CLOSEOUT PLAN 24-1

No Aqua Mine Permit No TA005RE:

for:

IMERYS PERLITE USA INC. (IMERYS)
NO AGUA FACILITY
7.5 MILES NORTH OF TRES PIEDRAS
39360 HWY 285, TAOS COUNTY
TRES PIEDRAS, NM 87577
719-376-5484

Prepared by:

MONTROSE ENVIRONMENTAL

1140 Valley Forge Road
Phoenixville, PA 19460
Montrose Project # 052753

October 2, 2025

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Summary

Montrose Environmental Solutions, Inc. (Montrose) is providing the enclosed additional information to resolve issues presented to Imerys Perlite USA, Inc in correspondence dated September 10, 2024 (Appendix A) concerning a Closeout Plan 23-1 Resubmission under Revision 24-1 No Agua Mine, Permit No. TA005RE.

The Closeout Plan targets the mine's 2030 configuration, which will then be updated every five years. The attached information should be considered like a 30% construction design. The information presents provides details that are presented with more elements than considered a 30% construction design. These additional details and elements were developed to strengthen required fill material quantities, stormwater management features, and financial reclamation cost estimates.

The information provided follows an outline presented in the above referenced communication:

- Past and Current Mining
- Hydrology
- Soils
- Revegetation/Test Plot Program
- Erosion Control
- Preliminary Slope Stability Report (Slope Stability Work Plan required at a future date)
- Financial Assurance/Cost Estimate

Past and Current Mining

The No Agua facility is in Taos County approximately 7.5 miles North of Tres Piedras New Mexico

on Hwy 285. Figure 1 presents the general location map of the mine.

The No Agua facility is a perlite mine and milling plant, which has been in operation since the late 1950s

and was acquired by Imerys Corporation in 1993. The mine has three deposits of the volcanic rock within 2 miles of the processing mill. The perlite crushes to a coarse fraction and a fine fraction. Commercial products are made from the perlite after transportation by truck to the Imerys facility at Antonito CO. More commercial products are made from the coarse fraction as compared to the fine fraction, and excess fine fraction material is kept at the mine at a fines dump area. Perlite is used in roofing systems, acoustical tile, low temperature insulation vessels, and other applications. Perlite is also used as an additive in thermal, fireproofing, and sound barrier materials. Appendix B presents more detail information on the mine.

The general location map for this facility presents enough detail to identify the location of the facility. Figure 2 presents the overall drainage areas and all receiving waters from potential stormwater discharges.

The mine is approximately 1,590 acres in size and the processing facility is on a 25-acre parcel. The permitted area for mining disturbance is 590 acres. The mine and processing facility are both owned by Imerys Corporation. The terrain of the mine area is predominantly mountains and receives an average of 2 inches of precipitation per year. The closest surface water body is over 20 miles away.

The mine has no structural storm water conveyance systems, such as storm drains and associated piping.

The water surface flows across the plant area, or is directed via earthen channels and berms to minimize any soil erosion. There are berms situated around the mine area to direct water to three retention areas. The impoundments are man-made berms designed to hold all storm water on the property.

There are no outdoor chemical or explosives storage areas. Oils, lubricants, and other (fuel) materials are stored indoors, under a canopy, or within storage tanks with secondary containment. A subcontractor is used for setting any explosive charges, and none are stored on site.

Mining involves:

- Surface removal of overburden;
- Loosening of the ore;
- Ore loading and unloading;
- Ore transportation to the mill;
- Product transportation off-site;
- Occasional controlled detonation

Ore is delivered to the plant in dump trucks and fed into a grizzly hopper. It is crushed and sized using mechanical equipment and then dried by two oil fired rotary dryers. All milled bulk perlite is stored in silos until it is transferred on tanker trucks 20 miles north to Antonito, CO. Waste consisting primarily of inert aluminum silicate fines is stored on site (Fines Area) and periodically is transferred back to the quarry for disposal.

The active mine area is a cluster of mountains called the No Agua Peaks. There are four peaks and the plant actively mines three areas. Most of the stormwater from the mine area drains into the excavated areas of the mining operations.

Milling and Mining operations are generally 6 consecutive 12- hour shifts Sunday at 11 pm to Wednesday at 11pm. The facility employs approximately 32 people, including production, maintenance, and administration personnel. The hours of operation may change according to company needs, if a modification is made, the plant will update this plan with changes.

Building uses and auxiliary operations include:

- Administrative office;
- Primary crusher;
- Processing plant;
- Maintenance Building; and

- Fuel storage and dispensing platform with secondary containment.

Only the fuel station, mobile shop floor, a second maintenance shop, the main mill floor, and the secondary containment for fuel storage are paved. explosive charges, and none are stored on site.

Mining projections are developed with respect to operational costs per ton and market rates for specific grades of perlite. Mining projections are developed no greater than 12 months into the future, however, multiple mining projections are developed to determine capital expenditures, operational expenses, and equipment delivery schedules. These multiple mining projections also are developed for several scenarios if certain market conditions would be presented. In summary, it is not feasible to provide a mine projection map for five years since the projections could not be used with any reasonable accuracy to predict the mining extent (limits of disturbance).

Hydrology

Appendix C is a Hydrologic Report for the mine and the report also includes a general location map that presents enough detail to identify the location of the facility and all receiving waters from potential stormwater discharges. The terrain of the mine area is predominantly mountains and receives an average of 2 inches of precipitation per year. The closest surface water body is over 20 miles away. The plant has no structural storm water conveyance systems, such as storm drains and associated piping. The water surface flows across the plant area or is directed via earthen channels and berms to minimize any soil erosion. There are berms situated around the mine area to direct water to 3 retention areas. The impoundments are man-made berms designed to hold all storm water on property.

The mine has two groundwater wells that supply make up water for dust control and mineral processing. The wells are located in the northwest portion of the mine near the mineral processing area.

Appendix D is a Stormwater Pollution Prevention Plan that presents details on the size, shape and volumes of stormwater retention structures. Erosion control structures with diversion structures are depicted with locations using topographic maps as base maps.

Figure 3 depicts the drainage areas of the mine. HUC 12 (Hydrologic Unit Code 12- the smallest watershed unit in the US national system) presents the specific drainage areas, which could be referred to as subwatersheds. The US national system is managed by the United States Geological Survey (USGS).

Figure 4 depicts a topographic comparison of 1954 USGS topographic information and 2023 USGS topographic information.

Soils

According to the National Cooperative Soil Survey, the project site is underlain by RRE – Rock outcrop-Raton, very stony complex, 15 to 30 percent slopes. The Raton soil is dark grayish brown, stony silt loam, and located at the higher elevation of the volcanic cones with a thickness ranging 10-20 inches. This soil type has a hydrologic soil group of D. This soil group consists of basalt rock outcrops from volcanic cones. This information is referenced in the Hydrologic Report in Attachment C.

Exposed areas of the mine are graded to provide retention basins that collect stormwater runoff on-site. Exposed areas are primarily heavy rock and therefore significant erosion is not typical. Eroded areas are

material is contained within three catch basins or three natural impounds were suspended particles are allowed to settle out. Rip Rap is used in the mine site to line drainage points as a method of erosion control.

Appendix E provides details for the quantity and quality of cover materials for backfill, with reencountering details. Estimated quantities of cover material are presented.

The Closeout plans for the mine is divided into subsections as named by the operational personnel.

- Figure 5 is the Fines Area Closeout Plan, depicting the watershed with drainage areas to a settling pond, diversion berms, channel restoration, and areas to be regraded to a 3:1 maximum slope.
- Figure 6 is the South Hill Closeout Plan, depicting the watershed with drainage areas to a settling pond, diversion berms, channel restoration, and areas to be regraded to a 3:1 maximum slope.
- Figure 7 is the West Hill Closeout Plan, depicting the watershed with drainage areas to a settling pond, diversion berms, channel restoration, and areas to be regraded to a 3:1 maximum slope.
- Figure 8 is the Plant Area and North Hill Closeout Plan, depicting the watershed with drainage areas to a settling pond, diversion berms, channel restoration, and areas to be regraded to a 3:1 maximum slope.
- Figure 9 is the Plant Area and North Hill Closeout Plan (additional), depicting the watershed with drainage areas to a settling pond, diversion berms, channel restoration, and areas to be regraded to a 3:1 maximum slope.

Revegetation/Test Plot Program

Montrose has reviewed information from the previous test plots locations and results. An additional Test Plot program will be implemented with an additional emphasis on vegetation selection. Appendix F is a matrix of seed mixes for the area where the mine is located, as recommended from the Bureau of Land Management (BLM). A Montrose staff registered Landscape Architect reviewed the three BLM seed mixes and noted common components. Appendix F presents Seed Mix components. Montrose recommends two test plots with the following criteria:

- Test Plot One: Will use a single seed mixture selected from the three recommended by BLM. The selected seed mix is Taos County Seed Mix (Wheatgrass) Number One, which provides a wide diversity of plant material. The larger plant selection seed mix will generate test results that will enable a more comprehensive refined seed mix for future implementation.
- Test Plot Two: Will use a combination of the prior BLM seed mix and any additional plant seeds suggested by the Landscape Architect. The combined seed mix will consist of the following, (Taos County Seed Mix (Wheatgrass) One, and El Grande Seed Mix (See Appendix F)). The El Grande Seed Mix is a mix from a neighboring site that has shown some early success establishing in similar conditions.

Each test plot will have a soil depth between six inches and one foot. Fifty percent of each test plot will contain soil obtained from the borrow area located on site. The other fifty percent will use soil existing at

the current location. Using on-site soil will generate more accurate data for the long-term restoration of the site, with minimal maintenance.

Fifty percent of test plots 1 & 2 will be broadcast seeded and the other fifty percent will be drill seeded.

Erosion Control

Attachment G is a series of drawings and worksheets that depict erosion control measures for the entire mine in the current status, as well as a 5-year projection and reclamation. The design intent of the erosion control is to prevent any impacted stormwater runoff from the mined areas. An updated Stormwater Pollution Prevention Plan (SWPPP), consistent with the USEPA 2021 Industrial SWPPP template, was developed. There are six discharge points identified for inspection and effluent limits. Erosion control methods will be implemented on a schedule with the six areas for discharge as a priority:

- West Hill
- South Hill
- North Hill
- Plant Area #1
- Plant Area #2
- Fines Stockpile

Stormwater flow modeling was performed for the structures design and locations to present an integrate plan for present and future stormwater management. The modeling presented that different erosion control measures are required for the three different watersheds at the mine. The erosion control methods are for the specific watersheds within the mine property for existing mining and end of mine life reclamation. The worksheets depict settling pond volumes and design parameters for stormwater management swales.

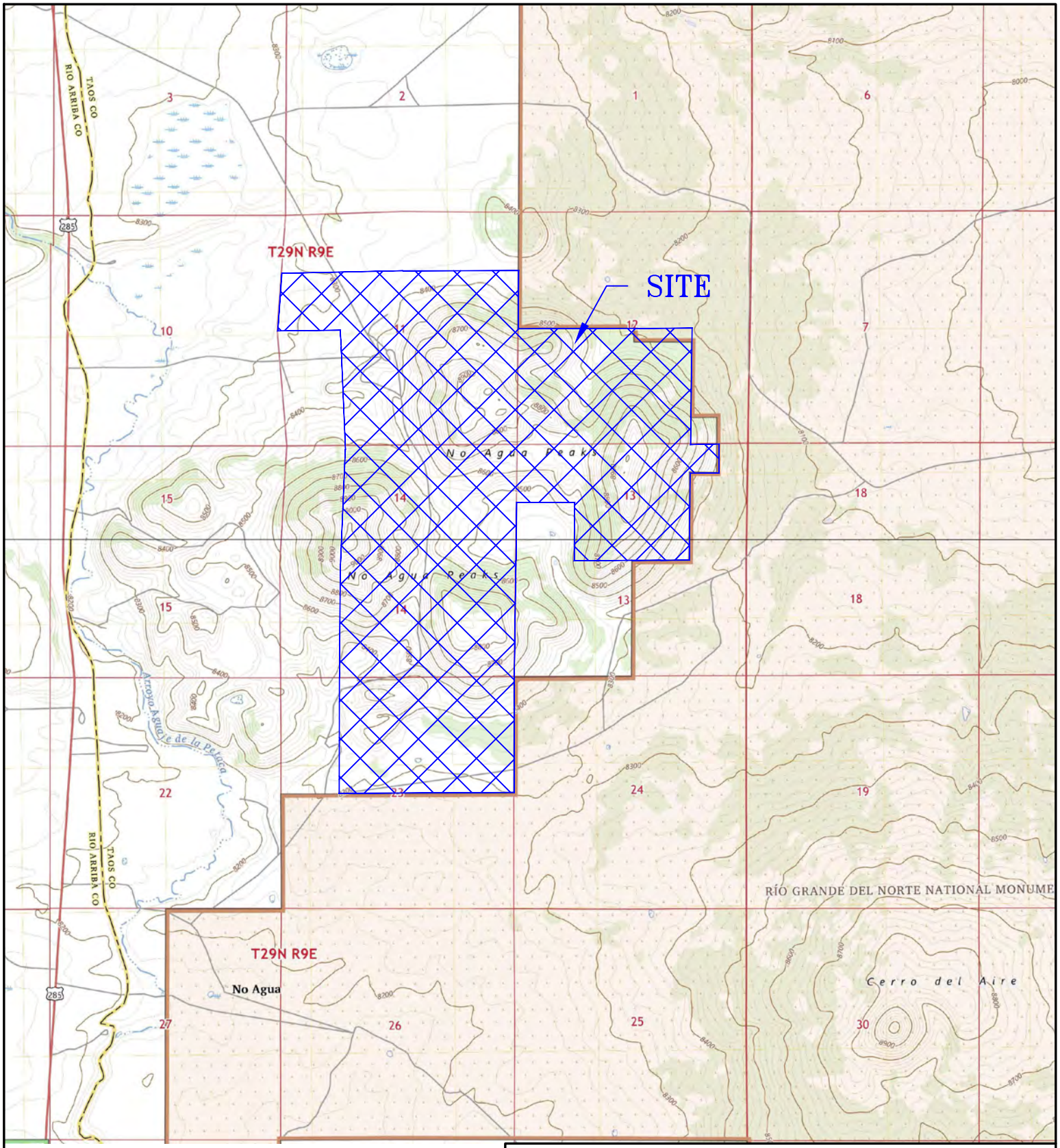
Preliminary Slope Stability Report

Imerys contracted with Call &Nicholas to provide a Geotechnical Evaluation in April 2025. Appendix F is that report. Montrose has reviewed the report and utilized information to develop the slope angle for reclamation cover. This information was also relied upon to generate cover volumes for reclamation of the mined areas.

Financial Assurance/Cost Estimate

Montrose reviewed historic cost estimates for reclamation developed by Imerys in a format that provides details and information that involves actual operational financial information used to develop the estimate. Montrose is not able update the information or to challenge the financial information due to a lack of current mining operational experience. Montrose is of the opinion that the additional information in this report supports an update to the Closeout Plan requirements with Imerys mining operational knowledge being used to supplement the cost estimate. Appendix I is a cost estimate provided by Imerys.

Figures



IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

LOCATION MAP

0 1500 3000 6000

1 INCH = 3000 FT

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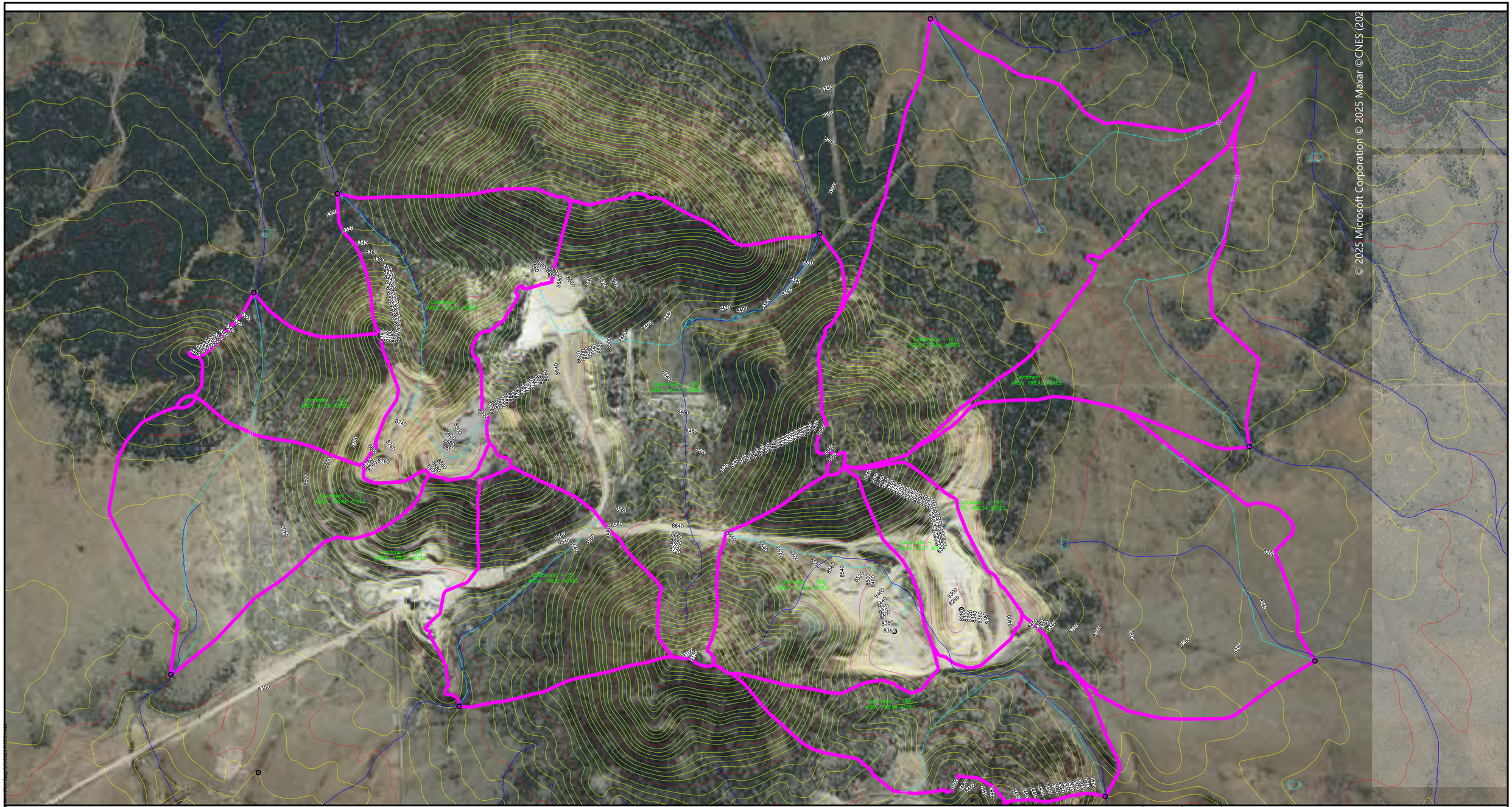
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Project Mgr.:	RJM
Originated By:	KHF
Project No.:	.
Drawing Date:	JULY 2025
Sheet No.:	1 OF 10
Revision Number:	0

SHEET 1

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60' 0' 30' 60' 120' 240'

SCALE 1"=60'

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IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

OVERALL DRAINAGE AREA PLAN

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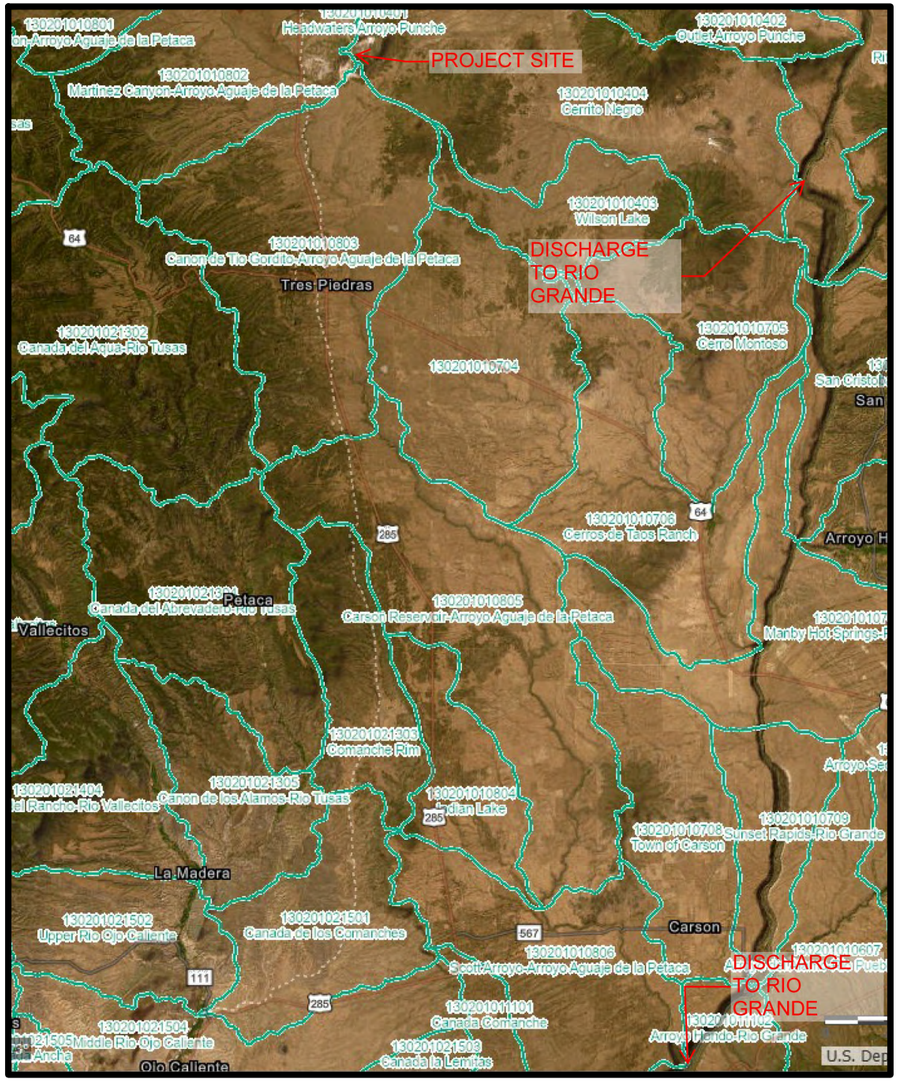
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SHEET 2

I:\Projects\Imerys\No Agua Mine\Drawings\Permit\Figure 2 - Overall Drainage.dwg





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150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

HUC12 DRAINAGE AREA PLAN

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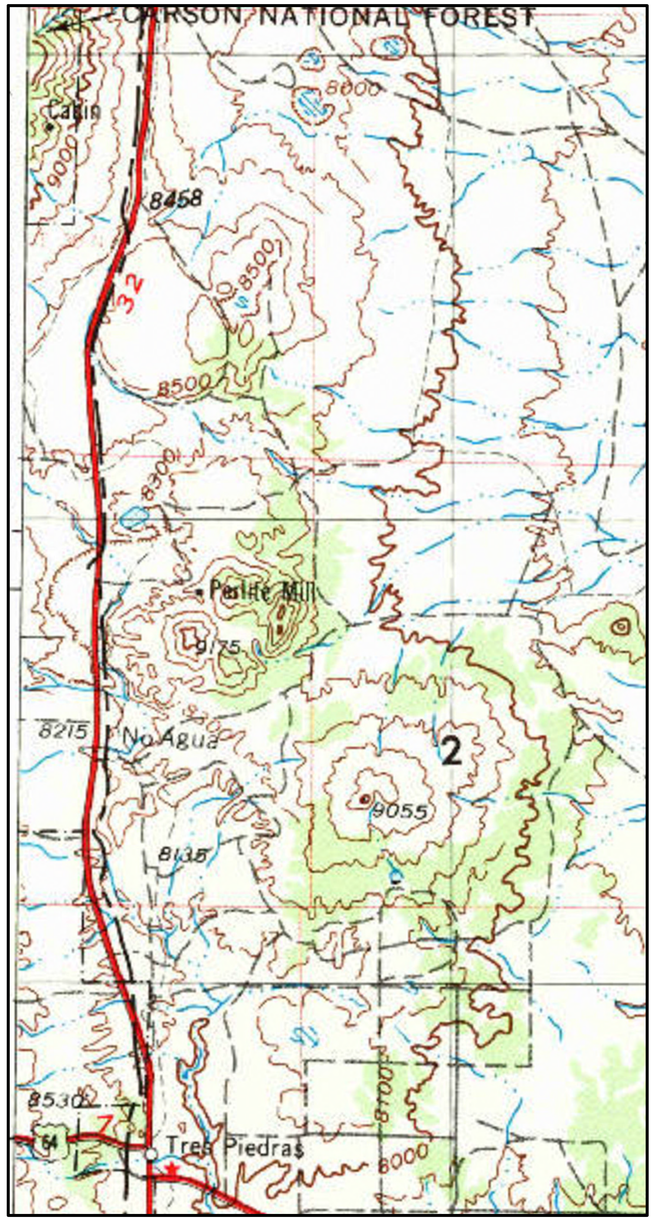
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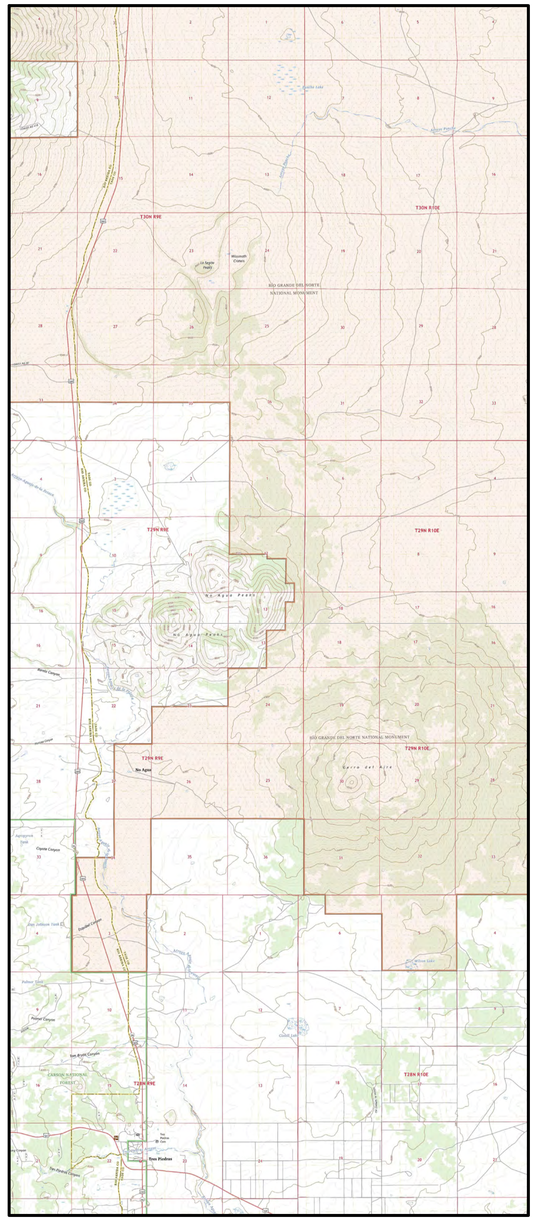
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Revision Number:	

SHEET 3

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1954 USGS TOPO
SCALE 1"=5,000'



2023 USGS TOPO
SCALE 1"=5,000'

5000 0 2500 5000 10000 20000
1 INCH = 5000 FT

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PERLITE, TAOS COUNTY

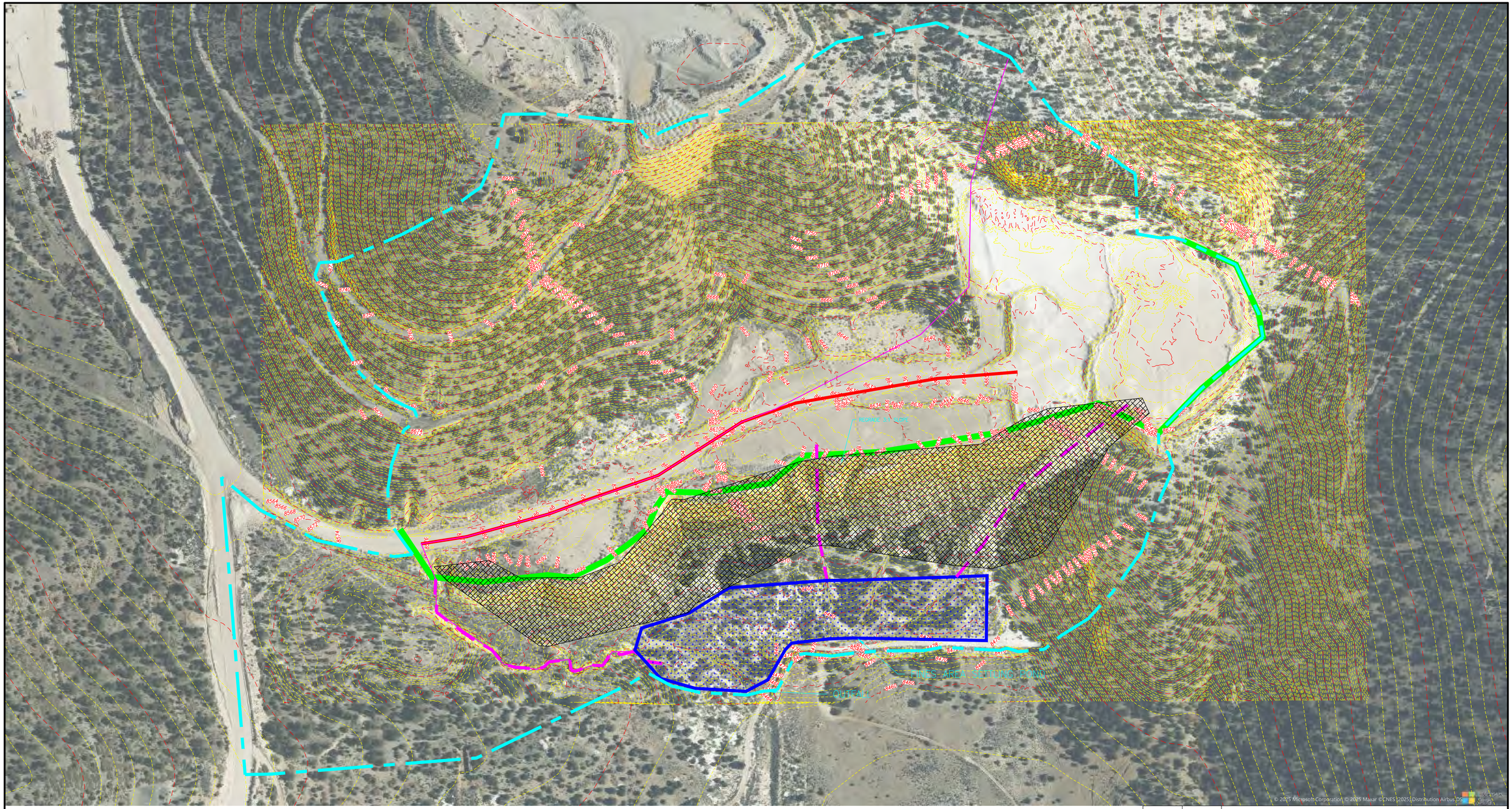
TOPOGRAPHIC COMPARISON PLAN

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Sheet No.:	4 OF 10
Revision Number:	0

SHEET 4

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LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

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150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
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FINES AREA CLOSEOUT PLAN

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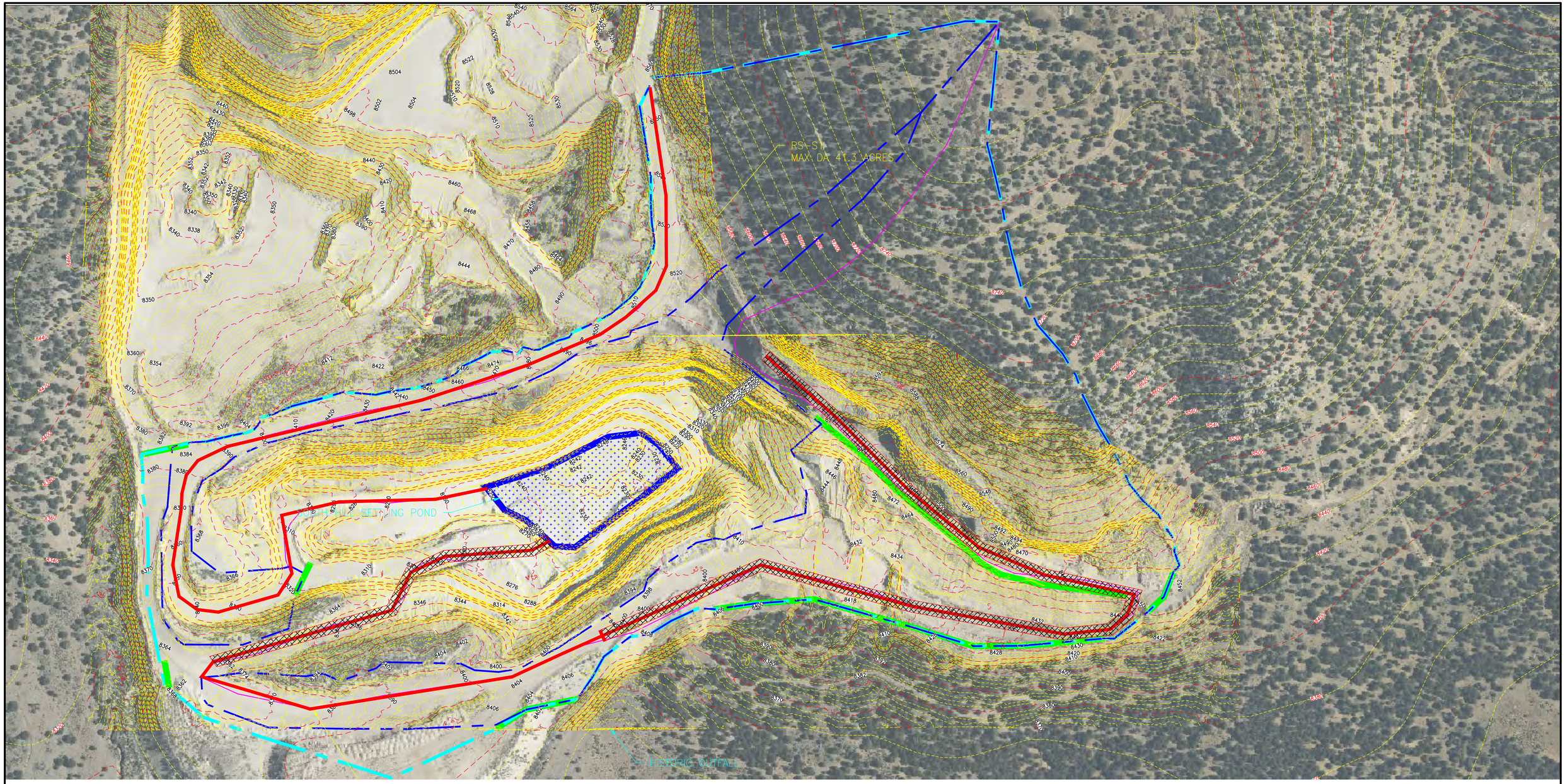
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Revision Number:	0

SHEET 5

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LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

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SOUTH HILL CLOSEOUT PLAN

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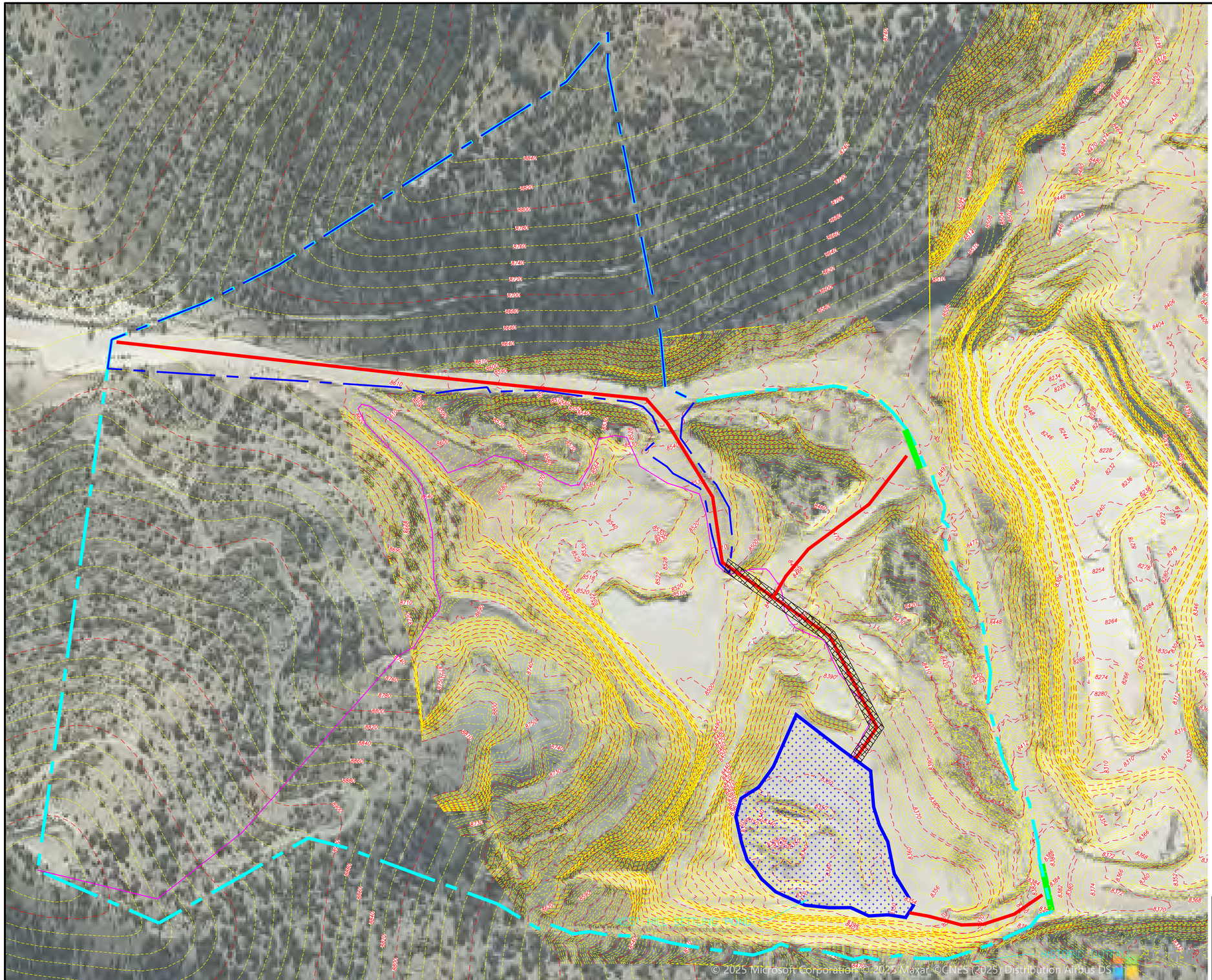
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SHEET 6

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LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

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WEST HILL CLOSEOUT PLAN

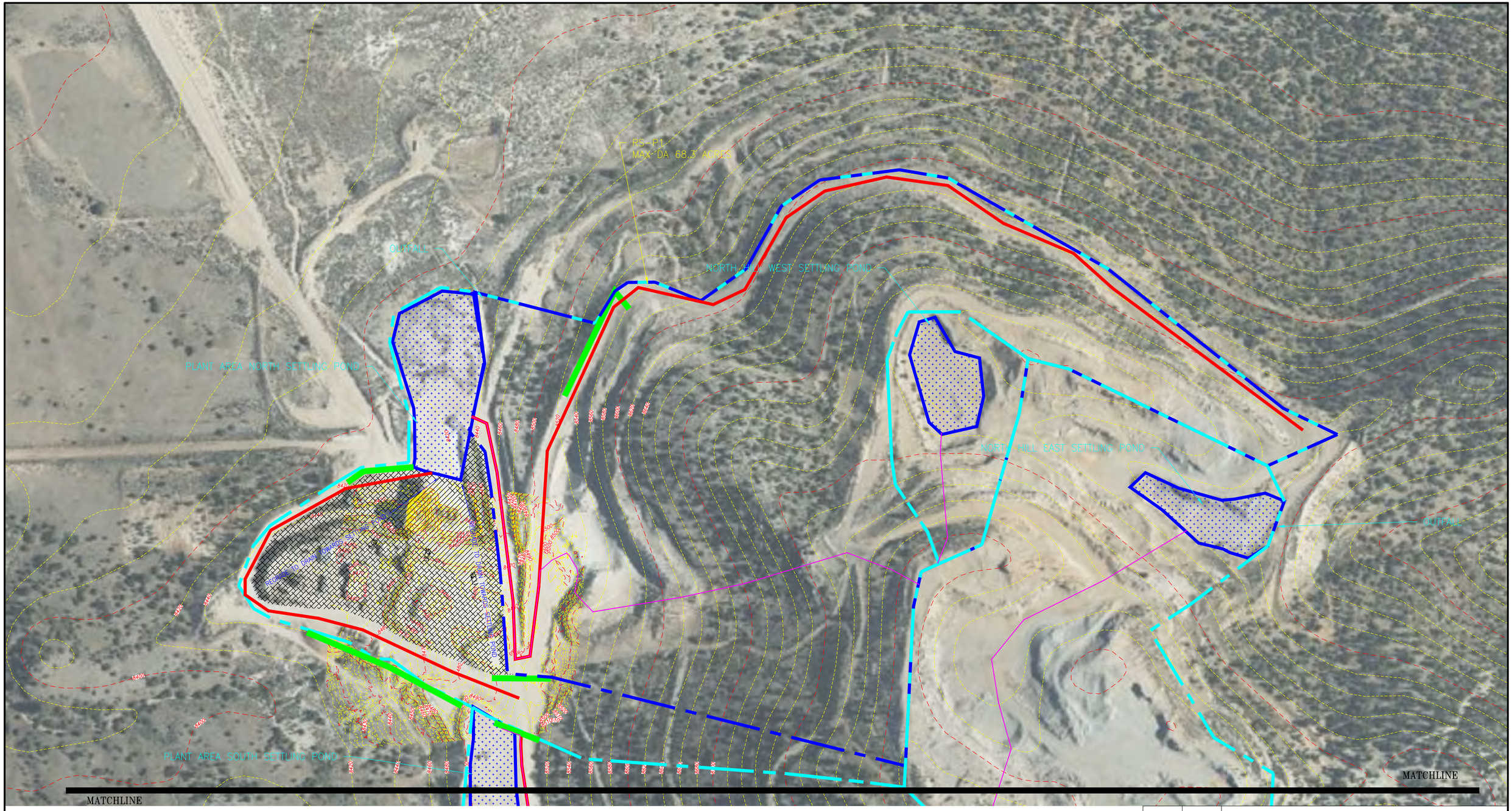
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SHEET 7

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LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

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150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
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PLANT AREA & NORTH HILL CLOSEOUT PLAN

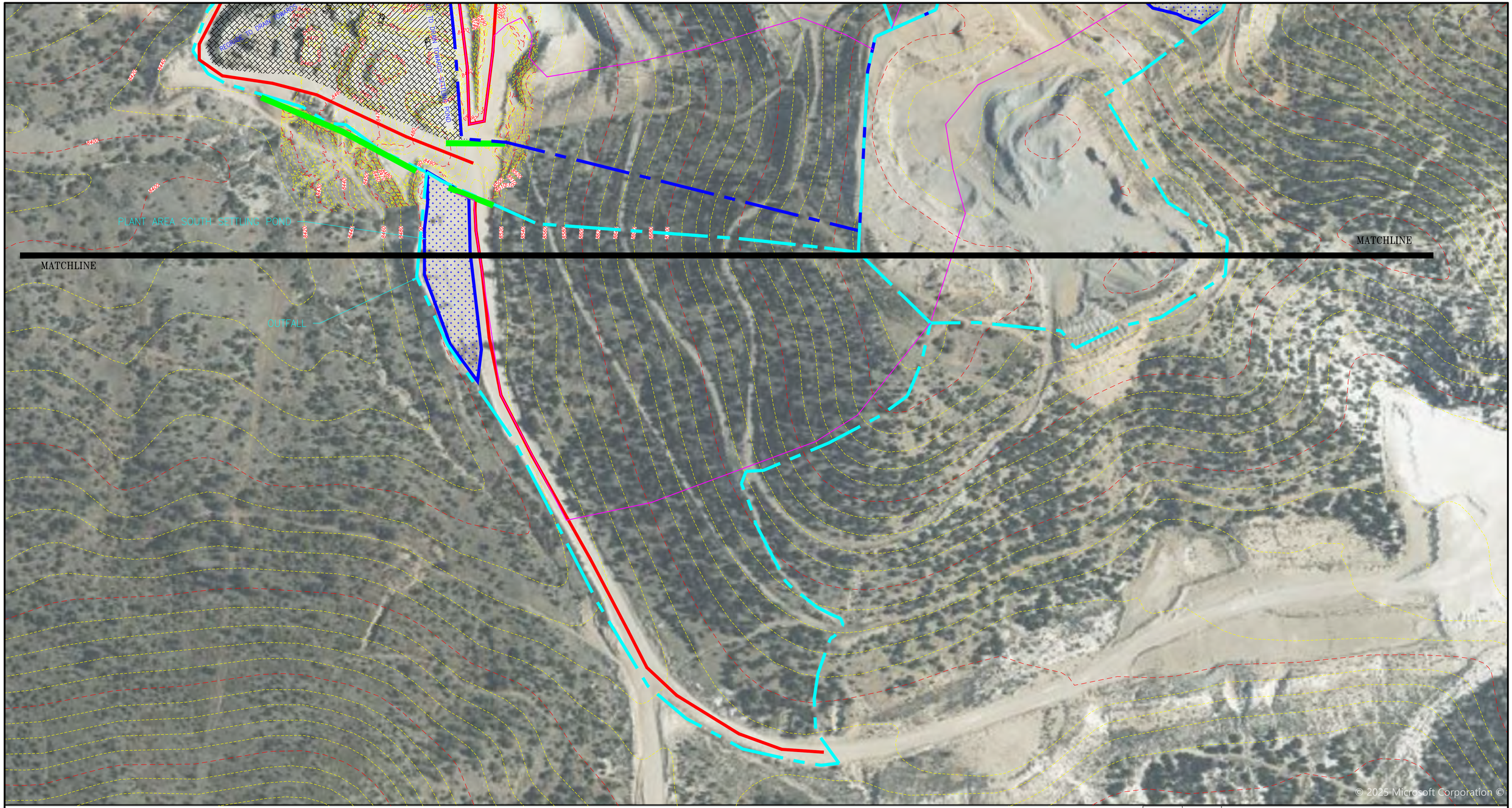
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SHEET 8

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- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

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150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

PLANT AREA & NORTH HILL CLOSEOUT PLAN

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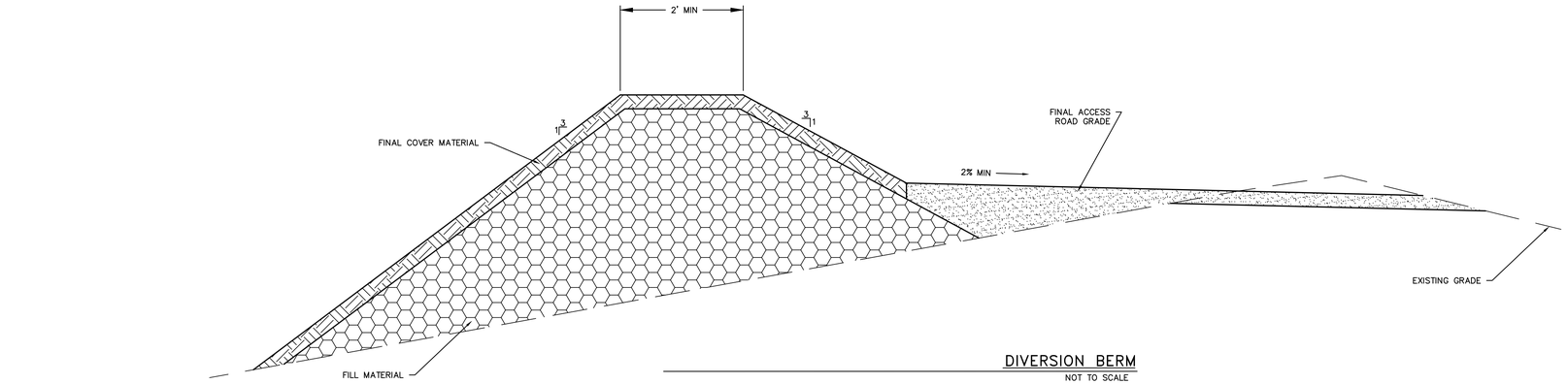
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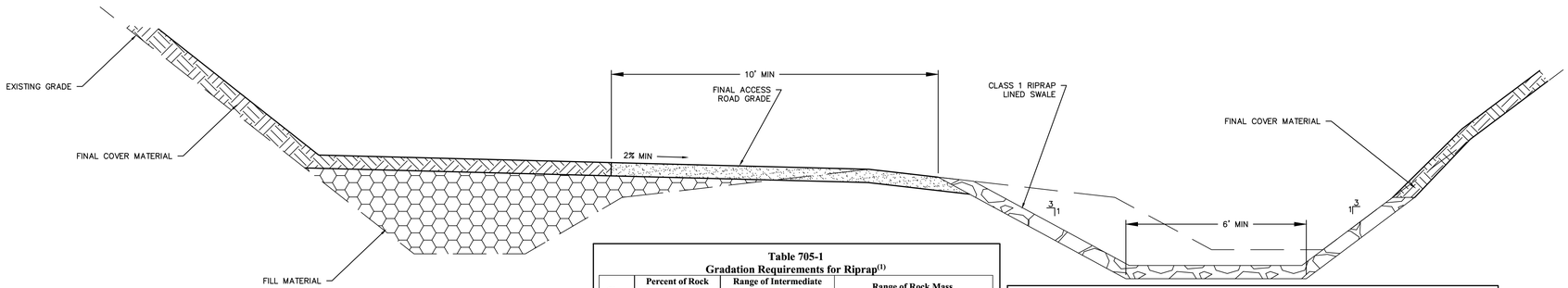
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Sheet No.:	8 OF 10
Revision Number:	0

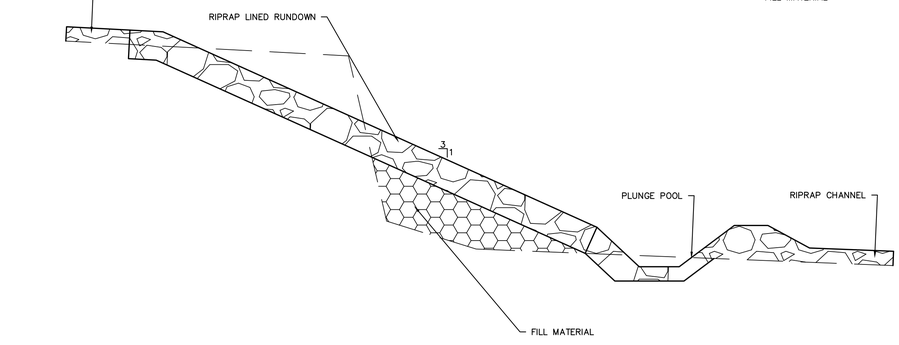
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DIVERSION BERM
NOT TO SCALE





DIVERSION SWALE RUNDOWN
NOT TO SCALE

Table 705-1
Gradation Requirements for Riprap[1]

Class	Percent of Rock Equal or Smaller by Count, DX	Range of Intermediate Dimensions, inches[2]	Range of Rock Mass, pounds[3]
1	100	9 to 15	59 to 270
	85	7 to 11	28 to 110
	50	5 to 8	10 to 42
	15	3 to 6	2 to 18
2	100	15 to 21	270 to 750
	85	11 to 15	110 to 270
	50	8 to 11	42 to 110
	15	6 to 8	10 to 42
3	100	21 to 27	750 to 1600
	85	15 to 19	270 to 560
	50	11 to 14	110 to 220
	15	8 to 10	42 to 81
4	100	27 to 33	1600 to 2900
	85	19 to 23	560 to 990
	50	14 to 17	220 to 400
	15	9 to 12	59 to 140
5	100	33 to 39	2900 to 4850
	85	23 to 28	990 to 1800
	50	17 to 20	400 to 650
	15	11 to 15	110 to 270
6	100	39 to 45	4850 to 7400
	85	28 to 32	1800 to 2650
	50	20 to 23	650 to 990
	15	13 to 17	180 to 400
7	100	45 to 54	7400 to 12,800
	85	32 to 38	2650 to 4450
	50	23 to 28	990 to 1800
	15	15 to 20	270 to 650
8	100	54 to 66	12,800 to 23,400
	85	38 to 47	4450 to 8450
	50	28 to 35	1800 to 3500
	15	19 to 25	560 to 250
9	100	66 to 78	23,400 to 38,600
	85	47 to 55	8450 to 13,500
	50	35 to 41	3500 to 5600
	15	22 to 30	870 to 2200
10	100	78 to 90	38,600 to 59,300
	85	55 to 64	13,500 to 21,300
	50	41 to 48	5600 to 9000
	15	26 to 36	1450 to 3800

(1) Gradation includes spalls and rock fragments to provide a stable, dense mass.
(2) The intermediate dimension is the longest straight-line distance across the rock that is perpendicular to the rock's longest axis on the rock face with the largest projection plane.
(3) Rock mass is based on a specific gravity of 2.65 and 85 percent of the cubic volume as calculated using the intermediate dimension.

TABLE 705-1 FROM STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-24) BY US DEPARTMENT OF TRANSPORTATION

MAINTENANCE DRIVE RESTORATION
NOT TO SCALE

705.02 Rock for Riprap. Provide hard, durable, angular rock that is resistant to weathering and water action, and free of organic and other unsuitable material. Angular rock is characterized by sharp, clean edges at the intersections of relatively flat surfaces. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. Conform to the following:

(a) Apparent specific gravity, AASHTO T 85	2.40 minimum
(b) Absorption, AASHTO T 85	4.0 percent maximum
(c) Soundness of aggregate using sodium sulfate, AASHTO T 104 (5 cycles)	12 percent loss maximum
(d) Los Angeles abrasion, AASHTO T 96	50 percent maximum
(e) Rock particle intermediate dimension (width) and minimum dimension (thickness)	⅓ longest dimension (length) minimum
(f) Gradation, FLH T 521	Table 705-1

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

DETAILS

MONTROSE ENVIRONMENTAL
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.
9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
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Scale:	NTS
Drawn By:	RRP
Checked By:	RM
Project Mgr.:	RM
Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	10 OF 10
Revision Number:	0

SHEET 10

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Appendix A
No Agua Reset Letter and Guideline Packet

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Melanie A. Kenderdine
Cabinet Secretary

Ben Shelton
Acting Deputy Cabinet Secretary

Albert C.S. Chang, Director
Mining and Minerals Division

September 10, 2024

Todd Whitacre
Imerys Perlite USA, Inc.
150 East Main, Suite 320
Femley, NV 89408

RE: Closeout Plan 23-1 Resubmission under Revision 24-1 No Agua Mine, Permit No. TA005RE

Dear Mr. Whitacre,

The New Mexico Mining and Minerals Division (MMD) received an application to Revise Permit No. TA005RE No Agua Mine on July 25, 2023, from Imerys Perlite USA Inc. (Imerys) titled, "No Agua Mine Closeout Plan Update" (Application). The Application, assigned Revision 23-1 by MMD, proposed to update the 5-year Closeout Plan.

On July 10th, MMD and Imerys met at the mine site to discuss Imerys submitted response to MMD's Technical comments. During this meeting it was determined that Imery's and MMD had different understandings of the Closeout Plan process. It is MMD's decision to request that Imerys re-submit their Closeout Plan and associated Financial Assurance with a 5-year "snap shot" parameter in mind, which is MMD's standard practice for Closeout Plans. MMD will be assigning a new revision number for this submission, 24-1, the previous submission 23-1 will be considered retired please update documents accordingly. For this iteration of the Closeout Plan, Imerys should target the mine's configuration in 2030 and build a Closeout Plan around that configuration. The Closeout Plan will then be updated approximately every 5 years. As discussed in the July 10th meeting, MMD agrees that creating a goal end date, including monthly meetings, is the best way to move forward in this process.

As discussed, the Closeout Plan should be a basic framework for MMD to implement reclamation if needed. Given this, MMD needs significantly more details about the scale and scope of reclamation activities. To date Imerys has provided broad scope concepts, however; the plan as a whole is lacking is quantitative technical designs. As discussed Closeout Plans are analogous to a 30% construction design, versus a generalized concept. See MMD's framework for moving forward on the 5 year Closeout Plan (Revision 24-1).

Goals of the 2025-2030 Closeout Plan (24-1)

- MMD will continue to offer guidance through monthly meetings to address any questions or comments.
- Goal completion date of January 2025.

MMD is requiring the following components of the Closeout Plan to include (See also the enclosed MMD Closeout Plan guideline):

- Past and current mining
    - Imerys has provided historical data on previous disturbance, MMD is needing more details on current mining practices on site.
        - Examples include backfilling of West Hill as overburden dump and more details on watershed configuration of site.
    - Need an updated disturbance map and calculated acreage.
- Hydrology
    - To include: size, shape, and volumes of the retention structures.
    - Provide detailed descriptions of implemented diversions and erosion control structures planned to stabilize the site.
    - Include features to ensure the pit basins will collect site run off.
    - Possible updated Storm Water Poluution Prevention Plan.
    - Topographic map describing surface hydrology
- Soils
    - MMD is needing to verify that Imerys has the quantity and quality of material needed for appropriate backfill, recountouring, and cover materials. (Materials handling plan)
    - Provide methods and sampling plan for suitable materials/borrow material needed.
- Revegetation/Test Plot Program
    - Historic Test Plot program including soil testing report.
    - Parameters/testing varilables of the Test Plot program
    - Account for needed borrow volume for the entire mine site.
    - The test plot program is Imerys' opportunity to build a robust test for the best path forward for reclamation. This plan must address a component of reclaimed 3:1 slopes.
- Erosion Control
    - Topographic maps for the plan must address surface configuration at the 5-year projection.
    - Methods used to remediate erosion and prevent material from running off of site. To date Imerys indicates that methods will be implemented on a "as needed" basis and provides no integrated plans for structures in their current plan. MMD observed erosion features already present and requests that Imerys

take a more proactive approach to prevent erosion from occurring and minimize future remediation.
    - See also Hydrology, MMD is needing Imerys to perform Water modeling to ensure that BMPs/structures are suitable for mitigating erosion control.
    - Significant areas of the mine site will need to be re-countroured to the 3:1 slope, include mapping to show areas to be re-countoured. This component is important to calculate material quantity needed for back fills.
    - Include detailed flow characteristics and evaluations of channels needing reconstructions and stabilization.
- Preliminary Slope Stability Report
    - Slope Stability work plan will still be required at a later date.
- Financial Assurance/Cost estimate
    - An updated cost estimate has been needed for some time. Essential components of this cost estimate have been lacking making providing this estimate difficult.
    - FA should be calculated off the the cost to reclaim the mine site for the highest year of disturbance between 2025-2030.

As the Permitte is responsible for providing all reclamation information necessary to process this Closeout Plan; MMD strongly encourages the use of consulting services from firms familiar with MMD's Closeout Plan requirements.

By issuing this letter MMD approves retiring Revision 23-1 and requests Imerys submit the 24-1 Closeout Plan with in 60 days of receipt of this letter. Please confirm a date between October 1st and October 31st for the first meeting to discuss this resubmittal process.

If you have any questions, please contact me at (505) 216-8945, or email samantha.rynas@emnrd.nm.gov.

Sincerely,

Samantha Rynas, Permit Lead
Mining Act Reclamation Program ("MARP")
Mining and Minerals Division

CC: DJ Ennis, Program Manager, MARP/MMD
Clint Chilser, Reclamation Specialist Supervisor, MARP/MMD
Mine File (TA005RE)

Enclosures:
1. MARP Closeout Plan Guidelines

April 30, 1996

CLOSEOUT PLAN GUIDELINES

FOR EXISTING MINES

Mining Act Reclamation Bureau
Mining and Minerals Division
New Mexico Energy, Minerals and
Natural Resources Department
2040 S. Pacheco St.
Santa Fe, New Mexico 87505
505/827-5970

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CLOSEOUT PLAN GUIDELINES

INTRODUCTION

The purpose of these guidelines is to provide a foundation upon which a Closeout/Reclamation plan might be developed. These guidelines are intended to help address the terms “Post-Mining Land use” and "Reclamation" as defined in Subpart 1 (General Provisions) of the New Mexico Mining Act Rules, and apply these terms to the concept of mine closeout.

These guidelines are advisory only, unless requirements are specifically identified as coming from a section of the New Mexico Mining Act (Act) or the New Mexico Mining Act Rules (Rules). These guidelines are provided to help operators, regulatory agencies, and the general public address the question of reclamation and final closure for existing units at existing mines. It is likely that most operations will not find it necessary to address all the items listed in these guidelines, as each site will present a unique set of circumstances, and not all items will apply.

The post-mining land use shall be selected by the landowner and approved by the Director of MMD. Categories which may be approved for post-mining land uses may include agricultural, commercial or ecological uses that would ensure compliance with Federal, State and local laws, regulations and standards (Section 107.EE, New Mexico Mining Act Rules (Rules). .

The Closeout Plan requirements under the New Mexico Mining Act (Act) for existing mining operations, are addressed under Subparts 506.A and B of the Rules. Also, these requirements are addressed under Sections 69-36-11B(3) and (4) of the Act. The following language is taken from these sections:

> Subpart 506.A states that "... closeout plans shall be based on site-specific characteristics and the anticipated life of the mining operation. Site- specific characteristics include, but are not limited to, disturbances from previous mining operations, past and current mining methods utilized, geology, hydrology and climatology of the area;".
>
> Subpart 506.B states “A proposed closeout plan or a proposed closeout plan for a portion of the mine shall include a detailed description of how the permit area will be reclaimed to meet the requirements of Section 69-36-11B(3) of the Act and the performance and reclamation standards and requirements of Subpart 5.”
>
> Section 69-36-11B(3) and (4) of the Act state “the closeout plan specifies

incremental work to be done within specific time frames that, if followed, will reclaim the physical environment of the permit area to a condition that allows for the reestablishment of a self-sustaining ecosystem on the permit area following closure, appropriate for the life zone of the surrounding areas unless conflicting with the approved post-mining land use; provided that for purposes of this section, upon a showing that achieving a post-mining land use or self-sustaining ecosystem is not technically or economically feasible or is environmentally unsound, the director may waive the requirement to achieve a self-sustaining ecosystem or post-mining land use for an open pit or waste unit if measures will be taken to ensure that the open pit or waste unit will meet all applicable federal and state laws, regulations and standards for air, surface water and ground water protection following closure and will not pose a current or future hazard to public health or safety; and

(4) the secretary of environment has provided a written determination in the form prescribed in Paragraph (2) of Subsection P of Section 7 of the New Mexico Mining Act."

Other important topics to be included in the Closeout Plan might include: roads, post-mining land use, wildlife considerations, acid rock drainage and stabilization of the reclaimed site.

These guidelines address the requirements of existing mines (Subpart 5 of the Rules). Although much of what is contained herein can be applied to new units of existing mines (Section 507.C of the Rules) or new mines (Subpart 6 of the Rules), these guidelines should not be used to address all requirements in these categories of mining. Please refer to Section 507.C and Subpart 6 for additional requirements.

In addressing the requirements of the closeout plan an operator should provide a list of federal and state permits required for the closeout plan and evidence of when they were issued or a schedule of when these permits are anticipated to be received. To avoid duplication and conflicting requirements, the applicant may include information from other federal and state environmental permits relevant to the application (506.B.2, Rules).

The information found in these guidelines will be used to ensure that a closeout plan will meet the requirements of the Act and Rules. Some of the information you need may have already been submitted in the site assessment or permit application or may have been included in other documents or permits. If this is the case, you may reference the other material but you will need to specify the document name and the specific page you are referencing.

As a final note, your closeout plan may follow a similar format as addressed in the Closeout Plan Format section of these guidelines.

CLOSEOUT PLAN GENERAL ELEMENTS

Each closeout plan needs to be written as specifically as possible to address the characteristics of the site. The plan should follow a logical sequence in addressing all post-mine land uses of the site. As discussed in Section 107.EE of the Rules, post-mine land uses include, but are not limited to: cropland, grazing land, wildlife habitat, forestry, residential, industrial/commercial, recreation or tourism, developed water resources, scientific or educational. The details of these guidelines as addressed below help to address the information required in Section 506.A and B.

1. Information common to all units or facilities of the site (i.e. post-mining land use, revegetation, wildlife, etc.) need only be addressed once.

2. For each unit or facility (i.e. pit, waste dump, tailings impoundment, staging area, plant site, pond, etc.), specific information, including environmental impacts, should be addressed in the closeout plan if not already addressed in the permit application. This information might include: **past and current mining methods utilized, hydrology, soils, revegetation, wildlife, land ownership, post-mining land use, roads, geology, erosion and acid rock drainage. A proposed financial assurance calculation and explanation may also be provided.**

In brief, the following general steps should be taken: (1) Identify the units regarding their location, use, size and other physical characteristics (design limits); (2) Identify the environmental impact of the unit; (3) Identify a post-mine land use; and (4) Explanation of how the post-mine land use will be achieved.

3. Reclamation solutions or a post-mine land use specific to a unit or facility may be addressed individually (hydrology, soils, geology, acid rock drainage, etc.) or in a group if similar.

4. Where specific closeout plan details are not included, additional information may be requested.

5. Consideration should be given to **concurrent reclamation**. Concurrent reclamation means progressively accomplishing reclamation operations as mining continues, for example, using waste material to backfill and grade a mined out pit instead of developing another waste dump and leaving the original pit unreclaimed, or reclaiming a discontinued waste dump or tailings pond. Utilizing concurrent reclamation allows you to minimize financial assurance

amounts and reduce disturbed lands.

6. In accordance with Section 506.J. 6 the applicant must submit a notarized statement, at the time of approval, which states that the applicant "agrees to comply with the performance and reclamation standards and requirements of the permit, these Rules and the Act and allows the Director to enter the permit area without delay for the purpose of conducting inspections during mining and reclamation".

CLOSEOUT PLAN FORMAT

It is recommended that the closeout plan be formatted with the following basic elements:

1. **Project Description** - Introduction providing a brief history and explanation for the submittal of the Closeout Plan.

2. **Site-specific Characteristics** - Discussion of site-specific information which might reference material in the site assessment and permit application.

3. **Post-Closure Land Use** - Discussion of the post-mine land use(s) proposed for the mine site. Identification of the property ownership should be made, if different from the information provided in the permit application. Each area of the site to have a separate land use should be specifically identified and a justification for the proposed land use provided.

4. **Waiver from Self-Sustaining Ecosystem or Post Mining Land Use** - Each area where a waiver from the self-sustaining ecosystem or post mining land use is to be requested should be identified and justification for the request provided.

5. **Description of Closeout Activities** - A description of the reclamation, removal of trash, equipment and debris, disposal of wastes, stabilization, monitoring programs to address post-closeout site conditions and safe-guarding work to be performed.

6. **Environmental Standards Compliance** - Any additional information needed to demonstrate that environmental standards are expected to be met. See Appendices #1 and #2 for Guidance for NM Environmental Department's Determination on Environmental Standards.

7. **Closeout Plan Schedule** - A schedule providing a timetable for the various stages of closeout work to be performed.

8. **Closeout Permitting Requirements** - A list of all federal and state permits required for completion of the closeout plan and the dates they were or are anticipated to be issued.

9. **Post Closeout map(s)** - A topographic map of the anticipated surface configuration upon completion of the Closeout plan.

10. **Cost Estimate for Closeout** - Provide a cost estimate for the proposed closeout work to be performed.

11. **Appendices** - Include here any additional information necessary to support the closeout activities discussed above.

COMPONENTS OF A CLOSEOUT PLAN

PAST AND CURRENT MINING

Mining methods may cause specific safety or contamination problems. Each mine is unique. Therefore, past and current mining methods used at the site may be identified and described. The following information, if applicable, should be part of a proposed closeout plan for all or a portion of the mine. This list is not all inclusive.

1. Impacted areas within the permit area resulting from past and current mining practices should be identified and evaluated for potential impact on the overall closeout plan . Pre-Act mining disturbances that fall within the permit area should be identified or excluded from the permit area .

2. The past and current extent of water quality problems should be determined. These issues can be addressed by following the guidances provided by the New Mexico Environment Department found in Appendices #1 and #2.

3. Improvements resulting from mining previously disposed or abandoned mining wastes, reprocessing waste piles, backfilling open pits or underground mines and regrading waste dumps may be identified.

4. Watershed inventories may be studied. The pre-mining watershed configuration may be compared to the post-mining watershed configuration. Affects to on and off site water users, surface drainage patterns and ground water discharge and recharge areas may be discussed. It is not required that disturbed watersheds be restored to pre-mining conditions. However, they should be reclaimed to a productive and stable condition.

5. VERTICAL OPENINGS: Vertical openings may be identified and closures

should be designed to provide for public safety and prevent environmental degradation.

6. PORTALS: Portals are entries, drifts, declines, inclines and adits that are horizontal or sloped mine entries. Such entries should be identified and portal closures should be designed to provide for public safety and prevent environmental degradation.

7. UNSTABLE PILES OR EMBANKMENTS: Unstable piles or embankments may be spoil banks from surface mining, refuse banks from underground mining and/or mineral processing and natural slopes where a mining activity has directly caused instability. These types of piles or embankments can pose a danger to human safety and environmental stability. Unstable piles or embankments should be stabilized or removed.

8. UNSTABLE IMPOUNDMENTS: Unstable impoundments are impoundments which pose the threat of failure. They typically involve the possibility of the retention of a large quantity of water slurry, or tailings associated with mining or processing activities. These types of impoundments can pose a danger to human safety and environmental health. There are several different types of impoundments: (1) Surface impoundments that were purposely constructed include tailings ponds, slurry ponds, and sedimentation ponds; (2) Inadvertently formed surface impoundments are those that evolved over time through excavation below the water table, erosion, changing drainage patterns, or other natural consequences. Such impoundments include abandoned strip pits and impoundments that formed as a result of subsidence or the sliding of unstable refuse or waste into a natural drainage; (3) Underground impoundments are formed as a result of past underground mining. Unstable impoundments, should be stabilized or removed.

9. SLOPE FAILURES: Slope failures may result when unconsolodiated material is piled beyond its maximum angle of repose, or when consolidated material develops continuous fracture planes within its structure and the inclination of the fractured material is towards an exposed out slope. Slope failures such as landslides may occur when supporting material is removed from the toe of a slope, the material becomes saturated with water, or an earthquake occurs. Past surface mining practices frequently cast spoil on out slopes beyond the angle of repose. Placement of spoil in natural drainages is another cause of slope failure. Slope failure may also result from changing the spoil-material geometry. For example, removal of the toe support by erosion or excavation decreases the resisting forces and may cause instability. Allowing water saturation of unstable material can result in slope failure. Water should be diverted away from areas susceptible to instability. Areas prone to slope failure

should be identified and the potential for movement mitigated.

10. SUBSIDENCE: Subsidence results from the collapse of overlying strata into underground mining workings and may manifest itself in the form of surface depressions and cracks. Subsidence can also occur from poor compaction or uncontrolled settling of fill materials, or surface drainage into subterranean mine workings. Subsidence can cause erosion, or damage structures, utilities, streams and land surface. Areas which have subsided, or may subside should be identified and addressed in the closeout plan.

11. HAZARDOUS MINE EQUIPMENT OR FACILITIES: A variety of buildings, structures, equipment and machinery are associated with underground and surface mining and processing. Most sites will pose a safety problem from structures or machinery left behind. Facility cleanup should be addressed. If such cleanup is to be addressed under another regulatory authority, the authority should be identified in the closeout plan.

12. INDUSTRIAL OR RESIDENTIAL WASTE: Mine lands may contain waste disposal sites. Solvents, reagents, hydrocarbons, or other types of chemicals may have been spilled at the mine site or left behind in barrels or other containers . Waste cleanup should be addressed. These various types of wastes should be identified and disposed of properly via the proper regulatory authority. The authority should be identified in the closeout plan.

13. HIGHWALLS: Highwalls are the sheer walls at the boundaries of mines and the dominant physical features of many abandoned surface mining operations. Highwalls generally range in height from 20 to 200 feet, or greater, depending on topography, mining methods, and the overburden ratio economically feasible at the time of mining. Highwalls should be identified and their stability should be evaluated and mitigated if necessary. For highwalls not compatible with the postmine land use, a waiver must be obtained if the highwall is to remain.

14. RECURRENT FLOODING OR GROUND SATURATION: Areas prone to ground saturation and/or flooding during storm events where there may be a potential for flood damage, slope failure or subsidence, should be identified and addressed.

15. POLLUTED WATER: Areas of current or potential water contamination should be identified and a remediation strategy designed. The remediation strategy should adhere to the guidelines provided by the Environment Dept. in Appendices #1 and #2.

CULTURAL RESOURCES

1. Provide a map of the permit area, indicating the locations of any cultural resources listed in the National Register or Historic Places and/or the State Register of Cultural Properties (this information is available at the State Historic Preservation Office), and any known locations of marked or unmarked human burials. . Indicate haul roads, borrow areas, tailings and waste rock disposal areas, mine facilities to be removed, and other locations of reclamation activity on this map. Describe how impacts to cultural resources will be avoided during reclamation activities.

If mining is conducted on state or federal land, the requirements for identifying and mitigating impacts to cultural resources will be more stringent. These requirements should be addressed through these other agencies and referenced in this reclamation plan.

As part of reclamation, cultural resources and marked or unmarked human burials that cannot be avoided must be treated in consultation with the State Historic Preservation Office, Office of Cultural Affairs.

HYDROLOGY

1. Provide descriptions of individual waste dumps, pits, ponds, tailings facilities, plant sites, and other facilities and how those sites will be reclaimed or stabilized to provide protection to surface and ground water. The description needs to include the size, shape and volumes or specific description of the structure or facility. Where appropriate, the physical and chemical characteristics should be described for those facilities which might pose an environmental problem (see New Mexico Environment Department's Guidelines in Appendices #1 and #2).

2. Include a description of how surface waters associated with the reclamation will be controlled to pass safely through the permit area. Provide a description of any diversions and the design and type of material to be used for erosion control structures.

3. Where shafts, adits, tunnels or other subsurface entrances are located, indicate how these facilities will be reclaimed such that positive drainage away from those entrances will be achieved to prevent water from flowing into these entrances.

4. . Provide water quality data for reclaimed areas with perennial and intermittent streams. This information can be provided based on the guidelines provided by the Environment Dept. in Appendices #1 and #2.

5. Other site specific information regarding hydrology and hydrologic stability should be included.

6. Measures should be taken to minimize formation of contaminates or leachates. Such measures may include diversion of surface waters, construction of rock drains, encapsulation or placement of impermeable covers to reduce surface water infiltration. Guidelines that address such measures can be found in Appendices #1 and #2.

SOILS

1. Attached is a list of Soil Suitability Criteria (Attachment #1) which can be used for analysis of soils to be used for reclamation. Soils to be used for reclamation should have adequate nutrients, organic material and texture and should be sufficiently lacking toxic constituents to ensure the material is suitable for the reestablishment of vegetation.

2. Soils to be used for reclamation may include: soils salvaged and stockpiled prior to disturbance; in place soils such as waste/overburden materials, or soils taken from borrow areas.

3. For best results in the re-establishment of a viable plant community on mine wastes or overburden that meet financial assurance release criteria, MMD recommends importing topdressing materials from an area which contains suitable materials.

4. Describe soil type and thickness of soils in areas to be reclaimed. However, if the soil has already been disturbed by mining, no such description is likely to be available. For the purposes of soils identification and descriptions, consult the Natural Resources Conservation Service (formerly Soil Conservation Service) County Soil Survey. These are generally available at the Department of Agriculture's county Natural Resources Conservatio Service.

5. Where unsuitable materials are present, describe the mitigation plan to provide for suitable material.

6. Where soil salvage is necessary, provide the methods and sampling program to be used for the identification of suitable materials.

7. If you plan to borrow topsoil or topdressing material for placement over unsuitable material, it is recommended that I the chemical and physical analysis of the material, a mass balance and sampling methods be provided (i.e. sample

size, methods, location of borrow material, etc.).

8. Where there is no topsoil or topdressing available, a physical and chemical analysis of the material to be used for planting of vegetation is needed.

9. Where materials are to be imported and applied to an area for reclamation, the application depth will be dependent on the plant species to be used and the type of material to be covered, and should be identified.

10. Where suitable planting material is less than 2 feet in thickness above unsuitable material, an analysis of the unsuitable material should be included to determine its potential impact on the plant species to be planted on the site. Note: some species will have rooting depths that extend beyond 2 feet.

11. Where soil amendments will be used as part of the closeout plan, provide the type and amount of amendments to be used.

REVEGETATION

1. Introduction

The purpose of this section of the guidelines is to provide a format for submitting vegetation information to be included in the reclamation and closeout plans. The purpose of submitting such information is:

a. to describe the existing vegetation resources associated with the site prior to mine closure and reclamation;

b. to predict the revegetation potential of the site;

c. to develop a revegetation plan that is compatible with the site's potential and with the post-mining land use; and,

d. to identify the methodology and the standards by which the success of revegetation will be measured and compared for the purpose of bond release.

2. Description of Vegetation Resources

a. Preparation of vegetation information should begin with a preliminary survey of the mine permit area. It is recommended that a site visit be arranged between the Division and the persons responsible for collecting this vegetation information. The purpose of such a meeting would be to verify the appropriateness of the proposed sampling techniques and

subsequent reclamation success standards. Following this preliminary consultation:

(1) Develop a map of the vegetation types (e.g. *Atriplex confertifolia/Gutierreza sarothrae, Sporobolus airoides/Atriplex obovata*, *Eurotia lanata/Hilaria jamesii*, etc.) found within the permit area and adjacent areas representative of the areas disturbed or to be disturbed. The map scale should be the same as that of the permit's disturbance maps and should show where the disturbance areas are located in relation to existing vegetation.

(2) Describe each vegetation type by the most visually dominant species and try to describe the condition and maturity of each vegetation type. Include in each description any present use by wildlife or livestock.

(3) Determine and list the acreage of each vegetation type. Also identify the areas of each vegetation type that have been disturbed or will be disturbed by mining or reclamation activities.

3. Description of Revegetation Potential

a. Sample each vegetation type found within the mine permit area. Different sampling methodologies for cover and production are described in Attachment 2. When following these procedures, make note of the slopes, aspects, soil types and other environmental characteristics that may affect where each vegetation type grows on the site. Additional areas adjacent to the disturbance area or mine permit boundary that have vegetation that has not been disturbed by mining or other activities should also be sampled for vegetation and soil characteristics. This and the following information will be used to determine the site's revegetation potential and ultimately the revegetation success standards.

b. List each species present in each vegetation type. List the species by plant groupings, such as trees, shrubs, forbs, grasses, etc. Identify each species by both its scientific (Latin) name (e.g. *Atriplex confertifolia*) as well as its common

name (e.g. Shadscale).

4. Methodology and Standards to Measure Revegetation Success

a. Provide a proposed standard/s addressing one or a combination of: cover, diversity, density, or productivity, for revegetation success and the sampling methodologies to be used in meeting that standard. The reclamation standards can be based on reference areas, test plots, range site, technical standard or numerical standard (see Attachment 2 for discussion). If existing test plots or reference areas are to be used as a basis for other reclamation on site, provide all data gathered on the plots. Data should be summarized and have statistical validity.

b. A complete revegetation plan should be considered. A complete revegetation plan covers the application of soil, amending soils, seeding methodologies, costs, and measuring or monitoring of revegetation success. See the attached example (Attachment #3).

WILDLIFE

1. If not already addressed in the site assessment, describe where wildlife areas are present, provide a description of the habitat in use and the species using it.

2. Provide an analysis of the mining operation's impact on wildlife. Describe whether or not these impacts will be addressed at closeout, and if so, what mitigative steps might be taken to address them.

3. If there is a known use for adits, shafts, ponds, etc. by wildlife, and that use will be continued,provide a description of the feature and how those features will be maintained. For example, shaft and adits are often used by bats.

4. Where grazing, wildlife habitat, forestry, developed water resources or other post-mining land uses enhance wildlife use or habitat, it is recommended that a description be included of how the specific reclamation effort promotes wildlife use. If wildlife habitat, recreation, or forest products are the intended post-mine land uses, the operator is encouraged to obtain technical expertise to address such uses with the New Mexico Game and Fish Department and/or the appropriate land management agency, if on public land.

POST-MINING LAND USE

1. Determining future land-use is the first step in deciding how much effort, if any,

should be put into reconstructing lands disturbed by mining. Lands disturbed through mining should be reclaimed to conditions that are capable of supporting the post-mining land use. Reclamation should include the permit area and affected areas.

2. For the permit area, the closeout plan **MUST** specify a post-mining land use as defined in Subpart 1. It is vital that a post-mining land use be described, because this use determines the extent and type of reclamation needed and will help to determine the amount of financial assurance required for the site.

3. Provide an explanation as to the feasibility of the post-mining land use.

4. Where the post-mining land use will not be the same as the surrounding land use, please provide a comprehensive description of the land use of the surrounding lands, and how the proposed post-mine land use will differ.

5. Provide a description of any zoning changes, permits or contracts that have been obtained to facilitate the proposed post-mine land use. .

6. If the post-mine land use is grazing then provide a description of the current range condition of the surrounding area, if not included in the permit application. The goal at closeout, for this type of post-mine land use, is to reclaim to a range condition of "good" (refer to the Revegetation Sections of these guidelines for further details).

7. Where wildlife habitat is the primary post-mining land use, provide specific reclamation plans developed for this specific use.

ROADS

1. Road reclamation and post-mine maintenance should be addressed. . Roads which do not have a post-mine use should be reclaimed.

2. Describe and show on a map the location(s) of roads to be left and how they will be stabilized to minimize erosion. Also describe their post-mining use.

3. Describe how roads will be reclaimed, i.e. regraded, ripped, seeded, mulched, etc.

4. Provide a description and the location of road culverts, bridges, low water-crossings, etc., to be reclaimed and if such features will be maintained for post-mining land use purposes.

5. Describe how access roads for the post mining land use will be maintained.

6. Describe how access to reclaimed areas, including reclaimed roads, will be prevented . If barricading or fencing and gating will be necessary, provide the length and type of fencing and the type of gate to be used, or describe the type of barricade to be used. Describe how the fence or barricade will be maintained until financial assurance is released. Road reclamation should be designed to control erosion and prevent unauthorized entry over the original road location.

GEOLOGY

1. Describe the general rock type and mineral assemblage of ore, overburden and waste rock in the permit area. A simple geologic map may be adequate.

2. Describe type of bedrock and subsoil material surrounding the mined area within the permit boundary, where different from above.

EROSION CONTROL

Erosion, if not addressed , can severely hamper efforts to remediate or reclaim mines. Reconstructed drainage ways should be designed to stabilize and control flow velocities. Slopes should not be steepened unnecesarily during the reshaping process. Steep slopes are difficult to traverse with revegetation equipment and are highly susceptible to erosion, slumping and landslides. Unsuitable soil and excessive erosion will severely hinder revegetation efforts. If revegetation is not successful on areas where the operator is attempting to establish a self-sustaining ecosystem then reclamation will not be successful.
When planning for post-mining erosion surface configuration, land use, roads, and drainage areas need to be addressed as follows:

1. Surface Configuration

a. Where practical, slopes to be revegetated should be graded to no steeper than 3 horizontal:1 vertical to enhance vegetation success. Slopes should usually be graded in a configuration that allows for even, unconcentrated drainage. A complex or uneven surface, which catches water and seed in small pockets, is in most cases more desirable than a manicured homogeneous surface, which promotes run-off. Slope configuration is the most important parameter in erosion planning.

b. Where other methods are to be used to control erosion such as rock armoring, land shaping, check dams, sediment traps, etc, please explain the proposed

application.

c. Slope length should be shortened where possible.

d. Land shaping may involve regrading disturbed areas of the mine. It is during this operation that surface drainage patterns, slope configurations and ponds are to be constructed in place. The technical design of a stable surface configuration should take into account appropriate technology .

e. Where large slopes will be reconfigured, models or formulas such as the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE). These models can be obtained from the Natural Resources Conservation Services (formerly the Soil Conservation Service), U.S. Forest Service or the Bureau of Land Management Other models include: the Water Erosion Prediction Project erosion prediction model WEPP, obtained from the National Soil Erosion Research Laboratory, USDA-ARS-MWA; and the Tractive Force or Allowable Shear Stress Equations, obtained from the USDA, Handbook 667.

The following factors should be taken into consideration when reconstructing a mine site to achieve a stable post-reclamation configuration:

(1) The major factors governing erosion rates include:

a) Precipitation - amount and intensity.

b) Soil - Texture, Permeability, Coarse Fragments, Surface Condition, and Chemical Composition as these affect detachability and transportability of soil particles and runoff. Mine waste material characteristics which have a potential impact on topdressing also impact erosion.

c) Slope - Length, Gradient and Shape.

d) Vegetation - Type, Density and Cover Characteristics.

e) Micro-relief - Depressions and Terraces.

f) Areas of concentrated flow.

g) Areas of sheet flow.

(2) Erosion can be reduced and stability increased by:

a) placing the best available overburden and topdressing at the surface; minimizing compaction, and leaving coarse fragments on the surface;

b) grading mined land to concave slopes, especially the lower part of the slope;

c) planting grasses, forbs, shrubs and trees with potential to provide maximum ground cover the climate will support;

d) leaving or providing micro-relief which reduces runoff and holds water in place for plant use; and

e) providing designed minor watercourses which will adequately drain reclaimed slopes.

(3) All major factors (except precipitation) can be controlled during mined land reclamation to minimize degradation. The goal for reclaimed lands should be for soil loss to be equal to or less than the natural rate of soil formation for that soil type. Soil formation is the rate that soil is naturally generated through the chemical and physical weathering of parent rock. Slope (length and gradient), vegetative cover, change in surface texture, and other factors will influence the rate of soil erosion. Using the USLE, for example, if all factors are held constant except one, erosion can be reduced from:

a) 6.4 tons of soil loss per acre per year (T/ac/yr) to 1.0 T/ac/yr by a change in texture from silt to gravelly loamy sand;

b) 3.6 T/ac/yr to 1.8 T/ac/yr by reducing slope length from 400 to 100 feet;

c) 4.1 T/ac/yr to 1.4 T/ac/yr by reducing slope gradient from 20 to 10 percent;

d) 2.7 T/ac/yr to 1.5 T/ac/yr by changing a convex slope to a concave slope; and

e) 3.0 T/ac/yr to 2.2 T/ac/yr by increasing vegetative cover from 20 to 30 percent.

2. DRAINAGE AREAS

Design of erosionally stable reconstructed watersheds are critical in providing for adequate post-mine reclamation. The following considerations need to be made:

a. Watersheds that contribute runoff to significant off-permit drainages and ponds should be reconstructed to produce run off equal to the pre-mining volume where the pre-mining volumes are known (± 10%). Watershed design should show:

1) post-mine watershed areas;

2) drainage stability including: gradient, vegetation cover, rip-rap, drop structures and erosion controls (if any) on receiving drainage channel.

b. All major reconstructed drainages that carry runoff across or around regraded mine wastes or dumps should be designed for long-term stability. Drainage design should include:

1) gradient and flow characteristics;

2) detailed evaluation of channel morphology and stabilization requirements.

ACID ROCK DRAINAGE (ARD)

1. Acid drainage occurs where rocks containing sulfides such as pyrite (FeS_2) are exposed. The sulfides oxidize, and the resulting soluble oxidation products dissolve in water flowing across the reaction site. Metals are highly soluble in these acid waters. ARD can cause a detrimental impact to water quality . It can also create an impediment to the successful reestablishment of vegetation where soils have become affected by sulfide oxidation products.

2. Where there is a potential for ARD, follow the guidelines provided by the Environment Department in Appendices #1 and #2. If it is determined that acid rock drainage does or will pose a hazard at the mine site, a plan will be necessary that discusses the isolation or containment of the material posing the hazard. The plan should be designed to address the water quality requirements under the authority of the Environment Department.

3. Soils that are acid, or have the potential to become acid, on the mine site pose a

problem to plant reestablishment. Such areas should be identified and steps taken to mitigate the problem of plant reestablishment. Such soils should be amended, isolated or reestablished with species that are tolerant of low pH conditions.

FINANCIAL ASSURANCE

1. Financial assurance is required prior to approval of the operation's closeout plan. A financial assurance proposal is required when the applicant receives notice from MMD that the closeout plan is approvable. However, a financial assurance estimate may be submitted with the closeout plan.

2. It is recommended that interim financial assurance be provided in situations where closeout plan submittal and eventual approval is to be deferred for an extended period of time.

3. Financial assurance must be provided in an amount adequate to complete the proposed reclamation or closeout plan, or specific increments of reclamation, if the work has to be performed by a third party contractor with the state. The amount of the financial assurance shall be determined by the Director and take into account, but not be limited to, the estimated cost submitted by the permittee or the applicant.

4. The financial assurance estimate should reflect the probable difficulty of reclamation or closure and include at a minimum the following costs: mobilization; demobilization; engineering redesign; profit and overhead; procurement costs; reclamation or closeout management; and contingencies. Information based on site specific conditions as well as requirements of the approved permit must be considered.

5. **The <u>permit applicant</u> is responsible for providing all reclamation or closeout information necessary to validate the financial assurance estimate.** However, other sources of information can be used in addition to those provided by the applicant to validate costs. **See Attachment #4, Financial Assurance Calculations, for details of submitting the financial assurance portion of the closeout plan.**

Appendix B
No Agua Mine Permit

Appendix B

Facility Information

Facility Name: **NO AGUA MINE**

Street/Location: **39360 US HWY 285**

City: **TRES PIEDRAS** State: **NM** ZIP Code: **87577**

County or Similar Government Subdivision: **TAOS**

NPDES ID : **NMR050000**

Primary Industrial Activity SIC code, and Sector and Subsector (2021 MSGP, Appendix D and Part 8):
1499, Miscellaneous Nonmetallic Minerals, Except Fuels, J2

Co-located Industrial Activity(s) SIC code(s), Sector(s) and Subsector(s) (2021 MSGP, Appendix D):
1446, Industrial Sand, J1

Latitude/Longitude

Latitude: **36.76028º N** (decimal degrees)

Longitude: **105.95667º W** (decimal degrees)

Method for determining latitude/longitude Google Earth Image

Horizontal Reference Datum NAD 83

Facility Operator(s):

Name: **IMERYS PERLITE USA INC. (IMERYS)**
Address: **39360 HWY 285**
City, State, Zip Code: **TRES PIEDRAS, NM 87577**
Telephone Number: **719-376-5484**
Email address: **JON.GROVES@IMERYS.COM**

Facility Owner(s):

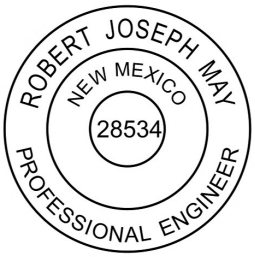
Name: **IMERYS PERLITE USA INC. (IMERYS)**
Address: **39360 HWY 285**
City, State, Zip Code: **TRES PIEDRAS, NM 87577**
Telephone Number: **719-376-5484**
Email address: **JON.GROVES@IMERYS.COM**

Appendix C
No Agua Mine Hydrologic Report

HYDROLOGIC REPORT
NO AGUA MINE

Prepared for: **IMERYS PERFORMANCE MINERALS AMERICAS (IMERYS)**

Prepared by: **MONTROSE ENVIRONMENTAL SOLUTIONS, INC.**



September 2025

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Appendix A – Hydrologic Calculations
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1 NARRATIVE

The No Agua facility is located on the eastern side of US Highway 285 and drains into three 12 digit HUC Subwatersheds. A location Map is included as Sheet 1. The area contains approximately eleven ephemeral streams which drain into three separate HUC12 watersheds. The overall drainage area plan is included as Sheet 2. The eastern portion of the facility drains to the Cerrito Negro, HUC12 130201010404 while the western portion drains to the Martinez Canyon-Arroyo Aguaje de la Petaca, HUC12 130201010802. The southernmost portion of the facility drains to the Canon de Tio Gordito-Arroyo Aguaje de la Petaca, HUC12 130201010803. A map showing the drainage divide of the HUC12 areas is included as Sheet 3. The site is located at the uppermost portions of these watersheds elevation wise.

Due to the grading that has occurred at the site, the current drainage patterns do not completely match the HUC12 watersheds. The South and West Hill grading has altered the drainage patterns between the Martinez Canyon-Arroyo Aguaje de la Petaca and the Canon de Tio Gordito-Arroyo Aguaje de la Petaca watersheds. The HUC12 watersheds show the drainage divide of these two watersheds bisecting the South Hill impoundment. We have changed the drainage area for Catchment 6 to define the portion not altered by the site grading (Catchment 6A), the portion draining to the West Hill impoundment (Catchment 6B), and the portion draining to the South Hill impoundment (Catchment 6C). According to the current topography of the site, all three of these areas would drain into the Martinez Canyon-Arroyo Aguaje de la Petaca watershed. A copy of a topographic comparison between the 1954 USGS Quadrangle Map and the current USGS Quadrangle Map is included in this report as Sheet 4. Per our analysis of these two topographic maps, the overall drainage patterns defined on the 1954 map match current conditions at the site.

Approximately four ephemeral streams flow from the facility to the Cerrito Negro watershed, four ephemeral streams flow to the Martinez Canyon-Arroyo Aguaje de la Petaca watershed, while two ephemeral stream flows to the Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed. Since these streams are ephemeral, they only flow during higher precipitation events. These ephemeral streams have not been reviewed for water quality. The nearest flowing waterbody that has been reviewed for water quality is the Rio Grande.
The Cerrito Negro watershed flows to the east and eventually drains directly into the Rio Grande approximately 2 miles north of Grant Besley Airport. The Rio Grande (Red River to CO Border) is impaired for temperature (AU ID MH-2119_05) at this location.

The Martinez Canyon-Arroyo Aguaje de la Petaca watershed drains south into the Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed which drains south southeast until it reaches the Rio Grande approximately 6 miles to the south of the Town of Carson. It drains through the Carson Reservoir – Arroyo Aguaje de la Petaca and Scott Arroyo – Arroyo Aguaje de La Petaca before entering the Rio Grande. This portion of the Rio Grande (Embudo Creek to Rio Pueblo de Taos) is impaired for Turbidity (NM-2111_12). A copy of the OpenEnviroMap with the HUC12 data is included below as Sheet 3.

The watersheds all drain to the same designated use area of the Rio Grande per 20.6.4.122 - RIO GRANDE BASIN: The main stem of the Rio Grande from Rio Pueblo de Taos upstream to the New Mexico-Colorado line. The designated uses are coldwater aquatic life, fish culture, irrigation, livestock watering, wildlife habitat and primary contact for this portion of the Rio Grande. Primary contact is any recreational use with prolonged contact with the water, such as swimming.
The NOAA Atlas 14 data for this location indicates a two-year, 24 hour storm event of 1.38 inches and a 100-year, 24 hour storm event of 3.01 inches. A copy of the NOAA Atlas 14 data is included in this report. Average annual precipitation is approximately 12.3 inches.

According to the National Cooperative Soil Survey, the project site is underlain by RRE – Rock outcrop-Raton, very stony complex, 15 to 30 percent slopes. This soil type has a hydrologic soil group of D. This soil group consists of basalt rock outcrops from volcanic cones.

A total of five outfalls are proposed post mine closure. The Fines Area and North Hill outfalls drain towards the east into the Cerrito Negro watershed. The Plant outfall, South Hill outfall, and West Hill Outfall drain to the west and south into the Martinez Canyon-Arroyo Aguaje de la Petaca watershed. No outfalls are proposed to drain directly into the Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed due to the grading changes made to the site over the lifetime of the mine. The overall drainage area plan is provided on Sheet 2.

The Fines Area outfall captures area that formerly drained to three separate ephemeral streams. A settling pond, diversion berms, stabilized swales, maintenance drive with swale, and 3:1 regrading are proposed to stabilize this area. The Fines Area Closeout Plan is provided on Sheet 5.

The South Hill outfall combines partial areas from three ephemeral streams. The existing excavation will be converted to a settling pond with no discharge due to the depth of the excavation. Additional water quality features include diversion berms, maintenance drive with swale, and stabilized swales. An outfall location indicates where runoff from the site will enter the ephemeral stream downhill of the site. The South Hill Closeout Plan is provided on Sheet 6.

The West Hill outfall combines partial areas from two ephemeral streams. The existing excavation will be converted to a settling pond with no discharge due to the depth of the excavation. Additional water quality features include diversion berms, maintenance drives with swales, and stabilized swales. An outfall location indicates where runoff from the site will enter the ephemeral stream downhill of the site. The West Hill Closeout Plan is provided on Sheet 7.

The Plant outfall combines partial areas from three ephemeral streams. Two settling ponds, diversion berms, stabilized swales, maintenance driveways with swale, and 3:1 regrading are proposed to stabilize this area. The plant area will be regraded at a maximum of 3:1 slope to drain to a settling pond in the north corner of this area. The proposed maintenance drive, with its integrated swale, will act as the perimeter control to ensure drainage reaches the settling pond. A large portion of the North Hill will be diverted to drain into the proposed settling pond. The portion of the haul road to the south of the plant area will be converted to a maintenance drive and drain into a settling pond. The Plant Area Closeout Plan is provided on Sheet 8.

The North Hill outfall drains towards the east and consists of runoff to two ephemeral streams. Diversion Berms, stabilized swales, maintenance drive with swale, and a settling pond are proposed for this area. The North Hill Closeout Plan is provided on Sheet 9.

Details of the proposed diversion berms, maintenance drive with swale, and stabilized swales are provided on Sheet 10.

All current haul roads will be revised to maintenance roads or removed during closeout of the mine. The areas previously disturbed by the maintenance roads will be amended with a reduced impervious width, stabilized channel, and restored area. The maintenance road will be graded to drain towards the stabilized channel. A detail of the conversion of the haul roads to maintenance road is provided on Sheet 10.

The riprap for the swales has been sized based upon Manning's equation and Equation 10 from the paper Riprap Design for Overtopping Flow by Steven Abt and Terry Johnson which states:

> D50=5.23S^(0.43)*q^(0.56) Where D50 is the median stone size, S is the swale slope, and q is the discharge through the swale. The paper recommends a factor of safety of 1.2 be utilized with this equation.

The dimensions and riprap sizing for the roadside swales are based upon RS-P1 since it has the largest drainage area draining to it. The swale calculations demonstrate a riprap stone with a D50 size of 5 inches will be required to stabilize the 100-year flow rate. This equates to a Class 1 Gradation per Table 705-1 of US DOT's FP-24 – Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects.

Sizing of the proposed settling ponds are based upon the drainage area and runoff volume draining to the settling pond. The total proposed drainage area to each of the ponds was delineated based upon the LIDAR survey information augmented with USGS topography. The cover type of Desert shrub range, fair was utilized based upon site visits, site photographs, and aerial photography. Type D hydrologic soil group was used per the National Cooperative Soil Survey. The footprint of each settling pond was delineated per the site topography. The 100-year volume to each settling pond was divided by the proposed footprint to determine the approximate depth of water required to store the 100-year storm. This provides a conservative footprint and depth of water for the settling ponds that should only get smaller with future design of the facilities.

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Appendix A – Hydrologic Calculations

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MONTROSE ENVIRONMENTAL

1140 Valley Forge Road, Phoenixville, PA 19460-2658
(610) 840-9100 - Fax (610) 840-9199

NO AGUA MINE

SETTLING POND DETAILS

SHEET: 1 OF 1		DATE:	7/16/2025
BY: RRP		REV:	
CHK'D: DTW			

SETTLING POND SUMMARY TABLE

SETTLING POND	DRAINAGE AREA (ACRES)	FOOTPRINT (SQUARE FEET)	FOOTPRINT (ACRES)	100-YR VOLUME (ACRE-FEET)	DEPTH* (FEET)
NORTH HILL EAST	35.6	73,400	1.69	4.96	2.94
NORTH HILL WEST	6.9	67,100	1.54	0.96	0.62
PLANT AREA NORTH	80.3	145,700	3.34	11.18	3.34
PLANT AREA SOUTH	42.4	86,800	1.99	5.90	2.96
FINES AREA	133.8	282,700	6.49	18.63	2.87
WEST HILL	139.7	223,000	5.12	19.45	3.80
SOUTH HILL	104.2	126,600	2.91	14.51	4.99

* DEPTH TO STORE THE 100-YEAR STORM EVENT VOLUME

MONTROSE ENVIRONMENTAL

1140 Valley Forge Road, Phoenixville, PA 19460-2658
(610) 840-9100 - Fax (610) 840-9199

NO AGUA MINE

SWALE SIZING

SHEET: 1 OF 2		DATE:	7/16/2025
BY: RRP		REV:	
CHK'D: DTW			

TRAPEZOIDAL DIVERSION/INTERCEPTOR CHANNEL DESIGN

CHANNEL OR CHANNEL SECTION	RS-P1	RS-P1			
Temporary or Permanent (T or P)	P	P			
Design Storm	100-YR	100-YR			
Drainage Area (AC)	68.30	68.30			
Qr (REQUIRED CAPACITY, CFS)	70.0	70.0			
Q (AT FLOW DEPTH d, CFS)	70.0	70.0			
PROTECTIVE LINING [2]	RIPRAP	RIPRAP			
Va (ALLOWABLE VELOCITY, FPS)	N/A	N/A			
V (AT FLOW DEPTH d, FPS)	3.9	9.0			
τa (MAX ALLOWABLE, PSF)	1.00	1.00			
τd (SHEAR STRESS AT d, PSF)	1.02	5.60			
CHANNEL BOTTOM WIDTH (FT)	6	6			
CHANNEL SIDE SLOPES (H:1V)	3	3			
D (TOTAL DEPTH, FT)	2.13	1.40			
CHANNEL TOP WIDTH @ D (FT)	18.80	14.38			
d (FLOW DEPTH IN FEET)	1.63	0.90			
CHANNEL TOP WIDTH @ d (FT)	15.80	11.38			
BOTTOM WIDTH:DEPTH RATIO (12:1 MAX)	3.7	6.7			
d50 STONE SIZE (IN)					
A (AREA IN SF)	17.8	7.8			
VEGETATIVE LINING RETARDANCE	C	C			
n (MANNING'S COEFFICIENT) **	0.040	0.040			
R (HYDRAULIC RADIUS)	1.09	0.67			
S (BED SLOPE, FT/FT) [3]	0.010	0.100			
Sc (CRITICAL SLOPE)	0.023	0.027			
.7Sc	0.016	0.019			
1.3Sc	0.030	0.036			
STABLE FLOW? (Y/N)	Y	Y',"N			
FREEBOARD (UNSTABLE FLOW, FT)	N/A	N/A			
FREEBOARD (STABLE FLOW, FT)	0.41	N/A			
MINIMUM REQUIRED FREEBOARD, FT[4]	0.50	0.50			
DESIGN METHOD FOR PROTECTIVE [5] LINING PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S			

MONTROSE ENVIRONMENTAL

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(610) 840-9100 - Fax (610) 840-9199

NO AGUA MINE

SWALE SIZING

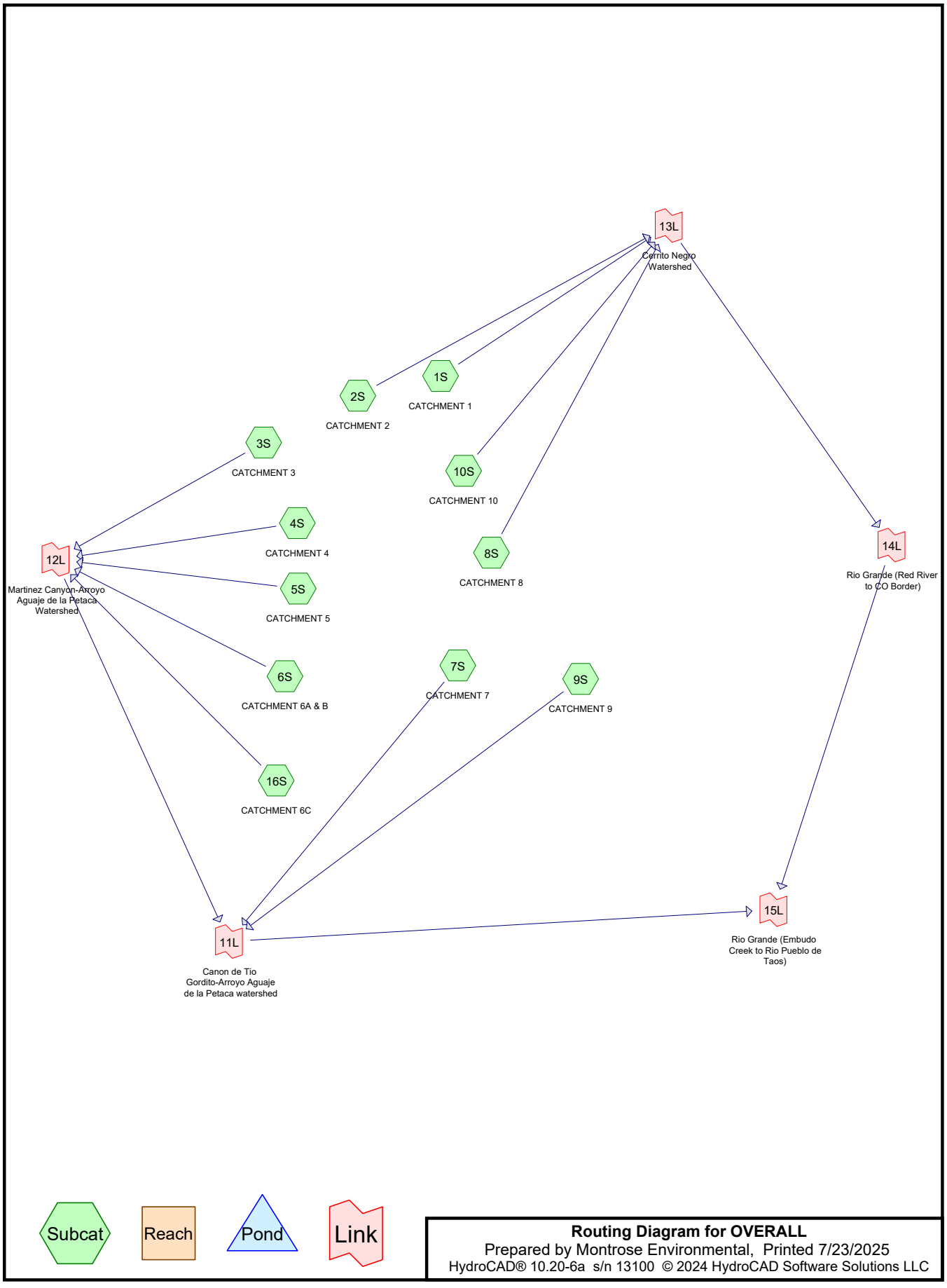
SHEET: 1 OF 1		DATE:	7/16/2025
BY: RRP		REV:	
CHK'D: DTW			

D50 SIZING

D50=5.23S^(0.43)*Q^0.56

SWALE	MAX SLOPE FT/FT	DISCHARGE CFS/FT	D50 IN	FLOW WIDTH	D50 WITH FOS IN
RS-P1	0.1	4.430767459	4.47	15.80	5

The riprap for the swales has been sized based upon Manning's equation and Equation 10 from the paper Riprap Design for Overtopping Flow by Steven Abt and Terry Johnson which states: D50=5.23S^(0.43)*q^(0.56) Where D50 is the median stone size, S is the swale slope, and q is the discharge through the swale. The paper recommends a factor of safety of 1.2 be utilized with this equation. The dimensions and riprap sizing for the roadside swales are based upon RS-P1 since it has the largest drainage area draining to it. The swale calculations demonstrate a riprap stone with a D50 size of 5 inches will be required to stabilize the 100-year flow rate. This equates to a Class 1 Gradation per Table 705-1 of US DOT's FP-24 – Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects.



