47	526.00	4964.53	443.88	1.449
74	270.60	4601.86	461.79	4524.96	522.61	4952.29	431.63	1.449

```
  75       270.60     4601.86      461.79     4524.96      517.90     4940.58      419.39     1.449
  76       269.55     4601.85      463.37     4524.19      529.25     4969.34      450.00     1.449
  77       270.60     4601.86      459.69     4525.98      523.69     4959.03      437.76     1.449
  78       270.07     4601.85      463.37     4524.19      522.88     4951.70      431.63     1.449
  79       270.07     4601.85      460.21     4525.73      525.68     4964.75      443.88     1.449
  80       270.07     4601.85      461.79     4524.96      524.29     4958.23      437.76     1.449
  81       270.60     4601.86      461.27     4525.22      522.29     4952.51      431.63     1.449
  82       270.60     4601.86      463.90     4523.94      516.77     4933.81      413.27     1.450
  83       270.60     4601.86      461.27     4525.22      517.59     4940.81      419.39     1.450
  84       269.55     4601.85      462.84     4524.45      528.94     4969.57      450.00     1.450
  85       269.55     4601.85      464.42     4523.82      527.31     4963.22      443.88     1.450
  86       270.60     4601.86      460.74     4525.47      521.98     4952.74      431.63     1.450
  87       270.07     4601.85      462.84     4524.45      522.57     4951.93      431.63     1.450
  88       270.07     4601.85      459.69     4525.98      525.36     4964.98      443.88     1.450
  89       269.55     4601.85      463.90     4523.94      527.23     4963.27      443.88     1.450
  90       270.60     4601.86      459.16     4526.24      523.38     4959.26      437.76     1.450
  91       270.07     4601.85      461.27     4525.22      523.97     4958.46      437.76     1.450
  92       270.60     4601.86      463.37     4524.19      516.46     4934.03      413.27     1.450
  93       270.60     4601.86      460.74     4525.47      517.27     4941.03      419.39     1.450
  94       270.07     4601.85      464.42     4523.82      520.93     4945.56      425.51     1.450
  95       270.07     4601.85      459.16     4526.24      527.37     4971.04      450.00     1.450
  96       269.55     4601.85      462.32     4524.71      528.62     4969.79      450.00     1.450
  97       270.07     4601.85      463.90     4523.94      520.84     4945.62      425.51     1.450
  98       270.07     4601.85      459.16     4526.24      525.04     4965.20      443.88     1.450
  99       270.07     4601.85      462.32     4524.71      522.26     4952.16      431.63     1.450

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     270.60      YL:    4601.86      XR:     464.42      YR:    4523.82
    Centre:  XC:     531.00      YC:    4968.86                 Radius:  R:     450.00
Generated failure surface: (20 points)
    270.60   4601.86          279.73   4595.55          289.01   4589.47          298.44   4583.61          308.01
4578.00
    317.72   4572.62          327.56   4567.48          337.52   4562.58          347.60   4557.94          357.78
4553.54
    368.08   4549.39          378.47   4545.50          388.96   4541.87          399.53   4538.50          410.19
4535.38
    420.91   4532.54          431.71   4529.96          442.56   4527.64          453.47   4525.59          464.42
4523.82

Slice Geometry and Properties - Critical Failure Surface (circle 1,  42 slices)
--------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                  PoreWater      Normal
Test
        X-Left       Area     Angle    Width     Length  Matl   Cohesion    Phi       Weight       Force          Stress
Factor
  1      270.60      6.52    34.7     4.56      5.55     6      50.00    25.0       651.75        0.00       97.12
0.99
  2      275.16     19.55    34.6     4.56      5.55     6      50.00    25.0      1954.79        0.00      330.46
```

```
0.99
  3      279.73      8.40    33.2     1.37     1.64     6      50.00    25.0       839.71        0.00       485.86
0.99
  4      281.10     22.64    33.2     3.05     3.65     2      10.00    35.0      2310.04        0.00       570.81
0.91
  5      284.16     44.42    33.2     4.59     5.49     2      10.00    35.0      4787.59      515.65       810.08
0.91
  6      288.75     39.11    31.9     3.25     3.83     5       0.00    45.0      3911.47        0.00       839.88
0.82
  7      292.00     97.17    31.8     6.44     7.58     6      50.00    25.0     10201.25        0.00      1301.03
0.98
  8      298.44     60.72    30.4     3.35     3.88     6      50.00    25.0      6323.22        0.00      1570.59
0.97
  9      301.79     76.67    30.4     3.78     4.38     2      10.00    35.0      8013.77        0.00      1646.79
0.90
 10      305.57     52.64    30.4     2.44     2.83     2      10.00    35.0      5554.87        0.00      1766.25
0.90
 11      308.01    105.96    29.0     4.85     5.55     2      10.00    35.0     11324.76        0.00      1835.67
0.90
 12      312.87    107.57    29.0     4.85     5.55     2      10.00    35.0     11681.74        0.00      1893.71
0.90
 13      317.72    110.27    27.6     4.92     5.55     2      10.00    35.0     12092.05        0.00      1958.34
0.90
 14      322.64    111.16    27.6     4.92     5.55     2      10.00    35.0     12194.16        0.00      1974.99
0.90
 15      327.56     24.72    26.2     1.09     1.21     2      10.00    35.0      2712.32        0.00      2007.89
0.90
 16      328.65    100.73    26.2     4.44     4.94     2      10.00    35.0     11124.30        0.00      2022.21
0.90
 17      333.08    100.84    26.2     4.44     4.94     2      10.00    35.0     11280.54        0.00      2050.75
0.90
 18      337.52     86.01    24.8     3.79     4.17     2      10.00    35.0      9734.06        0.00      2096.82
0.90
 19      341.31     85.65    24.8     3.79     4.17     2      10.00    35.0      9797.94        0.00      2110.61
0.90
 20      345.09     56.34    24.8     2.50     2.75     2      10.00    35.0      6479.41        0.00      2114.55
0.90
 21      347.60    113.93    23.3     5.09     5.55     2      10.00    35.0     13101.93        0.00      2123.84
0.90
 22      352.69    112.52    23.3     5.09     5.55     2      10.00    35.0     12940.01        0.00      2097.48
0.90
 23      357.78    111.88    21.9     5.15     5.55     2      10.00    35.0     12865.70        0.00      2088.47
0.90
 24      362.93    109.68    21.9     5.15     5.55     2      10.00    35.0     12612.79        0.00      2047.37
0.90
 25      368.08    108.11    20.5     5.20     5.55     2      10.00    35.0     12432.76        0.00      2022.41
0.90
 26      373.28    105.10    20.5     5.20     5.55     2      10.00    35.0     12086.44        0.00      1965.93
0.90
```

```
 27      378.47    102.60    19.1     5.24     5.55     2      10.00    35.0     11799.20        0.00      1924.37
0.91
 28      383.72     98.77    19.1     5.24     5.55     2      10.00    35.0     11358.38        0.00      1852.48
0.91
 29      388.96     95.32    17.7     5.29     5.55     2      10.00    35.0     10961.88        0.00      1793.63
0.91
 30      394.25     90.66    17.7     5.29     5.55     2      10.00    35.0     10425.71        0.00      1705.81
0.91
 31      399.53     86.25    16.3     5.33     5.55     2      10.00    35.0      9918.84        0.00      1629.18
0.91
 32      404.86     80.76    16.3     5.33     5.55     2      10.00    35.0      9286.89        0.00      1525.26
0.91
 33      410.19     75.37    14.9     5.36     5.55     2      10.00    35.0      8668.01        0.00      1430.08
0.92
 34      415.55     69.03    14.9     5.36     5.55     2      10.00    35.0      7938.85        0.00      1309.71
0.92
 35      420.91     62.69    13.5     5.40     5.55     2      10.00    35.0      7209.03        0.00      1195.37
0.92
 36      426.31     55.51    13.5     5.40     5.55     2      10.00    35.0      6383.25        0.00      1058.27
0.92
 37      431.71     48.19    12.0     5.43     5.55     2      10.00    35.0      5542.22        0.00       924.09
0.93
 38      437.13     40.17    12.0     5.43     5.55     2      10.00    35.0      4619.48        0.00       770.01
0.93
 39      442.56     31.90    10.6     5.45     5.55     2      10.00    35.0      3668.90        0.00       615.36
0.93
 40      448.01     23.04    10.6     5.45     5.55     2      10.00    35.0      2649.08        0.00       443.98
0.93
 41      453.47     13.61     9.2     5.35     5.42     2      10.00    35.0      1565.12        0.00       270.37
0.94
 42      458.81      4.34     9.2     5.61     5.68     2      10.00    35.0       498.57        0.00        81.36
0.94
                 --------                   -------                            ----------
     X-S Area:    2956.53    Path Length:    210.86              X-S Weight:   331502.81
```

```
DATA: Analysis  1 - Slope Stability - Case SS-2 Mining Slope - Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (15 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4620.00         700.00     4620.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4606.18         238.50     4606.18
Profile:  3 (2 points)   Material beneath:  2 - Sand and Gravel
```

```
    241.50     4606.18         700.00     4606.18
Profile:  4 (2 points)   Material beneath:  5 - Slurry Wall
    238.50     4607.18         241.50     4607.18
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4590.00         238.50     4590.00
Profile:  6 (2 points)   Material beneath:  6 - Clay
    241.50     4590.00         700.00     4590.00
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4584.18         238.50     4584.18
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    241.50     4584.18         700.00     4584.18
Profile:  9 (2 points)   Material beneath:  6 - Clay
      0.00     4581.18         238.50     4581.18
Profile: 10 (2 points)   Material beneath:  6 - Clay
    241.50     4581.18         700.00     4581.18
Profile: 11 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4579.18         238.50     4579.18
Profile: 12 (2 points)   Material beneath:  2 - Sand and Gravel
    241.50     4579.18         700.00     4579.18
Profile: 13 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4532.87          60.58     4532.87         190.93     4531.60         238.50     4531.61
Profile: 14 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    241.50     4531.61         408.47     4531.98         472.67     4532.14         613.33     4529.04         700.00
  4528.00
Profile: 15 (9 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4530.87          60.58     4530.87         190.93     4529.60         238.50     4529.61         241.50
  4529.61
    408.47     4529.98         472.67     4530.14         613.33     4527.04         700.00     4526.00

Slope Surface (15 points)
-------------
      0.00     4618.10          57.07     4618.10         156.63     4617.39         166.52     4610.32         173.33
  4610.28
    182.26     4614.99         196.20     4614.14         200.00     4612.45         238.50     4607.18         241.50
  4607.18
    255.01     4606.76         408.47     4531.98         472.67     4532.14         613.33     4529.04         700.00
  4528.00

Phreatic Surface (4 points)
----------------
      0.00     4595.18         238.50     4595.18         241.50     4531.98         408.47     4531.98

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     191.20      YL:    4614.44      XR:     408.47      YR:    4531.98
      Centre:  XC:     378.38      YC:    4780.16                  Radius:  R:     250.00

Variable Restraints
```

```
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
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RESULTS: Analysis  1 - Slope Stability - Case SS-2 Mining Slope - 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:   1.861

Analysis Summary

There were:  18587 successful analyses from a total of 20001 trial failure surfaces
             1414 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.75


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       195.67     4614.17      403.47     4534.42      360.43     4732.86      203.06     1.746   <-- Critical
Surface
   2       193.04     4614.33      403.47     4534.42      360.00     4736.95      207.14     1.748
   3       190.41     4614.49      403.47     4534.42      359.54     4741.02      211.22     1.749
   4       187.78     4614.65      403.47     4534.42      359.07     4745.10      215.31     1.751
   5       196.20     4614.14      403.47     4534.42      360.87     4732.96      203.06     1.754
   6       193.57     4614.30      403.47     4534.42      360.43     4737.04      207.14     1.755
   7       195.15     4614.20      404.00     4534.16      361.97     4737.00      207.14     1.756
   8       190.94     4614.46      403.47     4534.42      359.98     4741.11      211.22     1.757
   9       192.52     4614.36      404.00     4534.16      361.52     4741.07      211.22     1.757
  10       188.31     4614.62      403.47     4534.42      359.51     4745.19      215.31     1.758
  11       189.88     4614.53      404.00     4534.16      361.05     4745.14      215.31     1.759
  12       187.25     4614.69      404.00     4534.16      360.56     4749.21      219.39     1.760
  13       195.67     4614.17      404.00     4534.16      362.41     4737.09      207.14     1.763
  14       194.62     4614.24      404.52     4533.90      363.50     4741.11      211.22     1.763
  15       194.09     4614.27      403.47     4534.42      360.87     4737.13      207.14     1.763
  16       193.04     4614.33      404.00     4534.16      361.95     4741.16      211.22     1.764
  17       191.46     4614.43      403.47     4534.42      360.41     4741.21      211.22     1.764
  18       191.99     4614.40      404.52     4533.90      363.03     4745.17      215.31     1.765
  19       190.41     4614.49      404.00     4534.16      361.48     4745.23      215.31     1.765
  20       188.83     4614.59      403.47     4534.42      359.94     4745.28      215.31     1.766
  21       189.36     4614.56      404.52     4533.90      362.54     4749.24      219.39     1.766
```

22	187.78	4614.65	404.00	4534.16	360.99	4749.29	219.39	1.767
23	186.20	4614.75	403.47	4534.42	359.45	4749.34	219.39	1.767
24	196.20	4614.14	404.00	4534.16	362.85	4737.17	207.14	1.769
25	195.15	4614.20	404.52	4533.90	363.94	4741.19	211.22	1.769
26	194.62	4614.24	403.47	4534.42	361.30	4737.22	207.14	1.770
27	192.52	4614.36	404.52	4533.90	363.46	4745.26	215.31	1.770
28	191.99	4614.40	403.47	4534.42	360.85	4741.30	211.22	1.771
29	194.09	4614.27	405.05	4533.65	365.02	4745.20	215.31	1.771
30	193.57	4614.30	404.00	4534.16	362.39	4741.25	211.22	1.771
31	191.46	4614.43	405.05	4533.65	364.53	4749.26	219.39	1.771
32	190.94	4614.46	404.00	4534.16	361.92	4745.31	215.31	1.771
33	189.88	4614.53	404.52	4533.90	362.98	4749.32	219.39	1.771
34	189.36	4614.56	403.47	4534.42	360.37	4745.37	215.31	1.772
35	187.25	4614.69	404.52	4533.90	362.47	4753.38	223.47	1.772
36	188.31	4614.62	404.00	4534.16	361.43	4749.38	219.39	1.773
37	186.73	4614.72	403.47	4534.42	359.88	4749.43	219.39	1.774
38	195.67	4614.17	404.52	4533.90	364.38	4741.28	211.22	1.775
39	195.15	4614.20	403.47	4534.42	361.74	4737.31	207.14	1.776
40	194.62	4614.24	405.05	4533.65	365.45	4745.28	215.31	1.776
41	196.20	4614.14	405.58	4533.39	367.01	4745.21	215.31	1.776
42	193.57	4614.30	405.58	4533.39	366.52	4749.27	219.39	1.776
43	191.99	4614.40	405.05	4533.65	364.97	4749.34	219.39	1.777
44	194.09	4614.27	404.00	4534.16	362.83	4741.33	211.22	1.777
45	193.04	4614.33	404.52	4533.90	363.90	4745.34	215.31	1.777
46	192.52	4614.36	403.47	4534.42	361.28	4741.38	211.22	1.777
47	190.41	4614.49	404.52	4533.90	363.41	4749.40	219.39	1.777
48	191.46	4614.43	404.00	4534.16	362.35	4745.40	215.31	1.777
49	189.36	4614.56	405.05	4533.65	364.46	4753.40	223.47	1.778
50	187.78	4614.65	404.52	4533.90	362.91	4753.46	223.47	1.779
51	188.83	4614.59	404.00	4534.16	361.86	4749.46	219.39	1.779
52	189.88	4614.53	403.47	4534.42	360.81	4745.45	215.31	1.779
53	186.73	4614.72	405.05	4533.65	363.94	4757.45	227.55	1.779
54	186.20	4614.75	404.00	4534.16	361.36	4753.52	223.47	1.780
55	187.25	4614.69	403.47	4534.42	360.32	4749.52	219.39	1.781
56	196.20	4614.14	404.52	4533.90	364.81	4741.36	211.22	1.781
57	195.15	4614.20	405.05	4533.65	365.89	4745.36	215.31	1.781
58	194.09	4614.27	405.58	4533.39	366.96	4749.35	219.39	1.781
59	186.73	4614.72	404.52	4533.90	362.04	4753.30	223.47	1.782
60	194.62	4614.24	404.00	4534.16	363.26	4741.42	211.22	1.782
61	195.67	4614.17	406.10	4533.13	368.52	4749.28	219.39	1.782
62	195.67	4614.17	403.47	4534.42	362.18	4737.40	207.14	1.782
63	191.46	4614.43	405.58	4533.39	366.46	4753.41	223.47	1.782
64	188.83	4614.59	405.05	4533.65	364.03	4753.32	223.47	1.782
65	193.57	4614.30	404.52	4533.90	364.34	4745.43	215.31	1.782
66	192.52	4614.36	405.05	4533.65	365.40	4749.42	219.39	1.783
67	190.94	4614.46	404.52	4533.90	363.85	4749.49	219.39	1.783
68	191.99	4614.40	404.00	4534.16	362.79	4745.49	215.31	1.783
69	193.04	4614.33	403.47	4534.42	361.72	4741.47	211.22	1.783
70	188.83	4614.59	405.58	4533.39	365.94	4757.46	227.55	1.783

```
  71       189.88     4614.53      405.05     4533.65      364.90     4753.48      223.47     1.783
  72       196.20     4614.14      406.10     4533.13      368.96     4749.36      219.39     1.784
  73       187.25     4614.69      405.05     4533.65      364.38     4757.53      227.55     1.784
  74       188.31     4614.62      404.52     4533.90      363.34     4753.55      223.47     1.784
  75       186.20     4614.75      405.58     4533.39      365.40     4761.51      231.63     1.784
  76       189.36     4614.56      404.00     4534.16      362.30     4749.55      219.39     1.785
  77       190.41     4614.49      403.47     4534.42      361.24     4745.54      215.31     1.785
  78       190.94     4614.46      405.58     4533.39      366.02     4753.33      223.47     1.786
  79       195.67     4614.17      405.05     4533.65      366.33     4745.44      215.31     1.786
  80       186.73     4614.72      404.00     4534.16      361.79     4753.61      223.47     1.786
  81       194.62     4614.24      405.58     4533.39      367.40     4749.43      219.39     1.786
  82       187.78     4614.65      403.47     4534.42      360.75     4749.60      219.39     1.787
  83       193.57     4614.30      406.10     4533.13      368.46     4753.41      223.47     1.787
  84       195.15     4614.20      404.00     4534.16      363.70     4741.51      211.22     1.787
  85       193.04     4614.33      405.05     4533.65      365.84     4749.50      219.39     1.787
  86       191.99     4614.40      405.58     4533.39      366.90     4753.49      223.47     1.788
  87       194.09     4614.27      404.52     4533.90      364.78     4745.51      215.31     1.788
  88       190.94     4614.46      406.10     4533.13      367.94     4757.46      227.55     1.788
  89       196.20     4614.14      403.47     4534.42      362.61     4737.49      207.14     1.788
  90       190.41     4614.49      405.05     4533.65      365.34     4753.56      223.47     1.788
  91       189.36     4614.56      405.58     4533.39      366.38     4757.54      227.55     1.788
  92       192.52     4614.36      404.00     4534.16      363.23     4745.57      215.31     1.788
  93       191.46     4614.43      404.52     4533.90      364.29     4749.57      219.39     1.788
  94       188.31     4614.62      406.10     4533.13      367.41     4761.51      231.63     1.789
  95       195.67     4614.17      406.63     4532.88      370.47     4753.40      223.47     1.789
  96       186.73     4614.72      405.58     4533.39      365.84     4761.59      231.63     1.789
  97       187.78     4614.65      405.05     4533.65      364.82     4757.61      227.55     1.789
  98       193.57     4614.30      403.47     4534.42      362.15     4741.56      211.22     1.790
  99       188.83     4614.59      404.52     4533.90      363.78     4753.63      223.47     1.790

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     195.67      YL:    4614.17      XR:     403.47      YR:    4534.42
    Centre:  XC:     360.43      YC:    4732.86                 Radius:  R:     203.06
Generated failure surface: (20 points)
    195.67   4614.17          203.22   4604.34          211.36   4594.99          220.05   4586.15          229.26
4577.85
    238.97   4570.14          249.12   4563.03          259.69   4556.56          270.64   4550.74          281.92
4545.60
    293.49   4541.16          305.31   4537.43          317.34   4534.43          329.53   4532.17          341.83
4530.66
    354.21   4529.90          366.60   4529.90          378.98   4530.65          391.28   4532.16          403.47
4534.42

Slice Geometry and Properties - Critical Failure Surface (circle 1,  50 slices)
-------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                 PoreWater      Normal
Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi       Weight      Force         Stress
```

```
Factor
  1     195.67     8.90    52.5     4.33     7.10    6     50.00   25.0      889.98       0.00      124.94
1.22
  2     200.00     8.99    52.5     1.81     2.97    6     50.00   25.0      899.13       0.00      340.85
1.22
  3     201.81     9.67    52.5     1.41     2.32    2     10.00   35.0      986.80       0.00      453.83
1.08
  4     203.22    38.59    49.0     3.98     6.07    2     10.00   35.0     4105.48       0.00      700.85
1.04
  5     207.21    54.66    49.0     3.98     6.07    2     10.00   35.0     5986.18       0.00     1023.94
1.04
  6     211.19    91.24    45.6     5.07     7.25    2     10.00   35.0    10356.72    1176.60     1491.72
1.01
  7     216.26    82.92    45.5     3.79     5.40    6     50.00   25.0     9615.06    2395.81     2067.95
1.12
  8     220.05    53.32    42.0     2.19     2.94    6     50.00   25.0     6190.58    1838.05     2383.64
1.08
  9     222.24    88.32    42.0     3.33     4.48    2     10.00   35.0    10341.25    3497.86     2482.68
0.99
 10     225.57    63.59    42.0     2.22     2.99    6     50.00   25.0     7498.65    2798.29     2881.12
1.08
 11     227.79    44.23    42.0     1.47     1.98    2     10.00   35.0     5229.48    2060.47     2880.70
0.99
 12     229.26   148.29    38.5     4.62     5.90    2     10.00   35.0    17704.61    7054.72     3192.28
0.97
 13     233.88   162.33    38.5     4.62     5.90    2     10.00   35.0    19617.41    8407.21     3561.65
0.97
 14     238.50    45.07    36.4     1.21     1.51    5      0.00   45.0     4656.56    1161.97     2927.74
0.87
 15     239.71    68.23    35.0     1.79     2.18    5      0.00   45.0     6822.63       0.00     2725.94
0.87
 16     241.50   152.77    35.0     3.81     4.65    2     10.00   35.0    17068.21       0.00     3493.89
0.95
 17     245.31   162.49    35.0     3.81     4.65    2     10.00   35.0    18192.03       0.00     3724.14
0.95
 18     249.12   268.64    31.5     5.89     6.91    2     10.00   35.0    30144.17       0.00     4106.74
0.94
 19     255.01    56.39    31.5     1.19     1.39    2     10.00   35.0     6340.17       0.00     4276.43
0.94
 20     256.20   166.62    31.5     3.49     4.10    2     10.00   35.0    18751.50       0.00     4306.89
0.94
 21     259.69   262.94    28.0     5.47     6.20    2     10.00   35.0    29595.80       0.00     4454.86
0.93
 22     265.17   264.27    28.0     5.47     6.20    2     10.00   35.0    29748.85       0.00     4477.77
0.93
 23     270.64   272.52    24.5     5.64     6.20    2     10.00   35.0    30678.49       0.00     4596.62
0.93
 24     276.28   271.52    24.5     5.64     6.20    2     10.00   35.0    30563.05       0.00     4579.30
0.93
```

```
 25      281.92    179.11    21.0      3.74      4.01     2      10.00    35.0    20158.82        0.00       4665.76
0.93
 26      285.66    177.66    21.0      3.74      4.01     2      10.00    35.0    19992.00        0.00       4627.17
0.93
 27      289.40    192.39    21.0      4.09      4.38     2      10.00    35.0    21706.70        0.00       4599.75
0.93
 28      293.49    182.70    17.5      3.93      4.12     2      10.00    35.0    20723.09        0.00       4682.28
0.93
 29      297.42    180.04    17.5      3.93      4.12     2      10.00    35.0    20530.46        0.00       4638.77
0.93
 30      301.35    179.16    17.5      3.97      4.16     2      10.00    35.0    20484.28        0.00       4582.08
0.93
 31      305.31     97.55    14.0      2.19      2.26     2      10.00    35.0    11152.82        0.00       4629.78
0.94
 32      307.50    179.81    14.0      4.10      4.23     2      10.00    35.0    20616.59        0.00       4565.14
0.94
 33      311.61    244.51    14.0      5.73      5.91     2      10.00    35.0    28118.55        0.00       4456.48
0.94
 34      317.34    250.09    10.5      6.09      6.20     2      10.00    35.0    28760.63        0.00       4391.63
0.95
 35      323.44    238.88    10.5      6.09      6.20     2      10.00    35.0    27471.19        0.00       4194.69
0.95
 36      329.53     58.44     7.0      1.54      1.55     2      10.00    35.0     6720.47        0.00       4163.82
0.96
 37      331.07     51.39     7.0      1.37      1.38     2      10.00    35.0     5911.92        7.28       4107.24
0.96
 38      332.44    170.79     7.0      4.70      4.73     3    1000.00     0.0    19659.24      134.96       4115.08
1.01
 39      337.14    162.75     7.0      4.70      4.73     3    1000.00     0.0    18747.61      305.39       3921.00
1.01
 40      341.83    200.91     3.5      6.19      6.20     3    1000.00     0.0    23160.67      584.87       3708.58
1.00
 41      348.02    184.61     3.5      6.19      6.20     3    1000.00     0.0    21296.73      731.60       3407.34
1.00
 42      354.21    167.43     0.0      6.20      6.20     3    1000.00     0.0    19326.06      805.06       3117.96
1.00
 43      360.41    148.71     0.0      6.20      6.20     3    1000.00     0.0    17172.52      805.25       2770.57
1.00
 44      366.60    128.61    -3.5      6.19      6.20     3    1000.00     0.0    14853.81      732.54       2435.86
1.00
 45      372.79    107.62    -3.5      6.19      6.20     3    1000.00     0.0    12427.57      586.56       2043.73
1.00
 46      378.98     73.96    -7.0      5.25      5.28     3    1000.00     0.0     8535.16      332.01       1697.42
1.01
 47      384.22     57.18    -7.0      5.25      5.28     3    1000.00     0.0     6587.94      119.96       1326.18
1.01
 48      389.47     15.87    -7.0      1.81      1.83     2      10.00    35.0     1824.55        0.00       1058.87
1.06
 49      391.28     37.46   -10.5      6.09      6.20     2      10.00    35.0     4308.24        0.00        764.76
```

```
1.10
 50      397.38     12.49   -10.5     6.09     6.20     2      10.00    35.0      1435.96        0.00        255.65
1.10
                 --------                           -------                               ----------
     X-S Area:    6526.65    Path Length:    235.53               X-S Weight:   743666.50
```

```
DATA: Analysis  1 - Slope Stability - Case SS-2 Mining Slope - Pseudo Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (15 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4620.00         700.00     4620.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4606.18         238.50     4606.18
Profile:  3 (2 points)   Material beneath:  2 - Sand and Gravel
```

```
    241.50     4606.18         700.00     4606.18
Profile:  4 (2 points)   Material beneath:  5 - Slurry Wall
    238.50     4607.18         241.50     4607.18
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4590.00         238.50     4590.00
Profile:  6 (2 points)   Material beneath:  6 - Clay
    241.50     4590.00         700.00     4590.00
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4584.18         238.50     4584.18
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    241.50     4584.18         700.00     4584.18
Profile:  9 (2 points)   Material beneath:  6 - Clay
      0.00     4581.18         238.50     4581.18
Profile: 10 (2 points)   Material beneath:  6 - Clay
    241.50     4581.18         700.00     4581.18
Profile: 11 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4579.18         238.50     4579.18
Profile: 12 (2 points)   Material beneath:  2 - Sand and Gravel
    241.50     4579.18         700.00     4579.18
Profile: 13 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4532.87          60.58     4532.87         190.93     4531.60         238.50     4531.61
Profile: 14 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    241.50     4531.61         408.47     4531.98         472.67     4532.14         613.33     4529.04         700.00
  4528.00
Profile: 15 (9 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4530.87          60.58     4530.87         190.93     4529.60         238.50     4529.61         241.50
  4529.61
    408.47     4529.98         472.67     4530.14         613.33     4527.04         700.00     4526.00

Slope Surface (15 points)
-------------
      0.00     4618.10          57.07     4618.10         156.63     4617.39         166.52     4610.32         173.33
  4610.28
    182.26     4614.99         196.20     4614.14         200.00     4612.45         238.50     4607.18         241.50
  4607.18
    255.01     4606.76         408.47     4531.98         472.67     4532.14         613.33     4529.04         700.00
  4528.00

Phreatic Surface (4 points)
----------------
      0.00     4595.18         238.50     4595.18         241.50     4531.98         408.47     4531.98

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     191.20      YL:    4614.44      XR:     408.47      YR:    4531.98
      Centre:  XC:     378.38      YC:    4780.16                 Radius:  R:     250.00

Earthquake Force
```

```
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
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RESULTS: Analysis  1 - Slope Stability - Case SS-2 Mining Slope - Pseudo 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:   1.573

Analysis Summary

There were:  18587 successful analyses from a total of 20001 trial failure surfaces
             1414 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.47


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       187.78     4614.65      403.47     4534.42      359.07     4745.10      215.31     1.473   <-- Critical
Surface
   2       193.04     4614.33      403.47     4534.42      360.00     4736.95      207.14     1.474
   3       190.41     4614.49      403.47     4534.42      359.54     4741.02      211.22     1.474
   4       195.67     4614.17      403.47     4534.42      360.43     4732.86      203.06     1.474
   5       188.31     4614.62      403.47     4534.42      359.51     4745.19      215.31     1.480
   6       190.94     4614.46      403.47     4534.42      359.98     4741.11      211.22     1.480
   7       193.57     4614.30      403.47     4534.42      360.43     4737.04      207.14     1.481
   8       187.25     4614.69      404.00     4534.16      360.56     4749.21      219.39     1.481
   9       196.20     4614.14      403.47     4534.42      360.87     4732.96      203.06     1.481
  10       189.88     4614.53      404.00     4534.16      361.05     4745.14      215.31     1.482
  11       192.52     4614.36      404.00     4534.16      361.52     4741.07      211.22     1.482
  12       195.15     4614.20      404.00     4534.16      361.97     4737.00      207.14     1.482
  13       186.20     4614.75      403.47     4534.42      359.45     4749.34      219.39     1.487
  14       188.83     4614.59      403.47     4534.42      359.94     4745.28      215.31     1.487
  15       187.78     4614.65      404.00     4534.16      360.99     4749.29      219.39     1.487
  16       191.46     4614.43      403.47     4534.42      360.41     4741.21      211.22     1.487
  17       190.41     4614.49      404.00     4534.16      361.48     4745.23      215.31     1.488
```

18	189.36	4614.56	404.52	4533.90	362.54	4749.24	219.39	1.488
19	194.09	4614.27	403.47	4534.42	360.87	4737.13	207.14	1.488
20	193.04	4614.33	404.00	4534.16	361.95	4741.16	211.22	1.488
21	194.62	4614.24	404.52	4533.90	363.50	4741.11	211.22	1.488
22	191.99	4614.40	404.52	4533.90	363.03	4745.17	215.31	1.489
23	195.67	4614.17	404.00	4534.16	362.41	4737.09	207.14	1.489
24	187.25	4614.69	404.52	4533.90	362.47	4753.38	223.47	1.492
25	186.73	4614.72	403.47	4534.42	359.88	4749.43	219.39	1.493
26	188.31	4614.62	404.00	4534.16	361.43	4749.38	219.39	1.493
27	189.88	4614.53	404.52	4533.90	362.98	4749.32	219.39	1.493
28	189.36	4614.56	403.47	4534.42	360.37	4745.37	215.31	1.493
29	191.99	4614.40	403.47	4534.42	360.85	4741.30	211.22	1.493
30	190.94	4614.46	404.00	4534.16	361.92	4745.31	215.31	1.494
31	192.52	4614.36	404.52	4533.90	363.46	4745.26	215.31	1.494
32	191.46	4614.43	405.05	4533.65	364.53	4749.26	219.39	1.494
33	194.62	4614.24	403.47	4534.42	361.30	4737.22	207.14	1.494
34	195.15	4614.20	404.52	4533.90	363.94	4741.19	211.22	1.494
35	196.20	4614.14	404.00	4534.16	362.85	4737.17	207.14	1.495
36	193.57	4614.30	404.00	4534.16	362.39	4741.25	211.22	1.495
37	194.09	4614.27	405.05	4533.65	365.02	4745.20	215.31	1.495
38	186.73	4614.72	405.05	4533.65	363.94	4757.45	227.55	1.498
39	187.78	4614.65	404.52	4533.90	362.91	4753.46	223.47	1.498
40	186.20	4614.75	404.00	4534.16	361.36	4753.52	223.47	1.498
41	189.36	4614.56	405.05	4533.65	364.46	4753.40	223.47	1.498
42	190.41	4614.49	404.52	4533.90	363.41	4749.40	219.39	1.498
43	188.83	4614.59	404.00	4534.16	361.86	4749.46	219.39	1.499
44	187.25	4614.69	403.47	4534.42	360.32	4749.52	219.39	1.499
45	191.46	4614.43	404.00	4534.16	362.35	4745.40	215.31	1.499
46	191.99	4614.40	405.05	4533.65	364.97	4749.34	219.39	1.499
47	189.88	4614.53	403.47	4534.42	360.81	4745.45	215.31	1.499
48	192.52	4614.36	403.47	4534.42	361.28	4741.38	211.22	1.499
49	186.73	4614.72	404.52	4533.90	362.04	4753.30	223.47	1.500
50	195.15	4614.20	403.47	4534.42	361.74	4737.31	207.14	1.500
51	193.04	4614.33	404.52	4533.90	363.90	4745.34	215.31	1.500
52	194.62	4614.24	405.05	4533.65	365.45	4745.28	215.31	1.500
53	193.57	4614.30	405.58	4533.39	366.52	4749.27	219.39	1.500
54	194.09	4614.27	404.00	4534.16	362.83	4741.33	211.22	1.500
55	195.67	4614.17	404.52	4533.90	364.38	4741.28	211.22	1.500
56	196.20	4614.14	405.58	4533.39	367.01	4745.21	215.31	1.501
57	188.83	4614.59	405.05	4533.65	364.03	4753.32	223.47	1.502
58	186.20	4614.75	405.58	4533.39	365.40	4761.51	231.63	1.502
59	187.25	4614.69	405.05	4533.65	364.38	4757.53	227.55	1.503
60	188.83	4614.59	405.58	4533.39	365.94	4757.46	227.55	1.503
61	188.31	4614.62	404.52	4533.90	363.34	4753.55	223.47	1.503
62	186.73	4614.72	404.00	4534.16	361.79	4753.61	223.47	1.503
63	189.88	4614.53	405.05	4533.65	364.90	4753.48	223.47	1.504
64	191.46	4614.43	405.58	4533.39	366.46	4753.41	223.47	1.504
65	190.94	4614.46	404.52	4533.90	363.85	4749.49	219.39	1.504
66	189.36	4614.56	404.00	4534.16	362.30	4749.55	219.39	1.504

```
  67       191.99     4614.40      404.00     4534.16      362.79     4745.49      215.31     1.504
  68       187.78     4614.65      403.47     4534.42      360.75     4749.60      219.39     1.505
  69       192.52     4614.36      405.05     4533.65      365.40     4749.42      219.39     1.505
  70       190.41     4614.49      403.47     4534.42      361.24     4745.54      215.31     1.505
  71       194.09     4614.27      405.58     4533.39      366.96     4749.35      219.39     1.505
  72       194.62     4614.24      404.00     4534.16      363.26     4741.42      211.22     1.505
  73       195.15     4614.20      405.05     4533.65      365.89     4745.36      215.31     1.505
  74       193.57     4614.30      404.52     4533.90      364.34     4745.43      215.31     1.505
  75       193.04     4614.33      403.47     4534.42      361.72     4741.47      211.22     1.505
  76       196.20     4614.14      404.52     4533.90      364.81     4741.36      211.22     1.505
  77       195.67     4614.17      403.47     4534.42      362.18     4737.40      207.14     1.506
  78       195.67     4614.17      406.10     4533.13      368.52     4749.28      219.39     1.506
  79       186.73     4614.72      405.58     4533.39      365.84     4761.59      231.63     1.507
  80       190.94     4614.46      405.58     4533.39      366.02     4753.33      223.47     1.507
  81       187.78     4614.65      405.05     4533.65      364.82     4757.61      227.55     1.507
  82       188.31     4614.62      406.10     4533.13      367.41     4761.51      231.63     1.507
  83       189.36     4614.56      405.58     4533.39      366.38     4757.54      227.55     1.508
  84       186.20     4614.75      404.52     4533.90      363.26     4757.68      227.55     1.508
  85       190.41     4614.49      405.05     4533.65      365.34     4753.56      223.47     1.508
  86       190.94     4614.46      406.10     4533.13      367.94     4757.46      227.55     1.508
  87       188.83     4614.59      404.52     4533.90      363.78     4753.63      223.47     1.508
  88       187.25     4614.69      404.00     4534.16      362.23     4753.69      223.47     1.509
  89       196.20     4614.14      406.10     4533.13      368.96     4749.36      219.39     1.509
  90       191.99     4614.40      405.58     4533.39      366.90     4753.49      223.47     1.509
  91       191.46     4614.43      404.52     4533.90      364.29     4749.57      219.39     1.509
  92       189.88     4614.53      404.00     4534.16      362.73     4749.63      219.39     1.509
  93       193.04     4614.33      405.05     4533.65      365.84     4749.50      219.39     1.509
  94       194.62     4614.24      405.58     4533.39      367.40     4749.43      219.39     1.509
  95       192.52     4614.36      404.00     4534.16      363.23     4745.57      215.31     1.509
  96       193.57     4614.30      406.10     4533.13      368.46     4753.41      223.47     1.509
  97       195.67     4614.17      405.05     4533.65      366.33     4745.44      215.31     1.510
  98       194.09     4614.27      404.52     4533.90      364.78     4745.51      215.31     1.510
  99       188.31     4614.62      403.47     4534.42      361.18     4749.69      219.39     1.510

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     187.78      YL:    4614.65      XR:     403.47      YR:    4534.42
    Centre:  XC:     359.07      YC:    4745.10                 Radius:  R:     215.31
Generated failure surface: (20 points)
    187.78   4614.65          195.82   4604.72          204.43   4595.29          213.59   4586.38          223.26
4578.03
    233.41   4570.27          244.00   4563.12          255.00   4556.61          266.36   4550.77          278.05
4545.62
    290.03   4541.16          302.24   4537.42          314.66   4534.42          327.24   4532.16          339.92
4530.64
    352.68   4529.88          365.45   4529.88          378.21   4530.64          390.90   4532.15          403.47
4534.42

Slice Geometry and Properties - Critical Failure Surface (circle 1,  48 slices)
```

```
--------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                   PoreWater      Normal
Test
        X-Left      Area   Angle    Width    Length  Matl   Cohesion     Phi        Weight       Force        Stress
Factor
  1      187.78     27.63    51.0     6.86    10.90     6      50.00    25.0       2762.57        0.00       259.40
1.14
  2      194.64     10.32    51.0     1.18     1.87     2      10.00    35.0       1044.65        0.00       552.77
1.00
  3      195.82     45.78    47.6     4.18     6.20     2      10.00    35.0       4813.26        0.00       751.98
0.98
  4      200.00     63.96    47.6     4.43     6.57     2      10.00    35.0       6958.97        0.00      1027.73
0.98
  5      204.43    102.32    44.2     5.43     7.58     2      10.00    35.0      11542.32     1200.07      1497.95
0.95
  6      209.87     84.37    44.2     3.72     5.20     6      50.00    25.0       9731.04     2266.42      2075.44
1.07
  7      213.59     63.97    40.8     2.54     3.36     6      50.00    25.0       7392.73     2077.34      2391.04
1.04
  8      216.14     94.94    40.8     3.47     4.59     2      10.00    35.0      11067.09     3580.65      2481.17
0.94
  9      219.61     68.17    40.8     2.32     3.06     6      50.00    25.0       8004.28     2864.51      2891.70
1.04
 10      221.93     41.05    40.8     1.33     1.76     2      10.00    35.0       4831.95     1823.88      2863.79
0.94
 11      223.26    166.60    37.4     5.07     6.39     2      10.00    35.0      19808.76     7611.00      3176.81
0.92
 12      228.34    182.77    37.4     5.07     6.39     2      10.00    35.0      22016.29     9158.04      3560.42
0.92
 13      233.41    198.42    34.0     5.09     6.14     2      10.00    35.0      24151.80    10204.53      3992.64
0.91
 14      238.50     56.74    34.0     1.39     1.68     5       0.00    45.0       5871.35     1483.28      3174.66
0.83
 15      239.89     67.34    34.0     1.61     1.94     5       0.00    45.0       6733.86        0.00      2869.26
0.83
 16      241.50    107.99    34.0     2.50     3.02     2      10.00    35.0      12089.79        0.00      3656.60
0.91
 17      244.00    250.30    30.6     5.50     6.39     2      10.00    35.0      28070.48        0.00      3981.72
0.91
 18      249.50    267.24    30.6     5.50     6.39     2      10.00    35.0      30033.05        0.00      4260.47
0.91
 19      255.00     60.28    27.2     1.20     1.35     2      10.00    35.0       6786.29        0.00      4535.96
0.90
 20      256.20    255.32    27.2     5.08     5.71     2      10.00    35.0      28765.62        0.00      4547.21
0.90
 21      261.28    256.01    27.2     5.08     5.71     2      10.00    35.0      28844.76        0.00      4559.75
0.90
 22      266.36    294.11    23.8     5.84     6.39     2      10.00    35.0      33137.42        0.00      4684.36
0.90
```

```
  23      272.21    292.54    23.8      5.84      6.39     2      10.00    35.0     32956.41        0.00      4658.78
 0.90
  24      278.05    281.49    20.4      5.68      6.06     2      10.00    35.0     31705.90        0.00      4744.10
 0.91
  25      283.73    277.78    20.4      5.68      6.06     2      10.00    35.0     31278.77        0.00      4680.33
 0.91
  26      289.40    287.27    17.4      5.97      6.26     2      10.00    35.0     32466.32        0.00      4731.37
 0.91
  27      295.38    280.80    17.0      5.97      6.24     2      10.00    35.0     31982.71        0.00      4674.37
 0.91
  28      301.35     41.61    17.0      0.90      0.94     2      10.00    35.0      4758.79        0.00      4630.52
 0.91
  29      302.24    240.22    13.6      5.26      5.41     2      10.00    35.0     27467.69        0.00      4682.36
 0.92
  30      307.50    182.74    13.6      4.10      4.22     2      10.00    35.0     20953.76        0.00      4577.27
 0.92
  31      311.61    133.31    13.6      3.05      3.14     2      10.00    35.0     15330.39        0.00      4500.05
 0.92
  32      314.66    265.99    10.2      6.29      6.39     2      10.00    35.0     30589.13        0.00      4480.64
 0.94
  33      320.95    253.85    10.2      6.29      6.39     2      10.00    35.0     29192.26        0.00      4275.96
 0.94
  34      327.24     57.84     6.8      1.48      1.49     2      10.00    35.0      6651.42        0.00      4258.47
 0.95
  35      328.71     56.17     6.8      1.46      1.47     2      10.00    35.0      6460.98        7.95      4201.56
 0.95
  36      330.17    182.54     6.8      4.88      4.91     3    1000.00     0.0     21012.11      142.31      4227.58
 1.01
  37      335.05    173.79     6.8      4.88      4.91     3    1000.00     0.0     20019.21      320.54      4024.03
 1.01
  38      339.92    212.84     3.4      6.38      6.39     3    1000.00     0.0     24534.05      608.46      3806.83
 1.00
  39      346.30    195.44     3.4      6.38      6.39     3    1000.00     0.0     22544.24      759.70      3494.85
 1.00
  40      352.68    175.08     0.0      6.31      6.31     3    1000.00     0.0     20208.04      825.03      3202.33
 1.00
  41      358.99    155.68     0.0      6.31      6.31     3    1000.00     0.0     17975.85      825.23      2848.54
 1.00
  42      365.30    137.99    -3.3      6.46      6.47     3    1000.00     0.0     15936.54      771.87      2508.18
 1.00
  43      371.75    115.21    -3.4      6.46      6.47     3    1000.00     0.0     13303.75      617.28      2101.29
 1.00
  44      378.21     78.43    -6.8      5.43      5.47     3    1000.00     0.0      9049.91      346.36      1746.90
 1.01
  45      383.64     60.53    -6.8      5.43      5.47     3    1000.00     0.0      6973.28      125.18      1364.68
 1.01
  46      389.07     16.30    -6.8      1.82      1.84     2      10.00    35.0      1874.39        0.00      1091.06
 1.07
  47      390.90     39.56   -10.2      6.29      6.39     2      10.00    35.0      4549.75        0.00       792.61
```

```
1.11
 48      397.18     13.19   -10.2     6.29     6.39     2      10.00    35.0      1516.35        0.00       265.06
1.11
                 --------                    -------                                  ----------
     X-S Area:    6973.82    Path Length:    242.76               X-S Weight:   795750.44
```

```
DATA: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Road

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4602.00         700.00     4602.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4591.37         228.50     4591.37
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    228.50     4597.37         231.50     4597.37
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4591.37         700.00     4591.37
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4586.37         228.50     4586.37
Profile:  6 (2 points)   Material beneath:  6 - Clay
    231.50     4586.37         700.00     4586.37
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4578.37         228.50     4578.37
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4578.37         700.00     4578.37
Profile:  9 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4513.97          54.33     4514.03          89.95     4518.08         228.50     4521.44
Profile: 10 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
    231.50     4521.44         393.74     4525.37         565.84     4528.32         700.00     4529.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4511.97          54.33     4512.03          89.95     4517.08         228.50     4519.44         231.50
  4519.44
    393.74     4523.37         565.84     4526.32         700.00     4527.00

Slope Surface (14 points)
-------------
      0.00     4599.65          82.87     4599.65         120.53     4599.55         127.60     4601.00         177.60
  4601.00
    187.50     4598.40         194.00     4597.80         206.20     4597.24         228.50     4597.37         231.50
  4597.37
    245.00     4597.74         393.74     4525.37         565.84     4528.32         700.00     4529.00

Phreatic Surface (4 points)
----------------
      0.00     4589.37         228.50     4589.37         231.50     4525.37         393.74     4525.37

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     201.20      YL:    4597.47      XR:     393.47      YR:    4525.50
      Centre:  XC:     367.52      YC:    4749.00                 Radius:  R:     225.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       127.60       45.0         177.60       45.0

External Forces (2 forces)
---------------
Force      Force       X-Pos'n    Angle
  1      56500.0       196.00     270.0
  2      56500.0       205.00     270.0
```

```
Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Road

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

Initial failure surface approximation - Factor of Safety:   1.711

Analysis Summary

There were:  17856 successful analyses from a total of 20001 trial failure surfaces
             2145 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.57


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       203.57      4597.36      388.47     4527.93      344.62     4692.07      169.90     1.566   <-- Critical
Surface
   2       204.09      4597.34      388.47     4527.93      345.05     4692.19      169.90     1.572
   3       200.94      4597.48      388.47     4527.93      344.21     4696.19      173.98     1.573
   4       202.52      4597.41      389.00     4527.68      345.73     4696.19      173.98     1.575
   5       204.62      4597.31      389.52     4527.42      347.70     4696.30      173.98     1.577
   6       204.62      4597.31      388.47     4527.93      345.48     4692.30      169.90     1.578
   7       203.04      4597.39      389.00     4527.68      346.16     4696.30      173.98     1.581
   8       201.46      4597.46      389.52     4527.42      346.83     4700.29      178.06     1.583
   9       201.46      4597.46      388.47     4527.93      344.64     4696.30      173.98     1.583
  10       203.57      4597.36      390.05     4527.17      348.80     4700.38      178.06     1.583
  11       203.57      4597.36      389.00     4527.68      346.60     4696.41      173.98     1.586
  12       204.09      4597.34      390.05     4527.17      349.24     4700.49      178.06     1.588
  13       201.99      4597.43      389.52     4527.42      347.26     4700.40      178.06     1.588
  14       200.41      4597.51      389.00     4527.68      345.73     4700.40      178.06     1.589
  15       201.99      4597.43      388.47     4527.93      345.07     4696.41      173.98     1.590
  16       204.09      4597.34      389.00     4527.68      347.03     4696.52      173.98     1.590
  17       204.62      4597.31      393.73     4525.37      408.99     4850.02      325.00     1.590
  18       204.62      4597.31      393.73     4525.37      407.46     4846.00      320.92     1.591
  19       204.62      4597.31      390.05     4527.17      349.67     4700.59      178.06     1.592
  20       204.62      4597.31      393.73     4525.37      405.93     4841.98      316.84     1.592
```

21	202.52	4597.41	389.52	4527.42	347.70	4700.50	178.06	1.592
22	204.62	4597.31	393.21	4525.63	408.69	4850.26	325.00	1.592
23	204.62	4597.31	394.26	4525.38	408.95	4850.05	325.00	1.593
24	204.62	4597.31	393.21	4525.63	407.16	4846.24	320.92	1.593
25	204.62	4597.31	394.26	4525.38	407.43	4846.03	320.92	1.594
26	200.94	4597.48	390.05	4527.17	348.35	4704.47	182.14	1.594
27	204.62	4597.31	392.68	4525.89	408.38	4850.51	325.00	1.594
28	204.62	4597.31	392.15	4526.14	408.08	4850.75	325.00	1.594
29	204.62	4597.31	391.63	4526.40	407.77	4851.00	325.00	1.594
30	204.62	4597.31	389.00	4527.68	347.47	4696.63	173.98	1.594
31	204.62	4597.31	391.10	4526.65	407.46	4851.24	325.00	1.594
32	204.62	4597.31	390.58	4526.91	407.16	4851.49	325.00	1.594
33	203.04	4597.39	390.58	4526.91	350.32	4704.55	182.14	1.594
34	204.62	4597.31	390.05	4527.17	406.85	4851.73	325.00	1.594
35	204.62	4597.31	389.52	4527.42	406.54	4851.98	325.00	1.595
36	204.62	4597.31	389.00	4527.68	406.23	4852.22	325.00	1.595
37	204.62	4597.31	394.26	4525.38	405.90	4842.00	316.84	1.595
38	204.62	4597.31	388.47	4527.93	405.92	4852.47	325.00	1.595
39	202.52	4597.41	388.47	4527.93	345.50	4696.52	173.98	1.595
40	204.62	4597.31	392.68	4525.89	406.86	4846.49	320.92	1.595
41	204.62	4597.31	392.15	4526.14	406.55	4846.74	320.92	1.595
42	204.62	4597.31	391.63	4526.40	406.25	4846.98	320.92	1.595
43	204.62	4597.31	393.73	4525.37	404.40	4837.95	312.76	1.595
44	200.94	4597.48	389.00	4527.68	346.16	4700.51	178.06	1.595
45	204.62	4597.31	391.10	4526.65	405.94	4847.23	320.92	1.595
46	204.62	4597.31	390.58	4526.91	405.64	4847.48	320.92	1.595
47	204.62	4597.31	390.05	4527.17	405.33	4847.72	320.92	1.595
48	204.62	4597.31	389.52	4527.42	405.02	4847.97	320.92	1.595
49	204.62	4597.31	389.00	4527.68	404.72	4848.21	320.92	1.596
50	204.62	4597.31	388.47	4527.93	404.41	4848.46	320.92	1.596
51	204.09	4597.34	393.73	4525.37	408.46	4850.04	325.00	1.596
52	204.62	4597.31	394.26	4525.38	404.37	4837.97	312.76	1.596
53	204.62	4597.31	392.68	4525.89	405.33	4842.47	316.84	1.596
54	203.04	4597.39	389.52	4527.42	348.13	4700.61	178.06	1.596
55	204.62	4597.31	393.21	4525.63	405.63	4842.22	316.84	1.596
56	204.62	4597.31	392.15	4526.14	405.03	4842.72	316.84	1.596
57	204.62	4597.31	391.63	4526.40	404.72	4842.96	316.84	1.596
58	204.62	4597.31	391.10	4526.65	404.42	4843.21	316.84	1.596
59	204.62	4597.31	390.58	4526.91	404.12	4843.46	316.84	1.596
60	204.62	4597.31	390.05	4527.17	403.81	4843.70	316.84	1.596
61	204.62	4597.31	389.52	4527.42	403.51	4843.95	316.84	1.596
62	204.62	4597.31	389.00	4527.68	403.20	4844.20	316.84	1.596
63	204.62	4597.31	393.73	4525.37	402.86	4833.91	308.67	1.597
64	204.62	4597.31	388.47	4527.93	402.89	4844.44	316.84	1.597
65	204.09	4597.34	393.73	4525.37	406.94	4846.02	320.92	1.597
66	204.62	4597.31	391.10	4526.65	402.90	4839.19	312.76	1.598
67	204.62	4597.31	392.68	4525.89	403.80	4838.44	312.76	1.598
68	204.62	4597.31	391.63	4526.40	403.20	4838.94	312.76	1.598
69	204.62	4597.31	389.00	4527.68	401.68	4840.18	312.76	1.598

```
  70       204.62     4597.31      389.52     4527.42      401.99     4839.93      312.76     1.598
  71       204.62     4597.31      392.15     4526.14      403.50     4838.69      312.76     1.598
  72       204.62     4597.31      390.05     4527.17      402.29     4839.68      312.76     1.598
  73       204.62     4597.31      393.21     4525.63      404.10     4838.19      312.76     1.598
  74       204.62     4597.31      390.58     4526.91      402.59     4839.43      312.76     1.598
  75       203.57     4597.36      390.58     4526.91      350.76     4704.65      182.14     1.598
  76       204.62     4597.31      388.47     4527.93      401.38     4840.42      312.76     1.598
  77       204.09     4597.34      393.73     4525.37      405.41     4842.00      316.84     1.598
  78       204.09     4597.34      394.26     4525.38      408.43     4850.07      325.00     1.598
  79       204.62     4597.31      393.73     4525.37      401.33     4829.87      304.59     1.598
  80       204.09     4597.34      393.21     4525.63      408.16     4850.29      325.00     1.598
  81       204.09     4597.34      392.68     4525.89      407.85     4850.53      325.00     1.598
  82       204.09     4597.34      392.15     4526.14      407.55     4850.78      325.00     1.598
  83       204.09     4597.34      391.63     4526.40      407.24     4851.02      325.00     1.598
  84       201.46     4597.46      390.05     4527.17      348.78     4704.57      182.14     1.598
  85       204.09     4597.34      391.10     4526.65      406.93     4851.27      325.00     1.598
  86       204.09     4597.34      390.58     4526.91      406.63     4851.51      325.00     1.598
  87       204.09     4597.34      390.05     4527.17      406.32     4851.76      325.00     1.598
  88       204.09     4597.34      389.52     4527.42      406.01     4852.00      325.00     1.598
  89       204.09     4597.34      389.00     4527.68      405.70     4852.25      325.00     1.599
  90       204.09     4597.34      388.47     4527.93      405.39     4852.49      325.00     1.599
  91       204.62     4597.31      390.58     4526.91      401.07     4835.41      308.67     1.599
  92       204.62     4597.31      389.52     4527.42      400.46     4835.90      308.67     1.599
  93       204.62     4597.31      388.47     4527.93      399.86     4836.40      308.67     1.599
  94       204.62     4597.31      390.05     4527.17      400.77     4835.65      308.67     1.599
  95       204.62     4597.31      391.10     4526.65      401.37     4835.16      308.67     1.599
  96       204.62     4597.31      389.00     4527.68      400.16     4836.15      308.67     1.599
  97       204.62     4597.31      392.15     4526.14      401.97     4834.66      308.67     1.599
  98       204.62     4597.31      391.63     4526.40      401.67     4834.91      308.67     1.599
  99       204.62     4597.31      393.21     4525.63      402.57     4834.16      308.67     1.599

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     203.57      YL:    4597.36      XR:     388.47      YR:    4527.93
    Centre:  XC:     344.62      YC:    4692.07                 Radius:  R:     169.90
Generated failure surface: (20 points)
    203.57   4597.36          210.05   4588.36          217.10   4579.80          224.70   4571.72          232.81
4564.15
    241.39   4557.13          250.42   4550.68          259.84   4544.84          269.63   4539.62          279.73
4535.05
    290.12   4531.15          300.73   4527.94          311.54   4525.43          322.48   4523.62          333.52
4522.54
    344.60   4522.18          355.69   4522.54          366.72   4523.62          377.67   4525.42          388.47
4527.93

Slice Geometry and Properties - Critical Failure Surface (circle 1,  45 slices)
-------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                  PoreWater      Normal
Test
```

```
        X-Left      Area    Angle    Width    Length   Matl   Cohesion     Phi       Weight      Force        Stress
Factor
  1      203.57      4.65    54.2     2.63     4.50     6       50.00    25.0       465.15        0.00     15282.91
1.21
  2      206.20      7.91    54.2     1.68     2.88     6       50.00    25.0       791.48        0.00       301.67
1.21
  3      207.88      9.91    54.2     1.44     2.46     2       10.00    35.0      1012.83        0.00       428.50
1.06
  4      209.32     22.39    51.7     2.37     3.82     2       10.00    35.0      2421.17      372.94       683.05
1.03
  5      211.69     76.89    50.5     5.41     8.51     6       50.00    25.0      8605.25     3338.18      1243.34
1.16
  6      217.10     24.52    46.8     1.35     1.96     6       50.00    25.0      2760.18     1260.57      1686.62
1.11
  7      218.45     64.43    46.8     3.13     4.56     2       10.00    35.0      7349.01     3605.54      1843.49
0.99
  8      221.57     74.88    46.8     3.13     4.56     2       10.00    35.0      8705.67     4552.26      2204.50
0.99
  9      224.70    104.19    43.0     3.80     5.20     2       10.00    35.0     12292.28     6301.94      2634.45
0.97
 10      228.50     30.84    43.0     1.04     1.42     5        0.00    45.0      3194.33      939.97      2173.35
0.86
 11      229.54     60.95    43.0     1.96     2.68     5        0.00    45.0      6094.94        0.00      1947.72
0.86
 12      231.50     42.64    43.0     1.31     1.79     2       10.00    35.0      4628.52        0.00      2494.80
0.97
 13      232.81    150.52    39.3     4.29     5.55     2       10.00    35.0     16401.87        0.00      2794.28
0.95
 14      237.10    166.09    39.3     4.29     5.55     2       10.00    35.0     18185.35        0.00      3098.52
0.95
 15      241.39    151.02    35.5     3.61     4.44     2       10.00    35.0     16592.23        0.00      3481.44
0.93
 16      245.00    237.23    35.5     5.42     6.66     2       10.00    35.0     26221.06        0.00      3666.28
0.93
 17      250.42    171.49    31.8     3.84     4.52     2       10.00    35.0     19099.24        0.00      3892.79
0.92
 18      254.25    173.46    31.8     3.84     4.52     2       10.00    35.0     19433.08        0.00      3960.88
0.92
 19      258.09     79.69    31.8     1.75     2.06     2       10.00    35.0      8954.90        0.00      4005.65
0.92
 20      259.84    195.19    28.1     4.26     4.83     2       10.00    35.0     21935.05        0.00      4151.85
0.92
 21      264.10    196.04    28.1     4.26     4.83     2       10.00    35.0     22032.41        0.00      4170.27
0.92
 22      268.37     58.08    28.1     1.26     1.43     2       10.00    35.0      6533.73        0.00      4186.08
0.92
 23      269.63    232.70    24.3     5.05     5.55     2       10.00    35.0     26293.34        0.00      4326.35
0.91
 24      274.68    231.81    24.3     5.05     5.55     2       10.00    35.0     26378.26        0.00      4340.16
```

```
0.91
 25      279.73    230.98    20.6     5.08     5.42     2     10.00    35.0     26468.62        0.00     4463.08
0.91
 26      284.81    238.44    20.6     5.31     5.67     2     10.00    35.0     27420.43        0.00     4422.12
0.91
 27      290.12    234.31    16.8     5.31     5.55     2     10.00    35.0     26945.21        0.00     4469.97
0.92
 28      295.43    229.12    16.8     5.31     5.55     2     10.00    35.0     26349.29        0.00     4371.09
0.92
 29      300.73    226.82    13.1     5.40     5.55     2     10.00    35.0     26084.70        0.00     4373.27
0.93
 30      306.13    219.42    13.1     5.40     5.55     2     10.00    35.0     25232.91        0.00     4230.24
0.93
 31      311.54    211.81     9.4     5.42     5.49     2     10.00    35.0     24389.67      133.10     4190.47
0.94
 32      316.96    202.35     9.4     5.42     5.49     2     10.00    35.0     23374.43      439.48     4019.91
0.94
 33      322.38    196.99     5.7     5.57     5.60     3   1000.00     0.0     22802.66      701.64     4031.30
1.00
 34      327.95    184.95     5.6     5.57     5.60     3   1000.00     0.0     21425.77      892.68     3784.77
1.00
 35      333.52    170.34     1.9     5.52     5.52     3   1000.00     0.0     19746.82     1005.93     3558.91
1.00
 36      339.03    156.54     1.9     5.52     5.52     3   1000.00     0.0     18156.68     1068.15     3270.70
1.00
 37      344.55    143.03    -1.8     5.57     5.57     3   1000.00     0.0     16597.39     1079.34     3000.81
1.00
 38      350.12    126.93    -1.9     5.57     5.57     3   1000.00     0.0     14733.58     1016.37     2666.52
1.00
 39      355.69    108.91    -5.6     5.52     5.55     3   1000.00     0.0     12642.73      886.37     2353.45
1.00
 40      361.20     91.10    -5.6     5.52     5.55     3   1000.00     0.0     10572.29      699.00     1978.35
1.00
 41      366.72     53.12    -9.3     3.90     3.95     3   1000.00     0.0      6160.27      352.14     1685.09
1.01
 42      370.62     43.22    -9.4     3.90     3.95     3   1000.00     0.0      5005.86      193.95     1389.08
1.01
 43      374.52     25.16    -9.3     2.83     2.87     2     10.00    35.0      2903.38       41.66     1107.94
1.09
 44      377.35     33.34   -12.9     5.56     5.70     2     10.00    35.0      3834.53        0.00      769.79
1.14
 45      382.91     11.12   -13.1     5.56     5.71     2     10.00    35.0      1278.49        0.00      258.28
1.15
                 --------                   -------                            ----------
     X-S Area:    5705.53    Path Length:    210.72               X-S Weight:   648507.06
```

```
DATA: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Road

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4602.00         700.00     4602.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4591.37         228.50     4591.37
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    228.50     4597.37         231.50     4597.37
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4591.37         700.00     4591.37
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4586.37         228.50     4586.37
Profile:  6 (2 points)   Material beneath:  6 - Clay
    231.50     4586.37         700.00     4586.37
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4578.37         228.50     4578.37
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4578.37         700.00     4578.37
Profile:  9 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4513.97          54.33     4514.03          89.95     4518.08         228.50     4521.44
Profile: 10 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
    231.50     4521.44         393.74     4525.37         565.84     4528.32         700.00     4529.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4511.97          54.33     4512.03          89.95     4517.08         228.50     4519.44         231.50
  4519.44
    393.74     4523.37         565.84     4526.32         700.00     4527.00

Slope Surface (14 points)
-------------
      0.00     4599.65          82.87     4599.65         120.53     4599.55         127.60     4601.00         177.60
  4601.00
    187.50     4598.40         194.00     4597.80         206.20     4597.24         228.50     4597.37         231.50
  4597.37
    245.00     4597.74         393.74     4525.37         565.84     4528.32         700.00     4529.00

Phreatic Surface (4 points)
----------------
      0.00     4589.37         228.50     4589.37         231.50     4525.37         393.74     4525.37

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     201.20      YL:    4597.47      XR:     393.47      YR:    4525.50
      Centre:  XC:     367.52      YC:    4749.00                  Radius:  R:     225.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       127.60       45.0         177.60       45.0

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

External Forces (2 forces)
---------------
```

```
Force      Force       X-Pos'n    Angle
  1      56500.0       196.00     270.0
  2      56500.0       205.00     270.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Road

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

Initial failure surface approximation - Factor of Safety:   1.486

Analysis Summary

There were:  17856 successful analyses from a total of 20001 trial failure surfaces
             2145 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.36


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       203.57     4597.36      388.47     4527.93      344.62     4692.07      169.90     1.357   <-- Critical
Surface
   2       200.94     4597.48      388.47     4527.93      344.21     4696.19      173.98     1.361
   3       204.09     4597.34      388.47     4527.93      345.05     4692.19      169.90     1.363
   4       202.52     4597.41      389.00     4527.68      345.73     4696.19      173.98     1.364
   5       204.62     4597.31      389.52     4527.42      347.70     4696.30      173.98     1.368
   6       204.62     4597.31      388.47     4527.93      345.48     4692.30      169.90     1.369
   7       203.04     4597.39      389.00     4527.68      346.16     4696.30      173.98     1.369
   8       201.46     4597.46      389.52     4527.42      346.83     4700.29      178.06     1.370
   9       201.46     4597.46      388.47     4527.93      344.64     4696.30      173.98     1.370
  10       203.57     4597.36      390.05     4527.17      348.80     4700.38      178.06     1.373
  11       203.57     4597.36      389.00     4527.68      346.60     4696.41      173.98     1.374
  12       200.41     4597.51      389.00     4527.68      345.73     4700.40      178.06     1.374
  13       201.99     4597.43      389.52     4527.42      347.26     4700.40      178.06     1.375
  14       201.99     4597.43      388.47     4527.93      345.07     4696.41      173.98     1.377
  15       204.09     4597.34      390.05     4527.17      349.24     4700.49      178.06     1.377
  16       204.09     4597.34      389.00     4527.68      347.03     4696.52      173.98     1.379
```