Routing Diagram for OVERALL

Prepared by Montrose Environmental, Printed 7/23/2025

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Project Notes

Rainfall events imported from "NRCS2-Rain.txt" for 3082 NM Taos Zone 2
Rainfall events imported from "NRCS2-Rain.txt" for 3082 NM Taos Zone 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2,575.160	84	Desert shrub range, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 16S)
2,575.160	**84**	**TOTAL AREA**

Summary for Subcatchment 1S: CATCHMENT 1

Cerrito Negro watershed

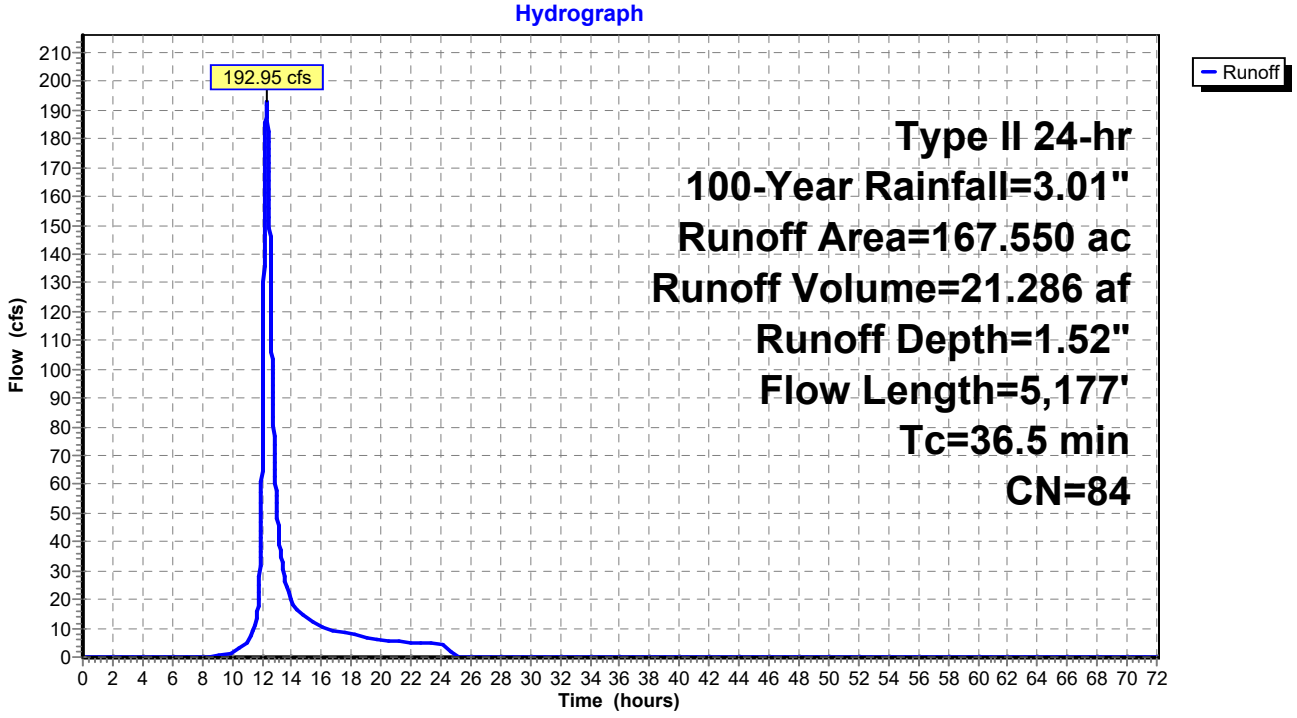
Runoff = 192.95 cfs @ 12.33 hrs, Volume= 21.286 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
167.550	84	Desert shrub range, Good, HSG D
167.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	300	0.0500	0.23		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
14.3	4,877	0.1240	5.67		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
36.5	5,177	Total			

Subcatchment 1S: CATCHMENT 1



Summary for Subcatchment 2S: CATCHMENT 2

Cerrito Negro watershed

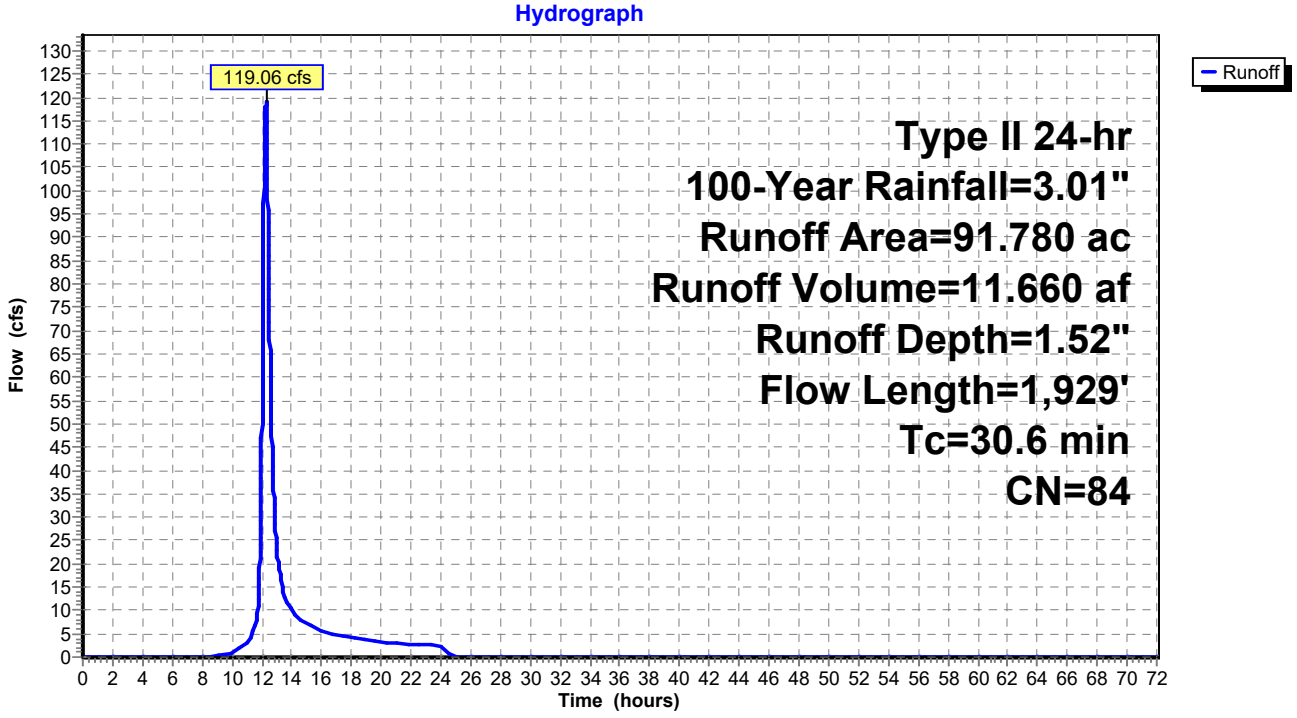
Runoff = 119.06 cfs @ 12.27 hrs, Volume= 11.660 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
91.780	84	Desert shrub range, Good, HSG D
91.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
7.4	1,629	0.0520	3.67		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
30.6	1,929	Total			

Subcatchment 2S: CATCHMENT 2



Summary for Subcatchment 3S: CATCHMENT 3

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

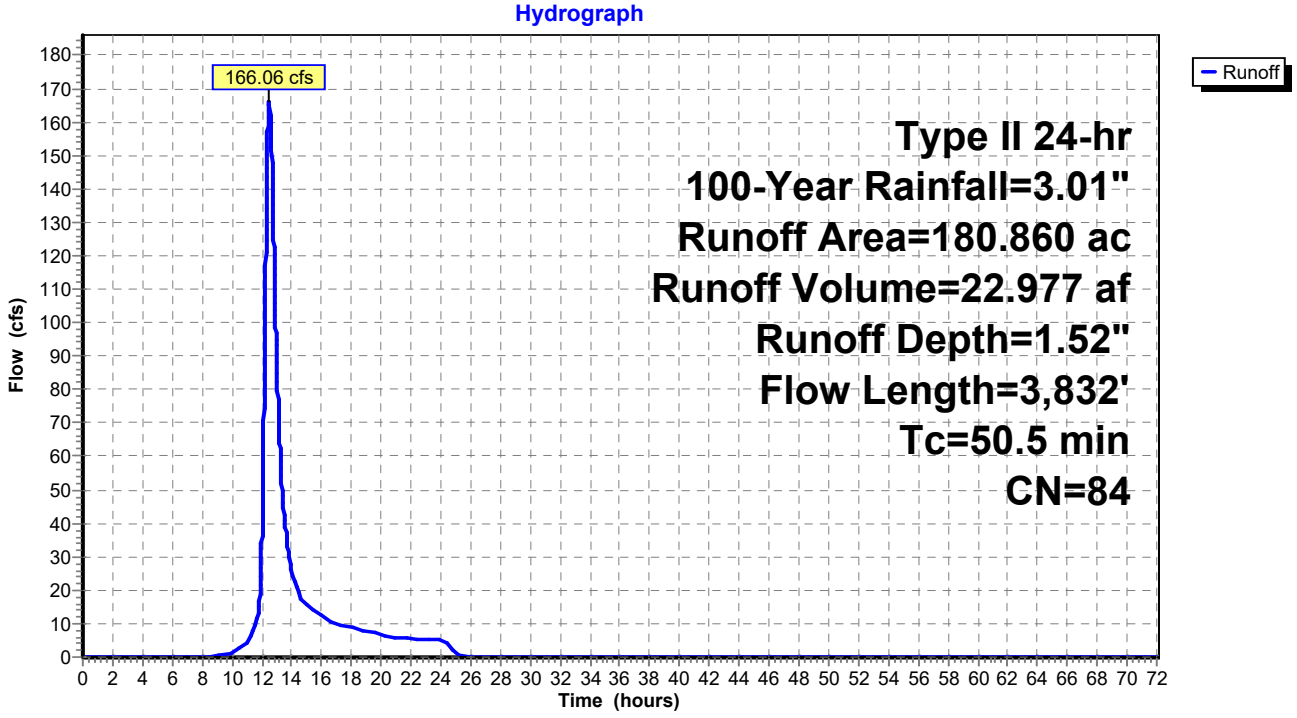
Runoff = 166.06 cfs @ 12.51 hrs, Volume= 22.977 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
180.860	84	Desert shrub range, Good, HSG D
180.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
27.3	3,532	0.0180	2.16		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
50.5	3,832	Total			

Subcatchment 3S: CATCHMENT 3



Summary for Subcatchment 4S: CATCHMENT 4

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

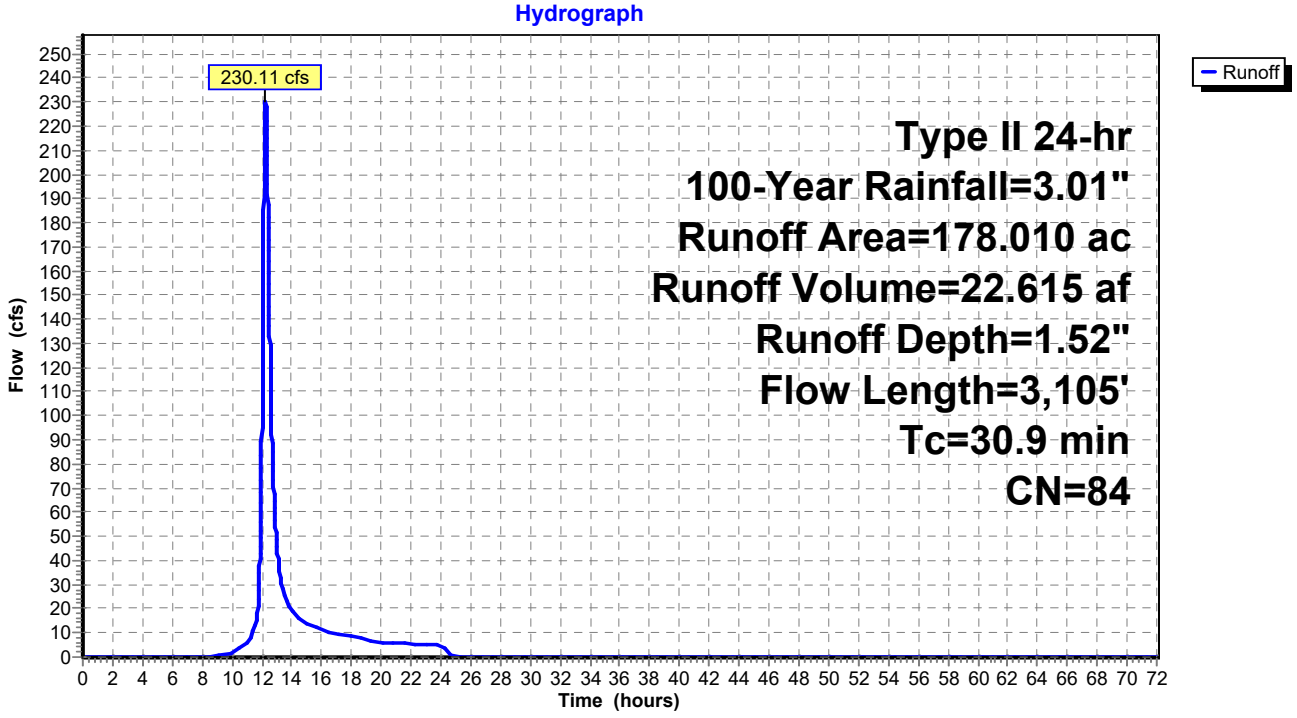
Runoff = 230.11 cfs @ 12.26 hrs, Volume= 22.615 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
178.010	84	Desert shrub range, Good, HSG D
178.010		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5	300	0.0790	0.27		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
12.4	2,805	0.0550	3.78		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
30.9	3,105	Total			

Subcatchment 4S: CATCHMENT 4



Summary for Subcatchment 5S: CATCHMENT 5

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

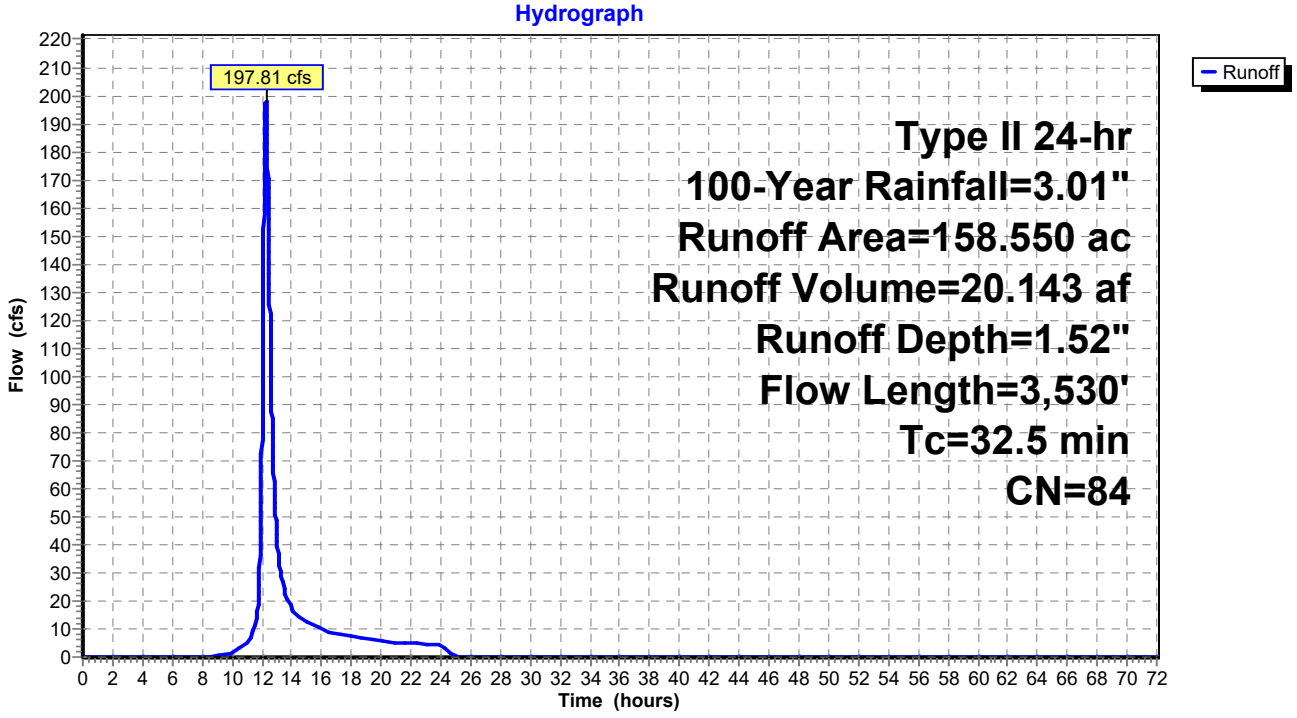
Runoff = 197.81 cfs @ 12.28 hrs, Volume= 20.143 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
158.550	84	Desert shrub range, Good, HSG D
158.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	300	0.0770	0.27		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
13.8	3,230	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
32.5	3,530	Total			

Subcatchment 5S: CATCHMENT 5



Summary for Subcatchment 6S: CATCHMENT 6A & B

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

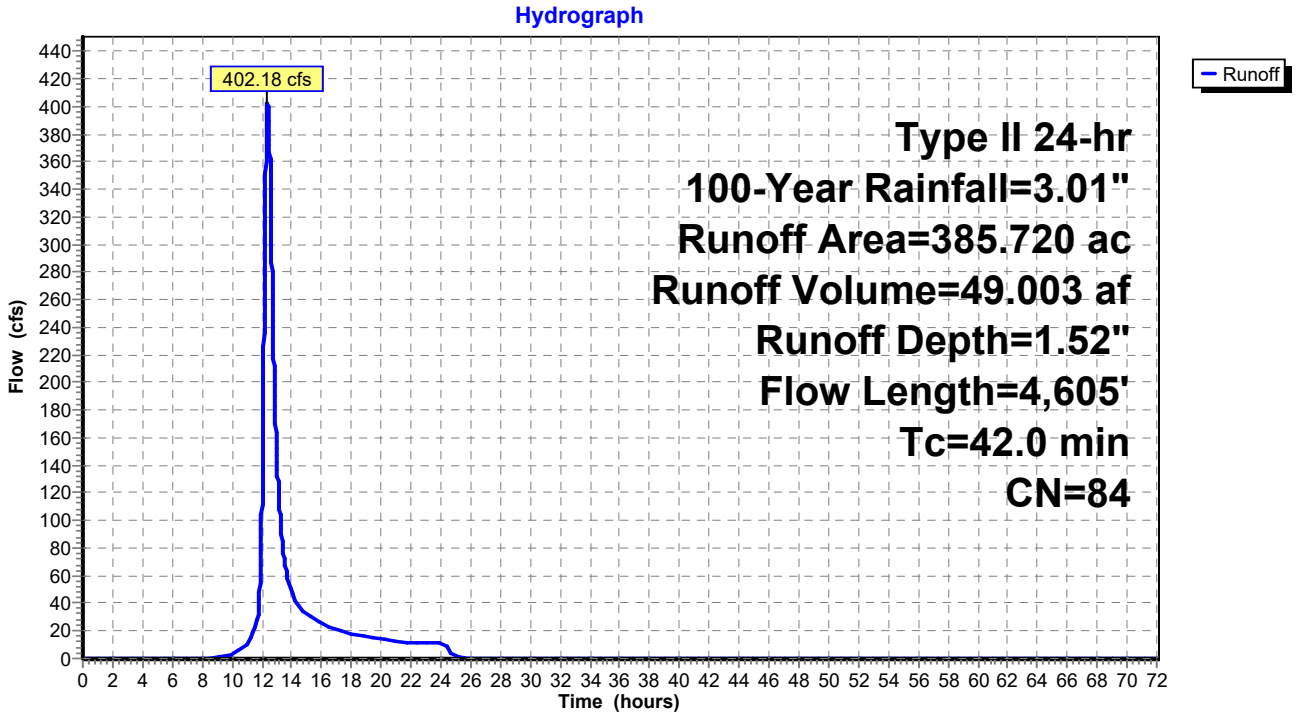
Runoff = 402.18 cfs @ 12.37 hrs, Volume= 49.003 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
158.640	84	Desert shrub range, Good, HSG D
154.810	84	Desert shrub range, Good, HSG D
72.270	84	Desert shrub range, Good, HSG D
385.720	84	Weighted Average
385.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
18.8	4,305	0.0560	3.81		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
42.0	4,605	Total			

Subcatchment 6S: CATCHMENT 6A & B



Summary for Subcatchment 7S: CATCHMENT 7

Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

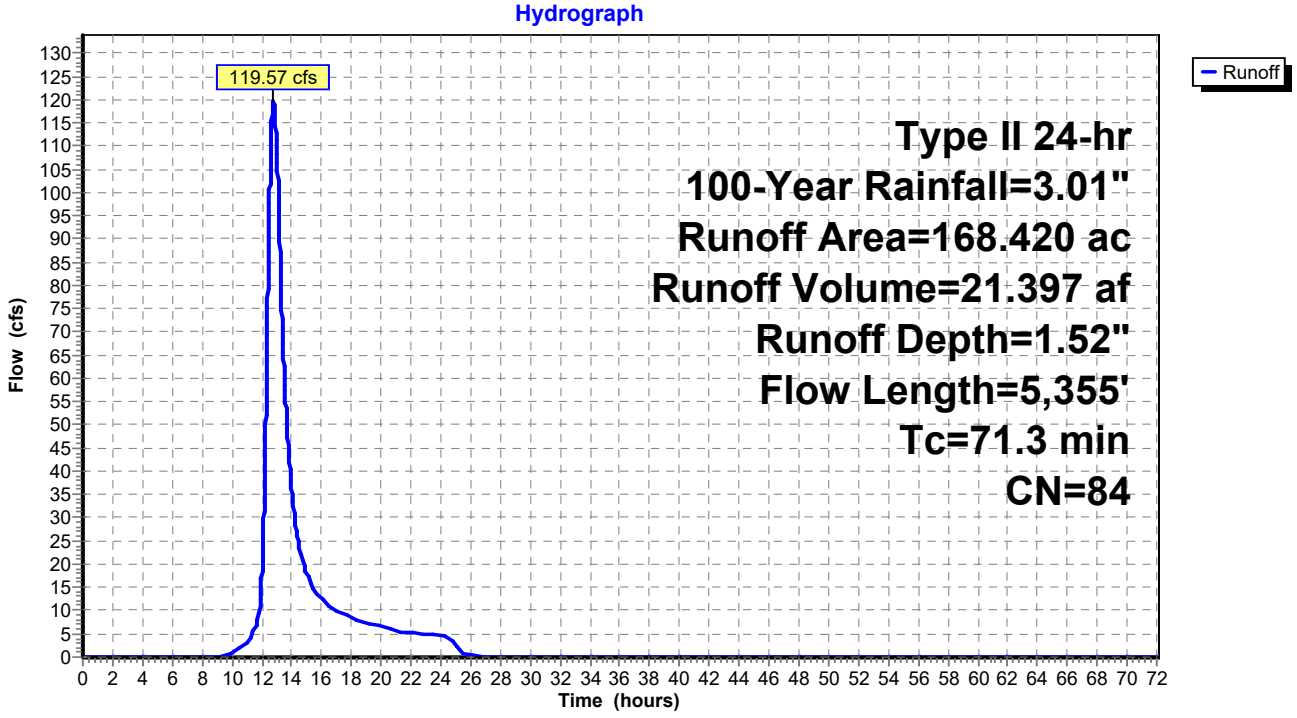
Runoff = 119.57 cfs @ 12.76 hrs, Volume= 21.397 af, Depth= 1.52"
Routed to Link 11L : Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
168.420	84	Desert shrub range, Good, HSG D
168.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	300	0.0150	0.14		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
35.3	5,055	0.0220	2.39		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
71.3	5,355	Total			

Subcatchment 7S: CATCHMENT 7



Summary for Subcatchment 8S: CATCHMENT 8

Cerrito Negro watershed

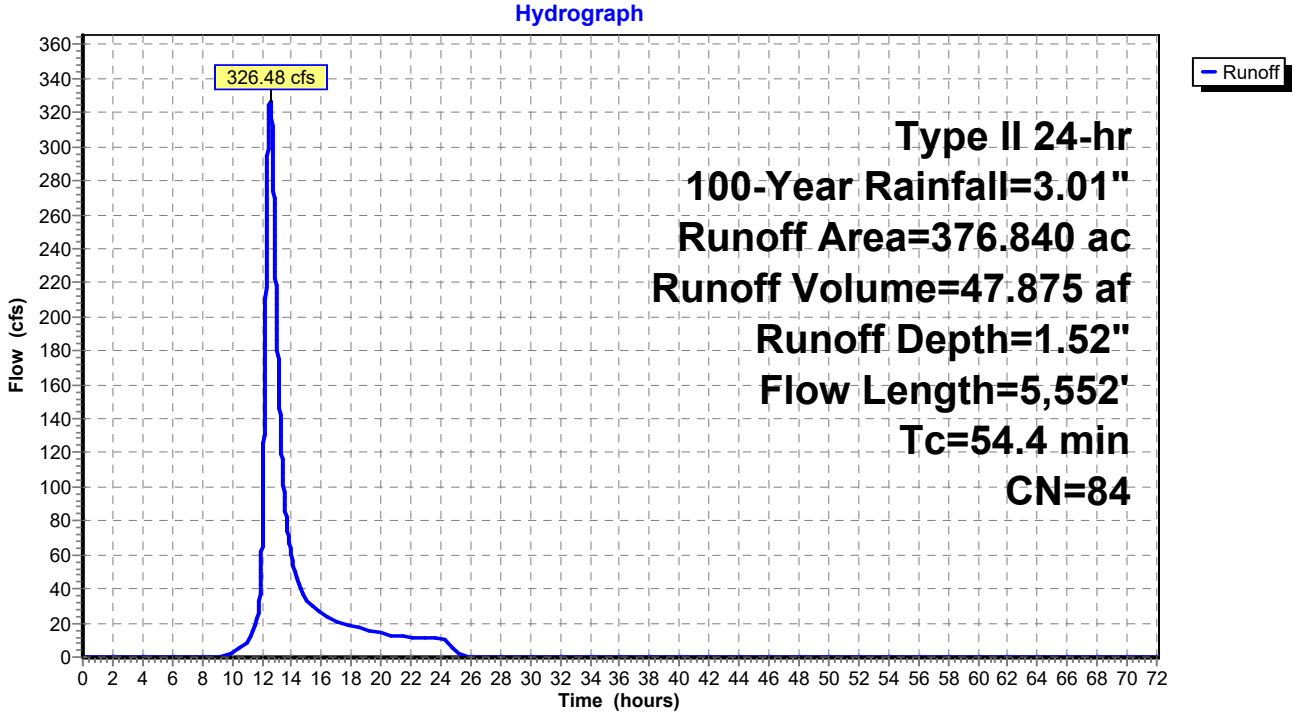
Runoff = 326.48 cfs @ 12.57 hrs, Volume= 47.875 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
376.840	84	Desert shrub range, Good, HSG D
376.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	300	0.0410	0.21		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
30.4	5,252	0.0320	2.88		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
54.4	5,552	Total			

Subcatchment 8S: CATCHMENT 8



Summary for Subcatchment 9S: CATCHMENT 9

Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

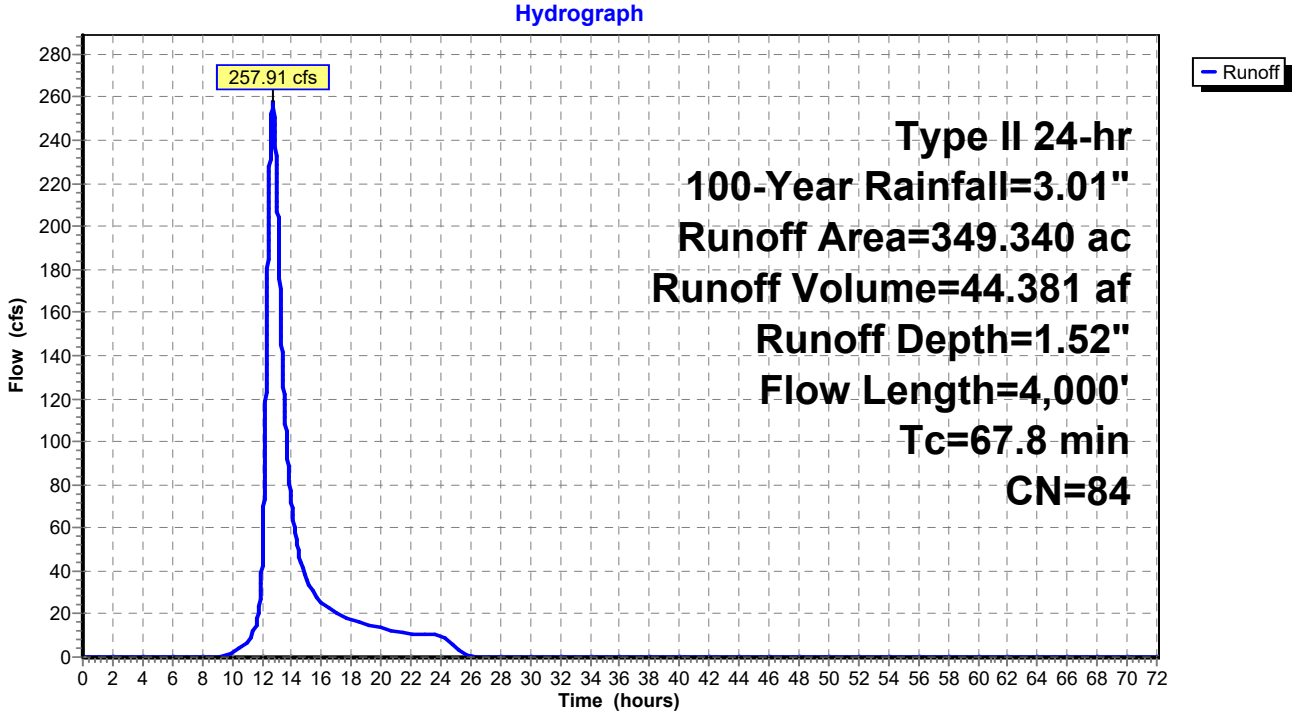
Runoff = 257.91 cfs @ 12.73 hrs, Volume= 44.381 af, Depth= 1.52"
Routed to Link 11L : Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
349.340	84	Desert shrub range, Good, HSG D
349.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.3	300	0.0120	0.13		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
28.5	3,700	0.0180	2.16		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
67.8	4,000	Total			

Subcatchment 9S: CATCHMENT 9



Summary for Subcatchment 10S: CATCHMENT 10

Cerrito Negro watershed

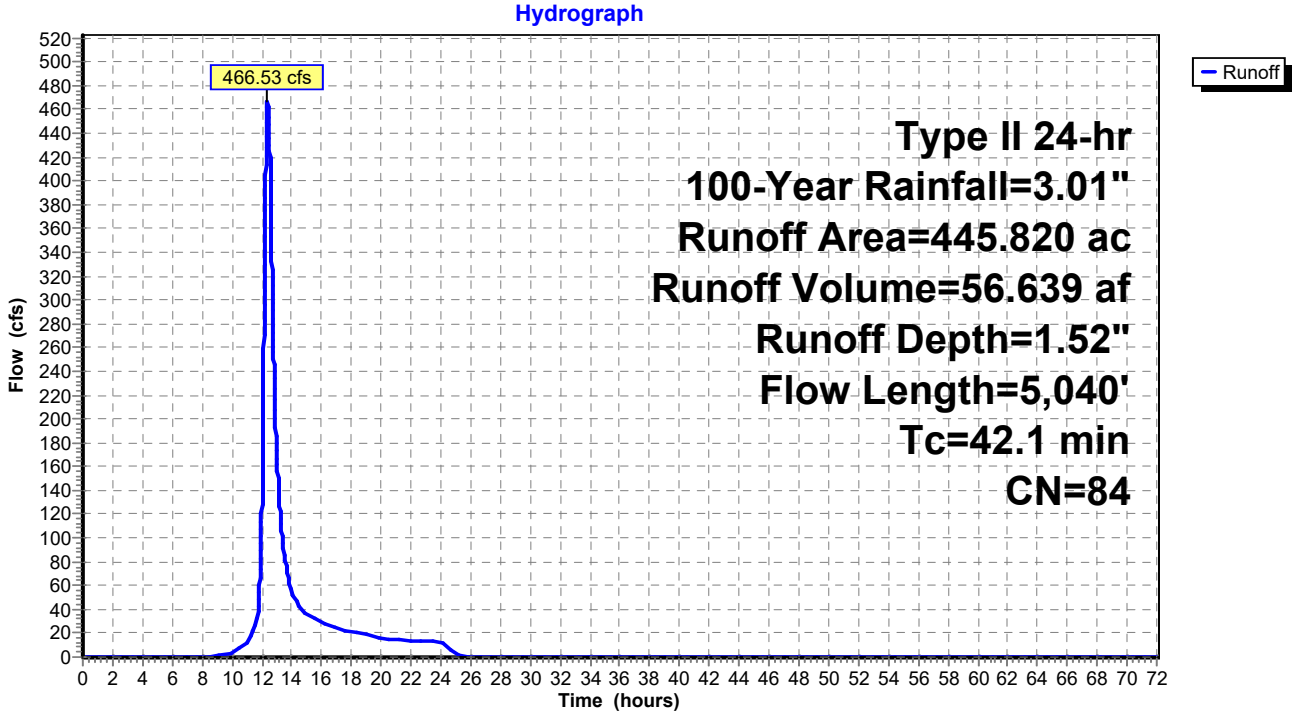
Runoff = 466.53 cfs @ 12.40 hrs, Volume= 56.639 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
445.820	84	Desert shrub range, Good, HSG D
445.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	300	0.0390	0.20		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
17.6	4,740	0.0780	4.50		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
42.1	5,040	Total			

Subcatchment 10S: CATCHMENT 10



Summary for Subcatchment 16S: CATCHMENT 6C

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

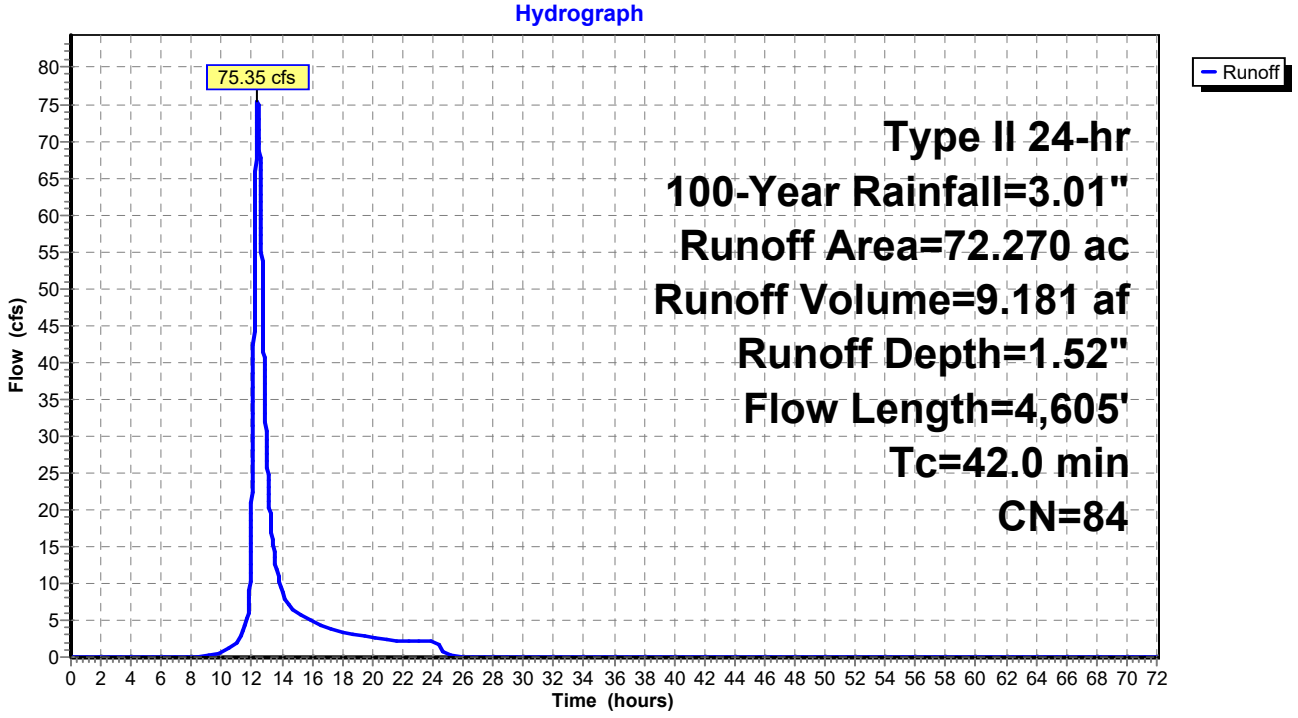
Runoff = 75.35 cfs @ 12.37 hrs, Volume= 9.181 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
72.270	84	Desert shrub range, Good, HSG D
72.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
18.8	4,305	0.0560	3.81		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
42.0	4,605	Total			

Subcatchment 16S: CATCHMENT 6C



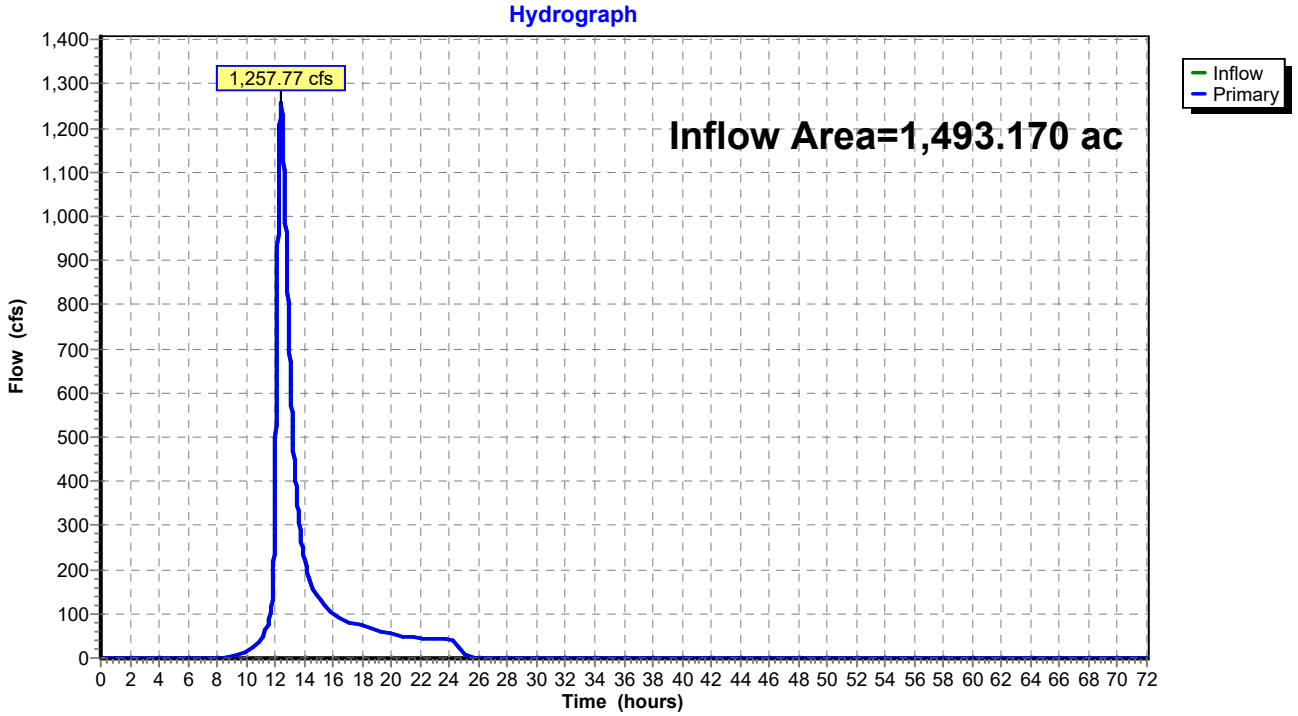
Summary for Link 11L: Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

TO RIO GRANDE

Inflow Area = 1,493.170 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 1,257.77 cfs @ 12.40 hrs, Volume= 189.698 af
Primary = 1,257.77 cfs @ 12.40 hrs, Volume= 189.698 af, Atten= 0%, Lag= 0.0 min
Routed to Link 15L : Rio Grande (Embudo Creek to Rio Pueblo de Taos)

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 11L: Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed



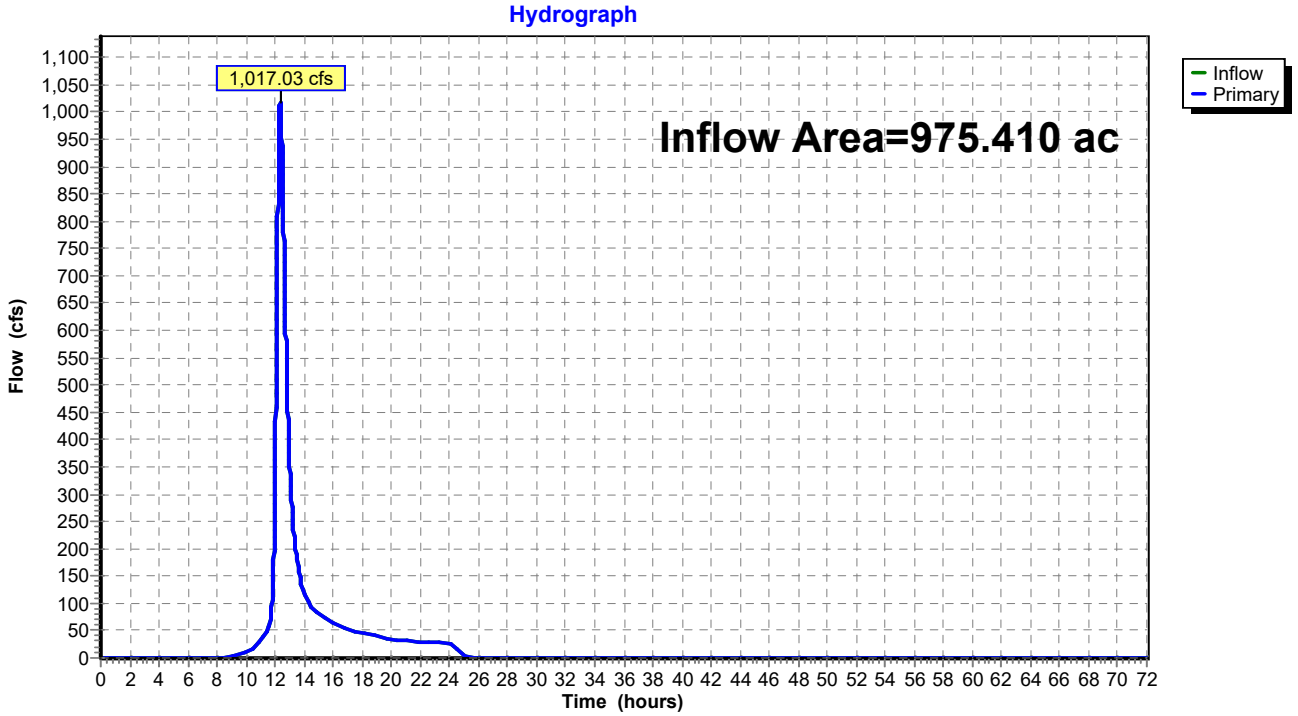
Summary for Link 12L: Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

FLOW TO ARRO AGUAJE DE LA PETACA

Inflow Area = 975.410 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 1,017.03 cfs @ 12.35 hrs, Volume= 123.919 af
Primary = 1,017.03 cfs @ 12.35 hrs, Volume= 123.919 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 12L: Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

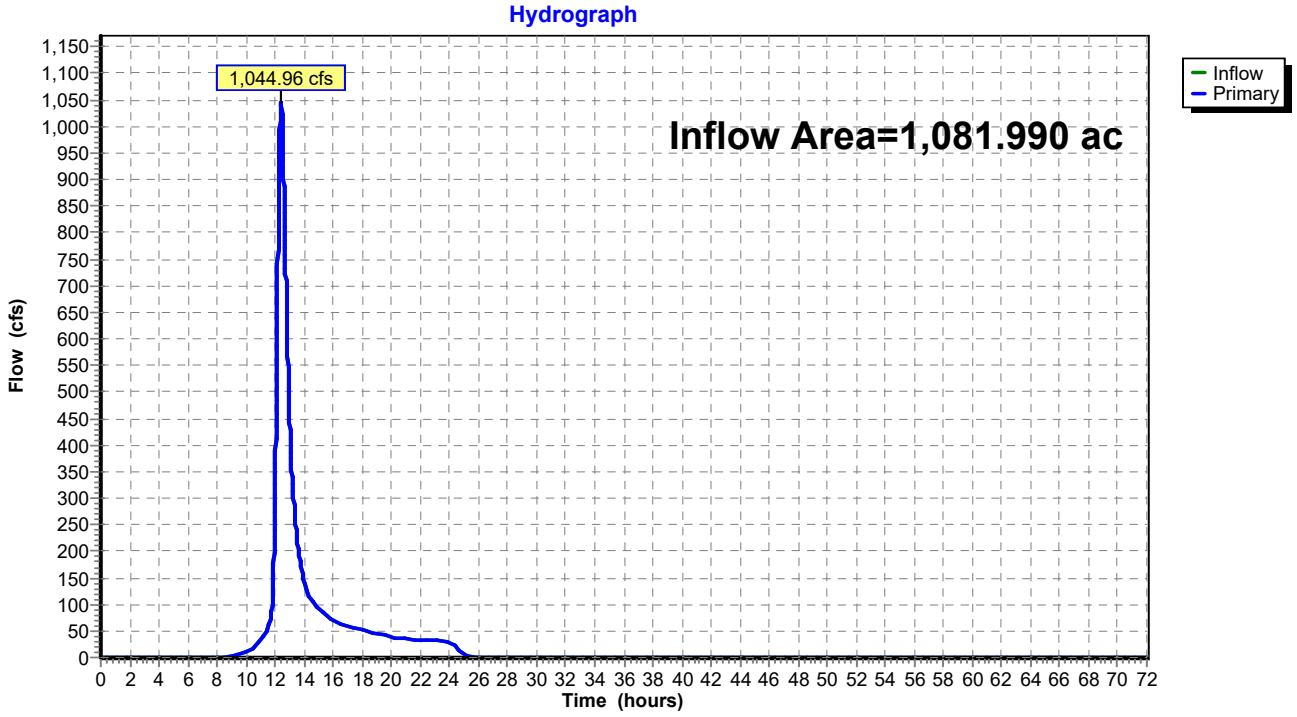


Summary for Link 13L: Cerrito Negro Watershed

Inflow Area = 1,081.990 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 1,044.96 cfs @ 12.40 hrs, Volume= 137.460 af
Primary = 1,044.96 cfs @ 12.40 hrs, Volume= 137.460 af, Atten= 0%, Lag= 0.0 min
Routed to Link 14L : Rio Grande (Red River to CO Border)

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 13L: Cerrito Negro Watershed

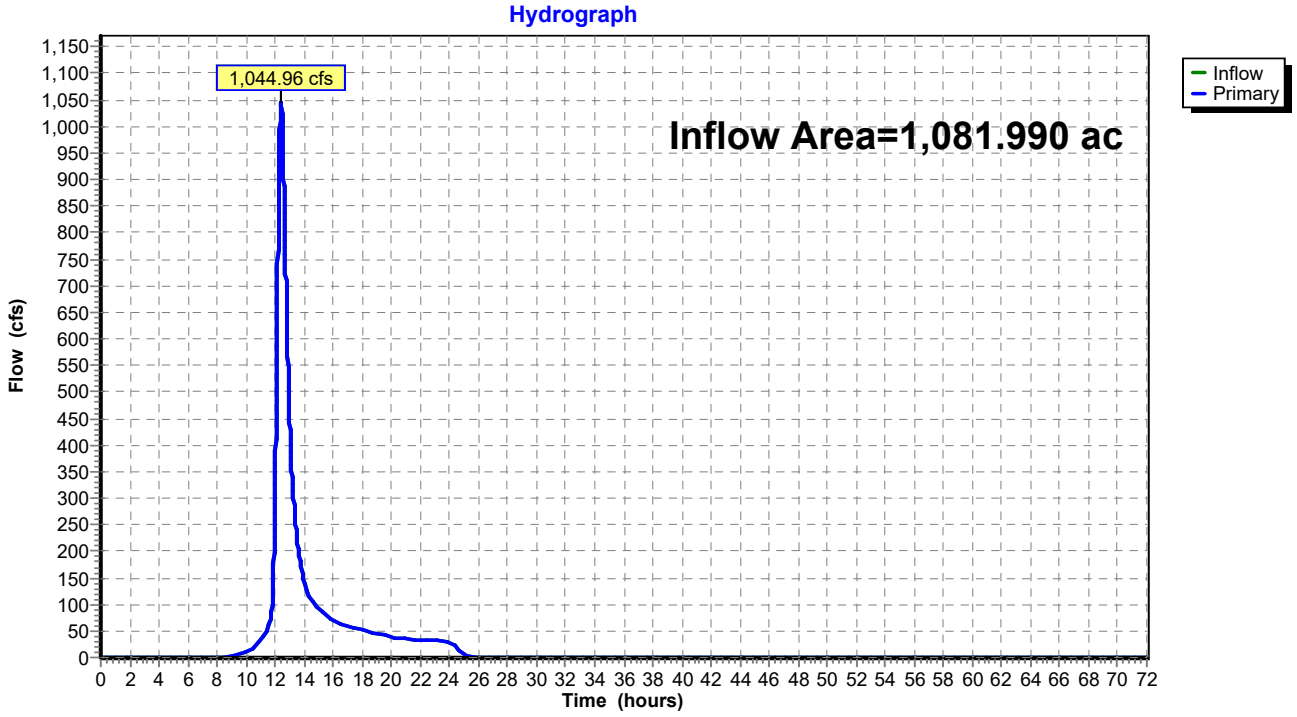


Summary for Link 14L: Rio Grande (Red River to CO Border)

Inflow Area = 1,081.990 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 1,044.96 cfs @ 12.40 hrs, Volume= 137.460 af
Primary = 1,044.96 cfs @ 12.40 hrs, Volume= 137.460 af, Atten= 0%, Lag= 0.0 min
Routed to Link 15L : Rio Grande (Embudo Creek to Rio Pueblo de Taos)

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 14L: Rio Grande (Red River to CO Border)

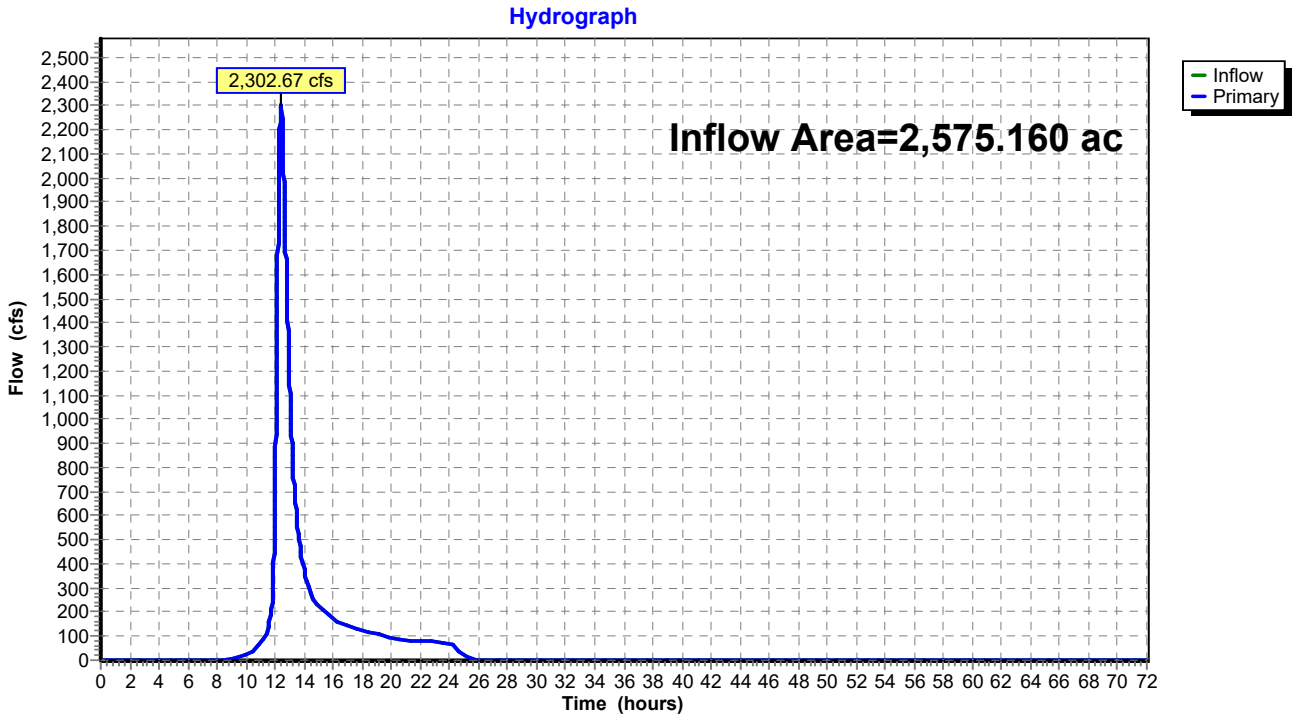


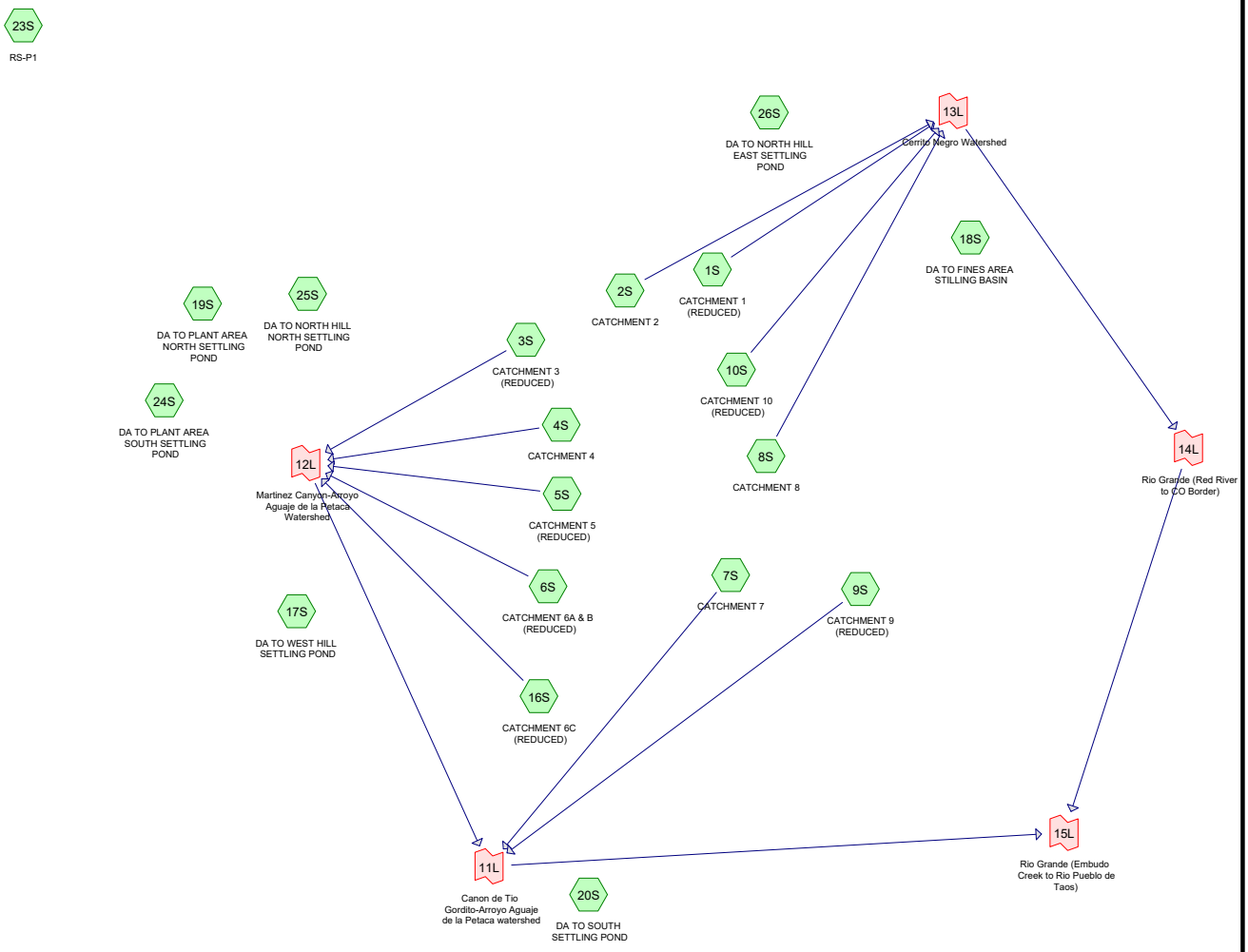
Summary for Link 15L: Rio Grande (Embudo Creek to Rio Pueblo de Taos)

Inflow Area = 2,575.160 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 2,302.67 cfs @ 12.40 hrs, Volume= 327.157 af
Primary = 2,302.67 cfs @ 12.40 hrs, Volume= 327.157 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 15L: Rio Grande (Embudo Creek to Rio Pueblo de Taos)





Subcat Reach Pond Link

Routing Diagram for CLOSEOUT CONDITIONS
Prepared by Montrose Environmental, Printed 7/23/2025
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Project Notes

Rainfall events imported from "NRCS2-Rain.txt" for 3082 NM Taos Zone 2
Rainfall events imported from "NRCS2-Rain.txt" for 3082 NM Taos Zone 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
611.200	86	Desert shrub range, Fair, HSG D (17S, 18S, 19S, 20S, 23S, 24S, 25S, 26S)
2,108.860	84	Desert shrub range, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 16S)
2,720.060	**84**	**TOTAL AREA**

Summary for Subcatchment 1S: CATCHMENT 1 (REDUCED)

Cerrito Negro watershed

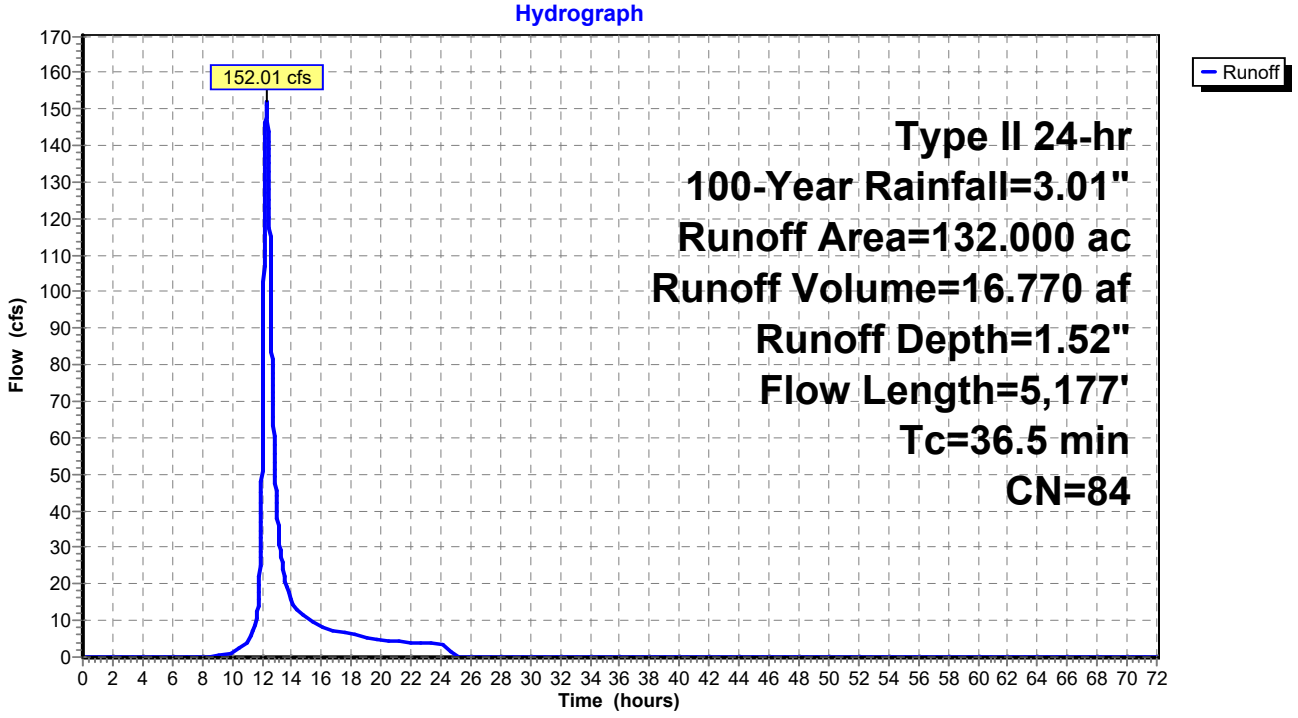
Runoff = 152.01 cfs @ 12.33 hrs, Volume= 16.770 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
132.000	84	Desert shrub range, Good, HSG D
132.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	300	0.0500	0.23		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
14.3	4,877	0.1240	5.67		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
36.5	5,177	Total			

Subcatchment 1S: CATCHMENT 1 (REDUCED)



Summary for Subcatchment 2S: CATCHMENT 2

Cerrito Negro watershed

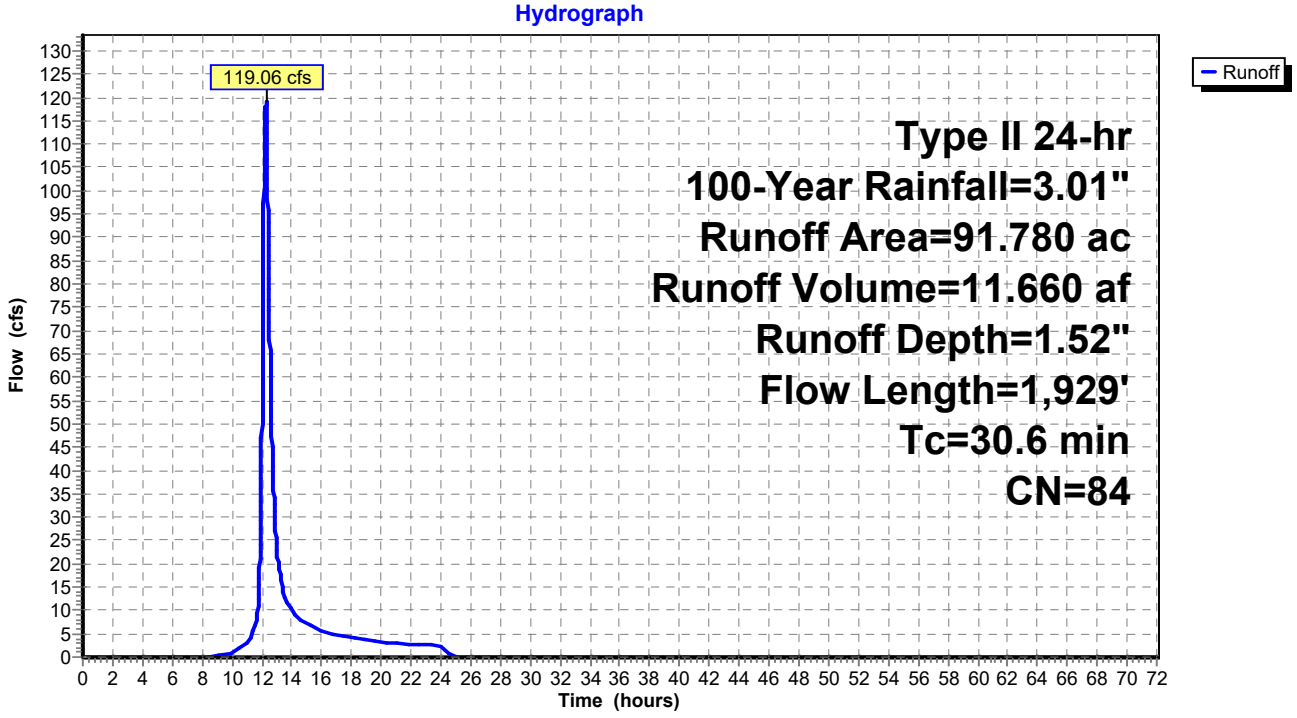
Runoff = 119.06 cfs @ 12.27 hrs, Volume= 11.660 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
91.780	84	Desert shrub range, Good, HSG D
91.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
7.4	1,629	0.0520	3.67		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
30.6	1,929	Total			

Subcatchment 2S: CATCHMENT 2



Summary for Subcatchment 3S: CATCHMENT 3 (REDUCED)

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

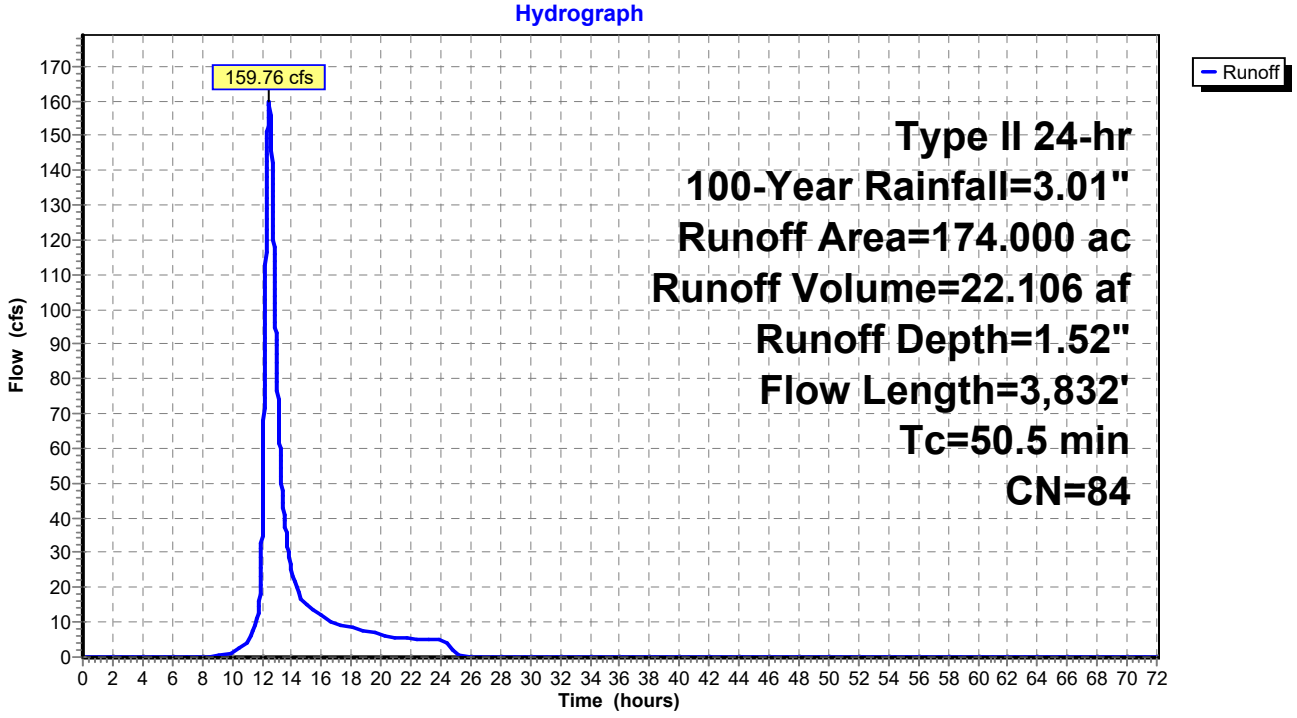
Runoff = 159.76 cfs @ 12.51 hrs, Volume= 22.106 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
174.000	84	Desert shrub range, Good, HSG D
174.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
27.3	3,532	0.0180	2.16		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
50.5	3,832	Total			

Subcatchment 3S: CATCHMENT 3 (REDUCED)



Summary for Subcatchment 4S: CATCHMENT 4

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

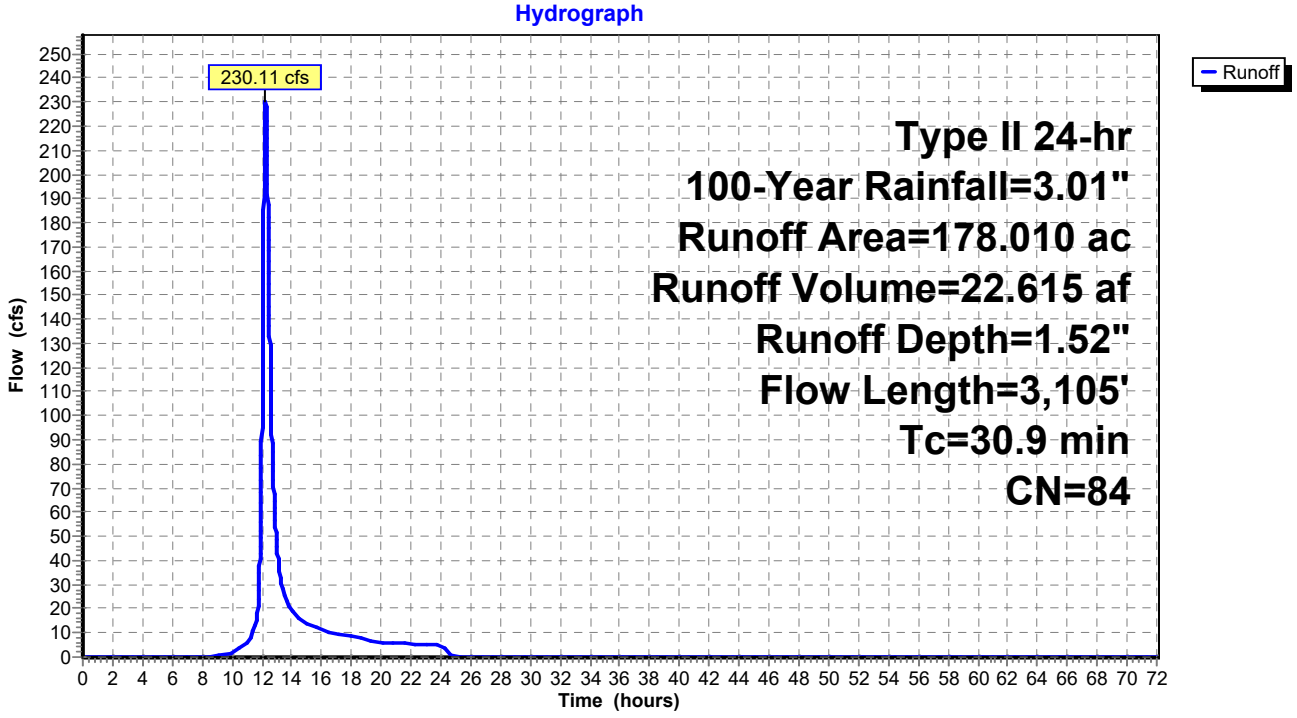
Runoff = 230.11 cfs @ 12.26 hrs, Volume= 22.615 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
178.010	84	Desert shrub range, Good, HSG D
178.010		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5	300	0.0790	0.27		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
12.4	2,805	0.0550	3.78		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
30.9	3,105	Total			

Subcatchment 4S: CATCHMENT 4



Summary for Subcatchment 5S: CATCHMENT 5 (REDUCED)

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

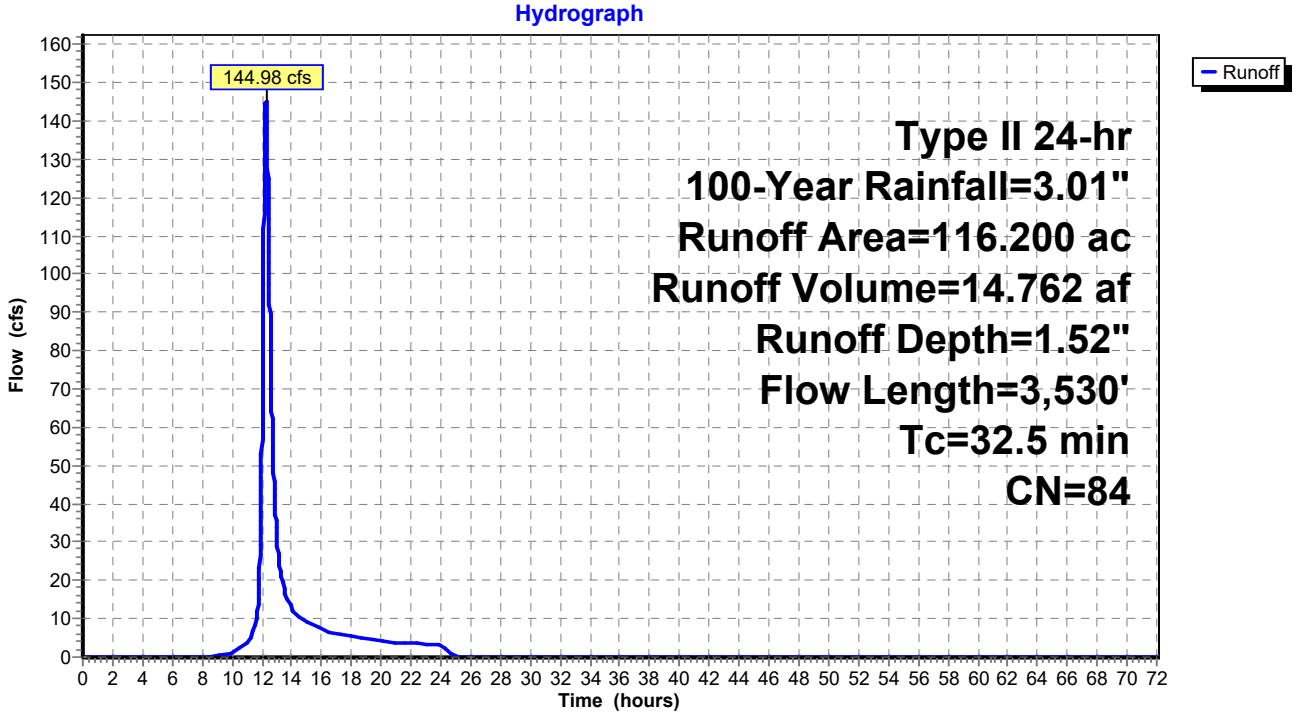
Runoff = 144.98 cfs @ 12.28 hrs, Volume= 14.762 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
116.200	84	Desert shrub range, Good, HSG D
116.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	300	0.0770	0.27		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
13.8	3,230	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
32.5	3,530	Total			

Subcatchment 5S: CATCHMENT 5 (REDUCED)



Summary for Subcatchment 6S: CATCHMENT 6A & B (REDUCED)

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

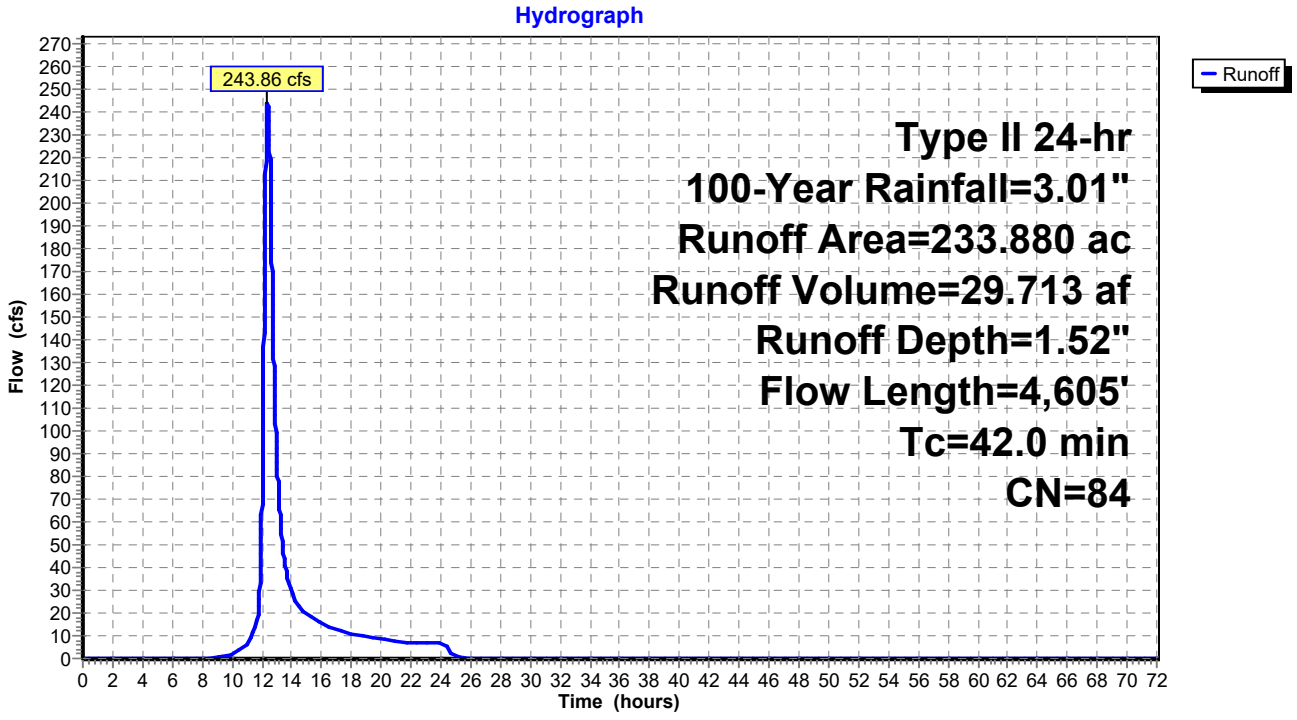
Runoff = 243.86 cfs @ 12.37 hrs, Volume= 29.713 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
15.110	84	Desert shrub range, Good, HSG D
146.500	84	Desert shrub range, Good, HSG D
72.270	84	Desert shrub range, Good, HSG D
233.880	84	Weighted Average
233.880		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
18.8	4,305	0.0560	3.81		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
42.0	4,605	Total			

Subcatchment 6S: CATCHMENT 6A & B (REDUCED)



Summary for Subcatchment 7S: CATCHMENT 7

Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

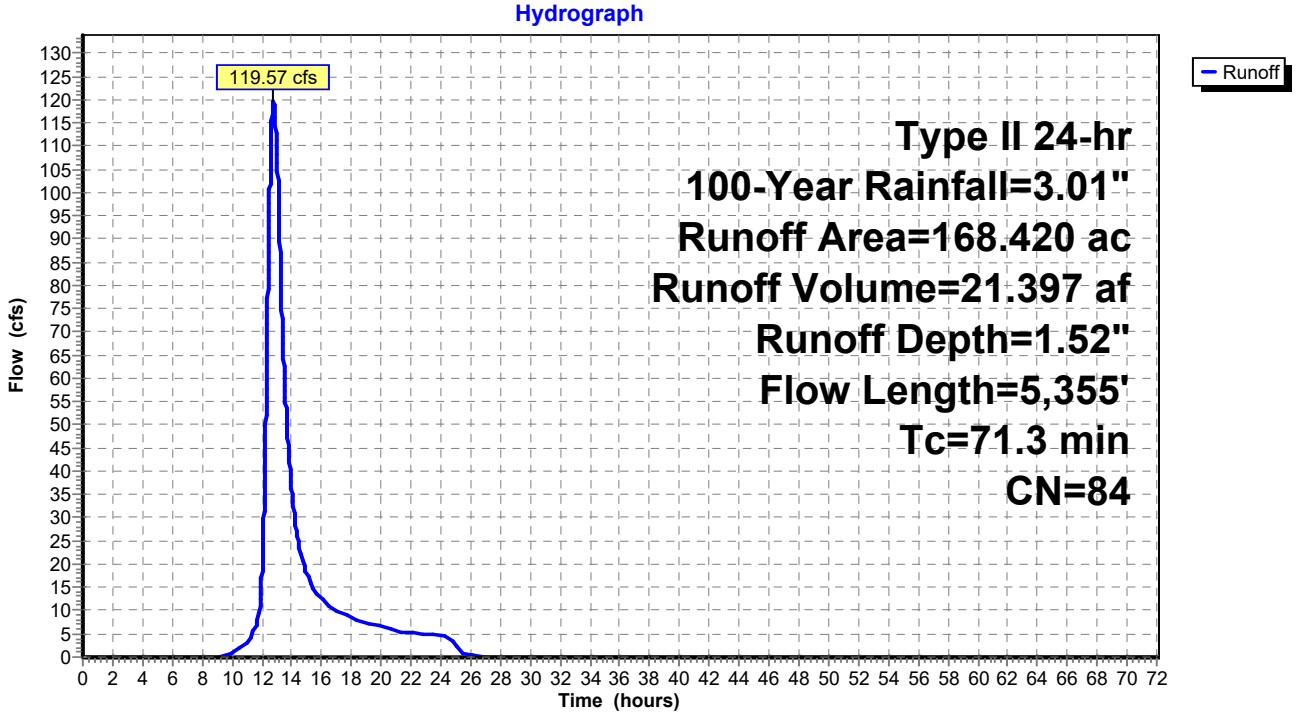
Runoff = 119.57 cfs @ 12.76 hrs, Volume= 21.397 af, Depth= 1.52"
Routed to Link 11L : Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
168.420	84	Desert shrub range, Good, HSG D
168.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	300	0.0150	0.14		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
35.3	5,055	0.0220	2.39		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
71.3	5,355	Total			

Subcatchment 7S: CATCHMENT 7



Summary for Subcatchment 8S: CATCHMENT 8

Cerrito Negro watershed

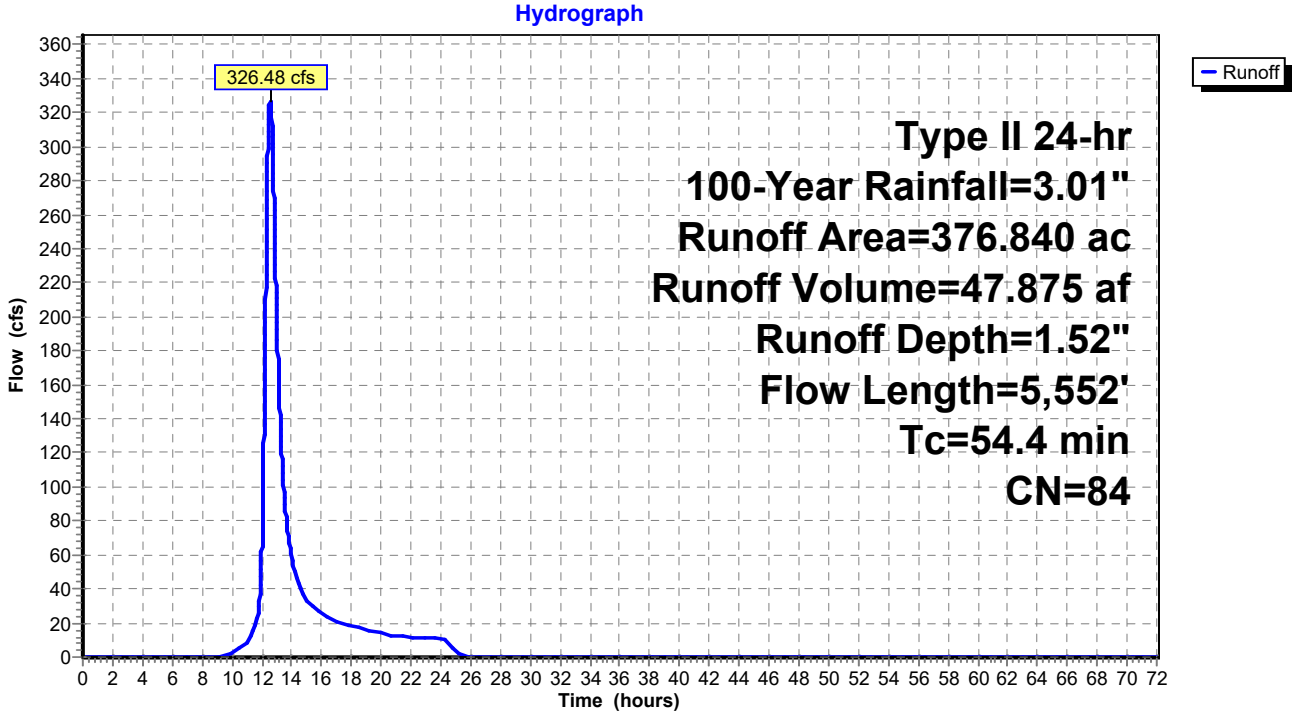
Runoff = 326.48 cfs @ 12.57 hrs, Volume= 47.875 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
376.840	84	Desert shrub range, Good, HSG D
376.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0	300	0.0410	0.21		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
30.4	5,252	0.0320	2.88		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
54.4	5,552	Total			

Subcatchment 8S: CATCHMENT 8



Summary for Subcatchment 9S: CATCHMENT 9 (REDUCED)

Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

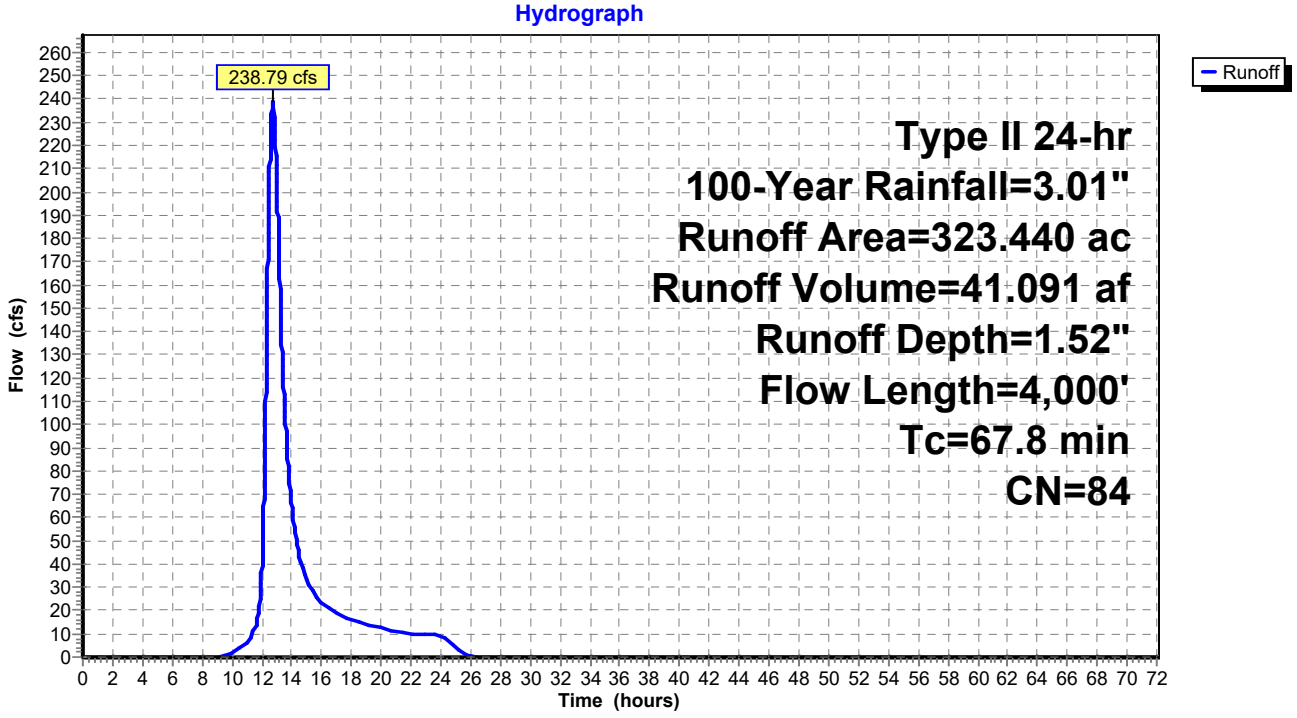
Runoff = 238.79 cfs @ 12.73 hrs, Volume= 41.091 af, Depth= 1.52"
Routed to Link 11L : Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
323.440	84	Desert shrub range, Good, HSG D
323.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.3	300	0.0120	0.13		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
28.5	3,700	0.0180	2.16		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
67.8	4,000	Total			

Subcatchment 9S: CATCHMENT 9 (REDUCED)



Summary for Subcatchment 10S: CATCHMENT 10 (REDUCED)

Cerrito Negro watershed

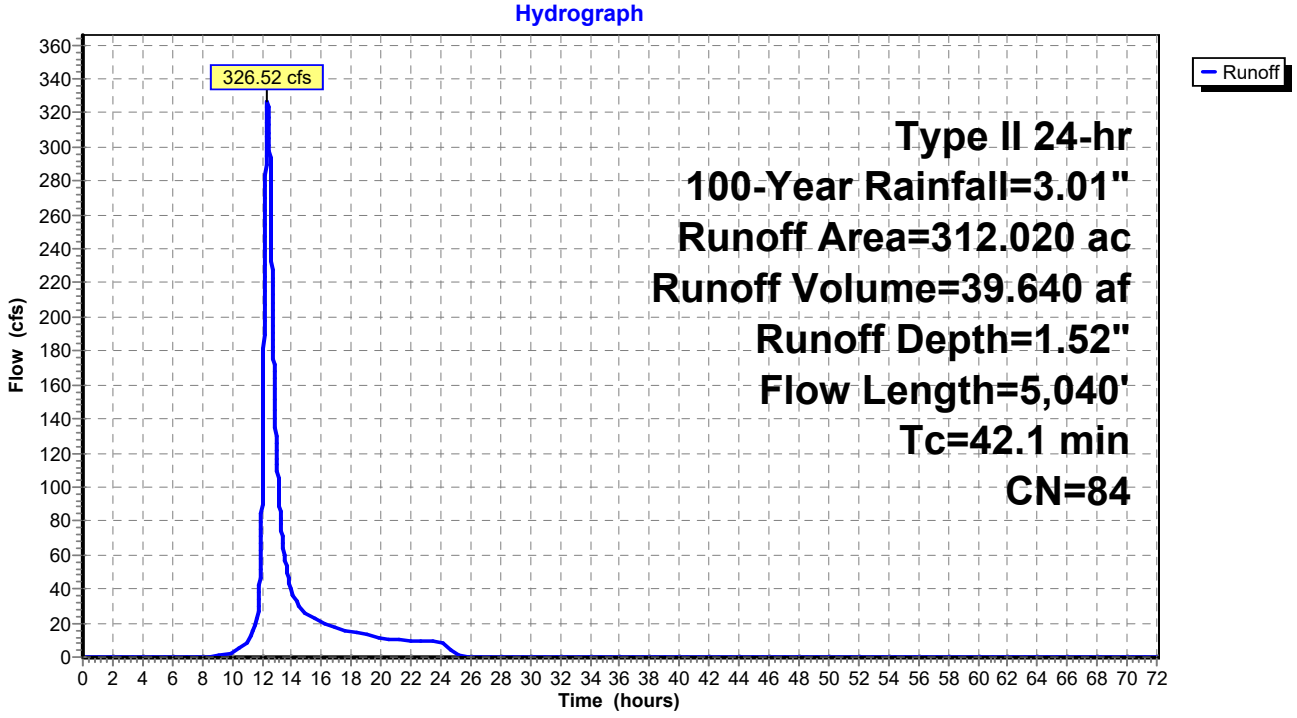
Runoff = 326.52 cfs @ 12.40 hrs, Volume= 39.640 af, Depth= 1.52"
Routed to Link 13L : Cerrito Negro Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
312.020	84	Desert shrub range, Good, HSG D
312.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	300	0.0390	0.20		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
17.6	4,740	0.0780	4.50		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
42.1	5,040	Total			

Subcatchment 10S: CATCHMENT 10 (REDUCED)



Summary for Subcatchment 16S: CATCHMENT 6C (REDUCED)

Martinez Canyon-Arroyo Aguaje de la Petaca watershed

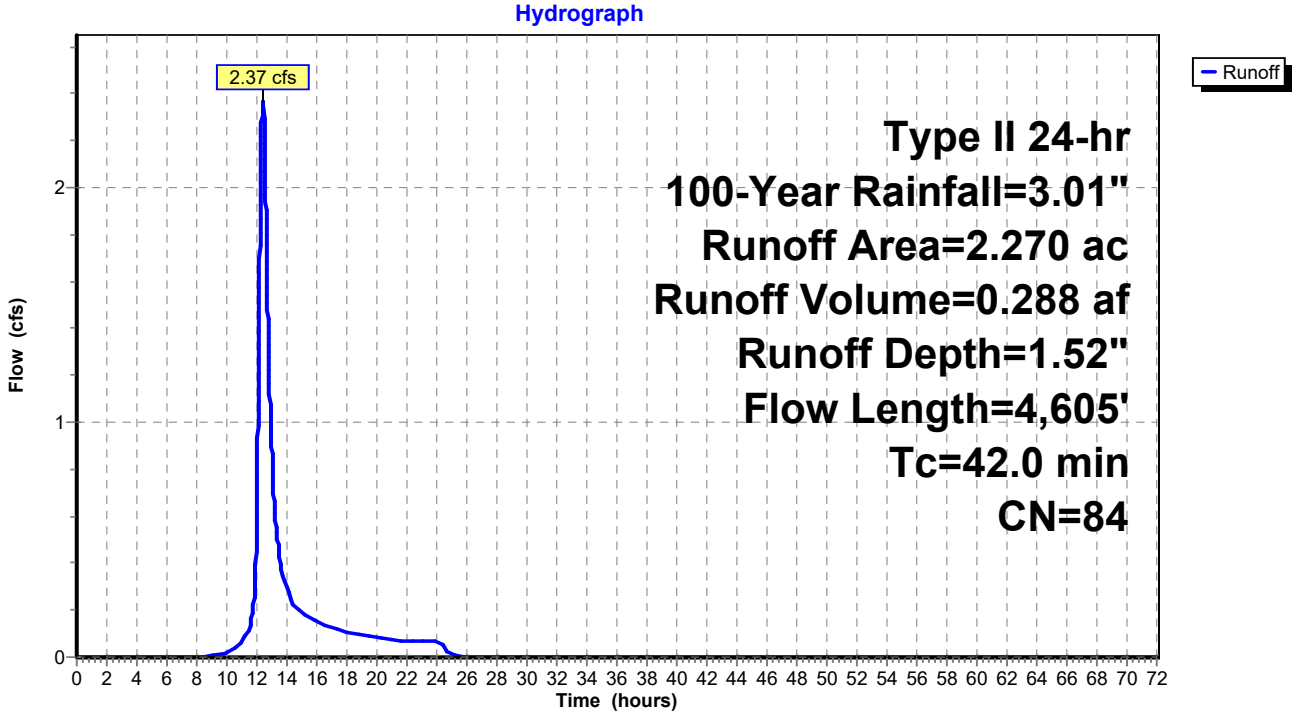
Runoff = 2.37 cfs @ 12.37 hrs, Volume= 0.288 af, Depth= 1.52"
Routed to Link 12L : Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
2.270	84	Desert shrub range, Good, HSG D
2.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	300	0.0450	0.22		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
18.8	4,305	0.0560	3.81		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
42.0	4,605	Total			

Subcatchment 16S: CATCHMENT 6C (REDUCED)



Summary for Subcatchment 17S: DA TO WEST HILL SETTLING POND

PORTIONS OF CATCHMENTS 6B

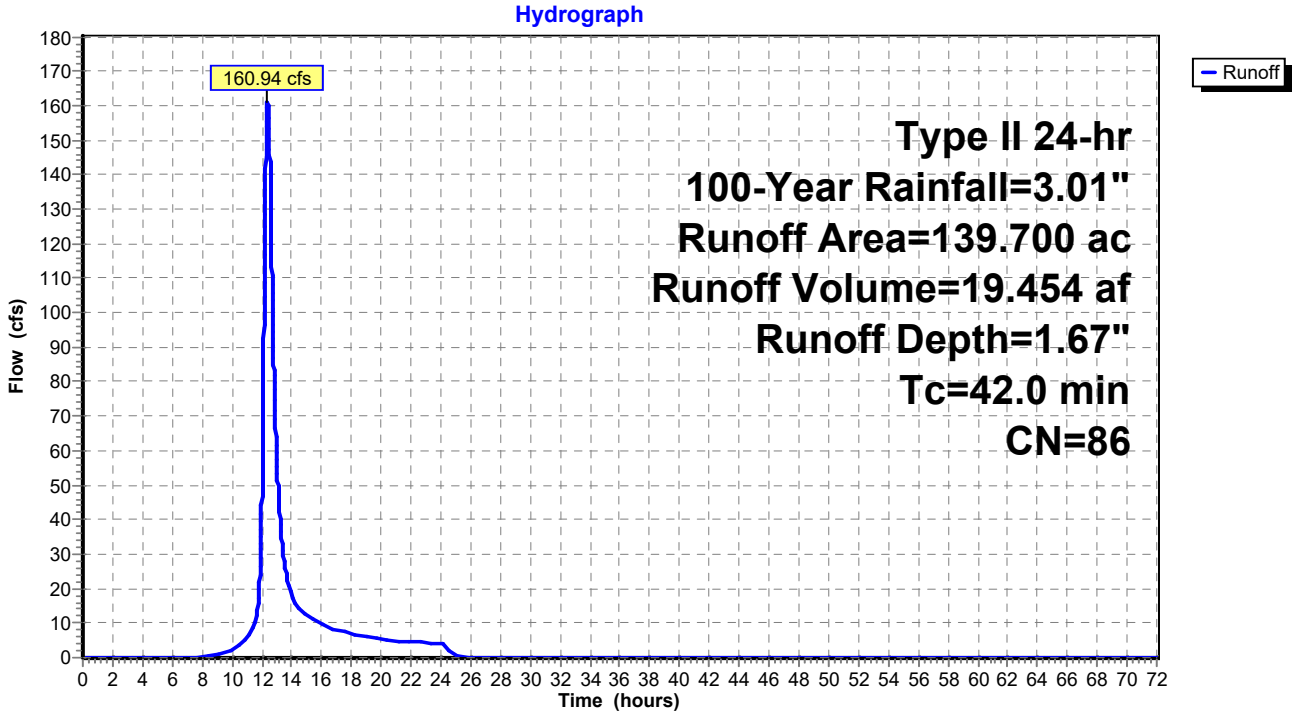
Runoff = 160.94 cfs @ 12.37 hrs, Volume= 19.454 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
139.700	86	Desert shrub range, Fair, HSG D
139.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.0					**Direct Entry, MATCH EXISTING**

Subcatchment 17S: DA TO WEST HILL SETTLING POND



Summary for Subcatchment 18S: DA TO FINES AREA STILLING BASIN

PORTIONS OF CATCHMENTS 10

[47] Hint: Peak is 206% of capacity of segment #3

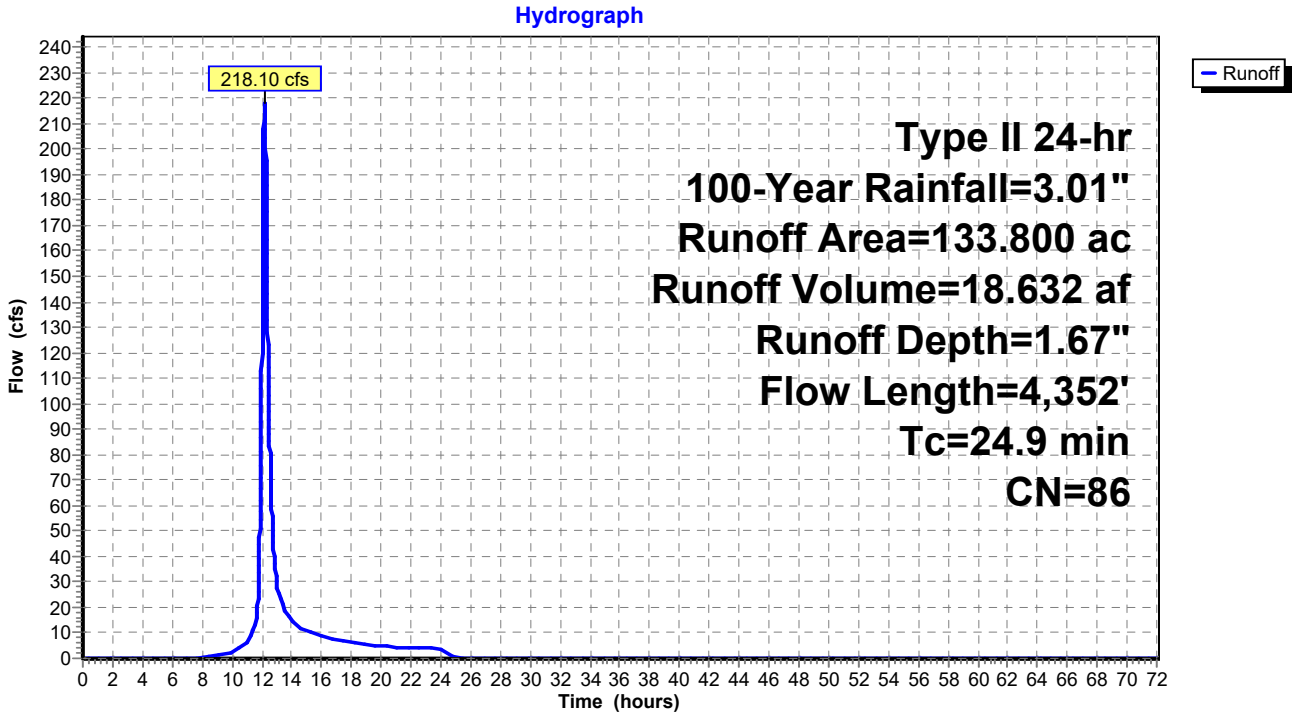
Runoff = 218.10 cfs @ 12.18 hrs, Volume= 18.632 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
133.800	86	Desert shrub range, Fair, HSG D
133.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	300	0.3000	0.46		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
7.5	1,422	0.1000	3.16		**Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps
5.0	1,315	0.0300	4.41	105.92	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
1.6	1,315	0.3000	13.96	334.95	**Trap/Vee/Rect Channel Flow, E-F** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
24.9	4,352	Total			

Subcatchment 18S: DA TO FINES AREA STILLING BASIN



Summary for Subcatchment 19S: DA TO PLANT AREA NORTH SETTLING POND

PORTIONS OF CATCHMENTS 2, 3, 4

[47] Hint: Peak is 111% of capacity of segment #3

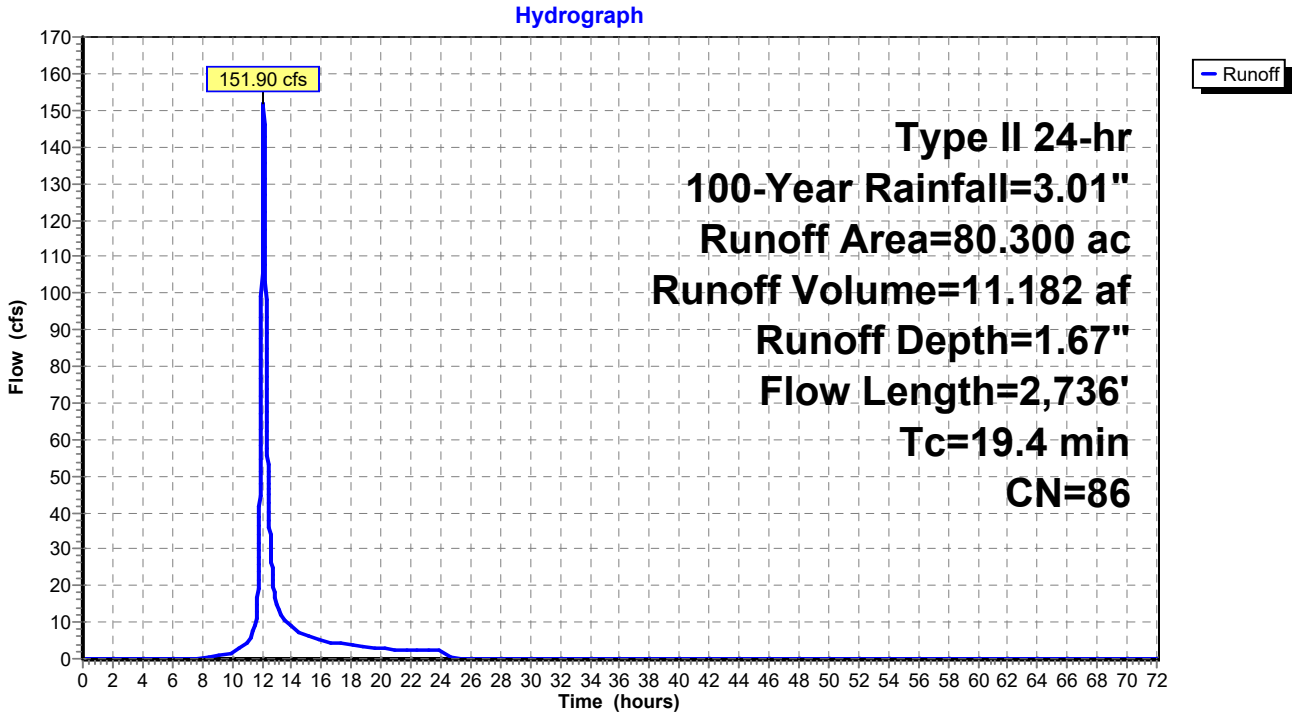
Runoff = 151.90 cfs @ 12.12 hrs, Volume= 11.182 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
80.300	86	Desert shrub range, Fair, HSG D
80.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	300	0.2300	0.41		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
3.7	1,212	0.3000	5.48		**Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps
3.6	1,224	0.0500	5.70	136.74	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
19.4	2,736	Total			

Subcatchment 19S: DA TO PLANT AREA NORTH SETTLING POND



Summary for Subcatchment 20S: DA TO SOUTH SETTLING POND

PORTIONS OF CATCHMENTS 6B AND 6C

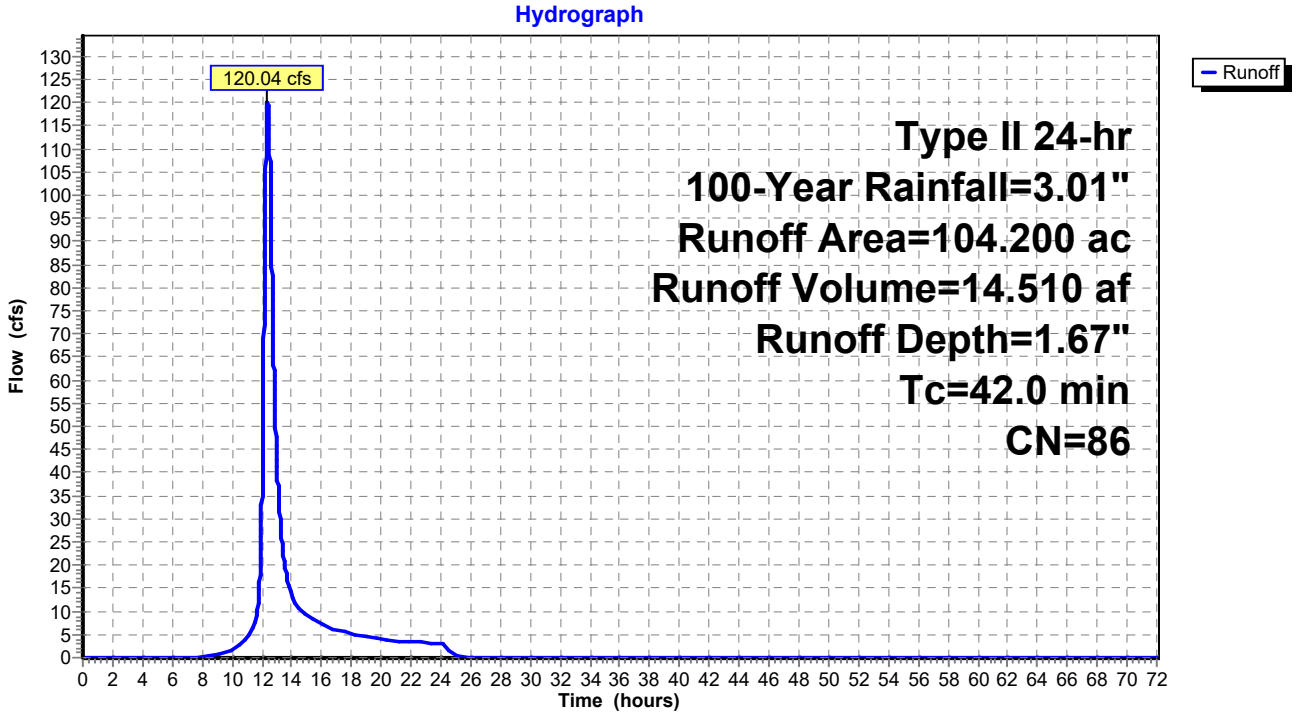
Runoff = 120.04 cfs @ 12.37 hrs, Volume= 14.510 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
104.200	86	Desert shrub range, Fair, HSG D
104.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.0					**Direct Entry, MATCH EXISTING**

Subcatchment 20S: DA TO SOUTH SETTLING POND



Summary for Subcatchment 23S: RS-P1

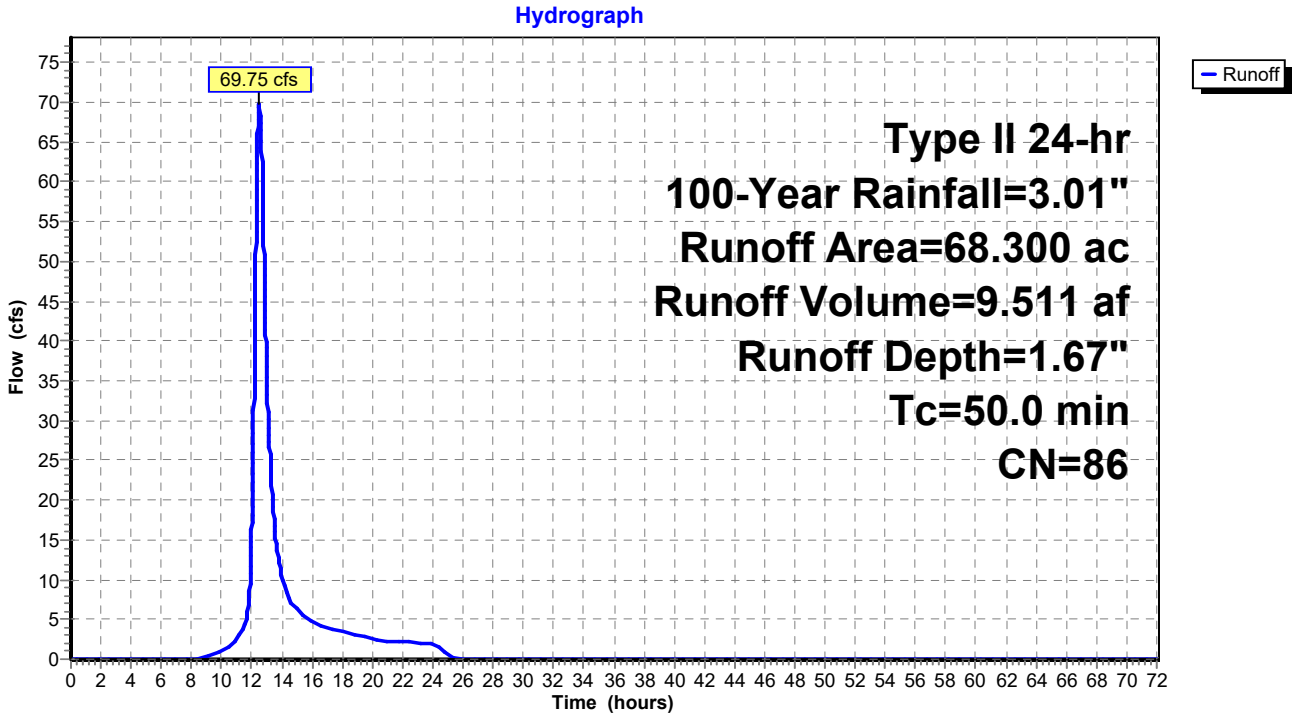
Runoff = 69.75 cfs @ 12.50 hrs, Volume= 9.511 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
68.300	86	Desert shrub range, Fair, HSG D
68.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
50.0					**Direct Entry,**

Subcatchment 23S: RS-P1



Summary for Subcatchment 24S: DA TO PLANT AREA SOUTH SETTLING POND

PORTIONS OF CATCHMENT 5

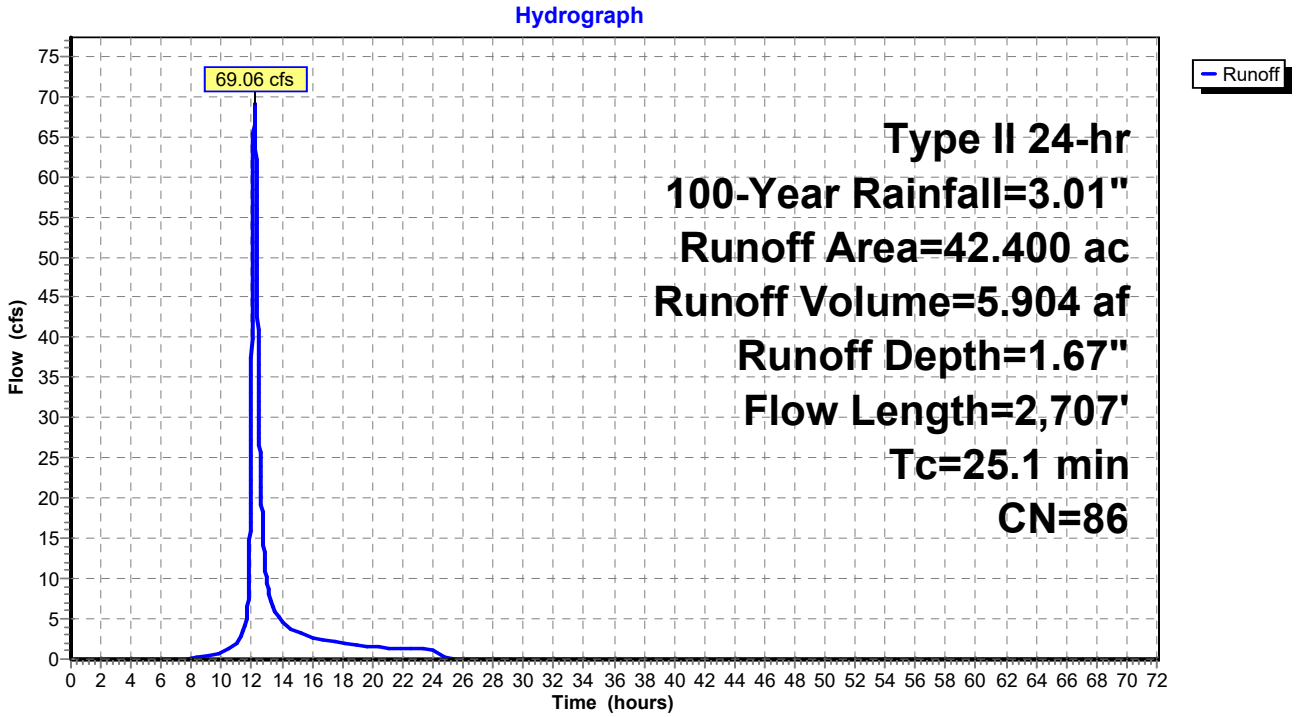
Runoff = 69.06 cfs @ 12.19 hrs, Volume= 5.904 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
42.400	86	Desert shrub range, Fair, HSG D
42.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	300	0.1000	0.30		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
3.5	1,147	0.3000	5.48		**Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps
4.8	1,260	0.0300	4.41	105.92	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
25.1	2,707	Total			

Subcatchment 24S: DA TO PLANT AREA SOUTH SETTLING POND



Summary for Subcatchment 25S: DA TO NORTH HILL NORTH SETTLING POND

PORTIONS OF CATCHMENT 3

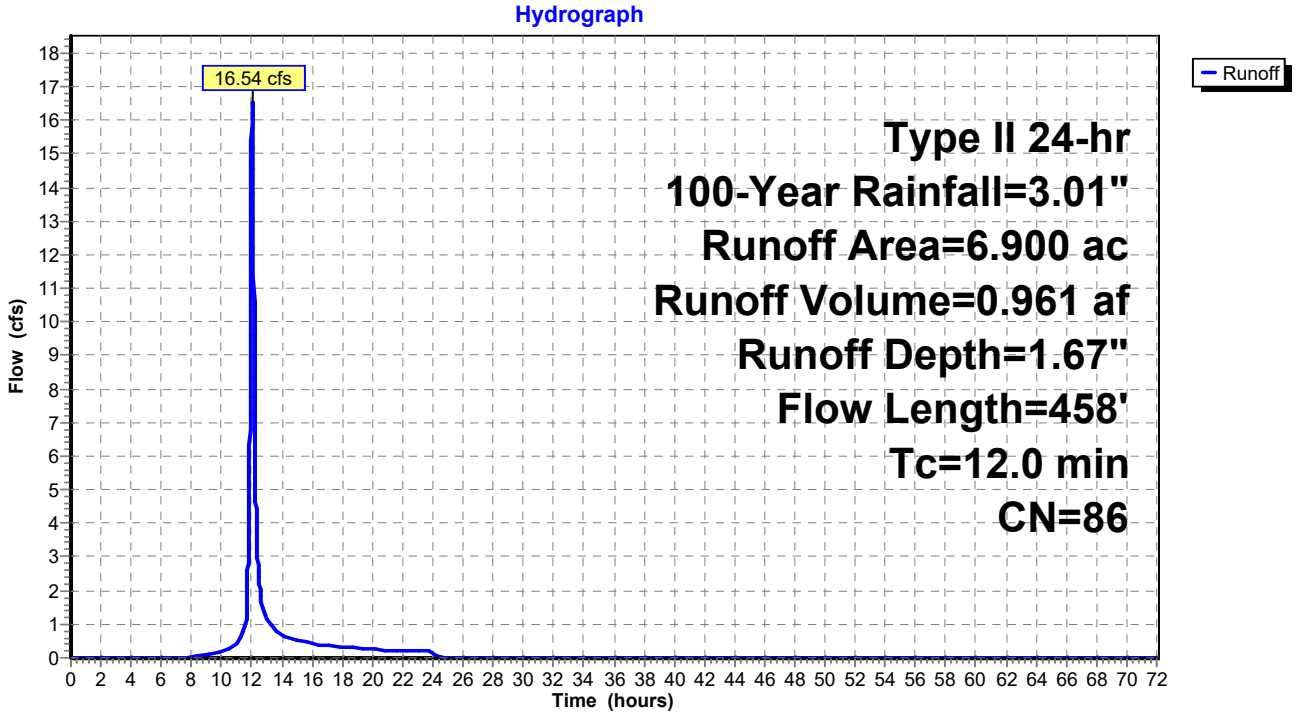
Runoff = 16.54 cfs @ 12.04 hrs, Volume= 0.961 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
6.900	86	Desert shrub range, Fair, HSG D
6.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	300	0.2600	0.44		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
0.5	158	0.3000	5.48		**Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps
12.0	458	Total			

Subcatchment 25S: DA TO NORTH HILL NORTH SETTLING POND



Summary for Subcatchment 26S: DA TO NORTH HILL EAST SETTLING POND

PORTIONS OF CATCHMENT 1

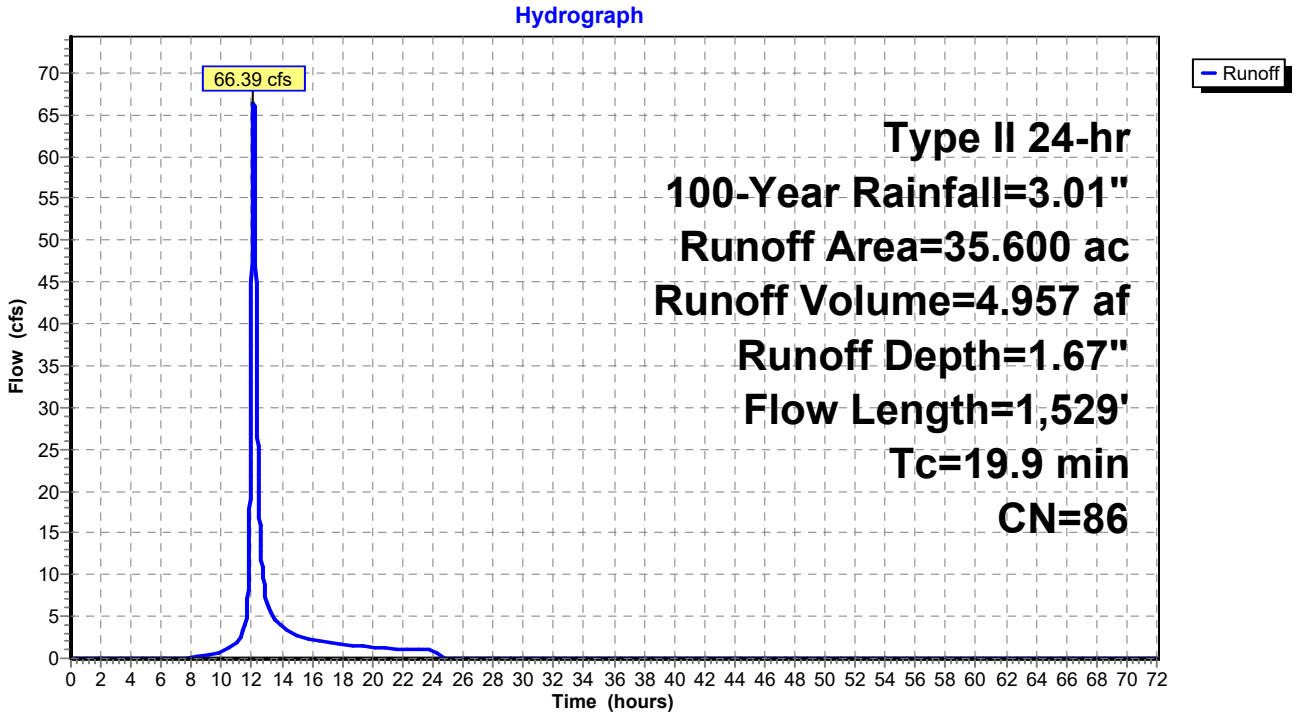
Runoff = 66.39 cfs @ 12.13 hrs, Volume= 4.957 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=3.01"

Area (ac)	CN	Description
35.600	86	Desert shrub range, Fair, HSG D
35.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	300	0.1000	0.30		**Sheet Flow, A-B** Range n= 0.130 P2= 1.38"
0.3	90	0.2000	4.47		**Shallow Concentrated Flow, B-C** Nearly Bare & Untilled Kv= 10.0 fps
0.3	160	0.1200	8.83	211.84	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
2.1	652	0.0400	5.10	122.31	**Trap/Vee/Rect Channel Flow, E-F** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
0.4	327	0.3000	13.96	334.95	**Trap/Vee/Rect Channel Flow, F-G** Bot.W=6.00' D=2.00' Z= 3.0 '/' Top.W=18.00' n= 0.069 Riprap, 6-inch
19.9	1,529	Total			

Subcatchment 26S: DA TO NORTH HILL EAST SETTLING POND



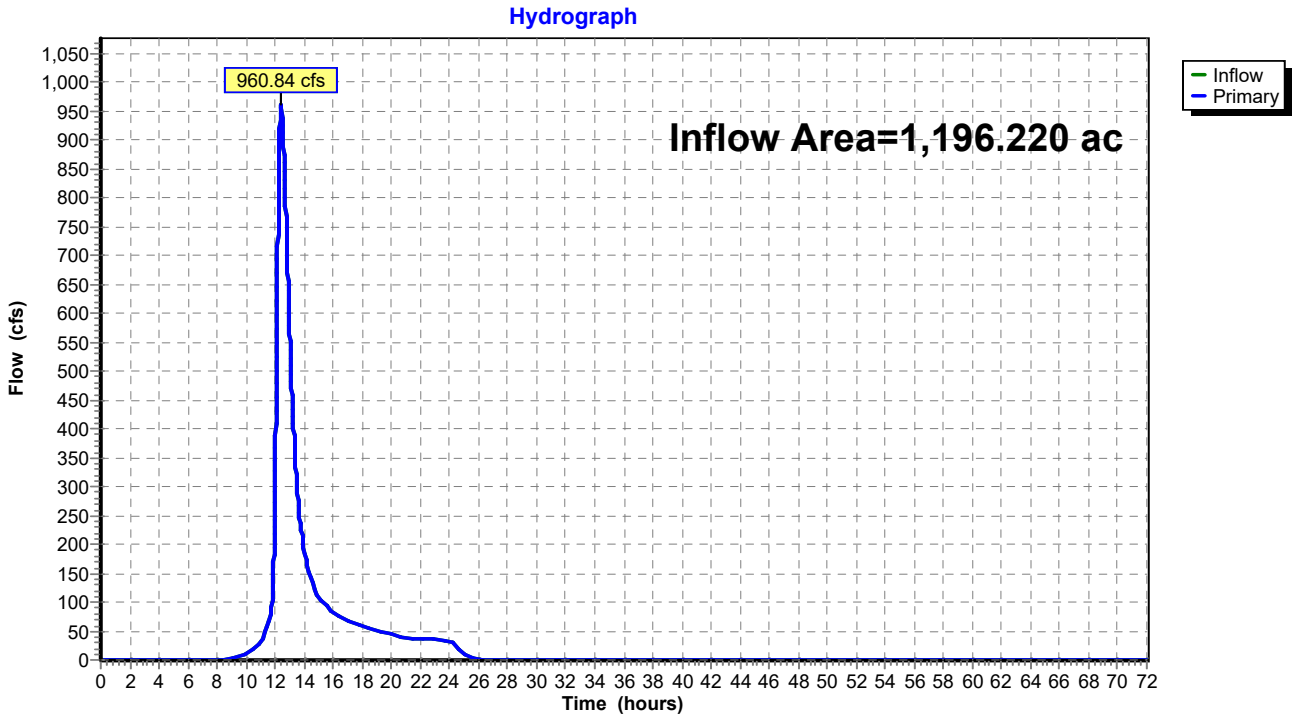
Summary for Link 11L: Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

TO RIO GRANDE

Inflow Area = 1,196.220 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 960.84 cfs @ 12.41 hrs, Volume= 151.972 af
Primary = 960.84 cfs @ 12.41 hrs, Volume= 151.972 af, Atten= 0%, Lag= 0.0 min
Routed to Link 15L : Rio Grande (Embudo Creek to Rio Pueblo de Taos)

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 11L: Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed



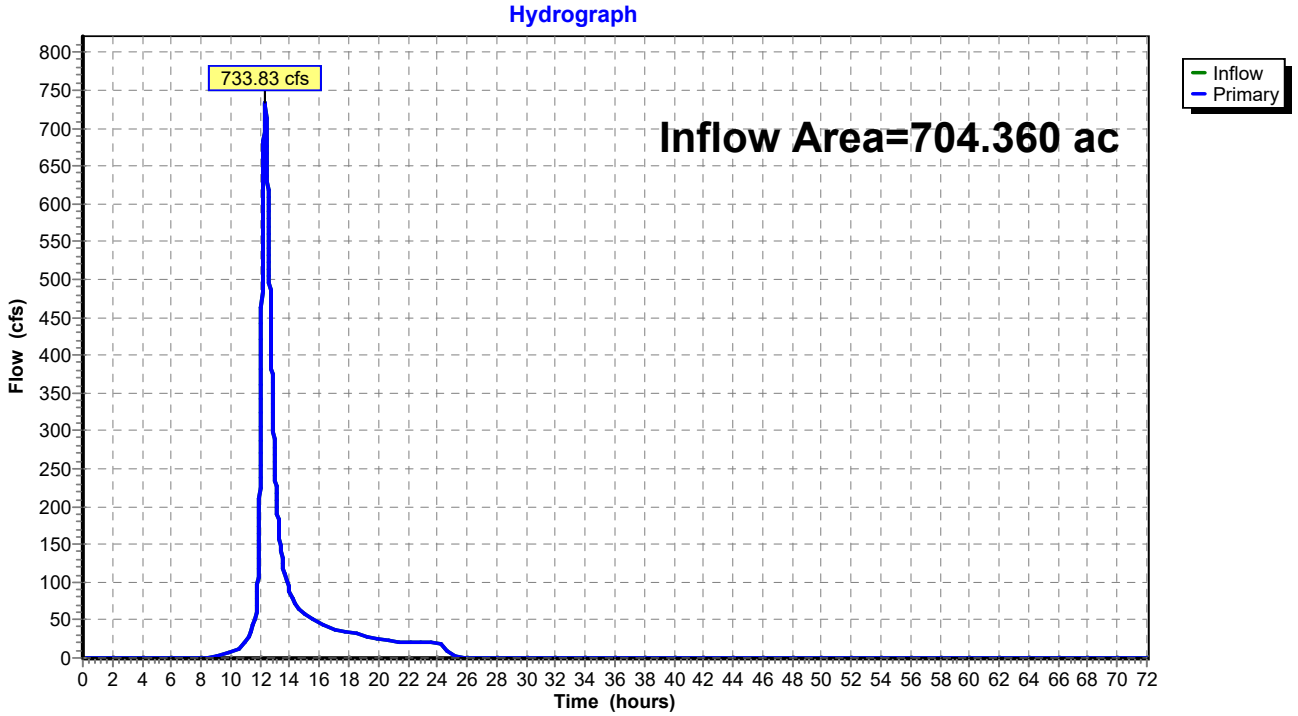
Summary for Link 12L: Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

FLOW TO ARRO AGUAJE DE LA PETACA

Inflow Area = 704.360 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 733.83 cfs @ 12.33 hrs, Volume= 89.484 af
Primary = 733.83 cfs @ 12.33 hrs, Volume= 89.484 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : Canon de Tio Gordito-Arroyo Aguaje de la Petaca watershed

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 12L: Martinez Canyon-Arroyo Aguaje de la Petaca Watershed

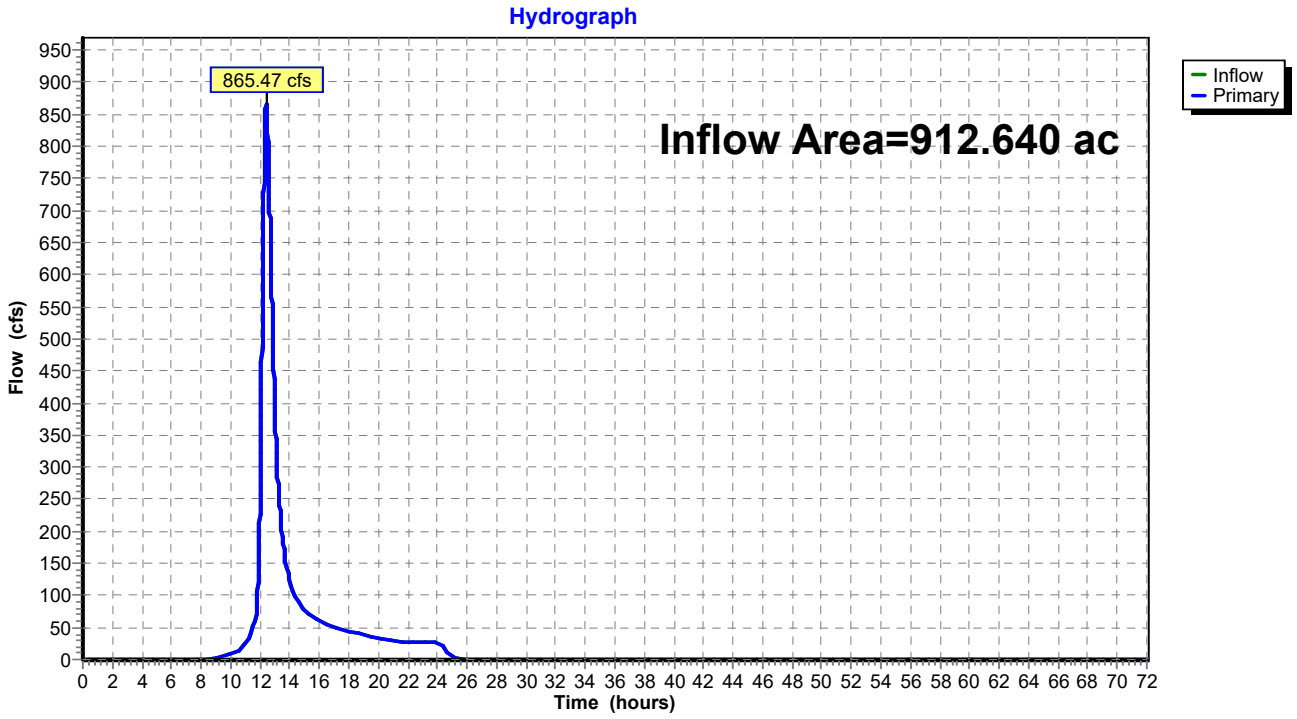


Summary for Link 13L: Cerrito Negro Watershed

Inflow Area = 912.640 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 865.47 cfs @ 12.40 hrs, Volume= 115.945 af
Primary = 865.47 cfs @ 12.40 hrs, Volume= 115.945 af, Atten= 0%, Lag= 0.0 min
Routed to Link 14L : Rio Grande (Red River to CO Border)

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 13L: Cerrito Negro Watershed

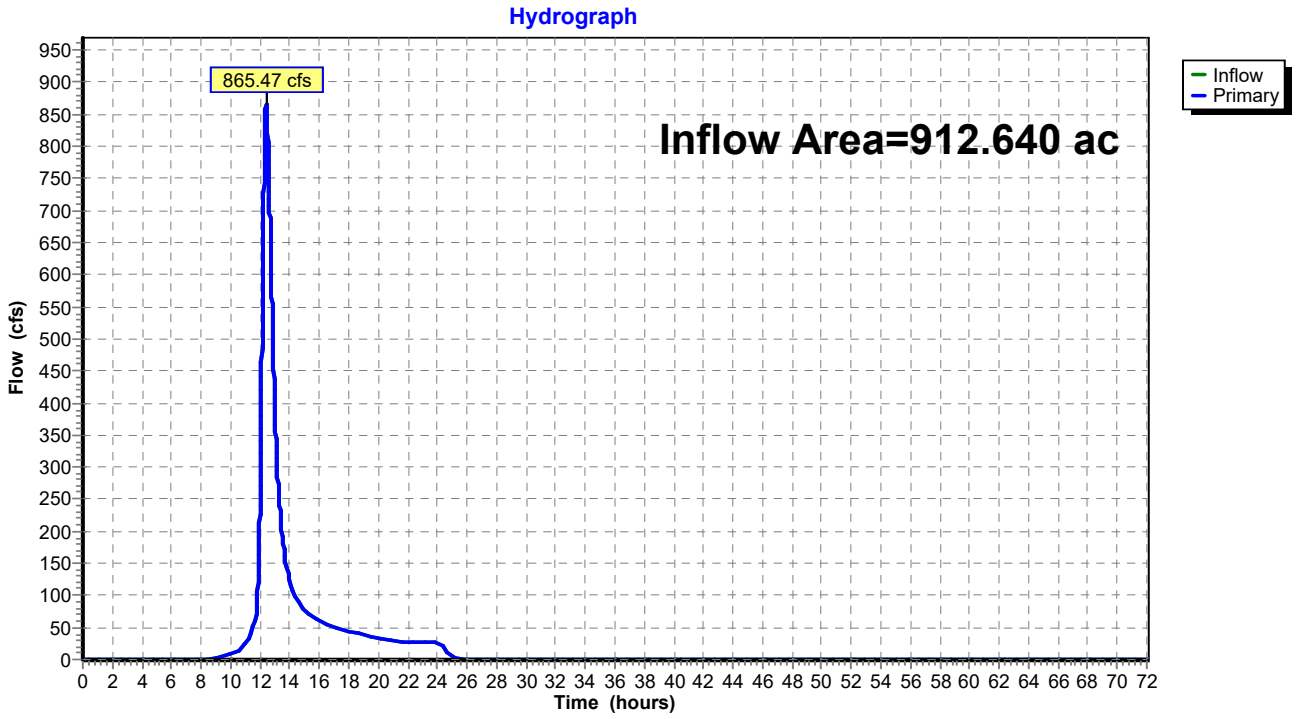


Summary for Link 14L: Rio Grande (Red River to CO Border)

Inflow Area = 912.640 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 865.47 cfs @ 12.40 hrs, Volume= 115.945 af
Primary = 865.47 cfs @ 12.40 hrs, Volume= 115.945 af, Atten= 0%, Lag= 0.0 min
Routed to Link 15L : Rio Grande (Embudo Creek to Rio Pueblo de Taos)

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 14L: Rio Grande (Red River to CO Border)

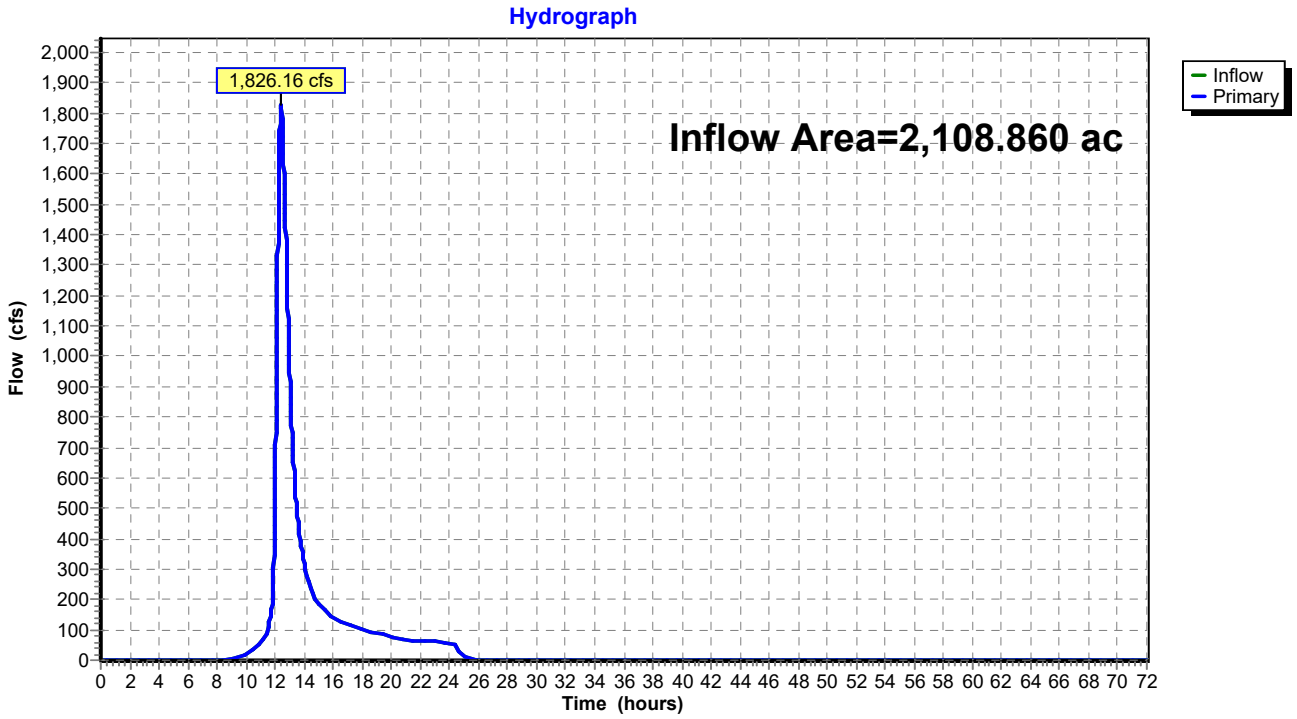


Summary for Link 15L: Rio Grande (Embudo Creek to Rio Pueblo de Taos)

Inflow Area = 2,108.860 ac, 0.00% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 1,826.16 cfs @ 12.40 hrs, Volume= 267.917 af
Primary = 1,826.16 cfs @ 12.40 hrs, Volume= 267.917 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 15L: Rio Grande (Embudo Creek to Rio Pueblo de Taos)



NOAA Atlas 14, Volume 1, Version 5
Location name: Ojo Caliente, New Mexico, USA*
Latitude: 36.7579°, Longitude: -105.9541°
Elevation: 8661 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.185** (0.162-0.213)	**0.239** (0.209-0.276)	**0.324** (0.282-0.374)	**0.393** (0.339-0.454)	**0.491** (0.419-0.568)	**0.573** (0.484-0.666)	**0.663** (0.550-0.776)	**0.758** (0.618-0.896)	**0.898** (0.713-1.08)	**1.02** (0.789-1.24)
10-min	**0.282** (0.246-0.325)	**0.364** (0.318-0.421)	**0.494** (0.428-0.570)	**0.599** (0.516-0.691)	**0.748** (0.638-0.865)	**0.873** (0.737-1.01)	**1.01** (0.838-1.18)	**1.16** (0.941-1.36)	**1.37** (1.08-1.64)	**1.55** (1.20-1.89)
15-min	**0.350** (0.305-0.403)	**0.451** (0.394-0.522)	**0.612** (0.531-0.706)	**0.742** (0.640-0.857)	**0.928** (0.791-1.07)	**1.08** (0.914-1.26)	**1.25** (1.04-1.46)	**1.43** (1.17-1.69)	**1.69** (1.34-2.04)	**1.92** (1.49-2.34)
30-min	**0.471** (0.411-0.543)	**0.608** (0.531-0.703)	**0.825** (0.716-0.951)	**0.999** (0.862-1.15)	**1.25** (1.06-1.44)	**1.46** (1.23-1.69)	**1.68** (1.40-1.97)	**1.93** (1.57-2.28)	**2.28** (1.81-2.74)	**2.58** (2.00-3.16)
60-min	**0.583** (0.509-0.672)	**0.753** (0.657-0.870)	**1.02** (0.886-1.18)	**1.24** (1.07-1.43)	**1.55** (1.32-1.79)	**1.80** (1.52-2.09)	**2.08** (1.73-2.44)	**2.39** (1.94-2.82)	**2.82** (2.24-3.40)	**3.20** (2.48-3.91)
2-hr	**0.682** (0.601-0.779)	**0.871** (0.767-1.00)	**1.16** (1.02-1.33)	**1.40** (1.22-1.60)	**1.74** (1.50-2.00)	**2.03** (1.72-2.34)	**2.35** (1.96-2.72)	**2.69** (2.20-3.15)	**3.18** (2.54-3.80)	**3.60** (2.80-4.36)
3-hr	**0.740** (0.656-0.842)	**0.935** (0.830-1.06)	**1.22** (1.08-1.39)	**1.46** (1.28-1.66)	**1.80** (1.56-2.05)	**2.08** (1.78-2.38)	**2.40** (2.02-2.76)	**2.74** (2.27-3.18)	**3.24** (2.61-3.81)	**3.65** (2.89-4.36)
6-hr	**0.862** (0.770-0.973)	**1.08** (0.970-1.22)	**1.38** (1.23-1.56)	**1.64** (1.45-1.84)	**2.01** (1.75-2.26)	**2.32** (1.99-2.62)	**2.65** (2.24-3.02)	**3.01** (2.51-3.47)	**3.53** (2.86-4.13)	**3.96** (3.12-4.69)
12-hr	**1.00** (0.901-1.11)	**1.25** (1.12-1.39)	**1.56** (1.40-1.74)	**1.83** (1.63-2.04)	**2.22** (1.96-2.47)	**2.53** (2.21-2.84)	**2.87** (2.47-3.23)	**3.23** (2.74-3.67)	**3.75** (3.11-4.32)	**4.17** (3.40-4.87)
24-hr	**1.11** (1.03-1.21)	**1.38** (1.28-1.51)	**1.72** (1.59-1.87)	**2.00** (1.85-2.16)	**2.38** (2.20-2.58)	**2.69** (2.47-2.91)	**3.01** (2.75-3.25)	**3.34** (3.04-3.71)	**3.80** (3.42-4.36)	**4.22** (3.71-4.92)
2-day	**1.26** (1.17-1.36)	**1.56** (1.45-1.68)	**1.92** (1.79-2.06)	**2.21** (2.06-2.38)	**2.61** (2.42-2.80)	**2.93** (2.71-3.14)	**3.26** (3.00-3.49)	**3.59** (3.29-3.86)	**4.05** (3.68-4.40)	**4.40** (3.98-4.97)
3-day	**1.36** (1.27-1.47)	**1.69** (1.58-1.82)	**2.08** (1.94-2.24)	**2.40** (2.23-2.57)	**2.83** (2.62-3.03)	**3.17** (2.93-3.39)	**3.52** (3.24-3.76)	**3.88** (3.55-4.15)	**4.36** (3.97-4.70)	**4.74** (4.29-5.21)
4-day	**1.47** (1.37-1.58)	**1.82** (1.70-1.97)	**2.24** (2.09-2.41)	**2.58** (2.40-2.77)	**3.05** (2.82-3.26)	**3.41** (3.15-3.64)	**3.78** (3.48-4.04)	**4.16** (3.82-4.45)	**4.68** (4.25-5.01)	**5.08** (4.59-5.44)
7-day	**1.76** (1.64-1.89)	**2.17** (2.03-2.34)	**2.65** (2.47-2.84)	**3.02** (2.82-3.24)	**3.52** (3.28-3.78)	**3.91** (3.63-4.19)	**4.30** (3.98-4.60)	**4.68** (4.33-5.02)	**5.19** (4.77-5.57)	**5.57** (5.10-5.98)
10-day	**2.00** (1.87-2.15)	**2.47** (2.31-2.66)	**3.00** (2.80-3.22)	**3.42** (3.18-3.66)	**3.97** (3.69-4.26)	**4.39** (4.07-4.71)	**4.81** (4.45-5.15)	**5.23** (4.82-5.60)	**5.77** (5.29-6.19)	**6.17** (5.64-6.63)
20-day	**2.71** (2.54-2.89)	**3.35** (3.14-3.58)	**4.04** (3.79-4.31)	**4.58** (4.29-4.89)	**5.30** (4.96-5.64)	**5.84** (5.44-6.21)	**6.37** (5.93-6.78)	**6.90** (6.40-7.34)	**7.58** (6.99-8.07)	**8.08** (7.42-8.62)
30-day	**3.35** (3.14-3.58)	**4.14** (3.88-4.42)	**4.96** (4.65-5.28)	**5.58** (5.23-5.94)	**6.39** (5.98-6.80)	**6.97** (6.52-7.42)	**7.54** (7.04-8.03)	**8.10** (7.53-8.62)	**8.78** (8.14-9.36)	**9.28** (8.58-9.91)
45-day	**4.15** (3.90-4.42)	**5.11** (4.81-5.46)	**6.08** (5.72-6.48)	**6.81** (6.40-7.25)	**7.72** (7.26-8.21)	**8.37** (7.86-8.90)	**9.00** (8.43-9.56)	**9.57** (8.96-10.2)	**10.3** (9.60-10.9)	**10.8** (10.0-11.4)
60-day	**4.85** (4.56-5.16)	**5.97** (5.62-6.37)	**7.07** (6.66-7.54)	**7.90** (7.43-8.41)	**8.93** (8.40-9.50)	**9.66** (9.06-10.3)	**10.3** (9.70-11.0)	**11.0** (10.3-11.7)	**11.8** (11.0-12.5)	**12.3** (11.4-13.1)

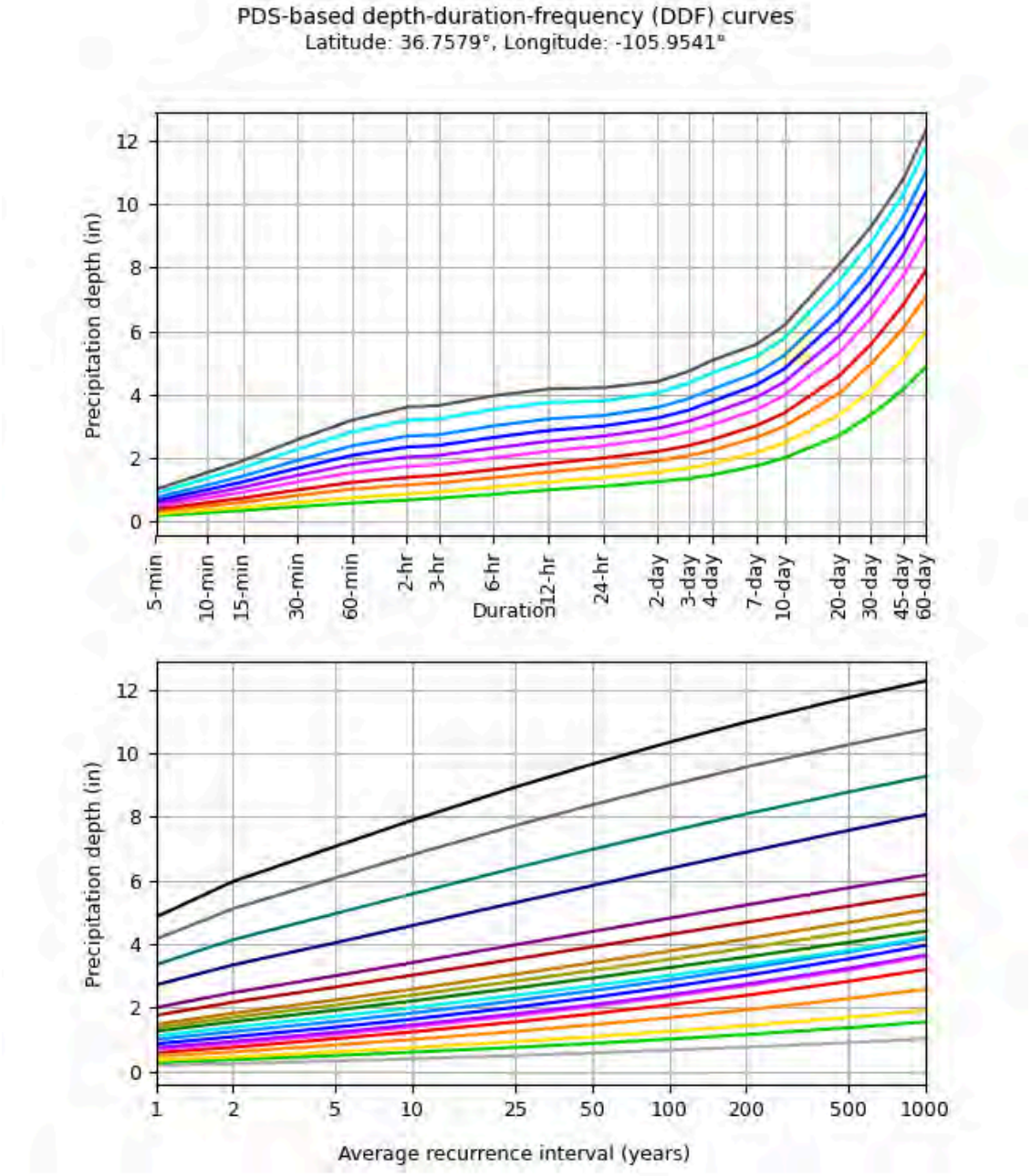
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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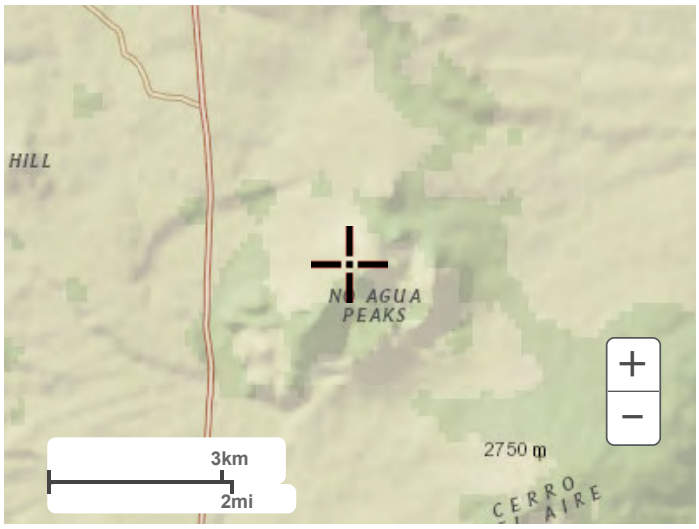
PF graphical



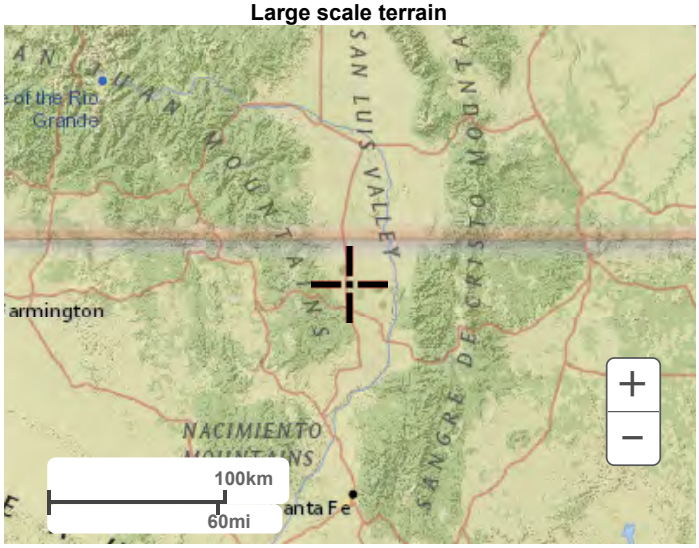
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Maps & aerials

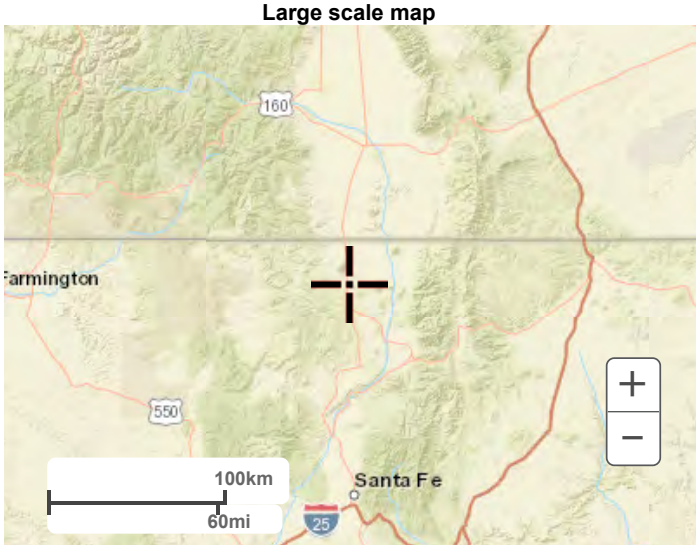
Small scale terrain



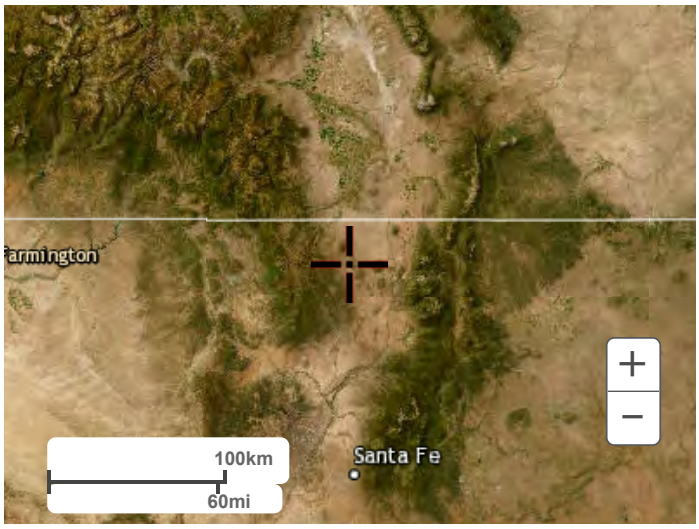
Large scale terrain



Large scale map



Large scale aerial

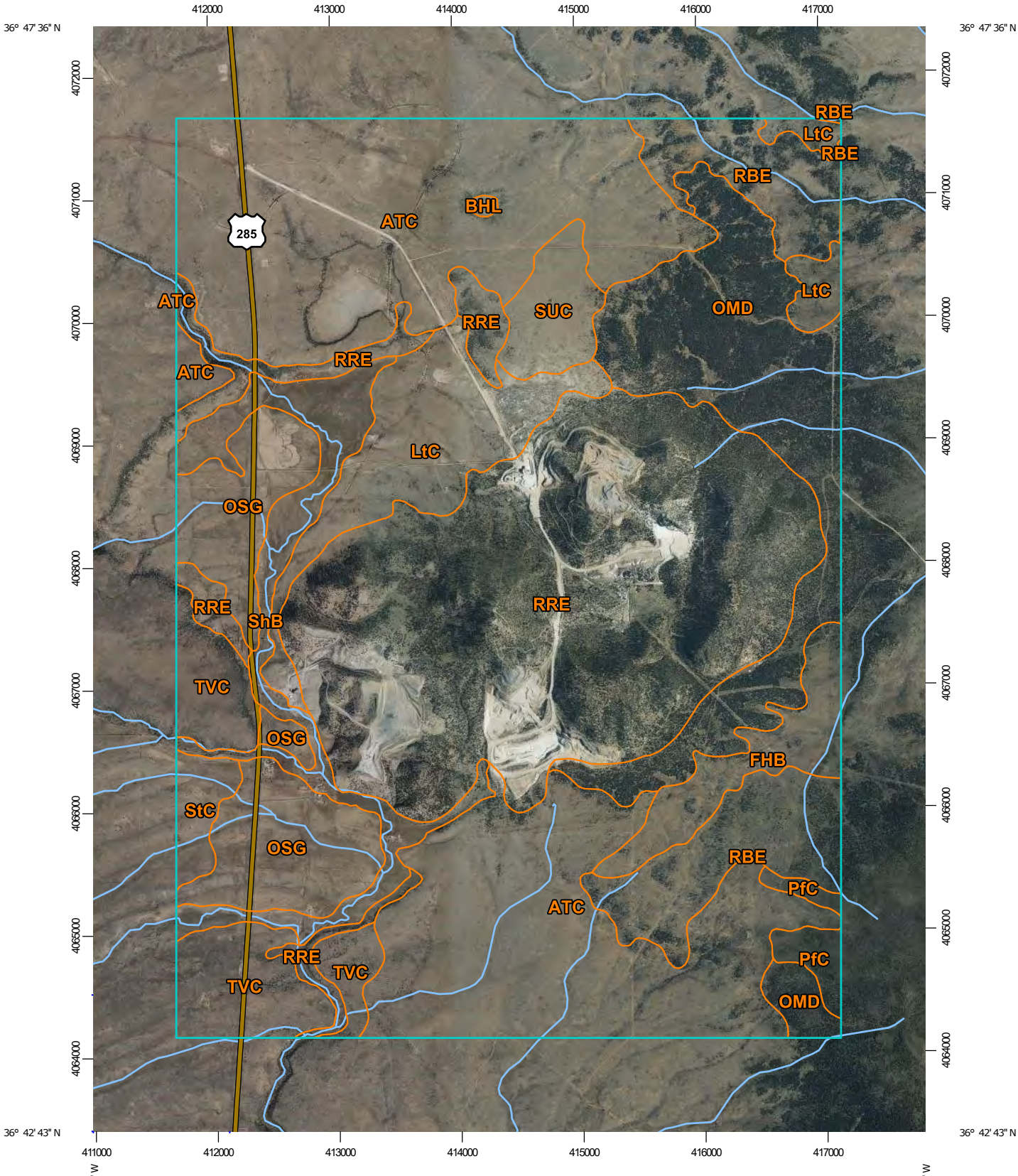


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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Soil Map—Taos County and Parts of Rio Arriba and Mora Counties, New Mexico



Map Scale: 1:44,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
Survey Area Data: Version 19, Sep 3, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 17, 2020—Oct 4, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ATC	Antonito-Travelers, extremely stony association, 1 to 8 percent slopes	2,843.1	28.0%
BHL	Ustertic Haplocambids-Chromic Haplotorrerts-Ustic Aquicambids, 0 to 2 percent slopes, frequently ponded	8.1	0.1%
FHB	Fernando-Hernandez association, 1 to 5 percent slopes	256.7	2.5%
LtC	Luhon-Travelers, extremely stony complex, 1 to 9 percent slopes	606.5	6.0%
OMD	Orejas, extremely stony-Montecito-Rock outcrop association, 5 to 30 percent slopes	1,038.3	10.2%
OSG	Orthents-Haplocalcids association, 10 to 80 percent slopes	657.2	6.5%
PfC	Petaca-Prieta complex, 1 to 8 percent slopes, very stony	81.9	0.8%
RBE	Raton-Stunner-Rock outcrop association, 3 to 40 percent slopes	640.5	6.3%
RRE	Rock outcrop-Raton, very stony complex, 15 to 30 percent slopes	2,794.3	27.6%
ShB	Shawa clay loam, 0 to 3 percent slopes	472.2	4.7%
StC	Stunner cobbly loam, 1 to 5 percent slopes	95.2	0.9%
SUC	Stunner-Luhon association, 1 to 8 percent slopes	175.9	1.7%
TVC	Travelers very stony loam, 1 to 8 percent slopes, extremely stony	470.1	4.6%
Totals for Area of Interest		**10,140.3**	**100.0%**

Taos County and Parts of Rio Arriba and Mora Counties, New Mexico

RRE—Rock outcrop-Raton, very stony complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: k1h3
Elevation: 7,700 to 9,500 feet
Mean annual precipitation: 15 to 17 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop, basalt: 45 percent
Raton, very stony, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop, Basalt

Setting

Landform: Volcanic cones

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Raton, Very Stony

Setting

Landform: Hills, volcanic cones
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits derived from sandstone and shale and/or residuum weathered from basalt

Typical profile

A - 0 to 4 inches: very stony silt loam
Bt - 4 to 18 inches: very stony silty clay loam
R - 18 to 60 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 6 to 20 inches to lithic bedrock
Drainage class: Well drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R048AY005NM - Mountain Malpais
Hydric soil rating: No

Minor Components

Orthents

Percent of map unit: 8 percent

Stunner

Percent of map unit: 7 percent

Data Source Information

Soil Survey Area: Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
Survey Area Data: Version 19, Sep 3, 2024

Section 705. — ROCK

705.01 Gabion and Revet Mattress Rock. Provide angular stone from a rock quarry or cut that is hard, durable, free of organic and other unsuitable material, and resistant to weathering and water action. Do not use crushed river rock or rock with rounded surfaces. Conform to the following:

(a) Durability index (coarse), AASHTO T 210	50 minimum
(b) Density of a filled basket	100 lb/ft^3 minimum

(c) Gradation. Provide rock with breadth and thickness at least one-third its length.

(1) Baskets 1 foot or greater in the vertical dimension.	
(a) Maximum dimension	8 inches
(b) Minimum dimension	4 inches
(2) Baskets less than 1 foot in the vertical dimension.	
(a) Maximum dimension	6 inches
(b) Minimum dimension	3 inches
(d) Los Angeles abrasion, AASHTO T 96	50 percent maximum

705.02 Rock for Riprap. Provide hard, durable, angular rock that is resistant to weathering and water action, and free of organic and other unsuitable material. Angular rock is characterized by sharp, clean edges at the intersections of relatively flat surfaces. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. Conform to the following:

(a) Apparent specific gravity, AASHTO T 85	2.40 minimum
(b) Absorption, AASHTO T 85	4.0 percent maximum
(c) Soundness of aggregate using sodium sulfate, AASHTO T 104 (5 cycles)	12 percent loss maximum
(d) Los Angeles abrasion, AASHTO T 96	50 percent maximum
(e) Rock particle intermediate dimension (width) and minimum dimension (thickness)	⅓ longest dimension (length) minimum
(f) Gradation, FLH T 521	Table 705-1

Table 705-1
Gradation Requirements for Riprap[1]

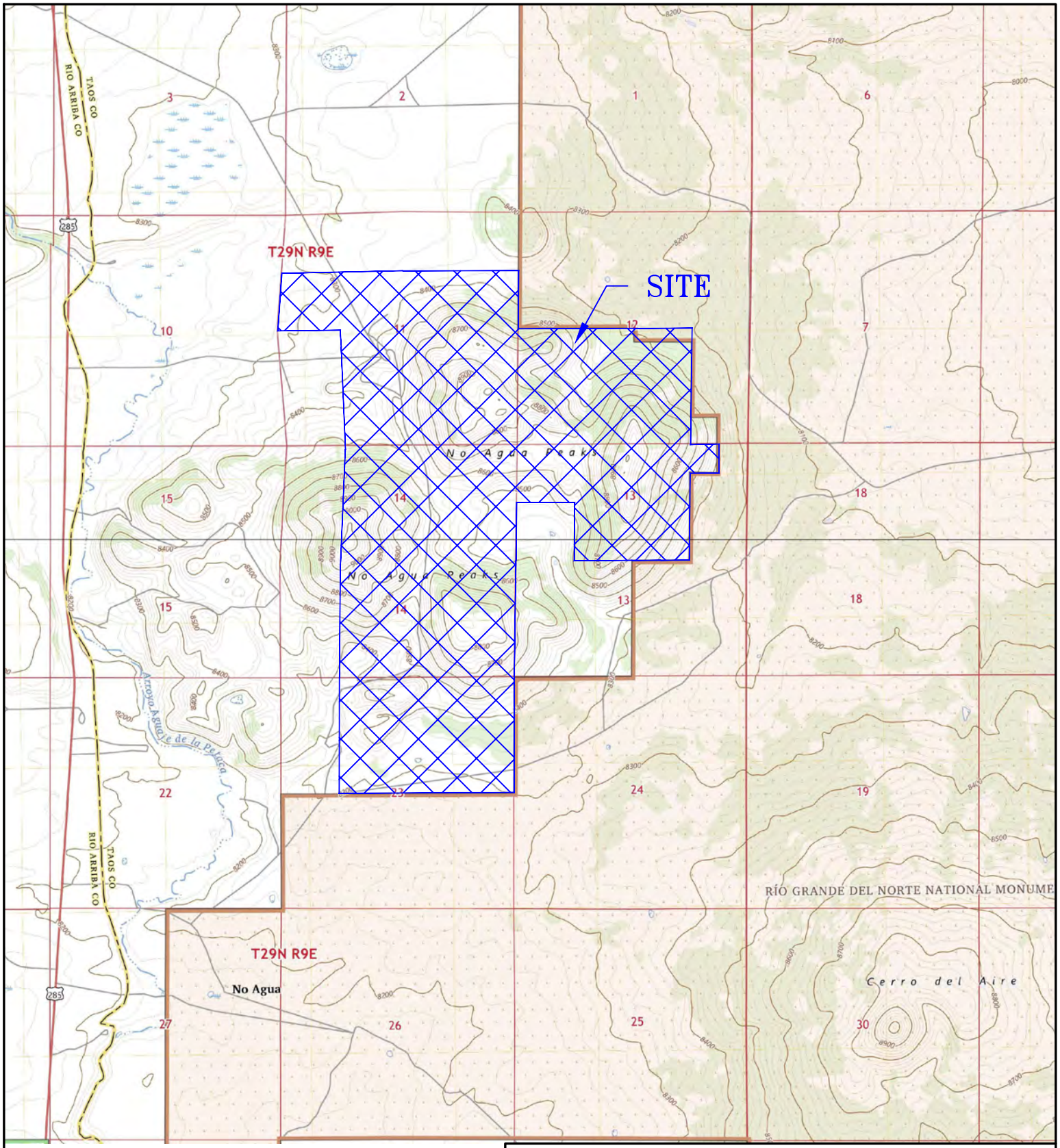
Class	Percent of Rock Equal or Smaller by Count, DX	Range of Intermediate Dimensions, inches[2]	Range of Rock Mass, pounds[3]
1	100	9 to 15	59 to 270
	85	7 to 11	28 to 110
	50	5 to 8	10 to 42
	15	3 to 6	2 to 18
2	100	15 to 21	270 to 750
	85	11 to 15	110 to 270
	50	8 to 11	42 to 110
	15	6 to 8	10 to 42
3	100	21 to 27	750 to 1600
	85	15 to 19	270 to 560
	50	11 to 14	110 to 220
	15	8 to 10	42 to 81
4	100	27 to 33	1600 to 2900
	85	19 to 23	560 to 990
	50	14 to 17	220 to 400
	15	9 to 12	59 to 140
5	100	33 to 39	2900 to 4850
	85	23 to 28	990 to 1800
	50	17 to 20	400 to 650
	15	11 to 15	110 to 270
6	100	39 to 45	4850 to 7400
	85	28 to 32	1800 to 2650
	50	20 to 23	650 to 990
	15	13 to 17	180 to 400
7	100	45 to 54	7400 to 12,800
	85	32 to 38	2650 to 4450
	50	23 to 28	990 to 1800
	15	15 to 20	270 to 650
8	100	54 to 66	12,800 to 23,400
	85	38 to 47	4450 to 8450
	50	28 to 35	1800 to 3500
	15	19 to 25	560 to 250
9	100	66 to 78	23,400 to 38,600
	85	47 to 55	8450 to 13,500
	50	35 to 41	3500 to 5600
	15	22 to 30	870 to 2200
10	100	78 to 90	38,600 to 59,300
	85	55 to 64	13,500 to 21,300
	50	41 to 48	5600 to 9000
	15	26 to 36	1450 to 3800

(1) Gradation includes spalls and rock fragments to provide a stable, dense mass.
(2) The intermediate dimension is the longest straight-line distance across the rock that is perpendicular to the rock's longest axis on the rock face with the largest projection plane.
(3) Rock mass is based on a specific gravity of 2.65 and 85 percent of the cubic volume as calculated using the intermediate dimension.

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Appendix B – Plan Set

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IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

LOCATION MAP

0 1500 3000 6000

1 INCH = 3000 FT

MONTROSE ENVIRONMENTAL

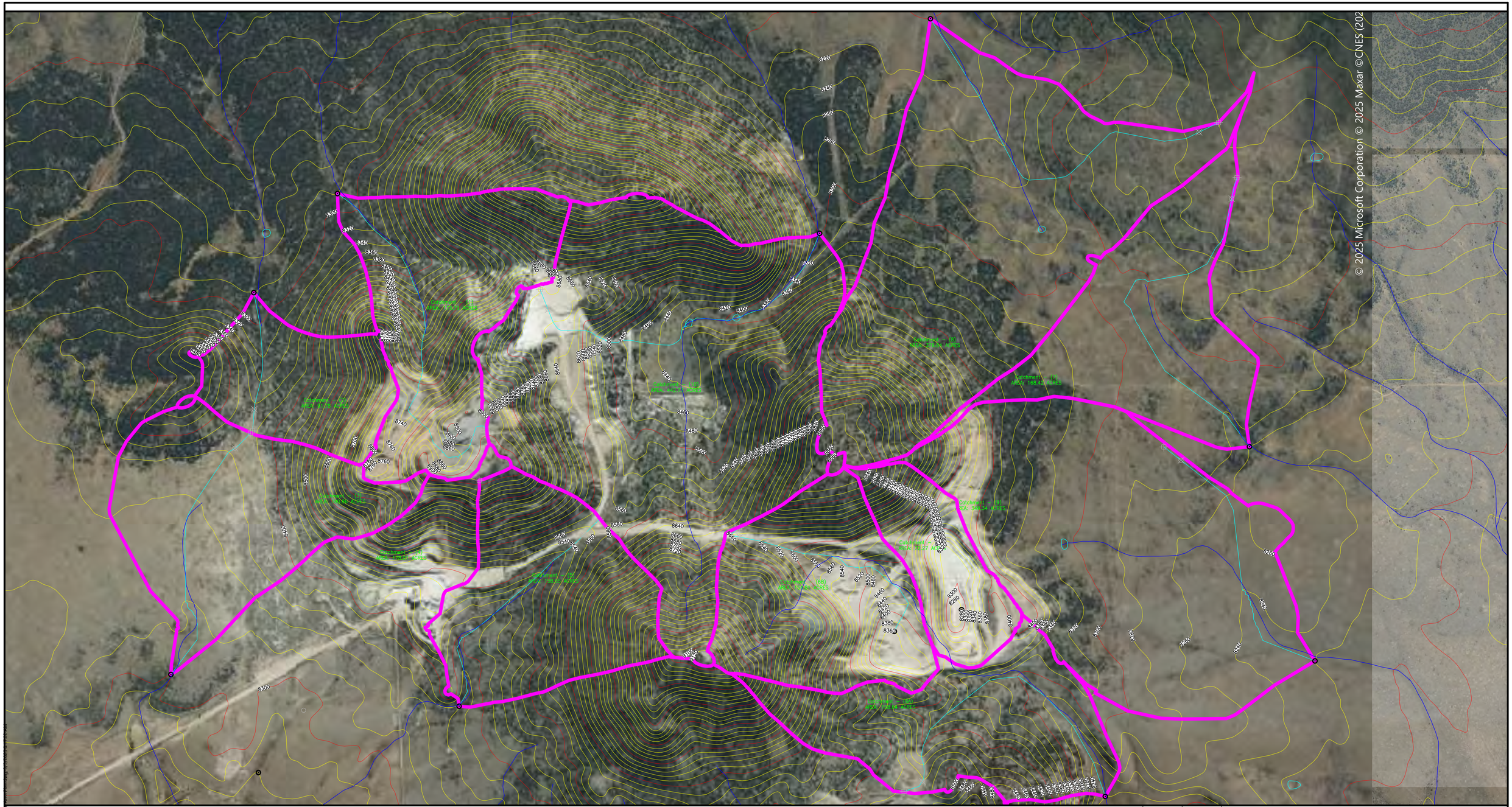
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.

1140 VALLEY FORGE ROAD,
PHOENIXVILLE, PENNSYLVANIA 19460-2658
T: 610.840.9100 F: 610.840.9199 montrose-env.com

Scale:	1" = 3000'
Drawn By:	KHF
Checked By:	RJM
Project Mgr.:	RJM
Originated By:	KHF
Project No.:	.
Drawing Date:	JULY 2025
Sheet No.:	1 OF 10
Revision Number:	0

SHEET 1

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 1 - Location Map.dwg, 9/3/2025 8:16:43 AM



60' 0' 30' 60' 120' 240'

SCALE 1"=60'

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

OVERALL DRAINAGE AREA PLAN

MONTROSE ENVIRONMENTAL

MONTROSE ENVIRONMENTAL SOLUTIONS, INC.

9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
T: 505.830.9680 montrose-env.com

Scale:	1" = 600'
Drawn By:	RRP
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Project Mgr.:	RM
Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	2 OF 10
Revision Number:	0

SHEET 2

I:\Projects\Imerys\No Agua Mine\Drawings\Permit Figures\2 - Overall Drainage



IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

HUC12 DRAINAGE AREA PLAN

MONTROSE ENVIRONMENTAL

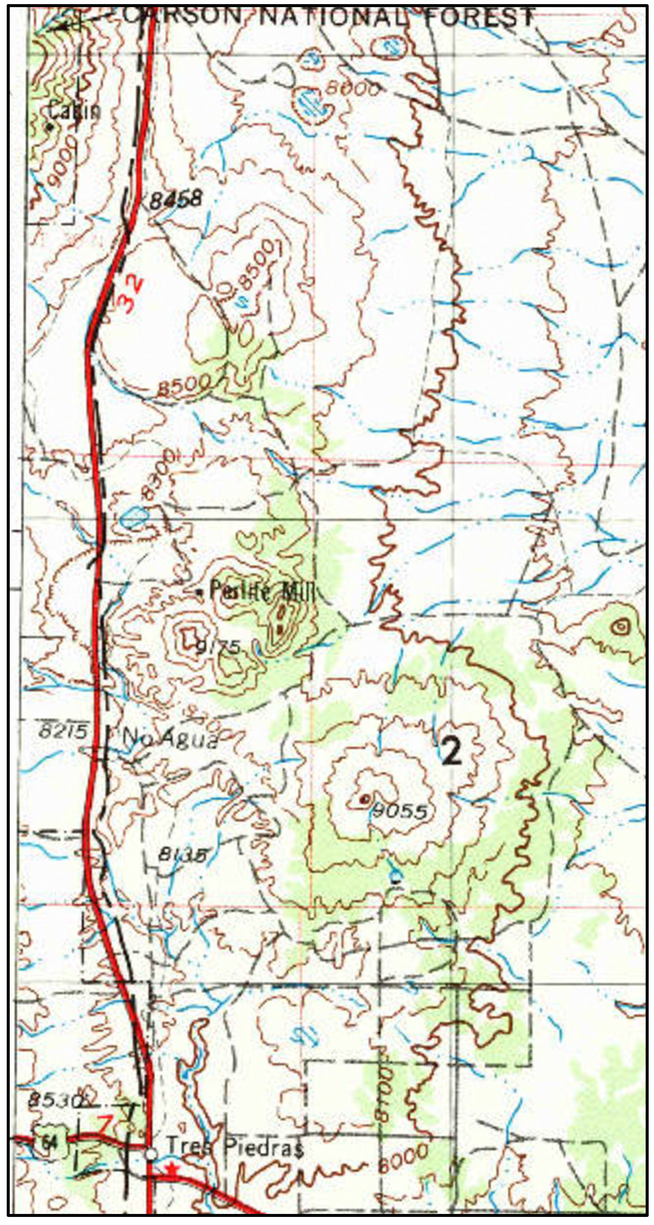
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.

1140 VALLEY FORGE ROAD,
PHOENIXVILLE, PENNSYLVANIA 19460–2658
T: 610.840.9100 F: 610.840.9199 montrose–env.com

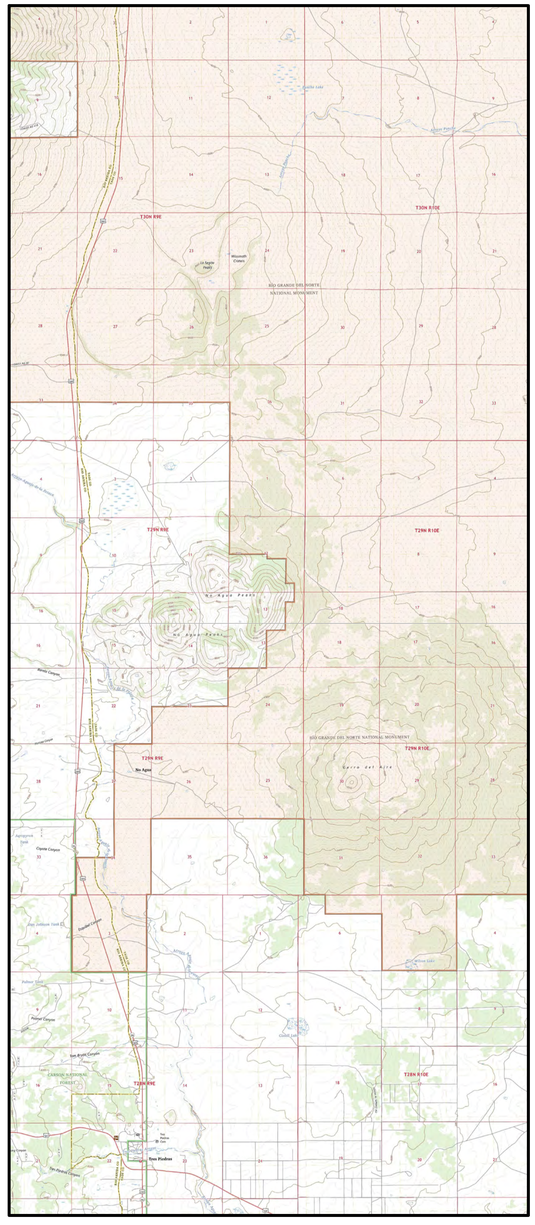
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Checked By:	RJM
Project Mgr.:	RJM
Originated By:	RRP
Project No.:	
Drawing Date:	JULY 2025
Sheet No.:	3 OF 10
Revision Number:	

SHEET 3

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 3 - Drainage Area Plan.dwg, 9/3/2025 8:17:10 AM



1954 USGS TOPO
SCALE 1"=5,000'



2023 USGS TOPO
SCALE 1"=5,000'

5000 0 2500 5000 10000 20000
1 INCH = 5000 FT

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

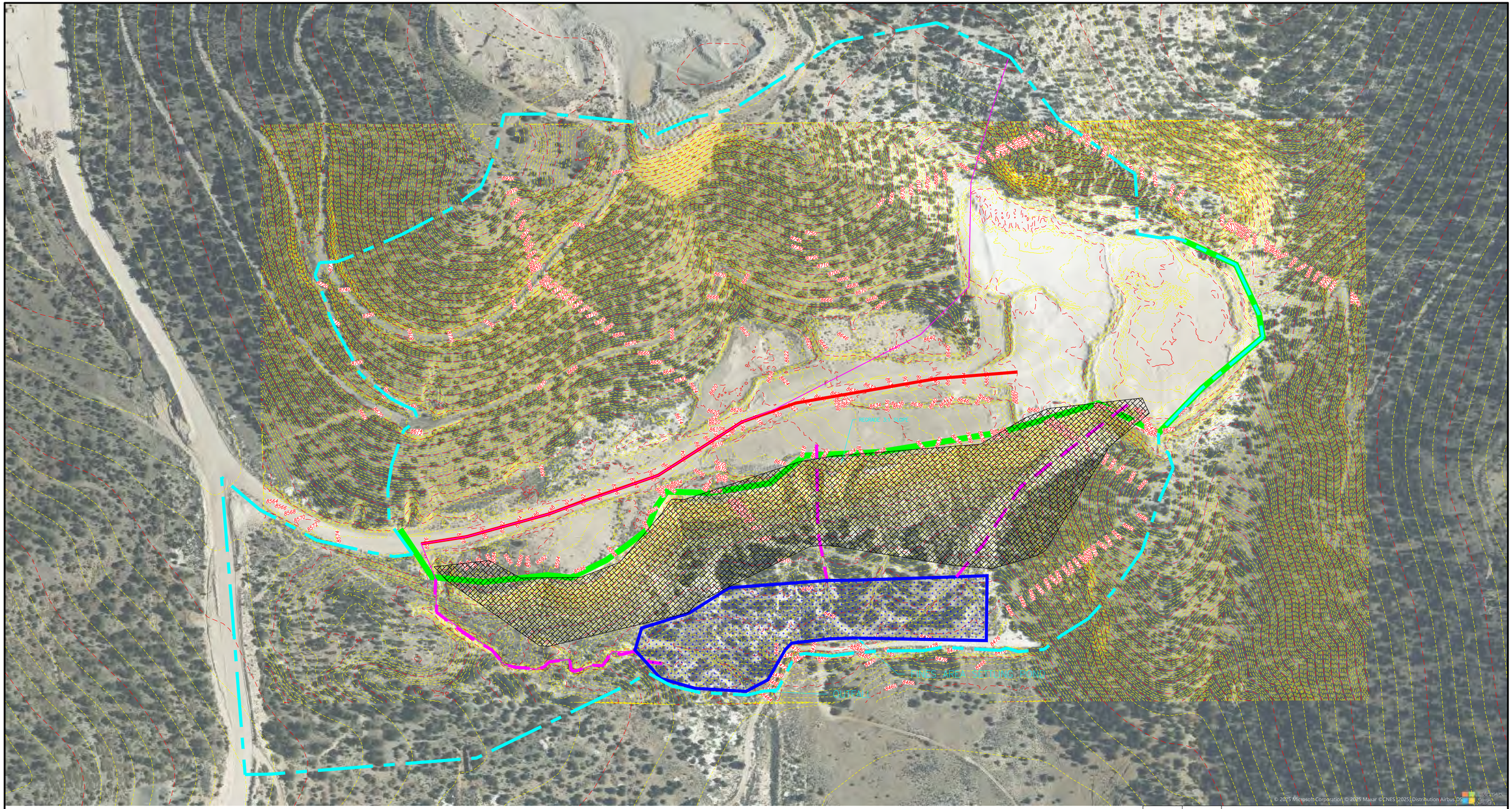
TOPOGRAPHIC COMPARISON PLAN

MONTROSE ENVIRONMENTAL
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.
9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
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Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	4 OF 10
Revision Number:	0

SHEET 4

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 4 - Topographic Comparison Plan.dwg, 9/3/2025 8:17:21 AM



LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

FINES AREA CLOSEOUT PLAN

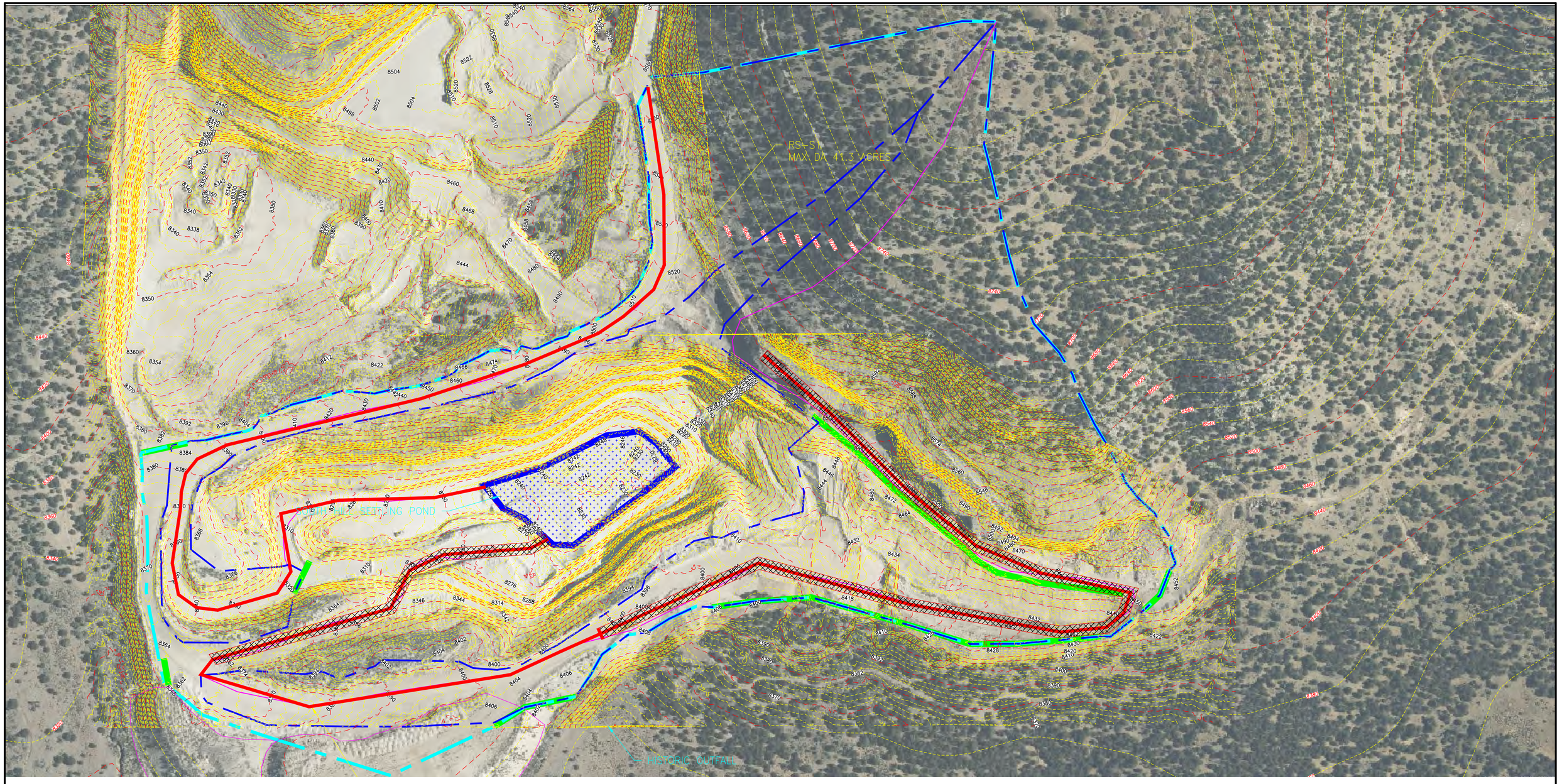
MONTROSE ENVIRONMENTAL

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9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
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Scale:	1" = 150'
Drawn By:	RRP
Checked By:	RM
Project Mgr.:	RM
Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	5 OF 10
Revision Number:	0

SHEET 5

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 5 - Fines Area Closeout Plan.dwg, 9/3/2025 8:17:42 AM



LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

SOUTH HILL CLOSEOUT PLAN

MONTROSE ENVIRONMENTAL

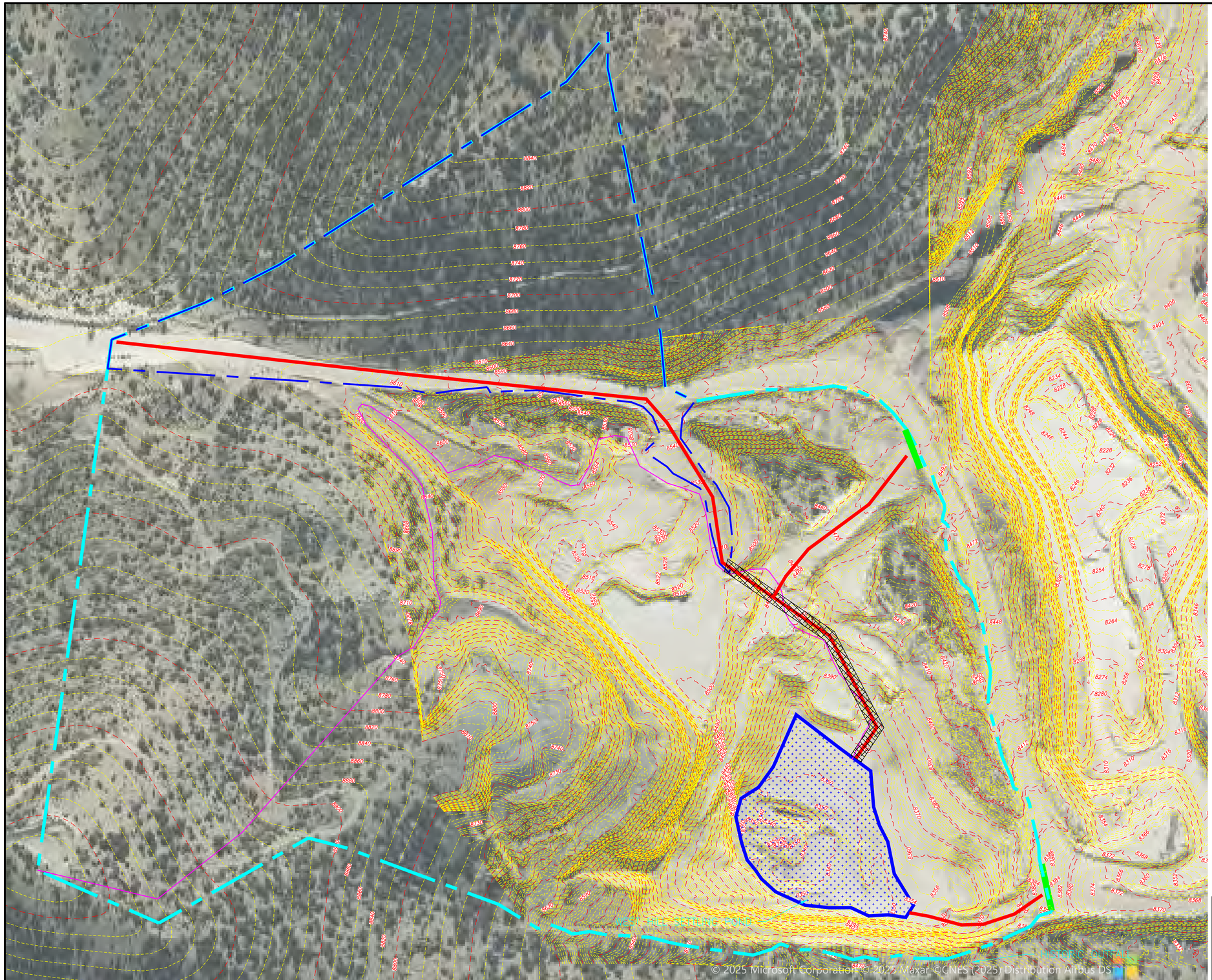
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.

9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
T: 505.830.9680 montrose-env.com

Scale:	1" = 150'
Drawn By:	RRP
Checked By:	RM
Project Mgr.:	RM
Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	5 OF 10
Revision Number:	0

SHEET 6

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 6 - South Hill Closeout Plan.dwg, 9/3/2025 8:18:06 AM



LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

WEST HILL CLOSEOUT PLAN

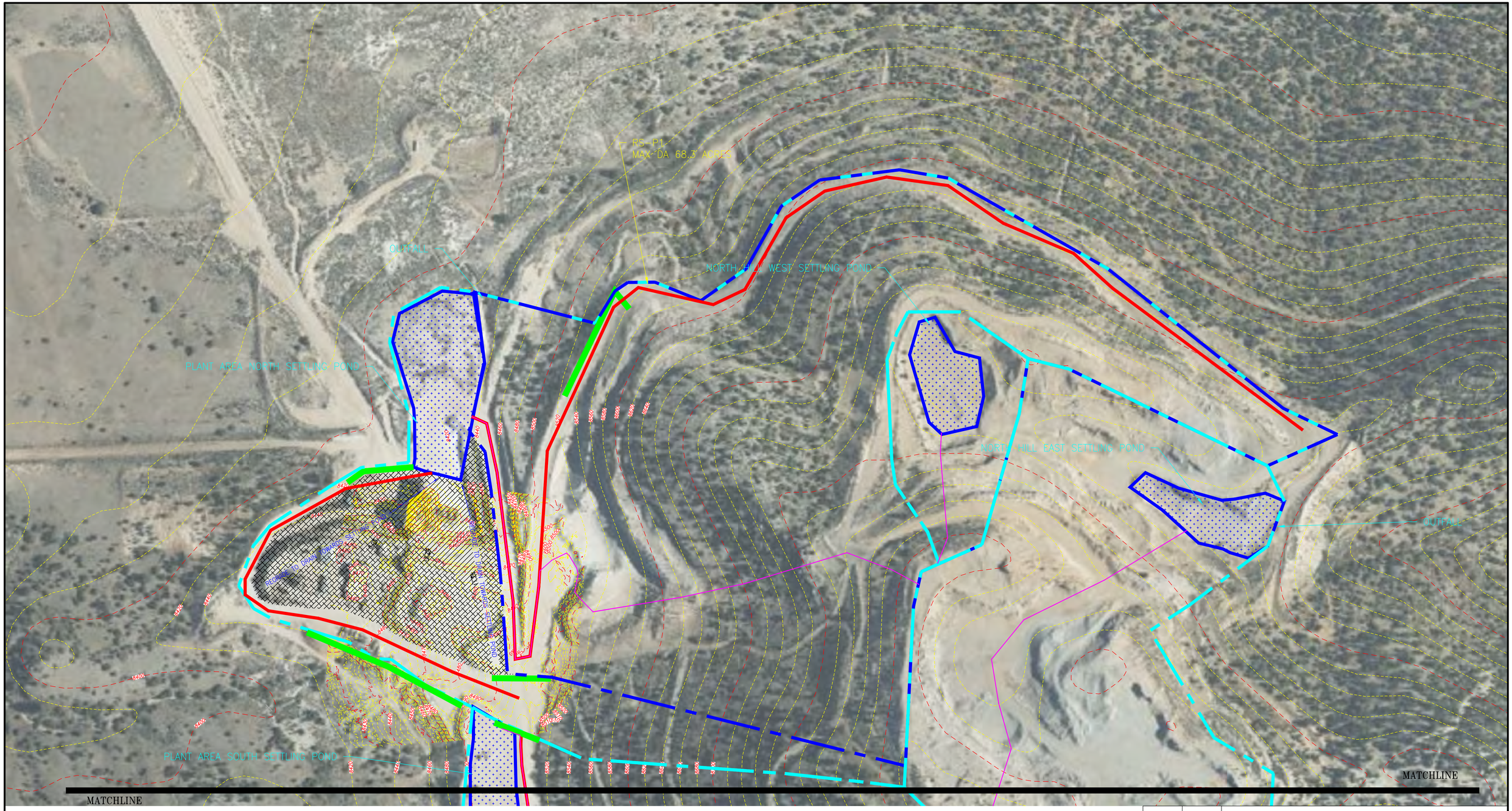
MONTROSE ENVIRONMENTAL

MONTROSE ENVIRONMENTAL SOLUTIONS, INC.
9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
T: 505.830.9680 montrose-env.com

Scale:	1" = 150'
Drawn By:	RRP
Checked By:	RM
Project Mgr.:	RM
Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	7 OF 10
Revision Number:	0

SHEET 7

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 7 - West Hill Closeout Plan.dwg, 9/3/2025 8:18:29 AM



LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

PLANT AREA & NORTH HILL CLOSEOUT PLAN

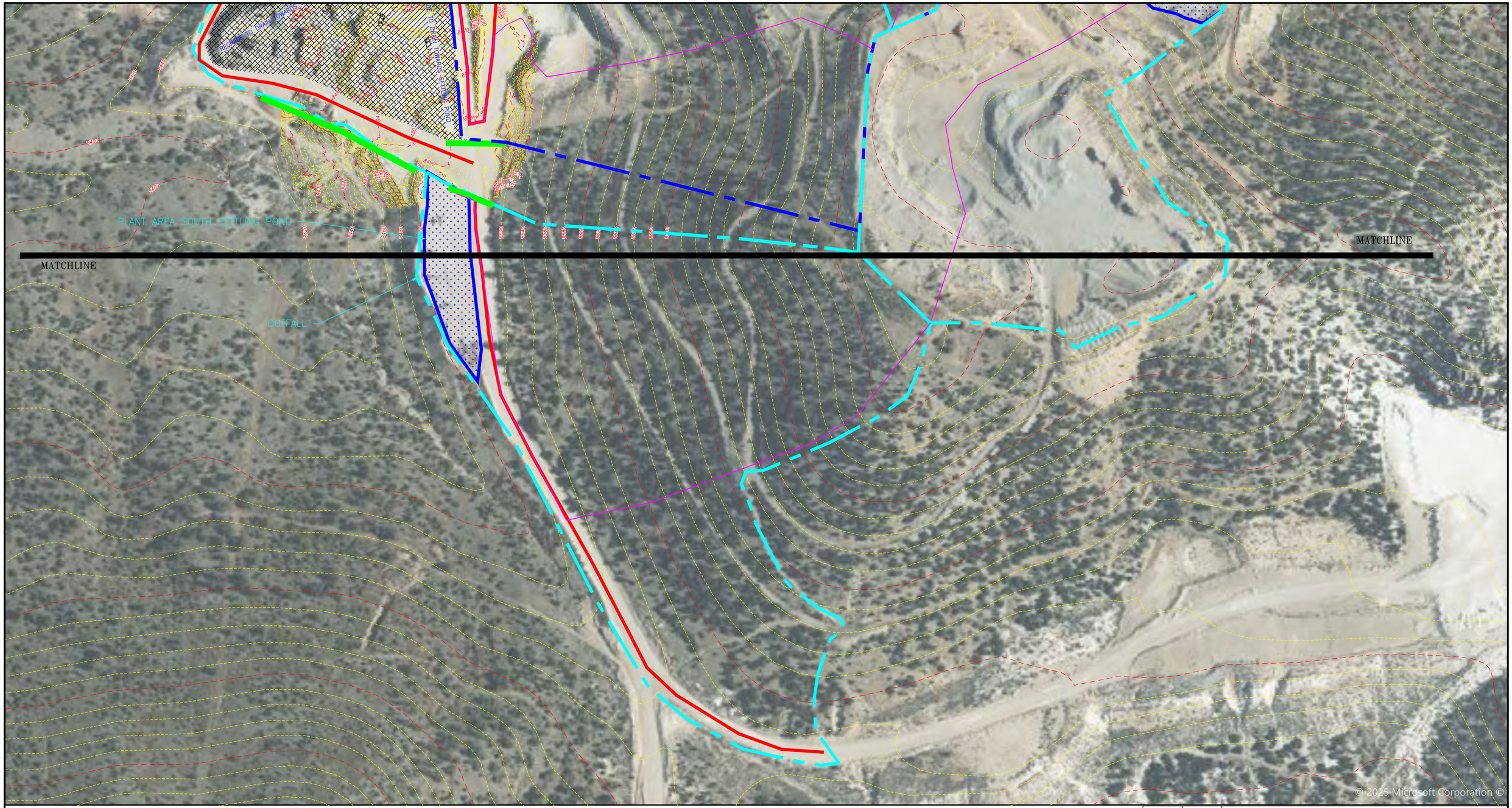
MONTROSE ENVIRONMENTAL

MONTROSE ENVIRONMENTAL SOLUTIONS, INC.
9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
T: 505.830.9680 montrose-env.com

Scale:	1" = 150'
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Checked By:	RM
Project Mgr.:	RM
Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	8 OF 10
Revision Number:	0

SHEET 8

H:\Imerys Perlite No Agua Mine\CAD\DWG\SHEETS\SHEET 8 - Plant Area and North Hill Closeout Plan.dwg, 9/3/2025 8:18:48 AM



LEGEND

- DRAINAGE AREA TO SETTLING POND
- DRAINAGE AREA TO MAINTENANCE DRIVE SWALE
- MAINTENANCE DRIVE
- DIVERSION BERM
- CHANNEL RESTORATION
- TIME OF CONCENTRATION
- SETTLING POND
- AREA TO BE REGRADED (3:1) MAXIMUM SLOPE

150 0 75 150 300 600

1 INCH = 150 FT

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE

150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

PLANT AREA & NORTH HILL CLOSEOUT PLAN

MONTROSE ENVIRONMENTAL

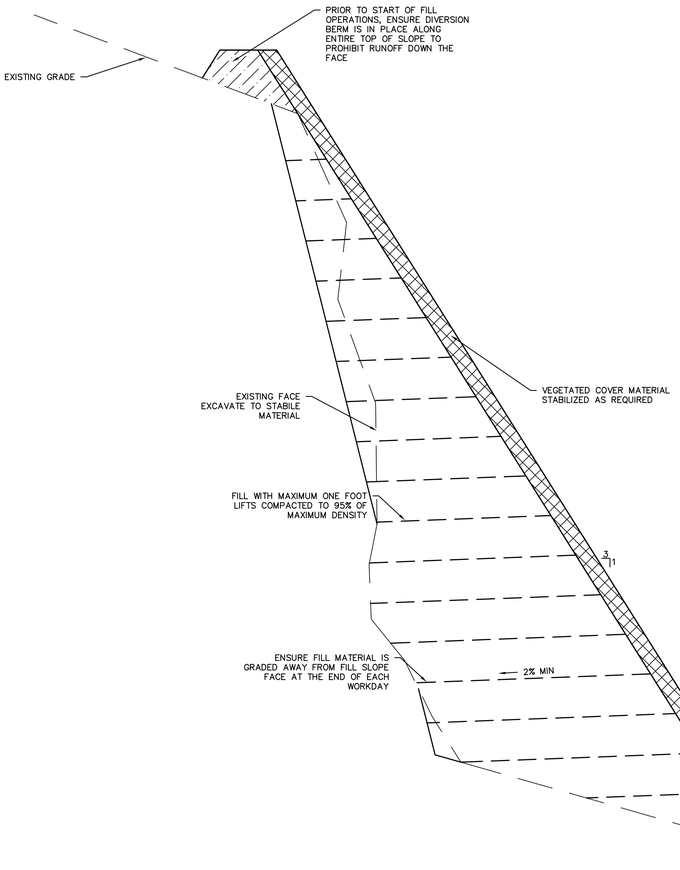
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.

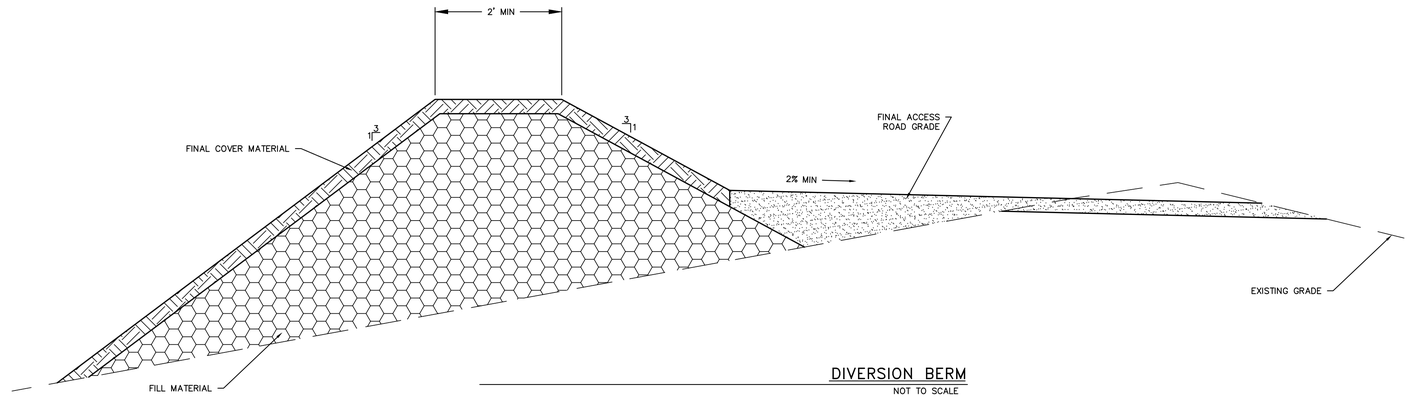
9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
T: 505.830.9680 montrose-env.com

Scale:	1" = 150'
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Checked By:	RM
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Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	8 OF 10
Revision Number:	0

SHEET 9

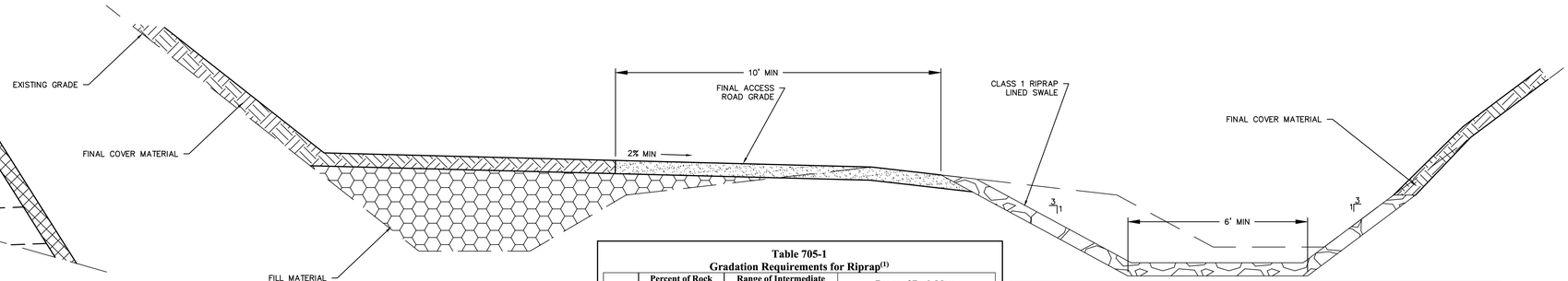
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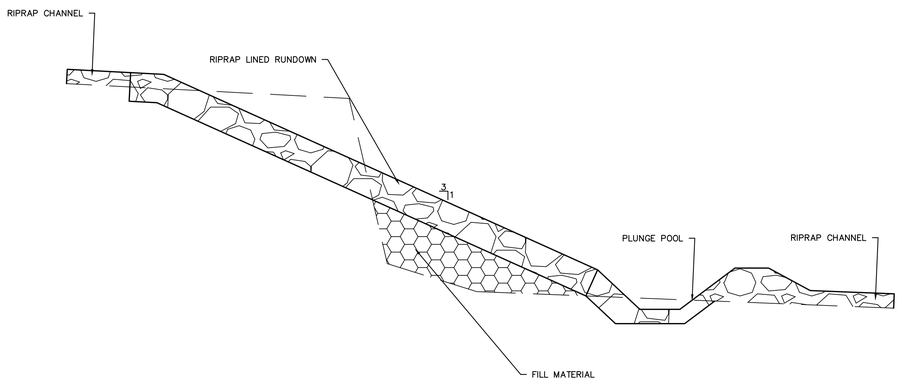
DIVERSION BERM

NOT TO SCALE



3:1 RECONTOURING DETAIL

NOT TO SCALE



DIVERSION SWALE RUNDOWN

NOT TO SCALE

Table 705-1
Gradation Requirements for Riprap[1]

Class	Percent of Rock Equal or Smaller by Count, DX	Range of Intermediate Dimensions, inches[2]	Range of Rock Mass, pounds[3]
1	100	9 to 15	59 to 270
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	50	5 to 8	10 to 42
	15	3 to 6	2 to 18
2	100	15 to 21	270 to 750
	85	11 to 15	110 to 270
	50	8 to 11	42 to 110
	15	6 to 8	10 to 42
3	100	21 to 27	750 to 1600
	85	15 to 19	270 to 560
	50	11 to 14	110 to 220
	15	8 to 10	42 to 81
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	85	19 to 23	560 to 990
	50	14 to 17	220 to 400
	15	9 to 12	59 to 140
5	100	33 to 39	2900 to 4850
	85	23 to 28	990 to 1800
	50	17 to 20	400 to 650
	15	11 to 15	110 to 270
6	100	39 to 45	4850 to 7400
	85	28 to 32	1800 to 2650
	50	20 to 23	650 to 990
	15	13 to 17	180 to 400
7	100	45 to 54	7400 to 12,800
	85	32 to 38	2650 to 4450
	50	23 to 28	990 to 1800
	15	15 to 20	270 to 650
8	100	54 to 66	12,800 to 23,400
	85	38 to 47	4450 to 8450
	50	28 to 35	1800 to 3500
	15	19 to 25	560 to 250
9	100	66 to 78	23,400 to 38,600
	85	47 to 55	8450 to 13,500
	50	35 to 41	3500 to 5600
	15	22 to 30	870 to 2200
10	100	78 to 90	38,600 to 59,300
	85	55 to 64	13,500 to 21,300
	50	41 to 48	5600 to 9000
	15	26 to 36	1450 to 3800

(1) Gradation includes spalls and rock fragments to provide a stable, dense mass.
(2) The intermediate dimension is the longest straight-line distance across the rock that is perpendicular to the rock's longest axis on the rock face with the largest projection plane.
(3) Rock mass is based on a specific gravity of 2.65 and 85 percent of the cubic volume as calculated using the intermediate dimension.

TABLE 705-1 FROM STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-24) BY US DEPARTMENT OF TRANSPORTATION

MAINTENANCE DRIVE RESTORATION

NOT TO SCALE

705.02 Rock for Riprap. Provide hard, durable, angular rock that is resistant to weathering and water action, and free of organic and other unsuitable material. Angular rock is characterized by sharp, clean edges at the intersections of relatively flat surfaces. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. Conform to the following:

(a) Apparent specific gravity, AASHTO T 85	2.40 minimum
(b) Absorption, AASHTO T 85	4.0 percent maximum
(c) Soundness of aggregate using sodium sulfate, AASHTO T 104 (5 cycles)	12 percent loss maximum
(d) Los Angeles abrasion, AASHTO T 96	50 percent maximum
(e) Rock particle intermediate dimension (width) and minimum dimension (thickness)	⅓ longest dimension (length) minimum
(f) Gradation, FLH T 521	Table 705-1

Number:	Date:	Revision:

IMERYS PERLITE USA, INC - NO AGUA MINE
150 EAST MAIN, SUITE 320 FERNLEY, NEW MEXICO 89408
PERLITE, TAOS COUNTY

DETAILS

MONTROSE ENVIRONMENTAL
MONTROSE ENVIRONMENTAL SOLUTIONS, INC.
9100 2ND STREET NW, SUITE 200
ALBUQUERQUE, NEW MEXICO 87114-1664
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Originated By:	RRP
Project No.:	052753
Drawing Date:	04/02/2025
Sheet No.:	10 OF 10
Revision Number:	0

SHEET 10

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Appendix D
No Agua Mine Stormwater Pollution Prevention Plan

Stormwater Pollution Prevention Plan

for:

IMERYS PERLITE USA INC. (IMERYS)
NO AGUA FACILITY
7.5 MILES NORTH OF TRES PIEDRAS
39360 HWY 285, TAOS COUNTY
TRES PIEDRAS, NM 87577
719-376-5484

SWPPP Contact(s):

IMERYS PERLITE USA INC. (IMERYS)
PLANT MANAGER
39360 HWY 285
TRES PIEDRAS, NM 87577
719-376-5484
JON.GROVES@IMERYS.COM

Original SWPPP Preparation Date:

June 2012

Date of Last Revision:

June 2017

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SECTION 1: FACILITY DESCRIPTION AND CONTACT INFORMATION.

Ref: 2015 MSGP Appendix G

1.1 Facility Information

Facility Information

Name of Facility: NO AGUA MINE

Street: 39360 US HWY 285

City: TRES PIEDRAS State: NM ZIP Code: 87577

County or Similar Subdivision: TAOS

NPDES ID (i.e., permit tracking number): NMR050000 (if covered under a previous permit)

Primary Industrial Activity SIC code, and Sector and Subsector (2015 MSGP, Appendix D and Part 8):
1499, Miscellaneous Nonmetallic Minerals, Except Fuels, J2

Co-located Industrial Activity(s) SIC code(s), Sector(s) and Subsector(s) (2015 MSGP, Appendix D):
1446, Industrial Sand, J1

Latitude/Longitude

Latitude: Longitude:

36.76028 º N (decimal degrees) 105.95667 º W (decimal degrees)

Method for determining latitude/longitude (check one):

☐USGS topographic map (specify scale:_____) ☐GPS

☒Other (please specify): Google Earth Image

Horizontal Reference Datum (check one):

☐NAD 27 ☒NAD 83 ☐WGS 84

Is the facility located in Indian country? ☐Yes ☒No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."

NOT APPLICABLE

Are you considered a "federal operator" of the facility?

Federal Operator – an entity that meets the definition of "operator" in this permit and is either any department, agency or instrumentality of the executive, legislative and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, operating for any such department, agency, or instrumentality.

☐Yes ☒No

Estimated area of industrial activity at site exposed to stormwater: 1,561 (acres)

Discharge Information

Does this facility discharge stormwater into a municipal separate storm sewer system (MS4)?

☐Yes ☒No

If yes, name of MS4 operator: NOT APPLICABLE

Name(s) of surface water(s) that receive stormwater from your facility:

NOT APPLICABLE

Does this facility discharge industrial stormwater directly into any segment of an "impaired water" (see definition in 2015 MSGP, Appendix A)? ☐Yes ☒No

If Yes, identify name of the impaired water(s) (and segment(s), if applicable):NOT APPLICABLE

Identify the pollutant(s) causing the impairment(s):NOT APPLICABLE

Which of the identified pollutants may be present in industrial stormwater discharges from this facility?

NOT APPLICABLE

Has a Total Maximum Daily Load (TMDL) been completed for any of the identified pollutants? If yes, please list the TMDL pollutants: NOT APPLICABLE

Does this facility discharge industrial stormwater into a receiving water designated as a Tier 2, Tier 2.5 or Tier 3 water (see definitions in 2015 MSGP, Appendix A)? ☐Yes ☒No

Are any of your stormwater discharges subject to effluent limitation guidelines (ELGs) (2015 MSGP Table 1-1)? ☐Yes ☒No

If Yes, which guidelines apply? NOT APPLICABLE

1.2 Contact Information/Responsible Parties

Ref: 2015 MSGP Appendix G

Facility Operator(s):

Name: IMERYS PERLITE USA INC. (IMERYS)
Address: 39360 HWY 285
City, State, Zip Code: TRES PIEDRAS, NM 87577
Telephone Number: 719-376-5484
Email address: JON.GROVES@IMERYS.COM
Fax number:

Facility Owner(s):

Name: IMERYS PERLITE USA INC. (IMERYS)
Address: 39360 HWY 285
City, State, Zip Code: TRES PIEDRAS, NM 87577
Telephone Number: 719-376-5484
Email address: JON.GROVES@IMERYS.COM
Fax number:

SWPPP Contact(s):

SWPPP Contact Name (Primary): PLANT MANAGER
Telephone number: 719-376-5484
Email address: JON.GROVES@IMERYS.COM
Fax number:

SWPPP Contact Name (Backup): JOHN LUCERO
Telephone number: 709-376-5484
Email address:
Fax number:

1.3 Stormwater Pollution Prevention Team

Ref: 2015 MSGP Part 5.2.1

The stormwater pollution prevention team is responsible for overseeing development of and any modifications to the SWPPP, implementing and maintaining control measures/BMPs, and taking corrective actions when required. Each member of the stormwater pollution prevention team has ready access to the 2015 MSGP, the most updated copy of the facility SWPPP, and other relevant documents.

Staff members (by title) that comprise the facility's stormwater pollution prevention team as well as their individual responsibilities are identified below. Normally at least one stormwater pollution prevention team member is on site during every shift.

Staff Names	Individual Responsibilities
PLANT MANAGER	SWPPP administration, SWPPP Revisions
PLANT MANAGER	Employee Training
PLANT MANAGER	Control Measures Installation
PLANT MANAGER	Implementation of Procedural Control Measures
PRODUCTION SUPERVISOR	Emergency Response
PRODUCTION SUPERVISOR	Control Measures Inspection, Control Measures Documentation, Control Measures Maintenance

1.4 Site Description

Ref: 2015 MSGP Part 5.2.2 and 8.J.6.1

The No Agua facility is located in Taos County approximately 7.5 miles North of Tres Piedras New Mexico on Hwy 285.

The No Agua facility is a perlite mine and milling plant, which has been in operation since the late 1950s and was acquired by Imerys Corporation in 1993. The mine has three deposits within 2 miles of the processing mill.

Mining involves:

- surface removal of overburden;
- loosening of the ore;
- ore loading and unloading;

- ore transportation to the mill;
- product transportation off-site;
- Occasional controlled detonation.

Ore is delivered to the plant in dump trucks and fed into a grizzly hopper. It is crushed and sized using mechanical equipment and then dried by two oil fired rotary dryers. All milled bulk perlite is stored in silos until it is transferred tanker trucks 20 miles north to Antonito, CO. Waste consisting primarily of inert aluminum silicate fines is stored on site and periodically transferred back to the quarry for disposal.

The active mine area is a cluster of mountains called the No Agua Peaks. There are four peaks and the plant actively mines three areas. Most of the stormwater from the mine area naturally drains to the center of the four No Agua Peaks and controlled by a central impoundment retention, which serves as the primary impoundment for the plant.

Milling and Mining operations are generally 6 consecutive 12 hour shifts Sunday at 11 pm to Wednesday at 11pm. The facility employs approximately 32 people, including production, maintenance, and administration personnel. The hours of operation may change according to company needs, if a modification is made, the plant will update this plan with changes.

Building uses and auxiliary operations include:

- Administrative office;
- Primary crusher;
- Processing plant;
- Maintenance Building; and
- Fuel storage and dispensing platform with secondary containment.

Only the fuel station, Mobile shop floor, a second maintenance shop, the main mill floor and the secondary containment for fuel storage are paved.

1.5 General Location Map

Ref: 2015 MSGP Part 5.2.2

The general location map for this facility can be found in Attachment A. The map presents enough detail to identify the location of the facility and all receiving waters from potential stormwater discharges.

The mine is approximately 1500 acres in size and the processing facility is on a 25-acre parcel. Both are owned by Imerys Corporation. The terrain of the mine area is predominantly mountains and receives an average of 2 inches of precipitation per year. The closest surface water body is over 20 miles away.

The plant has no structural storm water conveyance systems, such as storm drains and associated piping. The water surface flows across the plant area, or is directed via earthen channels and berms to minimize any soil erosion. There are berms situated around the mine area to direct water to 3 retention areas. The impoundments are man-made berms designed to hold all storm water on property.

There are no outdoor chemical or explosives storage areas. Oils, lubricants, and other (fuel) materials are stored indoors, under a canopy, or within secondary containment. A subcontractor is used for setting any explosive charges, and none are stored on site.

1.6 Site Map

Ref: 2015 MSGP Part 5.2.2 and 8.J.6.2

The site map for this facility is included as Attachment B. The map presents:

- Boundaries of the property and the size of the property in acres;
- Location and extent of significant structures and impervious surfaces;
- Directions of stormwater flow (using arrows);
- Locations of all stormwater control measures;
- Locations of all receiving waters, including wetlands, in the immediate vicinity of the facility indicating which waterbodies are listed as impaired and which are identified by your state, tribe or EPA as Tier 2, Tier 2.5, or Tier 3 waters (the nearest water body has been identified to be more than 20 miles away);
- Locations of all stormwater conveyances including ditches, pipes and swales;
- Locations of potential pollutant sources identified under 2015 MSGP Part 5.2.3.2;
- Locations where significant spills or leaks identified under MSGP Part 5.2.3.3 have occurred;
- Locations of all stormwater monitoring points;
- Locations of stormwater inlets and discharge points, with a unique identification code for each discharge point ;
- Areas of designated critical habitat for endangered or threatened species, if applicable.
- Locations of the following activities where such activities are exposed to precipitation:
    - fueling stations;
    - vehicle and equipment maintenance and/or cleaning areas;
    - loading/unloading areas;
    - locations used for the treatment, storage or disposal of wastes;
    - liquid storage tanks;
    - processing and storage areas;
    - immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility;
    - transfer areas for substances in bulk;
    - machinery; and
    - locations and sources of run-on to the facility from adjacent property that contains significant quantities of pollutants. The facility has inspected the potential of run on and has determined that all or almost all stormwater runs off property.

The map will be updated to show MS4s and where facility stormwater discharges to them if facility discharges to MS4 in future.

SECTION 2: POTENTIAL POLLUTANT SOURCES.

Ref: 2015 MSGP Part 5.2.2

Section 2 describes all areas at your facility where industrial materials or activities are exposed to stormwater or from which allowable non-stormwater discharges originate. Industrial materials or activities include, but are not limited to: material handling equipment or activities; industrial machinery; raw materials; industrial production and processes; and intermediate products, by-products, final products, and waste products. Material handling activities include, but are not limited to: the storage, loading and unloading, transportation, disposal or conveyance of any raw material, intermediate product, final product or waste product. For structures located in areas of industrial activity, you must be aware that the structures themselves are potential sources of pollutants. This could occur, for example, when metals such as aluminum or copper are leached from the structures as a result of acid rain.

For each area identified, the SWPPP must include industrial activities, potential pollutants, spills and leaks, unauthorized non-stormwater discharges, salt storage, stormwater sampling data and descriptions of control measures.

2.1 Potential Pollutants Associated with Industrial Activity

Ref: 2015 MSGP Parts 5.2.3.1, 5.2.3.2 and 8.J.6.3

The table below summarizes potential pollutants associated with Industrial Activity at the facility:

Activity	Pollutant Source	Potential Pollutant
Site Preparation	Road construction	Dust, total suspended solids (TSS), total dissolved solids (TDS), turbidity
	Removal of overburden	
	Removal of waste rock to expose the mineral body	
Mineral Extraction	Controlled detonation	Dust, TSS
Mineral Processing Activities	Perlite sorting and crushing	Dust, TSS,TDS, turbidity, fines
	Perlite material storage	Dust, TSS,TDS, turbidity
	Waste rock storage	
	Perlite loading and unloading	
	Perlite and waste rock transportation	
Equipment/Vehicle Maintenance	Fueling activities	Diesel/gas fuel, oil
	Parts cleaning	Solvents, oil, heavy metals, acid/alkaline waste
	Waste disposal of oily rags, oil and gas filters, batteries, coolants, degreasers	Oil, heavy metals, solvents, acids
	Fluid replacement including hydraulic fluid, oil, transmission fluid, radiator fluids, and grease	Oil, arsenic, lead, cadmium, chromium, benzene, TCA, TCE, PAHs, solvents
Reclamation Activities	Site preparation for stabilization	Dust, TSS, TDS, turbidity
	Fertilizers	Nitrogen, phosphorus
Other activities	Sedimentation pond upsets	TSS, TDS, turbidity, pH
	Sedimentation pond sludge removal and disposal	Dust, TSS, TDS, turbidity
	Air emission control cleaning	Dust, TSS, TDS, turbidity

2.2 Spills and Leaks

Ref: 2015 MSGP Part 5.2.3.3

Areas of Site Where Potential Spills/Leaks Could Occur

Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC §9602.

A description of where potential spills and leaks could occur at the site that could contribute pollutants to your stormwater discharge, and discharge points likely to be affected by such spills and leaks are specified in the table below:

Location	Discharge Points
Fuel storage	Main water pump house area 3
Maintenance area	Main water pump house area 3
Haul roads	Main water pump house area 3

Description of Past Spills/Leaks

A description of Significant spills and leaks in the past three years of oil or toxic or hazardous substances that actually occurred at exposed areas, or that drained to a stormwater conveyance are described in the table below:

Date	Description (where it occurred, what happened, types of pollutants, extent of damage)	Discharge Points
n/a	n/a	n/a

2.3 Unauthorized Non-stormwater Discharges Documentation

Ref: 2015 MSGP Part 5.2.3.4

Provided that all discharges comply with the applicable effluent limits, Part 1.1.3 of the 2015 MSGP identifies allowable non-stormwater discharges as follows:

- Discharges from emergency/unplanned fire-fighting activities;
- Fire hydrant flushings;
- Potable water, including water line flushings;
- Uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids;
- Irrigation drainage;
- Landscape watering provided all pesticides, herbicides, and fertilizers have been applied in accordance with the approved labeling;
- Pavement wash waters where no detergents or hazardous cleaning products are used (e.g., bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols), and the wash waters do

not come into contact with oil and grease deposits, sources of pollutants associated with industrial activities, or any other toxic or hazardous materials, unless residues are first cleaned up using dry clean-up methods (e.g., applying absorbent materials and sweeping, using hydrophobic mops/rags) and appropriate control measures to minimize discharges of mobilized solids and other pollutants (e.g., filtration, detention; settlement) have been implemented;

- Routine external building washdown / power wash water that does not use detergents or hazardous cleaning products;
- Uncontaminated ground water or spring water;
- Foundation or footing drains where flows are not contaminated with process materials; and
- Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of your facility, but not intentional discharges from the cooling tower.

A description of this facility's unauthorized non-stormwater discharge evaluation is presented in Attachment D.

2.4 Salt Storage

Ref: 2015 MSGP Part 5.2.3.5

No salt is stored at this facility.

2.5 Sampling Data Summary

Ref: 2015 MSGP Part 5.2.3.6

There were no discharges during the previous term (2008-2015). No sampling data summary is presented.

SECTION 3: STORMWATER CONTROL MEASURES

Ref: 2015 MSGP Parts 2.1, 2.1.1, 2.1.2, 2.1.3, 2.2, 2.3, Part 8.J.6.4, Part 9 and 5.2.4

3.1 Non-numeric Technology-based Effluent Limits (BPT/BAT/BCT)

Ref: 2015 MSGP Part 2.1.2

A discussion of how Imerys complies with applicable non-numeric effluent limits as well as sector-specific non-numeric effluent limits in Part 8 is presented in the sections below.

3.1.1 Minimize Exposure

Ref: 2015 MSGP Part 2.1.2.1

Imerys has designed, installed, and implemented pollution prevention measures to minimize the exposure of processing and material storage areas to storm water. To the extent practical, industrial materials and activities are protected with storm resistant coverings or performed inside.

Measures implemented include:

- Grading, berm creation or curbing are used to prevent runoff of contaminated flows and divert run-on away from these areas;

- Materials, equipment, and activities are located so that potential leaks and spills are contained, able to be contained or diverted before discharge;
- Spills and leaks are cleaned up promptly using dry methods (e.g., absorbents) to prevent the discharge of pollutants;
- Leaky vehicles and equipment are stored indoors. If stored outdoors, methods to contain drips such as drip pans and absorbents are applied;
- Spill/overflow protection equipment and procedures are utilized;
- All vehicle and/or equipment cleaning operations are performed indoors, under cover, or in bermed areas that prevent runoff and run-on and also that capture any overspray; and
- Fluids are drained from equipment and vehicles that are decommissioned. Vehicles that will remain unused for extended periods of time are inspected at least monthly for leaks.

Control measures to minimize exposure are discussed in the following sections.

3.1.1.1 Equipment Maintenance

- Vehicle and equipment maintenance is performed only in the maintenance shop or the concrete pad in front of the maintenance shop.
- Drip pans and/or drop cloths are used under engines during repair.
- Used fluids are transferred to appropriate waste or recycling drums promptly after maintenance activities.
- Adsorbents are stored in the maintenance spill kits and used to clean up spills as soon as spills occur.

3.1.1.2 Fuel Loading and Dispensing

- A secondary containment wall is provided around the diesel ASTs and dispensing equipment to prevent vehicle damage.
- Fuel transfer procedures have been developed and are followed during the transfer of fuel from tanker trucks to the storage tanks and during fuel dispensing.
- Preventative maintenance of storage tanks and dispensing equipment is conducted.
- All unloading of petroleum products from tanker trucks occurs in the designated fueling area.
- A spill kit is located near the ASTs. (need to buy some spill kit)
- Visual inspection of all fuel ASTs occurs as part of the Spill Prevention, Control, and Countermeasures (SPCC) Plan.
- Imerys Perlite USA Inc. (Imerys) personnel routinely observe all areas of the plant, including the fuel ASTs during the course of their work for signs of leaks, spills, or other issues.

3.1.1.3 Vehicle Parking and Equipment Storage

- Regular application of water to keep down dust and dirt.
- All areas used for equipment storage are graded and/or bermed so that storm water and other

fluids are retained on site.

- Scrap materials that do not have potential for re-use are disposed of or recycled off site.
- Equipment or vehicles that are planned for long-term storage or disposal will have the fluids drained.

3.1.1.4 On Site Waste Disposal Practices

The following practices are employed:

- Water is regularly applied to suppress dust generated from fines staged at the Mill.
- Trash bins are covered.

3.1.2 Good Housekeeping

Ref: 2015 MSGP Part 2.1.2.2 and 5.2.5.1

All exposed areas that are potential sources of pollutants are kept clean. Measures implemented include:

- Areas are swept or vacuumed at regular intervals;
- Perlite spills are cleaned up as soon as possible and are re-fed into the process or returned to the mine in dump trucks for reuse in reclamation efforts with the overburden;
- Materials are stored in appropriate containers;
- All dumpster lids are kept closed when not in use;
- Controls such as secondary containment are used for dumpsters and roll off boxes that do not have lids and could leak;
- The potential for waste, garbage and floatable debris to be discharged is minimize by keeping exposed areas free of such materials, or by intercepting them before they are discharged;
- Monthly inspections are performed encompassing housekeeping elements including checks for leaks and conditions of drums, tanks and containers; and
- Waste materials are picked up and disposed of regularly at least once per week.

3.1.3 Maintenance

Ref: 2015 MSGP Part 2.1.2.3 and 5.2.5.1

Control measures that are used to achieve the effluent limits are maintained in effective operating condition. Industrial equipment and systems are also maintained per manufacturer guidelines in order to minimize pollutant discharges.

Measures implemented include:

- Inspections and preventive maintenance of stormwater drainage, source controls, treatment systems, and plant equipment and systems that could fail and result in contamination of stormwater are performed.
- Non-structural control measures are diligently maintained. This includes maintaining spill response supplies and appropriately training personnel.

- Baghouses are inspected at least quarterly and maintained to prevent the escape of dust from the system. Any accumulated dust at the base of the exterior baghouse is immediately removed.

If inspections identify that any control measures:

- need routine maintenance:
    - necessary maintenance will be performed immediately in order to minimize pollutant discharges.
- need to be repaired or replaced:
    - all reasonable steps will be taken to prevent or minimize the discharge of pollutants until the final repair or replacement is implemented, including cleaning up any contaminated surfaces so that the material will not be discharged during subsequent storm events. Final repairs/replacement of stormwater controls will be completed as soon as feasible but must be no later than within 14 days or, if that is infeasible, within 45 days.

If the completion of stormwater control repairs/replacement will exceed the 45 day timeframe, Imerys may take the minimum additional time necessary to complete the maintenance. Prior to taking the additional time necessary Imerys will notify the EPA Regional Office of the intention to exceed 45 days, and document in this SWPPP rationale for a modified maintenance timeframe. Corrective actions as specified in Section 6 of this SWPPP will be performed for incorrectly installed control measures.

3.1.4 Spill Prevention and Response

Ref: 2015 MSGP Part 2.1.2.4 and 5.2.5.1

The facility has developed and implements a Spill Prevention Control and Countermeasure (SPCC) plan under a separate regulatory program (40 CFR 112).

The facility has the following liquid materials stored on site:

- Diesel fuel in AST
- Recycled burner oil in AST
- Used oil in AST
- Lubricants in 55-gallon drums
- Miscellaneous materials in 5-gallon pails and smaller containers.

3.1.4.1 Spill Prevention

Generally, liquid chemical products in containers of 55-gallon capacity or less are stored indoors or in secondary containment. Storage containers that could be susceptible to spillage or leakage are plainly labeled (e.g., “Used Oil,” “Spent Solvents,”) to encourage proper handling and facilitate rapid response if spills or leaks occur.

3.1.4.2 Spill Response

Staff are trained on procedures to quickly stop, contain and clean up leaks, spills, and other releases. As appropriate, staff are trained to execute such procedures as soon as possible.

In the event of a spill indoors, Perlite, an excellent absorbent, will be applied. The plant uses Perlite as an absorbent for spill cleanup and is readily available around plant for cleanup use at all locations in the plant. The used absorbent will then be containerized and disposed of in accordance with applicable regulations.

Chemical spill areas are not hosed down. Outdoor storage and operations areas are not hosed down.

Any collected liquids or soiled Perlite material are properly characterized and profiled for disposal after use. Storage and operation areas are swept and cleaned as applicable, based on monthly housekeeping inspections. Swept materials are properly disposed.

In the event of a chemical spill, areas are immediately isolated, and the facility response coordinator or alternate is notified.

If a spill is less than 5 gallons, Perlite is obtained and trained Imerys employees don the proper personnel protective equipment and clean up the spill. When necessary, materials will be absorbed with an absorbent. Smaller leaking containers and soiled Perlite will be placed in empty waste drums.

Spills that require clean up beyond the capabilities of employees will be addressed using an external remediation company. Appropriate local agencies will be notified as applicable.

While liquid materials are stored indoors, oils are contained within some outdoor non-mobile equipment. When oil is changed in such equipment, care will be taken to minimize spills. In the event that spills occur, absorbent will be applied as described above.

Where a leak, spill or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, the National Response Center (NRC) will be notified at (800) 424-8802 in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117, and 40 CFR Part 302 as soon as Imerys has knowledge of the discharge. Contact information is in locations that are readily accessible and available.

3.1.5 Erosion and Sediment Controls

Ref: 2015 MSGP Part 2.1.2.5, 5.2.5.1 and 8.J.5.2

Exposed areas are minimized to the extent practical during mining. To the extent practical, mined areas are graded to provide retention basins that collect potential stormwater runoff on-site.

The exposed areas of the mine are primarily heavy rock and therefore significant erosion is not typical. In addition, much of the area is contoured to prevent eroded material from leaving the site. Eroded material is contained within three catch basins or three natural impounds and allowed to settle out. The Imerys facility has implemented sediment and erosion control measures designed to keep sediment in place or capture sediment that may be capable of leaving the facility. Both the processing plant and the mine utilize settling impounds as the primary means of collecting sediment. Other control measures include:

- Berms to contain storm water volume within the upper processing plant;
- Solids/fines retention pond to receive storm water flow from low processing areas;
- Sequencing exploration and construction activities to minimize the area of disturbance;
- Stabilized entrances/exits are maintained at ingress and egress points to public right-of-way to

minimize tracking of sediment;

- Use of rip rap in the mine site to line drainage points where erosion control is required;
- Earth berms used to prevent outfalls and storm water from running off the site; and
- Reclamation activities.

3.1.6 Management of Runoff

Ref: 2015 MSGP Part 2.1.2.6

Certain mined areas are utilized as retention basins to divert, infiltrate, reuse, contain or otherwise reduce potential stormwater runoff as practical. Locations providing retention capacities are indicated in the site map in Attachment B.

3.1.7 Salt Storage Piles or Piles Containing Salt

Ref: 2015 MSGP Part 2.1.2.7

The facility does not have salt storage piles or piles containing salt.

3.1.8 Dust Generation and Vehicle Tracking of Industrial Materials

Ref: 2015 MSGP Part 2.1.2.10

Generation of dust and off-site tracking of raw, final, or waste materials is minimized in order to minimize pollutant discharges. Measures implemented include:

- Controlled speed limits; and
- Use of a water truck for wet dust suppression on roads.

3.2 Sector-Specific Non-Numeric Effluent Limits

Ref: 2015 MSGP Part 8

3.2.1 Requirements Applicable to Earth-Disturbing Activities Conducted Prior to Active Mining Activities.

Ref: 2015 MSGP Part 8.G.3.3, 8.G.3.4

2015 MSGP Part 8.G.3.3 defines active mining activities as activities related to the extraction, removal or recovery, and benefication of metal ore from the earth; removal of overburden and waste rock to expose mineable minerals; and site reclamation and closure activities. All such activities occur within the “active mining area.” Reclamation involves activities undertaken, in compliance with applicable mined land reclamation requirements, to return the land to an appropriate post-mining contour and land use in order to meet applicable federal and state reclamation requirements. Once earth-disturbing activities conducted prior to active mining activities have ceased and a well-delineated “active mining area” has been established, all activities (including any clearing, grading, and excavation) that occur within the active mining area are “active mining activities.”

No Agua Mine is an existing facility with Active Mining Activities. Requirements applicable to earth-disturbing activities conducted prior to active mining activities are not applicable.

Per 2015 MSGP Part 8.G.4, earth-disturbing activities (clearing, grading and excavation) that occur on areas outside the active mining area (e.g., for expansion of the mine into undeveloped territory) are considered "earth-disturbing conducted prior to active mining activities". Content of this SWPPP describes how No Agua Mine meets 2015 MSGP requirements.

3.2.2 Certification of Permit Coverage for Commingled Non-Stormwater Discharges

Ref: 2015 MSGP Part 8.J.6

No certification of permit coverage for commingled non-stormwater discharges is included with this SWPPP. Discharge from No Agua Mine is not composed of commingled stormwater and non-stormwater covered under a separate NPDES permit.

3.3 Numeric Effluent Limitations Based on Effluent Limitations Guidelines

Ref: 2015 MSGP Part 2.1.3, , 8.J.2 and 8.J.9

Incidental mine dewatering may occur at the facility. The activity is listed as a regulated activity in Table 2-1 of the 2015 MSGP.

Regulated Activity	40 CFR Part/Subpart	Effluent Limit
Mine dewatering discharges at crushed stone, construction sand and gravel, or industrial sand mining facilities	Part 436, Subparts B, C, or D	2015 MSGP Part 8.J.9

Applicable Effluent Limits from Table 8.J-2 of 2015 MSGP are presented below:

Industrial Activity	Parameter	Effluent Limitation
Mine dewatering discharges at industrial sand mining facilities (SIC 1446)	Total Suspended Solids (TSS)	25 mg/L, monthly avg.
		45 mg/L, daily maximum
	pH	6.0 - 9.0

Stormwater control measures identified in Section 3 of this SWPPP are implemented.

Compliance with these effluent limits will be determined based on discharges from these industrial activities independent of commingling with any other waste streams that may be covered under this permit.

When there is dewatering, monitoring will be conducted annually.

3.4 Water Quality-based Effluent Limitations and Water Quality Standards

Ref: 2015 MSGP Part 2.2.1, Part 9.6

The measures identified in this SWPPP will be implemented to control industrial stormwater discharge as necessary to meet applicable water quality standards of all affected states.

If at any time Imerys becomes aware, or EPA determines, that discharge does not meet applicable water quality standards, corrective action(s) identified in Section 6 of this SWPPP will be taken and documented. EPA may also require additional control measures to be undertaken on a site-specific basis, or require coverage under an individual permit, if information in the NOI, required reports, or from other sources indicates that discharges are not controlled as necessary to meet applicable water quality standards.

3.5 New Mexico Specific Water Quality-based Effluent Limitations and Water Quality Standards

3.5.1 Benchmark Monitoring Concentrations

Ref: 2015 MSGP Part 6.2.1.2

Benchmark monitoring must be conducted quarterly for the first four full quarters of permit coverage commencing no earlier than September 2, 2015.

Monitoring requirements begin in the first full quarter following either September 2, 2015 or date of discharge authorization, whichever date comes later. Monitoring is performed at least once in each of the following 3-month intervals:

• January 1 – March 31;

• April 1 – June 30;

• July 1 – September 30;

• October 1 – December 31.

The monitoring schedule for No Agua Mine may be modified because the facility is located in an area where limited rainfall occurs during parts of the year. In addition stormwater is retained onsite during most storm events leading to no discharge.

Required monitoring events are distributed during seasons when precipitation occurs in order to collect the required number of samples.

"No data" or "NODI" code will be reported in NetDMR for any 3-month interval that samples were not taken.

2015 MSGP requires that the benchmark values for the indicated pollutants in the table below be modified to reflect New Mexico water quality standards for the facilities in New Mexico, based on benchmark values from the Standards for Interstate and Intrastate Surface Waters (as approved on June. 5, 2013), 20.6.4.900 NMAC).

Pollutant	MSGP Benchmark	Lowest New Mexico Water Quality Standard	Hardness Dependent Value (if appropriate)
Total Suspended Solids	100 mg/L	Segment specific	
pH	6.0 – 9.0 SU	Segment specific	

Due to No Agua Mine's location relative to the nearest water body, no modifications are applicable.

3.6 Requirements Relating to Endangered Species, Historic Properties, and Federal CERCLA Sites

Ref: 2015 MSGP Part 2.3

There are no additional measures relating to Endangered Species, Historic Properties, and Federal CERCLA Sites.

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SECTION 4: SCHEDULES AND PROCEDURES

4.1 Good Housekeeping

Ref: 2015 MSGP Part 5.2.5.1

Roll off dumpsters are collected when full.

Routine inspections for leaks and conditions of drums, tanks and containers are conducted as part of daily workplace exams.

Monthly inspections including housekeeping are performed.

4.2 Maintenance

Ref: 2015 MSGP Part 5.2.5.1

Maintenance practices avoid situations that may result in leaks, spills, and other releases. Vehicles are inspected pre-operation and maintained per manufacturer guidelines. Machinery and equipment is regularly inspected during the shift and maintained per manufacturer guidelines.

Control measures used to comply with effluent limits are inspected at least quarterly and necessary maintenance performed on them promptly. Additional inspections including housekeeping are conducted monthly.

4.3 Spill Prevention and Response Procedures

Ref: 2015 MSGP Part 5.2.5.1

No Agua Mine implements procedures for preventing and responding to spills and leaks that can contaminate stormwater.

Material is stored in containers appropriate for the material at designated locations. Tank capacities are known. Tank capacities are checked prior to conducting material transfer. Unattended material transfer is not allowed.

When tankers make fuel deliveries they use wheel chocks to prevent unintended tanker movement during fuel transfer.

Minor spills are cleaned up using perlite absorbent and collected into covered drums for offside management according to applicable regulations. The facility also has heavy equipment such as loaders that can be used to create berms for spill containment.

Where a leak, spill or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, the National Response Center (NRC) will be notified at (800) 424-8802 as soon as the facility has knowledge of the discharge.

The facility also implements a Spill Prevention, Control and Countermeasure Plan (SPCC) under a separate program.

4.4 Erosion and Sediment Control

Ref: 2015 MSGP Part 5.2.5.1

The facility does not use polymers and/or other chemical treatments as part of its controls. If in future such treatments are used the SWPPP will be updated to identify them.

4.5 Employee Training

Ref: 2015 MSGP Part 2.1.2.8, 5.2.5.1, 8.J.5.1 and 8.J.6.5

All employees who work in areas where industrial materials or activities are exposed to stormwater, or who are responsible for implementing activities necessary to meet the conditions of this permit (e.g., inspectors, maintenance personnel), including all members of the stormwater pollution prevention team are trained at least annually. Personnel are trained to understand the requirements of the permit and their specific responsibilities with respect to those requirements. Personnel trained include:

• Personnel who are responsible for the design, installation, maintenance, and/or repair of controls (including pollution prevention measures);

• Personnel responsible for the storage and handling of chemicals and materials that could become contaminants in stormwater discharges;

• Personnel who are responsible for conducting and documenting monitoring and inspections; and

• Personnel who are responsible for taking and documenting corrective actions.

Personnel are trained in at least the following if related to the scope of their job duties:

• An overview of what is in the SWPPP;

• Spill response procedures, good housekeeping, maintenance requirements, and material management practices;

• The location of all controls on the site required by this permit, and how they are to be maintained;

• The proper procedures to follow with respect to the permit's pollution prevention requirements; and

• When and how to conduct inspections, record applicable findings, and take corrective actions.

The facility has numerous hazardous material training programs. This program includes training for all new employees and refresher training annually. The training covers spill response, waste minimization, monthly inspections, and waste storage and labeling.

In addition, employees with storm water responsibilities are trained on their responsibilities under the plan within 30 days of submission of the SWPPP NOI permit application and annually thereafter. New employees with storm water responsibilities are trained prior to carrying out any storm water

responsibilities. Storm water training covers the items listed in the SWPPP and employees are trained on their responsibilities under the plan.

Training of individual employees is documented on training attendance rosters and retained in Attachment E of this SWPPP for a minimum of three years.

4.6 Inspections and Assessments

Ref: 2015 MSGP Part 3

4.6.1 Routine Facility Inspections

Ref: 2015 MSGP Part 3.1 and **8.J.7**

Imerys conducts inspections of areas of the facility covered by the requirements in this permit during normal facility operating hours, including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to stormwater;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years, if any;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

No Agua Mine does not discharge to waters which are designated as Tier 2 or 2.5 or waters which are impaired for sediment or nitrogen where inspections are required at least monthly.

Inspections will be conducted at least quarterly (i.e., once each calendar quarter).

Increased frequency may be appropriate for some types of equipment, processes and stormwater control measures, or areas of the facility with significant activities and materials exposed to stormwater. At least once each calendar year, the routine inspection will be conducted during a period when a stormwater discharge is occurring.

Inspections are performed by qualified personnel. (Qualified personnel are those who are knowledgeable in the principles and practices of industrial stormwater controls and pollution prevention, and who possess the education and ability to assess conditions at the industrial facility that could impact stormwater quality, and the education and ability to assess the effectiveness of stormwater controls selected and installed to meet the requirements of the permit) with at least one member of the stormwater pollution prevention team participating. Inspectors will consider the results of visual and analytical monitoring (if any) for the past year when planning and conducting inspections.

During inspections, No Agua Mine examines or looks out for the following:

- Industrial materials, residue or trash that may have or could come into contact with stormwater;
- Leaks or spills from industrial equipment, drums, tanks and other containers;
- Offsite tracking of industrial or waste materials, or sediment where vehicles enter or exit the site;
- Tracking or blowing of raw, final or waste materials from areas of no exposure to exposed areas;
- Control measures needing replacement, maintenance or repair.

During an inspection occurring during a stormwater event or discharge, control measures implemented to comply with effluent limits will be observed to ensure they are functioning correctly. Discharge points will also be observed during this inspection. If such discharge locations are inaccessible, nearby downstream locations will be inspected.

Findings of facility inspections will be maintained with this SWPPP. Checklist for conducting routine facility inspections and visual assessments are presented in Attachment F. Findings will be summarized in the annual report.

An Annual Report will be submitted to EPA electronically by January 30th for each year of permit coverage containing information generated from the past calendar year including but not limited to:

- A summary of your past year's routine facility inspection documentation required. The inspection date and time;
- The name(s) and signature(s) of the inspector(s);
- Weather information;
- All observations relating to the implementation of control measures at the facility, including:
- A description of any discharges occurring at the time of the inspection;
- Any previously unidentified discharges from and/or pollutants at the site;
- Any evidence of, or the potential for, pollutants entering the drainage system;
- Observations regarding the physical condition of and around all outfalls, including any flow dissipation devices, and evidence of pollutants in discharges and/or the receiving water;
- Any control measures needing maintenance, repairs, or replacement;
- Any additional control measures needed to comply with the permit requirements;
- Any incidents of noncompliance; and
- A statement, signed and certified with the following certification statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Corrective actions required as a result of a routine facility inspection are performed consistent with Part 4 of the 2015 MSGP as described in Section 6 of this SWPPP.

For routine facility inspections:

1. Person(s) or positions of person(s) responsible for inspection.

   The Production Supervisor is responsible for routine facility inspection.

2. Schedules for conducting inspections.

Inspections are conducted at least quarterly (i.e. once each calendar quarter) and as appropriate. At least one routine inspection will be conducted during a period when a stormwater discharge is occurring.

3. List of areas where industrial materials or activities are exposed to stormwater.
    - Perlite mining
    - Material Hauling to Storage and Processing Areas
    - Material Loading and Unloading
    - Outdoor Processing Activities
    - Material Storage
    - Equipment Maintenance
    - Fuel Loading and Dispensing
    - Equipment Parking and Storage
    - On Site Waste Disposal Practices
4. List of areas identified in Section 1 of the SWPPP and any others that are potential pollutant sources.
    - Perlite mining
    - Material Hauling to Storage and Processing Areas
    - Material Loading and Unloading
    - Outdoor Processing Activities
    - Material Storage
    - Equipment Maintenance
    - Fuel Loading and Dispensing
    - Equipment Parking and Storage
    - On Site Waste Disposal Practices
5. Areas where spills and leaks have occurred in the past 3 years.

    There have been no significant spills or leaks in the past 3 years.
6. Inspection information for discharge points.

DISCHARGE POINT	GPS COORDINATES	SAFETY CONSIDERATIONS
LOCATION A		
LOCATION B		
LOCATION C		

7. List of control measures used to comply with the effluent limits contained in this permit.
    - Grading, berm creation or curbing are used to prevent runoff of contaminated flows and divert run-on away from these areas;
    - Materials, equipment, and activities are located so that potential leaks and spills are contained, able to be contained or diverted before discharge;
    - Spills and leaks are cleaned up promptly using dry methods (e.g., absorbents) to prevent the discharge of pollutants;
    - Leaky vehicles and equipment are stored indoors. If stored outdoors, methods to contain drips such as drip pans and absorbents are applied;
    - Spill/overflow protection equipment and procedures are utilized;
    - All vehicle and/or equipment cleaning operations are performed indoors, under cover, or in bermed areas that prevent runoff and run-on and also that capture any overspray; and
    - Fluids are drained from equipment and vehicles that are decommissioned. Vehicles that will remain unused for extended periods of time are inspected at least monthly for leaks.
    - Good housekeeping
    - Maintenance
    - Employee Training
    - Stormwater retention on site.
8. Other site-specific inspection objectives.

    Additional site-specific inspection objectives may develop as operations continue.

4.6.2 Quarterly Visual Assessment of Stormwater Discharges

Ref: 2015 MSGP Part 3.2

Quarterly visual assessments are performed at No Agua Mine as described below:

1. Person(s) or positions of person(s) responsible for assessments.

    The Production Supervisor is responsible for quarterly visual assessments performed at the site.

2. Schedules for conducting assessments.

    Visual assessment will be conducted at least once per calendar quarter whenever there is stormwater runoff during the quarter.

3. Specific assessment activities.

    Visual assessments are made:

- Of a discharge sample contained in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. When a sample cannot be collected within the first 30 minutes of discharge, the sample will collected as soon as practicable after the first 30 minutes. Reasons why it was not possible to take the sample within the first 30 minutes will be documented. In the case of snowmelt, samples are taken during a

period with a measurable discharge from your site; and

- For storm events, on discharges that occur at least 72 hours (3 days) from the previous discharge. The 72-hour (3-day) storm interval does not apply if it is documented that less than a 72-hour (3-day) interval is representative for local storm events during the sampling period.

Findings of quarterly visual assessments will be maintained with this SWPPP. Checklist for conducting quarterly visual assessments is presented in Attachment F. Findings will be summarized in the annual report.

An Annual Report will be submitted to EPA electronically by January 30th for each year of permit coverage containing information generated from the past calendar year including but not limited to:

- A summary of your past year's quarterly visual assessment documentation including, but not limited to the following information:
    - Sample location(s);
    - Sample collection date and time, and visual assessment date and time for each sample;
    - Personnel collecting the sample and performing visual assessment, and their signatures;
    - Nature of the discharge (i.e., runoff or snowmelt);
    - Results of observations of the stormwater discharge;
    - Probable sources of any observed stormwater contamination;
    - If applicable, why it was not possible to take samples within the first 30 minutes; and
    - A statement signed and certified with the following certification statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The results of visual assessments are maintained onsite with this SWPPP as Attachment F. Corrective actions required as a result of a quarterly visual assessment are performed as described in Section 6 of this SWPPP.

4.6.3 Exception to Routine Facility Inspections and Quarterly Visual Assessments for Inactive and Unstaffed Sites

Ref: 2015 MSGP Part 3.1.1, 3.2.3 and 8.J.7

The exception for inactive and unstaffed sites for routine facility inspections and/or quarterly visual assessments is not invoked for this site.

4.7 Monitoring

Ref: 2015 MSGP Part 5.2.5.3

The following monitoring activities are applicable to this facility:

☒Quarterly benchmark monitoring (2015 MSGP Part 6.2.1 and relevant requirements in Part 8 and/or Part 9);

☒Effluent limitations guidelines monitoring (2015 MSGP Part 6.2.2 and relevant requirements in Part 8);

☐State- or tribal-specific monitoring (2015 MSGP Part 6.2.3 and relevant requirements in Part 9);

☐Impaired waters monitoring (2015 MSGP Part 6.2.4);

☐Other monitoring required by EPA (2015 MSGP Part 6.2.5).

Quarterly Benchmark Monitoring

1. Sample location(s).

- Discharge Point A
- Discharge Point B
- Discharge Point C

2. Pollutants to be sampled.

    - Total Suspended Solids (TSS)

3. Monitoring Schedules.

    Monitoring will be performed when there is a stormwater discharge on a quarterly basis. No Agua Mine is at a location with limited stormwater discharge events which may restrict the ability to monitor on every calendar quarter.

4. Numeric Limitations.

    Pollutants subject to numeric limits (effluent limitations guidelines) and which discharge points are subject to such limits are presented in the table below.

Parameter	Discharge Points	MSGP Benchmark Monitoring Concentration
Total Suspended Solids (TSS)		100 mg/L

5. Procedures.

    The Production Supervisor will conduct quarterly benchmark monitoring.

    The following precautions are observed when taking samples:

    Grab samples will be collected at the sampling locations identified in the site map. The following

subsections provide specific details for sample handling, analytical parameters, and other details required to ensure that proper representative samples are taken.

To maintain sample integrity and prevent cross-contamination, sample collection must follow the protocols below.

- Collect samples only in containers provided by the analytical laboratory;
- Decontaminate all equipment (e.g. bucket, tubing) prior to sample collection (e.g. using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water. Dispose of wash and rinse water appropriately, i.e., do not discharge to storm drain or receiving water). Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

Sampling supplies should include the following:

- Sample collection equipment
- Litmus paper
- Coolers
- Identification labels and marker pens
- Re-sealable storage bags
- Sample containers
- Chain of Custody Forms

The following sample containers that should be on hand prior to a sampling event:

Parameter	Bottle Type	Minimum Volume	Maximum Holding Time	Preservation
Total Suspended Solids	500 ml wide- mouth poly	100 ml	7 days	Refrigerate/ cooler

- Allow storm water to flow directly into the sample bottle, rather than transferring it from another collection vessel. Sample where the water has a moderate flow and, if possible, some turbulence, so that the storm water discharge will be well mixed and the sample will be representative. Sampling in still water should be avoided. When using a sample bottle, the bottle should be plunged below the surface in a sweeping arc and then brought upwards through the water surface again, so the water surface is broken twice by the mouth of the bottle. The sample bottle should be placed so that the storm water flows

directly into the bottle.

- Ensure that any preservative placed in the bottle by the laboratory (e.g. acid) is not lost prior to or during sampling.
- Never allow the bottle to overflow during sampling, particularly if it contains a preservative
- Keeps hands away from the sample bottle's opening to prevent contaminating the sample
- Hold the sample bottle facing upstream
- Take the sample directly from the discharge inlet/outlet
- As soon as the sample is taken, cap the bottle and label it before temporarily storing it in a cooler with an ice pack. Record the sampling information on the sampling log.
- Properly fill out chain of custody forms.
- Preserve the sample in a refrigerator if the sample cannot be delivered to the laboratory on the same day.
- Deliver samples to an approved laboratory for analysis.

  Any laboratory from the list of approved laboratories provided by New Mexico Environment Department's website at this link may be used: https://www.env.nm.gov/dwb/sampling/CertifiedLabs.htm
- Monitoring data must be reported using EPA's electronic NetDMR tool at www.epa.gov/netdmr no later than 30 days after receiving complete laboratory results.

ELG Monitoring

1. Sample location(s).
   - Discharge Point A
   - Discharge Point B
   - Discharge Point C
2. Pollutants to be sampled.
   - TSS
3. Monitoring Schedules.

   Dewatering is an event that occurs intermittently. Monitoring will be performed when there is dewatering leading to discharge.
4. Numeric Limitations.

   Pollutants subject to numeric limits (effluent limitations guidelines) and which discharge points are subject to such limits are presented in the table below.

Parameter	Discharge Points	MSGP Benchmark Monitoring

		Concentration
Total Suspended Solids (TSS)	Discharge Point A	100 mg/L
Total Suspended Solids (TSS)	Discharge Point B	100 mg/L
Total Suspended Solids (TSS)	Discharge Point C	100 mg/L

Procedures.

The Production Supervisor will conduct quarterly benchmark monitoring.

The following precautions are observed when taking samples:

Grab samples will be collected at the sampling locations identified in the site map. The following subsections provide specific details for sample handling, analytical parameters, and other details required to ensure that proper representative samples are taken.

To maintain sample integrity and prevent cross-contamination, sample collection must follow the protocols below.

- Collect samples only in containers provided by the analytical laboratory;
- Decontaminate all equipment (e.g. bucket, tubing) prior to sample collection (e.g. using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water. Dispose of wash and rinse water appropriately, i.e., do not discharge to storm drain or receiving water). Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

Sampling supplies should include the following:

- Sample collection equipment
- Litmus paper
- Coolers
- Identification labels and marker pens
- Re-sealable storage bags
- Sample containers
- Chain of Custody Forms

The following sample containers that should be on hand prior to a sampling event:

Parameter	Bottle Type	Minimum Volume	Maximum Holding Time	Preservation
Total Suspended Solids	500 ml wide- mouth poly	100 ml	7 days	Refrigerate/ cooler

- Allow storm water to flow directly into the sample bottle, rather than transferring it from another collection vessel. Sample where the water has a moderate flow and, if possible, some turbulence, so that the storm water discharge will be well mixed and the sample will be representative. Sampling in still water should be avoided. When using a sample bottle, the bottle should be plunged below the surface in a sweeping arc and then brought upwards through the water surface again, so the water surface is broken twice by the mouth of the bottle. The sample bottle should be placed so that the storm water flows directly into the bottle.
- Ensure that any preservative placed in the bottle by the laboratory (e.g. acid) is not lost prior to or during sampling.
- Never allow the bottle to overflow during sampling, particularly if it contains a preservative
- Keeps hands away from the sample bottle's opening to prevent contaminating the sample
- Hold the sample bottle facing upstream
- Take the sample directly from the discharge inlet/outlet
- As soon as the sample is taken, cap the bottle and label it before temporarily storing it in a cooler with an ice pack. Record the sampling information on the sampling log.
- Properly fill out chain of custody forms.
- Preserve the sample in a refrigerator if the sample cannot be delivered to the laboratory on the same day.
- Deliver samples to an approved laboratory for analysis.
- Any laboratory from the list of approved laboratories provided by New Mexico Environment Department's website at this link may be used:

  https://www.env.nm.gov/dwb/sampling/CertifiedLabs.htm
- Monitoring data must be reported using EPA's electronic NetDMR tool at www.epa.gov/netdmr no later than 30 days after receiving complete laboratory results.

Inactive and unstaffed sites exception (if applicable)

This exception is not applied to this site.

SECTION 5: DOCUMENTATION TO SUPPORT ELIGIBILITY CONSIDERATIONS UNDER OTHER FEDERAL LAWS

5.1 Documentation Regarding Endangered Species

Ref: 2015 MSGP Part 5.2.6.1

No Agua Mine meets Criterion A of 2015 MSGP Part 5.2.6.1 eligibility for coverage.

Certification of eligibility under Criterion A of the permit was performed using the Criterion Selection Worksheet in Part E.4 of Appendix E of the MSGP of 2015.

STEP 1: DETERMINE IF THE ELIGIBILITY REQUIREMENTS OF CRITERION B, D, OR E CAN BE MET.

Criterion	Summary Description	Eligibility
B	Another operator has accounted for your action area in their valid certification of eligibility under the 2015 MSGP	☐ Yes ☒ No
D	Previously completed ESA section 7 consultation	☐ Yes ☒ No
E	Previously issued ESA section 10 permit	☐ Yes ☒ No

STEP 2: DETERMINE THE EXTENT OF YOUR ACTION AREA
No Agua Mine experiences few stormwater runoff events and often retains stormwater on site. The extent of the action area was determined to be the property boundaries.
A determination of whether species listed as either threatened or endangered, or their critical habitat(s) are located in your facility's action area was made.
A map that was generated from the FWS' on-line mapping tool IPaC (the *Information, Planning, and Consultation System*) located at http://ecos.fws.gov/ipac/ and a written description of the action area of your facility is included in Attachment G.

STEP 3: DETERMINE IF LISTED THREATENED OR ENDANGERED SPECIES AND/OR CRITICAL HABITAT ARE PRESENT IN YOUR ACTION AREA.
Federally listed species and designated critical habitat are under the purview of the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) (together, "Services"). Species and critical habitat lists were acquired from both Services. Results from the services are presented in Attachment G.

For FWS species information, the on-line mapping tool IPaC (the *Information, Planning,and Consultation System*) located at http://ecos.fws.gov/ipac/ was utilized. IPaC report indicates that critical habitats are absent from No Agua Mine's action area.
The following areas were included in the definition of action area:
•The areas where stormwater discharges originate and flow from the industrial facility to the point of discharge into receiving waters.
•The areas where stormwater from industrial activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge.
•The areas where stormwater controls will be constructed and operated, including any areas where stormwater flows to and from the stormwater controls.
•The areas upstream and/or downstream from the stormwater discharge into a stream segment that may be affected by these discharges.

For NMFS species and critical habitat information, the following webpages, which provide up-to-date information on listed species were utilized:

i. Listed species: (http://www.nmfs.noaa.gov/pr/species/esa/)
ii. Critical habitat: (http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm).

Results indicate that there are no Critical Habitats within the "action area" and therefore no federally listed threatened or endangered species or their designated critical habitat(s) are likely to occur in the "action area". This confirms that there are no listed species and no critical habitat in No Agua Mine action area.

Services online systems generated reports are presented in Attachment G.

5.2 Documentation Regarding Historic Properties

Ref: 2015 MSGP Part 5.2.6.2 and Appendix F

No Agua Mine is an existing facility that gained coverage under the 2008 MSGP. Per 2015 MSGP Part 5.2.6.2, as long as the facility is not constructing or installing any new stormwater control measures then the facility meets eligibility Criterion A.

Procedures in Appendix F of will be followed if the facility chooses to construct or install stormwater control measures that require subsurface disturbance of less than one (1) acre.

Attachment H presents NOI and EPA Acknowledgement Correspondence.

SECTION 6: CORRECTIVE ACTIONS

Ref: 2015 MSGP Part 4

6.1 Conditions Requiring SWPPP Review and Revision to Ensure Effluent Limits are Met

The SWPPP (e.g., sources of pollution; spill and leak procedures; non-stormwater discharges; the selection, design, installation and implementation of your control measures) will be reviewed and revised, as appropriate, when any of the following conditions occur or are detected during an inspection, monitoring or other means, (so that this permit's effluent limits are met and pollutant discharges are minimized):

• An unauthorized release or discharge (e.g., spill, leak, or discharge of non-stormwater not authorized by MSGP or another NPDES permit to a water of the U.S.) occurs.

• A discharge violates a numeric effluent limit identified in Section 3.3 of this SWPPP.

• Control measures are not stringent enough for the discharge to meet applicable water quality standards or the non-numeric effluent limits in this permit.

• A required control measure was never installed, was installed incorrectly, or is not being properly operated or maintained.

• Whenever a visual assessment shows evidence of stormwater pollution (e.g., color, odor, floating solids, settled solids, suspended solids, foam).

6.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary

This SWPPP (e.g., sources of pollution, spill and leak procedures, non-stormwater discharges, selection, design, installation and implementation of your control measures) will be reviewed to determine if modifications are necessary to meet the effluent limits in the MSGP if any of the following conditions occur:

• Construction or a change in design, operation, or maintenance at your facility that significantly changes the nature of pollutants discharged in stormwater from your facility, or significantly increases the quantity of pollutants discharged.

• The average of four quarterly sampling results exceeds an applicable benchmark. If less than four benchmark samples have been taken, but the results are such that an exceedance of the four quarter average is mathematically certain (i.e., if the sum of quarterly sample results to date is more than four times the benchmark level) this is considered a benchmark exceedance, triggering this review.

Note: A benchmark exceedance does not trigger a corrective action if it is determined that the exceedance is solely attributable to natural background sources, or if a finding is made that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice.

Note: When run-on to the facility causes a benchmark exceedance, in addition to reviewing and revising, as appropriate, this SWPPP, the other operators contributing run-on to facility discharges will be notified to abate their pollutant contribution. Where the other operators fail to take action to address the stormwater run-on, the EPA Regional Office will be contacted.

6.3 Corrective Actions and Deadlines

6.3.1 Immediate Actions

If corrective action is needed, all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational are taken, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.

In this context, the term “immediately” requires, on the same day a condition requiring corrective action is found, to take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the work day when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following work day. “All reasonable steps” means No Agua Mine has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date. “All reasonable steps” for purposes of complying with 2015 MSGP Part 4.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary, when it is concluded that a corrective action is, in fact, not necessary, could include documenting why a corrective action is unnecessary.

6.3.2 Subsequent Actions

If it is determined that additional actions are necessary beyond those identified in SWPPP Section 6.3.1 above, corrective actions (e.g., install a new or modified control and make it operational, complete the

repair) are completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, documentation of why it is infeasible to complete the corrective action within the 14-day timeframe will be made. A schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery will be developed. If the completion of corrective action will exceed the 45 day timeframe, No Agua Mine may take the minimum additional time necessary to complete the corrective action, provided that the EPA Regional Office is notified of the intention to exceed 45 days, rationale for an extension, and a completion date, which must also be included in corrective action documentation. Where corrective actions result in changes to any of the controls or procedures documented in this SWPPP, the SWPPP will be modified accordingly within 14 calendar days of completing corrective action work.

The 2015 MSGP views these time intervals not as grace periods, but schedules considered reasonable for documenting findings and for making repairs and improvements. They are included in the permit to ensure that the conditions prompting the need for these repairs and improvements do not persist indefinitely.