17	200.94	4597.48	390.05	4527.17	348.35	4704.47	182.14	1.379
18	202.52	4597.41	389.52	4527.42	347.70	4700.50	178.06	1.379
19	200.94	4597.48	389.00	4527.68	346.16	4700.51	178.06	1.381
20	204.62	4597.31	390.05	4527.17	349.67	4700.59	178.06	1.381
21	203.04	4597.39	390.58	4526.91	350.32	4704.55	182.14	1.382
22	202.52	4597.41	388.47	4527.93	345.50	4696.52	173.98	1.382
23	204.62	4597.31	393.73	4525.37	408.99	4850.02	325.00	1.382
24	204.62	4597.31	393.73	4525.37	407.46	4846.00	320.92	1.383
25	204.62	4597.31	389.00	4527.68	347.47	4696.63	173.98	1.383
26	203.04	4597.39	389.52	4527.42	348.13	4700.61	178.06	1.384
27	201.46	4597.46	390.05	4527.17	348.78	4704.57	182.14	1.384
28	204.62	4597.31	393.73	4525.37	405.93	4841.98	316.84	1.384
29	204.62	4597.31	393.21	4525.63	408.69	4850.26	325.00	1.384
30	204.62	4597.31	394.26	4525.38	408.95	4850.05	325.00	1.384
31	204.62	4597.31	393.21	4525.63	407.16	4846.24	320.92	1.385
32	204.62	4597.31	394.26	4525.38	407.43	4846.03	320.92	1.385
33	203.57	4597.36	390.58	4526.91	350.76	4704.65	182.14	1.385
34	204.62	4597.31	392.68	4525.89	408.38	4850.51	325.00	1.386
35	204.62	4597.31	392.15	4526.14	408.08	4850.75	325.00	1.386
36	204.62	4597.31	391.63	4526.40	407.77	4851.00	325.00	1.386
37	204.62	4597.31	391.10	4526.65	407.46	4851.24	325.00	1.386
38	204.62	4597.31	394.26	4525.38	405.90	4842.00	316.84	1.386
39	204.09	4597.34	393.73	4525.37	408.46	4850.04	325.00	1.386
40	204.62	4597.31	390.58	4526.91	407.16	4851.49	325.00	1.386
41	201.46	4597.46	389.00	4527.68	346.60	4700.62	178.06	1.386
42	204.62	4597.31	390.05	4527.17	406.85	4851.73	325.00	1.386
43	204.62	4597.31	393.73	4525.37	404.40	4837.95	312.76	1.386
44	204.62	4597.31	389.52	4527.42	406.54	4851.98	325.00	1.386
45	204.62	4597.31	389.00	4527.68	406.23	4852.22	325.00	1.387
46	204.62	4597.31	392.68	4525.89	406.86	4846.49	320.92	1.387
47	204.62	4597.31	392.15	4526.14	406.55	4846.74	320.92	1.387
48	204.62	4597.31	388.47	4527.93	405.92	4852.47	325.00	1.387
49	204.62	4597.31	391.63	4526.40	406.25	4846.98	320.92	1.387
50	203.04	4597.39	388.47	4527.93	345.94	4696.63	173.98	1.387
51	204.62	4597.31	391.10	4526.65	405.94	4847.23	320.92	1.387
52	204.62	4597.31	390.58	4526.91	405.64	4847.48	320.92	1.387
53	204.09	4597.34	393.73	4525.37	406.94	4846.02	320.92	1.387
54	204.62	4597.31	394.26	4525.38	404.37	4837.97	312.76	1.387
55	204.62	4597.31	390.05	4527.17	405.33	4847.72	320.92	1.387
56	204.62	4597.31	389.52	4527.42	405.02	4847.97	320.92	1.387
57	204.62	4597.31	389.00	4527.68	404.72	4848.21	320.92	1.387
58	203.57	4597.36	389.52	4527.42	348.57	4700.71	178.06	1.387
59	204.62	4597.31	393.73	4525.37	402.86	4833.91	308.67	1.388
60	204.62	4597.31	388.47	4527.93	404.41	4848.46	320.92	1.388
61	204.62	4597.31	393.21	4525.63	405.63	4842.22	316.84	1.388
62	204.62	4597.31	392.68	4525.89	405.33	4842.47	316.84	1.388
63	204.62	4597.31	392.15	4526.14	405.03	4842.72	316.84	1.388
64	204.62	4597.31	391.63	4526.40	404.72	4842.96	316.84	1.388
65	204.62	4597.31	391.10	4526.65	404.42	4843.21	316.84	1.388

```
  66       204.62     4597.31      390.58     4526.91      404.12     4843.46      316.84     1.388
  67       201.99     4597.43      390.05     4527.17      349.22     4704.67      182.14     1.388
  68       204.62     4597.31      390.05     4527.17      403.81     4843.70      316.84     1.388
  69       200.41     4597.51      390.58     4526.91      349.85     4708.63      186.22     1.388
  70       204.09     4597.34      393.73     4525.37      405.41     4842.00      316.84     1.388
  71       204.62     4597.31      389.52     4527.42      403.51     4843.95      316.84     1.388
  72       204.62     4597.31      389.00     4527.68      403.20     4844.20      316.84     1.388
  73       204.09     4597.34      394.26     4525.38      408.43     4850.07      325.00     1.388
  74       204.62     4597.31      388.47     4527.93      402.89     4844.44      316.84     1.388
  75       204.09     4597.34      393.21     4525.63      408.16     4850.29      325.00     1.388
  76       204.09     4597.34      392.68     4525.89      407.85     4850.53      325.00     1.389
  77       204.09     4597.34      390.58     4526.91      351.20     4704.75      182.14     1.389
  78       204.62     4597.31      393.21     4525.63      404.10     4838.19      312.76     1.389
  79       204.09     4597.34      389.52     4527.42      347.26     4696.19      173.98     1.389
  80       204.09     4597.34      392.15     4526.14      407.55     4850.78      325.00     1.389
  81       204.62     4597.31      392.68     4525.89      403.80     4838.44      312.76     1.389
  82       204.62     4597.31      393.73     4525.37      401.33     4829.87      304.59     1.389
  83       204.09     4597.34      391.63     4526.40      407.24     4851.02      325.00     1.389
  84       204.62     4597.31      392.15     4526.14      403.50     4838.69      312.76     1.389
  85       204.62     4597.31      391.63     4526.40      403.20     4838.94      312.76     1.389
  86       204.62     4597.31      391.10     4526.65      351.87     4704.52      182.14     1.389
  87       204.62     4597.31      391.10     4526.65      402.90     4839.19      312.76     1.389
  88       204.09     4597.34      391.10     4526.65      406.93     4851.27      325.00     1.389
  89       203.57     4597.36      393.73     4525.37      407.94     4850.06      325.00     1.389
  90       204.62     4597.31      390.58     4526.91      402.59     4839.43      312.76     1.389
  91       204.09     4597.34      390.58     4526.91      406.63     4851.51      325.00     1.389
  92       204.62     4597.31      390.05     4527.17      402.29     4839.68      312.76     1.389
  93       204.62     4597.31      389.52     4527.42      401.99     4839.93      312.76     1.389
  94       204.09     4597.34      390.05     4527.17      406.32     4851.76      325.00     1.389
  95       204.09     4597.34      393.73     4525.37      403.88     4837.96      312.76     1.389
  96       204.62     4597.31      389.00     4527.68      401.68     4840.18      312.76     1.389
  97       200.41     4597.51      389.52     4527.42      347.68     4704.69      182.14     1.389
  98       204.09     4597.34      394.26     4525.38      406.90     4846.05      320.92     1.389
  99       204.62     4597.31      388.47     4527.93      401.38     4840.42      312.76     1.389

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     203.57      YL:    4597.36      XR:     388.47      YR:    4527.93
    Centre:  XC:     344.62      YC:    4692.07                Radius:  R:     169.90
Generated failure surface: (20 points)
    203.57   4597.36          210.05   4588.36          217.10   4579.80          224.70   4571.72          232.81
4564.15
    241.39   4557.13          250.42   4550.68          259.84   4544.84          269.63   4539.62          279.73
4535.05
    290.12   4531.15          300.73   4527.94          311.54   4525.43          322.48   4523.62          333.52
4522.54
    344.60   4522.18          355.69   4522.54          366.72   4523.62          377.67   4525.42          388.47
4527.93
```

```
Slice Geometry and Properties - Critical Failure Surface (circle 1,  45 slices)
--------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                   PoreWater      Normal
Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi       Weight       Force        Stress
Factor
  1      203.57      4.65    54.2     2.63     4.50     6      50.00    25.0        465.15        0.00     14618.25
1.16
  2      206.20      7.91    54.2     1.68     2.88     6      50.00    25.0        791.48        0.00       284.01
1.16
  3      207.88      9.91    54.2     1.44     2.46     2      10.00    35.0       1012.83        0.00       403.78
1.00
  4      209.32     22.39    51.7     2.37     3.82     2      10.00    35.0       2421.17      372.94       651.35
0.98
  5      211.69     76.89    50.5     5.41     8.51     6      50.00    25.0       8605.25     3338.18      1205.64
1.11
  6      217.10     24.52    46.8     1.35     1.96     6      50.00    25.0       2760.18     1260.57      1645.39
1.07
  7      218.45     64.43    46.8     3.13     4.56     2      10.00    35.0       7349.01     3605.54      1792.92
0.94
  8      221.57     74.88    46.8     3.13     4.56     2      10.00    35.0       8705.67     4552.26      2146.66
0.94
  9      224.70    104.19    43.0     3.80     5.20     2      10.00    35.0      12292.28     6301.94      2572.02
0.92
 10      228.50     30.84    43.0     1.04     1.42     5       0.00    45.0       3194.33      939.97      2090.99
0.81
 11      229.54     60.95    43.0     1.96     2.68     5       0.00    45.0       6094.94        0.00      1841.63
0.81
 12      231.50     42.64    43.0     1.31     1.79     2      10.00    35.0       4628.52        0.00      2385.79
0.92
 13      232.81    150.52    39.3     4.29     5.55     2      10.00    35.0      16401.87        0.00      2682.84
0.91
 14      237.10    166.09    39.3     4.29     5.55     2      10.00    35.0      18185.35        0.00      2975.02
0.91
 15      241.39    151.02    35.5     3.61     4.44     2      10.00    35.0      16592.23        0.00      3355.58
0.90
 16      245.00    237.23    35.5     5.42     6.66     2      10.00    35.0      26221.06        0.00      3533.77
0.90
 17      250.42    171.49    31.8     3.84     4.52     2      10.00    35.0      19099.24        0.00      3766.18
0.89
 18      254.25    173.46    31.8     3.84     4.52     2      10.00    35.0      19433.08        0.00      3832.07
0.89
 19      258.09     79.69    31.8     1.75     2.06     2      10.00    35.0       8954.90        0.00      3875.41
0.89
 20      259.84    195.19    28.1     4.26     4.83     2      10.00    35.0      21935.05        0.00      4031.71
0.89
 21      264.10    196.04    28.1     4.26     4.83     2      10.00    35.0      22032.41        0.00      4049.60
0.89
 22      268.37     58.08    28.1     1.26     1.43     2      10.00    35.0       6533.73        0.00      4064.97
```

```
0.89
 23      269.63    232.70    24.3     5.05     5.55     2      10.00    35.0     26293.34       0.00      4216.64
0.89
 24      274.68    231.81    24.3     5.05     5.55     2      10.00    35.0     26378.26       0.00      4230.07
0.89
 25      279.73    230.98    20.6     5.08     5.42     2      10.00    35.0     26468.62       0.00      4365.95
0.89
 26      284.81    238.44    20.6     5.31     5.67     2      10.00    35.0     27420.43       0.00      4325.87
0.89
 27      290.12    234.31    16.8     5.31     5.55     2      10.00    35.0     26945.21       0.00      4389.00
0.90
 28      295.43    229.12    16.8     5.31     5.55     2      10.00    35.0     26349.29       0.00      4291.91
0.90
 29      300.73    226.82    13.1     5.40     5.55     2      10.00    35.0     26084.70       0.00      4310.42
0.92
 30      306.13    219.42    13.1     5.40     5.55     2      10.00    35.0     25232.91       0.00      4169.42
0.92
 31      311.54    211.81     9.4     5.42     5.49     2      10.00    35.0     24389.67     133.10      4146.67
0.93
 32      316.96    202.35     9.4     5.42     5.49     2      10.00    35.0     23374.43     439.48      3978.48
0.93
 33      322.38    196.99     5.7     5.57     5.60     3    1000.00     0.0     22802.66     701.64      4021.50
1.00
 34      327.95    184.95     5.6     5.57     5.60     3    1000.00     0.0     21425.77     892.68      3775.08
1.00
 35      333.52    170.34     1.9     5.52     5.52     3    1000.00     0.0     19746.82    1005.93      3555.69
1.00
 36      339.03    156.54     1.9     5.52     5.52     3    1000.00     0.0     18156.68    1068.15      3267.48
1.00
 37      344.55    143.03    -1.8     5.57     5.57     3    1000.00     0.0     16597.39    1079.34      3003.95
1.00
 38      350.12    126.93    -1.9     5.57     5.57     3    1000.00     0.0     14733.58    1016.37      2669.73
1.00
 39      355.69    108.91    -5.6     5.52     5.55     3    1000.00     0.0     12642.73     886.37      2363.11
1.00
 40      361.20     91.10    -5.6     5.52     5.55     3    1000.00     0.0     10572.29     699.00      1988.02
1.00
 41      366.72     53.12    -9.3     3.90     3.95     3    1000.00     0.0      6160.27     352.14      1701.30
1.01
 42      370.62     43.22    -9.4     3.90     3.95     3    1000.00     0.0      5005.86     193.95      1405.30
1.01
 43      374.52     25.16    -9.3     2.83     2.87     2      10.00    35.0      2903.38      41.66      1121.67
1.11
 44      377.35     33.34   -12.9     5.56     5.70     2      10.00    35.0      3834.53       0.00       783.80
1.16
 45      382.91     11.12   -13.1     5.56     5.71     2      10.00    35.0      1278.49       0.00       263.25
1.17
                 --------                          -------                                ----------
     X-S Area:    5705.53    Path Length:    210.72             X-S Weight:   648507.06
```

```
DATA: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Shop

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4602.00         700.00     4602.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4591.37         228.50     4591.37
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    228.50     4597.37         231.50     4597.37
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4591.37         700.00     4591.37
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4586.37         228.50     4586.37
Profile:  6 (2 points)   Material beneath:  6 - Clay
    231.50     4586.37         700.00     4586.37
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4578.37         228.50     4578.37
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4578.37         700.00     4578.37
Profile:  9 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4513.97          54.33     4514.03          89.95     4518.08         228.50     4521.44
Profile: 10 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
    231.50     4521.44         393.74     4525.37         565.84     4528.32         700.00     4529.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4511.97          54.33     4512.03          89.95     4517.08         228.50     4519.44         231.50
  4519.44
    393.74     4523.37         565.84     4526.32         700.00     4527.00

Slope Surface (14 points)
-------------
      0.00     4599.65          82.87     4599.65         120.53     4599.55         127.60     4601.00         177.60
  4601.00
    187.50     4598.40         194.00     4597.80         206.20     4597.24         228.50     4597.37         231.50
  4597.37
    245.00     4597.74         393.74     4525.37         565.84     4528.32         700.00     4529.00

Phreatic Surface (4 points)
----------------
      0.00     4589.37         228.50     4589.37         231.50     4525.37         393.74     4525.37

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     152.60      YL:    4601.00      XR:     393.47      YR:    4525.50
      Centre:  XC:     354.44      YC:    4822.95                  Radius:  R:     300.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       127.60       45.0         177.60       45.0

External Forces (2 forces)
---------------
Force      Force       X-Pos'n    Angle
  1      56500.0       196.00     270.0
  2      56500.0       205.00     270.0
```

```
Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              50.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - Static - With Bearing - to Shop

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

Initial failure surface approximation - Factor of Safety:   1.867

Analysis Summary

There were:  18980 successful analyses from a total of 20001 trial failure surfaces
             1021 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.59


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       177.60     4601.00      389.52     4527.42      342.66     4734.43      212.24     1.593   <-- Critical
Surface
   2       177.60     4601.00      388.47     4527.93      340.57     4730.51      208.16     1.598
   3       174.97     4601.00      389.52     4527.42      342.00     4738.46      216.33     1.599
   4       174.97     4601.00      388.47     4527.93      339.93     4734.55      212.24     1.605
   5       177.60     4601.00      390.05     4527.17      344.49     4738.64      216.33     1.605
   6       177.60     4601.00      389.00     4527.68      342.40     4734.75      212.24     1.611
   7       174.97     4601.00      390.05     4527.17      343.82     4742.67      220.41     1.612
   8       177.60     4601.00      390.58     4526.91      346.31     4742.83      220.41     1.616
   9       174.97     4601.00      389.00     4527.68      341.74     4738.78      216.33     1.618
  10       177.60     4601.00      389.52     4527.42      344.23     4738.95      216.33     1.621
  11       174.97     4601.00      390.58     4526.91      345.62     4746.85      224.49     1.624
  12       177.60     4601.00      391.10     4526.65      348.13     4746.99      224.49     1.625
  13       174.97     4601.00      389.52     4527.42      343.55     4742.98      220.41     1.629
  14       177.60     4601.00      388.47     4527.93      342.15     4735.06      212.24     1.629
  15       177.60     4601.00      390.05     4527.17      346.05     4743.14      220.41     1.630
  16       174.97     4601.00      391.10     4526.65      347.42     4751.01      228.57     1.633
  17       177.60     4601.00      391.63     4526.40      349.95     4751.14      228.57     1.636
  18       177.60     4601.00      390.58     4526.91      347.87     4747.30      224.49     1.637
  19       174.97     4601.00      388.47     4527.93      341.48     4739.10      216.33     1.637
  20       177.60     4601.00      389.00     4527.68      343.97     4739.27      216.33     1.637
```

21	174.97	4601.00	390.05	4527.17	345.36	4747.16	224.49	1.639
22	174.97	4601.00	391.63	4526.40	349.22	4755.15	232.65	1.642
23	177.60	4601.00	389.52	4527.42	345.79	4743.45	220.41	1.644
24	177.60	4601.00	392.15	4526.14	351.76	4755.26	232.65	1.644
25	174.97	4601.00	389.00	4527.68	343.29	4743.29	220.41	1.645
26	177.60	4601.00	391.10	4526.65	349.68	4751.44	228.57	1.646
27	174.97	4601.00	390.58	4526.91	347.16	4751.32	228.57	1.646
28	177.60	4601.00	393.73	4525.37	380.88	4835.31	310.20	1.647
29	177.60	4601.00	393.21	4525.63	355.37	4763.45	240.82	1.649
30	172.34	4601.00	388.47	4527.93	339.27	4738.59	216.33	1.649
31	177.60	4601.00	392.68	4525.89	380.27	4835.84	310.20	1.651
32	174.97	4601.00	392.15	4526.14	351.02	4759.27	236.73	1.651
33	177.60	4601.00	393.21	4525.63	380.58	4835.58	310.20	1.651
34	174.97	4601.00	389.52	4527.42	345.09	4747.47	224.49	1.653
35	177.60	4601.00	392.15	4526.14	378.52	4831.96	306.12	1.653
36	177.60	4601.00	393.21	4525.63	379.13	4831.43	306.12	1.653
37	177.60	4601.00	392.68	4525.89	378.82	4831.69	306.12	1.653
38	177.60	4601.00	392.68	4525.89	353.56	4759.37	236.73	1.653
39	174.97	4601.00	391.10	4526.65	348.95	4755.46	232.65	1.654
40	177.60	4601.00	390.05	4527.17	347.61	4747.61	224.49	1.654
41	177.60	4601.00	393.21	4525.63	377.68	4827.27	302.04	1.655
42	177.60	4601.00	392.68	4525.89	377.37	4827.54	302.04	1.655
43	169.71	4601.00	388.47	4527.93	338.59	4742.62	220.41	1.655
44	177.60	4601.00	392.15	4526.14	377.07	4827.81	302.04	1.655
45	177.60	4601.00	391.63	4526.40	376.76	4828.07	302.04	1.655
46	177.60	4601.00	391.10	4526.65	376.46	4828.34	302.04	1.655
47	177.60	4601.00	393.21	4525.63	376.22	4823.10	297.96	1.656
48	172.34	4601.00	390.05	4527.17	343.12	4746.70	224.49	1.656
49	177.60	4601.00	391.63	4526.40	351.49	4755.56	232.65	1.656
50	177.60	4601.00	392.68	4525.89	375.92	4823.37	297.96	1.657
51	177.60	4601.00	392.15	4526.14	375.62	4823.64	297.96	1.657
52	177.60	4601.00	391.63	4526.40	375.31	4823.91	297.96	1.657
53	177.60	4601.00	391.10	4526.65	375.01	4824.18	297.96	1.657
54	177.60	4601.00	390.58	4526.91	374.71	4824.45	297.96	1.657
55	172.34	4601.00	392.15	4526.14	350.26	4763.29	240.82	1.657
56	177.60	4601.00	393.21	4525.63	374.76	4818.93	293.88	1.658
57	174.97	4601.00	393.73	4525.37	403.87	4908.91	383.67	1.658
58	174.97	4601.00	391.63	4526.40	350.74	4759.58	236.73	1.658
59	177.60	4601.00	391.63	4526.40	373.86	4819.74	293.88	1.658
60	177.60	4601.00	392.15	4526.14	374.16	4819.47	293.88	1.658
61	177.60	4601.00	392.68	4525.89	374.46	4819.20	293.88	1.658
62	177.60	4601.00	391.10	4526.65	373.56	4820.01	293.88	1.658
63	177.60	4601.00	390.58	4526.91	373.26	4820.28	293.88	1.658
64	177.60	4601.00	390.05	4527.17	372.96	4820.55	293.88	1.659
65	177.60	4601.00	389.52	4527.42	372.65	4820.81	293.88	1.659
66	174.97	4601.00	393.73	4525.37	402.47	4904.86	379.59	1.659
67	177.60	4601.00	388.47	4527.93	343.71	4739.58	216.33	1.659
68	174.97	4601.00	393.73	4525.37	401.07	4900.81	375.51	1.659
69	177.60	4601.00	394.26	4525.38	357.23	4767.46	244.90	1.660

```
  70       174.97     4601.00      392.68     4525.89      352.81     4763.38      240.82     1.660
  71       174.97     4601.00      393.73     4525.37      399.66     4896.75      371.43     1.660
  72       177.60     4601.00      390.05     4527.17      371.50     4816.37      289.80     1.660
  73       177.60     4601.00      390.58     4526.91      371.80     4816.10      289.80     1.660
  74       177.60     4601.00      392.15     4526.14      379.97     4836.11      310.20     1.660
  75       177.60     4601.00      389.52     4527.42      371.20     4816.64      289.80     1.660
  76       177.60     4601.00      391.10     4526.65      372.10     4815.83      289.80     1.660
  77       177.60     4601.00      392.68     4525.89      373.00     4815.01      289.80     1.660
  78       177.60     4601.00      391.63     4526.40      372.40     4815.56      289.80     1.660
  79       177.60     4601.00      389.00     4527.68      370.90     4816.91      289.80     1.661
  80       177.60     4601.00      392.15     4526.14      372.70     4815.28      289.80     1.661
  81       177.60     4601.00      388.47     4527.93      370.60     4817.18      289.80     1.661
  82       174.97     4601.00      394.26     4525.38      403.84     4908.93      383.67     1.661
  83       177.60     4601.00      394.79     4525.39      357.29     4767.40      244.90     1.661
  84       174.97     4601.00      393.73     4525.37      398.26     4892.69      367.35     1.661
  85       174.97     4601.00      394.26     4525.38      402.44     4904.88      379.59     1.661
  86       174.97     4601.00      393.21     4525.63      402.13     4905.12      379.59     1.662
  87       174.97     4601.00      390.05     4527.17      346.89     4751.63      228.57     1.662
  88       174.97     4601.00      393.73     4525.37      396.85     4888.63      363.27     1.662
  89       177.60     4601.00      392.68     4525.89      371.53     4810.82      285.71     1.662
  90       174.97     4601.00      394.26     4525.38      401.05     4900.83      375.51     1.662
  91       177.60     4601.00      391.63     4526.40      378.21     4832.23      306.12     1.662
  92       174.97     4601.00      393.21     4525.63      400.73     4901.06      375.51     1.662
  93       177.60     4601.00      392.15     4526.14      371.24     4811.09      285.71     1.662
  94       177.60     4601.00      391.10     4526.65      377.91     4832.49      306.12     1.662
  95       177.60     4601.00      393.21     4525.63      373.30     4814.74      289.80     1.662
  96       177.60     4601.00      389.00     4527.68      369.45     4812.72      285.71     1.662
  97       177.60     4601.00      389.52     4527.42      369.75     4812.45      285.71     1.662
  98       177.60     4601.00      388.47     4527.93      369.15     4812.99      285.71     1.662
  99       174.97     4601.00      392.68     4525.89      400.40     4901.32      375.51     1.663

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     177.60      YL:    4601.00      XR:     389.52      YR:    4527.42
    Centre:  XC:     342.66      YC:    4734.43                Radius:  R:     212.24
Generated failure surface: (20 points)
    177.60   4601.00          185.70   4591.56          194.34   4582.61          203.49   4574.18          213.11
4566.31
    223.18   4559.01          233.66   4552.31          244.52   4546.24          255.71   4540.81          267.20
4536.05
    278.95   4531.97          290.92   4528.59          303.07   4525.91          315.35   4523.95          327.73
4522.71
    340.15   4522.20          352.59   4522.42          364.99   4523.36          377.32   4525.03          389.52
4527.42

Slice Geometry and Properties - Critical Failure Surface (circle 1,  46 slices)
--------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                  PoreWater      Normal
Test
```

```
        X-Left      Area    Angle     Width     Length  Matl   Cohesion     Phi         Weight        Force        Stress
Factor
  1      177.60      7.40    49.4      4.05       6.22    6       50.00    25.0         740.34         0.00        109.04
1.15
  2      181.65     22.21    49.4      4.05       6.22    6       50.00    25.0        2221.02         0.00        381.66
1.15
  3      185.70     14.42    46.0      1.80       2.59    2       10.00    35.0        1461.97         0.00        553.45
0.99
  4      187.50     32.80    46.0      3.21       4.62    2       10.00    35.0        3505.01       385.68        772.00
0.99
  5      190.71     43.72    46.0      3.29       4.74    6       50.00    25.0        4850.68      1390.84       1174.53
1.10
  6      194.00     84.20    42.9      4.94       6.75    6       50.00    25.0        9437.30      3671.76      10584.15
1.07
  7      198.94     96.30    42.7      4.54       6.18    2       10.00    35.0       11005.97      5048.14       1955.27
0.97
  8      203.49     65.77    39.3      2.71       3.51    2       10.00    35.0        7659.82      3566.88      17649.13
0.95
  9      206.20    194.38    39.3      6.91       8.93    2       10.00    35.0       23012.07     11276.59       2779.09
0.95
 10      213.11    165.23    35.9      5.04       6.22    2       10.00    35.0       19829.09      9658.46       3358.29
0.94
 11      218.15    183.75    35.9      5.04       6.22    2       10.00    35.0       22232.95     11074.67       3775.36
0.94
 12      223.18    212.98    32.6      5.32       6.31    2       10.00    35.0       25934.42     12627.00       4242.79
0.93
 13      228.50     68.98    32.6      1.63       1.94    5        0.00    45.0        7173.72      2039.40       3439.87
0.85
 14      230.13     59.18    32.6      1.37       1.62    5        0.00    45.0        5917.82         0.00       3086.20
0.85
 15      231.50     96.03    32.6      2.16       2.57    2       10.00    35.0       10587.83         0.00       3818.71
0.93
 16      233.66    253.54    29.2      5.43       6.22    2       10.00    35.0       28006.35         0.00       4138.96
0.92
 17      239.09    270.82    29.2      5.43       6.22    2       10.00    35.0       29982.04         0.00       4430.99
0.92
 18      244.52    289.50    25.9      5.60       6.22    2       10.00    35.0       32181.09         0.00       4737.96
0.92
 19      250.11    289.45    25.9      5.60       6.22    2       10.00    35.0       32403.35         0.00       4770.70
0.92
 20      255.71    122.99    22.5      2.38       2.58    2       10.00    35.0       13836.98         0.00       4911.93
0.92
 21      258.09    234.01    22.5      4.55       4.93    2       10.00    35.0       26364.76         0.00       4894.71
0.92
 22      262.65    232.51    22.5      4.55       4.93    2       10.00    35.0       26192.64         0.00       4862.94
0.92
 23      267.20     59.32    19.1      1.17       1.24    2       10.00    35.0        6681.15         0.00       4963.23
0.92
 24      268.37    266.45    19.1      5.29       5.60    2       10.00    35.0       30108.72         0.00       4934.85
```

```
0.92
 25      273.66    262.55    19.1      5.29      5.60     2       10.00    35.0     29864.43         0.00      4894.96
0.92
 26      278.95    285.08    15.8      5.86      6.09     2       10.00    35.0     32659.40         0.00      4956.00
0.92
 27      284.81    289.78    15.8      6.11      6.35     2       10.00    35.0     33324.30         0.00      4850.18
0.92
 28      290.92    279.39    12.4      6.07      6.22     2       10.00    35.0     32129.66         0.00      4821.73
0.93
 29      296.99    269.57    12.4      6.07      6.22     2       10.00    35.0     31000.52         0.00      4652.39
0.93
 30      303.07    145.37     9.1      3.38      3.42     2       10.00    35.0     16717.35         0.00      4622.45
0.95
 31      306.45    185.85     9.1      4.45      4.51     2       10.00    35.0     21396.44       100.00      4491.42
0.95
 32      310.90    179.37     9.1      4.45      4.51     2       10.00    35.0     20698.96       300.00      4347.94
0.95
 33      315.35    149.04     5.7      3.84      3.86     2       10.00    35.0     17232.17       388.52      4303.13
0.96
 34      319.19    159.03     5.7      4.27      4.29     3     1000.00     0.0     18406.18       540.61      4249.19
1.00
 35      323.46    151.98     5.7      4.27      4.29     3     1000.00     0.0     17600.85       654.98      4060.48
1.00
 36      327.73    207.52     2.4      6.21      6.22     3     1000.00     0.0     24045.57      1081.97      3843.87
1.00
 37      333.94    190.32     2.4      6.21      6.22     3     1000.00     0.0     22066.46      1181.07      3525.42
1.00
 38      340.15    172.10    -1.0      6.22      6.22     3     1000.00     0.0     19964.58      1209.67      3221.74
1.00
 39      346.37    152.61    -1.0      6.22      6.22     3     1000.00     0.0     17710.63      1167.42      2859.20
1.00
 40      352.59    131.66    -4.4      6.20      6.22     3     1000.00     0.0     15282.02      1054.69      2512.32
1.00
 41      358.79    110.01    -4.4      6.20      6.22     3     1000.00     0.0     12768.97       871.06      2107.02
1.00
 42      364.99     83.47    -7.7      5.89      5.95     3     1000.00     0.0      9683.05       597.07      1728.14
1.01
 43      370.88     61.86    -7.7      5.89      5.95     3     1000.00     0.0      7166.50       300.62      1301.07
1.01
 44      376.78     17.94   -10.3      2.26      2.30     2       10.00    35.0      2071.17        31.84       993.91
1.10
 45      379.04     28.11   -11.1      5.24      5.34     2       10.00    35.0      3232.30         0.00       676.26
1.11
 46      384.28      9.37   -11.1      5.24      5.34     2       10.00    35.0      1077.54         0.00       226.34
1.11
                 --------                          -------                          ----------
     X-S Area:    6887.91    Path Length:    236.32              X-S Weight:   787426.12
```

```
DATA: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Shop

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4602.00         700.00     4602.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4591.37           228.50     4591.37
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    228.50     4597.37        231.50     4597.37
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4591.37        700.00     4591.37
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4586.37        228.50     4586.37
Profile:  6 (2 points)   Material beneath:  6 - Clay
    231.50     4586.37        700.00     4586.37
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4578.37        228.50     4578.37
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    231.50     4578.37        700.00     4578.37
Profile:  9 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4513.97         54.33     4514.03         89.95     4518.08        228.50     4521.44
Profile: 10 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
    231.50     4521.44        393.74     4525.37        565.84     4528.32        700.00     4529.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4511.97         54.33     4512.03         89.95     4517.08        228.50     4519.44        231.50
  4519.44
    393.74     4523.37        565.84     4526.32        700.00     4527.00

Slope Surface (14 points)
-------------
      0.00     4599.65         82.87     4599.65        120.53     4599.55        127.60     4601.00        177.60
  4601.00
    187.50     4598.40        194.00     4597.80        206.20     4597.24        228.50     4597.37        231.50
  4597.37
    245.00     4597.74        393.74     4525.37        565.84     4528.32        700.00     4529.00

Phreatic Surface (4 points)
----------------
      0.00     4589.37        228.50     4589.37        231.50     4525.37        393.74     4525.37

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     152.60      YL:    4601.00      XR:     393.47      YR:    4525.50
      Centre:  XC:     354.44      YC:    4822.95                  Radius:  R:     300.00

Distributed Loads (1 load)
-----------------
Load      X-Left    Pressure        X-Right   Pressure
  1       127.60       45.0         177.60       45.0

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

External Forces (2 forces)
---------------
```

```
Force      Force       X-Pos'n    Angle
  1      56500.0       196.00     270.0
  2      56500.0       205.00     270.0

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              50.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-3 Mining Slope - PseudoStatic - With Bearing - to Shop

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

Initial failure surface approximation - Factor of Safety:   1.587

Analysis Summary

There were:  18980 successful analyses from a total of 20001 trial failure surfaces
             1021 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.38
__________________________________________

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       177.60     4601.00      389.52     4527.42      342.66     4734.43      212.24     1.378   <-- Critical
Surface
   2       174.97     4601.00      389.52     4527.42      342.00     4738.46      216.33     1.380
   3       177.60     4601.00      388.47     4527.93      340.57     4730.51      208.16     1.382
   4       174.97     4601.00      388.47     4527.93      339.93     4734.55      212.24     1.385
   5       177.60     4601.00      390.05     4527.17      344.49     4738.64      216.33     1.388
   6       174.97     4601.00      390.05     4527.17      343.82     4742.67      220.41     1.392
   7       177.60     4601.00      389.00     4527.68      342.40     4734.75      212.24     1.394
   8       174.97     4601.00      389.00     4527.68      341.74     4738.78      216.33     1.397
   9       177.60     4601.00      390.58     4526.91      346.31     4742.83      220.41     1.398
  10       174.97     4601.00      390.58     4526.91      345.62     4746.85      224.49     1.402
  11       177.60     4601.00      389.52     4527.42      344.23     4738.95      216.33     1.403
  12       177.60     4601.00      391.10     4526.65      348.13     4746.99      224.49     1.407
  13       174.97     4601.00      389.52     4527.42      343.55     4742.98      220.41     1.407
  14       177.60     4601.00      388.47     4527.93      342.15     4735.06      212.24     1.410
  15       174.97     4601.00      391.10     4526.65      347.42     4751.01      228.57     1.411
  16       177.60     4601.00      390.05     4527.17      346.05     4743.14      220.41     1.411
```

17	174.97	4601.00	388.47	4527.93	341.48	4739.10	216.33	1.414
18	174.97	4601.00	390.05	4527.17	345.36	4747.16	224.49	1.416
19	177.60	4601.00	391.63	4526.40	349.95	4751.14	228.57	1.416
20	177.60	4601.00	390.58	4526.91	347.87	4747.30	224.49	1.417
21	177.60	4601.00	389.00	4527.68	343.97	4739.27	216.33	1.417
22	174.97	4601.00	391.63	4526.40	349.22	4755.15	232.65	1.419
23	172.34	4601.00	388.47	4527.93	339.27	4738.59	216.33	1.420
24	174.97	4601.00	389.00	4527.68	343.29	4743.29	220.41	1.422
25	169.71	4601.00	388.47	4527.93	338.59	4742.62	220.41	1.422
26	174.97	4601.00	390.58	4526.91	347.16	4751.32	228.57	1.423
27	177.60	4601.00	389.52	4527.42	345.79	4743.45	220.41	1.423
28	177.60	4601.00	392.15	4526.14	351.76	4755.26	232.65	1.424
29	177.60	4601.00	391.10	4526.65	349.68	4751.44	228.57	1.425
30	172.34	4601.00	390.05	4527.17	343.12	4746.70	224.49	1.426
31	174.97	4601.00	392.15	4526.14	351.02	4759.27	236.73	1.427
32	174.97	4601.00	389.52	4527.42	345.09	4747.47	224.49	1.428
33	177.60	4601.00	393.21	4525.63	355.37	4763.45	240.82	1.429
34	174.97	4601.00	391.10	4526.65	348.95	4755.46	232.65	1.429
35	172.34	4601.00	392.15	4526.14	350.26	4763.29	240.82	1.430
36	172.34	4601.00	389.00	4527.68	341.07	4742.81	220.41	1.432
37	177.60	4601.00	392.68	4525.89	353.56	4759.37	236.73	1.432
38	177.60	4601.00	393.73	4525.37	380.88	4835.31	310.20	1.432
39	177.60	4601.00	390.05	4527.17	347.61	4747.61	224.49	1.433
40	174.97	4601.00	391.63	4526.40	350.74	4759.58	236.73	1.433
41	169.71	4601.00	389.00	4527.68	340.37	4746.84	224.49	1.433
42	172.34	4601.00	389.52	4527.42	341.33	4742.50	220.41	1.434
43	169.71	4601.00	390.05	4527.17	342.42	4750.72	228.57	1.434
44	177.60	4601.00	391.63	4526.40	351.49	4755.56	232.65	1.434
45	174.97	4601.00	392.68	4525.89	352.81	4763.38	240.82	1.435
46	177.60	4601.00	392.68	4525.89	380.27	4835.84	310.20	1.435
47	177.60	4601.00	393.21	4525.63	380.58	4835.58	310.20	1.436
48	172.34	4601.00	390.58	4526.91	344.91	4750.87	228.57	1.436
49	174.97	4601.00	390.05	4527.17	346.89	4751.63	228.57	1.436
50	177.60	4601.00	388.47	4527.93	343.71	4739.58	216.33	1.437
51	177.60	4601.00	392.15	4526.14	378.52	4831.96	306.12	1.437
52	177.60	4601.00	393.21	4525.63	379.13	4831.43	306.12	1.437
53	177.60	4601.00	392.68	4525.89	378.82	4831.69	306.12	1.438
54	172.34	4601.00	392.68	4525.89	352.03	4767.39	244.90	1.438
55	169.71	4601.00	390.58	4526.91	344.19	4754.89	232.65	1.438
56	174.97	4601.00	393.73	4525.37	403.87	4908.91	383.67	1.438
57	172.34	4601.00	391.63	4526.40	349.98	4763.59	240.82	1.438
58	174.97	4601.00	393.73	4525.37	402.47	4904.86	379.59	1.438
59	177.60	4601.00	393.21	4525.63	377.68	4827.27	302.04	1.439
60	177.60	4601.00	392.68	4525.89	377.37	4827.54	302.04	1.439
61	174.97	4601.00	393.73	4525.37	401.07	4900.81	375.51	1.439
62	177.60	4601.00	394.26	4525.38	357.23	4767.46	244.90	1.439
63	177.60	4601.00	392.15	4526.14	377.07	4827.81	302.04	1.439
64	177.60	4601.00	391.63	4526.40	376.76	4828.07	302.04	1.439
65	177.60	4601.00	391.10	4526.65	376.46	4828.34	302.04	1.439

```
  66       177.60     4601.00      394.79     4525.39      357.29     4767.40      244.90     1.440
  67       174.97     4601.00      393.73     4525.37      399.66     4896.75      371.43     1.440
  68       174.97     4601.00      388.47     4527.93      343.03     4743.61      220.41     1.440
  69       177.60     4601.00      393.21     4525.63      376.22     4823.10      297.96     1.440
  70       174.97     4601.00      393.73     4525.37      398.26     4892.69      367.35     1.440
  71       174.97     4601.00      394.26     4525.38      403.84     4908.93      383.67     1.440
  72       177.60     4601.00      392.68     4525.89      375.92     4823.37      297.96     1.440
  73       177.60     4601.00      392.15     4526.14      375.62     4823.64      297.96     1.441
  74       177.60     4601.00      391.63     4526.40      375.31     4823.91      297.96     1.441
  75       177.60     4601.00      391.10     4526.65      375.01     4824.18      297.96     1.441
  76       177.60     4601.00      390.58     4526.91      374.71     4824.45      297.96     1.441
  77       174.97     4601.00      394.26     4525.38      402.44     4904.88      379.59     1.441
  78       174.97     4601.00      393.73     4525.37      396.85     4888.63      363.27     1.441
  79       174.97     4601.00      393.21     4525.63      402.13     4905.12      379.59     1.441
  80       177.60     4601.00      393.21     4525.63      374.76     4818.93      293.88     1.441
  81       174.97     4601.00      394.26     4525.38      401.05     4900.83      375.51     1.442
  82       174.97     4601.00      393.21     4525.63      400.73     4901.06      375.51     1.442
  83       174.97     4601.00      393.73     4525.37      395.45     4884.55      359.18     1.442
  84       172.34     4601.00      389.52     4527.42      342.86     4747.01      224.49     1.442
  85       172.34     4601.00      392.15     4526.14      351.76     4767.68      244.90     1.442
  86       177.60     4601.00      392.68     4525.89      374.46     4819.20      293.88     1.442
  87       174.97     4601.00      392.68     4525.89      400.40     4901.32      375.51     1.442
  88       177.60     4601.00      392.15     4526.14      374.16     4819.47      293.88     1.442
  89       177.60     4601.00      391.63     4526.40      373.86     4819.74      293.88     1.442
  90       177.60     4601.00      390.58     4526.91      349.42     4751.75      228.57     1.442
  91       177.60     4601.00      391.10     4526.65      373.56     4820.01      293.88     1.442
  92       177.60     4601.00      390.58     4526.91      373.26     4820.28      293.88     1.442
  93       174.97     4601.00      394.26     4525.38      399.65     4896.77      371.43     1.442
  94       174.97     4601.00      393.73     4525.37      394.04     4880.48      355.10     1.442
  95       177.60     4601.00      390.05     4527.17      372.96     4820.55      293.88     1.442
  96       167.07     4601.00      388.47     4527.93      337.90     4746.65      224.49     1.442
  97       177.60     4601.00      392.15     4526.14      353.29     4759.67      236.73     1.443
  98       177.60     4601.00      389.52     4527.42      372.65     4820.81      293.88     1.443
  99       174.97     4601.00      393.21     4525.63      399.33     4897.01      371.43     1.443

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     177.60      YL:    4601.00      XR:     389.52      YR:    4527.42
    Centre:  XC:     342.66      YC:    4734.43                 Radius:  R:     212.24
Generated failure surface: (20 points)
    177.60   4601.00          185.70   4591.56          194.34   4582.61          203.49   4574.18          213.11
4566.31
    223.18   4559.01          233.66   4552.31          244.52   4546.24          255.71   4540.81          267.20
4536.05
    278.95   4531.97          290.92   4528.59          303.07   4525.91          315.35   4523.95          327.73
4522.71
    340.15   4522.20          352.59   4522.42          364.99   4523.36          377.32   4525.03          389.52
4527.42
```

```
Slice Geometry and Properties - Critical Failure Surface (circle 1,  46 slices)
-------------------------------------------------------
Slice               X-S     ------------------- Base ---------------------                 PoreWater      Normal
Test
        X-Left      Area    Angle     Width     Length  Matl   Cohesion    Phi         Weight      Force         Stress
Factor
  1      177.60      7.40    49.4      4.05      6.22     6      50.00    25.0         740.34       0.00         100.76
1.10
  2      181.65     22.21    49.4      4.05      6.22     6      50.00    25.0        2221.02       0.00         362.96
1.10
  3      185.70     14.42    46.0      1.80      2.59     2      10.00    35.0        1461.97       0.00         526.97
0.94
  4      187.50     32.80    46.0      3.21      4.62     2      10.00    35.0        3505.01     385.68         739.21
0.94
  5      190.71     43.72    46.0      3.29      4.74     6      50.00    25.0        4850.68    1390.84        1139.83
1.07
  6      194.00     84.20    42.9      4.94      6.75     6      50.00    25.0        9437.30    3671.76       10255.87
1.04
  7      198.94     96.30    42.7      4.54      6.18     2      10.00    35.0       11005.97    5048.14        1905.57
0.93
  8      203.49     65.77    39.3      2.71      3.51     2      10.00    35.0        7659.82    3566.88       16987.94
0.91
  9      206.20    194.38    39.3      6.91      8.93     2      10.00    35.0       23012.07   11276.59        2718.29
0.91
 10      213.11    165.23    35.9      5.04      6.22     2      10.00    35.0       19829.09    9658.46        3292.05
0.90
 11      218.15    183.75    35.9      5.04      6.22     2      10.00    35.0       22232.95   11074.67        3702.23
0.90
 12      223.18    212.98    32.6      5.32      6.31     2      10.00    35.0       25934.42   12627.00        4167.99
0.90
 13      228.50     68.98    32.6      1.63      1.94     5       0.00    45.0        7173.72    2039.40        3337.61
0.81
 14      230.13     59.18    32.6      1.37      1.62     5       0.00    45.0        5917.82       0.00        2953.97
0.81
 15      231.50     96.03    32.6      2.16      2.57     2      10.00    35.0       10587.83       0.00        3691.63
0.90
 16      233.66    253.54    29.2      5.43      6.22     2      10.00    35.0       28006.35       0.00        4014.65
0.89
 17      239.09    270.82    29.2      5.43      6.22     2      10.00    35.0       29982.04       0.00        4297.92
0.89
 18      244.52    289.50    25.9      5.60      6.22     2      10.00    35.0       32181.09       0.00        4610.93
0.89
 19      250.11    289.45    25.9      5.60      6.22     2      10.00    35.0       32403.35       0.00        4642.79
0.89
 20      255.71    122.99    22.5      2.38      2.58     2      10.00    35.0       13836.98       0.00        4796.06
0.89
 21      258.09    234.01    22.5      4.55      4.93     2      10.00    35.0       26364.76       0.00        4779.23
0.89
 22      262.65    232.51    22.5      4.55      4.93     2      10.00    35.0       26192.64       0.00        4748.23
```

```
0.89
 23      267.20     59.32    19.1     1.17     1.24     2      10.00    35.0      6681.15        0.00      4862.29
0.90
 24      268.37    266.45    19.1     5.29     5.60     2      10.00    35.0     30108.72        0.00      4834.45
0.90
 25      273.66    262.55    19.1     5.29     5.60     2      10.00    35.0     29864.43        0.00      4795.40
0.90
 26      278.95    285.08    15.8     5.86     6.09     2      10.00    35.0     32659.40        0.00      4871.55
0.91
 27      284.81    289.78    15.8     6.11     6.35     2      10.00    35.0     33324.30        0.00      4767.52
0.91
 28      290.92    279.39    12.4     6.07     6.22     2      10.00    35.0     32129.66        0.00      4755.84
0.92
 29      296.99    269.57    12.4     6.07     6.22     2      10.00    35.0     31000.52        0.00      4588.83
0.92
 30      303.07    145.37     9.1     3.38     3.42     2      10.00    35.0     16717.35        0.00      4575.38
0.94
 31      306.45    185.85     9.1     4.45     4.51     2      10.00    35.0     21396.44      100.00      4445.91
0.94
 32      310.90    179.37     9.1     4.45     4.51     2      10.00    35.0     20698.96      300.00      4304.33
0.94
 33      315.35    149.04     5.7     3.84     3.86     2      10.00    35.0     17232.17      388.52      4275.53
0.96
 34      319.19    159.03     5.7     4.27     4.29     3    1000.00     0.0     18406.18      540.61      4239.38
1.00
 35      323.46    151.98     5.7     4.27     4.29     3    1000.00     0.0     17600.85      654.98      4050.66
1.00
 36      327.73    207.52     2.4     6.21     6.22     3    1000.00     0.0     24045.57     1081.97      3839.83
1.00
 37      333.94    190.32     2.4     6.21     6.22     3    1000.00     0.0     22066.46     1181.07      3521.38
1.00
 38      340.15    172.10    -1.0     6.22     6.22     3    1000.00     0.0     19964.58     1209.67      3223.46
1.00
 39      346.37    152.61    -1.0     6.22     6.22     3    1000.00     0.0     17710.63     1167.42      2860.92
1.00
 40      352.59    131.66    -4.4     6.20     6.22     3    1000.00     0.0     15282.02     1054.69      2519.81
1.00
 41      358.79    110.01    -4.4     6.20     6.22     3    1000.00     0.0     12768.97      871.06      2114.50
1.00
 42      364.99     83.47    -7.7     5.89     5.95     3    1000.00     0.0      9683.05      597.07      1741.44
1.01
 43      370.88     61.86    -7.7     5.89     5.95     3    1000.00     0.0      7166.50      300.62      1314.37
1.01
 44      376.78     17.94   -10.3     2.26     2.30     2      10.00    35.0      2071.17       31.84      1007.58
1.12
 45      379.04     28.11   -11.1     5.24     5.34     2      10.00    35.0      3232.30        0.00       686.57
1.13
 46      384.28      9.37   -11.1     5.24     5.34     2      10.00    35.0      1077.54        0.00       229.93
1.13
```

```
                    --------                            -------                          ----------
     X-S Area:     6887.91    Path Length:     236.32               X-S Weight:   787426.12
```

```
DATA: Analysis  1 - Slope Stability - Case SS-4 Mining Slope - Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4600.00         700.00     4600.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4589.51         243.50     4589.51
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    243.50     4595.51         246.50     4595.51
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    246.50     4589.51         700.00     4589.51
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4583.51         243.50     4583.51
Profile:  6 (2 points)   Material beneath:  6 - Clay
    246.50     4583.51         700.00     4583.51
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4574.51         243.50     4574.51
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    246.50     4574.51         700.00     4574.51
Profile:  9 (3 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4525.20         129.56     4527.98         243.50     4528.29
Profile: 10 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    246.50     4528.29         290.29     4528.40         392.67     4531.25         539.96     4535.35         700.00
  4537.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4523.20         129.56     4525.98         243.50     4526.29         246.50     4526.29         290.29
  4526.40
    392.67     4529.25         539.96     4533.35         700.00     4535.00

Slope Surface (12 points)
-------------
      0.00     4597.05         157.98     4597.05         200.00     4596.74         206.26     4596.43         210.00
  4596.15
    224.00     4595.66         243.50     4595.51         246.50     4595.51         260.01     4595.61         392.67
  4531.25
    539.96     4535.35         700.00     4537.00

Phreatic Surface (4 points)
----------------
      0.00     4585.51         243.50     4585.51         246.50     4531.25         392.67     4531.25

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     219.00      YL:    4595.83      XR:     392.67      YR:    4531.25
      Centre:  XC:     367.62      YC:    4729.67                  Radius:  R:     200.00

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     150.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-4 Mining Slope - 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:   2.007

Analysis Summary

There were:  17935 successful analyses from a total of 20001 trial failure surfaces
             2066 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.83


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       224.00     4595.66      392.93     4531.26      400.98     4806.14      275.00     1.826   <-- Critical
Surface
   2       224.00     4595.66      392.41     4531.38      400.86     4806.25      275.00     1.827
   3       224.00     4595.66      391.88     4531.63      400.56     4806.50      275.00     1.827
   4       224.00     4595.66      391.35     4531.89      400.26     4806.74      275.00     1.828
   5       224.00     4595.66      390.83     4532.14      399.97     4806.99      275.00     1.829
   6       224.00     4595.66      392.93     4531.26      399.83     4803.11      271.94     1.829
   7       224.00     4595.66      392.41     4531.38      399.70     4803.22      271.94     1.829
   8       224.00     4595.66      391.88     4531.63      399.40     4803.47      271.94     1.830
   9       224.00     4595.66      391.35     4531.89      399.11     4803.72      271.94     1.830
  10       224.00     4595.66      390.30     4532.40      399.67     4807.24      275.00     1.831
  11       224.00     4595.66      390.83     4532.14      398.81     4803.96      271.94     1.831
  12       224.00     4595.66      392.93     4531.26      398.67     4800.07      268.88     1.831
  13       224.00     4595.66      389.78     4532.65      399.37     4807.49      275.00     1.832
  14       224.00     4595.66      392.41     4531.38      398.54     4800.19      268.88     1.832
  15       224.00     4595.66      390.30     4532.40      398.52     4804.21      271.94     1.832
  16       223.47     4595.68      392.93     4531.26      400.46     4806.15      275.00     1.832
  17       223.47     4595.68      392.41     4531.38      400.33     4806.26      275.00     1.832
  18       224.00     4595.66      391.88     4531.63      398.25     4800.44      268.88     1.832
  19       224.00     4595.66      389.25     4532.91      399.07     4807.73      275.00     1.833
  20       224.00     4595.66      391.35     4531.89      397.95     4800.68      268.88     1.833
  21       223.47     4595.68      391.88     4531.63      400.04     4806.51      275.00     1.833
  22       224.00     4595.66      388.72     4533.17      398.77     4807.98      275.00     1.833
  23       224.00     4595.66      390.83     4532.14      397.66     4800.93      268.88     1.834
  24       223.47     4595.68      391.35     4531.89      399.74     4806.76      275.00     1.834
  25       224.00     4595.66      389.78     4532.65      398.22     4804.46      271.94     1.834
  26       224.00     4595.66      392.93     4531.26      397.51     4797.03      265.82     1.834
  27       224.00     4595.66      392.41     4531.38      397.38     4797.15      265.82     1.834
  28       224.00     4595.66      388.20     4533.42      398.47     4808.23      275.00     1.834
  29       224.00     4595.66      390.30     4532.40      397.36     4801.18      268.88     1.834
  30       223.47     4595.68      390.83     4532.14      399.44     4807.01      275.00     1.835
```

31	223.47	4595.68	392.93	4531.26	399.31	4803.12	271.94	1.835
32	224.00	4595.66	389.25	4532.91	397.92	4804.71	271.94	1.835
33	223.47	4595.68	392.41	4531.38	399.18	4803.23	271.94	1.835
34	224.00	4595.66	391.88	4531.63	397.09	4797.40	265.82	1.835
35	224.00	4595.66	389.78	4532.65	397.07	4801.43	268.88	1.835
36	224.00	4595.66	387.67	4533.68	398.17	4808.48	275.00	1.835
37	223.47	4595.68	391.88	4531.63	398.88	4803.48	271.94	1.836
38	224.00	4595.66	391.35	4531.89	396.80	4797.65	265.82	1.836
39	224.00	4595.66	388.72	4533.17	397.62	4804.96	271.94	1.836
40	222.95	4595.70	392.41	4531.38	399.81	4806.28	275.00	1.836
41	223.47	4595.68	391.35	4531.89	398.59	4803.73	271.94	1.836
42	223.47	4595.68	390.30	4532.40	399.14	4807.26	275.00	1.836
43	224.00	4595.66	390.83	4532.14	396.50	4797.90	265.82	1.836
44	222.95	4595.70	392.93	4531.26	399.94	4806.17	275.00	1.836
45	222.95	4595.70	391.88	4531.63	399.51	4806.53	275.00	1.837
46	224.00	4595.66	388.20	4533.42	397.32	4805.21	271.94	1.837
47	224.00	4595.66	392.93	4531.26	396.35	4793.99	262.76	1.837
48	223.47	4595.68	390.83	4532.14	398.29	4803.98	271.94	1.837
49	223.47	4595.68	389.78	4532.65	398.84	4807.50	275.00	1.837
50	222.95	4595.70	391.35	4531.89	399.22	4806.78	275.00	1.837
51	224.00	4595.66	390.30	4532.40	396.21	4798.15	265.82	1.837
52	224.00	4595.66	392.41	4531.38	396.22	4794.10	262.76	1.837
53	224.00	4595.66	389.25	4532.91	396.77	4801.68	268.88	1.837
54	223.47	4595.68	392.93	4531.26	398.15	4800.08	268.88	1.837
55	223.47	4595.68	390.30	4532.40	397.99	4804.23	271.94	1.837
56	223.47	4595.68	389.25	4532.91	398.54	4807.75	275.00	1.837
57	222.95	4595.70	390.83	4532.14	398.92	4807.02	275.00	1.837
58	223.47	4595.68	392.41	4531.38	398.02	4800.20	268.88	1.837
59	224.00	4595.66	387.67	4533.68	347.42	4674.46	146.43	1.837
60	224.00	4595.66	387.67	4533.68	397.02	4805.45	271.94	1.838
61	224.00	4595.66	389.78	4532.65	395.92	4798.40	265.82	1.838
62	224.00	4595.66	391.88	4531.63	395.93	4794.36	262.76	1.838
63	222.95	4595.70	390.30	4532.40	398.62	4807.27	275.00	1.838
64	223.47	4595.68	388.72	4533.17	398.24	4808.00	275.00	1.838
65	224.00	4595.66	388.72	4533.17	396.47	4801.93	268.88	1.838
66	223.47	4595.68	391.88	4531.63	397.73	4800.45	268.88	1.838
67	224.00	4595.66	391.35	4531.89	395.64	4794.61	262.76	1.838
68	222.95	4595.70	392.41	4531.38	398.66	4803.24	271.94	1.839
69	224.00	4595.66	389.25	4532.91	395.62	4798.65	265.82	1.839
70	223.47	4595.68	388.20	4533.42	397.94	4808.25	275.00	1.839
71	222.95	4595.70	392.93	4531.26	398.79	4803.13	271.94	1.839
72	223.47	4595.68	391.35	4531.89	397.44	4800.70	268.88	1.839
73	223.47	4595.68	389.78	4532.65	397.70	4804.48	271.94	1.839
74	222.95	4595.70	391.88	4531.63	398.36	4803.49	271.94	1.839
75	224.00	4595.66	388.20	4533.42	396.18	4802.18	268.88	1.839
76	222.42	4595.72	392.93	4531.26	399.42	4806.18	275.00	1.839
77	223.47	4595.68	390.83	4532.14	397.14	4800.95	268.88	1.839
78	224.00	4595.66	390.83	4532.14	395.35	4794.86	262.76	1.839
79	223.47	4595.68	387.67	4533.68	397.64	4808.50	275.00	1.839

```
  80       222.95     4595.70      391.35     4531.89      398.07     4803.74      271.94     1.839
  81       223.47     4595.68      389.25     4532.91      397.40     4804.73      271.94     1.839
  82       223.47     4595.68      390.30     4532.40      396.84     4801.20      268.88     1.839
  83       224.00     4595.66      392.93     4531.26      395.19     4790.94      259.69     1.840
  84       222.95     4595.70      389.78     4532.65      398.32     4807.52      275.00     1.840
  85       222.95     4595.70      390.83     4532.14      397.77     4803.99      271.94     1.840
  86       224.00     4595.66      390.30     4532.40      395.05     4795.11      262.76     1.840
  87       223.47     4595.68      389.78     4532.65      396.55     4801.45      268.88     1.840
  88       223.47     4595.68      392.93     4531.26      397.00     4797.04      265.82     1.840
  89       224.00     4595.66      392.41     4531.38      395.06     4791.06      259.69     1.840
  90       224.00     4595.66      387.67     4533.68      395.88     4802.43      268.88     1.840
  91       223.47     4595.68      388.72     4533.17      397.10     4804.97      271.94     1.840
  92       222.95     4595.70      390.30     4532.40      397.47     4804.24      271.94     1.840
  93       223.47     4595.68      392.41     4531.38      396.87     4797.16      265.82     1.840
  94       222.95     4595.70      389.25     4532.91      398.02     4807.77      275.00     1.840
  95       222.95     4595.70      389.78     4532.65      397.17     4804.49      271.94     1.840
  96       224.00     4595.66      389.78     4532.65      394.76     4795.36      262.76     1.841
  97       223.47     4595.68      388.20     4533.42      396.80     4805.22      271.94     1.841
  98       224.00     4595.66      388.72     4533.17      395.32     4798.90      265.82     1.841
  99       223.47     4595.68      388.20     4533.42      348.55     4677.56      149.49     1.841

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     224.00      YL:    4595.66      XR:     392.93      YR:    4531.26
    Centre:  XC:     400.98      YC:    4806.14                  Radius:  R:     275.00
Generated failure surface: (20 points)
    224.00   4595.66          231.53   4589.55          239.27   4583.71          247.21   4578.15          255.34
4572.87
    263.66   4567.88          272.14   4563.19          280.78   4558.80          289.58   4554.72          298.51
4550.95
    307.57   4547.49          316.74   4544.36          326.02   4541.55          335.40   4539.08          344.85
4536.93
    354.38   4535.12          363.96   4533.64          373.59   4532.51          383.25   4531.71          392.93
4531.26

Slice Geometry and Properties - Critical Failure Surface (circle 1,  39 slices)
--------------------------------------------------------
Slice               X-S     ------------------- Base ---------------------                  PoreWater      Normal
Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi       Weight      Force        Stress
Factor
  1      224.00      5.69    39.0     3.76     4.85     6     50.00    25.0       569.30        0.00       106.88
1.07
  2      227.76     17.08    39.1     3.76     4.85     6     50.00    25.0      1708.27        0.00       357.50
1.07
  3      231.53     43.15    37.0     5.36     6.71     2     10.00    35.0      4473.64        0.00       644.31
0.97
  4      236.89     26.05    37.0     2.38     2.98     2     10.00    35.0      2811.62      167.10       925.39
0.97
```

```
  5      239.27     56.24    35.0     4.23     5.17     6      50.00    25.0      6212.84    1056.47      1260.53
1.04
  6      243.50     47.43    35.0     3.00     3.66     5       0.00    45.0      4743.02       0.00      1142.71
0.88
  7      246.50     12.16    35.0     0.71     0.87     6      50.00    25.0      1279.48       0.00      1511.67
1.04
  8      247.21    107.74    33.0     5.61     6.69     6      50.00    25.0     11278.92       0.00      1709.43
1.02
  9      252.82     55.17    33.0     2.52     3.01     2      10.00    35.0      5775.08       0.00      1830.60
0.95
 10      255.34    112.58    31.0     4.67     5.44     2      10.00    35.0     11891.03       0.00      2068.48
0.95
 11      260.01     93.87    31.0     3.65     4.25     2      10.00    35.0     10017.25       0.00      2231.13
0.95
 12      263.66    110.72    29.0     4.24     4.85     2      10.00    35.0     11950.17       0.00      2321.71
0.94
 13      267.90    111.95    28.9     4.24     4.85     2      10.00    35.0     12221.87       0.00      2374.64
0.94
 14      272.14    114.89    26.9     4.32     4.85     2      10.00    35.0     12629.12       0.00      2443.48
0.94
 15      276.46    115.32    26.9     4.32     4.85     2      10.00    35.0     12678.14       0.00      2452.98
0.94
 16      280.78    111.23    24.9     4.17     4.60     2      10.00    35.0     12228.51       0.00      2488.60
0.94
 17      284.95    123.03    24.9     4.63     5.10     2      10.00    35.0     13601.46       0.00      2493.92
0.94
 18      289.58    117.94    22.9     4.47     4.85     2      10.00    35.0     13182.58       0.00      2538.64
0.93
 19      294.04    116.68    22.9     4.47     4.85     2      10.00    35.0     13183.26       0.00      2538.68
0.93
 20      298.51    128.46    20.9     4.99     5.34     2      10.00    35.0     14682.71       0.00      2563.58
0.93
 21      303.50    102.68    20.9     4.07     4.35     2      10.00    35.0     11808.44       0.00      2532.27
0.93
 22      307.57    113.38    18.8     4.59     4.85     2      10.00    35.0     13039.13       0.00      2511.66
0.93
 23      312.16    110.36    18.9     4.59     4.85     2      10.00    35.0     12691.10       0.00      2444.49
0.93
 24      316.74    108.12    16.8     4.64     4.85     2      10.00    35.0     12433.77       0.00      2399.79
0.94
 25      321.38    104.19    16.8     4.64     4.85     2      10.00    35.0     11981.47       0.00      2312.44
0.94
 26      326.02    100.82    14.8     4.69     4.85     2      10.00    35.0     11594.42       0.00      2244.93
0.94
 27      330.71     95.97    14.8     4.69     4.85     2      10.00    35.0     11036.71       0.00      2136.97
0.94
 28      335.40     91.48    12.8     4.73     4.85     2      10.00    35.0     10519.93       0.00      2046.07
0.94
 29      340.12     85.71    12.8     4.73     4.85     2      10.00    35.0      9856.30       0.00      1916.85
```

```
0.94
 30      344.85     80.09    10.8     4.76     4.85     2      10.00    35.0      9210.37        0.00      1801.64
0.95
 31      349.61     73.40    10.8     4.76     4.85     2      10.00    35.0      8440.77        0.00      1651.02
0.95
 32      354.38     66.68     8.7     4.79     4.85     2      10.00    35.0      7668.14        0.00      1510.50
0.96
 33      359.17     59.07     8.7     4.79     4.85     2      10.00    35.0      6793.54        0.00      1338.12
0.96
 34      363.96     51.28     6.7     4.81     4.85     2      10.00    35.0      5897.46        0.00      1171.40
0.96
 35      368.77     42.77     6.7     4.81     4.85     2      10.00    35.0      4918.61        0.00       976.87
0.96
 36      373.59     33.95     4.7     4.83     4.85     2      10.00    35.0      3904.39        0.00       782.97
0.97
 37      378.42     24.55     4.7     4.83     4.85     2      10.00    35.0      2823.28        0.00       566.07
0.97
 38      383.25     14.49     2.7     4.71     4.72     2      10.00    35.0      1666.70        0.00       347.31
0.98
 39      387.96      4.75     2.7     4.97     4.98     2      10.00    35.0       546.01        0.00       107.58
0.98
                 --------                   -------                            ----------
     X-S Area:    2991.11    Path Length:    184.21               X-S Weight:   333948.81
```

```
DATA: Analysis  1 - Slope Stability - Case SS-4 Mining Slope - Pseudo Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4600.00         700.00     4600.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4589.51         243.50     4589.51
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    243.50     4595.51         246.50     4595.51
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    246.50     4589.51         700.00     4589.51
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4583.51         243.50     4583.51
Profile:  6 (2 points)   Material beneath:  6 - Clay
    246.50     4583.51         700.00     4583.51
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4574.51         243.50     4574.51
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    246.50     4574.51         700.00     4574.51
Profile:  9 (3 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4525.20         129.56     4527.98         243.50     4528.29
Profile: 10 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    246.50     4528.29         290.29     4528.40         392.67     4531.25         539.96     4535.35         700.00
  4537.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4523.20         129.56     4525.98         243.50     4526.29         246.50     4526.29         290.29
  4526.40
    392.67     4529.25         539.96     4533.35         700.00     4535.00

Slope Surface (12 points)
-------------
      0.00     4597.05         157.98     4597.05         200.00     4596.74         206.26     4596.43         210.00
  4596.15
    224.00     4595.66         243.50     4595.51         246.50     4595.51         260.01     4595.61         392.67
  4531.25
    539.96     4535.35         700.00     4537.00

Phreatic Surface (4 points)
----------------
      0.00     4585.51         243.50     4585.51         246.50     4531.25         392.67     4531.25

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     219.00      YL:    4595.83      XR:     392.67      YR:    4531.25
      Centre:  XC:     367.62      YC:    4729.67                Radius:  R:     200.00

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     150.00
Trial positions within range:      20         20         50
```

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

RESULTS: Analysis  1 - Slope Stability - Case SS-4 Mining Slope - Pseudo 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:   1.700

Analysis Summary

There were:  17935 successful analyses from a total of 20001 trial failure surfaces
             2066 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.55