6.4 Corrective Action Documentation.

Documentation of the existence of any of the conditions requiring Immediate Actions or Subsequent Actions will be performed within 24 hours of becoming aware of the conditions. Corrective action documentation is not submitted to EPA, unless specifically requested to do so. Findings are summarized in the annual report.

The following information is included in the documentation:

- Description of the condition triggering the need for corrective action review. For any spills or leaks, the following information is included: a description of the incident including material, date/time, amount, location, and reason for spill, and any leaks, spills or other releases that resulted in discharges of pollutants to waters of U.S., through stormwater or otherwise;
- Date the condition was identified;
- Description of immediate actions taken to minimize or prevent the discharge of pollutants. For any spills or leaks, response actions, the date/time clean-up completed, notifications made, and staff involved are included. Also included are any measures taken to prevent the reoccurrence of such releases; and
- A statement, signed and certified in accordance with 2015 MSGP Appendix B, Subsection 11.

The corrective actions taken or to be taken (or, for triggering events where it is determined that corrective action is not necessary, the basis for this determination) are documented within 14 days from the time of discovery of any of those conditions. The dates when each corrective action was initiated and completed (or is expected to be completed) are provided. If applicable, documentation explaining why it is infeasible to complete the necessary installations or repairs within the 14-day timeframe and a schedule for installing the controls and making them operational as soon as practicable after the 14-day timeframe will be made. If EPA is notified regarding an extension of the 45 day timeframe, rationale for an extension will be documented.

Corrective action documentation is presented in Attachment I.

6.5 Effect of Corrective Action

Under 2015 MSGP, if the event triggering the review is a permit violation (e.g., non-compliance with an effluent limit), correcting it does not remove the original violation. Additionally, failing to take corrective action in accordance with this section is an additional permit violation. EPA will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations.

6.6 Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review will assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls will also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes set forth in Section 6 of this SWPPP.

SECTION 7: SWPPP CERTIFICATION

Ref: 2015 MSGP Part 5.2.7

7.1 Responsible Officer Identification

As a corporation, Imerys' NOIs, NOTs, and NOEs must be signed by a responsible corporate officer as defined in Appendix B, Subsection 11.A, of the 2015 MSGP. A responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or

(ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

The facility Plant Manager of Imerys Perlite USA's No Agua facility meets description (ii) of a responsible corporate officer as presented above.

SWPPP or changes to the SWPPP to document any corrective actions, and any other compliance documentation required under the MSGP, including the Annual Report, DMRs, inspection reports, and corrective action reports, must be signed by a responsible corporate officer or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by responsible corporate officer;

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

3. The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

7.2 Certification Statement

Ref: 2015 MSGP Part 5.2.7

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

SECTION 8: SWPPP MODIFICATIONS

Ref: 2015 MSGP Part 5.3

The SWPPP is a "living" document and is modified and updated, as necessary, in response to corrective actions.

If the SWPPP is modified in response to a corrective action as presented in Section 6 of this plan, then a certification statement in Section 7 of this plan will be re-signed in accordance with 2015 MSGP Appendix B, Subsection 11.A.

Other modifications will be tracked by a log presented in Attachment E. The log presents the date, the name of person, the signature of the person and a description of the modification made.

SWPPP ATTACHMENTS

Attach the following documentation to the SWPPP:

Attachment A – General Location Map

Attachment B – Site Map

Attachment C –2015 MSGP

Attachment D –Unauthorized Non-Stormwater Discharge Evaluation

Attachment E –Training Records

Attachment F – Inspection Checklists and Records

Attachment G – Documentation Regarding Endangered Species

Attachment H – NOI and EPA Acknowledgement Correspondence

Attachment I – Corrective Actions Log

Attachment J – SWPPP Modification Log

ATTACHMENT A – GENERAL LOCATION MAP

ATTACHMENT B- SITE MAP

ATTACHMENT C – 2015 MULTI-SECTORAL GENERAL PERMIT (MSGP)

ATTACHMENT D – UNAUTHORIZED NON-STORMWATER DISCHARGE EVALUATION

UNAUTHORIZED NON-STORMWATER DISCHARGE EVALUATION

DATE OF EVALUATION:

AREAS OBSERVED:

DRAINAGE AREAS OBSERVED:

EVALUATION CRITERIA	
AUTHORIZED NON-STORMWATER DISCHARGES	OBSERVED?
Discharges from emergency/unplanned fire-fighting activities	☐ Yes ☐ No ☐ NA
Fire hydrant flushings	☐ Yes ☐ No ☐ NA
Potable water, including water line flushings	☐ Yes ☐ No ☐ NA
Uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids	☐ Yes ☐ No ☐ NA
Irrigation drainage	☐ Yes ☐ No ☐ NA
Landscape watering provided all pesticides, herbicides, and fertilizers have been applied in accordance with the approved labeling	☐ Yes ☐ No ☐ NA
Pavement wash waters where no detergents or hazardous cleaning products are used and the wash waters do not come into contact with sources of pollutants	☐ Yes ☐ No ☐ NA
Routine external building washdown / power wash water that does not use detergents or hazardous cleaning products	☐ Yes ☐ No ☐ NA
Uncontaminated ground water or spring water	☐ Yes ☐ No ☐ NA
Foundation or footing drains where flows are not contaminated with process materials	☐ Yes ☐ No ☐ NA
Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of your facility, but not intentional discharges from the cooling tower (e.g., “piped” cooling tower blowdown; drains)	☐ Yes ☐ No ☐ NA
AUTHORIZED NON-STORMWATER DISCHARGES for earth-disturbing activities conducted prior to active mining activities	
Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes	☐ Yes ☐ No ☐ NA
Water used to control dust	☐ Yes ☐ No ☐ NA
Dewatering water that has been treated by an appropriate control	☐ Yes ☐ No ☐ NA

UNAUTHORIZED NON-STORMWATER DISCHARGES
LOCATION: OBSERVATION: ACTIONS TAKEN:
LOCATION: OBSERVATION: ACTIONS TAKEN:
LOCATION: OBSERVATION: ACTIONS TAKEN:
LOCATION: OBSERVATION: ACTIONS TAKEN:
LOCATION: OBSERVATION: ACTIONS TAKEN:
LOCATION: OBSERVATION: ACTIONS TAKEN:
LOCATION: OBSERVATION: ACTIONS TAKEN:

Attachment E – Training Records

ATTACHMENT F – INSPECTION CHECKLISTS AND RECORDS

Date: _____ Time: _____

☐Quarter 1 ☐Quarter 2 ☐Quarter 3 ☐Quarter 4 ☐ Annual Stormwater Discharge

☐ Other_____

Weather Information

☐Dry ☐ Wet ☐Sunny ☐ Partly cloudy ☐ Cloudy

☐ Adverse (describe) _____

Locations Inspected

☐ Mine
☐ Material Loading and Unloading
☐ Material Storage
☐ Fuel Loading and Dispensing
☐ Control Measures
☐ Discharge Points
☐ Material Hauling to Storage and Processing Areas
☐ Outdoor Processing Activities
☐ Equipment Maintenance, Parking and Storage
☐ On Site Waste Disposal Practices
☐ Areas where spills/leaks have occurred in past three years
☐ Other (describe)_____

Description	Observation	Corrective Actions/Additional Measures Needed
Industrial materials, residue or trash that may have or could come into contact with stormwater?	☐ Yes ☐ No	
Leaks or spills from industrial equipment, drums, tanks and other containers?	☐ Yes ☐ No	
Offsite tracking of industrial or waste materials, or sediment where vehicles enter or exit the site?	☐ Yes ☐ No	
Tracking or blowing of raw, final or waste materials from areas of no exposure to exposed areas	☐ Yes ☐ No	
Control measures need replacement, maintenance or repair?	☐ Yes ☐ No	
Control measures are functioning correctly?	☐ Yes ☐ No	
Any discharges observed? Describe.	☐ Yes ☐ No	
Any previously unidentified discharges from and/or pollutants at the site? Describe.	☐ Yes ☐ No	
Evidence of or potential for pollutants in discharges?	☐ Yes ☐ No	
Describe physical condition of and around all outfalls, including flow dissipation devices		

Inspector Name	Stormwater Pollution Team Member?	Signature
	☐Yes ☐ No	
	☐Yes ☐ No	

Visual Assessment Inspection

☐Quarter 1 ☐Quarter 2 ☐Quarter 3 ☐Quarter 4

Nature of the Discharge

☐Runoff ☐ Snowmelt

Observation	Location A	Location B	Location C	Corrective Action
Sample Collection Date				
Sample Collection Time				
Was sample taken within the first 30 minutes?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Visual Assessment Date				
Visual Assessment Time				
Color				
Odor	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Clarity (diminished)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Floating solids	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Settled solids	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Suspended solids	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Foam	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Oil sheen	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Other obvious indicators of stormwater pollution	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	

Name of sampler and visual assessor	Signature

Comments (if applicable) Reasons sample was not taken within the first 30 minutes
Probable sources of observed stormwater contamination

ATTACHMENT G – Documentation Regarding Endangered Species

ATTACHMENT H - NOI and EPA Acknowledgement Correspondence

ATTACHMENT I – Corrective Actions Log

CORRECTIVE ACTIONS LOG

Location of incident	☐ Spill ☐ Leak ☐ Other release		
Was there discharge of pollutants to waters of U.S., through stormwater or otherwise?	☐ Yes ☐ No		
Date and Time of incident:		Date Incident Identified:	
Material involved:		Amount of material:	
Description, including reason for the incident:			
Immediate actions to minimize or prevent the discharge of pollutants and notifications made			
Date and time clean-up was initiated and completed			
Staff involved			
Measures taken to prevent reoccurrence?			
Are subsequent corrective actions necessary? (If not provide a basis for this determination)			
EPA Notification regarding an extension to the 45 day timeframe performed?			

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____ _____

Signature Date

ATTACHMENT J – SWPPP Modification Log

SWPPP MODIFICATION LOG

Date	*Description of the modification*	*Name of modifier*	*Signature*

Appendix E
No Agua Cover Soil Analysis

MONTROSE ENVIRONMENTAL

1140 Valley Forge Road, Phoenixville, PA 19460-2658
(610) 840-9100 - Fax (610) 840-9199

PROJECT:	NO AGUA		
SUBJECT:	COVER SOIL ANALYSIS		
SHEET:	1 OF 1	DATE:	9/2/2025
BY:	RRP	REV:	
CHK'D:	RM		

TOPSOIL STOCKPILE VOLUMES

PILE 1	9,414,360 CF
PILE 2	2,534,557 CF
TOTAL	11,948,917 CF

VOLUMES BASED UPON COMPARISON OF PREVIOUS EXISTING CONDITIONS TOPOGRAPHY TO A 2020 DRONE SURVEY OF THE STOCKPILES

ASSUMING ONE FOOT OF COVER SOIL, THE TOTAL AMOUNT OF AREA THE TWO STOCKPILES CAN COVER IS AS FOLLOWS:

TOTAL VOLUME OF MATERIAL	11,948,917	CF
AREA OF MATERIAL 1' DEEP	11,948,917	SF
AREA OF MATERIAL 1' DEEP	**274**	**ACRES**

MINIMUM AREAS THAT REQUIRE COVER SOIL

LOCATION	AREA (ACRES)	
SOUTH HILL	44	
WEST HILL	71	
NORTH HILL	58	
PLANT AREA	34	
FINES STOCKPILE	59	LF (ASSUME 20' WIDE DRIVE)
ACCESS DRIVES	8	18,146
TOTAL	**273**	

THEREFORE THE TWO STOCKPILES HAVE ADEQUATE COVER MATERIAL TO MEET MINIMUM COVER REQUIREMENTS

Appendix F
Bureau of Land Management (BLM) & El Grande Mine Seed Mix

Taos County Seed Mix (Wheatgrass) One			
SPECIES	**SPECIES**	**Reccomended cultivar (if applicable)**	**PLS Seed Rate (lbs/acre)**
Grasses	***Grasses***		
Western wheatgrass PASM	*Pascopyrum smithii*	Arriba	7 to 15
Blue grama BOGR2	*Bouteloua gracilis*	Hachita	1 to 3
Indian ricegrass ACHY	*Acnatherum hymenoides*	Paloma	5 to 10
New Mexico feathergrass HENE5	*Hesperostipa neomexicana* or *H. comata*		7 to 14
Bottlebrush Squiireltail	*Elymus elymoides*	Pueblo or Tusas	4 to 9
Shrubs	***Shrubs***		
Winterfat KRLA2	*Krashninnikovia lanata*		5
Fourwing saltbush ATCA2	*Atriplex canescens*		10 to 25
Rubber Rabbitbrush	*Ericameria nauseosa*		2 to 3
Red Wax Currant	*Ribes cereum*	planting plugs might be more successful	
Mountain Mahogany	*Cercocarpus montanus*	planting plugs might be more successful	
Apache Plume	*Fallugia paradoxa*	planting plugs might be more successful	
Forbs	***Forbs***		
Prairie sagewort ARFR4	*Artemesia frigida*		.5 to 1
Western yarrow ACMI2	*Achillea millefolia*		0.5
Horsetail milkweed	*Ascelpias subverticillata*		
Showy Milkweek	*Asclepias speciosa*		10 to 11
Hairy Goldenaster	*Heterotheca villosa*		variable
Common Sunflower	*Helianthus petiolaris* or *annuus*		3 to 5
Rocky Mountain Bee Plant	*Cleome serrulata*		12 to 15
Scarlet Globemallow	*Spharalcea coccinea*		1 to 2
Narrowleaf penstemon	*Penstemon angustifolius*		3

Taos County Seed Mix (Wheatgrass) Two				
SPECIES 1	**SPECIES 2**	**% COMPOSITION IN MIX**	**Reccomended cultivar (if applicable)**	**PLS Seed Rate (lbs/acre)**
Grasses	***Grasses***	Total 70%		
Western wheatgrass PASM	*Pascopyrum smithii*	30%	Arriba	3.6
Blue grama BOGR2	*Bouteloua gracilis*	20%	Hachita	0.6
Indian ricegrass ACHY	*Acnatherum hymenoides*	10%	Paloma	0.8
New Mexico feathergrass HENE5	*Hesperostipa neomexicana*	10%		0.7
Shrubs	***Shrubs***	Total 20%		
Winterfat KRLA2	*Krashninnikovia lanata*	10%		0.5
Fourwing saltbush ATCA2	*Atriplex canescens*	10%		0.8
Forbs	***Forbs***	Total 10%		
Prairie sagewort ARFR4	*Artemesia frigida*	5%		0.0125
Western yarrow ACMI2	*Achillea millefolia*	5%		0.05

Taos County Seed Mix Three (Indian Rice Grass Mix)			
SPECIES	**% COMPOSITION IN MIX**	**Reccomended cultivar (if applicable)**	**PLS Seed Rate (lbs/acre)**
Grasses	Total 70%		
Indian ricegrass ACHY	30%	Paloma	2.4
Blue grama BOGR2	20%	Hachita	0.6
Squirreltail ELEL5	20%	Tusas germplasm	1.4
Shrubs	Total 20%		
Winterfat KRLA2	10%		0.5
Fourwing saltbush ATCA2	10%		0.8
Forbs	Total 10%		
Prairie sagewort ARFR4	5%		0.0125
Scarlet globemallow SPCO	5%		0.3

EL GRANDE RECLAMATION MIX - 2 AC.
Lot: G-211908

Mixture/Variety :	Pure Seed %	Total Viable%	Origin:
WESTERN WHEATGRASS, ROSANA	34.65%	95.00%	WY
4-WING SALTBUSH, VNS	14.37%	97.00%	NM
WOODS ROSE, VNS	13.52%	83.00%	UT
SIDEOATS GRAMA, EL RENO	11.75%	86.00%	NE
PURPLE PRAIRIE CLOVER, VNS	4.96%	93.00%	WA
LEWIS BLUE FLAX, VNS	4.31%	96.00%	WY
BLUE GRAMA, LOVINGTON	3.73%	94.00%	CO
ROCKY MTN PENSTEMON, BANDERA	1.84%	85.00%	CO
MUNROE GLOBEMALLOW, VNS	1.74%	84.00%	UT
PRAIRIE CONEFLOWER (MEX HAT), VNS	1.67%	98.00%	OR
WESTERN YARROW, VNS	0.58%	73.00%	WA
BASIN BIG SAGEBRUSH, VNS	0.49%	81.00%	UT
SAND DROPSEED, VNS	0.40%	92.00%	CO
BOTTLEBRUSH SQUIRRELTAIL, TOE JAM	0.38%	96.00%	WA
FRINGED SAGE, VNS	0.36%	91.00%	WY

* VNS = Variety Not Stated

Crop Seed: 0.00% Inert Matter: 5.23% Weed Seed: 0.02% Net Wt: 32.0#

Noxious Weeds NONE FOUND Tested: 05/21

CUSTOM MIX FOR RIO GRANDE SEED
THIS 32# BAG COVERS APPROX. 1 ACRE

Buffalo Brand Seed Greeley, CO 80631 (970) 356-4710

Appendix G
No Agua Geotechnical Report

MEMORANDUM

2475 N Coyote Dr. Tucson, AZ USA | +1.520.670.9774 | www.cnitucson.com

TO: Linda Frimpong, Geotechnical Engineer / Imerys Americas
Frank Lloyd-Mills, Principal Engineer / Imerys Corporate
Clay Diemert, Mine Engineer / Imerys Performance Minerals Americas

FROM: Matthew Schmidt / Call & Nicholas, Inc.
Francisco Sanz / Call & Nicholas, Inc.
Scott Cylwik P.E. / Call & Nicholas, Inc.

DATE: March 17, 2025

SUBJECT: Imerys No Agua Geotechnical Evaluation

1. INTRODUCTION

Call & Nicholas, Inc. was requested to review the slope geotechnical conditions of the No Agua perlite mine near Taos, New Mexico by Imerys Performance Minerals, Inc. The goals of this study included characterization of the rock mass and geologic structure, laboratory strength testing, a review of bench stability, analysis of overall slope stability, and development a slope design template for the future No Agua pit plans. Mr. Matthew Schmidt visited the site on October 17, 2024, accompanied by Mr. Clay Diemert of Imerys.

Three mining areas were part of this geotechnical review: West Hill, South Hill, and the fines dump (Figure 1). Mining in the West Hill pit has been completed. The western slope of the West Hill pit is immediately adjacent to the Imerys property boundary. One goal of this study was to provide a geotechnical slope stability analysis of this wall. The South Hill pit is currently in operation with an expected mine life of at least 20 years. Slope design recommendations are provided for the future South Hill pit walls. The fines dump is located in a valley southeast of the production plant. Dump material was tested for this evaluation and simple slope analyses were completed for future dump slopes. No dump foundation characterization nor stability analyses were completed.

Slope design recommendations are presented in Section 6 of this memo and are based on bench reliability analysis, laboratory strength testing, review of the larger geologic structures, and the results of the overall stability analyses.

1.1 Data Utilized

The following data was received from Imerys as part of this review:

- Recent point clouds of the West Hill pit, South Hill pit, and fines dump area

- Core photos
- Geology solids for the South Hill pit area (2024 Model)
- Preliminary geologic map of the No Agua district (Appendix A)
- 2024 life of mine (LOM) pit plan for the South Hill pit

2. SITE CHARACTERIZATION

The No Agua Perlite deposit is located 30 miles northeast of the town of Taos in Taos County, New Mexico. The No Agua site mines and processes perlite ore and has been in operation since 1951 with no record of slope failure. Figure 1 shows the No Agua site layout and property boundaries.

2.1 Geology Setting

The South Hill and West Hill pits are located respectively on the south and southwest sides of the No Agua Peaks. The No Agua Peaks are formed by a series of silicic and intermediate volcanic rocks that cover an area of approximately 2.5 square miles located in the Taos Plateau volcanic field physiographic province. The Taos Plateau volcanic field was erupted between about 5.88 and 1.03 Ma and is formed by approximately 35 central-vent volcanic shields and cones. The approximated age of the No Agua peaks is 4.06±0.05 Ma, making it one of the older volcanic centers that form the Taos Plateau volcanic field. The peaks are the erosional remnants of two rhyolite domes among a succession of late Cenozoic volcanic and sedimentary rocks which were deposited upon Precambrian metamorphic and igneous rocks.

The No Auga district geology is shown in Appendix A. The mining sequence contains several textural varieties of perlite which are discussed below.

2.2 No Agua Lithologies

No Agua ore types can be divided into hard ore and soft ore groups. Hard ore and waste lithologies are mined with traditional drilling and blasting techniques, while the soft ores are mechanically excavated by dozer ripping. Map 1 shows the South Hill geology model projected onto the South Hill pit topography. Map 2 shows the model geology on the South Hill LOM pit plan. No 3D geologic model exists for the West Hill area. The following lithologies have been modeled in the No Agua geologic model.

2.2.1 Hard Ores

These units and associated hard waste units comprise the hill east of the South Hill pit. They are mainly exposed in the upper east wall of the pit along the 8500 level. Structurally, the hard ores are

characterized by steeply inclined fractures which are favorable for bench stability. Several moderately dipping (~35° to 45°) faults are observed in these units along the 8500 level which dip pitward. The following lithology types are characterized as hard ore.

- C - classical perlite
- CGT - classical granular transition perlite
- G - granular perlite

2.2.2 Soft Ores

Soft ores are excavated by dozer ripping and comprise the majority of the West Hill and South Hill pit lithologies.

- West Hill Pyroclastic Flows

  This unit includes clast supported and matrix supported sub-units. The clast supported material is located in the north wall and in the upper half of the west wall of the West Hill pit. This material is weakly cemented and resembles coarse, angular rockfill. The matrix supported pyroclastic flow material is located in the lower half of the west wall and in the floor of the West Hill pit. This material is dominantly coarse laminated sand which is also weakly cemented. The sandy material was sampled from the West Hill pit and tested for remolded direct-shear strength. Both the clast dominated and sand dominated flow units are readily erodible.

- SH – Shardy Perlite

  This unit is exposed along northeast and east walls of the South Hill pit, below the hard ores. This unit is somewhat transitional between the airfall breccias and the granular perlite as some steep fractures exist in the shardy perlite, however, the unit is more massive than the hard ores.

- FBXA – Fines Dominated Airfall Breccia

  This unit is exposed in the upper benches of the south wall of the South Hill pit. Similar to the pyroclastic flow material, this unit is weakly cemented and easily erodible. This unit will comprise about two benches in the south wall of the South Hill LOM.

- CXBA – Clast Dominated Airfall Breccia

  The CXBA unit makes up the majority of the South Hill pit walls in both the current pit configuration and the LOM pit shape. This unit is generally unfractured and massive. Several faults are observed within the CXBA, however, the fault material is not believed to be weaker than the matrix of the CXBA material. Blocks of CXBA material were sampled and tested for intact rock strength, as discussed below.

- UT – Upper Tuff

  The upper tuff is located in the westernmost portion of the South Hill pit. This unit will not comprise significant portions of the future pit slopes.

- LT – Lower Tuff

  The lower tuff has been identified by drilling and is not exposed in the current pit. The top of the lower tuff is modeled to be 150 feet below the LOM pit.

2.3 Geologic Structure

The geologic structure of the No Agua pit was examined during the site visit and by reviewing the lithologic model and modeling major structures with the South Hill point cloud.

2.3.1 Rock Jointing

Soft ore lithologies are mostly massive with few joint discontinuities. Hard ore and waste lithologies are characterized by long, steeply inclined joints. The structures are favorable for achieving steep bench faces and for overall slope stability. However, local toppling failures on one or more benches could occur if the structures are dipping steeply back into the slope and are perfectly parallel to the slope.

2.3.2 Faults

Appendix B presents the results of major structure mapping on the South Hill point cloud. Maps 1 and 2 show the modeled faults projected onto the current South Hill pit and the LOM pit, respectively.

The primary major structure type encountered in the South Hill pit are faults which can be mapped continuously for at least 200 – 300 feet and are shallowly to moderately dipping (from 17 to 55 degrees) . Many show normal offset on the order of ~50 feet. Fault planes within the soft ores are slightly healed. Because of this healing, and because of the weak material strength of the soft ore, the fault planes do not appear to act as preferential weakness planes from a slope stability standpoint with the soft ore. Conversely, in the hard ore and waste units, the faults are slickensided and not healed and will act as preferential failure planes when they are daylighted.

Figure 2 shows the trace of Fault FT03 on the north wall of South Hill. FT03 has a dip direction of ~185° and dips ~30° into the pit. This structure has been daylighted in a plane shear orientation in the soft ore (CBXA). If the shear strength along the fault plane was significantly lower than the strength of the surrounding rock mass, the material above the fault would likely have collapsed into the pit. The wall appears to be stable with no sign that displacement has occurred along the fault. However, the geometry the fault plane creates with the slope is inherently unstable and the wall must be monitored for any movement.

Figure 3 shows the CT01 fault exposed on the 8490 level of the east wall in the South Hill pit. Here, the fault forms the contact between obsidian-rich hard waste and hard ore, and has an orientation of ~220°, ~40° (DDR, dip). This area is just above the future east wall ramp. As shown in the photograph, the fault dips shallowly toward the pit and creates a sliding plane on which material has collapsed from the bench. This fault can be traced ~450 feet down into the soft ore units in the South Hill pit. The persistence of this structure in the hard ore is unknown and CNI recommends in-person mapping to the east along the 8490 level to identify the length and location of the fault. Using the limited exposure of the CT01 fault and the orientation of the plane shown in Figure 3, CNI modeled the potential extent of the CT01 fault eastward and used it to define a slope design sector, as discussed in Section 6 of this report.

Other major structures identified in the point cloud include two faults that trace along the south wall of the pit and a few faults in the western portion of the pit in an area that has been mined to completion. These other structures are not expected to adversely affect slope stability in future mine cuts.

2.4 Mining Operations

Three areas of the No Agua Mine were toured during the site visit and are the subject of this evaluation: the West Hill pit, the South Hill pit, and the fines dump. These areas are described below, and Figure 1 shows the layout of the No Agua site.

2.4.1 West Hill Pit

The West Hill pit is located south of the plant area and along the western edge of the No Agua property (Figure 1). Map 3 shows the detailed pit topography along with the location of the WH stability section. Mining in the West Hill has been completed. Appendix A shows the geology of the West Hill area. No 3D geologic model was provided for the West Hill area.

The primary geotechnical concern of the West Hill pit is the western wall that is adjacent to the property boundary. Other slopes in the west hill pit were not part of this review. Figure 4 shows the western slope. A barbed wire fence, located immediately at the slope crest, is assumed to be the property boundary, however, CNI did not review any land survey information. In some areas of the crest, as shown in Figure 4, material has eroded away beyond the fence. No tension cracking or other obvious signs of slope distress were observed during the inspection. CNI was requested to perform an overall slope stability assessment of this slope, which is given later in this report. The area of the slope analyzed has an interramp slope angle (ISA) of 51° and is 130 feet high. While the risk of overall slope failure is low for this

slope, localized erosion will continue to degrade the slope to and beyond the fence line/property boundary.

2.4.2 South Hill Pit

The South Hill pit is located south of West Hill and is currently in operation. Soft ore is mined by dozer ripping in the main portion of the pit and hard ore and waste is mined by conventional blasting in upper elevations of the east wall (Map 1). The pit is currently up to 270 feet deep with slopes mined at variable ISAs from ~38° in south and east walls, to 51° degrees in the north wall. As-built bench heights are also variable from ~15 feet high to 55 feet high in the soft ore. Bench heights in hard ore were completed from ~15 to over 60 feet in height.

The South Hill pit has at least a 20-year mine life remaining. Map 2 shows the LOM pit plan for South Hill. The majority of the future mining will be in east and south wall pushbacks, while the north wall and west wall are near their final configurations. The LOM plan uses 25-foot-high benches and a ~40° ISA for the future walls. However, the 2017 closure plan specifies a bench high of 35 feet and a 15-foot-wide catch bench width. Based on the bench audit analyses which are discussed in the next section, CNI recommends adjusting the LOM slopes to a 35-foot-high bench. Additionally, the 15-foot width is likely to be too narrow for reliably containing rockfall, and a greater width is recommended for future mining, as discussed in Section 6 below.

Maps 1 and 2 show the location of the analysis cross sections used to evaluate the overall stability of the LOM slopes.

2.4.3 Fines Dump

Figure 1 shows the fines dump location in the overall site layout. Map 4 shows the current topography of the fines dump and the location of the stability analysis section. A bucket sample of the fines material was tested for shear strength and used in the stability analysis. Coarse material is added to the top of the dump periodically for dust control. No future stacking plans, nor expansion footprint were provided for the fines dump. Also, no bedrock surface or original topography models were provided for this area. However, the 2017 closure plan states that the fines dump will be re-graded to a 3:1 slope. The current slope along the analysis section has a height of ~100 feet with a maximum angle of repose of ~35°.

3. BENCH AUDIT

CNI completed an audit of the as-built bench geometries in the South Hill pit using a drone-acquired point cloud provided by Imerys. These scans and the bench areas audited are shown in Appendix C. The goal of the bench audit was to determine the achieved distribution of bench face angles (BFA) for hard ore/waste units and soft ore units for different wall orientations and bench heights. Once these distributions are recorded and analyzed, a bench configuration will be recommended based on the reliability of maintaining a specified catch bench width for rockfall containment. The recommended bench configuration is then extrapolated for the design interramp slope angles by design sector, as discussed in Section 6.

These results indicate that the bench faces are not controlled by wall orientation. In the soft ores, no brittle structures are present to induce backbreak and limit the BFAs. Therefore, changes in wall orientation do not influence the BFA distribution in the soft ores. In the hard ore/waste rocks, the exposed benches are very limited in wall orientation, so no such comparison of achieved BFAs by wall orientation could be made.

The bench audit results do show that the optimal bench heights for both soft and hard ore are between 35 and 45 feet. Because of this, and because a bench height of 35 feet is specified in the closure document, CNI recommends changing the LOM plan to use 35-foot-high benches.

Figure 5 shows the results of the slope audit. Bench-face angle distributions are shown for hard ore/waste and soft ore for all measured orientations for bench height between 35 and 45 feet. At a reliability of 80%, the hard ore/waste has a slightly higher BFA of 67° degrees compared to the 65° in soft ore. CNI believes a reliability of 80% is appropriate for the 35-foot-high bench design at No Agua.

4. LABORATORY TESTING AND ROCK STRENGTH ESTIMATES

Strength testing and classification testing was completed in the CNI laboratory to support this evaluation. The testing program consisted of two uniaxial compression tests (UCS) and three triaxial compression tests (TCS) from a boulder of the CXBA unit collected in the South Hill pit bottom. Loose samples of the laminated sand unit of the West Hill pyroclastic unit and of the fines dump were tested for USCS classification and remold direct shear strength. Appendix D provides the testing results.

The intact tests from the CBXA samples were combined and used to derive an intact rock failure envelope. One of the TCS test results was removed from the regression as it broke along a preexisting

weakness plane. The calculated failure envelop has a cohesion of 63.8 psi, a friction angle of 49.9 degrees, and a compressive strength of 350 psi. This value was taken as the upper limit of rock strength for the soft ores in South Hill and West Hill pits.

This intact strength was weighted by the assumed RQD for each material type to calculate rock-mass shear strengths following the CNI rock-mass criterion as described in Cylwik et al. (2023). The remold direct shear strength of the West Hill laminated sand (airfall tuff within the West Hill pyroclastics, 5.0 psi cohesion, 35.0-degree Phi) was assumed as the lower bound material strength for the rock-mass calculation.

Rock-mass properties for hard ore and waste units at No Agua were derived from laboratory testing on similar materials at another Imerys perlite site.

A key input into the CNI rock-mass calculation is RQD, which was estimated for No Agua rock masses. The West Hill pyroclastics were assigned an RQD value of 5% based on field observations. For the South Hill materials, a RQD value of 50% was assumed, based on field observations and a review of core photographs. Finally, a cohesion reduction factor (CRF) of 0.35 was used for the South Hill hard lithologies and a CRF of 1.0 was used for the soft ores in both the West Hill and South Hill because of the low UCS values of the soft units (Cylwik et al., 2023). Rock-mass calculation worksheets are shown in Appendix D and Table 1 presents the material properties used in the stability analyses.

Finally, a sample of the fines dump was collected during the site visit for classification and strength testing. This material is classified as a well-sorted silt with minor sand (ML). The remold direct shear test for the fines dump material resulted in a friction angle of 35.2 degrees and 3.2 psi cohesion.

5. OVERALL SLOPE STABILITY ANALYSES

Overall slope stability analyses were conducted using the Slide2© software, which applies the limit-equilibrium method of slices in two dimensions. Four cross-sections were selected for overall slope stability analysis, two in the South Hill pit (shown in Maps 1 and 2), one at the West Hill pit (Map 3), and one to evaluate the stability of the dump area located at the northeast area of the property (Map 4).

The South Hill sections (SH Section 1 and SH Section 2) were chosen to analyze the stability of the LOM pit. Section SH-2 was also used to review the stability of the current pit. The West Hill sections (WH-1) location was selected to evaluate the stability of the current pit and the potential for an overall slope failure breaching the property boundary. The location of the fine dump section was selected to evaluate

the stability of the dump's current configuration and the potential for increasing the height of the dump lifts.

Based on field observations and discussions with Imerys engineers, the stability analyses assume no groundwater pore pressures.

5.1 Slide Limit-Equilibrium Analysis Results

Results of the overall stability analyses are summarized for each cross section in Table 2. CNI recommends a design acceptance criterion (DAC) of a 1.3 static factor of safety (FOS) or greater for the overall in-situ rock slopes. For working slopes in the fines dump material, a DAC of 1.5 is recommended due to the uncertainty of the dump foundation. The closure DAC for the fines dump will be likely be similar, however, the closure analysis must consider the foundation properties and the design must meet other environmental standards.

All slope geometries tested in these analyses, including the hypothetical steepened slopes, achieve the DAC, indicating that the risk of overall slope instability is low for the planned and current slopes heights.

5.1.1 SH Section 1

This section analyzes the slope located on the northeastern side of the South Hill pit. The LOM slope is 279 feet high and has an interramp slope angle of 39° as designed. Lithology contacts in this area dip into the slope at an average of 10°, except for the Classical unit on the upper part of the slope, which dips pitward at an angle of approximately 6°. Two prominent faults are present behind the slope face. The first one dips approximately 34° towards the pit and cuts the section about 40 feet behind the wall. The second shallow one is nearly daylighted and dips at approximately 40° towards the pit.

Stability analyses were run on SH Section 1 to evaluate the influence of both faults on the stability of the north wall LOM design. The analysis of a deep-seated failure is shown in Figure 6 and resulted in a FOS of 1.96. The analysis of a shallow failure is shown in Figure 7 and resulted in a FOS of 2.0.

As shown in Map 2, the shallow fault (CT01) is likely to extend to the east, defining a potential unstable block. The maximum thickness between the fault and the pit slope will be about 40 feet. To account for this condition, the location of the shallow fault displaced in this section was modified and the FOS recalculated. Figures 8 and 9 show the analysis results when the fault is located respectively 40 feet and 20 feet behind the pit slope. The first case results in a FOS of 1.69 and the second case in a FOS of 1.68.

5.1.2 SH Section 2

This section analyzes a slope located on the northwest side of the South Hill pit. The current slope has a height of 247 feet and an interramp slope angle of 53 degrees. The LOM design wall has a total height of 270 feet and an interramp slope angle of 44 degrees in the lower portion of the slope. The main rock type present in the wall is CBXA.

The stability analysis of the current slope is presented in Figure 10 and resulted in a FOS of 1.91. Figure 11 presents the stability analysis of the LOM slope, which results in a FOS of 1.76.

5.1.3 WH Section 1

This section analyzes a slope located on the west side of the West Hill pit. The Imerys property boundary is located at the crest of this slope. The current slope has a height of 136 feet and an interramp slope angle of 51 degrees. The main rock type present in the wall is the West Hill Pyroclastic Flow unit. The upper portion of the slope is the clast dominated subunit, and the toe of the slope is composed of the laminated sand subunit. The stability analysis of the current slope is presented in Figure 12 and resulted in a FOS of 1.52.

5.1.4 Fines Dump Section

This section analyzes a south facing slope of the fine dump (Map 4). The configuration of the current dump consists of a single ~120-foot-high single lift, with an approximate slope angle of 35 degrees. The stability analysis of the current configuration is presented in Figure 13 and results in a FOS of 1.62.

Higher stack heights were tested to determine the maximum stack height that maintains the working DAC of 1.5 FOS. A ~160-foot-high slope with an overall angle of 35 degrees yields a FOS of 1.5, as shown in Figure 14.

6. CONCLUSIONS AND RECOMMENDATIONS

The following section summarizes CNI's recommended slope design for future slopes in the South Hill pit and recommendations for the geotechnical slope management of the No Agua perlite mine. As discussed above, CNI recommends a 35-foot bench height for future mining in the South Hill pit. The ISA recommendations are expected to achieve an 80% reliability or higher of maintaining a minimum target catch bench width of 19 feet. The 80% reliability is appropriate for the moderate overall slope heights and low bench heights.

6.1 Design Sectors

Table 3 presents the recommended slope design for the future South Hill pit walls. Three design sectors have been identified and are shown on the LOM pit plan in Map 5.

6.1.1 South Hill Rippable Ore

The central portion of the South Hill LOM is within the rippable ore sector. The lithologies in this domain are CBXA and FBXA. CNI recommends an ISA of 45 degrees for all wall orientations in this sector.

6.1.2 South Hill Northeast Wall

As shown on Map 5, this sector is defined by the assumed extension of the CT01 fault in the northeast wall of the LOM pit and includes both hard ore/waste and soft ore lithologies. Because of the uncertainty of the extent, location, and strength properties of the CT01 fault, CNI does not recommend steeping in the sector beyond the planned 40° ISA. However, as seen in the north wall, daylighted faults in the soft ore units do not necessarily lead to slope failures. Mapping and strength testing is recommended for the CT01 fault. Based on additional information, this sector should be reevaluated for potential changes to the slope design.

6.1.3 South Hill Hard Ore/Waste

Map 5 shows the hard ore/waste design sector on the LOM map. This sector is limited to the easternmost portion of the pit in the footwall of the CT01 projection. The recommended ISA of the hard ore sector is 46 degrees.

6.1.4 Catch Bench Widths

CNI uses a Modified Ritchie Criterion as a *guide* for designing catch bench width (CBWs). This method evolved following publication of a technical paper by Ritchie (1963) on the design of highway shoulders for catching rockfall off excavated and natural slopes. Ritchie's investigation was limited to a relatively small number of slope angle/slope height geometries and therefore requires extrapolation for use in open-pit mining. Because slope (bench) height is one of the most important controls on the distance a rock will travel when detached from the bench, CNI has derived an empirical relationship between the slope height and the target CBW needed for adequate rockfall containment, as follows:

Modified Ritchie Criterion for CBW

For bench heights less than 50 feet

*CBW (feet) = 0.2*bench height + 12 feet*

*(35-foot bench height) 19 feet = 0.2 * 35 feet + 12 feet*

The original equations published by Call (1992) in the SME Mining Engineering Handbook are too conservative for bench height under 50 feet (Ryan and Pryor, 2000) and were modified for shorter benches. The 19-foot CBW is generally acceptable for 35-foot-high benches with controlled blasting or ripping and scaling practices that minimize the amount of loose material and limit potential rockfall.

6.2 Dump Slopes

The natural angle of repose of fines dump material is ~35 degrees. The stability analyses show that fines dump material can be stacked up to 160 feet and maintain a FOS of 1.5. The mine closeout plan includes reducing the fines dump to a 3:1 slope angle and requires geotechnical analysis and monitoring in the 5-year period after closure. This analysis should include a foundation investigation and additional material strength testing. Material runout analyses are also recommended for the fines dump.

The active dumping area should be inspected at the beginning of each shift, or prior to the periodic dumping activity. The dump slopes should be periodically monitored for cracking at the slope crest and displacement of the slope face. Imerys can use drone-based difference mapping for the displacement monitoring.

Avoid placing wet waste on this dump. Wet waste has a tendency of over-steepening the crest of the dump due to capillary suction. This material will stand at a higher angle, but only temporarily. When the capillary pressure is diminished during drying, the crest area will experience failure.

A berm should be maintained at all times along the crest of the active dump. The berm should be at minimum half the height of the tire of the largest equipment.

All surfaces and working areas should be sloped and graded at a slight angle to direct surface water flow with the goal of directing water to appropriate catchment areas. Water should be directed away from the active dump face.

Mobile equipment, including trucks adding material on the dump, should not approach the crest areas of the dump piles. Unconfined material at the dump crests could displace and pose a significant hazard to equipment operating at the crest. Short dumping and dozer pushing should be employed.

6.3 Ground Control

Scaling loose rock must be completed on all benches and slopes. Proper scaling will eliminate the majority of the rockfall risk to operators and equipment. Scaling is usually done with a long boom excavator or with a chain pulled behind a dozer. In areas where scaling is not feasible or ineffective, berms should be constructed to mitigate the rockfall risk to operations. Scaling is required in both the hard and soft ore sectors. Figure 15 shows loose boulders at the crests of benches on the south wall of South Hill. These rocks should be removed if that can be done safely, and future benches must be scaled to avoid leaving loose boulders at the crest.

6.4 Recommended Slope Monitoring

Standard slope monitoring that is recommended for all mining operations includes daily, visual pre-shift inspections of the slopes above the working areas. The daily inspections should identify indications of slope distress such as bulging, cracking, new water seeps, and new rockfall. Periodic surveying of slope crests for cracking is also recommended for all slopes, including the fines dump.

Monitoring is recommended specifically for the slope in the hanging wall of the FT03 fault. Figure 2 shows the fault daylighting in the north wall of the South Hill pit. The area near the fault on the 8445 level should be monitored for tension cracks and if any cracking is present, pin sets or an automated extensometer should be deployed to actively monitor any movement. Similarly, the CT01 fault in the east wall of the pit will require monitoring as mining advances along the fault.

6.5 Recommended Future Work

The CT01 fault has potential to cause bench to multi-bench scale failures in future pit slopes. CNI recommends mapping east along the 8490 level to better constrain the extent and location of the CT01 fault. Based on the results of the mapping, the pitward dipping structures should be remodeled and the northeast wall slope design should be reviewed. Periodic mapping should be continued as each new bench is exposed, especially in the northeast design sector.

Additional laboratory strength testing is also recommended. This should include fault gouge testing, fracture direct shear tests (hard ore), additional remold direct shear testing on the soft material types, and additional UCS and triaxial compression testing of the hard ore and waste and soft perlite ore types. If future mine plans change significantly from the current LOM, and other material types will comprise the pit slope, material testing will be required for the other units, such as the Upper Tuff, FXBA, etc.

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Table 1. 2025 No Agua Material Properties									
Geological Unit	Density (pcf)	RQD Estimate	CRF	Rock Mass Strength		Intact Rock Strength		Remold Shear Strength	
				Phi (°)	C (psf)	Phi (°)	C (psf)	Phi (°)	C (psf)
West Hill Pyroclastic Flow[2]	94.4	5%	1.00	37.7	1195.2	49.9	9187	35.0	712.8
Classical (C)[1]	135.6	50%	0.35	37.1	13521.0	50.6	210571	28.2	0.0
Clast Dominated Airfall Breccia (CBXA)	94.4	50%	1.00	40.6	2260.8	49.9	9187	35.0	712.8
Classic-Granular Transition (CGT)[1]	135.6	50%	0.35	37.1	13521.0	50.6	210571	28.2	0.0
Granular (G)[1]	135.6	50%	0.35	37.1	13521.0	50.6	210571	28.2	0.0
Shardy (SH)[2]	94.4	50%	1.00	40.6	2260.8	49.9	9187	35.0	712.8
Faults[2]	94.4	-	-	-	-	-	-	35.0	712.8
Fines Dump	93.2		-	-	-	-	-	35.2	455.04
Overburden (OB)[3]	90	-	-	-	-	-	-	35.0	288

[1] Based on testing from other perlite localities

[2] Based on testing from other No Agua lithologies

[3] Assumed typical colluvium properties

Table 2. No Agua Overall Stability Analysis Results					
Cross Section	Pit Geometry	Failure	ISA (°)	Slope Height (ft)	Minimum FOS
SH-1	LOM Design	Deep Seated	39	279	1.95
		Shallow	39	279	2.03
		Shallow + 20 ft	39	279	1.68
		Shallow + 40 ft	39	279	1.69
SH-2	As Built	Overall	53	247	1.91
	LOM Design	Overall	44	270	1.76
WH-1	As Built	Overall	51	136	1.57
Fine Dump	As Built	Overall	35	121	1.62
	Forward	Overall	35	160	1.50

Table 3. Recommended Slope Design for No Agua South Hill - 35' Bench Height			
Design Parameter	Soft Ore	Hard Ore/Waste	East Wall Fault Area
Inter-ramp Slope Angle, ISA (°)	45	46	40
Bench Height, BH (ft.)	35	35	35
Layout Bench Face Angle, BFA_L (°)	75	75	75
Layout Bench Width, CBW_L (ft.)	25	24	32
Minimum Bench Face Angle, BFA_M (°)	65	67	57
Minimum Bench Width, CBW_M (ft.)	19	19	19
Target Reliability (%)	80%	80%	>80%

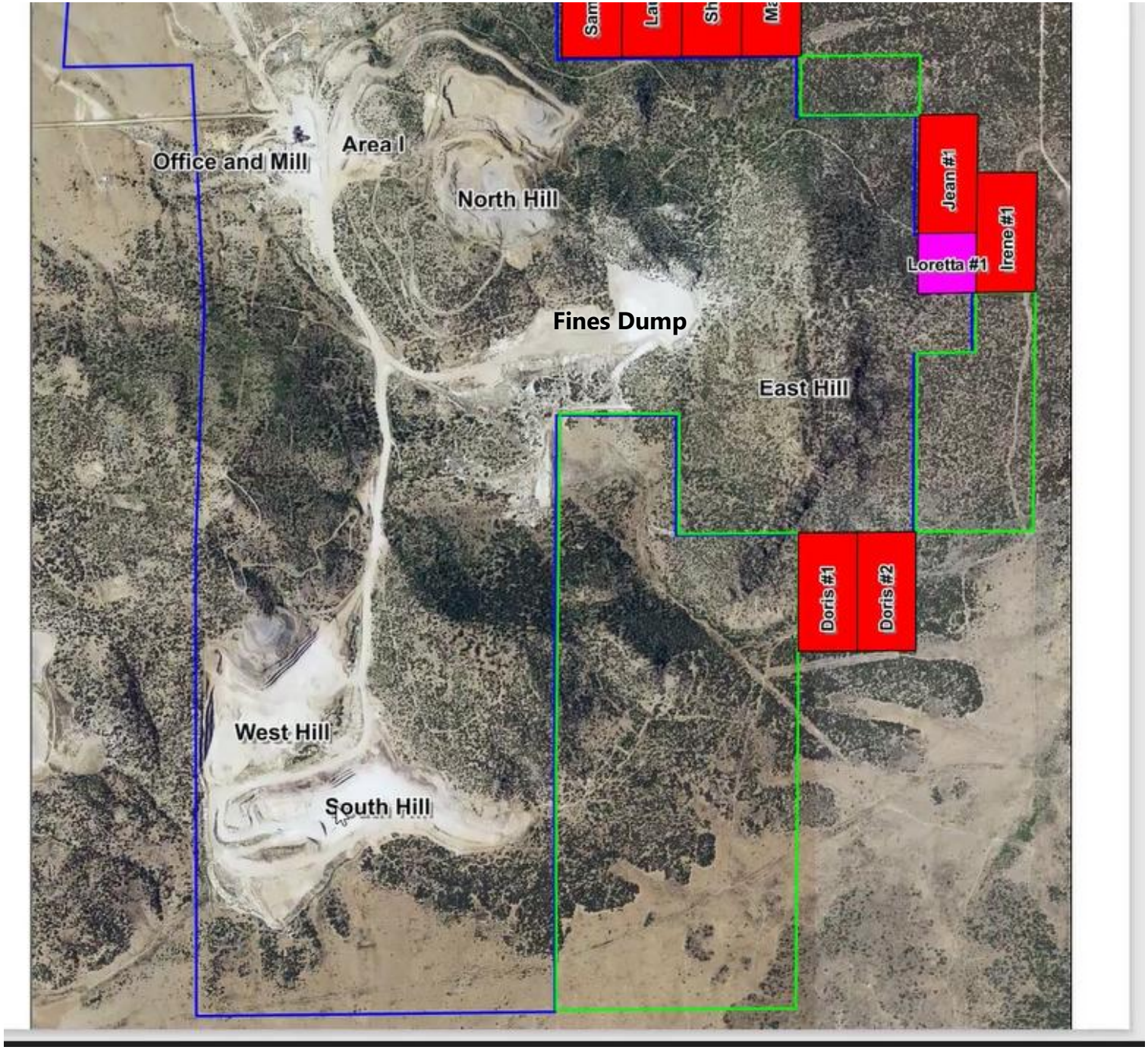


Figure 1. No Agua Site Layout



Figure 2. Fault FT03 exposed on the north wall of South Hill pit



Figure 3. Fault CT01 exposed above the 8490 level

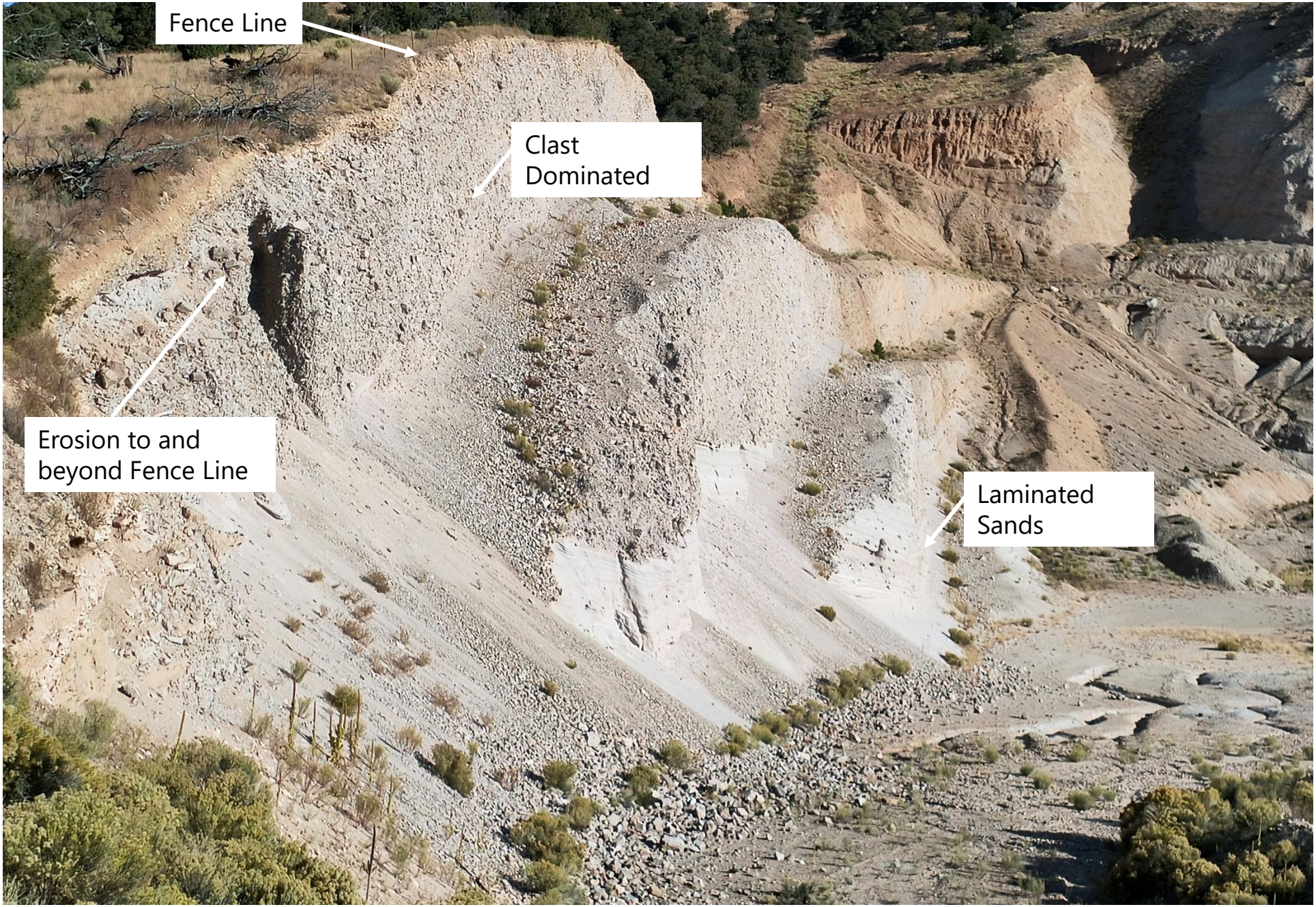


Figure 4. West Hill Western Slope

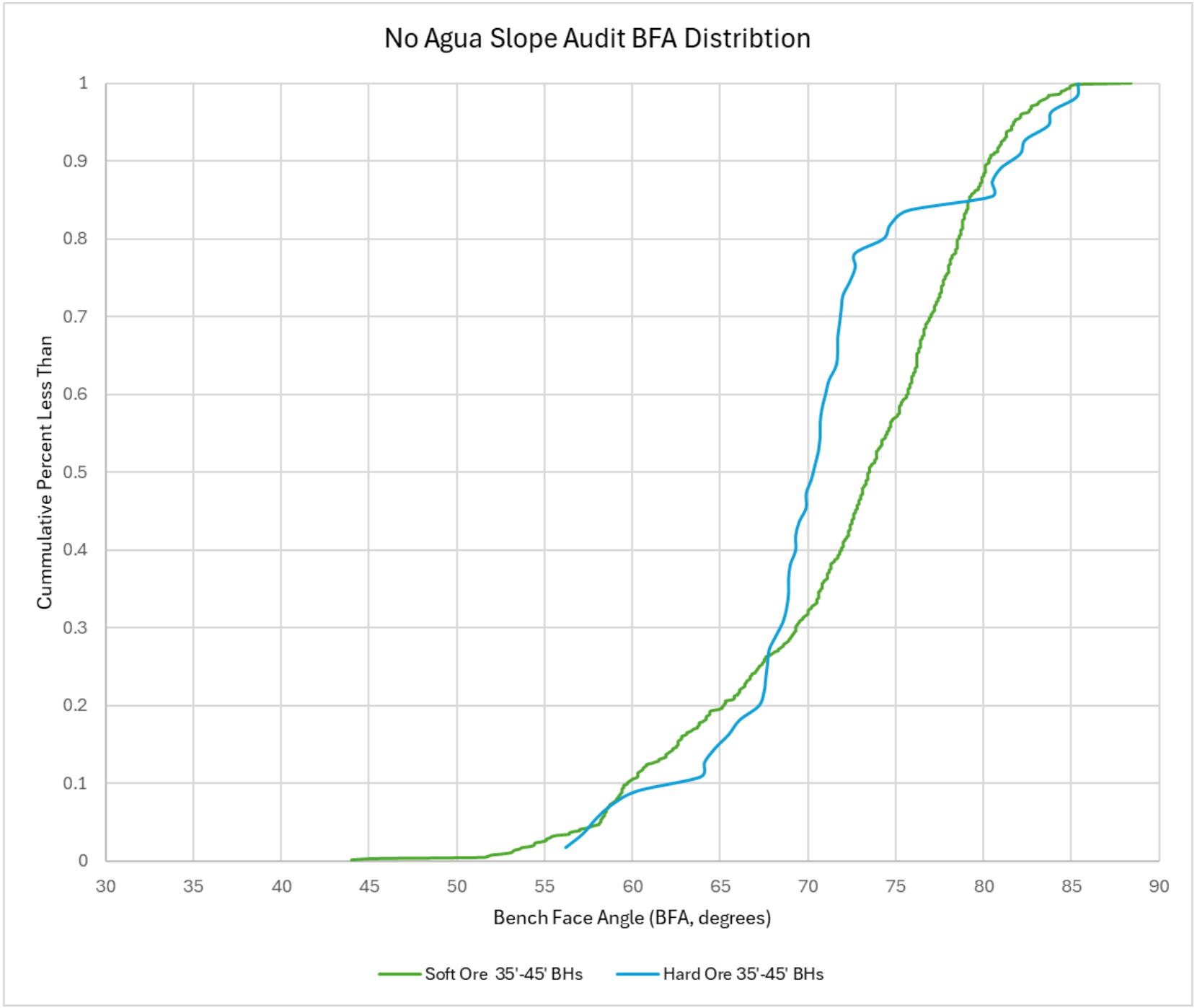


Figure 5. No Agua BFA Distributions

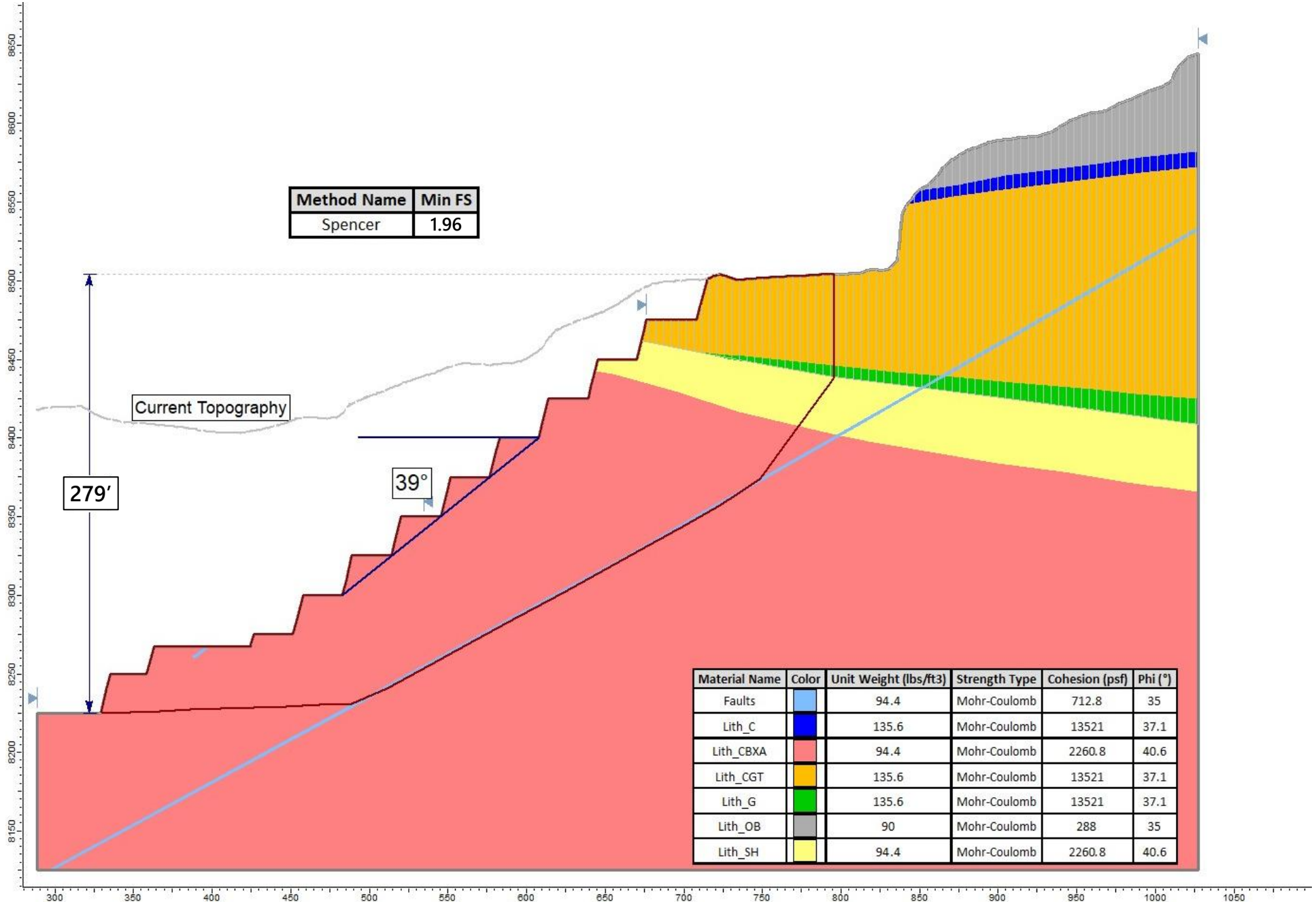


Figure 6. Cross Section SH-1 Deep Seated Failure Slope Stability Analysis

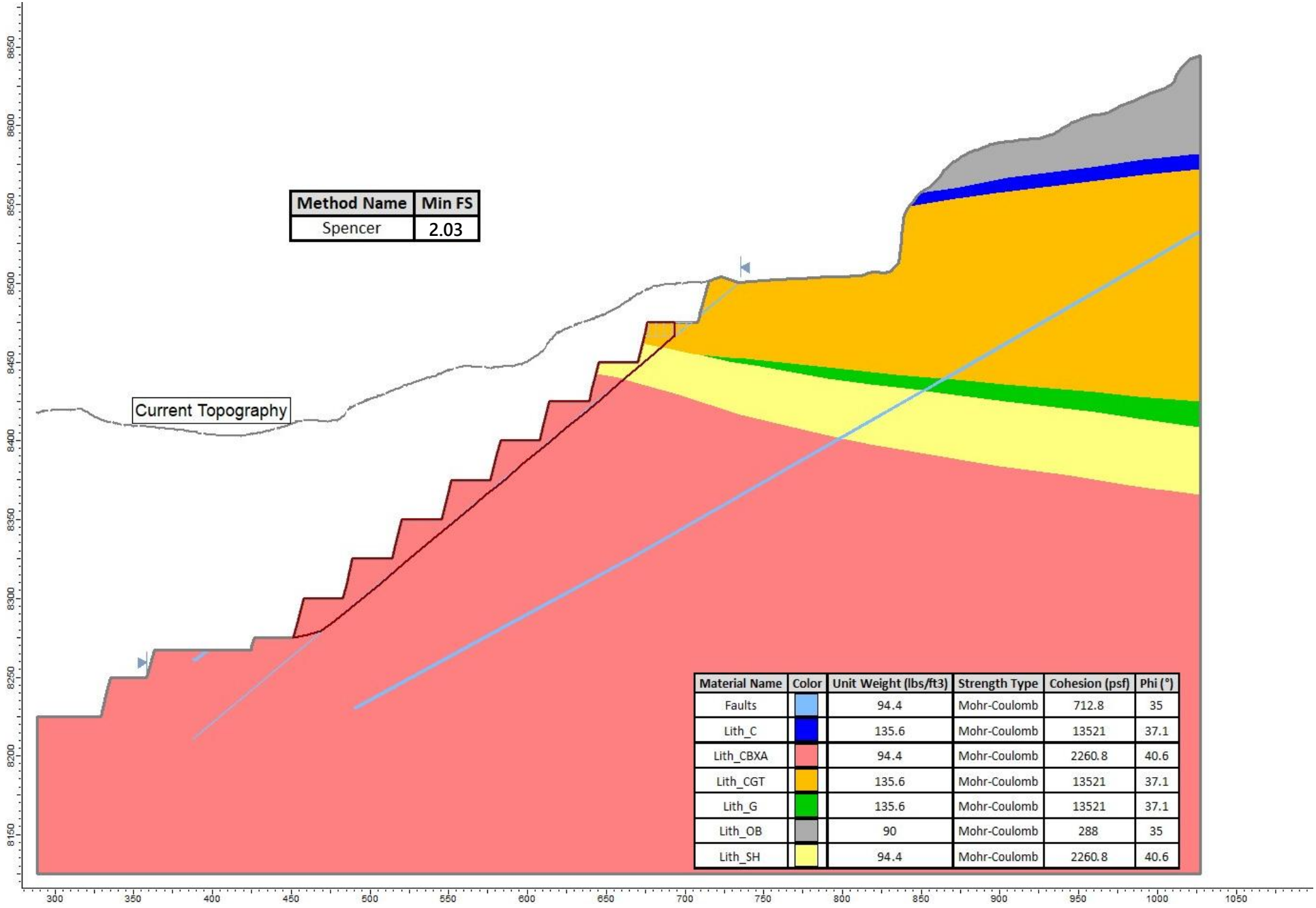


Figure 7. Cross Section SH-1 Shallow Failure Slope Stability Analysis

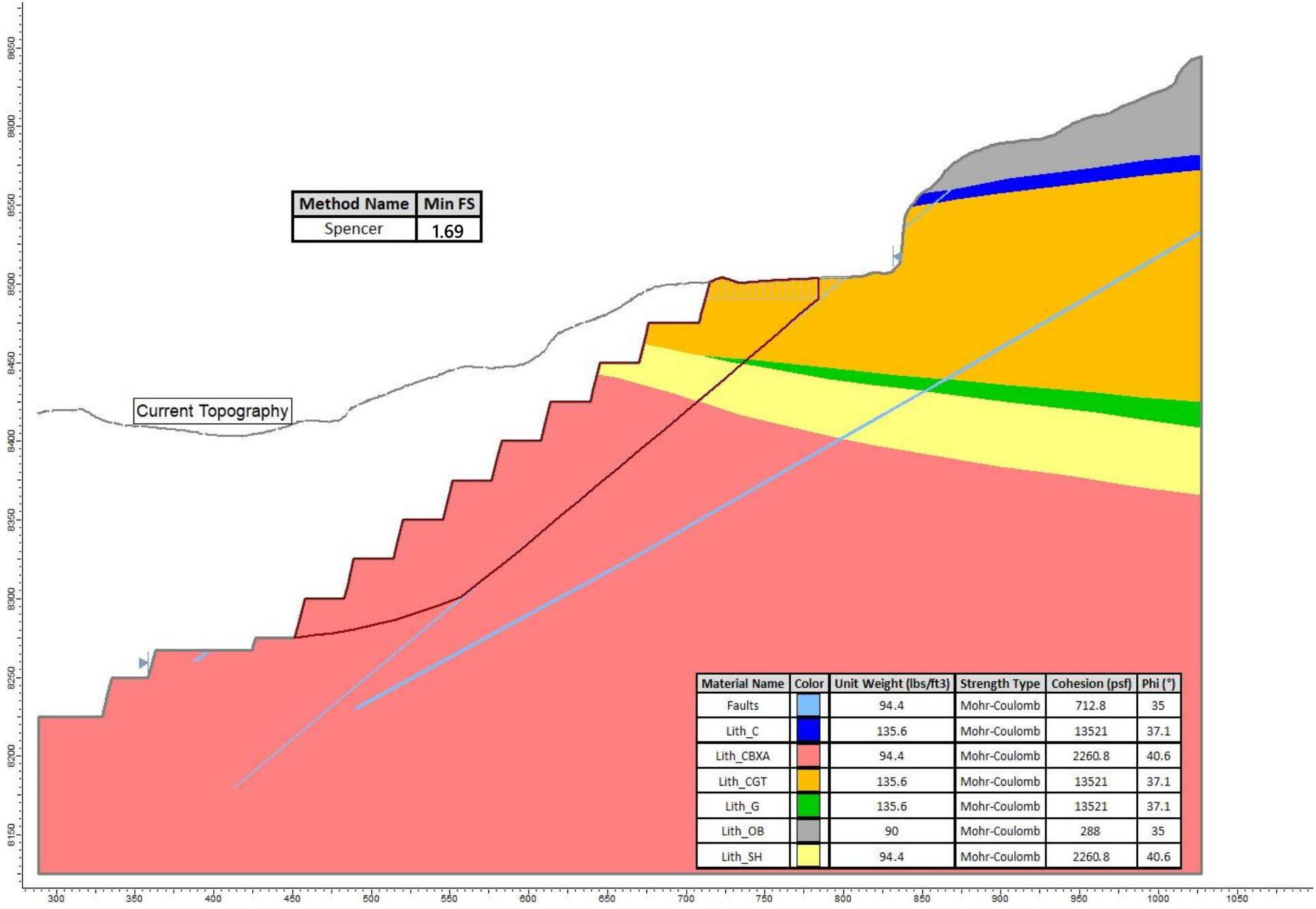


Figure 8. Cross Section SH-1 Shallow Failure +40 ft Slope Stability Analysis

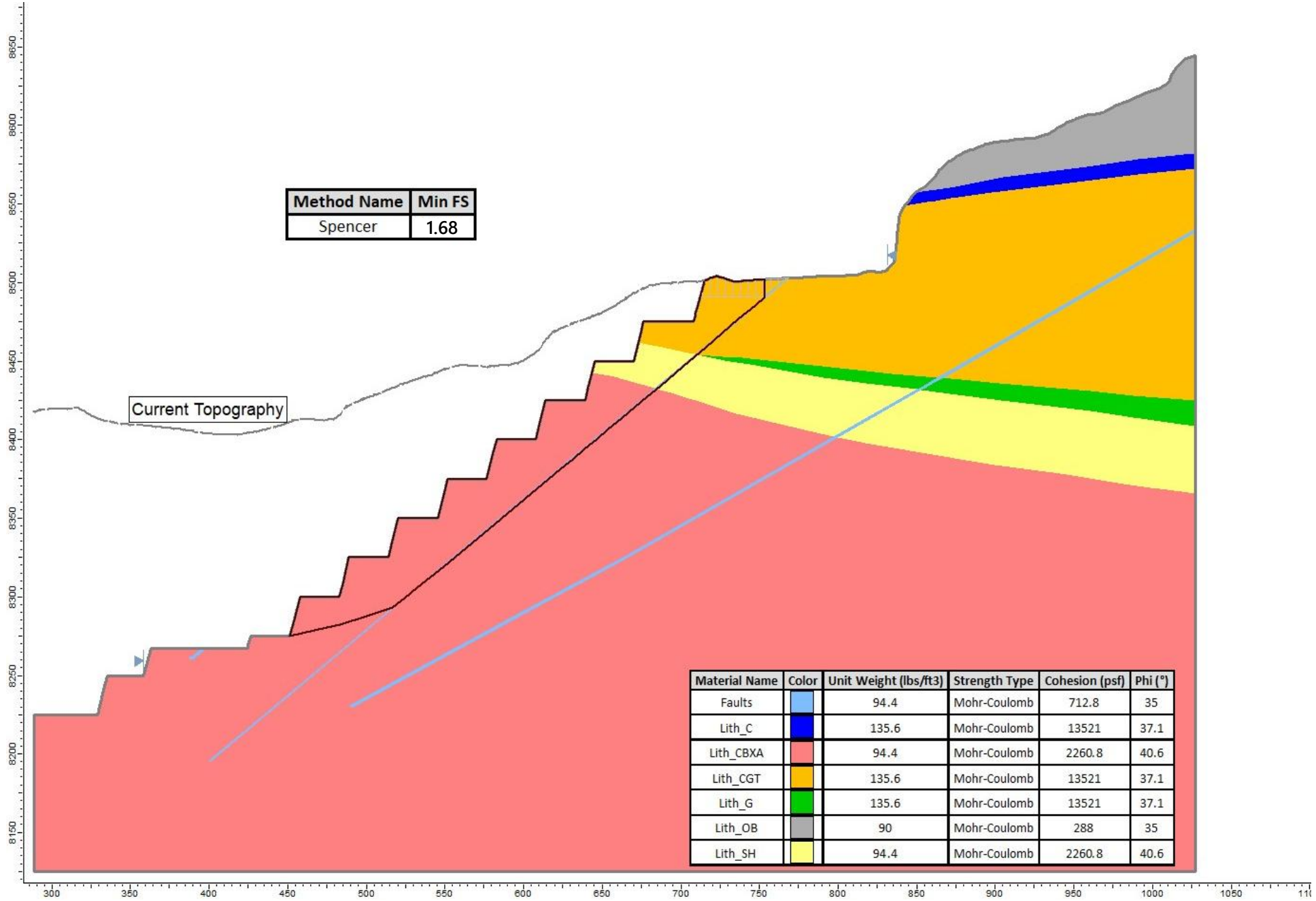


Figure 9. Cross Section SH-1 Shallow Failure +20 ft Slope Stability Analysis

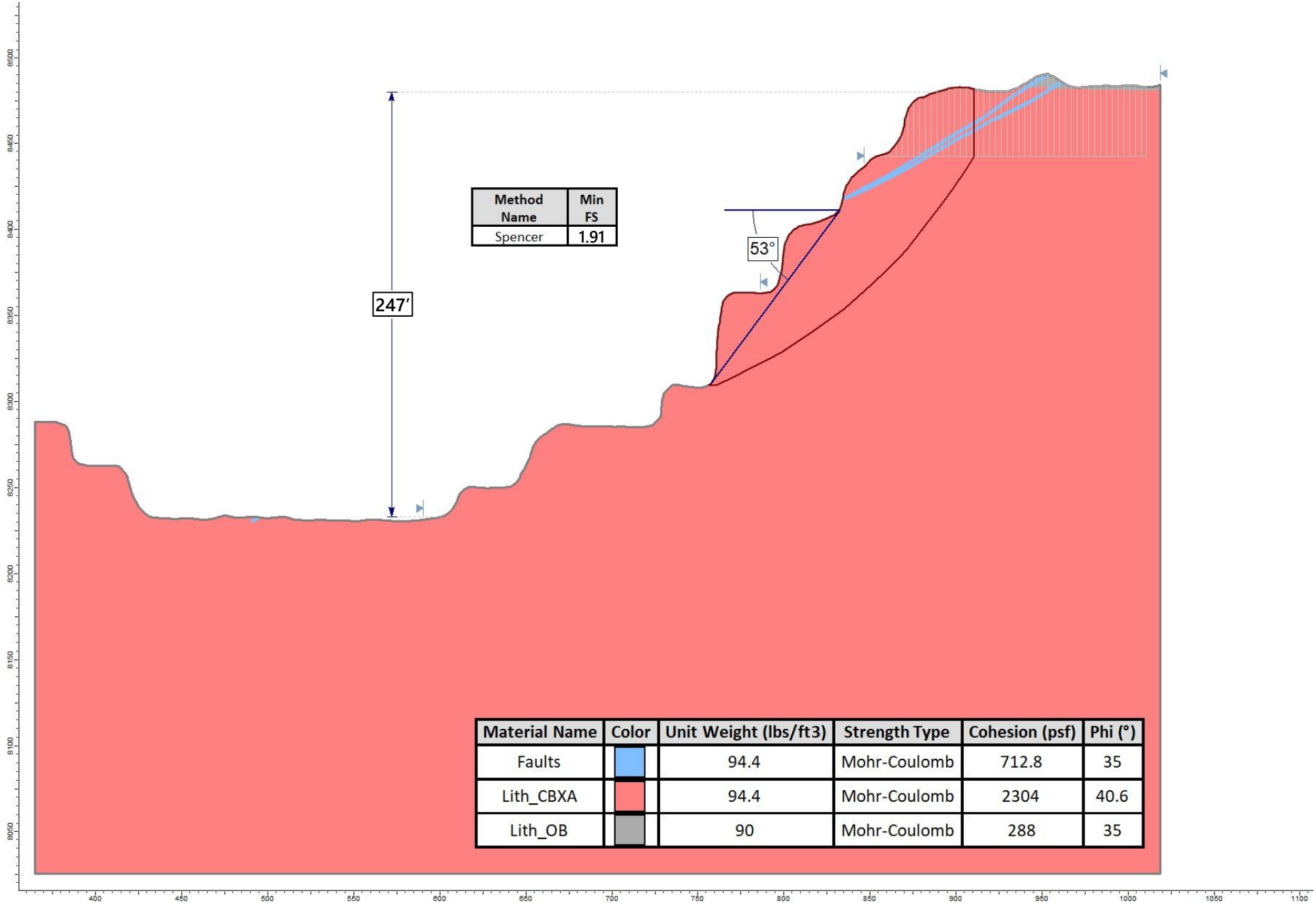


Figure 10. Cross Section SH-2 Slope Stability Analysis – Current Topography

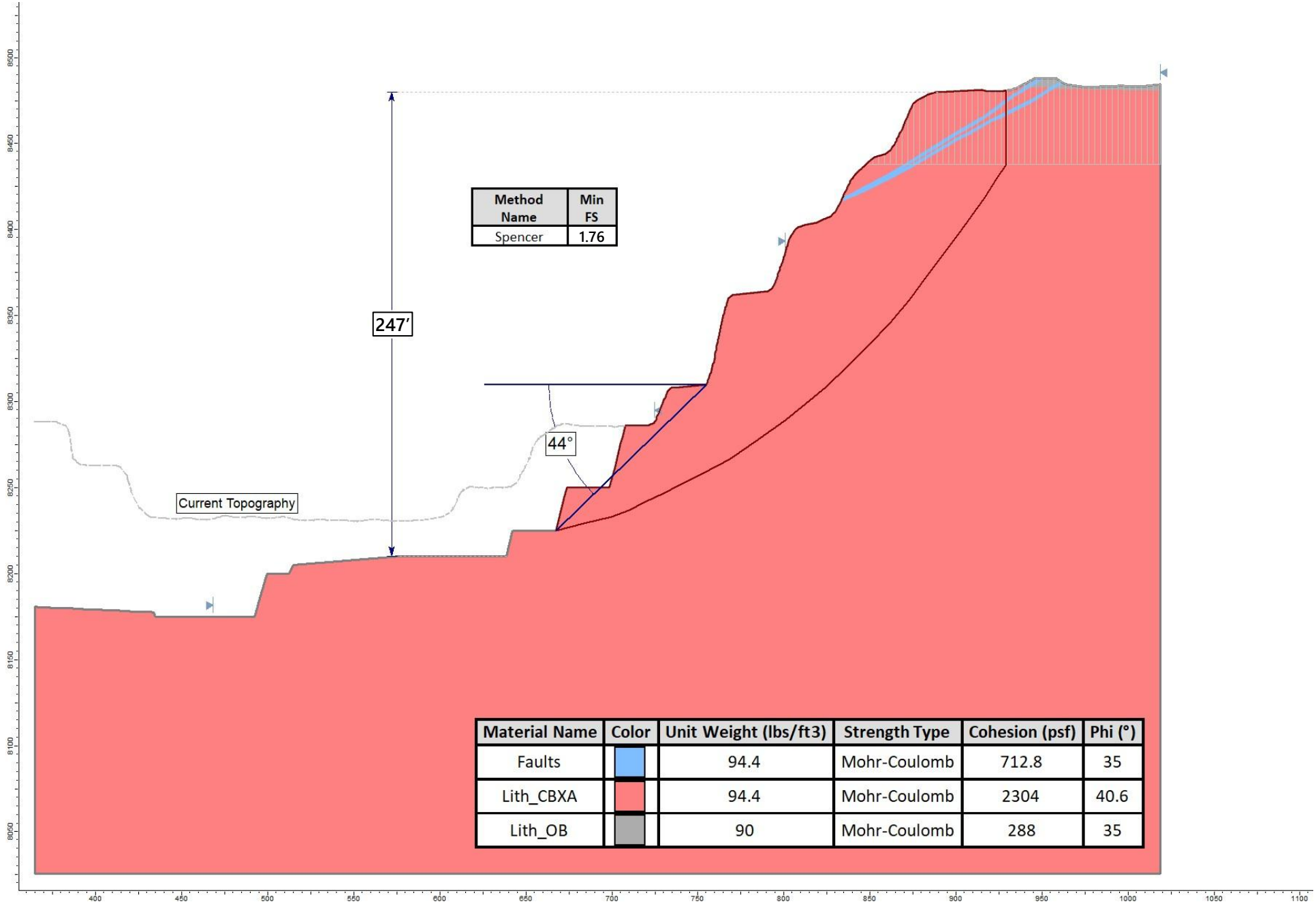


Figure 11. Cross Section SH-2 Slope Stability Analysis - Design

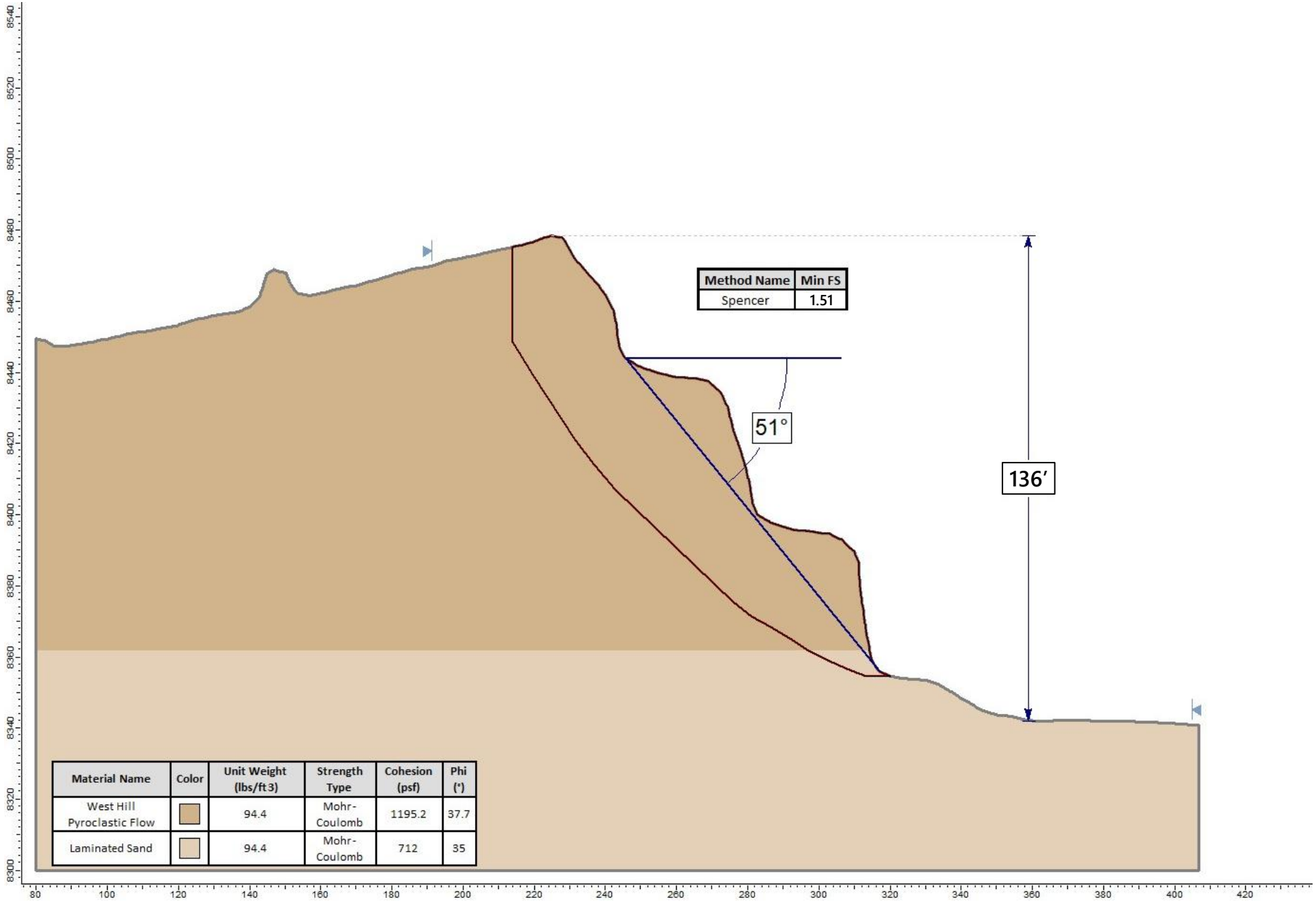


Figure 12. Cross Section WH-1 Slope Stability Analysis

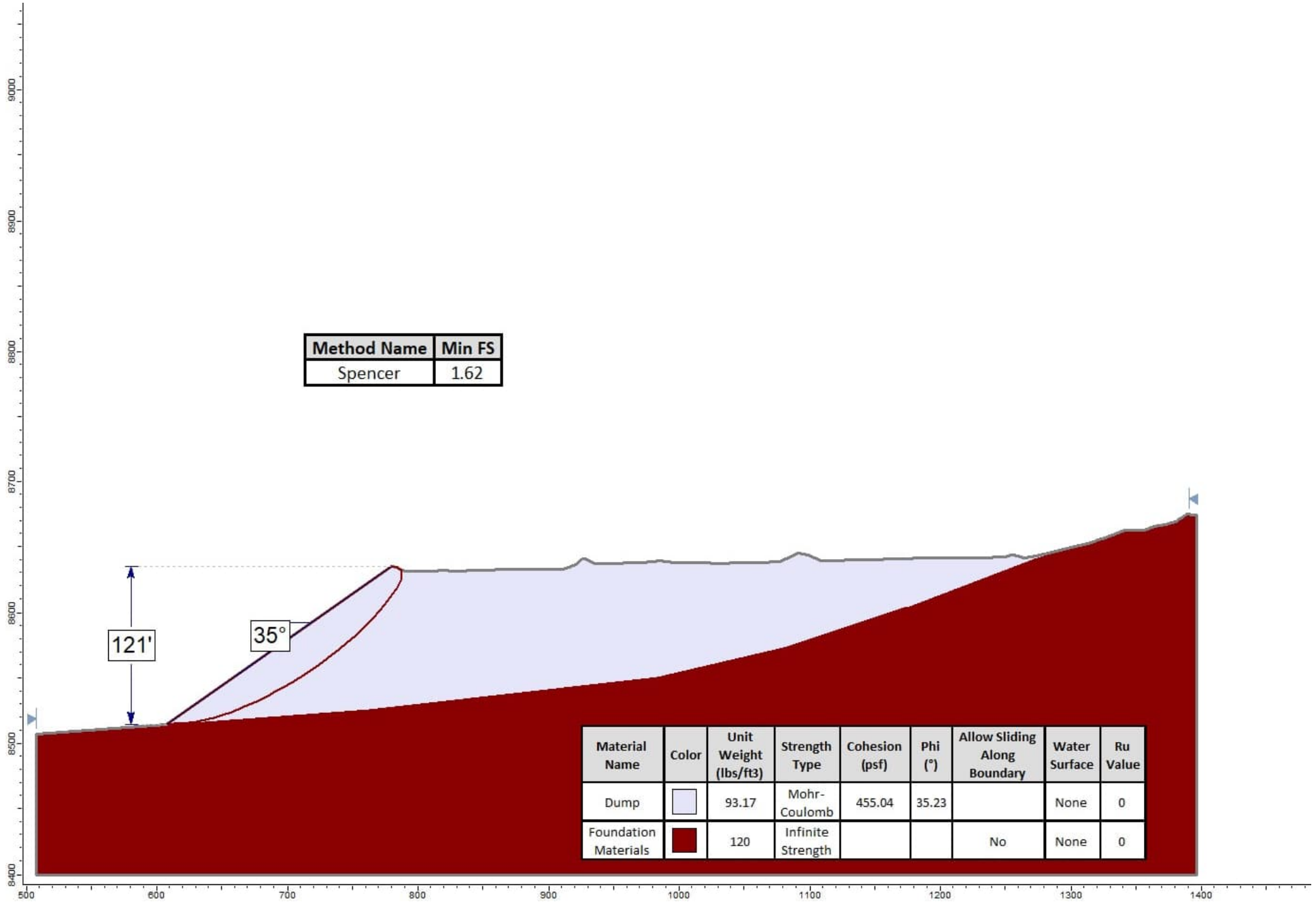


Figure 13. Dump Cross Section Slope Stability Analysis

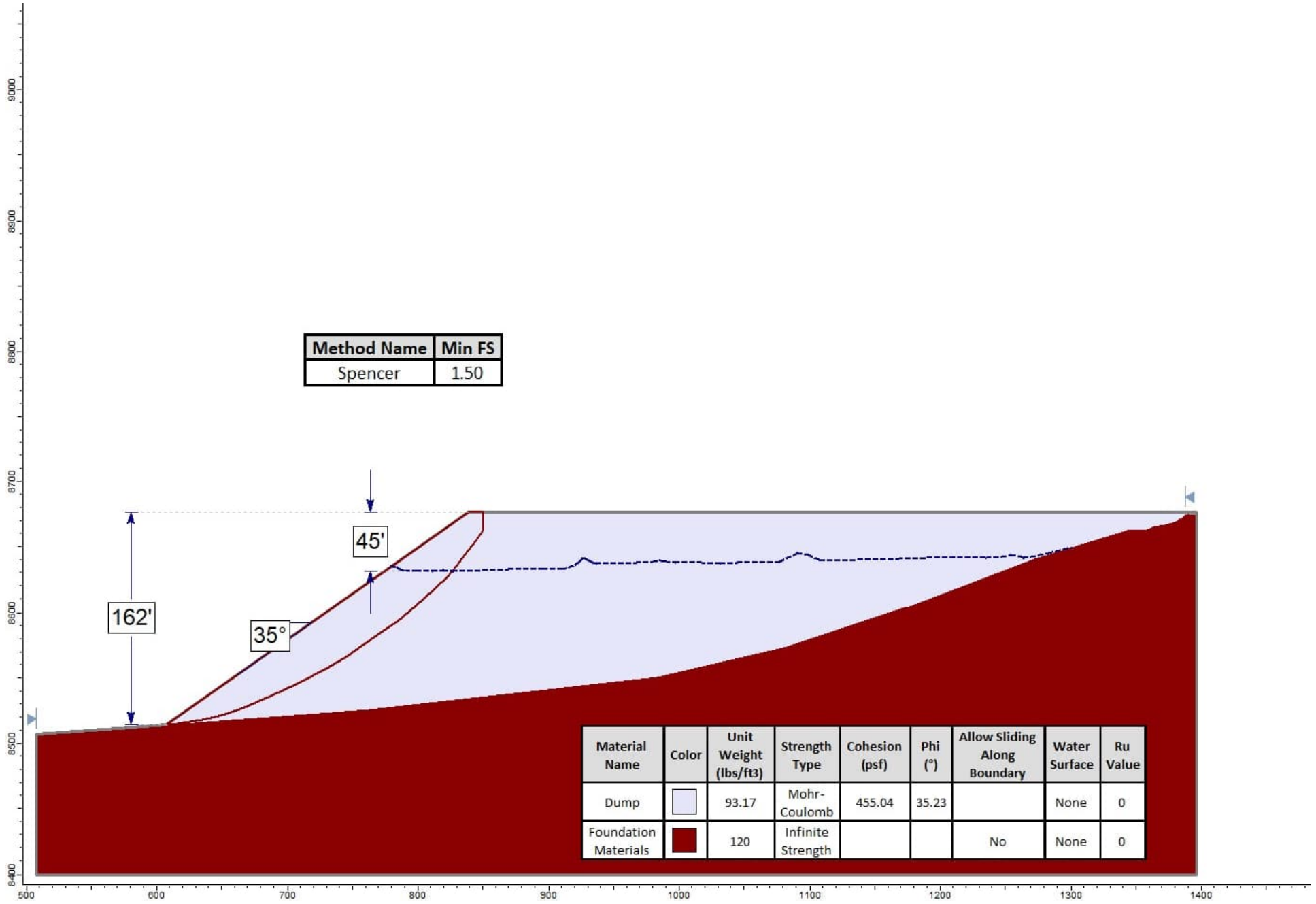


Figure 14. Dump Cross Section Slope Stability Analysis

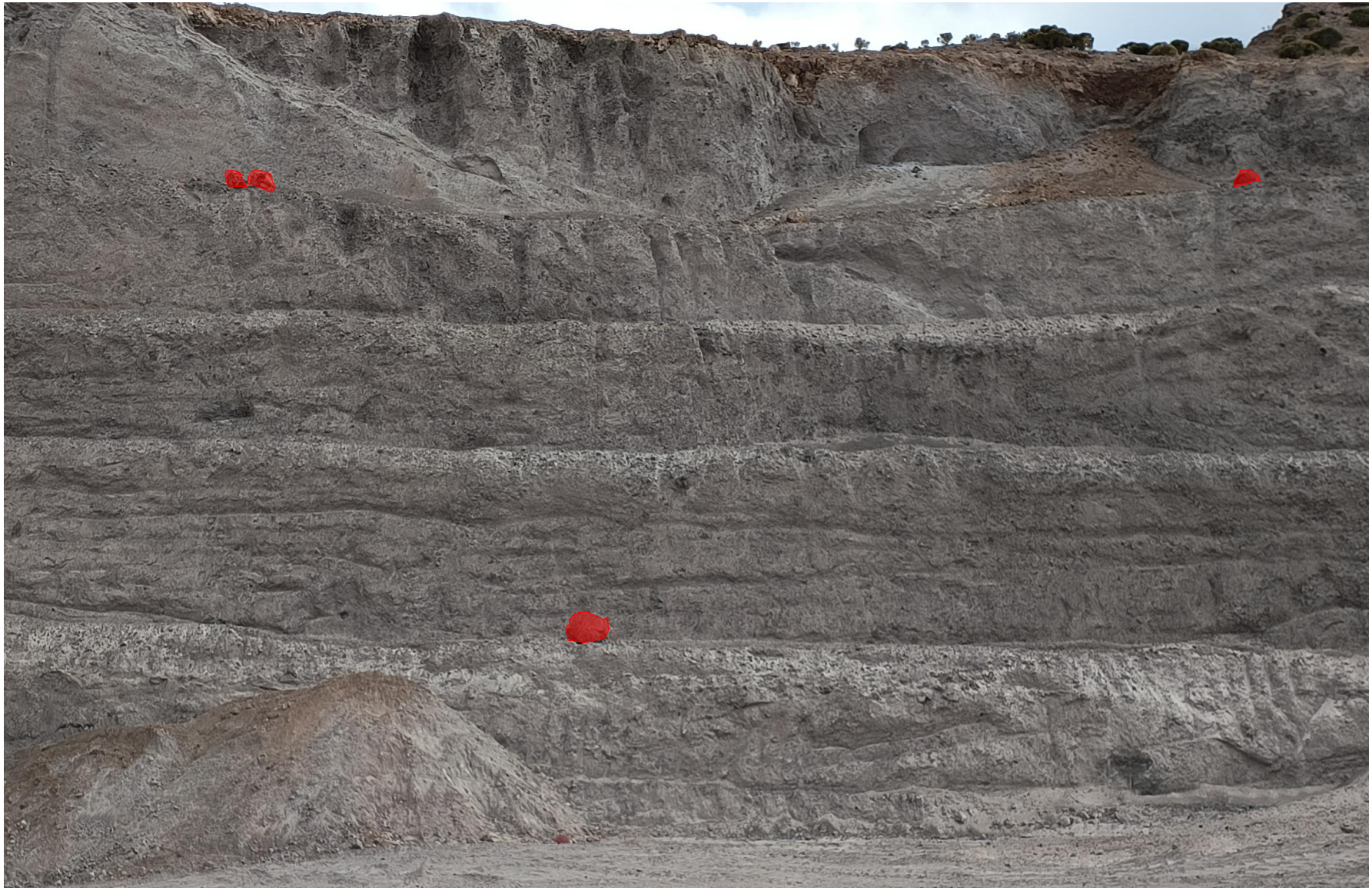
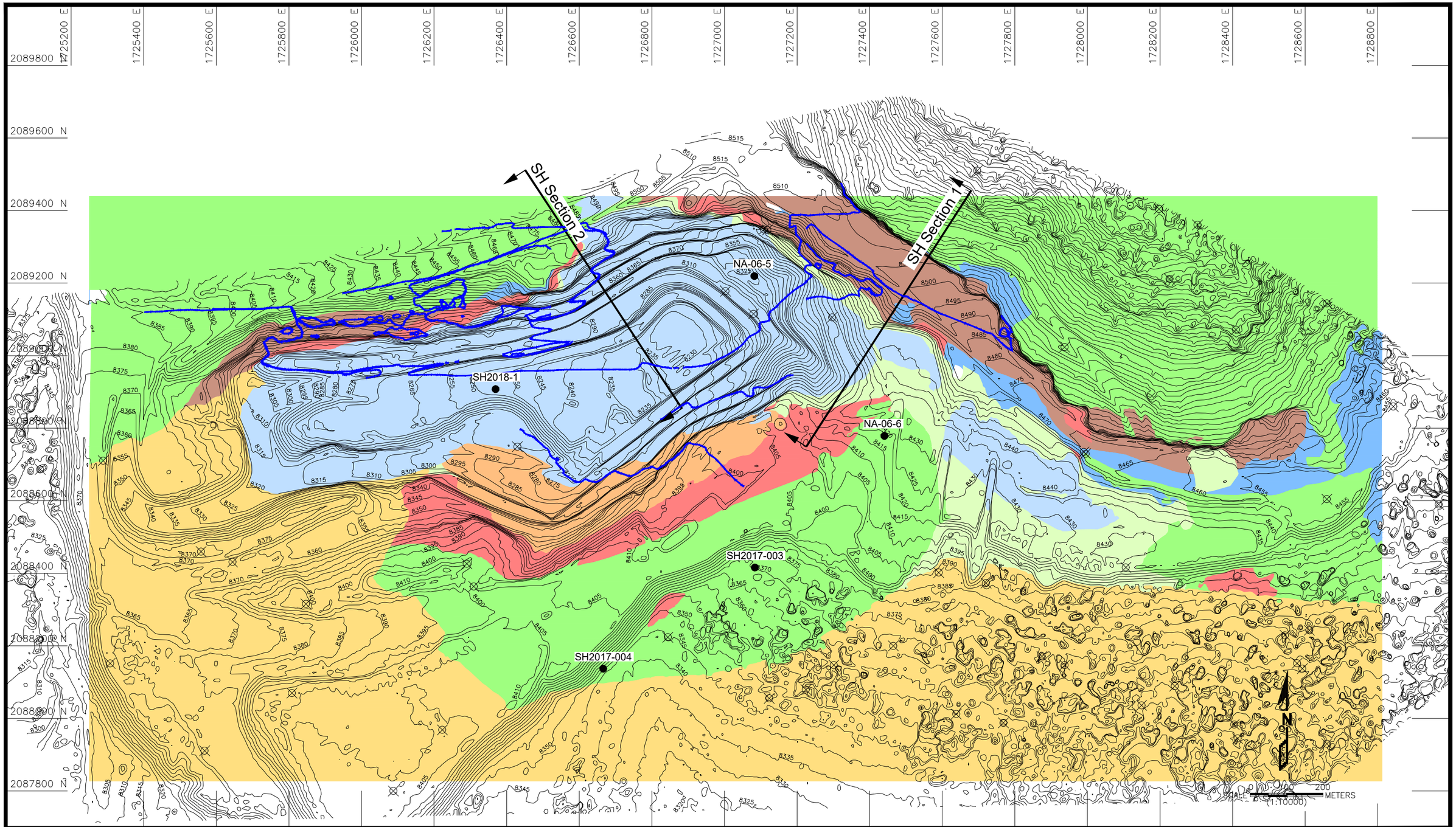


Figure 15. Loose boulders (red highlights) on bench crests south wall of South Hill Pit.



LEGEND

- CLASSICAL (C)
- CLAST DOMINATED AIRFALL BRECCIA (CBXA)
- CLASSIC-GRANULAR TRANSITION (CGT)
- FINES DOMINATED AIRFALL BRECCIA (FBXA)
- GRANULAR (G)
- OVERBURDEN (OB)
- SHARDY (SH)
- UPPER TUFF (UT)
- NA-06-6 ● DRILL HOLE COLLAR
- FAULTS

CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA

DRAWN	DATE	REVISED
LMC	11/24	2/27/2025 11:39 AM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\SOUTH_HILL_TOPO_5FT.DWG

GEOLOGY AND SECTION LOCATIONS
SOUTH HILL CURRENT PIT
IMERYS / NO AGUA

SCALE 1:10000 | MAP 1

SH Section 2

SH Section 1

N

SCALE 0 100 200 METERS
1:10000

LEGEND

- CLASSICAL (C)
- CLAST DOMINATED AIRFALL BRECCIA (CBXA)
- CLASSIC-GRANULAR TRANSITION (CGT)
- FINES DOMINATED AIRFALL BRECCIA (FBXA)
- GRANULAR (G)
- OVERBURDEN (OB)
- SHARDY (SH)
- UPPER TUFF (UT)
- FAULTS

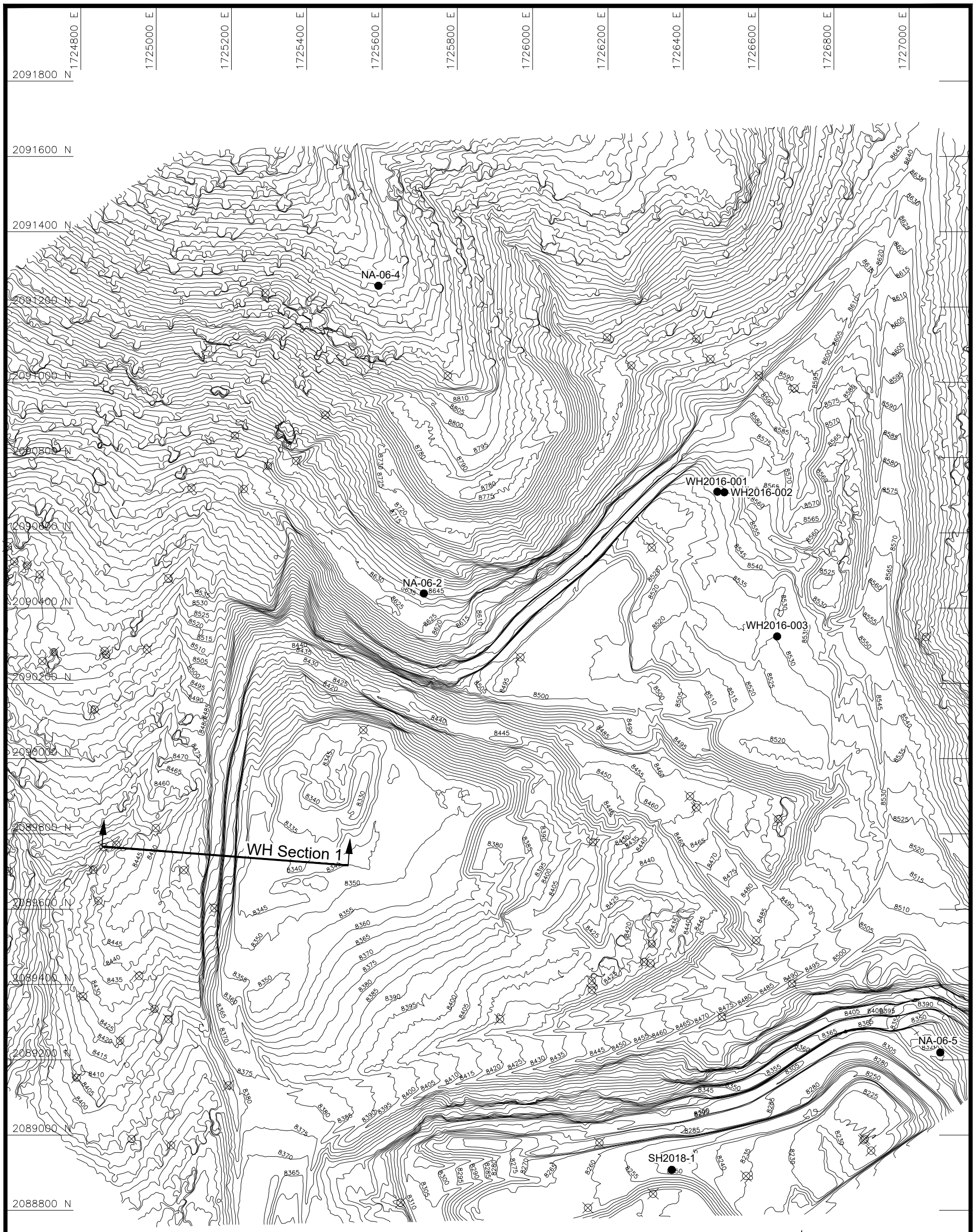
CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA

DRAWN	LMC	DATE	11/24	REVISED	2/27/2025 11:39 AM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\LOM_5FT.DWG

GEOLOGY AND SECTION LOCATIONS
SOUTH HILL LOM DESIGN
IMERYS / NO AGUA

SCALE 1:10000 | MAP 2



LEGEND

NA-06-2 ● DRILL HOLE COLLAR

CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA

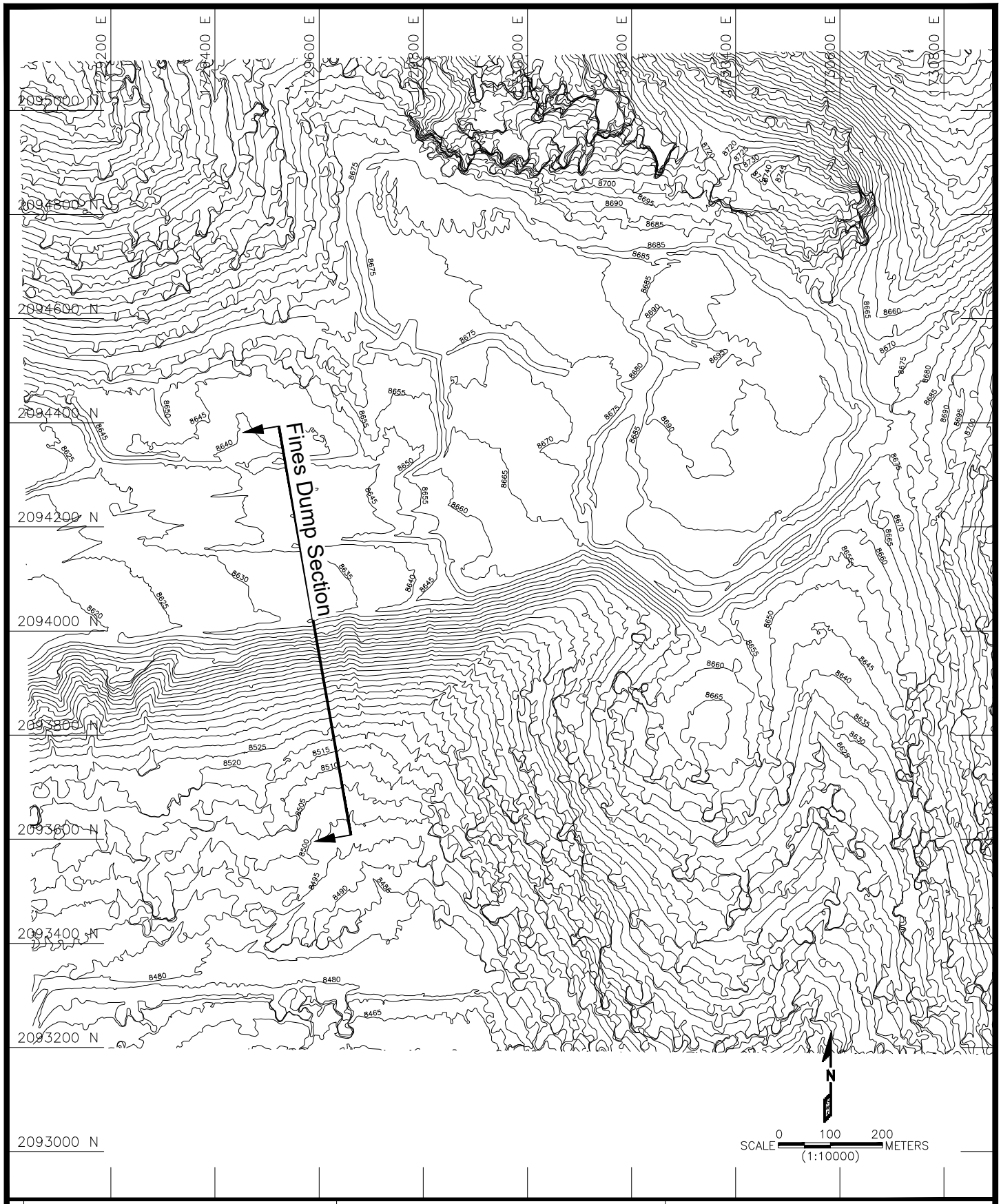
DRAWN	DATE	REVISED
LMC	11/24	2/26/2025 4:30 PM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\WEST_HILL_TOPO.DWG

WEST HILL PIT TOPOGRAPHY AND ANALYSIS SECTION LOCATION

IMERYS / NO AGUA

SCALE 1:10000 | MAP 3



LEGEND

CALL & NICHOLAS, INC.

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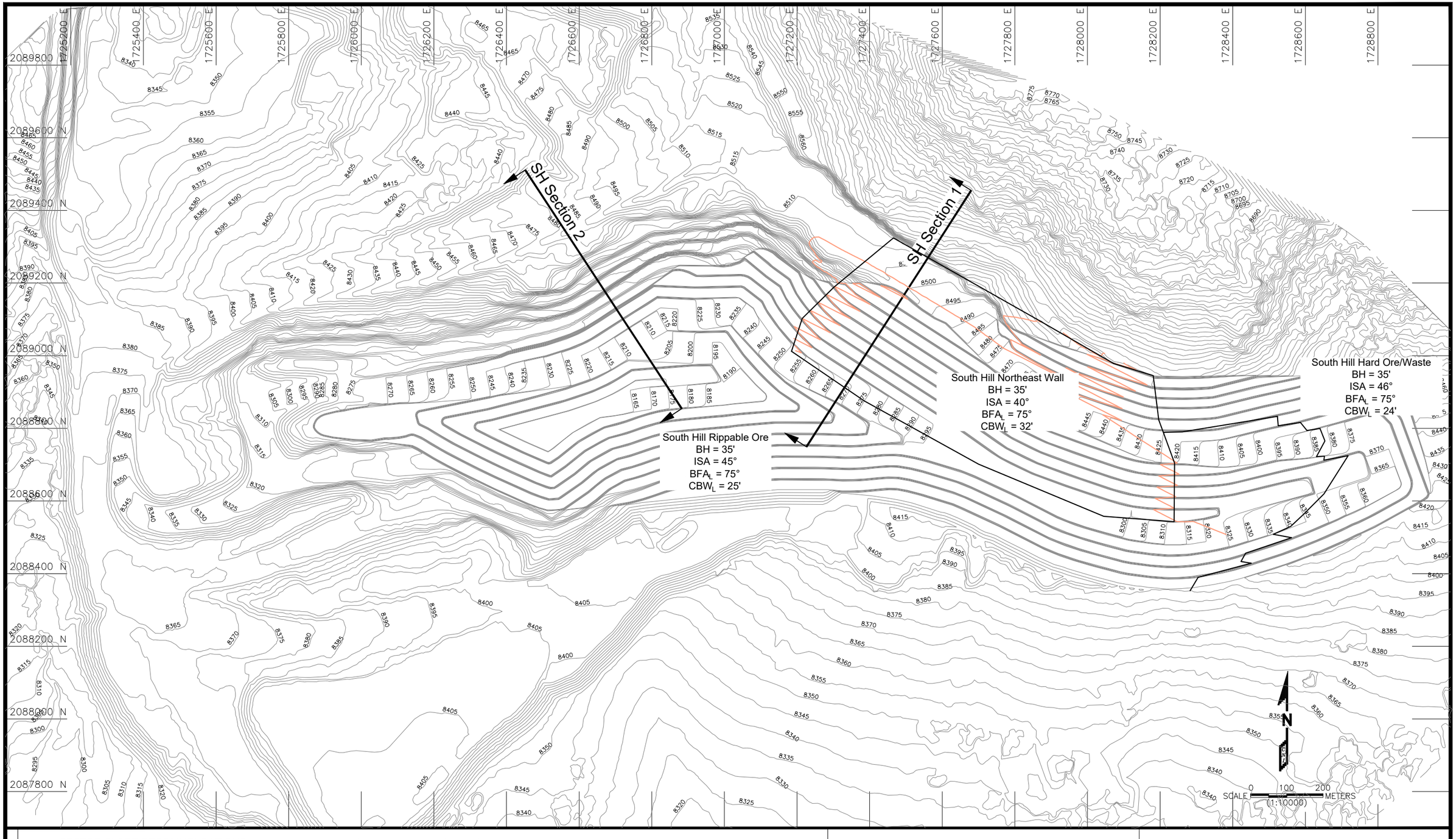
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LMC	02/25	2/26/2025 1:22 PM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\DUMP_AREA_TOPO.DWG

FINES DUMP AREA TOPOGRAPHY MAP

IMERYS / NO AGUA

SCALE	MAP
1:10000	MAP 4



LEGEND

SECTOR SLOPE RECOMMENDATIONS
BH = BENCH HEIGHT
ISA = INTERRAMP SLOPE ANGLE
BFA$_L$ = LAYOUT BENCH FACE ANGLE
CBW$_L$ = LAYOUT CATCH BENCH WIDTH

ISA SECTOR BOUNDARY

POTENTIAL FAULT CT01 - SEE TEXT

CALL & NICHOLAS, INC.
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DRAWN	DATE	REVISED
LMC	11/24	3/5/2025 5:45 PM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\SECTOR_MAPS.DWG

SOUTH HILL LOM
SLOPE DESIGN SECTOR MAP

IMERYS / NO AGUA

SCALE 1:10000 | MAP 5

APPENDIX A

PRELIMIARY GEOLOGIC MAP OF THE NO AGUA SITE

PROVIDED BY IMERYS



Mine Dump

Basalt

West Hill Flow Rhyolite/Obsidian

West Hill Flow Lower Glass

West Hill Flow Pyroclastics

West Hill Flow Tuff

North Hill Phreatic Breccia

North Hill Late Stage Intrusive

Low Hills Flow upper Glass

Low Hills Flow Rhyolite/Obsidian

North Hill Flows Upper Glass

North Hill Flows Rhyolite/Obsidian

North Hill Flows Lower Glass

North Hill Flows Coarse Pyroclastics

North Hill Tuff

Preliminary Geologic Map of No Agua Peaks, Taos Co., NM

1"=500'

0 500 1000

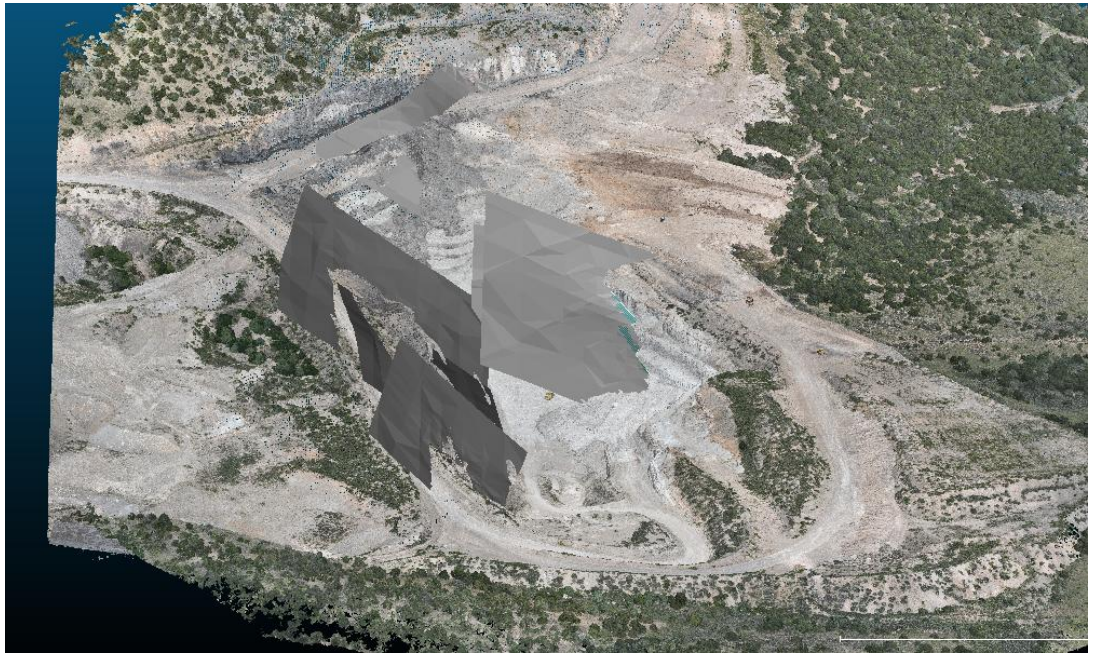
Contour Interval = 20'

APPENDIX B

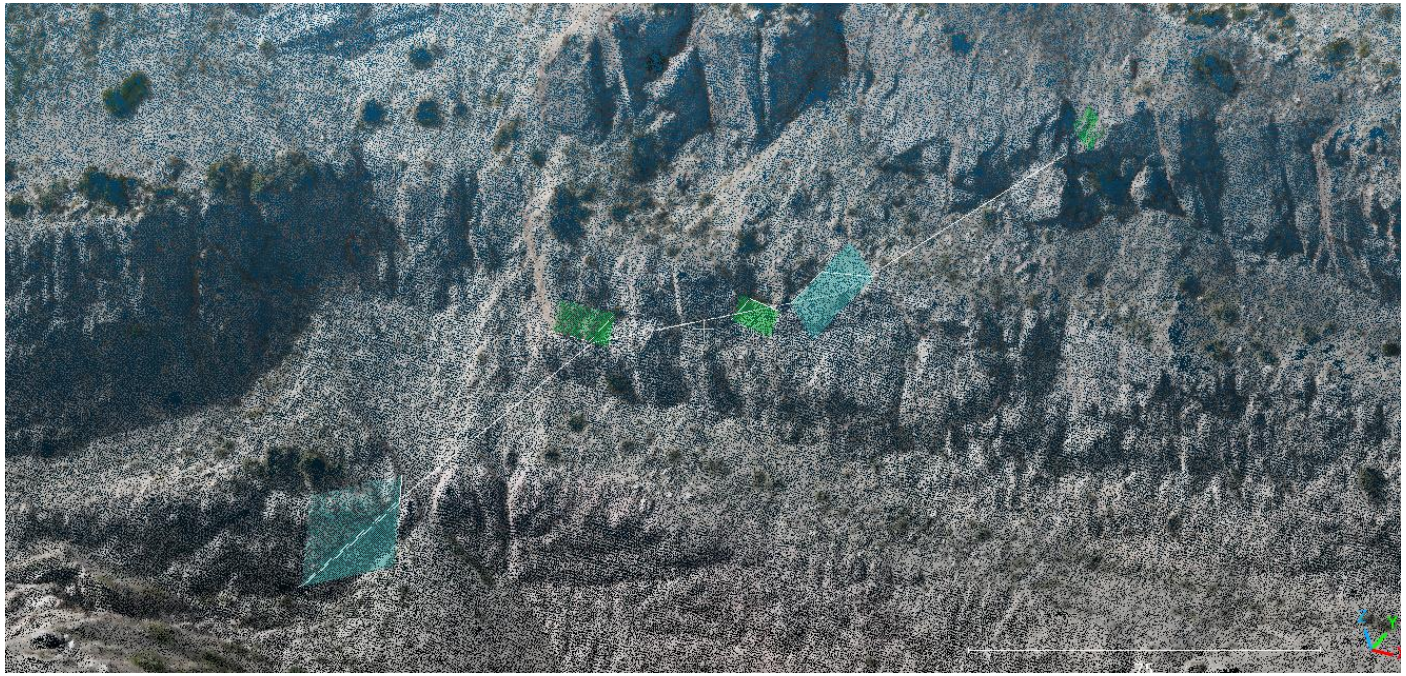
FAULT MAPPING ON SOUTH HILL POINTCLOUD

Overall View





W Fault, the fault trace can be followed along more than 3 benches



Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1725897.07	2089084.99	8383.39	55.7564	184.062	-1	FW
1725735.56	2088997.15	8300.71	35.0756	197.763	-1	FW
1725778.68	2089039.64	8335.57	48.1234	184.839	-1	FW
1725822.57	2089046.09	8343.51	42.6224	188.605	-1	FW
1725841.18	2089052.04	8350.55	34.7861	195.717	-1	FW
1725804.62	2089039.09	8337.47	34.9815	190.066	-1	FW

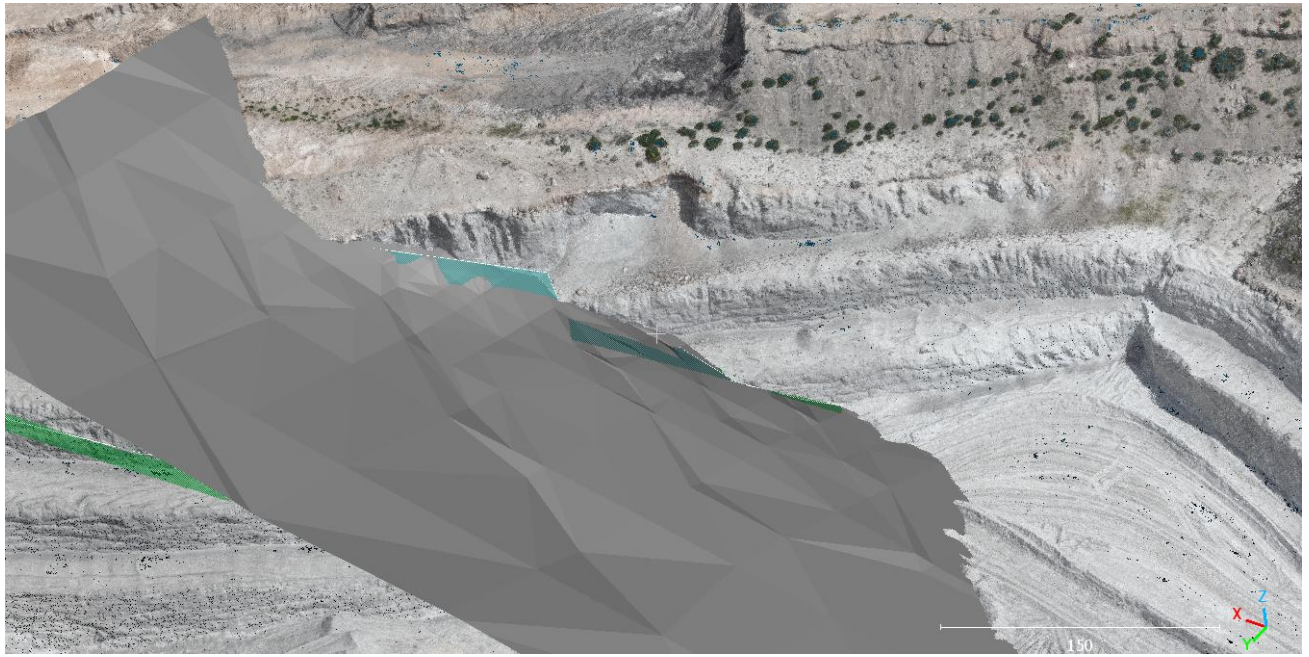


Fault 2, can be followed as a continuous lineament along more than 2 benches on the south wall of the pit



Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726848.75	2088726.95	8361.48	24.8963	252.532	-1	FT-02
1726744.54	2088689.87	8319.21	29.1115	199.326	-1	FT-02
1726678.39	2088668.28	8296.02	25.9481	206.014	-1	FT-02



Fault 3, can be followed along more than 3 benches



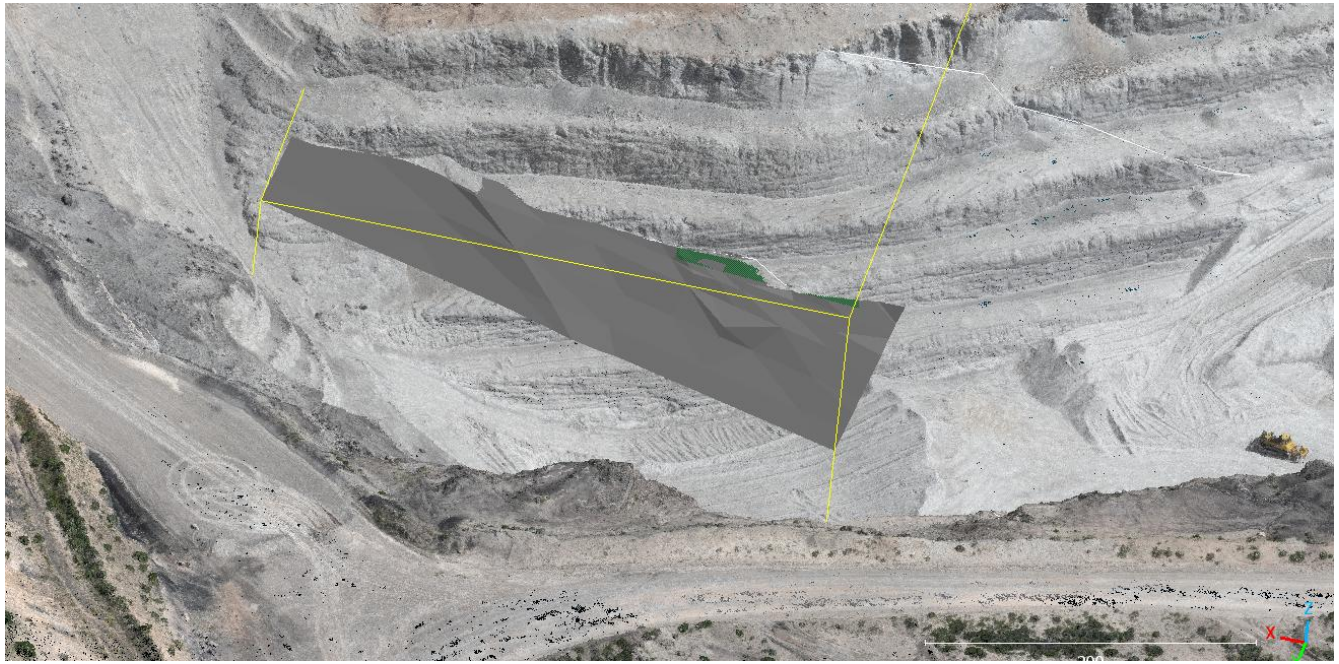


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726613.79	2089192.76	8382.34	28.0532	182.547	-1	FT-03
1726662.87	2089266.42	8428.07	32.4743	196.689	-1	FT-03
1726675.38	2089318.55	8464.82	37.4614	179.54	-1	FT-03
1726559.35	2089131.24	8345.66	29.8329	190.601	-1	FT-03

Fault 4, can be followed along more than 2 benches.

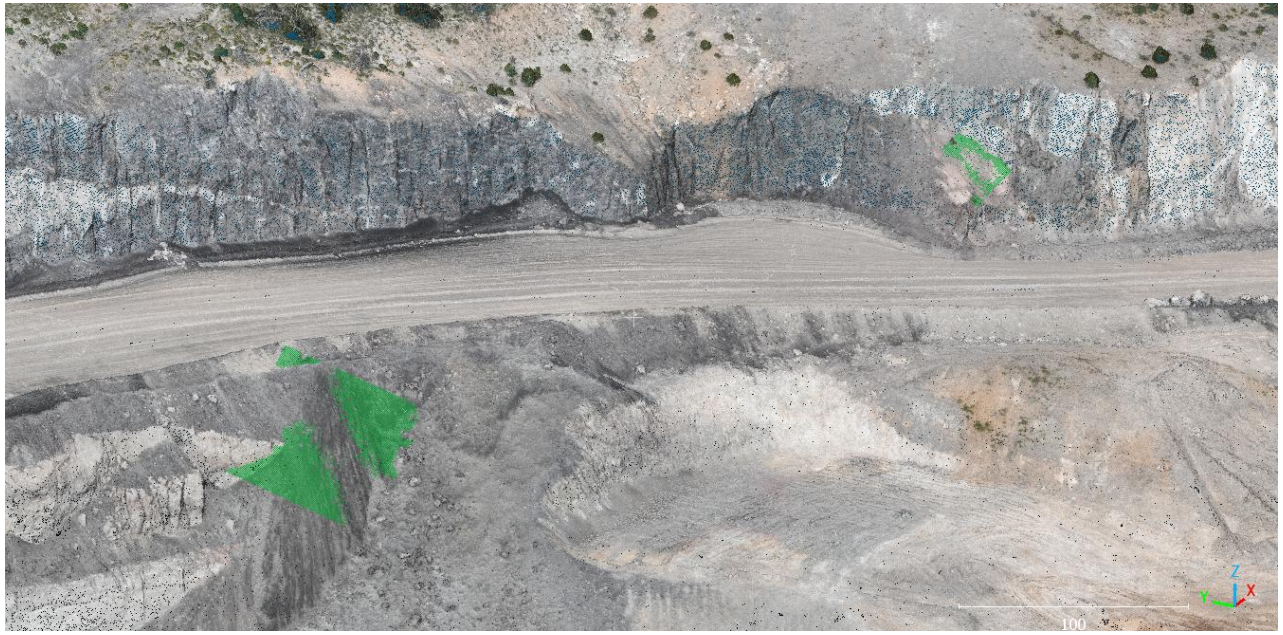


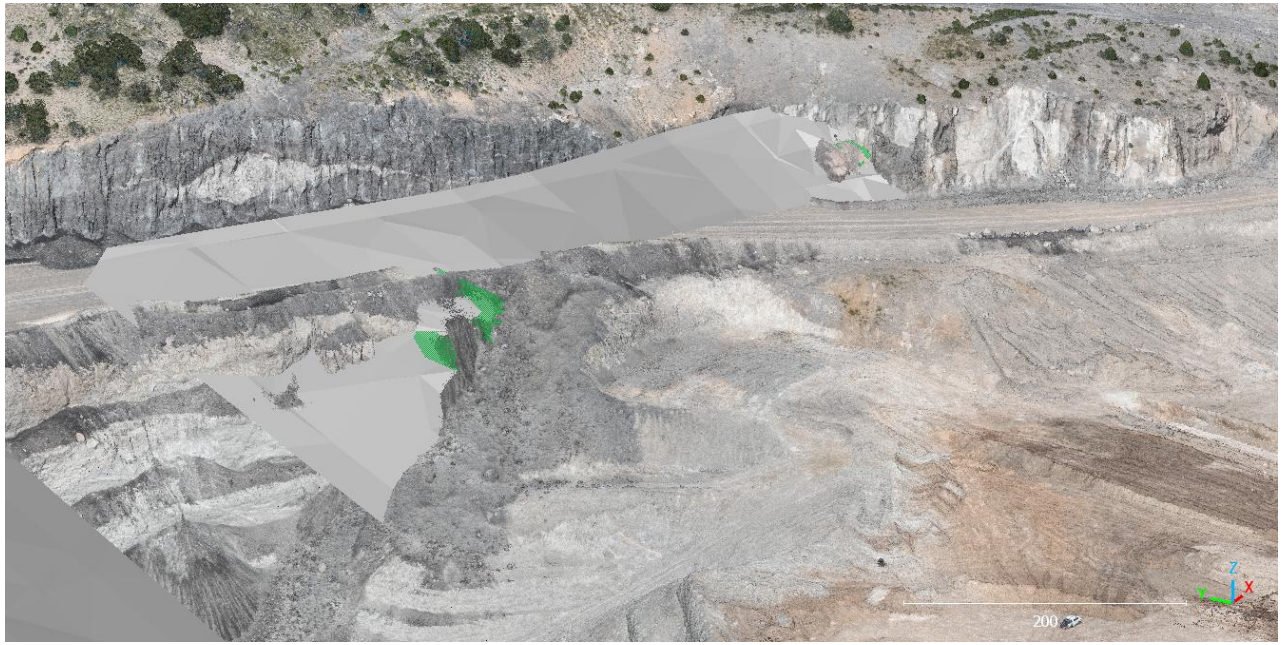


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726941.61	2088871.88	8298.91	17.6431	235.83	-1	FT-04

Contact 1, located in the east pit wall . A contact between different lithologies is defined by two semi-parallel planes.

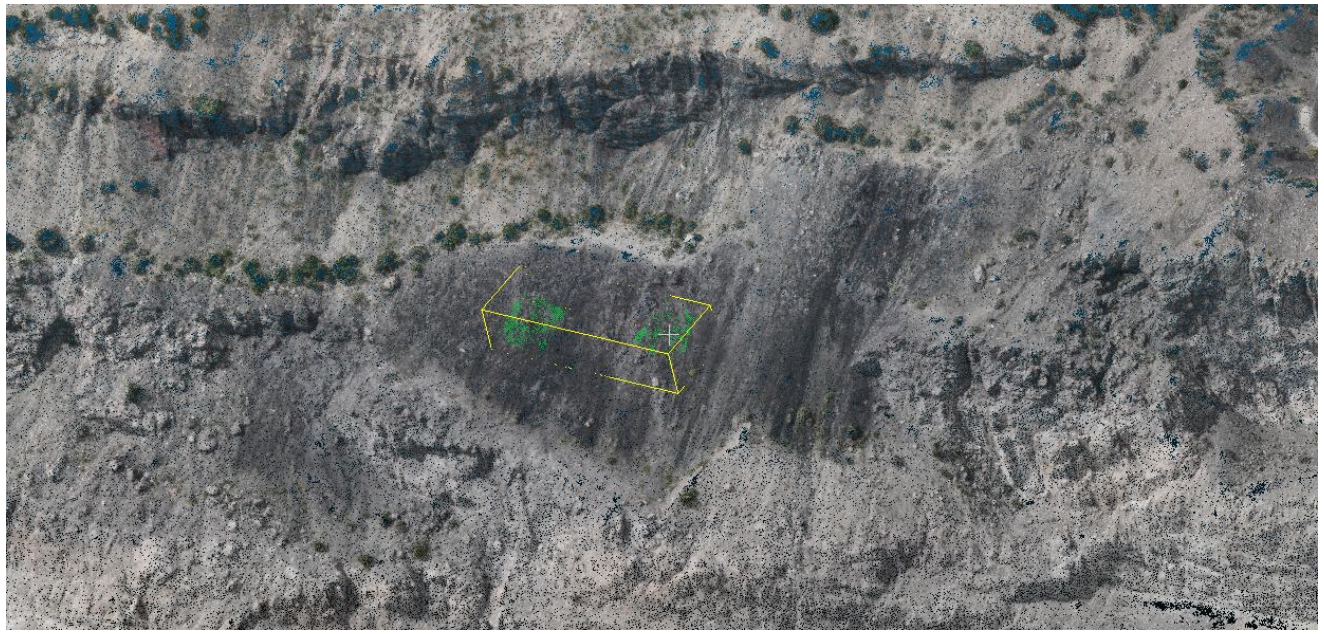


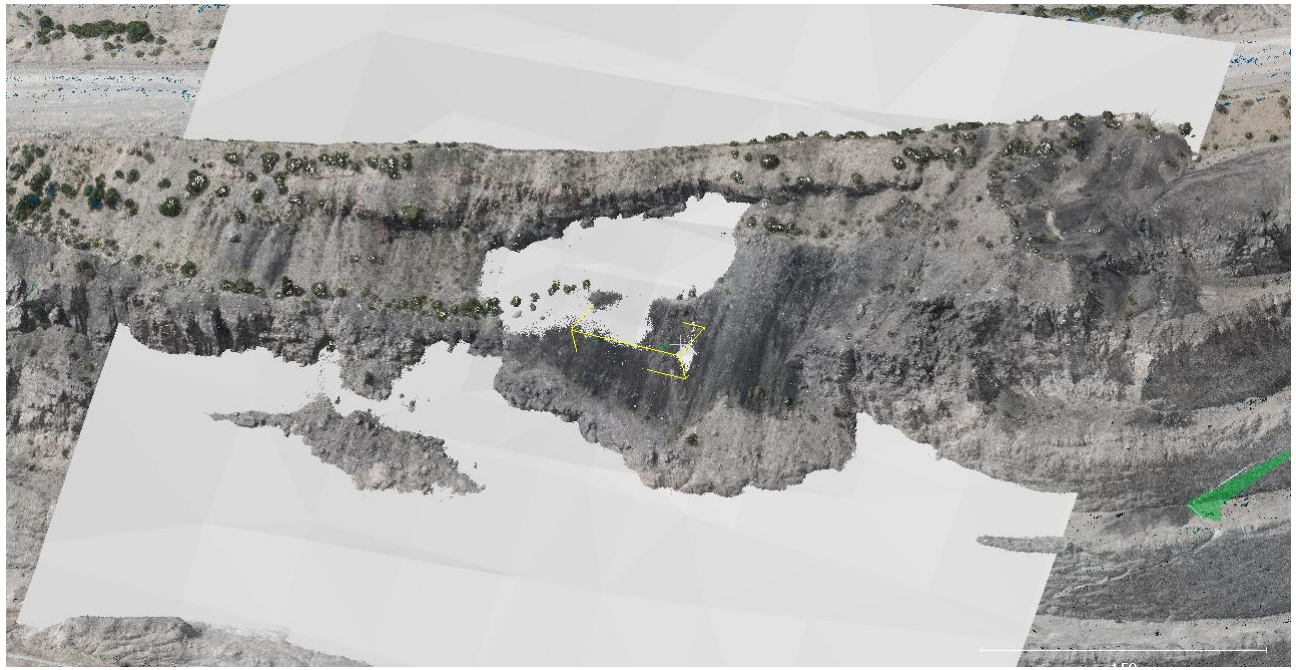


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1727399.92	2089183.75	8478.69	32.6982	223.239	-1	CT01
1727783.26	2089058.97	8508.53	42.7075	213.691	-1	CT01

Contact 2, a cone-shaped spill can be observed; however, it is consistent with the general trend of the structures, which could have been exposed by the scaling.



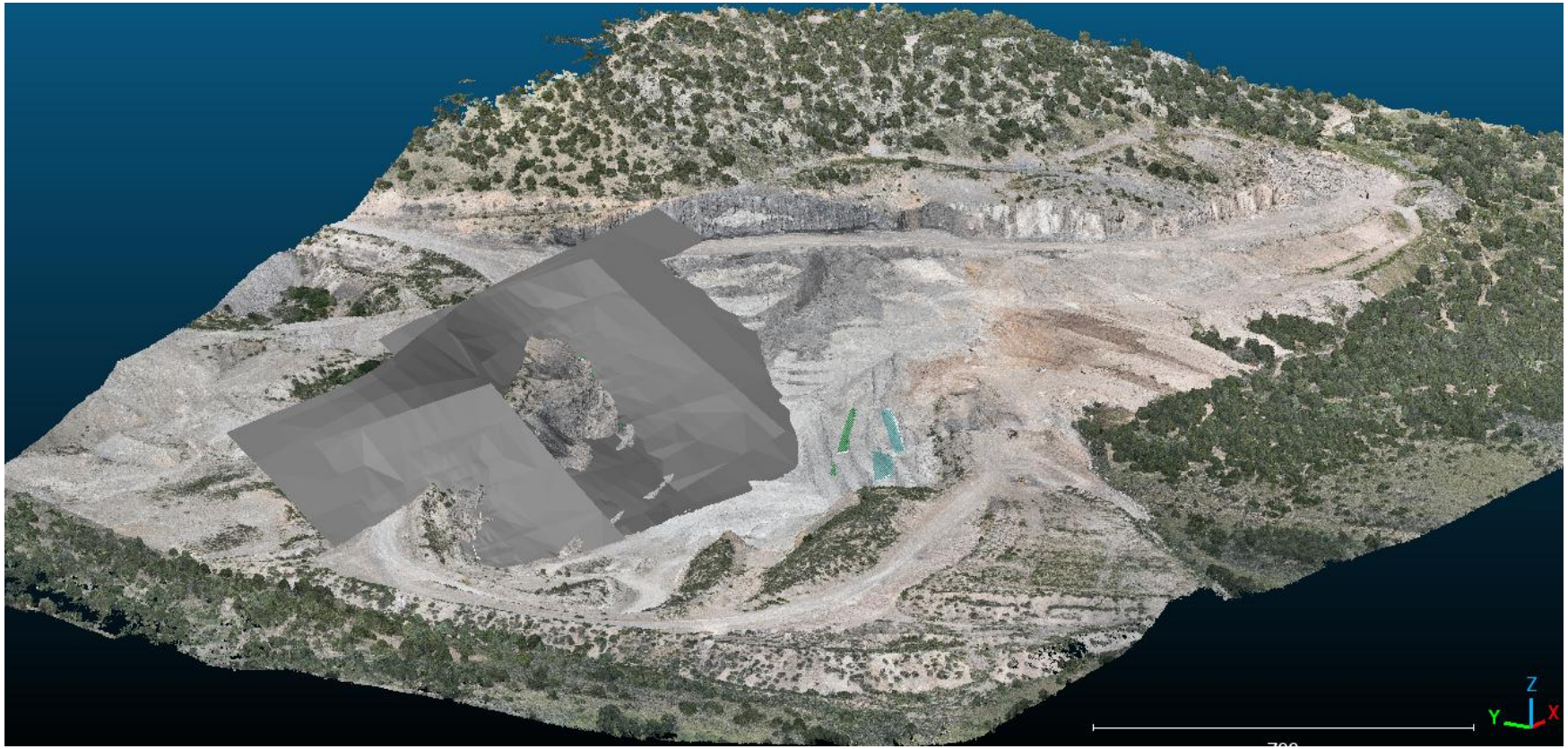


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726227.13	2089134.42	8396.81	33.9338	177.324	-1	CT02
1726274.49	2089141.72	8399.95	33.3311	164.6	-1	CT02

Potential Major Fault

In the northern wall of the pit, it is possible to correlate 3 moderately coplanar structures that could be associated with a major fault that coincides with the greatest dimension of the pit.



APPENDIX C

SOUTH HILL BENCH AUDIT

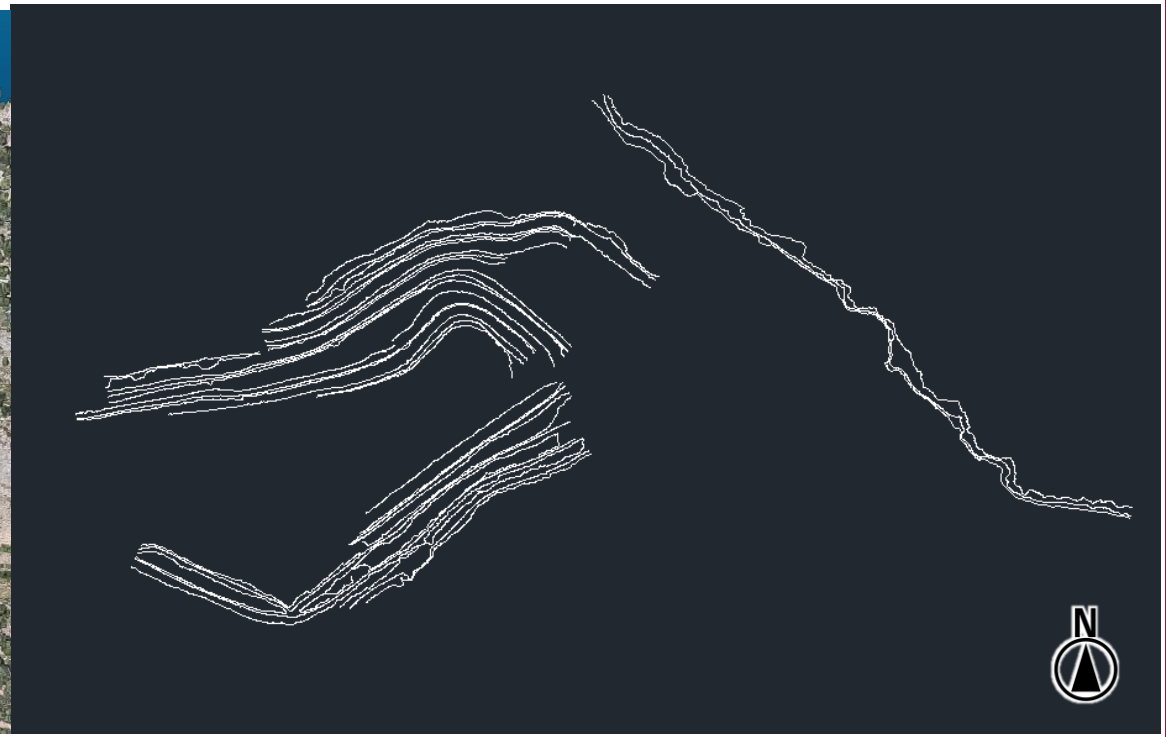
Slope Audit No Agua

Nov 2024

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Slope Audit – No Agua (South Hill) – Line Digitalization Process



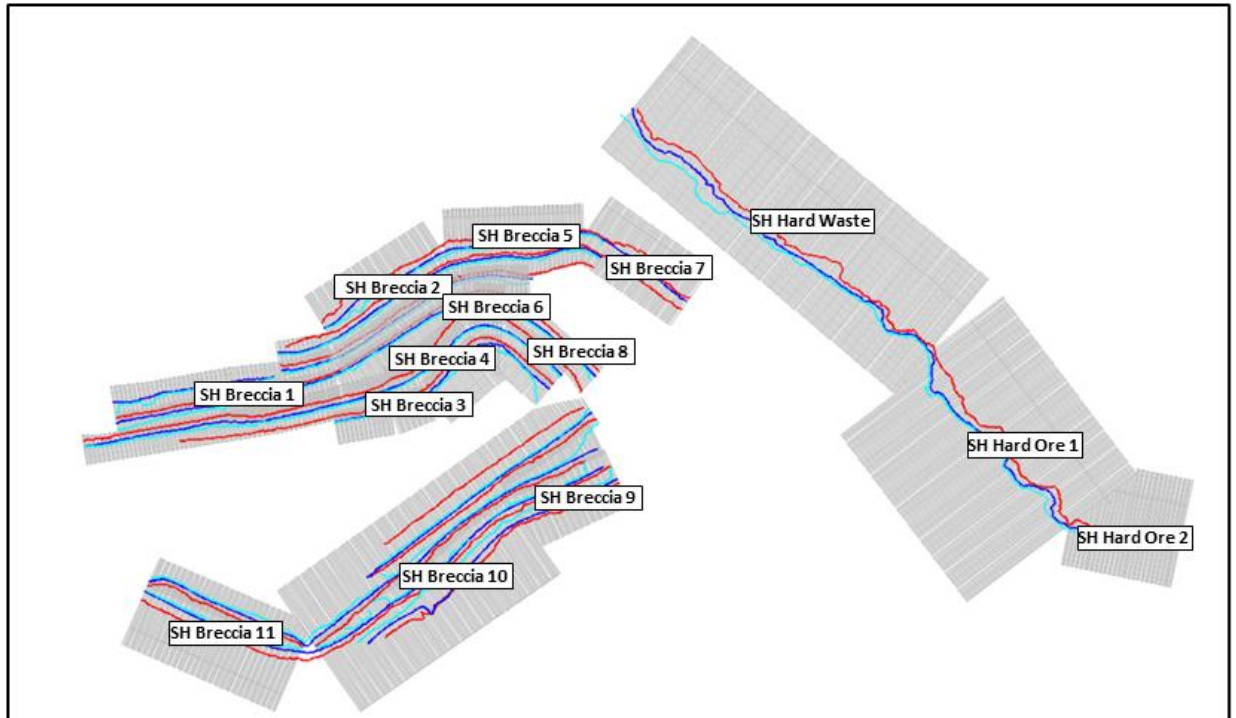


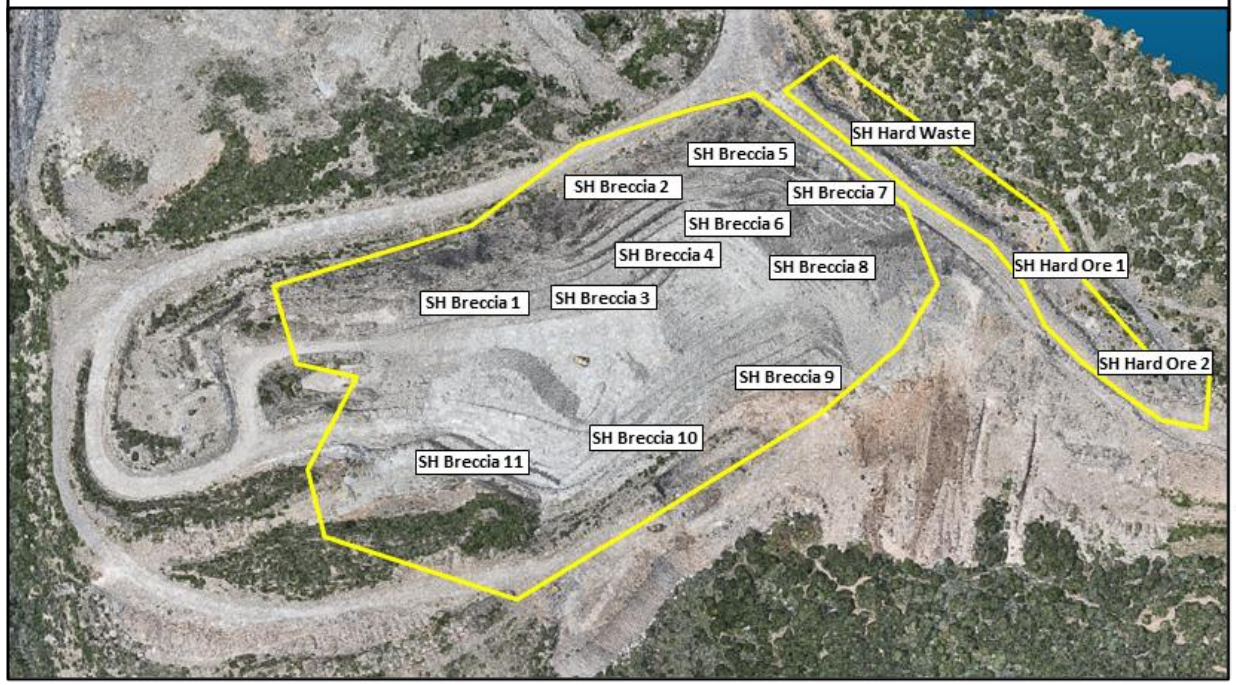
CALL&NICHOLAS

Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - North		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Breccia 1 (24ft)	170.1	54.16	58.35	20.62	23.87	24
SH Breccia 1 (40ft)	170.1	61.90	67.50	No Lower Bench	No Lower Bench	40
SH Breccia 1 (55ft)	170.1	76.20	77.00	21.34	22.50	55
SH Breccia 2 (24ft)	147.7	67.98	72.80	21.38	22.76	24
SH Breccia 2 (40 ft)	147.7	65.14	71.90	27.31	28.01	40
SH Breccia 2 (55ft)	147.7	77.86	80.10	31.46	55.02	55
SH Breccia 3 (24ft)	158.6	54.40	56.70	20.37	24.12	24
SH Breccia 3 (40 ft)	158.6	63.88	65.80	22.79	24.94	40
SH Breccia 4 (24ft)	140.7	53.18	54.90	No Lower Bench	No Lower Bench	24
SH Breccia 4 (40ft)	140.7	48.86	56.05	22.00	24.75	40



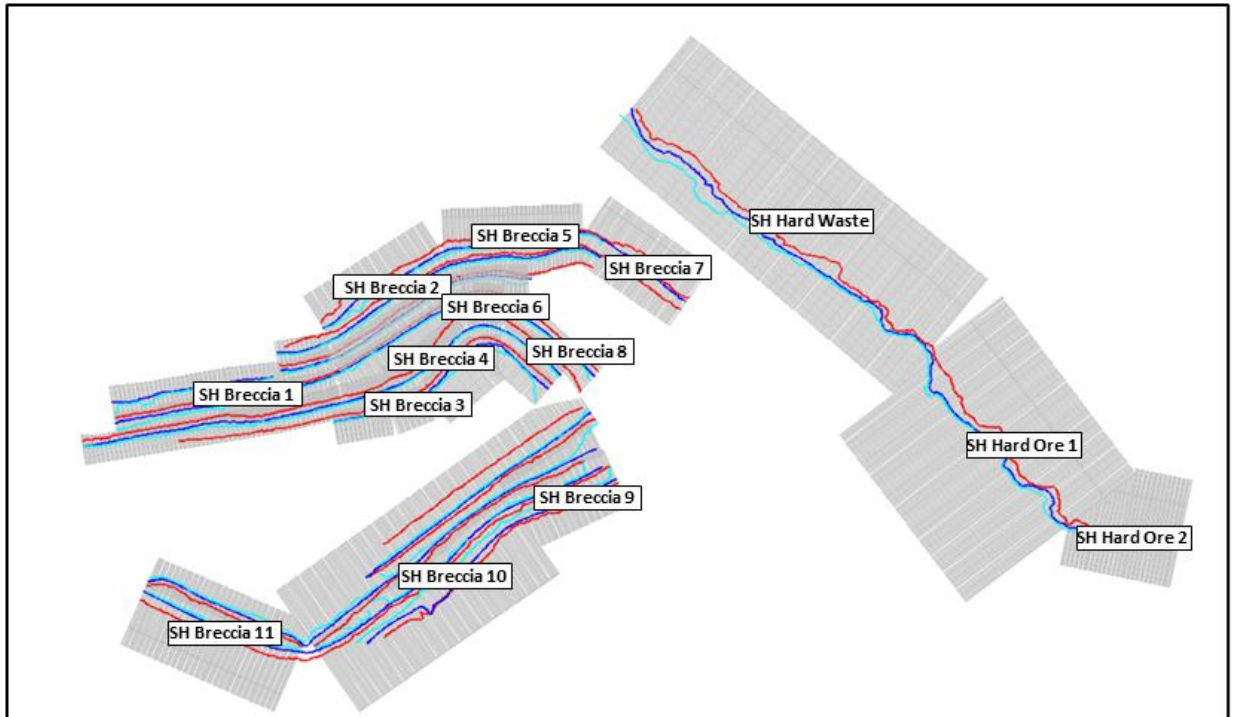


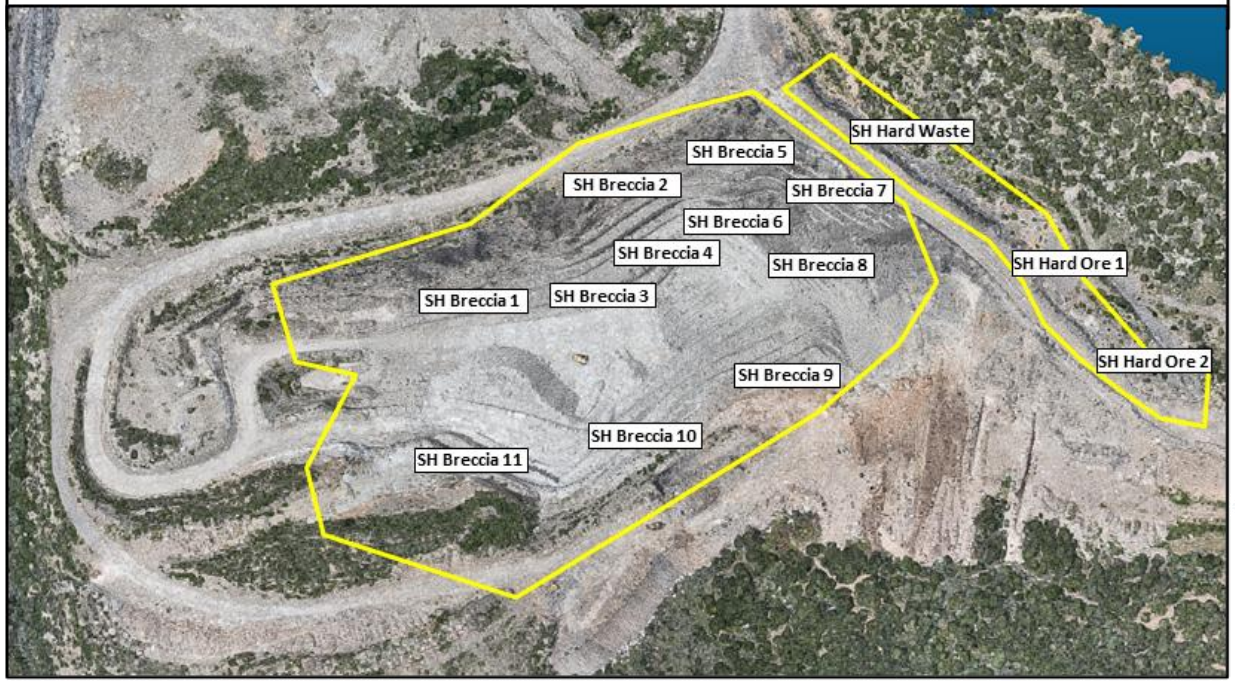
CALL&NICHOLAS

Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - North		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Breccia 5 (40ft)	177.9	65.44	78.40	22.54	26.35	40
SH Breccia 5 (55ft)	177.9	79.38	81.10	28.34	29.40	55
SH Breccia 6 (24ft)	184.2	47.96	55.75	25.00	27.13	24
SH Breccia 6 (40ft)	184.2	49.62	52.30	22.06	22.58	40
SH Breccia 7 (40ft)	215	64.46	81.90	17.39	19.98	40
SH Breccia 8 (24ft)	221.1	53.38	59.90	23.79	25.56	24
SH Breccia 8 (40ft)	221.1	55.82	57.50	22.82	24.63	40

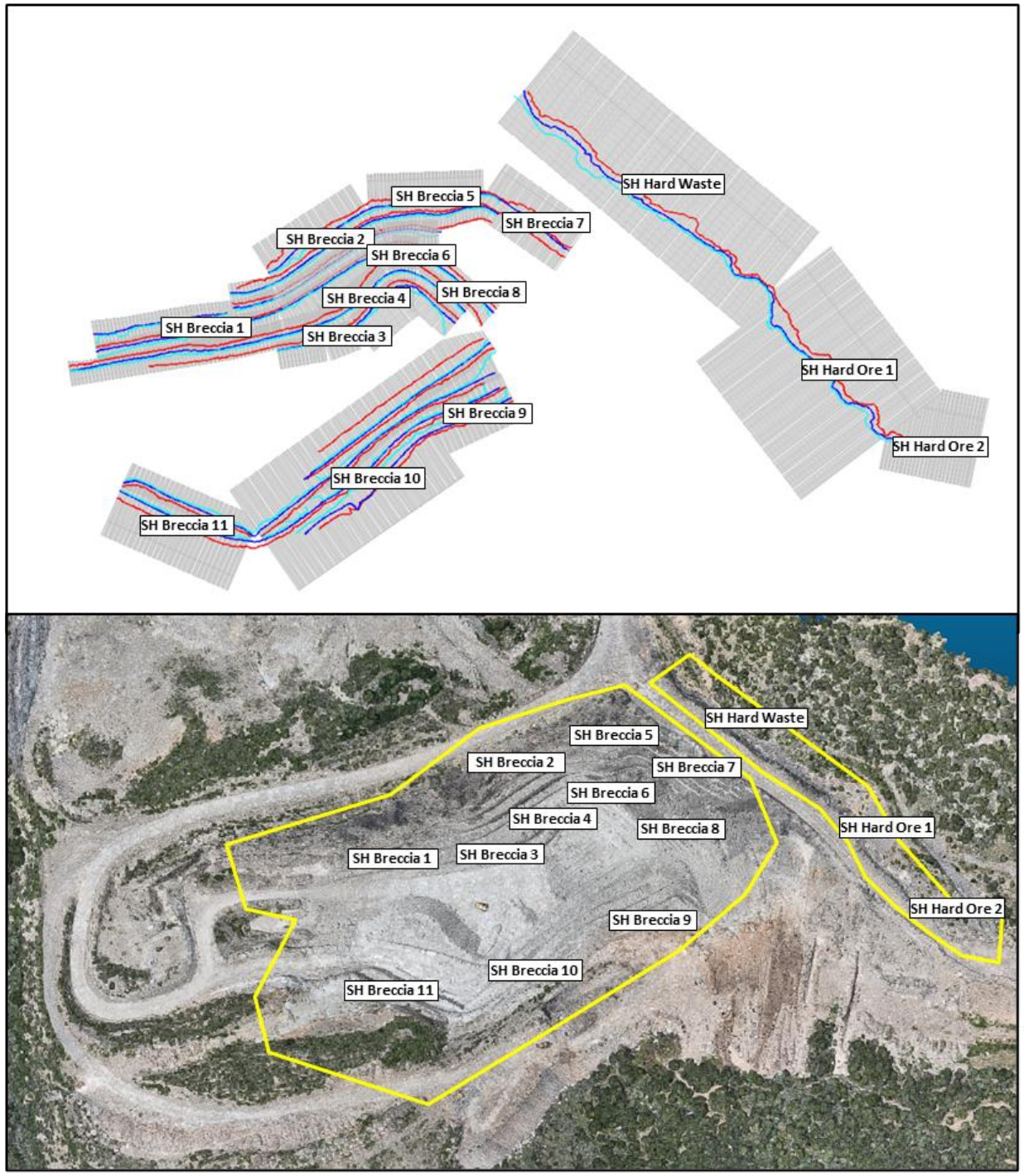




Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - South		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Breccia 9 (24ft)	335.1	66.80	70.20	30.40	33.42	24
SH Breccia 9 (40ft)	335.1	71.56	75.70	24.09	25.72	40
SH Breccia 10 (24ft)	325.5	64.90	71.60	21.68	26.98	24
SH Breccia 10 (40ft)	325.5	67.22	72.50	21.16	25.38	40
SH Breccia 11 (24ft)	23.6	60.52	64.80	No Lower Bench	No Lower Bench	24
SH Breccia 11 (40ft)	23.6	54.80	56.50	24.52	27.95	40

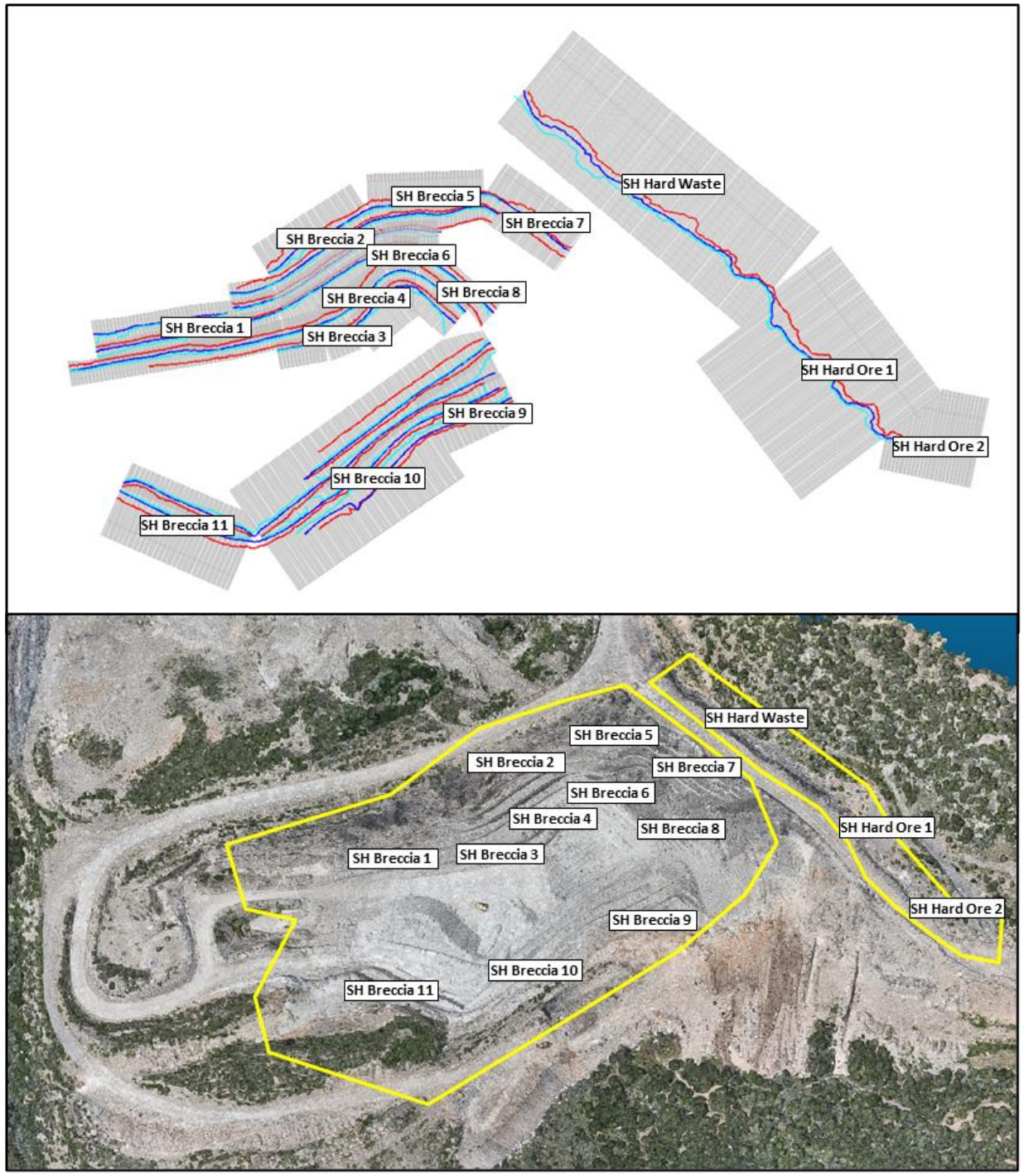


CALL&NICHOLAS

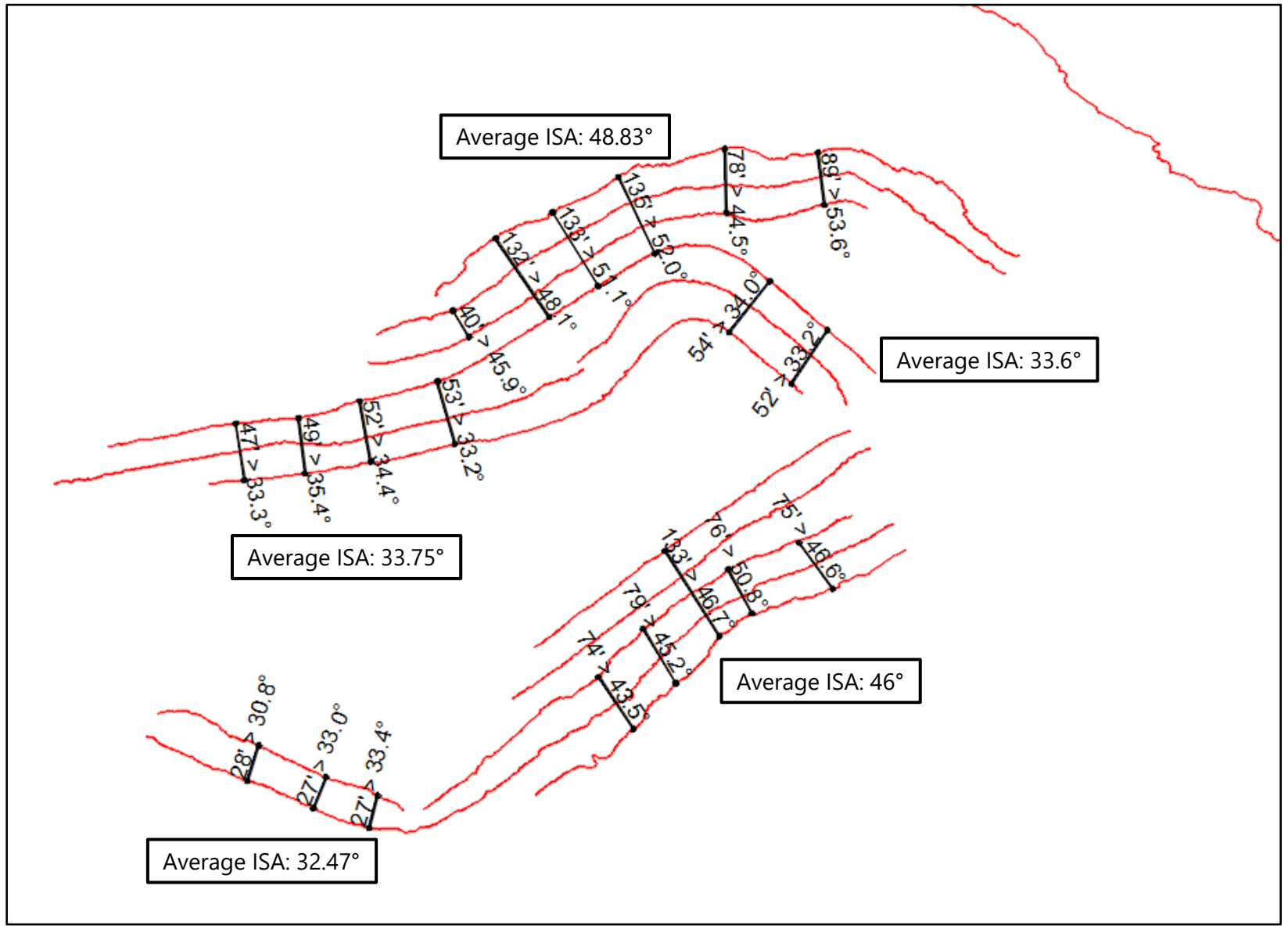
Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - Northeast		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Hard Ore (55ft)	232.9	63.86	70.80	No Lower Bench	No Lower Bench	55
SH Hard Ore 2 (55t)	191.7	67.12	70.05	No Lower Bench	No Lower Bench	55
SH Hard Waste (40ft)	219.4	65.48	73.20	No Lower Bench	No Lower Bench	40
SH Hard Waste (55ft)	219.4	73.72	77.20	No Lower Bench	No Lower Bench	55



ISA Audit Results – No Agua (South Hill)



APPENDIX D

2025 NO AGUA LABORATORY TESTING

AND ROCK MASS STRENGTH CALCULATIONS

2025 No Agua Geomechanical Laboratory Results

Intact Test Summary

Sample #	*Drill Hole*	*Depth (ft)*	*Rock Type*	*Test Type*	*Density (pcf)*	*Failure Mode*	*Confinement (psi)*	*Failure Stress (psi)*
24334-Surface A-0000-U	Boulder	Surface	CBXA	UCS	89.9	Fracture & Intact	0	260
24334-Surface B-0000-U	Boulder	Surface	CBXA	UCS	97.2	Intact	0	439
24334-Surface C-T	Boulder	Surface	CBXA	TCS	95.8	Fracture	75	928
24334-Surface D-T	Boulder	Surface	CBXA	TCS	95.3	Both	75	896
24334-Surface E-T[A]	Boulder	Surface	CBXA	TCS	93.7	Both	75	395

[A] not used in intact regression

USCS Summary

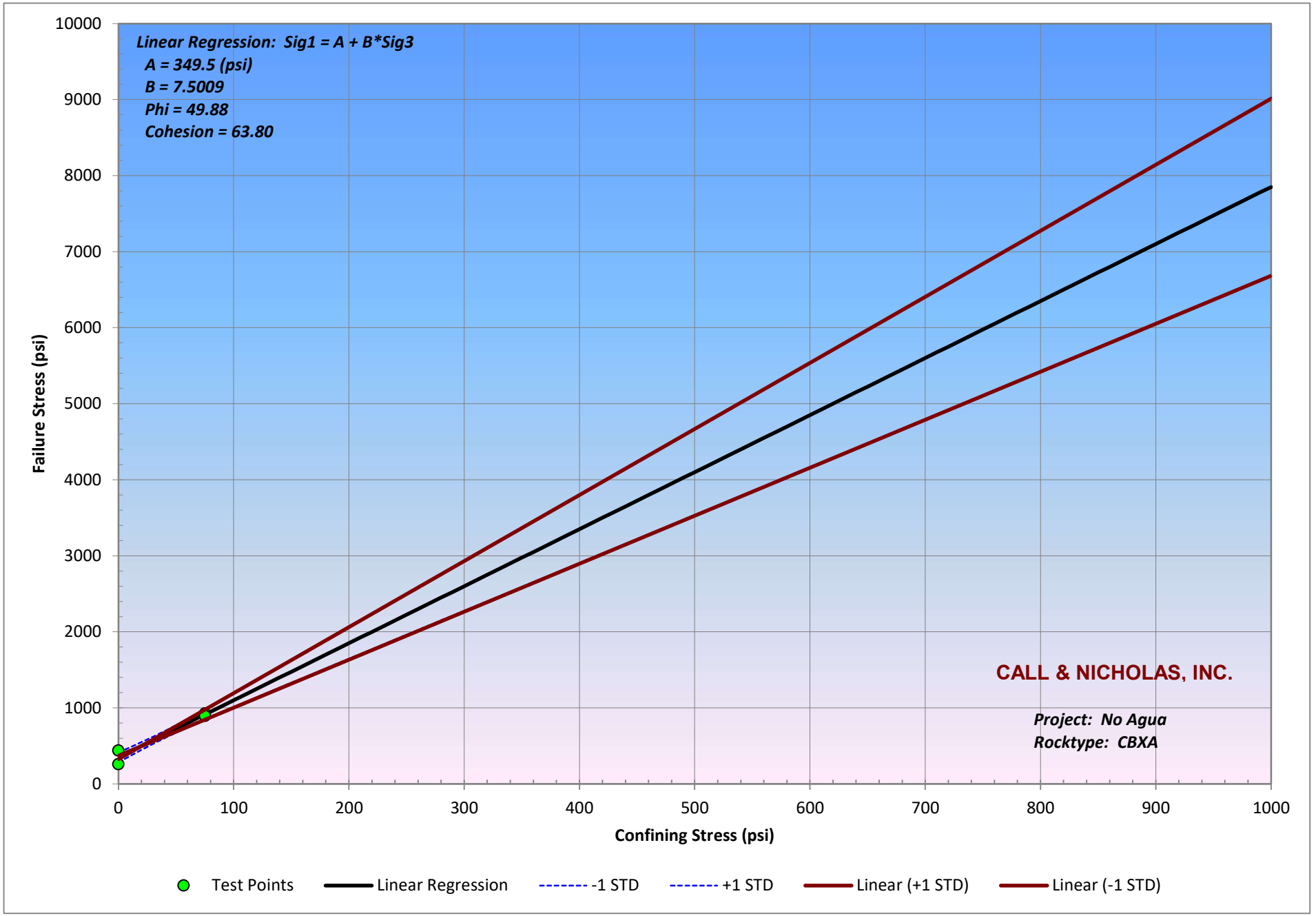
Sample #	**Hole**	**Depth (ft)**	**Rock Type**	*As-Rcvd Moisture (%)*	*Liquid Limit*	*Plasticity Index*	*Plastic Limit*	*USCS*
24334-FineDump-C	Surface	Surface	Fines Dump	0.58%	39.0	11	28	ML
24334-WestHillTuff-C	Surface	Surface	Airfall Tuff (Laminated Sand)	2.24%	42.0	N/A	NP	SW-SM

Remold Direct Shear Test Summary

Sample #	**Hole**	*Depth (ft)*	**Rock Type**	*Test Type*	*Wet Density (pcf)*	*Pre Test Moisture %*	*Post Test Moisture %*	*Linear*		*Power*	
								phi (deg)	*coh (psi)*	*k (psi)*	*m*
24334-FineDump-R	Surface	Surface	Fines Dump	Remold SSDS	113.7	22.0	18.6	35.2	3.2	0.9241	0.9534
24334-WestHillTuff-R	Surface	Surface	Airfall Tuff (Laminated Sand)	Remold SSDS	98.7	10.1	7.9	35.0	5.0	1.0956	0.9222

INTACT FAILURE ENVELOPE

SOUTH HILL CBXA


Linear Regression: Sig1 = A + B*Sig3
A = 349.5 (psi)
B = 7.5009
Phi = 49.88
Cohesion = 63.80
CALL & NICHOLAS, INC.
Project: No Agua
Rocktype: CBXA
Failure Stress (psi)
Confining Stress (psi)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
0
100
200
300
400
500
600
700
800
900
1000
Test Points
Linear Regression
-1 STD
+1 STD
Linear (+1 STD)
Linear (-1 STD)

ROCKMASS CALCULATIONS

CNI Method Nonlinear Rock Mass Strength Estimation Worksheet

Project #	24334	*Imperial Units*	Client	Imerys
Date	2/20/2025		Location	No Agua
Engineer	M Schmidt		Rock Type	CBXA
Comments	SH - CBXA		Rock Type (2)	

Input Data

Intact Rock Strength

σ_{ci} = 350 psi

$\emptyset_i$ = 49.9 deg.

Degree of Fracturing

RQD = 50 %

Fracture Shear Strength

$coh_{fracture}$ = 5 psi

$\emptyset_{fracture}$ = 35.0 deg.

Cohesion Reduction Factor

C_{rf} = 1

Estimated Rock Mass Strength (Linear)

$r = 0.05e^{0.026 \cdot RQD}$ = 0.183

$\emptyset_m = \text{atan}\left[r^{2/3}\tan\emptyset_i + \left(1 - r^{2/3}\right)\tan\emptyset_{fracture}\right]$ = 40.6 deg.

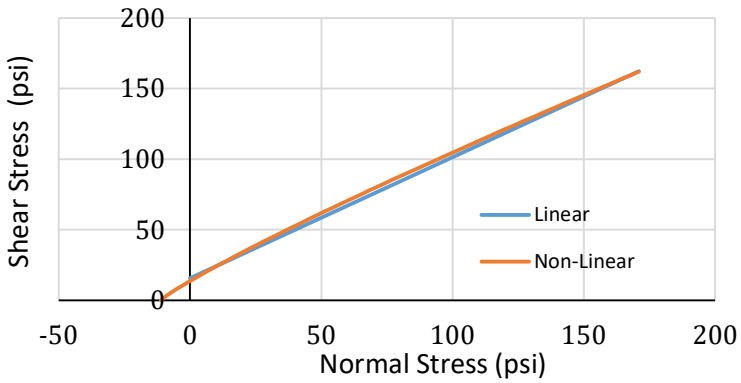
$coh_m = C_{rf}\left[r\, coh_i + (1-r)coh_{fracture}\right]$ = 16 psi

$\sigma_{cm} = 2 \cdot coh_m \cdot \tan\left(45 + \frac{\emptyset_m}{2}\right)$ = 68 psi

Estimated Rock Mass Strength (Nonlinear)

ρ_{atm}	14.7 psi	T_o	-11.1 psi
χ	0.98	T_o/C_o	-0.163
n	0.88	A	1.16
φc	45.3 deg.	a	1.00

$\sigma_{n\text{-}max}$ 171 psi



References: Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2023). A practical nonlinear strength criterion for rock masses and other geological materials. In: Proceedings of Rocscience International Conference. April 24-26, 2023, Toronto, Canada.

Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2022). A practical strength criterion for rock masses based on quantitative input parameters. In: Proceedings of International Slope Stability 2022 Symposium. October 17-21, 2022, Tucson, AZ, USA.

CNI Method Rock Mass Strength Estimation Worksheet

Project #	24315	*Imperial Untis*	Client	Imerys
Date	11/19/2024	*Input Data: UCS+mi Data, Jr Ja Data, RQD Data*	Location	No Agua
Engineer	MJS		Rock Type	C, CGT, G
Comments	Tucker Hill CGT Data		Rock Type (2)	HARD ORES/WASTE

Input Data

Intact Rock Strength

UCS = 1,176,768 psf

m_i = 25.0

$Estimated\ \emptyset_i$ = 50.6 deg.

Degree of Fracturing

RQD = 50 %

Fracture Shear Strength

Jr = 2.0

Ja = 2.0

$Estimated\ \emptyset_{fracture}$ = 28.2 deg.

Cohesion Reduction Factor

C_{rf} = 0.35

Estimated Rock Mass Properties

$$r = 0.05e^{0.03 \cdot RQD} = 0.183$$

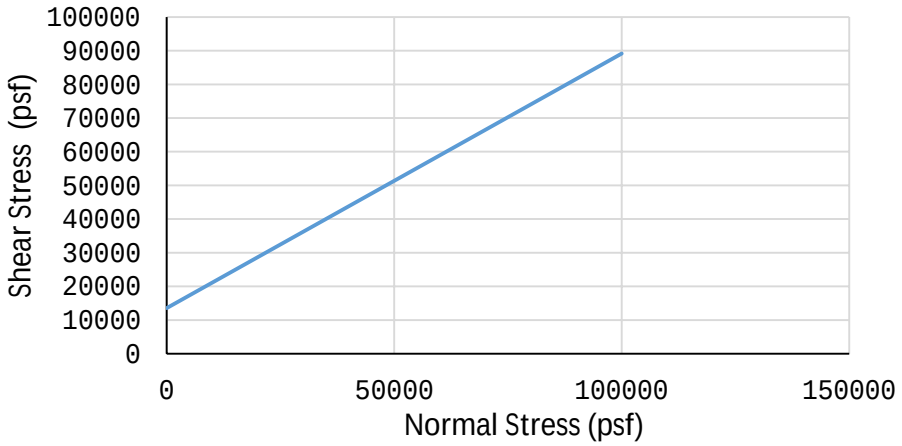
$$\emptyset_m = \operatorname{atan}\left[r^{2/3}\tan\emptyset_i + \left(1 - r^{2/3}\right)\tan\emptyset_{fracture}\right] = 37.1 \text{ deg.}$$

$$coh_m = C_{rf}\left[r\,coh_i + (1-r)coh_{fracture}\right] = 13{,}521 \text{ psf}$$

$$\sigma_{cm} = 2 \cdot coh_m \cdot \tan\left(45 + \frac{\emptyset_m}{2}\right) = 54{,}367 \text{ psf}$$

σ_n-max

100,000 psf



Reference: Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2022). A practical strength criterion for rock masses based on quantitative input parameters. In: Proceedings of International Slope Stability 2022 Symposium. October 17-21, 2022, Tucson, AZ, USA.

CNI Method Nonlinear Rock Mass Strength Estimation Worksheet

Project #	24334	*Imperial Units*	Client	Imerys
Date	2/20/2025		Location	No Agua
Engineer	M Schmidt		Rock Type	WH Pyroclastic
Comments	Intact strength from CBXA		Rock Type (2)	

Input Data

Intact Rock Strength

σ_{ci} = 350 psi

$\emptyset_i$ = 49.9 deg.

Degree of Fracturing

RQD = 5 %

Fracture Shear Strength

$coh_{fracture}$ = 5 psi

$\emptyset_{fracture}$ = 35.0 deg.

Cohesion Reduction Factor

C_{rf} = 1

Estimated Rock Mass Strength (Linear)

$r = 0.05e^{0.026 \cdot RQD}$ = 0.057

$\emptyset_m = \text{atan}\left[r^{2/3}\tan\emptyset_i + \left(1 - r^{2/3}\right)\tan\emptyset_{fracture}\right]$ = 37.7 deg.

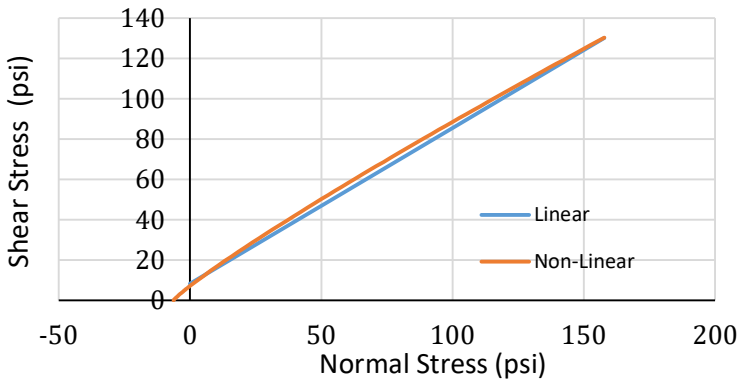
$coh_m = C_{rf}\left[r\, coh_i + (1-r)coh_{fracture}\right]$ = 8 psi

$\sigma_{cm} = 2 \cdot coh_m \cdot \tan\left(45 + \frac{\emptyset_m}{2}\right)$ = 34 psi

Estimated Rock Mass Strength (Nonlinear)

ρ_{atm}	14.7 psi	T_o	-6.3 psi
χ	0.98	T_o/C_o	-0.187
n	0.89	A	1.22
φc	43.3 deg.	a	0.94

$\sigma_{n\text{-}max}$ 158 psi



References: Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2023). A practical nonlinear strength criterion for rock masses and other geological materials. In: Proceedings of Rocscience International Conference. April 24-26, 2023, Toronto, Canada.

Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2022). A practical strength criterion for rock masses based on quantitative input parameters. In: Proceedings of International Slope Stability 2022 Symposium. October 17-21, 2022, Tucson, AZ, USA.

UCS TEST RESULTS

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

2445 North Coyote Drive , Suite 107, Tucson, AZ 85745

UNIAXIAL COMPRESSION STRENGTH

Uniaxial Compressive Strength of Intact Rock Core Specimens

With basis in ASTM 7012-10, Method C (Uniaxial Compression - No Elastic Constant determination)



Pre Test Front



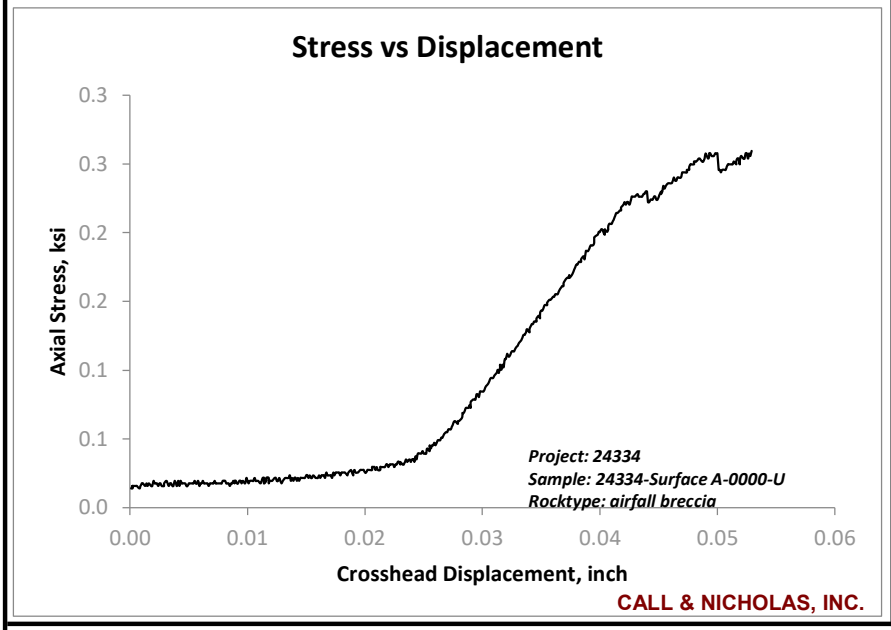
Pre Test Back



Post Test Front



Post Test Back



Date	07-February-2025	
Client	Imerys	
Location	No Agua	
Tech	EK	
Facility	CNI - Tucson	
Load Frame	Southwark, S/N: 32132	
Load Cell	Omega 300 Kip, S/N: 324427-A/B	

Sample Specifications

Sample ID	***24334-Surface A-0000-U***	
Project No:	24334	
Hole ID	Surface A	
Depth	From:	Surface
	To:	Boulder
Coordinates (if applicable)		
Northing		
Easting		
Elevation		
Rock Type:	airfall breccia	
Rock Code:	CBXA	
Alteration:		
Diameter (in)		2.01
Length (in)		4.45
L/D Ratio		2.2
Sample meets the L/D >= 2 requirement.		
Loading faces are parallel as per ASTM D4543-19		
Area (in^2)		3.18
Volume (in^3)		14.15
Mass (g)		333.75
Bulk Density	(pcf)	89.9
	(kg/m^3)	1439

Testing Specifications

Strain Rate (%/sec)	4.50E-03
Stress Rate (psi/sec)	1
Sample Moisture	As-received Dry
Temperature (ºF)	Room Temperature

Test Results

Time to Failure (min)	4.4	
Failure Load (lbs)	826	
Strain at Failure (%)	N/A	
Primary Failure Mode	Fracture & Intact	
Secondary Failure Mode	Single Shear	
Failure Stress, σ_{cd}	260	psi
	1.8	MPa

REMARKS:

Elastic Properties

Method: Elastic Properties NOT determined

Young's Modulus	N/A	psi
	N/A	GPa
Poisson's Ratio:	N/A	

Normalized UCS to 50 mm (Hoek & Brown, 1980)

$\sigma_{c50} = \sigma_{cd}/((50/d)^{0.18})$, where d is in mm

σ_{c50}	261	psi
	1.8	MPa

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

2445 North Coyote Drive , Suite 107, Tucson, AZ 85745

UNIAXIAL COMPRESSION STRENGTH

Uniaxial Compressive Strength of Intact Rock Core Specimens

With basis in ASTM 7012-10, Method C (Uniaxial Compression - No Elastic Constant determination)



Pre Test Front



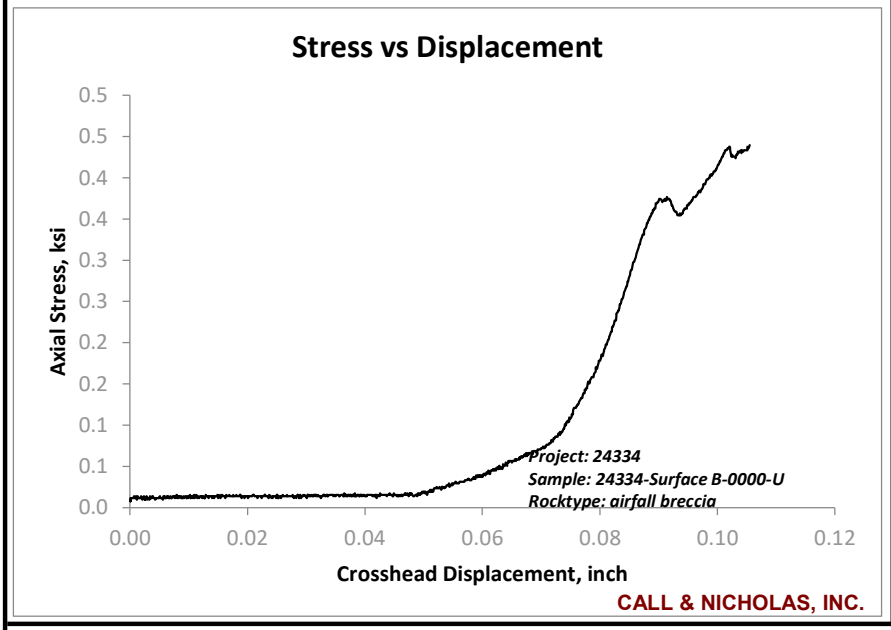
Pre Test Back



Post Test Front



Post Test Back



Date	07-February-2025
Client	Imerys
Location	No Agua
Tech	EK
Facility	CNI - Tucson
Load Frame	Southwark, S/N: 32132
Load Cell	Omega 300 Kip, S/N: 324427-A/B

Sample Specifications

Sample ID	***24334-Surface B-0000-U***	
Project No:	24334	
Hole ID	Surface B	
Depth	From:	Surface
	To:	Boulder
Coordinates (if applicable)		
Northing		
Easting		
Elevation		
Rock Type:	airfall breccia	
Rock Code:	CBXA	
Alteration:		
Diameter (in)		2.02
Length (in)		4.28
L/D Ratio		2.1
Sample meets the L/D >= 2 requirement.		
Loading faces are parallel as per ASTM D4543-19		
Area (in^2)		3.20
Volume (in^3)		13.68
Mass (g)		349.21
Bulk Density	(pcf)	97.2
	(kg/m^3)	1558

Testing Specifications

Strain Rate (%/sec)	4.67E-03
Stress Rate (psi/sec)	1
Sample Moisture	As-received Dry
Temperature (ºF)	Room Temperature

Test Results

Time to Failure (min)	8.7	
Failure Load (lbs)	1405	
Strain at Failure (%)	N/A	
Primary Failure Mode	Intact	
Secondary Failure Mode	Spalling	
Failure Stress, σ_{cd}	439	psi
	3.0	MPa

REMARKS:

Elastic Properties

Method: Elastic Properties NOT determined

Young's Modulus	N/A	psi
	N/A	GPa
Poisson's Ratio:	N/A	

Normalized UCS to 50 mm (Hoek & Brown, 1980)

$\sigma_{c50} = \sigma_{cd}/((50/d)^{0.18})$, where d is in mm

σ_{c50}	441	psi
	3.0	MPa

TCS TEST RESULTS

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

Project #	24334	Triaxial Compression Test Results	Client	Imerys
Date	2/7/2025		Location	No Agua
Technician	EK	**Failure Data:**	Sample #	**24334-Surface C-T**
		Sample # 24334-Surface C-T	Rock Type:	Airfall Breccia
			Density:	95.8 (pcf)
				1,533.9 (kg/m^3)

Sample Data :	
Sample #	24334-Surface C-T
Rock Type:	Airfall Breccia
Hole ID:	Surface C
Depth:	Surface Boulder
Alterations:	
Diameter:	2.209 (in)
Length:	5.151 (in)
Mass:	496.07 (gm)
Area:	3.832 (in^2)
Volume:	19.735 (in^3)

Rock Code:	CBXA
Hardness:	

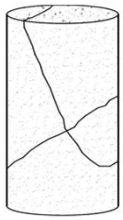
U.S. Standard		
Sigma 3 (psi)	**Sigma 1** (psi)	
75	928	**Peak**
		Residuals

Metric Standard		
Sigma 3 (MPa)	**Sigma 1** (MPa)	
0.52	6.4	**Peak**
		Residuals

Test Data:	
Disp. Rate:	0.0002 (in/sec)
Load Rate:	(lbs/sec)
Gage Reading:	(lbs)
Mode of Failure:	Fracture
Test Duration:	(sec)
L/D Ratio:	2.33

Secondary Failure Mode

Multiple_Shear





Front Pre Test



Back Pre Test

Mode of Failure :

Fracture	X
Intact	
Both	



Front Post Test



Back Post Test

NOTES:

Dia. 1	2.186	Length 1	5.152
Dia. 2	2.250	Length 2	5.153
Dia. 3	2.202	Length 3	5.148
Dia. 4	2.237	Length 4	5.151
Dia. 5	2.194	Mass (gm)	496.07
Dia. 6	2.185		

Sigma 3 (psi)	**Fail Load** gage (lbs)
75	3,557

Sample No.	**24334-Surface C-T**

Does sample meet ASTM standards for loading face tolerances: Yes

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

Project #	24334	Triaxial Compression Test Results	Client	Imerys
Date	2/7/2025		Location	No Agua
Technician	EK	**Failure Data:**	Sample #	**24334-Surface D-T**
		Sample # 24334-Surface D-T	Rock Type:	Airfall Breccia
			Density:	95.3 (pcf)
				1,526.3 (kg/m^3)

Sample Data :	
Sample #	24334-Surface D-T
Rock Type:	Airfall Breccia
Hole ID:	Surface D
Depth:	Surface Boulder
Alterations:	
Diameter:	2.212 (in)
Length:	5.073 (in)
Mass:	487.52 (gm)
Area:	3.843 (in^2)
Volume:	19.492 (in^3)

Rock Code:	CBXA
Hardness:	

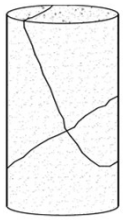
U.S. Standard		
Sigma 3 (psi)	**Sigma 1** (psi)	
75	896	**Peak**
		Residuals

Metric Standard		
Sigma 3 (MPa)	**Sigma 1** (MPa)	
0.52	6.2	**Peak**
		Residuals

Test Data:	
Disp. Rate:	0.0002 (in/sec)
Load Rate:	(lbs/sec)
Gage Reading:	(lbs)
Mode of Failure:	Both
Test Duration:	(sec)
L/D Ratio:	2.29

Secondary Failure Mode

Multiple_Shear





Front Pre Test



Back Pre Test

Mode of Failure :

Fracture	
Intact	
Both	X



Front Post Test



Back Post Test

NOTES:

Dia. 1	2.184	Length 1	5.069
Dia. 2	2.236	Length 2	5.082
Dia. 3	2.250	Length 3	5.065
Dia. 4	2.204	Length 4	5.076
Dia. 5	2.243	Mass (gm)	487.52
Dia. 6	2.155		

Sigma 3 (psi)	**Fail Load** gage (lbs)
75	3,442

Sample No.	**24334-Surface D-T**

Does sample meet ASTM standards for loading face tolerances: Yes

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

Project #	24334
Date	2/7/2025
Technician	EK

Triaxial Compression Test Results

Failure Data:

Sample # 24334-Surface E-T

Client	Imerys
Location	No Agua
Sample #	**24334-Surface E-T**
Rock Type:	Airfall Breccia
Density:	93.7 (pcf)
	1,500.4 (kg/m^3)

Sample Data :	
Sample #	24334-Surface E-T
Rock Type:	Airfall Breccia
Hole ID:	Surface E
Depth:	Surface Boulder
Alterations:	
Diameter:	1.719 (in)
Length:	4.329 (in)
Mass:	246.92 (gm)
Area:	2.320 (in^2)
Volume:	10.042 (in^3)

Rock Code:	CBXA
Hardness:	

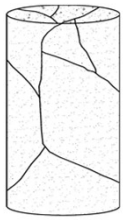
U.S. Standard		
Sigma 3 (psi)	**Sigma 1** (psi)	
75	395	**Peak**
		Residuals

Metric Standard		
Sigma 3 (MPa)	**Sigma 1** (MPa)	
0.52	2.7	**Peak**
		Residuals

Test Data:	
Disp. Rate:	0.0002 (in/sec)
Load Rate:	(lbs/sec)
Gage Reading:	(lbs)
Mode of Failure:	Both
Test Duration:	(sec)
L/D Ratio:	2.51

Secondary Failure Mode

Multiple_Fracturing





Front Pre Test



Back Pre Test

Mode of Failure :

Fracture	
Intact	
Both	X



Front Post Test



Back Post Test

NOTES:

Dia. 1	1.783	Length 1	4.334
Dia. 2	1.656	Length 2	4.326
Dia. 3	1.681	Length 3	4.328
Dia. 4	1.770	Length 4	4.327
Dia. 5	1.718	Mass (gm)	246.92
Dia. 6	1.706		

Sigma 3 (psi)	**Fail Load** gage (lbs)
75	916

Sample No.	**24334-Surface E-T**

Does sample meet ASTM standards for loading face tolerances: Yes

REMOLD SSDS AND USCS TEST RESULTS

WEST HILL LAMINATED SAND (AIRFALL TUFF)

Call & Nicholas, Inc.

Geomechanical Laboratory

Tucson, Arizona USA

Date	11/27/24	Area & Load Data for SSDS	*Project #*	24334
Technician	CB		*Client*	Imerys

Sample Data		
Peak/Residual	Residual	
Location	No Agua	
Sample #	24334-WestHillTuff-R	
Rock Type	AirFall Tuff	
Drill Hole	West Hill Tuff (Breccia)	
Depth	Surface	
Rock Code		
Shear Plane	Remold	
Surface Prep	Insitu	
Shape	Circle	
Test Speed	0.00125	*in/min*
Area	4.881	*in²*
Diameter	2.493	*in*
Radius	1.247	*in*
Tilt Correction		*deg*
Plane Filling		

Adjusted Trace Data				
Normal Load (lbs)	*Shear Load (lbs)*	*Area (in^2)*	*Normal Stress (psi)*	*Shear Stress (psi)*
124.2	99.0	4.2	29.2	23.3
244.2	193.6	4.2	58.0	46.0
487.0	374.6	4.1	118.2	90.9
978.8	700.4	4.2	230.5	164.9

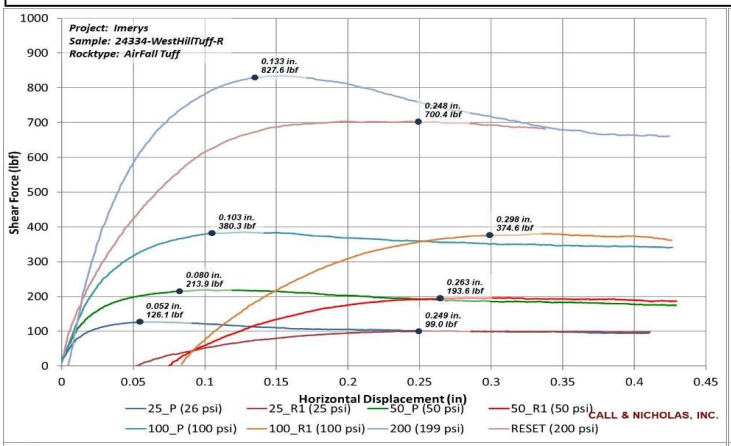
Pre Test Moisture	10.11	%
Post Test Moisture	7.90	%
Initial Density, wet	98.74	*pcf*
Calculated density, dry	89.67	*pcf*

Results		
Linear: Y = BX + C		
Friction Angle	35.01	*deg*
Cohesion	4.95	*psi*

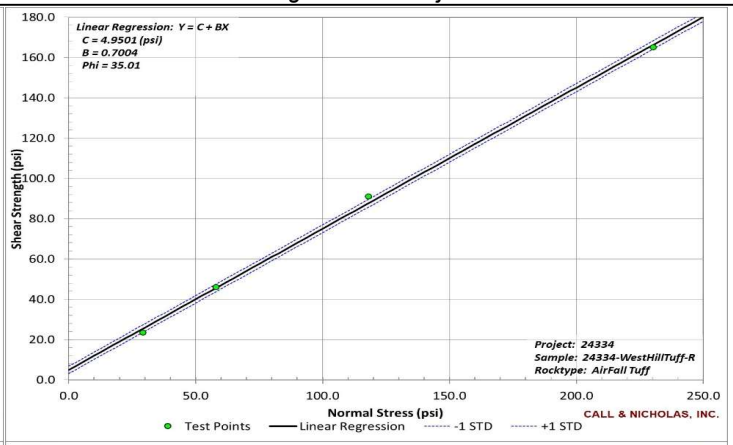
Power: $Y = KX^M$		
K	1.0956	*(for X in psi)*
M	0.9222	

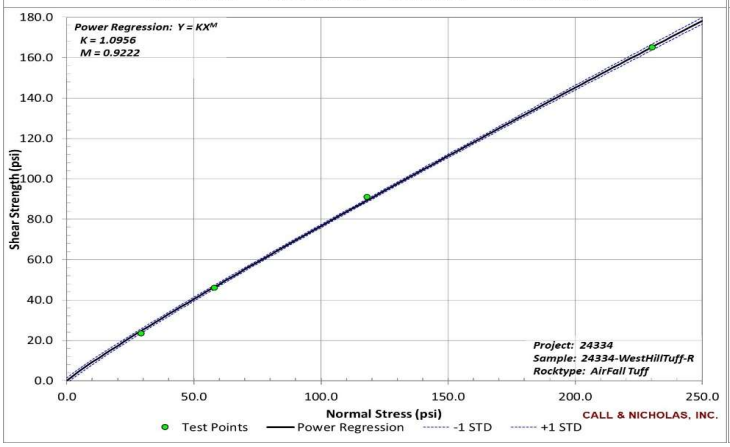
Modified Power: $Y = KX^M + C$		
K	1.0519	*(for X in psi)*
M	0.9301	
C	0.0281	*psi*

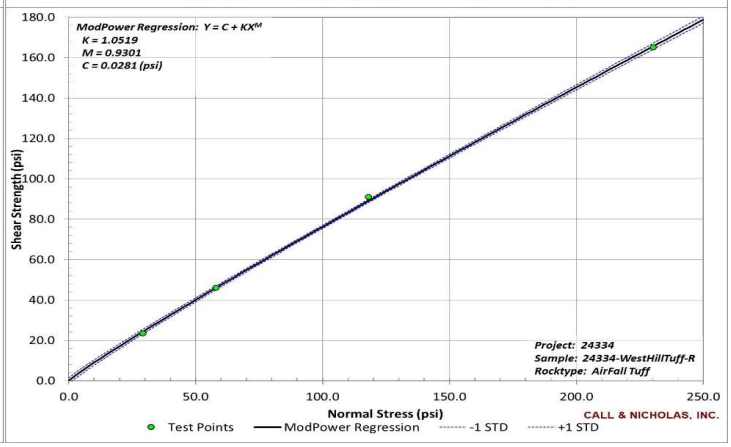
Plot of Raw Trace Data



Linear Regression of Adjusted Trace Data







Color	**Consistency**	**Plasticity**
Grey	Well-Graded Sand w/ Silt and Gravel	Sample is Not Plastic

Notes :

Sample reconditioned to: 10.0%

Packed to max. density (pcf) shear box would accept: 98.74

Calculated Dry Density (pcf): 89.67

Final moisture: 7.9%

Sample consolidated at each normal

As-rcvd moisture: 2.24 %

PL = Non Plastic

Fines classify as: ML

LL = 42

Overal sample classifies as: SW-SM

PI = N/A

Fresh material packed for each trace

Sample: 24334-WestHillTuff-R

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Tech	KP/MP/CB/MT	Call & Nicholas, Inc.		Sample #	24334-WestHillTuff-C
Date	11/5/2024	Geomechanical Laboratory		Drill Hole	West Hill Tuff (Breccia)
Client	Imerys	**As-Received Descriptions**		Depth	Surface
Location	No Agua			Rock Type	AirFall Tuff

Consistency

	DRY (dusty, no water)	WET (damp ± visible, free water)	
	Loose: non-coherent	Loose: non-coherent	X
	Soft: breaks into powder or individual grains under very slight pressure	Very Friable: crushes easily under little pressure but will stick together if pressed again	X
	Slightly Hard: resists light pressure, but can be easily broken between thumb and forefinger	Friable: crushes easily under gentle/moderate pressure	
	Hard: resists moderate pressure, can be broken in the hands without difficulty	Firm: crushes under moderate pressure, but resistance is noticable	
	Very Hard: resists great pressure, but can be broken in the hands difficulty	Very Firm: crushes under strong pressure, but is difficult to do between thumb and forefinger	X
	Extremely Hard: resists extreme pressure and cannot be broken in between the hands	Extremely Firm: crushes only under very stong pressure, must be pulled apart to break	

Sample Color(s)

Primary (> 30%)	Secondary (< 30%)
Light Gray	White

Plasticity of Fines

Nonplastic	Low	Medium	High
Sample cannot be rolled, NP.	Sample can barely be rolled.	Easy to roll. PL reached with mild effort.	Easy to roll. Considerable work needed to reach PL.
	X		

USCS - Grouping Estimation (Pick NO More than 2)

Gravels			Sands		
GW	Well-graded gravel		SW	Well-graded sand	
GP	Poorly graded gravel		SP	Poorly graded sand	
GM	Silty gravel	X	SM	Silty sand	
GC	Clayey gravel		SC	Clayey sand	X
Silts/clays			**Organics**		
ML	Silt		OL	Organic clay	
MH	Elastic silt		OH	Organic silt	
CL	Lean clay		PT	Peat	
CH	Fat clay		*If a borderline case, check both applicable boxes.		

Minerals of Note

	Sulfides	Olivine	
	Muscovite	Magnitite	
	Calcite	Hematite	
	Quartz	Pyroxene	
	Biotite	Other	

Density Method

Density by 'slug'	ASTM 7263 Method B	
Wax method	ASTM 7263 Method A	
Density by suspension in water	ASTM C127 and C128	
Specific gravity by pycnometer	ASTM D854	

Sample Odor (If applicable)

Sulfurous	Petroleum	Chemical	Organic

Split Masses

Split Location	mass (grams)	%
Total As-Received mass	**10000**	**100.0%**
USCS (-10) bucket	1277.72	11.3%
USCS bucket + sample	2407.07	
USCS Starting Split	1129.35	
SSDS bucket	0	22.8%
SSDS bucket + sample	2278.27	
SSDS Split	2278.27	
Atterberg (-40) bucket	391.01	4.6%
Atterberg bucket + sample	847.3	
Atterberg Split	456.29	
As-Rcv'd bowl #	SSDS #2	7.1%
As-Rcv'd moisture bowl	585.46	
bowl + sample	1291.34	
As-Rcv'd moisture split	705.88	
Reserve	**5430.21**	**54.3%**
Summation	10000	**100.0%**

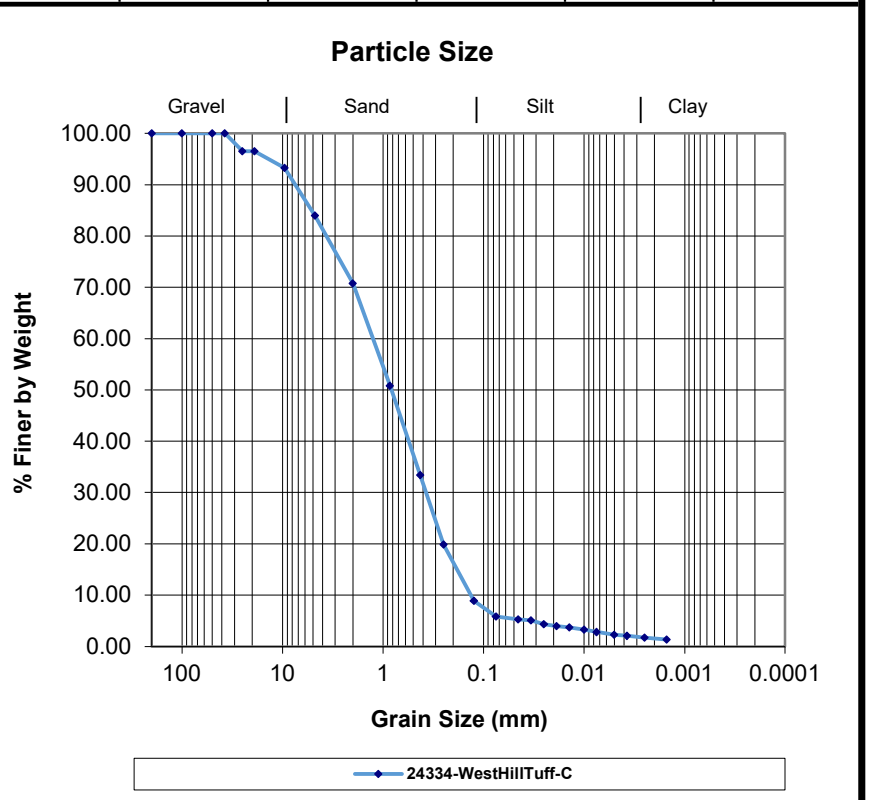
As-Received Photograph

No Picture

Sieve Analysis & Soil Classification

Sieve Size		Retained Weight	Retained % of Weight	Cumulative % Retained	Cumulative % Passing
U.S. - mm		Grams		Coarser	Finer
8"	200		0.00	0.00	100.00
4"	100		0.00	0.00	100.00
2"	50.0		0.00	0.00	100.00
1.5"	37.5		0.00	0.00	100.00
1"	25.0	35.18	3.48	3.48	96.52
3/4"	19.0	0.00	0.00	3.48	96.52
3/8"	9.5	32.52	3.22	6.70	93.30
# 4	4.75	93.68	9.28	15.98	84.02
# 10	2.00	134.11	13.28	29.26	70.74
# 20	0.850	201.46	19.95	49.21	50.79
# 40	0.425	175.47	17.38	66.58	33.42
# 60	0.250	136.82	13.55	80.13	19.87
# 120	0.125	110.70	10.96	91.09	8.91
# 200	0.075	30.95	3.06	94.16	5.84
Finer than #200		59.01	5.84	100.00	0.00
Final USCS (g)		1009.89	100.00		

Coarse Gravel %	Fine Gravel %	Coarse Sand %	Medium Sand %	Fine Sand %	Silt / Clay %
3.48	12.50	13.28	37.32	27.57	5.84



Dia (mm)	Hydrometer Data		% Passing
0.04500			5.31
0.03375	**Working Values & Coefficients**		5.12
0.02500	**D_{10}**	0.1375	4.38
0.01875	**D_{30}**	0.3809	3.99
0.01400	**D_{60}**	1.3808	3.75
0.01000	**Cu**	10.0	3.30
0.00750	**Cc**	0.8	2.81
0.00500	**Starting USCS (g)**	1009.89	2.31
0.00375	**Rock Code**	N/A	2.09
0.00250	**Estimated USCS**	SM (ML)	1.74
0.00150	**Rock Type**	AirFall Tuff	1.36

Project #	**24334**
Drill Hole	West Hill Tuff (Breccia)
Depth	Surface
Client	Imerys
Location	No Agua
Date	10/26/2024
Technician	KP/MP/CB/MT

Notes:

Plastic Limit cannot be rolled

Fines described as ML

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As Received Moisture %		2.24%	
LL	42	PL	NP
PI	N/A	Flow Index	N/A
USCS	**SW-SM**	Silt/Clay %	5.8
Description	Well-graded sand with silt and gravel		
Sample #	**24334-WestHillTuff-C**		

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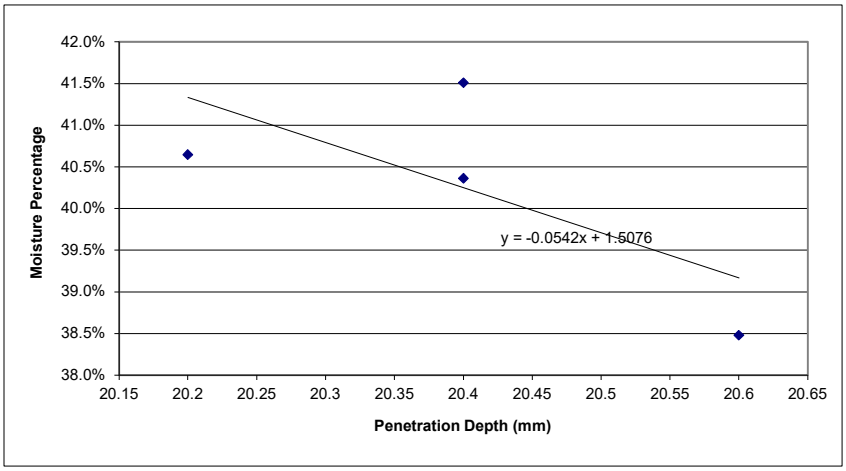
Project #	24334	**ATTERBERG LIMITS BY DROP CONE ASTM BS1377-2**		Date	11/14/2024
Drill Hole	West Hill Tuff (Breccia)			Tech	MP
Depth	Surface	**24334-WestHillTuff-C**		Client	Imerys
Estimated USCS	SM (ML)			Location	No Agua

Plastic Limit PL

Can No.						**Average**
Can Mass (g)						
1st Oven-Dried (g)		Cannot Roll				
2nd Oven-Dried (g)						
3rd Oven-Dried (g)						
Sample Moisture (g)						
Oven-Dried Sample (g)						
Sample Moisture (%)						

Liquid Limit - Drop Cone Penetrometer Method

Can No.		75	134	215	223
Can Mass (g)		30.752	30.864	31.037	31.105
Can + Matl. (g)		51.155	51.352	52.580	52.003
1st Oven-Dried (g)		45.170	45.431	46.385	46.196
2nd Oven-Dried (g)					
3rd Oven-Dried (g)					
Sample Moisture (g)		5.985	5.921	6.195	5.807
Oven-Dried Sample (g)		14.418	14.567	15.348	15.091
Sample Moisture (%)		**41.5%**	**40.6%**	**40.4%**	**38.5%**
Initial dial reading (mm)		0	0	0	0
Final dial reading (mm)		20.4	20.2	20.4	20.6
Corrected (mm)		**20.4**	**20.2**	**20.4**	**20.6**



Non Plastic (Cannot roll)

Dry Strength	Low
Dilatancy	Rapid
Toughness	Cannot Roll
Cementation	No

NOTES

Liquid Limit	Plastic Limit	Plasticity Index:
42		

Sample #	24334-WestHillTuff-C

REMOLD SSDS AND USCS TEST RESULTS

FINES DUMP MATERIAL

Call & Nicholas, Inc.

Geomechanical Laboratory

Tucson, Arizona USA

Date	11/27/24	Area & Load Data for SSDS	*Project #*	24334
Technician	CB		*Client*	Imerys

Sample Data		
Peak/Residual	Residual	
Location	No Agua	
Sample #	24334-FineDump-R	
Rock Type	Fines waste	
Drill Hole	Fine Dump	
Depth	Surface	
Rock Code		
Shear Plane	Remold	
Surface Prep	Insitu	
Shape	Circle	
Test Speed	0.00125	*in/min*
Area	4.893	*in²*
Diameter	2.496	*in*
Radius	1.248	*in*
Tilt Correction		*deg*
Plane Filling		

Adjusted Trace Data

Normal Load (lbs)	*Shear Load (lbs)*	*Area (in^2)*	*Normal Stress (psi)*	*Shear Stress (psi)*
123.4	100.3	4.4	28.1	22.9
241.9	182.2	4.4	55.2	41.5
485.9	362.0	4.4	111.0	82.7
970.4	697.4	4.4	221.4	159.1

Pre Test Moisture	22.03	%
Post Test Moisture	18.60	%
Initial Density, wet	113.70	*pcf*
Calculated density, dry	93.17	*pcf*

Results

Linear: Y = BX + C

Friction Angle	35.23	*deg*
Cohesion	3.16	*psi*

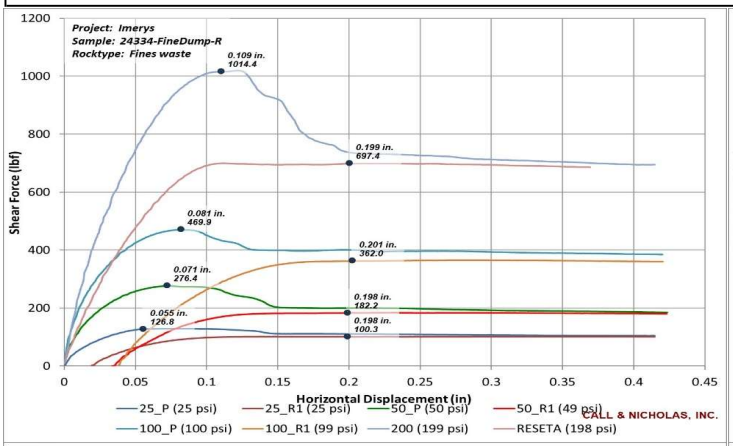
Power: $Y = KX^M$

K	0.9241	*(for X in psi)*
M	0.9534	

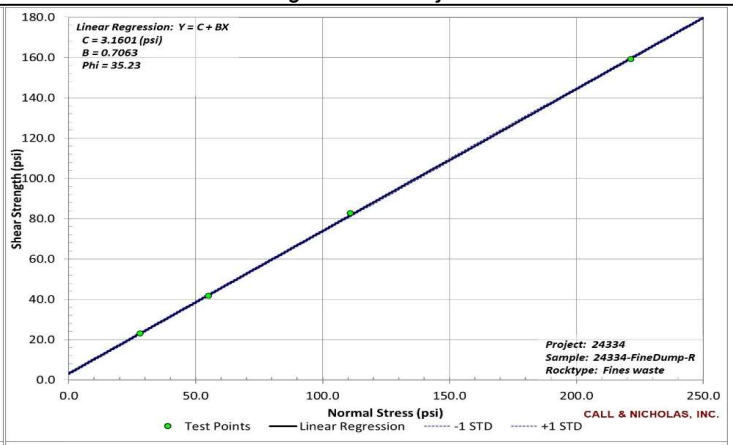
Modified Power: $Y = KX^M + C$

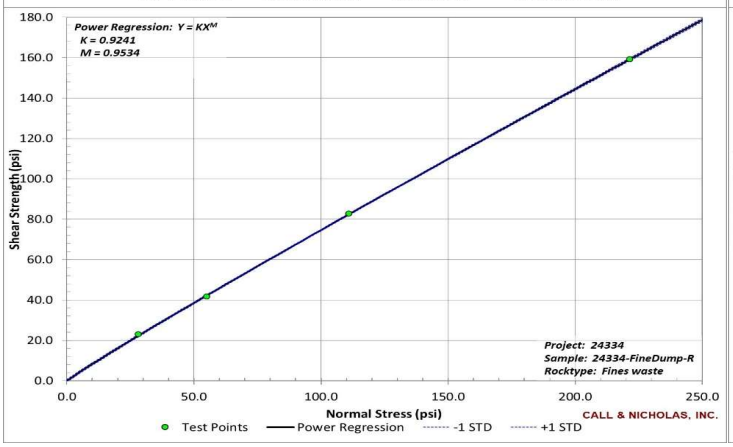
K	0.8687	*(for X in psi)*
M	0.9641	
C	0.8138	*psi*

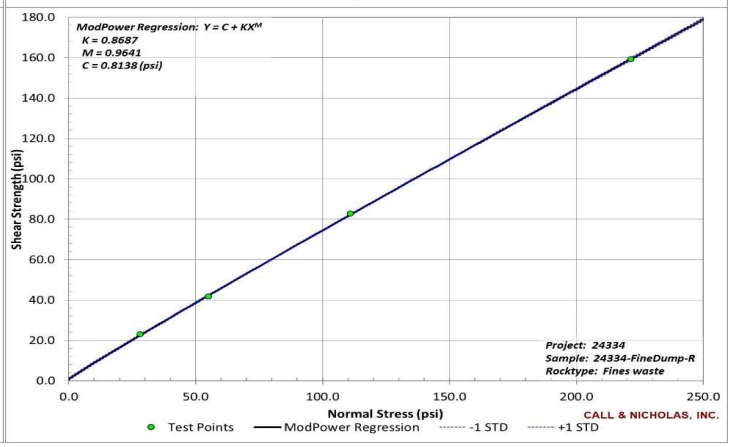
Plot of Raw Trace Data



Linear Regression of Adjusted Trace Data







Color	**Consistency**	**Plasticity**
LIGHT GREY	SILTY CLAY	INTERMEDIATE

Notes :

Sample reconditioned to: 78.9% PL
corrected for oversize fraction
Final moisture: 66.5% of the Plastic Limit.
As-rcvd moisture: 0.58 %
Fines classify as:
Overal sample classifies as: ML
Fresh material packed for each trace

Packed to max. density (pcf) shear box would accept: 113.70
Calculated Dry Density (pcf): 93.17
Sample consolidated at each normal

PL = 28
LL = 39
PI = 11

Sample: 24334-FineDump-R

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Tech	KP/MP/CB/MT	Call & Nicholas, Inc.		Sample #	24334-FineDump-C
Date	11/6/2024	Geomechanical Laboratory		Drill Hole	Fine Dump
Client	Imerys	**As-Received Descriptions**		Depth	Surface
Location	No Agua			Rock Type	Fines waste

Consistency

	DRY (dusty, no water)	WET (damp ± visible, free water)	
X	Loose: non-coherent	Loose: non-coherent	
	Soft: breaks into powder or individual grains under very slight pressure	Very Friable: crushes easily under little pressure but will stick together if pressed again	
	Slightly Hard: resists light pressure, but can be easily broken between thumb and forefinger	Friable: crushes easily under gentle/moderate pressure	
	Hard: resists moderate pressure, can be broken in the hands without difficulty	Firm: crushes under moderate pressure, but resistance is noticable	
	Very Hard: resists great pressure, but can be broken in the hands difficulty	Very Firm: crushes under strong pressure, but is difficult to do between thumb and forefinger	
	Extremely Hard: resists extreme pressure and cannot be broken in between the hands	Extremely Firm: crushes only under very stong pressure, must be pulled apart to break	

Sample Color(s)

Primary (> 30%)	Secondary (< 30%)
Light Gray	White

Plasticity of Fines

Nonplastic	Low	Medium	High
Sample cannot be rolled, NP.	Sample can barely be rolled.	Easy to roll. PL reached with mild effort.	Easy to roll. Considerable work needed to reach PL.
		X	

USCS - Grouping Estimation (Pick NO More than 2)

Gravels			Sands		
GW	Well-graded gravel		SW	Well-graded sand	
GP	Poorly graded gravel		SP	Poorly graded sand	
GM	Silty gravel		SM	Silty sand	
GC	Clayey gravel	X	SC	Clayey sand	X
Silts/clays			**Organics**		
ML	Silt		OL	Organic clay	
MH	Elastic silt		OH	Organic silt	
CL	Lean clay		PT	Peat	
CH	Fat clay		*If a borderline case, check both applicable boxes.		

Minerals of Note

	Sulfides	Olivine	
	Muscovite	Magnitite	
	Calcite	Hematite	
	Quartz	Pyroxene	
	Biotite	Other	

Density Method

Density by 'slug'	ASTM 7263 Method B	
Wax method	ASTM 7263 Method A	
Density by suspension in water	ASTM C127 and C128	
Specific gravity by pycnometer	ASTM D854	

Sample Odor (If applicable)

Sulfurous	Petroleum	Chemical	Organic

Split Masses

Split Location	mass (grams)	%
Total As-Received mass	**13040**	**100.0%**
USCS (-10) bucket	1169.23	4.8%
USCS bucket + sample	1798.72	
USCS Starting Split	629.49	
SSDS bucket	0	11.7%
SSDS bucket + sample	1531.66	
SSDS Split	1531.66	
Atterberg (-40) bucket	376.95	2.1%
Atterberg bucket + sample	655.94	
Atterberg Split	278.99	
As-Rcv'd bowl #	M40	3.2%
As-Rcv'd moisture bowl	812.2	
bowl + sample	1231.39	
As-Rcv'd moisture split	419.19	
Reserve	**10180.67**	**78.1%**
Summation	13040	**100.0%**

As-Received Photograph

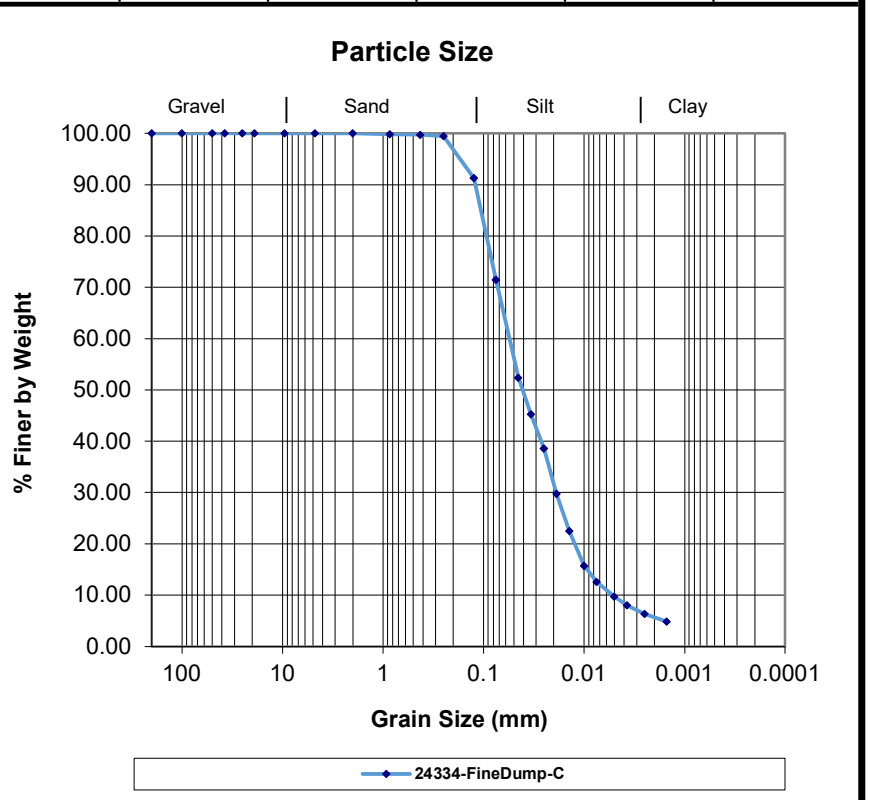
No Picture

Sieve Analysis & Soil Classification

Sieve Size		Retained Weight	Retained % of Weight	Cumulative % Retained	Cumulative % Passing
U.S.	mm	Grams		Coarser	Finer
8"	200		0.00	0.00	100.00
4"	100		0.00	0.00	100.00
2"	50.0		0.00	0.00	100.00
1.5"	37.5		0.00	0.00	100.00
1"	25.0		0.00	0.00	100.00
3/4"	19.0		0.00	0.00	100.00
3/8"	9.5		0.00	0.00	100.00
# 4	4.75		0.00	0.00	100.00
# 10	2.00		0.00	0.00	100.00
# 20	0.850	0.73	0.13	0.13	99.87
# 40	0.425	0.90	0.16	0.28	99.72
# 60	0.250	1.63	0.28	0.57	99.43
# 120	0.125	47.13	8.16	8.72	91.28
# 200	0.075	114.53	19.83	28.55	71.45
Finer than #200		412.75	71.45	100.00	0.00
Final USCS (g)		577.68	100.00		

Coarse Gravel %	Fine Gravel %	Coarse Sand %	Medium Sand %	Fine Sand %	Silt / Clay %
0.00	**0.00**	**0.00**	**0.28**	**28.27**	**71.45**

Dia (mm)	Hydrometer Data		% Passing
0.04500			52.43
0.03375	**Working Values & Coefficients**		45.29
0.02500	**D_{10}**	0.0052	38.58
0.01875	**D_{30}**	0.0190	29.71
0.01400	**D_{60}**	0.0569	22.52
0.01000	**Cu**	10.9	15.72
0.00750	**Cc**	1.2	12.58
0.00500	**Starting USCS (g)**	577.68	9.73
0.00375	**Rock Code**	ML	8.07
0.00250	**Estimated USCS**	N/A	6.31
0.00150	**Rock Type**	Fines waste	4.82



Project #	**24334**
Drill Hole	Fine Dump
Depth	Surface
Client	Imerys
Location	No Agua
Date	10/26/2024
Technician	KP/MP/CB/MT

Notes: **Fines classify as ML**

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As Received Moisture %	0.58%		
LL	39	PL	28
PI	11	Flow Index	N/A
USCS	**ML**	Silt/Clay %	71.5
Description	Silt with sand		
Sample #	**24334-FineDump-C**		

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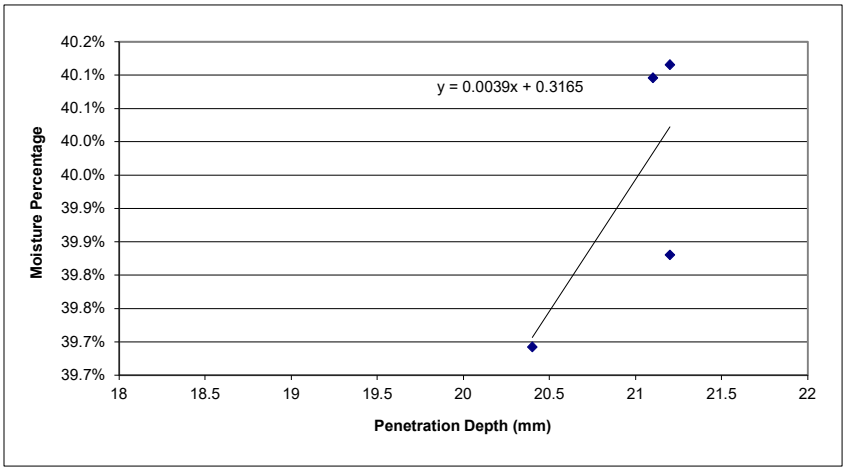
Project #	24334	**ATTERBERG LIMITS BY DROP CONE ASTM BS1377-2**		Date	11/8/2024
Drill Hole	Fine Dump			Tech	MP
Depth	Surface -	**24334-FineDump-C**		Client	Imerys
Estimated USCS				Location	No Agua

Plastic Limit PL

Can No.	102	104	334	411	**Average**
Can Mass (g)	11.143	11.044	11.268	11.372	
	16.764	16.742	16.871	17.051	
1st Oven-Dried (g)	15.491	15.502	15.658	15.838	
2nd Oven-Dried (g)					
3rd Oven-Dried (g)					
Sample Moisture (g)	1.273	1.240	1.213	1.213	1.235
Oven-Dried Sample (g)	4.348	4.458	4.390	4.466	4.416
Sample Moisture (%)	**29.3%**	**27.8%**	**27.6%**	**27.2%**	**28.0%**

Liquid Limit - Drop Cone Penetrometer Method

Can No.	6	10	60	61
Can Mass (g)	29.391	29.631	31.159	30.891
Can + Matl. (g)	52.172	51.444	52.252	52.520
1st Oven-Dried (g)	45.652	45.246	46.213	46.359
2nd Oven-Dried (g)				
3rd Oven-Dried (g)				
Sample Moisture (g)	6.520	6.198	6.039	6.161
Oven-Dried Sample (g)	16.261	15.615	15.054	15.468
Sample Moisture (%)	**40.1%**	**39.7%**	**40.1%**	**39.8%**
Initial dial reading (mm)	0	0	0	0
Final dial reading (mm)	21.1	20.4	21.2	21.2
Corrected (mm)	**21.1**	**20.4**	**21.2**	**21.2**



Non Plastic (Cannot roll)

Dry Strength	
Dilatancy	
Toughness	
Cementation	

NOTES

Liquid Limit	Plastic Limit	Plasticity Index:
39		

Per ASTM 2487, Fines Classified as: **ML**

Sample #	24334-FineDump-C

MEMORANDUM

2475 N Coyote Dr. Tucson, AZ USA | +1.520.670.9774 | www.cnitucson.com

TO: Linda Frimpong, Geotechnical Engineer / Imerys Americas
Frank Lloyd-Mills, Principal Engineer / Imerys Corporate
Clay Diemert, Mine Engineer / Imerys Performance Minerals Americas

FROM: Matthew Schmidt / Call & Nicholas, Inc.
Francisco Sanz / Call & Nicholas, Inc.
Scott Cylwik P.E. / Call & Nicholas, Inc.

DATE: April 29, 2025

SUBJECT: Imerys No Agua Geotechnical Evaluation

1. INTRODUCTION

Call & Nicholas, Inc. was requested to review the slope geotechnical conditions of the No Agua perlite mine near Taos, New Mexico by Imerys Performance Minerals, Inc. The goals of this study included characterization of the rock mass and geologic structure, laboratory strength testing, a review of bench stability, analysis of overall slope stability, and development a slope design template for the future No Agua pit plans. Mr. Matthew Schmidt visited the site on October 17, 2024, accompanied by Mr. Clay Diemert of Imerys.

Three mining areas were part of this geotechnical review: West Hill, South Hill, and the fines dump (Figure 1). Mining in the West Hill pit has been completed. The western slope of the West Hill pit is immediately adjacent to the Imerys property boundary. One goal of this study was to provide a geotechnical slope stability analysis of this wall. The South Hill pit is currently in operation with an expected mine life of at least 20 years. Slope design recommendations are provided for the future South Hill pit walls. The fines dump is located in a valley southeast of the production plant. Dump material was tested for this evaluation and simple slope analyses were completed for future dump slopes. No dump foundation characterization nor stability analyses were completed.

Slope design recommendations are presented in Section 6 of this memo and are based on bench reliability analysis, laboratory strength testing, review of the larger geologic structures, and the results of the overall stability analyses.

1.1 Data Utilized

The following data was received from Imerys as part of this review:

- Recent point clouds of the West Hill pit, South Hill pit, and fines dump area

- Core photos
- Geology solids for the South Hill pit area (2024 Model)
- Preliminary geologic map of the No Agua district (Appendix A)
- 2024 life of mine (LOM) pit plan for the South Hill pit

2. SITE CHARACTERIZATION

The No Agua Perlite deposit is located 30 miles northeast of the town of Taos in Taos County, New Mexico. The No Agua site mines and processes perlite ore and has been in operation since 1951 with no record of slope failure. Figure 1 shows the No Agua site layout and property boundaries.

2.1 Geology Setting

The South Hill and West Hill pits are located respectively on the south and southwest sides of the No Agua Peaks. The No Agua Peaks are formed by a series of silicic and intermediate volcanic rocks that cover an area of approximately 2.5 square miles located in the Taos Plateau volcanic field physiographic province. The Taos Plateau volcanic field was erupted between about 5.88 and 1.03 Ma and is formed by approximately 35 central-vent volcanic shields and cones. The approximated age of the No Agua peaks is 4.06±0.05 Ma, making it one of the older volcanic centers that form the Taos Plateau volcanic field. The peaks are the erosional remnants of two rhyolite domes among a succession of late Cenozoic volcanic and sedimentary rocks which were deposited upon Precambrian metamorphic and igneous rocks.

The No Auga district geology is shown in Appendix A. The mining sequence contains several textural varieties of perlite which are discussed below.

2.2 No Agua Lithologies

No Agua ore types can be divided into hard ore and soft ore groups. Hard ore and waste lithologies are mined with traditional drilling and blasting techniques, while the soft ores are mechanically excavated by dozer ripping. Map 1 shows the South Hill geology model projected onto the South Hill pit topography. Map 2 shows the model geology on the South Hill LOM pit plan. No 3D geologic model exists for the West Hill area. The following lithologies have been modeled in the No Agua geologic model.

2.2.1 Hard Ores

These units and associated hard waste units comprise the hill east of the South Hill pit. They are mainly exposed in the upper east wall of the pit along the 8500 level. Structurally, the hard ores are

characterized by steeply inclined fractures which are favorable for bench stability. Several moderately dipping (~35° to 45°) faults are observed in these units along the 8500 level which dip pitward. The following lithology types are characterized as hard ore.

- C - classical perlite
- CGT - classical granular transition perlite
- G - granular perlite

2.2.2 Soft Ores

Soft ores are excavated by dozer ripping and comprise the majority of the West Hill and South Hill pit lithologies.

- West Hill Pyroclastic Flows

  This unit includes clast supported and matrix supported sub-units. The clast supported material is located in the north wall and in the upper half of the west wall of the West Hill pit. This material is weakly cemented and resembles coarse, angular rockfill. The matrix supported pyroclastic flow material is located in the lower half of the west wall and in the floor of the West Hill pit. This material is dominantly coarse laminated sand which is also weakly cemented. The sandy material was sampled from the West Hill pit and tested for remolded direct-shear strength. Both the clast dominated and sand dominated flow units are readily erodible.

- SH – Shardy Perlite

  This unit is exposed along northeast and east walls of the South Hill pit, below the hard ores. This unit is somewhat transitional between the airfall breccias and the granular perlite as some steep fractures exist in the shardy perlite, however, the unit is more massive than the hard ores.

- FBXA – Fines Dominated Airfall Breccia

  This unit is exposed in the upper benches of the south wall of the South Hill pit. Similar to the pyroclastic flow material, this unit is weakly cemented and easily erodible. This unit will comprise about two benches in the south wall of the South Hill LOM.

- CXBA – Clast Dominated Airfall Breccia

  The CXBA unit makes up the majority of the South Hill pit walls in both the current pit configuration and the LOM pit shape. This unit is generally unfractured and massive. Several faults are observed within the CXBA, however, the fault material is not believed to be weaker than the matrix of the CXBA material. Blocks of CXBA material were sampled and tested for intact rock strength, as discussed below.

- UT – Upper Tuff

  The upper tuff is located in the westernmost portion of the South Hill pit. This unit will not comprise significant portions of the future pit slopes.

- LT – Lower Tuff

  The lower tuff has been identified by drilling and is not exposed in the current pit. The top of the lower tuff is modeled to be 150 feet below the LOM pit.

2.3 Geologic Structure

The geologic structure of the No Agua pit was examined during the site visit and by reviewing the lithologic model and modeling major structures with the South Hill point cloud.

2.3.1 Rock Jointing

Soft ore lithologies are mostly massive with few joint discontinuities. Hard ore and waste lithologies are characterized by long, steeply inclined joints. The structures are favorable for achieving steep bench faces and for overall slope stability. However, local toppling failures on one or more benches could occur if the structures are dipping steeply back into the slope and are perfectly parallel to the slope.

2.3.2 Faults

Appendix B presents the results of major structure mapping on the South Hill point cloud. Maps 1 and 2 show the modeled faults projected onto the current South Hill pit and the LOM pit, respectively.

The primary major structure type encountered in the South Hill pit are faults which can be mapped continuously for at least 200 – 300 feet and are shallowly to moderately dipping (from 17 to 55 degrees) . Many show normal offset on the order of ~50 feet. Fault planes within the soft ores are slightly healed. Because of this healing, and because of the weak material strength of the soft ore, the fault planes do not appear to act as preferential weakness planes from a slope stability standpoint with the soft ore. Conversely, in the hard ore and waste units, the faults are slickensided and not healed and will act as preferential failure planes when they are daylighted.

Figure 2 shows the trace of Fault FT03 on the north wall of South Hill. FT03 has a dip direction of ~185° and dips ~30° into the pit. This structure has been daylighted in a plane shear orientation in the soft ore (CBXA). If the shear strength along the fault plane was significantly lower than the strength of the surrounding rock mass, the material above the fault would likely have collapsed into the pit. The wall appears to be stable with no sign that displacement has occurred along the fault. However, the geometry the fault plane creates with the slope is inherently unstable and the wall must be monitored for any movement.

Figure 3 shows the CT01 fault exposed on the 8490 level of the east wall in the South Hill pit. Here, the fault forms the contact between obsidian-rich hard waste and hard ore, and has an orientation of ~220°, ~40° (DDR, dip). This area is just above the future east wall ramp. As shown in the photograph, the fault dips shallowly toward the pit and creates a sliding plane on which material has collapsed from the bench. This fault can be traced ~450 feet down into the soft ore units in the South Hill pit. The persistence of this structure in the hard ore is unknown and CNI recommends in-person mapping to the east along the 8490 level to identify the length and location of the fault. Using the limited exposure of the CT01 fault and the orientation of the plane shown in Figure 3, CNI modeled the potential extent of the CT01 fault eastward and used it to define a slope design sector, as discussed in Section 6 of this report.

Other major structures identified in the point cloud include two faults that trace along the south wall of the pit and a few faults in the western portion of the pit in an area that has been mined to completion. These other structures are not expected to adversely affect slope stability in future mine cuts.

2.4 Mining Operations

Three areas of the No Agua Mine were toured during the site visit and are the subject of this evaluation: the West Hill pit, the South Hill pit, and the fines dump. These areas are described below, and Figure 1 shows the layout of the No Agua site.

2.4.1 West Hill Pit

The West Hill pit is located south of the plant area and along the western edge of the No Agua property (Figure 1). Map 3 shows the detailed pit topography along with the location of the WH stability section. Mining in the West Hill has been completed. Appendix A shows the geology of the West Hill area. No 3D geologic model was provided for the West Hill area.

The primary geotechnical concern of the West Hill pit is the western wall that is adjacent to the property boundary. There are two other major slopes in the northern portion of the West Hill pit which were not part of this review. A south-southwest dipping slope is 425 feet high with an overall slope angle of 33 degrees. This wall has high, uninterrupted slope segments and inadequate rockfall catchment. The other slope dips to the southeast with an overall slope height of 270 feet and an overall slope angle of 41 degrees. The southeast dipping slope was constructed with benches and has good rockfall catchment in the lower half of the slope.

Figure 4 shows the western slope of the West Hill pit. A barbed wire fence, located immediately at the slope crest, is assumed to be the property boundary, however, CNI did not review any land survey information. In some areas of the crest, as shown in Figure 4, material has eroded away beyond the fence. No tension cracking or other obvious signs of slope distress were observed during the inspection. CNI was requested to perform an overall slope stability assessment of this slope, which is given later in this report. The area of the slope analyzed has an interramp slope angle (ISA) of 51° and is 130 feet high.

While the risk of overall slope failure is low for this slope, localized erosion will continue to degrade the slope. The natural topography west of the pit crest slopes gently away from the crest providing favorable drainage away from the crest. However, the material exposed in the bench faces is susceptible to wind erosion and direct precipitation on the slope face. If maintaining the current crest line is a priority, Imerys should evaluate meshing, shotcrete, or backfilling options for erosion control.

2.4.2 South Hill Pit

The South Hill pit is located south of West Hill and is currently in operation. Soft ore is mined by dozer ripping in the main portion of the pit and hard ore and waste is mined by conventional blasting in upper elevations of the east wall (Map 1). The pit is currently up to 270 feet deep with slopes mined at variable ISAs from ~38° in south and east walls, to 51° degrees in the north wall. As-built bench heights are also variable from ~15 feet high to 55 feet high in the soft ore. Bench heights in hard ore were completed from ~15 to over 60 feet in height.

The South Hill pit has at least a 20-year mine life remaining. Map 2 shows the LOM pit plan for South Hill. The majority of the future mining will be in east and south wall pushbacks, while the north wall and west wall are near their final configurations. The LOM plan uses 25-foot-high benches and a ~40° ISA for the future walls. However, the 2017 closure plan specifies a bench high of 35 feet and a 15-foot-wide catch bench width. Based on the bench audit analyses which are discussed in the next section, CNI recommends adjusting the LOM slopes to a 35-foot-high bench. Additionally, the 15-foot width is likely to be too narrow for reliably containing rockfall, and a greater width is recommended for future mining, as discussed in Section 6 below.

Maps 1 and 2 show the location of the analysis cross sections used to evaluate the overall stability of the LOM slopes.

2.4.3 Fines Dump

Figure 1 shows the fines dump location in the overall site layout. Map 4 shows the current topography of the fines dump and the location of the stability analysis section. A bucket sample of the fines material was tested for shear strength and used in the stability analysis. Coarse material is added to the top of the dump periodically for dust control. No future stacking plans, nor expansion footprint were provided for the fines dump. Also, no bedrock surface or original topography models were provided for this area. However, the 2017 closure plan states that the fines dump will be re-graded to a 3:1 slope. The current slope along the analysis section has a height of ~100 feet with a maximum angle of repose of ~35°.

3. BENCH AUDIT

CNI completed an audit of the as-built bench geometries in the South Hill pit using a drone-acquired point cloud provided by Imerys. These scans and the bench areas audited are shown in Appendix C. The goal of the bench audit was to determine the achieved distribution of bench face angles (BFA) for hard ore/waste units and soft ore units for different wall orientations and bench heights. Once these distributions are recorded and analyzed, a bench configuration will be recommended based on the reliability of maintaining a specified catch bench width for rockfall containment. The recommended bench configuration is then extrapolated for the design interramp slope angles by design sector, as discussed in Section 6.

These results indicate that the bench faces are not controlled by wall orientation. In the soft ores, no brittle structures are present to induce backbreak and limit the BFAs. Therefore, changes in wall orientation do not influence the BFA distribution in the soft ores. In the hard ore/waste rocks, the exposed benches are very limited in wall orientation, so no such comparison of achieved BFAs by wall orientation could be made.

The bench audit results do show that the optimal bench heights for both soft and hard ore are between 35 and 45 feet. Because of this, and because a bench height of 35 feet is specified in the closure document, CNI recommends changing the LOM plan to use 35-foot-high benches.

Figure 5 shows the results of the slope audit. Bench-face angle distributions are shown for hard ore/waste and soft ore for all measured orientations for bench height between 35 and 45 feet. At a reliability of 80%, the hard ore/waste has a slightly higher BFA of 67° degrees compared to the 65° in soft ore. CNI believes a reliability of 80% is appropriate for the 35-foot-high bench design at No Agua.

4. LABORATORY TESTING AND ROCK STRENGTH ESTIMATES

Strength testing and classification testing was completed in the CNI laboratory to support this evaluation. The testing program consisted of two uniaxial compression tests (UCS) and three triaxial compression tests (TCS) from a boulder of the CXBA unit collected in the South Hill pit bottom. Loose samples of the laminated sand unit of the West Hill pyroclastic unit and of the fines dump were tested for USCS classification and remold direct shear strength. Appendix D provides the testing results.

The intact tests from the CBXA samples were combined and used to derive an intact rock failure envelope. One of the TCS test results was removed from the regression as it broke along a preexisting weakness plane. The calculated failure envelop has a cohesion of 63.8 psi, a friction angle of 49.9 degrees, and a compressive strength of 350 psi. This value was taken as the upper limit of rock strength for the soft ores in South Hill and West Hill pits.

This intact strength was weighted by the assumed RQD for each material type to calculate rock-mass shear strengths following the CNI rock-mass criterion as described in Cylwik et al. (2023). The remold direct shear strength of the West Hill laminated sand (airfall tuff within the West Hill pyroclastics, 5.0 psi cohesion, 35.0-degree Phi) was assumed as the lower bound material strength for the rock-mass calculation.

Rock-mass properties for hard ore and waste units at No Agua were derived from laboratory testing on similar materials at another Imerys perlite site. Based on site observations at both localities, CNI believes this is an appropriate assumption and is probably conservative. The intact strength of the No Agua hard ores is likely underestimated in the LE analyses presented in the next section, however, the intact strength of these units is not a controlling factor of in the South Hill slope stability. The strength of the soft ore units and the location, orientation, and shear strength of major structures will control the overall slope stability of the South Hill walls.

A key input into the CNI rock-mass calculation is RQD, which was estimated for No Agua rock masses. The West Hill pyroclastics were assigned an RQD value of 5% based on field observations. For the South Hill materials, a RQD value of 50% was assumed, based on field observations and a review of core photographs. Finally, a cohesion reduction factor (CRF) of 0.35 was used for the South Hill hard lithologies and a CRF of 1.0 was used for the soft ores in both the West Hill and South Hill because of the low UCS values of the soft units (Cylwik et al., 2023). Rock-mass calculation worksheets are shown in Appendix D and Table 1 presents the material properties used in the stability analyses.

Finally, a sample of the fines dump was collected during the site visit for classification and strength testing. This material is classified as a well-sorted silt with minor sand (ML). The remold direct shear test for the fines dump material resulted in a friction angle of 35.2 degrees and 3.2 psi cohesion.

5. OVERALL SLOPE STABILITY ANALYSES

Overall slope stability analyses were conducted using the Slide2© software, which applies the limit-equilibrium method of slices in two dimensions. Four cross-sections were selected for overall slope stability analysis, two in the South Hill pit (shown in Maps 1 and 2), one at the West Hill pit (Map 3), and one to evaluate the stability of the dump area located at the northeast area of the property (Map 4).

The South Hill sections (SH Section 1 and SH Section 2) were chosen to analyze the stability of the LOM pit. Section SH-2 was also used to review the stability of the current pit. The West Hill sections (WH-1) location was selected to evaluate the stability of the current pit and the potential for an overall slope failure breaching the property boundary. The location of the fine dump section was selected to evaluate the stability of the dump's current configuration and the potential for increasing the height of the dump lifts.

Based on field observations and discussions with Imerys engineers, the stability analyses assume no groundwater pore pressures.

5.1 Slide Limit-Equilibrium Analysis Results

Results of the overall stability analyses are summarized for each cross section in Table 2. CNI recommends a design acceptance criterion (DAC) of a 1.3 static factor of safety (FOS) or greater for the overall in-situ rock slopes. For working slopes in the fines dump material, a DAC of 1.5 is recommended due to the uncertainty of the dump foundation. The closure DAC for the fines dump will be likely be similar, however, the closure analysis must consider the foundation properties and the design must meet other environmental standards.

All slope geometries tested in these analyses, including the hypothetical steepened slopes, achieve the DAC, indicating that the risk of overall slope instability is low for the planned and current slopes heights.

5.1.1 SH Section 1

This section analyzes the slope located on the northeastern side of the South Hill pit. The LOM slope is 279 feet high and has an interramp slope angle of 39° as designed. Lithology contacts in this area dip into

the slope at an average of 10°, except for the Classical unit on the upper part of the slope, which dips pitward at an angle of approximately 6°. Two prominent faults are present behind the slope face. The first one dips approximately 34° towards the pit and cuts the section about 40 feet behind the wall. The second shallow one is nearly daylighted and dips at approximately 40° towards the pit.