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       224.00     4595.66      392.93     4531.26      400.98     4806.14      275.00     1.546   <-- Critical
Surface
   2       224.00     4595.66      392.41     4531.38      400.86     4806.25      275.00     1.546
   3       224.00     4595.66      391.88     4531.63      400.56     4806.50      275.00     1.547
   4       224.00     4595.66      391.35     4531.89      400.26     4806.74      275.00     1.547
   5       224.00     4595.66      390.83     4532.14      399.97     4806.99      275.00     1.548
   6       224.00     4595.66      392.93     4531.26      399.83     4803.11      271.94     1.548
   7       224.00     4595.66      392.41     4531.38      399.70     4803.22      271.94     1.549
   8       224.00     4595.66      391.88     4531.63      399.40     4803.47      271.94     1.549
   9       224.00     4595.66      390.30     4532.40      399.67     4807.24      275.00     1.549
  10       224.00     4595.66      391.35     4531.89      399.11     4803.72      271.94     1.549
  11       224.00     4595.66      389.78     4532.65      399.37     4807.49      275.00     1.550
  12       224.00     4595.66      390.83     4532.14      398.81     4803.96      271.94     1.550
  13       224.00     4595.66      390.30     4532.40      398.52     4804.21      271.94     1.550
  14       224.00     4595.66      389.25     4532.91      399.07     4807.73      275.00     1.550
  15       223.47     4595.68      392.93     4531.26      400.46     4806.15      275.00     1.551
  16       223.47     4595.68      392.41     4531.38      400.33     4806.26      275.00     1.551
  17       224.00     4595.66      392.93     4531.26      398.67     4800.07      268.88     1.551
  18       224.00     4595.66      388.72     4533.17      398.77     4807.98      275.00     1.551
  19       224.00     4595.66      392.41     4531.38      398.54     4800.19      268.88     1.551
  20       223.47     4595.68      391.88     4531.63      400.04     4806.51      275.00     1.551
  21       224.00     4595.66      391.88     4531.63      398.25     4800.44      268.88     1.551
  22       224.00     4595.66      388.20     4533.42      398.47     4808.23      275.00     1.551
  23       223.47     4595.68      391.35     4531.89      399.74     4806.76      275.00     1.552
  24       224.00     4595.66      391.35     4531.89      397.95     4800.68      268.88     1.552
  25       224.00     4595.66      389.78     4532.65      398.22     4804.46      271.94     1.552
  26       223.47     4595.68      390.83     4532.14      399.44     4807.01      275.00     1.552
```

27	224.00	4595.66	387.67	4533.68	398.17	4808.48	275.00	1.552
28	224.00	4595.66	390.83	4532.14	397.66	4800.93	268.88	1.552
29	224.00	4595.66	389.25	4532.91	397.92	4804.71	271.94	1.552
30	224.00	4595.66	390.30	4532.40	397.36	4801.18	268.88	1.553
31	223.47	4595.68	392.93	4531.26	399.31	4803.12	271.94	1.553
32	224.00	4595.66	388.72	4533.17	397.62	4804.96	271.94	1.553
33	224.00	4595.66	389.78	4532.65	397.07	4801.43	268.88	1.553
34	223.47	4595.68	392.41	4531.38	399.18	4803.23	271.94	1.553
35	224.00	4595.66	392.93	4531.26	397.51	4797.03	265.82	1.553
36	224.00	4595.66	392.41	4531.38	397.38	4797.15	265.82	1.553
37	223.47	4595.68	390.30	4532.40	399.14	4807.26	275.00	1.553
38	223.47	4595.68	391.88	4531.63	398.88	4803.48	271.94	1.553
39	224.00	4595.66	388.20	4533.42	397.32	4805.21	271.94	1.553
40	223.47	4595.68	389.78	4532.65	398.84	4807.50	275.00	1.554
41	222.95	4595.70	392.41	4531.38	399.81	4806.28	275.00	1.554
42	224.00	4595.66	391.88	4531.63	397.09	4797.40	265.82	1.554
43	222.95	4595.70	391.88	4531.63	399.51	4806.53	275.00	1.554
44	223.47	4595.68	391.35	4531.89	398.59	4803.73	271.94	1.554
45	222.95	4595.70	392.93	4531.26	399.94	4806.17	275.00	1.554
46	223.47	4595.68	389.25	4532.91	398.54	4807.75	275.00	1.554
47	222.95	4595.70	391.35	4531.89	399.22	4806.78	275.00	1.554
48	224.00	4595.66	391.35	4531.89	396.80	4797.65	265.82	1.554
49	224.00	4595.66	387.67	4533.68	397.02	4805.45	271.94	1.554
50	222.95	4595.70	390.83	4532.14	398.92	4807.02	275.00	1.554
51	223.47	4595.68	390.83	4532.14	398.29	4803.98	271.94	1.554
52	223.47	4595.68	388.72	4533.17	398.24	4808.00	275.00	1.554
53	222.95	4595.70	390.30	4532.40	398.62	4807.27	275.00	1.554
54	223.47	4595.68	390.30	4532.40	397.99	4804.23	271.94	1.554
55	224.00	4595.66	389.25	4532.91	396.77	4801.68	268.88	1.554
56	224.00	4595.66	390.83	4532.14	396.50	4797.90	265.82	1.554
57	223.47	4595.68	388.20	4533.42	397.94	4808.25	275.00	1.555
58	223.47	4595.68	387.67	4533.68	397.64	4808.50	275.00	1.555
59	224.00	4595.66	390.30	4532.40	396.21	4798.15	265.82	1.555
60	224.00	4595.66	388.72	4533.17	396.47	4801.93	268.88	1.555
61	223.47	4595.68	392.93	4531.26	398.15	4800.08	268.88	1.555
62	224.00	4595.66	389.78	4532.65	395.92	4798.40	265.82	1.555
63	223.47	4595.68	392.41	4531.38	398.02	4800.20	268.88	1.555
64	223.47	4595.68	389.78	4532.65	397.70	4804.48	271.94	1.555
65	222.95	4595.70	389.78	4532.65	398.32	4807.52	275.00	1.556
66	224.00	4595.66	387.67	4533.68	347.42	4674.46	146.43	1.556
67	224.00	4595.66	392.93	4531.26	396.35	4793.99	262.76	1.556
68	224.00	4595.66	388.20	4533.42	396.18	4802.18	268.88	1.556
69	222.95	4595.70	392.41	4531.38	398.66	4803.24	271.94	1.556
70	222.42	4595.72	392.93	4531.26	399.42	4806.18	275.00	1.556
71	224.00	4595.66	389.25	4532.91	395.62	4798.65	265.82	1.556
72	223.47	4595.68	391.88	4531.63	397.73	4800.45	268.88	1.556
73	223.47	4595.68	389.25	4532.91	397.40	4804.73	271.94	1.556
74	224.00	4595.66	392.41	4531.38	396.22	4794.10	262.76	1.556
75	222.95	4595.70	391.88	4531.63	398.36	4803.49	271.94	1.556

```
  76       222.95    4595.70     392.93    4531.26     398.79    4803.13     271.94    1.556
  77       222.95    4595.70     389.25    4532.91     398.02    4807.77     275.00    1.556
  78       222.95    4595.70     391.35    4531.89     398.07    4803.74     271.94    1.556
  79       223.47    4595.68     388.72    4533.17     397.10    4804.97     271.94    1.556
  80       223.47    4595.68     391.35    4531.89     397.44    4800.70     268.88    1.556
  81       222.95    4595.70     390.83    4532.14     397.77    4803.99     271.94    1.556
  82       224.00    4595.66     391.88    4531.63     395.93    4794.36     262.76    1.556
  83       223.47    4595.68     390.83    4532.14     397.14    4800.95     268.88    1.556
  84       224.00    4595.66     387.67    4533.68     395.88    4802.43     268.88    1.556
  85       222.95    4595.70     390.30    4532.40     397.47    4804.24     271.94    1.556
  86       223.47    4595.68     390.30    4532.40     396.84    4801.20     268.88    1.556
  87       223.47    4595.68     388.20    4533.42     396.80    4805.22     271.94    1.556
  88       222.95    4595.70     389.78    4532.65     397.17    4804.49     271.94    1.556
  89       223.47    4595.68     389.78    4532.65     396.55    4801.45     268.88    1.556
  90       224.00    4595.66     391.35    4531.89     395.64    4794.61     262.76    1.557
  91       223.47    4595.68     387.67    4533.68     396.50    4805.47     271.94    1.557
  92       224.00    4595.66     390.83    4532.14     395.35    4794.86     262.76    1.557
  93       224.00    4595.66     388.72    4533.17     395.32    4798.90     265.82    1.557
  94       224.00    4595.66     390.30    4532.40     395.05    4795.11     262.76    1.557
  95       223.47    4595.68     392.93    4531.26     397.00    4797.04     265.82    1.558
  96       223.47    4595.68     389.25    4532.91     396.25    4801.70     268.88    1.558
  97       222.95    4595.70     389.25    4532.91     396.88    4804.74     271.94    1.558
  98       224.00    4595.66     389.78    4532.65     394.76    4795.36     262.76    1.558
  99       222.95    4595.70     392.41    4531.38     397.51    4800.21     268.88    1.558

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     224.00      YL:    4595.66      XR:     392.93      YR:    4531.26
    Centre:  XC:     400.98      YC:    4806.14              Radius:  R:     275.00
Generated failure surface: (20 points)
    224.00   4595.66          231.53   4589.55          239.27   4583.71          247.21   4578.15          255.34
4572.87
    263.66   4567.88          272.14   4563.19          280.78   4558.80          289.58   4554.72          298.51
4550.95
    307.57   4547.49          316.74   4544.36          326.02   4541.55          335.40   4539.08          344.85
4536.93
    354.38   4535.12          363.96   4533.64          373.59   4532.51          383.25   4531.71          392.93
4531.26

Slice Geometry and Properties - Critical Failure Surface (circle 1,  39 slices)
-------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                 PoreWater      Normal
Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi       Weight       Force          Stress
Factor
  1      224.00      5.69    39.0     3.76     4.85     6      50.00    25.0       569.30         0.00         100.43
1.03
  2      227.76     17.08    39.1     3.76     4.85     6      50.00    25.0      1708.27         0.00         343.49
1.03
```

```
  3      231.53    43.15    37.0     5.36     6.71     2      10.00    35.0     4473.64       0.00      618.59
0.93
  4      236.89    26.05    37.0     2.38     2.98     2      10.00    35.0     2811.62     167.10      890.88
0.93
  5      239.27    56.24    35.0     4.23     5.17     6      50.00    25.0     6212.84    1056.47     1229.41
1.01
  6      243.50    47.43    35.0     3.00     3.66     5       0.00    45.0     4743.02       0.00     1088.06
0.84
  7      246.50    12.16    35.0     0.71     0.87     6      50.00    25.0     1279.48       0.00     1468.37
1.01
  8      247.21   107.74    33.0     5.61     6.69     6      50.00    25.0    11278.92       0.00     1663.81
1.00
  9      252.82    55.17    33.0     2.52     3.01     2      10.00    35.0     5775.08       0.00     1766.32
0.92
 10      255.34   112.58    31.0     4.67     5.44     2      10.00    35.0    11891.03       0.00     2000.22
0.92
 11      260.01    93.87    31.0     3.65     4.25     2      10.00    35.0    10017.25       0.00     2157.52
0.92
 12      263.66   110.72    29.0     4.24     4.85     2      10.00    35.0    11950.17       0.00     2249.92
0.91
 13      267.90   111.95    28.9     4.24     4.85     2      10.00    35.0    12221.87       0.00     2301.24
0.91
 14      272.14   114.89    26.9     4.32     4.85     2      10.00    35.0    12629.12       0.00     2372.98
0.91
 15      276.46   115.32    26.9     4.32     4.85     2      10.00    35.0    12678.14       0.00     2382.20
0.91
 16      280.78   111.23    24.9     4.17     4.60     2      10.00    35.0    12228.51       0.00     2421.90
0.91
 17      284.95   123.03    24.9     4.63     5.10     2      10.00    35.0    13601.46       0.00     2427.08
0.91
 18      289.58   117.94    22.9     4.47     4.85     2      10.00    35.0    13182.58       0.00     2475.79
0.91
 19      294.04   116.68    22.9     4.47     4.85     2      10.00    35.0    13183.26       0.00     2475.82
0.91
 20      298.51   128.46    20.9     4.99     5.34     2      10.00    35.0    14682.71       0.00     2505.36
0.91
 21      303.50   102.68    20.9     4.07     4.35     2      10.00    35.0    11808.44       0.00     2474.76
0.91
 22      307.57   113.38    18.8     4.59     4.85     2      10.00    35.0    13039.13       0.00     2459.79
0.92
 23      312.16   110.36    18.9     4.59     4.85     2      10.00    35.0    12691.10       0.00     2393.98
0.92
 24      316.74   108.12    16.8     4.64     4.85     2      10.00    35.0    12433.77       0.00     2355.18
0.92
 25      321.38   104.19    16.8     4.64     4.85     2      10.00    35.0    11981.47       0.00     2269.45
0.92
 26      326.02   100.82    14.8     4.69     4.85     2      10.00    35.0    11594.42       0.00     2207.87
0.92
 27      330.71    95.97    14.8     4.69     4.85     2      10.00    35.0    11036.71       0.00     2101.70
```

```
0.92
 28      335.40     91.48    12.8      4.73      4.85      2      10.00     35.0     10519.93         0.00      2016.62
0.93
 29      340.12     85.71    12.8      4.73      4.85      2      10.00     35.0      9856.30         0.00      1889.24
0.93
 30      344.85     80.09    10.8      4.76      4.85      2      10.00     35.0      9210.37         0.00      1779.55
0.94
 31      349.61     73.40    10.8      4.76      4.85      2      10.00     35.0      8440.77         0.00      1630.76
0.94
 32      354.38     66.68     8.7      4.79      4.85      2      10.00     35.0      7668.14         0.00      1495.26
0.95
 33      359.17     59.07     8.7      4.79      4.85      2      10.00     35.0      6793.54         0.00      1324.60
0.95
 34      363.96     51.28     6.7      4.81      4.85      2      10.00     35.0      5897.46         0.00      1162.18
0.96
 35      368.77     42.77     6.7      4.81      4.85      2      10.00     35.0      4918.61         0.00       969.16
0.96
 36      373.59     33.95     4.7      4.83      4.85      2      10.00     35.0      3904.39         0.00       778.57
0.97
 37      378.42     24.55     4.7      4.83      4.85      2      10.00     35.0      2823.28         0.00       562.88
0.97
 38      383.25     14.49     2.7      4.71      4.72      2      10.00     35.0      1666.70         0.00       346.15
0.98
 39      387.96      4.75     2.7      4.97      4.98      2      10.00     35.0       546.01         0.00       107.19
0.98
                  --------                    -------                              ----------
     X-S Area:    2991.11    Path Length:    184.21               X-S Weight:   333948.81
```

```
DATA: Analysis  1 - Slope Stability - Case SS-5 Mining Slope - Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400          Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4611.00         700.00     4611.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4596.10         218.50     4596.10
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    218.80     4603.10         221.50     4603.10
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    221.50     4596.10         700.00     4596.10
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4577.10         218.50     4577.10
Profile:  6 (2 points)   Material beneath:  6 - Clay
    221.50     4577.10         700.00     4577.10
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4574.10         218.50     4574.10
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    221.50     4574.10         700.00     4574.10
Profile:  9 (3 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4549.18          73.68     4549.18         218.50     4549.15
Profile: 10 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
    221.50     4549.15         347.46     4548.81         489.45     4548.17         700.00     4547.00
Profile: 11 (7 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4547.18          73.68     4547.18         218.50     4547.15         221.50     4547.15         347.46
  4546.81
    489.45     4546.17         700.00     4545.00

Slope Surface (13 points)
-------------
      0.00     4606.96          93.40     4606.96         120.00     4606.88         147.50     4609.84         195.90
  4604.65
    197.50     4604.59         200.00     4604.51         218.50     4603.10         221.50     4603.10         235.07
  4602.94
    347.45     4548.81         489.45     4548.17         700.00     4547.00

Phreatic Surface (4 points)
----------------
      0.00     4591.10         218.50     4591.10         221.50     4549.15         700.00     4547.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     191.00      YL:    4605.18      XR:     347.46      YR:    4548.81
      Centre:  XC:     349.14      YC:    4798.80                 Radius:  R:     250.00

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-5 Mining Slope - 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:   1.949

Analysis Summary

There were:  15184 successful analyses from a total of 20001 trial failure surfaces
             4817 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.85
__________________________________________

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius       FoS
   1       196.00     4604.65      347.72     4548.81       389.47     4896.31      350.00     1.853   <-- Critical
Surface
   2       196.00     4604.65      347.72     4548.81       388.03     4892.37      345.92     1.854
   3       196.00     4604.65      347.20     4548.93       389.36     4896.38      350.00     1.855
   4       196.00     4604.65      347.20     4548.93       387.91     4892.45      345.92     1.856
   5       196.00     4604.65      347.72     4548.81       386.58     4888.43      341.84     1.856
   6       196.00     4604.65      346.67     4549.19       389.01     4896.61      350.00     1.857
   7       196.00     4604.65      347.20     4548.93       386.46     4888.51      341.84     1.857
   8       196.00     4604.65      347.72     4548.81       385.12     4884.49      337.76     1.858
   9       196.00     4604.65      346.67     4549.19       387.56     4892.68      345.92     1.858
  10       196.00     4604.65      347.20     4548.93       385.01     4884.56      337.76     1.858
  11       196.00     4604.65      346.14     4549.44       388.66     4896.85      350.00     1.858
  12       196.00     4604.65      346.67     4549.19       386.11     4888.74      341.84     1.859
  13       196.00     4604.65      347.72     4548.81       383.67     4880.54      333.67     1.859
  14       196.00     4604.65      347.20     4548.93       383.56     4880.62      333.67     1.859
  15       196.00     4604.65      346.14     4549.44       387.21     4892.91      345.92     1.859
  16       196.00     4604.65      346.67     4549.19       384.66     4884.80      337.76     1.860
  17       196.00     4604.65      347.72     4548.81       382.22     4876.59      329.59     1.860
  18       195.47     4604.70      347.72     4548.81       388.92     4896.38      350.00     1.860
  19       196.00     4604.65      346.14     4549.44       385.77     4888.97      341.84     1.860
  20       196.00     4604.65      347.20     4548.93       382.10     4876.67      329.59     1.860
  21       196.00     4604.65      345.62     4549.69       388.31     4897.08      350.00     1.860
  22       195.47     4604.70      347.20     4548.93       388.81     4896.45      350.00     1.861
  23       196.00     4604.65      346.67     4549.19       383.21     4880.85      333.67     1.861
  24       196.00     4604.65      345.62     4549.69       386.86     4893.14      345.92     1.861
  25       196.00     4604.65      347.72     4548.81       380.76     4872.64      325.51     1.861
  26       195.47     4604.70      347.72     4548.81       387.48     4892.44      345.92     1.861
  27       196.00     4604.65      346.14     4549.44       384.32     4885.03      337.76     1.861
  28       196.00     4604.65      347.20     4548.93       380.64     4872.72      325.51     1.862
  29       195.47     4604.70      347.20     4548.93       387.36     4892.51      345.92     1.862
  30       196.00     4604.65      345.09     4549.95       387.96     4897.31      350.00     1.862
  31       196.00     4604.65      346.67     4549.19       381.76     4876.90      329.59     1.862
```

32	196.00	4604.65	345.62	4549.69	385.42	4889.20	341.84	1.862
33	195.47	4604.70	347.72	4548.81	386.03	4888.49	341.84	1.862
34	196.00	4604.65	347.72	4548.81	379.31	4868.68	321.43	1.862
35	196.00	4604.65	346.14	4549.44	382.87	4881.09	333.67	1.862
36	195.47	4604.70	346.67	4549.19	388.46	4896.68	350.00	1.862
37	195.47	4604.70	347.20	4548.93	385.92	4888.57	341.84	1.863
38	196.00	4604.65	347.20	4548.93	379.19	4868.76	321.43	1.863
39	196.00	4604.65	345.62	4549.69	383.97	4885.26	337.76	1.863
40	196.00	4604.65	344.57	4550.20	387.60	4897.54	350.00	1.863
41	196.00	4604.65	346.67	4549.19	380.30	4872.95	325.51	1.863
42	195.47	4604.70	347.72	4548.81	384.58	4884.55	337.76	1.863
43	196.00	4604.65	345.09	4549.95	386.51	4893.38	345.92	1.863
44	195.47	4604.70	346.67	4549.19	387.02	4892.74	345.92	1.863
45	196.00	4604.65	346.14	4549.44	381.42	4877.14	329.59	1.864
46	196.00	4604.65	347.72	4548.81	377.85	4864.72	317.35	1.864
47	195.47	4604.70	347.20	4548.93	384.47	4884.62	337.76	1.864
48	196.00	4604.65	345.62	4549.69	382.52	4881.32	333.67	1.864
49	195.47	4604.70	346.14	4549.44	388.11	4896.91	350.00	1.864
50	196.00	4604.65	347.20	4548.93	377.73	4864.81	317.35	1.864
51	195.47	4604.70	345.62	4549.69	387.76	4897.15	350.00	1.864
52	195.47	4604.70	346.67	4549.19	385.57	4888.80	341.84	1.864
53	195.47	4604.70	347.72	4548.81	383.13	4880.60	333.67	1.864
54	196.00	4604.65	346.67	4549.19	378.85	4869.00	321.43	1.864
55	196.00	4604.65	345.09	4549.95	383.62	4885.50	337.76	1.865
56	196.00	4604.65	344.57	4550.20	386.16	4893.61	345.92	1.865
57	196.00	4604.65	344.57	4550.20	383.27	4885.73	337.76	1.865
58	196.00	4604.65	346.14	4549.44	379.96	4873.19	325.51	1.865
59	196.00	4604.65	344.04	4550.45	387.25	4897.78	350.00	1.865
60	196.00	4604.65	345.09	4549.95	385.07	4889.44	341.84	1.865
61	195.47	4604.70	347.20	4548.93	383.02	4880.68	333.67	1.865
62	196.00	4604.65	347.72	4548.81	376.39	4860.76	313.27	1.865
63	195.47	4604.70	346.14	4549.44	386.67	4892.98	345.92	1.865
64	196.00	4604.65	345.62	4549.69	381.07	4877.37	329.59	1.865
65	195.47	4604.70	346.67	4549.19	384.12	4884.86	337.76	1.865
66	195.47	4604.70	347.72	4548.81	381.68	4876.65	329.59	1.865
67	196.00	4604.65	347.20	4548.93	376.27	4860.85	313.27	1.866
68	196.00	4604.65	346.67	4549.19	377.39	4865.04	317.35	1.866
69	194.95	4604.75	347.72	4548.81	388.39	4896.44	350.00	1.866
70	196.00	4604.65	345.09	4549.95	382.17	4881.55	333.67	1.866
71	195.47	4604.70	345.09	4549.95	387.40	4897.38	350.00	1.866
72	196.00	4604.65	344.04	4550.45	385.80	4893.84	345.92	1.866
73	196.00	4604.65	346.14	4549.44	378.51	4869.23	321.43	1.866
74	195.47	4604.70	347.20	4548.93	381.56	4876.73	329.59	1.866
75	195.47	4604.70	346.14	4549.44	385.22	4889.04	341.84	1.866
76	194.95	4604.75	347.20	4548.93	388.27	4896.51	350.00	1.866
77	196.00	4604.65	344.57	4550.20	384.72	4889.67	341.84	1.866
78	196.00	4604.65	345.62	4549.69	379.62	4873.42	325.51	1.866
79	195.47	4604.70	345.62	4549.69	386.31	4893.21	345.92	1.866
80	195.47	4604.70	346.67	4549.19	382.67	4880.91	333.67	1.867

```
  81       196.00     4604.65      343.51     4550.71      386.89     4898.01      350.00     1.867
  82       194.95     4604.75      347.72     4548.81      386.94     4892.50      345.92     1.867
  83       195.47     4604.70      347.72     4548.81      380.23     4872.69      325.51     1.867
  84       196.00     4604.65      345.09     4549.95      380.73     4877.61      329.59     1.867
  85       195.47     4604.70      346.14     4549.44      383.77     4885.09      337.76     1.867
  86       196.00     4604.65      346.67     4549.19      375.93     4861.08      313.27     1.867
  87       196.00     4604.65      344.57     4550.20      381.83     4881.79      333.67     1.867
  88       194.95     4604.75      347.20     4548.93      386.83     4892.57      345.92     1.867
  89       195.47     4604.70      347.20     4548.93      380.11     4872.77      325.51     1.867
  90       196.00     4604.65      342.99     4550.96      386.53     4898.24      350.00     1.867
  91       196.00     4604.65      346.14     4549.44      377.05     4865.28      317.35     1.867
  92       196.00     4604.65      344.04     4550.45      384.36     4889.90      341.84     1.867
  93       196.00     4604.65      342.46     4551.21      386.17     4898.47      350.00     1.867
  94       195.47     4604.70      345.62     4549.69      384.87     4889.27      341.84     1.867
  95       196.00     4604.65      344.04     4550.45      381.48     4882.02      333.67     1.867
  96       196.00     4604.65      343.51     4550.71      385.45     4894.07      345.92     1.868
  97       196.00     4604.65      345.62     4549.69      378.17     4869.47      321.43     1.868
  98       195.47     4604.70      344.57     4550.20      387.05     4897.61      350.00     1.868
  99       195.47     4604.70      346.67     4549.19      381.22     4876.96      329.59     1.868

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     196.00      YL:    4604.65      XR:     347.72      YR:    4548.81
    Centre:  XC:     389.47      YC:    4896.31                  Radius:  R:     350.00
Generated failure surface: (20 points)
    196.00   4604.65          203.21   4599.99          210.54   4595.51          217.97   4591.21          225.51
4587.09
    233.14   4583.16          240.87   4579.42          248.69   4575.87          256.59   4572.52          264.57
4569.35
    272.63   4566.39          280.76   4563.62          288.95   4561.06          297.21   4558.69          305.52
4556.53
    313.88   4554.57          322.28   4552.82          330.73   4551.27          339.21   4549.94          347.72
4548.81

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      196.00      0.68    32.9     1.50     1.79     6      50.00    25.0        68.48        0.00         24.28
1.02
  2      197.50      4.20    32.9     2.50     2.98     6      50.00    25.0       419.92        0.00        129.51
1.02
  3      200.00     10.80    32.9     3.21     3.82     6      50.00    25.0      1080.15        0.00        274.19
1.02
  4      203.21     16.30    31.4     3.18     3.73     6      50.00    25.0      1629.82        0.00        430.10
1.02
  5      206.39     21.71    31.4     3.18     3.73     6      50.00    25.0      2170.66        0.00        577.57
```

```
1.02
  6      209.57     7.69    31.4     0.97     1.14     2      10.00    35.0      773.18        0.00      645.84
0.95
  7      210.54    33.94    30.0     3.72     4.29     2      10.00    35.0     3486.78        0.00      767.41
0.95
  8      214.25    40.87    30.0     3.72     4.29     2      10.00    35.0     4300.12        0.00      947.02
0.95
  9      217.97    10.06    28.7     0.83     0.95     2      10.00    35.0     1070.83        6.94     1069.05
0.94
 10      218.80    35.32    28.6     2.70     3.08     5       0.00    45.0     3531.88        0.00     1010.42
0.88
 11      221.50    59.66    28.6     4.01     4.57     2      10.00    35.0     6441.09        0.00     1330.19
0.94
 12      225.51    64.58    27.2     3.82     4.29     2      10.00    35.0     7030.32        0.00     1539.60
0.94
 13      229.32    71.91    27.2     3.82     4.29     2      10.00    35.0     7875.52        0.00     1724.89
0.94
 14      233.14    39.07    25.8     1.93     2.14     2      10.00    35.0     4294.38        0.00     1879.96
0.94
 15      235.07    60.06    25.8     2.90     3.22     2      10.00    35.0     6640.27        0.00     1933.64
0.94
 16      237.97    60.08    25.8     2.90     3.22     2      10.00    35.0     6703.35        0.00     1951.92
0.94
 17      240.87    52.94    24.4     2.56     2.81     2      10.00    35.0     5956.08        0.00     1984.61
0.94
 18      243.43    52.75    24.4     2.56     2.81     2      10.00    35.0     5982.39        0.00     1993.52
0.94
 19      245.99    55.47    24.4     2.70     2.97     6      50.00    25.0     6317.04        0.00     2088.53
0.99
 20      248.69    85.13    23.0     4.18     4.54     6      50.00    25.0     9657.64        0.00     2079.17
0.98
 21      252.86    75.15    23.0     3.73     4.05     2      10.00    35.0     8475.02        0.00     1957.28
0.94
 22      256.59    79.38    21.6     3.99     4.29     2      10.00    35.0     8948.60        0.00     1948.25
0.94
 23      260.58    78.01    21.6     3.99     4.29     2      10.00    35.0     8791.87        0.00     1914.10
0.94
 24      264.57    77.14    20.2     4.03     4.29     2      10.00    35.0     8689.53        0.00     1891.68
0.94
 25      268.60    75.29    20.2     4.03     4.29     2      10.00    35.0     8477.38        0.00     1845.44
0.94
 26      272.63    73.85    18.8     4.06     4.29     2      10.00    35.0     8310.11        0.00     1810.14
0.94
 27      276.70    71.52    18.8     4.06     4.29     2      10.00    35.0     8041.56        0.00     1751.58
0.94
 28      280.76    67.54    17.4     3.98     4.17     2      10.00    35.0     7587.50        0.00     1703.86
0.94
 29      284.74    64.87    17.4     3.98     4.17     2      10.00    35.0     7280.95        0.00     1634.90
0.94
```

```
 30      288.72     48.81    16.1     3.11     3.24     2      10.00    35.0      5507.86        0.00      1593.38
0.94
 31      291.83     46.92    16.0     3.11     3.24     2      10.00    35.0      5360.33        0.00      1551.77
0.94
 32      294.94     32.90    16.0     2.26     2.35     2      10.00    35.0      3783.95        0.00      1507.41
0.94
 33      297.21     57.58    14.6     4.15     4.29     2      10.00    35.0      6622.21        0.00      1449.89
0.94
 34      301.36     53.76    14.6     4.15     4.29     2      10.00    35.0      6182.70        0.00      1353.57
0.94
 35      305.52     50.00    13.2     4.18     4.29     2      10.00    35.0      5750.21        0.00      1262.68
0.94
 36      309.70     45.68    13.2     4.18     4.29     2      10.00    35.0      5252.64        0.00      1153.31
0.94
 37      313.88     41.34    11.8     4.20     4.29     2      10.00    35.0      4753.61        0.00      1047.41
0.95
 38      318.08     36.51    11.8     4.20     4.29     2      10.00    35.0      4198.53        0.00       924.98
0.95
 39      322.28     31.59    10.4     4.22     4.29     2      10.00    35.0      3633.40        0.00       803.83
0.95
 40      326.51     26.27    10.4     4.22     4.29     2      10.00    35.0      3020.62        0.00       668.13
0.95
 41      330.73     20.79     9.0     4.24     4.29     2      10.00    35.0      2390.57        0.00       531.22
0.96
 42      334.97     14.96     9.0     4.24     4.29     2      10.00    35.0      1720.48        0.00       382.08
0.96
 43      339.21      8.74     7.6     4.12     4.16     2      10.00    35.0      1005.03        0.00       231.66
0.96
 44      343.33      2.79     7.6     4.39     4.43     2      10.00    35.0       321.38        0.00        68.99
0.96
                 --------                   -------                            ----------
     X-S Area:    1964.62    Path Length:    163.14               X-S Weight:   219535.92
```

```
DATA: Analysis  1 - Slope Stability - Case SS-5 Mining Slope - Pseudo Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4611.00         700.00     4611.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4596.10         218.50     4596.10
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    218.80     4603.10         221.50     4603.10
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    221.50     4596.10         700.00     4596.10
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4577.10         218.50     4577.10
Profile:  6 (2 points)   Material beneath:  6 - Clay
    221.50     4577.10         700.00     4577.10
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4574.10         218.50     4574.10
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    221.50     4574.10         700.00     4574.10
Profile:  9 (3 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4549.18          73.68     4549.18         218.50     4549.15
Profile: 10 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
    221.50     4549.15         347.46     4548.81         489.45     4548.17         700.00     4547.00
Profile: 11 (7 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4547.18          73.68     4547.18         218.50     4547.15         221.50     4547.15         347.46
  4546.81
    489.45     4546.17         700.00     4545.00

Slope Surface (13 points)
-------------
      0.00     4606.96          93.40     4606.96         120.00     4606.88         147.50     4609.84         195.90
  4604.65
    197.50     4604.59         200.00     4604.51         218.50     4603.10         221.50     4603.10         235.07
  4602.94
    347.45     4548.81         489.45     4548.17         700.00     4547.00

Phreatic Surface (4 points)
----------------
      0.00     4591.10         218.50     4591.10         221.50     4549.15         700.00     4547.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     191.00      YL:    4605.18      XR:     347.46      YR:    4548.81
      Centre:  XC:     349.14      YC:    4798.80                  Radius:  R:     250.00

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-5 Mining Slope - Pseudo 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:   1.637

Analysis Summary

There were:  15184 successful analyses from a total of 20001 trial failure surfaces
             4817 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.56
__________________________________________


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       196.00     4604.65      347.72     4548.81      389.47     4896.31      350.00     1.558   <-- Critical
Surface
   2       196.00     4604.65      347.72     4548.81      388.03     4892.37      345.92     1.559
   3       196.00     4604.65      347.20     4548.93      389.36     4896.38      350.00     1.560
   4       196.00     4604.65      347.20     4548.93      387.91     4892.45      345.92     1.560
   5       196.00     4604.65      346.67     4549.19      389.01     4896.61      350.00     1.561
   6       196.00     4604.65      347.72     4548.81      386.58     4888.43      341.84     1.561
   7       196.00     4604.65      347.20     4548.93      386.46     4888.51      341.84     1.561
   8       196.00     4604.65      346.67     4549.19      387.56     4892.68      345.92     1.562
   9       196.00     4604.65      346.14     4549.44      388.66     4896.85      350.00     1.562
  10       196.00     4604.65      347.72     4548.81      385.12     4884.49      337.76     1.562
  11       196.00     4604.65      347.20     4548.93      385.01     4884.56      337.76     1.562
  12       196.00     4604.65      346.67     4549.19      386.11     4888.74      341.84     1.563
  13       196.00     4604.65      346.14     4549.44      387.21     4892.91      345.92     1.563
  14       196.00     4604.65      347.72     4548.81      383.67     4880.54      333.67     1.563
  15       196.00     4604.65      345.62     4549.69      388.31     4897.08      350.00     1.563
  16       196.00     4604.65      347.20     4548.93      383.56     4880.62      333.67     1.563
  17       195.47     4604.70      347.72     4548.81      388.92     4896.38      350.00     1.564
  18       196.00     4604.65      346.67     4549.19      384.66     4884.80      337.76     1.564
  19       196.00     4604.65      346.14     4549.44      385.77     4888.97      341.84     1.564
  20       195.47     4604.70      347.20     4548.93      388.81     4896.45      350.00     1.564
  21       196.00     4604.65      345.62     4549.69      386.86     4893.14      345.92     1.564
  22       196.00     4604.65      347.72     4548.81      382.22     4876.59      329.59     1.564
  23       196.00     4604.65      345.09     4549.95      387.96     4897.31      350.00     1.564
  24       195.47     4604.70      347.72     4548.81      387.48     4892.44      345.92     1.564
  25       196.00     4604.65      347.20     4548.93      382.10     4876.67      329.59     1.565
  26       196.00     4604.65      346.67     4549.19      383.21     4880.85      333.67     1.565
  27       196.00     4604.65      346.14     4549.44      384.32     4885.03      337.76     1.565
```

28	195.47	4604.70	347.20	4548.93	387.36	4892.51	345.92	1.565
29	196.00	4604.65	345.62	4549.69	385.42	4889.20	341.84	1.565
30	195.47	4604.70	346.67	4549.19	388.46	4896.68	350.00	1.565
31	196.00	4604.65	347.72	4548.81	380.76	4872.64	325.51	1.565
32	195.47	4604.70	347.72	4548.81	386.03	4888.49	341.84	1.565
33	196.00	4604.65	344.57	4550.20	387.60	4897.54	350.00	1.565
34	196.00	4604.65	346.67	4549.19	381.76	4876.90	329.59	1.566
35	196.00	4604.65	345.09	4549.95	386.51	4893.38	345.92	1.566
36	196.00	4604.65	347.20	4548.93	380.64	4872.72	325.51	1.566
37	196.00	4604.65	346.14	4549.44	382.87	4881.09	333.67	1.566
38	195.47	4604.70	347.20	4548.93	385.92	4888.57	341.84	1.566
39	196.00	4604.65	345.62	4549.69	383.97	4885.26	337.76	1.566
40	195.47	4604.70	346.67	4549.19	387.02	4892.74	345.92	1.566
41	195.47	4604.70	346.14	4549.44	388.11	4896.91	350.00	1.566
42	195.47	4604.70	345.62	4549.69	387.76	4897.15	350.00	1.566
43	195.47	4604.70	347.72	4548.81	384.58	4884.55	337.76	1.566
44	196.00	4604.65	347.72	4548.81	379.31	4868.68	321.43	1.567
45	196.00	4604.65	344.57	4550.20	386.16	4893.61	345.92	1.567
46	196.00	4604.65	344.04	4550.45	387.25	4897.78	350.00	1.567
47	195.47	4604.70	347.20	4548.93	384.47	4884.62	337.76	1.567
48	196.00	4604.65	346.67	4549.19	380.30	4872.95	325.51	1.567
49	196.00	4604.65	346.14	4549.44	381.42	4877.14	329.59	1.567
50	196.00	4604.65	347.20	4548.93	379.19	4868.76	321.43	1.567
51	196.00	4604.65	345.62	4549.69	382.52	4881.32	333.67	1.567
52	195.47	4604.70	346.67	4549.19	385.57	4888.80	341.84	1.567
53	196.00	4604.65	345.09	4549.95	383.62	4885.50	337.76	1.567
54	196.00	4604.65	345.09	4549.95	385.07	4889.44	341.84	1.567
55	196.00	4604.65	344.57	4550.20	383.27	4885.73	337.76	1.567
56	195.47	4604.70	346.14	4549.44	386.67	4892.98	345.92	1.567
57	195.47	4604.70	347.72	4548.81	383.13	4880.60	333.67	1.567
58	195.47	4604.70	345.09	4549.95	387.40	4897.38	350.00	1.567
59	196.00	4604.65	344.04	4550.45	385.80	4893.84	345.92	1.568
60	194.95	4604.75	347.72	4548.81	388.39	4896.44	350.00	1.568
61	195.47	4604.70	347.20	4548.93	383.02	4880.68	333.67	1.568
62	196.00	4604.65	347.72	4548.81	377.85	4864.72	317.35	1.568
63	195.47	4604.70	346.67	4549.19	384.12	4884.86	337.76	1.568
64	196.00	4604.65	346.14	4549.44	379.96	4873.19	325.51	1.568
65	196.00	4604.65	343.51	4550.71	386.89	4898.01	350.00	1.568
66	196.00	4604.65	345.62	4549.69	381.07	4877.37	329.59	1.568
67	196.00	4604.65	346.67	4549.19	378.85	4869.00	321.43	1.568
68	196.00	4604.65	344.57	4550.20	384.72	4889.67	341.84	1.568
69	194.95	4604.75	347.20	4548.93	388.27	4896.51	350.00	1.568
70	196.00	4604.65	342.46	4551.21	386.17	4898.47	350.00	1.568
71	196.00	4604.65	345.09	4549.95	382.17	4881.55	333.67	1.568
72	195.47	4604.70	346.14	4549.44	385.22	4889.04	341.84	1.568
73	196.00	4604.65	347.20	4548.93	377.73	4864.81	317.35	1.568
74	196.00	4604.65	342.99	4550.96	386.53	4898.24	350.00	1.568
75	195.47	4604.70	345.62	4549.69	386.31	4893.21	345.92	1.568
76	195.47	4604.70	347.72	4548.81	381.68	4876.65	329.59	1.568

```
  77       194.95     4604.75      347.72     4548.81      386.94     4892.50      345.92     1.569
  78       195.47     4604.70      344.57     4550.20      387.05     4897.61      350.00     1.569
  79       196.00     4604.65      343.51     4550.71      385.45     4894.07      345.92     1.569
  80       195.47     4604.70      347.20     4548.93      381.56     4876.73      329.59     1.569
  81       195.47     4604.70      346.67     4549.19      382.67     4880.91      333.67     1.569
  82       194.95     4604.75      347.20     4548.93      386.83     4892.57      345.92     1.569
  83       196.00     4604.65      344.04     4550.45      384.36     4889.90      341.84     1.569
  84       196.00     4604.65      345.62     4549.69      379.62     4873.42      325.51     1.569
  85       195.47     4604.70      346.14     4549.44      383.77     4885.09      337.76     1.569
  86       196.00     4604.65      346.14     4549.44      378.51     4869.23      321.43     1.569
  87       196.00     4604.65      345.09     4549.95      380.73     4877.61      329.59     1.569
  88       196.00     4604.65      347.72     4548.81      376.39     4860.76      313.27     1.569
  89       196.00     4604.65      346.67     4549.19      377.39     4865.04      317.35     1.569
  90       194.95     4604.75      346.67     4549.19      387.92     4896.75      350.00     1.569
  91       196.00     4604.65      344.57     4550.20      381.83     4881.79      333.67     1.569
  92       195.47     4604.70      345.62     4549.69      384.87     4889.27      341.84     1.569
  93       196.00     4604.65      344.04     4550.45      381.48     4882.02      333.67     1.569
  94       196.00     4604.65      347.20     4548.93      376.27     4860.85      313.27     1.569
  95       195.47     4604.70      345.09     4549.95      385.96     4893.44      345.92     1.569
  96       194.95     4604.75      347.72     4548.81      385.50     4888.55      341.84     1.570
  97       196.00     4604.65      342.46     4551.21      384.74     4894.54      345.92     1.570
  98       195.47     4604.70      344.57     4550.20      385.61     4893.67      345.92     1.570
  99       195.47     4604.70      347.72     4548.81      380.23     4872.69      325.51     1.570

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     196.00      YL:    4604.65      XR:     347.72      YR:    4548.81
    Centre:  XC:     389.47      YC:    4896.31                 Radius:  R:     350.00
Generated failure surface: (20 points)
    196.00   4604.65          203.21   4599.99          210.54   4595.51          217.97   4591.21          225.51
4587.09
    233.14   4583.16          240.87   4579.42          248.69   4575.87          256.59   4572.52          264.57
4569.35
    272.63   4566.39          280.76   4563.62          288.95   4561.06          297.21   4558.69          305.52
4556.53
    313.88   4554.57          322.28   4552.82          330.73   4551.27          339.21   4549.94          347.72
4548.81

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      196.00      0.68    32.9     1.50      1.79     6      50.00    25.0        68.48         0.00         20.89
1.00
  2      197.50      4.20    32.9     2.50      2.98     6      50.00    25.0       419.92         0.00        123.40
1.00
  3      200.00     10.80    32.9     3.21      3.82     6      50.00    25.0      1080.15         0.00        264.36
```

```
1.00
  4      203.21     16.30    31.4     3.18     3.73     6      50.00    25.0     1629.82        0.00      416.87
0.99
  5      206.39     21.71    31.4     3.18     3.73     6      50.00    25.0     2170.66        0.00      560.71
0.99
  6      209.57      7.69    31.4     0.97     1.14     2      10.00    35.0      773.18        0.00      623.19
0.92
  7      210.54     33.94    30.0     3.72     4.29     2      10.00    35.0     3486.78        0.00      741.74
0.92
  8      214.25     40.87    30.0     3.72     4.29     2      10.00    35.0     4300.12        0.00      915.46
0.92
  9      217.97     10.06    28.7     0.83     0.95     2      10.00    35.0     1070.83        6.94     1035.29
0.91
 10      218.80     35.32    28.6     2.70     3.08     5       0.00    45.0     3531.88        0.00      968.69
0.84
 11      221.50     59.66    28.6     4.01     4.57     2      10.00    35.0     6441.09        0.00     1288.02
0.91
 12      225.51     64.58    27.2     3.82     4.29     2      10.00    35.0     7030.32        0.00     1493.14
0.91
 13      229.32     71.91    27.2     3.82     4.29     2      10.00    35.0     7875.52        0.00     1672.89
0.91
 14      233.14     39.07    25.8     1.93     2.14     2      10.00    35.0     4294.38        0.00     1826.09
0.91
 15      235.07     60.06    25.8     2.90     3.22     2      10.00    35.0     6640.27        0.00     1878.26
0.91
 16      237.97     60.08    25.8     2.90     3.22     2      10.00    35.0     6703.35        0.00     1896.00
0.91
 17      240.87     52.94    24.4     2.56     2.81     2      10.00    35.0     5956.08        0.00     1930.68
0.91
 18      243.43     52.75    24.4     2.56     2.81     2      10.00    35.0     5982.39        0.00     1939.37
0.91
 19      245.99     55.47    24.4     2.70     2.97     6      50.00    25.0     6317.04        0.00     2046.72
0.97
 20      248.69     85.13    23.0     4.18     4.54     6      50.00    25.0     9657.64        0.00     2039.91
0.96
 21      252.86     75.15    23.0     3.73     4.05     2      10.00    35.0     8475.02        0.00     1906.97
0.91
 22      256.59     79.38    21.6     3.99     4.29     2      10.00    35.0     8948.60        0.00     1901.04
0.91
 23      260.58     78.01    21.6     3.99     4.29     2      10.00    35.0     8791.87        0.00     1867.72
0.91
 24      264.57     77.14    20.2     4.03     4.29     2      10.00    35.0     8689.53        0.00     1848.62
0.91
 25      268.60     75.29    20.2     4.03     4.29     2      10.00    35.0     8477.38        0.00     1803.43
0.91
 26      272.63     73.85    18.8     4.06     4.29     2      10.00    35.0     8310.11        0.00     1771.61
0.92
 27      276.70     71.52    18.8     4.06     4.29     2      10.00    35.0     8041.56        0.00     1714.29
0.92
```

```
 28      280.76     67.54    17.4     3.98     4.17     2       10.00    35.0      7587.50        0.00      1670.11
0.92
 29      284.74     64.87    17.4     3.98     4.17     2       10.00    35.0      7280.95        0.00      1602.50
0.92
 30      288.72     48.81    16.1     3.11     3.24     2       10.00    35.0      5507.86        0.00      1564.01
0.92
 31      291.83     46.92    16.0     3.11     3.24     2       10.00    35.0      5360.33        0.00      1523.34
0.92
 32      294.94     32.90    16.0     2.26     2.35     2       10.00    35.0      3783.95        0.00      1479.77
0.92
 33      297.21     57.58    14.6     4.15     4.29     2       10.00    35.0      6622.21        0.00      1425.49
0.93
 34      301.36     53.76    14.6     4.15     4.29     2       10.00    35.0      6182.70        0.00      1330.77
0.93
 35      305.52     50.00    13.2     4.18     4.29     2       10.00    35.0      5750.21        0.00      1243.33
0.93
 36      309.70     45.68    13.2     4.18     4.29     2       10.00    35.0      5252.64        0.00      1135.62
0.93
 37      313.88     41.34    11.8     4.20     4.29     2       10.00    35.0      4753.61        0.00      1032.94
0.93
 38      318.08     36.51    11.8     4.20     4.29     2       10.00    35.0      4198.53        0.00       912.18
0.93
 39      322.28     31.59    10.4     4.22     4.29     2       10.00    35.0      3633.40        0.00       793.93
0.94
 40      326.51     26.27    10.4     4.22     4.29     2       10.00    35.0      3020.62        0.00       659.89
0.94
 41      330.73     20.79     9.0     4.24     4.29     2       10.00    35.0      2390.57        0.00       525.48
0.95
 42      334.97     14.96     9.0     4.24     4.29     2       10.00    35.0      1720.48        0.00       377.90
0.95
 43      339.21      8.74     7.6     4.12     4.16     2       10.00    35.0      1005.03        0.00       229.45
0.95
 44      343.33      2.79     7.6     4.39     4.43     2       10.00    35.0       321.38        0.00        68.25
0.95
                   --------                  -------                        ----------
     X-S Area:    1964.62    Path Length:    163.14          X-S Weight:   219535.92
```

```
DATA: Analysis  1 - Slope Stability - Case SS-6 Mining Slope - Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4596.00         600.00     4596.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4591.65         198.50     4591.65
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    198.50     4594.67         201.50     4594.67
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    201.50     4591.65         600.00     4591.65
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4573.65         198.50     4573.65
Profile:  6 (2 points)   Material beneath:  6 - Clay
    201.50     4573.65         600.00     4573.65
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4571.17         198.50     4571.17
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    201.50     4571.17         600.00     4571.17
Profile:  9 (3 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4518.00          22.27     4522.00         198.50     4539.33
Profile: 10 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    201.50     4539.33         252.56     4545.03         316.47     4546.18         433.64     4548.29         600.00
  4549.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4516.00          22.27     4520.00         198.50     4537.33         201.50     4537.33         252.56
  4543.03
    316.47     4544.18         433.64     4546.29         600.00     4547.00

Slope Surface (10 points)
-------------
      0.00     4592.65         116.00     4593.44         152.70     4594.19         158.60     4594.32         198.50
  4594.67
    201.50     4594.67         215.01     4594.91         316.47     4546.18         433.64     4548.29         600.00
  4549.00

Phreatic Surface (4 points)
----------------
      0.00     4576.67         198.50     4576.67         201.50     4546.18         316.47     4546.18

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     175.00      YL:    4594.46      XR:     316.47      YR:    4546.18
      Centre:  XC:     314.28      YC:    4771.17                Radius:  R:     225.00

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-6 Mining Slope - 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:   2.057

Analysis Summary

There were:  15098 successful analyses from a total of 20001 trial failure surfaces
             4903 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.92
__________________________________________

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       180.00     4594.51      316.73     4546.19      353.93     4869.05      325.00     1.924   <-- Critical
Surface
   2       180.00     4594.51      316.21     4546.31      353.81     4869.12      325.00     1.924
   3       180.00     4594.51      316.73     4546.19      352.54     4865.10      320.92     1.925
   4       180.00     4594.51      316.21     4546.31      352.42     4865.18      320.92     1.925
   5       180.00     4594.51      316.73     4546.19      351.14     4861.15      316.84     1.925
   6       180.00     4594.51      316.21     4546.31      351.02     4861.23      316.84     1.926
   7       180.00     4594.51      316.73     4546.19      349.74     4857.19      312.76     1.926
   8       180.00     4594.51      316.21     4546.31      349.62     4857.27      312.76     1.927
   9       180.00     4594.51      315.68     4546.56      353.44     4869.36      325.00     1.927
  10       180.00     4594.51      316.73     4546.19      348.34     4853.24      308.67     1.927
  11       180.00     4594.51      315.68     4546.56      352.05     4865.41      320.92     1.928
  12       180.00     4594.51      316.21     4546.31      348.22     4853.32      308.67     1.928
  13       180.00     4594.51      316.73     4546.19      346.94     4849.27      304.59     1.928
  14       180.00     4594.51      315.68     4546.56      350.65     4861.46      316.84     1.928
  15       180.00     4594.51      316.21     4546.31      346.82     4849.36      304.59     1.929
  16       180.00     4594.51      316.73     4546.19      345.54     4845.31      300.51     1.929
  17       180.00     4594.51      315.68     4546.56      349.25     4857.51      312.76     1.929
  18       180.00     4594.51      315.15     4546.81      353.07     4869.59      325.00     1.929
  19       180.00     4594.51      316.21     4546.31      345.42     4845.39      300.51     1.930
  20       180.00     4594.51      315.15     4546.81      351.68     4865.65      320.92     1.930
  21       180.00     4594.51      315.68     4546.56      347.86     4853.55      308.67     1.930
  22       180.00     4594.51      315.15     4546.81      350.28     4861.70      316.84     1.931
  23       180.00     4594.51      315.68     4546.56      346.46     4849.59      304.59     1.931
  24       180.00     4594.51      315.15     4546.81      348.89     4857.74      312.76     1.932
  25       180.00     4594.51      314.63     4547.06      352.70     4869.83      325.00     1.932
  26       179.47     4594.50      316.73     4546.19      353.28     4869.12      325.00     1.932
  27       180.00     4594.51      315.68     4546.56      345.06     4845.63      300.51     1.932
  28       180.00     4594.51      316.73     4546.19      342.74     4837.37      292.35     1.932
  29       180.00     4594.51      314.63     4547.06      351.31     4865.88      320.92     1.933
  30       180.00     4594.51      315.15     4546.81      347.49     4853.79      308.67     1.933
  31       180.00     4594.51      316.73     4546.19      341.33     4833.40      288.27     1.933
```

32	179.47	4594.50	316.21	4546.31	353.16	4869.20	325.00	1.933
33	179.47	4594.50	316.73	4546.19	351.89	4865.17	320.92	1.933
34	180.00	4594.51	316.73	4546.19	344.14	4841.34	296.43	1.933
35	180.00	4594.51	315.68	4546.56	343.66	4841.67	296.43	1.933
36	180.00	4594.51	314.63	4547.06	349.91	4861.93	316.84	1.933
37	180.00	4594.51	316.21	4546.31	341.20	4833.49	288.27	1.934
38	179.47	4594.50	316.21	4546.31	351.77	4865.25	320.92	1.934
39	180.00	4594.51	315.15	4546.81	346.10	4849.83	304.59	1.934
40	179.47	4594.50	316.73	4546.19	350.50	4861.22	316.84	1.934
41	180.00	4594.51	316.21	4546.31	342.61	4837.46	292.35	1.934
42	180.00	4594.51	316.73	4546.19	339.93	4829.42	284.18	1.934
43	180.00	4594.51	314.63	4547.06	348.52	4857.98	312.76	1.934
44	179.47	4594.50	316.21	4546.31	350.37	4861.30	316.84	1.934
45	180.00	4594.51	314.10	4547.32	352.32	4870.06	325.00	1.934
46	180.00	4594.51	316.21	4546.31	344.01	4841.43	296.43	1.934
47	179.47	4594.50	316.73	4546.19	349.10	4857.26	312.76	1.935
48	180.00	4594.51	315.15	4546.81	344.70	4845.87	300.51	1.935
49	180.00	4594.51	316.21	4546.31	339.80	4829.51	284.18	1.935
50	180.00	4594.51	314.63	4547.06	347.13	4854.02	308.67	1.935
51	180.00	4594.51	314.10	4547.32	350.93	4866.12	320.92	1.935
52	179.47	4594.50	315.68	4546.56	352.79	4869.43	325.00	1.935
53	179.47	4594.50	316.21	4546.31	348.98	4857.34	312.76	1.935
54	179.47	4594.50	316.73	4546.19	347.71	4853.30	308.67	1.935
55	180.00	4594.51	316.73	4546.19	338.52	4825.44	280.10	1.936
56	180.00	4594.51	315.15	4546.81	343.30	4841.90	296.43	1.936
57	180.00	4594.51	314.10	4547.32	349.54	4862.17	316.84	1.936
58	179.47	4594.50	315.68	4546.56	351.40	4865.48	320.92	1.936
59	180.00	4594.51	314.63	4547.06	345.73	4850.06	304.59	1.936
60	179.47	4594.50	316.21	4546.31	347.58	4853.38	308.67	1.936
61	180.00	4594.51	316.21	4546.31	338.39	4825.53	280.10	1.936
62	180.00	4594.51	315.68	4546.56	340.85	4833.72	288.27	1.936
63	180.00	4594.51	314.10	4547.32	348.15	4858.21	312.76	1.937
64	179.47	4594.50	315.68	4546.56	350.01	4861.53	316.84	1.937
65	180.00	4594.51	315.15	4546.81	341.90	4837.93	292.35	1.937
66	180.00	4594.51	316.21	4546.31	335.56	4817.56	271.94	1.937
67	180.00	4594.51	313.58	4547.57	351.95	4870.30	325.00	1.937
68	180.00	4594.51	316.73	4546.19	337.11	4821.45	276.02	1.937
69	180.00	4594.51	314.63	4547.06	344.34	4846.10	300.51	1.937
70	180.00	4594.51	315.68	4546.56	339.44	4829.75	284.18	1.937
71	180.00	4594.51	315.68	4546.56	342.25	4837.70	292.35	1.937
72	180.00	4594.51	314.10	4547.32	346.76	4854.26	308.67	1.938
73	180.00	4594.51	313.58	4547.57	350.56	4866.35	320.92	1.938
74	179.47	4594.50	315.68	4546.56	348.61	4857.58	312.76	1.938
75	179.47	4594.50	315.15	4546.81	352.41	4869.67	325.00	1.938
76	180.00	4594.51	316.21	4546.31	336.98	4821.54	276.02	1.938
77	180.00	4594.51	314.63	4547.06	342.94	4842.14	296.43	1.938
78	180.00	4594.51	315.68	4546.56	335.22	4817.80	271.94	1.938
79	180.00	4594.51	313.58	4547.57	349.17	4862.40	316.84	1.938
80	180.00	4594.51	314.10	4547.32	345.37	4850.30	304.59	1.939

```
  81       179.47     4594.50      315.15     4546.81      351.03     4865.72      320.92     1.939
  82       180.00     4594.51      315.68     4546.56      338.04     4825.77      280.10     1.939
  83       179.47     4594.50      315.68     4546.56      347.22     4853.62      308.67     1.939
  84       179.47     4594.50      316.73     4546.19      343.52     4841.40      296.43     1.939
  85       179.47     4594.50      316.73     4546.19      344.92     4845.37      300.51     1.939
  86       180.00     4594.51      316.73     4546.19      335.70     4817.46      271.94     1.939
  87       180.00     4594.51      313.58     4547.57      347.78     4858.45      312.76     1.939
  88       180.00     4594.51      314.63     4547.06      341.54     4838.17      292.35     1.939
  89       179.47     4594.50      315.15     4546.81      349.64     4861.77      316.84     1.939
  90       180.00     4594.51      315.15     4546.81      339.09     4829.99      284.18     1.939
  91       179.47     4594.50      316.21     4546.31      343.39     4841.49      296.43     1.939
  92       180.00     4594.51      314.10     4547.32      343.97     4846.34      300.51     1.940
  93       180.00     4594.51      313.05     4547.82      351.57     4870.53      325.00     1.940
  94       179.47     4594.50      315.68     4546.56      345.83     4849.66      304.59     1.940
  95       179.47     4594.50      316.73     4546.19      346.31     4849.34      304.59     1.940
  96       179.47     4594.50      316.73     4546.19      342.12     4837.43      292.35     1.940
  97       180.00     4594.51      315.15     4546.81      340.50     4833.96      288.27     1.940
  98       180.00     4594.51      315.68     4546.56      336.63     4821.78      276.02     1.940
  99       180.00     4594.51      313.58     4547.57      346.39     4854.49      308.67     1.940

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     180.00      YL:    4594.51      XR:     316.73      YR:    4546.19
    Centre:  XC:     353.93      YC:    4869.05                  Radius:  R:     325.00
Generated failure surface: (20 points)
    180.00   4594.51          186.55   4590.47          193.20   4586.58          199.93   4582.85          206.75
4579.29
    213.65   4575.88          220.64   4572.64          227.69   4569.57          234.82   4566.66          242.02
4563.93
    249.27   4561.36          256.59   4558.97          263.96   4556.75          271.38   4554.71          278.85
4552.84
    286.36   4551.15          293.91   4549.64          301.49   4548.31          309.10   4547.16          316.73
4546.19

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      180.00      1.68    31.7     2.32     2.72     6      50.00    25.0       167.69        0.00         49.04
1.02
  2      182.32      5.03    31.7     2.32     2.72     6      50.00    25.0       503.42        0.00        175.14
1.02
  3      184.63      6.71    31.7     1.92     2.25     2      10.00    35.0       688.40        0.00        290.32
0.96
  4      186.55     16.89    30.3     3.32     3.85     2      10.00    35.0      1796.74        0.00        443.40
0.96
  5      189.87     23.45    30.3     3.32     3.85     2      10.00    35.0      2548.94        0.00        630.08
```

```
0.96
  6      193.20     23.31    29.0     2.65     3.03      2      10.00    35.0      2562.18        0.00       801.58
0.95
  7      195.85     27.27    29.0     2.65     3.03      2      10.00    35.0      3016.14        0.00       944.08
0.95
  8      198.50     16.33    29.0     1.43     1.63      5       0.00    45.0      1632.95        0.00       886.94
0.89
  9      199.93     19.20    27.6     1.57     1.77      5       0.00    45.0      1920.20        0.00       961.43
0.89
 10      201.50     35.04    27.6     2.63     2.96      2      10.00    35.0      3910.28        0.00      1249.04
0.95
 11      204.13     38.77    27.6     2.63     2.96      2      10.00    35.0      4336.83        0.00      1385.47
0.95
 12      206.75     56.47    26.2     3.45     3.85      2      10.00    35.0      6331.12        0.00      1552.89
0.95
 13      210.20     62.56    26.2     3.45     3.85      2      10.00    35.0      7028.06        0.00      1724.06
0.95
 14      213.65     26.21    24.9     1.36     1.49      2      10.00    35.0      2947.96        0.00      1858.21
0.94
 15      215.01     67.79    24.9     3.45     3.81      2      10.00    35.0      7669.86        0.00      1897.99
0.94
 16      218.46     42.56    24.9     2.17     2.40      6      50.00    25.0      4842.46        0.00      1992.27
0.99
 17      220.64     22.70    23.5     1.16     1.27      6      50.00    25.0      2583.59        0.00      2001.44
0.99
 18      221.80     43.16    23.5     2.22     2.42      6      50.00    25.0      4896.57        0.00      1987.34
0.99
 19      224.02     71.11    23.5     3.68     4.01      2      10.00    35.0      8040.61        0.00      1884.95
0.94
 20      227.69     68.15    22.2     3.56     3.85      2      10.00    35.0      7704.22        0.00      1880.53
0.94
 21      231.26     67.22    22.2     3.56     3.85      2      10.00    35.0      7598.12        0.00      1854.69
0.94
 22      234.82     66.74    20.8     3.60     3.85      2      10.00    35.0      7541.47        0.00      1839.76
0.94
 23      238.42     65.45    20.8     3.60     3.85      2      10.00    35.0      7392.39        0.00      1803.44
0.94
 24      242.02     64.53    19.5     3.63     3.85      2      10.00    35.0      7285.94        0.00      1777.43
0.94
 25      245.64     62.86    19.5     3.63     3.85      2      10.00    35.0      7093.82        0.00      1730.44
0.94
 26      249.27     61.50    18.1     3.66     3.85      2      10.00    35.0      6936.50        0.00      1693.09
0.94
 27      252.93     59.45    18.1     3.66     3.85      2      10.00    35.0      6700.31        0.00      1635.31
0.94
 28      256.59     42.26    16.8     2.69     2.81      2      10.00    35.0      4759.46        0.00      1595.40
0.94
 29      259.28     35.79    16.7     2.34     2.45      2      10.00    35.0      4048.15        0.00      1556.38
0.94
```

```
 30      261.62     34.80    16.8     2.34     2.45     2      10.00    35.0      3974.48        0.00      1527.91
0.94
 31      263.96     52.94    15.4     3.71     3.85     2      10.00    35.0      6088.62        0.00      1490.14
0.94
 32      267.67     50.12    15.4     3.71     3.85     2      10.00    35.0      5764.20        0.00      1410.68
0.94
 33      271.38     47.41    14.0     3.73     3.85     2      10.00    35.0      5452.20        0.00      1337.24
0.94
 34      275.11     44.20    14.0     3.73     3.85     2      10.00    35.0      5083.16        0.00      1246.66
0.94
 35      278.85     41.04    12.7     3.75     3.85     2      10.00    35.0      4719.24        0.00      1160.70
0.95
 36      282.60     37.43    12.7     3.75     3.85     2      10.00    35.0      4304.97        0.00      1058.66
0.95
 37      286.36     33.82    11.3     3.77     3.85     2      10.00    35.0      3889.51        0.00       959.72
0.95
 38      290.13     29.83    11.3     3.77     3.85     2      10.00    35.0      3430.73        0.00       846.36
0.95
 39      293.91     25.78    10.0     3.79     3.85     2      10.00    35.0      2964.16        0.00       734.12
0.95
 40      297.70     21.40    10.0     3.79     3.85     2      10.00    35.0      2460.76        0.00       609.30
0.95
 41      301.49     16.90     8.6     3.81     3.85     2      10.00    35.0      1943.81        0.00       483.39
0.96
 42      305.29     12.14     8.6     3.81     3.85     2      10.00    35.0      1395.94        0.00       346.95
0.96
 43      309.10      7.05     7.3     3.69     3.72     2      10.00    35.0       811.19        0.00       209.68
0.96
 44      312.78      2.23     7.3     3.95     3.98     2      10.00    35.0       256.81        0.00        61.51
0.96
                 --------                   -------                              ----------
     X-S Area:    1657.28    Path Length:    146.25               X-S Weight:   187024.14
```

```
DATA: Analysis  1 - Slope Stability - Case SS-6 Mining Slope - Pseudo Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (11 profiles)
-----------------
Profile:  1 (2 points)   Material beneath:  6 - Clay
      0.00     4596.00         600.00     4596.00
Profile:  2 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4591.65         198.50     4591.65
Profile:  3 (2 points)   Material beneath:  5 - Slurry Wall
```

```
    198.50     4594.67         201.50     4594.67
Profile:  4 (2 points)   Material beneath:  2 - Sand and Gravel
    201.50     4591.65         600.00     4591.65
Profile:  5 (2 points)   Material beneath:  6 - Clay
      0.00     4573.65         198.50     4573.65
Profile:  6 (2 points)   Material beneath:  6 - Clay
    201.50     4573.65         600.00     4573.65
Profile:  7 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4571.17         198.50     4571.17
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
    201.50     4571.17         600.00     4571.17
Profile:  9 (3 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4518.00          22.27     4522.00         198.50     4539.33
Profile: 10 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    201.50     4539.33         252.56     4545.03         316.47     4546.18         433.64     4548.29         600.00
  4549.00
Profile: 11 (8 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4516.00          22.27     4520.00         198.50     4537.33         201.50     4537.33         252.56
  4543.03
    316.47     4544.18         433.64     4546.29         600.00     4547.00

Slope Surface (10 points)
-------------
      0.00     4592.65         116.00     4593.44         152.70     4594.19         158.60     4594.32         198.50
  4594.67
    201.50     4594.67         215.01     4594.91         316.47     4546.18         433.64     4548.29         600.00
  4549.00

Phreatic Surface (4 points)
----------------
      0.00     4576.67         198.50     4576.67         201.50     4546.18         316.47     4546.18

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     175.00      YL:    4594.46      XR:     316.47      YR:    4546.18
      Centre:  XC:     314.28      YC:    4771.17                   Radius:  R:     225.00

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     200.00
Trial positions within range:      20         20         50

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

```
--  --  --  -

RESULTS: Analysis  1 - Slope Stability - Case SS-6 Mining Slope - Pseudo 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:   1.720

Analysis Summary

There were:  15098 successful analyses from a total of 20001 trial failure surfaces
             4903 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.61


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       180.00     4594.51      316.73     4546.19      353.93     4869.05      325.00     1.612   <-- Critical
Surface
   2       180.00     4594.51      316.21     4546.31      353.81     4869.12      325.00     1.612
   3       180.00     4594.51      316.73     4546.19      352.54     4865.10      320.92     1.613
   4       180.00     4594.51      316.21     4546.31      352.42     4865.18      320.92     1.613
   5       180.00     4594.51      316.73     4546.19      351.14     4861.15      316.84     1.613
   6       180.00     4594.51      316.21     4546.31      351.02     4861.23      316.84     1.614
   7       180.00     4594.51      315.68     4546.56      353.44     4869.36      325.00     1.614
   8       180.00     4594.51      316.73     4546.19      349.74     4857.19      312.76     1.614
   9       180.00     4594.51      316.21     4546.31      349.62     4857.27      312.76     1.615
  10       180.00     4594.51      315.68     4546.56      352.05     4865.41      320.92     1.615
  11       180.00     4594.51      316.73     4546.19      348.34     4853.24      308.67     1.615
  12       180.00     4594.51      315.68     4546.56      350.65     4861.46      316.84     1.616
  13       180.00     4594.51      316.21     4546.31      348.22     4853.32      308.67     1.616
  14       180.00     4594.51      315.15     4546.81      353.07     4869.59      325.00     1.616
  15       180.00     4594.51      316.73     4546.19      346.94     4849.27      304.59     1.616
  16       180.00     4594.51      315.68     4546.56      349.25     4857.51      312.76     1.616
  17       180.00     4594.51      315.15     4546.81      351.68     4865.65      320.92     1.617
  18       180.00     4594.51      316.21     4546.31      346.82     4849.36      304.59     1.617
  19       180.00     4594.51      316.73     4546.19      345.54     4845.31      300.51     1.617
  20       180.00     4594.51      315.15     4546.81      350.28     4861.70      316.84     1.617
  21       180.00     4594.51      315.68     4546.56      347.86     4853.55      308.67     1.617
  22       180.00     4594.51      314.63     4547.06      352.70     4869.83      325.00     1.618
  23       180.00     4594.51      316.21     4546.31      345.42     4845.39      300.51     1.618
  24       179.47     4594.50      316.73     4546.19      353.28     4869.12      325.00     1.618
  25       180.00     4594.51      315.15     4546.81      348.89     4857.74      312.76     1.618
  26       180.00     4594.51      314.63     4547.06      351.31     4865.88      320.92     1.618
  27       180.00     4594.51      315.68     4546.56      346.46     4849.59      304.59     1.618
```

28	179.47	4594.50	316.21	4546.31	353.16	4869.20	325.00	1.619
29	179.47	4594.50	316.73	4546.19	351.89	4865.17	320.92	1.619
30	180.00	4594.51	315.15	4546.81	347.49	4853.79	308.67	1.619
31	180.00	4594.51	314.63	4547.06	349.91	4861.93	316.84	1.619
32	179.47	4594.50	316.21	4546.31	351.77	4865.25	320.92	1.619
33	180.00	4594.51	315.68	4546.56	345.06	4845.63	300.51	1.619
34	180.00	4594.51	314.10	4547.32	352.32	4870.06	325.00	1.619
35	179.47	4594.50	316.73	4546.19	350.50	4861.22	316.84	1.620
36	180.00	4594.51	314.63	4547.06	348.52	4857.98	312.76	1.620
37	180.00	4594.51	315.15	4546.81	346.10	4849.83	304.59	1.620
38	180.00	4594.51	314.10	4547.32	350.93	4866.12	320.92	1.620
39	179.47	4594.50	316.21	4546.31	350.37	4861.30	316.84	1.620
40	180.00	4594.51	316.73	4546.19	342.74	4837.37	292.35	1.620
41	179.47	4594.50	315.68	4546.56	352.79	4869.43	325.00	1.620
42	180.00	4594.51	315.68	4546.56	343.66	4841.67	296.43	1.620
43	179.47	4594.50	316.73	4546.19	349.10	4857.26	312.76	1.620
44	180.00	4594.51	316.73	4546.19	341.33	4833.40	288.27	1.621
45	180.00	4594.51	316.73	4546.19	344.14	4841.34	296.43	1.621
46	180.00	4594.51	314.63	4547.06	347.13	4854.02	308.67	1.621
47	180.00	4594.51	314.10	4547.32	349.54	4862.17	316.84	1.621
48	180.00	4594.51	315.15	4546.81	344.70	4845.87	300.51	1.621
49	179.47	4594.50	316.21	4546.31	348.98	4857.34	312.76	1.621
50	179.47	4594.50	315.68	4546.56	351.40	4865.48	320.92	1.621
51	180.00	4594.51	316.21	4546.31	342.61	4837.46	292.35	1.621
52	180.00	4594.51	316.21	4546.31	341.20	4833.49	288.27	1.621
53	180.00	4594.51	313.58	4547.57	351.95	4870.30	325.00	1.621
54	179.47	4594.50	316.73	4546.19	347.71	4853.30	308.67	1.621
55	180.00	4594.51	316.21	4546.31	344.01	4841.43	296.43	1.622
56	180.00	4594.51	314.10	4547.32	348.15	4858.21	312.76	1.622
57	180.00	4594.51	314.63	4547.06	345.73	4850.06	304.59	1.622
58	179.47	4594.50	315.68	4546.56	350.01	4861.53	316.84	1.622
59	180.00	4594.51	313.58	4547.57	350.56	4866.35	320.92	1.622
60	180.00	4594.51	316.73	4546.19	339.93	4829.42	284.18	1.622
61	179.47	4594.50	316.21	4546.31	347.58	4853.38	308.67	1.622
62	179.47	4594.50	315.15	4546.81	352.41	4869.67	325.00	1.622
63	180.00	4594.51	315.15	4546.81	343.30	4841.90	296.43	1.622
64	180.00	4594.51	316.21	4546.31	339.80	4829.51	284.18	1.622
65	180.00	4594.51	314.10	4547.32	346.76	4854.26	308.67	1.623
66	180.00	4594.51	313.58	4547.57	349.17	4862.40	316.84	1.623
67	180.00	4594.51	314.63	4547.06	344.34	4846.10	300.51	1.623
68	179.47	4594.50	315.68	4546.56	348.61	4857.58	312.76	1.623
69	179.47	4594.50	315.15	4546.81	351.03	4865.72	320.92	1.623
70	180.00	4594.51	313.05	4547.82	351.57	4870.53	325.00	1.623
71	180.00	4594.51	315.15	4546.81	341.90	4837.93	292.35	1.623
72	180.00	4594.51	316.73	4546.19	338.52	4825.44	280.10	1.623
73	180.00	4594.51	315.68	4546.56	340.85	4833.72	288.27	1.623
74	180.00	4594.51	314.10	4547.32	345.37	4850.30	304.59	1.623
75	180.00	4594.51	313.58	4547.57	347.78	4858.45	312.76	1.623
76	179.47	4594.50	315.15	4546.81	349.64	4861.77	316.84	1.624

```
  77       179.47     4594.50      315.68     4546.56      347.22     4853.62      308.67     1.624
  78       180.00     4594.51      313.05     4547.82      350.18     4866.59      320.92     1.624
  79       180.00     4594.51      314.63     4547.06      342.94     4842.14      296.43     1.624
  80       180.00     4594.51      315.68     4546.56      342.25     4837.70      292.35     1.624
  81       180.00     4594.51      316.21     4546.31      338.39     4825.53      280.10     1.624
  82       179.47     4594.50      314.63     4547.06      352.04     4869.90      325.00     1.624
  83       180.00     4594.51      315.68     4546.56      339.44     4829.75      284.18     1.624
  84       178.95     4594.50      316.73     4546.19      352.63     4869.20      325.00     1.624
  85       180.00     4594.51      313.58     4547.57      346.39     4854.49      308.67     1.624
  86       180.00     4594.51      314.10     4547.32      343.97     4846.34      300.51     1.624
  87       180.00     4594.51      313.05     4547.82      348.80     4862.64      316.84     1.624
  88       179.47     4594.50      315.15     4546.81      348.25     4857.81      312.76     1.624
  89       179.47     4594.50      316.73     4546.19      343.52     4841.40      296.43     1.625
  90       179.47     4594.50      314.63     4547.06      350.65     4865.96      320.92     1.625
  91       179.47     4594.50      315.68     4546.56      345.83     4849.66      304.59     1.625
  92       179.47     4594.50      316.73     4546.19      344.92     4845.37      300.51     1.625
  93       178.95     4594.50      316.21     4546.31      352.51     4869.27      325.00     1.625
  94       180.00     4594.51      316.73     4546.19      337.11     4821.45      276.02     1.625
  95       180.00     4594.51      316.21     4546.31      335.56     4817.56      271.94     1.625
  96       180.00     4594.51      314.63     4547.06      341.54     4838.17      292.35     1.625
  97       180.00     4594.51      312.52     4548.08      351.19     4870.77      325.00     1.625
  98       178.95     4594.50      316.73     4546.19      351.24     4865.24      320.92     1.625
  99       180.00     4594.51      312.00     4548.33      350.81     4871.00      325.00     1.625

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     180.00      YL:    4594.51      XR:     316.73      YR:    4546.19
    Centre:  XC:     353.93      YC:    4869.05                Radius:  R:     325.00
Generated failure surface: (20 points)
    180.00   4594.51          186.55   4590.47          193.20   4586.58          199.93   4582.85          206.75
4579.29
    213.65   4575.88          220.64   4572.64          227.69   4569.57          234.82   4566.66          242.02
4563.93
    249.27   4561.36          256.59   4558.97          263.96   4556.75          271.38   4554.71          278.85
4552.84
    286.36   4551.15          293.91   4549.64          301.49   4548.31          309.10   4547.16          316.73
4546.19

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      180.00      1.68    31.7     2.32     2.72     6      50.00    25.0       167.69        0.00          45.21
1.00
  2      182.32      5.03    31.7     2.32     2.72     6      50.00    25.0       503.42        0.00         168.21
1.00
  3      184.63      6.71    31.7     1.92     2.25     2      10.00    35.0       688.40        0.00         279.88
```

```
0.93
  4      186.55     16.89    30.3     3.32     3.85     2       10.00    35.0      1796.74        0.00        428.37
0.92
  5      189.87     23.45    30.3     3.32     3.85     2       10.00    35.0      2548.94        0.00        608.92
0.92
  6      193.20     23.31    29.0     2.65     3.03     2       10.00    35.0      2562.18        0.00        775.94
0.92
  7      195.85     27.27    29.0     2.65     3.03     2       10.00    35.0      3016.14        0.00        913.97
0.92
  8      198.50     16.33    29.0     1.43     1.63     5        0.00    45.0      1632.95        0.00        850.18
0.85
  9      199.93     19.20    27.6     1.57     1.77     5        0.00    45.0      1920.20        0.00        923.24
0.85
 10      201.50     35.04    27.6     2.63     2.96     2       10.00    35.0      3910.28        0.00       1211.13
0.92
 11      204.13     38.77    27.6     2.63     2.96     2       10.00    35.0      4336.83        0.00       1343.45
0.92
 12      206.75     56.47    26.2     3.45     3.85     2       10.00    35.0      6331.12        0.00       1508.06
0.92
 13      210.20     62.56    26.2     3.45     3.85     2       10.00    35.0      7028.06        0.00       1674.34
0.92
 14      213.65     26.21    24.9     1.36     1.49     2       10.00    35.0      2947.96        0.00       1807.29
0.92
 15      215.01     67.79    24.9     3.45     3.81     2       10.00    35.0      7669.86        0.00       1845.97
0.92
 16      218.46     42.56    24.9     2.17     2.40     6       50.00    25.0      4842.46        0.00       1951.98
0.97
 17      220.64     22.70    23.5     1.16     1.27     6       50.00    25.0      2583.59        0.00       1963.18
0.97
 18      221.80     43.16    23.5     2.22     2.42     6       50.00    25.0      4896.57        0.00       1949.33
0.97
 19      224.02     71.11    23.5     3.68     4.01     2       10.00    35.0      8040.61        0.00       1835.96
0.92
 20      227.69     68.15    22.2     3.56     3.85     2       10.00    35.0      7704.22        0.00       1834.30
0.92
 21      231.26     67.22    22.2     3.56     3.85     2       10.00    35.0      7598.12        0.00       1809.11
0.92
 22      234.82     66.74    20.8     3.60     3.85     2       10.00    35.0      7541.47        0.00       1797.14
0.92
 23      238.42     65.45    20.8     3.60     3.85     2       10.00    35.0      7392.39        0.00       1761.66
0.92
 24      242.02     64.53    19.5     3.63     3.85     2       10.00    35.0      7285.94        0.00       1738.77
0.92
 25      245.64     62.86    19.5     3.63     3.85     2       10.00    35.0      7093.82        0.00       1692.78
0.92
 26      249.27     61.50    18.1     3.66     3.85     2       10.00    35.0      6936.50        0.00       1658.67
0.92
 27      252.93     59.45    18.1     3.66     3.85     2       10.00    35.0      6700.31        0.00       1602.04
0.92
```

```
 28      256.59     42.26    16.8     2.69     2.81     2      10.00    35.0      4759.46        0.00      1565.21
0.92
 29      259.28     35.79    16.7     2.34     2.45     2      10.00    35.0      4048.15        0.00      1526.95
0.92
 30      261.62     34.80    16.8     2.34     2.45     2      10.00    35.0      3974.48        0.00      1498.99
0.92
 31      263.96     52.94    15.4     3.71     3.85     2      10.00    35.0      6088.62        0.00      1464.09
0.93
 32      267.67     50.12    15.4     3.71     3.85     2      10.00    35.0      5764.20        0.00      1386.00
0.93
 33      271.38     47.41    14.0     3.73     3.85     2      10.00    35.0      5452.20        0.00      1315.77
0.93
 34      275.11     44.20    14.0     3.73     3.85     2      10.00    35.0      5083.16        0.00      1226.62
0.93
 35      278.85     41.04    12.7     3.75     3.85     2      10.00    35.0      4719.24        0.00      1143.75
0.93
 36      282.60     37.43    12.7     3.75     3.85     2      10.00    35.0      4304.97        0.00      1043.17
0.93
 37      286.36     33.82    11.3     3.77     3.85     2      10.00    35.0      3889.51        0.00       947.08
0.94
 38      290.13     29.83    11.3     3.77     3.85     2      10.00    35.0      3430.73        0.00       835.19
0.94
 39      293.91     25.78    10.0     3.79     3.85     2      10.00    35.0      2964.16        0.00       725.51
0.94
 40      297.70     21.40    10.0     3.79     3.85     2      10.00    35.0      2460.76        0.00       602.13
0.94
 41      301.49     16.90     8.6     3.81     3.85     2      10.00    35.0      1943.81        0.00       478.41
0.95
 42      305.29     12.14     8.6     3.81     3.85     2      10.00    35.0      1395.94        0.00       343.34
0.95
 43      309.10      7.05     7.3     3.69     3.72     2      10.00    35.0       811.19        0.00       207.78
0.96
 44      312.78      2.23     7.3     3.95     3.98     2      10.00    35.0       256.81        0.00        60.87
0.96
                 --------                   -------                            ----------
     X-S Area:    1657.28    Path Length:    146.25               X-S Weight:   187024.14
```

Reclamation Conditions

```
DATA: Analysis  1 - Slope Stability - Case SS-2 Reclamation Slope - Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (20 profiles)
-----------------
Profile:  1 (9 points)   Material beneath:  6 - Clay
      0.00     4618.10          57.07     4618.10         156.63     4617.39         166.52     4610.32         173.33
  4610.28
    182.26     4614.99         196.20     4614.14         200.00     4612.45         238.50     4607.18
Profile:  2 (3 points)   Material beneath:  6 - Clay
```

```
    241.50     4607.18         255.01     4606.76         613.33     4527.04
Profile:  3 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4606.18         238.50     4606.18
Profile:  4 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4606.18         256.17     4606.18         288.16     4590.18
Profile:  5 (2 points)   Material beneath:  5 - Slurry Wall
    238.50     4607.18         241.50     4607.18
Profile:  6 (2 points)   Material beneath:  6 - Clay
      0.00     4590.00         238.50     4590.00
Profile:  7 (3 points)   Material beneath:  6 - Clay
    241.50     4590.00         288.16     4590.00         300.16     4584.18
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4584.18         238.50     4584.18
Profile:  9 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4584.18         300.16     4584.18         306.16     4581.18
Profile: 10 (2 points)   Material beneath:  6 - Clay
      0.00     4581.18         238.50     4581.18
Profile: 11 (4 points)   Material beneath:  6 - Clay
    241.50     4581.18         300.16     4581.18         306.16     4581.18         310.15     4579.18
Profile: 12 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4579.18         238.50     4579.18
Profile: 13 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4579.18         310.15     4579.18         369.13     4549.68
Profile: 14 (2 points)   Material beneath:  6 - Clay
      0.00     4549.68         238.50     4549.68
Profile: 15 (3 points)   Material beneath:  6 - Clay
    241.50     4549.68         369.13     4549.68         372.13     4548.18
Profile: 16 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4548.18         238.50     4548.18
Profile: 17 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4548.18         372.13     4548.18         408.47     4529.98
Profile: 18 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4532.87          60.58     4532.87         190.93     4531.60         238.50     4531.61
Profile: 19 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    241.50     4531.61         408.47     4529.98         472.67     4530.14         613.33     4527.04         700.00
  4526.00
Profile: 20 (9 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4530.87          60.58     4530.87         190.93     4529.60         238.50     4529.61         241.50
  4529.61
    408.47     4529.98         472.67     4530.14         613.33     4527.04         700.00     4526.00

Slope Surface (13 points)
-------------
      0.00     4618.10          57.07     4618.10         156.63     4617.39         166.52     4610.32         173.33
  4610.28
    182.26     4614.99         196.20     4614.14         200.00     4612.45         238.50     4607.18         241.50
  4607.18
    255.01     4606.76         613.33     4527.04         700.00     4526.00
```

```
Phreatic Surface (7 points)
----------------
      0.00     4595.18         238.50     4595.18         241.50     4592.18         288.19     4590.18         511.59
  4549.68
    613.33     4527.04         700.00     4526.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     191.20      YL:    4614.44      XR:     613.33      YR:    4527.04
      Centre:  XC:     579.43      YC:    5426.40                  Radius:  R:     900.00

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     900.00
Trial positions within range:      20         20         50

-  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
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RESULTS: Analysis  1 - Slope Stability - Case SS-2 Reclamation Slope - 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:   3.056

Analysis Summary

There were:  17405 successful analyses from a total of 20001 trial failure surfaces
             2596 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.57


Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       195.67     4614.17      612.01     4527.33      611.24     5565.09     1037.76     1.567   <-- Critical
Surface
   2       195.15     4614.20      611.49     4527.45      606.69     5546.83     1019.39     1.567
   3       195.67     4614.17      611.49     4527.45      607.14     5546.83     1019.39     1.567
   4       195.15     4614.20      610.96     4527.57      606.42     5546.94     1019.39     1.568
   5       195.67     4614.17      610.96     4527.57      606.87     5546.95     1019.39     1.568
   6       195.15     4614.20      610.44     4527.68      606.15     5547.06     1019.39     1.569
   7       195.67     4614.17      610.44     4527.68      606.60     5547.06     1019.39     1.569
   8       195.15     4614.20      609.91     4527.80      605.88     5547.18     1019.39     1.570
```

9	196.20	4614.14	608.33	4528.15	586.77	5455.45	927.55	1.570
10	195.67	4614.17	609.91	4527.80	606.34	5547.18	1019.39	1.570
11	195.67	4614.17	608.86	4528.04	590.45	5473.77	945.92	1.571
12	195.67	4614.17	610.96	4527.57	603.04	5528.56	1001.02	1.571
13	195.67	4614.17	608.33	4528.15	586.33	5455.44	927.55	1.571
14	195.67	4614.17	611.49	4527.45	610.97	5565.20	1037.76	1.571
15	195.67	4614.17	610.44	4527.68	598.93	5510.27	982.65	1.571
16	195.15	4614.20	610.96	4527.57	602.59	5528.55	1001.02	1.571
17	195.67	4614.17	609.91	4527.80	594.82	5491.97	964.29	1.571
18	195.15	4614.20	609.91	4527.80	594.38	5491.96	964.29	1.572
19	195.15	4614.20	610.44	4527.68	598.49	5510.26	982.65	1.572
20	195.67	4614.17	610.44	4527.68	602.77	5528.68	1001.02	1.572
21	195.67	4614.17	608.33	4528.15	590.18	5473.90	945.92	1.572
22	195.15	4614.20	610.44	4527.68	602.32	5528.67	1001.02	1.572
23	195.67	4614.17	610.96	4527.57	610.70	5565.32	1037.76	1.573
24	195.67	4614.17	609.38	4527.92	594.56	5492.09	964.29	1.573
25	195.67	4614.17	609.91	4527.80	598.66	5510.39	982.65	1.573
26	195.67	4614.17	609.91	4527.80	602.50	5528.79	1001.02	1.573
27	195.15	4614.20	609.38	4527.92	594.11	5492.08	964.29	1.573
28	194.62	4614.24	611.49	4527.45	606.24	5546.82	1019.39	1.573
29	195.15	4614.20	608.86	4528.04	590.01	5473.77	945.92	1.573
30	195.15	4614.20	609.91	4527.80	598.22	5510.38	982.65	1.573
31	195.15	4614.20	608.33	4528.15	585.90	5455.43	927.55	1.573
32	195.67	4614.17	608.33	4528.15	594.02	5492.33	964.29	1.573
33	195.15	4614.20	609.91	4527.80	602.05	5528.79	1001.02	1.573
34	194.62	4614.24	610.96	4527.57	602.14	5528.55	1001.02	1.574
35	195.67	4614.17	609.38	4527.92	602.23	5528.91	1001.02	1.574
36	194.62	4614.24	609.91	4527.80	593.94	5491.96	964.29	1.574
37	194.62	4614.24	610.44	4527.68	598.04	5510.26	982.65	1.574
38	194.62	4614.24	610.96	4527.57	605.97	5546.94	1019.39	1.574
39	195.67	4614.17	610.44	4527.68	610.44	5565.44	1037.76	1.574
40	195.67	4614.17	609.38	4527.92	598.40	5510.51	982.65	1.574
41	195.67	4614.17	608.86	4528.04	594.29	5492.21	964.29	1.574
42	195.15	4614.20	610.96	4527.57	610.25	5565.32	1037.76	1.574
43	195.15	4614.20	608.86	4528.04	593.85	5492.20	964.29	1.574
44	195.15	4614.20	609.38	4527.92	605.62	5547.30	1019.39	1.574
45	195.15	4614.20	608.33	4528.15	589.74	5473.89	945.92	1.574
46	195.15	4614.20	609.38	4527.92	597.95	5510.50	982.65	1.574
47	195.15	4614.20	612.01	4527.33	614.61	5583.45	1056.12	1.574
48	194.62	4614.24	611.49	4527.45	610.07	5565.20	1037.76	1.574
49	195.15	4614.20	609.38	4527.92	601.79	5528.91	1001.02	1.574
50	195.67	4614.17	612.01	4527.33	615.07	5583.45	1056.12	1.574
51	194.62	4614.24	610.44	4527.68	601.88	5528.67	1001.02	1.575
52	195.67	4614.17	609.38	4527.92	606.07	5547.30	1019.39	1.575
53	195.67	4614.17	608.86	4528.04	601.97	5529.03	1001.02	1.575
54	195.67	4614.17	613.07	4527.10	623.26	5619.91	1092.86	1.575
55	194.62	4614.24	610.44	4527.68	605.70	5547.06	1019.39	1.575
56	194.62	4614.24	612.54	4527.22	618.25	5601.69	1074.49	1.575
57	195.15	4614.20	611.49	4527.45	610.52	5565.20	1037.76	1.575

```
  58        194.62     4614.24      609.38     4527.92      593.67     5492.08      964.29     1.575
  59        195.67     4614.17      608.86     4528.04      598.13     5510.63      982.65     1.575
  60        194.62     4614.24      609.91     4527.80      597.78     5510.38      982.65     1.575
  61        194.09     4614.27      611.49     4527.45      605.79     5546.82     1019.39     1.575
  62        194.62     4614.24      608.86     4528.04      589.57     5473.76      945.92     1.575
  63        195.15     4614.20      608.86     4528.04      597.69     5510.62      982.65     1.575
  64        194.62     4614.24      612.01     4527.33      614.16     5583.45     1056.12     1.575
  65        195.67     4614.17      609.91     4527.80      610.17     5565.56     1037.76     1.575
  66        195.15     4614.20      610.44     4527.68      609.98     5565.44     1037.76     1.575
  67        195.15     4614.20      608.86     4528.04      601.52     5529.03     1001.02     1.575
  68        195.15     4614.20      608.33     4528.15      593.58     5492.33      964.29     1.575
  69        194.62     4614.24      608.33     4528.15      585.46     5455.42      927.55     1.575
  70        195.15     4614.20      608.86     4528.04      605.35     5547.42     1019.39     1.576
  71        194.62     4614.24      609.91     4527.80      601.61     5528.79     1001.02     1.576
  72        194.09     4614.27      611.49     4527.45      609.62     5565.20     1037.76     1.576
  73        195.15     4614.20      611.49     4527.45      614.35     5583.57     1056.12     1.576
  74        194.62     4614.24      610.96     4527.57      609.80     5565.32     1037.76     1.576
  75        195.67     4614.17      608.33     4528.15      601.70     5529.15     1001.02     1.576
  76        194.09     4614.27      610.96     4527.57      601.70     5528.54     1001.02     1.576
  77        194.62     4614.24      609.91     4527.80      605.44     5547.18     1019.39     1.576
  78        195.67     4614.17      608.86     4528.04      605.80     5547.42     1019.39     1.576
  79        195.67     4614.17      611.49     4527.45      614.80     5583.57     1056.12     1.576
  80        195.15     4614.20      610.44     4527.68      613.81     5583.80     1056.12     1.576
  81        195.67     4614.17      612.54     4527.22      619.17     5601.69     1074.49     1.576
  82        194.09     4614.27      610.96     4527.57      605.53     5546.94     1019.39     1.576
  83        194.09     4614.27      610.44     4527.68      597.60     5510.25      982.65     1.576
  84        195.67     4614.17      608.33     4528.15      597.86     5510.75      982.65     1.576
  85        195.15     4614.20      608.33     4528.15      597.42     5510.75      982.65     1.576
  86        195.67     4614.17      613.59     4527.04      627.22     5638.18     1111.22     1.576
  87        194.62     4614.24      608.86     4528.04      593.41     5492.20      964.29     1.576
  88        195.67     4614.17      612.54     4527.22      622.99     5620.02     1092.86     1.576
  89        195.67     4614.17      614.12     4527.03      627.22     5638.18     1111.22     1.576
  90        195.15     4614.20      608.33     4528.15      601.25     5529.15     1001.02     1.577
  91        194.62     4614.24      608.33     4528.15      589.30     5473.88      945.92     1.577
  92        194.62     4614.24      609.38     4527.92      597.51     5510.50      982.65     1.577
  93        195.67     4614.17      614.65     4527.02      627.22     5638.18     1111.22     1.577
  94        194.62     4614.24      611.49     4527.45      613.89     5583.57     1056.12     1.577
  95        194.62     4614.24      609.38     4527.92      601.34     5528.91     1001.02     1.577
  96        195.67     4614.17      609.38     4527.92      609.90     5565.67     1037.76     1.577
  97        195.15     4614.20      609.91     4527.80      609.71     5565.56     1037.76     1.577
  98        195.15     4614.20      608.33     4528.15      605.08     5547.54     1019.39     1.577
  99        194.09     4614.27      610.44     4527.68      601.43     5528.66     1001.02     1.577

Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     195.67      YL:    4614.17      XR:     612.01      YR:    4527.33
    Centre:  XC:     611.24      YC:    5565.09                Radius:  R:    1037.76
Generated failure surface: (20 points)
    195.67   4614.17          216.43   4605.37          237.37   4597.02          258.48   4589.13          279.77
```

```
4581.69
    301.21   4574.73          322.79   4568.23          344.51   4562.20          366.36   4556.64          388.33
4551.56
    410.40   4546.95          432.56   4542.83          454.81   4539.19          477.13   4536.04          499.51
4533.36
    521.95   4531.18          544.43   4529.49          566.94   4528.28          589.47   4527.56          612.01
4527.33

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      195.67      0.68    23.0     4.33     4.70     6      50.00    25.0        68.02        0.00         1.94
0.96
  2      200.00      8.39    23.0     7.26     7.88     6      50.00    25.0       838.89        0.00        90.61
0.96
  3      207.26     23.52    23.0     7.26     7.88     6      50.00    25.0      2352.23        0.00       275.74
0.96
  4      214.52      8.71    23.0     1.91     2.08     2      10.00    35.0       882.58        0.00       385.98
0.91
  5      216.43     64.94    21.7    10.47    11.27     2      10.00    35.0      6949.35        0.00       561.20
0.91
  6      226.90     93.65    21.7    10.47    11.27     2      10.00    35.0     10475.59        0.00       847.06
0.91
  7      237.37     45.17    20.5     4.13     4.41     5       0.00    45.0      4517.24        0.00       882.68
0.86
  8      241.50    133.55    20.5     9.96    10.63     2      10.00    35.0     15231.58        0.00      1308.60
0.91
  9      251.46     55.85    20.5     3.55     3.79     2      10.00    35.0      6420.45      139.09      1552.25
0.91
 10      255.01     57.66    20.5     3.47     3.71     6      50.00    25.0      6685.93      405.07      1731.83
0.96
 11      258.48    122.60    19.3     7.08     7.50     6      50.00    25.0     14029.87     1596.53      1804.21
0.96
 12      265.57    128.96    19.3     7.08     7.50     6      50.00    25.0     14520.18     2612.64      1879.66
0.96
 13      272.65    135.97    19.3     7.12     7.54     2      10.00    35.0     15215.08     3648.24      1912.75
0.92
 14      279.77    154.38    18.0     7.74     8.14     6      50.00    25.0     17222.93     5044.95      2074.99
0.96
 15      287.50    265.75    18.0    12.66    13.31     2      10.00    35.0     29819.44     9992.33      2150.87
0.92
 16      300.16    131.45    17.0     6.00     6.27     2      10.00    35.0     14933.44     5217.29      2288.23
0.92
 17      306.16     88.98    16.8     3.99     4.17     2      10.00    35.0     10123.63     3621.01      2337.76
0.92
 18      310.15    290.23    16.8    12.64    13.20     2      10.00    35.0     32969.64    12295.68      2407.20
```

												0.92
19	322.79	246.99	15.5	10.40	10.80	2	10.00	35.0	27766.56	10902.94	2484.16	0.92
20	333.20	252.96	15.5	10.40	10.80	2	10.00	35.0	28157.90	11577.88	2524.55	0.92
21	343.60	282.28	14.4	11.38	11.75	6	50.00	25.0	31322.21	13285.86	2629.71	0.96
22	354.98	286.42	14.3	11.38	11.74	6	50.00	25.0	31877.69	13889.69	2679.55	0.96
23	366.36	278.89	13.0	10.98	11.27	6	50.00	25.0	31125.05	13817.09	2723.77	0.96
24	377.34	279.96	13.0	10.98	11.27	6	50.00	25.0	31322.94	14204.14	2742.84	0.96
25	388.33	281.00	11.8	11.03	11.27	6	50.00	25.0	31513.29	14503.67	2757.91	0.96
26	399.36	279.31	11.8	11.03	11.27	6	50.00	25.0	31393.98	14715.57	2748.82	0.96
27	410.40	277.41	10.5	11.08	11.27	6	50.00	25.0	31248.54	14839.46	2735.38	0.96
28	421.48	272.93	10.5	11.08	11.27	6	50.00	25.0	30808.57	14875.87	2697.93	0.96
29	432.56	268.08	9.3	11.12	11.27	6	50.00	25.0	30325.07	14825.51	2655.64	0.97
30	443.68	260.80	9.3	11.12	11.27	6	50.00	25.0	29563.78	14686.96	2589.84	0.97
31	454.81	252.96	8.0	11.16	11.27	6	50.00	25.0	28737.91	14461.42	2518.42	0.97
32	465.97	242.86	8.0	11.16	11.27	6	50.00	25.0	27653.09	14148.24	2424.01	0.97
33	477.13	232.02	6.8	11.19	11.27	6	50.00	25.0	26483.18	13747.36	2323.21	0.97
34	488.32	219.09	6.8	11.19	11.27	6	50.00	25.0	25074.30	13259.75	2200.14	0.97
35	499.51	218.27	5.6	11.96	12.02	6	50.00	25.0	25056.75	13499.79	2064.58	0.98
36	511.47	176.49	5.6	10.48	10.53	6	50.00	25.0	20295.90	11067.64	1909.52	0.98
37	521.95	172.67	4.3	11.24	11.27	6	50.00	25.0	19857.61	10808.25	1746.87	0.98
38	533.19	154.10	4.3	11.24	11.27	6	50.00	25.0	17721.19	9645.38	1558.68	0.98
39	544.43	134.31	3.1	11.26	11.27	6	50.00	25.0	15446.08	8395.28	1360.95	0.99
40	555.69	112.92	3.1	11.26	11.27	6	50.00	25.0	12985.67	7057.98	1143.89	0.99
41	566.94	88.52	1.8	11.02	11.03	6	50.00	25.0	10179.54	5527.65	918.80	0.99
42	577.96	65.37	1.8	11.02	11.03	6	50.00	25.0	7517.23	4081.65	678.21	0.99

```
 43      588.98     42.24     0.6    11.52    11.52     6      50.00    25.0      4857.33     2636.49       420.90
1.00
 44      600.50     14.08     0.6    11.52    11.52     6      50.00    25.0      1619.25      879.02       140.12
1.00
                 --------                   -------                            ----------
     X-S Area:    7203.37    Path Length:    428.33              X-S Weight:   813166.69
```

```
DATA: Analysis  1 - Slope Stability - Case SS-2 Reclamation Slope - Pseudo Static

Material Properties (6 materials)
-------------------
Material:  1 (Mohr-Coulomb Isotropic) - Overburden
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto
Material:  2 (Mohr-Coulomb Isotropic) - Sand and Gravel
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     10.00   35.0     115.00    Auto
      Saturated:     10.00   35.0     130.00    Auto
Material:  3 (Mohr-Coulomb Isotropic) - Weathered Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   1000.00    0.0     110.00    Auto
      Saturated:   1000.00    0.0     120.00    Auto
Material:  4 (Mohr-Coulomb Isotropic) - Stable Claystone Bedrock
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:   3000.00    0.0     120.00    Auto
      Saturated:   3000.00    0.0     135.00    Auto
Material:  5 (Mohr-Coulomb Isotropic) - Slurry Wall
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:      0.00   45.0     100.00    Auto
      Saturated:      0.00   45.0     110.00    Auto
Material:  6 (Mohr-Coulomb Isotropic) - Clay
                   Cohesion   Phi   UnitWeight   Ru
    Unsaturated:     50.00   25.0     100.00    Auto
      Saturated:     50.00   25.0     115.00    Auto

Water Properties
----------------
Unit weight of water: 62.400           Unit weight of water/medium above ground:  62.400

Material Profiles (20 profiles)
-----------------
Profile:  1 (9 points)   Material beneath:  6 - Clay
      0.00     4618.10          57.07     4618.10         156.63     4617.39         166.52     4610.32         173.33
  4610.28
    182.26     4614.99         196.20     4614.14         200.00     4612.45         238.50     4607.18
Profile:  2 (3 points)   Material beneath:  6 - Clay
```

```
    241.50     4607.18         255.01     4606.76         613.33     4527.04
Profile:  3 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4606.18         238.50     4606.18
Profile:  4 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4606.18         256.17     4606.18         288.16     4590.18
Profile:  5 (2 points)   Material beneath:  5 - Slurry Wall
    238.50     4607.18         241.50     4607.18
Profile:  6 (2 points)   Material beneath:  6 - Clay
      0.00     4590.00         238.50     4590.00
Profile:  7 (3 points)   Material beneath:  6 - Clay
    241.50     4590.00         288.16     4590.00         300.16     4584.18
Profile:  8 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4584.18         238.50     4584.18
Profile:  9 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4584.18         300.16     4584.18         306.16     4581.18
Profile: 10 (2 points)   Material beneath:  6 - Clay
      0.00     4581.18         238.50     4581.18
Profile: 11 (4 points)   Material beneath:  6 - Clay
    241.50     4581.18         300.16     4581.18         306.16     4581.18         310.15     4579.18
Profile: 12 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4579.18         238.50     4579.18
Profile: 13 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4579.18         310.15     4579.18         369.13     4549.68
Profile: 14 (2 points)   Material beneath:  6 - Clay
      0.00     4549.68         238.50     4549.68
Profile: 15 (3 points)   Material beneath:  6 - Clay
    241.50     4549.68         369.13     4549.68         372.13     4548.18
Profile: 16 (2 points)   Material beneath:  2 - Sand and Gravel
      0.00     4548.18         238.50     4548.18
Profile: 17 (3 points)   Material beneath:  2 - Sand and Gravel
    241.50     4548.18         372.13     4548.18         408.47     4529.98
Profile: 18 (4 points)   Material beneath:  3 - Weathered Claystone Bedrock
      0.00     4532.87          60.58     4532.87         190.93     4531.60         238.50     4531.61
Profile: 19 (5 points)   Material beneath:  3 - Weathered Claystone Bedrock
    241.50     4531.61         408.47     4529.98         472.67     4530.14         613.33     4527.04         700.00
  4526.00
Profile: 20 (9 points)   Material beneath:  4 - Stable Claystone Bedrock
      0.00     4530.87          60.58     4530.87         190.93     4529.60         238.50     4529.61         241.50
  4529.61
    408.47     4529.98         472.67     4530.14         613.33     4527.04         700.00     4526.00

Slope Surface (13 points)
-------------
      0.00     4618.10          57.07     4618.10         156.63     4617.39         166.52     4610.32         173.33
  4610.28
    182.26     4614.99         196.20     4614.14         200.00     4612.45         238.50     4607.18         241.50
  4607.18
    255.01     4606.76         613.33     4527.04         700.00     4526.00
```

```
Phreatic Surface (7 points)
----------------
      0.00     4595.18         238.50     4595.18         241.50     4592.18         338.50     4565.00         511.59
  4549.68
    613.33     4527.04         700.00     4526.00

Failure Surface
---------------
Initial circular surface for critical search defined by: XL,XR,R
  Intersects:  XL:     196.20      YL:    4614.14      XR:     613.33      YR:    4527.04
      Centre:  XC:     583.50      YC:    5426.55                  Radius:  R:     900.00

Earthquake Force
----------------
Pseudo-static earthquake (seismic) coefficient:  0.063

Variable Restraints
-------------------
Parameter descriptor:              XL         XR         R
Range of variation:              10.00      10.00     900.00
Trial positions within range:      20         20          50

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

RESULTS: Analysis  1 - Slope Stability - Case SS-2 Reclamation Slope - Pseudo 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:   2.679

Analysis Summary

There were:  15978 successful analyses from a total of 20001 trial failure surfaces
             4023 analyses terminated due to unacceptable geometry

Critical (minimum) Factor of Safety:  1.52

Negative normal stresses exist on the base of one or more slices; examine slice data and consult the GALENA Help utility
Test Factor is less than 0.2 lower limit for one or more slices; examine slice data and consult the GALENA Help utility

Results Summary - Lowest 99 Factor of Safety circles
----------------------------------------------------
Circle    X-Left      Y-Left     X-Right     Y-Right     X-Centre    Y-Centre      Radius      FoS
   1       200.15     4612.43      608.33     4528.15      587.00     5455.46      927.55     1.522   <-- Critical
Surface
   2       200.15     4612.43      609.91     4527.80      595.42     5491.98      964.29     1.525
```

3	200.15	4612.43	610.44	4527.68	599.50	5510.28	982.65	1.525
4	200.15	4612.43	610.96	4527.57	603.57	5528.56	1001.02	1.526
5	200.15	4612.43	609.38	4527.92	591.35	5473.67	945.92	1.527
6	200.15	4612.43	609.38	4527.92	595.15	5492.10	964.29	1.527
7	200.15	4612.43	609.91	4527.80	599.23	5510.40	982.65	1.527
8	201.20	4612.29	609.91	4527.80	596.13	5491.99	964.29	1.528
9	200.15	4612.43	610.44	4527.68	603.30	5528.68	1001.02	1.528
10	200.15	4612.43	608.86	4528.04	591.08	5473.79	945.92	1.529
11	200.15	4612.43	608.86	4528.04	594.88	5492.22	964.29	1.529
12	200.67	4612.36	608.33	4528.15	587.35	5455.47	927.55	1.529
13	198.57	4613.09	608.33	4528.15	586.86	5455.45	927.55	1.529
14	198.04	4613.32	608.33	4528.15	586.84	5455.45	927.55	1.529
15	200.15	4612.43	609.38	4527.92	598.96	5510.52	982.65	1.529
16	201.20	4612.29	610.44	4527.68	600.21	5510.28	982.65	1.529
17	199.62	4612.62	608.33	4528.15	586.89	5455.46	927.55	1.530
18	197.52	4613.56	608.33	4528.15	586.82	5455.45	927.55	1.530
19	199.09	4612.85	609.38	4527.92	591.23	5473.66	945.92	1.530
20	201.20	4612.29	609.38	4527.92	595.86	5492.11	964.29	1.530
21	198.57	4613.09	609.38	4527.92	591.22	5473.66	945.92	1.530
22	196.99	4613.79	608.33	4528.15	586.80	5455.45	927.55	1.530
23	200.15	4612.43	611.49	4527.45	607.64	5546.83	1019.39	1.530
24	199.09	4612.85	610.44	4527.68	599.40	5510.28	982.65	1.530
25	201.20	4612.29	610.96	4527.57	600.48	5510.16	982.65	1.530
26	200.15	4612.43	608.33	4528.15	590.81	5473.91	945.92	1.530
27	201.20	4612.29	608.33	4528.15	587.70	5455.47	927.55	1.531
28	201.20	4612.29	609.38	4527.92	592.05	5473.68	945.92	1.531
29	195.41	4614.19	608.33	4528.15	586.12	5455.44	927.55	1.531
30	200.15	4612.43	608.33	4528.15	594.61	5492.34	964.29	1.531
31	196.46	4614.02	608.33	4528.15	586.78	5455.45	927.55	1.531
32	200.15	4612.43	609.91	4527.80	603.03	5528.80	1001.02	1.531
33	200.67	4612.36	609.38	4527.92	591.70	5473.67	945.92	1.531
34	194.88	4614.22	608.33	4528.15	585.68	5455.43	927.55	1.531
35	200.15	4612.43	608.86	4528.04	598.69	5510.64	982.65	1.531
36	199.62	4612.62	609.38	4527.92	591.24	5473.66	945.92	1.532
37	199.62	4612.62	610.44	4527.68	599.40	5510.28	982.65	1.532
38	199.62	4612.62	609.91	4527.80	595.32	5491.98	964.29	1.532
39	195.94	4614.16	608.33	4528.15	586.55	5455.45	927.55	1.532
40	199.09	4612.85	608.33	4528.15	586.87	5455.46	927.55	1.532
41	200.67	4612.36	609.91	4527.80	595.78	5491.98	964.29	1.532
42	201.20	4612.29	609.91	4527.80	599.94	5510.40	982.65	1.532
43	201.20	4612.29	608.86	4528.04	595.59	5492.23	964.29	1.532
44	200.15	4612.43	610.96	4527.57	607.37	5546.95	1019.39	1.532
45	199.09	4612.85	609.91	4527.80	595.31	5491.98	964.29	1.533
46	201.20	4612.29	608.86	4528.04	591.78	5473.80	945.92	1.533
47	198.57	4613.09	609.91	4527.80	595.31	5491.98	964.29	1.533
48	199.62	4612.62	608.86	4528.04	590.97	5473.78	945.92	1.533
49	200.15	4612.43	608.33	4528.15	598.42	5510.76	982.65	1.533
50	200.15	4612.43	609.38	4527.92	602.76	5528.92	1001.02	1.533
51	195.41	4614.19	608.86	4528.04	590.23	5473.77	945.92	1.534

52	200.67	4612.36	608.86	4528.04	591.43	5473.79	945.92	1.534
53	200.67	4612.36	610.44	4527.68	599.85	5510.28	982.65	1.534
54	199.62	4612.62	609.91	4527.80	599.13	5510.40	982.65	1.534
55	199.62	4612.62	609.38	4527.92	595.05	5492.10	964.29	1.534
56	201.20	4612.29	610.96	4527.57	604.28	5528.56	1001.02	1.534
57	200.67	4612.36	609.38	4527.92	595.51	5492.10	964.29	1.534
58	199.09	4612.85	609.91	4527.80	599.13	5510.40	982.65	1.534
59	200.15	4612.43	610.44	4527.68	607.10	5547.07	1019.39	1.534
60	194.88	4614.22	608.86	4528.04	589.79	5473.76	945.92	1.534
61	201.20	4612.29	608.33	4528.15	595.32	5492.35	964.29	1.534
62	195.41	4614.19	609.91	4527.80	594.60	5491.97	964.29	1.534
63	200.15	4612.43	612.01	4527.33	611.70	5565.09	1037.76	1.534
64	195.94	4614.16	608.86	4528.04	590.67	5473.78	945.92	1.535
65	201.20	4612.29	609.38	4527.92	599.67	5510.52	982.65	1.535
66	199.09	4612.85	608.86	4528.04	590.96	5473.78	945.92	1.535
67	194.36	4614.25	608.86	4528.04	589.35	5473.75	945.92	1.535
68	199.62	4612.62	608.33	4528.15	590.70	5473.91	945.92	1.535
69	198.57	4613.09	608.86	4528.04	590.95	5473.78	945.92	1.535
70	194.88	4614.22	609.91	4527.80	594.16	5491.96	964.29	1.535
71	199.09	4612.85	609.38	4527.92	595.04	5492.10	964.29	1.535
72	198.57	4613.09	609.38	4527.92	595.04	5492.10	964.29	1.535
73	200.67	4612.36	610.96	4527.57	603.92	5528.56	1001.02	1.535
74	195.94	4614.16	609.91	4527.80	595.04	5491.97	964.29	1.535
75	201.20	4612.29	608.33	4528.15	591.52	5473.92	945.92	1.535
76	193.83	4614.28	608.86	4528.04	588.92	5473.74	945.92	1.535
77	195.41	4614.19	608.33	4528.15	589.96	5473.89	945.92	1.536
78	199.62	4612.62	609.38	4527.92	598.86	5510.52	982.65	1.536
79	200.67	4612.36	609.91	4527.80	599.58	5510.40	982.65	1.536
80	199.62	4612.62	608.86	4528.04	594.78	5492.22	964.29	1.536
81	201.20	4612.29	610.44	4527.68	604.01	5528.68	1001.02	1.536
82	198.57	4613.09	610.44	4527.68	599.39	5510.27	982.65	1.536
83	200.15	4612.43	608.86	4528.04	602.49	5529.04	1001.02	1.536
84	199.09	4612.85	610.96	4527.57	603.48	5528.56	1001.02	1.536
85	200.67	4612.36	608.86	4528.04	595.24	5492.22	964.29	1.536
86	200.67	4612.36	608.33	4528.15	591.16	5473.92	945.92	1.536
87	200.15	4612.43	609.91	4527.80	606.82	5547.18	1019.39	1.536
88	199.09	4612.85	609.38	4527.92	598.86	5510.52	982.65	1.536
89	194.88	4614.22	608.33	4528.15	589.52	5473.88	945.92	1.536
90	200.15	4612.43	611.49	4527.45	611.43	5565.21	1037.76	1.536
91	199.09	4612.85	608.33	4528.15	590.69	5473.91	945.92	1.536
92	199.62	4612.62	610.96	4527.57	603.47	5528.56	1001.02	1.536
93	198.57	4613.09	608.33	4528.15	590.68	5473.91	945.92	1.537
94	193.31	4614.32	608.86	4528.04	588.48	5473.73	945.92	1.537
95	195.94	4614.16	608.33	4528.15	590.40	5473.90	945.92	1.537
96	200.67	4612.36	611.49	4527.45	607.99	5546.83	1019.39	1.537
97	194.36	4614.25	608.33	4528.15	589.09	5473.88	945.92	1.537
98	194.88	4614.22	609.38	4527.92	593.89	5492.08	964.29	1.537
99	201.20	4612.29	608.86	4528.04	599.40	5510.64	982.65	1.537

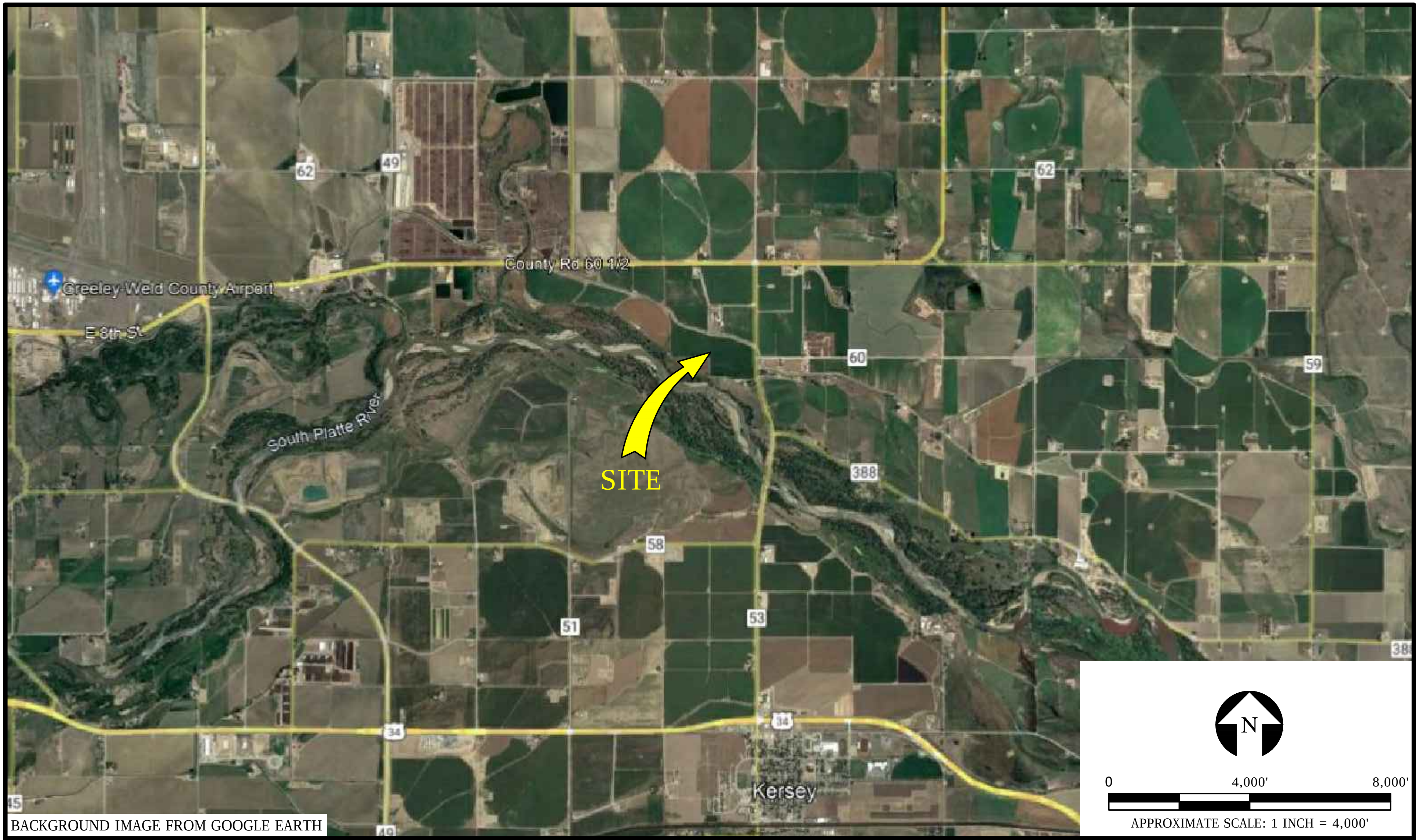
```
Critical Failure Surface (circle 1)
------------------------
Intersects:  XL:     200.15      YL:    4612.43      XR:     608.33      YR:    4528.15
    Centre:  XC:     587.00      YC:    5455.46                  Radius:  R:     927.55
Generated failure surface: (20 points)
    200.15   4612.43          220.36   4603.44          240.79   4594.94          261.41   4586.93          282.22
4579.41
    303.20   4572.39          324.35   4565.87          345.64   4559.86          367.07   4554.36          388.62
4549.37
    410.29   4544.90          432.06   4540.94          453.92   4537.50          475.85   4534.59          497.84
4532.20
    519.89   4530.34          541.97   4529.00          564.08   4528.19          586.21   4527.91          608.33
4528.15

Slice Geometry and Properties - Critical Failure Surface (circle 1,  49 slices)
--------------------------------------------------------
Slice                X-S     ------------------- Base ---------------------                 PoreWater      Normal
Test
        X-Left      Area    Angle    Width    Length  Matl   Cohesion    Phi       Weight       Force       Stress
Factor
  1      200.00      7.60   -89.9     7.18  4609.26     6      50.00    25.0       759.80        0.00      -108.31
-3.28
  2      207.18     22.80    24.0     7.03     7.69     6      50.00    25.0      2280.33        0.00       272.65
0.96
  3      214.21     32.46    24.0     6.16     6.74     2      10.00    35.0      3372.23        0.00       452.32
0.91
  4      220.36     67.88    22.6     9.07     9.82     2      10.00    35.0      7416.94        0.00       684.21
0.91
  5      229.43     90.85    22.6     9.07     9.82     2      10.00    35.0     10227.88        0.00       944.40
0.91
  6      238.50     26.94    22.6     2.29     2.48     5       0.00    45.0      2694.46        0.00       923.72
0.85
  7      240.79    184.82    21.2    12.72    13.64     2      10.00    35.0     21097.09        0.00      1405.39
0.91
  8      253.51     46.03    21.2     2.66     2.86     6      50.00    25.0      5249.08        0.00      1749.97
0.96
  9      256.17     94.23    21.2     5.24     5.63     6      50.00    25.0     10592.51        0.00      1793.96
0.96
 10      261.41     75.52    19.9     4.04     4.30     6      50.00    25.0      8313.00        0.00      1841.28
0.96
 11      265.45     68.48    19.9     3.56     3.79     6      50.00    25.0      7424.32       34.17      1866.00
0.96
 12      269.02    166.37    19.9     8.30     8.83     2      10.00    35.0     17858.41      344.82      1848.01
0.91
 13      277.32    102.71    19.9     4.90     5.21     6      50.00    25.0     10898.65      377.74      1998.67
0.96
 14      282.22    128.44    18.5     5.94     6.26     2      10.00    35.0     13463.38      594.69      1975.62
0.91
 15      288.16    271.62    18.5    12.00    12.65     2      10.00    35.0     28741.11     1586.53      2090.49
```

```
0.91
 16      300.16     71.44    18.5      3.04      3.21     2       10.00    35.0      7643.72       484.25       2195.11
0.91
 17      303.20     70.30    17.1      2.96      3.09     2       10.00    35.0      7497.23       490.91       2238.53
0.92
 18      306.16     96.05    17.1      3.99      4.18     2       10.00    35.0     10261.01       687.85       2271.03
0.92
 19      310.15    174.25    17.1      7.10      7.43     2       10.00    35.0     18601.33      1295.65       2315.07
0.92
 20      317.25    178.57    17.1      7.10      7.43     2       10.00    35.0     18909.74      1387.98       2354.67
0.92
 21      324.35    181.69    15.8      7.08      7.35     2       10.00    35.0     19075.38      1423.40       2406.29
0.92
 22      331.42    184.69    15.8      7.08      7.35     2       10.00    35.0     19213.32      1430.35       2423.64
0.92
 23      338.50    189.33    15.8      7.14      7.42     2       10.00    35.0     19593.43      1766.23       2455.02
0.92
 24      345.64    173.10    14.4      6.45      6.66     2       10.00    35.0     17873.87      2097.76       2511.21
0.92
 25      352.09    202.90    14.4      7.49      7.73     6       50.00    25.0     20989.00      3003.06       2618.10
0.96
 26      359.58    204.82    14.4      7.49      7.73     6       50.00    25.0     21323.06      3611.50       2665.18
0.96
 27      367.07    296.59    13.0     10.78     11.06     6       50.00    25.0     31095.08      6132.56       2723.73
0.96
 28      377.85    297.63    13.0     10.78     11.06     6       50.00    25.0     31448.32      7195.93       2760.73
0.96
 29      388.62    298.78    11.7     10.83     11.06     6       50.00    25.0     31800.78      8169.19       2798.29
0.96
 30      399.46    296.89    11.7     10.83     11.06     6       50.00    25.0     31820.11      9051.27       2804.71
0.96
 31      410.29    294.92    10.3     10.88     11.06     6       50.00    25.0     31819.50      9842.21       2810.55
0.96
 32      421.18    290.09    10.3     10.88     11.06     6       50.00    25.0     31502.06     10542.55       2786.28
0.96
 33      432.06    284.93     8.9     10.93     11.06     6       50.00    25.0     31141.47     11151.83       2760.14
0.97
 34      442.99    277.14     8.9     10.93     11.06     6       50.00    25.0     30484.90     11669.88       2704.97
0.97
 35      453.92    268.80     7.6     10.97     11.06     6       50.00    25.0     29762.04     12096.45       2646.43
0.97
 36      464.88    258.02     7.6     10.97     11.06     6       50.00    25.0     28764.23     12432.50       2560.19
0.97
 37      475.85    246.46     6.2     11.00     11.06     6       50.00    25.0     27675.12     12675.92       2468.89
0.97
 38      486.85    232.69     6.2     11.00     11.06     6       50.00    25.0     26334.83     12828.71       2351.36
0.97
 39      497.84    137.51     4.8      6.86      6.88     6       50.00    25.0     15671.83      8019.64       2255.14
0.98
```

```
 40      504.70    131.03     4.8     6.86     6.88     6      50.00    25.0     15020.78     8008.14      2162.51
0.98
 41      511.55    150.59     4.8     8.34     8.37     6      50.00    25.0     17317.35     9432.60      2051.14
0.98
 42      519.89    183.27     3.5    11.04    11.06     6      50.00    25.0     21076.15    11459.76      1891.06
0.98
 43      530.93    163.52     3.5    11.04    11.06     6      50.00    25.0     18804.90    10225.08      1687.10
0.98
 44      541.97    142.47     2.1    11.05    11.06     6      50.00    25.0     16384.26     8898.56      1473.59
0.99
 45      553.03    119.76     2.1    11.05    11.06     6      50.00    25.0     13772.19     7479.61      1238.43
0.99
 46      564.08     95.64     0.7    11.06    11.06     6      50.00    25.0     10999.10     5970.04       992.27
1.00
 47      575.15     69.98     0.7    11.06    11.06     6      50.00    25.0      8048.03     4368.64       725.97
1.00
 48      586.21     42.87    -0.6    11.06    11.06     6      50.00    25.0      4929.86     2675.82       446.80
1.00
 49      597.27     14.29    -0.6    11.06    11.06     6      50.00    25.0      1643.49      892.17       149.21
1.00
                 --------                   -------                            ----------
     X-S Area:    7707.76    Path Length:   5021.94               X-S Weight:   838686.69
```

APPENDIX D

W:\2022\Frederick\22.3058.A Todd Bean Gravel Evaluation\ACAD new template 6.13.22\TEMPLATE_2013.dwg 10/24/2022 1:50 PM



BACKGROUND IMAGE FROM GOOGLE EARTH

PROJECT NO:	22.3058		
PROJECT NAME:	Todd Bean Gravel Evaluation		
DRAWN BY:	JBE	CHECKED BY:	KCV
DWG DATE:	10.24.22	REV. DATE:	--

FIGURE 1
Vicinity Map

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

W:\2022\Frederick\22.3058.A Todd Bean Gravel Evaluation\ACAD new template 6.13.22\TEMPLATE_2013.dwg 10/24/2022 2:24 PM

LEGEND:

B-1 ●	BORING NUMBER AND APPROXIMATE LOCATION
🟥 🟥 🟥	IMPROVEMENT BOUNDARY

N

0 500' 1,000'

APPROXIMATE SCALE: 1 INCH = 500 FEET

BACKGROUND IMAGE FROM GOOGLE EARTH

PROJECT NO:	22.3058		
PROJECT NAME:	Todd Bean Gravel Evaluation		
DRAWN BY:	JBE	CHECKED BY:	KCV
DWG DATE:	10.24.22	REV. DATE:	--

FIGURE 2
Site Plan and Boring Locations

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME Todd Bean Gravel Evaluation
BORING LOCATION See Figure 2
DRILLING COMPANY/RIG Dakota Drilling/Diedrich 120
DRILLING METHOD 8in. Diameter SSA
HAMMER SYSTEM NA

PROJECT NUMBER 22.3058
BORING ELEVATION
CMTTS REP. J. Edwards
DATE STARTED 10/21/2022
DATE COMPLETED 10/21/2022

B-1

DEPTH (ft)	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
					CLAY, sandy, moist, brown.	1	
5 10 15		☒ ☒			SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.	17	▼
20					CLAY, sandy, wet, brown to gray.	23	
25					SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.	26	
					CLAY, sandy, wet, brown to gray.	28	
30					SAND, well graded, gravelly, gravels about 1-2" maximum, wet, brown.		

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

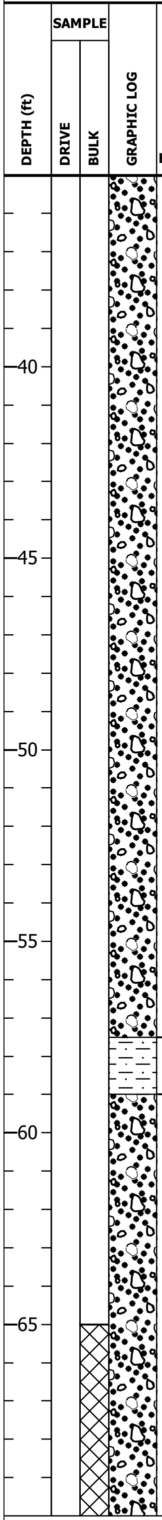
→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058
BORING LOCATION	See Figure 2	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022

B-1



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
		57.5	
	CLAY, sandy, wet, brown to gray.	59	
	SAND, gravelly, gravels about 3-4" maximum, wet, brown.		

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

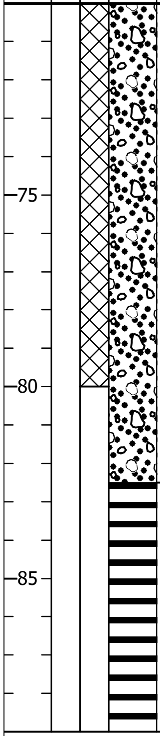
→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058	**B-1**
BORING LOCATION	See Figure 2	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards	
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022	
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022	Page 3 of 3

DEPTH (ft)	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
						82.5	
					CLAYSTONE, very moist, brown to gray.	89	



Boring terminated at 89 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

☒ BULK SAMPLE

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

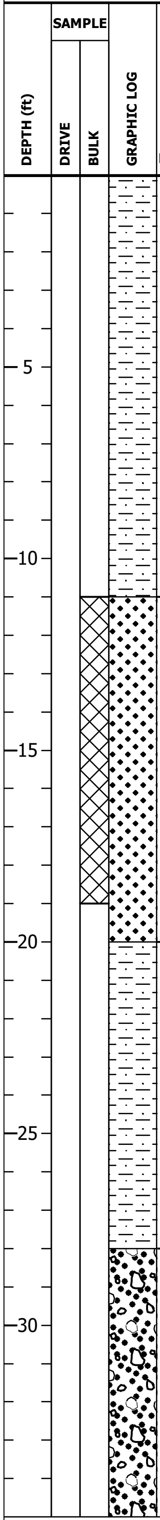
↑ DEPTH OF REFUSAL

CESARE, INC. Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058
BORING LOCATION	See Figure 2	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022

B-2



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
	CLAY, sandy, moist, brown.	11	
	SAND, poorly graded, fine to medium grained, moist, brown.	▼0	
	CLAY, sandy, wet, brown.	28	
	SAND, well graded, gravelly, gravels about 1-2" maximum, wet, brown.		

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

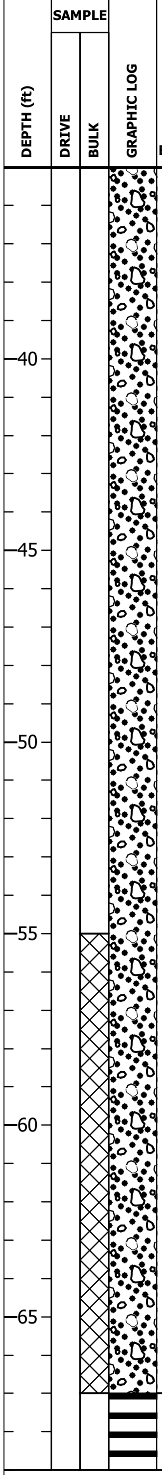
↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058	**B-2**
BORING LOCATION	See Figure 2	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards	
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022	
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022	Page 2 of 2



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
		67	
	CLAYSTONE, very moist, brown to gray.	69	

Boring terminated at 69 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

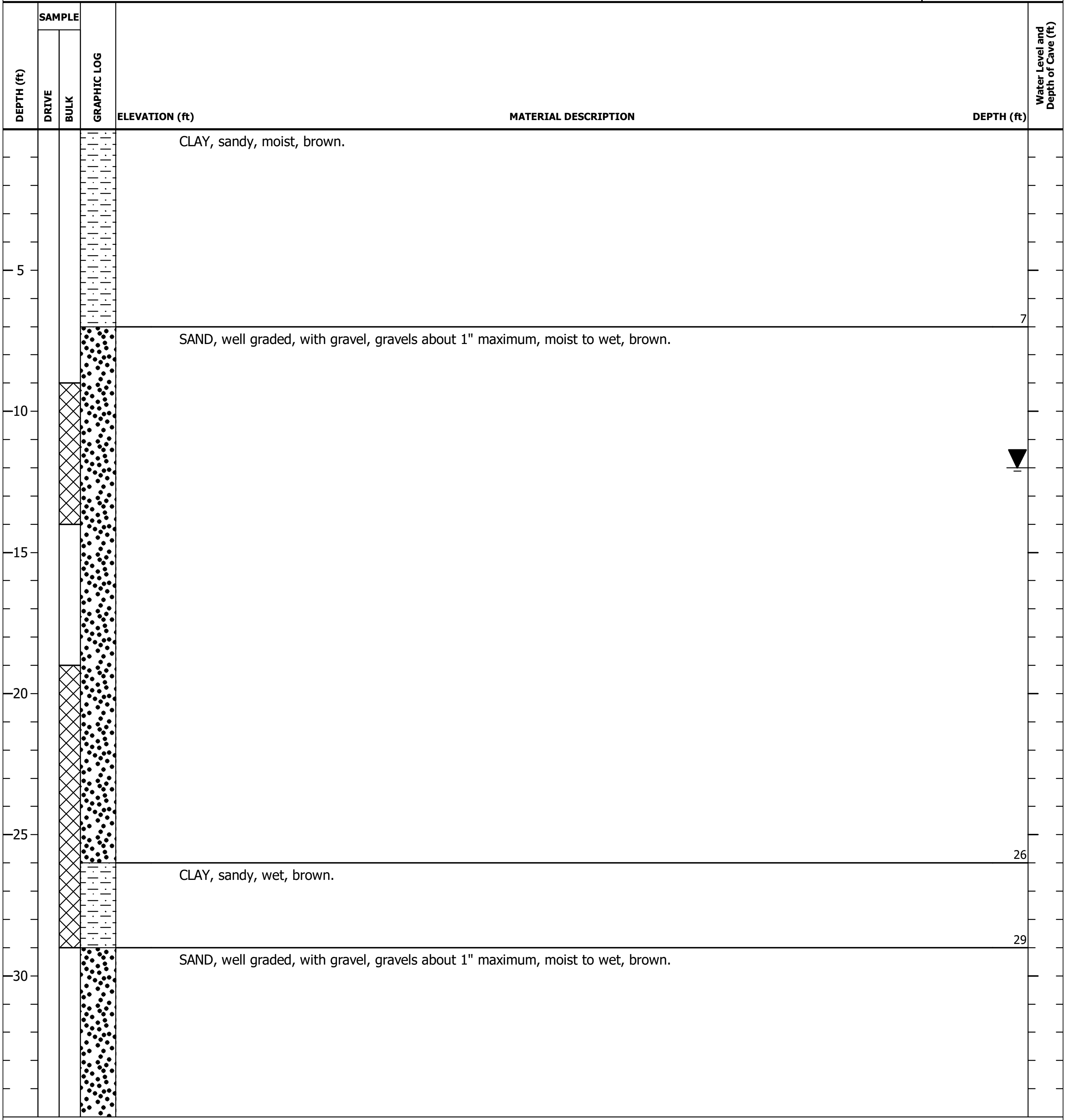
☒ BULK SAMPLE

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058	B-3
BORING LOCATION	See Figure 2	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards	
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022	
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022	Page 1 of 2



CLAY, sandy, moist, brown.

SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.

CLAY, sandy, wet, brown.

SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

☒ BULK SAMPLE

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

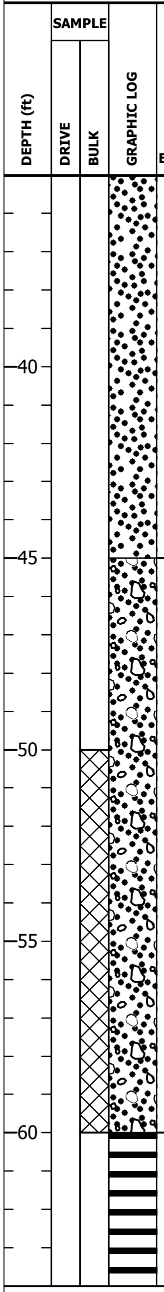
CMT TECHNICAL SERVICES

PROJECT NAME Todd Bean Gravel Evaluation
BORING LOCATION See Figure 2
DRILLING COMPANY/RIG Dakota Drilling/Diedrich 120
DRILLING METHOD 8in. Diameter SSA
HAMMER SYSTEM NA

PROJECT NUMBER 22.3058
BORING ELEVATION
CMTTS REP. J. Edwards
DATE STARTED 10/21/2022
DATE COMPLETED 10/21/2022

B-3

Page 2 of 2



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
		45	
	SAND, gravelly, gravels about 2-3" maximum, wet, brown.	60	
	CLAYSTONE, very moist, brown to gray.	64	

Boring terminated at 64 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058
BORING LOCATION	See Figure 2	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022

B-4

Page 1 of 3

DEPTH (ft)	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
5					CLAY, sandy, moist, brown.	6	
10		☒			SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.	11	▼
15					CLAY, sandy, wet, gray.	19	
20 25 30					SAND, well graded, gravelly, gravels about 1-2" maximum, wet, brown.	31	
		☒			SAND, well graded, gravelly, to GRAVEL, sandy, gravels about 2-4" maximum, wet, brown.		