Stability analyses were run on SH Section 1 to evaluate the influence of both faults on the stability of the north wall LOM design. The analysis of a deep-seated failure is shown in Figure 6 and resulted in a FOS of 1.96. The analysis of a shallow failure is shown in Figure 7 and resulted in a FOS of 2.0.

As shown in Map 2, the shallow fault (CT01) is likely to extend to the east, defining a potential unstable block. The maximum thickness between the fault and the pit slope will be about 40 feet. To account for this condition, the location of the shallow fault displaced in this section was modified and the FOS recalculated. Figures 8 and 9 show the analysis results when the fault is located respectively 40 feet and 20 feet behind the pit slope. The first case results in a FOS of 1.69 and the second case in a FOS of 1.68.

5.1.2 SH Section 2

This section analyzes a slope located on the northwest side of the South Hill pit. The current slope has a height of 247 feet and an interramp slope angle of 53 degrees. The LOM design wall has a total height of 270 feet and an interramp slope angle of 44 degrees in the lower portion of the slope. The main rock type present in the wall is CBXA.

The stability analysis of the current slope is presented in Figure 10 and resulted in a FOS of 1.91. Figure 11 presents the stability analysis of the LOM slope, which results in a FOS of 1.76.

5.1.3 WH Section 1

This section analyzes a slope located on the west side of the West Hill pit. The Imerys property boundary is located at the crest of this slope. The current slope has a height of 136 feet and an interramp slope angle of 51 degrees. The main rock type present in the wall is the West Hill Pyroclastic Flow unit. The upper portion of the slope is the clast dominated subunit, and the toe of the slope is composed of the laminated sand subunit. The stability analysis of the current slope is presented in Figure 12 and resulted in a FOS of 1.52.

5.1.4 Fines Dump Section

This section analyzes a south facing slope of the fine dump (Map 4). The configuration of the current dump consists of a single ~120-foot-high single lift, with an approximate slope angle of 35 degrees. The stability analysis of the current configuration is presented in Figure 13 and results in a FOS of 1.62.

Higher stack heights were tested to determine the maximum stack height that maintains the working DAC of 1.5 FOS. A ~160-foot-high slope with an overall angle of 35 degrees yields a FOS of 1.5, as shown in Figure 14.

6. CONCLUSIONS AND RECOMMENDATIONS

The following section summarizes CNI's recommended slope design for future slopes in the South Hill pit and recommendations for the geotechnical slope management of the No Agua perlite mine. As discussed above, CNI recommends a 35-foot bench height for future mining in the South Hill pit. The ISA recommendations are expected to achieve an 80% reliability or higher of maintaining a minimum target catch bench width of 19 feet. The 80% reliability is appropriate for the moderate overall slope heights and low bench heights.

6.1 Design Sectors

Table 3 presents the recommended slope design for the future South Hill pit walls. Three design sectors have been identified and are shown on the LOM pit plan in Map 5.

6.1.1 South Hill Soft Ore

The central portion of the South Hill LOM is within the soft (rippable) ore sector. The lithologies in this domain are CBXA and FBXA. CNI recommends an ISA of 45 degrees for all wall orientations in this sector.

6.1.2 South Hill East Wall Fault Sector

As shown on Map 5, this sector is defined by the assumed extension of the CT01 fault in the northeast wall of the LOM pit and includes both hard ore/waste and soft ore lithologies. Because of the uncertainty of the extent, location, and strength properties of the CT01 fault, CNI does not recommend steeping in the sector beyond the planned 40° ISA. However, as seen in the north wall, daylighted faults in the soft ore units do not necessarily lead to slope failures. Mapping and strength testing is recommended for the CT01 fault. Based on additional information, this sector should be reevaluated for potential changes to the slope design.

6.1.3 South Hill Hard Ore/Waste

Map 5 shows the hard ore/waste design sector on the LOM map. This sector is limited to the easternmost portion of the pit in the footwall of the CT01 projection. The recommended ISA of the hard ore sector is 46 degrees.

6.1.4 Catch Bench Widths

CNI uses a Modified Ritchie Criterion as a *guide* for designing catch bench width (CBWs). This method evolved following publication of a technical paper by Ritchie (1963) on the design of highway shoulders for catching rockfall off excavated and natural slopes. Ritchie's investigation was limited to a relatively small number of slope angle/slope height geometries and therefore requires extrapolation for use in open-pit mining. Because slope (bench) height is one of the most important controls on the distance a rock will travel when detached from the bench, CNI has derived an empirical relationship between the slope height and the target CBW needed for adequate rockfall containment, as follows:

Modified Ritchie Criterion for CBW

For bench heights less than 50 feet

*CBW (feet) = 0.2*bench height + 12 feet*

*(35-foot bench height) 19 feet = 0.2 * 35 feet + 12 feet*

The original equations published by Call (1992) in the SME Mining Engineering Handbook are too conservative for bench height under 50 feet (Ryan and Pryor, 2000) and were modified for shorter benches. The 19-foot CBW is generally acceptable for 35-foot-high benches with controlled blasting or ripping and scaling practices that minimize the amount of loose material and limit potential rockfall.

6.2 Dump Slopes

The natural angle of repose of fines dump material is ~35 degrees. The stability analyses show that fines dump material can be stacked up to 160 feet and maintain a FOS of 1.5.

The active dumping area should be inspected at the beginning of each shift, or prior to the periodic dumping activity. The dump slopes should be periodically monitored for cracking at the slope crest and displacement of the slope face. Imerys can use drone-based difference mapping for the displacement monitoring.

Avoid placing wet waste on this dump. Wet waste has a tendency of over-steepening the crest of the dump due to capillary suction. This material will stand at a higher angle, but only temporarily. When the capillary pressure is diminished during drying, the crest area will experience failure.

A berm should be maintained at all times along the crest of the active dump. The berm should be at minimum half the height of the tire of the largest equipment.

All surfaces and working areas should be sloped and graded at a slight angle to direct surface water flow with the goal of directing water to appropriate catchment areas. Water should be directed away from the active dump face.

Mobile equipment, including trucks adding material on the dump, should not approach the crest areas of the dump piles. Unconfined material at the dump crests could displace and pose a significant hazard to equipment operating at the crest. Short dumping and dozer pushing should be employed.

6.3 Ground Control

Scaling loose rock must be completed on all benches and slopes. Proper scaling will eliminate the majority of the rockfall risk to operators and equipment. Scaling is usually done with a long boom excavator or with a chain pulled behind a dozer. In areas where scaling is not feasible or ineffective, berms should be constructed to mitigate the rockfall risk to operations. Scaling is required in both the hard and soft ore sectors. Figure 15 shows loose boulders at the crests of benches on the south wall of South Hill. These rocks should be removed if that can be done safely, and future benches must be scaled to avoid leaving loose boulders at the crest.

6.4 Recommended Slope Monitoring

Standard slope monitoring that is recommended for all mining operations includes daily, visual pre-shift inspections of the slopes above the working areas. The daily inspections should identify indications of slope distress such as bulging, cracking, new water seeps, and new rockfall. Periodic surveying of slope crests for cracking is also recommended for all slopes, including the fines dump.

Monitoring is recommended specifically for the slope in the hanging wall of the FT03 fault. Figure 2 shows the fault daylighting in the north wall of the South Hill pit. The area near the fault on the 8445 level should be monitored for tension cracks and if any cracking is present, pin sets or an automated

extensometer should be deployed to actively monitor any movement. Similarly, the CT01 fault in the east wall of the pit will require monitoring as mining advances along the fault.

6.5 Recommended Future Work

The CT01 fault has potential to cause bench to multi-bench scale failures in future pit slopes. CNI recommends mapping east along the 8490 level to better constrain the extent and location of the CT01 fault. Based on the results of the mapping, the pitward dipping structures should be remodeled and the northeast wall slope design should be reviewed. Periodic mapping should be continued as each new bench is exposed, especially in the northeast design sector.

Additional laboratory strength testing is also recommended. This should include fault gouge testing, fracture direct shear tests (hard ore), additional remold direct shear testing on the soft material types, and additional UCS and triaxial compression testing of the hard ore and waste and soft perlite ore types. If future mine plans change significantly from the current LOM, and other material types will comprise the pit slope, material testing will be required for the other units, such as the Upper Tuff, FXBA, etc.

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Table 1. 2025 No Agua Material Properties									
Geological Unit	Density (pcf)	RQD Estimate	CRF	Rock Mass Strength		Intact Rock Strength		Remold Shear Strength	
				Phi (°)	C (psf)	Phi (°)	C (psf)	Phi (°)	C (psf)
West Hill Pyroclastic Flow[2]	94.4	5%	1.00	37.7	1195.2	49.9	9187	35.0	712.8
Classical (C)[1]	135.6	50%	0.35	37.1	13521.0	50.6	210571	28.2	0.0
Clast Dominated Airfall Breccia (CBXA)	94.4	50%	1.00	40.6	2260.8	49.9	9187	35.0	712.8
Classic-Granular Transition (CGT)[1]	135.6	50%	0.35	37.1	13521.0	50.6	210571	28.2	0.0
Granular (G)[1]	135.6	50%	0.35	37.1	13521.0	50.6	210571	28.2	0.0
Shardy (SH)[2]	94.4	50%	1.00	40.6	2260.8	49.9	9187	35.0	712.8
Faults[2]	94.4	-	-	-	-	-	-	35.0	712.8
Fines Dump	93.2		-	-	-	-	-	35.2	455.04
Overburden (OB)[3]	90	-	-	-	-	-	-	35.0	288

[1] Based on testing from other perlite localities

[2] Based on testing from other No Agua lithologies

[3] Assumed typical colluvium properties

Table 2. No Agua Overall Stability Analysis Results					
Cross Section	Pit Geometry	Failure	ISA (°)	Slope Height (ft)	Minimum FOS
SH-1	LOM Design	Deep Seated	39	279	1.95
		Shallow	39	279	2.03
		Shallow + 20 ft	39	279	1.68
		Shallow + 40 ft	39	279	1.69
SH-2	As Built	Overall	53	247	1.91
	LOM Design	Overall	44	270	1.76
WH-1	As Built	Overall	51	136	1.57
Fine Dump	As Built	Overall	35	121	1.62
	Forward	Overall	35	160	1.50

Table 3. Recommended Slope Design for No Agua South Hill - 35' Bench Height			
Design Parameter	Soft Ore	Hard Ore/Waste	East Wall Fault Sector
Inter-ramp Slope Angle, ISA (°)	45	46	40
Bench Height, BH (ft.)	35	35	35
Layout Bench Face Angle, BFA_L (°)	75	75	75
Layout Bench Width, CBW_L (ft.)	25	24	32
Minimum Bench Face Angle, BFA_M (°)	65	67	57
Minimum Bench Width, CBW_M (ft.)	19	19	19
Target Reliability (%)	80%	80%	>80%

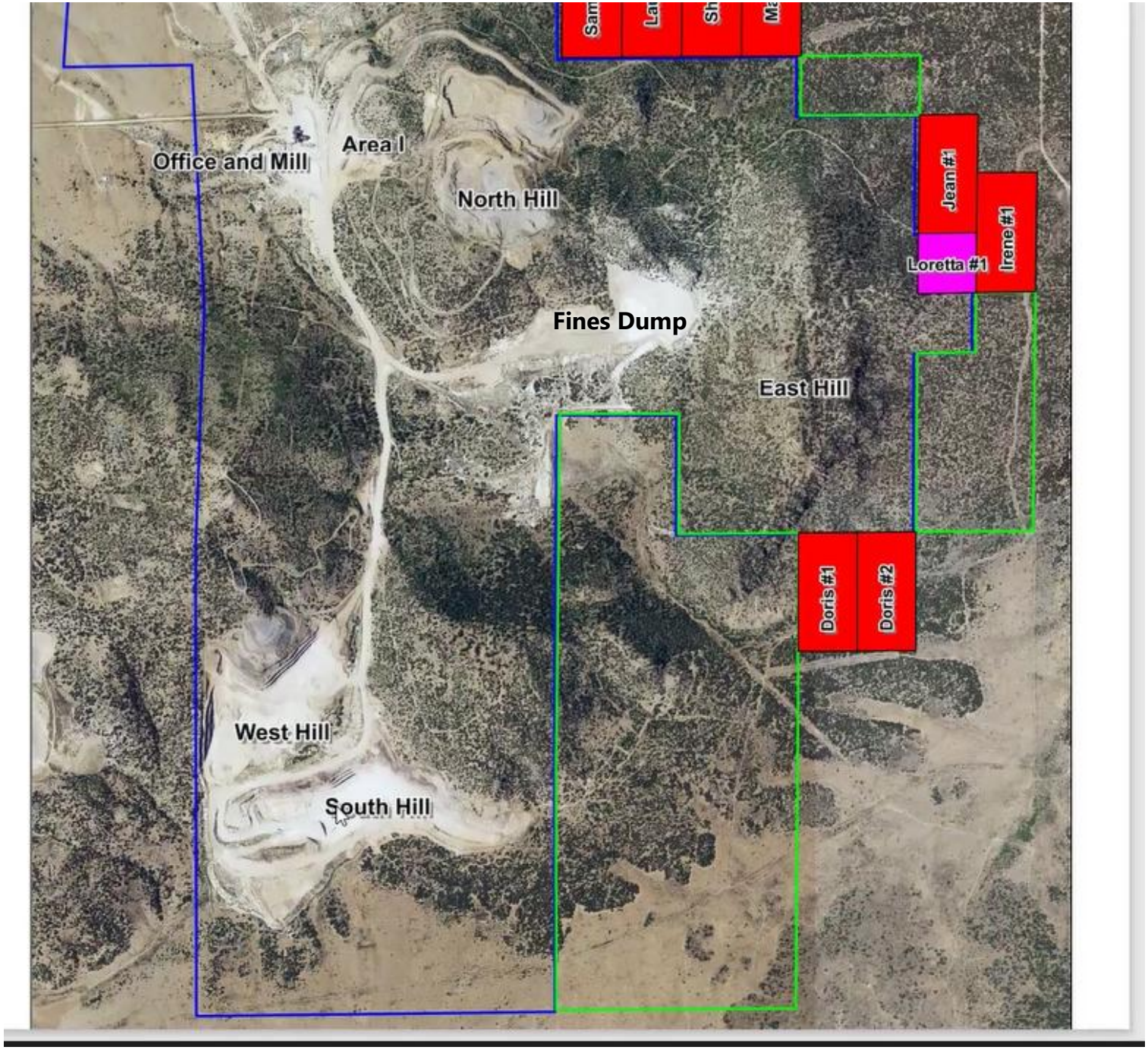


Figure 1. No Agua Site Layout



Figure 2. Fault FT03 exposed on the north wall of South Hill pit



Figure 3. Fault CT01 exposed above the 8490 level

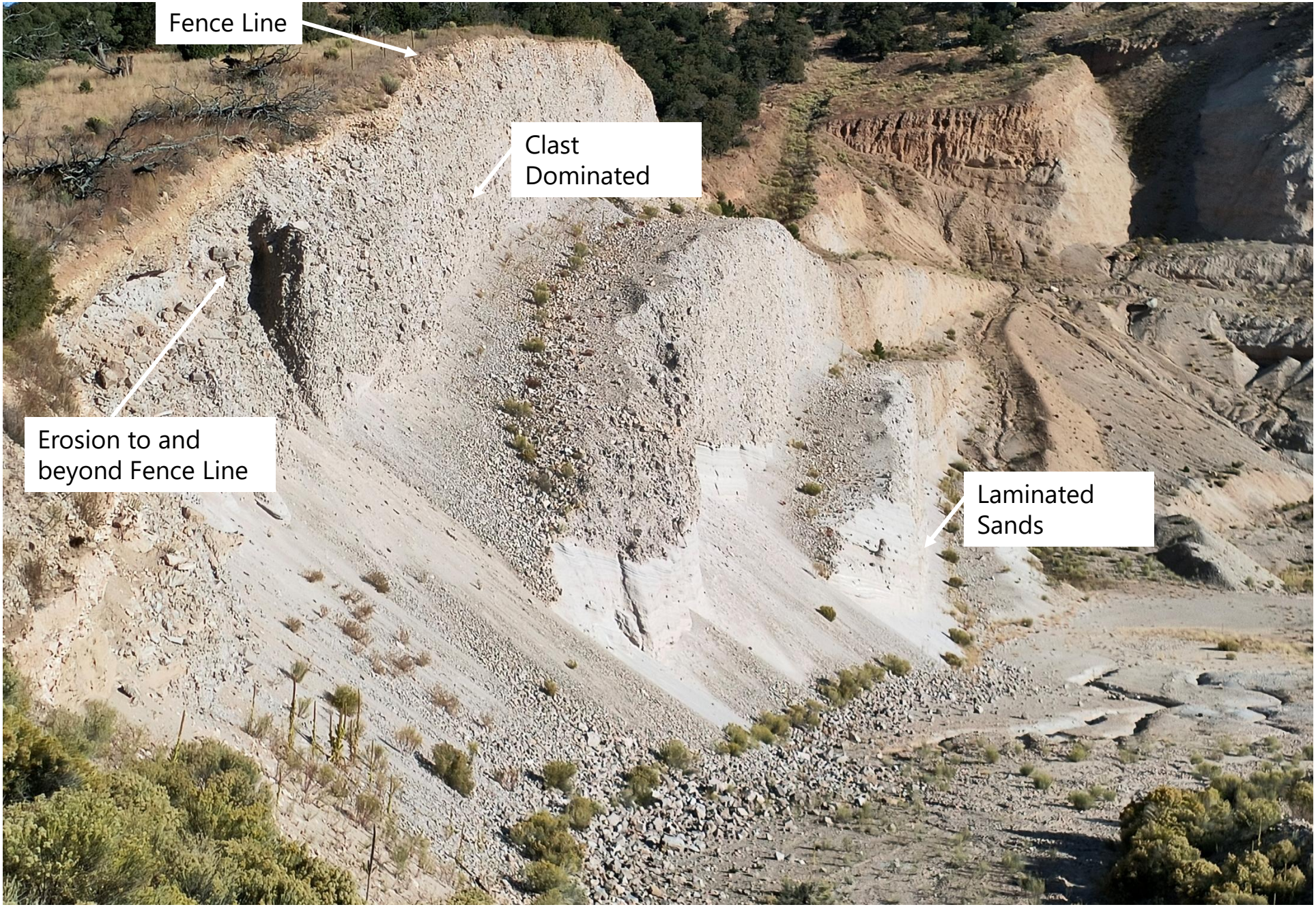


Figure 4. West Hill Western Slope

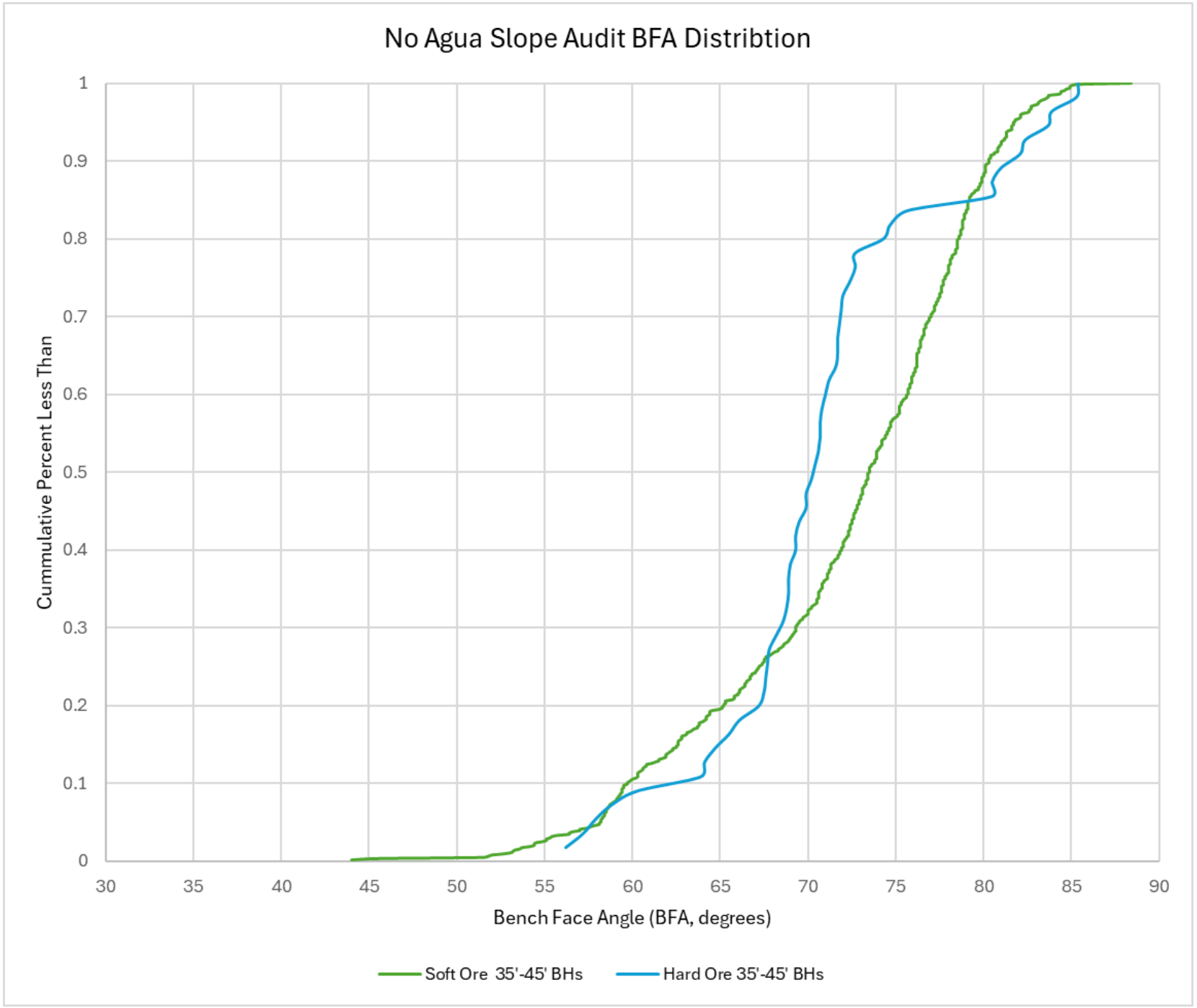


Figure 5. No Agua BFA Distributions

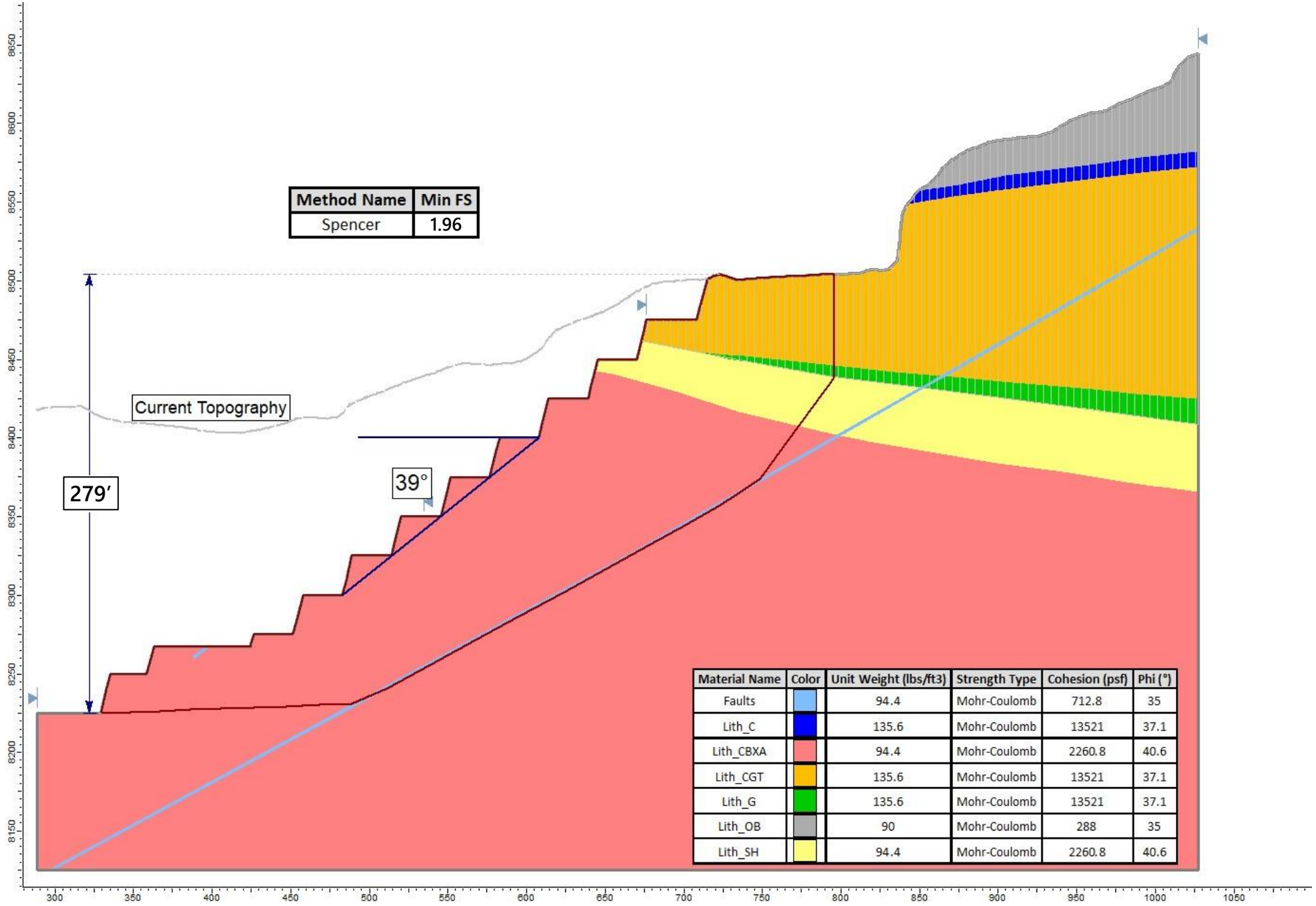


Figure 6. Cross Section SH-1 Deep Seated Failure Slope Stability Analysis

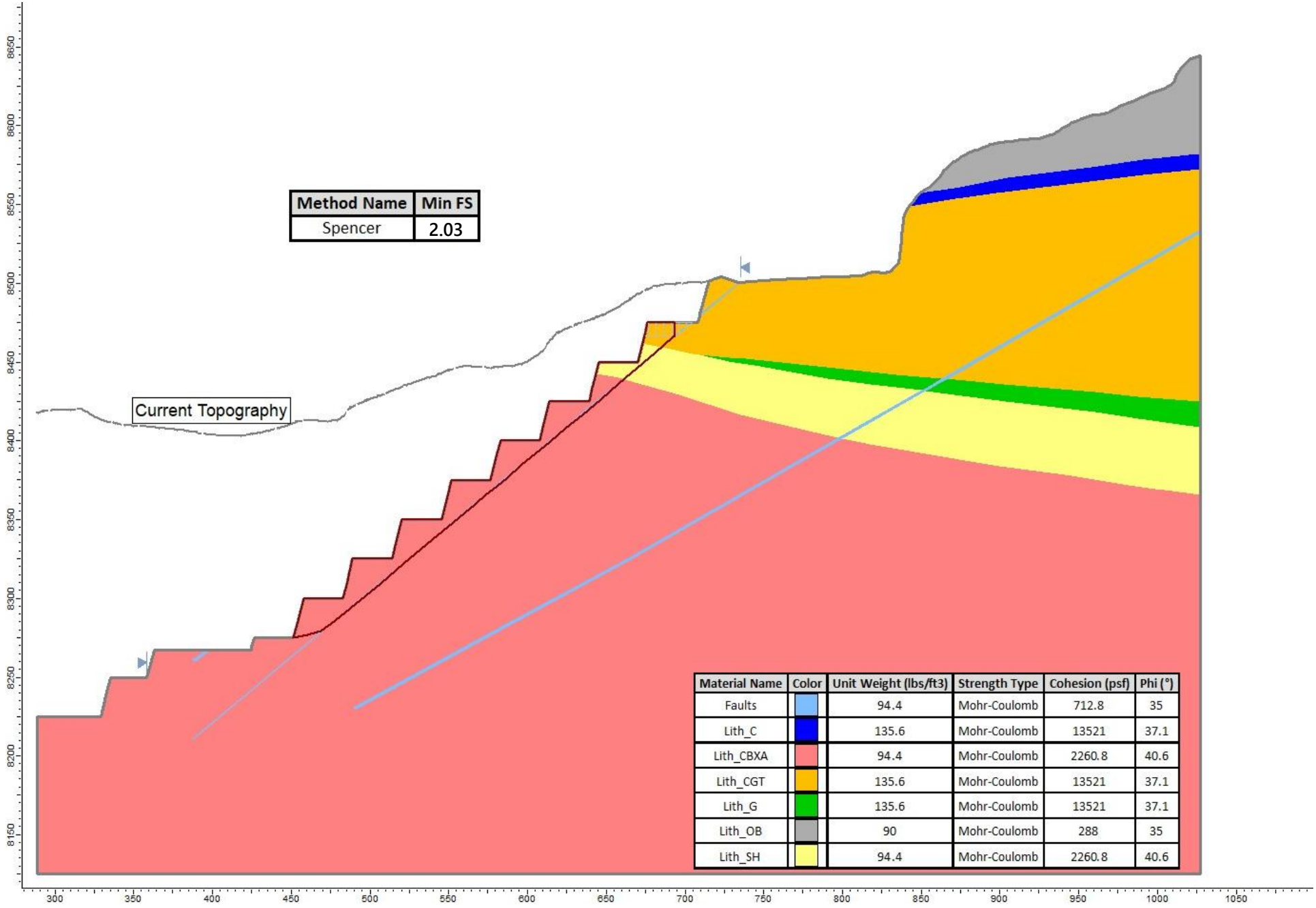


Figure 7. Cross Section SH-1 Shallow Failure Slope Stability Analysis

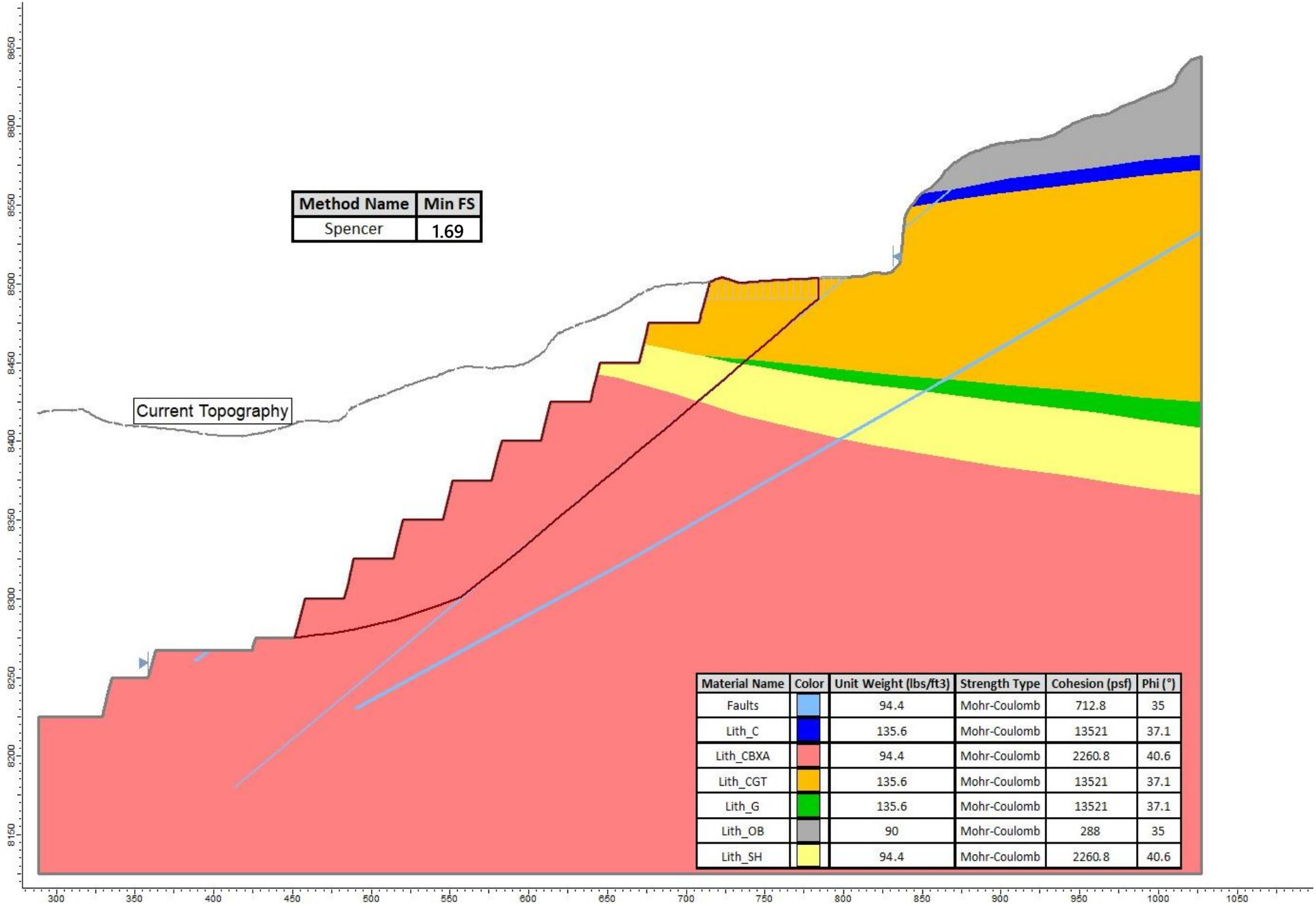


Figure 8. Cross Section SH-1 Shallow Failure +40 ft Slope Stability Analysis

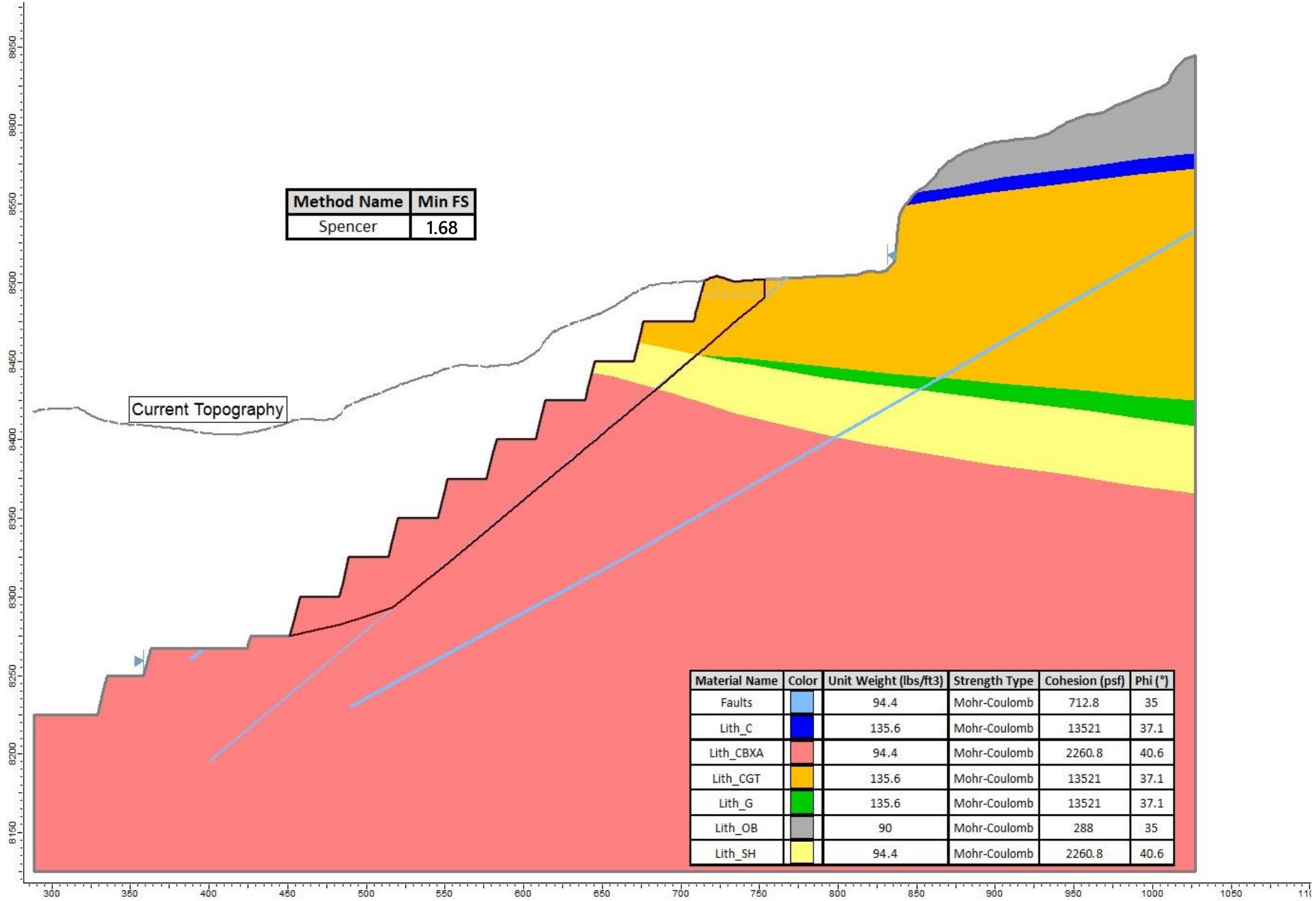


Figure 9. Cross Section SH-1 Shallow Failure +20 ft Slope Stability Analysis

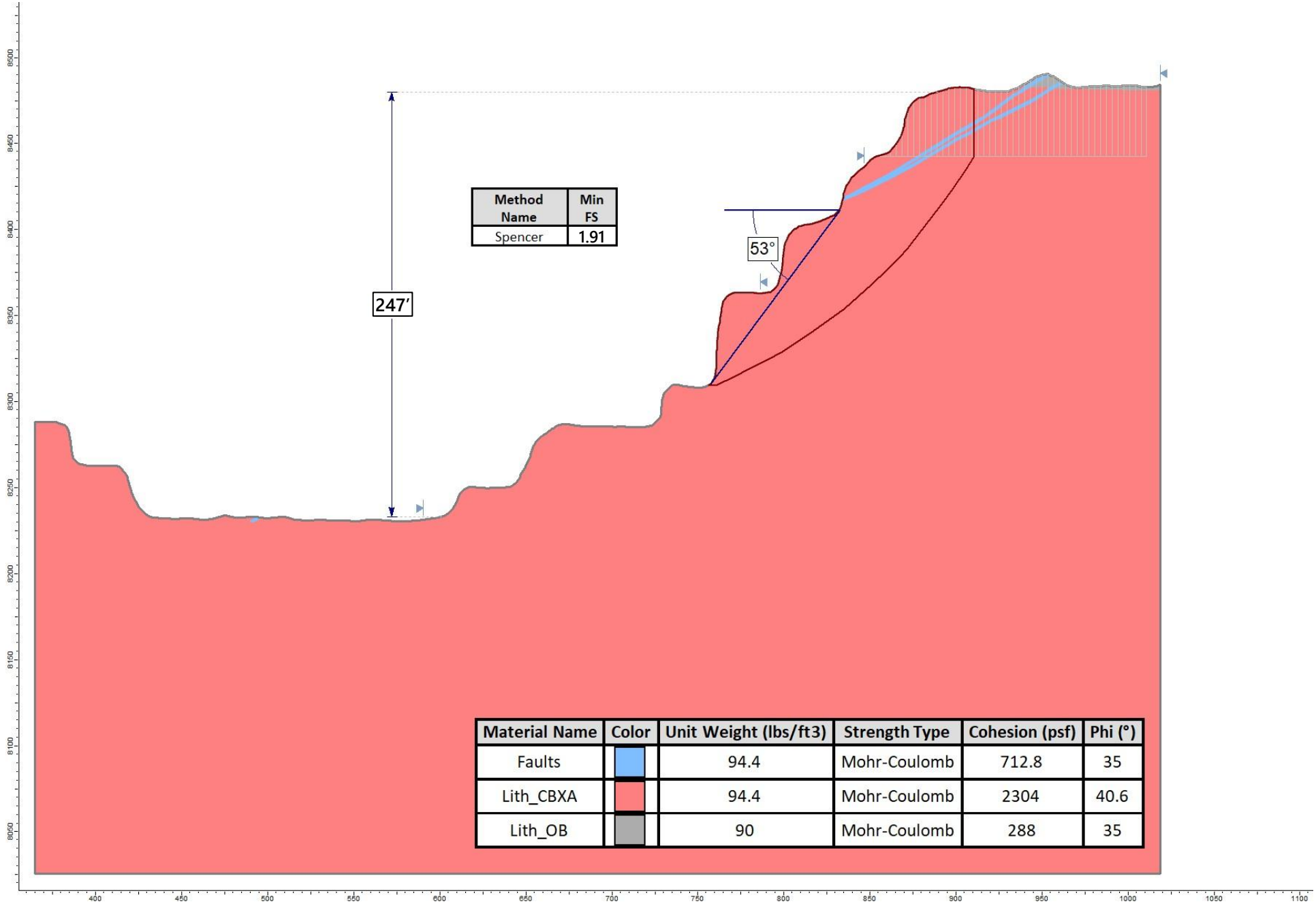


Figure 10. Cross Section SH-2 Slope Stability Analysis – Current Topography

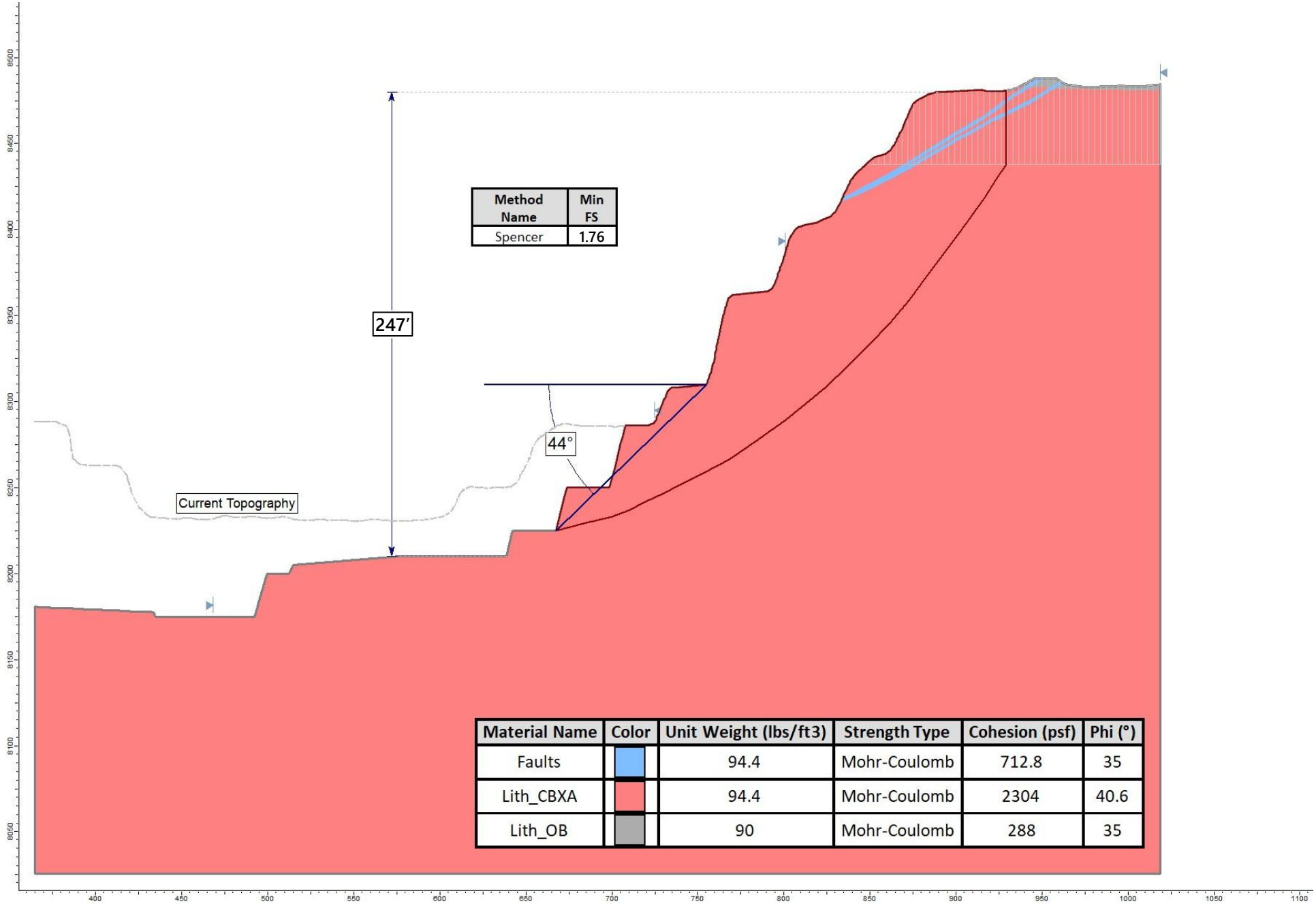


Figure 11. Cross Section SH-2 Slope Stability Analysis - Design

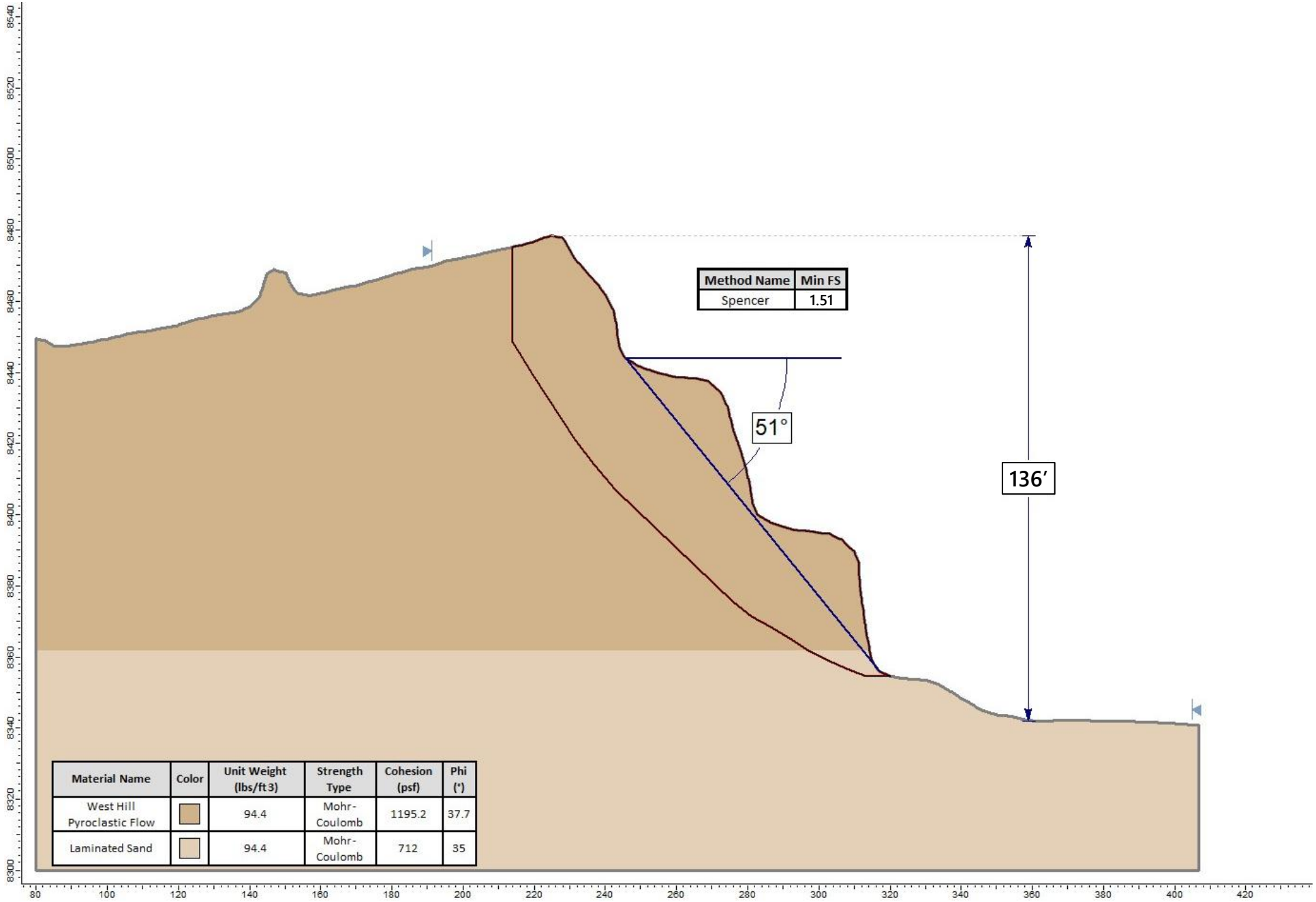


Figure 12. Cross Section WH-1 Slope Stability Analysis

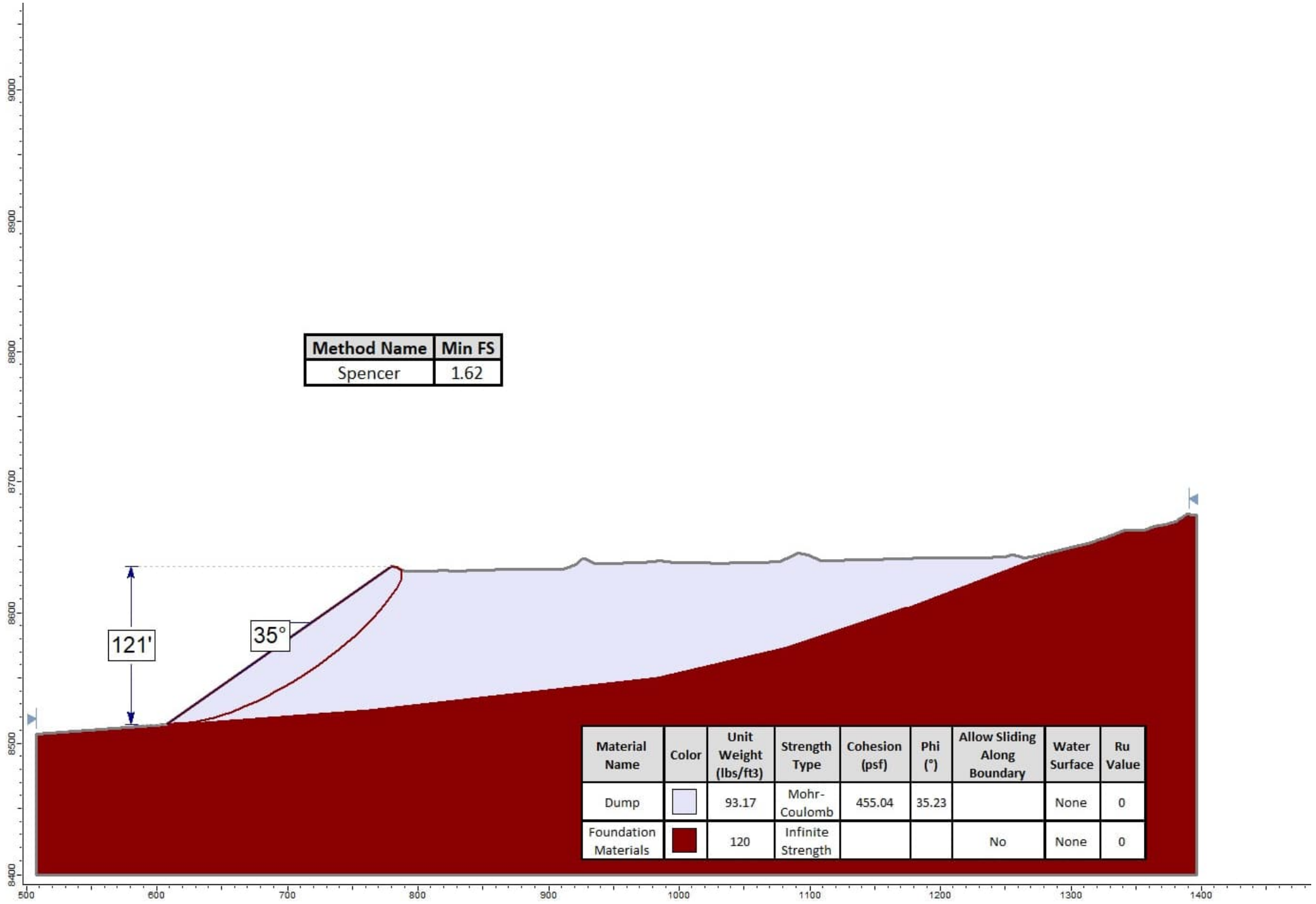


Figure 13. Dump Cross Section Slope Stability Analysis

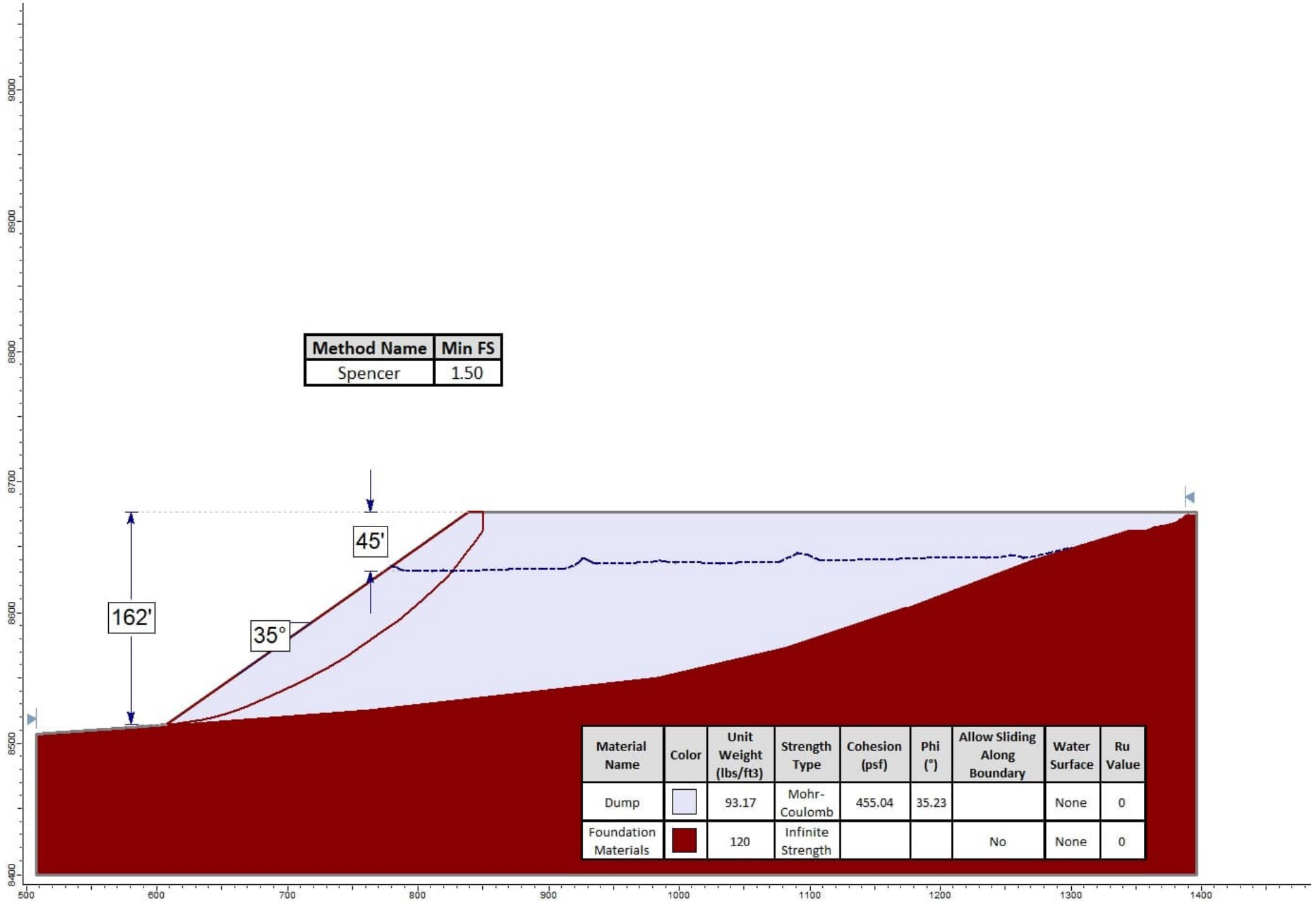


Figure 14. Dump Cross Section Slope Stability Analysis

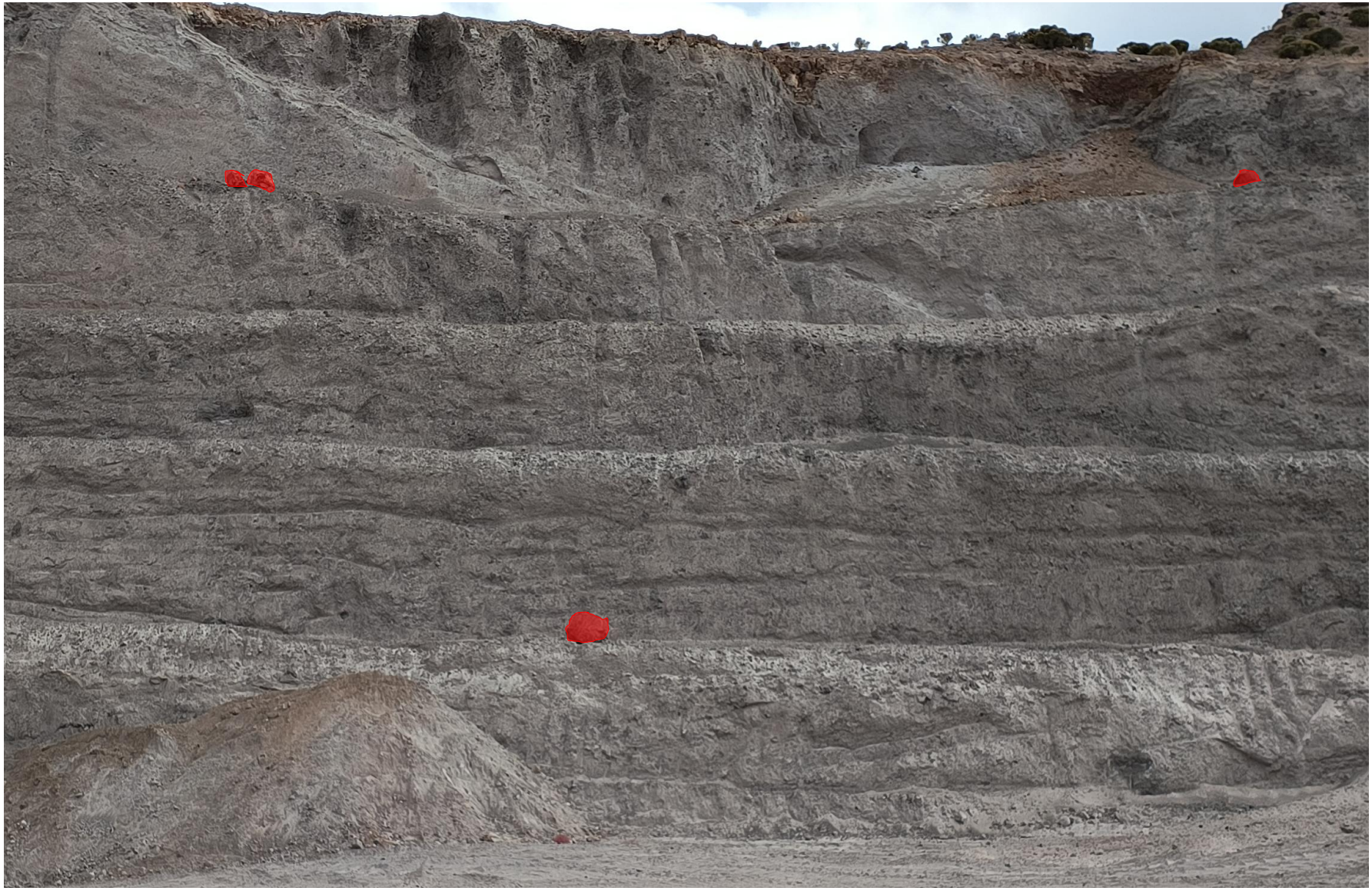
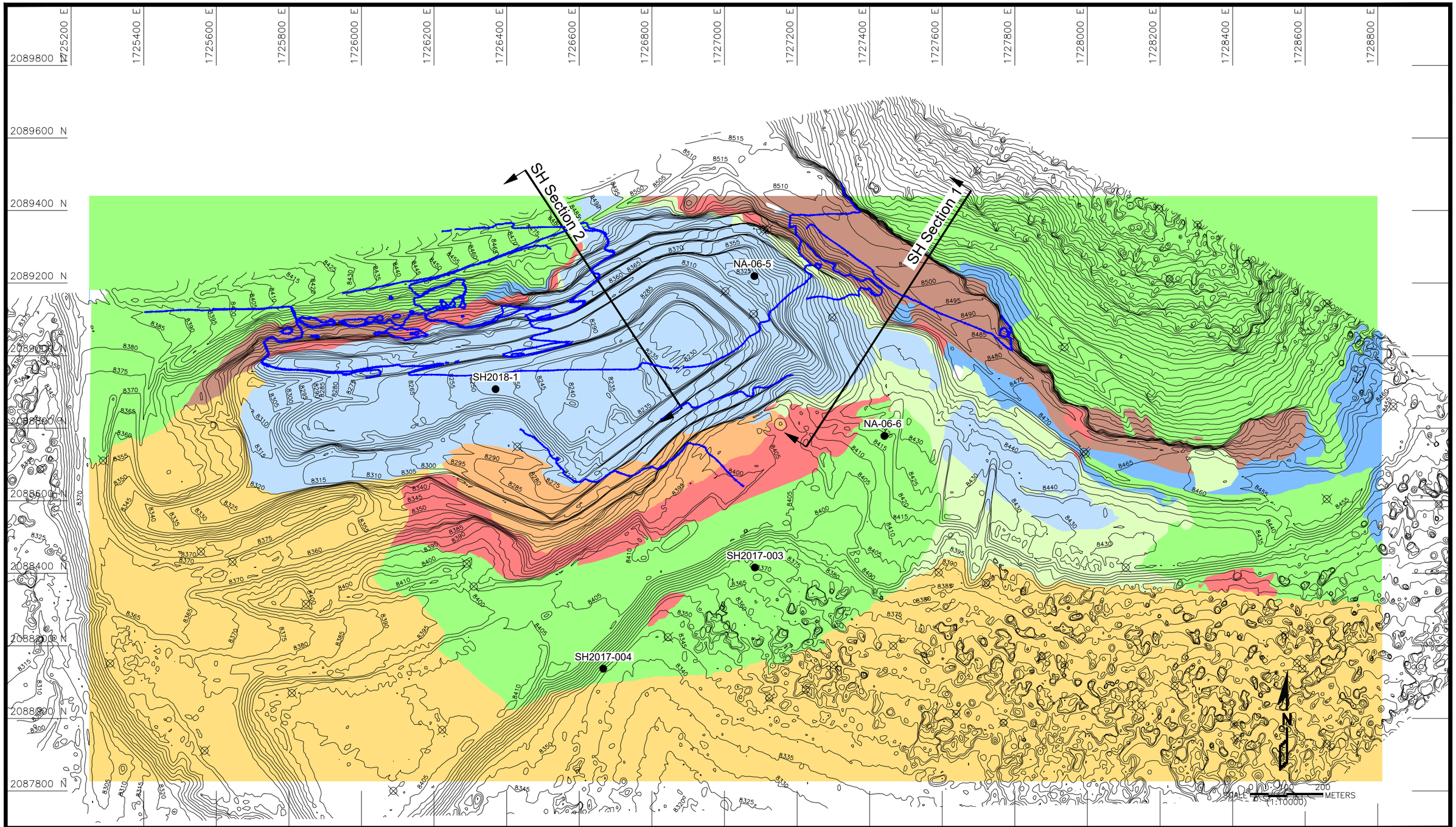


Figure 15. Loose boulders (red highlights) on bench crests south wall of South Hill Pit.



LEGEND

- CLASSICAL (C)
- CLAST DOMINATED AIRFALL BRECCIA (CBXA)
- CLASSIC-GRANULAR TRANSITION (CGT)
- FINES DOMINATED AIRFALL BRECCIA (FBXA)
- GRANULAR (G)
- OVERBURDEN (OB)
- SHARDY (SH)
- UPPER TUFF (UT)
- NA-06-6 ● DRILL HOLE COLLAR
- FAULTS

CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA

DRAWN	DATE	REVISED
LMC	11/24	2/27/2025 11:39 AM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\SOUTH_HILL_TOPO_5FT.DWG

GEOLOGY AND SECTION LOCATIONS
SOUTH HILL CURRENT PIT
IMERYS / NO AGUA

SCALE 1:10000 | MAP 1

SH Section 2

SH Section 1

N

SCALE 0 100 200 METERS
1:10000

LEGEND

- CLASSICAL (C)
- CLAST DOMINATED AIRFALL BRECCIA (CBXA)
- CLASSIC-GRANULAR TRANSITION (CGT)
- FINES DOMINATED AIRFALL BRECCIA (FBXA)
- GRANULAR (G)
- OVERBURDEN (OB)
- SHARDY (SH)
- UPPER TUFF (UT)
- FAULTS

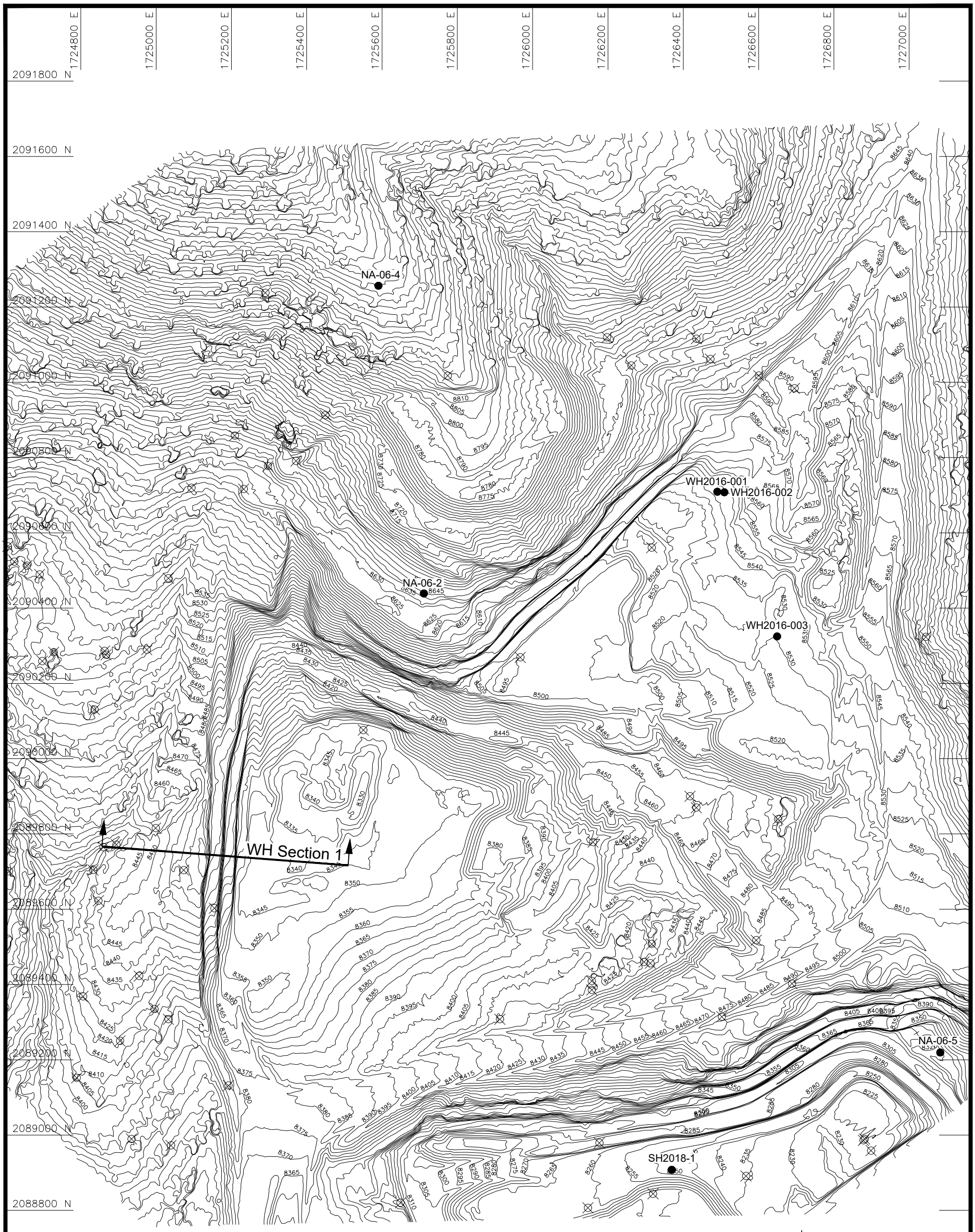
CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA

DRAWN	LMC	DATE	11/24	REVISED	2/27/2025 11:39 AM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\LOM_5FT.DWG

GEOLOGY AND SECTION LOCATIONS
SOUTH HILL LOM DESIGN
IMERYS / NO AGUA

SCALE 1:10000 | MAP 2



LEGEND

NA-06-2 ● DRILL HOLE COLLAR

CALL & NICHOLAS, INC.
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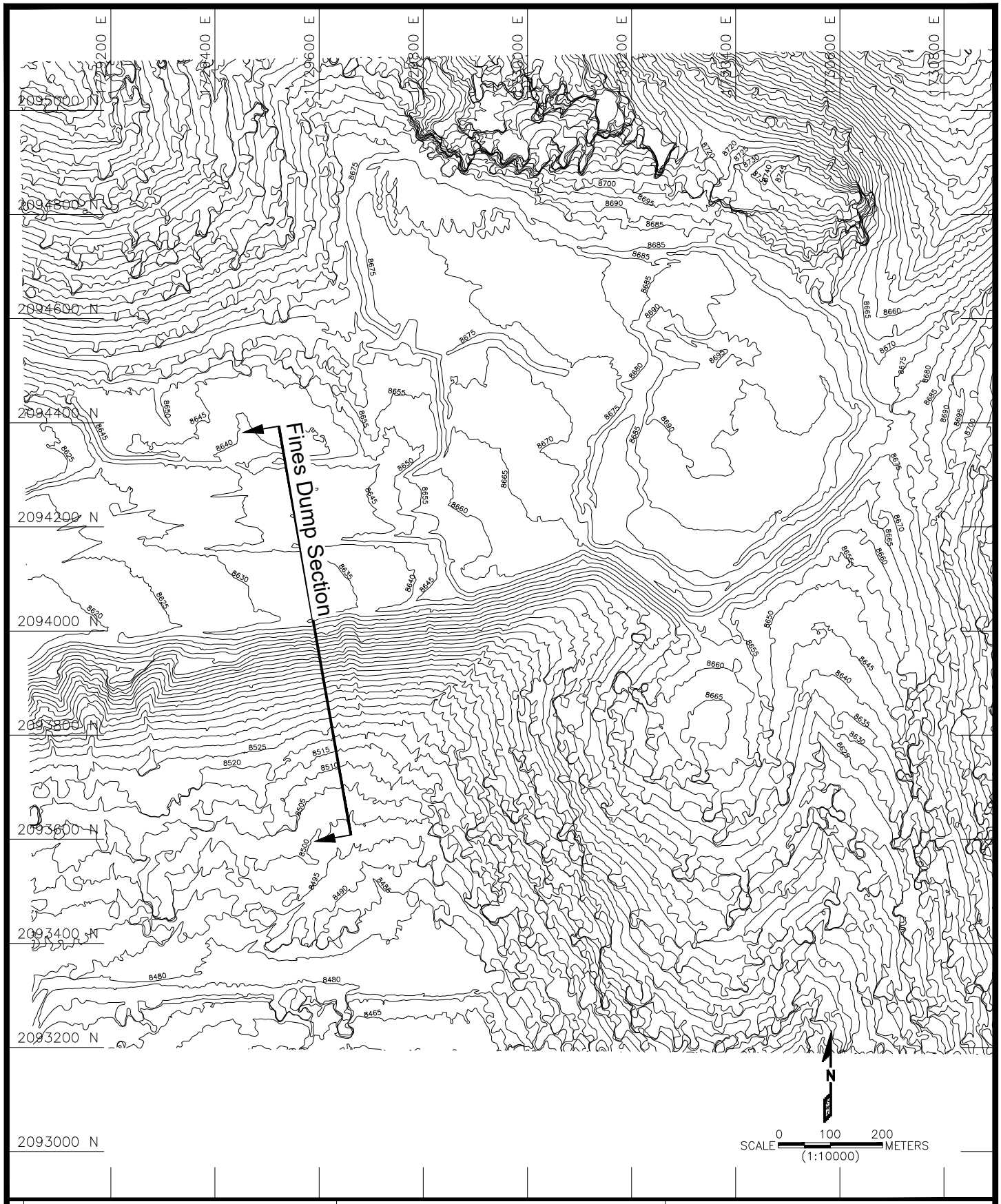
DRAWN	DATE	REVISED
LMC	11/24	2/26/2025 4:30 PM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\WEST_HILL_TOPO.DWG

WEST HILL PIT TOPOGRAPHY AND ANALYSIS SECTION LOCATION

IMERYS / NO AGUA

SCALE 1:10000 | MAP 3



LEGEND

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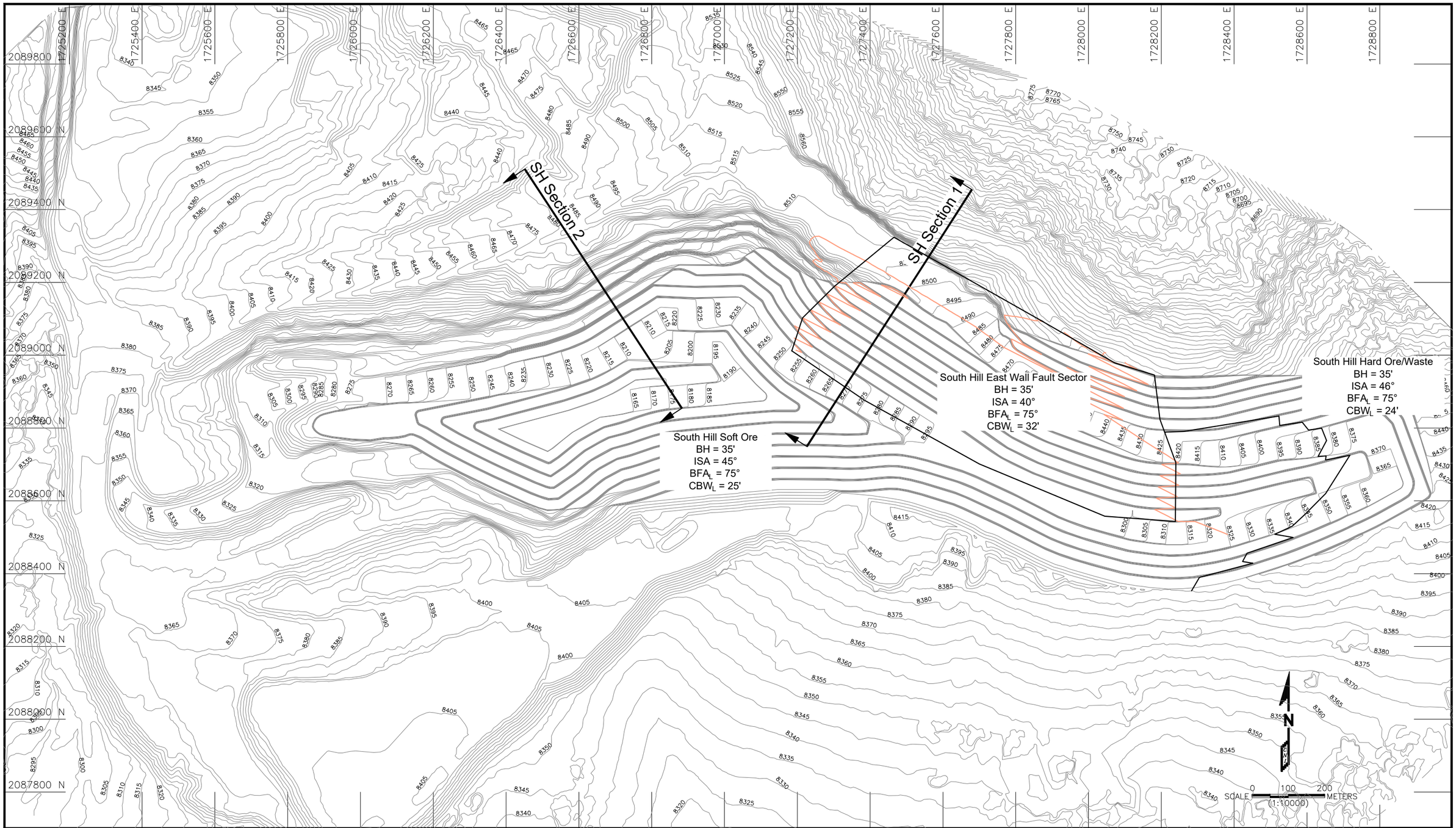
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LMC	02/25	2/26/2025 1:22 PM

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FINES DUMP AREA TOPOGRAPHY MAP

IMERYS / NO AGUA

SCALE	MAP
1:10000	MAP 4



LEGEND

SECTOR SLOPE RECOMMENDATIONS
BH = BENCH HEIGHT
ISA = INTERRAMP SLOPE ANGLE
BFA$_L$ = LAYOUT BENCH FACE ANGLE
CBW$_L$ = LAYOUT CATCH BENCH WIDTH

ISA SECTOR BOUNDARY

POTENTIAL FAULT CT01 - SEE TEXT

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DRAWN	DATE	REVISED
LMC	11/24	3/5/2025 6:00 PM

\PROJECTS\IMERYS\NO_AGUA\REPORT\MAPS\SECTOR_MAPS.DWG

SOUTH HILL LOM
SLOPE DESIGN SECTOR MAP

IMERYS / NO AGUA

SCALE 1:10000

MAP 5

APPENDIX A

PRELIMIARY GEOLOGIC MAP OF THE NO AGUA SITE

PROVIDED BY IMERYS



Mine Dump

Basalt

West Hill Flow Rhyolite/Obsidian

West Hill Flow Lower Glass

West Hill Flow Pyroclastics

West Hill Flow Tuff

North Hill Phreatic Breccia

North Hill Late Stage Intrusive

Low Hills Flow upper Glass

Low Hills Flow Rhyolite/Obsidian

North Hill Flows Upper Glass

North Hill Flows Rhyolite/Obsidian

North Hill Flows Lower Glass

North Hill Flows Coarse Pyroclastics

North Hill Tuff

Preliminary Geologic Map of No Agua Peaks, Taos Co., NM

1"=500'

0 500 1000

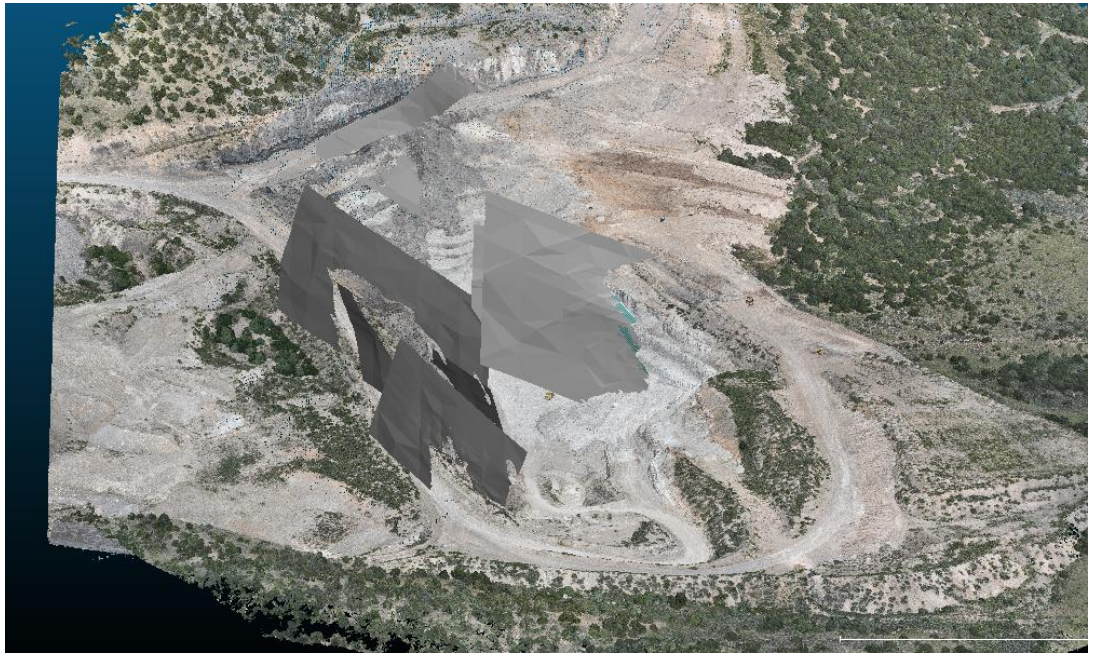
Contour Interval = 20'

APPENDIX B

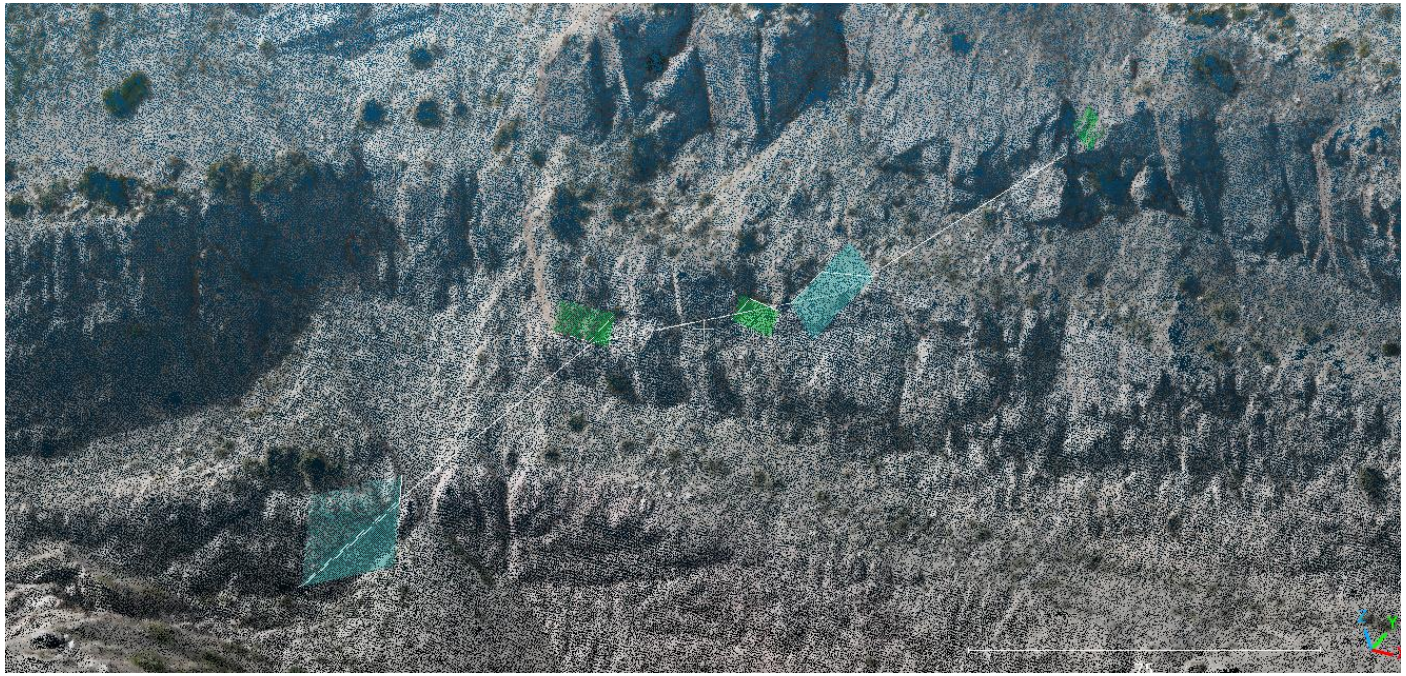
FAULT MAPPING ON SOUTH HILL POINTCLOUD

Overall View





W Fault, the fault trace can be followed along more than 3 benches



Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1725897.07	2089084.99	8383.39	55.7564	184.062	-1	FW
1725735.56	2088997.15	8300.71	35.0756	197.763	-1	FW
1725778.68	2089039.64	8335.57	48.1234	184.839	-1	FW
1725822.57	2089046.09	8343.51	42.6224	188.605	-1	FW
1725841.18	2089052.04	8350.55	34.7861	195.717	-1	FW
1725804.62	2089039.09	8337.47	34.9815	190.066	-1	FW

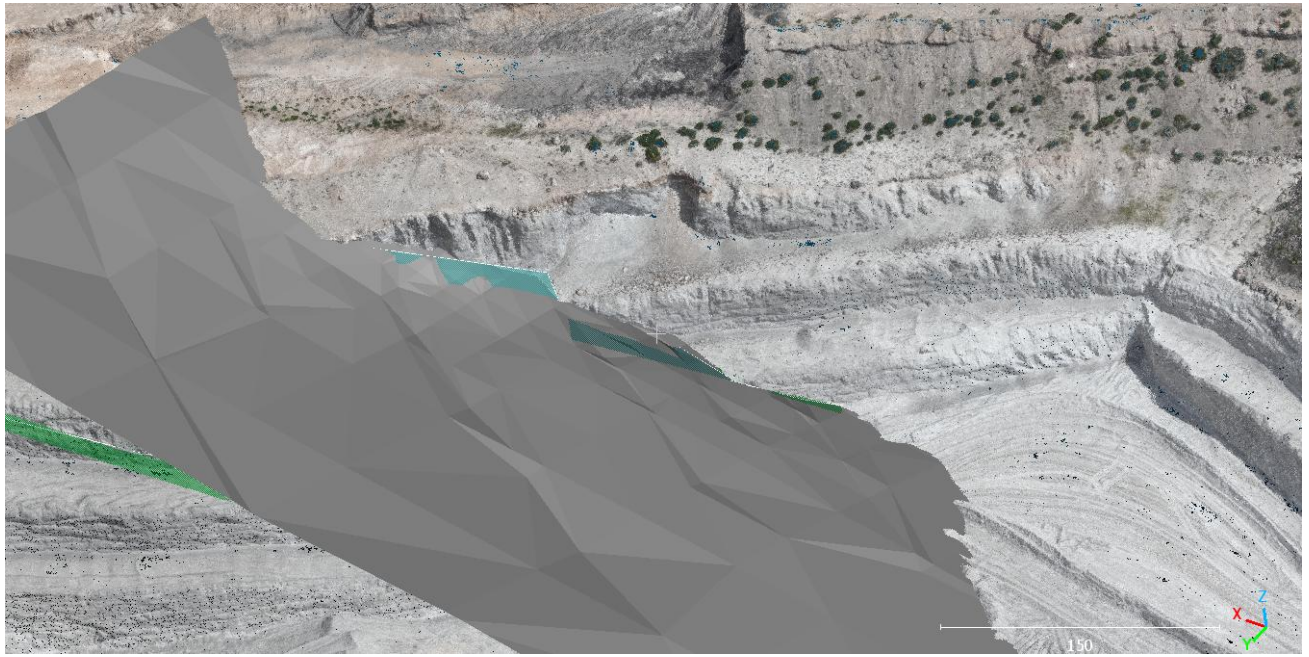


Fault 2, can be followed as a continuous lineament along more than 2 benches on the south wall of the pit



Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726848.75	2088726.95	8361.48	24.8963	252.532	-1	FT-02
1726744.54	2088689.87	8319.21	29.1115	199.326	-1	FT-02
1726678.39	2088668.28	8296.02	25.9481	206.014	-1	FT-02



Fault 3, can be followed along more than 3 benches



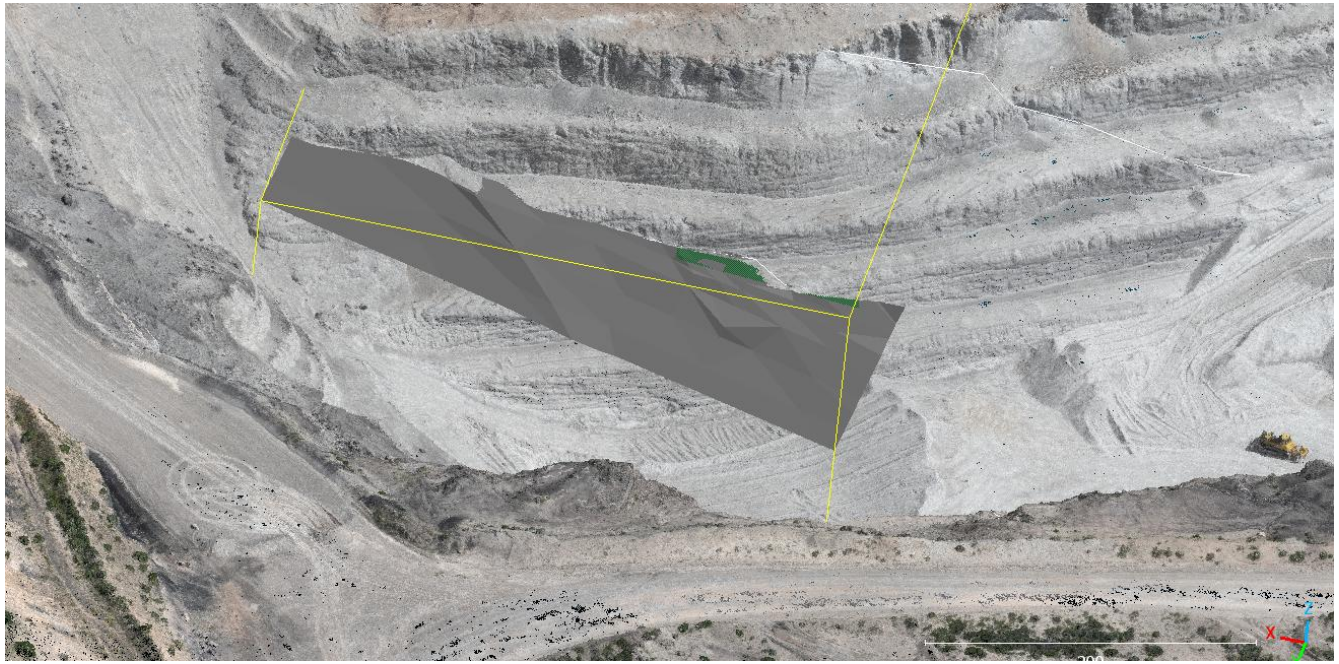


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726613.79	2089192.76	8382.34	28.0532	182.547	-1	FT-03
1726662.87	2089266.42	8428.07	32.4743	196.689	-1	FT-03
1726675.38	2089318.55	8464.82	37.4614	179.54	-1	FT-03
1726559.35	2089131.24	8345.66	29.8329	190.601	-1	FT-03

Fault 4, can be followed along more than 2 benches.

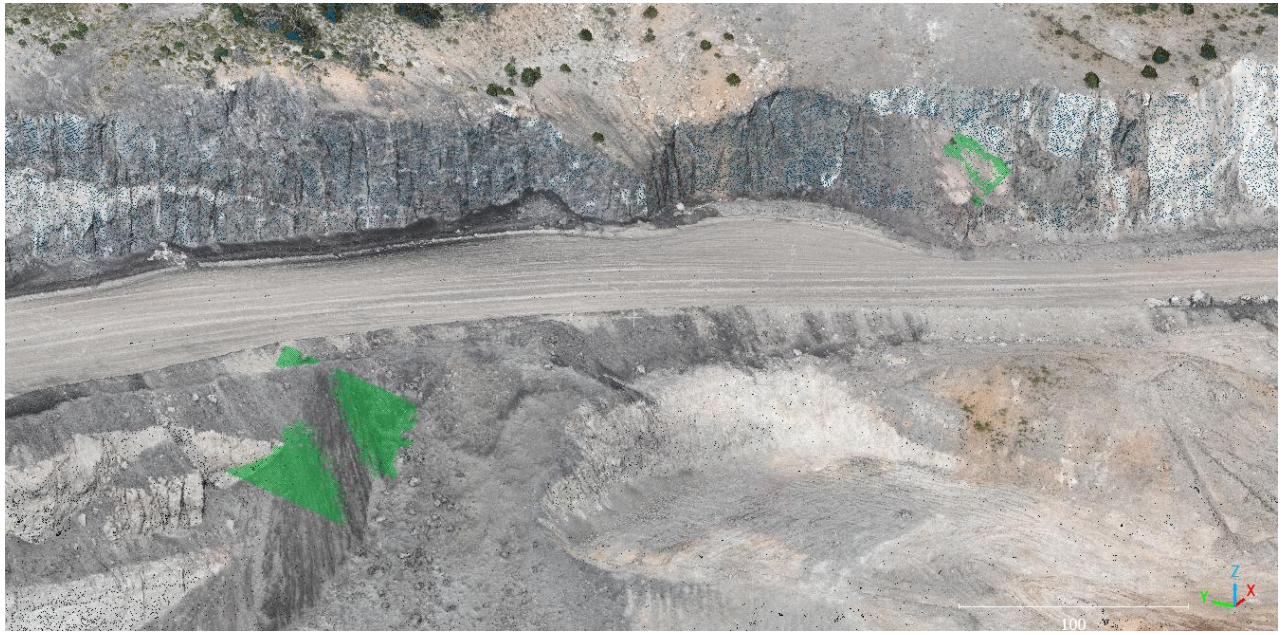


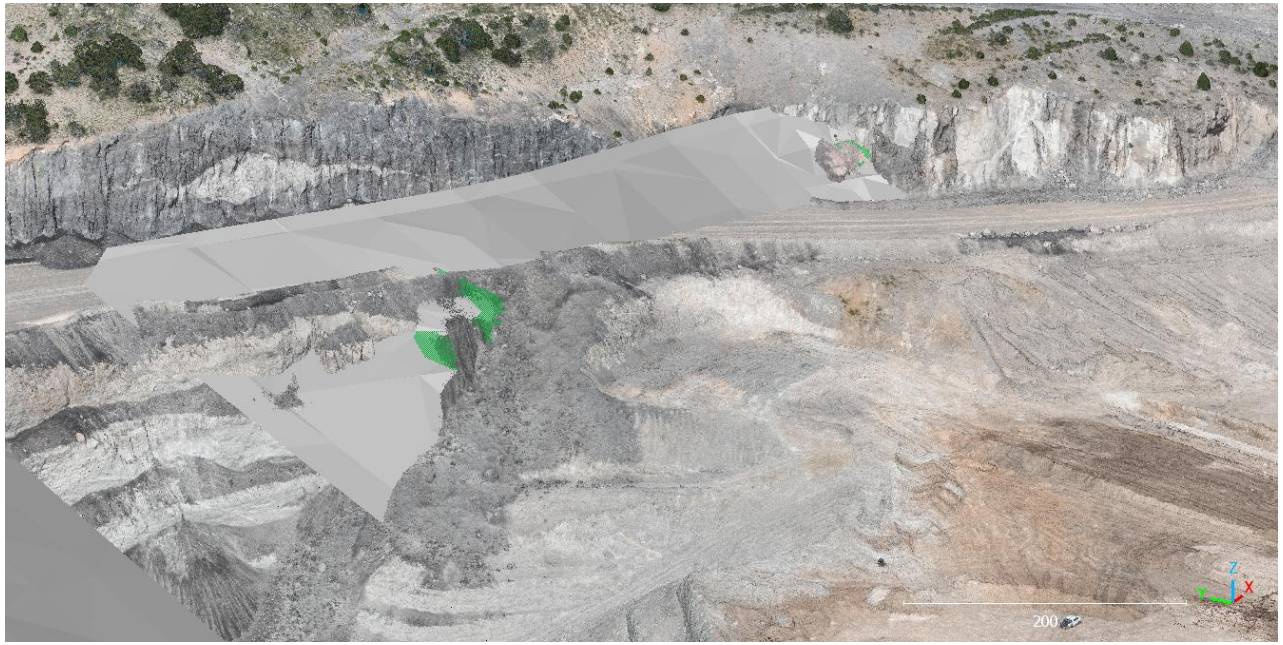


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726941.61	2088871.88	8298.91	17.6431	235.83	-1	FT-04

Contact 1, located in the east pit wall . A contact between different lithologies is defined by two semi-parallel planes.

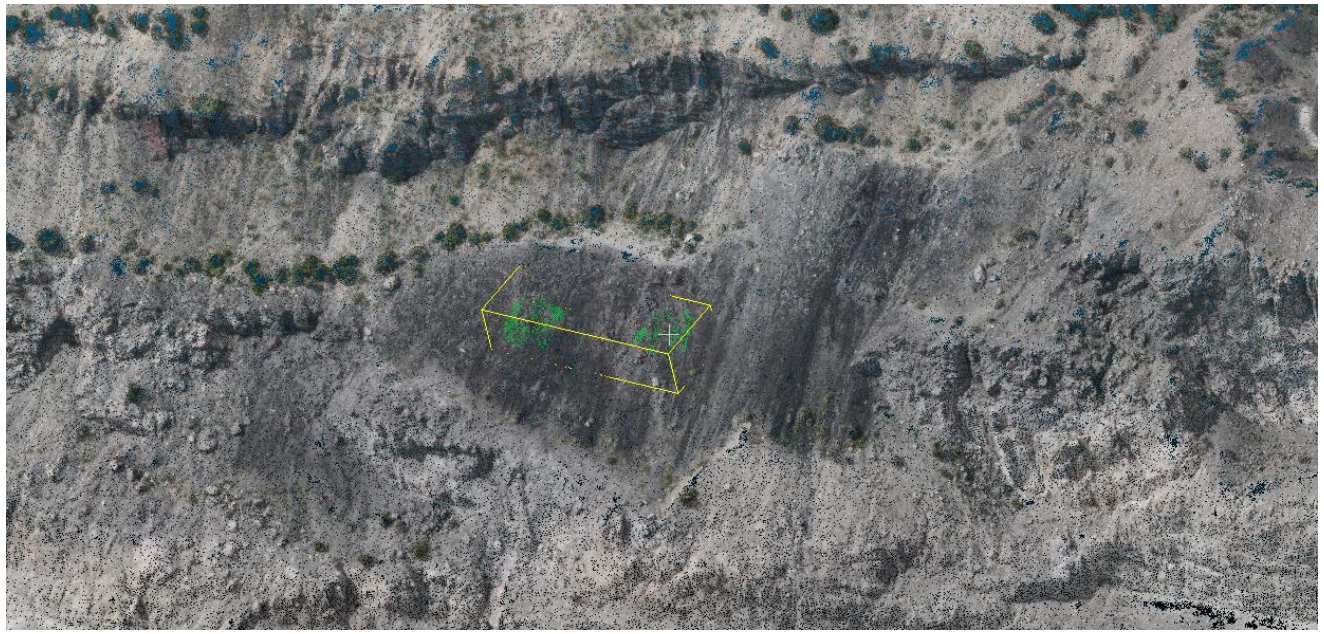


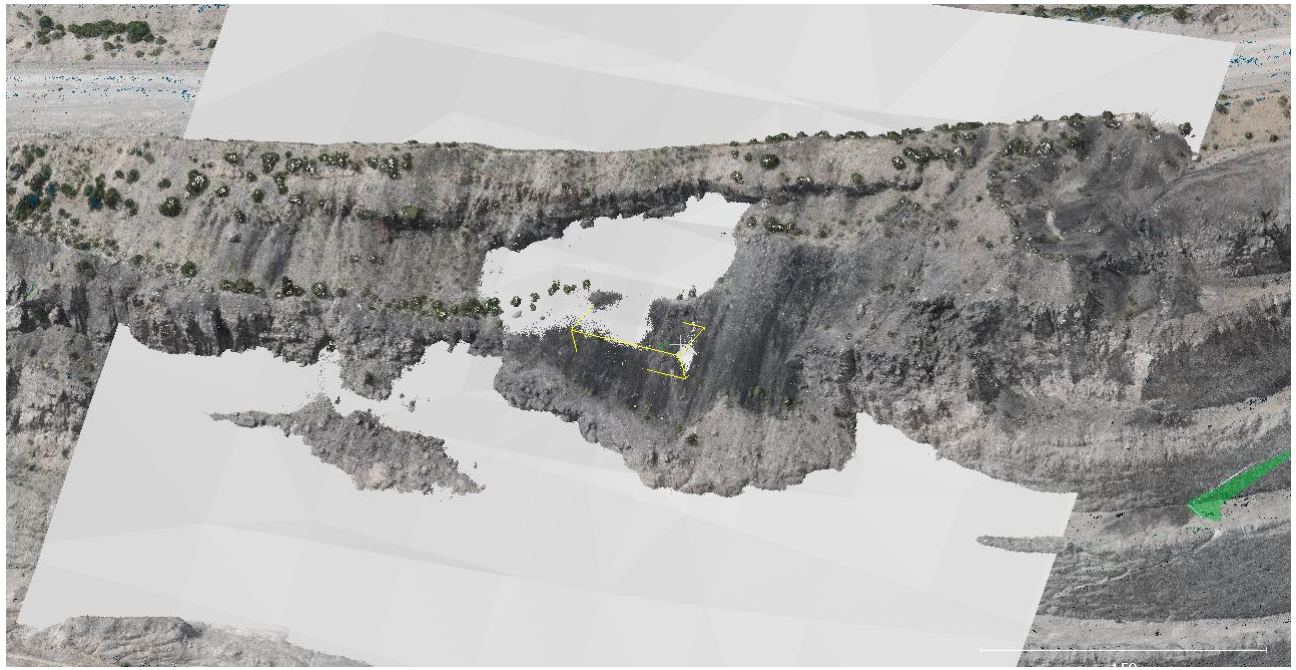


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1727399.92	2089183.75	8478.69	32.6982	223.239	-1	CT01
1727783.26	2089058.97	8508.53	42.7075	213.691	-1	CT01

Contact 2, a cone-shaped spill can be observed; however, it is consistent with the general trend of the structures, which could have been exposed by the scaling.



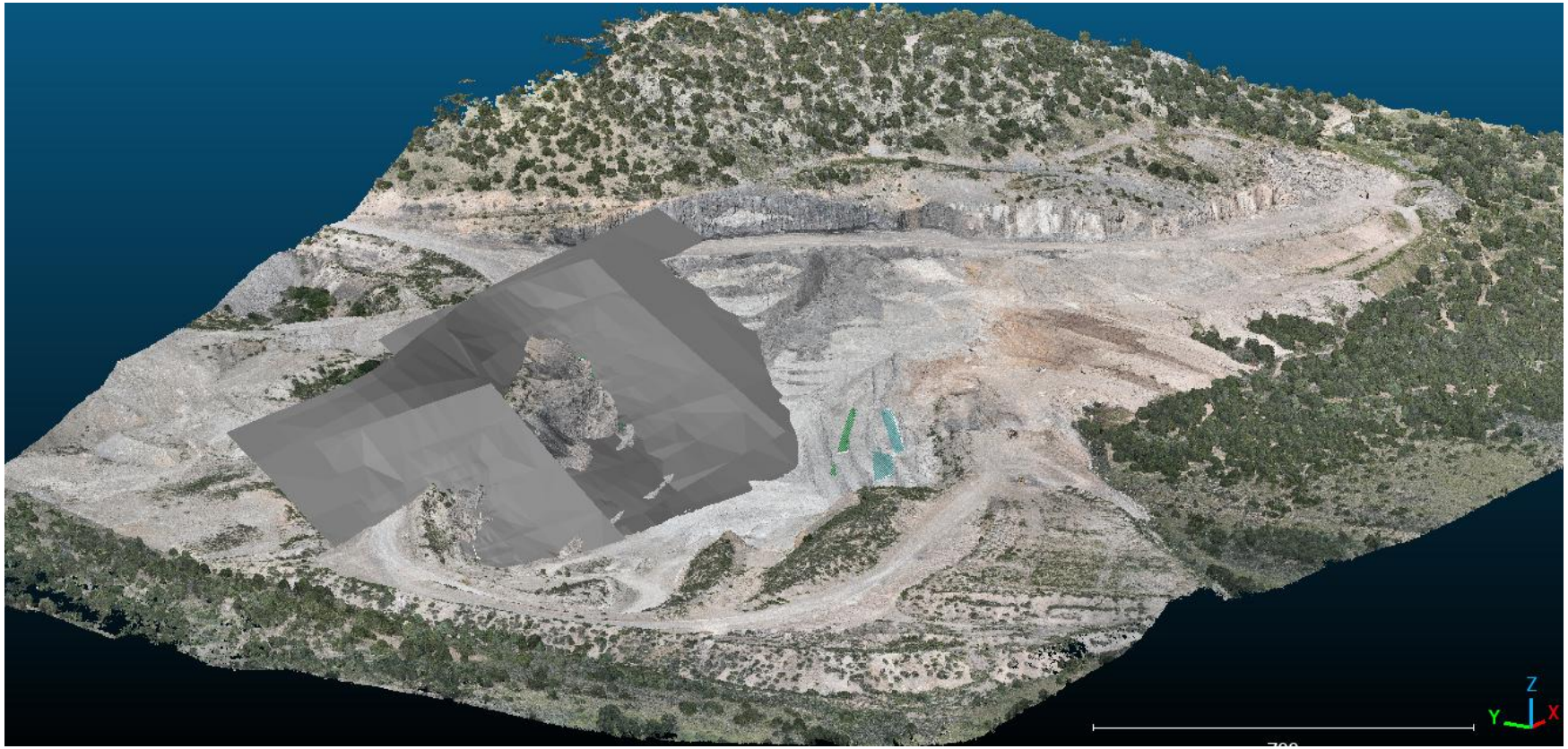


Fault Plane Measurements

X	Y	Z	DIP	DDR	POLARITY	TYPE
1726227.13	2089134.42	8396.81	33.9338	177.324	-1	CT02
1726274.49	2089141.72	8399.95	33.3311	164.6	-1	CT02

Potential Major Fault

In the northern wall of the pit, it is possible to correlate 3 moderately coplanar structures that could be associated with a major fault that coincides with the greatest dimension of the pit.



APPENDIX C

SOUTH HILL BENCH AUDIT

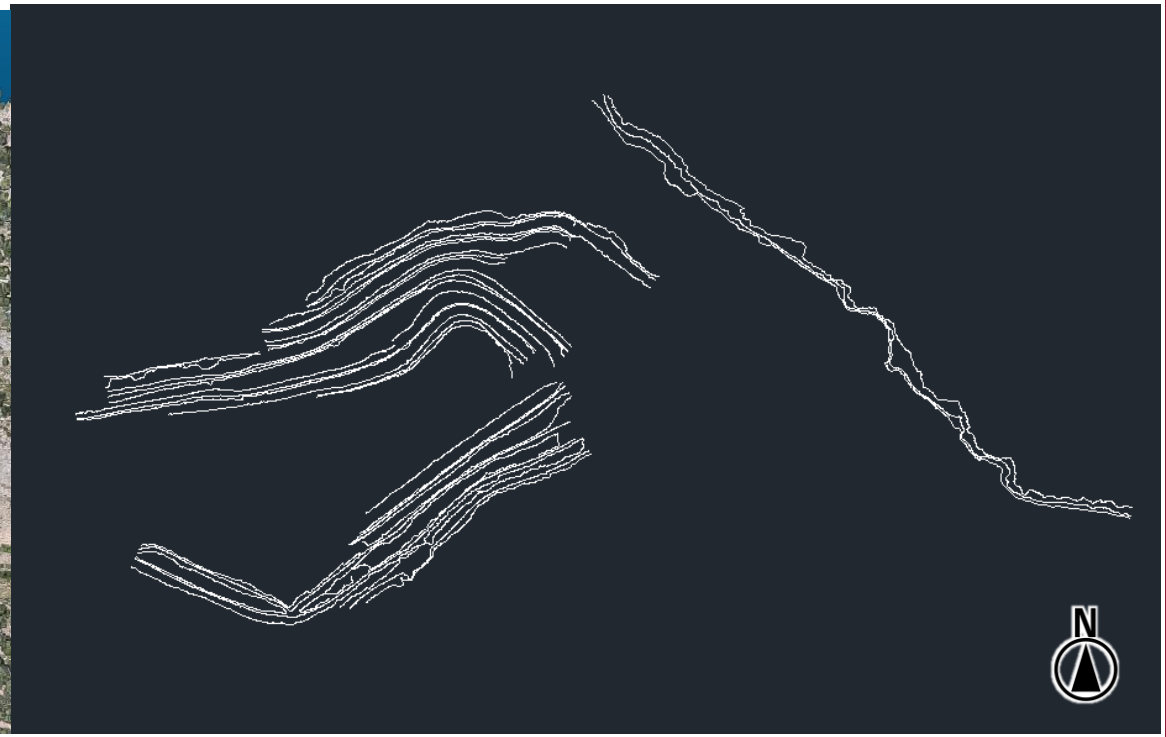
Slope Audit No Agua

Nov 2024

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Slope Audit – No Agua (South Hill) – Line Digitalization Process



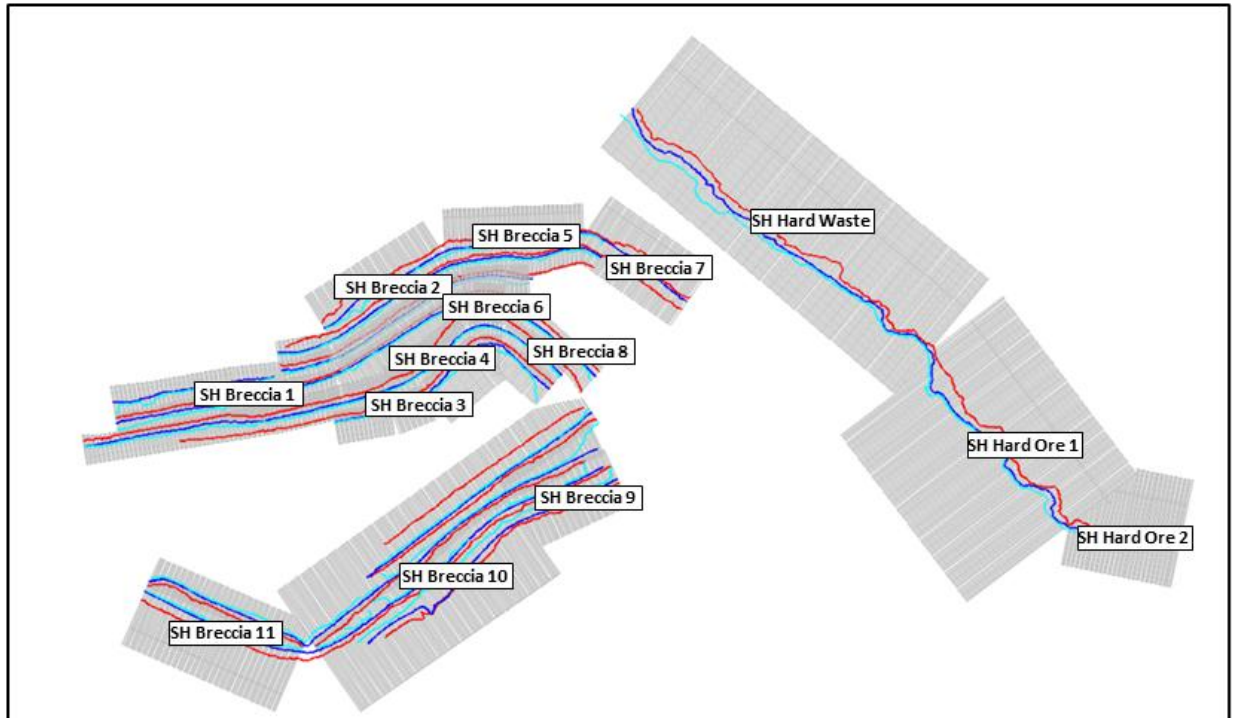


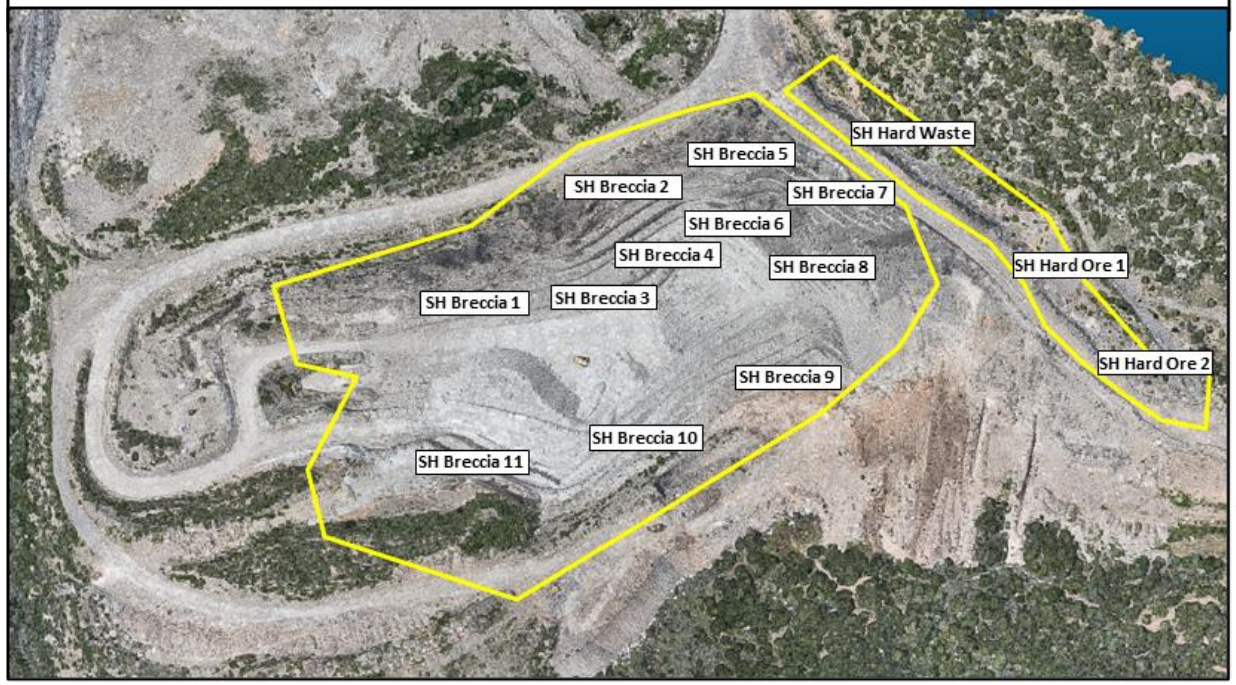
CALL&NICHOLAS

Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - North		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Breccia 1 (24ft)	170.1	54.16	58.35	20.62	23.87	24
SH Breccia 1 (40ft)	170.1	61.90	67.50	No Lower Bench	No Lower Bench	40
SH Breccia 1 (55ft)	170.1	76.20	77.00	21.34	22.50	55
SH Breccia 2 (24ft)	147.7	67.98	72.80	21.38	22.76	24
SH Breccia 2 (40 ft)	147.7	65.14	71.90	27.31	28.01	40
SH Breccia 2 (55ft)	147.7	77.86	80.10	31.46	55.02	55
SH Breccia 3 (24ft)	158.6	54.40	56.70	20.37	24.12	24
SH Breccia 3 (40 ft)	158.6	63.88	65.80	22.79	24.94	40
SH Breccia 4 (24ft)	140.7	53.18	54.90	No Lower Bench	No Lower Bench	24
SH Breccia 4 (40ft)	140.7	48.86	56.05	22.00	24.75	40



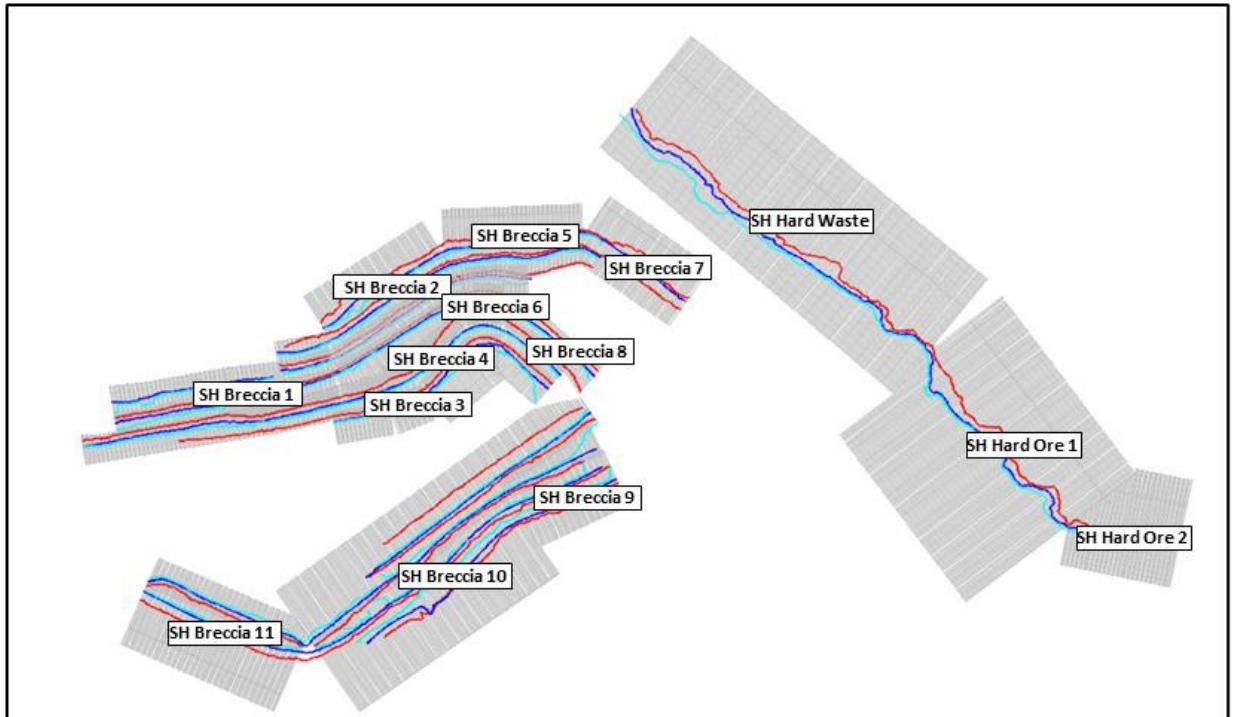


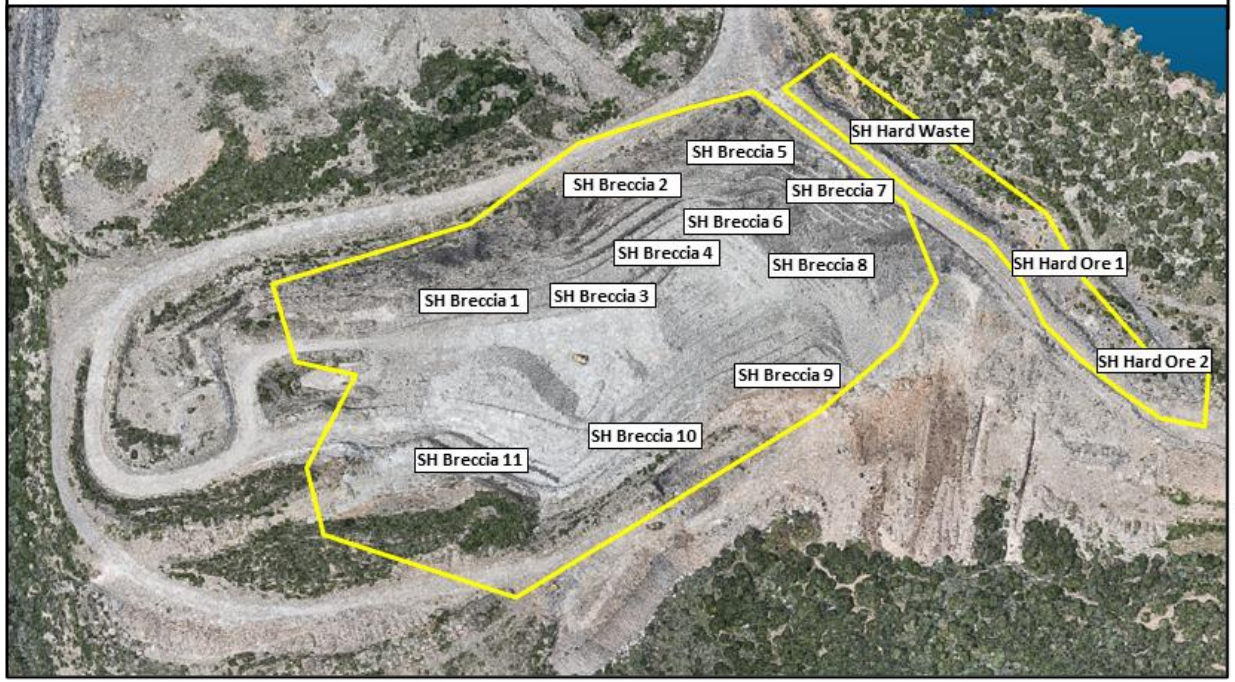
CALL&NICHOLAS

Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - North		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Breccia 5 (40ft)	177.9	65.44	78.40	22.54	26.35	40
SH Breccia 5 (55ft)	177.9	79.38	81.10	28.34	29.40	55
SH Breccia 6 (24ft)	184.2	47.96	55.75	25.00	27.13	24
SH Breccia 6 (40ft)	184.2	49.62	52.30	22.06	22.58	40
SH Breccia 7 (40ft)	215	64.46	81.90	17.39	19.98	40
SH Breccia 8 (24ft)	221.1	53.38	59.90	23.79	25.56	24
SH Breccia 8 (40ft)	221.1	55.82	57.50	22.82	24.63	40

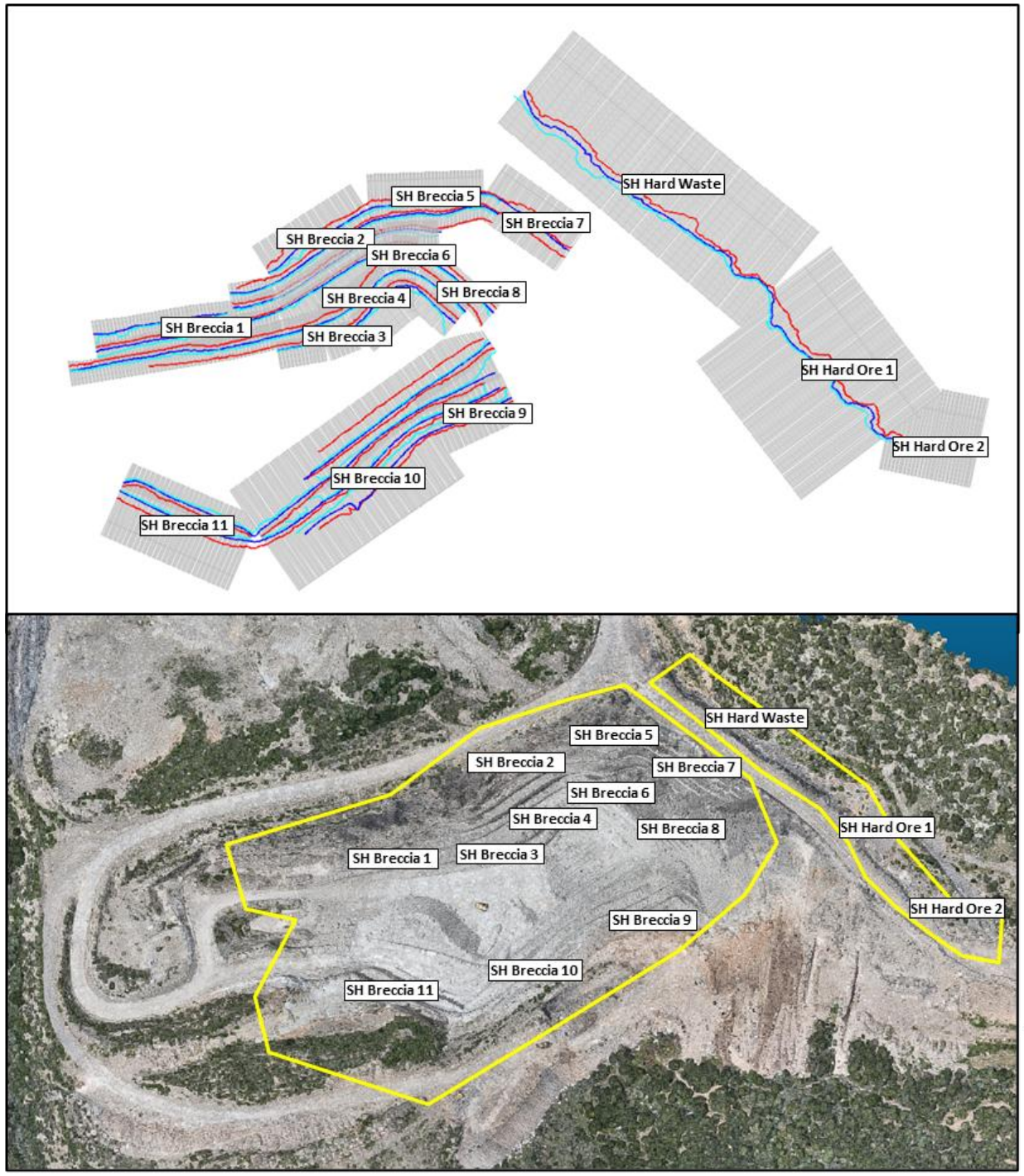




Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - South		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Breccia 9 (24ft)	335.1	66.80	70.20	30.40	33.42	24
SH Breccia 9 (40ft)	335.1	71.56	75.70	24.09	25.72	40
SH Breccia 10 (24ft)	325.5	64.90	71.60	21.68	26.98	24
SH Breccia 10 (40ft)	325.5	67.22	72.50	21.16	25.38	40
SH Breccia 11 (24ft)	23.6	60.52	64.80	No Lower Bench	No Lower Bench	24
SH Breccia 11 (40ft)	23.6	54.80	56.50	24.52	27.95	40

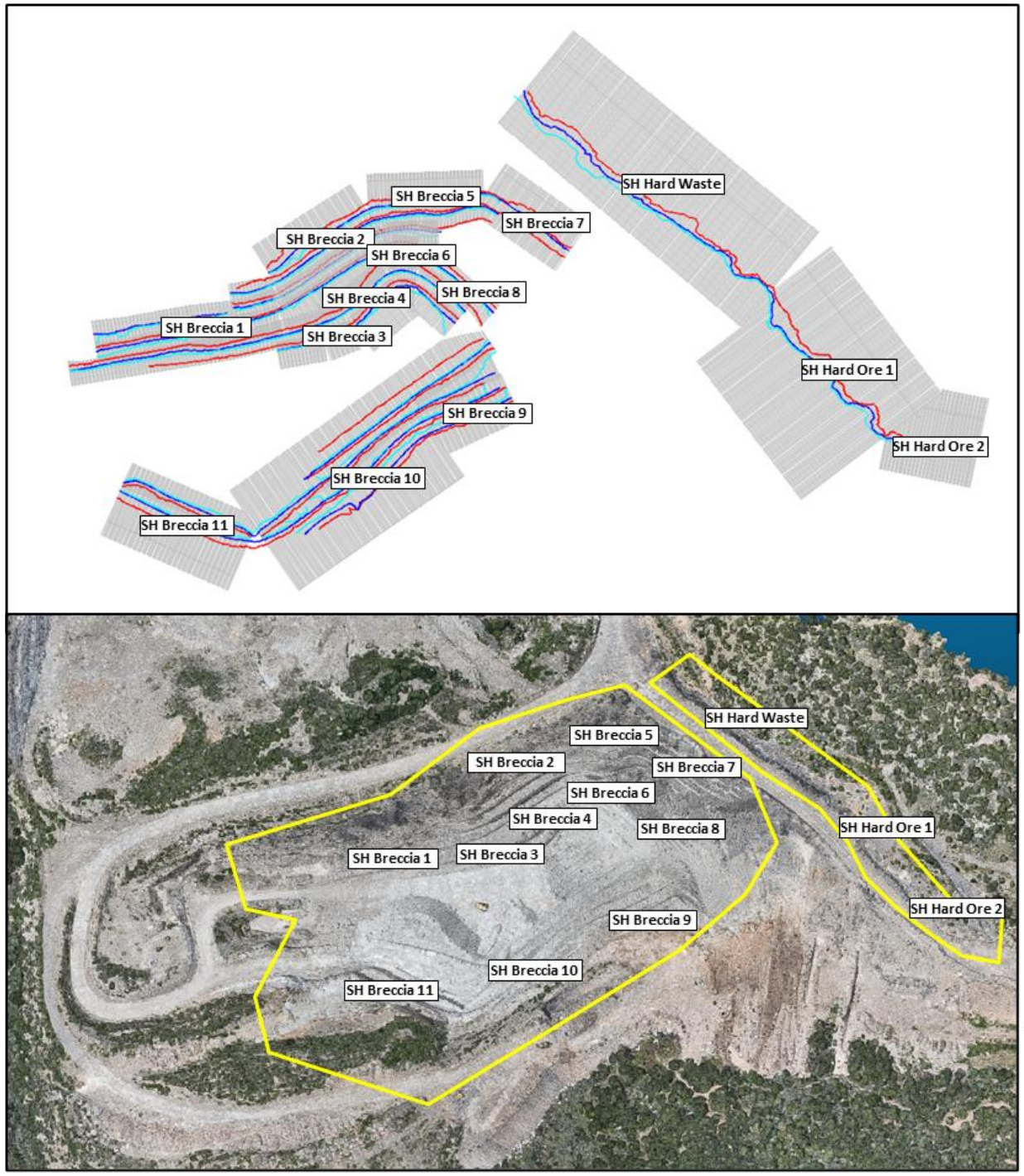


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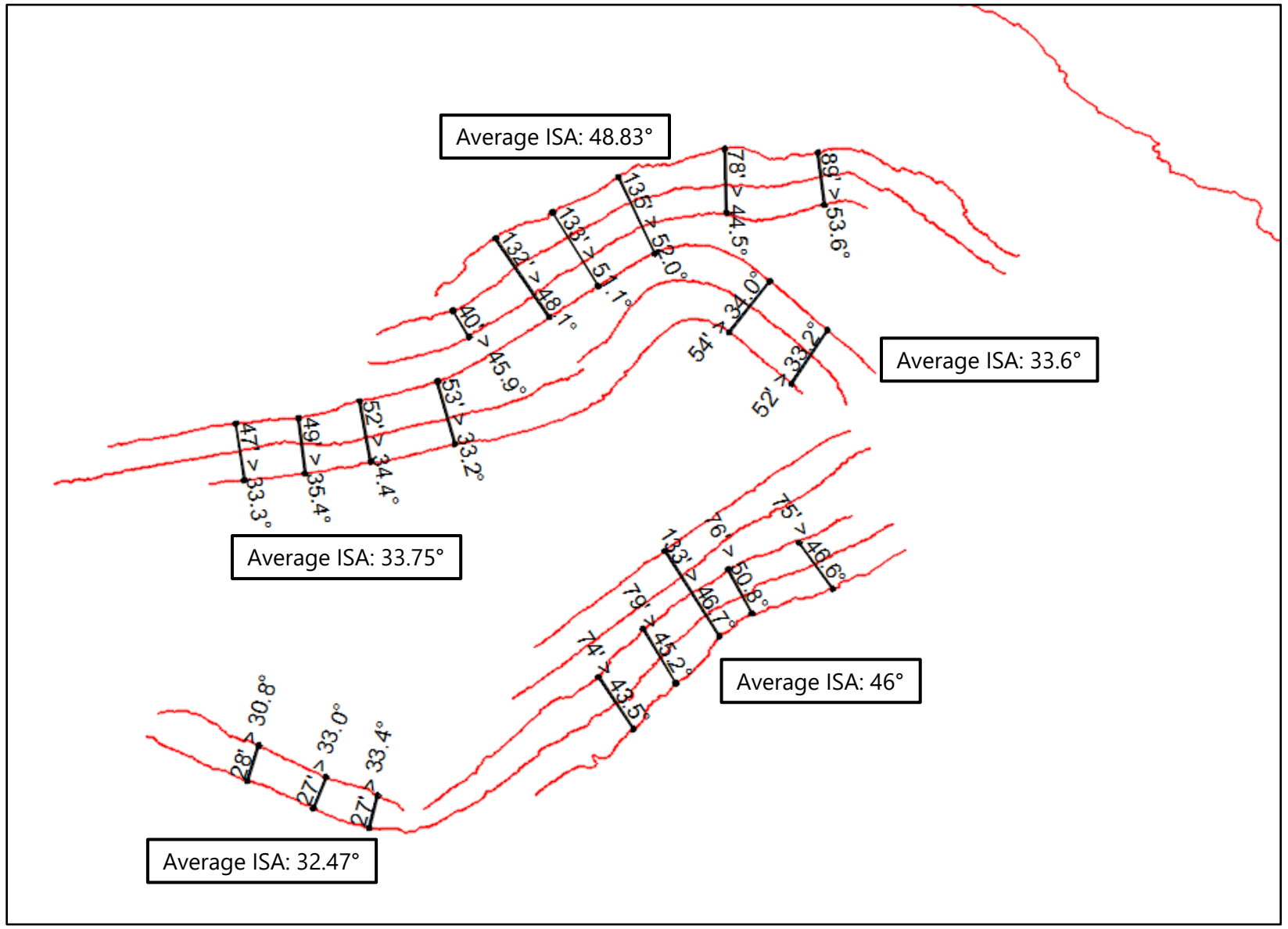
Slope Audit Results – No Agua (South Hill)

Bench Height (ft)	CBW (Ritchie) (ft)
24	14.08
40	23
55	26

South Hill - Northeast		BFA (°)		CBW (ft)		Bench Height (ft)
		Rely		Rely		
ID	WDD(°)	80%	50%	80%	50%	
SH Hard Ore (55ft)	232.9	63.86	70.80	No Lower Bench	No Lower Bench	55
SH Hard Ore 2 (55t)	191.7	67.12	70.05	No Lower Bench	No Lower Bench	55
SH Hard Waste (40ft)	219.4	65.48	73.20	No Lower Bench	No Lower Bench	40
SH Hard Waste (55ft)	219.4	73.72	77.20	No Lower Bench	No Lower Bench	55



ISA Audit Results – No Agua (South Hill)



APPENDIX D

2025 NO AGUA LABORATORY TESTING

AND ROCK MASS STRENGTH CALCULATIONS

2025 No Agua Geomechanical Laboratory Results

Intact Test Summary

Sample #	*Drill Hole*	*Depth (ft)*	*Rock Type*	*Test Type*	*Density (pcf)*	*Failure Mode*	*Confinement (psi)*	*Failure Stress (psi)*
24334-Surface A-0000-U	Boulder	Surface	CBXA	UCS	89.9	Fracture & Intact	0	260
24334-Surface B-0000-U	Boulder	Surface	CBXA	UCS	97.2	Intact	0	439
24334-Surface C-T	Boulder	Surface	CBXA	TCS	95.8	Fracture	75	928
24334-Surface D-T	Boulder	Surface	CBXA	TCS	95.3	Both	75	896
24334-Surface E-T[A]	Boulder	Surface	CBXA	TCS	93.7	Both	75	395

[A] not used in intact regression

USCS Summary

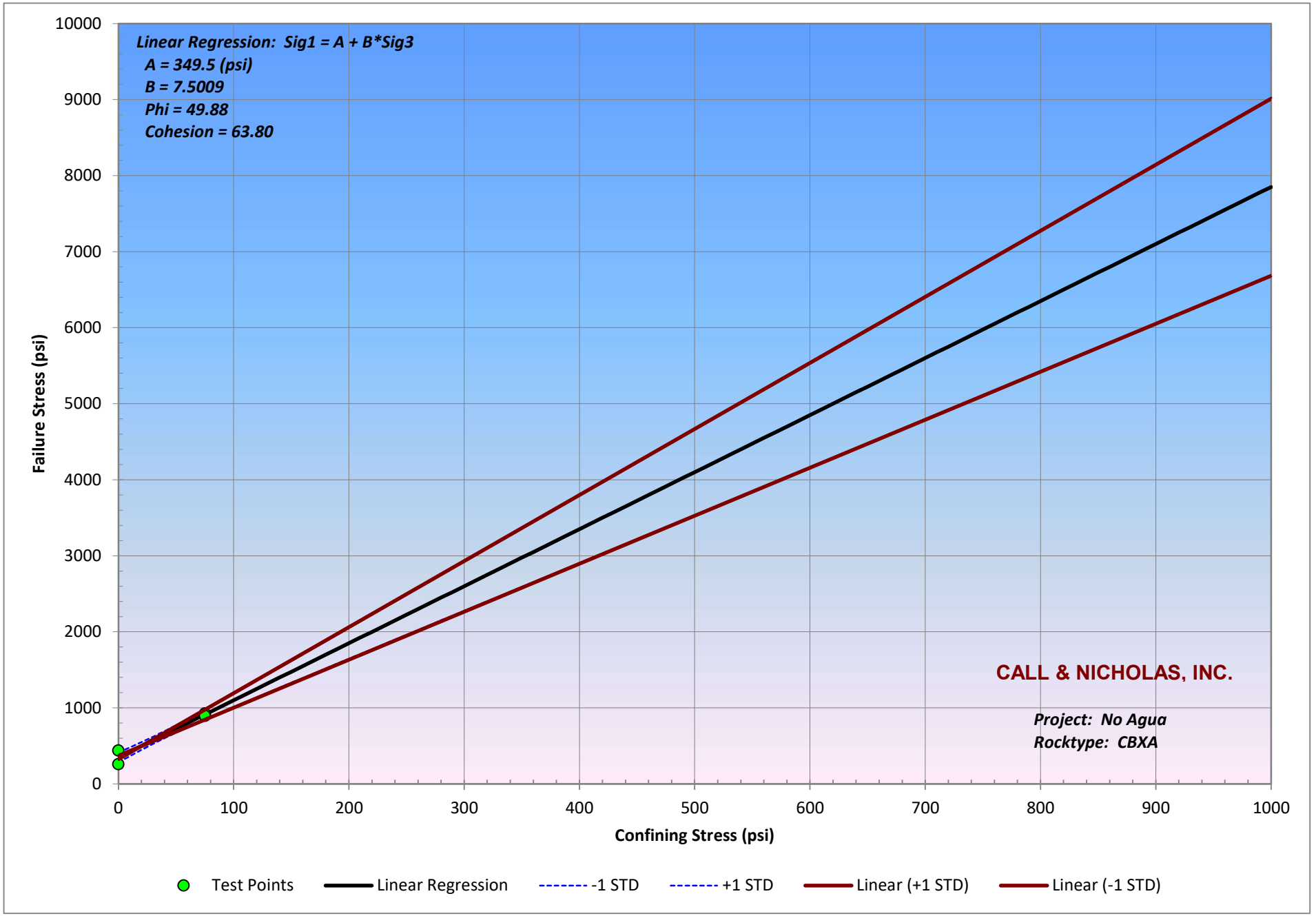
Sample #	**Hole**	**Depth (ft)**	**Rock Type**	*As-Rcvd Moisture (%)*	*Liquid Limit*	*Plasticity Index*	*Plastic Limit*	*USCS*
24334-FineDump-C	Surface	Surface	Fines Dump	0.58%	39.0	11	28	ML
24334-WestHillTuff-C	Surface	Surface	Airfall Tuff (Laminated Sand)	2.24%	42.0	N/A	NP	SW-SM

Remold Direct Shear Test Summary

Sample #	**Hole**	*Depth (ft)*	**Rock Type**	*Test Type*	*Wet Density (pcf)*	*Pre Test Moisture %*	*Post Test Moisture %*	*Linear*		*Power*	
								phi (deg)	*coh (psi)*	*k (psi)*	*m*
24334-FineDump-R	Surface	Surface	Fines Dump	Remold SSDS	113.7	22.0	18.6	35.2	3.2	0.9241	0.9534
24334-WestHillTuff-R	Surface	Surface	Airfall Tuff (Laminated Sand)	Remold SSDS	98.7	10.1	7.9	35.0	5.0	1.0956	0.9222

INTACT FAILURE ENVELOPE

SOUTH HILL CBXA


Linear Regression: Sig1 = A + B*Sig3
A = 349.5 (psi)
B = 7.5009
Phi = 49.88
Cohesion = 63.80
CALL & NICHOLAS, INC.
Project: No Agua
Rocktype: CBXA
Failure Stress (psi)
Confining Stress (psi)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
0
100
200
300
400
500
600
700
800
900
1000
Test Points
Linear Regression
-1 STD
+1 STD
Linear (+1 STD)
Linear (-1 STD)

ROCKMASS CALCULATIONS

CNI Method Nonlinear Rock Mass Strength Estimation Worksheet

Project #	24334	*Imperial Units*	Client	Imerys
Date	2/20/2025		Location	No Agua
Engineer	M Schmidt		Rock Type	CBXA
Comments	SH - CBXA		Rock Type (2)	

Input Data

Intact Rock Strength

σ_{ci} = 350 psi

$\emptyset_i$ = 49.9 deg.