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

☒ BULK SAMPLE

▽# WATER LEVEL # DAYS AFTER DRILLING

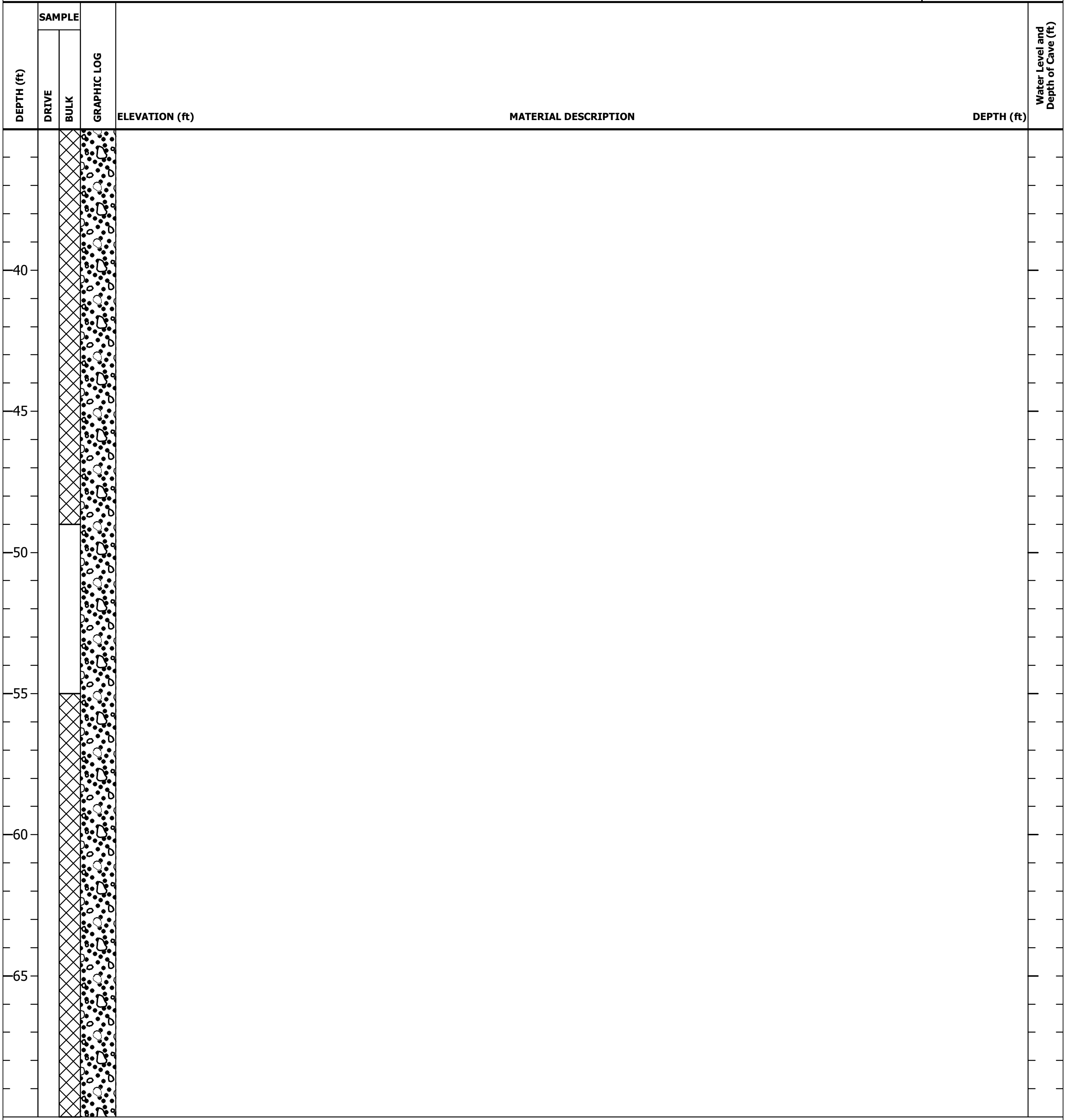
→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058	**B-4**
BORING LOCATION	See Figure 2	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards	
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022	
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022	Page 2 of 3



LEGEND

▼	WATER LEVEL AT TIME OF DRILLING	☒	BULK SAMPLE
▽#	WATER LEVEL # DAYS AFTER DRILLING		
→#	DEPTH OF CAVE # DAYS AFTER DRILLING		
↑	DEPTH OF REFUSAL		

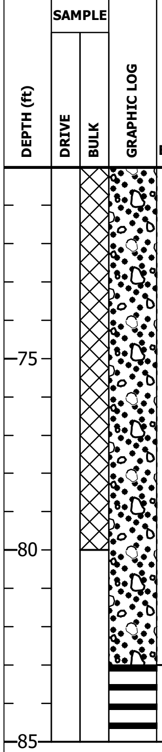
CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058
BORING LOCATION	See Figure 2	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022

B-4

Page 3 of 3



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
		83	
	CLAYSTONE, very moist, brown to gray.	85	

Boring terminated at 85 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

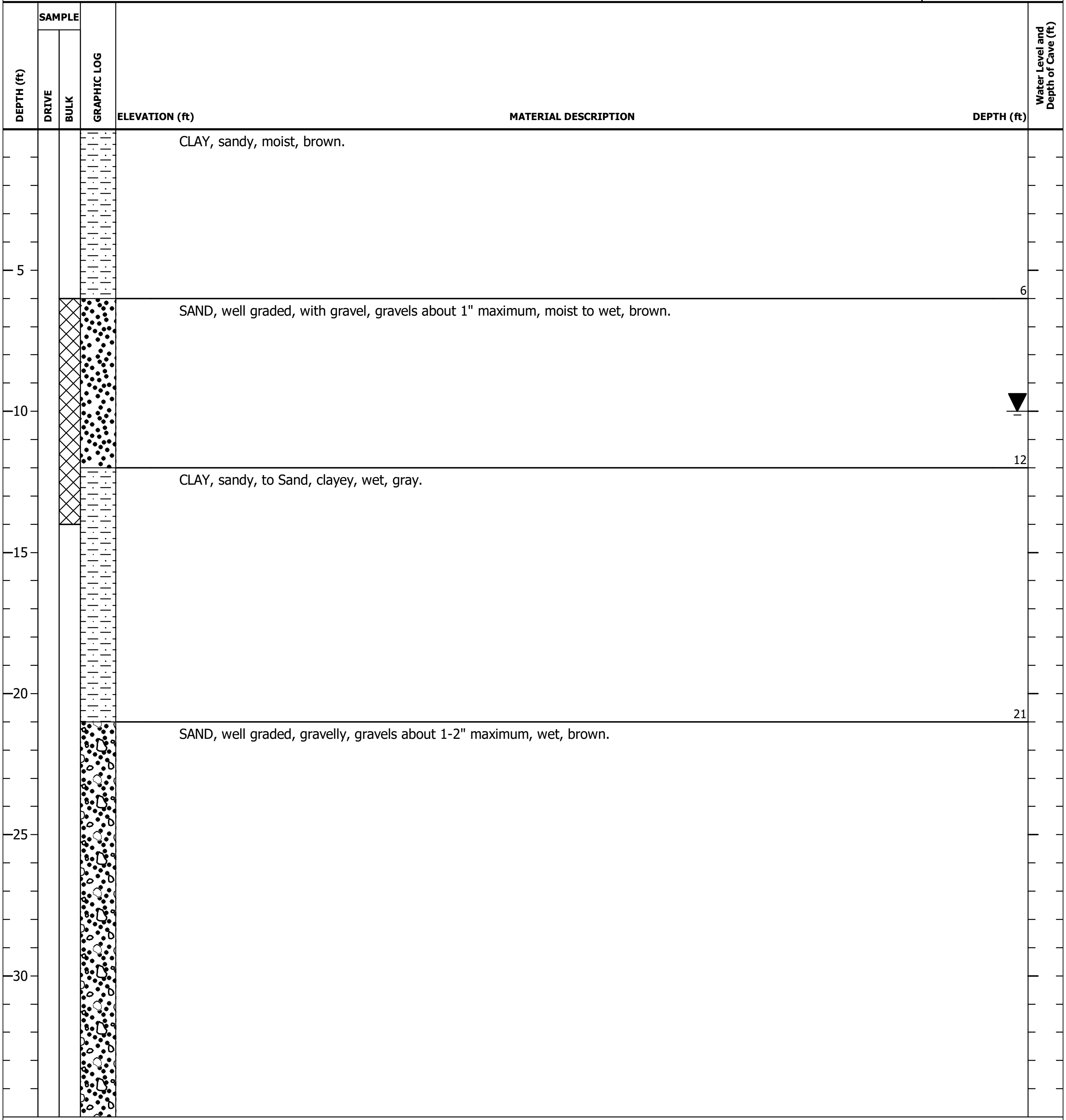
☒ BULK SAMPLE

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058	**B-5**
BORING LOCATION	See Figure 2	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards	
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022	
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022	Page 1 of 2



CLAY, sandy, moist, brown.

6

SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.

12

CLAY, sandy, to Sand, clayey, wet, gray.

21

SAND, well graded, gravelly, gravels about 1-2" maximum, wet, brown.

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

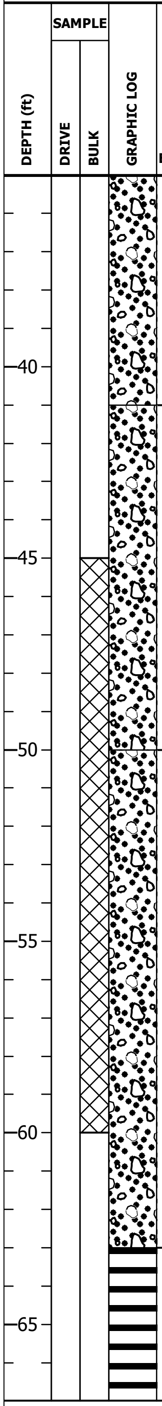
↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058
BORING LOCATION	See Figure 2	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022

B-5

Page 2 of 2



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)
		41
	SAND, well graded, gravelly, gravels about 2-3" maximum, wet, brown.	50
	SAND, gravelly, gravels about 3-4" maximum, wet, brown.	63
	CLAYSTONE, very moist, brown and gray.	67

Water Level and Depth of Cave (ft)

Boring terminated at 67 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

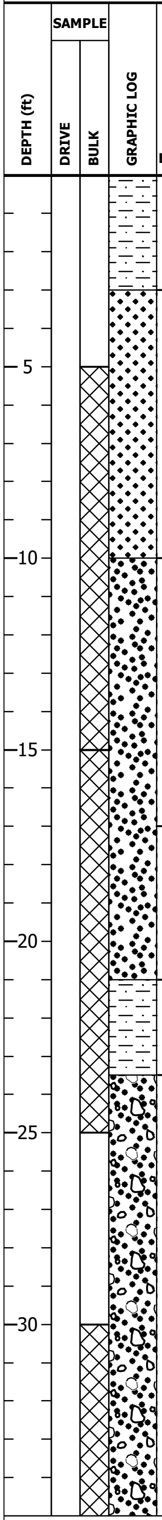
↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058	**B-6**
BORING LOCATION	See Figure 2	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards	
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022	
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022	Page 1 of 2



ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
	CLAY, sandy, moist, brown.	3	
	SAND, poorly graded, with gravel, gravels about 1" maximum, moist to wet, brown.	10	
	SAND, well graded, with gravel, gravels about 1" maximum, moist to wet, brown.		
	thin clay lense 17'		▼
		21	
	CLAY, sandy, wet, brown.	23.5	
	SAND, well graded, gravelly, gravels about 1-2" maximum, wet, brown.		

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

CESARE, INC. Geotechnical Engineers & Construction Materials Consultants

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Gravel Evaluation	PROJECT NUMBER	22.3058
BORING LOCATION	See Figure 2	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 120	CMTTS REP.	J. Edwards
DRILLING METHOD	8in. Diameter SSA	DATE STARTED	10/21/2022
HAMMER SYSTEM	NA	DATE COMPLETED	10/21/2022

B-6

Page 2 of 2

DEPTH (ft)	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	Water Level and Depth of Cave (ft)
40 45		☒				49	
50 55		☒			CLAYSTONE, very moist, gray.	58	

Boring terminated at 58 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

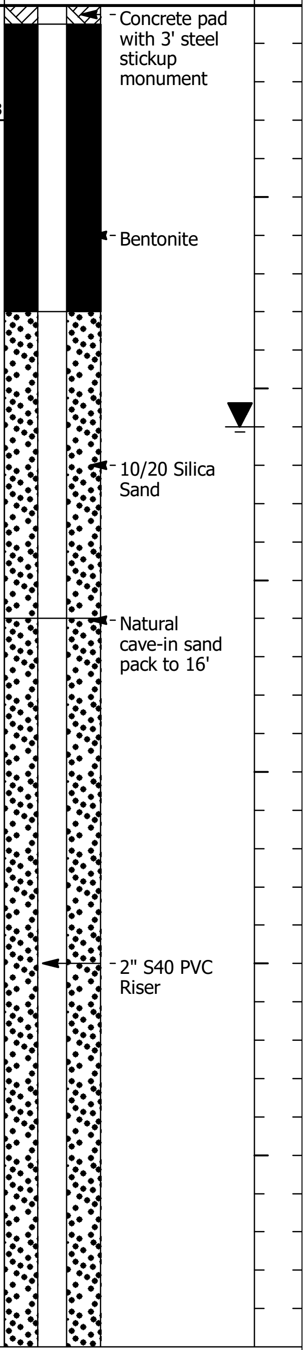
↑ DEPTH OF REFUSAL

☒ BULK SAMPLE

MW-1

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058
BORING LOCATION	40.423518°/-104.573160°	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/CME 55	CMTTS REP.	J. Edwards
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/29/2023
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/29/2023

DEPTH (ft)	BLOW COUNT	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)
						CLAY, sandy, moist, dark brown.	3
						SAND, well graded, gravelly, with cobbles, moist to wet, brown.	



Depth scale: 5, 10, 15, 20, 25, 30

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

☒ SPLIT SPOON

▽# WATER LEVEL # DAYS AFTER DRILLING

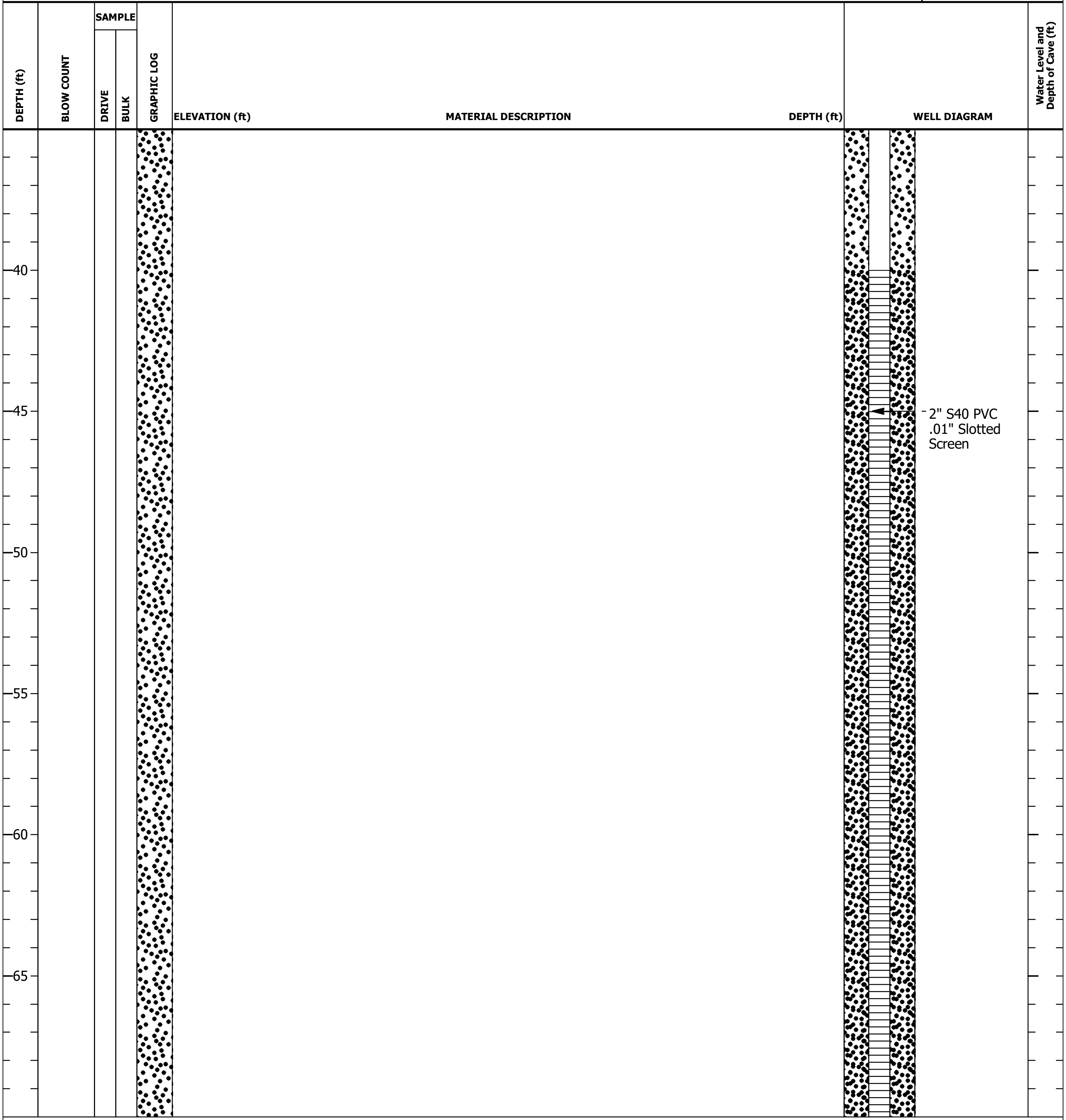
→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058
BORING LOCATION	40.423518°/-104.573160°	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/CME 55	CMTTS REP.	J. Edwards
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/29/2023
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/29/2023

MW-1



LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

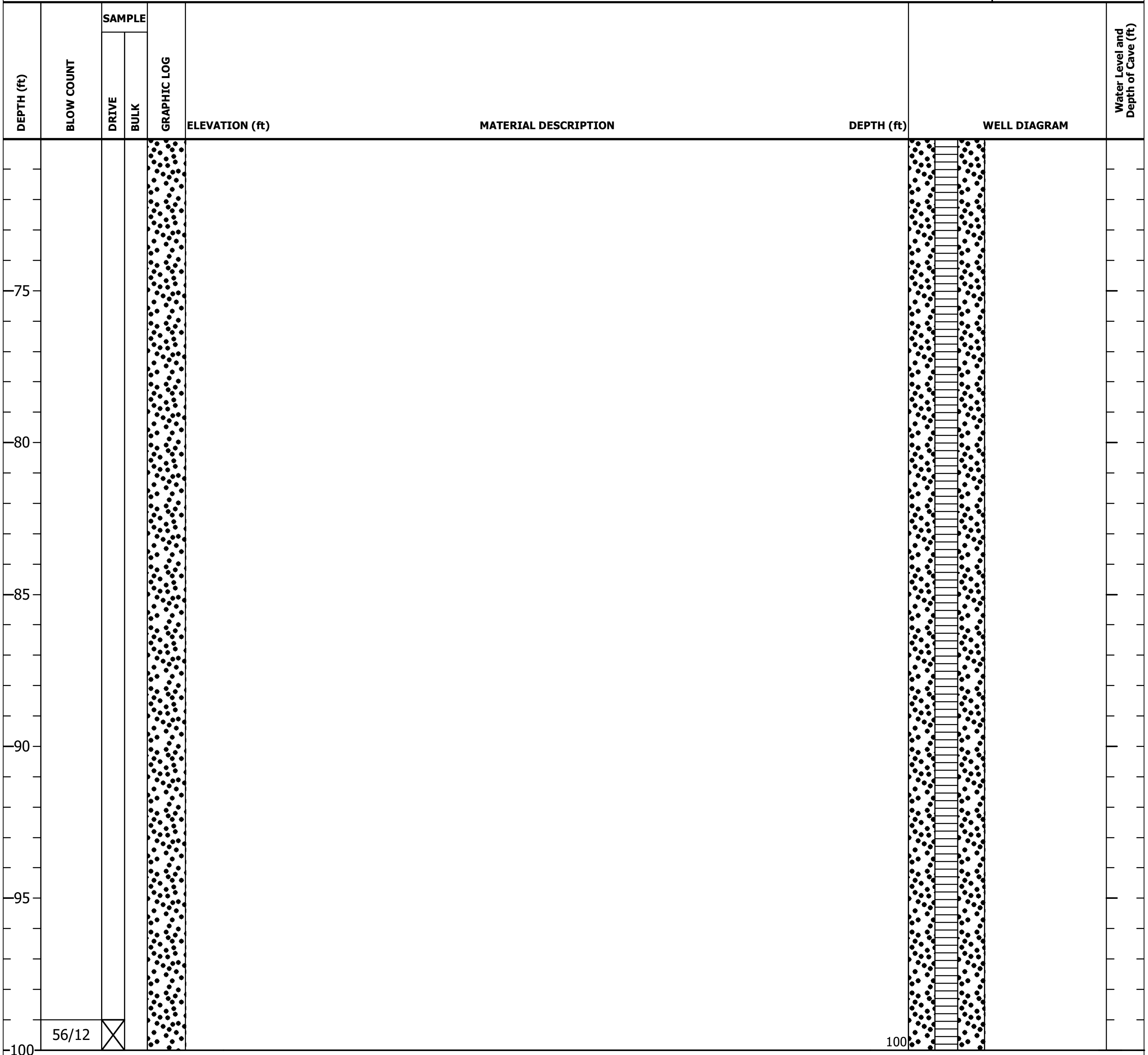
☒ SPLIT SPOON

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	**MW-1**
BORING LOCATION	40.423518°/-104.573160°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/CME 55	CMTTS REP.	J. Edwards	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/29/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/29/2023	Page 3 of 3



Boring terminated at 100 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

☒ SPLIT SPOON

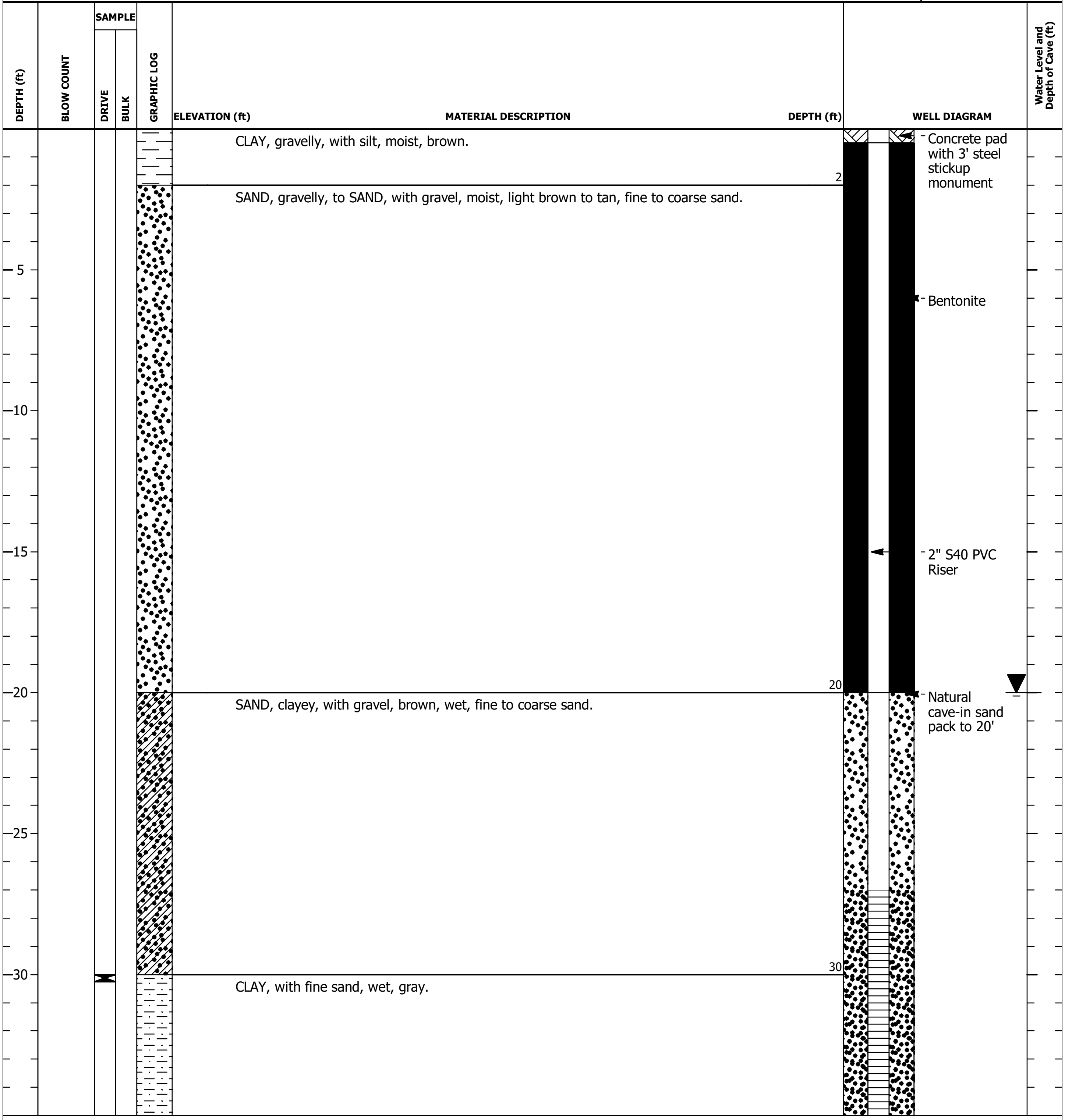
▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	**MW-2**
BORING LOCATION	40.421645°/-104.564902°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/CME 55	CMTTS REP.	K. McNally	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/26/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/26/2023	Page 1 of 2



DEPTH (ft)	MATERIAL DESCRIPTION
2	CLAY, gravelly, with silt, moist, brown.
20	SAND, gravelly, to SAND, with gravel, moist, light brown to tan, fine to coarse sand.
30	SAND, clayey, with gravel, brown, wet, fine to coarse sand.
	CLAY, with fine sand, wet, gray.

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

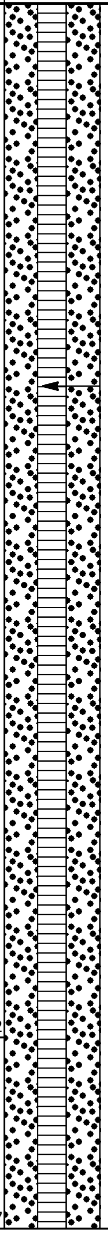
⧗ STANDARD PENETRATION TEST

⧗ MODIFIED CALIFORNIA SAMPLER

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	MW-2
BORING LOCATION	40.421645°/-104.564902°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/CME 55	CMTTS REP.	K. McNally	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/26/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/26/2023	Page 2 of 2

DEPTH (ft)	BLOW COUNT	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	WELL DIAGRAM	Water Level and Depth of Cave (ft)
40									
45								2" S40 PVC .01" Slotted Screen	
50									
55									
60									
						SILTSTONE, hard, moist, light brown, iron oxide staining.	62		
65	50/8	☒							
							67		



Boring terminated at 67 feet

LEGEND

- ▼ WATER LEVEL AT TIME OF DRILLING
- ▽# WATER LEVEL # DAYS AFTER DRILLING
- →# DEPTH OF CAVE # DAYS AFTER DRILLING
- ↑ DEPTH OF REFUSAL
- ☒ STANDARD PENETRATION TEST
- ☒ MODIFIED CALIFORNIA SAMPLER

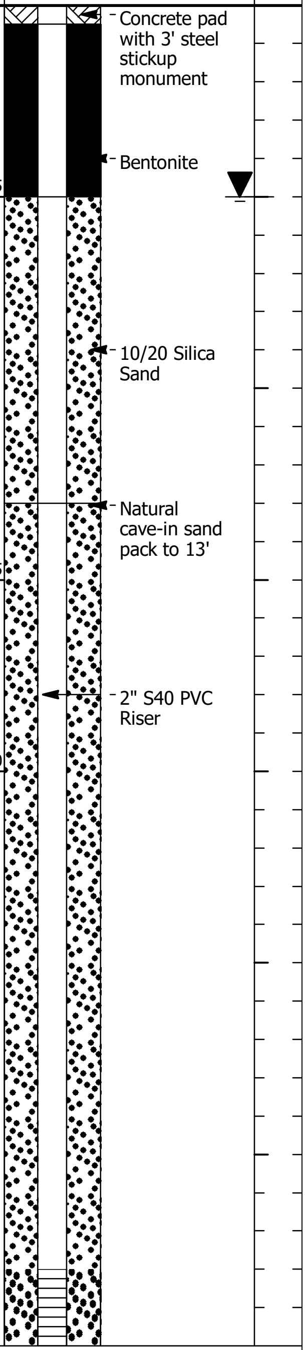
CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058
BORING LOCATION	40.419102°/-104.569162°	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 50	CMTTS REP.	J. Edwards
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/27/2023
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/27/2023

MW-3

Page 1 of 3

DEPTH (ft)	BLOW COUNT	SAMPLE DRIVE	SAMPLE BULK	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)
0						CLAY, sandy, moist, dark brown.	5
5						SAND, well graded, with gravel, wet, brown.	15
15						CLAY, sandy, wet, gray.	20
20						SAND, gravelly, with cobbles, wet, brown.	



LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

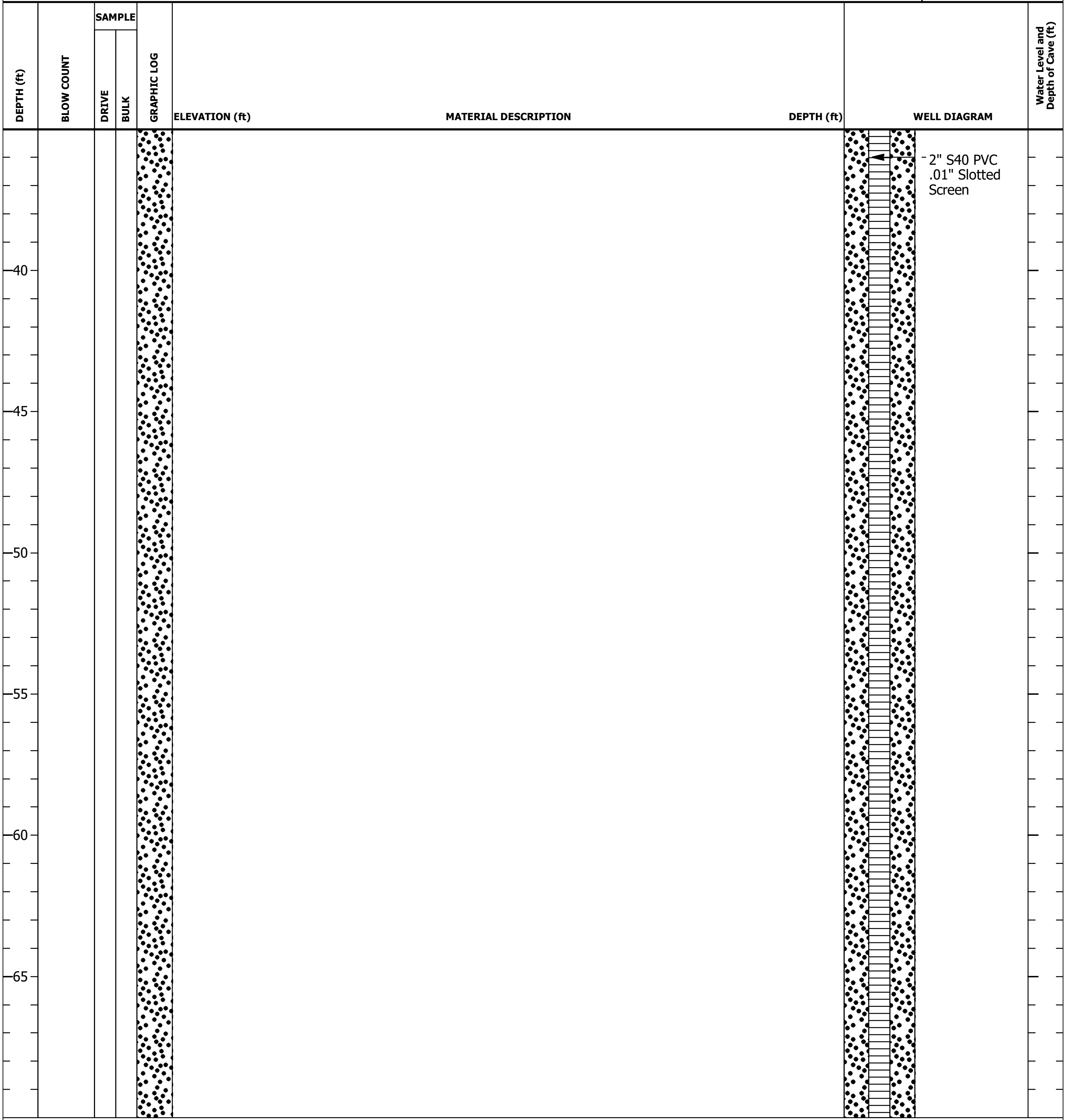
▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

☒ MODIFIED CALIFORNIA SAMPLER

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	MW-3
BORING LOCATION	40.419102°/-104.569162°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 50	CMTTS REP.	J. Edwards	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/27/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/27/2023	Page 2 of 3



LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

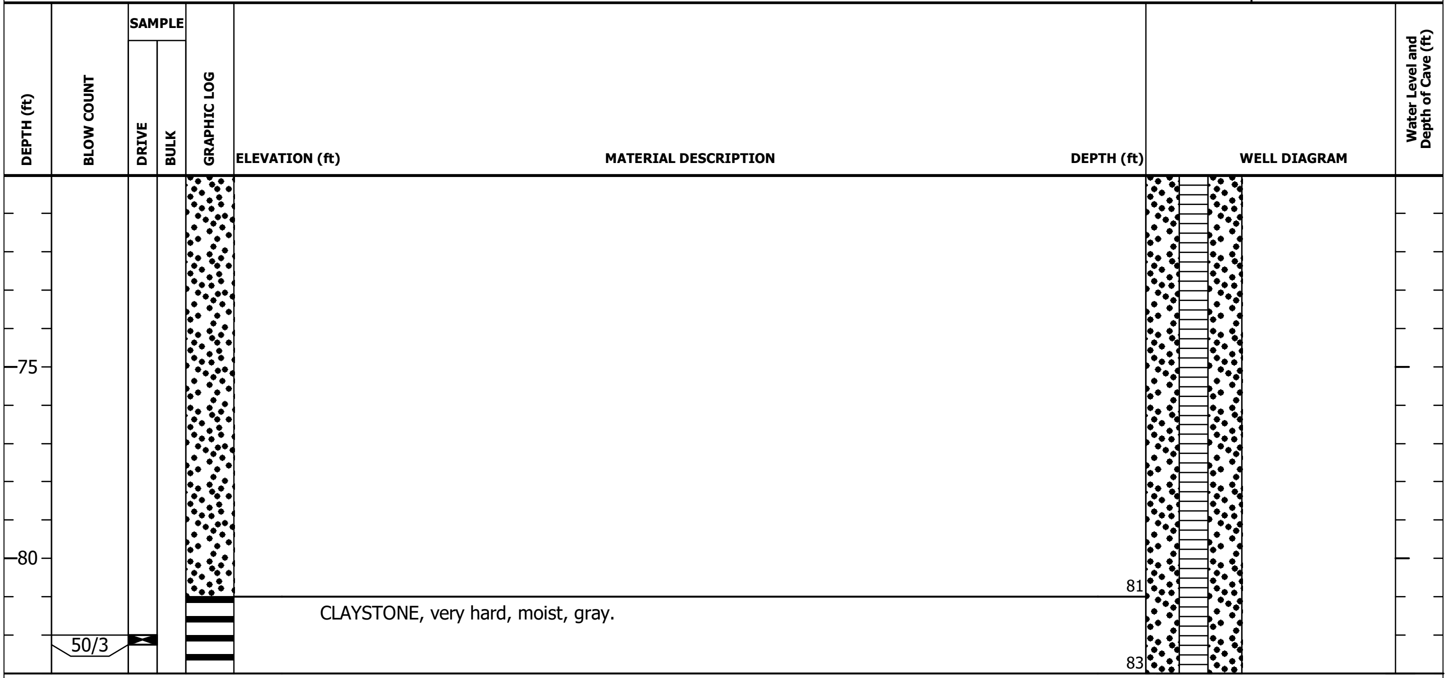
☒ MODIFIED CALIFORNIA SAMPLER

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	**MW-3**
BORING LOCATION	40.419102°/-104.569162°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 50	CMTTS REP.	J. Edwards	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/27/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/27/2023	Page 3 of 3



CLAYSTONE, very hard, moist, gray.

Boring terminated at 83 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

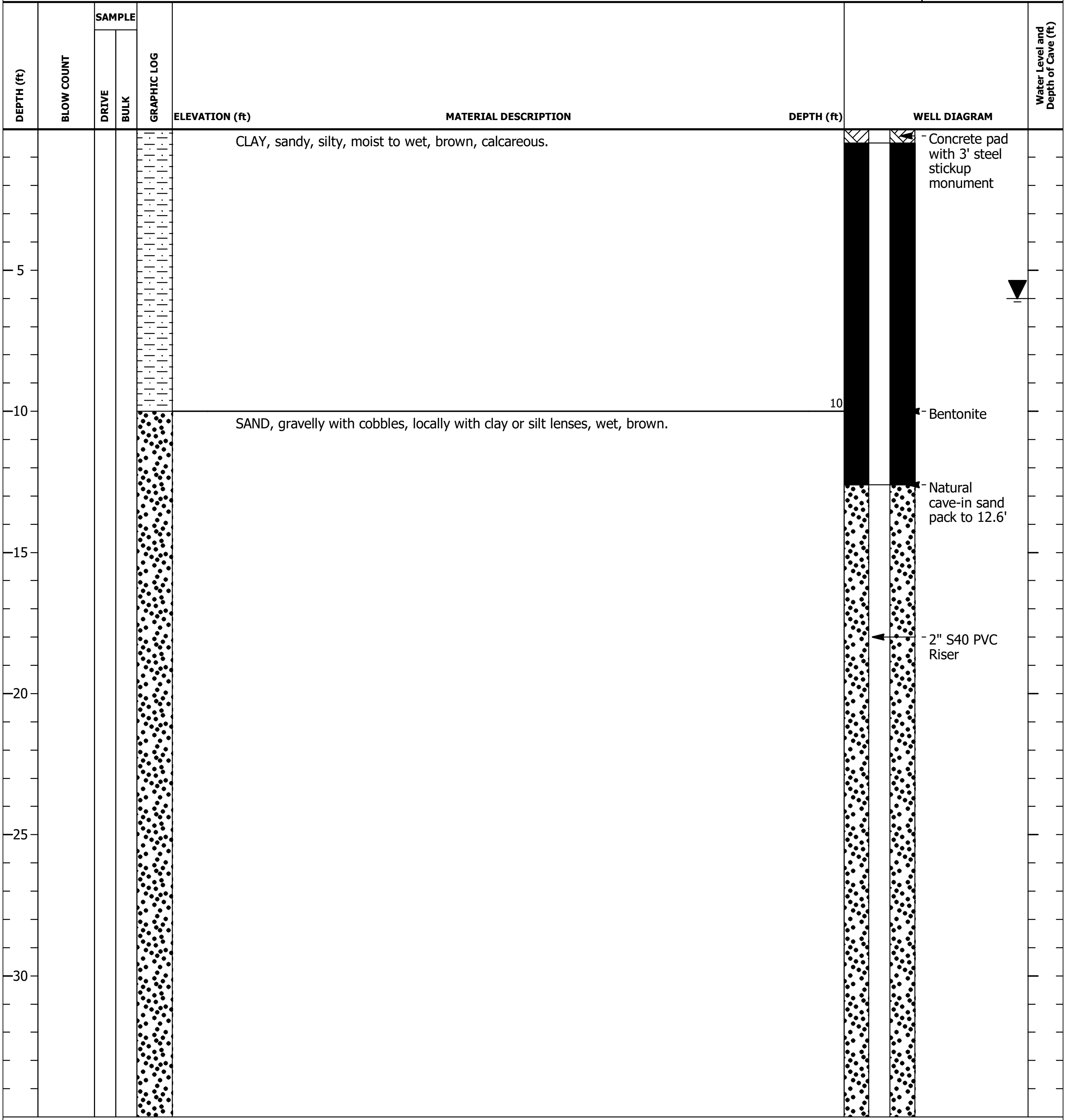
▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

☒ MODIFIED CALIFORNIA SAMPLER

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	**MW-4**
BORING LOCATION	40.417947°/-104.564652°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 50	CMTTS REP.	K. McNally	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/28/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/28/2023	Page 1 of 3



CLAY, sandy, silty, moist to wet, brown, calcareous.

SAND, gravelly with cobbles, locally with clay or silt lenses, wet, brown.

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

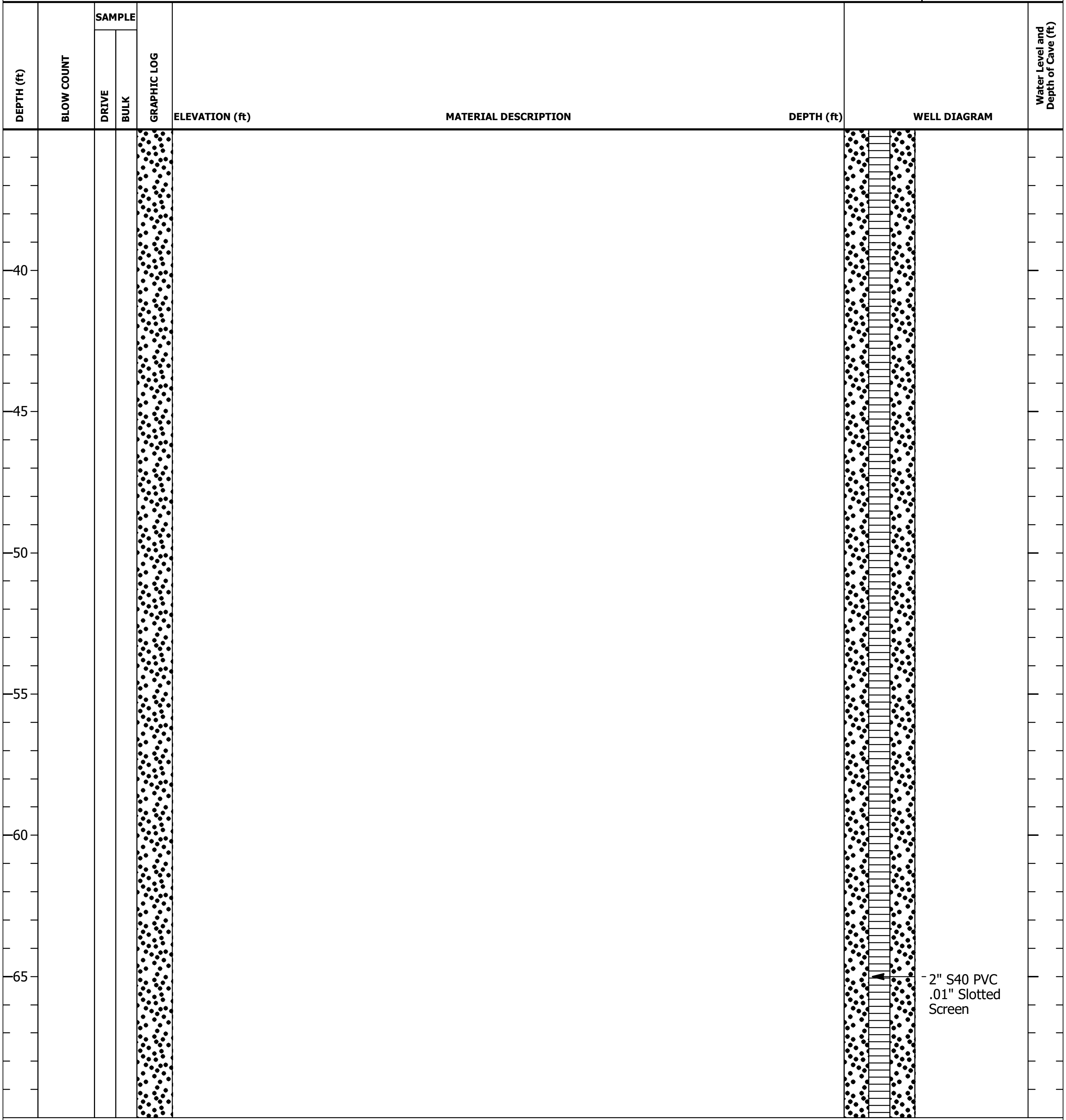
→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

⧗ STANDARD PENETRATION TEST

CMT TECHNICAL SERVICES

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058	MW-4
BORING LOCATION	40.417947°/-104.564652°	BORING ELEVATION		
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 50	CMTTS REP.	K. McNally	
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/28/2023	
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/28/2023	Page 2 of 3



LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

→# DEPTH OF CAVE # DAYS AFTER DRILLING

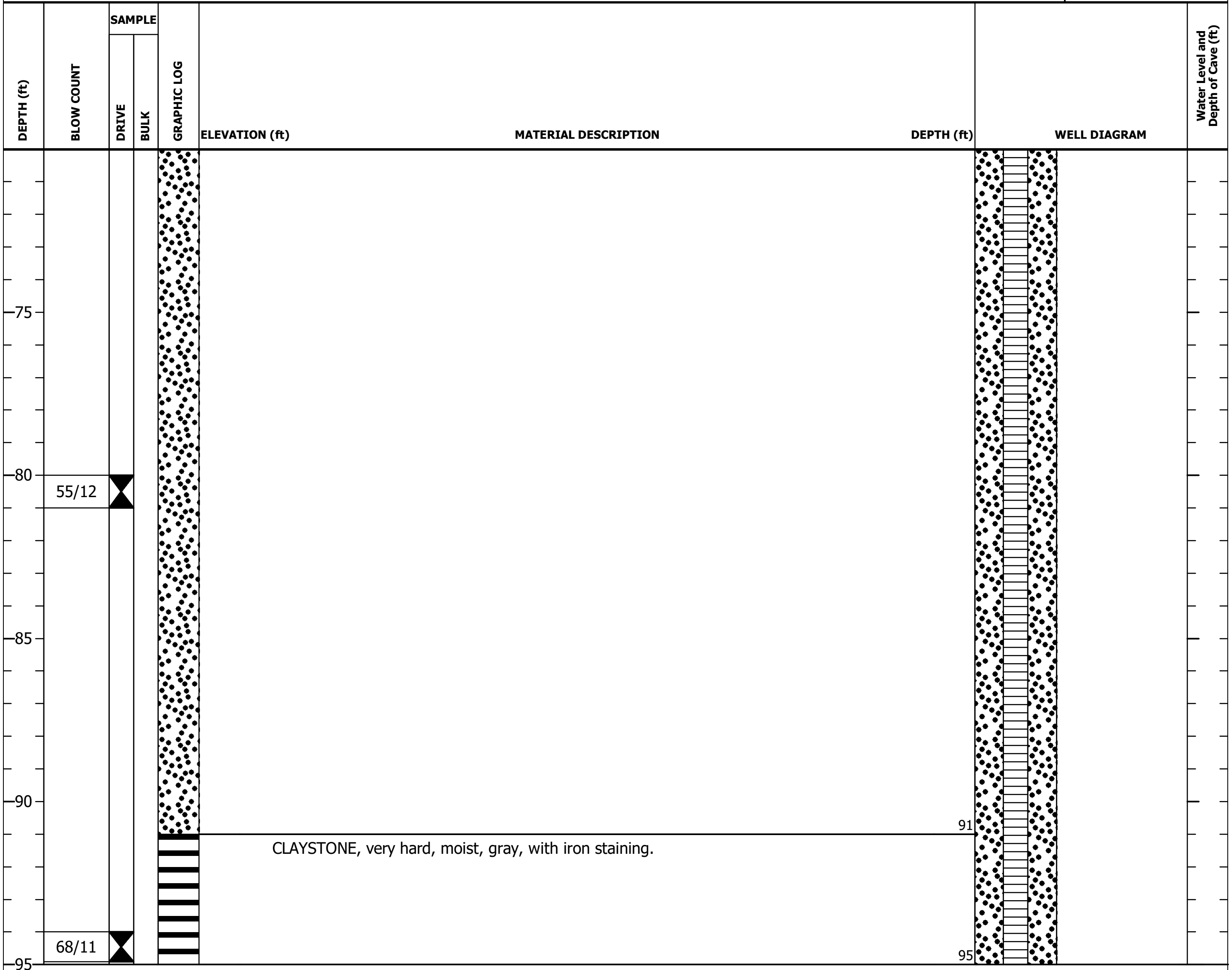
↑ DEPTH OF REFUSAL

⧗ STANDARD PENETRATION TEST

PROJECT NAME	Todd Bean Property Monitor Wells	PROJECT NUMBER	22.3058
BORING LOCATION	40.417947°/-104.564652°	BORING ELEVATION	
DRILLING COMPANY/RIG	Dakota Drilling/Diedrich 50	CMTTS REP.	K. McNally
DRILLING METHOD	4.25in. Diameter HSA	DATE STARTED	6/28/2023
HAMMER SYSTEM	Rope & Cathead	DATE COMPLETED	6/28/2023

MW-4

Page 3 of 3



DEPTH (ft)	BLOW COUNT	MATERIAL DESCRIPTION	DEPTH (ft)
80	55/12		
91		CLAYSTONE, very hard, moist, gray, with iron staining.	91
95	68/11		95

Boring terminated at 95 feet

LEGEND

▼ WATER LEVEL AT TIME OF DRILLING

▽# WATER LEVEL # DAYS AFTER DRILLING

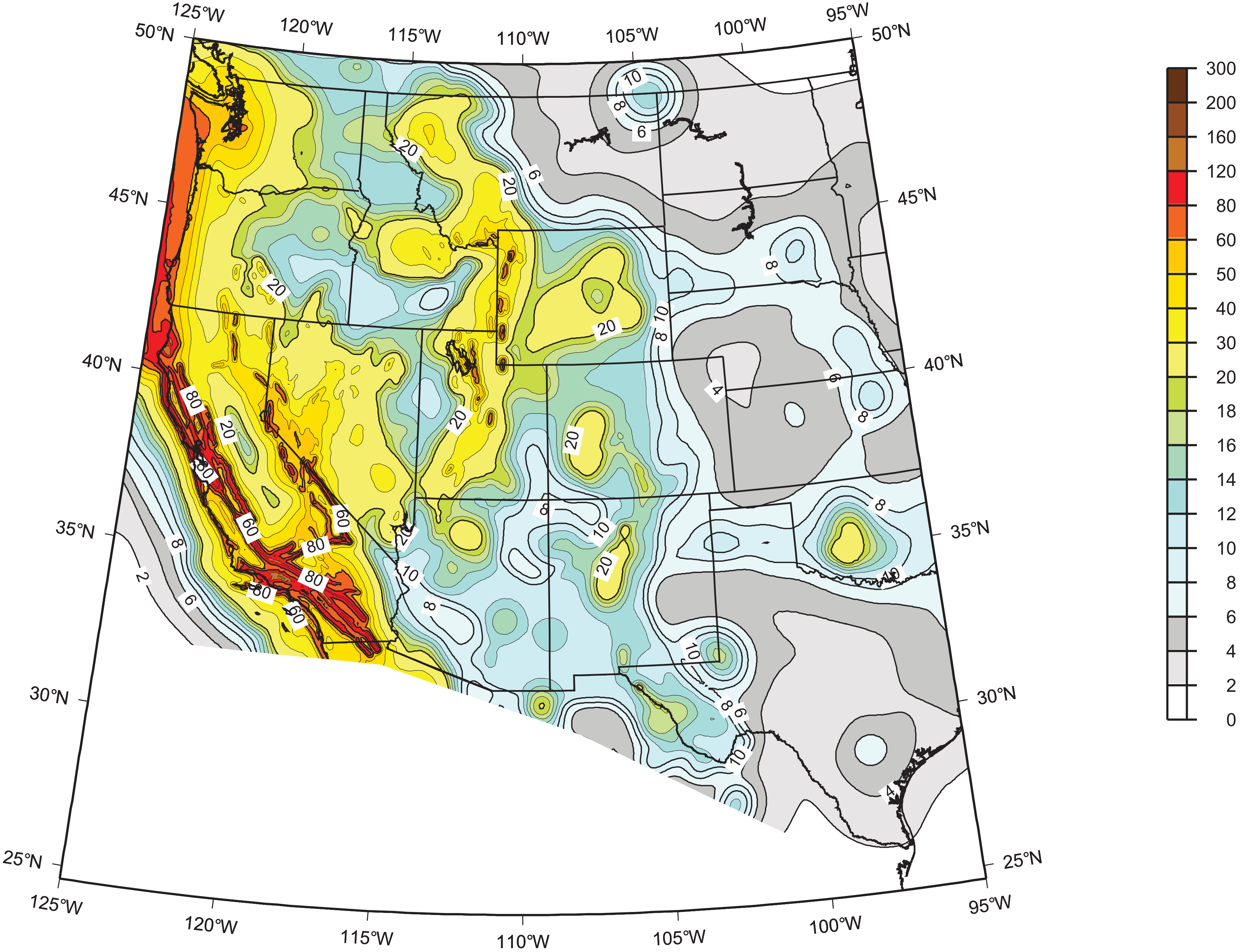
→# DEPTH OF CAVE # DAYS AFTER DRILLING

↑ DEPTH OF REFUSAL

⧗ STANDARD PENETRATION TEST

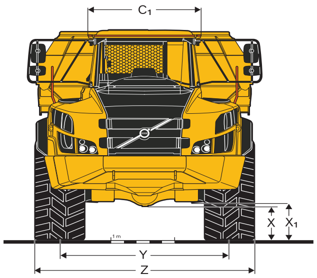
APPENDIX E

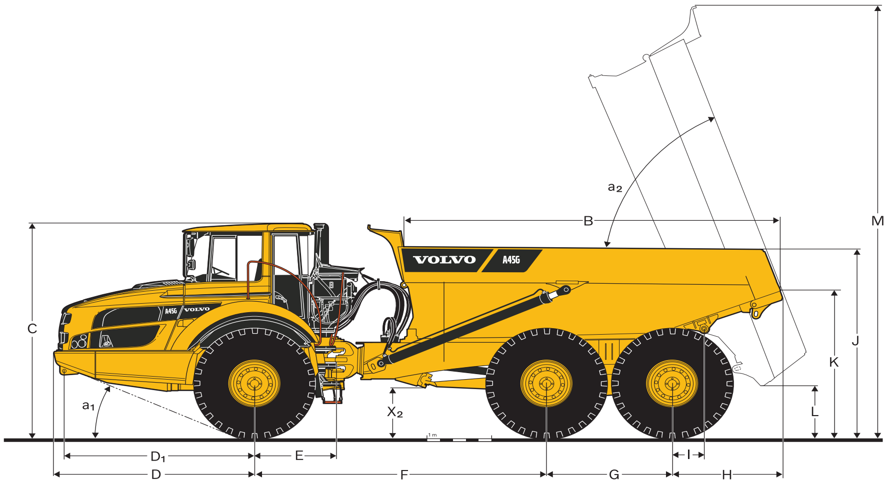
Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
USGS Map, Oct. 2002rev

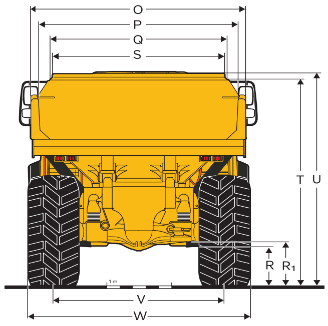


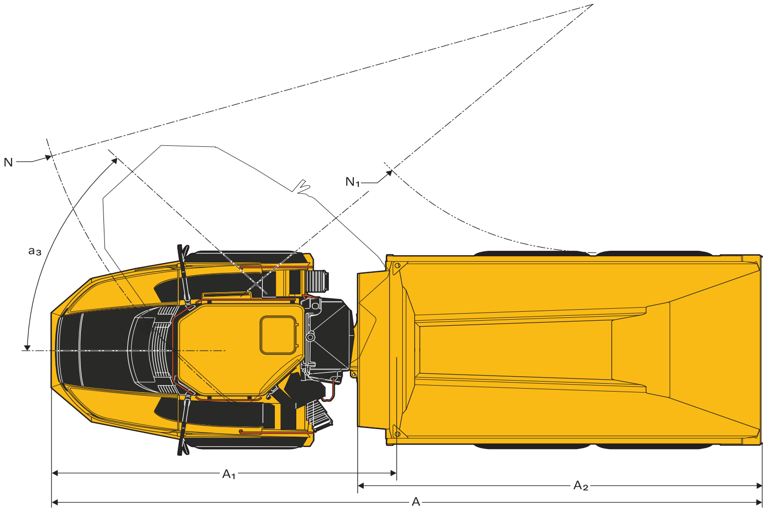

20
10
8
ORF Pit Entrance
4
20
N
Google Earth
Image Landsat / Copernicus

APPENDIX F









DIMENSIONS

Pos	Unit		A45G	
A	mm	ft in	11 263	36‘11“
A_1	mm	ft in	5 476	18‘
A_2	mm	ft in	6 404	21‘0“
B	mm	ft in	5 844	19‘2“
C	mm	ft in	3 599	11‘10“
C_1	mm	ft in	1 772	5‘10“
D	mm	ft in	3 100	10‘2“
D_1	mm	ft in	2 942	9‘8“
E	mm	ft in	1 277	4‘2“
F	mm	ft in	4 518	14‘10“
G	mm	ft in	1 940	6‘4“
H	mm	ft in	1 706	5‘7“
I	mm	ft in	495	1‘7“
J	mm	ft in	3 200	10‘6“
K	mm	ft in	2 435	8‘
L	mm	ft in	822	2‘8“
M	mm	ft in	7 265	23‘10“
N	mm	ft in	8 957	29‘5“
N_1	mm	ft in	4 327	14‘2“
O	mm	ft in	3 430	11‘3“

DIMENSIONS

Pos	Unit		A45G	
P	mm	ft in	3 118	10‘3“
Q	mm	ft in	2 820	9‘3“
R	mm	ft in	613	2‘0“
R_1	mm	ft in	701	2‘4“
S	mm	ft in	2 651	8‘8“
T	mm	ft in	3 427	11‘3“
U	mm	ft in	3 546	11‘8“
V	mm	ft in	2 636	8‘8“
W	mm	ft in	3 403	11‘2“
X	mm	ft in	553	1‘10“
X_1	mm	ft in	645	2‘1“
X_2	mm	ft in	788	2‘7“
Y	mm	ft in	2 636	8‘8“
Z	mm	ft in	3 403	12‘
a_1	°		24.3	
a_2	°		70	
a_3	°		45	

A45G: Unloaded machine with 29.5R25 tires.

Specifications

REFILL CAPACITIES

Crankcase	l	gal	55	14.5
Fuel tank	l	gal	480	126.8
Cooling system	l	gal	49	12.9
Brake cooling system	l	gal	188	49.7
Transmission	l	gal	43	11.4
Dropbox	l	gal	9	2.4
Axles, front/bogie	l	gal	26/52	6.9/13.7
Hydraulic tank	l	gal	174	46
DEF	l	gal	39	10.3

SPEED

Forward				
1	km/h	mph	5.8	3.6
2	km/h	mph	8.5	5.3
3	km/h	mph	10.4	6.5
4	km/h	mph	15	9.3
5	km/h	mph	21.6	13.4
6	km/h	mph	27.3	17
7	km/h	mph	36.1	22.4
8	km/h	mph	47.8	29.7
9	km/h	mph	57	35.4
Reverse				
1	km/h	mph	6.5	4
2	km/h	mph	9.4	5.8
3	km/h	mph	18	11.2

OPERATING WEIGHT UNLOADED

Tires			29.5R25*	
Front	kg	lb	16,500	36,376
Rear	kg	lb	14,600	32,187
Total	kg	lb	31,100	68,564
Payload	kg	lb	41,000	90,389

Operating weight includes all fluids and operator

*) A45G with tires 875/65R25, add 300 kg (660 lb)/axle

TOTAL WEIGHT

Tires			29.5R25*	
Front	kg	lb	20,900	46,077
Rear	kg	lb	51,200	112,877
Total	kg	lb	72,100	158,953

*) A45G with tires 875/65R25, add 300 kg (660 lb)/axle

GROUND PRESSURE

Tires			**29.5R25**		**875/65R25**	
Unloaded						
Front	kPa	psi	113	16.4	99	14.4
Rear	kPa	psi	47	6.8	42	6.1
Loaded						
Front	kPa	psi	142	20.6	124	18
Rear	kPa	psi	174	25.2	151	219

J&T Consulting, Inc.

June 21, 2024

Mr. Brock Bowles
Environmental Protection Specialist
State of Colorado
Division of Reclamation, Mining, and Safety
Physical Address:
1313 Sherman Street, Room 215
Denver, CO 80203
Mailing Address:
Division of Reclamation, Mining and Safety, Room 215
1001 East 62nd Avenue
Denver, CO 80216

RE: Ogilvy River Farm Pit (Permit No. M-2024-006)
Objection Letter Response

Dear Mr. Bowles,

Ogilvy River Farm, LLC has received the Objection Letter from Mrs. Smith from the Division dated May 8, 2024. Below are the comments and the corresponding responses that we have provided to address the comments.

Comments

RIGHT OF WAY / DRIVEWAY CONCERNS

1. The very poor almost unreadable application maps indicates where the entrance to the pit will be located. This is **TOTALLY UNACCEPTABLE** to use my ROW for access to the gravel pit. This is the only access to my property, by allowing my driveway to be the mine entrance is denying me unobstructed access to my place and could cause safety concerns for me.

   Response: The access/utility easement allows the owner of the property to utilize the easement for a field road per Item No. 6. Unobstructed access can be maintained by improving the access to accommodate the mine traffic as well as keeping unobstructed access for Mrs. Smith as well as providing better safety for all traffic entering and exiting the property. The owner can improve the access per Item No. 5 where the owner will repair any damage caused by the owner.

2. My understanding is the applicant has to be 200 feet from any structure of which I was told these are considered structures and those items listed above would not be at the 200-foot restriction from the access road.

   Response: The mining can be within 200 feet as long as either a structure agreement is in place with the structure owner to mine within 200 feet or per the engineering slope stability analysis that has been provided to the DRMS and

meets the requirements of the DRMS rules and regulations. A structure agreement has been provided that provides compensation/repairs to any structure that may be damaged as a result of the mining operations.

3. That driveway is not wide enough for semi-trucks to enter or exit especially with the water meter on the north side of the driveway, the power pole and mailbox on the south.

   Response: The driveway will be widened to accommodate the mine traffic and the infrastructure for the water meter, water line, power pole, and mailbox. The structures will be protected and kept in the current conditions they are in today throughout the mining.

4. In the ROW recorded agreement filed with Weld County, it states "The Grantors agree that they will not use vehicles upon the right of way which are in excess of the capacity of the roadway constructed by the grantees". This road was **DEFINITELY NOT** constructed to handle heavy semi-trucks loaded with sand and gravel.

   Response: This references Item No. 7 in the easement agreement. The roadway would be improved to handle the capacity of the mine traffic and mining operation equipment within the mine permit boundary. During the construction of the improved roadway there will be an access detour provided at all times to ensure Mrs. Smith has unobstructed access.

5. I have to have full unimpeded access to my place at all times of the day and night for my safety.

   Response: Acknowledged. Ogilvy River Farm, LLC intends to keep full unimpeded access for Mrs. Smith and continue to have a safe access road.

6. I own a rental units and a land business. This location is where all the trailers, vehicles, farm equipment, and supplies are stored, I need full access to those.

   Response: Acknowledged. Ogilvy River Farm, LLC intends to keep full unimpeded access for Mrs. Smith.

7. There are major highway concerns from the driveway – will address this concern under highway concerns.

   Response: See responses in highway concerns.

HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS

1. Again, with the noted 200-foot restriction from any structure for this gravel pit application, the shop, house, outbuildings, propane tank and irrigation well are all closer than 200' from his proposed pit.

   Response: The mining can be within 200 feet as long as either a structure agreement is in place with the structure owner to mine within 200 feet or per the engineering slope stability analysis that has been provided to the DRMS. The

slope stability analysis meets the requirements of the DRMS rules and regulations. A structure agreement has been provided that provides compensation/repairs to any structure that may be damaged as a result of the mining operations.

2. If the slurry wall is constructed on the north side of the pit, with water table rising on the elevated side what is to prevent the water from coming around the wall and undermining my basement and engineered septic system especially knowing the 50' drop in elevation from the north side of the property to the south as underground water is returning to the river.

   Response: Per the groundwater modeling report the impacts to groundwater from the slurry wall are documented and some mounding occurs on the upstream side of the wall but it does not cause an impact to upstream wells or dwellings as the depth to groundwater ranges from 20 to 24 feet below the ground surface (per readings from MW-1 and MW-2). The groundwater flows through the alluvium (sand/gravel) based on the hydraulic conductivity/transmissivity of the materials in the alluvium which has been provided in the groundwater model. There is not a 50-foot drop in elevation from the location where the slurry wall is installed on the north side of the Ogilvy River Farm Property and where the north side of the Smith property is located. The surface topography gradient change in elevation is 15 feet.

   We direct Mrs. Smith to the McGrane Water Engineering (MWE) Groundwater Evaluation Report dated September 19, 2023 ("MWE Report"). Figure A-9 in the MWE Report shows the slurry wall will likely cause less than a 1.5 foot decline in water levels on the property. This will likely not be noticeable compared to the seasonal rise in the water table in response to spring runoff. Mrs. Smith's concerns that "water from coming around the wall and undermining my basement and engineered septic system" is unwarranted. Although there may be a slightly increased gradient from the north side of the pit to the South Platte River (SRP), the velocity of groundwater flow is only a few feet per day, unlike the flow in the SPR which is in units of feet per second.

   In addition, septic systems are designed so that the constructed leach field is above the water table which allows proper aeration and biological degradation of the effluent. Septic systems are typically installed less than 5 feet deep. Therefore, a septic system can only be impacted if the water table rises to within 5 feet of ground level. The Smith's septic system is located in an area where we expect a slight decrease in groundwater levels. Therefore, we do not expect any impact to their septic system.

3. I have an old, adjudicated irrigation well with a registration # 12254 that was originally registered to George Jurgens who we bought the land from. The information on the well indicates it is 48' deep, 40 x16" diameter with a 29" casing. The static water is at 14', with a pump of 1000 gpm from 25 feet. The pump was first used in 1952. The well is not currently augmented or used but once augmentation is acquired the well is operational and could be used and needs to be protected. A recent check showed the static water still at the 14' level. What will be the long-term effect of this pit have on my well? This a huge concern for me to be able to ensure the integrity of my well and its future use.

Response: Well yield is directly proportional to the saturated thickness of the aquifer. According to the information provided, the saturated aquifer thickness is 34 ft (48-14). All things considered equal, if the water table declines 2 feet at this location, then the well drawdown would simply increase 2 feet (to 27 ft) in the well. A pump is not typically sensitive to a 2-foot decline in the water table. Therefore, there would likely be no measurable change in well yield caused by the pit.

Mrs. Smith may also be concerned that the slurry wall may block groundwater that may be flowing to her well from the north. However, once the slurry wall is installed the drawdown gradient in the well drawdown (aka cone of depression) will simply steepen toward the SPR and induce more recharge from the SPR. Therefore, there should be no noticeable effect in well yield.

If water quality is a concern, we do not anticipate any significant change to the groundwater quality of the well caused by the mine since both the groundwater and South Platte River water quality in the area are similar.

Note that the well is not a legal well or water right. The well and the water right associated with it have been abandoned, a cease and desist order has been issued, and the well has been red-tagged by the Colorado Division of Water Resources. See attached documentation for the well.

4. If the well water level is now at 14’ and that is approximately the same elevation drop to the South Platte river basin, this mean the proposed mining will be tapping into the South Platte River flow basin and the potential consequences of interfering with the flow of the river.

   Response: Indeed, the groundwater in the Smith well is hydraulically connected to the SPR which is why the elevation of the water table in the well and the river are similar. When the well is pumped, more water will be induced to seep from the SPR than did previously (read response to the previous concern). However, the buildup of water on the upgradient side of the pit will cause increased flow to the SPR on either side of the pit. The steepened gradient will accelerate flow rates to the SPR and offset any potential depletions that may occur from the future pumping of the Smith (Jurgen) well located in between. Therefore, there will be no significant net change in the groundwater flow regime and no senior water rights in the vicinity of the SPR will be impacted.

5. My shop that is located close to the applicant’s proposed pit wall. This shop is filled with heavy farm equipment and vehicles estimated at 100,000 lbs. This weight load has not been factored into the ground stability analysis. A 39’ setback for the pit will undermine the integrity of my shop.

   Response: The slope stability analysis has been revised to address the loads associated with the shop. The setback of 39 feet is to the north edge of the gravel

road. The setback to the shop is 67 feet. The factors of safety are greater than what the DRMS requires for each location.

6. With mining operations there is the potential of adverse vibration to the propane tank, the connections and underground lines that could possibly lead to an explosion.

   Response: Ogilvy River Farm, LLC understands this concern and would propose having the propane company and a mechanical contractor specializing in gas piping come check the existing connections prior to mining activities beginning in this area. We would also propose to have vibration monitoring in place during the initial mining operations so that the actual vibration can be recorded. The location of the sources of vibration such as the processing plant is over 400 feet away from the propane tank and piping. The edge of the mining limit or top of slope is greater than 70 feet from the propane tank. In other locations where mining or construction activities are occurring within these distances there have not been vibrations created capable of damaging underground lines or structures.

7. I have serious concerns regarding his proposed water storage unit especially related to the dramatic drop in elevation from north to south of the proposed location which is not mention. The west to east elevation drop is noted as 17’. The north to south drop in elevation is approximately 30’ and definitely should be addressed as that is critical to me.

   Response: As stated above the north to south drop in elevation is 15 feet.

8. The dewatering trenches during mining are not located. This is critical for my safety.

   Response: As shown on Exhibit C2 the dewatering trench(es) will be located in the interior of the mine inside the slurry wall at the toe of the slopes on the mine floor and will not cause any safety risk to the Smith property.

9. The inflow and outflow locations for the water reclamation plan are not listed. To me if water storage is the end goal of this application these concerns to be included in this application. I have some very serious concerns for my safety with a large water storage just north of my property as well as inflow and out flow locations.

   Response: The inlet/outlet water facilities will depend on how the end user intends to operate the water storage reservoir. This has not been finalized at this time. The facilities will not affect the safety of the access or utilities serving the Smith property as they would be constructed to not impede or damage any existing use or service to the Smith property.

HIGHWAY SAFETY CONCERNS

1. This county road was **NOT** built for heavy truck traffic, it has no shoulders and even with paving not too long ago it shows significant damage from the overuse by the heavy weight truck traffic. If there is a dramatic increase in heavy sand and gravel truck traffic, the heavy weight overuse will destroy the road.

Response: County roads/bridges are not under the jurisdiction of the DRMS. The existing county road was improved by Weld County in 2012 with new pavement, turn lanes, and striping, in 2017/2018 with a new bridge and new pavement and striping between CR 58 and just north of CR 388, and in 2021 with new pavement, turn lanes, and striping at the intersection of CR 58 and CR 53. All of these improvements were designed and constructed per Weld County's criteria which includes incorporating truck traffic. Roadway improvements are proposed for the access into the Ogilvy River Farm, LLC to accommodate truck traffic and keep the entrance/access safe. These improvements will be provided to Weld County and/or the Town of Kersey for review/approval once the DRMS permit application is approved.

2. The 2013 flood destroyed the old bridge across the South Platte River on CR 53 just south of his property. A new bridge had to be constructed. This heavily used bridge is extremely narrow with no edges between highway and guard rails. If there is a dramatic increase of heavy semi traffic over this bridge it will have a destructive effect on the integrity and safety of this bridge.

   Response: County roads/bridges are not under the jurisdiction of the DRMS. As stated in the previous comment response the improvements to CR 53 including the bridge were designed per Weld County's criteria which includes incorporating truck traffic.

3. I was told recently of an accident of two large vehicles with extended mirrors hitting the vehicle's mirror traveling in opposite direction causing major damage. When I drive north across the bridge, the guard rail edge of the bridge sets off my mirror alarms for a close object. There is no place to pull over if the oncoming vehicle happens to be traveling even on the yellow line let alone if it is the oncoming lane. This bridge is an accident waiting to happen with the very large wide trucks that have no room for error when meeting one another on the bridge.

   Response: County roads/bridges are not under the jurisdiction of the DRMS. As stated in the previous comment responses the improvements to CR 53 including the bridge were designed per Weld County's criteria which includes incorporating truck traffic.

4. An even worse scenario what if it was a sand and gravel belly dump truck from the proposed pit and a school bus loaded with students trying to pass one another crossing that bridge and one of the large vehicle's is not in it's lane. It is scary to think of what the catastrophic consequences of that could be.

   Response: County roads/bridges are not under the jurisdiction of the DRMS. As stated in the previous comment responses the improvements to CR 53 including the bridge were designed per Weld County's criteria which includes incorporating truck traffic.

5. When entering CR 53 from my driveway (the proposed entrance to the applicant's pit) there is very limited sight distance especially to the north. You cannot see past the crest of the hill at the north side of his property. It will become a **serious safety hazard** if a slow-moving sand and gravel truck is trying to enter traffic or turning to exit.

Response: County roads/bridges are not under the jurisdiction of the DRMS. The site distance is acceptable for truck traffic entering CR 53 from this location, Sustainable Traffic Solutions is in the process of finalizing the traffic study.

6. CR 53 is a high-speed narrow road especially as it passes my driveway. The speed limit on this road is 55 MPH. Most vehicles drive at 55 -65 MPH especially on that part of the road along the applicant's proposed site.

Response: County roads/bridges are not under the jurisdiction of the DRMS. As stated in the previous comment responses the improvements to CR 53 including the bridge were designed per Weld County's criteria which includes incorporating truck traffic.

7. Coming from the south, driving north at my driveway (proposed pit access location) there is a curve in the road that limits vision of oncoming traffic, as well as the crest of the hill, both limiting vision of oncoming vehicles especially when they are traveling at a high speed. This could be disastrous for any truck attempting to turn there. It would still be dangerous even with a turn lane**. It is NOT a location for access to the proposed pit**

Response: County roads/bridges are not under the jurisdiction of the DRMS. The site distance is acceptable for truck traffic entering CR 53 from this location, Sustainable Traffic Solutions is in the process of finalizing the traffic study.

8. There are no shoulders or turn lanes for any entering or exiting trucks this could cause catastrophic consequences for traffic. I have seen pictures of belly dump trucks lining the edge of the Weld Co Parkway waiting for the pit to open. This also was an issue on CR 58 when the pit was being mined over there That would be totally disastrous in this location, even with shoulders and turn lanes, it would block traffic causing a serious hazardous situation.

Response: County roads/bridges are not under the jurisdiction of the DRMS. Sustainable Traffic Solutions is in the process of finalizing the traffic study and it will provide information for what turn lanes, deceleration and acceleration lanes are warranted/required per Weld County's design requirements. The mine's hours of operation will be adhered to and trucks entering the site will be provided with designated truck routes and hours of operation. Parking on the CR 53 shoulder or potential future turn lanes will not be acceptable to the operator.

9. This highway is used for the school buses needing to transport students to the Platte Valley School living north of the river. It is a very serious concern for the safety of students on the buses as well as any teenage drivers or parent driving their students to and from school. It could be catastrophic!!

Response: County roads/bridges are not under the jurisdiction of the DRMS. As stated in the previous comment responses the improvements to CR 53 including the bridge were designed per Weld County's criteria which includes incorporating truck traffic.

OGILVY DITCH CANAL CONCERNS

1. If with the presence of a slurry wall just to the south of this irrigation canal and as the water table rises north of the canal, the underground water returning to the river could potentially cause the water level to undermine the irrigation canal causing serious loss of irrigation water in sand that sits below that ditch. If that happens what is to prevent it from flowing south and potentially destroying my basement and septic system? In 2013 with the rise of the flood water I had water in my basement.

   ***Response: See the response to the same question under* HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS, item 2.**

2. During the 2013 flood, portions of the proposed pit were under flowing water. This could be disastrous if another flood like that happened. There is no mention of any plans to handle possible future flood. With climate changing our weather patterns this concern and a plan to deal with it needs to be in the application.

   Response: The mining limits have a setback from the river bank of 400 feet required by the Division to protect the river bank from the effects during flood event flows. If a flood event occurs, the presence of the excavated mine will in fact improve the flooding conditions in the area as it will act as a detention pond for flood flows if they reach the pit.

3. When the water table rises upslope from the slurry wall, there is an elevation drop of 55 feet from the northside of his property to the river basin. The significant drop in elevation, in that short of a distance, increases the likelihood of increased underground water causing damage to my basement and septic system.

   ***Response: See the response to the same question under* HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS, item 2.**

4. In the applicant's water engineering report conclusion, it even states "We ignored the presence of the New Cache La Poudre ditch and the Ogilvy ditch flow from the west to the east north of the ORFP". How in the world can you ignore a large irrigation canal that is within a few feet of a slurry wall with underground water flowing back downhill from the north toward the river? Common sense tells you it will affect it.

   Response: The purpose of the MWE report was to evaluate potential <u>changes</u> to the hydrologic system caused by the pit. We determined, via modeling, that the water table may rise up to 4 feet below the Ogilvy Ditch and rise up to approximately 1.5 feet below the New Cache La Poudre Ditch (See MWE report Figure A9).

   As stated in the MWE report (pg. 6), we ignored the presence of the ditches. We do not know whether there is simply a vertical seepage gradient that won't be affected by a rise in groundwater or if the 4-foot rise reaches the ditch bottom

causing the ditch to leak less. In either case, this is not going to cause any adverse impacts. By ignoring the ditch's potentially mitigating effect of mounding, our analysis provides a "worst-case" impact scenario to wells.

ENVIRONMENTAL CONCERNS

1. Loud and very annoying noise from all types of machines. There will be constant noise from the scrapers, extractors, compactors back up beepers etc etc! There will be the continual noise of diesel semi-trucks that will run continuously while at the site.

    Response: Noise control is not under the jurisdiction of the DRMS. Wave Engineering is finalizing the noise study for this project. The location of the stockpiles is also a measure to help with noise from the processing plant and providing a barrier to decrease noise levels. Backup alarms are a required safety measure that are within noise level limits required by Weld County. Ogilvy River Farm, LLC will adhere to Weld County regulations regarding noise levels.

2. The ground water is at 14' at my land – ground water will be exposed with the construction of the slurry wall – how will this be handled?

    Response: The groundwater exposed during the construction of the slurry wall will be contained within the slurry wall trench and slurry is added as excavation commences to keep the trench open until backfill is placed. The slurry wall trench is backfilled as construction is completed thus keeping the exposed groundwater to a minimum. A substitute supply plan will be approved prior to slurry wall construction by the Division of Water Resources (DWR) to incorporate augmentation water releases to account for any exposed groundwater.

3. "Dewatering trenches" where will they be located; how will they be managed, and will they adversely affect me?

    Response: As shown on Exhibit C2 the dewatering trench(es) will be located in the interior of the mine inside the slurry wall at the toe of the slopes and will not adversely affect the Smith property.

4. Sediment pond is indicated but does not state where or for how long and what are the implications of it to me.

    Response: The sedimentation pond will be in the processing area as stated in Exhibit D. This area will be inside the slurry wall so no impacts outside of the slurry wall, hence to surrounding properties, will result from the sedimentation pond.

5. What will the noise level be with the constant running of the dewatering pumps? Will these pumps be running constantly day and night?

    Response: Noise control is not under the jurisdiction of the DRMS. The dewatering pumps are expected to run intermittently as needed to maintain the water level within the pit. These will typically not run at night and only during

daytime hours. The units will also be below the ground surface to provide a barrier to decrease noise levels. Ogilvy River Farm, LLC will adhere to Weld County regulations regarding noise levels.

6. Dust from the extraction process as well as all the increased traffic at the site. This area has a lot of wind and my location is most of the time downwind from the site. With the top soil stored near my property how will wind affect the erosion of that. As the dirt and sand is mined it will blow over onto my land, into my house and shop.

   Response: Dust control is not under the jurisdiction of the DRMS. Ogilvy River Farm, LLC will have an approved Air Permit through the State Air Quality Control Division. Best management practices will be used to mitigate erosion (i.e. top soil piles will be seeded after they are built and a water truck will be utilized to wet areas where stockpiles are located and where traffic is occurring during the creation of the stockpile) from stock piles by wetting with a water truck/sprinklers and/or seeding topsoil/overburden at locations on the stockpiles that are not actively being removed or placed. Haul roads will be wetted with a water truck to keep dust from being created and may be treated with a dust suppressant (i.e. main haul road from processing area to access road).

7. Diesel from the semis and other machines will cause air pollution and a nasty smell. What happens to the ground and the water if a hydraulic hose blows out, or diesel or gas is spilled. It could easily get into our water system downstream especially knowing you are tapping into the South Platte River basin. That will happen over the course of the proposed operation.

   Response: Emissions from motor vehicles are not under the jurisdiction of the DRMS. All equipment will have mufflers and be in working order per Federal and State regulations. Ogilvy River Farm, LLC will have a spill prevention control and countermeasure plan for any spill. Any spill of a hazardous material will be immediately contained, and the contaminated materials cleaned per industry standards and/or removed from the site and landfilled.

8. Knowing there is a capped abandoned oil well in the proposed mining site could easily be damaged causing extremely serious consequences.

   Response: The abandoned well has been plugged per industry standards to ensure no leakage can occur from it. The top of the well casing will be lowered below the floor of the pit per industry standards when necessary to complete mining and the reclamation of the pit.

9. There are numerous horizontal oil and gas lines under that property (I receive royalties from two pads to the east of the land and one to the north). Those lines have to lie under the applicant's property. How does the extraction process with the disruption of the earth above including possible vibration etc. by the mining and later the weight of the water, affect the horizontal gas and oil well lines? Will the fractured earth above the lines result in any damage to the oil and gas well production?

Response: The directional/horizontal oil/gas lines are thousands of feet below the pit and their structural integrity or production capacity will not be affected by the extraction process or the water storage end use.

WILDLIFE INFORMATION CONCERNS

1. The animals I have seen that are not listed include: mule deer, wild turkeys, pelicans and blue herons along the river. I have heard that the mountain lions run up and down the river but have never seen one.

   Response: Acknowledged. Impacts to threatened and endangered species have been addressed in Exhibit H – Wildlife Information.

2. There are bald eagle nests along the river that I have spotted in the past, and there are red tail hawk nests, but I have not spotted them. These birds need to be protected.

   Response: Impacts to threatened and endangered species have been addressed in Exhibit H – Wildlife Information.

3. I have seen spotted owls and great horned owls.

   Response: Acknowledged. Impacts to threatened and endangered species have been addressed in Exhibit H – Wildlife Information.

4. There is a long list of birds not listed – these are ones that have come to my bird feeders in past years, they include: blue jays, Eurasia collared doves, spotted towhees, various varieties of sparrows – field, lark , song, house, fox, and black throated; common grackle, house finch, European starling, black headed grossbeak, rose breasted grossbeak, brown thrasher, house wrens, red and yellow winged blackbirds, northern flicker, downy woodpecker, red bellied woodpecker, Lewis woodpecker, red headed woodpecker, lesser gold finch, northern cardinals, white breasted nuthatch, western tanager, dark eyed junco and black capped chickadees.

   Response: Acknowledged. Impacts to threatened and endangered species have been addressed in Exhibit H – Wildlife Information.

HISTORIC ARCHEOLOGICAL CONCERNS

1. There is a high possibility another prehistoric Paleo-Indian site could be found on this side of the river that needs to be fully investigated by archeologists.

   Response: The cultural resources report lists the found/known sites in the area using standard investigation practices. If cultural resources are found during the mining of the site, impacts to those areas will be addressed at that time. History Colorado was also a referral agency in reviewing this permit and CRS 24-80 part 13 will be followed if remains are found during ground disturbing activities.

2. The Cultural Resources report of the archeological review that was submitted by the applicant, reported where these sites are in their report. **BUT,** what they reported to

determine the finding of a possible site on the applicant's land was a "shovel exploration" to determine if anything was there. Of course, a shovel is not going to uncover anything, this ground has been farmed for 50+ years with continual cultivation. This will eliminate finding anything on the surface. It will take careful archeological exploration to find any artifacts buried underground

> ***Response: The cultural resources report lists the found/known sites in the area using standard investigation practices. If cultural resources are found during the mining of the site, impacts to those areas will be addressed at that time. History Colorado was also a referral agency in reviewing this permit and CRS 24-80 part 13 will be followed if remains are found during ground disturbing activities.***

3. Because of the close proximity to the important known site, it is ultimately important to do an exploration of this site.

> ***Response: The cultural resources report lists the found/known sites in the area using standard investigation practices. If cultural resources are found during the mining of the site, impacts to those areas will be addressed at that time. History Colorado was also a referral agency in reviewing this permit and CRS 24-80 part 13 will be followed if remains are found during ground disturbing activities.***

4. If both my family and the former owners of the applicant's land have found artifacts of Indians, this needs to be further explored.

> ***Response: The cultural resources report lists the found/know sites in the area using standard investigation practices. If cultural resources are found during the mining of the site, impacts to those areas will be addressed at that time. History Colorado was also a referral agency in reviewing this permit and CRS 24-80 part 13 will be followed if remains are found during ground disturbing activities.***

OTHER QUESTIONS AND CONCERNS AFTER REVIEW OF APPLICATION

1. My understanding is that sand and gravel are considered minerals. The former owner told me she sold her mineral rights. So, does the applicant actually own the rights to the sand and gravel?

> ***Response: Sand and gravel are considered part of the surface and are the property of the land owner and can be mined/extracted by the land owner per the DRMS regulations.***

2. Calculating the figures given in the application it states that 650,000 tons will be removed from this pit per year. If you calculate that amount to the load of one truck estimated at 20 tons per truck, a calculation indicates 2708 loads per month, or 136 loads per day leaving. the pit when operating five days. That is a huge number of trucks entering and leaving the site each day. That will have a huge devastating effect on the traffic on CR53.

Response: County roads/bridges are not under the jurisdiction of the DRMS. The existing county road was improved by Weld County in 2012 with new pavement, turn lanes, and striping, in 2017/2018 with a new bridge and new pavement and striping between CR 58 and just north of CR 388, and in 2021 with new pavement, turn lanes, and striping at the intersection of CR 58 and CR 53. All of these improvements were designed and constructed per Weld County's criteria which includes incorporating truck traffic. Roadway improvements are proposed for the access into the Ogilvy River Farm, LLC to accommodate truck traffic and keep the entrance/access safe. These improvements will be provided to Weld County and/or the Town of Kersey for review/approval once the DRMS permit application is approved.

3. The water reclamation plan in the application has no information on the inlet and outlet water facilities. This information needs to be indicated in the application as it directly affects me and the ROW access to my property.

   Response: The inlet/outlet water facilities will depend on how the end user intends to operate the water storage reservoir. This has not been finalized at this time. The facilities will not affect the safety of the access or utilities serving the Smith property as they would be constructed to not impede or damage any existing use or service to the Smith property.

4. Who will regulate and monitor the ground water level and its effects on the flow of the South Platte river? It cannot be the applicant or his contractor, it needs to be an overseer.

   Response: Groundwater monitoring wells have been installed around the perimeter of the mine. Groundwater wells will be measured monthly by the land owner. Groundwater well readings will be submitted to the DRMS quarterly. See the previous responses on the effect the mine will have on the flow of the South Platte River.

5. Who monitors the dust and control of the dust? What recourse do I have as a landowner downwind from the pit when the sand and dust are not controlled?

   Response: Dust control is not under the jurisdiction of the DRMS. Ogilvy River Farm, LLC will have an approved Air Permit through the State Air Quality Control Division. Best management practices will be used to mitigate erosion (i.e. top soil piles will be seeded after they are built and a water truck will be utilized to wet areas where stockpiles are located and where traffic is occurring during the creation of the stockpile) from stock piles by wetting with a water truck/sprinklers and/or seeding topsoil/overburden at locations on the stockpiles that are not actively being removed or placed. Haul roads will be wetted with a water truck to keep dust from being created and may be treated with a dust suppressant (i.e. main haul road from processing area to access road).

6. Part of the proposed pit was under running water in the 2013 flood. Has that been factored in with the potential of another flood of that magnitude?

Response: The mining limits have a setback from the river bank of 400 feet required by the Division to protect the river bank from the effects during flood event flows. If a flood event occurs, the presence of the excavated mine will in fact improve the flooding conditions in the area as it will act as a detention pond for flood flows if they reach the pit.

7. On page 96 of the water engineering report, it states "there is unusual bedrock elevation drop of 20-30'. "there needs. to be special care when keying into bedrock" Shouldn't that serious concern need to be addressed and determined if it is safe to have a large elevation drop in the bedrock before mining is approved?

   Response: Yes, this drop in bedrock is safe along the pit floor. Keying into bedrock during the construction of the slurry wall will be monitored/measured to ensure it is of sufficient depth to tie into the bedrock.

8. The water level contours of the pit are noted from west to east are listed at 17 feet but there is no. listing of the water level contours from north to south. The elevation drop from the ditch road to my house is 30 feet. That figure is not listed and has to be factored into the application.

   Response: As stated above the north to south drop in surface elevation is 15 feet. The water level elevation difference from north to south in the groundwater monitoring wells is approximately 1 to 2 feet on the west side and approximately 0.5 to 1 feet on the east. The water elevation difference from west to east is approximately 1 to 1.5 feet on the north side and approximately 0.1 to 1 feet on the south side.

9. Exhibit S is missing some crucial information. Missing are PVREA poles/lines, the deeded right of way with the NWCWD water meter/water line, mail box, capped gas line, my well, my propane tank, my engineered septic system.

   Response: Exhibit S has been updated to include all know man-made structures on this list.

OVERALL CONCERNS

1. The proposed pit land is highly productive farm ground. Every year it produces high yielding 10-14' tall corn. To take this income producing agricultural land out of production forever is a serious and sad lost to the agricultural economy and farmers of Weld County. There are plenty of other locations on the South Platte River that have large deposits of sand and gravel that are not suited for farming that could be used for sand and gravel mining and subsequent water storage that will not negatively impact the agricultural economy of Weld County, the farmers, the surrounding land, the home and business owners, as well as the Kersey community and anyone that travels on CR53.

   Response: Land use and county roads/bridges are not under the jurisdiction of the DRMS. A Use-by-Special Review permit application will be turned into Weld County after the DRMS 112 permit has been approved.

2. What is the historical long-term information of slurry wall reservoirs? How long do these walls hold up? What will happen if the slurry wall gives away releasing the water stored within it. If that ever happened it could cause major damage to my house, shop and land.

   Response: Slurry walls are an industry standard lining for gravel pits. There are several slurry walls installed at other gravel mines and reclaimed water storage reservoirs. These walls are designed and constructed to be in place for years and will remain sealed. There are existing walls within the front range that are over 20 years old.

3. **NOWHERE** in the report does it detail the **water storage unit** and how it will operate. If that is the end goal that should be detailed in the full application. That is critical for me and how it will impact me. The applicant's river access is across my recorded ROW.

   Response: The inlet/outlet water facilities will depend on how the end user intends to operate the water storage reservoir. This has not been finalized at this time. The facilities will not affect the safety of the access or utilities serving the Smith property as they would be constructed to not impede or damage any existing use or service to the Smith property.

COMMENTS FROM LINDA M. BOWLES

Retired Bureau of Reclamation Civil Engineer

FATAL FLAWS

ACCESS ROAD ENTRANCE – The access into the Ogilvy River Farm Pit appears to be from County Road 53. The two drawings in Exhibit C are very small with a lot of lines in the junction of County Road 53 and the Ogilvy River Farm Access Road. The delineation of the Ogilvy River Farm Access Road and the Smith residence Access Road is not clear. Are they the same? Using large trucks to haul the mined sand and gravel should require an acceleration and deceleration lane to minimize the traffic impact on County Road 53. No additional details are provided on Drawing 2 in Exhibit C or elsewhere in the document. Details of the planned access from County Road 53 must be included before this proposal is considered.

Response: The access is the same. County roads/bridges are not under the jurisdiction of the DRMS. The existing county road was improved by Weld County in 2012 with new pavement, turn lanes, and striping, in 2017/2018 with a new bridge and new pavement and striping between CR 58 and just north of CR 388, and in 2021 with new pavement, turn lanes, and striping at the intersection of CR 58 and CR 53. All of these improvements were designed and constructed per Weld County's criteria which includes incorporating truck traffic. Roadway improvements are proposed for the access into the Ogilvy River Farm, LLC to accommodate truck traffic and keep the entrance/access safe. These improvements will be provided to Weld County and/or the Town of Kersey for review/approval once the DRMS permit application is approved. Sustainable Traffic Solutions is in the process of finalizing the traffic study and it will provide information for what turn lanes, deceleration and acceleration lanes are warranted/required per Weld County's design requirements.

SLOPE STABILITY - The report includes a slope stability report by J&T Consulting, February 2024 (pages 180-325), for the ground with the mining operations and the water storage basin. The Smith property is Case SS-3 and the access road is Case SS-6. The Smith Property has a building that houses farm equipment (ie. tractors, etc.) near the property line. The report states on page 185 "The mining operation is adjacent to a gravel road, fence and buildings on the south side of the pit. The proposed setback for mining is 39 feet from the gravel road". However, the slope stability analysis, SS3, does not seem to include the building or farm equipment loads. If building and farm equipment loads were used, then they should be clearly stated and the building/farm equipment should be shown on the diagrams in the slope stability study (pages 199 and 200). In addition, the input data used for Case SS-3 appears to be the same as for all the case studies (page 244) and does not include any loads for the buildings or farm equipment. The proposed mining setback of 39 feet does not seem to adequately account for the heavy loads on the Smith property. The analysis for Case SS-3 must be re-analyzed to include the building and farm equipment loads to provide a more accurate setback length.

> ***Response: The slope stability analysis has been revised to address the loads associated with the shop.***

EXISTING SEPTIC SEWER SYSTEM – The Smith residence uses a septic sewer system which is not listed anywhere in this document. The Smith septic system will be directly affected by the mining operations and its slurry wall. The impacts to the Smith septic system must be included before this proposal is considered.

Response: This is addressed in the responses to HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS items above.

EXISTING PROPANE TANK AND GAS LINE – The Smith residence uses propane and has a tank next to the property line adjacent to the proposed sand and gravel mine. The proposal on page 23 of Exhibit D Mining Plan states that "Various setbacks from adjacent roads, adjacent structures, and oil and gas infrastructure will be maintained as mining occurs. All setbacks specified in the surface use agreements with the oil/gas companies will be followed. The final executed agreements are expected to be obtained in the near future and will be forwarded to the Division when they are available. A minimum 200-foot setback from any existing oil/gas facility will be maintained until that time." There is not a 200-foot setback between the proposed mining operations and the propane tank and gas line. No agreement has been reached with the Smith family that owns the property and uses the propane tank and gas line. The nearby mining operations could damage the connections between the tank and the gas line, as well as any other underground fittings, and could cause an explosion. The mining operation's plan must be modified to protect the Smith propane tank and gas line before this proposal is considered.

> ***Response: The propane tank is not considered an oil/gas facility requiring a surface use agreement. Surface use agreements are being obtained from oil/gas producing companies with their facilities being oil/gas wells, separators, flares, and/or tank batteries. The slope stability analysis indicates that the setback shown adjacent to the permanent man-made structures on the Smith property (including the propane tank and gas line) meets the factor of safety required by the DRMS, hence the setback is acceptable to protect the structures. A structure agreement has been provided to Mrs. Smith.***

MAJOR CONCERNS

SLURRY WALL – The proposal includes a slurry wall to be constructed around the perimeter of the mining area so that the sand and gravel deposit can be dry mined. The proposal states two different timelines for the slurry wall completion. Exhibit D Mining Methods on page 24, states that "Mining will not expose groundwater prior to the slurry wall being constructed." Exhibit G Water Information on page 34 states "The gravel pit will have a slurry wall liner constructed prior to the commencing of mining." In addition, the design and construction specifications for the slurry wall are not included in this report. Only that "Design specifications for slurry wall and quality control procedures used during construction will ensure that the reclaimed reservoir meets State Engineer's Office (SEO) performance standards" (page 24 under Exhibit D Mining Methods). The slurry wall is used in the Ground Water Evaluation and Slope Stability Study. Review of the design of the slurry wall and its adequacy for short and long term could not be done to ensure that the Smith residence is not negatively impacted. Additional details for the slurry wall design should be provided.

> ***Response: The slurry wall will be designed and constructed to industry standards to ensure it meets SEO standards.***

MINING PROCESSING EQUIPMENT LOCATIONS - The Scaling Equipment and Processing Equipment are listed in the proposal (page 24), however, the Mining Plan Map does not show where they are going to located. The document states that the Processing Equipment locations will be mobile and temporary. The Scaling Equipment will have concrete pads and will be somewhat permanent. Where will the scaling equipment's concrete pad be located? How close to the Smith property will the movable processing equipment be allowed?

> ***Response: The scale equipment's concrete pad will be located in the scale/scale house area shown on Exhibit C2. The processing equipment will be mobile in the sense that it will not have permanent foundations. It will be located where shown on Exhibit C2, approximately 400 feet from the Smith north property line.***

NOISE AND LIGHTS – The proposal does not include any limitations on noise or lights under the Mining Plan. The Smith residence is adjacent to the mining operations and will be negatively impacted by the noise from the excavating, hauling, and processing of the sand and gravel. There is no mention of the hours of operation. In addition, there is no mention of where the lights, if used, will be located during the mining operation and later during the water storage operation. Limitations for the mining contractor on the noise (decibels), lighting (lumens) and hours of operations need to be included.

> ***Response: Noise control, dust control, light control, and hours of operation are not under the jurisdiction of the DRMS. These will be provided with the Use-By-Special-Review with Weld County. A Use-by-Special Review permit application will be turned into Weld County after the DRMS 112 permit has been approved.***

TOPSOIL AND STOCK PILES – There are sparse and confusing details on the stockpiles for topsoil and overburden, their location, the order of mining operations and subsequent seeding. The amount of topsoil is either 6-inches or 12 -inches (Exhibit D and Exhibit E). The location of the stockpiles is hard to determine as they seem to be placed on the side of the basin where the mining will start (Exhibit C Drawing 2).

For Example: The drawing on page 22 shows the location of the overburden stockpile adjacent to the Smith property and on the side slope in the western part of the mining operation. An arrow seems to indicate that the mining operation will start in the west and move to the east. In Exhibit D, Topsoil Handling Plant states “The topsoil will be stripped and stockpiled prior to mining operations. The height of the topsoil stockpile will be approximately 15 feet.” If the stockpile is located as shown, then how is the mining operation going to start in the west? The proposal states on page 25 “All soil and overburden material will be used on-site for reclamation; so long-term stockpiling of these materials is not anticipated”. The on-site reclamation, based on the figures and drawings, seems to be done after the entire area is mined and stated in Exhibit D of the document as 12 years or longer “The overall time to required to complete the mining and reclamation is estimated to be 12 years based on the average rate of 650,000 tons per year”. Also, the statement on page 28, “Topsoil will be rehandled as little as possible” seems to indicate that there will be one pile at the beginning that won’t be moved.

Further conflicting information on topsoil and stockpiles are listed in the Additional Comments section.

The Topsoil and Stockpile information needs to be revised to provide clear and coordinated information on the topsoil and stockpiles.

> ***Response: The topsoil is 12 inches. The arrow shown indicates the general direction that the mining will occur. The topsoil/overburden stockpile locations will be as shown on Exhibit C2 and will remain there as long as possible as visual and sound buffers for the Smith property until those areas are mined toward the end of the mining activities.***

MINING TIMELINE – The mining timeline is very confusing. The timeline of 12 years or more is stated in Exhibit D, whereas a timeline of 5 years, 6 months is mentioned in Exhibit E and elsewhere in the document. For additional details on timeline issues, see Additional Comments. The mining phase timeline needs to be clarified to provide clear and coordinated information on how many years the mining operations will be conducted.

> ***Response: The anticipated timeline is 5 years, 6 months. Mining timelines have been estimated and can/will vary based on market conditions for the sale of the mine materials.***

RECLAMATION STRUCTURES – None of the structures for the water storage aspect of this project were included. Exhibit E states “During reclamation activities, inlet and outlet facilities for the reservoir will be designed and installed once the operational criteria of the proposed reservoir have been identified by an end user.” The Smith property could be adversely affected by the location of the inlet and outlet facilities. Preliminary designs and locations for the Reclamation Structures and features should be provided.

> ***Response: The inlet/outlet water facilities will depend on how the end user intends to operate the water storage reservoir. This has not been finalized at this time. The facilities will not affect the safety of the access or utilities serving the Smith property as they would be constructed to not impede or damage any existing use or service to the Smith property.***

Additional Comments

1. Page 1 and 15 – Applications - Resource is spelled wrong – "Developed Water Resourse".

   Response: Noted.

2. Page 21 – Ogilvy River Farm Pit Pre Mining Plan - The proposed mine entrance is similar or adjacent to the Smith entrance from County Road 53. The water and power to the Smith residence are not shown on this and subsequent drawings.

   Response: All known structures are shown on the Exhibit C maps.

3. Page 25 – Exhibit D Mining Methods – Where are the first top soil stock piles going to be located? The Mining Plan Map locates the stockpiles on the western side slopes of the excavation. What is the definition of long-term storage as used in "All soil and overburden material will be used on-site for reclamation; so long-term stockpiling of these materials is not anticipated."? Elsewhere in this document states that mining operations will take from 5 to 12 years, maybe longer.

   Response: The topsoil/overburden stockpile locations will be as shown on Exhibit C2 and will remain there as long as possible as visual and sound buffers for the Smith property until those areas are mined toward the end of the mining activities. Long term stockpiling is intended to mean stockpiling after reclamation.

4. Page 25 – Exhibit D Topsoil Handling Plan – The document states that the depth of topsoil is approximately 12-inches deep, whereas Exhibit E Topsoil states that the topsoil is 6-inches deep. The estimated 90,000 cubic yards of topsoil volume is closer to the 12-inches deep measurement. Usually, all the topsoil is cleared at the beginning and therefore, the stockpile will be above natural ground surface and will need to be seeded immediately with the seeding process stated later in this document since the top soil is to be used in the reclamation process...5 to 12 years later. Also, the statement on page 28 - 'Topsoil will be rehandled as little as possible" seems to indicate that there will be one pile at the beginning that won't be moved...which is where? And on page 29 "Reservoir side slopes below the anticipated reservoir water level will not be seeded" which leaves the side slopes of the mining operation below anticipated water levels open for extended periods of time.

   Response: The topsoil/overburden stockpile locations will be as shown on Exhibit C2 and will remain there as long as possible as visual and sound buffers for the Smith property until those areas are mined toward the end of the mining activities. Yes, the slopes below the anticipated water levels will be open while mining occurs. The slopes will be maintained as needed prior to being reclaimed.

5. Page 25 – Exhibit D Mine Phasing – The statement "The overall time required to complete the mining and reclamation is estimated to be 12 years based on an average rate of 650,000 tons per year" conflicts with the statement on page 28, Exhibit E Topsoil which states "By using concurrent reclamation techniques, the topsoil is not expected to remain in stockpiles for more than one to five years....All topsoil will be retained onsite

to reclaim reservoir shoreline, and other areas of disturbed by mining activities." And on page 29 "Reservoir side slopes below the anticipated reservoir water level will not be seeded" which leaves the side slopes of the mining operation below anticipated water levels open for extended periods of time. The stockpiling of topsoil location and seeding is not very clear.

Response: See responses above regarding mine timing, topsoil/overburden stockpiles, and mine slopes.

6. Page 27 – Exhibit E Reclamation Plan – A bench is mentioned in "Upon placing the backfill material, 95 percent compaction will be achieved to ensure adequate integrity of the clay liner above the bench, backfilled areas for haul/access roads...." A bench was not on the cross sections of the basin walls in Exhibit F.

   Response: The reference to the bench has been removed from Exhibit E.

7. Page 27 – Exhibit E Reclamation Plan – The document states that "Recommendations for monitoring of slope stability..." will be done weekly during construction and then every 6 months, and after a major precipitation event. Are these requirements or just recommendations and do not need to be done? Who oversees and enforces the requirements/recommendations?

   Response: These are recommendations. Ultimately Ogilvy River Farm, LLC has the same desire as Smith does to protect the slopes of the mine to prevent slope failures, and will regularly inspect the slopes and repair any issues found immediately to ensure the integrity of the slopes.

8. Page 28 – Exhibit E Reclamation Plan Topsoil – As mentioned earlier, there is a difference of depth of topsoil, 6-inches here, and 12-inches on page 24.

   Response: Exhibit E has been revised to match Exhibit D.

9. Page 28 – Exhibit E Reclamation Plan Topsoil – As mentioned earlier, there is a difference of time for how long the topsoil will need to be retained, one to five years here, whereas on page 24 it will take 12 years or more to mine. If all of the topsoil is removed at one time, there is a time difference. If the topsoil is removed in stages, then maybe, but that does not seem economical.

   Response: Acknowledged. Topsoil is removed from the areas to be used as stockpiles and processing first, then removed from the area that will be mined. Five acre areas are generally used to mine an area then open up another 5 acre area. The anticipated mining time frame is 5 years, 6 months.

10. Page 29 – Exhibit E Reclamation Plan Revegetation – To control weeds, the document states "Chemical methods will only be used if no other alternative produces acceptable results." However, in Exhibit J, page 106, the document states that "Mowing will be terminated in late August followed by a herbicide treatment during late September through October – before a hard frost." Isn't herbicide a chemical?

Response: Yes, an herbicide is a chemical, which will be used when mowing is ineffective at controlling weeds that may be present on the site.

11. Page 30 – Exhibit E Reclamation Plan Groundwater – From the report and models showing expected drawdowns from the slurry wall which are depicted in Figure A-9 on page 83, the expected drawdown near the Smith home is 1.5 to 3 feet. Since the existing Smith well is near the slurry wall, there probably will be a difference, maybe greater than 3 feet since the upstream gradient will be cut-off and the river probably won't be able to fill it back in.

    Response: See the response to the same question under HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS, item 3. Specifically, the slurry wall will cause the cone of depression from the Smith (Jurgen) pumping well to induce additional seepage from the SPR and therefore likely not cause a measurable decline to its pumping rate or water quality. The more likely scenario is that the pump no longer is operable and the well may have plugged or collapsed due to nonuse and old age.

    Note that the well is not a legal well or water right. The well and the water right associated with it have been abandoned, a cease and desist order has been issued, and the well has been red-tagged by the Colorado Division of Water Resources. See attached documentation for the well.

12. Page 30 – Exhibit E Reclamation Plan – Approximate Time Table – This section states "The total time frame to mine all phases assuming an average production rate of 650,000 tons per year is approximately 5 years and 6 months" is different than what Exhibit D Topsoil Handling Plan, page 25, states of 12 years or longer using the same average production rate of 650,000 tons per year.

    Response: Exhibit D has been revised to match Exhibit E.

13. Page 30 – Exhibit # Reclamation Plan Approximate Time Table – The section states "For more information on sequencing and size of the reclamation activities refer to Exhibit L financial warranty calculations". There is not much information in Exhibit L on sequencing and size of reclamation activities.

    Response: The sequencing shown in the calculations are Phase 1A mining above groundwater, and Phase 1 mining after groundwater is encountered. The sizes of the reclaimed areas are shown in the calculations.

14. Page 33 – Exhibit F Sheet 2 – Seeding Map – The base of the water reservoir will be at Elevation 4534. The Smith residence does have a basement which was flooded in 2013 when the Platte River exceeded the 100-year flood. If the slurry wall fails, then the Smith basement will be flooded once the pit is reclaimed and filled with water.

    Response: The fact that basement flooding occurred in Mrs. Smith's basement during the 2013 flood suggests that the house would benefit from being located where we expect post-pit water levels to decline up to 1.5 feet (See MWE Report Figure A-9).

15. Page 33 - Exhibit F Sheet 2 – Seeding Map – The seeding is shown encompassing the Smith access road. A note does state "All disturbed areas outside of the water surface will be seeded and mulched with the exception of the access road which will be gravel surfaced." Will the Smith access road also be gravel surfaced?

    Response: No, the Smith access road will not be seeded. Exhibit F shows the revised gravel road and seeded areas.

16. Page 34 - Exhibit G Water Information – The time listed is again 5 years, 6 months which is different than what Exhibit D Topsoil Handling Plan, page 25, states 12 years or longer.

    Response: The time shown in Exhibit G is correct.

17. Page 34 – Exhibit G Water Information Introduction – The proposal states "The water will be pumped into dewatering ditch, which traverses the site and ultimately into the South Platte River." The location of the dewatering ditch extension to the South Platte River is not shown. Does it cross the Smith access road? If so, how and where?

    Response: The dewatering ditch water will be pumped from a sump location at the end of the dewatering ditch to an existing ditch(es) at the surface that flows to one of several existing culvert pipes installed under the access road that then discharges to an existing ditch that flows the South Platte River. Currently the existing irrigation excess water flows through these same existing ditches and culverts to the South Platte River.

18. Page 35 – Exhibit G Water Information Operational Loss – Dust control is listed as 6 days a week, 4 weeks/month and 10 months per year. Does that mean that they will be mining 6 days a week for 10 months? Or is that the average if they take the holidays (Memorial Day, Fourth of July, Labor Day) off. What are the planned operational hours for the mining?

    Response: Dust control and hours of operation are not under the jurisdiction of the DRMS. The hours of operation can be dawn to dusk but are typically 7:00 AM to 4:00 PM and 6 days a week for the year. The mine would be closed on most holidays. These will be included in the permit through Weld County. The DRMS permit has to be approved prior to permitting through Weld County.

19. Page 35 and 36- Exhibit G Water Information Surrounding Water Rights – Table G-1 does not list the Smith property as having an active well which is true, however, the well could be activated in the future and should be included in the study.

    Response: The well is not required to be included since it is not a legal well or water right.

    <u>***Note that the well is not a legal well or water right. The well and the water right associated with it have been abandoned, a cease and desist order has been issued, and the well has been red-tagged by the Colorado Division of Water Resources. See attached documentation for the well.***</u>

20. Page 37 – Exhibit G Water Information Impacts to Groundwater/Hydrologic Balance – The document states "If groundwater levels drop to a level that prevents an adjacent well from performing acceptably, according to that well's owner, Ogilvy River Farm, LLC will either implement a groundwater recharge ditch/pond near the well in order to raise the groundwater level in the vicinity of the well and hence return it's operation to acceptable standards, or will negotiate an agreement with that well owner to replace the well or provide replacement water via other means until the mining and reclamation activities are concluded but it is not anticipated that any groundwater levels will drop since the slurry wall will be installed prior to exposing groundwater." Since the Smith well is inside the shown water level drop zone, the existing well may be impacted by the slurry wall and mining operations if it is reactivated. The Smith residence also uses a septic system which was not mentioned in the report.

    Response: The well is in an area where the proposed slurry wall will cause a drop in the water table of up to approximately 1.5 feet. This will not impact the well yield or water quality or impact the residence septic system. See the response under HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS, item 2.

    <u>***Note that the well is not a legal well or water right. The well and the water right associated with it have been abandoned, a cease and desist order has been issued, and the well has been red-tagged by the Colorado Division of Water Resources. See attached documentation for the well.***</u>

21. Page 37 – Exhibit G Water Information Impacts to Groundwater/Hydrologic Balance – The document states that the "...exact physical location of these wells will be determined during the SWSP and well permit application processes. If wells are found to be within 600 feet of the mining limits, Ogilvy River Farm, LLC will either obtain a well waiver from the owner of the well or provide an agreement with the well owner that Ogilvy River Farm, LLC will mitigate and [sic] material damage to the well that is directly attributable to the mining and reclamation of the site." The existing Smith well is not currently active, although it would be impacted by the mining operations if it is reactivated and therefore, should be included or at least mentioned in the well permit application process.

    Response: The well permit application process only considers legal wells and water rights. Based on the analysis presented in the MWE Report and our responses to the questions and comments listed above, we do not believe the well, regardless of its legal status, will be impacted by the proposed mine.

22. Page 53 – Exhibit G – McCrane Water Engineering Report – Table 1 in the report does not list the existing Smith well as a registered well. McCrane evaluated the ground water changes caused by the slurry wall and concluded that uphill from the river, the mounding upgradient could be as high as 10 feet, whereas, downhill from the slurry wall, the mounding is less and could reduce the aquifer saturation thickness. Therefore, the Smith family basement should not be impacted adversely if the slurry wall works as intended, however, the existing septic system is also not mentioned and will be impacted by the changing ground water table.

    Response: Mounding is not expected to be "as high as 10 ft." Table 1 shows impacted registered "active" wells with reported depths to water ranging from 36

to 55 feet from ground level. Predicted mounding is not to exceed 4 feet on the north side of the pit slurry wall per MWE Report figure A-9.

The reported depth to water of the well is 14 feet. This is far below a typical septic system which is typically no more than 5 feet deep. Therefore, the septic system will not be affected. (See response to similar question under HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS).

More likely, the predicted decline in water levels on the Smith parcel should help reduce the impacts of potential basement flooding associated with seasonal recharge from the South Platte River.

23. Page 55 – Exhibit G – McCrane Water Engineering Report - Figure 1 does not show the existing Smith well which means that they did not account for it in their report.

    Response: We only evaluated "active" well permits available from the State's well database. The Smith well water right was abandoned per the Division of Water Resources in 2013.

24. Page 66 – Exhibit G – McCrane Water Engineering Report – Table A1 – SEO Well Permit Data (1 of 3) – The report does not mention the existing Smith septic system or explain the impacts to it.

    Response: We also do not anticipate any impacts to existing septic systems as discussed in our responses to HOUSE, SHOP, OUTBUILDINGS, WELL, PROPANE TANK, SEPTIC SYSTEM, LAND CONCERNS items above.

25. Page 125 – Exhibit J Overview Aquatic Resource Delineation Map – The notes have the county listed as Summit County, not Weld County.

    Response: Noted. The correct county is Weld County as shown in the title block of the map.

26. Page 179 – Exhibit S Permanent Man-Made Structures within 200 Ft of the Affected Lands – Roberta Smith is listed as owning "House, Outbuilding, and Fence". There is no mention of the well, septic system, propane tank, water lines, power lines, etc. The existing septic system and propane tank are important features that are missing from this report. The change in the aquifer from the slurry wall will affect the septic system operations and should be included. The vibrations from the mining activities could damage the propane tank and fittings and could cause an explosion.

    Response: Exhibit S has been updated to include all know man-made structures on this list and have been addressed in the updated slope stability report.

27. Page 199 – Exhibit S Permanent Man-Made Structure J&T Consulting Inc. – All of the drawings showing the cross section have the blue clay layer extending down the slurry wall and then horizontally daylighting in the basin floor. The scale is too small to determine if the slurry wall is keyed in the 3 to 4 feet as depicted on page 22 of the Typical Mining Section. The cross section on page 22 is different than the ones shown in the J&T Consulting, Inc report.

> ***Response: The blue line is the estimated phreatic surface within the section, not a clay layer. Yes, the slurry wall is keyed into the bedrock in the models. Correct, the cross-section on page 22 is intended to illustrate the location of the slurry wall relative to the mining slope, the slope of the mining slope, and the general location of the dewatering trench. More detailed soil strata has been included in the slope stability model, and the dewatering trench was not included in the slope stability model as it has no affect on the stability of the slope.***

COMMENTS FROM KAREN KROMREY

Former USFS Natural Resources Specialist

Exhibit C – Maps

Pre-mining Exhibit C1 – This map is at such a small scale with so many overlapping features that the_key information is indiscernible. The applicant needs to provide separate maps showing easements, utilities, constructed features, waterlines, etc. so that commenters can see what the applicant is acknowledging as pre-mining condition.

> ***Response: The Exhibit C maps are at a scale acceptable to the DRMS, with all easements, utilities, and structures labeled.***

Exhibit C2 – Mining Map

This map does not show where the road will access the mining area or if it does, it is not discernible by the reviewers. There is a half circle diagram in the middle of the northwestern part of the mining area but no description as to what this is.

> ***Response: The map has been revised to show how the road will access the mining area. The half circle diagram is the location of a product stockpile and has been labeled on the map.***

Exhibit D – Mining Plan

Mining Methods

How close to the mining boundary will the slurry wall be located? The diagram on the Mining Map has wording/numbers that are indiscernible to the reviewer. How close will the slurry wall be to the Smith residence? There is no description of how this slurry wall may affect the irrigation well on the Smith property or the septic system.

> ***Response: As shown on the Exhibit C2 map the slurry wall will be 15 feet from the mining boundary. The slurry wall will be approximately 90 feet to the north of the Smith residence building. See the responses to numerous comments above addressing how the slurry wall may affect the well.***

There are no stated hours of operation in Appendix D. Reasonable hours of operation are crucial with a private residence located directly adjacent to the mining operation. Will there be 24 hour operations? Will pumps be running 24 hours/day to pump ground water into dewatering ditches? Where will these pumps be located?

Response: Hours of operation are not under the jurisdiction of the DRMS. The dewatering pumps are expected to run intermittently as needed to maintain the water level within the pit. These will typically not run at night and only during daytime hours. The units will also be below the ground surface to provide a barrier to decrease noise levels. Ogilvy River Farm, LLC will adhere to Weld County regulations regarding noise levels.

Will lights be used for any operations conducted in low light times? This is not mentioned in the application.

Response: Light control is not under the jurisdiction of the DRMS.

Will the road leading to the Smith property be used for any part of the mining or reclamation process? There is no mention of use except that the reclamation map has a proposed access road around the entire perimeter of the proposed reclamation area.

Response: The access to the site will be shared between the Smith property and the mining site. The road leading to the Smith property will not be used for the mining or reclamation process. The road around the perimeter of the reclaimed reservoir will be used by the end user to inspect and maintain the reservoir. The access road to the Smith property and the perimeter road around the reclaimed reservoir will be configured as shown on the Exhibit F2 map.

Exhibit E Reclamation plan
Water – general requirements
How will the application mitigate any damage to adjacent irrigation well on Smith residence? Exhibit G has very vague language that measures will be taken with no detail description.

Response: The well on the Smith residence is not a legal well or water right so no measures need to be taken to mitigate damage to it that may result from a change in groundwater levels. However, Exhibit G clearly states what measures will be taken to mitigate damage to surrounding wells:
"If groundwater levels drop to a level that prevents an adjacent well from performing acceptably, according to that well's owner, Ogilvy River Farm, LLC will either implement a groundwater recharge ditch/pond near the well in order to raise the groundwater level in the vicinity of the well and hence return it's operation to acceptable standards, or will negotiate an agreement with that well owner to replace the well or provide replacement water via other means until the mining and reclamation activities are concluded".

Note that the well is not a legal well or water right. The well and the water right associated with it have been abandoned, a cease and desist order has been issued, and the well has been red-tagged by the Colorado Division of Water Resources. See attached documentation for the well.

Who has oversight in the groundwater monitoring that application states will be done?

Response: The DRMS has oversight.

Exhibit F Reclamation Map
There is a proposed access road shown on the reclamation map that circles the entire proposed water storage area but no mention of this road in Exhibit E. Who would have access to this road, where is the access to this road, what type of equipment/and/or vehicles would be allowed on the road, and what would the expected frequency of us?

> ***Response: The road around the perimeter of the reclaimed reservoir will be used by the end user to inspect and maintain the reservoir. Access to this road will be from the site access off of County Road 53 as shown on the Exhibit F2 map. Passenger cars/trucks will be the main type of equipment using this road to inspect the reservoir at occasional intervals, i.e. weekly or monthly depending on end user usage. Very occasional larger vehicles may use the road if needed to maintain the site, i.e. mowing, weed control, etc.***

The existing access road to the Smith property is shown as being seeded during reclamation.

> ***Response: The road will not be seeded as shown on the revised Exhibit F2 map.***

Exhibit G Water
Evaporative losses – The application describes that the evaporative losses will not exceed the maximum but does not describe what this maximum is or who defines the maximum, or how this evaporative loss will be measured.

> ***Response: The "maximum" in that sentence refers to the maximum exposed water surface of 0.75 acres, which is stated in the same paragraph, and three paragraphs above. The evaporative loss is calculated by multiplying the net annual evaporation rate by the measured open water surface.***

Table G-1 – Wells within 600 feet of mining boundary
Smith's irrigation well is not listed on this table and likely is the closest well and the one that could be most impacted by the mining operations. The application states that if material injury occurs to the surrounding wells, Ogilvy River Farms, LLC will ensure that all necessary measures will be taken to address the issues. There are no details of what these measures would be.

> ***Response: See response to Exhibit E Reclamation Plan above.***

Ground water impacts
The application states that Ogilvy River Farms, LLC will monitor groundwater levels but does not say who they will report their findings to or how often they will be monitoring the ground water levels.

> ***Response: Groundwater levels are monitored monthly and reports will be submitted to the DRMS quarterly.***

McGrane Water Engineering, LLC – Letter dated September 19,2023 (part of the application) This reports states that impacts of a slurry wall on ground water include a rise in the water table ("mounding") on the upgradient side of the slurry wall which could lead to water levels within 10 feet of the surface and could cause flooding of low-lying structures such as basements. The applicant has made no mention of this possible impact to the Smith residence which is the closest residential structure to the proposed mining operation, nor have they mentioned what mitigation they would employ to ensure flooding of the basement would not occur. In addition, the Smith residence also has a septic system with a leach field and there is no mention of how changing water tables might affect the functionality of the septic system.

> ***Response: See the responses above to the same questions.***

The McGrane letter lists potential impacts to area wells (of which the Smith irrigation well is not on this list) based on their use of the USGS MODFLOW 2000 modeling program, but there is no mention of impacts to the Smith residence such as flooding in their basement or potential impacts to a septic system.

> ***Response: See the responses above to the same questions.***

Exhibit J – Vegetation Information

Weed control through herbicide treatment

This exhibit mentions chemical control by using herbicide treatments occurring in September through October. There is no further information on what type of herbicide, frequency of application, and what type of application will be used. The Smith residence is directly adjacent to the area where this chemical control would be administered.

> ***Response: The type of herbicide to be used and application rate/frequency is not known at this time and will depend on the type of weeds present, and what type of herbicide is appropriate to be used to control them. Best management practices will be used to control the weeds and also when applying any herbicide.***

Exhibit L Reclamation Cost

This exhibit mentions the Bernhardt Sand and Gravel Pit mining site operation. What does this mining operation have to do with the Ogilvy River Farms, LLC? Is any of the other information in this exhibit correct for the application by Ogilvy River Farms, LLC.?

> ***Response: The reference to Bernhardt Sand and Gravel Pit has been revised to Ogilvy River Farm. Yes, all information is correct for the application by Ogilvy River Farm, LLC.***

Exhibit N – Source of Legal Right to Enter

As mentioned previously in comments about the reclamation map, there is no description of any other use of existing roads that are for access to the Smith residence.

> ***Response: This has been addressed in the Exhibit D – Mining Plan comment response above.***

Exhibit S – Permanent Man-made structures within 200 feet of the affected land

Seven items are listed in this exhibit within 200 feet of the affected land but a residential home is not listed among the seven structures unless it falls in the category with Fences/Structures. There is a significant difference between a fence and a home. The Smith home is listed on the next page but the septic system is not listed there.

Response: All known man-made structures have been shown on Exhibit S.

Slope Stability Report

On pages 2-3 of this report, the cases SS-1 through SS-6 are listed with what structures are located on in these areas and the proposed setbacks. SS-3 and SS-6 have structures critical to the Smith residence. The SS-3 lists a proposed setback of 39 feet from the gravel road which is just adjacent to the Smith outbuilding and not much farther from the Smith residence. This proposed setback is the narrowest of all of the Cases around the mining area and is too narrow given what type of structures these are (residential home, outbuilding, irrigation well, and septic system). Any type of slope failure while mining is occurring could have a severe consequence to the Smith residence, building, and septic system. A more reasonable setback would be at least 200 feet from the closest structure on the Smith property.

Response: This has been addressed in the numerous slope stability comment responses above.

SS-6 doesn't list the water line which leads to the Smith property and provides the domestic water for the household.

Response: The water line has been shown on SS-6.

Appendix B shows a series of graphs that show the stability analysis of each case. There is no definition of what the red line on the graph means. Is this the expected failure line? In addition, there is a lighter blue line and there is no definition of what this is. Is this the current ground water level?

Response: The red line is the failure surface for the lowest factor of safety found in the analysis (of 20,000 failure surfaces analyzed for each case). The blue line is the estimated phreatic surface (level of water) within the modeled section.

Ogilvy River Farm, LLC appreciates your consideration of this response.

Please feel free to contact me with any questions or comments.

Sincerely,

J.C. York

J.C. York, P.E.
J&T Consulting, Inc.

Attachments:
1. Smith (Jergens) Well and Water Right Abandonment Information

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER RESOURCES

John W. Hickenlooper
Governor

Mike King
Executive Director

Dick Wolfe, P.E.
Director/State Engineer

David L. Nettles, P.E.
Division Engineer

March 7, 2012

CERTIFIED MAIL: 7007 0220 0000 6709 6439

ROBERTA & JACKIE SMITH
28879 WCR 53
GREELEY, CO 80631

SUBJECT: **2010 LIST OF ABANDONED WATER RIGHTS**
JURGENS Well 2-1254 (WDID 0107065)

Dear Ms. Smith

The Division Engineer, in accordance with 37-92-401, C.R.S. has compiled a revised list of absolute water rights that he "has determined to have been abandoned in whole or in part and which previously have not been adjudged to have been abandoned." This list has been submitted to the Water Court, and, when concluded by judgment and decree, shall be conclusive as to water rights determined to have been abandoned. You are receiving this letter as the owner, operator, or a potential interested party, to provide you Notice that the water rights listed on the back of this letter have been determined by the Division Engineer to have been abandoned.

The revised abandonment list may be inspected at the offices of the State Engineer, Division Engineer, Water Commissioners, and the Clerk of the Water Court during regular office hours. The Division Engineer will furnish or mail a copy of the Water Division No. 1 revised abandonment list to anyone requesting one upon payment of ten dollars ($10.00). Additionally, the revised abandonment list is available online, at http://water.state.co.us/DWRDocs/Reports/Pages/Abandonment.aspx.

Those wishing to protest and have the court review the decision to include a water right on the list will need to file a protest with the Water Court. The protest must be filed in writing with the Water Clerk (with a $45 filing fee) and a copy provided to the Division Engineer (no additional fee), set forth in detail the factual and legal basis for said protest, and **be filed by June 30, 2012**. The Court has "Protest to Revised Abandonment List" forms available at the Court Web site, http://www.courts.state.co.us/ . Go to "Forms" and then select "Water", then select "Protest to Revised Abandonment List". The Court can also be reached at: Water Division One – South Platte River Basin; Clerk of the Court; 901 9th Avenue, Greeley, CO 80632 or by phone at (970) 351-7300.

If you have any further questions regarding the abandonment list, please do not hesitate to contact Claudia Engelmann at the number below.

Sincerely,

David L. Nettles

David L. Nettles, P.E.
Division Engineer

ec: WDID File (0107065)

Water Division 1 • Greeley
810 9th Street, Suite 200 • Greeley, CO 80631 • Phone: 970-352-8712 • Fax: 970-392-1816
www.water.state.co.us

Water Rights on the Abandonment List – Division One
March 7, 2012
0107065 Jurgens Well 2-12254

Structure Name	Source	Decreed Amount*	Abandoned Amount*	Remaining Amount*	Abandoned Decreed Use	Adjudication Date	Appropriation Date
Jurgens Well 2-12254	GRND	2.22	2.22	0.00	IRR	12/31/1971	05/31/1952

*All amounts listed in cubic feet per second (cfs)

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RESOURCES

John W. Hickenlooper
Governor

Mike King
Executive Director

Dick Wolfe, P.E.
Director/State Engineer

David L. Nettles, P.E.
Division Engineer

CERTIFIED MAIL: 7007 0220 0000 6709 6439

March 7, 2012

ROBERTA and JACKIE SMITH
28879 WCR 53
GREELEY, CO 80631

RE: CEASE AND DESIST ORDER POSTED

To: Roberta & Jackie Smith

Well owners/users who have
approved plan for augmenta
State Engineer are not able
records show you as the ow

WDID 0107065
Water Court C
W-1292

This well diverts water tribut
decrees, rules, regulations a
water in the South Platte Riv

Based on Division of Water F
Resources to not pump in ac
§ 37-92-502(2)(a), C.R.S on
courtesy reminder that our
our records are not correct, c
Lever at the telephone numb

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

ROBERTA AND JACKIE SMITH
28879 WCR 53
GREELEY, CO 80631

2. Article Number
(Transfer from service label) 7007 0220 0000 6709 6439

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Roberta Smith ☐ Agent ☐ Addressee

B. Received by (*Printed Name*)
ROBERTA SMITH

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☑ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

Illegal use of water in violation of this cease and desist o
General's Office initiating injunctive proceedings against
payment of all state costs, including reasonable attorney
for each day such violations continue, for each well

Sincerely,

David L. Nettles

David L Nettles, P.E.
Division One Engineer

ec: Brent Schantz, River Operations Coordinator
Claudia Engelmann P.E., Asst. Division Engineer
WDID File (0107065)

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Sent To ROBERTA AND JACKIE SMITH
Street, Apt. No.; or PO Box No. 28879 WCR 53
City, State, ZIP+4 GREELEY, CO 80631

PS Form 3800, August 2006 See Reverse for Instructions

EFILED Document – District Court
2011CW263
CO Weld County District Court 19th JD
Filing Date: Jan 30 2013 06:42AM MST
Filing ID: 49191726

DISTRICT COURT, WATER DIVISION 1
Weld County, Colorado
901 9th Ave., Rm. 418
Greeley, CO 80631
970-475-2400

CONCERNING THE REVISED ABANDONMENT LIST OF WATER RIGHTS IN WATER DIVISION NO. 1

IN ALL COUNTIES LOCATED WITHIN WATER DIVISION NO. 1, COLORADO.