Degree of Fracturing

RQD = 50 %

Fracture Shear Strength

$coh_{fracture}$ = 5 psi

$\emptyset_{fracture}$ = 35.0 deg.

Cohesion Reduction Factor

C_{rf} = 1

Estimated Rock Mass Strength (Linear)

$r = 0.05e^{0.026 \cdot RQD}$ = 0.183

$\emptyset_m = \text{atan}\left[r^{2/3}\tan\emptyset_i + \left(1 - r^{2/3}\right)\tan\emptyset_{fracture}\right]$ = 40.6 deg.

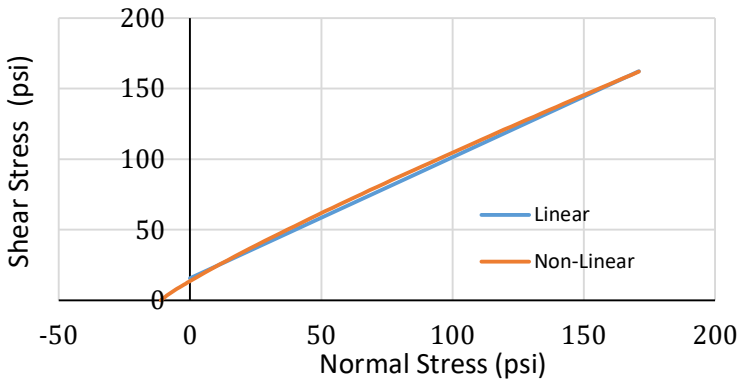
$coh_m = C_{rf}\left[r\, coh_i + (1-r)coh_{fracture}\right]$ = 16 psi

$\sigma_{cm} = 2 \cdot coh_m \cdot \tan\left(45 + \frac{\emptyset_m}{2}\right)$ = 68 psi

Estimated Rock Mass Strength (Nonlinear)

ρ_{atm}	14.7 psi	T_o	-11.1 psi
χ	0.98	T_o/C_o	-0.163
n	0.88	A	1.16
φc	45.3 deg.	a	1.00

$\sigma_{n\text{-}max}$ 171 psi



References: Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2023). A practical nonlinear strength criterion for rock masses and other geological materials. In: Proceedings of Rocscience International Conference. April 24-26, 2023, Toronto, Canada.

Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2022). A practical strength criterion for rock masses based on quantitative input parameters. In: Proceedings of International Slope Stability 2022 Symposium. October 17-21, 2022, Tucson, AZ, USA.

CNI Method Rock Mass Strength Estimation Worksheet

Project #	24315	*Imperial Untis*	Client	Imerys
Date	11/19/2024	*Input Data: UCS+mi Data, Jr Ja Data, RQD Data*	Location	No Agua
Engineer	MJS		Rock Type	C, CGT, G
Comments	Tucker Hill CGT Data		Rock Type (2)	HARD ORES/WASTE

Input Data

Intact Rock Strength

UCS = 1,176,768 psf

m_i = 25.0

$Estimated\ \emptyset_i$ = 50.6 deg.

Degree of Fracturing

RQD = 50 %

Fracture Shear Strength

Jr = 2.0

Ja = 2.0

$Estimated\ \emptyset_{fracture}$ = 28.2 deg.

Cohesion Reduction Factor

C_{rf} = 0.35

Estimated Rock Mass Properties

$$r = 0.05e^{0.03 \cdot RQD} = 0.183$$

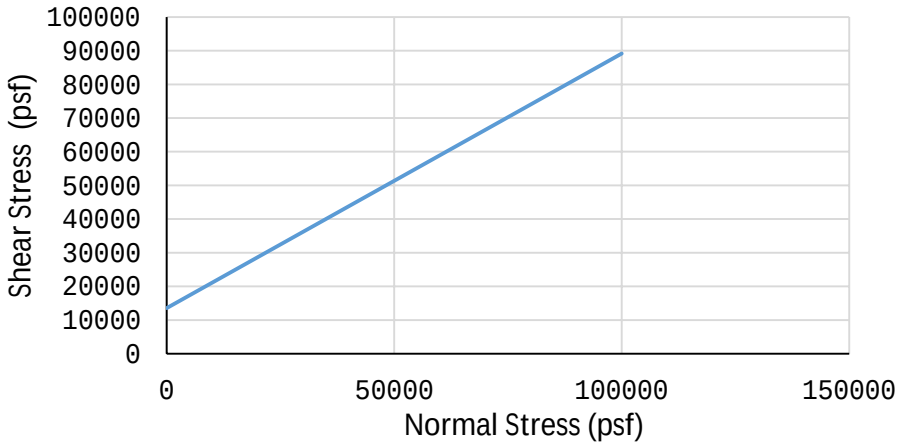
$$\emptyset_m = \operatorname{atan}\left[r^{2/3}\tan\emptyset_i + \left(1 - r^{2/3}\right)\tan\emptyset_{fracture}\right] = 37.1 \text{ deg.}$$

$$coh_m = C_{rf}\left[r\,coh_i + (1-r)coh_{fracture}\right] = 13{,}521 \text{ psf}$$

$$\sigma_{cm} = 2 \cdot coh_m \cdot \tan\left(45 + \frac{\emptyset_m}{2}\right) = 54{,}367 \text{ psf}$$

σ_n-max

100,000 psf



Reference: Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2022). A practical strength criterion for rock masses based on quantitative input parameters. In: Proceedings of International Slope Stability 2022 Symposium. October 17-21, 2022, Tucson, AZ, USA.

CNI Method Nonlinear Rock Mass Strength Estimation Worksheet

Project #	24334	*Imperial Units*	Client	Imerys
Date	2/20/2025		Location	No Agua
Engineer	M Schmidt		Rock Type	WH Pyroclastic
Comments	Intact strength from CBXA		Rock Type (2)	

Input Data

Intact Rock Strength

σ_{ci} = 350 psi

$\emptyset_i$ = 49.9 deg.

Degree of Fracturing

RQD = 5 %

Fracture Shear Strength

$coh_{fracture}$ = 5 psi

$\emptyset_{fracture}$ = 35.0 deg.

Cohesion Reduction Factor

C_{rf} = 1

Estimated Rock Mass Strength (Linear)

$r = 0.05e^{0.026 \cdot RQD}$ = 0.057

$\emptyset_m = \text{atan}\left[r^{2/3}\tan\emptyset_i + \left(1 - r^{2/3}\right)\tan\emptyset_{fracture}\right]$ = 37.7 deg.

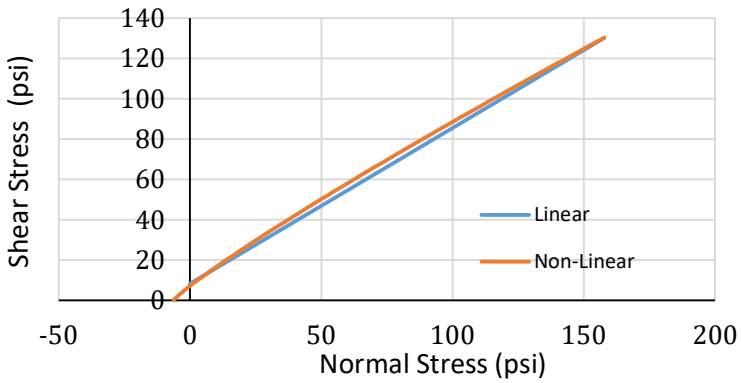
$coh_m = C_{rf}\left[r\, coh_i + (1-r)coh_{fracture}\right]$ = 8 psi

$\sigma_{cm} = 2 \cdot coh_m \cdot \tan\left(45 + \frac{\emptyset_m}{2}\right)$ = 34 psi

Estimated Rock Mass Strength (Nonlinear)

ρ_{atm}	14.7 psi	T_o	-6.3 psi
χ	0.98	T_o/C_o	-0.187
n	0.89	A	1.22
φc	43.3 deg.	a	0.94

$\sigma_{n\text{-}max}$ 158 psi



References: Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2023). A practical nonlinear strength criterion for rock masses and other geological materials. In: Proceedings of Rocscience International Conference. April 24-26, 2023, Toronto, Canada.

Cylwik, S.D., Killian, J.R., Cicchini, P.F. (2022). A practical strength criterion for rock masses based on quantitative input parameters. In: Proceedings of International Slope Stability 2022 Symposium. October 17-21, 2022, Tucson, AZ, USA.

UCS TEST RESULTS

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

2445 North Coyote Drive , Suite 107, Tucson, AZ 85745

UNIAXIAL COMPRESSION STRENGTH

Uniaxial Compressive Strength of Intact Rock Core Specimens

With basis in ASTM 7012-10, Method C (Uniaxial Compression - No Elastic Constant determination)



Pre Test Front



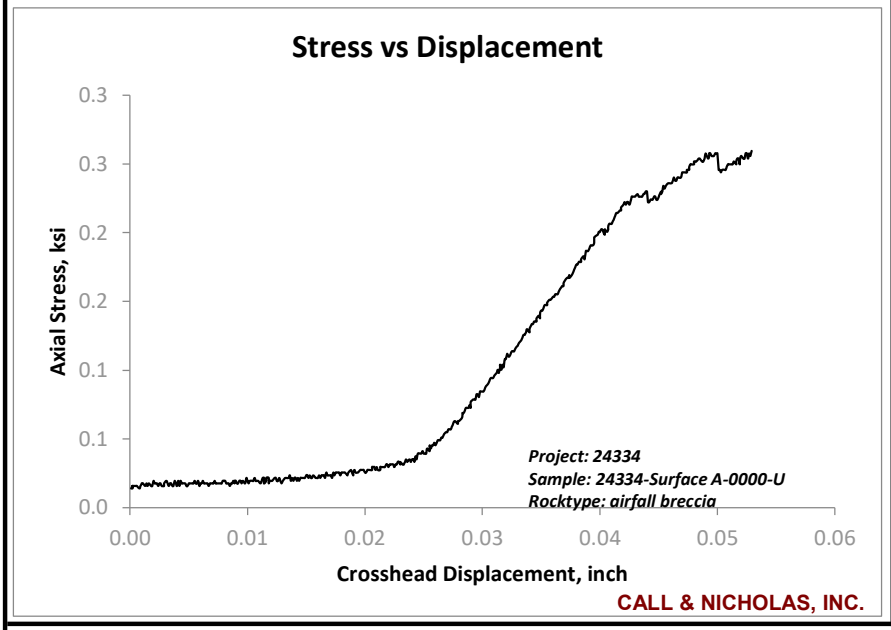
Pre Test Back



Post Test Front



Post Test Back



Date	07-February-2025	
Client	Imerys	
Location	No Agua	
Tech	EK	
Facility	CNI - Tucson	
Load Frame	Southwark, S/N: 32132	
Load Cell	Omega 300 Kip, S/N: 324427-A/B	

Sample Specifications

Sample ID	***24334-Surface A-0000-U***	
Project No:	24334	
Hole ID	Surface A	
Depth	From:	Surface
	To:	Boulder
Coordinates (if applicable)		
Northing		
Easting		
Elevation		
Rock Type:	airfall breccia	
Rock Code:	CBXA	
Alteration:		
Diameter (in)		2.01
Length (in)		4.45
L/D Ratio		2.2
Sample meets the L/D >= 2 requirement.		
Loading faces are parallel as per ASTM D4543-19		
Area (in^2)		3.18
Volume (in^3)		14.15
Mass (g)		333.75
Bulk Density	(pcf)	89.9
	(kg/m^3)	1439

Testing Specifications

Strain Rate (%/sec)	4.50E-03
Stress Rate (psi/sec)	1
Sample Moisture	As-received Dry
Temperature (ºF)	Room Temperature

Test Results

Time to Failure (min)	4.4	
Failure Load (lbs)	826	
Strain at Failure (%)	N/A	
Primary Failure Mode	Fracture & Intact	
Secondary Failure Mode	Single Shear	
Failure Stress, σ_{cd}	260	psi
	1.8	MPa

REMARKS:

Elastic Properties

Method: Elastic Properties NOT determined

Young's Modulus	N/A	psi
	N/A	GPa
Poisson's Ratio:	N/A	

Normalized UCS to 50 mm (Hoek & Brown, 1980)

$\sigma_{c50} = \sigma_{cd}/((50/d)^{0.18})$, where d is in mm

σ_{c50}	261	psi
	1.8	MPa

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

2445 North Coyote Drive , Suite 107, Tucson, AZ 85745

UNIAXIAL COMPRESSION STRENGTH

Uniaxial Compressive Strength of Intact Rock Core Specimens

With basis in ASTM 7012-10, Method C (Uniaxial Compression - No Elastic Constant determination)



Pre Test Front



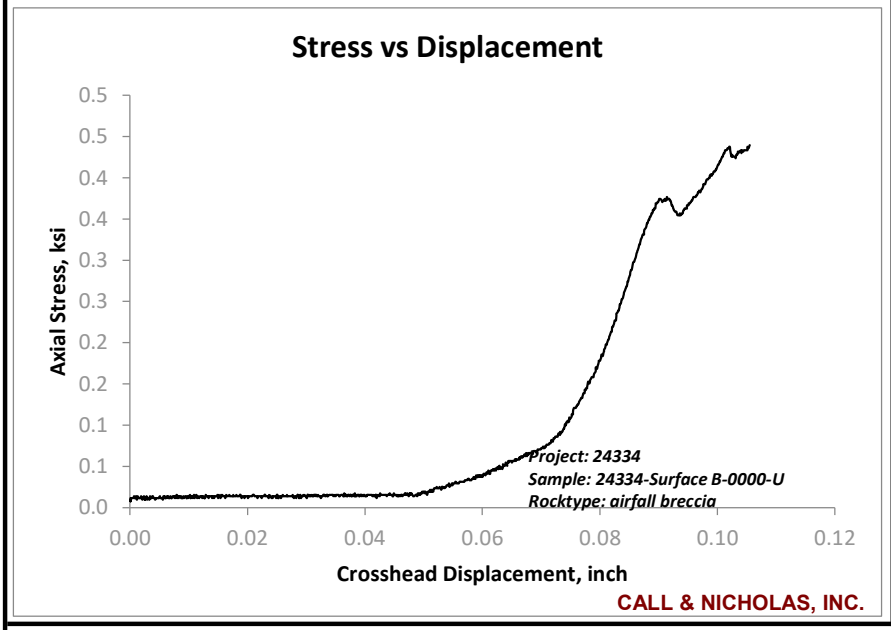
Pre Test Back



Post Test Front



Post Test Back



Date	07-February-2025
Client	Imerys
Location	No Agua
Tech	EK
Facility	CNI - Tucson
Load Frame	Southwark, S/N: 32132
Load Cell	Omega 300 Kip, S/N: 324427-A/B

Sample Specifications

Sample ID	***24334-Surface B-0000-U***	
Project No:	24334	
Hole ID	Surface B	
Depth	From:	Surface
	To:	Boulder
Coordinates (if applicable)		
Northing		
Easting		
Elevation		
Rock Type:	airfall breccia	
Rock Code:	CBXA	
Alteration:		
Diameter (in)		2.02
Length (in)		4.28
L/D Ratio		2.1
Sample meets the L/D >= 2 requirement.		
Loading faces are parallel as per ASTM D4543-19		
Area (in^2)		3.20
Volume (in^3)		13.68
Mass (g)		349.21
Bulk Density	(pcf)	97.2
	(kg/m^3)	1558

Testing Specifications

Strain Rate (%/sec)	4.67E-03
Stress Rate (psi/sec)	1
Sample Moisture	As-received Dry
Temperature (ºF)	Room Temperature

Test Results

Time to Failure (min)	8.7	
Failure Load (lbs)	1405	
Strain at Failure (%)	N/A	
Primary Failure Mode	Intact	
Secondary Failure Mode	Spalling	
Failure Stress, σ_{cd}	439	psi
	3.0	MPa

REMARKS:

Elastic Properties

Method: Elastic Properties NOT determined

Young's Modulus	N/A	psi
	N/A	GPa
Poisson's Ratio:	N/A	

Normalized UCS to 50 mm (Hoek & Brown, 1980)

$\sigma_{c50} = \sigma_{cd}/((50/d)^{0.18})$, where d is in mm

σ_{c50}	441	psi
	3.0	MPa

TCS TEST RESULTS

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

Project #	24334	Triaxial Compression Test Results	Client	Imerys
Date	2/7/2025		Location	No Agua
Technician	EK	**Failure Data:**	Sample #	**24334-Surface C-T**
		Sample # 24334-Surface C-T	Rock Type:	Airfall Breccia
			Density:	95.8 (pcf)
				1,533.9 (kg/m^3)

Sample Data :	
Sample #	24334-Surface C-T
Rock Type:	Airfall Breccia
Hole ID:	Surface C
Depth:	Surface Boulder
Alterations:	
Diameter:	2.209 (in)
Length:	5.151 (in)
Mass:	496.07 (gm)
Area:	3.832 (in^2)
Volume:	19.735 (in^3)

Rock Code:	CBXA
Hardness:	

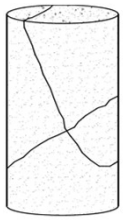
U.S. Standard		
Sigma 3 (psi)	**Sigma 1** (psi)	
75	928	**Peak**
		Residuals

Metric Standard		
Sigma 3 (MPa)	**Sigma 1** (MPa)	
0.52	6.4	**Peak**
		Residuals

Test Data:	
Disp. Rate:	0.0002 (in/sec)
Load Rate:	(lbs/sec)
Gage Reading:	(lbs)
Mode of Failure:	Fracture
Test Duration:	(sec)
L/D Ratio:	2.33

Secondary Failure Mode

Multiple_Shear





Front Pre Test



Back Pre Test

Mode of Failure :

Fracture	X
Intact	
Both	



Front Post Test



Back Post Test

NOTES:

Dia. 1	2.186	Length 1	5.152
Dia. 2	2.250	Length 2	5.153
Dia. 3	2.202	Length 3	5.148
Dia. 4	2.237	Length 4	5.151
Dia. 5	2.194	Mass (gm)	496.07
Dia. 6	2.185		

Sigma 3 (psi)	**Fail Load** gage (lbs)
75	3,557

Sample No.	**24334-Surface C-T**

Does sample meet ASTM standards for loading face tolerances: Yes

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

Project #	24334	Triaxial Compression Test Results	Client	Imerys
Date	2/7/2025		Location	No Agua
Technician	EK	**Failure Data:**	Sample #	**24334-Surface D-T**
		Sample # 24334-Surface D-T	Rock Type:	Airfall Breccia
			Density:	95.3 (pcf)
				1,526.3 (kg/m^3)

Sample Data :	
Sample #	24334-Surface D-T
Rock Type:	Airfall Breccia
Hole ID:	Surface D
Depth:	Surface Boulder
Alterations:	
Diameter:	2.212 (in)
Length:	5.073 (in)
Mass:	487.52 (gm)
Area:	3.843 (in^2)
Volume:	19.492 (in^3)

Rock Code:	CBXA
Hardness:	

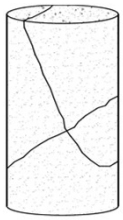
U.S. Standard		
Sigma 3 (psi)	**Sigma 1** (psi)	
75	896	**Peak**
		Residuals

Metric Standard		
Sigma 3 (MPa)	**Sigma 1** (MPa)	
0.52	6.2	**Peak**
		Residuals

Test Data:	
Disp. Rate:	0.0002 (in/sec)
Load Rate:	(lbs/sec)
Gage Reading:	(lbs)
Mode of Failure:	Both
Test Duration:	(sec)
L/D Ratio:	2.29

Secondary Failure Mode

Multiple_Shear





Front Pre Test



Back Pre Test

Mode of Failure :

Fracture	
Intact	
Both	X



Front Post Test



Back Post Test

NOTES:

Dia. 1	2.184	Length 1	5.069
Dia. 2	2.236	Length 2	5.082
Dia. 3	2.250	Length 3	5.065
Dia. 4	2.204	Length 4	5.076
Dia. 5	2.243	Mass (gm)	487.52
Dia. 6	2.155		

Sigma 3 (psi)	**Fail Load** gage (lbs)
75	3,442

Sample No.	**24334-Surface D-T**

Does sample meet ASTM standards for loading face tolerances: Yes

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

Project #	24334
Date	2/7/2025
Technician	EK

Triaxial Compression Test Results

Failure Data:

Sample # 24334-Surface E-T

Client	Imerys
Location	No Agua
Sample #	**24334-Surface E-T**
Rock Type:	Airfall Breccia
Density:	93.7 (pcf)
	1,500.4 (kg/m^3)

Sample Data :	
Sample #	24334-Surface E-T
Rock Type:	Airfall Breccia
Hole ID:	Surface E
Depth:	Surface Boulder
Alterations:	
Diameter:	1.719 (in)
Length:	4.329 (in)
Mass:	246.92 (gm)
Area:	2.320 (in^2)
Volume:	10.042 (in^3)

Rock Code:	CBXA
Hardness:	

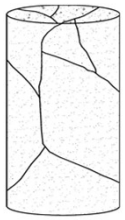
U.S. Standard		
Sigma 3 (psi)	**Sigma 1** (psi)	
75	395	**Peak**
		Residuals

Metric Standard		
Sigma 3 (MPa)	**Sigma 1** (MPa)	
0.52	2.7	**Peak**
		Residuals

Test Data:	
Disp. Rate:	0.0002 (in/sec)
Load Rate:	(lbs/sec)
Gage Reading:	(lbs)
Mode of Failure:	Both
Test Duration:	(sec)
L/D Ratio:	2.51

Secondary Failure Mode

Multiple_Fracturing





Front Pre Test



Back Pre Test

Mode of Failure :

Fracture	
Intact	
Both	X



Front Post Test



Back Post Test

NOTES:

Dia. 1	1.783	Length 1	4.334
Dia. 2	1.656	Length 2	4.326
Dia. 3	1.681	Length 3	4.328
Dia. 4	1.770	Length 4	4.327
Dia. 5	1.718	Mass (gm)	246.92
Dia. 6	1.706		

Sigma 3 (psi)	**Fail Load** gage (lbs)
75	916

Sample No.	**24334-Surface E-T**

Does sample meet ASTM standards for loading face tolerances: Yes

REMOLD SSDS AND USCS TEST RESULTS

WEST HILL LAMINATED SAND (AIRFALL TUFF)

Call & Nicholas, Inc.

Geomechanical Laboratory

Tucson, Arizona USA

Date	11/27/24	Area & Load Data for SSDS	*Project #*	24334
Technician	CB		*Client*	Imerys

Sample Data		
Peak/Residual	Residual	
Location	No Agua	
Sample #	24334-WestHillTuff-R	
Rock Type	AirFall Tuff	
Drill Hole	West Hill Tuff (Breccia)	
Depth	Surface	
Rock Code		
Shear Plane	Remold	
Surface Prep	Insitu	
Shape	Circle	
Test Speed	0.00125	*in/min*
Area	4.881	*in²*
Diameter	2.493	*in*
Radius	1.247	*in*
Tilt Correction		*deg*
Plane Filling		

Adjusted Trace Data				
Normal Load (lbs)	*Shear Load (lbs)*	*Area (in^2)*	*Normal Stress (psi)*	*Shear Stress (psi)*
124.2	99.0	4.2	29.2	23.3
244.2	193.6	4.2	58.0	46.0
487.0	374.6	4.1	118.2	90.9
978.8	700.4	4.2	230.5	164.9

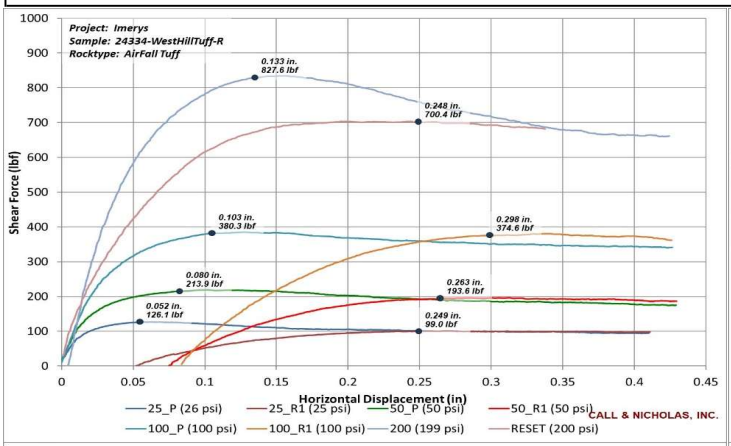
Pre Test Moisture	10.11	%
Post Test Moisture	7.90	%
Initial Density, wet	98.74	*pcf*
Calculated density, dry	89.67	*pcf*

Results		
Linear: Y = BX + C		
Friction Angle	35.01	*deg*
Cohesion	4.95	*psi*

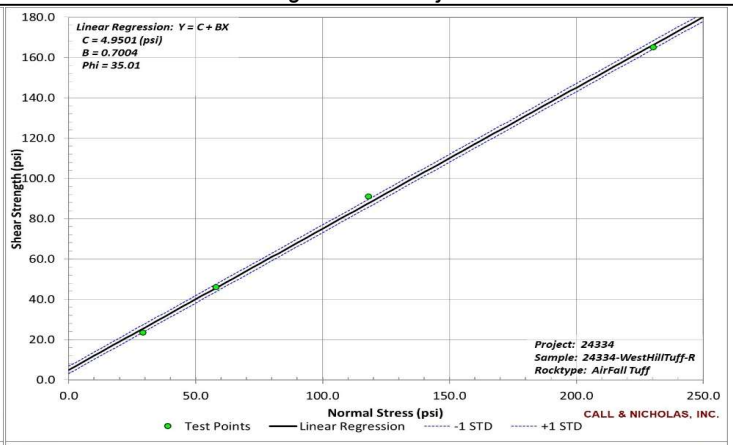
Power: $Y = KX^M$		
K	1.0956	*(for X in psi)*
M	0.9222	

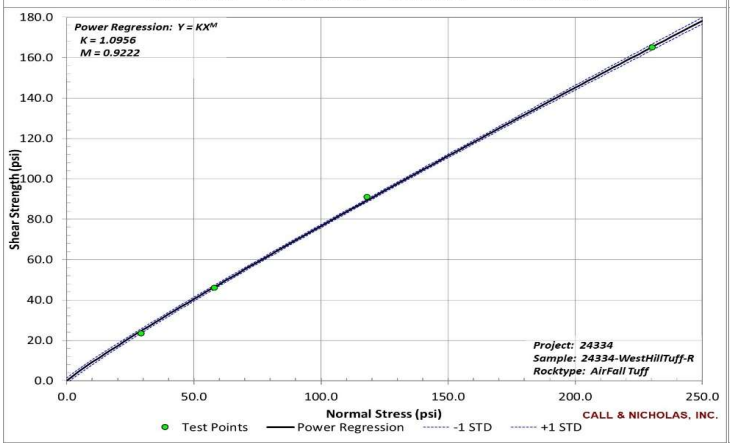
Modified Power: $Y = KX^M + C$		
K	1.0519	*(for X in psi)*
M	0.9301	
C	0.0281	*psi*

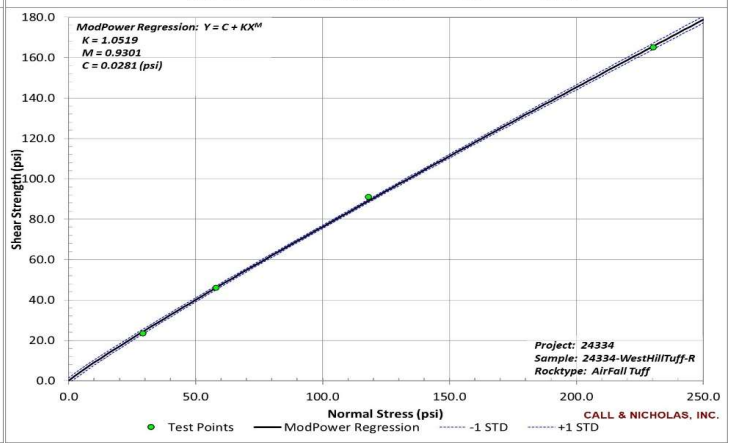
Plot of Raw Trace Data



Linear Regression of Adjusted Trace Data







Color	**Consistency**	**Plasticity**
Grey	Well-Graded Sand w/ Silt and Gravel	Sample is Not Plastic

Notes :

Sample reconditioned to: 10.0%

Packed to max. density (pcf) shear box would accept: 98.74

Calculated Dry Density (pcf): 89.67

Final moisture: 7.9%

Sample consolidated at each normal

As-rcvd moisture: 2.24 %

PL = Non Plastic

Fines classify as: ML

LL = 42

Overal sample classifies as: SW-SM

PI = N/A

Fresh material packed for each trace

Sample: 24334-WestHillTuff-R

CALL & NICHOLAS, INC.

Tech	KP/MP/CB/MT	Call & Nicholas, Inc.		Sample #	24334-WestHillTuff-C
Date	11/5/2024	Geomechanical Laboratory		Drill Hole	West Hill Tuff (Breccia)
Client	Imerys	**As-Received Descriptions**		Depth	Surface
Location	No Agua			Rock Type	AirFall Tuff

Consistency

	DRY (dusty, no water)	WET (damp ± visible, free water)	
	Loose: non-coherent	Loose: non-coherent	X
	Soft: breaks into powder or individual grains under very slight pressure	Very Friable: crushes easily under little pressure but will stick together if pressed again	X
	Slightly Hard: resists light pressure, but can be easily broken between thumb and forefinger	Friable: crushes easily under gentle/moderate pressure	
	Hard: resists moderate pressure, can be broken in the hands without difficulty	Firm: crushes under moderate pressure, but resistance is noticable	
	Very Hard: resists great pressure, but can be broken in the hands difficulty	Very Firm: crushes under strong pressure, but is difficult to do between thumb and forefinger	X
	Extremely Hard: resists extreme pressure and cannot be broken in between the hands	Extremely Firm: crushes only under very stong pressure, must be pulled apart to break	

Sample Color(s)

Primary (> 30%)	Secondary (< 30%)
Light Gray	White

Plasticity of Fines

Nonplastic	Low	Medium	High
Sample cannot be rolled, NP.	Sample can barely be rolled.	Easy to roll. PL reached with mild effort.	Easy to roll. Considerable work needed to reach PL.
	X		

USCS - Grouping Estimation (Pick NO More than 2)

Gravels			Sands		
GW	Well-graded gravel		SW	Well-graded sand	
GP	Poorly graded gravel		SP	Poorly graded sand	
GM	Silty gravel	X	SM	Silty sand	
GC	Clayey gravel		SC	Clayey sand	X
Silts/clays			**Organics**		
ML	Silt		OL	Organic clay	
MH	Elastic silt		OH	Organic silt	
CL	Lean clay		PT	Peat	
CH	Fat clay		*If a borderline case, check both applicable boxes.		

Minerals of Note

	Sulfides	Olivine	
	Muscovite	Magnitite	
	Calcite	Hematite	
	Quartz	Pyroxene	
	Biotite	Other	

Density Method

Density by 'slug'	ASTM 7263 Method B	
Wax method	ASTM 7263 Method A	
Density by suspension in water	ASTM C127 and C128	
Specific gravity by pycnometer	ASTM D854	

Sample Odor (If applicable)

Sulfurous	Petroleum	Chemical	Organic

Split Masses

Split Location	mass (grams)	%
Total As-Received mass	**10000**	**100.0%**
USCS (-10) bucket	1277.72	11.3%
USCS bucket + sample	2407.07	
USCS Starting Split	1129.35	
SSDS bucket	0	22.8%
SSDS bucket + sample	2278.27	
SSDS Split	2278.27	
Atterberg (-40) bucket	391.01	4.6%
Atterberg bucket + sample	847.3	
Atterberg Split	456.29	
As-Rcv'd bowl #	SSDS #2	7.1%
As-Rcv'd moisture bowl	585.46	
bowl + sample	1291.34	
As-Rcv'd moisture split	705.88	
Reserve	**5430.21**	**54.3%**
Summation	10000	**100.0%**

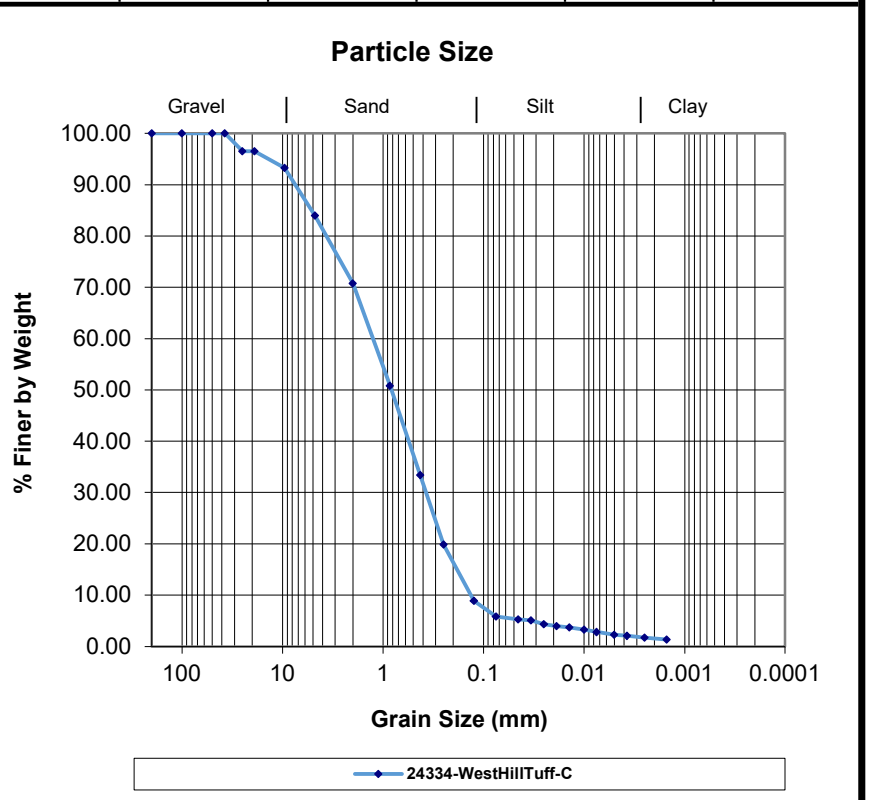
As-Received Photograph

No Picture

Sieve Analysis & Soil Classification

Sieve Size		Retained Weight	Retained % of Weight	Cumulative % Retained	Cumulative % Passing
U.S. - mm		Grams		Coarser	Finer
8"	200		0.00	0.00	100.00
4"	100		0.00	0.00	100.00
2"	50.0		0.00	0.00	100.00
1.5"	37.5		0.00	0.00	100.00
1"	25.0	35.18	3.48	3.48	96.52
3/4"	19.0	0.00	0.00	3.48	96.52
3/8"	9.5	32.52	3.22	6.70	93.30
# 4	4.75	93.68	9.28	15.98	84.02
# 10	2.00	134.11	13.28	29.26	70.74
# 20	0.850	201.46	19.95	49.21	50.79
# 40	0.425	175.47	17.38	66.58	33.42
# 60	0.250	136.82	13.55	80.13	19.87
# 120	0.125	110.70	10.96	91.09	8.91
# 200	0.075	30.95	3.06	94.16	5.84
Finer than #200		59.01	5.84	100.00	0.00
Final USCS (g)		1009.89	100.00		

Coarse Gravel %	Fine Gravel %	Coarse Sand %	Medium Sand %	Fine Sand %	Silt / Clay %
3.48	12.50	13.28	37.32	27.57	5.84



Dia (mm)	Hydrometer Data		% Passing
0.04500			5.31
0.03375	**Working Values & Coefficients**		5.12
0.02500	**D_{10}**	0.1375	4.38
0.01875	**D_{30}**	0.3809	3.99
0.01400	**D_{60}**	1.3808	3.75
0.01000	**Cu**	10.0	3.30
0.00750	**Cc**	0.8	2.81
0.00500	**Starting USCS (g)**	1009.89	2.31
0.00375	**Rock Code**	N/A	2.09
0.00250	**Estimated USCS**	SM (ML)	1.74
0.00150	**Rock Type**	AirFall Tuff	1.36

Project #	**24334**
Drill Hole	West Hill Tuff (Breccia)
Depth	Surface
Client	Imerys
Location	No Agua
Date	10/26/2024
Technician	KP/MP/CB/MT

Notes:

Plastic Limit cannot be rolled

Fines described as ML

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TUCSON, ARIZONA USA

As Received Moisture %		2.24%	
LL	42	PL	NP
PI	N/A	Flow Index	N/A
USCS	**SW-SM**	Silt/Clay %	5.8
Description	Well-graded sand with silt and gravel		
Sample #	**24334-WestHillTuff-C**		

CALL & NICHOLAS, INC.

GEOMECHANICAL LABORATORY

TUCSON, ARIZONA USA

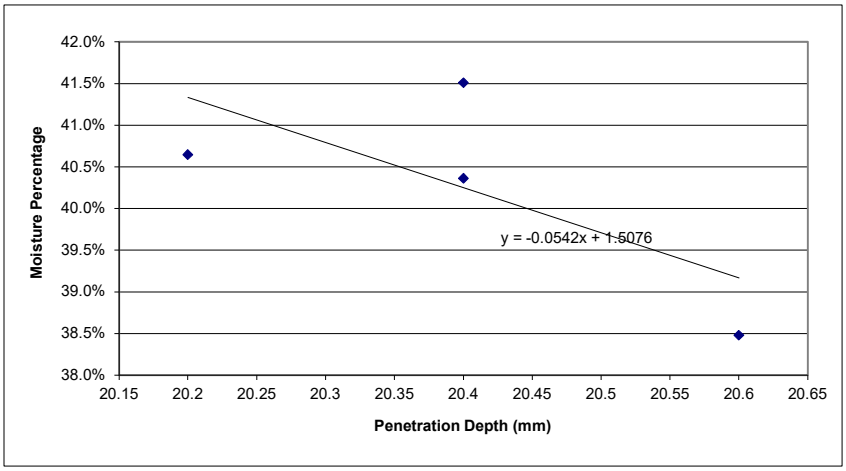
Project #	24334	**ATTERBERG LIMITS BY DROP CONE ASTM BS1377-2**		Date	11/14/2024
Drill Hole	West Hill Tuff (Breccia)			Tech	MP
Depth	Surface	**24334-WestHillTuff-C**		Client	Imerys
Estimated USCS	SM (ML)			Location	No Agua

Plastic Limit PL

Can No.						**Average**
Can Mass (g)						
1st Oven-Dried (g)		Cannot Roll				
2nd Oven-Dried (g)						
3rd Oven-Dried (g)						
Sample Moisture (g)						
Oven-Dried Sample (g)						
Sample Moisture (%)						

Liquid Limit - Drop Cone Penetrometer Method

Can No.		75	134	215	223
Can Mass (g)		30.752	30.864	31.037	31.105
Can + Matl. (g)		51.155	51.352	52.580	52.003
1st Oven-Dried (g)		45.170	45.431	46.385	46.196
2nd Oven-Dried (g)					
3rd Oven-Dried (g)					
Sample Moisture (g)		5.985	5.921	6.195	5.807
Oven-Dried Sample (g)		14.418	14.567	15.348	15.091
Sample Moisture (%)		**41.5%**	**40.6%**	**40.4%**	**38.5%**
Initial dial reading (mm)		0	0	0	0
Final dial reading (mm)		20.4	20.2	20.4	20.6
Corrected (mm)		**20.4**	**20.2**	**20.4**	**20.6**



Non Plastic (Cannot roll)

Dry Strength	Low
Dilatancy	Rapid
Toughness	Cannot Roll
Cementation	No

NOTES

Liquid Limit	Plastic Limit	Plasticity Index:
42		

Sample #	24334-WestHillTuff-C

REMOLD SSDS AND USCS TEST RESULTS

FINES DUMP MATERIAL

Call & Nicholas, Inc.

Geomechanical Laboratory

Tucson, Arizona USA

Date	11/27/24	Area & Load Data for SSDS	*Project #*	24334
Technician	CB		*Client*	Imerys

Sample Data		
Peak/Residual	Residual	
Location	No Agua	
Sample #	24334-FineDump-R	
Rock Type	Fines waste	
Drill Hole	Fine Dump	
Depth	Surface	
Rock Code		
Shear Plane	Remold	
Surface Prep	Insitu	
Shape	Circle	
Test Speed	0.00125	*in/min*
Area	4.893	*in²*
Diameter	2.496	*in*
Radius	1.248	*in*
Tilt Correction		*deg*
Plane Filling		

Adjusted Trace Data

Normal Load (lbs)	*Shear Load (lbs)*	*Area (in^2)*	*Normal Stress (psi)*	*Shear Stress (psi)*
123.4	100.3	4.4	28.1	22.9
241.9	182.2	4.4	55.2	41.5
485.9	362.0	4.4	111.0	82.7
970.4	697.4	4.4	221.4	159.1

Pre Test Moisture	22.03	%
Post Test Moisture	18.60	%
Initial Density, wet	113.70	*pcf*
Calculated density, dry	93.17	*pcf*

Results

Linear: Y = BX + C

Friction Angle	35.23	*deg*
Cohesion	3.16	*psi*

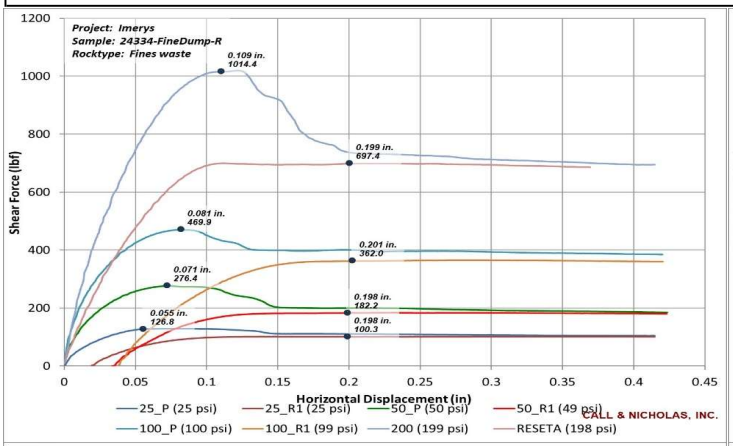
Power: $Y = KX^M$

K	0.9241	*(for X in psi)*
M	0.9534	

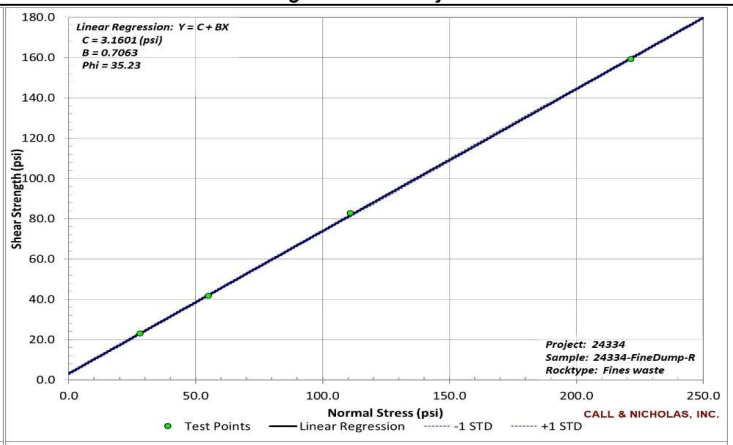
Modified Power: $Y = KX^M + C$

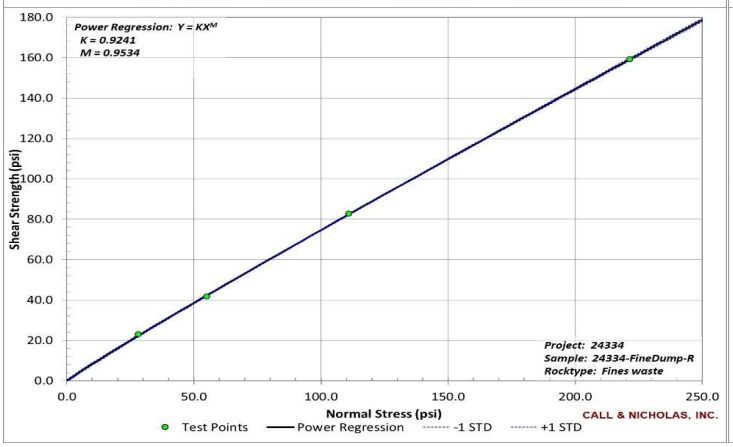
K	0.8687	*(for X in psi)*
M	0.9641	
C	0.8138	*psi*

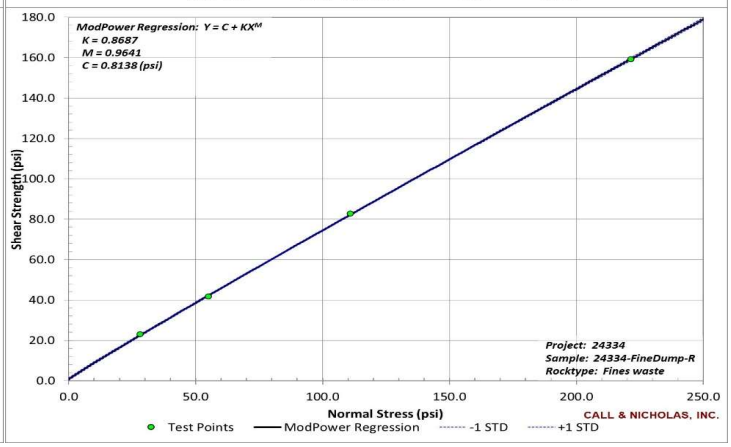
Plot of Raw Trace Data



Linear Regression of Adjusted Trace Data







Color	**Consistency**	**Plasticity**
LIGHT GREY	SILTY CLAY	INTERMEDIATE

Notes :

Sample reconditioned to: 78.9% PL
corrected for oversize fraction
Final moisture: 66.5% of the Plastic Limit.
As-rcvd moisture: 0.58 %
Fines classify as:
Overal sample classifies as: ML
Fresh material packed for each trace

Packed to max. density (pcf) shear box would accept: 113.70
Calculated Dry Density (pcf): 93.17
Sample consolidated at each normal

PL = 28
LL = 39
PI = 11

Sample: 24334-FineDump-R

CALL & NICHOLAS, INC.

Tech	KP/MP/CB/MT	Call & Nicholas, Inc.		Sample #	24334-FineDump-C
Date	11/6/2024	Geomechanical Laboratory		Drill Hole	Fine Dump
Client	Imerys	**As-Received Descriptions**		Depth	Surface
Location	No Agua			Rock Type	Fines waste

Consistency

	DRY (dusty, no water)	WET (damp ± visible, free water)	
X	Loose: non-coherent	Loose: non-coherent	
	Soft: breaks into powder or individual grains under very slight pressure	Very Friable: crushes easily under little pressure but will stick together if pressed again	
	Slightly Hard: resists light pressure, but can be easily broken between thumb and forefinger	Friable: crushes easily under gentle/moderate pressure	
	Hard: resists moderate pressure, can be broken in the hands without difficulty	Firm: crushes under moderate pressure, but resistance is noticable	
	Very Hard: resists great pressure, but can be broken in the hands difficulty	Very Firm: crushes under strong pressure, but is difficult to do between thumb and forefinger	
	Extremely Hard: resists extreme pressure and cannot be broken in between the hands	Extremely Firm: crushes only under very stong pressure, must be pulled apart to break	

Sample Color(s)

Primary (> 30%)	Secondary (< 30%)
Light Gray	White

Plasticity of Fines

Nonplastic	Low	Medium	High
Sample cannot be rolled, NP.	Sample can barely be rolled.	Easy to roll. PL reached with mild effort.	Easy to roll. Considerable work needed to reach PL.
		X	

USCS - Grouping Estimation (Pick NO More than 2)

Gravels			Sands		
GW	Well-graded gravel		SW	Well-graded sand	
GP	Poorly graded gravel		SP	Poorly graded sand	
GM	Silty gravel		SM	Silty sand	
GC	Clayey gravel	X	SC	Clayey sand	X
Silts/clays			**Organics**		
ML	Silt		OL	Organic clay	
MH	Elastic silt		OH	Organic silt	
CL	Lean clay		PT	Peat	
CH	Fat clay		*If a borderline case, check both applicable boxes.		

Minerals of Note

	Sulfides	Olivine	
	Muscovite	Magnitite	
	Calcite	Hematite	
	Quartz	Pyroxene	
	Biotite	Other	

Density Method

Density by 'slug'	ASTM 7263 Method B	
Wax method	ASTM 7263 Method A	
Density by suspension in water	ASTM C127 and C128	
Specific gravity by pycnometer	ASTM D854	

Sample Odor (If applicable)

Sulfurous	Petroleum	Chemical	Organic

Split Masses

Split Location	mass (grams)	%
Total As-Received mass	**13040**	**100.0%**
USCS (-10) bucket	1169.23	4.8%
USCS bucket + sample	1798.72	
USCS Starting Split	629.49	
SSDS bucket	0	11.7%
SSDS bucket + sample	1531.66	
SSDS Split	1531.66	
Atterberg (-40) bucket	376.95	2.1%
Atterberg bucket + sample	655.94	
Atterberg Split	278.99	
As-Rcv'd bowl #	M40	3.2%
As-Rcv'd moisture bowl	812.2	
bowl + sample	1231.39	
As-Rcv'd moisture split	419.19	
Reserve	**10180.67**	**78.1%**
Summation	13040	**100.0%**

As-Received Photograph

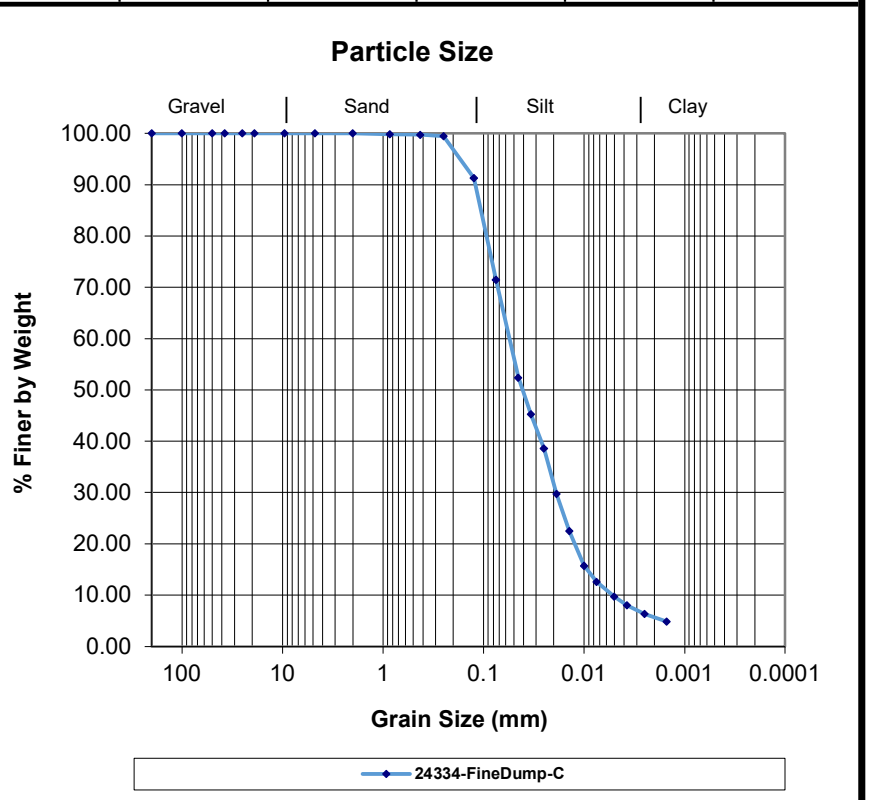
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Sieve Analysis & Soil Classification

Sieve Size		Retained Weight	Retained % of Weight	Cumulative % Retained	Cumulative % Passing
U.S.	mm	Grams		Coarser	Finer
8"	200		0.00	0.00	100.00
4"	100		0.00	0.00	100.00
2"	50.0		0.00	0.00	100.00
1.5"	37.5		0.00	0.00	100.00
1"	25.0		0.00	0.00	100.00
3/4"	19.0		0.00	0.00	100.00
3/8"	9.5		0.00	0.00	100.00
# 4	4.75		0.00	0.00	100.00
# 10	2.00		0.00	0.00	100.00
# 20	0.850	0.73	0.13	0.13	99.87
# 40	0.425	0.90	0.16	0.28	99.72
# 60	0.250	1.63	0.28	0.57	99.43
# 120	0.125	47.13	8.16	8.72	91.28
# 200	0.075	114.53	19.83	28.55	71.45
Finer than #200		412.75	71.45	100.00	0.00
Final USCS (g)		577.68	100.00		

Coarse Gravel %	Fine Gravel %	Coarse Sand %	Medium Sand %	Fine Sand %	Silt / Clay %
0.00	**0.00**	**0.00**	**0.28**	**28.27**	**71.45**

Dia (mm)	Hydrometer Data		% Passing
0.04500			52.43
0.03375	**Working Values & Coefficients**		45.29
0.02500	**D_{10}**	0.0052	38.58
0.01875	**D_{30}**	0.0190	29.71
0.01400	**D_{60}**	0.0569	22.52
0.01000	**Cu**	10.9	15.72
0.00750	**Cc**	1.2	12.58
0.00500	**Starting USCS (g)**	577.68	9.73
0.00375	**Rock Code**	ML	8.07
0.00250	**Estimated USCS**	N/A	6.31
0.00150	**Rock Type**	Fines waste	4.82



Project #	**24334**
Drill Hole	Fine Dump
Depth	Surface
Client	Imerys
Location	No Agua
Date	10/26/2024
Technician	KP/MP/CB/MT

Notes: **Fines classify as ML**

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As Received Moisture %	0.58%		
LL	39	PL	28
PI	11	Flow Index	N/A
USCS	**ML**	Silt/Clay %	71.5
Description	Silt with sand		
Sample #	**24334-FineDump-C**		

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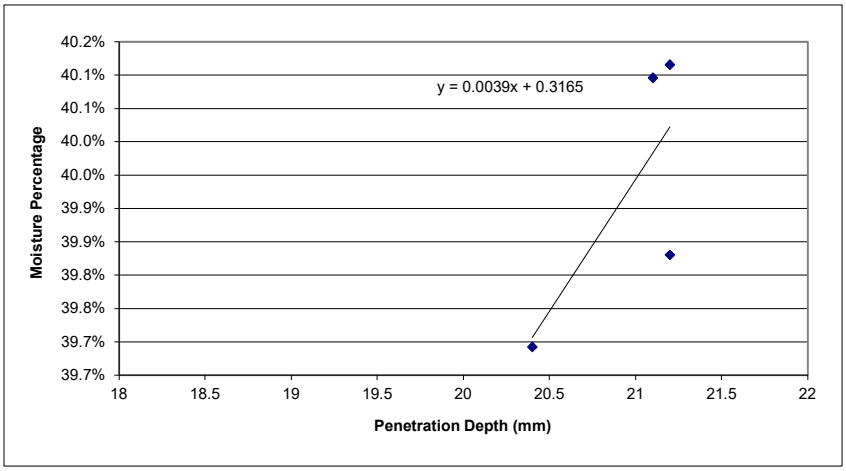
Project #	24334	**ATTERBERG LIMITS BY DROP CONE ASTM BS1377-2**		Date	11/8/2024
Drill Hole	Fine Dump			Tech	MP
Depth	Surface -	**24334-FineDump-C**		Client	Imerys
Estimated USCS				Location	No Agua

Plastic Limit PL

Can No.	102	104	334	411	**Average**
Can Mass (g)	11.143	11.044	11.268	11.372	
	16.764	16.742	16.871	17.051	
1st Oven-Dried (g)	15.491	15.502	15.658	15.838	
2nd Oven-Dried (g)					
3rd Oven-Dried (g)					
Sample Moisture (g)	1.273	1.240	1.213	1.213	1.235
Oven-Dried Sample (g)	4.348	4.458	4.390	4.466	4.416
Sample Moisture (%)	**29.3%**	**27.8%**	**27.6%**	**27.2%**	**28.0%**

Liquid Limit - Drop Cone Penetrometer Method

Can No.	6	10	60	61
Can Mass (g)	29.391	29.631	31.159	30.891
Can + Matl. (g)	52.172	51.444	52.252	52.520
1st Oven-Dried (g)	45.652	45.246	46.213	46.359
2nd Oven-Dried (g)				
3rd Oven-Dried (g)				
Sample Moisture (g)	6.520	6.198	6.039	6.161
Oven-Dried Sample (g)	16.261	15.615	15.054	15.468
Sample Moisture (%)	**40.1%**	**39.7%**	**40.1%**	**39.8%**
Initial dial reading (mm)	0	0	0	0
Final dial reading (mm)	21.1	20.4	21.2	21.2
Corrected (mm)	**21.1**	**20.4**	**21.2**	**21.2**



Non Plastic (Cannot roll)

Dry Strength	
Dilatancy	
Toughness	
Cementation	

NOTES

Liquid Limit	Plastic Limit	Plasticity Index:
39		

Per ASTM 2487, Fines Classified as: **ML**

Sample #	24334-FineDump-C

Appendix H
No Agua Closure Cost Estimate

Enter Data Below in Green and Blue Spaces

STANDARDIZED RECLAMATION COST ESTIMATOR

Version 1.4.1
Build 017b (revised to work with Excel 2016 - 24 Oct 2016)

Approved for use in Nevada, August 1, 2012

COST DATA FILE INFORMATION

File Name:	No Agua 2025 SRCE-rev-1.xlsm		
Cost Data File:	No Agua 2023 RS Means Cost Data File.xlsm		
Cost Data Date:	September 11, 2025		
Cost Data Basis:	User Data	Data Cost Units:	Imperial
Author/Source:	Imerys		

PROJECT INFORMATION

Property/Mine Name:	No Agua	Property Code:	
Project Name:	No Agua Reclamation		
Date of Submittal:		Average Altitude:	0 ft.

Select One: ☐ Notice or Sm Exploration Plan ☐ Lg Exploration Plan ☒ Mine Operation

Select One: ☒ Private Land ☐ Public or Public/Private

Cost Estimate Type: Surety

Cost Basis Category: RS Means 9/2025

RS Means Data Inflated 9/2025

Cost Basis Description:

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Closure Cost Estimate
Cost Summary

Project Name: No Agua Reclamation
Enter Submittal Date
Model Version: Version 1.4.1
File Name: No Agua 2025 SRCE-rev-1.xlsm

A. Earthwork/Recontouring	Labor [1]	Equipment [2]	Materials	Total
Exploration	$0	$0	$0	$0
Exploration Roads & Drill Pads	$0	$0	$0	$0
Roads	$4,419	$26,126	$0	$30,545
Well Abandonment	$23,448	$48,960	$0	$72,408
Pits	$0	$0	N/A	$0
Quarries & Borrow Areas	$52,036	$153,379	$0	$205,415
Underground Openings	$0	$0	$0	$0
Process Ponds	$0	$0	$0	$0
Heaps	$0	$0	$0	$0
Waste Rock Dumps	$49,340	$154,677	$0	$204,017
Landfills	$0	$0	$0	$0
Tailings	$0	$0	$0	$0
Foundation & Buildings Areas	$0	$0	$0	$0
Yards, Etc.	$12,399	$32,670	$0	$45,069
Drainage & Sediment Control	$0	$0	$0	$0
Generic Material Hauling	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal	**$141,642**	**$415,812**	**$0**	**$557,454**
Mob/Demob if included in Other User sheet	$0	$0	$0	$0
Mob/Demob				$0
Subtotal "A"	**$141,642**	**$415,812**	**$0**	**$557,454**

B. Revegetation/Stabilization	Labor [1]	Equipment [2]	Materials	Total
Exploration	$0	$0	$0	$0
Exploration Roads & Drill Pads	$0	$0	$0	$0
Roads	$5,119	$2,925	$37,918	$45,962
Well Abandonment				N/A
Pits	$0	$0	$0	$0
Quarries & Borrow Areas	$9,591	$5,480	$71,021	$86,092
Underground Openings				N/A
Process Ponds	$0	$0	$0	$0
Heaps	$0	$0	$0	$0
Waste Rock Dumps	$8,086	$4,621	$59,887	$72,594
Landfills	$0	$0	$0	$0
Tailings	$0	$0	$0	$0
Foundation & Buildings Areas	$0	$0	$0	$0
Yards, Etc.	$42,946	$24,540	$318,089	$385,575
Drainage & Sediment Control	$0	$0	$0	$0
Generic Material Hauling	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "B"	**$65,742**	**$37,566**	**$486,915**	**$590,223**

C. Detoxification/Water Treatment/Disposal of Wastes**	Labor [1]	Equipment [2]	Materials	Total
Process Ponds/Sludge				$0
Heaps				$0
Dumps (Waste & Landfill)				$0
Tailings				$0
Surplus Water Disposal				$0
Monitoring				$0
Miscellaneous				$0
Solid Waste - On Site	$0	$0	N/A	$0
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "C"	**$0**	**$0**	**$0**	**$0**

D. Structure, Equipment and Facility Removal, and Misc.	Labor [1]	Equipment [2]	Materials	Total
Foundation & Buildings Areas	$192,176	$99,309	$0	$291,485
Other Demolition	$333,398	$0	$0	$333,398
Equipment Removal	$3,200	$4,905	$11,113	$19,218
Fence Removal	$0	$0		$0
Fence Installation	$0	$0	$0	$0
Culvert Removal	$0	$0	N/A	$0
Pipe Removal	$0	$0	N/A	$0
Powerline Removal	$0			$0
Transformer Removal	$0			$0
Rip-rap, rock lining, gabions	$20,275	$7,466	$7,181	$34,922
Other Misc. Costs	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "D"	**$549,050**	**$111,680**	**$18,294**	**$679,023**

E. Monitoring	Labor [1]	Equipment [2]	Materials	Total
Reclamation Monitoring and Maintenance	$122,936	$3,419	$0	$126,355
Ground and Surface Water Monitoring	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Subtotal "E"	**$122,936**	**$3,419**	**$0**	**$126,355**

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Closure Cost Estimate
Cost Summary

Project Name: No Agua Reclamation
Enter Submittal Date
Model Version: Version 1.4.1
File Name: No Agua 2025 SRCE-rev-1.xlsm

F. Construction Management & Support	Labor	Equipment [2]	Materials	Total
Construction Management	$63,574	$14,574	N/A	$78,148
Construction Support	$0	$738	$0	$738
Road Maintenance	$39,050	$80,950	$0	$120,000
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other** Mob/Demob 2.5% of Operational & Maint. Costs		$27,507		$27,507
Subtotal "F"	**$102,624**	**$123,769**	**$0**	**$226,393**

Subtotal Operational & Maintenance Costs	Labor [1]	Equipment [2]	Materials [3]	Total
Subtotal A through F	**$981,993**	**$692,246**	**$505,209**	**$2,179,448**

** Other Operator supplied costs - additional documentation required.

Indirect Costs			Include?	Total
1. Engineering, Design and Construction (ED&C) Plan (7)				$196,150
2. Contingency (8)				$217,945
3. Insurance (9)	$14,730			
4. Performance Bond (10)				
5. Contractor Profit (11)				$217,945
6. Contract Administration (12)				$65,383
7. Government Indirect Cost (13)				N/A
Subtotal Add-On Costs				**$697,423**
Total Indirect Costs as % of Direct Cost				32%
GRAND TOTAL				**$2,876,871**

Administrative Cost Rates (%)

	Cost Ranges for Indirect Cost Percentages				
	<=	<=	<=	>	
4% Const. Mgt per MMD + 5% MMD Procurement Cost	$1,000,000	$25,000,000		$25,000,000	Small Plan
Variable Rate	0%	9%		4%	0%
	<=	<=	<=	>	
2. Contingency (8)	$500,000	$5,000,000	$50,000,000	$50,000,000	Small Plan
Variable Rate	10%	10%	10%	4%	0%
3. Insurance (9)	1.5%	of labor costs			
4. Bond (10)	0.0%	of the O&M costs if O&M costs are >$100,000			
5. Contractor Profit (11)	10%	of the O&M costs			
	<=	<=	<=	>	
6. Contract Administration (12)	$1,000,000	$25,000,000		$25,000,000	
Variable Rate	1%	3%		6%	
0	21%	of contract administration			

RECLAMATION COST ESTIMATION SUMMARY SHEET FOOTNOTES

1. Federal construction contracts require Davis-Bacon wage rates for contracts over $2,000. Wage rate estimates may include base pay, payroll loading, overhead
2. The reclamation cost estimate must include the estimated plugging cost of at least one drill hole for each active drill rig in the project area. Where the submitted
3. Miscellaneous items should be itemized on accompanying worksheets.
4. Fluid management should be calculated only when mineral processing activities are involved. Fluid management represents the costs of maintaining proper
5. Handling of hazardous materials includes the cost of decontaminating, neutralizing, disposing, treating and/or isolating all hazardous materials used, produced,
6. Any mitigation measures required in the Plan of Operations must be included in the reclamation cost estimate. Mitigation may include measures to avoid,
7. An indirect cost for construction management should be included as a separate line item under Indirect Costs. The New Mexico Mining and Minerals Division
8. A contingency cost is included in the reclamation cost estimation to cover unforeseen cost elements. Calculate the contingency cost as a percentage of the
9. Insurance premiums are calculated at 1.5% of the total labor costs. Enter the premium amount if liability insurance is not included in the itemized unit costs.
10. Federal construction contracts exceeding $100,000 require both a performance and a payment bond (Miller Act, 40 USC 270et seq.). Each bond premium is
11. For Federal construction contracts, use 10% of estimated O&M cost for the contractor's profit.
12. To estimate the contract administration cost, use 6 to 10% of the operational and maintenance (O&M) cost. Calculate the contract administration cost as a
13. Government indirect cost rate is 21% of the contract administration costs.

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Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Data Cost File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Reclamation Quantity Summary

	Description	Total Regrade or Haul Volume cy	Total Regrade or Haul Cost $	Total Cover Volume cy	Cover Placement Cost $	Total Growth Media Volume cy	Growth Media Placement Cost $	Total Surface Area acres	Total Scarify Cost $	Total Revetation Cost $	TOTALS $	Unit Costs: Regrade Unit Cost $/CY	Material Haul or Backfill Unit Cost $/CY	Cover Unit Cost $/CY	Growth Media Unit Cost $/CY	Scarify Unit Cost $/CY	Area Unit Cost $/acre
1	Waste Rock Dumps	69,159	$ 18,200	72,229	$ 178,386		$ -	45.27	$ 7,431	$ 72,594	$ 276,611	$0.26	N/A	$2.47		$164.15	$6,110.25
2	Tailings Impoundments		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
3	Heap Leach Pads		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
5	Open Pits		$ -							$ -	$ -		N/A				
4	Quarries & Borrow Pits		$ -	84,699	$ 195,103		$ -	65.38914141	$ 10,312	$ 86,092	$ 291,507		N/A	$2.30		$157.70	$4,458.03
6	Roads	42,484	$ 26,230				$ -	28.03	$ 4,315	$ 45,962	$ 76,507	$0.62	N/A			$153.94	$2,729.47
7	Landfills		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
8	Buildings				$ -		$ -	1	$ -	$ -	$ -		N/A			$0.00	$0.00
9	Yards		$ -		$ -		$ -	235.14	$ 45,069	$ 385,575	$ 430,644		N/A			$191.67	$1,831.44
10	Ponds		$ -				$ -			$ -	$ -	N/A					
11	Exploration Roads		$ -				$ -		$ -	$ -	$ -		N/A				
12	Exploration Trenches		$ -							$ -	$ -		N/A				
13	Diversion Ditches		$ -							$ -	$ -		N/A				
14	Sediment Ponds		$ -				$ -		$ -	$ -	$ -						
15	Generic Haulage/Backfill		$ -		$ -		$ -		$ -	$ -	$ -	N/A					
16	Adit/Decline Backfilling1		$ -								$ -	N/A					
17	Shaft Backfilling		$ -								$ -	N/A					
	TOTALS	111,643	$ 44,430	156,928	$ 373,489	-	$ -	374.83	$ 67,127	$ 590,223	$ 1,075,269						
	Average Costs	per CY	$0.40	per CY	$2.38	per CY		per acre	$179.09	$8.79	$2,869	per acre					

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Closure Cost Estimate
Waste Rock Dumps

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$2,242	$15,958	N/A	$18,200
Cover Placement Cost	$45,054	$133,332	N/A	$178,386
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,044	$5,387	N/A	$7,431
Subtotal Earthworks	**$49,340**	**$154,677**	**$0**	**$204,017**
Revegetation Cost	$8,086	$4,621	$59,887	$72,594
TOTALS	**$57,426**	**$159,298**	**$59,887**	**$276,611**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Waste Rock Dumps - User Input

You must fill in ALL green cells in this section for each dump, lift or dump category

	Facility Description			Physical - MANDATORY									Cover				Growth Media			
	Description (required)	ID Code	Type	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % Grade	Lift (dump) Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Dump Footprint acres	Regrade Volume (1) (if calculated elsewhere) cy	Cover Thickness Slopes in	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Dump to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Dump to Stockpile % grade
1	sh_waste_to_fines	1	Waste Rock Dump	11.0	1.6	3.0	1.0	102	154	2,800	44.51	69158.96296	12.0	12.0	9,909	2.2				
2	areai_riprap_to_fines	1	Waste Rock Dump							2,800	1.44			6.0	4,936	2.4				

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

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Closure Cost Estimate
Waste Rock Dumps

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Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$2,242	$15,958	N/A	$18,200
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TOTALS	**$57,426**	**$159,298**	**$59,887**	**$276,611**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Waste Rock Dumps - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each dump, lift or dump category

		Grading				Cover		Growth Media		Revegetation								
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Slopes (select)	Seed Mix Flat Areas (select)	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)
1	sh_waste_to_fines	1.2	Topsoil	Large	Yes	Stone - crush	Large Truck	Stone - crush	Large Truck	User Mix 1	User Mix 1					Yes	Yes	Grader
2	areai_riprap_to_fines			Large		Stone - crush	Large Truck									No	No	

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Closure Cost Estimate
Waste Rock Dumps

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Waste Rock Dumps - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$2,242	$15,958	N/A	$18,200
Cover Placement Cost	$45,054	$133,332	N/A	$178,386
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,044	$5,387	N/A	$7,431
Subtotal Earthworks	**$49,340**	**$154,677**	**$0**	**$204,017**
Revegetation Cost	$8,086	$4,621	$59,887	$72,594
TOTALS	**$57,426**	**$159,298**	**$59,887**	**$276,611**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Waste Rock Dumps - Calculations

Regrading Volume Calculation

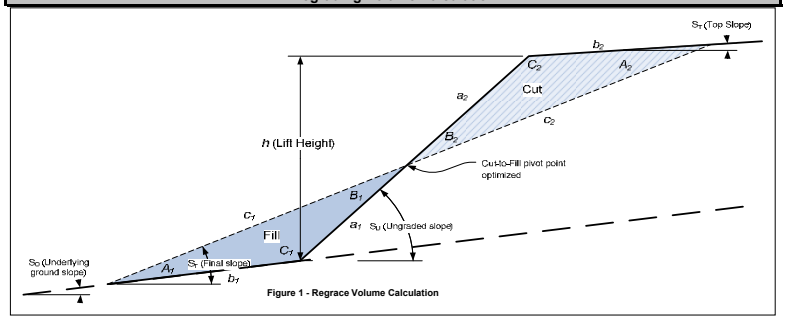


Figure 1 - Regrace Volume Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

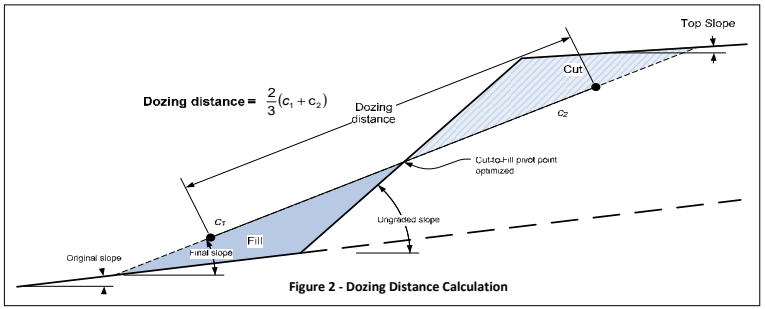


Figure 2 - Dozing Distance Calculation

Final Slope Area and Footprint Area Calculations

Final slope length = $c_1 + c_2$
Final slope area = Final slope length x Mid-bench Length
Final lift height (h_{final}) = $(c_1 + c_2)$ x sin(Final slope)
Final slope width (d) = $(c_1 + c_2)$ x cos(Final slope)
Final slope footprint = Final slope width x Mid-bench Length
Final flat area = Final footprint – Final slope footprint

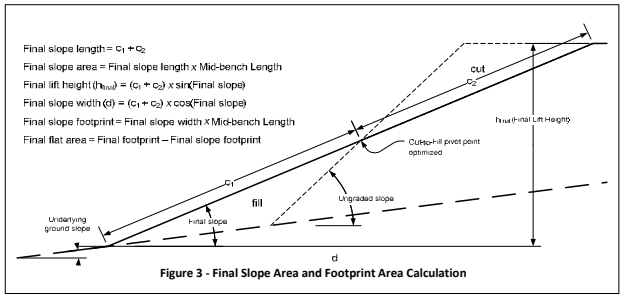


Figure 3 - Final Slope Area and Footprint Area Calculation

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per dump

Slopes:
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Mid-bench length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr

Flat Areas:
Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

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Closure Cost Estimate
Waste Rock Dumps

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Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$2,242	$15,958	N/A	$18,200
Cover Placement Cost	$45,054	$133,332	N/A	$178,386
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,044	$5,387	N/A	$7,431
Subtotal Earthworks	**$49,340**	**$154,677**	**$0**	**$204,017**
Revegetation Cost	$8,086	$4,621	$59,887	$72,594
TOTALS	**$57,426**	**$159,298**	**$59,887**	**$276,611**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Waste Rock Dumps - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**sh_waste_to_fines**	69,159	183	D10R	974	1.6	1.2	1.44	1.2	2,012	34	$2,242	$15,958	$18,200
2	**areai_riprap_to_fines**			D10R								$0	$0	$0
		69,159									34	**$2,242**	**$15,958**	**$18,200**

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Closure Cost Estimate
Waste Rock Dumps

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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$2,242	$15,958	N/A	$18,200
Cover Placement Cost	$45,054	$133,332	N/A	$178,386
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,044	$5,387	N/A	$7,431
Subtotal Earthworks	**$49,340**	**$154,677**	**$0**	**$204,017**
Revegetation Cost	$8,086	$4,621	$59,887	$72,594
TOTALS	**$57,426**	**$159,298**	**$59,887**	**$276,611**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Waste Rock Dumps - Cover and Growth Media Costs

		Cover (lower layer)								Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost $	Cover Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**sh_waste_to_fines**	71,422	769D/988G/D7R	762	6	94	$44,693	$132,258	$176,951						$0	$0	$0
2	**areai_riprap_to_fines**	807	769D/988G/D7R	757	4	1	$361	$1,074	$1,435						$0	$0	$0
		72,229				95	**$45,054**	**$133,332**	**$178,386**						**$0**	**$0**	**$0**

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Closure Cost Estimate
Waste Rock Dumps

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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Go To Labor Rates sheet and select Zone for Each Labor Classification

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$2,242	$15,958	N/A	$18,200
Cover Placement Cost	$45,054	$133,332	N/A	$178,386
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,044	$5,387	N/A	$7,431
Subtotal Earthworks	**$49,340**	**$154,677**	**$0**	**$204,017**
Revegetation Cost	$8,086	$4,621	$59,887	$72,594
TOTALS	**$57,426**	**$159,298**	**$59,887**	**$276,611**

Waste Rock Dumps - Scarifying/Revegetation Costs

	Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**sh_waste_to_fines**	1.27	43.00	44.27	360	2,800	16G/H	1	30	$2,044	$5,387	$7,431	$8,086	$4,621	$59,887	$72,594
2	**areai_riprap_to_fines**	0.00	1.00	1.00						$0	$0	$0	$0	$0	$0	$0
		1.27	44.00	45.27				1	30	**$2,044**	**$5,387**	**$7,431**	**$8,086**	**$4,621**	**$59,887**	**$72,594**

Notes: 1) Minimum total ripping hours = 1 (i.e. If total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in in scarifying table.)

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Closure Cost Estimate
Roads

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Roads - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$3,232	$22,998	N/A	$26,230
Cover Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$1,187	$3,128	N/A	$4,315
Subtotal Earthworks	**$4,419**	**$26,126**		**$30,545**
Revegetation Cost	$5,119	$2,925	$37,918	$45,962
TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - User Input

You must fill in ALL green cells and relevant blue cells in this section for each road

	Facility Description			Physical (1) - MANDATORY						User Overrides		Growth Media		
	Description (required)	ID Code	Type	Underlying Ground Slope % grade	Ungraded Slope _H:1V	Cut Slope degrees	Road Width ft	Road Length ft	Slope Replacement Percent %	Regrade Volume (if calculated elsewhere) cy	Disturbed Area (if calculated elsewhere) acres	Growth Media Thickness in	Haul Distance from Growth Media Stockpile ft	Slope from Road to Stockpile % grade
1	**Site Haul Roads**		**Haul Road**					**15,000**		**42484**	**28.03**			

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
3. Because the work required for building roads with a dozer is similar to that required to regrade a road with a dozer, this sheet could be used to provide a rough estimate of road construction costs if a dozer is selected as the grading fleet.

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Closure Cost Estimate
Roads

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Ripping/Scarifying Cost	$1,187	$3,128	N/A	$4,315
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TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - User Input (cont.)

		Haul Road Safety Berms				
	Description (required)	Berm Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Number of Berms (2) (1 or 2 sides)
1	**Site Haul Roads**					

(2) Enter 1 if berm on only one side of road, 2 if both sides of road are bermed.

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Closure Cost Estimate
Roads

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Ripping/Scarifying Cost	$1,187	$3,128	N/A	$4,315
Subtotal Earthworks	**$4,419**	**$26,126**		**$30,545**
Revegetation Cost	$5,119	$2,925	$37,918	$45,962
TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each road

		Grading				Growth Media			Revegetation				
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	No. of Excavators if grade >30% (select)	Growth Media Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarifying/ Ripping? (select)	Ripping Fleet (select)
1	**Site Haul Roads**	**1**	**Stone - crushed**	**Lg Dozer**	**1**				**User Mix 1**			**Yes**	**Grader**

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
2. If original slope >30% only excavators are allowed.

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Closure Cost Estimate
Roads

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Roads - Cost Summary	Labor	Equipment	Materials	Totals
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Subtotal Earthworks	**$4,419**	**$26,126**		**$30,545**
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TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - Calculations

Regrading Volume and Footprint Volume

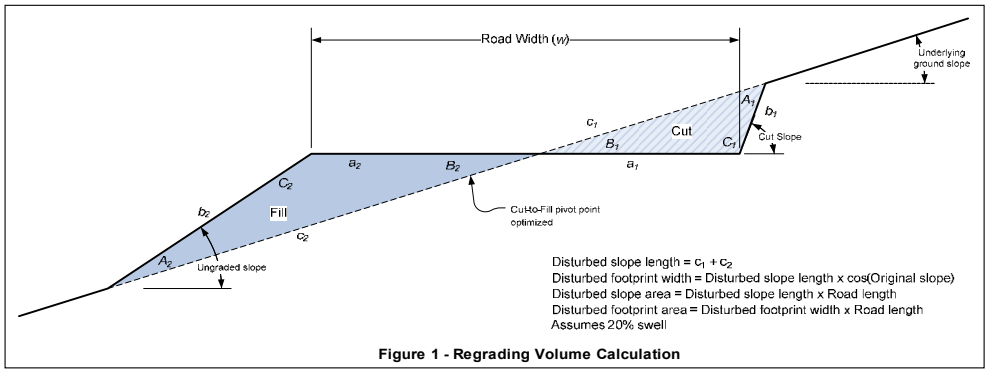


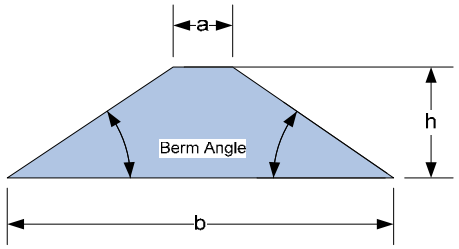
Figure 1 - Regrading Volume Calculation

Will not allow dozer for slopes greater than 30%
For dozer regrading push distance = road width
Assumes dozer push is uphill
Assumes minimum push distance of 100 ft

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a+b)}{2} \times h$

Berm Volume = Berm Length x Cross Sectional Area x No. Sides



Total berm volume doubled if both sides of road are bermed.
If length of berm on each side of road is different, input total length of both berms and input 1 for number of sides

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per area
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Road length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
For dozer regrading assumes push distance = 3 x road width

Revegetation Calculations

Minimum of 1 acre crew time per area

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Closure Cost Estimate
Roads

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Roads - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$3,232	$22,998	N/A	$26,230
Cover Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$1,187	$3,128	N/A	$4,315
Subtotal Earthworks	**$4,419**	**$26,126**		**$30,545**
Revegetation Cost	$5,119	$2,925	$37,918	$45,962
TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - Regrading Costs

	Description (required)	Regrading Volume cy	Recontouring Fleet	Fleet Productivity cy/hr	Total Fleet Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**Site Haul Roads**	42,484	D10R	863	49	$3,232	$22,998	$26,230
		42,484			49	**$3,232**	**$22,998**	**$26,230**

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Closure Cost Estimate
Roads

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Roads - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$3,232	$22,998	N/A	$26,230
Cover Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$1,187	$3,128	N/A	$4,315
Subtotal Earthworks	**$4,419**	**$26,126**		**$30,545**
Revegetation Cost	$5,119	$2,925	$37,918	$45,962
TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - Growth Media Costs

	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**Site Haul Roads**						$0	$0	$0
							$0	**$0**	**$0**

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Closure Cost Estimate
Roads

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Roads - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$3,232	$22,998	N/A	$26,230
Cover Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$1,187	$3,128	N/A	$4,315
Subtotal Earthworks	**$4,419**	**$26,126**		**$30,545**
Revegetation Cost	$5,119	$2,925	$37,918	$45,962
TOTALS	**$9,538**	**$29,051**	**$37,918**	**$76,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Roads - Scarifying/Revegetation Costs

	Description (required)	Total Surface Area acres	Final Slope Length ft	Ripping/ Scarifying Fleet	Ripping Hours hrs	Ripping Labor Costs $	Ripping Equipment Cost $	Total Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**Site Haul Roads**	28.03	81.0	16G/H	18	$1,187	$3,128	$4,315	$5,119	$2,925	$37,918	$45,962
		28.03			18	**$1,187**	**$3,128**	**$4,315**	**$5,119**	**$2,925**	**$37,918**	**$45,962**

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Closure Cost Estimate
Quarries & Borrow Pits

Project Name: No Agua Reclamation - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Waste Rock Dumps - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$49,198	$145,905	N/A	$195,103
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Quarries & Borrow Pits - User Input

You must fill in ALL green cells in this section for each dump, lift or dump category

	Facility Description			Physical - MANDATORY									Cover				Growth Media			
	Description (required)	ID Code	Type	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % Grade	Bench or Highwall Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Footprint acres	Regrade Volume (1) (if calculated elsewhere) cy	Cover Thickness Slopes in	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Dump to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Dump to Stockpile % grade
1	fines_waste_to_nh_1	1	Waste Rock Dump	0.0							2.03			6.0	10,187	1.2				
2	fines_waste_to_nh_2	1	Waste Rock Dump	0.0							3.54			6.0	9,129	1.5				
3	fines_waste_to_nh_3	1	Waste Rock Dump	0.0							0.99			6.0	9,129	1.0				
4	fines_waste_to_nh_4	1	Waste Rock Dump	0.0							6.32			6.0	12,624	2.1				
5	sh_waste_to_areai	1	Waste Rock Dump	0.0						160	2.07			12.0	10,906	0.9				
6	sh_waste_to_nh_1	1	Waste Rock Dump	0.0						250	2.03			6.0	16,157	2.1				
7	sh_waste_to_nh_2	1	Waste Rock Dump	0.0						275	3.54			6.0	15,099	2.4				
8	sh_waste_to_nh_3	1	Waste Rock Dump	0.0						85	0.99			6.0	15,099	2.1				
9	sh_waste_to_nh_4	1	Waste Rock Dump	0.0						250	6.32			6.0	18,593	2.6				
10	sh_waste_to_sh_1	1	Waste Rock Dump	0.0						175	6.13			12.0	4,003	-2.4				
11	sh_waste_to_sh_2	1	Waste Rock Dump	0.0						300	2.12			12.0	2,540	-2.7				
12	sh_waste_to_sh_3	1	Waste Rock Dump	0.0						200	1.92			12.0	4,472	-3.1				
13	sh_waste_to_wh_1	1	Waste Rock Dump	0.0						500	7.13			12.0	5,364	2.3				
14	sh_waste_to_wh_2	1	Waste Rock Dump	0.0						525	9.29			12.0	3,087	-1.7				
15	sh_waste_to_plant_1	1	Waste Rock Dump	0.0						250	2.32			12.0	11,743	0.0				
16	sh_waste_to_plant_2	1	Waste Rock Dump	0.0						250	8.63			12.0	10,730	0.0				

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Half of the cap for North Hill (nh) will come from the fines dump as it is a shorter haul. This material will only need to be hauled. It won't require ripping or vegetation, however the 2nd half of cap from South Hill will.
sh = South Hill
wh = West Hill

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Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Waste Rock Dumps - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$49,198	$145,905	N/A	$195,103
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Quarries & Borrow Pits - User Input (cont.) — You must fill in ALL green cells and relevant blue cells in this section for each dump, lift or dump category

		Grading				Cover		Growth Media		Revegetation								
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Slopes (select)	Seed Mix Flat Areas (select)	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)
1	fines_waste_to_nh_1					Tailings - Co	Large Truck											
2	fines_waste_to_nh_2					Tailings - Co	Large Truck											
3	fines_waste_to_nh_3					Tailings - Co	Large Truck											
4	fines_waste_to_nh_4					Tailings - Co	Large Truck											
5	sh_waste_to_areai					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
6	sh_waste_to_nh_1					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
7	sh_waste_to_nh_2					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
8	sh_waste_to_nh_3					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
9	sh_waste_to_nh_4					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
10	sh_waste_to_sh_1					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
11	sh_waste_to_sh_2					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
12	sh_waste_to_sh_3					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
13	sh_waste_to_wh_1					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
14	sh_waste_to_wh_2					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
15	sh_waste_to_plant_1					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader
16	sh_waste_to_plant_2					Stone - crush	Large Truck			User Mix 1	User Mix 1					Yes	Yes	Grader

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Closure Cost Estimate
Quarries & Borrow Pits

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Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Quarries & Borrow Pits - User Input (cont.)

	Facility Description	Highwall Berms					Berm Construction		Excavate or Doze	Hauling (if selected method)				Revegetation		
	Description (required)	Berm (or Highwall) Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Volume (if calculated elsewhere) cy	Construction Method (select)	Berm Material Type (select)	Berm Construction Equipment Fleet (select)	Berm Hauling Fleet (select)	Distance to Borrow Source ft	Slope to Borrow Source % grade	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)
1	fines_waste_to_nh_1															
2	fines_waste_to_nh_2															
3	fines_waste_to_nh_3															
4	fines_waste_to_nh_4															
5	sh_waste_to_areai															
6	sh_waste_to_nh_1															
7	sh_waste_to_nh_2															
8	sh_waste_to_nh_3															
9	sh_waste_to_nh_4															
10	sh_waste_to_sh_1															
11	sh_waste_to_sh_2															
12	sh_waste_to_sh_3															
13	sh_waste_to_wh_1															
14	sh_waste_to_wh_2															
15	sh_waste_to_plant_1															
16	sh_waste_to_plant_2															

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
3. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Quarries & Borrow Pits - Calculations

Regrading Volume Calculation

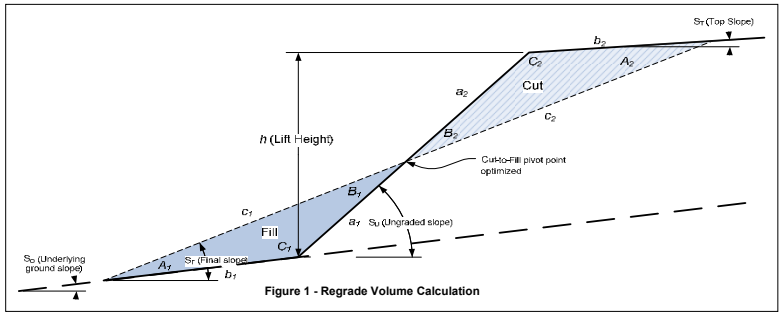


Figure 1 - Regrade Volume Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

Final Slope Area and Footprint Area Calculations

Final slope length = $c_1 + c_2$
Final slope area = Final slope length x Mid-bench Length
Final lift height (h_{final}) = ($c_1 + c_2$) x sin(Final slope)
Final slope width (d) = ($c_1 + c_2$) x cos(Final slope)
Final slope footprint = Final slope width x Mid-bench Length
Final flat area = Final footprint – Final slope footprint

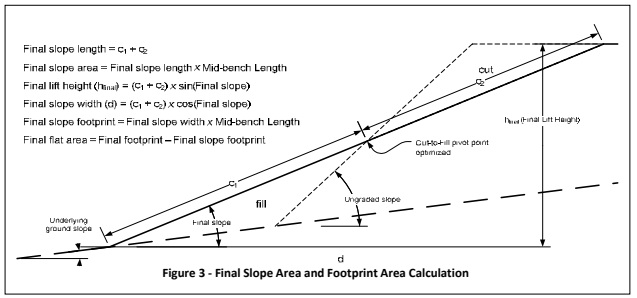


Figure 3 - Final Slope Area and Footprint Area Calculation

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per dump

Slopes:

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Waste Rock Dumps - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$49,198	$145,905	N/A	$195,103
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

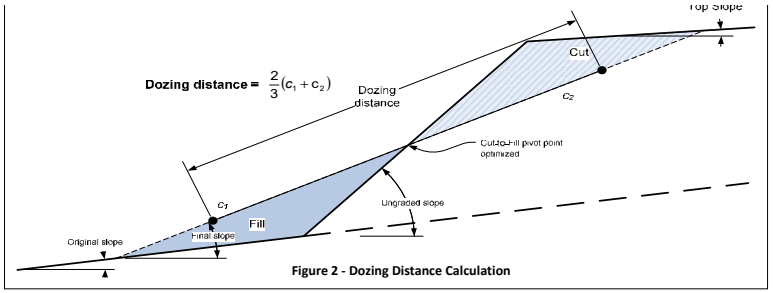


Figure 2 - Dozing Distance Calculation

Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Mid-bench length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr

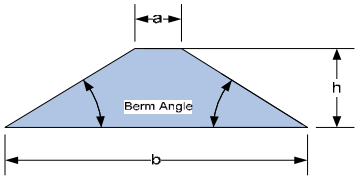
Flat Areas:
Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a+b)}{2} \times h$

Berm Volume = Berm Length x Cross Sectional Area



Dozer productivity assumes push distance of: **100** feet

Dozer:
Length x (Berm Base Width + Dozer Push Distance) - accounts for disturbance created in borrow area

Excavator:
Length x (Berm Base Width + (2 x Excavator Track Width) - accounts for disturbance created in borrow area

Haul & Place:
Length x Berm Base Width - if necessary use Yards sheet to account for disturbance created in borrow area

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Waste Rock Dumps - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$49,198	$145,905	N/A	$195,103
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Quarries & Borrow Pits - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	fines_waste_to_nh_1			Select Fleet								$0	$0	$0
2	fines_waste_to_nh_2			Select Fleet								$0	$0	$0
3	fines_waste_to_nh_3			Select Fleet								$0	$0	$0
4	fines_waste_to_nh_4			Select Fleet								$0	$0	$0
5	sh_waste_to_areai			Select Fleet								$0	$0	$0
6	sh_waste_to_nh_1			Select Fleet								$0	$0	$0
7	sh_waste_to_nh_2			Select Fleet								$0	$0	$0
8	sh_waste_to_nh_3			Select Fleet								$0	$0	$0
9	sh_waste_to_nh_4			Select Fleet								$0	$0	$0
10	sh_waste_to_sh_1			Select Fleet								$0	$0	$0
11	sh_waste_to_sh_2			Select Fleet								$0	$0	$0
12	sh_waste_to_sh_3			Select Fleet								$0	$0	$0
13	sh_waste_to_wh_1			Select Fleet								$0	$0	$0
14	sh_waste_to_wh_2			Select Fleet								$0	$0	$0
15	sh_waste_to_plant_1			Select Fleet								$0	$0	$0
16	sh_waste_to_plant_2			Select Fleet								$0	$0	$0
												$0	**$0**	**$0**

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Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$49,198	$145,905	N/A	$195,103
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Quarries & Borrow Pits - Cover and Growth Media Costs

		Cover (lower layer)								Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost $	Cover Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**fines_waste_to_nh_1**	1,638	769D/988G/D7R	772	6	2	$951	$2,814	$3,765						$0	$0	$0
2	**fines_waste_to_nh_2**	2,858	769D/988G/D7R	802	6	4	$1,902	$5,628	$7,530						$0	$0	$0
3	**fines_waste_to_nh_3**	799	769D/988G/D7R	689	5	1	$418	$1,241	$1,659						$0	$0	$0
4	**fines_waste_to_nh_4**	5,100	769D/988G/D7R	755	7	7	$3,729	$11,014	$14,743						$0	$0	$0
5	**sh_waste_to_areai**	3,335	769D/988G/D7R	737	6	5	$2,377	$7,035	$9,412						$0	$0	$0
6	**sh_waste_to_nh_1**	1,638	769D/988G/D7R	724	8	2	$1,180	$3,480	$4,660						$0	$0	$0
7	**sh_waste_to_nh_2**	2,858	769D/988G/D7R	757	8	4	$2,360	$6,959	$9,319						$0	$0	$0
8	**sh_waste_to_nh_3**	799	769D/988G/D7R	757	8	1	$590	$1,740	$2,330						$0	$0	$0
9	**sh_waste_to_nh_4**	5,100	769D/988G/D7R	732	9	7	$4,531	$13,344	$17,875						$0	$0	$0
10	**sh_waste_to_sh_1**	9,896	769D/988G/D7R	797	4	12	$4,331	$12,890	$17,221						$0	$0	$0
11	**sh_waste_to_sh_2**	3,417	769D/988G/D7R	720	3	5	$1,518	$4,539	$6,057						$0	$0	$0
12	**sh_waste_to_sh_3**	3,100	769D/988G/D7R	757	4	4	$1,444	$4,297	$5,741						$0	$0	$0
13	**sh_waste_to_wh_1**	11,507	769D/988G/D7R	727	4	16	$5,775	$17,186	$22,961						$0	$0	$0
14	**sh_waste_to_wh_2**	14,984	769D/988G/D7R	670	3	22	$6,681	$19,970	$26,651						$0	$0	$0
15	**sh_waste_to_plant_1**	3,745	769D/988G/D7R	702	6	5	$2,377	$7,035	$9,412						$0	$0	$0
16	**sh_waste_to_plant_2**	13,925	769D/988G/D7R	747	6	19	$9,034	$26,733	$35,767						$0	$0	$0
		84,699				116	**$49,198**	**$145,905**	**$195,103**						**$0**	**$0**	**$0**

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Closure Cost Estimate
Quarries & Borrow Pits

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Waste Rock Dumps - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$49,198	$145,905	N/A	$195,103
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$2,838	$7,474	N/A	$10,312
Safety Berm Construction Cost	$0	$0	N/A	$0
Subtotal Earthwork	**$52,036**	**$153,379**	**$0**	**$205,415**
Revegetation Cost	$9,591	$5,480	$71,021	$86,092
Safety Berm Revegetation Cost	$0	$0	$0	$0
	$9,591	**$5,480**	**$71,021**	**$86,092**
TOTALS	**$61,627**	**$158,859**	**$71,021**	**$291,507**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Quarries & Borrow Pits - Scarifying/Revegetation Costs

	Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**fines_waste_to_nh_1**	0.00	2.03	2.03						$0	$0	$0	$0	$0	$0	$0
2	**fines_waste_to_nh_2**	0.00	3.54	3.54						$0	$0	$0	$0	$0	$0	$0
3	**fines_waste_to_nh_3**	0.00	0.99	0.99						$0	$0	$0	$0	$0	$0	$0
4	**fines_waste_to_nh_4**	0.00	6.32	6.32						$0	$0	$0	$0	$0	$0	$0
5	**sh_waste_to_areai**	0.00	2.07	2.07		160	16G/H	0	2	$132	$348	$480	$378	$216	$2,796	$3,390
6	**sh_waste_to_nh_1**	0.00	2.03	2.03		250	16G/H	0	2	$132	$348	$480	$371	$212	$2,748	$3,331
7	**sh_waste_to_nh_2**	0.00	3.54	3.54		275	16G/H	0	3	$198	$521	$719	$647	$370	$4,793	$5,810
8	**sh_waste_to_nh_3**	0.00	0.99	0.99		85	16G/H	0	1	$66	$174	$240	$183	$104	$1,340	$1,627
9	**sh_waste_to_nh_4**	0.00	6.32	6.32		250	16G/H	0	5	$330	$869	$1,199	$1,155	$660	$8,553	$10,368
10	**sh_waste_to_sh_1**	0.00	6.13	6.13		175	16G/H	0	5	$330	$869	$1,199	$1,120	$640	$8,298	$10,058
11	**sh_waste_to_sh_2**	0.00	2.12	2.12		300	16G/H	0	2	$132	$348	$480	$387	$221	$2,865	$3,473
12	**sh_waste_to_sh_3**	0.00	1.92	1.92		200	16G/H	0	2	$132	$348	$480	$351	$201	$2,599	$3,151
13	**sh_waste_to_wh_1**	0.00	7.13	7.13		500	16G/H	0	5	$330	$869	$1,199	$1,303	$744	$9,649	$11,696
14	**sh_waste_to_wh_2**	0.00	9.29	9.29		525	16G/H	0	7	$462	$1,216	$1,678	$1,696	$969	$12,564	$15,229
15	**sh_waste_to_plant_1**	0.00	2.32	2.32		250	16G/H	0	2	$132	$348	$480	$424	$242	$3,140	$3,806
16	**sh_waste_to_plant_2**	0.00	8.63	8.63		250	16G/H	0	7	$462	$1,216	$1,678	$1,576	$901	$11,676	$14,153
			65.39	65.39					43	**$2,838**	**$7,474**	**$10,312**	**$9,591**	**$5,480**	**$71,021**	**$86,092**

Notes: 1) Minimum total ripping hours = 1 (i.e. If total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in in scarifying table.)

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Buildings & Foundation Demolition Cost Summary

Go To Labor Rates sheet and select Zone for Each Labor Classification

	Labor	Equipment	Materials	Totals
Building Demolition Cost	$141,929	$84,893	N/A	$226,822
Wall Demolition Cost	$49,442	$8,631	N/A	$58,073
Slab Demolition	$805	$5,785	N/A	$6,590
Subtotal Demolition	**$192,176**	**$99,309**	**$0**	**$291,485**
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**	**$0**	**$0**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$192,176**	**$99,309**	**$0**	**$291,485**

Buildings & Foundation - User Input

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

	Facility Description			Physical - MANDATORY								Foundation Cover (1)			Growth Media (1) (entire footprint)		
	Description (required)	ID Code	Type	Length ft	Width ft	Eve Height ft	Slab Thickness in	Foundation Wall Thickness in	Foundation Wall Height ft	Average Flat Area Long Dimension (ripping distance) ft	Building Area Footprint (including surrounding facilities) acres	Foundation Cover Thickness in	Distance from Foundation Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade
1	**Mill - Main Building**		**Process - Plant & Buildings**	**102**	**62**	**76**	**6**	**22**	**6**								
2	**Mill - Side Slab**		**Process - Plant & Buildings**	**54**	**38**	**0**	**6**	**0**	**0**								
3	**Mill - Side Slab**		**Process - Plant & Buildings**	**19**	**16**	**0**	**8**	**0**	**0**								
4	**Office**		**Site Facilities - Buildings**	**42**	**32**	**20**	**4**	**6**	**3**								
5	**Shop**		**Site Facilities - Buildings**	**120**	**60**	**40**	**6**	**12**	**4**								
6	**Building 1**		**Site Facilities - Buildings**	**48**	**62**	**20**	**4**	**6**	**3**								
7	**Building 2**		**Site Facilities - Buildings**	**30**	**20**	**10**	**3**										
8	**Building 3**		**Site Facilities - Buildings**	**30**	**20**	**10**	**3**										
9	**Building 1 apron**		**Site Facilities - Structures**	**18**	**18**	**0**	**3**										
10	**Fuel Storage Pad**		**Site Facilities - Structures**	**50**	**35**	**0**	**4**	**6**	**3**								

Notes:
1. Foundation cover only calculated to cover slab. Growth media estimated over entire footprint area
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

All earthwork (cover, regrading, reveg., etc.) is accounted for on the Yards, Etc. tab.

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Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**	**$0**	**$0**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$192,176**	**$99,309**	**$0**	**$291,485**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Buildings & Foundation - User Input (cont.) — You must fill in ALL green cells and relevant blue cells in this section for each building or facility

		Construction Materials		Slab Demolition		Foundation Cover			Growth Media			Revegetation				
	Description (required)	Building Type (select)	Foundation Wall Type (select)	Slab Demo Method (select)	Slab Breaking Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)
1	**Mill - Main Building**	**Lg. steel**	**Conc 6 in (150 mm) thick**	**Break & bury**	**Med Excavator**											
2	**Mill - Side Slab**	**Lg. steel**	**Conc 6 in (150 mm) thick**	**Break & bury**	**Med Excavator**											
3	**Mill - Side Slab**	**Lg. steel**	**Conc 6 in (150 mm) thick**	**Break & bury**	**Med Excavator**											
4	**Office**	**Sm. steel**	**Block 4 in (100 mm) thick**	**Break & bury**	**Med Excavator**											
5	**Shop**	**Lg. steel**	**Block 6 in (150 mm) thick**	**Break & bury**	**Med Excavator**											
6	**Building 1**	**Sm. steel**	**Block 4 in (100 mm) thick**	**Break & bury**	**Med Excavator**											
7	**Building 2**	**Sm. steel**		**Break & bury**	**Med Excavator**											
8	**Building 3**	**Sm. steel**		**Break & bury**	**Med Excavator**											
9	**Building 1 apron**			**Break & bury**	**Med Excavator**											
10	**Fuel Storage Pad**		**Conc 6 in (150 mm) thick**	**Break & bury**	**Med Excavator**											

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**	**$0**	**$0**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$192,176**	**$99,309**	**$0**	**$291,485**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Buildings & Foundation - Calculations

Building Volume Calculations

Using Means Heavy Construction Cost Data (2004) calculates cubic feet from building dimensions
- Estimage slab thickness and wall thickness if not known
- Assumes that all concrete slabs are reinforced
- Productivity for crew from Means Heavy Construction Cost Data (2004) adjusted for supervision (addressed in Misc. Costs) and Davis-Bacon Wage Rates
- Demolition costs do not include hauling or disposing if debris - Use Waste Disposal module

Slab Demolition Calculations

Minimum 1 hr excavator time for slab demolition

Cover Volume Calculation

Foundation area x cover thickness
- If "Bury in Place" is selected as slab demolition method, cover thickness is adjusted such that total cover (cover + growth media) equals value entered in "Minimum thickness of cover over unbroken slab" cell above

Ripping/Scarifying Calculations

Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation

Minimum 1 acre revegetation crew time per area

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Buildings & Foundation Demolition Cost Summary

Go To Labor Rates sheet and select Zone for Each Labor Classification

	Labor	Equipment	Materials	Totals
Building Demolition Cost	$141,929	$84,893	N/A	$226,822
Wall Demolition Cost	$49,442	$8,631	N/A	$58,073
Slab Demolition	$805	$5,785	N/A	$6,590
Subtotal Demolition	**$192,176**	**$99,309**	**$0**	**$291,485**
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**	**$0**	**$0**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$192,176**	**$99,309**	**$0**	**$291,485**

Building & Foundation Demolition Costs

Uses RS Means Heavy Construction Cost Data for building and wall demolition cost calculations. Uses CAT Handbook for slab breaking production.

								Building Demolition			Wall Demolition			Slab Demolition			Total Costs		
	Description (required)	Building Footprint (slab area) sqft	Building Volume cu ft	Wall Length ft	Wall Area sq ft	Slab Demolition Fleet	Slab Volume cy	Total Labor Cost $	Total Equipment Cost $	Total Building Demolition Cost $	Total Labor Cost $	Total Equipment Cost $	Total Wall Demolition Cost $	Total Labor Cost $	Total Equipment Cost $	Total Slab Breaking Cost $	Total Labor Cost $	Total Equipment Cost $	Total Demolition Costs $
1	**Mill - Main Building**	6,324	482,205	328	1,804	345B	117	$77,153	$48,221	$125,374	$33,410	$6,729	$40,139	$132	$949	$1,081	$110,695	$55,899	$166,594
2	**Mill - Side Slab**	2,052	0	184	0	345B	38	$0	$0	$0	$0	$0	$0	$66	$474	$540	$66	$474	$540
3	**Mill - Side Slab**	304	0	70	0	345B	8	$0	$0	$0	$0	$0	$0	$66	$474	$540	$66	$474	$540
4	**Office**	1,344	26,880	148	444	345B	17	$5,107	$2,150	$7,257	$1,114	$0	$1,114	$66	$474	$540	$6,287	$2,624	$8,911
5	**Shop**	7,200	288,000	360	1,440	345B	133	$46,080	$28,800	$74,880	$3,816	$0	$3,816	$145	$1,044	$1,189	$50,041	$29,844	$79,885
6	**Building 1**	2,976	59,520	220	660	345B	37	$11,309	$4,762	$16,071	$1,657	$0	$1,657	$66	$474	$540	$13,032	$5,236	$18,268
7	**Building 2**	600	6,000	100	0	345B	6	$1,140	$480	$1,620	$0	$0	$0	$66	$474	$540	$1,206	$954	$2,160
8	**Building 3**	600	6,000	100	0	345B	6	$1,140	$480	$1,620	$0	$0	$0	$66	$474	$540	$1,206	$954	$2,160
9	**Building 1 apron**	324	0	72	0	345B	3	$0	$0	$0	$0	$0	$0	$66	$474	$540	$66	$474	$540
10	**Fuel Storage Pad**	1,750	0	170	510	345B	22	$0	$0	$0	$9,445	$1,902	$11,347	$66	$474	$540	$9,511	$2,376	$11,887
			868,605				387	**$141,929**	**$84,893**	**$226,822**	**$49,442**	**$8,631**	**$58,073**	**$805**	**$5,785**	**$6,590**	**$192,176**	**$99,309**	**$291,485**

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Buildings & Foundation Demolition Cost Summary

Go To Labor Rates sheet and select Zone for Each Labor Classification

	Labor	Equipment	Materials	Totals
Building Demolition Cost	$141,929	$84,893	N/A	$226,822
Wall Demolition Cost	$49,442	$8,631	N/A	$58,073
Slab Demolition	$805	$5,785	N/A	$6,590
Subtotal Demolition	**$192,176**	**$99,309**	**$0**	**$291,485**
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**	**$0**	**$0**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$192,176**	**$99,309**	**$0**	**$291,485**

Building & Foundation - Foundation Cover and Growth Media Costs

		Foundation Cover								Growth Media								Total Cover & Growth Media Costs		
	Description (required)	Cover Volume cy	Cover Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $	Total Labor Cost $	Total Equipment Cost $	Total Costs $
1	**Mill - Main Building**						$0	$0	$0						$0	$0	$0	$0	$0	$0
2	**Mill - Side Slab**						$0	$0	$0						$0	$0	$0	$0	$0	$0
3	**Mill - Side Slab**						$0	$0	$0						$0	$0	$0	$0	$0	$0
4	**Office**						$0	$0	$0						$0	$0	$0	$0	$0	$0
5	**Shop**						$0	$0	$0						$0	$0	$0	$0	$0	$0
6	**Building 1**						$0	$0	$0						$0	$0	$0	$0	$0	$0
7	**Building 2**						$0	$0	$0						$0	$0	$0	$0	$0	$0
8	**Building 3**						$0	$0	$0						$0	$0	$0	$0	$0	$0
9	**Building 1 apron**						$0	$0	$0						$0	$0	$0	$0	$0	$0
10	**Fuel Storage Pad**						$0	$0	$0						$0	$0	$0	$0	$0	$0
							$0	**$0**	**$0**						**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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Buildings & Foundation Demolition Cost Summary

Go To Labor Rates sheet and select Zone for Each Labor Classification

	Labor	Equipment	Materials	Totals
Building Demolition Cost	$141,929	$84,893	N/A	$226,822
Wall Demolition Cost	$49,442	$8,631	N/A	$58,073
Slab Demolition	$805	$5,785	N/A	$6,590
Subtotal Demolition	**$192,176**	**$99,309**	**$0**	**$291,485**
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$0**	**$0**	**$0**	**$0**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$192,176**	**$99,309**	**$0**	**$291,485**

Building & Foundation - Scarifying/Revegetation Costs

					Scarifying/Ripping			Revegetation				Total Scarify & Revegation Costs			
	Description (required)	Flat Area acres	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Costs $
1	**Mill - Main Building**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2	**Mill - Side Slab**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3	**Mill - Side Slab**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
4	**Office**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
5	**Shop**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
6	**Building 1**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
7	**Building 2**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	**Building 3**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
9	**Building 1 apron**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	**Fuel Storage Pad**	0.10			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
		1.00			**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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Other Demoltion and Equipment Removal - Cost Summary

Go To Labor Rates sheet and se

	Labor	Equipment	Materials	Totals
Other Demolition	$333,398	$0	$0	$333,398
Equipment Removal	$3,200	$4,905	$11,113	$19,218
TOTALS	**$336,599**	**$4,905**	**$11,113**	**$352,617**

Other Demolition

Facility Description

	Description (required)	ID Code	Type	Quantity	Units	Labor Unit Cost $	Equipment Unit Cost $	Material Unit Cost $
1	**Asbestos Abatement of the Trasnite roofing located at the mill**		Site Facilities	**12000**		**$27.78**	**$0.00**	
						$333,398	**$0**	**$0**

Notes: **An estimate was accquired from SHC.**
The original estimate listed a quantity of 12000 at a unit price of $22.67.
The date on the estimate is 2/20/18
The spreadsheet does not calculate unless there is a value in the Equipment cell. A negligble amount was added so the cost would be reflected under the Labor Unit Cost cell.