▲COURT USE ONLY▲

Case No. : 11CW263

Div.1

ABANDONMENT ORDER AND DECREE

This matter comes before the court on the State Engineer and Division Engineer for Water Division 1's filing of the Motion to Enter Abandonment Order and Decree. Having reviewed the Motion and good cause being shown, it is hereby ordered, for the reasons set forth in the Engineers' Motion, that the following water rights are hereby ordered and decreed abandoned on the Revised 2010 Abandonment List:

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 1									
ANDERSON SUMP	GROUNDWATER	0.8800	0.8800	0.0000	C		12/31/1971	04/15/1969	0105493
ANDERSON WELL 1-8916	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1971	05/20/1958	0105497
ANDERSON WELL 3	GROUNDWATER	0.1670	0.1670	0.0000	C		12/31/1972	12/31/1935	0105503
ATKINSON WELL 1-12337	GROUNDWATER	1.4800	1.4800	0.0000	C		12/31/1972	6/20/1955	0105540
ATKINSON WELL 2-12338	GROUNDWATER	1.3650	1.3650	0.0000	C		12/31/1972	4/30/1955	0105542
BACKSTRUM SIPHON 1-12895	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	01/01/1921	0105567
BACKSTRUM WELL SIPHON 2	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	01/01/1921	0105568
BACKSTRUM WELL SUMP	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	06/01/1970	0105569
BAILEY WELL 1-8769	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	06/30/1955	0105574
BASHOR WELL 1-28949	GROUNDWATER	0.2300	0.1186	0.1114	C		12/31/1972	09/29/1966	0105594
BASS WELL 1-11696	GROUNDWATER	2.8800	2.8800	0.0000	C		12/31/1972	4/2/1945	0105598
BASS WELL 2-11697	GROUNDWATER	2.8800	2.8800	0.0000	C		12/31/1972	5/4/1955	0105599
BAUGH WELL 3728-F	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1972	08/30/1962	0105625
BEAUPREZ WELL 1-11074	GROUNDWATER	3.1000	3.1000	0.0000	C		12/31/1972	05/01/1941	0105640

BECKER WELL 12691F	GROUNDWATER	2.0900	2.0900	0.0000	C		12/31/1972	12/31/1936	0105661
BEN GAY WELL 10-6875	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/30/1947	0105671
BEN GAY WELL 11-2127F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	04/30/1959	0105672
BEN GAY WELL 12-2128F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	04/15/1959	0105673
BEN GAY WELL 13-3125F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	05/31/1961	0105674
BEN GAY WELL 21-12321	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	06/30/1946	0105684
BEN GAY WELL 22-12322	GROUNDWATER	0.9270	0.9270	0.0000	C		12/31/1972	05/31/1952	0105685
BEN GAY WELL 2-6868	GROUNDWATER	1.5300	1.5300	0.0000	C		12/31/1972	06/30/1935	0105682
BEN GAY WELL 5-6871	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	05/31/1945	0105688
BEN GAY WELL 6-6874	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	05/31/1947	0105689
BEN GAY WELL 8-6872	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	06/30/1946	0105691
BEN GAY WELL 9-6873	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/30/1946	0105692
BENDER WELL 1	GROUNDWATER	3.2200	3.2200	0.0000	C		12/31/1972	06/22/1950	0105695
BENNETT WW EFFLUENT PUMP	LOST CREEK	0.7800	0.7800	0.0000	C		12/31/1980	07/21/1980	0100720
BETTALE SUMP	GROUNDWATER	1.4800	1.4800	0.0000	C		12/31/1972	04/30/1938	0105708
BICEK WELL 1-3774-F	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	04/30/1963	0105714
BICKLING WELL 1-11569	GROUNDWATER	2.0500	2.0500	0.0000	C		12/31/1972	12/31/1924	0109330
BICKLING WELL 5-13975	GROUNDWATER	2.4600	2.4600	0.0000	C		12/31/1972	09/30/1934	0105721
BILLING BURMAN W 2-RD220	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	07/01/1941	0105731
BILLINGS WELL 1-RD-197	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	07/01/1940	0105732
BLAKE WELL 1	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	12/31/1940	0105064
BLAKE WELL 10-3555-F	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	05/02/1962	0105065
BLAKE WELL 2-2032-F	GROUNDWATER	0.1120	0.1120	0.0000	C		12/31/1972	10/30/1958	0105066
BLAKE WELL 3	GROUNDWATER	1.7780	1.7780	0.0000	C		12/31/1972	12/31/1939	0105067
BLAKE WELL 4	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	12/31/1941	0105068
BLAKE WELL 5	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	12/31/1941	0105069
BLAKE WELL 6	GROUNDWATER	4.6670	4.6670	0.0000	C		12/31/1972	10/21/1939	0105070
BLAKE WELL 7	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	12/31/1940	0105071
BLAKE WELL 8-3556-F	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	04/28/1962	0105072
BLAKE WELL 9-3511-F	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	04/13/1962	0105073
BOLINGER WELL 1	GROUNDWATER	4.4500	4.4500	0.0000	C		12/31/1975	01/01/1975	0105003
BOLINGER WELL 2	GROUNDWATER	4.4500	4.4500	0.0000	C		12/31/1975	12/01/1975	0105004
BORN FARMS WELL	GROUNDWATER	2.2200	2.2200	0.0000	C		03/26/1971	03/31/1934	0105780
BRENCKLE WELL 1	GROUNDWATER	1.3300	1.3300	0.0000	C	Irrigation	12/31/1972	12/02/1953	0105840
BRENCKLE WELL 1	GROUNDWATER	1.3300	1.2186	0.1114	C	Domestic	12/31/1972	12/02/1953	0105840
CABLE WELL 2-103473F	GROUNDWATER	0.6100	0.6100	0.0000	C		12/31/1972	04/25/1957	0105919
CAMFIELD DITCH	LITTLE CROW CREEK	20.0000	20.0000	0.0000	C		11/21/1895	12/20/1884	0100633
CAMFIELD DITCH	LITTLE CROW CREEK	63.0000	63.0000	0.0000	C		11/21/1895	10/01/1885	0100633

CHILSON WELL 9507-F	GROUNDWATER	2.7800	2.7800	0.0000	C		12/31/1972	12/31/1965	0105977
CHRISTENSEN WELL 1-13525	GROUNDWATER	0.2800	0.2800	0.0000	C		12/31/1972	04/30/1948	0105983
CHUMLEY WELL 10036	GROUNDWATER	0.8880	0.8880	0.0000	C		12/31/1971	08/15/1944	0106000
CLARY SIPHON WELL 1-1566	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1971	12/31/1934	0106007
COLBURN WELL 1-6074	GROUNDWATER	1.4900	1.4900	0.0000	C		12/31/1972	02/28/1948	0106030
COLO STATE SUMP 3-12086F	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	05/15/1932	0109134
COLO STATE SUMP 4-12083F	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	05/15/1930	0109135
COX WELL 1	GROUNDWATER	0.6700	0.5586	0.1114	C	Stock	12/31/1972	9/22/1943	0106149
COX WELL 1	GROUNDWATER	0.6700	0.5586	0.1114	C	Domestic	12/31/1972	9/22/1943	0106149
COX WELL 1	GROUNDWATER	0.6700	0.6700	0.0000	C	Irrigation	12/31/1972	09/22/1943	0106149
COX WELL 2	GROUNDWATER	1.6700	1.6700	0.0000	C	Irrigation	12/31/1972	09/22/1943	0106150
COX WELL 2	GROUNDWATER	1.6700	1.5586	0.1114	C	Stock	12/31/1972	9/22/1943	0106150
COX WELL 2	GROUNDWATER	1.6700	1.5586	0.1114	C	Domestic	12/31/1972	9/22/1943	0106150
CRUEA WELL 1-R5837-RF	GROUNDWATER	2.5600	2.5600	0.0000	C		12/31/1972	06/20/1954	0106183
DAVIDSON WELL 14798	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	12/31/1930	0106273
DAVIS WELL 4-14961	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	06/30/1945	0106283
DAVIS WELL 6	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	03/31/1953	0106285
DAVIS WELL 724	GROUNDWATER	0.6000	0.6000	0.0000	C		12/31/1972	12/31/1938	0106286
DILLEY WELL 1	GROUNDWATER	0.1220	0.0106	0.1114	C		12/31/1972	6/30/1938	0106328
DILLEY WELL 2	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1972	11/30/1952	0106329
DROEGEMUELLER W 2-12087	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1970	05/31/1945	0106383
ECKHARDT WELL 14783	GROUNDWATER	1.3330	1.3330	0.0000	C		12/31/1972	05/15/1954	0106419
EHRLICH WELL 1-14459	GROUNDWATER	0.6700	0.6100	0.0600	C		12/31/1971	06/21/1939	0106429
ENDERSON WELL 1-1737-R	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	05/21/1941	0106449
FOSS WELL 1-10578-F	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1971	01/27/1966	0106566
FUERST WELL 3070-F	GROUNDWATER	4.4400	4.4400	0.0000	C		04/13/1971	03/31/1966	0106615
FUNK WELL 1-R-11474	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	12/31/1949	0106617
FUNK WELL 2-3532-F	GROUNDWATER	2.5400	2.5400	0.0000	C		12/31/1972	04/30/1962	0106618
FUNK WELL 3-04027-F	GROUNDWATER	2.6600	2.6600	0.0000	C		12/31/1972	06/20/1963	0106619
FURROW WELL 1-13143F	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	04/01/1937	0106620
GERKEN WELL 1-0569	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1971	12/31/1926	0106667
GLENN WELL 5-6254	GROUNDWATER	0.2000	0.0886	0.1114	C		12/31/1972	03/10/1949	0106700
GLENN WELL 7342	GROUNDWATER	0.1770	0.0656	0.1114	C		12/31/1972	03/15/1953	0106703
GRAF WELL 1-8781	GROUNDWATER	0.6000	0.6000	0.0000	C		12/31/1972	05/10/1949	0106729
GRAF WELL 2-8782	GROUNDWATER	0.4600	0.4600	0.0000	C		12/31/1972	02/15/1938	0106730
GRAF WELL 3-6301-F	GROUNDWATER	0.7200	0.7200	0.0000	C		12/31/1972	01/12/1965	0106731
GROVER DITCH	YERBY DRAW	380.0000	380.0000	0.0000	C		01/15/1914	11/26/1908	0100641
GROVES WELL 1-04338-F	GROUNDWATER	4.0000	4.0000	0.0000	C		12/31/1972	08/02/1963	0106764

GURTLER WELL 1-11155F	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1973	06/27/1973	0106772
HAGEN WELL 5-22096	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	12/31/1920	0106805
HALLAHAN WELL 9-4060	GROUNDWATER	0.2500	0.2500	0.0000	C		12/31/1972	04/15/1963	0106827
HARRELL WELL 1	GROUNDWATER	0.4500	0.4500	0.0000	C		12/31/1972	12/31/1908	0106851
HEIN WELL 1-2081F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	03/01/1959	0106878
HEIN WELL 2-2302F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	09/28/1959	0106880
HIGHLAND WELL 4	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	12/31/1943	0106935
HOFF WELL	GROUNDWATER	0.4500	0.4500	0.0000	C		03/26/1971	05/31/1935	0108107
HOSHIKO WELL 15492	GROUNDWATER	1.3330	1.3330	0.0000	C		12/31/1970	12/31/1936	0109154
HUNT WELL 1-8291	GROUNDWATER	0.6300	0.6300	0.0000	C		12/31/1972	12/31/1912	0109179
HUNT WELL 2-8292	GROUNDWATER	0.8400	0.8400	0.0000	C		12/31/1972	12/31/1912	0109180
HUNT WELL 3-8293	GROUNDWATER	1.3200	1.3200	0.0000	C		12/31/1972	12/31/1912	0109181
ISAKSON WELL 1-11501	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	02/01/1936	0106984
JEMIOLA SUMP 1	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	04/08/1950	0107015
JONES WELL 3-04440F	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	07/14/1963	0107060
JORDAN WELL 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	06/02/1951	0107062
JURGENS WELL 2-12254	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1971	05/31/1952	0107065
KERBS WELL 7-19392-F	G Smith Well	1.3300	1.3300	0.0000	C		12/31/1971	02/28/1970	0107105
KISSLER WELL 6-10853	GROUNDWATER	0.6533	0.6533	0.0000	C		12/31/1972	06/20/1946	0109331
KISSLER WELL 7-10854	GROUNDWATER	0.9067	0.9067	0.0000	C		12/31/1972	06/20/1946	0109333
KISSLER WELL 8-11639F	GROUNDWATER	1.4378	1.4378	0.0000	C		12/31/1972	06/20/1946	0109334
KLEBER WELL 2-1490	GROUNDWATER	0.3880	0.3880	0.0000	C		12/31/1972	08/20/1941	0107176
KREHMEYER WELL 16174	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	07/30/1940	0107207
LANDAKER WELL 10309	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	06/30/1953	0107377
LARSON WELL	GROUNDWATER	1.8330	1.8330	0.0000	C		12/31/1974	05/27/1953	0107400
LEBSACK WELL 1	GROUNDWATER	0.4380	0.4380	0.0000	C		12/31/1972	01/08/1957	0107424
LEMONDS WELL 1	GROUNDWATER	0.2800	0.2800	0.0000	C		12/31/1971	04/30/1910	0107435
LESH WELL 1	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	12/31/1925	0105201
LESH WELL 2	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	12/31/1925	0105202
LESH WELL 3	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	12/31/1907	0105203
LOG LANE WELL 2	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1972	06/19/1956	0107486
LOHR WELL 1-6140	GROUNDWATER	1.8200	1.8200	0.0000	C		12/31/1971	05/18/1955	0107489
MARWITZ WELL 1-0774	GROUNDWATER	0.4700	0.4700	0.0000	C		12/31/1972	06/20/1944	0107542
MARWITZ WELL 1-0776	GROUNDWATER	2.3200	2.3200	0.0000	C		12/31/1972	4/30/1957	0107543
MARWITZ WELL 2-0775	GROUNDWATER	0.7000	0.7000	0.0000	C		12/31/1972	06/20/1944	0107544
MARWITZ WELL 2-2553-F	GROUNDWATER	0.5200	0.5200	0.0000	C		12/31/1972	05/13/1960	0107545
MARWITZ WELL 3-0771	GROUNDWATER	0.5200	0.5200	0.0000	C		12/31/1972	6/20/1939	0107546
MARWITZ WELL 3-0773	GROUNDWATER	0.4100	0.4100	0.0000	C		12/31/1972	06/20/1945	0107547

MARWITZ WELL 4-0772	GROUNDWATER	0.5200	0.5200	0.0000	C		12/31/1972	06/20/1940	0107548
MARWITZ WELL 4-7760-F	GROUNDWATER	0.6200	0.6200	0.0000	C		12/31/1972	09/17/1957	0107549
MAY WELL 1-11580	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	03/10/1954	0107552
MAY WELL 3-11577	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	12/31/1925	0106172
MCCONNELL WELL 1-13380	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	4/15/1942	0107563
MCVEY WELL 12063	GROUNDWATER	0.1700	0.1700	0.0000	C		12/31/1972	06/10/1956	0107615
MEEK WELL 1	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	12/31/1940	0107619
MEISINGER WELL 14839	GROUNDWATER	0.3400	0.3400	0.0000	C		12/31/1972	03/10/1955	0107632
MEISINGER WELL 14840	GROUNDWATER	0.3400	0.3400	0.0000	C		12/31/1972	05/01/1956	0107633
MEREDITH WELL 0565	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1972	03/31/1950	0107643
MERRILL WELL 2-6366	GROUNDWATER	1.2220	1.2220	0.0000	C		12/31/1972	06/30/1942	0107645
MONSON WELL DRAIN 49977	GROUNDWATER	0.7700	0.7700	0.0000	C		12/31/1990	03/01/1989	0107279
MYLANDER GUSTIN W 10738-R	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1971	08/30/1912	0105253
MYLANDER GUSTIN W 10738-R	GROUNDWATER	0.8880	0.8880	0.0000	C		12/31/1971	09/30/1951	0105253
MYLANDER WELL 1-12367	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	05/29/1956	0107772
MYLANDER WELL 2	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	06/22/1943	0107775
NOFFSINGER WELL 11	GROUNDWATER	2.6600	2.6600	0.0000	C		12/31/1972	12/31/1960	0107820
NOFFSINGER WELL 14	GROUNDWATER	1.7700	1.7700	0.0000	C		12/31/1972	12/31/1935	0107823
NOFFSINGER WELL 6	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	12/31/1955	0107829
ODLE WELL 1-2543-F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	5/5/1960	0107846
ODLE WELL 1-6832	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	5/10/1940	0107847
ODLE WELL 2-6831	GROUNDWATER	2.3300	2.3300	0.0000	C		12/31/1972	6/1/1940	0107848
ODLE WELL 2-8685	GROUNDWATER	4.0000	4.0000	0.0000	C		12/31/1972	6/1/1947	0107845
ODLE WELL 3-6830	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1972	5/1/1945	0107849
ODLE WELL 4-8822F	GROUNDWATER	3.3300	3.3300	0.0000	C		12/31/1972	01/17/1958	0107850
ODLE WELL 5-6829	GROUNDWATER	0.9700	0.9700	0.0000	C		12/31/1972	6/15/1957	0107851
PAINTER WELL 1-11752	GROUNDWATER	0.3330	0.3300	0.0030	C		12/31/1972	04/14/1955	0107883
PAINTER WELL 2-11753	GROUNDWATER	0.3890	0.3890	0.0000	C		12/31/1972	03/15/1946	0107884
PAINTER WELL 3-11754	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	04/01/1955	0107885
PAINTER WELL 4-11755	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	05/01/1940	0107886
PAINTER WELL 5-5996-F	GROUNDWATER	0.6300	0.6300	0.0000	C		12/31/1972	06/15/1964	0107887
PARKER WELL 1	GROUNDWATER	1.8500	1.8500	0.0000	C		12/31/1972	06/30/1928	0107899
PARKER WELL 12-11926	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1972	12/31/1937	0107902
PARKER WELL 13-11927	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1972	04/30/1945	0107903
PARKER WELL 14-11928	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1972	06/30/1954	0107904
PARKER WELL 2	GROUNDWATER	2.3000	2.3000	0.0000	C		12/31/1972	12/31/1941	0107906
PARKER WELL 3	GROUNDWATER	1.4000	1.4000	0.0000	C		12/31/1972	06/30/1945	0107907
PARKER WELL 4-3266F	GROUNDWATER	1.4000	1.4000	0.0000	C		12/31/1972	08/01/1961	0107908

PARKER WELL 6-11988	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1972	04/01/1926	0107910
PARKER WELL 7-11987	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	03/01/1912	0107911
PETERSON WELL 1-11737	GROUNDWATER	0.7500	0.7500	0.0000	C		12/31/1972	05/01/1956	0107946
PETERSON WELL 2-11738	GROUNDWATER	0.7500	0.7500	0.0000	C		12/31/1972	05/01/1956	0107954
PFOST WELL 2-0342	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	05/10/1945	0107980
PFOST WELL 3-10781F	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1972	04/28/1966	0107981
PLATTE ENTER WELL 13296	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1973	12/31/1936	0105279
PLATTE ENTER WELL 13296	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1973	12/31/1966	0105279
POINDEXTER WELL 1	GROUNDWATER	0.7600	0.7600	0.0000	C		12/31/1972	06/20/1940	0108004
QUERY WELL 2-2143-F	GROUNDWATER	0.7100	0.7100	0.0000	C		12/31/1972	05/07/1959	0108041
QUERY WELL 3-2156-F	GROUNDWATER	0.5100	0.5100	0.0000	C		12/31/1972	05/20/1959	0108042
QUERY WELL 4-2155F	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	05/20/1959	0108043
RASMUSSEN SUMP 1	GROUNDWATER	1.3900	1.3900	0.0000	C		12/31/1972	12/31/1954	0108050
RICHARDSON WELL 1-5808	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	06/01/1948	0108081
RICHARDSON WELL 2-5809	GROUNDWATER	0.1550	0.1550	0.0000	C		12/31/1972	07/01/1952	0108082
ROHR WELL 1-5000F	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	05/20/1955	0108125
ROHR WELL 2-1417	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	04/19/1955	0108126
RUSCH WELL 6-11177	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1970	12/31/1936	0108197
RUSCH WELL 7-11177	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1970	12/31/1936	0108198
RUSCH WELL 8-11177	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1970	12/31/1936	0108199
SALBERG WELL 6747	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1973	03/15/1957	0108231
SANDOZ WELL 1-11431	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	10/31/1934	0108239
SANDOZ WELL 4-11434	GROUNDWATER	0.6120	0.6120	0.0000	C		12/31/1972	09/30/1952	0105305
SANDOZ WELL 5-2079F	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	06/30/1961	0108242
SAPPINGTON WELL 1-1362	GROUNDWATER	1.0500	1.0500	0.0000	C		12/31/1972	11/30/1956	0108244
SIDWELL WELL 5	GROUNDWATER	0.7775	0.7775	0.0000	C		12/31/1972	03/30/1938	0108350
SIDWELL WELL 6	GROUNDWATER	0.7775	0.7775	0.0000	C		12/31/1972	03/30/1938	0108351
SIVERS WELL 3	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	12/31/1934	0108384
STOLARCZYK WELL 1	GROUNDWATER	0.2000	0.0886	0.1114	C		12/31/1971	05/05/1956	0108494
SYMAN SEEPAGE DITCH	SEEPAGE	0.0330	0.0330	0.0000	C		12/31/1984	07/01/1984	0100861
THOMA WELL 2-6204F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	09/08/1964	0108615
THOMA WELL 8-6636R	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/01/1952	0108621
THOMPSON WELL 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	07/25/1957	0105336
TODD WELL 12038	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	06/30/1955	0108649
TRETTENERO WELL 015594-F	GROUNDWATER	1.9800	1.9800	0.0000	C		12/31/1972	06/07/1956	0108661
VIEFHAUS WELL 1-5293-F	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	04/03/1964	0108748
WADSWORTH WELL 1-19472F	GROUNDWATER	0.2330	0.2330	0.0000	C		12/31/1972	05/10/1947	0108766
WAGERS WELL 1-11190-F	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	04/30/1943	0108767

WAGERS WELL 2-19731F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	12/31/1950	0108768
WEBSTER LAND WELL 10008	GROUNDWATER	0.7780	0.7780	0.0000	C		12/31/1972	06/01/1950	0108821
WEIMER WELL 1-1950	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1971	03/31/1952	0108845
WEISS WELL 10234	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	12/31/1935	0108898
WELD CO WELL 19740-F	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1974	06/23/1972	0108911
WELLS WELL 1-13219	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	12/31/1916	0108920
WELLS WELL 2-13220	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	12/31/1916	0108921
WEST PAVING CO WELL 1	GROUNDWATER	0.5560	0.5560	0.0000	C		12/31/1972	07/15/1954	0108939
WEST PAVING CO WELL 2	GROUNDWATER	0.5560	0.5560	0.0000	C		12/31/1972	05/01/1941	0108938
WHITNEY WELL 2-R14652	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	07/01/1953	0108951
WHITNEY WELL 4-7307	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	12/31/1945	0108953
WILKINSON WELL A	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1970	12/31/1944	0108975
WILKINSON WELL B	GROUNDWATER	0.4450	0.3336	0.1114	C	Domestic	12/31/1970	12/31/1944	0108982
WILKINSON WELL B	GROUNDWATER	0.4450	0.4450	0.0000	C	Irrigation	12/31/1970	12/31/1944	0108982
WINGER WELL 7	GROUNDWATER	0.1700	0.1700	0.0000	C		12/31/1972	10/10/1950	0109015
WINTER WELL 4429-F	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	03/31/1964	0109025
YAGER/WOOD WELL 21034-1	GROUNDWATER	2.1100	2.1100	0.0000	C		12/31/1972	06/21/1946	0109068
YAGER/WOOD WELL 21034-2	GROUNDWATER	2.6600	2.6600	0.0000	C		12/31/1972	07/15/1953	0109069
YAGER/WOOD WELL 21034-3	GROUNDWATER	3.6600	3.6600	0.0000	C		12/31/1972	11/01/1956	0109070
YETTER WELL 1-13187	GROUNDWATER	1.3330	1.3330	0.0000	C		12/31/1972	07/27/1955	0109074

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 2									
104TH & I 80S WELL 1	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1974	06/20/1947	0205150
104TH & I 80S WELL 2	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1974	05/15/1948	0209865
1415 CO WELL 1-06637	GROUNDWATER	2.6000	2.6000	0.0000	C		12/31/1972	06/30/1955	0205153
1415 CO WELL 2-06638	GROUNDWATER	2.0800	2.0800	0.0000	C		12/31/1972	04/30/1945	0205154
1415 CO WELL 4-04234F	GROUNDWATER	2.6000	2.6000	0.0000	C		12/31/1972	05/29/1963	0205156
ABBETT WELL 1-2186F	GROUNDWATER	0.2400	0.2400	0.0000	C		12/31/1971	06/08/1959	0205167
ADDUCCI WELL 10458-R	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	09/15/1940	0205192
ALBANESE WELL 1-10463	GROUNDWATER	0.3900	0.3900	0.0000	C		12/31/1972	05/20/1925	0205205
ALFORD WELL 1-4475	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	03/31/1951	0205209
ALLEN WELL 12090	GROUNDWATER	0.7700	0.7700	0.0000	C		12/31/1972	03/04/1949	0205213
ANDERSON WELL 12670	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	07/31/1947	0205243
ANNIS WELL 3-14302	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1973	06/15/1937	0205260
ARENS WELL 3-9779	GROUNDWATER	0.1200	0.1200	0.0000	C		12/31/1972	09/25/1961	0205291
BALISTRERI W 1-014507-F	GROUNDWATER	0.1604	0.1604	0.0000	C		12/31/1971	04/23/1932	0205312
BAUMGARTNER WELL 1-6291	GROUNDWATER	3.1100	3.1100	0.0000	C		12/31/1972	12/31/1930	0205330

BAUMGARTNER WELL 2-6293	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	12/31/1942	0205331
BEILHARTZ WELL 13203-F	GROUNDWATER	0.1780	0.1780	0.0000	C		12/31/1972	10/18/1968	0205346
BERNHARDT WELL 1-81	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	04/01/1935	0205380
BERNHARDT WELL 6-13701-F	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	06/22/1942	0205393
BETHKE WELL 1	GROUNDWATER	0.8000	0.8000	0.0000	C		12/31/1972	05/05/1948	0205402
BIERBACH WELL 5-11911	GROUNDWATER	1.8400	1.8400	0.0000	C		12/31/1972	09/30/1944	0205409
BOHLENDER WELL 1	GROUNDWATER	4.3000	4.3000	0.0000	C		12/31/1970	07/31/1954	0205426
BOXELDER W 14-18380-G	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	09/14/1946	0205488
BOXELDER W 16-18380-H	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	05/07/1946	0205490
BOXELDER W 17-18380-I	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1971	09/30/1955	0205491
BOXELDER W 19-18380-K	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	03/31/1934	0205493
BOXELDER WELL 10-18380-W	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1971	12/31/1932	0205484
BOXELDER WELL 11-18380-X	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	12/31/1932	0205485
BOXELDER WELL 1-18380-R	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	03/31/1932	0205483
BOXELDER WELL 12-18380-Y	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	12/31/1932	0205486
BOXELDER WELL 13-18380-Z	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	03/31/1932	0205487
BOXELDER WELL 15-10023	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	07/14/1952	0205489
BOXELDER WELL 18-10025	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	11/01/1952	0205492
BOXELDER WELL 20-2653-F-R	GROUNDWATER	0.3340	0.3340	0.0000	C		12/31/1971	09/15/1971	0205495
BOXELDER WELL 2-10029-R	GROUNDWATER	0.5570	0.5570	0.0000	C		12/31/1971	09/30/1955	0205494
BOXELDER WELL 21-10028-R	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1971	05/04/1954	0205496
BOXELDER WELL 22-10027-R	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	05/05/1954	0205497
BOXELDER WELL 23-P03169F	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1971	05/23/1961	0205498
BOXELDER WELL 3	GROUNDWATER	0.6680	0.6680	0.0000	C		12/31/1971	07/10/1958	0205503
BOXELDER WELL 4-P5254F	GROUNDWATER	1.2300	1.2300	0.0000	C		12/31/1971	03/14/1964	0205504
BOXELDER WELL 5-18380-S	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	05/31/1931	0205505
BOXELDER WELL 6-10026-R	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1971	12/22/1953	0205506
BOXELDER WELL 7-18380-T	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	12/31/1931	0205507
BOXELDER WELL 8-18380-V	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	12/31/1931	0205508
BOXELDER WELL 9-10024-R	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1971	03/31/1932	0205509
BRANCUCCI WELL 1-12992-F	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	12/31/1930	0205515
BRIGGS SUMP 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	05/15/1953	0205542
BROMLEY WELL 2-23195-F	GROUNDWATER	0.4400	0.3286	0.1114	C	Stock	12/31/1972	07/01/1952	0205569
BROMLEY WELL 2-23195-F	GROUNDWATER	0.4400	0.4400	0.0000	C	Irrigation	12/31/1972	07/01/1952	0205569
BROMLEY WELL 2-23195-F	GROUNDWATER	0.4400	0.3286	0.1114	C	Domestic	12/31/1972	07/01/1952	0205569
BUENO WELL NO 12175	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1982	06/21/1940	0205131
BUNGO HORIUCHI W 14701	GROUNDWATER	0.5800	0.5800	0.0000	C		12/31/1981	06/01/1947	0205590
BURGER WELL 1	GROUNDWATER	0.3670	0.3670	0.0000	C	Commercial	12/31/1972	12/31/1949	0205592

BURGER WELL 1	GROUNDWATER	0.3670	0.2556	0.1114	C	Domestic	12/31/1972	12/31/1949	0205592
BUTTERFIELD WELL 2526-F	GROUNDWATER	1.5000	1.5000	0.0000	C		12/31/1971	06/01/1960	0205598
CAIN WELL 11436	GROUNDWATER	1.4253	1.4253	0.0000	C		12/31/1972	04/30/1937	0205610
CALVERT WELL 1-RF-541	GROUNDWATER	1.3770	1.3770	0.0000	C		12/31/1972	05/18/1968	0205617
CARLSON WELL 1	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	12/07/1945	0205653
CCWCD WELL 1-019805F	GROUNDWATER	2.9300	2.9300	0.0000	C		12/31/1975	12/16/1974	0205674
CCWCD WELL 2-019807F	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1975	12/16/1974	0205676
CCWCD WELL 3-019806F	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1975	12/16/1974	0205677
CCWCD WELL 4-020032-F	GROUNDWATER	2.5500	2.5500	0.0000	C		12/31/1984	12/16/1974	0205680
CENTER WELL 2-1574-R	GROUNDWATER	0.7200	0.7200	0.0000	C		12/31/1971	02/17/1960	0205689
CHIKUMA WELL 2-4180F	GROUNDWATER	1.7700	1.7700	0.0000	C		12/31/1972	07/10/1964	0205700
CIMYOTT WELL 16123-R	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	03/10/1955	0205714
CITY ICE CO WELL 1-10780-F-R	GROUNDWATER	1.4000	1.4000	0.0000	C		12/31/1972	06/10/1944	0205717
CITY ICE CO WELL 2-1873	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1972	07/15/1950	0205718
CITY ICE CO WELL 3-1874	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1972	02/01/1955	0205719
CLARK WELL 1-13250	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	06/30/1940	0205723
COLO STATE W 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1971	12/05/1941	0205739
COLO STATE W 2	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1971	06/15/1936	0205740
CONT PLASTICS WELL 12653	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1971	12/27/1967	0205765
COTTON WELL 1-19542F	GROUNDWATER	0.1800	0.1800	0.0000	C		12/31/1972	12/31/1949	0205806
COUGHLIN WELL 1	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	12/31/1951	0205807
CRAVEN WELL 1-12521-R	GROUNDWATER	2.8800	2.8800	0.0000	C		12/31/1972	07/31/1934	0205815
DAHLINGER WELL 1-10605F	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	03/09/1966	0205834
DAMIANA WELL 1-47867-F	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	04/15/1939	0205843
DANDREA WELL 1-13692-F	GROUNDWATER	0.5555	0.5555	0.0000	C		12/31/1972	12/31/1915	0205848
DANDREA WELL 2-13703-F	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	12/31/1915	0205849
DAVIS WELL 1	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	07/01/1898	0205855
DAVIS WELL 1-10739	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1971	12/03/1936	0205856
DAVIS WELL 13526	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	04/30/1932	0205858
DAVIS WELL 13527	GROUNDWATER	2.3500	2.3500	0.0000	C		12/31/1972	04/30/1932	0205859
DAVIS WELL 13528	GROUNDWATER	1.4800	1.4800	0.0000	C		12/31/1972	04/30/1934	0205860
DAVIS WELL 13529	GROUNDWATER	2.7000	2.7000	0.0000	C		12/31/1972	04/30/1940	0205861
DAVIS WELL 13530-R	GROUNDWATER	2.3400	2.3400	0.0000	C		12/31/1972	04/30/1950	0205862
DAVIS WELL 2	GROUNDWATER	0.4890	0.4890	0.0000	C		12/31/1972	11/15/1940	0205863
DAVIS WELL 3	GROUNDWATER	0.1220	0.1220	0.0000	C		12/31/1972	08/15/1944	0205866
DAVIS WELL 3-2680-F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1971	08/31/1960	0205867
DE MOTT WELL 2	GROUNDWATER	0.1890	0.1890	0.0000	C	Irrigation	12/31/1972	12/31/1938	0205873
DE MOTT WELL 2	GROUNDWATER	0.1890	0.0776	0.1114	C	Domestic	12/31/1972	12/31/1938	0205873

DECHANT WELL 7275-R	GROUNDWATER	1.7200	1.7200	0.0000	C		12/31/1972	06/30/1957	0205875
DENVER REND WELL 2-3801F	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	11/05/1962	0205894
DENVER REND WELL 4	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	10/01/1955	0205896
DERSHAM SUMP 10456-R	GROUNDWATER	0.9300	0.9300	0.0000	C		12/31/1971	04/30/1957	0205905
DERSHAM WELL 10455	GROUNDWATER	0.9150	0.9150	0.0000	C		12/31/1971	06/01/1951	0205906
DERSHAM WELL 3690F	GROUNDWATER	0.7250	0.7250	0.0000	C		12/31/1971	08/31/1962	0205907
DISNER WELL 017338-F	GROUNDWATER	0.2900	0.1786	0.1114	C	Domestic	12/31/1974	08/15/1928	0205932
DISNER WELL 017338-F	GROUNDWATER	0.2900	0.2900	0.0000	C	Irrigation	12/31/1974	08/15/1928	0205932
DOLL WELL 1199	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1970	06/30/1940	0205950
DOTSON WELL 6023	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1970	12/31/1948	0205955
DUNNING WELL 3-15372-R	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1972	06/15/1951	0205995
EATON CATTLE W 2-19924-8	GROUNDWATER	0.9000	0.9000	0.0000	C		12/31/1972	06/30/1930	0206014
EATON CATTLE W 5-14524	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1972	06/30/1940	0206015
EILERS WELL 13212	GROUNDWATER	1.2220	1.1106	0.1114	C	Domestic	12/31/1972	08/03/1948	0206037
EILERS WELL 13212	GROUNDWATER	1.2220	1.2220	0.0000	C	Irrigation	12/31/1972	08/03/1948	0206037
ELLIOTT WELL 1	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	09/01/1912	0206042
ELLIOTT WELL 13542	GROUNDWATER	1.8300	1.8300	0.0000	C		12/31/1971	12/31/1953	0206043
ELLIOTT WELL 13543	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	12/31/1938	0206044
ELLIOTT WELL 13544	GROUNDWATER	1.2700	1.2700	0.0000	C		12/31/1971	12/31/1945	0206045
EPPINGER WELL 1-22451-F-R	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1976	02/26/1976	0206063
EVITT WELL 15366	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/01/1918	0206099
EWING WELL 1-10809	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1971	05/31/1971	0206102
FAY WELL 1-R14253	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	03/01/1935	0206133
FEHR WELL 2-6516-F	GROUNDWATER	0.1550	0.1550	0.0000	C		12/31/1972	09/05/1964	0206143
FERGUSON WELD WELL	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	12/31/1950	0206151
FERGUSON WELL 14789R	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	04/01/1956	0206157
FERGUSON WELL 19808R	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	05/01/1933	0206162
FERGUSON WELL 19808-S	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	05/15/1947	0206161
FIEDLER WELL 4-20098	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1971	12/31/1950	0206176
FLANAGAN WELL 1	GROUNDWATER	2.6200	2.6200	0.0000	C		12/31/1972	04/01/1951	0205024
FLANAGAN WELL 2-14449	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	04/01/1951	0205027
FLANAGAN WELL 4	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1972	09/01/1940	0205029
FORD WELL 1-20372	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1972	06/15/1955	0206193
FORD WELL 2-27320F	GROUNDWATER	0.7000	0.7000	0.0000	C		12/31/1972	12/31/1930	0206194
FREEMAN WELL 1-16238	GROUNDWATER	1.4000	1.4000	0.0000	C		12/31/1972	02/16/1957	0206208
FREI WELL 1	GROUNDWATER	0.8800	0.8800	0.0000	C	Fishery	12/31/1972	12/31/1930	0206211
FRONT RANGE WELL 3-8967	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1973	07/10/1958	0206224
FROSSARD WELL 1-14469-R	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	08/15/1921	0206225

FROSSARD WELL 2-14470-R	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	07/31/1956	0206226
FROSSARD WELL 3-14471-R	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	04/23/1953	0206227
FRY WELL 4-2130-F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	04/27/1959	0206238
FRY WELL 8-12633	GROUNDWATER	0.1700	0.1700	0.0000	C		12/31/1971	03/19/1955	0206242
FRY WELL 9-12635	GROUNDWATER	0.1700	0.1700	0.0000	C		12/31/1971	03/23/1949	0206243
FT LUPTON CAN CO WELL 1	GROUNDWATER	0.0444	0.0444	0.0000	C		12/31/1971	12/31/1929	0206246
FT LUPTON CAN W 1-2261F	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1971	12/31/1897	0206247
FT LUPTON H SCH W 20098	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1987	06/21/1912	0209308
FUKAYE WELL 1-13139-F	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	03/31/1944	0206263
FUKAYE WELL 7-14511-F	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	04/15/1954	0206269
GACCETTA WELL 1-10457-R	GROUNDWATER	0.7550	0.7550	0.0000	C		12/31/1972	01/31/1954	0206356
GACCETTA WELL 1-10459	GROUNDWATER	0.2500	0.2500	0.0000	C		12/31/1972	12/31/1933	0206357
GACCETTA WELL 1-10461	GROUNDWATER	0.7550	0.7550	0.0000	C		12/31/1972	03/31/1954	0206358
GANN WELL 13370-R	GROUNDWATER	0.3600	0.3600	0.0000	C		12/31/1971	04/28/1949	0206363
GERACE WELL 1-11091-R	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1972	09/30/1944	0206384
GLENN WELL 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1977	06/30/1930	0206415
GRAY WELL 1-19509-R	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1971	05/31/1951	0206422
GREAT WESTERN W 1-10137	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1972	08/01/1948	0206349
GREAT WESTERN W 2-10138	GROUNDWATER	2.8000	2.8000	0.0000	C		12/31/1972	10/05/1956	0206350
GREAT WESTERN W 3-10958	GROUNDWATER	1.2000	1.2000	0.0000	C		12/31/1972	08/05/1966	0206351
GREEN WELL 1-016338-F	GROUNDWATER	2.2280	2.2280	0.0000	C		12/31/1972	01/23/1957	0206432
GRESS W 1-10256	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	04/23/1925	0206445
HACK W 2-13180-R	GROUNDWATER	1.2800	1.2800	0.0000	C		12/31/1972	06/25/1955	0206472
HALLMARK WELL 49080	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	10/01/1971	0206489
HANSON WELL 1-15060-R	GROUNDWATER	1.8000	1.8000	0.0000	C		12/31/1971	06/30/1954	0206500
HARDMAN WELL 1-10026-F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	09/10/1965	0206503
HARRINGTON WELL 1-820	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	11/12/1939	0206509
HAZELTINE WELL 1-1564	GROUNDWATER	0.8300	0.8300	0.0000	C		12/31/1975	05/05/1954	0206526
HAZELTINE WELL 2-1565	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1975	05/27/1955	0206529
HAZELTINE WELL 3-1562	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1975	12/31/1935	0206530
HEINZE WELL	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1983	05/08/1954	0206539
HENDERSON LAND W 1-15066	GROUNDWATER	0.8800	0.8800	0.0000	C		12/31/1972	12/31/1955	0206547
HENDERSON PICKLE W 1038	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1971	04/01/1953	0205039
HOLZER WELL 2-6759-R	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	01/30/1937	0206604
HONNEN WELL 3721-F	GROUNDWATER	0.2770	0.2770	0.0000	C		12/31/1971	09/01/1962	0206607
HOSE WELL 11335	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	09/22/1932	0206618
HOSE WELL 11496-R	GROUNDWATER	0.3040	0.3040	0.0000	C		12/31/1971	09/22/1913	0206619
HUBBELL WELL 4-15963-3	GROUNDWATER	3.3021	3.3021	0.0000	C		12/31/1972	05/27/1927	0206625

HUBBELL WELL 5-11107-F	GROUNDWATER	0.9000	0.9000	0.0000	C		12/31/1972	08/16/1929	0206626
HUDSON WELL 9576-F	GROUNDWATER	0.4220	0.4220	0.0000	C		12/31/1972	05/18/1965	0206630
HYATT WELL 8799	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	12/31/1940	0206644
IRITANI-KAWANO W 1-0518-R	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	04/15/1947	0206661
ISHIGURO SIPHON WELL 1-A	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1972	12/31/1948	0206664
ISHIGURO SIPHON WELL 2-A	GROUNDWATER	1.8900	1.8900	0.0000	C		12/31/1972	12/31/1947	0206665
JACQUEZ WELL 3-10834-R	GROUNDWATER	1.4200	1.4200	0.0000	C		12/31/1972	06/30/1946	0206679
JOHNSON WELL 1-013607-F	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	12/31/1940	0206703
JOHNSON WELL 1-20203	GROUNDWATER	2.5000	2.5000	0.0000	C		12/31/1972	3/2/1972	0206707
JOHNSON WELL 1-22916F	GROUNDWATER	1.1666	1.1666	0.0000	C		12/31/1972	07/01/1940	0206699
JOHNSON WELL 2	GROUNDWATER	0.1667	0.1667	0.0000	C	Irrigation	12/31/1972	04/01/1935	0206710
JOHNSON WELL 2	GROUNDWATER	0.1667	0.1333	0.0334	C	Stock	12/31/1972	4/1/1935	0206710
K&B PACKING W 2-19719F	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	12/31/1917	0206735
K&B PACKING W 3-19720F	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	12/31/1958	0206736
K&B PACKING W 4-19721F	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1972	01/27/1953	0206737
KALLSEN WELL 1-5178F	GROUNDWATER	2.2500	2.2500	0.0000	C		12/31/1970	02/22/1964	0206747
KARPINSKI WELL 1-12682	GROUNDWATER	0.5400	0.5400	0.0000	C		12/31/1972	06/30/1929	0206763
KINNEY WELL 0334-R	GROUNDWATER	0.5100	0.5100	0.0000	C	Irrigation	12/31/1972	06/30/1946	0206809
KINNEY WELL 0334-R	GROUNDWATER	0.5100	0.3986	0.1114	C	Domestic	12/31/1972	06/30/1946	0206809
KIYOTA WELL 12883	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	04/30/1947	0206818
KOCH WELL 1-48684-F	GROUNDWATER	1.4400	1.4400	0.0000	C		12/31/1972	08/27/1955	0206859
KOENIG WELL 20137	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	07/12/1954	0206863
KRAMER WELL 1-16398	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	12/31/1929	0206869
KRAMER WELL 2-16399-R	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	12/31/1937	0206872
KROGH WELL 1-11234-F	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	04/30/1935	0206878
KROGH WELL 14-14024	GROUNDWATER	2.6800	2.6800	0.0000	C		12/31/1972	06/30/1956	0206882
KROGH WELL 15-14024	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	06/30/1967	0206883
KROGH WELL 16-14022	GROUNDWATER	2.0100	2.0100	0.0000	C		12/31/1972	05/31/1937	0206884
KROGH WELL 21-15422	GROUNDWATER	1.1800	1.1800	0.0000	C		12/31/1972	01/31/1938	0206890
KROGH WELL 2-14472	GROUNDWATER	0.2490	0.2490	0.0000	C		12/31/1972	07/01/1940	0206877
KUNER EMPSON W 1-44901-F	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1971	05/15/1925	0206903
KUNER EMPSON W 2-19676-F	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1971	05/15/1925	0206000
KUNER EMPSON W 2-19676-F ALT PT	GROUNDWATER	0.0000	0.0000	1.0000	C		12/31/1971	05/15/1925	0206907
KUNER EMPSON W 3-19677-F-R	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	06/01/1953	0205046
KUNER EMPSON W 4-44904-F	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1971	05/15/1925	0206904
KUNER EMPSON W 5-19679-F	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1971	04/15/1950	0206905
KUNER EMPSON W 7-45268F	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1971	07/05/1963	0206902

KURTZ WELL 11-2489F	GROUNDWATER	1.8400	1.8400	0.0000	C		12/31/1972	04/08/1960	0206910
LAMBERTSON SUMP 1-13641-R	GROUNDWATER	1.5000	1.5000	0.0000	C		12/31/1971	06/01/1932	0206918
LAMBERTSON WELL 1-9150-F	GROUNDWATER	0.2500	0.2500	0.0000	C		12/31/1971	04/24/1965	0206919
LATORRA WELL 11136F	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	06/01/1930	0206952
LITVAK WELL 2-14005	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1971	12/31/1940	0207000
LITVAK WELL 4-14007	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1971	06/30/1956	0207002
LITVAK WELL 6-15305	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1971	03/31/1953	0207004
LONGWELL WELL 1-6564-F	GROUNDWATER	0.4580	0.4580	0.0000	C		12/31/1972	12/30/1964	0207020
LOYD WELL 1-3962F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	03/28/1963	0210215
LOYD WELL 2-4643-F	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1972	08/28/1963	0210216
LOYD WELL 3-4830-F	GROUNDWATER	0.5555	0.5555	0.0000	C		12/31/1972	05/20/1964	0210217
LOYD WELL 4-10248-F	GROUNDWATER	1.1111	1.1111	0.0000	C		12/31/1972	01/07/1966	0210218
LUTHER WELL 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	05/01/1954	0207063
MAGEE WELL 29308	GROUNDWATER	0.2222	0.2222	0.0000	C		12/31/1972	10/11/1966	0207071
MANCINI WELL 1-13410-F	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1971	08/31/1955	0207073
MANN WELL 4-15254-R-R	GROUNDWATER	0.6680	0.6680	0.0000	C		12/31/1972	04/28/1960	0207083
MATHEWS WELL 1	GROUNDWATER	0.1660	0.1660	0.0000	C		12/31/1972	12/31/1930	0207124
MATSCHKE WELL 1-03019F	GROUNDWATER	0.7570	0.7570	0.0000	C		12/31/1972	03/16/1961	0207128
MATSCHKE WELL 2-0998-R	GROUNDWATER	0.8730	0.8730	0.0000	C		12/31/1972	04/30/1954	0207129
MATSCHKE WELL 3-0997-R	GROUNDWATER	0.6990	0.6990	0.0000	C		12/31/1972	04/20/1953	0207130
MAZZOTTI WELL NO 1602R	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	02/19/1960	0207156
MAZZOTTI WELL NO 1603R	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	02/19/1960	0207157
MCCORMICK WELL 6588-F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	08/23/1964	0207176
MCCOY WELL 10-2312-F	GROUNDWATER	0.4890	0.4890	0.0000	C		12/31/1971	10/31/1959	0207177
MCCOY WELL 11-8239-R	GROUNDWATER	0.3930	0.3930	0.0000	C		12/31/1971	01/21/1958	0207178
MCCOY WELL 12-10344-R	GROUNDWATER	0.4890	0.4890	0.0000	C		12/31/1971	12/31/1945	0207179
MCCOY WELL 1-8235-R-R	GROUNDWATER	0.4730	0.4730	0.0000	C		12/31/1971	12/31/1933	0207180
MCCOY WELL 2-8236-R-R	GROUNDWATER	0.5620	0.5620	0.0000	C		12/31/1971	12/31/1935	0207181
MCCOY WELL 5-8237	GROUNDWATER	0.8800	0.8800	0.0000	C		12/31/1971	12/31/1940	0205052
MCCOY WELL 5-8237	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	12/31/1958	0205052
MCCOY WELL 7-8240-R-R	GROUNDWATER	0.4240	0.4240	0.0000	C		12/31/1971	12/31/1948	0207185
MCCOY WELL 8-8238-R	GROUNDWATER	0.4890	0.4890	0.0000	C		12/31/1971	12/31/1945	0207186
MCCOY WELL 9-8241-R-R	GROUNDWATER	0.6444	0.6444	0.0000	C		12/31/1971	12/31/1955	0207187
MCMILLEN WELL 3-20461T	GROUNDWATER	2.2300	2.2300	0.0000	C		12/31/1970	03/01/1953	0207208
METZGER WELL 1	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1972	09/21/1956	0207217
METZGER WELL 1-8667	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1972	05/30/1911	0207218
METZGER WELL 2-10951-R	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	04/15/1950	0207219
METZGER WELL 3-04425F	GROUNDWATER	3.5500	3.5500	0.0000	C		12/31/1972	07/15/1963	0207222

MIDDLE SCHOOL WELL	GROUNDWATER	0.6100	0.6100	0.0000	C		12/31/1972	06/20/1915	0209309
MILE HIGH K C W 1-8272	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1972	08/31/1949	0207231
MILLER SPRING W 1-24265F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1978	10/07/1913	0207237
MILLER SPRING W 2-24266F	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1978	10/07/1913	0207238
MILLER WELL 1-11366	GROUNDWATER	2.6600	2.6600	0.0000	C		12/31/1972	04/30/1944	0207240
MILLER WELL 1-1228	GROUNDWATER	1.0000	0.8886	0.1114	C	Domestic	12/31/1972	7/31/1947	0205058
MILLER WELL 1-1228	GROUNDWATER	1.0000	1.0000	0.0000	C	Irrigation	12/31/1972	07/31/1947	0205058
MOFFAT WELL 1	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1972	04/06/1940	0207274
MOFFITT WELL 1-0512	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	05/31/1949	0207278
MOFFITT WELL 2-0513	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	12/31/1949	0207280
MOFFITT WELL 3-0514	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	12/31/1949	0207282
MOFFITT WELL 4-0515	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	12/31/1949	0207283
MOFFITT WELL 5-0516	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1971	12/31/1949	0207284
MONFORT WELL 1	GROUNDWATER	1.5700	1.5700	0.0000	C		12/31/1972	06/01/1970	0207305
MONSON WELL 0468	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1972	07/20/1956	0207340
MONSON WELL 0469	GROUNDWATER	0.6820	0.6820	0.0000	C		12/31/1972	07/22/1956	0207341
MONSON WELL 0470	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1972	06/01/1955	0207342
MONTANDON WELL 2-10430	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	12/31/1954	0207346
MOUNTAIN AG WELL 2	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1971	03/20/1936	0207385
MUNSON WELL 1-15905-R	GROUNDWATER	2.1000	2.1000	0.0000	C		12/31/1971	02/10/1923	0207392
MURPHY WELL 2-10563	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1971	06/21/1950	0207397
NAKAMOTO WELL 1	GROUNDWATER	2.6600	2.6600	0.0000	C		12/31/1972	06/30/1935	0207415
NETZ WELL 1	GROUNDWATER	1.4400	1.4400	0.0000	C		12/31/1972	03/30/1950	0207447
OBRIEN WELL 6264-F	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	10/02/1964	0207515
OCKER WELL 3	GROUNDWATER	0.2560	0.2560	0.0000	C		12/31/1972	12/31/1928	0207521
OETTING WELL 1-15016-R	GROUNDWATER	0.4170	0.4170	0.0000	C	Irrigation	12/31/1972	04/30/1952	0207530
OETTING WELL 1-15016-R	GROUNDWATER	0.4170	0.3056	0.1114	C	Domestic	12/31/1972	4/30/1952	0207530
OFFEN WELL 2	GROUNDWATER	0.3900	0.3900	0.0000	C		12/31/1973	12/31/1945	0207535
PALIZZI WELL 1-24566F	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	06/19/1923	0207558
PALMER WELL 1	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	12/31/1922	0207565
PARKER PIT WELL 1	GROUNDWATER	1.5550	1.5550	0.0000	C		12/31/1972	01/31/1948	0207570
PEDOTTO WELL 10898-F	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1970	03/31/1941	0207586
PEDOTTO WELL 1-1600-R	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1971	02/19/1960	0207585
PEDOTTO WELL 2-1599-R	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1971	02/17/1960	0207587
PELINO WELL 1-6589-F	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1972	11/08/1964	0205066
PENROD WELL 1	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	10/27/1954	0207592
PEREZ WELL 1	GROUNDWATER	0.1550	0.1550	0.0000	C		12/31/1972	11/05/1949	0207601
PLATTE R LAND W 2-10806	GROUNDWATER	2.1900	2.1900	0.0000	C		12/31/1972	06/30/1953	0207630

PLATTE R LAND W 3-10393	GROUNDWATER	2.0700	2.0700	0.0000	C		12/31/1972	06/30/1954	0207631
POPE WELL 2-20638	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	11/08/1954	0207641
POWERS WELL 1-17875-R	GROUNDWATER	1.6200	1.6200	0.0000	C		12/31/1971	06/19/1936	0207647
POWERS WELL 2-13104-R	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1971	08/31/1950	0207648
PRINCETON WELL 1-14004	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	12/31/1934	0207653
PRIOLA WELL	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1977	04/01/1939	0207654
PRIOLA WELL 1-10915-R	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	12/31/1955	0207656
PRIOLA WELL 2-10916-R	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1972	12/31/1956	0207659
PRIOLA-GILMORE W 10873	GROUNDWATER	0.8800	0.8800	0.0000	C		12/31/1972	03/31/1940	0207661
PUBLIC SER WELL 2-1072-R	GROUNDWATER	0.2670	0.2670	0.0000	C		12/31/1972	05/11/1955	0207665
PUBLIC SER WELL 3-1073-R	GROUNDWATER	0.1920	0.1920	0.0000	C		12/31/1972	09/10/1955	0207666
PUBLIC SERVICE 1-18904-R	GROUNDWATER	3.3800	3.3800	0.0000	C		12/31/1972	06/01/1945	0207671
PUBLIC SERVICE 13-2585-F	GROUNDWATER	3.2200	3.2200	0.0000	C		12/31/1972	05/31/1957	0207675
PUBLIC SERVICE 14-11610-R	GROUNDWATER	2.1600	2.1600	0.0000	C		12/31/1972	07/31/1955	0207676
PUBLIC SERVICE 15-11609-R	GROUNDWATER	2.0200	2.0200	0.0000	C		12/31/1972	04/30/1952	0207677
PUBLIC SERVICE 16-2583-F	GROUNDWATER	4.3800	4.3800	0.0000	C		12/31/1972	04/30/1955	0207678
PUBLIC SERVICE 17-1999-R	GROUNDWATER	1.4600	1.4600	0.0000	C		12/31/1972	12/31/1918	0207679
PUBLIC SERVICE 2-18904-S	GROUNDWATER	2.5700	2.5700	0.0000	C		12/31/1972	04/30/1947	0207682
PUBLIC SERVICE 32-6723-R	GROUNDWATER	0.1780	0.1780	0.0000	C		12/31/1972	12/31/1937	0207696
PUBLIC SERVICE 5-18904-W	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	07/31/1947	0207700
PUBLIC SERVICE 6-18904-X	GROUNDWATER	1.4600	1.4600	0.0000	C		12/31/1972	06/30/1946	0207701
PUBLIC SERVICE 7-20480-R	GROUNDWATER	1.8500	1.8500	0.0000	C		12/31/1972	07/31/1955	0207702
PURSE WELL 1-10887-F	GROUNDWATER	0.1900	0.1900	0.0000	C		12/31/1972	03/01/1966	0207705
REASONER WELL 1-R-13643	GROUNDWATER	0.8600	0.8600	0.0000	C		12/31/1971	07/15/1952	0207731
REED WELL 14269	GROUNDWATER	2.8000	2.8000	0.0000	C		12/31/1972	08/03/1948	0207740
ROCK WELL 3-11654-R-R	GROUNDWATER	0.7700	0.7700	0.0000	C		12/31/1972	04/06/1955	0208574
ROLLA WELL NO 1-10871R	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1982	04/30/1957	0207820
ROLLA WELL NO 3-10874R	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1982	04/30/1946	0207822
ROLLA WELL NO 4-10876R	GROUNDWATER	0.6100	0.6100	0.0000	C		12/31/1982	04/01/1976	0207823
ROSA WELL	GROUNDWATER	0.3100	0.3100	0.0000	C		12/31/1972	09/04/1964	0207833
ROSENBROCK WELL 1-11655	GROUNDWATER	1.0500	1.0500	0.0000	C		12/31/1972	06/01/1937	0207835
ROSENBROCK WELL 2-11656	GROUNDWATER	3.0200	3.0200	0.0000	C		12/31/1972	07/18/1955	0207836
ROYER WELL 13050	GROUNDWATER	1.7000	1.7000	0.0000	C		12/31/1971	05/02/1950	0207841
RULE WELL 5-0319	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	04/26/1955	0207849
SAKATA WELL 12-6819-R	GROUNDWATER	2.8200	2.8200	0.0000	C		12/31/1972	07/30/1943	0207913
SAKATA WELL 16-11749-R-R	GROUNDWATER	1.0600	1.0600	0.0000	C		12/31/1972	05/03/1955	0207917
SAKATA WELL 17-11748-R	GROUNDWATER	1.0300	1.0300	0.0000	C		12/31/1972	05/02/1955	0207918
SAKATA WELL 18-11750-R	GROUNDWATER	0.9300	0.9300	0.0000	C		12/31/1972	05/01/1955	0207919

SALAMANCA WELL 4-12564	GROUNDWATER	0.8800	0.8800	0.0000	C		12/31/1971	05/31/1947	0207936
SALAMANCA WELL 5-12565	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1971	05/31/1946	0207937
SAURINI WELL 36009	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	12/01/1968	0207965
SAVOIE WELL 1	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1972	07/31/1969	0207966
SCHMIDT W 2-6882-F	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	05/06/1965	0207987
SCHMIDT W 3-10969-F	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	06/18/1966	0207988
SCHUYLER WELL 1-13116	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1971	06/30/1954	0208022
SECURITY REALTY WELL 1	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1972	01/01/1955	0208047
SHANE WELL 1	GROUNDWATER	0.8660	0.7546	0.1114	C	Domestic	12/31/1972	09/20/1940	0208078
SHANE WELL 1	GROUNDWATER	0.8660	0.8660	0.0000	C	Irrigation	12/31/1972	09/20/1940	0208078
SHEARER WELL 1-18283F	GROUNDWATER	0.3500	0.3500	0.0000	C		12/31/1972	01/30/1962	0208091
SHERFFIUS WELL 2-13733-R	GROUNDWATER	0.6127	0.6127	0.0000	C		12/31/1972	12/31/1950	0208092
SHERFFIUS WELL NO 1	GROUNDWATER	0.8912	0.8912	0.0000	C		12/31/1972	12/31/1950	0208093
SMITH W 2-0291	GROUNDWATER	1.5000	1.5000	0.0000	C		12/31/1972	04/20/1956	0208118
SMITH WELL 1-4821-F	GROUNDWATER	0.4440	0.4440	0.0000	C		12/31/1970	11/04/1963	0208122
SMITH WELL 2-013447-F	GROUNDWATER	0.5780	0.5780	0.0000	C		12/31/1970	12/24/1968	0208124
SPENCER WELL 6647-F	GROUNDWATER	2.6000	2.6000	0.0000	C		12/31/1972	04/01/1965	0208153
SPIKENER W 6584-F	GROUNDWATER	1.4400	1.4400	0.0000	C		12/31/1972	12/31/1964	0208154
STARR WELL 1	GROUNDWATER	0.3780	0.3780	0.0000	C		12/31/1972	06/30/1934	0208168
STITES WELL 2	GROUNDWATER	0.9560	0.9560	0.0000	C		12/31/1972	06/10/1945	0208211
STOCKYARD WELL NO 3	GROUNDWATER	0.9400	0.9400	0.0000	C		12/31/1978	12/31/1931	0208214
STRONG WELL 10-19711F	GROUNDWATER	1.9900	1.9900	0.0000	C		12/31/1972	07/31/1954	0208235
STRONG WELL 13-19713F	GROUNDWATER	1.9900	1.9900	0.0000	C		12/31/1972	12/20/1968	0208238
STRONG WELL 3-28583	GROUNDWATER	1.5800	1.5800	0.0000	C		12/31/1972	09/30/1966	0208240
TALARICO WELL 13720	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	04/10/1954	0208281
TALL INC WELL 1-1366	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1972	09/21/1934	0208283
TANABE WELL 1-7325	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1970	12/31/1953	0208285
TANABE WELL 2-7326	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1970	12/31/1934	0208287
TANABE WELL 3-7327	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1970	05/31/1955	0208289
TANABE WELL 4-13723	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1970	05/31/1934	0208290
TANI WELL 1-14169-R	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	02/28/1951	0208291
TANI WELL 2-14170-R-R	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	06/30/1955	0208293
TANI WELL R-1924	GROUNDWATER	2.2500	2.2500	0.0000	C		12/31/1972	08/01/1924	0208294
TASHIRO WELL 2-1929	GROUNDWATER	0.5200	0.5200	0.0000	C		12/31/1972	12/31/1949	0208302
TASHIRO WELL 3-1923-R	GROUNDWATER	1.3400	1.3400	0.0000	C		12/31/1972	12/31/1944	0208303
TETI WELL 1-12694F	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	09/30/1956	0208317
TETI WELL 1-5957-F	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1971	09/16/1929	0208318
THIMMING WELL 3-20483F	GROUNDWATER	0.2770	0.2770	0.0000	C		12/31/1972	08/01/1954	0208325

THORNTON WELL 1-5849	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1971	07/31/1948	0208340
THORNTON WELL 2-5850	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	05/31/1951	0208341
THORNTON WELL S-11-4233F	GROUNDWATER	1.4000	1.4000	0.0000	C		12/31/1972	05/13/1963	0208346
THORNTON WELL S-12-4132F	GROUNDWATER	1.3600	1.3600	0.0000	C		12/31/1972	05/08/1963	0208347
THORNTON WELL S-13-4248F	GROUNDWATER	1.4700	1.4700	0.0000	C		12/31/1972	05/29/1963	0208348
THORNTON WELL S-14-4247F	GROUNDWATER	1.1700	1.1700	0.0000	C		12/31/1972	05/29/1963	0208349
THORNTON WELL S-15-5706F	GROUNDWATER	1.0600	1.0600	0.0000	C		12/31/1972	06/01/1964	0208350
THORNTON WELL S-16-6712F	GROUNDWATER	0.9100	0.9100	0.0000	C		12/31/1972	01/20/1965	0208351
THORNTON WELL S18-10696F	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1972	03/10/1966	0208358
THORNTON WELL S19-10695F	GROUNDWATER	1.1300	1.1300	0.0000	C		12/31/1972	03/03/1966	0208359
THORNTON WELL S20-10694F	GROUNDWATER	1.3100	1.3100	0.0000	C		12/31/1972	03/03/1966	0208360
THORNTON WELL S21-20552W	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	11/22/1954	0208361
THORNTON WELL S-2-20552T	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	11/25/1954	0208352
THORNTON WELL S-5-20552X	GROUNDWATER	0.7300	0.7300	0.0000	C		12/31/1972	11/20/1954	0208354
THORNTON WELL S-6-19838R	GROUNDWATER	1.3200	1.3200	0.0000	C		12/31/1972	07/16/1953	0208355
THORNTON WELL S-9-3989F	GROUNDWATER	0.5600	0.5600	0.0000	C		12/31/1972	03/19/1963	0208357
TOWER WELL 2-9215-F	GROUNDWATER	0.2219	0.2219	0.0000	C		12/31/1972	02/22/1972	0205081
TOWN/COUNTRY MUT 2-2226F	GROUNDWATER	0.5880	0.5880	0.0000	C		12/31/1972	07/20/1959	0208375
TOWN/COUNTRY MUT 22915F	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	05/27/1949	0208376
TRAPP WELL 6587	GROUNDWATER	1.1820	1.1820	0.0000	C		12/31/1970	05/01/1950	0208384
TRIPLE G WELL 4-6292	GROUNDWATER	1.6200	1.6200	0.0000	C		12/31/1972	12/31/1926	0208393
TROIANO WELL 016297-F	GROUNDWATER	0.2600	0.2600	0.0000	C		12/31/1972	04/20/1955	0208395
TROSTEL WELL 1	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	12/31/1957	0208397
TRUJILLO WELL 1-26935F	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1973	05/24/1965	0205082
UNITED PACK WELL 2	GROUNDWATER	0.7770	0.7770	0.0000	C		12/31/1972	06/30/1956	0208440
UNITED PACK WELL 3-2201F	GROUNDWATER	0.7760	0.7760	0.0000	C		12/31/1972	06/23/1959	0208441
VALENCIA WELL 1-19540F	GROUNDWATER	0.7700	0.7700	0.0000	C		12/31/1972	09/21/1932	0208444
VALENCIA WELL 3-25734	GROUNDWATER	0.7700	0.7700	0.0000	C		12/31/1972	11/01/1965	0208446
VINCENT WELL 1-20845	GROUNDWATER	2.0500	2.0500	0.0000	C		12/31/1972	12/31/1946	0208454
VYNCKIER WELL 1-3572F	GROUNDWATER	1.9430	1.9430	0.0000	C		12/31/1971	07/27/1957	0208469
WEAVER WELL 16091-R	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1971	07/26/1944	0208511
WEBB WELL 1	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	07/26/1952	0208514
WEBHAN CORP W 1-19043F	GROUNDWATER	0.2910	0.2910	0.0000	C		12/31/1972	05/23/1945	0208523
WEBHAN CORP W 2-19044F	GROUNDWATER	0.5250	0.5250	0.0000	C		12/31/1972	10/22/1962	0208524
WEBSTER WELL 1-P13696	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1973	05/15/1958	0208525
WEBSTER WELL 2-P13697	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1973	09/30/1961	0208526
WETHINGTON WELL 1-1113-R	GROUNDWATER	1.4400	1.4400	0.0000	C		12/31/1970	06/30/1901	0208561
WISSLER WELL 1	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	07/23/1955	0208594

WURTZ WELL 1-11771	GROUNDWATER	3.5500	3.5500	0.0000	C		12/31/1972	04/01/1955	0208624
YAMASHITA WELL 3	GROUNDWATER	0.2300	0.2300	0.0000	C	Irrigation	12/31/1972	05/31/1948	0208633
YAMASHITA WELL 3	GROUNDWATER	0.2300	0.1186	0.1114	C	Domestic	12/31/1972	05/31/1948	0208633
YAMASHITA WELL 3	GROUNDWATER	0.2300	0.2300	0.0000	C	Commercial	12/31/1972	05/31/1948	0208633
YAMASHITA WELL NO 1	GROUNDWATER	0.5700	0.5700	0.0000	C		12/31/1972	04/30/1938	0208634
YAMASHITA WELL NO 5	GROUNDWATER	0.5700	0.5700	0.0000	C		12/31/1972	05/15/1935	0208636
YOUNTS WELL 1	GROUNDWATER	0.4300	0.4300	0.0000	C		12/31/1972	12/31/1957	0208643

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 3									
1ST NAT BANK W 1-10957R	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	01/31/1957	0306879
ALPERT DITCH	PARK CREEK	5.0000	5.0000	0.0000	C		04/22/1922	12/27/1908	0301085
BAIAMONTE WELL 1-13202	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	06/22/1935	0305643
BARNES WELL 1-12117	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	04/30/1952	0306531
BARNES WELL 2-12118	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	04/30/1952	0306530
BARNES WELL 3-12119	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	04/30/1952	0306532
BARNES WELL 4-12120	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	04/30/1952	0306529
BARNES WELL 5	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1972	04/15/1955	0306708
BLEVINS WELL 14448	GROUNDWATER	0.6100	0.6100	0.0000	C		12/31/1972	03/01/1957	0306884
BRUNNER MIDDLE WELL	GROUNDWATER	0.4000	0.4000	0.0000	C		12/31/1978	06/02/1946	0306156
BRUNNER NORTH WELL	GROUNDWATER	0.4000	0.4000	0.0000	C		12/31/1978	06/02/1946	0306154
BRUNNER SOUTH WELL	GROUNDWATER	0.4000	0.4000	0.0000	C		12/31/1978	06/02/1946	0306155
BURNS WELL 1-1650	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	10/31/1956	0306868
BURNS WELL 1648	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	10/31/1956	0306867
BUSTEED WELL 10-15887	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	02/24/1951	0306463
COLLINS WELL NO 1	GROUNDWATER	1.1700	1.1700	0.0000	C		12/31/1972	09/02/1940	0305971
CRAPPS WELL 1	GROUNDWATER	1.7600	1.7600	0.0000	C		12/31/1972	05/15/1936	0305696
CRIM WELL 1	GROUNDWATER	0.1200	0.1200	0.0000	C	Irrigation	12/31/1972	12/31/1948	0306318
CRIM WELL 1	GROUNDWATER	0.1200	0.0086	0.1114	C	Stock	12/31/1972	12/31/1948	0306318
CRIM WELL 1	GROUNDWATER	0.1200	0.0086	0.1114	C	Domestic	12/31/1972	12/31/1948	0306318
D D BEAN COMPANY WELL 1	GROUNDWATER	0.1467	0.1467	0.0000	C		12/31/1972	12/31/1924	0305343
DIEHL WELL 1	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	12/31/1940	0305369
DOERINGSFELD/ELLIOTT W 1	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1973	11/09/1938	0305836
DOERINGSFELD/ELLIOTT W 1	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1973	12/31/1939	0305836
DOW WELL 013346F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1977	02/28/1969	0307354
EICHHEIM BATTERY WELL 1A-14355	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1970	05/31/1954	0305287
EICHHEIM BATTERY WELL 2-14356	GROUNDWATER	0.2750	0.2750	0.0000	C		12/31/1970	12/31/1918	0305288
EICHHEIM BATTERY WELL 3A-14357	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1970	05/31/1938	0305292

EICHHEIM BATTERY WELL 4-14358	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1970	12/31/1918	0305298
EICHHEIM BATTERY WELL 5A-14359	GROUNDWATER	1.4200	1.4200	0.0000	C		12/31/1970	11/30/1954	0305300
EICHHEIM BATTERY WELL 6A-14360	GROUNDWATER	1.0600	1.0600	0.0000	C		12/31/1970	12/31/1956	0305301
EICHHEIM BATTERY WELL 7A-14361	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1970	12/31/1914	0305304
FLATIRON PAV SUMP L-13	GROUNDWATER	9.2600	9.2600	0.0000	C		12/31/1972	01/01/1968	0307333
FLATIRON PAV W 19-14515	GROUNDWATER	0.2930	0.2930	0.0000	C		12/31/1972	05/31/1923	0305329
FLATIRON PAV W 20-14514	GROUNDWATER	0.3440	0.3440	0.0000	C		12/31/1972	05/31/1923	0305330
FLATIRON PAV WELL 21	GROUNDWATER	0.9900	0.9900	0.0000	C		12/31/1972	04/06/1962	0307052
FLATIRON PAV WELL 22	GROUNDWATER	0.6770	0.6770	0.0000	C		12/31/1972	04/06/1962	0307053
FULTS WELL 1	GROUNDWATER	0.2550	0.2550	0.0000	C		12/31/1972	07/01/1920	0305290
GLENDENNING WELL 13978	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	12/31/1921	0305311
GOFF WELL 1-16150	GROUNDWATER	1.0400	1.0400	0.0000	C		12/31/1972	12/31/1938	0305845
GREELEY ICE WELL 1-9687-F-R	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1972	12/31/1920	0305297
GREELEY WELL 4-4506	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	06/30/1955	0306755
GREELEY WELL 5-4507	GROUNDWATER	1.2000	1.2000	0.0000	C		12/31/1972	10/31/1941	0306024
GREELEY WELL 7-7109	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	11/12/1948	0306304
HAWKINS WELL 2-12686-F	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1971	05/31/1950	0306406
HICKMAN WELL 2-6398	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1971	12/31/1943	0306072
HINZE WELL NO 1-0295	GROUNDWATER	0.6150	0.6150	0.0000	C		12/31/1972	07/01/1916	0305224
HYDE CROUT WELL 1-R14707	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	05/30/1937	0305741
HYDE CROUT WELL 2-R14708	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	05/30/1932	0305476
JOHNSON DITCH	PARK CREEK	7.5000	7.5000	0.0000	C		04/22/1922	02/01/1910	0301096
JOHNSON SUMP 1	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	08/31/1946	0306176
KLUVER PUMP SYS 8	COOPER SLOUGH	2.2300	2.2300	0.0000	C		09/10/1953	02/21/1932	0301099
KODAK WELL 1-R-8767	GROUNDWATER	0.9150	0.9150	0.0000	C		12/31/1972	07/30/1957	0306910
KOHLER WELL 11328	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1971	12/31/1938	0305839
LAKE FARMS WELL 11144-F	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	07/01/1966	0307281
LINDERSCHMIDT W 1-13519R	GROUNDWATER	0.6000	0.6000	0.0000	C		12/31/1977	12/31/1957	0306922
LOEFFLER WELL 14380	GROUNDWATER	0.2670	0.2670	0.0000	C		12/31/1977	06/01/1948	0306268
MARTINEZ WELL NO 9675-F	GROUNDWATER	0.2400	0.2400	0.0000	C		12/31/1985	06/22/1965	0305331
MCFERREN WELL 1-44378	GROUNDWATER	0.0888	0.0888	0.0000	C	Irrigation	12/31/1972	3/10/1971	0307415
MCFERREN WELL 3-37321	GROUNDWATER	0.1110	0.1110	0.0000	C	Irrigation	12/31/1972	04/08/1969	0307357
MILLER WELL 1	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	12/31/1945	0306131
MILLER WELL 1-13884	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	12/31/1930	0305451
MILLER WELL 2	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	12/31/1945	0306134
MONFORT WELL 3	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	10/20/1940	0305979
MONFORT WELL RD-203	GROUNDWATER	1.2100	1.2100	0.0000	C		12/31/1972	06/30/1940	0305940
MURPHY WELL 1	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	05/10/1927	0305377

NOAH WELL 14913	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1973	06/21/1940	0305934
PANKEY WELL 1-12280-R	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1971	07/26/1946	0306172
PARROTT WELL 013394-R	GROUNDWATER	0.8110	0.8110	0.0000	C		12/31/1972	06/01/1945	0306116
PETERSON WELL 1-19380-1	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	08/15/1949	0306355
PETERSON WELL 2-19380-2	GROUNDWATER	1.5000	1.5000	0.0000	C		12/31/1972	08/01/1950	0306423
POUDRE HOSPITAL W 23689F	GROUNDWATER	0.5570	0.5570	0.0000	C		12/31/1978	03/31/1978	0307562
PROSPECT LAND SUMP L-9	GROUNDWATER	3.0200	3.0200	0.0000	C		12/31/1972	12/31/1964	0307793
PUTNAM WELL 1-13952	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	04/30/1958	0306930
REVIS WELL 2	GROUNDWATER	0.0670	0.0670	0.0000	C		12/31/1972	08/01/1965	0307232
RIVER PARK CO INC WELL 1	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	05/01/1929	0305403
ROMAN WELL 1-016241-F	GROUNDWATER	1.0000	1.0000	0.0000	C	Irrigation	12/31/1972	12/31/1910	0305198
ROMAN WELL 1-016241-F	GROUNDWATER	1.0000	0.8886	0.1114	C	Stock	12/31/1972	12/31/1910	0305198
ROMAN WELL 2-016242-F	GROUNDWATER	0.7500	0.7500	0.0000	C		12/31/1972	12/31/1952	0306561
ROMAN WELL 3-016240	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	12/31/1950	0306454
ROSS WELL NO 1	GROUNDWATER	0.4000	0.4000	0.0000	C		12/31/1972	07/31/1934	0305554
RUYLE WELL 1-14463	GROUNDWATER	0.8880	0.8880	0.0000	C		12/31/1972	07/15/1954	0306647
RUYLE WELL 2-14464	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	05/05/1935	0305632
RUYLE WELL 3-14465	GROUNDWATER	0.8880	0.8880	0.0000	C		12/31/1972	04/23/1946	0306146
S F AGENCY W R-19282-02	GROUNDWATER	1.2200	1.2200	0.0000	C		12/31/1972	05/24/1937	0305529
SANDY SUMP 867R	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	07/15/1955	0306764
SCHNEIDER WELL 1	GROUNDWATER	0.3330	0.3330	0.0000	C		12/31/1972	08/05/1946	0306174
SCHNEIDER WELL 10293F	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1971	09/23/1965	0307236
SECOR WELL 1-1026	GROUNDWATER	0.6440	0.6440	0.0000	C		12/31/1971	11/13/1949	0306364
SEILBACK WELL 1-14369	GROUNDWATER	0.5600	0.5600	0.0000	C		12/31/1971	09/10/1955	0306784
SEILBACK WELL 2-14371	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1971	10/31/1956	0306869
SHARP WELL 1-10638	GROUNDWATER	0.3330	0.2216	0.1114	C		12/31/1971	05/31/1931	0305456
SHARP WELL 1-10638	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1971	02/28/1956	0305456
SIMONDS WELL 1	GROUNDWATER	0.2140	0.2140	0.0000	C		12/31/1972	07/19/1963	0307121
SMITH WELL 1	GROUNDWATER	1.2100	1.2100	0.0000	C		12/31/1972	05/15/1961	0307022
SMITH WELL 1-R-10611	GROUNDWATER	2.6100	2.6100	0.0000	C		12/31/1972	05/30/1945	0306110
SMITH WELL 3-R-01028	GROUNDWATER	1.9900	1.9900	0.0000	C		12/31/1972	04/30/1957	0306896
STROMBERGER WELL 1	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	12/31/1951	0306523
SUBER WELL 1-26649	GROUNDWATER	0.1700	0.1700	0.0000	C	Irrigation	12/31/1972	05/01/1966	0307270
SUBER WELL 1-26649	GROUNDWATER	0.1700	0.0586	0.1114	C	Domestic	12/31/1972	5/1/1966	0307270
TAYLOR WELL 1	GROUNDWATER	0.6600	0.6600	0.0000	C		12/31/1970	11/15/1962	0307079
TREIBER WELL 1	GROUNDWATER	1.7500	1.7500	0.0000	C		12/31/1972	06/20/1935	0305640
ULRICH SEC 1 DRAIN WELL	GROUNDWATER	1.2000	1.2000	0.0000	C		12/31/1971	12/07/1941	0305683
UNITED MINERALS W 13882R	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1973	12/31/1940	0305988

UNITED MINERALS WELL 1	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1973	12/31/1945	0306132
VIGOR WELL 3-23508-F	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	04/30/1971	0307418
VINEY WELL 11088	GROUNDWATER	0.1220	0.1220	0.0000	C		12/31/1972	06/15/1957	0306904
WATTS WELL 1-10606	GROUNDWATER	0.4400	0.3286	0.1114	C		12/31/1971	06/01/1915	0305217
WEILAND WELL 1-11663-F	GROUNDWATER	1.2000	1.2000	0.0000	C		12/31/1972	04/17/1967	0307309
WELD CO HOSP WELL 2-4449	GROUNDWATER	1.2900	1.2900	0.0000	C		12/31/1972	09/12/1955	0306785
WELD COUNTY WELL 1	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	03/20/1925	0305355
WELD COUNTY WELL 4	GROUNDWATER	0.1200	0.1200	0.0000	C		12/31/1972	03/30/1948	0306252
WELD COUNTY WELL 5	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	08/07/1953	0306583
WELD SCHOOL RE-4 6-28538	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	12/31/1965	0307246
WEST WELL 2	GROUNDWATER	0.2300	0.2300	0.0000	C		12/31/1972	05/01/1951	0306484
WILLIAMS DITCH 2	BLACK HOLLOW	4.2500	4.2500	0.0000	C		12/18/1945	06/19/1928	0301150
WILSON WELL 1	GROUNDWATER	0.1200	0.0086	0.1114	C		12/31/1972	05/31/1951	0306492
WINDER BUTLER WELL 5	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	12/31/1932	0305502
WINDY HILL IRR SYS	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1972	12/31/1938	0305394
WYKERT WELL 2-15875	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	08/31/1937	0305771

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 4									
ADMIRE WELL 1	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	04/15/1964	0405032
ANSTETT WELL 1	GROUNDWATER	0.4100	0.4100	0.0000	C		12/31/1972	06/01/1956	0405040
BACON WELL 1	GROUNDWATER	0.2500	0.2500	0.0000	C	Irrigation	12/31/1972	01/01/1951	0405047
BACON WELL 1	GROUNDWATER	0.2500	0.1386	0.1114	C	Domestic	12/31/1972	1/1/1951	0405047
BRUMFIELD WELL 1-15122	GROUNDWATER	0.1733	0.1733	0.0000	C		12/31/1972	04/30/1956	0405113
BRYANT SEEPAGE DITCH	SEEPAGE	1.0000	1.0000	0.0000	C		12/31/1978	03/31/1903	0400812
BRYANT SEEPAGE DITCH EXT	SEEPAGE	1.0000	1.0000	0.0000	C		12/31/1982	09/01/1979	0400811
CHAMBERLIN WELL 1-5676-F	GROUNDWATER	0.7110	0.7110	0.0000	C		12/31/1972	10/28/1964	0405573
CHILSON WELL 1	GROUNDWATER	0.1400	0.1400	0.0000	C		12/31/1972	08/03/1951	0405128
GLEN HAVEN WELL 1	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	01/01/1965	0405213
GRAVEL PIT SUMP	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1971	05/31/1957	0405593
GREAT WESTERN W 11-10145	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1972	09/30/1953	0405196
GREAT WESTERN W 12-10146	GROUNDWATER	0.7000	0.7000	0.0000	C		12/31/1972	11/15/1953	0405197
GREAT WESTERN W 13-10147	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1972	04/22/1956	0405198
GREAT WESTERN W 14-10148	GROUNDWATER	0.4000	0.4000	0.0000	C		12/31/1972	04/30/1956	0405199
GREAT WESTERN W 15-10837	GROUNDWATER	0.3000	0.3000	0.0000	C		12/31/1972	08/31/1953	0405200
GREAT WESTERN W 16-10838	GROUNDWATER	0.4000	0.4000	0.0000	C		12/31/1972	09/24/1953	0405201
GREAT WESTERN W 17-2465F	GROUNDWATER	0.6000	0.6000	0.0000	C		12/31/1972	07/31/1957	0405203
GROSVENOR WELL 3	GROUNDWATER	0.2940	0.2940	0.0000	C		12/31/1972	05/30/1961	0405222

HART WELL 1627	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1971	05/31/1941	0405230
HERNLUND WELL 17004	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1973	05/05/1940	0405241
HILL-HUGHS WELL 7357	GROUNDWATER	1.0500	1.0500	0.0000	C		12/31/1972	05/04/1958	0405244
HINRICHSEN WELL 1	GROUNDWATER	0.2600	0.2600	0.0000	C		12/31/1972	05/31/1948	0405245
LUCE WELL 2	GROUNDWATER	0.2770	0.2770	0.0000	C		12/31/1972	09/04/1964	0405298
LUCE WELL 3	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	08/28/1933	0405299
LUCE WELL 5	GROUNDWATER	0.4400	0.4400	0.0000	C	Irrigation	12/31/1972	08/17/1951	0405301
LUCE WELL 5	GROUNDWATER	0.4400	0.3286	0.1114	C	Domestic	12/31/1972	8/17/1951	0405301
MAITLAND WELL 1	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	12/31/1916	0405337
MCCAULEY WELL 1	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	05/15/1957	0405355
MCCAULEY WELL 2	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	05/15/1957	0405356
PROSPECT LAND SUMP L-11	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1972	12/31/1964	0405434
ROCKY MTN WELL 1-R-13669	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	12/31/1920	0405446
ROCKY MTN WELL 2-8885	GROUNDWATER	1.3400	1.3400	0.0000	C		12/31/1972	03/31/1959	0405447
ROSSUM SUMP 1	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	04/15/1949	0400875
SELBY WELL 1-06654	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1970	07/06/1950	0405465
SELBY WELL 2-06655	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1971	06/30/1955	0405466
SIMPSON WELL 1-26768	GROUNDWATER	0.1400	0.1400	0.0000	C		12/31/1972	06/02/1966	0405473
SMALL WELL 1-11018	GROUNDWATER	0.3520	0.3520	0.0000	C		12/31/1971	06/30/1948	0405475
STROH WELL 1-0452	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/01/1936	0405505
THOMPSON WELL 12179	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	06/25/1925	0405520

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 5									
ANDERSON SUMP	GROUNDWATER	1.5000	1.5000	0.0000	C		12/31/1978	12/31/1946	0500664
ASMUSSEN WELL 1-14762	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1972	04/29/1948	0505020
BARRETT WELL 1	GROUNDWATER	2.2280	2.2280	0.0000	C		12/31/1972	01/01/1925	0505552
BORGMANN WELL 1	GROUNDWATER	0.1800	0.0686	0.1114	C		12/31/1972	3/1/1923	0505038
BORGMANN WELL 15128	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1970	07/07/1953	0505037
BORGMANN WELL 6393	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1969	08/12/1937	0505039
COORS WELL LF-14-14150	GROUNDWATER	0.4500	0.4500	0.0000	C		12/31/1972	06/01/1940	0505077
CTC CO WELL 1-6058-F	GROUNDWATER	1.4800	1.4800	0.0000	C		12/31/1972	08/31/1964	0505093
CTC CO WELL 2-6331-F	GROUNDWATER	1.4500	1.4500	0.0000	C		12/31/1972	10/28/1964	0505094
FRANK WELL 417	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1971	05/31/1937	0505551
HEFFINGTON WELL 1	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	05/31/1926	0505133
IMPERIAL WELL 1-20712F	GROUNDWATER	0.6680	0.6680	0.0000	C		12/31/1971	05/31/1926	0505154
IMPERIAL WELL 2-20713F	GROUNDWATER	0.3900	0.3900	0.0000	C		12/31/1971	12/31/1938	0505155
IMPERIAL WELL 3-20714F	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1971	11/04/1960	0505156

JOHNSON WELL 1	GROUNDWATER	2.0800	2.0800	0.0000	C		12/31/1972	05/31/1961	0505002
JOHNSON WELL 1-015129-F	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1970	07/25/1954	0505160
JORDAN WELL 1-6060-F	GROUNDWATER	0.5790	0.5790	0.0000	C		12/31/1972	09/30/1964	0505165
KELLER WELL 1	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	12/31/1949	0505171
KELLER WELL 3	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	12/31/1937	0505173
LANSON WELL CP 10058	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1970	06/21/1965	0505208
LOPER WELL 1-6059-F	GROUNDWATER	1.0030	1.0030	0.0000	C		12/31/1972	08/31/1964	0505235
MAYEDA WELL 1-13094	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	12/31/1935	0505256
MAYEDA WELL 2	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	12/31/1945	0505257
MAYEDA WELL 3	GROUNDWATER	1.8000	1.8000	0.0000	C		12/31/1972	12/31/1954	0505258
MIDWEST WELL & PUMP NO 1	GROUNDWATER	3.1200	3.1200	0.0000	C		02/25/1971	04/30/1925	0505268
MURPHY WELL 1	GROUNDWATER	0.2630	0.2630	0.0000	C		12/31/1972	06/01/1928	0505286
NISHIDA WELL 16383	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	07/31/1954	0505292
OSWALD WELL 1-12392	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	06/27/1956	0505556
RIEDER WELL 20426	GROUNDWATER	3.0000	3.0000	0.0000	C		12/31/1972	06/27/1955	0505321
RUOTE WELL 04098-F	GROUNDWATER	2.1000	2.1000	0.0000	C		12/31/1972	05/15/1963	0505327
SPARKS WELL 1	GROUNDWATER	0.1560	0.1560	0.0000	C		12/31/1972	04/15/1965	0505347
ST VRAIN SCH W 3-15495-F	GROUNDWATER	0.1120	0.1120	0.0000	C		12/31/1972	03/31/1971	0505415
ST VRAIN SCH W 4-15497-F	GROUNDWATER	0.1120	0.1120	0.0000	C		12/31/1972	03/31/1971	0505416
ST VRAIN SCH W 5-15496-F	GROUNDWATER	0.1120	0.1120	0.0000	C		12/31/1972	03/31/1971	0505350

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 6									
ANDRUS WELL 2-19789	GROUNDWATER	1.6700	1.6700	0.0000	C		12/31/1971	04/15/1952	0605020
BAILEY WELL 2-7054	GROUNDWATER	0.0735	0.0735	0.0000	C	Irrigation	12/31/1971	10/13/1960	0605046
BAR H LAZY S SUMP 1	GROUNDWATER	1.2000	1.2000	0.0000	C		12/31/1972	12/31/1953	0600814
BASD MARY ANNE W 16058R	GROUNDWATER	0.1800	0.1800	0.0000	C		12/31/1980	6/15/1956	0605063
BEAUPREZ WELL 12285	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1970	12/31/1941	0605196
BELL WELL 1-13248	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	12/31/1925	0605075
BELL WELL 2-13249	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1972	12/31/1925	0605077
BISHOP WELL 10422	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	07/17/1944	0605093
BLAIR WELL 1-016108-F	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1972	03/31/1952	0605094
BOULDER VALLEY W 1-5670F	GROUNDWATER	1.5550	1.5550	0.0000	C		12/31/1972	09/01/1964	0605103
BOULDER VALLEY W 2-4053F	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	07/01/1963	0605104
BOULDER VALLEY W 3-9084F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/06/1965	0605105
BOULDER VALLEY W 4-9083F	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	06/06/1965	0605106
BOULDER VALLEY W 5	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	11/01/1971	0605107
CLARK WELL 2-53469	GROUNDWATER	0.1290	0.1290	0.0000	C		12/31/1972	05/31/1968	0605170

COLEMAN WELL 1	GROUNDWATER	0.3000	0.2666	0.0334	C		12/31/1972	06/27/1932	0605186
COLEMAN WELL 1	GROUNDWATER	0.3000	0.2666	0.0334	C		12/31/1972	07/14/1949	0605187
COLEMAN WELL 3	GROUNDWATER	0.3000	0.2666	0.0334	C		12/31/1972	12/31/1962	0605189
COURT SQUARE WELL 11157	GROUNDWATER	0.6200	0.6200	0.0000	C		12/31/1972	02/28/1917	0605214
CRAFT WELL 1	GROUNDWATER	0.1270	0.1270	0.0000	C		12/31/1972	12/31/1943	0605215
CRAFT WELL 2	GROUNDWATER	0.1330	0.1330	0.0000	C	Irrigation	12/31/1972	12/31/1960	0605216
CRAFT WELL 2	GROUNDWATER	0.1330	0.0216	0.1114	C	Domestic	12/31/1972	12/31/1960	0605216
DEBACKER SUMP	GROUNDWATER	0.5000	0.3886	0.1114	C	Stock	12/31/1972	08/14/1931	0605240
DEBACKER SUMP	GROUNDWATER	0.5000	0.3886	0.1114	C	Domestic	12/31/1972	08/14/1931	0605240
DEBACKER SUMP	GROUNDWATER	0.5000	0.5000	0.0000	C	Irrigation	12/31/1972	08/14/1931	0605240
ERIE WELL 2-20499	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	05/15/1964	0605287
GABRIELLA WELL 1	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1971	12/31/1943	0605334
HAAN WELL 2-30267	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	04/10/1967	0605378
HEADRICK WELL 1-47351	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1974	09/05/1968	0606035
HEADRICK WELL 2-47352	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1974	09/22/1929	0605394
HEATON WELL 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	09/01/1960	0605396
JAMIESON WELL 1	GROUNDWATER	0.2696	0.2696	0.0000	C		12/31/1975	06/01/1960	0605443
JOECKEL WELL 2-14671	GROUNDWATER	0.6680	0.6680	0.0000	C		12/31/1972	12/31/1954	0605450
KENT WELL 2	GROUNDWATER	0.1156	0.1156	0.0000	C		12/31/1972	03/28/1969	0605482
KNEALE WELL 1	GROUNDWATER	0.2370	0.2370	0.0000	C		12/31/1972	12/31/1912	0605495
KNEALE WELL 2	GROUNDWATER	0.2370	0.2370	0.0000	C		12/31/1972	07/15/1954	0605496
KOENIG WELL 9149-F	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	06/01/1965	0605512
LAFAYETTE WELL 10935-F	GROUNDWATER	0.1550	0.1550	0.0000	C		12/31/1971	05/23/1966	0605536
LEWIS WELL 2-15187	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	05/13/1963	0605555
LEWIS WELL 7114	GROUNDWATER	1.3368	1.3368	0.0000	C		12/31/1970	06/01/1955	0605556
LOUSBERG WELL 13637	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	06/30/1950	0605570
MAYHOFFER WELL 2-12557	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1970	12/30/1970	0605604
MCBROOM WELL 1	GROUNDWATER	0.1300	0.1300	0.0000	C		12/31/1972	12/31/1948	0605612
MORGAN WELL 1	GROUNDWATER	0.1330	0.0216	0.1114	C		12/31/1972	06/15/1959	0605643
MORGAN WELL 30384	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1972	04/10/1967	0605645
NELSON SUMP 1-15958R	GROUNDWATER	3.0000	3.0000	0.0000	C		12/31/1971	07/31/1959	0605661
ORCHARD WELL 6061F	GROUNDWATER	0.1400	0.1400	0.0000	C		12/31/1971	08/31/1964	0605682
PEATE WELL 03153F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	05/15/1961	0605716
REICHERT WELL 11675F	GROUNDWATER	1.3333	1.3333	0.0000	C		12/31/1970	05/28/1969	0605743
REMINGTON WELL 1-013128F	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	09/03/1968	0605746
SAWHILL PUMP 2	GROUNDWATER	0.3345	0.3345	0.0000	C		07/17/1961	08/06/1954	0600733
SAWHILL PUMP 3	GROUNDWATER	0.3345	0.3345	0.0000	C		07/17/1961	08/06/1954	0600769
SAWHILL PUMP 4	GROUNDWATER	0.3345	0.3345	0.0000	C		07/17/1961	08/06/1954	0600770

SHORT & MILNE SUMP L-6	GROUNDWATER	1.0300	1.0300	0.0000	C		12/31/1972	09/30/1954	0605801
SHORT&MILNE W L-14-2749F	GROUNDWATER	1.0200	1.0200	0.0000	C		12/31/1972	07/31/1970	0605807
SPARKS WELL	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	06/10/1945	0605842
ST VRAIN SCH W 1-24248	GROUNDWATER	0.1120	0.1120	0.0000	C		12/31/1972	05/11/1956	0605845
ST VRAIN SCH W 2-30670	GROUNDWATER	0.1460	0.1460	0.0000	C		12/31/1972	05/01/1967	0605846
STEELE/VARRA WELL 2	GROUNDWATER	0.1330	0.0996	0.0334	C		12/31/1972	05/02/1969	0605853
STELTER WELL 2	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1971	02/15/1954	0605856
STRACK WELL 1-017141-F	GROUNDWATER	0.2300	0.2300	0.0000	C		12/31/1973	07/31/1972	0605865
TEDESCO WELL 1	GROUNDWATER	0.3200	0.2086	0.1114	C	Domestic	12/31/1972	12/31/1940	0605894
TEDESCO WELL 1	GROUNDWATER	0.3200	0.2086	0.1114	C	Stock	12/31/1972	12/31/1940	0605894
TEDESCO WELL 1	GROUNDWATER	0.3200	0.3200	0.0000	C	Irrigation	12/31/1972	12/31/1940	0605894
TELLEEN WELL	GROUNDWATER	1.1140	1.1140	0.0000	C		12/31/1970	10/28/1968	0605365
URBAN WASTE WELL 9045F	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	03/27/1965	0605926
WAGONER WD WELL 10-3916F	GROUNDWATER	0.2600	0.2600	0.0000	C	Municipal	12/31/1972	02/06/1963	0605953
WAGONER WD WELL 10-3916F	GROUNDWATER	0.2600	0.1486	0.1114	C	Domestic	12/31/1972	2/6/1963	0605953
WAGONER WD WELL 5-14660	GROUNDWATER	0.1230	0.1230	0.0000	C		12/31/1971	08/31/1956	0605958
WALKER WELL 1-6500F	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1971	12/31/1934	0605962
WANEKA WELL 3-21786F	GROUNDWATER	0.1334	0.0220	0.1114	C		12/31/1972	06/01/1948	0605971
WILLIAM G BEST WELL	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1980	06/30/1919	0605996
WISE WELL 1	GROUNDWATER	0.2500	0.1386	0.1114	C	Domestic	12/31/1972	12/31/1920	0606002
WISE WELL 1	GROUNDWATER	0.2500	0.2500	0.0000	C	Irrigation	12/31/1972	12/31/1920	0606002
WISE WELL 2	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	12/31/1922	0606004

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 7									
BLACKMAN DITCH	SOUTH CLEAR CREEK	100.0000	100.0000	0.0000	C		10/09/1914	07/20/1865	0700521
CLEAR CR INVESTMENT W 1	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	06/01/1936	0705156
CRAMER WELL 1	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	03/15/1917	0705228
CRAMER WELL 2-14934	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1972	08/15/1960	0705227
DAVIS WELL 1	GROUNDWATER	0.7800	0.7800	0.0000	C	Irrigation	12/31/1972	04/30/1939	0705233
DAVIS WELL 1	GROUNDWATER	0.7800	0.6686	0.1114	C	Domestic	12/31/1972	4/30/1939	0705233
DINIGO PL 1	SPRING	0.4000	0.4000	0.0000	C		12/31/1975	08/19/1936	0701132
DINIGO PL 2	SPRING	0.2000	0.2000	0.0000	C		12/31/1975	08/19/1936	0701131
DINIGO PL 3	SPRING	0.0500	0.0500	0.0000	C		12/31/1975	08/19/1936	0701133
ECKHARDT WELL 1-RN516	GROUNDWATER	0.1500	0.1500	0.0000	C	Irrigation	12/31/1971	6/3/1955	0705271
ECKHARDT WELL 1-RN516	GROUNDWATER	0.1500	0.1166	0.0334	C	Domestic	12/31/1971	06/03/1955	0705271
ELLIOTT WELL 9525F	GROUNDWATER	0.4902	0.4902	0.0000	C		12/31/1971	05/11/1965	0705273

FORBES WELL 1-44111	GROUNDWATER	0.3000	0.3000	0.0000	C	Irrigation	12/31/1971	12/31/1955	0705298
FORBES WELL 1-44111	GROUNDWATER	0.3000	0.1886	0.1114	C	Domestic	12/31/1971	12/31/1955	0705298
GREENFIELD WELL 1-6300-F	GROUNDWATER	0.8900	0.8700	0.0200	C		12/31/1972	11/30/1964	0705319
HELBIG WELL 1	GROUNDWATER	2.7000	2.7000	0.0000	C		12/31/1972	04/01/1958	0705330
KING WELL 1	GROUNDWATER	0.1900	0.1900	0.0000	C		12/31/1972	07/31/1925	0705385
KING WELL 3	GROUNDWATER	0.2060	0.2060	0.0000	C		12/31/1972	04/30/1930	0705387
LANE WELL 1-20474	GROUNDWATER	0.0666	0.0666	0.0000	C	Irrigation	12/31/1972	6/29/1964	0705406
LARSON WELL NO 16198	GROUNDWATER	0.8890	0.8890	0.0000	C		12/31/1972	06/01/1935	0705407
POMPONIO WELL 1-6797	GROUNDWATER	0.2780	0.2780	0.0000	C		12/31/1972	06/30/1933	0705515
PUBLIC SERVICE W 1-29406	GROUNDWATER	0.1510	0.1510	0.0000	C		12/31/1972	06/11/1967	0705520
ROCKY MOUNTAIN DITCH	CLEAR CREEK	37.0000	37.0000	0.0000	C		10/04/1884	05/01/1873	0700652
RODY-SPANO WELL 1	GROUNDWATER	0.1270	0.1270	0.0000	C		12/31/1972	06/30/1936	0705560
SACCOMANO WELL 3-24811F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	05/31/1947	0705574
SCHEIBEL WELL 1-6585F	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1971	12/21/1964	0705054
SLOAN AND COOPER LAKES	CLEAR CREEK	0.0000	0.0000	0.0000	A		10/04/1884	05/01/1873	0704449
SPANO DOMINIC WELL 2-19710-F	GROUNDWATER	2.5000	2.5000	0.0000	C		12/31/1972	05/05/1951	0706145
SPANO SALVATORE J WELL 1-25882-F-R	GROUNDWATER	0.1560	0.1560	0.0000	C		12/31/1971	08/31/1970	0705679
STRIPPGEN WELL 1	GROUNDWATER	0.1340	0.1340	0.0000	C		12/31/1972	06/01/1965	0705706
SWIFT WELL 3-15471R	GROUNDWATER	0.2680	0.2680	0.0000	C		12/31/1970	12/31/1948	0705715
SWIFT WELL 4-21954F	GROUNDWATER	0.2400	0.2400	0.0000	C		12/31/1970	12/31/1957	0705716
SWIFT WELL 5-21955F	GROUNDWATER	0.2500	0.2500	0.0000	C		12/31/1970	12/31/1952	0705717
WALTERS WELL 1	GROUNDWATER	0.1480	0.0366	0.1114	C		12/31/1972	07/10/1951	0705741
WARDLE WELL 1	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1974	09/01/1954	0705743

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 8									
ABEL WELL 3-6337F	GROUNDWATER	1.5000	1.5000	0.0000	C		05/18/1972	10/29/1964	0808185
ALLSTATE WELL 1-7230	GROUNDWATER	0.2680	0.2680	0.0000	C		12/31/1972	03/22/1968	0805257
ARNALD DITCH	CARPENTER CREEK	1.0000	1.0000	0.0000	C		12/10/1883	12/31/1870	0801176
BASHOR WELL 1	GROUNDWATER	0.1660	0.1660	0.0000	C		12/31/1972	06/01/1951	0805370
BECHTOLD WELL 1-18707R	GROUNDWATER	4.0100	4.0100	0.0000	C		05/18/1972	09/05/1950	0808147
BENNION WELL 1	GROUNDWATER	0.9550	0.9550	0.0000	C		12/31/1972	10/24/1957	0805395
BETTS WELL NO 3-4849F	GROUNDWATER	0.5889	0.5889	0.0000	C		12/31/1972	11/18/1963	0805413
BETTS WELL NO 3A	GROUNDWATER	0.2222	0.2222	0.0000	C		12/31/1972	11/18/1963	0805414
BETTS WELL NO 3C-4849F	GROUNDWATER	0.4889	0.4889	0.0000	C		12/31/1972	11/18/1963	0805415
BETTS WELL NO 9-6633F	GROUNDWATER	1.5555	1.5555	0.0000	C		12/31/1972	10/31/1965	0805422
BOND DITCH PL	SOUTH PLATTE RIVER	1.5000	1.5000	0.0000	C		05/22/1913	05/01/1863	0801003

BOWLES AVE WELL R-11552	GROUNDWATER	2.2200	2.2200	0.0000	C		06/28/1972	06/30/1942	0805462
BUCK WELL 1	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	06/15/1924	0805514
BUCK WELL 1	GROUNDWATER	0.2300	0.2300	0.0000	C		12/31/1972	05/15/1938	0805514
BUCK WELL 4	GROUNDWATER	0.1555	0.1555	0.0000	C		12/31/1972	07/10/1940	0805515
CABIN SPRING PL WELL	GROUNDWATER	0.1939	0.1939	0.0000	C		12/31/1972	12/31/1914	0805561
CANNON ESTATE WELL 1	GROUNDWATER	0.7700	0.7700	0.0000	C		12/31/1972	06/01/1919	0805571
CAREY WELL 1-14902R	GROUNDWATER	1.7100	1.7100	0.0000	C		05/18/1972	07/15/1954	0808155
CAREY WELL 2-14901R	GROUNDWATER	2.3300	2.3300	0.0000	C		05/18/1972	07/15/1954	0808152
CAREY WELL 3-14903R	GROUNDWATER	1.7700	1.7700	0.0000	C		05/18/1972	07/15/1954	0808153
CAREY WELL 4	GROUNDWATER	0.6100	0.6100	0.0000	C		05/18/1972	07/15/1954	0808154
CENTENNIAL WELL 4212-F	GROUNDWATER	3.1100	3.1100	0.0000	C		12/31/1972	07/01/1963	0805611
CENTENNIAL WELL R-11557	GROUNDWATER	1.9400	1.9400	0.0000	C		12/31/1972	02/01/1955	0805616
CENTENNIAL WELL R-11558	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	02/01/1955	0805612
CENTENNIAL WELL R-11559	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	02/01/1955	0805613
CENTENNIAL WELL R-11560	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	02/01/1955	0805614
CENTENNIAL WELL R-15877	GROUNDWATER	3.3300	3.3300	0.0000	C		06/28/1972	09/10/1934	0805615
CENTRAL CONST W 2-14590	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	04/30/1955	0805620
CENTRAL CONST W 3-20020	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	04/30/1950	0805621
CENTRAL CONST WELL 4	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	04/30/1955	0805622
CENTRAL POWER W 10-10948	GROUNDWATER	0.6000	0.6000	0.0000	C		05/18/1972	07/14/1955	0805624
CHANDLER SUMP	GROUNDWATER	1.1000	1.1000	0.0000	C		05/18/1972	07/10/1955	0801707
CHERRY CR MED WELL 2727F	GROUNDWATER	0.5600	0.5600	0.0000	C		12/31/1976	08/31/1960	0805640
CHERRY CR MED WELL 2727F	GROUNDWATER	0.2000	0.2000	0.0000	C		12/31/1981	08/24/1960	0805640
CHERRY CR SHOP WELL 1	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	04/06/1955	0805641
CHERRY CR SHOP WELL 2	GROUNDWATER	0.8670	0.8670	0.0000	C		12/31/1972	04/11/1955	0805642
CHERRY CR SHOP WELL 3	GROUNDWATER	0.3890	0.3890	0.0000	C		12/31/1972	02/25/1957	0805643
CHERRY CR SHOP WELL 4	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	02/21/1957	0805644
CHERRY CR SHOP WELL 5	GROUNDWATER	0.3890	0.3890	0.0000	C		12/31/1972	02/26/1957	0805645
CHERRY CR SHOP WELL 6	GROUNDWATER	0.3560	0.3560	0.0000	C		12/31/1972	02/22/1957	0805646
CHERRY CR W D R13533	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	02/16/1955	0805649
CHERRY HILLS CC 1-12231	GROUNDWATER	0.5600	0.5600	0.0000	C		12/31/1972	10/30/1954	0805651
CHERRY HILLS CC 2-12232	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1972	10/30/1954	0805652
CHERRY HILLS CC 3-12233	GROUNDWATER	0.6200	0.6200	0.0000	C		12/31/1972	12/31/1934	0805653
CHERRY HILLS CC 5-12235	GROUNDWATER	0.6200	0.6200	0.0000	C		12/31/1972	09/30/1955	0805654
CHERRY HILLS CC 6-12236	GROUNDWATER	0.6200	0.6200	0.0000	C		12/31/1972	09/30/1955	0805655
CITY DITCH PL	SOUTH PLATTE RIVER	13.0000	13.0000	0.0000	C		12/10/1883	11/01/1873	0801008
CITY DITCH PL	SOUTH PLATTE RIVER	42.9500	42.9500	0.0000	C		12/10/1883	03/07/1882	0801008
COLEMAN DITCH	JARRE CREEK	3.9500	3.9500	0.0000	C		05/23/1904	10/30/1895	0801260

COLO GFP W 3-4569F	GROUNDWATER	1.5500	1.5500	0.0000	C		12/31/1972	5/15/1963	0815162
COLO GFP W 4	GROUNDWATER	0.6100	0.6100	0.0000	C		12/31/1972	12/31/1951	0805696
COLO GFP W 5-4567F	GROUNDWATER	1.6600	1.6600	0.0000	C		12/31/1972	04/01/1963	0805697
COLO GFP W 6	GROUNDWATER	0.8880	0.8880	0.0000	C		12/31/1972	12/31/1951	0805698
COLO GFP W 7	GROUNDWATER	0.6660	0.6660	0.0000	C		12/31/1972	12/31/1951	0805699
COOLEY WELL 2188F	GROUNDWATER	2.3400	2.3400	0.0000	C		12/31/1972	07/27/1959	0805715
COOLEY WELL 2189F	GROUNDWATER	2.2700	2.2700	0.0000	C		12/31/1972	08/03/1959	0805712
COOLEY WELL 2190F	GROUNDWATER	2.2800	2.2800	0.0000	C		12/31/1972	08/09/1959	0805713
COOLEY WELL 9097F	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1972	05/01/1965	0805714
CREST FENCE WELL 1-2654F	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1973	07/17/1960	0805739
DAD CLARK DITCH 3	DAD CLARK GULCH	4.0000	4.0000	0.0000	C		06/09/1924	07/31/1886	0801296
DAHLBERG WELL 1-19457F	GROUNDWATER	0.6670	0.6670	0.0000	C		12/31/1972	06/01/1953	0805159
DARDANO WELL 1	GROUNDWATER	1.3888	1.3888	0.0000	C		12/31/1972	06/01/1935	0805781
DARDANO WELL 2-23378F	GROUNDWATER	0.5555	0.5555	0.0000	C		12/31/1972	06/01/1935	0805782
DUNN WELL 1	GROUNDWATER	0.1250	0.1250	0.0000	C		12/31/1972	04/01/1970	0805927
ELISA LINHART DITCH 3	LEE GULCH	2.0000	2.0000	0.0000	C		06/09/1924	09/28/1886	0801306
ELLIOTT WELL 6728	GROUNDWATER	1.0100	1.0100	0.0000	C		12/31/1971	12/31/1945	0805032
ENGLEWOOD WELL 10-13075F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	05/15/1953	0806003
ENGLEWOOD WELL 13-P20071	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1972	02/24/1955	0806006
ENGLEWOOD WELL 14-P20310	GROUNDWATER	2.5000	2.5000	0.0000	C		12/31/1972	07/07/1955	0806007
ENGLEWOOD WELL 15-P20071	GROUNDWATER	2.7000	2.7000	0.0000	C		12/31/1972	02/24/1955	0806008
ENGLEWOOD WELL 16-P578	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	09/04/1959	0806009
ENGLEWOOD WELL 18-P05588	GROUNDWATER	4.0000	4.0000	0.0000	C		12/31/1972	06/08/1964	0806011
ENTERPRISE DITCH 1	PLUM CREEK	10.1200	10.1200	0.0000	C		12/10/1883	04/15/1880	0801153
EVERGREEN DITCH 1	CARPENTER CREEK	0.7500	0.7500	0.0000	C		06/09/1924	12/30/1919	0801175
EVERITT WELL	GROUNDWATER	1.8400	1.8400	0.0000	C		05/18/1972	10/28/1950	0805042
FARNELL LANE W R-11553	GROUNDWATER	2.2200	2.2200	0.0000	C		06/28/1972	11/21/1950	0806096
FARNELL LANE W R-11554	GROUNDWATER	2.0000	2.0000	0.0000	C		06/28/1972	03/08/1951	0806094
FARNELL LANE W R-11555	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1972	04/12/1952	0806095
FITZGERALD WELL 1-46164	GROUNDWATER	0.2200	0.1086	0.1114	C	Stock	12/31/1971	12/31/1939	0806132
FITZGERALD WELL 1-46164	GROUNDWATER	0.2200	0.2200	0.0000	C	Irrigation	12/31/1971	12/31/1939	0806132
FITZGERALD WELL 1-46164	GROUNDWATER	0.2200	0.1086	0.1114	C	Domestic	12/31/1971	12/31/1939	0806132
FLAKE WELL 1-6361	GROUNDWATER	0.0666	0.0666	0.0000	C	Irrigation	12/31/1972	6/23/1960	0806134
FLAKE WELL 2	GROUNDWATER	0.1440	0.1440	0.0000	C		12/31/1972	06/20/1950	0805114
FRIESEN WELL 20068-R	GROUNDWATER	0.5100	0.5100	0.0000	C		12/31/1978	07/31/1954	0806161
FRIESEN WELL 20068-S	GROUNDWATER	0.8200	0.8200	0.0000	C		12/31/1978	12/31/1908	0808166
GARRAMONE WELL 6136	GROUNDWATER	0.8890	0.8890	0.0000	C		12/31/1972	02/16/1953	0805146
GARRAMONE WELL 6138	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	02/16/1953	0805147

GATES WELL 1-03356-F	GROUNDWATER	1.3320	1.3320	0.0000	C		12/31/1972	10/14/1961	0806191
GATES WELL 2-03038-F	GROUNDWATER	1.7220	1.7220	0.0000	C		12/31/1972	03/14/1961	0806192
GATES WELL 2425	GROUNDWATER	0.1270	0.1270	0.0000	C		12/31/1972	12/08/1958	0806190
GATES WELL 3-03357-F	GROUNDWATER	2.0000	2.0000	0.0000	C		12/31/1972	11/10/1961	0806193
GATES WELL 4-2830-F	GROUNDWATER	0.5310	0.5310	0.0000	C		12/31/1972	12/12/1961	0806194
GATES WELL 5-20223F	GROUNDWATER	0.6400	0.6400	0.0000	C		12/31/1972	02/06/1957	0806195
GATES WELL 6-20224F	GROUNDWATER	0.8900	0.8900	0.0000	C		12/31/1972	10/05/1962	0806196
GRAVES WELL 2-15535	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	06/30/1925	0808517
GREGG DITCH	CHERRY CREEK	14.0000	14.0000	0.0000	C		03/03/1890	03/31/1885	0801378
GREGG WELL 6888R	GROUNDWATER	2.0000	2.0000	0.0000	C		05/18/1972	09/15/1956	0805058
HAMILTON SUMP NO 3148-F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1982	03/12/1962	0801675
HAWKEY DITCH	CHERRY CREEK	3.0000	3.0000	0.0000	C		03/03/1890	08/25/1884	0801389
HEINEMAN SUMP 6170	GROUNDWATER	0.6000	0.6000	0.0000	C		05/18/1972	05/06/1955	0805025
HILDEBRAND WELL	GROUNDWATER	1.1100	1.1100	0.0000	C		05/18/1972	12/31/1918	0805012
HILL WELL 3-R12434	GROUNDWATER	0.5500	0.5500	0.0000	C		06/09/1924	06/01/1923	0806413
HILL WELL 3-R12434	GROUNDWATER	0.5500	0.5500	0.0000	C		12/31/1972	05/02/1952	0806413
HOLLBERG PUMP SYSTEM 1	GROUNDWATER	1.0000	1.0000	0.0000	C		05/18/1972	10/31/1940	0800552
HOLM WELL 1	GROUNDWATER	0.1330	0.0216	0.1114	C	Stock	12/31/1972	5/1/1937	0809749
HOLM WELL 1	GROUNDWATER	0.1330	0.1330	0.0000	C	Irrigation	12/31/1972	05/01/1937	0809749
HOLM WELL 1	GROUNDWATER	0.1330	0.0216	0.1114	C	Domestic	12/31/1972	5/1/1937	0809749
JENSEN DITCH	SELLARS GULCH	2.4000	2.4000	0.0000	C		02/28/1926	01/01/1906	0801202
JORGENSEN WELL 1	GROUNDWATER	0.1600	0.1600	0.0000	C		12/31/1970	04/24/1956	0805068
KIMBALL WELL 14-14419	GROUNDWATER	1.6670	1.6670	0.0000	C		12/31/1972	11/15/1956	0806558
KIMBALL WELL 15-14420	GROUNDWATER	1.1110	1.1110	0.0000	C		12/31/1972	03/01/1957	0806559
KIME SUMP	GROUNDWATER	2.2300	2.2300	0.0000	C		05/18/1972	10/22/1955	0806630
KIME WELL 3	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	10/01/1954	0806631
KOUNTZ DITCH	EAST PLUM CREEK	0.7500	0.7500	0.0000	C		12/10/1883	09/01/1873	0801181
LEE GULCH DITCH	LEE GULCH	3.0000	3.0000	0.0000	C		06/09/1924	07/01/1886	0801305
LEE GULCH DITCH	LEE GULCH	2.0000	2.0000	0.0000	C		06/09/1924	09/28/1886	0801305
LEETSDALE GREENHOUSE W 1	GROUNDWATER	0.6127	0.6127	0.0000	C		12/31/1972	06/20/1915	0805209
LININGER WELL 1-19990-1	GROUNDWATER	1.3000	1.3000	0.0000	C		12/31/1972	11/09/1954	0806737
LININGER WELL 2-19990-2	GROUNDWATER	1.6000	1.6000	0.0000	C		12/31/1972	11/20/1954	0805162
LOUP-MILLER WELL 1-13724	GROUNDWATER	0.5560	0.5560	0.0000	C		12/31/1972	12/31/1946	0806775
MARCOR HOUSING INC 11120	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	01/24/1967	0806841
MCKINSTER WELL 1	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	06/24/1955	0805180
MCLAIN WELL 1-19989R	GROUNDWATER	0.8000	0.8000	0.0000	C		05/18/1972	12/31/1935	0806886
MCLAIN WELL 3-20706R	GROUNDWATER	5.5000	5.5000	0.0000	C		05/18/1972	03/28/1956	0806889
MILL CREEK DITCH	MILL CREEK	1.5000	1.5000	0.0000	C		06/09/1924	06/01/1884	0801142

MOBILE PREMIX 1-3851F	GROUNDWATER	0.3900	0.3900	0.0000	C		12/31/1972	12/05/1962	0806991
MOBILE PREMIX 2-3851-F	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	12/05/1962	0806996
MOBILE PREMIX WELL 1	GROUNDWATER	0.5300	0.5300	0.0000	C		12/31/1972	12/31/1951	0805120
MORGAN DITCH	MILL CREEK	1.2000	1.2000	0.0000	C		06/09/1924	01/01/1872	0801141
MORGAN DITCH	MILL CREEK	1.2000	1.2000	0.0000	C		06/09/1924	03/17/1898	0801141
MULLER WELL 4	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	01/11/1955	0808194
MURMUR DITCH	CHERRY CREEK	1.7500	1.7500	0.0000	C		12/10/1883	12/30/1878	0801387
MYRICK IRRIGATION EXCAVATED SUMP	GROUNDWATER	2.4200	2.4200	0.0000	C		05/18/1972	09/21/1951	0805011
OHIO WELL G NO R13537	GROUNDWATER	2.5600	2.5600	0.0000	C		12/31/1972	04/18/1955	0807130
OHIO WELL H NO R13536	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1972	04/14/1955	0807131
PARK FLORAL CO WELL 1-13789-R	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1977	04/04/1954	0807159
PARR WELL 1-12922-F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1971	12/31/1956	0807225
PARR WELL 1-29931F	GROUNDWATER	0.6700	0.6700	0.0000	C		12/31/1972	03/15/1956	0807224
PORTOFINO WELL 15256	GROUNDWATER	0.1670	0.1670	0.0000	C		12/31/1974	05/31/1954	0805210
PUBLIC SER W-4AR-7396-F	GROUNDWATER	2.2200	2.2200	0.0000	C		05/18/1972	08/13/1953	0807308
PUBLIC SERVICE 1 ZU 6216	GROUNDWATER	0.6700	0.6700	0.0000	C		05/18/1972	12/31/1948	0807312
PUBLIC SERVICE 4-W-7391R	GROUNDWATER	1.2500	1.2500	0.0000	C		05/18/1972	08/28/1953	0807317
PUBLIC SERVICE WELL 2 ZU	GROUNDWATER	0.4500	0.4500	0.0000	C		05/18/1972	12/31/1941	0807314
PUBLIC SERVICE WELL 4 ZU	GROUNDWATER	0.4500	0.4500	0.0000	C		05/18/1972	12/31/1941	0807316
PUBLIC SERVICE WELL 6214	GROUNDWATER	0.4120	0.4120	0.0000	C		05/18/1972	12/31/1935	0807318
REA WELL & PUMP SYSTEM	GROUNDWATER	0.7000	0.7000	0.0000	C		05/18/1972	12/14/1956	0807341
REA WELL 1	GROUNDWATER	0.1500	0.1500	0.0000	C		05/18/1972	09/03/1955	0805028
RICHARD H CLARK WELL	GROUNDWATER	2.5300	2.5300	0.0000	C		05/18/1972	12/31/1909	0808199
RICHARD H CLARK WELL & RES	GROUNDWATER	2.5300	2.5300	0.0000	C		05/18/1972	12/31/1909	0803669
ROBINSON DITCH	GOVE AKA E BR PLUM	0.1000	0.1000	0.0000	C		03/03/1890	01/01/1883	0801222
ROBINSON WELL 1	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	06/13/1955	0807400
RODINE WELL 2-10925-R	GROUNDWATER	0.4450	0.4450	0.0000	C		05/18/1972	04/30/1957	0805052
SABELL WELL 1	GROUNDWATER	0.2440	0.2440	0.0000	C		12/31/1972	06/21/1925	0807443
SABELL WELL 2	GROUNDWATER	0.1670	0.1670	0.0000	C		12/31/1972	06/21/1925	0807444
SHORE DITCH	CHERRY CREEK	5.0000	5.0000	0.0000	C		12/10/1883	06/30/1879	0801377
SINCLAIRE WELL 3-P4712F	GROUNDWATER	1.5580	1.5580	0.0000	C		12/31/1972	07/01/1963	0805084
SPRING DITCH	JARRE CREEK	1.5000	1.5000	0.0000	C		05/23/1904	04/30/1897	0801265
STOPA WELL 6829-F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	02/11/1965	0805188
SWEDISH GH WELL 1	GROUNDWATER	0.2780	0.2780	0.0000	C		12/31/1972	05/06/1935	0807765
SWEDISH HOSPITAL W 1-15856-R	GROUNDWATER	0.5560	0.5560	0.0000	C		12/31/1972	05/06/1935	0807766
THIRTY THREE DITCH	PLUM CREEK	3.4400	3.4400	0.0000	C		12/10/1883	06/30/1878	0801159
THORNTON WELL D-77	GROUNDWATER	0.1330	0.0216	0.1114	C		12/31/1972	07/18/1957	0807836
TOLAN WELL 1	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1972	02/15/1956	0805113

TOMAC WELL 2-5170-F	GROUNDWATER	1.0000	1.0000	0.0000	C		12/31/1971	10/14/1963	0805161
TUCK WELL 1-9059F	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1971	11/08/1965	0807868
TUCK WELL 19682-F	GROUNDWATER	0.6660	0.6660	0.0000	C	Irrigation	12/31/1971	12/31/1950	0807872
TUCK WELL 19682-F	GROUNDWATER	0.6660	0.6326	0.0334	C	Domestic	12/31/1971	12/31/1950	0807872
TUCK WELL 19682-F	GROUNDWATER	0.6660	0.6326	0.0334	C	Stock	12/31/1971	12/31/1950	0807872
TUCK WELL 19682-F	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1981	03/31/1977	0807872
TUCK WELL 2	GROUNDWATER	2.2000	2.2000	0.0000	C		12/31/1971	12/31/1943	0807869
VALVERDE W E R-13534	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	04/10/1955	0807894
VALVERDE W F R-13535	GROUNDWATER	1.2100	1.2100	0.0000	C		12/31/1972	04/11/1955	0807895
VERDOS-MARTIN W P13622F	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	05/28/1956	0807906
WEAVER WELL 3	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	10/16/1958	0807951
WEEKS WELL 1-3425-F	GROUNDWATER	2.4400	2.4400	0.0000	C		12/31/1971	05/20/1956	0807960
WEEKS WELL 2-3426-F	GROUNDWATER	1.3300	1.3300	0.0000	C		12/31/1971	03/26/1962	0807961
WHISENHUNT SUMP 2-P 6311	GROUNDWATER	1.0000	1.0000	0.0000	C		05/18/1972	10/31/1964	0808014
WILLIAMSON IND W 14427F	GROUNDWATER	4.0000	4.0000	0.0000	C		12/31/1970	05/02/1905	0808179
WILLIS BRYANT DITCH	PLUM CREEK	5.0000	5.0000	0.0000	C		12/10/1883	06/30/1867	0801150

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 9									
CARVER WELL 1-4452	GROUNDWATER	0.2560	0.2560	0.0000	C		12/31/1972	12/31/1950	0905719
LAGROW-JONES WELL 1	GROUNDWATER	0.4400	0.3286	0.1114	C	Stock	12/31/1971	9/26/1955	0905345
LAGROW-JONES WELL 1	GROUNDWATER	0.4400	0.3286	0.1114	C	Domestic	12/31/1971	9/26/1955	0905345
LAGROW-JONES WELL 1	GROUNDWATER	0.4400	0.4400	0.0000	C	Irrigation	12/31/1971	09/26/1955	0905345
LAGROW JONES WELL 2	GROUNDWATER	0.4400	0.4400	0.0000	C		12/31/1971	05/31/1946	0905348
METZ WELL 3	GROUNDWATER	0.2160	0.1046	0.1114	C	Stock	12/31/1972	12/31/1957	0905437
METZ WELL 3	GROUNDWATER	0.2160	0.1046	0.1114	C	Domestic	12/31/1972	12/31/1957	0905437
ROONEY WELL 10408-F	GROUNDWATER	0.1330	0.1330	0.0000	C		12/31/1972	9/8/1965	0905548

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 49									
EMERSON DITCH 3	SO FK REPUBLICAN RIV	45.0000	45.0000	0.0000	C		12/28/1893	4/10/1891	4900508
GREEN MEADOW DITCH 1	SO FK REPUBLICAN RIV	2.0000	2.0000	0.0000	C		9/8/1938	7/27/1902	4900510
GREEN MEADOW DITCH 2	SO FK REPUBLICAN RIV	1.0000	1.0000	0.0000	C		9/8/1938	7/28/1902	4900511
HALE DITCH	SO FK REPUBLICAN RIV	4.5400	4.5400	0.0000	C		9/8/1938	7/15/1904	4900512
MCCRILLIS DITCH 1	LAUNCHMAN CK-LANDS..	6.6000	6.6000	0.0000	C		9/8/1938	1/2/1894	4900521
MCCRILLIS DITCH 2	LAUNCHMAN CK-LANDS..	3.0000	3.0000	0.0000	C		9/8/1938	1/3/1894	4900522
MCCRILLIS RES	LAUNCHMAN CK-LANDS..	36.2630	36.2630	0.0000	A		9/8/1938	11/15/1904	4904477

WINKLER DITCH	SO FK REPUBLICAN RIV	4.5000	4.5000	0.0000	C		9/8/1938	4/18/1894	4900533

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 64									
AMEN WELL 1-6894-F	GROUNDWATER	3.0000	3.0000	0.0000	C		12/31/1972	02/25/1965	6405154
AMEN WELL 2-9094-F	GROUNDWATER	0.4450	0.3336	0.1114	C		12/31/1972	4/2/1965	6405153
ANDERSON WELL 2-11035-F	GROUNDWATER	0.7800	0.7800	0.0000	C		12/31/1971	06/30/1966	6405131
BARTHOLOMEW WELL 1-6811	GROUNDWATER	1.0300	1.0300	0.0000	C		12/31/1972	07/31/1936	6405146
BENKER WELL 1-5758-F	GROUNDWATER	1.7700	1.7700	0.0000	C		12/31/1972	06/16/1964	6405177
EHMKE WELL 6440	GROUNDWATER	0.8700	0.8700	0.0000	C		12/31/1972	09/30/1937	6405449
ELLIFF WELL 1	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	12/31/1945	6405461
ELLIFF WELL 1-15391-F	GROUNDWATER	0.8800	0.8800	0.0000	C		12/31/1971	05/31/1956	6405462
FEHRINGER WELL 1-5877-F	GROUNDWATER	0.5000	0.5000	0.0000	C		12/31/1971	08/15/1964	6405481
FEHRINGER WELL 2-014654	GROUNDWATER	0.8880	0.8880	0.0000	C		12/31/1971	04/25/1970	6405483
FELT WELL 1-2193-F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1971	06/30/1959	6405485
FRANK WELL 1	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	06/06/1969	6405498
FRITZLER WELL 2-14799-R	GROUNDWATER	0.4450	0.4450	0.0000	C		12/31/1971	06/30/1955	6405520
GREAT WESTERN PIPELINE	LODGEPOLE CREEK	10.0000	10.0000	0.0000	C		12/31/1972	10/20/1926	6400817
GUETTER WELL 1	GROUNDWATER	0.1670	0.1670	0.0000	C	Irrigation	12/31/1972	12/31/1923	6405588
GUETTER WELL 1	GROUNDWATER	0.1670	0.0556	0.1114	C	Domestic	12/31/1972	12/31/1923	6405588
HPGA WELL 12	GROUNDWATER	0.7800	0.7800	0.0000	C		06/30/1972	09/30/1944	6405654
HPGA WELL 1-P454	GROUNDWATER	0.2200	0.2200	0.0000	C	Irrigation	06/30/1972	09/04/1957	6405651
HPGA WELL 1-P454	GROUNDWATER	0.2200	0.1532	0.0668	C	Stock	6/30/1972	9/4/1957	6405651
HPGA WELL 2	GROUNDWATER	0.1700	0.0809	0.0891	C	Stock	6/30/1972	7/31/1942	6405663
HPGA WELL 2	GROUNDWATER	0.1700	0.1700	0.0000	C	Irrigation	06/30/1972	07/31/1942	6405663
HPGA WELL 3	GROUNDWATER	0.1800	0.1800	0.0000	C	Domestic	06/30/1972	06/30/1969	6405656
HPGA WELL 3	GROUNDWATER	0.1800	0.1800	0.0000	C	Irrigation	06/30/1972	06/30/1969	6405656
HPGA WELL 3	GROUNDWATER	0.1800	0.0686	0.1114	C	Stock	06/30/1972	06/30/1969	6405656
HPGA WELL 5	GROUNDWATER	0.3300	0.3300	0.0000	C		06/30/1972	08/08/1901	6405658
INOUYE WELL 2-6440-F	GROUNDWATER	0.3300	0.3300	0.0000	C		12/31/1972	11/19/1964	6405674
JANKOVSKY WELL 2-7041	GROUNDWATER	1.7800	1.7800	0.0000	C		12/31/1972	05/01/1947	6405047
JOHNSON WELL 1-03829-F	GROUNDWATER	2.8800	2.8800	0.0000	C		12/31/1972	12/05/1962	6405693
JOHNSON WELL 1-2356-F	GROUNDWATER	1.1000	1.1000	0.0000	C		12/31/1972	12/31/1959	6405695
KAEPERNIK WELL 2	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1971	04/30/1945	6405719
KNUDSON WELL 1	GROUNDWATER	0.7000	0.7000	0.0000	C		12/31/1972	12/31/1939	6405770
KNUDSON WELL 2	GROUNDWATER	0.7000	0.7000	0.0000	C		12/31/1972	12/31/1939	6405771
KNUDSON WELL 3	GROUNDWATER	0.7000	0.7000	0.0000	C		12/31/1972	12/31/1939	6405772
KOESTER WELL 1-R-04589	GROUNDWATER	1.1140	1.1140	0.0000	C		12/31/1972	07/19/1950	6405777

KOKES WELL 1-4732-F	GROUNDWATER	4.4500	4.4500	0.0000	C		12/31/1972	10/01/1963	6405778
LEI WELL 1-8909F	GROUNDWATER	2.2200	2.2200	0.0000	C		12/31/1972	05/08/1958	6405814
LUFT WELL 1	GROUNDWATER	2.6700	2.6700	0.0000	C		12/31/1971	12/31/1941	6405846
MCNAMES WELL 1-20214-F-R	GROUNDWATER	0.5570	0.5570	0.0000	C		12/31/1972	07/30/1940	6405896
MEIER WELL 2-12701	GROUNDWATER	1.8500	1.8500	0.0000	C		12/31/1972	05/22/1947	6405903
MOIST WELL 1-3913-F	GROUNDWATER	0.6670	0.6670	0.0000	C		12/31/1972	02/15/1963	6405933
MOIST WELL 2-RF-498	GROUNDWATER	0.2220	0.2220	0.0000	C		12/31/1972	11/25/1967	6405934
MONAHAN WELL 1-03386-F	GROUNDWATER	0.4100	0.4100	0.0000	C		12/31/1972	01/31/1962	6405937
MUSSEY WELL 1-04453-F	GROUNDWATER	0.5730	0.5730	0.0000	C		12/31/1972	07/20/1963	6405968
NELSON WELL 1-629	GROUNDWATER	2.6600	2.6600	0.0000	C		12/31/1971	03/01/1942	6406504
PEAVY SNADER WELL 1-5845	GROUNDWATER	1.1100	1.1100	0.0000	C		12/31/1972	06/30/1943	6406014
PEAVY SNADER WELL 2	GROUNDWATER	0.4500	0.4500	0.0000	C		12/31/1972	05/31/1940	6406015
PUBLIC SER WELL 1-6473	GROUNDWATER	0.8040	0.8040	0.0000	C		12/31/1972	07/17/1934	6406092
PUBLIC SER WELL 2-6474	GROUNDWATER	0.8040	0.8040	0.0000	C		12/31/1972	10/02/1934	6406093
PUBLIC SER WELL 3-6475	GROUNDWATER	4.0220	4.0220	0.0000	C		12/31/1972	12/31/1937	6406094
PUBLIC SER WELL 4-6476	GROUNDWATER	4.4250	4.4250	0.0000	C		12/31/1972	12/31/1948	6406095
PUBLIC SER WELL 5-6477	GROUNDWATER	0.4230	0.4230	0.0000	C		12/31/1972	12/02/1958	6406096
S C M HOSP WELL 1-P12888	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	10/04/1962	6406174
SCHMIDT WELL 1-6374	GROUNDWATER	1.6100	1.6100	0.0000	C		12/31/1972	12/31/1943	6406202
SMYTH WELL 1-3626-F	GROUNDWATER	4.2200	4.2200	0.0000	C		12/31/1972	06/29/1962	6406262
SONNENBERG WELL 19-2207F	GROUNDWATER	3.5600	3.5600	0.0000	C		12/31/1972	12/31/1908	6406292
SUNSET WELL 2-11884-F	GROUNDWATER	0.5550	0.5550	0.0000	C		12/31/1972	03/22/1957	6406425
TAPPY SPRING SUMP 1	GROUNDWATER	0.2200	0.2200	0.0000	C		12/31/1972	05/03/1963	6406433
YOUNGLUND WELL 10	GROUNDWATER	1.2800	1.2800	0.0000	C	Commercial	12/31/1972	11/30/1913	6406537
YOUNGLUND WELL 10	GROUNDWATER	1.2800	1.1686	0.1114	C	Stock	12/31/1972	11/30/1913	6406537
YOUNGLUND WELL 10	GROUNDWATER	1.2800	1.1686	0.1114	C	Domestic	12/31/1972	11/30/1913	6406537
YOUNGLUND WELL 10	GROUNDWATER	1.2800	1.2800	0.0000	C	Irrigation	12/31/1972	11/30/1913	6406537
YOUNGLUND WELL 11-P26026	GROUNDWATER	1.5600	1.5600	0.0000	C		12/31/1972	12/31/1965	6406536
YOUNGLUND WELL 7 P43261	GROUNDWATER	1.3300	1.2186	0.1114	C	Stock	12/31/1972	11/30/1952	6406566
YOUNGLUND WELL 7 P43261	GROUNDWATER	1.3300	1.3300	0.0000	C	Irrigation	12/31/1972	11/30/1952	6406566
YOUNGLUND WELL 8	GROUNDWATER	0.5600	0.5600	0.0000	C		12/31/1972	11/30/1952	6406567
YOUNGLUND WELL 9	GROUNDWATER	1.1100	1.1100	0.0000	C	Irrigation	12/31/1972	11/30/1952	6406568
YOUNGLUND WELL 9	GROUNDWATER	1.1100	0.9986	0.1114	C	Stock	12/31/1972	11/30/1952	6406568
YOUNGLUND WELL 9	GROUNDWATER	1.1100	1.1100	0.0000	C	Domestic	12/31/1972	11/30/1952	6406568
YOUNGLUND WELL 9	GROUNDWATER	1.1100	1.1100	0.0000	C	Commercial	12/31/1972	11/30/1952	6406568

Structure Name	**Source Stream**	**Decreed Amount**	**Abandoned Amount**	**Remaining Amount**	**U***	**Abandoned Decreed Use**	**Adjudication Date**	**Appropriation Date**	**WDID**
Structures in Water District # 65									

DENBO PUMPING PLANT 1	FRENCHMAN CREEK	2.0000	2.0000	0.0000	C		12/31/1977	12/31/1977	6500557
JONES DITCH	HAYES CREEK	3.5000	3.5000	0.0000	C		12/31/1975	6/18/1956	6500528
KRUEGER PUMPING PLANT 1	FRENCHMAN CREEK	1.0000	1.0000	0.0000	C		12/31/1974	12/31/1966	6500561
SCHWELLER PIT 1	FRENCHMAN CREEK	100.0000	100.00000	0.0000	A		12/31/1981	12/20/1976	6504497
WILLMON PUMPING PLANT 1	FRENCHMAN CREEK	2.0000	2.0000	0.0000	C		12/31/1977	12/31/1977	6500564
WILLMON PUMPING PLANT 2	FRENCHMAN CREEK	4.0000	4.0000	0.0000	C		12/31/1977	12/31/1977	6500565
WILLMON PUMPING PLANT 3	FRENCHMAN CREEK	2.0000	2.0000	0.0000	C		12/31/1977	12/31/1977	6500566
WRAY MILL RACE	NO FK REPUBLICAN RIV	50.0000	50.0000	0.0000	C		7/3/1912	2/1/1892	6500518

Structure Name	Source Stream	Decreed Amount	Abandoned Amount	Remaining Amount	U*	Abandoned Decreed Use	Adjudication Date	Appropriation Date	WDID
Structures in Water District # 80									
GLEN ISLE PL	PAYNE CREEK	0.3100	0.3100	0.0000	C		3/24/1953	12/31/1900	8000768
GLEN ISLE WELL	GROUNDWATER	1.0000	1.0000	0.0000	C		03/24/1953	12/31/1947	8005001

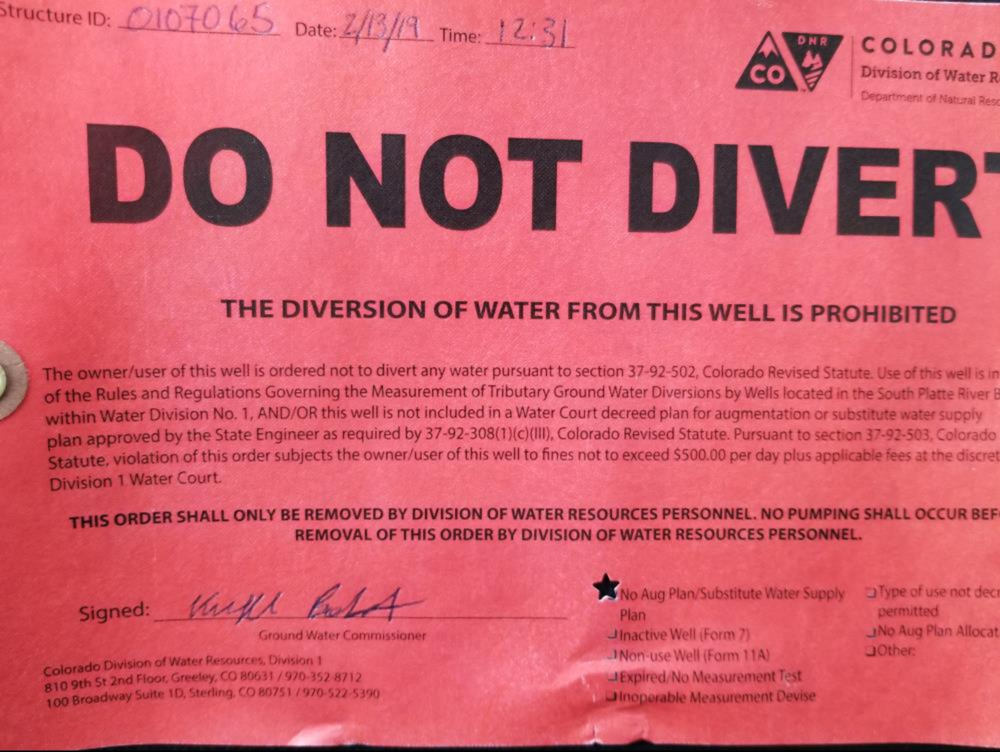
Pursuant to section 37-92-401(10), C.R.S. (2011), clerical mistakes in the decree concerning the Revised 2010 Abandonment List may be corrected by the Water Judge *sua sponte* or upon the petition of any person. Any substantive error in the decree concerning the Revised 2010 Abandonment List may be corrected by the Water Judge upon the petition of any person whose rights are adversely affected by the error and a satisfactory showing that such person did not file a timely protest to the Revised 2010 Abandonment List due to mistake, inadvertence, or excusable neglect. Any petition to correct the decree must be filed with the water clerk within four (4) years of the entry of this decree. *Id.*

So ORDERED this 30th day of January, 2013.

BY THE COURT:

James Hartmann

James F. Hartmann
Water Judge
Water Division 1



Structure ID: 0107065 Date: 2/13/19 Time: 12:31

COLORAD
Division of Water R
Department of Natural Reso

DO NOT DIVER

THE DIVERSION OF WATER FROM THIS WELL IS PROHIBITED

The owner/user of this well is ordered not to divert any water pursuant to section 37-92-502, Colorado Revised Statute. Use of this well is in
of the Rules and Regulations Governing the Measurement of Tributary Ground Water Diversions by Wells located in the South Platte River B
within Water Division No. 1, AND/OR this well is not included in a Water Court decreed plan for augmentation or substitute water supply
plan approved by the State Engineer as required by 37-92-308(1)(c)(III), Colorado Revised Statute. Pursuant to section 37-92-503, Colorado
Statute, violation of this order subjects the owner/user of this well to fines not to exceed $500.00 per day plus applicable fees at the discret
Division 1 Water Court.

**THIS ORDER SHALL ONLY BE REMOVED BY DIVISION OF WATER RESOURCES PERSONNEL. NO PUMPING SHALL OCCUR BEF
REMOVAL OF THIS ORDER BY DIVISION OF WATER RESOURCES PERSONNEL.**

Signed: ______________________
Ground Water Commissioner

Colorado Division of Water Resources, Division 1
810 9th St 2nd Floor, Greeley, CO 80631 / 970-352-8712
100 Broadway Suite 1D, Sterling, CO 80751 / 970-522-5390

- ☑ No Aug Plan/Substitute Water Supply Plan
- ☐ Inactive Well (Form 7)
- ☐ Non-use Well (Form 11A)
- ☐ Expired/No Measurement Test
- ☐ Inoperable Measurement Devise
- ☐ Type of use not decr permitted
- ☐ No Aug Plan Allocat
- ☐ Other:

02/13/2019 12:30 Lat: 40.420618/Long: -104.571348

02/13/2019 12:31   Lat: 40.420618/Long: -104.571348

02/13/2019 12:31 Lat: 40.434175/Long: -104.557698

02/13/2019 12:32 Lat: 40.434175/Long: -104.557698

02/13/2019 12:33 Lat: 40.434175/Long: -104.557698