10889	ENR Feb 2018
13345	ENR June 2023
1.225548719	2018 Estimate Adjustment

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Other Demolition and Equipment Removal - Cost Summary

Go To Labor Rates sheet and se

	Labor	Equipment	Materials	Totals
Other Demolition	$333,398	$0	$0	$333,398
Equipment Removal	$3,200	$4,905	$11,113	$19,218
TOTALS	**$336,599**	**$4,905**	**$11,113**	**$352,617**

Equipment & Material Removal

Facility Description

	Description (required)	ID Code	Type	Quantity	Units	Labor Unit Cost ($)	Equipment Unit Cost ($)	Material Unit Cost ($)
1	Primary Crushing & Screening - Jaw Crusher/Grizzly Hopper		Process - Crushing & Screening	10	tons	$10.08	$15.45	$35.00
2	Cone Crusher		Process - Crushing & Screening	8	tons	$10.08	$15.45	$35.00
3	Bucket Elevators (13)		Process - Plant & Buildings	32.5	tons	$10.08	$15.45	$35.00
4	South/North Dryer		Process - Plant & Buildings	30	tons	$10.08	$15.45	$35.00
5	Cyclones (2)		Process - Plant & Buildings	8	tons	$10.08	$15.45	$35.00
6	Dirty Air Plenum		Process - Plant & Buildings	4	tons	$10.08	$15.45	$35.00
7	Surge Bins (2)		Process - Plant & Buildings	4	tons	$10.08	$15.45	$35.00
8	Storage Bins (11)		Process - Plant & Buildings	55	tons	$10.08	$15.45	$35.00
9	Mogensen Sizers (3)		Process - Plant & Buildings	6	tons	$10.08	$15.45	$35.00
10	-30, -1/4, +1/4 Storage Bins		Process - Plant & Buildings	10	tons	$10.08	$15.45	$35.00
11	Impactors (3)		Process - Plant & Buildings	16	tons	$10.08	$15.45	$35.00
12	Screens (13)		Process - Plant & Buildings	45	tons	$10.08	$15.45	$35.00
13	Separators (3)		Process - Plant & Buildings	33	tons	$10.08	$15.45	$35.00
14	Belt Conveyors (20)		Process - Plant & Buildings	40	tons	$10.08	$15.45	$35.00
15	Screw Conveyors (7)		Process - Plant & Buildings	5	tons	$10.08	$15.45	$35.00
16	Man Lift		Process - Plant & Buildings	1	tons	$10.08	$15.45	$35.00
17	Motors		Process - Plant & Buildings	10	tons	$10.08	$15.45	$35.00
						$3,200	$4,905	$11,113

Notes:

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$12,399	$32,670	N/A	$45,069
Subtotal Earthworks	**$12,399**	**$32,670**		**$45,069**
Revegetation Cost	$42,946	$24,540	$318,089	$385,575
TOTALS	**$55,345**	**$57,210**	**$318,089**	**$430,644**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Yards, Etc. - User Input

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

	Facility Description			Physical			Cover			Growth Media		
	Description (required)	ID Code	Type	Area acres	Average Flat Area Long Dimension (ripping distance) ft	Regrade Volume (calculated elsewhere) cy	Cover Thickness in	Distance from Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade
1	**North Hill Pit**		**Yard**	**44.18**	**250**	**0**						
2	**West Hill and South Hill Pits**		**Yard**	**59.81**	**250**	**0**						
3	**Plant Area**		**Yard**	**49.94**	**250**	**0**						
4	**Overburden Waste Dump**		**Yard**	**50.00**	**250**	**0**						
5	**Fines Waste Dump**		**Yard**	**31.21**	**250**	**0**						

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$12,399	$32,670	N/A	$45,069
Subtotal Earthworks	**$12,399**	**$32,670**		**$45,069**
Revegetation Cost	$42,946	$24,540	$318,089	$385,575
TOTALS	**$55,345**	**$57,210**	**$318,089**	**$430,644**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Yards, Etc. - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

		Grading			Cover			Growth Media			Revegetation				
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)
1	**North Hill Pit**										**User Mix 1**			**Yes**	**Grader**
2	**West Hill and South Hill Pits**										**User Mix 1**			**Yes**	**Grader**
3	**Plant Area**										**User Mix 1**			**Yes**	**Grader**
4	**Overburden Waste Dump**										**User Mix 1**			**Yes**	**Grader**
5	**Fines Waste Dump**										**User Mix 1**			**Yes**	**Grader**

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$12,399	$32,670	N/A	$45,069
Subtotal Earthworks	**$12,399**	**$32,670**		**$45,069**
Revegetation Cost	$42,946	$24,540	$318,089	$385,575
TOTALS	**$55,345**	**$57,210**	**$318,089**	**$430,644**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Yards, Etc. - Calculations

Grading Calculations

Average push distance assumed to be 2/3 of the 600 feet maximum from Catepillar Handbook or 400 feet
Material assumed to be loose stockile (1.2 productivity factor)
Slope assumed to be 0 to 5% (1.0 productivity factor)

Cover Volume Calculation

Yard area x cover thickness

Ripping/Scarifying Calculations

Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr ripping/scarifying per area

Revegetation

Minimum 1 acre revegetation crew time per area

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$12,399	$32,670	N/A	$45,069
Subtotal Earthworks	**$12,399**	**$32,670**		**$45,069**
Revegetation Cost	$42,946	$24,540	$318,089	$385,575
TOTALS	**$55,345**	**$57,210**	**$318,089**	**$430,644**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Yards, Etc. - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**North Hill Pit**			Dozing Material							$0	$0	$0
2	**West Hill and South Hill Pits**			Dozing Material							$0	$0	$0
3	**Plant Area**			Dozing Material							$0	$0	$0
4	**Overburden Waste Dump**			Dozing Material							$0	$0	$0
5	**Fines Waste Dump**			Dozing Material							$0	$0	$0
											$0	**$0**	**$0**

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Closure Cost Estimate
Yards, Etc.

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Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$12,399	$32,670	N/A	$45,069
Subtotal Earthworks	**$12,399**	**$32,670**		**$45,069**
Revegetation Cost	$42,946	$24,540	$318,089	$385,575
TOTALS	**$55,345**	**$57,210**	**$318,089**	**$430,644**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Yards, Etc. - Cover and Growth Media Costs

		Cover								Growth Media							
	Description (required)	Cover Volume cy	Topsoil Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Growth Media Cost $
1	**North Hill Pit**						$0	$0	$0						$0	$0	$0
2	**West Hill and South Hill Pits**						$0	$0	$0						$0	$0	$0
3	**Plant Area**						$0	$0	$0						$0	$0	$0
4	**Overburden Waste Dump**						$0	$0	$0						$0	$0	$0
5	**Fines Waste Dump**						$0	$0	$0						$0	$0	$0
							$0	**$0**	**$0**						**$0**	**$0**	**$0**

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Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
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Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$12,399	$32,670	N/A	$45,069
Subtotal Earthworks	**$12,399**	**$32,670**		**$45,069**
Revegetation Cost	$42,946	$24,540	$318,089	$385,575
TOTALS	**$55,345**	**$57,210**	**$318,089**	**$430,644**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Yards, Etc. - Scarifying/Revegetation Costs

	Description (required)	Surface Area acres	Area Long Dimension ft	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**North Hill Pit**	44.18	250	16G/H	35	$2,308	$6,082	$8,390	$8,069	$4,611	$59,765	$72,445
2	**West Hill and South Hill Pits**	59.81	250	16G/H	48	$3,166	$8,341	$11,507	$10,924	$6,242	$80,909	$98,075
3	**Plant Area**	49.94	250	16G/H	40	$2,638	$6,951	$9,589	$9,121	$5,212	$67,557	$81,890
4	**Overburden Waste Dump**	50.00	250	16G/H	40	$2,638	$6,951	$9,589	$9,132	$5,218	$67,638	$81,988
5	**Fines Waste Dump**	31.21	250	16G/H	25	$1,649	$4,345	$5,994	$5,700	$3,257	$42,220	$51,177
		235.14			188	**$12,399**	**$32,670**	**$45,069**	**$42,946**	**$24,540**	**$318,089**	**$385,575**

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Closure Cost Estimate
Well Abandonment

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Well Abandonment	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	$23,448	$48,960	$0	$72,408
Monitoring Wells	$0	$0	$0	$0
TOTALS	**$23,448**	**$48,960**	**$0**	**$72,408**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Production, Dewatering and Infiltration Well Closure

	Description (required)	ID Code	Number of Holes	Casing Diam in	Average Depth[1] ft bgs	Depth to First Water ft bgs	Original Static Water Level ft bgs	Top of Slotted Casing[2] ft bgs	Blank Casing Below Top of Screen[2] ft	Type of Pump (if any) (select)	Depth to Pump ft bgs	Hole Plug Method (select)	Casing Volume per ft cf	Perforation Length[3,4] ft	Grout Volume per Hole[4,5] cy	Cement Volume per Hole[6] cy	Inert Media Volume per Hole[7] cy	Pump Removal Labor Cost $	Pump Removal Equip Cost $	Perf Labor Cost $	Perf Equip Cost[8] $	Grout + Cement Labor Cost[9] $	Grout + Cement Equip Cost[9] $	Grout + Cement Material Cost $	Inert Media Labor Cost[10] $	Inert Media Equip Cost[9] $
1	**Well 1**		**1**	**14.0**	**1,060**	**730**	**730**			**Submersib**	**800**	**Cement Pl**	1.070			0.80	41.21	$10,395	$24,480	$0	$0	$0	$0	$0	$1,329	$0
2	**Inactive Well**		**1**	**14.0**	**1,060**	**730**	**730**			**Submersib**	**800**	**Cement Pl**	1.070			0.80	41.21	$10,395	$24,480	$0	$0	$0	$0	$0	$1,329	$0
																		$20,790	**$48,960**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,658**	**$0**

(1) For previously abandoned holes enter "0" for depth
(2) Wells abandoned per Nevada Administrative Code (NAC 534.420). Hole grouted and perforated from bottom to 50 feet (15.24m) above the top of the screen, or first water encountered or original static water level, depending on vertical hydraulic gradient and well construction parameters. Inert media (cuttings or alluvium) used from top of grout to top seal.
(3) Perforation length = amount of blank casing below first water (for confined aquifers) or predicted recovered water table (unconfined aquifers) + 50 feet (15.24m) of blank casing above water table
(4) Assumes 50' (15.24m) sanitary seal at top of hole. Therefore, perforation and grouting only required to bottom of sanitary seal.
(5) Assumes 100% loss to formation for grout (abandonite) for screened and perforated sections.
(6) Assumes 20' (6m) top seal of cement in casing only. See note 4.
(7) Inert material is cuttings or alluvium sourced locally.
(8) Includes perforation tool wear cost/ft of perforation (see Productivty Sheet).
(9) See Productivity Sheet for hourly production. Minimum 1 hr per hole + fixed hours per hole for move and setup. If no perforation required, use standard drill rig.
(10) See Productivity Sheet for hourly production. Minimum 1 hr per hole.

Notes:

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Closure Cost Estimate
Well Abandonment

Project Name: No Agua Reclamation - Reclamation Plan
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Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Well Abandonment	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	$23,448	$48,960	$0	$72,408
Monitoring Wells	$0	$0	$0	$0
TOTALS	**$23,448**	**$48,960**	**$0**	**$72,408**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Monitoring Well Closure

	Description (required)	ID Code	Number of Holes	Casing Diam in	Average Depth ft bgs	Top of Screen[1] ft bgs	Hole Plug Method (select)	Casing Volume per ft ft3	Grout Volume/ Well[2,3] cy	Cement Volume per Hole[4] cy	Inert Backfill Volume per Hole[5] cy	Total Grouting Hours/ Hole hr	Total Inert Media Hours/ Hole hr	Grout + Cement Labor Cost[6] $	Grout + Cement Equip Cost[6] $	Grout + Cement Material Cost $	Inert Material Labor Cost[7] $	Inert Material Equip Cost[7] $
														$0	**$0**	**$0**	**$0**	**$0**

Wells abandoned per NAC 534.420 with bentonite grout placed to 50 feet above the top of the screen (see note 1).
(1) Assumes top of screen is at or above the static water level (in unconfined aquifers) or the depth of first water encountered (in confined aquifers).
(2) Assumes 25% loss to formation for grouting
(3) Grouting only required to 50' (15.24m) above the top of screen because monitor wells are constructed with a seal in the annular space.
(4) Assumes top 20' (6m) plugged with cement.
(5) Assumes hole plugged with inert material (cuttings or alluvium) above grout up to cement surface plug.
(6) See Productivity Sheet for hourly production. Minimum 1 hr per hole + fixed hours per hole for move and setup (see Productivty Sheet).
(7) See Productivity Sheet for hourly production. Minimum 1 hr per hole.

Notes:

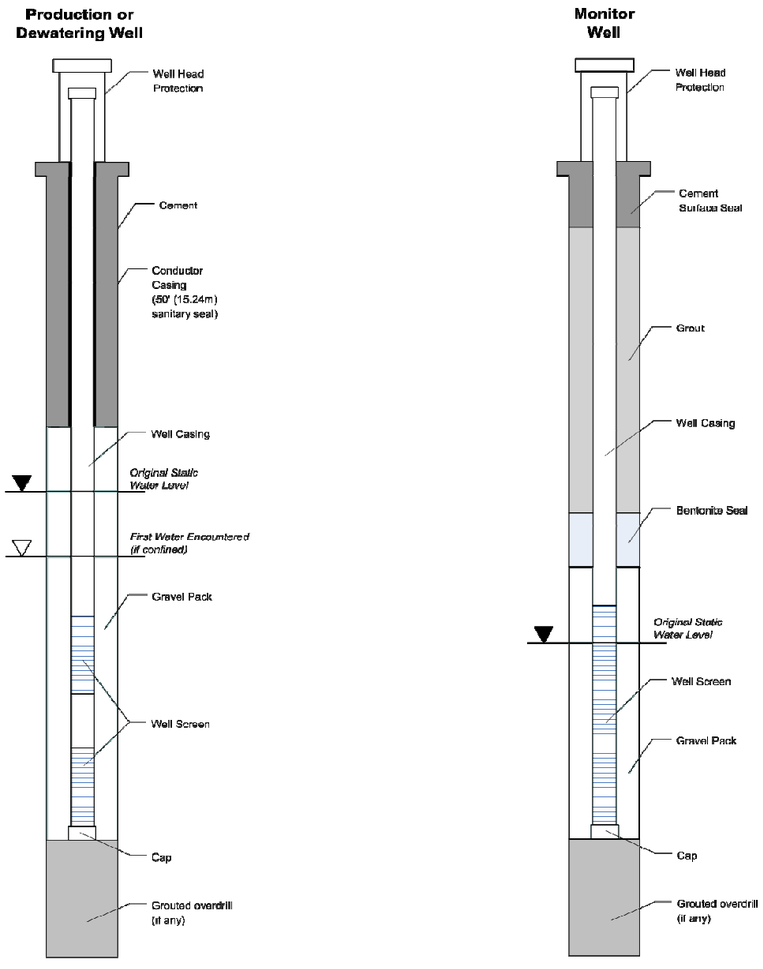
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Project Name: No Agua Reclamation - Reclamation Plan
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Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Well Abandonment	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	$23,448	$48,960	$0	$72,408
Monitoring Wells	$0	$0	$0	$0
TOTALS	**$23,448**	**$48,960**	**$0**	**$72,408**

Go To Labor Rates sheet and select Zone for Each Labor Classification

Well Construction



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Closure Cost Estimate
Misc. Costs

Project Name: No Agua Reclamation - Reclamation Plan
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Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Go To Labor Rate

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$0	$0	$0	$0
Culvert & Buried Pipe Removal	$0	$0	N/A	$0
Surface Pipe Removal	$0	$0	N/A	$0
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$20,275	$7,466	$7,181	$34,922
Other Costs	$0	$0	$0	$0
TOTALS	**$20,275**	**$7,466**	**$7,181**	**$34,922**

Fence Removal

You must fill in ALL green and blue cells

	Description (required)	ID Code	Length ft	Type (select type)	Costs: Labor Cost $	Costs: Equipment Cost $	Costs: Total Cost $
					$0	**$0**	**$0**

Notes:

Fence Installation

You must fill in ALL green and blue cells

	Description (required)	ID Code	Input: Length ft	Input: Type (select type)	Costs: Labor Cost $	Costs: Equipment Cost $	Costs: Material Cost ($)
					$0	**$0**	**$0**

Notes:

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Closure Cost Estimate
Misc. Costs

Project Name: No Agua Reclamation - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Go To Labor Rate

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$0	$0	$0	$0
Culvert & Buried Pipe Removal	$0	$0	N/A	$0
Surface Pipe Removal	$0	$0	N/A	$0
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$20,275	$7,466	$7,181	$34,922
Other Costs	$0	$0	$0	$0
TOTALS	**$20,275**	**$7,466**	**$7,181**	**$34,922**

Culvert & Buried Pipe Removal

You must fill in ALL green and blue cells

	Description (required)	ID Code	Input: Length ft	Input: Type (select type)	Input: Location (select)	Costs: Labor Cost $	Costs: Equipment Cost $
						$0	**$0**

Notes:

Surface Pipe Removal

You must fill in ALL green and blue cells

	Description (required)	ID Code	Input: Length ft	Input: Type (select type)	Input: Location (select)	Costs: Labor Cost $	Costs: Equipment Cost $
						$0	**$0**

Notes:

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Closure Cost Estimate
Misc. Costs

Project Name: No Agua Reclamation - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Go To Labor Rate

Miscellaneous Cost Summary

	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$0	$0	$0	$0
Culvert & Buried Pipe Removal	$0	$0	N/A	$0
Surface Pipe Removal	$0	$0	N/A	$0
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$20,275	$7,466	$7,181	$34,922
Other Costs	$0	$0	$0	$0
TOTALS	**$20,275**	**$7,466**	**$7,181**	**$34,922**

Power Line and Substation Removal

You must fill in ALL green and blue cells

	Description (required)	ID Code	Input: Power Line Length (miles)	Input: Power Line Type (select)	Input: Number of Substations #	Input: Location (select)	Power Line Removal $
							$0

Notes: If substation owned by operator, use Other Demo & Equipment Removal sheet
User may need to add line items in Foundations & Buildings for substation slab demolition and fence removal
Labor/Equipment costs assume approximately 80% of cost are equipment and 20% are labor related costs

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Closure Cost Estimate
Misc. Costs

Project Name: No Agua Reclamation - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Go To Labor Rate

Miscellaneous Cost Summary	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$0	$0	$0	$0
Culvert & Buried Pipe Removal	$0	$0	N/A	$0
Surface Pipe Removal	$0	$0	N/A	$0
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$20,275	$7,466	$7,181	$34,922
Other Costs	$0	$0	$0	$0
TOTALS	**$20,275**	**$7,466**	**$7,181**	**$34,922**

Rip-Rap & Rock Lining

You must fill in ALL green and blue cells

	Description (required)	ID Code	Input: Area S.Y.	Input: Type (select type)	Costs: Labor Cost $	Costs: Equipment Cost $	Costs: Material Cost $
1	**Rip rap Channel Crew**		**395**	**Rip-Rap 18 in (45**	$20,275	$7,466	$7,181
					$20,275	**$7,466**	**$7,181**

Notes:

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Closure Cost Estimate
Misc. Costs

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Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Go To Labor Rate

Miscellaneous Cost Summary				
	Labor	Equipment	Materials	Totals
Fence Removal	$0	$0	N/A	$0
Fence Installation	$0	$0	$0	$0
Culvert & Buried Pipe Removal	$0	$0	N/A	$0
Surface Pipe Removal	$0	$0	N/A	$0
Power Lines	$0	N/A	N/A	$0
Substations/Transformers	$0	N/A	N/A	$0
Rip-rap, rock lining, gabions	$20,275	$7,466	$7,181	$34,922
Other Costs	$0	$0	$0	$0
TOTALS	**$20,275**	**$7,466**	**$7,181**	**$34,922**

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Closure Cost Estimate
Monitoring

Project Name: No Agua Reclamation - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Reclamation Monitoring & Maintenance - Cost Summary

Go To Labor Rates sheet and select Zone for Each Labor Cla

	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	$0	$0	$0	$0
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$122,936	$3,419	N/A	$126,355
Subtotal Reclamation Monitoring	**$122,936**	**$3,419**	**$0**	**$126,355**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$122,936**	**$3,419**	**$0**	**$126,355**

Reclamation Maintenance

Description	Total Revegetation Surface Area (1,2) acres	% Area Requiring Reseeding	Seed Mix (select)	Area Requiring Reseeding acres	Seed $/acres	Labor $/acres	Equipment $/acres	Totals $
Revegetation Maintenance	375			0.0	$0.00	$182.64	$104.37	
Labor								$0
Equipment								$0
Materials								$0
Cost/Acre								$0
							Subtotal	**$0**

Notes: 1) Surface area is NOT the same as footprint disturbance area typically used for permitting purposes.

	Total Volume Growth Media cy	% Volume Requiring Maintenance	Average Growth Media Placement Cost $/CY	Volume Requiring Replacement cy		Labor (assume: 25%) $/acres	Equipment (assume: 75%) $/acres	Total $
Erosion Maintenance	0		$0.00	0		$0.00	$0.00	$0

Notes:

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Closure Cost Estimate
Monitoring

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Reclamation Monitoring & Maintenance - Cost Summary				
	Labor	**Equipment**	**Lab & Materials**	**Totals**
Revegetation Maintenance	$0	$0	$0	$0
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$122,936	$3,419	N/A	$126,355
Subtotal Reclamation Monitoring	**$122,936**	**$3,419**	**$0**	**$126,355**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$122,936**	**$3,419**	**$0**	**$126,355**

Go To Labor Rates sheet and select Zone for Each Labor Cla

Reclamation Monitoring

Description	Hrs/Day	Days/Year	Number of Years	Rate $/hr		
Field Work						
Field Geologist/Engineer	**8**	**8**	**10**	$153.67		$98,349
Range Scientist				$126.23		$0
Reporting						
Field Geologist/Engineer	**8**	**2**	**10**	$153.67		$24,587
Range Scientist				$126.23		$0
					Subtotal	**$122,936**
Travel						
	Hrs/Trip hr	**Trips/Year**	**Years**	**Truck Cost** $/hr		
Travel	**2**	**8**	**10**	$21.37		$3,419
					Subtotal	**$3,419**
					Total Reclamation Monitoring	**$126,355**

Notes:

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Closure Cost Estimate
Monitoring

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Reclamation Monitoring & Maintenance - Cost Summary				
	Labor	**Equipment**	**Lab & Materials**	**Totals**
Revegetation Maintenance	$0	$0	$0	$0
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$122,936	$3,419	N/A	$126,355
Subtotal Reclamation Monitoring	**$122,936**	**$3,419**	**$0**	**$126,355**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$122,936**	**$3,419**	**$0**	**$126,355**

Go To Labor Rates sheet and select Zone for Each Labor Cla

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Closure Cost Estimate
Monitoring

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Reclamation Monitoring & Maintenance - Cost Summary

	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	$0	$0	$0	$0
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$122,936	$3,419	N/A	$126,355
Subtotal Reclamation Monitoring	**$122,936**	**$3,419**	**$0**	**$126,355**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$122,936**	**$3,419**	**$0**	**$126,355**

Go To Labor Rates sheet and select Zone for Each Labor Cla

Water and Rock Sample Analysis

Description	Samples #	Events/Year	No. Years	First Sample Year closure year (1-100)	No. of Samplers	Days/Event	Hrs/Day	Analysis Cost $/sample	Supplies $/sample	Lab Cost $
										$0.00

Notes: Sampling labor cost = No. Samplers x Years x Events/year x Days/event x Hour/Day x Labor Rate
Sampling equipment costs include 1 pickup truck for every two samplers

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Closure Cost Estimate
Monitoring

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Reclamation Monitoring & Maintenance - Cost Summary

	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	$0	$0	$0	$0
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$122,936	$3,419	N/A	$126,355
Subtotal Reclamation Monitoring	**$122,936**	**$3,419**	**$0**	**$126,355**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$122,936**	**$3,419**	**$0**	**$126,355**

Go To Labor Rates sheet and select Zone for Each Labor Cla

Ground & Surface Water Monitoring

Pump Costs

Description	No. of units		Years		Cost $
Pump (purchased)		Replacement period (yrs):			$0
				Subtotal Field Work	**$0**

Notes: Replacement period = frequency of pump replacement

Reporting

Description	Hrs/Event	Rate $/hr	Cost $
Field Geologist/Engineer			
		Subtotal Reporting	

Notes:

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Closure Cost Estimate
Monitoring

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Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Reclamation Monitoring & Maintenance - Cost Summary				
	Labor	**Equipment**	**Lab & Materials**	**Totals**
Revegetation Maintenance	$0	$0	$0	$0
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$122,936	$3,419	N/A	$126,355
Subtotal Reclamation Monitoring	**$122,936**	**$3,419**	**$0**	**$126,355**
Water Quality Monitoring	$0	$0	$0	$0
TOTAL MONITORING	**$122,936**	**$3,419**	**$0**	**$126,355**

Go To Labor Rates sheet and select Zone for Each Labor Cla

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Closure Cost Estimate
Constr. Mgmt

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File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Construction Management & Road Maintenance - Cost Summary				
	Labor	Equipment	Materials	Totals
Construction Management	$63,574	$14,574	N/A	$78,148
Construction Support		$738		$738
Road Maintenance	$39,050	$80,950	$0	$120,000
TOTAL CONSTRUCTION MANAGEMENT	**$102,624**	**$96,262**	**$0**	**$198,886**

Go To Labor Rates sheet an

Construction Management

Construction Management Staff

Description	Duration mo.	Hours/ Month hr.	Number of Supervisors	Supervisor Rate $/hr	Labor Cost $	Equipment Cost[1] $	Totals $
Active Reclamation	**4**	**195**	**1**	$93.22	$63,574	$14,574	$78,148
Monitoring & Maintenance					$0	$0	$0
				Total Staff	**$63,574**	**$14,574**	**$78,148**

Construction Management Support

Description	Duration mo.	Number of Units		Rental Rate $/mo	Generator Cost $/mo	Equipment Cost[1] $	Totals $
Temporary Office Rental	**4**	**1**		$211	$0	$738	$738
Temporary Toilets						$0	$0
					Total Support	**$738**	**$738**

Notes: Office rental assumes only 1 generator required for every 4 trailers

Total Construction Management **$78,886**

Road Maintenance

Description	Fleet Size (select)	Number	Duration mo.	Hours/ Month hr.	Labor Cost $	Equipment Cost $	Totals $
Active Reclamation							
Water Truck	**Medium**	**1**	**4**	**195**	$39,050	$80,950	$120,000
Grader					$0	$0	$0
Monitoring & Maintenance							
Water Truck					$0	$0	$0
Grader					$0	$0	$0

Description	Gallons/ Day	Days/ Month	Duration mo.	Cost/ Gallon $			Totals $
Water Fees							
Water Fees							$0
				Total Project Maintenance	**$39,050**	**$80,950**	**$120,000**

Notes: 1) Supervisor equipment = pickup truck

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Closure Cost Estimate
Labor Rates

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Color Code Key	
User Input - Direct Input	Direct Input
User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

Go To Labor Rates sheet and select Zone for Each Labor Classifi

ZONE ADJUSTMENTS			
Cost Basis/Project Region	RS Means 9/2025	RS Means Data Inflated 9/2025	
Power Equipment Operators		Select Zone	
Truck Drivers		Select Zone	<<<<<<< Select Zone for Each Labor Classification
Laborers		Select Zone	

INDIRECT COSTS	
Unemployment (%)	3.00%
Retirement/SS/Medicare (%)	7.65%
Workman's Compensation (%)	13.10%

Other Indirects	
State Payroll Tax (13),(15),(17),(18	6.40%
Total Other Indirects	**6.40%**

HOURLY LABOR RATE TABLE

EQUIPMENT TYPE (1) OR JOB DESCRIPTION	Labor Group	Base Rate ($/hr)	Zone Adjustment ($/hr)	Hourly Wage ($/hr)	Fringe ($/hr)	Retirement/ Medicare ($/hr)	Unemployment Insurance ($/hr)	Workman's Compensation ($/hr)	Other Indirect Costs ($/hr)	Total ($/hr)
Equipment Operators ($/hr) (2)										
Bulldozers										
D6R										
D6R w/ Winch										
D7R		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
D8R										
D9R										
D10R		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
D11R										
Wheeled Dozers										
824G										
834G										
844										
854G										
Motor Graders										
120H										
14G/H										
16G/H		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
24M										
Track Excavators										
312C		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
320C		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
325C		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
330C		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
345B		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
365BL		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
385BL		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
Scrapers										
631G										
637G										
Wheeled Loaders										
924G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
928G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
950G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
966G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
972G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
980G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
988G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
990		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
992G		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
994D		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
L2350		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
Shovels										
PC2000										
PC3000										
PC4000										
PC5500										

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Closure Cost Estimate
Labor Rates

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Color Code Key	
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User Input - Pull Down List	Pull Down Selection
Program Constant (can override)	Alternate Input
Program Calculated Value	Locked Cell - Formula or Reference

Go To Labor Rates sheet and select Zone for Each Labor Classifi

ZONE ADJUSTMENTS			
Cost Basis/Project Region	RS Means 9/2025	RS Means Data Inflated 9/2025	
Power Equipment Operators		Select Zone	
Truck Drivers		Select Zone	<<<<<<< Select Zone for Each Labor Classification
Laborers		Select Zone	

INDIRECT COSTS	
Unemployment (%)	3.00%
Retirement/SS/Medicare (%)	7.65%
Workman's Compensation (%)	13.10%

Other Indirects	
State Payroll Tax (13),(15),(17),(18	6.40%
Total Other Indirects	**6.40%**

HOURLY LABOR RATE TABLE										
PC8000										
Hydraulic Hammers										
H-120 (fits 325)										
H-160 (fits 345)										
H-180 (fits 365/385)										
Demolition Shears										
S340 (fits 322/325/330)										
S365 (fits 330/345)										
S390 (fits 365/385)										
Demolition Grapples										
G315 (fits 322/325)										
G320 (fits 325/330)										
G330 (fits 345/365)										

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Closure Cost Estimate
Labor Rates

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
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User Input - Direct Input	Direct Input
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Go To Labor Rates sheet and select Zone for Each Labor Classifi

ZONE ADJUSTMENTS			
Cost Basis/Project Region	RS Means 9/2025	RS Means Data Inflated 9/2025	
Power Equipment Operators		Select Zone	
Truck Drivers		Select Zone	<<<<<<< Select Zone for Each Labor Classification
Laborers		Select Zone	
INDIRECT COSTS			
Unemployment (%)	3.00%		
Retirement/SS/Medicare (%)	7.65%		
Workman's Compensation (%)	13.10%		
Other Indirects			
State Payroll Tax (13),(15),(17),(18	6.40%		
Total Other Indirects	**6.40%**		

HOURLY LABOR RATE TABLE

Other Equipment

420D 4WD Backhoe		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
428D 4WD Backhoe		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
CS533E Vibratory Roller		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
CS633E Vibratory Roller		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
CP533E Sheepsfoot Compactor		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
CP633E Sheepsfoot Compactor		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$62.71
Light Truck - 1.5 Ton		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
Supervisor's Truck		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
Flatbed Truck		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$62.71
Air Compressor + tools		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$62.71
Welding Equipment		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$62.71
Heavy Duty Drill Rig		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$62.71
Pump (plugging) Drill Rig		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$62.71
Concrete Pump										
Gas Engine Vibrator		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
Generator 5KW										
HDEP Welder (pipe or liner)										
5 Ton Crane		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
20 Ton Crane		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
50 Ton Crane		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95
120 Ton Crane		$50.67	Select Zone	$50.67		$1.52	$3.88	$6.64	$3.24	$65.95

NOTES:

(1) Equipment Type:	Catepillar model or equivalent, LeTourneau
(2) Equipment Operator Source:	
(3) Zone Basis:	

Truck Drivers ($/hr) (4)

725		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
730		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
735		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
740		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
769D		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
773E		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
777D		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
785C		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
793C		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
797B		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
613E (5,000 gal) Water Wagon		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
621E (8,000 gal) Water Wagon		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
777D Water Truck		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
785C Water Truck		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26
Dump Truck (10-12 yd3)		$43.99	Select Zone	$43.99		$1.32	$3.37	$5.76	$2.82	$57.26

NOTES:

(4) Truck Driver Source:	
(5) Zone Basis:	

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Closure Cost Estimate
Labor Rates

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

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Go To Labor Rates sheet and select Zone for Each Labor Classifi

ZONE ADJUSTMENTS

Cost Basis/Project Region	RS Means 9/2025	RS Means Data Inflated 9/2025	
Power Equipment Operators		Select Zone	
Truck Drivers		Select Zone	<<<<<<< Select Zone for Each Labor Classification
Laborers		Select Zone	

INDIRECT COSTS

Unemployment (%)	3.00%
Retirement/SS/Medicare (%)	7.65%
Workman's Compensation (%)	13.10%

Other Indirects

State Payroll Tax (13),(15),(17),(18	6.40%
Total Other Indirects	**6.40%**

HOURLY LABOR RATE TABLE

Laborers ($/hr) (6,7)

General Laborer		$36.07	Select Zone	$36.07		$1.08	$2.76	$4.72	$2.31	$46.94
Skilled Laborer		$48.98	Select Zone	$48.98		$1.47	$3.75	$6.42	$3.13	$63.74
Driller's Helper		$36.07	Select Zone	$36.07		$1.08	$2.76	$4.72	$2.31	$46.94
Rodmen (reinforcing concrete)		$51.92	Select Zone	$51.92		$1.56	$3.97	$6.80	$3.32	$67.57
Cement finisher		$45.47	Select Zone	$45.47		$1.36	$3.48	$5.96	$2.91	$59.17
Carpenter		$47.79	Select Zone	$47.79		$1.43	$3.66	$6.26	$3.06	$62.19

NOTES:

(6) Laborer Source:	
(7) Carpenter Source:	
(8) Zone Basis:	

Project Management and Technical Labor ($/hr) (9)

Project Manager		$71.62		$71.62		$2.15	$5.48	$9.38	$4.58	$93.22
Foreman		$66.34		$66.34		$1.99	$5.07	$8.69	$4.25	$86.34
Field Geologist/Engineer		$118.07		$118.07		$3.54	$9.03	$15.47	$7.56	$153.67
Field Tech/Sampler		$80.12		$80.12		$2.40	$6.13	$10.50	$5.13	$104.28
Range Scientist		$96.99		$96.99		$2.91	$7.42	$12.71	$6.21	$126.23
Senior Planning Engineer										
Project Engineer										
Mechanic/Fitter										

NOTES:

(9) Project Manager:	
(9) Foreman Source:	
(9) Techical Labor Source:	
Other Labor Source:	
Other Labor Source:	
†Additional User Markups	
(These are added by the user to the	
base rate to account for site-specific	
conditions or corporate requirements)	

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Closure Cost Estimate
Equipment Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Monthly Rental Basis: 172 hrs month

EQUIPMENT RENTAL RATE TABLE

EQUIPMENT TYPE (1)	Monthly Owner/Rental Rate	Equipment Hourly Rate	Fuel/Lube/ Wear	Total Rate
Bulldozers				
D6R				$0.00
D6R w/ Winch				$0.00
D7R	$15,693.11	$91.24	$95.76	$187.00
D8R				$0.00
D9R	$25,974.81	$151.02	$126.63	$277.64
D10R	$33,767.25	$196.32	$273.02	$469.34
D11R				$0.00
Wheeled Dozers				
824G				$0.00
834G				$0.00
844				$0.00
854G				$0.00
Motor Graders				
120H				$0.00
14G/H				$0.00
16G/H	$16,234.26	$94.39	$79.39	$173.78
24M				$0.00
Track Excavators				
312C				$0.00
320C				$0.00
325C				$0.00
330C				$0.00
345B	$9,740.55	$56.63	$67.12	$123.75
365BL				$0.00
385BL				$0.00
Scrapers				
631G				$0.00
637G				$0.00
Wheeled Loaders				
924G				$0.00
928G	$6,493.70	$37.75	$35.03	$72.78
950G				$0.00
966G				$0.00
972G				$0.00
980G				$0.00
988G	$19,481.11	$113.26	$108.16	$221.42
990				$0.00
992G				$0.00
994D				$0.00
L2350				$0.00
Shovels				
PC2000				$0.00
PC3000				$0.00
PC4000				$0.00
PC5500				$0.00
PC8000				$0.00
Hydraulic Hammers				
H-120 (fits 325)				$0.00
H-160 (fits 345)	$12,563.69	$73.04	$0.00	$73.04
H-180 (fits 365/385)				$0.00
Demolition Shears				
S340 (fits 322/325/330)				$0.00
S365 (fits 330/345)				$0.00
S390 (fits 365/385)				$0.00
Demolition Grapples				
G315 (fits 322/325)				$0.00
G320 (fits 325/330)				$0.00
G330 (fits 345/365)				$0.00
Other Equipment				
420D 4WD Backhoe				$0.00
428D 4WD Backhoe				$0.00
CS533E Vibratory Roller				$0.00
CS633E Vibratory Roller				$0.00
CP533E Sheepsfoot Compactor				$0.00
CP633E Sheepsfoot Compactor				$0.00
Light Truck - 1.5 Ton	$1,734.88	$10.09	$11.28	$21.37
Supervisor's Truck	$1,734.88	$10.09	$11.28	$21.37
Flatbed Truck				$0.00
Air Compressor + tools	$4,571.57	$26.58	$41.19	$67.77
Welding Equipment				$0.00
Heavy Duty Drill Rig				$0.00
Pump (plugging) Drill Rig				$0.00
Concrete Pump				$0.00
Gas Engine Vibrator				$0.00
Generator 5KW				$0.00
HDEP Welder (pipe or liner)				$0.00
5 Ton Crane				$0.00
20 Ton Crane	$10,476.42	$60.91	$64.33	$125.24
50 Ton Crane				$0.00
120 Ton Crane				$0.00
Trucks				
725				$0.00
730				$0.00
735				$0.00
740				$0.00
769D	$14,935.52	$86.83	$79.60	$166.43
773E				$0.00
777D				$0.00
785C				$0.00
793C				$0.00
797B				$0.00
613E (5,000 gal) Water Wagon	$7,792.44	$45.30	$73.39	$118.70
621E (8,000 gal) Water Wagon				$0.00
777D Water Truck				$0.00
785C Water Truck				$0.00
Dump Truck (10-12 yd^3)	$6,493.70	$37.75	$0.00	$37.75

NOTES:

(1) Power Equipment Source:	
(2) Power Equipment Type:	Catepillar model or equivalent, LeTourneau loader, Komatsu shovels
(3) Drilling Equipment Source:	
(4) Other Equipment Source:	

(5) Drill rig includes support (pipe) truck

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Closure Cost Estimate
Equipment Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm

FUEL, LUBE AND WEAR CALCULATIONS

EQUIPMENT TYPE	PM Cost Per Hour (1)	Under carriage or Tires (2)	G.E.T Consumption (3)	Fuel Use Rate gal/hr (4)	Cost@ 0.00/gal	Total Hourly Equipment Cost
Bulldozers						
D6R				6.25	$0.00	$0.00
D6R w/ Winch				6.25	$0.00	$0.00
D7R	$95.76			7.50	$0.00	$95.76
D8R				9.75	$0.00	$0.00
D9R	$126.63			14.25	$0.00	$126.63
D10R	$273.02			18.00	$0.00	$273.02
D11R				26.50	$0.00	$0.00
Wheeled Dozers						
824G		$0.00		10.75	$0.00	$0.00
834G		$0.00		12.60	$0.00	$0.00
844		$0.00		15.00	$0.00	$0.00
854G		$0.00		19.00	$0.00	$0.00
Motor Graders						
120H				4.00	$0.00	$0.00
14G/H				6.25	$0.00	$0.00
16G/H	$79.39			7.50	$0.00	$79.39
24M				15.50	$0.00	$0.00
Track Excavators						
312C				1.88	$0.00	$0.00
320C				4.90	$0.00	$0.00
325C				6.60	$0.00	$0.00
330C				8.20	$0.00	$0.00
345B	$67.12			10.60	$0.00	$67.12
365BL				13.20	$0.00	$0.00
385BL				17.50	$0.00	$0.00
Scrapers						
631G				15.00	$0.00	$0.00
637G				23.75	$0.00	$0.00
Wheeled Loaders						
924G				2.75	$0.00	$0.00
928G	$35.03			3.50	$0.00	$35.03
950G				4.00	$0.00	$0.00
966G				5.75	$0.00	$0.00
972G				6.25	$0.00	$0.00
980G				7.50	$0.00	$0.00
988G	$108.16			12.10	$0.00	$108.16
990				17.00	$0.00	$0.00
992G				23.00	$0.00	$0.00
994D				36.00	$0.00	$0.00
L2350				66.00	$0.00	$0.00
Shovels						
PC2000				37.00	$0.00	$0.00
PC3000				50.00	$0.00	$0.00
PC4000				70.00	$0.00	$0.00
PC5500				119.00	$0.00	$0.00
PC8000				149.00	$0.00	$0.00
Hydraulic Hammers						
H-120 (fits 325)	N/A					$0.00
H-160 (fits 345)	N/A					$0.00
H-180 (fits 365/385)	N/A					$0.00
Demolition Shears						
S340 (fits 322/325/330)	N/A					$0.00
S365 (fits 330/345)	N/A					$0.00
S390 (fits 365/385)	N/A					$0.00
Demolition Grapples						
G315 (fits 322/325)	N/A					$0.00
G320 (fits 325/330)	N/A					$0.00
G330 (fits 345/365)	N/A					$0.00
Other Equipment						
420D 4WD Backhoe				3.00	$0.00	$0.00
428D 4WD Backhoe				3.00	$0.00	$0.00
CS533E Vibratory Roller				3.75	$0.00	$0.00
CS633E Vibratory Roller				4.75	$0.00	$0.00
CP533E Sheepsfoot Compactor				3.75	$0.00	$0.00
CP633E Sheepsfoot Compactor				4.75	$0.00	$0.00
Light Truck - 1.5 Ton	$11.28			1.50	$0.00	$11.28
Supervisor's Truck	$11.28			1.00	$0.00	$11.28
Flatbed Truck				4.70	$0.00	$0.00
Air Compressor + tools	$41.19		N/A	1.00	$0.00	$41.19
Welding Equipment			N/A	2.00	$0.00	$0.00
Heavy Duty Drill Rig				12.00	$0.00	$0.00
Pump (plugging) Drill Rig				10.00	$0.00	$0.00
Concrete Pump			N/A	10.00	$0.00	$0.00
Gas Engine Vibrator			N/A	1.00	$0.00	$0.00
Generator 5KW			N/A	1.50	$0.00	$0.00
HDEP Welder (pipe or liner)			N/A	2.00	$0.00	$0.00
5 Ton Crane				3.00	$0.00	$0.00
20 Ton Crane	$64.33			4.00	$0.00	$64.33
50 Ton Crane				4.70	$0.00	$0.00
120 Ton Crane				5.20	$0.00	$0.00
Trucks						
725				4.70	$0.00	$0.00
730				5.20	$0.00	$0.00
735				7.35	$0.00	$0.00
740				7.35	$0.00	$0.00
769D	$79.60			9.25	$0.00	$79.60
773E				11.75	$0.00	$0.00
777D				16.75	$0.00	$0.00
785C				24.25	$0.00	$0.00
793C				41.75	$0.00	$0.00
797B				58.75	$0.00	$0.00
613E (5,000 gal) Water Wagon	$73.39			6.00	$0.00	$73.39
621E (8,000 gal) Water Wagon				10.75	$0.00	$0.00
777D Water Truck				16.75	$0.00	$0.00
785C Water Truck				24.25	$0.00	$0.00
Dump Truck (10-12 yd3) (5)	N/A		N/A	5.20	$0.00	$0.00

Notes:

(1) PM Source:	
(2) Undercarriage Source:	
(3) G.E.T. Source:	CAT Historical Data
(4) Fuel Use Source:	Caterpillar Handbook, Edition 35, Ch. 20; or estimated average for smaller vehicles
(5) Dump Truck Oper. Cost Source:	Means Heavy Construction (2008)

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Closure Cost Estimate
Equipment Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm

TIRE COST TABLES

Equipment	Tire Size	# of Tires Per Piece of Equipment	Cost Per Tire	Tire Cost (1)(2)	Life Expectency Hours (Low/Zone A) (3)	Tire Cost per Hour
Bulldozers						
D6R			N/A			
D6R w/ Winch			N/A			
D7R			N/A			
D8R			N/A			
D9R			N/A			
D10R			N/A			
D11R			N/A			
Wheeled Dozers						
824G	29.5R25	4		$0.00	3,500	$0.00
834G	35/65-R33	4		$0.00	3,500	$0.00
844	45/65-R39	4		$0.00	3,500	$0.00
854G	45/65-R45	4		$0.00	3,500	$0.00
Motor Graders						
120H	13PR24	6		$0.00	3,500	
14G/H	20.5R25	6		$0.00	3,500	
16G/H	23.5R25	6		$0.00	3,500	
24M	23.5R25	6		$0.00	3,500	
Track Excavators						
312C			N/A			
320C			N/A			
325C			N/A			
330C			N/A			
345B			N/A			
365BL			N/A			
385BL			N/A			
Scrapers						
631G	37.25R35	4		$0.00	4,000	
637G	37.25R35	4		$0.00	4,000	
Wheeled Loaders						
924G	17.5R25	4		$0.00	4,500	
928G	17.5R25	4		$0.00	4,500	
950G	26.5R25	4		$0.00	4,500	
966G	26.5R25	4		$0.00	4,500	
972G	26.5R25	4		$0.00	4,500	
980G	29.5R25	4		$0.00	4,500	
988G	35/65-33	4		$0.00	4,500	
990	41.25/70-39	4		$0.00	4,500	
992G	45/65R45	4		$0.00	4,500	
994D	55/85R57	4		$0.00	4,500	
L2350	55/85R57	4		$0.00	4,500	
Shovels						
PC2000			N/A			
PC3000			N/A			
PC4000			N/A			
PC5500			N/A			
PC8000			N/A			
Hydraulic Hammers						
H-120 (fits 325)			N/A			
H-160 (fits 345)			N/A			
H-180 (fits 365/385)			N/A			
Demolition Shears						
S340 (fits 322/325/330)			N/A			
S365 (fits 330/345)			N/A			
S390 (fits 365/385)			N/A			
Demolition Grapples						
G315 (fits 322/325)			N/A			
G320 (fits 325/330)			N/A			
G330 (fits 345/365)			N/A			
Other Equipment						
420D 4WD Backhoe	340/80R18-19.5LR24	2		$0.00	3,000	
428D 4WD Backhoe	340/80R18-16.9R28	2		$0.00	3,000	
CS533E Vibratory Roller			N/A			
CS633E Vibratory Roller			N/A			
CP533E Sheepsfoot Compactor			N/A			
CP633E Sheepsfoot Compactor			N/A			
Light Truck - 1.5 Ton		4		$0.00	3,000	
Supervisor's Truck		4		$0.00	3,000	
Flatbed Truck		22		$0.00	3,000	
Air Compressor + tools			N/A			
Welding Equipment			N/A			
Heavy Duty Drill Rig		4		$0.00	3,000	
Pump (plugging) Drill Rig		4		$0.00	3,000	
Concrete Pump			N/A			
Gas Engine Vibrator			N/A			
Generator 5KW			N/A			
HDEP Welder (pipe or liner)			N/A			
5 Ton Crane		4		$0.00	3,000	
20 Ton Crane		4		$0.00	3,000	
50 Ton Crane		6		$0.00	3,000	
120 Ton Crane		6		$0.00	3,000	
Trucks						
725	23.5R25	6		$0.00	2,000	
730	23.5R25	6		$0.00	2,000	
735	26.5R25	6		$0.00	2,000	
740	29.5R25	6		$0.00	2,000	
769D	18.00R33	6		$0.00	6,000	
773E	24.00R35	6		$0.00	5,000	
777D	27.00R49	6		$0.00	5,000	
785C	33.00R51	6		$0.00	4,000	
793C	40.00R57	6		$0.00	4,000	
797B	40.00R57	6		$0.00	4,000	
613E (5,000 gal) Water Wagon	23.5R25	6		$0.00	6,000	
621E (8,000 gal) Water Wagon	33.25R29	6		$0.00	8,000	
777D Water Truck	27.00R49	6		$0.00	5,000	
785C Water Truck	33.00R51	6		$0.00	4,000	
Dump Truck (10-12 yd3)		10		$0.00	6,000	

Notes:

(1) Unit Cost Basis:	Cost per tyre each
(2) Cost Basis:	
(3) Tire Cost Source:	
(4) Tire Wear Source:	Caterpillar Handbook, Edition 37

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Closure Cost Estimate
Material Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Revegetation Materials

Seed Mixes

Seed Mix	Description		Cost/Acre
None			
Mix 1	Basins		
Mix 2	Low Hills		
Mix 3	Uplands		
Mix 4	Riparian or Custom		
User Mix 1	**Imerys**		**$1,352.76**
User Mix 2			
User Mix 3			
User Mix 4			
	Cost/lb	**lbs/Acre**	**Cost/Acre**
User Mix 5 (from Seed Mix sheet)	$0.00	$25.97	$0.00
Notes:			
	Imerys Cost/Acre includes:		
	Apply mulch, fertilizer, and seed mix to areas		
	and chain, plow, and crimp		
	Uses a location adjustment to Santa Fe		

Mulch

Item	Cost/lb	lbs/Acre	Cost/Acre
None			
Straw Mulch			
Hydro Mulch			
Timber Mulch			
Notes:			

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Closure Cost Estimate
Material Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Amendments			
Item	**Cost/lb**	**lbs/Acre**	**Cost/Acre**
None			
Organic Matter			
Treated Sludge			
Chemical			
Notes:			

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Closure Cost Estimate
Material Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Well Abandonment Materials

Description	Cost/50lb bag	Units	Cost/unit*
Cement		cy	
Grout (Low Grade Bentonite)		cy	
Inert Material/Cuttings		cy	
		cy	
		cy	

* Assumes 1 bag mixes with water to make 0.21 y3 or 0.16 m3 of grout/cement slurry.

Monitoring Costs

Description	Units	Cost/unit
Monitor Well Pump	ea.	
Sampling Supplies	ea.	
Water Analysis (Profile I) (1)	ea.	
Leach Test (MWMP) w/ analysis	ea.	
ABA + S speciation	ea.	
WAD Cyanide in water	ea.	
Water Analysis (Profile II) (1)	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	

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Closure Cost Estimate
Material Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Fuel, Etc.

Description	Units	Cost/unit
Off-road Diesel - delivered (1)	$/gal	
Pickup Truck Mileage	$/mi	
Electical Power	$/kWh	

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Closure Cost Estimate
Material Costs

Revegetation Method

Slopes

Disturbance Type	Seed Application Method	Labor Cost/Acre	Equipment Cost/Acre	Total Cost/Acre
Waste Rock Dumps	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Heap Leach	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Tailings	**Hand Broadcast**	**No Cost Data**	**No Cost Data**	**No Cost Data**
Quarries & Borrow Pits	**Mechanical Broadcast**	$182.64	$104.37	$287.01

Flat Areas and Undifferentiated

Disturbance Type	Seed Application Method	Labor Cost/Acre	Equipment Cost/Acre	Total Cost/Acre
Exploration Trenches	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Exploration Roads	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Waste Rock Dumps	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Heap Leach	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Tailings	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Quarries & Borrow Pits	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Roads	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Pits	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Haul Material	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Foundations & Buildings	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Sediment & Drainge Control	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Process Ponds	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Landfills	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Yards, Etc.	**Mechanical Broadcast**	$182.64	$104.37	$287.01
Revegetation Maintenance	**Mechanical Broadcast**	$182.64	$104.37	$287.01

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Closure Cost Estimate
Misc. Unit Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Revegetation

	Means Number	Unit	Crew	Daily Output	Daily Output User	Materials	Labor	Equipment	Total	Notes
Seeding - Broadcast Hand (1)		acres							$0.00	
Seeding - Broadcast Mechanical (1)		acres					$182.64	$104.37	$287.01	
Seeding - Drill (1)		acres		365					$0.00	
Seeding - Hydroseeding (1)				365					$0.00	
Shrub Planting - bare root 6-10 in (150- 250mm) (2)	02910-400-0561	ea.	1 Clab	365					$0.00	
Tree Planting - bare root 11-16 in (270- 400mm) (3)	02910-400-0562	ea.	1 Clab	260					$0.00	
Cactus Planting (4)		ea.	1 Clab						$0.00	
NOTES:										
(1) Seeding Source:										
(2) Shrub Source:										
(3) Tree Source:										
(4) Cactus Source:										

Building and Wall Demolition

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Daily Output User	Labor	Equipment	Premium	Total	Notes
Building Demolition										
Lg. steel	02220-110-0012	C.F.	B-8	21500		$0.16	$0.10	20%	$0.31	
Lg. concrete	02220-110-0050	C.F.	B-8	15300		$0.22	$0.14	20%	$0.43	
Lg. masonry	02220-110-0080	C.F.	B-8	20100		$0.17	$0.11	20%	$0.34	
Lg. mixed	02220-110-0100	C.F.	B-8	20100		$0.17	$0.11	20%	$0.34	
Sm. steel	02220-110-0500	C.F.	B-3	14800		$0.19	$0.08	10%	$0.30	
Sm. concrete	02220-110-0600	C.F.	B-3	11300		$0.26	$0.10	10%	$0.40	
Sm. masonry	02220-110-0650	C.F.	B-3	14800		$0.19	$0.08	10%	$0.30	
Sm. wood	02220-110-0700	C.F.	B-3	14800		$0.19	$0.08	10%	$0.30	
Wall Demolition										
Block 4 in (100 mm) thick	02220-130-2000	S.F.	1 Clab	180		$2.09	$0.00	20%	$2.51	
Block 6 in (150 mm) thick	02220-130-2040	S.F.	1 Clab	170		$2.21	$0.00	20%	$2.65	
Block 8 in (200 mm) thick	02220-130-2080	S.F.	1 Clab	150		$2.50	$0.00	20%	$3.00	
Block 12 in (300 mm) thick	02220-130-2100	S.F.	1 Clab	150		$2.50	$0.00	20%	$3.00	
Conc 6 in (150 mm) thick	02220-130-2400	S.F.	B-9	160		$16.84	$3.39	10%	$22.25	
Conc 8 in (200 mm) thick	02220-130-2420	S.F.	B-9	140		$19.25	$3.87	10%	$25.43	
Conc 10 in (250 mm) thick	02220-130-2440	S.F.	B-9	120		$22.45	$4.52	10%	$29.67	
Conc 12 in (300 mm) thick	02220-130-2500	S.F.	B-9	100		$26.94	$5.42	10%	$35.60	

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Closure Cost Estimate
Misc. Unit Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Waste Disposal

Unit rates from Means Heavy Construction 2006 Edition by permission of R.S.Means/Reed Construction Data .

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment		Total	Notes
Rubbish Handling										
Dumpster delivery (average for all sizes)	02220-350-0910	ea.							$0.00	
Haul (average for all sizes)	02220-350-0920	ea.							$0.00	
Rent per month (average for all sizes)	02220-350-0940	ea.							$0.00	
Disposal fee per ton (tonne) (average for all sizes)	02220-350-0950	ton							$0.00	
NOTES:										
Dumpster Cost Source										
Dumpster Disposal Fee Source:										
Hazardous Material Handling - Solids (+ Liquids in drums)										
Pickup fees 55 gal (200 L). drums	02110-300-1100	ea.							$0.00	
Bulk material (average)	02110-300-1220/1230	ton							$0.00	
Transport - truck load (80 drums, 25 cy (m3), 18 tons)	02110-300-1260/1270	mile							$0.00	
Dump site solid disposal fee	02110-300-6000/6020	ton							$0.00	
NOTES:										
Solid Handling Cost Source										
Solid Disposal Fee Source:										
Hazardous Material Handling - Liquids										
Vacuum Truck Pickup (2200 gal/8300 L)	02110-300-3110	hr.							$0.00	
Vacuum Truck Pickup (5000 gal/19000 L)	02110-300-3120	hr.							$0.00	
Dump site liquid disposal fee	02110-300-6000/6020	ton							$0.00	
NOTES:										
Liquid Handling Cost Source										
Liquid Disposal Fee Source:										
Hydrocarbon Contaminated Soils (HCS)										
Insitu Biotreatment	02115-200-2020/2021	C.Y.							$0.00	
HCS disposal fee	02115-200-2050/2055	C.Y.							$0.00	
NOTES:										
Insitu Treatement Cost Source										
HCS Disposal Fee Source:										

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Closure Cost Estimate
Misc. Unit Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Concrete Structure Installation

Weekly dumpster rental rates from Means Heavy Construction 2005 Edition with permission by R.S.Means/Reed Construction Data .
Weekly dumpster rental rates include haul to off-site disposal site and disposal fees

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Reinforced Concrete Bulkheads and Shaft Covers										
Grade walls - 15 in (400mm) thick, 8 ft (2.5m) high	03310-240-4300	C.Y.	C-14D	80.02		$162.54	$2.14		$164.68	includes reinforcing
Grade walls - 15 in (400mm) thick, 12 ft (3.7m) high	03310-240-4350	C.Y.	C-14D	26.2		$496.44	$6.53		$502.97	includes reinforcing
Elevated conc, 1-way beam & slab - 15ft (4.6m) span	03310-240-2700	C.Y.	C-14B	20.59		$658.88	$8.30		$667.18	includes reinforcing
Elevated conc, 1-way beam & slab - 25ft (7.5m) span	03310-240-2750	C.Y.	C-14B	28.36		$478.36	$6.03		$484.39	includes reinforcing
Bat Gate/Foam Plug Installation										
Bat Gate (5)		ea.								materials $/ea. Installed
Culvert Gate (5)		ea.								materials $/ea. Installed
Adit Foam Plug (6)		ea./C.Y.								materials $/cy placed
Production Opening Foam Plug (6)		ea./C.Y.								materials $/cy placed
NOTES:										
(5) Bat Gate Source:										
(6) Foam Plug Source:										

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Closure Cost Estimate
Misc. Unit Costs

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Misc. Linear Projects

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Fencing Installation										
Barbed 3-strand	02820-170-1650	L.F.	B-80A	760		$2.18	$0.22		$2.40	
Barbed 4-strand	extrapolated	L.F.	B-80A	570		$2.90	$0.30		$3.20	
Barbed 5-strand	02820-130-0920	L.F.	B-80A	456		$3.63	$0.37		$4.00	
Chain link 8-10ft (2.5-3m) Install	02820-130-0920	L.F.	B-80C	180		$9.19	$0.95		$10.14	
Wood stockade fence 6 ft (2 m) high - Install	02820-510-1240	L.F.	B-80C	150		$11.03	$1.14		$12.17	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
Fencing Removal										
Barbed 3-strand Removal	02220-220-1600	L.F.	2 Clab	430		$2.97	$0.40		$3.37	
Barbed 4-strand Removal	extrapolated	L.F.	2 Clab	355		$3.60	$0.48		$4.08	
Barbed 5-strand Removal	02220-220-1650	L.F.	2 Clab	280		$4.57	$0.61		$5.18	
Chain link 8-10 ft (2.5-3 m) Removal	02220-220-1700	L.F.	B-6	445		$2.87	$1.31		$4.18	
Wood, all types 4-6 ft ("1.5-2 m) high - Removal	02220-220-1775	L.F.	2 Clab	430		$2.97	$0.40		$3.37	
	user	L.F.								
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
Culvert Removal										
12 in (300 mm) Diameter	02220-220-2900	L.F.	B-6	175		$7.31	$3.33		$10.64	
18 in (450 mm) Diameter	02220-220-2930	L.F.	B-6	150		$8.52	$3.88		$12.40	
24 in (600 mm) Diameter	02220-220-2960	L.F.	B-6	120		$10.66	$4.85		$15.51	
36 in (1m) Diameter	02220-220-3000	L.F.	B-6	90		$14.21	$6.47		$20.68	
Pipeline Removal										
0.75 in (20mm) - 4 in (100 mm) diameter	02220-381-1600	L.F.	B-20	700		$3.01	$0.24		$3.25	
6 in (150 mm) - 8 in (200 mm)	02220-381-1700	L.F.	B-20	500		$4.21	$0.34		$4.55	
10 in (250 mm) - 18 in (450 mm)	02220-381-1800	L.F.	B-20	300		$7.01	$0.57		$7.58	
20 in (500 mm) - 36 in (1 m)	02220-381-1900	L.F.	B-20	200		$10.52	$0.85		$11.37	
Pipe and Drainpipe Installation										
Water 4in (100mm) 40ft (12m) length, welded HDPE	02510-760-0100	L.F.	B-22A	400		$7.11	$4.17		$11.28	
Water 6in (150mm) 40ft (12m) length, welded HDPE	02510-760-0200	L.F.	B-22A	380		$7.48	$4.39		$11.87	
Water 12in (300mm) 40ft (12m) length, welded HDPE	02510-760-0500	L.F.	B-22A	260		$10.94	$6.41		$17.35	
Drain 4in (100mm) perforated PVC	02620-630-2100	L.F.	B-14	315		$10.31	$0.54		$10.85	
Drain 6in (150mm) perforated PVC	02620-630-2110	L.F.	B-14	300		$10.83	$0.57		$11.40	
Drain 4in (100mm) corrugated, perf or plain	02620-660-0040	L.F.	2 Clab	1200		$1.07	$0.14		$1.21	
Drain 6in (150mm) corrugated., perf or plain	02620-660-0060	L.F.	2 Clab	900		$1.42	$0.19		$1.61	

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Closure Cost Estimate
Misc. Unit Costs

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Drain Rock Preparation										
Crushing		C.Y.								
Screening		C.Y.								
TOTAL									$0.00	
Misc.										
Backhoe work	02210-700-0120	C.Y.	B-11M	28		$18.84	$0.00		$18.84	
Powerline and Transformer Removal										
Single Pole		mile								
Double Pole		mile								
Transformer (9)		ea.								
NOTES:										
(7) Single Pole Source:										
(8) Double Pole Source:										
(9) Transformer Source:										

Erosion and Sedimentation Control

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Rip-Rap & Rock Lining										
Rip-Rap 3/8 to 1/4 CY (m3) pieces, grouted	02370-450-0110	S.Y.	B-13	80		$34.01	$12.52		$46.53	assumes on-site source of rip-rap
Rip-Rap 18 in (450 mm) min thick, no grout	02370-450-0200	S.Y.	B-13	53	$18.18	$51.33	$18.90		$88.41	assumes on-site source of rip-rap
Gabions, 6 in (150 mm) deep	02370-450-0400	S.Y.	B-13	200		$13.60	$5.01		$18.61	assumes on-site source rock fill for gabions
Gabions, 9 in (250 mm) deep	02370-450-0500	S.Y.	B-13	163		$16.69	$6.15		$22.84	assumes on-site source rock fill for gabions
Gabions, 12 in (300 mm) deep	02370-450-0200	S.Y.	B-13	153		$17.78	$6.55		$24.33	assumes on-site source rock fill for gabions
Gabions, 18 in (450 mm) deep	02370-450-0200	S.Y.	B-13	102		$26.67	$9.82		$36.49	assumes on-site source rock fill for gabions
Gabions, 36 in (1m) deep	02370-450-0200	S.Y.	B-13	60		$45.34	$16.70		$62.04	assumes on-site source rock fill for gabions
HDEP Liner Installation										
Finish grading large area	2310-100-0100	S.F.	B-11L	18000		$0.02	$0.00		$0.02	
Compaction-riding, vibrating roller - 12in (300mm) lifts	2315-310-5100	C.Y.	B-10Y	2600		$0.35	$0.00		$0.35	
60 mil HDPE	2660-610-0010	S.F.	3 Skwk	1600		$1.29	$0.00		$1.29	
80 mil HDPE	user	S.F.	3 Skwk	149		$13.81	$0.00		$13.81	
40 mil VLDPE	user	S.F.	3 Skwk	150		$13.72	$0.00		$13.72	
	user	S.F.	3 Skwk	149		$13.81	$0.00		$13.81	
	user	S.F.	3 Skwk	149		$13.81	$0.00		$13.81	

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Closure Cost Estimate
Misc. Unit Costs

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Construction Management Support

Office Trailer, Furnished, no hook-ups	0150-500-0250	mo.			$210.83				$210.83	
Toilet Portable, chemical	1590-400-6410	mo.							$0.00	
TOTAL					$210.83				$210.83	

Pump and Casing Removal

	Pump Type	Measurement	Unit				Labor	Equipment		Total	Notes
Pump Removal											
	Submersible	ft to pump	L.F.				$12.99	$30.60		$43.59	
	Line Shaft	ft to pump	L.F.							$0.00	

NOTES:
(10) Pump Removal Source:

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
RIPPING					
Rip road					
Waste rock dumps, heaps, tails - rip flat surfaces					
Surface preparation					
Scarify					
Small Dozer w/ multi-shank					
D7R		1	$187.00	$65.95	$252.95
Totals			$187.00	$65.95	$252.95
Medium Dozer w/ multi-shank					
D9R		1	$277.64	$0.00	$277.64
Totals			$277.64	$0.00	$277.64
Large Dozer w/ multi-shank					
D10R		1	$469.34	$65.95	$535.29
Totals			$469.34	$65.95	$535.29
Grader w/ multi-shank					
16G/H		1	$173.78	$65.95	$239.73
Totals			$173.78	$65.95	$239.73
GRADING					
Grading storage and structure areas					
Grading waste rock dumps and heaps					
Grading landfills					
Constructing pit safety berms					
Small Dozer Fleet					
D7R		1	$187.00	$65.95	$252.95
Totals			$187.00	$65.95	$252.95
Medium Dozer Fleet					
D9R		1	$277.64	$0.00	$277.64
Totals			$277.64	$0.00	$277.64
Large Dozer Fleet					
D10R		1	$469.34	$65.95	$535.29
Totals			$469.34	$65.95	$535.29
EXPLORATION GRADING					
Backfilling and grading exploration trenches					
Grading flat exploration roads					

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
Small Dozer Fleet					
D6R		1	$0.00	$0.00	$0.00
Totals			$0.00	$0.00	$0.00
Medium Dozer Fleet					
D7R		1	$187.00	$65.95	$252.95
Totals			$187.00	$65.95	$252.95
Large Dozer Fleet					
D8R		1	$0.00	$0.00	$0.00
Totals			$0.00	$0.00	$0.00

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
EXCAVATING					
Earthen Berms					
Diversion ditch excavation and backfill					
Underground openings backfill - excavate and place					
Pit berm construction (excavator option)					
Small Excavator					
325C		1	$0.00	$65.95	$65.95
Totals			$0.00	$65.95	$65.95
Medium Excavator					
345B		1	$123.75	$65.95	$189.70
Totals			$123.75	$65.95	$189.70
Large Excavator					
385BL		1	$0.00	$65.95	$65.95
Totals			$0.00	$65.95	$65.95
EXCAVATE AND RECONTOUR					
Recontour large roads (haul roads, access roads, etc.)					
Ponds - Excavate and pull liner and bury					
Small Excavator + Dozer					
325C		1	$0.00	$65.95	$65.95
D7R		1	$187.00	$65.95	$252.95
Total Equipment			$187.00	$131.90	$318.90
Medium Excavator + Dozer					
345B		1	$123.75	$65.95	$189.70
D9R		1	$277.64	$0.00	$277.64
Totals			$401.39	$65.95	$467.34
Large Excavator + Dozer					
385BL		1	$0.00	$65.95	$65.95
D10R		1	$469.34	$65.95	$535.29
Totals			$469.34	$131.90	$601.24
EXPLORATION ROAD/PAD RECONTOUR					
Recontour small roads (exploration roads, service roads, etc.)					
Cut and Fill reclamation on slopes					
Drill pad recountour					
Drill sump backfill					

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
Small Dozer					
D6R		1	$0.00	$0.00	$0.00
Totals			$0.00	$0.00	$0.00
Large Dozer					
D8R		1	$0.00	$0.00	$0.00
Totals			$0.00	$0.00	$0.00
Grader					
14G/H		1	$0.00	$0.00	$0.00
Totals			$0.00	$0.00	$0.00
Small Excavator					
320C		1	$0.00	$65.95	$65.95
Totals			$0.00	$65.95	$65.95
Medium Excavator					
325C		1	$0.00	$65.95	$65.95
Totals			$0.00	$65.95	$65.95

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
LOAD, HAUL AND PLACE MATERIAL					
Rock placement					
Haul overburden for backfill					
Haul borrow for backfill					
Haul cover or growth media					
Small Truck/Loader Fleet					
725		Calculated	$0.00	$57.26	$57.26
966G	**Loader**	1	$0.00	$65.95	$65.95
D7R		1	$187.00	$65.95	$252.95
Totals			$187.00	$189.16	$376.16
Medium Truck/Loader Fleet					
740		Calculated	$0.00	$57.26	$57.26
988G	**Loader**	1	$221.42	$65.95	$287.37
D8R		1	$0.00	$0.00	$0.00
Totals			$221.42	$123.21	$344.63
Large Truck/Loader Fleet					
769D		Calculated	$166.43	$57.26	$223.69
988G	**Loader**	1	$221.42	$65.95	$287.37
D7R		1	$187.00	$65.95	$252.95
Totals			$574.85	$189.16	$764.01
Extra Large Truck/Loader Fleet					
777D		Calculated	$0.00	$57.26	$57.26
992G	**Loader**	1	$0.00	$65.95	$65.95
D7R		1	$187.00	$65.95	$252.95
Totals			$187.00	$189.16	$376.16
Scraper/Dozer Fleet					
631G		Calculated	$0.00	$0.00	$0.00
D10R		1	$469.34	$65.95	$535.29
D7R		1	$187.00	$65.95	$252.95
Totals			$656.34	$131.90	$788.24
Tandem Scraper Fleet					
637G		2	$0.00	$0.00	$0.00
D7R		1	$187.00	$65.95	$252.95
Totals			$187.00	$65.95	$252.95
MISC. LOAD AND HAUL AND EARTHWORKS					
Sludge removal					
Drainage controls					

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
Misc. - Cat 325B Excavator / 10-12 yd3 Truck					
325C		1	$0.00	$65.95	$65.95
Dump Truck (10-12 yd3)		1	$37.75	$57.26	$95.01
Totals			$37.75	$123.21	$160.96
Misc. - Cat D9R Dozer/ Loader (5 yd3) / 10-12 yd3 Truck					
D9R		1	$277.64	$0.00	$277.64
966G		1	$0.00	$65.95	$65.95
Dump Truck (10-12 yd3)		1	$37.75	$57.26	$95.01
Totals			$315.39	$123.21	$438.60
Misc. - Cat D6 Dozer / Cat 966 Loader / 10-12 yd3 Truck					
D6R		1	$0.00	$0.00	$0.00
966G		1	$0.00	$65.95	$65.95
Dump Truck (10-12 yd3)		1	$37.75	$57.26	$95.01
Totals			$37.75	$123.21	$160.96

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
CONCRETE BREAKING					
Slab demolition Footing demolition Wall demolition					
Small - Cat 325B Excavator w/ H140D s Hammer					
325C		1	$0.00	$65.95	$65.95
H-120 (fits 325)		1	$0.00	$0.00	$0.00
D9R		1	$277.64	$0.00	$277.64
Totals			$277.64	$65.95	$343.59
Medium - Cat 345B Excavator w/ H180D s Hammer					
345B		1	$123.75	$65.95	$189.70
H-160 (fits 345)		1	$73.04	$0.00	$73.04
D9R		1	$277.64	$0.00	$277.64
Totals			$474.43	$65.95	$540.38
Large - Cat 385B Excavator w/ H180D s Hammer					
385BL		1	$0.00	$65.95	$65.95
H-180 (fits 365/385)		1	$0.00	$0.00	$0.00
D9R		1	$277.64	$0.00	$277.64
Totals			$277.64	$65.95	$343.59
DRILL HOLE ABANDONMENT					
Drill Hole - Grout or Cement					
Pump (plugging) Drill Rig		1	$0.00	$62.71	$62.71
Driller's Helper		2	$0.00	$93.88	$93.88
Totals			$0.00	$156.59	$156.59
Drill Hole - Inert Media (Means Crew B-11M+ 1 Laborer)					
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
General Laborer		1	$0.00	$46.94	$46.94
Totals			$0.00	$112.89	$112.89
Drill Hole - Casing Perforation or Removal					
Heavy Duty Drill Rig		1	$0.00	$62.71	$62.71
Driller's Helper		2	$0.00	$93.88	$93.88
Totals			$0.00	$156.59	$156.59
MAINTENANCE FLEET					
Road Grading, Dust Suppression, Clean Up					
Maintenance - Small Water Truck and Cat 14G Grader					
613E (5,000 gal) Water Wagon		1	$118.70	$57.26	$175.96

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
120H		1	$0.00	$0.00	$0.00
Totals			$118.70	$57.26	$175.96
Maintenance - Medium Water Truck and Cat 16G Grader					
613E (5,000 gal) Water Wagon		1	$118.70	$57.26	$175.96
14G/H		1	$0.00	$0.00	$0.00
Totals			$118.70	$57.26	$175.96
Maintenance - Large Water Truck and Cat 16G Grader					
621E (8,000 gal) Water Wagon		1	$0.00	$57.26	$57.26
16G/H		1	$173.78	$65.95	$239.73
Totals			$173.78	$123.21	$296.99
PROJECT SUPERVISION					
Foreman		1	$0.00	$86.34	$86.34
Supervisor's Truck		1	$21.37	$65.95	$87.32
Totals			$21.37	$152.29	$173.66

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
MEANS CREW DEFINITIONS					
Crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data . For use with misc. unit costs where Means is the source for productivity					
1 Clab - Seedling Planting/Block Wall Demolition					
General Laborer		1	$0.00	$46.94	$46.94
Totals			$0.00	$46.94	$46.94
2 Clab - Barbed Wire/Wood Fence Removal, Drainpipe Installation, Pumping, Evaporation					
General Laborer		2	$0.00	$93.88	$93.88
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$159.83	$181.20
2 Clab + Excavator - Pond Liner Cut and Fold					
General Laborer		2	$0.00	$93.88	$93.88
325C		1	$0.00	$65.95	$65.95
Totals			$0.00	$159.83	$159.83
2 Clab + Welder - Bat Gates					
General Laborer		2	$0.00	$93.88	$93.88
Welding Equipment		1	$0.00	$62.71	$62.71
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$222.54	$243.91
3 Clab - Foam Adit Plugs					
General Laborer		2	$0.00	$93.88	$93.88
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$225.78	$247.15
3 Clab + Welder - Culvert Bat Gate					
General Laborer		2	$0.00	$93.88	$93.88
Welding Equipment		1	$0.00	$62.71	$62.71
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$288.49	$309.86
3 Clab D - 3 Laborers + Foreman - Decontamination					
General Laborer		3	$0.00	$140.82	$140.82
Foreman		1	$0.00	$86.34	$86.34
Supervisor's Truck		1	$21.37	$65.95	$87.32
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$42.74	$359.06	$401.80

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Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
3 SKWK - Liner Installation					
Skilled Laborer		3	$0.00	$191.22	$191.22
HDEP Welder (pipe or liner)		1	$0.00	$0.00	$0.00
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
Totals			$0.00	$257.17	$257.17

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-3 - Small Building Demoltion					
LABOR					
General Laborer		2	$0.00	$93.88	$93.88
Foreman		1	$0.00	$86.34	$86.34
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
EQUIPMENT					
928G		1	$72.78	$65.95	$138.73
Dump Truck (10-12 yd3)		2	$75.50	$114.52	$190.02
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
Totals			$148.28	$360.69	$508.97
B-6 - Chain Link Fence/Culvert Removal					
General Laborer		2	$0.00	$93.88	$93.88
928G		1	$72.78	$65.95	$138.73
Totals			$72.78	$159.83	$232.61
B-8 - Large Building Demolition					
LABOR					
General Laborer		2	$0.00	$93.88	$93.88
Foreman		1	$0.00	$86.34	$86.34
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
EQUIPMENT					
928G		1	$72.78	$65.95	$138.73
20 Ton Crane		1	$125.24	$65.95	$191.19
Dump Truck (10-12 yd3)		2	$75.50	$114.52	$190.02
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00
			$0.00		$0.00

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
			$0.00		$0.00
Totals			$273.52	$426.64	$700.16
B-9 - Concrete Wall Demolition					
General Laborer		4	$0.00	$187.76	$187.76
Foreman		1	$0.00	$86.34	$86.34
Air Compressor + tools			$67.77	$62.71	$130.48
Totals			$67.77	$336.81	$404.58

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-10Y - General Compaction					
General Laborer		1	$0.00	$46.94	$46.94
CS533E Vibratory Roller		1	$0.00	$65.95	$65.95
Totals			$0.00	$112.89	$112.89
B-11L - Fine Grading for Evaporation Pond Liner Base					
General Laborer		1	$0.00	$46.94	$46.94
14G/H		1	$0.00	$0.00	$0.00
Totals			$0.00	$46.94	$46.94
B-11M - Backhoe Work					
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
Totals			$0.00	$65.95	$65.95
B-12G - Rip-Rap Machine Placed (Modified)					
966G		1	$0.00	$65.95	$65.95
325C		1	$0.00	$65.95	$65.95
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$197.85	$219.22
B-13 - Grouted Rip-Rap & Gabion Baskets					
General Laborer		4	$0.00	$187.76	$187.76
Foreman		1	$0.00	$86.34	$86.34
20 Ton Crane		1	$125.24	$65.95	$191.19
Totals			$125.24	$340.05	$465.29
B-14 PVC Drain Pipe Installation					
Foreman		1	$0.00	$86.34	$86.34
General Laborer		4	$0.00	$187.76	$187.76
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$406.00	$427.37
B-20 - Remove Pipelines					
Foreman		1	$0.00	$86.34	$86.34
Skilled Laborer		1	$0.00	$63.74	$63.74
General Laborer		1	$0.00	$46.94	$46.94
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$262.97	$284.34
B-22A - HDEP Installation - Pipe or Liner					
Skilled Laborer		1	$0.00	$63.74	$63.74
General Laborer		2	$0.00	$93.88	$93.88
D7R		1	$187.00	$65.95	$252.95

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
420D 4WD Backhoe		1	$0.00	$65.95	$65.95
Generator 5KW		1	$0.00	$0.00	$0.00
HDEP Welder (pipe or liner)		1	$0.00	$0.00	$0.00
Totals			$208.37	$355.47	$563.84
B-80A - Install Barbed Wire Fence					
General Laborer		3	$0.00	$140.82	$140.82
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$206.77	$228.14

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Crew Size	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-80C - Install Chain Link Fence (Flatbed truck has small crane)					
General Laborer		3	$0.00	$140.82	$140.82
Light Truck - 1.5 Ton		1	$21.37	$65.95	$87.32
Totals			$21.37	$206.77	$228.14
C-14B - Elevated Concrete Slabs (Reinforced Concrete Shaft Covers)					
Foreman		1	$0.00	$86.34	$86.34
Supervisor's Truck		1	$21.37	$65.95	$87.32
Carpenter		16	$0.00	$995.04	$995.04
General Laborer		2	$0.00	$93.88	$93.88
Rodmen (reinforcing concrete)		4	$0.00	$270.28	$270.28
Cement finisher		2	$0.00	$118.34	$118.34
Gas Engine Vibrator		1	$0.00	$65.95	$65.95
Concrete Pump		1	$0.00	$0.00	$0.00
Totals			$21.37	$1,695.78	$1,717.15
C-14D - Concrete Walls Formed in Place (Reinforced Concrete Adit Bulkheads)					
Foreman		1	$0.00	$86.34	$86.34
Supervisor's Truck		1	$21.37	$65.95	$87.32
Carpenter		18	$0.00	$1,119.42	$1,119.42
General Laborer		2	$0.00	$93.88	$93.88
Rodmen (reinforcing concrete)		2	$0.00	$135.14	$135.14
Cement finisher		1	$0.00	$59.17	$59.17
Gas Engine Vibrator		1	$0.00	$65.95	$65.95
Concrete Pump		1	$0.00	$0.00	$0.00
Totals			$21.37	$1,625.85	$1,647.22

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Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Dozer Operator Skill:	Average
Grader Operator Skill:	Average
Truck/Scraper Operator:	Average
Loader Operator Skill:	Average
Excavator Operator Skill:	Average
Dozer Job Efficiency:	50 min/hr
Truck Job Efficiency:	50 min/hr
Scraper Job Efficiency:	50 min/hr
Loader Job Efficiency:	50 min/hr
Excavator Job Efficiency:	50 min/hr
Grader Job Efficiency:	50 min/hr

Productivity - Bulldozers

Dozer Specifications

Description	D11R	D10R	D9R	D8R	D7R	D6R
Blade Width (SU) (ft)	18.33	15.92	14.17	12.92	12.08	10.67
Shank Guage (3 shanks) (ft)	9.83	8.67	7.67	7.08	6.5	6.5
Pocket Spacing (ft)	4.75	4.33	3.87	3.58	3.25	3.25
Ripping Width (Ripper + 1 Pocket) (ft)	14.58	13	11.54	10.66	9.75	9.75
Ripping Speed (mph)	1	1	1	1	1	1
Ripping Maneuver (turn) Time (min)	0.25	0.25	0.25	0.25	0.25	0.25
Altitude Deration Factor	1	1	1	1	1	1
Ripping Hourly Production (excluding maneuvering time) (ft)	5,280	5,280	5,280	5,280	5,280	5,280

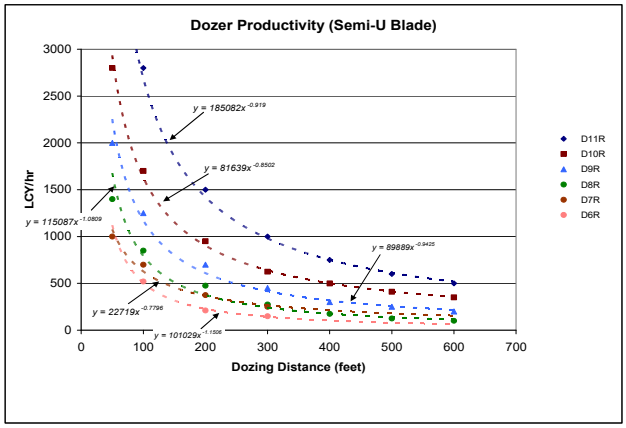
Source: Caterpillar Performance Handbook Edition 35

Dozer Productivity vs. Grading Distance

Average Dozing Distance (feet)	Production (LCY/hr) D11R	D10R	D9R	D8R	D7R	D6R
50	4,800	2,800	2,000	1,400	1,000	
100	2,800	1,700	1,250	850	700	520
200	1,500	950	700	475	375	210
300	1,000	625	450	275	250	150
400	750	500	300	175		
500	600	410	250	125		
600	500	350	200	100		

Source: Caterpillar Performance Handbook Edition 35

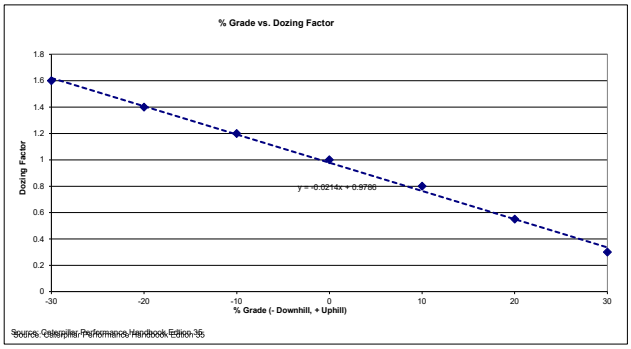
dozer productivity = k x Dozing Distance^p (see graph)						
k =	185082	81639	89889	115087	22719	101029
p =	-0.919	-0.8502	-0.9425	-1.0809	-0.7796	-1.1506



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Productivity - Bulldozers (cont.)

% Grade vs. Dozing Factor	
% Grade	**Dozing Factor**
-30	1.6
-20	1.4
-10	1.2
0	1
10	0.8
20	0.55
30	0.3
Source: Caterpillar Performance Handbook Edition 35	
% Grade Dozing Factor = -0.0214x + 0.9786 (see graph)	



Job Condition Correction Factors - Bulldozers	
OPERATOR	
Average	0.75
MATERIAL (1)	
Loose stockpile	1.2
Normal	1
Hard to cut; frozen — with tilt cylinder	0.8
Hard to drift; "dead" (dry,non-cohesive material) or very sticky material	0.8
Rock, ripped or blasted	0.6
SLOT DOZING OR SIDE BY SIDE (1)	1.2
VISIBILITY	
Good conditions	1
JOB EFFICIENCY	
50 min/hr	0.83
(1) Selected in facility worksheets. Other factors included as standard factors. Source: Caterpillar Performance Handbook Edition 35	

Material Densities(1)		
Material	**lb/cy**	**kg/m^3**
Alluvium	2,900	1,720
Basalt	3,300	1,960
Clay - Dry	2,500	1,480
Granite - broken	2,800	1,660
Gravel	2,550	1,510
LS - broken	2,600	1,540
LS - crushed	2,600	1,540
Sandstone	2,550	1,510
Shale	2,100	1,250
Stone - crushed	2,700	1,600
Tailings - Coarse (dry, loose sand)	2,400	1,420
Tailings - Slimes (loose sand & clay)	2,700	1,600
Topsoil	1,600	950
(1) Source: Caterpillar Performance Handbook Edition 35		

Note: uses Sand & Gravel - Dry from Caterpillar Handbook

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Productivity - Scrapers

Scraper Specifications		
Description	**631G**	**637G**
Empty Weight	100,600	112,760
Payload Capacity (cy)		
Struck	24	24
Heaped	34	34
Average	29	29
Loaded by	One D10R	Self*
Load Time (min)	1	1
Maneuver and Spread (min)	1	1
Job Efficiency	1	1
Rolling Resistance**	3	3
Altitude Deration Factor	1	1

* Requires pair

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials			Downhill Scraper Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)											
			631G						637G PP					
Material	**lb/cy**	**Scraper Load lb**	**Loaded Weight (lbs)**	**22**	**16**	**10**	**5**	**1**	**Loaded Weight (lbs)**	**25**	**15**	**10**	**5**	**1**
Alluvium	2,900	84,100	184,700	7.5	10	13	33	33	196,860	7	10	18.5	34	34
Basalt	3,300	95,700	196,300	7.5	10	13	24.5	33	208,460	7	10	18.5	25	34
Clay - Dry	2,500	72,500	173,100	7.5	10	13	33	33	185,260	7	10	18.5	34	34
Granite - broken	2,800	81,200	181,800	7.5	10	13	33	33	193,960	7	10	18.5	34	34
Gravel	2,550	73,950	174,550	7.5	10	13	33	33	186,710	7	10	18.5	34	34
LS - broken	2,600	75,400	176,000	7.5	10	13	33	33	188,160	7	10	18.5	34	34
LS - crushed	2,600	75,400	176,000	7.5	10	13	33	33	188,160	7	10	18.5	34	34
Sandstone	2,550	73,950	174,550	7.5	10	13	33	33	186,710	7	10	18.5	34	34
Shale	2,100	60,900	161,500	7.5	10	18	33	33	173,660	10	13.5	18.5	34	34
Stone - crushed	2,700	78,300	178,900	7.5	10	13	33	33	191,060	7	10	18.5	34	34
Tailings - Coarse (dry, loose sand)	2,400	69,600	170,200	7.5	10	13	33	33	182,360	7	10	18.5	34	34
Tailings - Slimes (loose sand & clay)	2,700	78,300	178,900	7.5	10	13	33	33	191,060	7	10	18.5	34	34
Topsoil	1,600	46,400	147,000	7.5	10	18	33	33	159,160	10	13.5	18.5	34	34
			Empty	10	18	24.5	33	33	Empty	10	13.5	18.5	34	34

Source: Caterpillar Performance Handbook Edition 34

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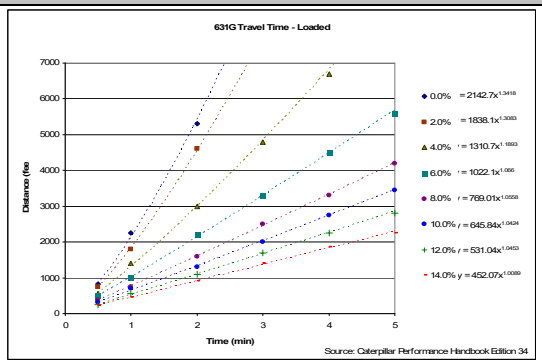
Productivity - Scrapers (cont.)

631G Scraper Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	825	2,250	5,300				2142.7	1.3418
2	750	1,800	4,600				1838.1	1.3083
4	550	1,400	3,000	4,800	6,700		1310.7	1.1893
6	490	1,000	2,200	3,300	4,500	5,600	1022.1	1.066
8	375	750	1,600	2,500	3,300	4,200	769.01	1.0558
10	300	700	1,300	2,000	2,750	3,450	645.84	1.0424
12	250	550	1,100	1,700	2,250	2,800	531.04	1.0453
14	225	450	900	1,400	1,850	2,250	452.07	1.0089

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35

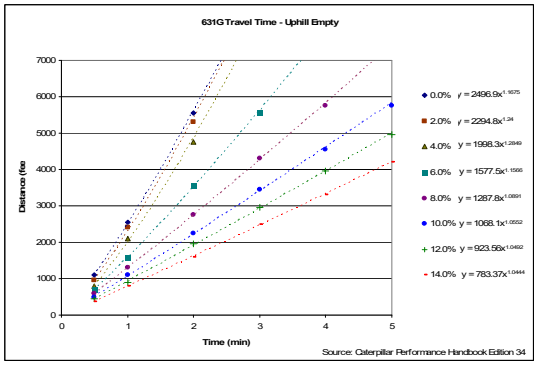


631G Scraper Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	1,100	2,550	5,550				2496.9	1.1675
2	950	2,400	5,300				2294.8	1.24
4	800	2,100	4,750				1998.3	1.2849
6	700	1,600	3,550	5,550			1557.5	1.1566
8	600	1,300	2,750	4,300	5,750		1287.8	1.0891
10	500	1,100	2,250	3,450	4,550	5,750	1068.1	1.0552
12	450	900	1,950	2,950	3,950	4,950	923.56	1.0492
14	375	800	1,600	2,500	3,300	4,200	783.37	1.0444

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



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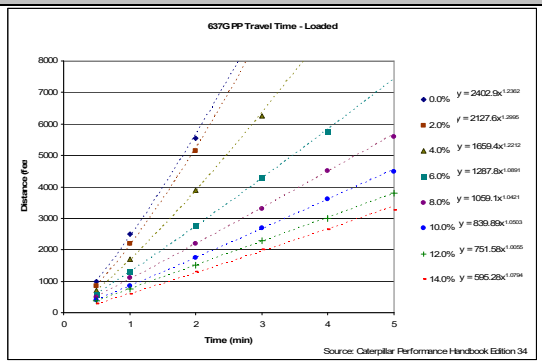
Productivity - Scrapers (cont.)

637G Push-Pull Scraper Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	1,000	2,500	5,550				2402.9	1.2362
2	850	2,200	5,150				2127.6	1.2995
4	700	1,700	3,900	6,250			1659.4	1.2212
6	600	1,300	2,750	4,300	5,750		1287.8	1.0891
8	500	1,100	2,200	3,300	4,500	5,600	1059.1	1.0421
10	400	850	1,750	2,700	3,600	4,475	839.89	1.0503
12	375	750	1,500	2,300	3,000	3,800	751.58	1.0055
14	275	600	1,300	2,000	2,650	3,250	595.28	1.0794

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



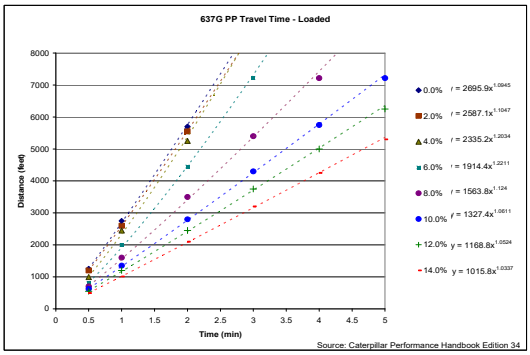
Source: Caterpillar Performance Handbook Edition 34

637G Push-Pull Scraper Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	1,250	2,750	5,700				2695.9	1.0945
2	1,200	2,600	5,550				2587.1	1.1047
4	990	2,450	5,250				2335.2	1.0234
6	800	2,000	4,450	7,216			1914.4	1.2211
8	700	1,600	3,500	5,400	7,216		1563.8	1.124
10	625	1,350	2,800	4,300	5,750	7,216	1327.4	1.0611
12	550	1,200	2,450	3,750	5,000	6,250	1168.8	1.0524
14	495	1,010	2,100	3,200	4,250	5,300	1015.8	1.0337

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

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Productivity - Haul Trucks

Haul Truck Specifications

Description	769D	773E	777D	785C	793C	797B
Chassis Weight (lb)	53,506	70,330	113,160	170,000	259,500	473,600
Body Weight (lb)	17,350	20,300	34,785	36,788	70,785	104,200
Standard Liner Weight (lb)	7,000	8,600	12,040	16,846	24,418	8,800
Total Truck Weight (lb)	77,856	99,230	159,985	223,634	354,703	586,600
Payload Capacity (cy)						
Struck	21.6	34.8	55	78.5	126	228
Heaped	31.7	46	78.6	102	169	290
Average	26.65	40.4	66.8	90.25	147.5	259
Maneuver to Load Time (min)	0.7	0.7	0.7	0.7	0.7	0.7
Maneuver and Dump Time (min)	1.1	1.1	1.1	1.1	1.1	1.1
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5	2.5
Altitude Deration Factor	1	1	1	1	1	1

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials

Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

Material	lb/cy	Truck (769D) Load lb	Truck (773E) Load lb	Truck (777D) Load lb	769D Loaded Weight (lbs)	20	15	10	5	773E Loaded Weight (lbs)	20	15	10	5	777D Loaded Weight (lbs)	20	15	10	5
Alluvium	2,900	77,285	117,160	193,720	155,141	11	11	15	26	216,390	7	7	13	23	353,705	7	9	12	29
Basalt	3,300	87,945	133,320	220,440	165,801	11	11	11	20	232,550	7	7	13	23	380,425	7	7	12	21
Clay - Dry	2,500	66,625	101,000	167,000	144,481	11	11	15	26	200,230	7	9	13	23	326,985	7	9	16	29
Granite - broken	2,800	74,620	113,120	187,040	152,476	11	11	15	26	212,350	7	7	13	23	347,025	7	9	12	29
Gravel	2,550	67,958	103,020	170,340	145,814	11	11	15	26	202,250	7	9	13	23	330,325	7	9	16	29
LS - broken	2,600	69,290	105,040	173,680	147,146	11	11	15	26	204,270	7	9	13	23	333,665	7	9	12	29
LS - crushed	2,600	69,290	105,040	173,680	147,146	11	11	15	26	204,270	7	9	13	23	333,665	7	9	12	29
Sandstone	2,550	67,958	103,020	170,340	145,814	11	11	15	26	202,250	7	9	13	23	330,325	7	9	16	29
Shale	2,100	55,965	84,840	140,280	133,821	11	11	15	26	184,070	7	9	13	31	300,265	7	9	16	29
Stone - crushed	2,700	71,955	109,080	180,360	149,811	11	11	15	26	208,310	7	7	13	23	340,345	7	9	12	29
Tailings - Coarse (dry, loose sand)	2,400	63,960	96,960	160,320	141,816	11	11	15	26	196,190	7	9	13	23	320,305	7	9	16	29
Tailings - Slimes (loose sand & clay)	2,700	71,955	109,080	180,360	149,811	11	11	15	26	208,310	7	7	13	23	340,345	7	9	12	29
Topsoil	1,600	42,640	64,640	106,880	120,496	11	11	15	26	163,870	7	9	17	31	266,865	9	12	16	29
					Empty	15	15	26	36	Empty	13	17	23	42	Empty	16	16	29	39

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials

Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

Material	lb/cy	Truck (785C) Load lb	Truck (793C) Load lb	Truck (797B) Load lb	785C Loaded Weight (lbs)	20	15	10	5	793C Loaded Weight (lbs)	20	15	10	5	797B Loaded Weight (lbs)	20	15	10	5
Alluvium	2,900	261,725	427,750	751,100	485,359	8	8	14	27	782,453	7	7	10	17	1,337,700	7	7	9	17
Basalt	3,300	297,825	486,750	854,700	521,459	8	8	14	27	841,453	7	7	10	17	1,441,300	7	7	9	17
Clay - Dry	2,500	225,625	368,750	647,500	449,259	8	11	14	36	723,453	7	7	10	25	1,234,100	7	7	9	23
Granite - broken	2,800	252,700	413,000	725,200	476,334	8	8	14	27	767,703	7	7	10	17	1,311,800	7	7	9	17
Gravel	2,550	230,138	376,125	660,450	453,772	8	8	14	36	730,828	7	7	10	25	1,247,050	7	7	9	23
LS - broken	2,600	234,650	383,500	673,400	458,284	8	8	14	27	738,203	7	7	10	25	1,260,000	7	7	9	23
LS - crushed	2,600	234,650	383,500	673,400	458,284	8	8	14	27	738,203	7	7	10	25	1,260,000	7	7	9	23
Sandstone	2,550	230,138	376,125	660,450	453,772	8	8	14	36	730,828	7	7	10	25	1,247,050	7	7	9	23
Shale	2,100	189,525	309,750	543,900	413,159	8	11	14	36	664,453	7	7	10	25	1,130,500	7	7	13	23
Stone - crushed	2,700	243,675	398,250	699,300	467,309	8	8	14	27	752,953	7	7	10	17	1,285,900	7	7	9	23
Tailings - Coarse (dry, loose sand)	2,400	216,600	354,000	621,600	440,234	8	11	14	36	708,703	7	7	10	25	1,208,200	7	7	9	23
Tailings - Slimes (loose sand & clay)	2,700	243,675	398,250	699,300	467,309	8	8	14	27	752,953	7	7	10	17	1,285,900	7	7	9	23
Topsoil	1,600	144,400	236,000	414,400	368,034	8	11	19	36	590,703	7	10	13	25	1,001,000	7	9	13	23
					Empty	14	19	36	36	Empty	10	13	17	33	Empty	13	17	23	42

Source: Caterpillar Performance Handbook Edition 35

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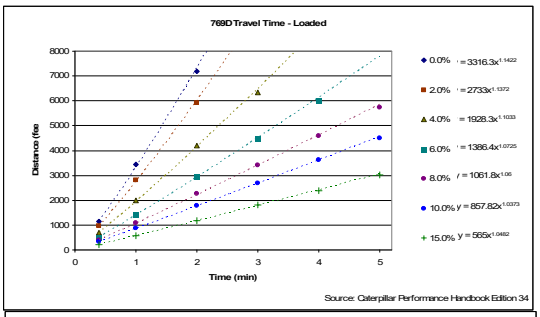
Productivity - Haul Trucks (cont.)

769D Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,148	3,428	7,183				3316.3	1.1422
4	689	1,984	4,198	6,330			1928.3	1.1033
6	508	1,427	2,952	4,510	6,002		1386.4	1.0725
8	394	1,082	2,263	3,411	4,592	5,740	1061.8	1.06
10	328	869	1,771	2,690	3,608	4,510	857.82	1.0373
15	213	574	1,181	1,804	2,394	3,018	565	1.0482

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



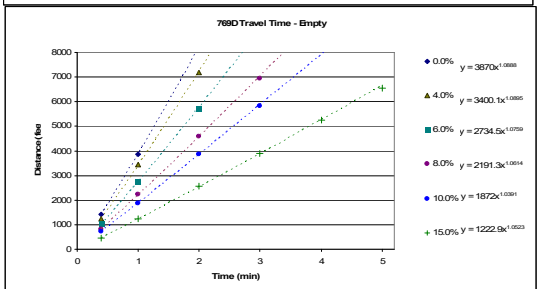
Source: Caterpillar Performance Handbook Edition 34

769D Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,427	3,870					3870	1.0888
4	1,246	3,444	7,183				3400.1	1.0895
6	1,017	2,755	5,740				2734.5	1.0759
8	820	2,230	4,592	6,954			2191.3	1.0614
10	722	1,870	3,870	5,838			1872	1.0391
15	459	1,246	2,558	3,903	5,248	6,560	1222.9	1.0523

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

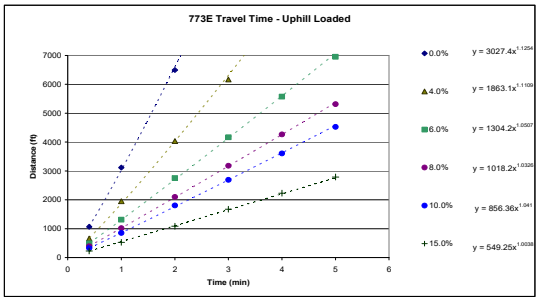
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Productivity - Haul Trucks (cont.)

773E Haul Truck Travel Time - Uphill Loaded								
Total Resistance (%) (rolling + grade)	Time (min)							
	0.4	1	2	3	4	5	k	p
0	1,066	3,117	6,496				3027.4	1.1254
4	656	1,952	4,035	6,168			1863.1	1.1109
6	492	1,312	2,756	4,167	5,577	6,955	1304.2	1.0507
8	394	1,017	2,100	3,182	4,265	5,315	1018.2	1.0326
10	328	853	1,804	2,690	3,609	4,528	856.36	1.041
15	226	525	1,083	1,673	2,231	2,789	549.25	1.0038

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

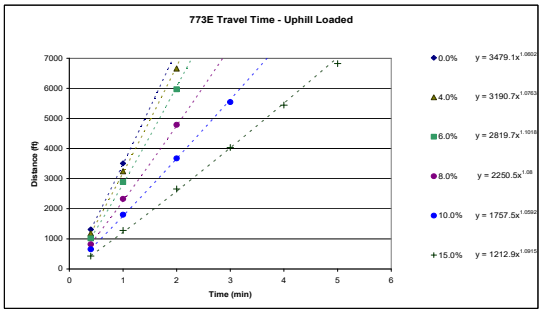
Source: Caterpillar Performance Handbook Edition 35



773E Haul Truck Travel Time - Uphill Empty								
Total Resistance (%) (rolling + grade)	Time (min)							
	0.4	1	2	3	4	5	k	p
0	1,312	3,510	7,218				3479.1	1.0602
4	1,181	3,248	6,660				3190.7	1.0763
6	1,017	2,887	5,971				2819.7	1.1018
8	820	2,329	4,790	7,218			2250.5	1.08
10	656	1,804	3,675	5,545			1757.5	1.0592
15	427	1,280	2,657	4,035	5,446	6,824	1212.9	1.0915

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



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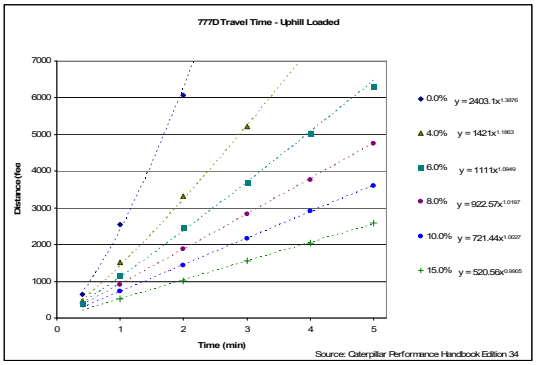
Productivity - Haul Trucks (cont.)

777D Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min)							
	0.4	1	2	3	4	5	k	p
0	656	2,558	6,068				2403.1	1.3876
4	459	1,509	3,313	5,215	7,085		1412	1.1863
6	394	1,148	2,460	3,706	5,018	6,298	1111	1.0949
8		918	1,886	2,837	3,772	4,756	922.57	1.0197
10		722	1,443	2,165	2,919	3,608	721.44	1.0027
15		525	1,017	1,558	2,034	2,591	520.56	0.9905

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



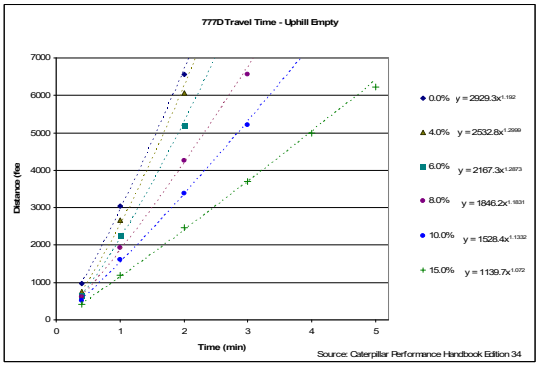
Source: Caterpillar Performance Handbook Edition 34

777D Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min)							
	0.4	1	2	3	4	5	k	p
0	968	3,034	6,560				2929.3	1.192
4	754	2,657	6,068				2532.8	1.2999
6	656	2,247	5,182				2167.3	1.2873
8	607	1,935	4,248	6,560			1846.2	1.1831
10	525	1,607	3,378	5,215	7,282		1528.4	1.1332
15	410	1,197	2,460	3,706	4,986	6,232	1139.7	1.072

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

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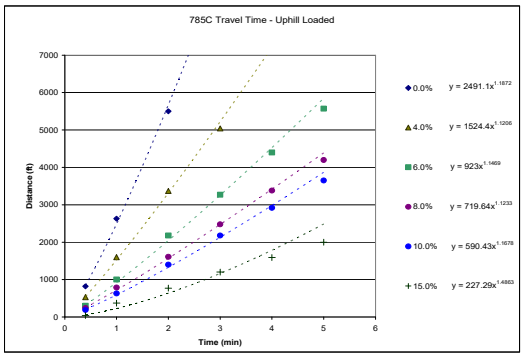
Productivity - Haul Trucks (cont.)

785C Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	820	2,630	5,500				2491.1	1.1872
4	530	1,600	3,370	5,040			1524.4	1.1206
6	300	1,000	2,180	3,270	4,400	5,570	923	1.1469
8	240	790	1,610	2,480	3,380	4,200	719.64	1.1233
10	190	630	1,400	2,180	2,920	3,650	590.43	1.1678
15	40	370	770	1,200	1,590	2,000	227.29	1.4863

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

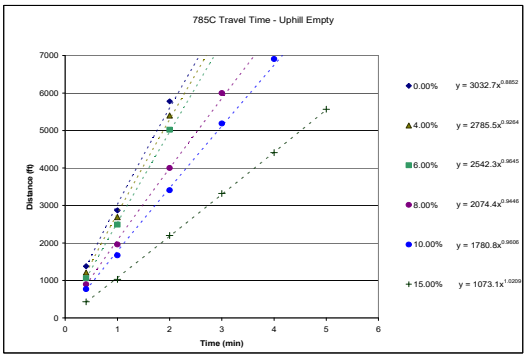


785C Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,380	2,870	5,780				3032.7	0.8852
4	1,210	2,690	5,400				2785.5	0.9264
6	1,060	2,490	5,020				2542.3	0.9645
8	900	1,960	4,000	6,000			2074.4	0.9446
10	770	1,670	3,410	5,190	6,910		1780.8	0.9606
15	430	1,030	2,200	3,320	4,410	5,570	1073.1	1.0209

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



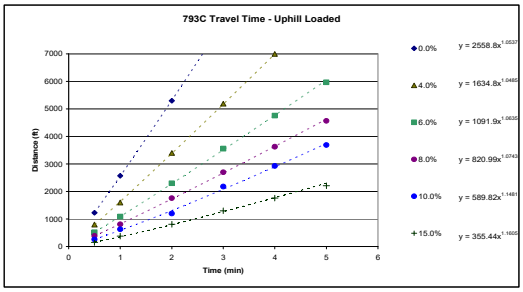
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Productivity - Haul Trucks (cont.)

793C Haul Truck Travel Time - Uphill Loaded								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	1,230	2,570	5,300				2558.8	1.0537
4	800	1,600	3,400	5,190	7,000		1634.8	1.0485
6	520	1,090	2,300	3,560	4,760	5,970	1091.9	1.0635
8	390	810	1,760	2,700	3,630	4,570	820.99	1.0743
10	260	630	1,200	2,180	2,930	3,690	589.82	1.1481
15	150	380	810	1,300	1,760	2,210	355.44	1.1605

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

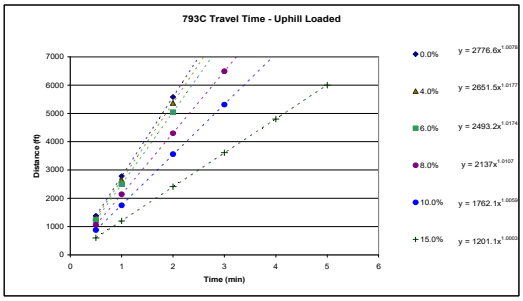
Source: Caterpillar Performance Handbook Edition 35



793C Haul Truck Travel Time - Uphill Empty								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	1,380	2,780	5,580				2776.6	1.0078
4	1,310	2,650	5,370				2651.5	1.0177
6	1,230	2,500	5,040				2493.2	1.0174
8	1,060	2,140	4,300	6,490			2137	1.0107
10	880	1,750	3,560	5,310			1762.1	1.0059
15	600	1,200	2,410	3,610	4,800	6,000	1201.1	1.0003

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



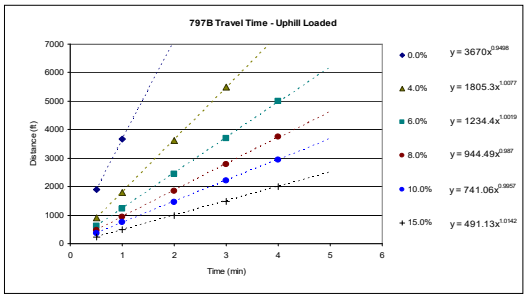
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Productivity - Haul Trucks (cont.)

797B Haul Truck Travel Time - Uphill Loaded								
Total Resistance (%) (rolling + grade)	Time (min)							
	0.5	1	2	3	4	5	k	p
0	1,900	3,670					3670	0.9498
4	900	1,800	3,620	5,480			1805.3	1.0077
6	620	1,230	2,450	3,700	5,000		1234.4	1.0019
8	480	940	1,850	2,790	3,750		944.49	0.987
10	370	750	1,460	2,220	2,950		741.06	0.9957
15	240	500	1,000	1,480	2,000		491.13	1.0142

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

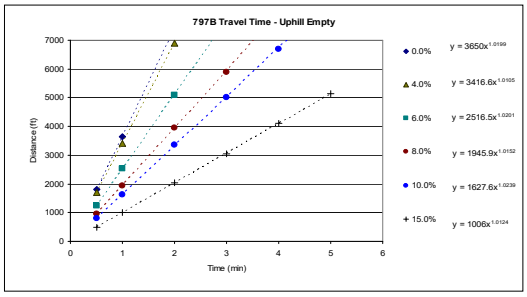
Source: Caterpillar Performance Handbook Edition 35



797B Haul Truck Travel Time - Uphill Empty								
Total Resistance (%) (rolling + grade)	Time (min)							
	0.5	1	2	3	4	5	k	p
0	1,800	3,650					3650	1.0199
4	1,700	3,400	6,900				3416.6	1.0105
6	1,240	2,520	5,100				2516.5	1.0201
8	960	1,950	3,960	5,900			1945.9	1.0152
10	800	1,620	3,350	5,000	6,700		1627.6	1.0239
15	500	1,000	2,040	3,050	4,100	5,130	1006	1.0124

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



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Productivity - Articulated Trucks

Articulated Truck Specifications

Description	725	730	735	740
Chassis Weight (lb)				
Body Weight (lb)				
Standard Liner Weight (lb)				
Operating Weight (Empty) (lb)	50,120	51,220	65,830	72,070
Payload Capacity (cy)				
Struck	14.5	17.1	19.3	23.3
Heaped	18.8	22.1	31.8	30.2
Average	16.65	19.6	25.55	26.75
Maneuver to Load Time (min)	0.7	0.7	0.7	0.7
Maneuver and Dump Time (min)	1.1	1.1	1.1	1.1
Job Efficiency	0.83	0.83	0.83	0.83
Rolling Resistance**	2.5	2.5	2.5	2.5
Altitude Deration Factor	1	1	1	1

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials

Material	lb/cy	Truck (725) Load lb	Truck (730) Load lb
Alluvium	2,900	48,285	56,840
Basalt	3,300	54,945	64,680
Clay - Dry	2,500	41,625	49,000
Granite - broken	2,800	46,620	54,880
Gravel	2,550	42,458	49,980
LS - broken	2,600	43,290	50,960
LS - crushed	2,600	43,290	50,960
Sandstone	2,550	42,458	49,980
Shale	2,100	34,965	41,160
Stone - crushed	2,700	44,955	52,920
Tailings - Coarse (dry, loose sand)	2,400	39,960	47,040
Tailings - Slimes (loose sand & clay)	2,700	44,955	52,920
Topsoil	1,600	26,640	31,360

Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

	725					730				
Material	Loaded Weight (lbs)	20	15	10	5	Loaded Weight (lbs)	20	15	10	5
Alluvium	98,405	9	9	13	30	108,060	5	8	13	29
Basalt	105,065	5	9	13	22	115,900	5	8	13	29
Clay - Dry	91,745	9	13	13	30	100,220	8	8	13	29
Granite - broken	96,740	9	13	13	30	106,100	5	8	13	29
Gravel	92,578	9	13	13	30	101,200	8	8	13	29
LS - broken	93,410	9	13	13	30	102,180	8	8	13	29
LS - crushed	93,410	9	13	13	30	102,180	8	8	13	29
Sandstone	92,578	9	13	13	30	101,200	8	8	13	29
Shale	85,085	9	13	22	30	92,380	8	13	13	29
Stone - crushed	95,075	9	13	13	30	104,140	8	8	13	29
Tailings - Coarse (dry, loose sand)	90,080	9	13	13	30	98,260	8	8	13	29
Tailings - Slimes (loose sand & clay)	95,075	9	13	13	30	104,140	8	8	13	29
Topsoil	76,760	9	13	22	30	82,580	8	13	22	35
	Empty	13	13	22	30	Empty	13	13	22	35

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials

Material	lb/cy	Truck (735) Load lb	Truck (740) Load lb
Alluvium	2,900	74,095	77,575
Basalt	3,300	84,315	88,275
Clay - Dry	2,500	63,875	66,875
Granite - broken	2,800	71,540	74,900
Gravel	2,550	65,153	68,213
LS - broken	2,600	66,430	69,550
LS - crushed	2,600	66,430	69,550
Sandstone	2,550	65,153	68,213
Shale	2,100	53,655	56,175
Stone - crushed	2,700	68,985	72,225
Tailings - Coarse (dry, loose sand)	2,400	61,320	64,200
Tailings - Slimes (loose sand & clay)	2,700	68,985	72,225
Topsoil	1,600	40,880	42,800

Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

	735					740				
Material	Loaded Weight (lbs)	20	15	10	5	Loaded Weight (lbs)	20	15	10	5
Alluvium	139,925	7	9	13	27	149,645	7	9	17	23
Basalt	150,145	7	9	13	27	160,345	7	9	13	23
Clay - Dry	129,705	7	9	13	27	138,945	9	13	17	31
Granite - broken	137,370	7	9	13	27	146,970	7	9	17	23
Gravel	130,983	7	9	13	27	140,283	7	9	17	31
LS - broken	132,260	7	9	13	27	141,620	7	9	17	31
LS - crushed	132,260	7	9	13	27	141,620	7	9	17	31
Sandstone	130,983	7	9	13	27	140,283	7	9	17	31
Shale	119,485	9	9	18	27	128,245	7	13	17	31
Stone - crushed	134,815	7	9	13	27	144,295	7	9	17	23
Tailings - Coarse (dry, loose sand)	127,150	7	9	13	27	136,270	9	13	17	31
Tailings - Slimes (loose sand & clay)	134,815	7	9	13	27	144,295	7	9	17	23
Topsoil	106,710	9	13	18	36	114,870	9	13	17	31
	Empty	13	18	27	42	Empty	17	17	23	31

Source: Caterpillar Performance Handbook Edition 35

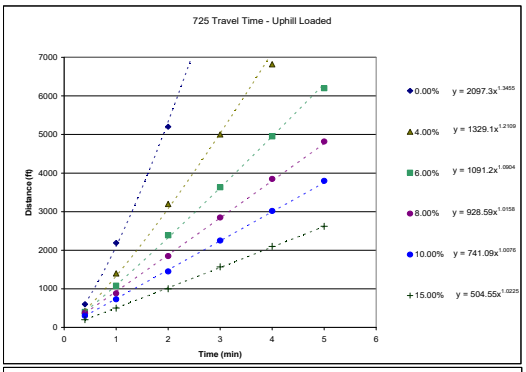
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Productivity - Articulated Trucks (cont.)

725 Articulated Truck Travel Time - Uphill Loaded								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	600	2,190	5,200				2097.3	1.3455
4	420	1,400	3,200	5,000	6,820		1329.1	1.2109
6	400	1,080	2,390	3,630	4,950	6,200	1091.2	1.0904
8	380	880	1,850	2,850	3,850	4,820	928.59	1.0158
10	300	729	1,450	2,250	3,020	3,800	741.09	1.0076
15	200	500	1,000	1,570	2,100	2,620	504.55	1.0225

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

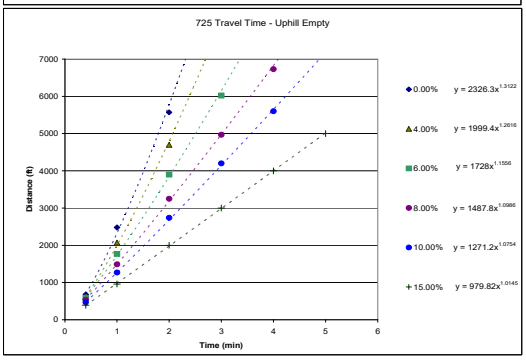
Source: Caterpillar Performance Handbook Edition 35



725 Haul Truck Travel Time - Uphill Empty								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	680	2,480	5,570				2326.3	1.3122
4	620	2,070	4,700				1999.4	1.2616
6	590	1,770	3,900	6,020			1728	1.1556
8	540	1,490	3,250	4,970	6,730		1487.8	1.0986
10	470	1,270	2,740	4,200	5,600	7,050	1271.2	1.0754
15	390	960	2,000	3,000	4,000	5,000	979.82	1.0145

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



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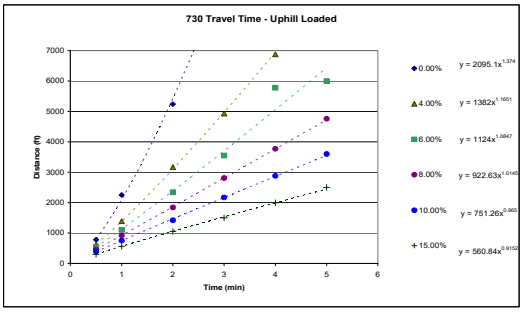
Productivity - Articulated Trucks (cont.)

730 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	780	2,250	5,240				2095	1.374
4	610	1,390	3,170	4,930	6,880		1382	1.1651
6	540	1,100	2,340	3,550	5,780	6,000	112	1.0847
8	460	920	1,840	2,810	3,770	4,760	922.63	1.0145
10	390	750	1,420	2,170	2,880	3,600	751.26	0.965
15	300	560	1,050	1,500	1,995	2,500	560.84	0.9152

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

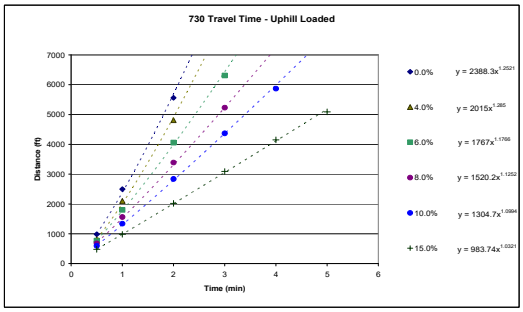


730 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	980	2,500	5,560				2388	1.25621
4	810	2,100	4,810				2015	1.285
6	770	1,800	4,060	6,310			1767	1.1766
8	680	1,560	3,390	5,230	7,070		1520.2	1.1252
10	595	1,340	2,840	4,370	5,870		1304.7	1.0994
15	480	980	2,020	3,090	4,150	5,090	983.74	1.0321

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



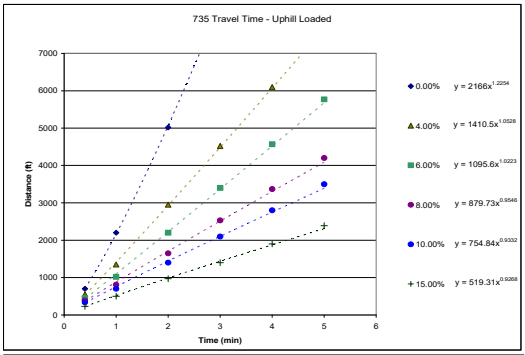
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Productivity - Articulated Trucks (cont.)

735 Articulated Truck Travel Time - Uphill Loaded								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	700	2,200	5,020				2166	1.2254
4	550	1,350	2,950	4,520	6,100		1410.5	1.0528
6	450	1,020	2,200	3,400	4,570	5,770	1095.6	1.0223
8	390	810	1,650	2,530	3,370	4,200	879.73	0.9546
10	340	700	1,400	2,100	2,800	3,500	754.84	0.9332
15	230	500	970	1,400	1,900	2,390	519.31	0.9268

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

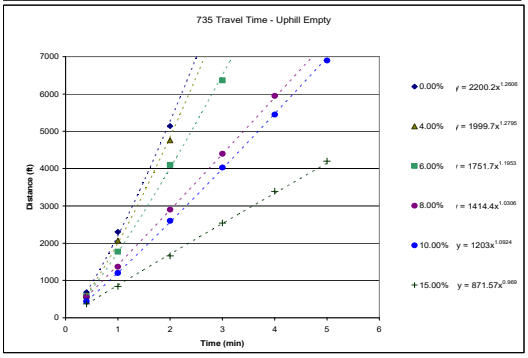
Source: Caterpillar Performance Handbook Edition 35



735 Haul Truck Travel Time - Uphill Empty								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	680	2,300	5,140				2200.2	1.2606
4	610	2,070	4,760				1999.7	1.2795
6	580	1,770	4,100	6,370			1751.7	1.1953
8	560	1,370	2,900	4,400	5,950		1414.4	1.0306
10	440	1,200	2,600	4,030	5,450	6,900	1203	1.0924
15	370	840	1,660	2,540	3,390	4,200	871.57	0.969

Travel Time (min) = $\sqrt[p]{\frac{\text{distance}}{k}}$

Source: Caterpillar Performance Handbook Edition 35



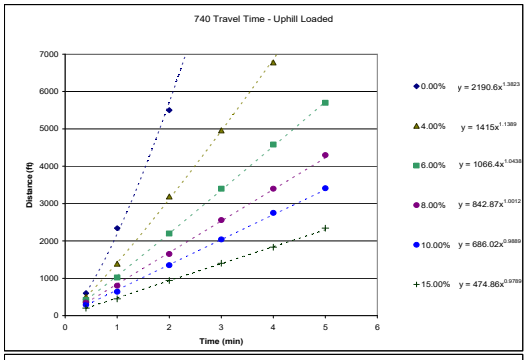
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Productivity - Articulated Trucks (cont.)

740 Articulated Truck Travel Time - Uphill Loaded								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	600	2,340	5,500				2190.6	1.3823
4	500	1,390	3,190	4,960	6,780		1415	1.1389
6	420	1,020	2,200	3,400	4,580	5,700	1066.4	1.0438
8	350	800	1,650	2,560	3,400	4,300	842.87	1.0012
10	290	640	1,350	2,040	2,750	3,410	686.02	0.9889
15	200	450	940	1,400	1,830	2,340	474.86	0.9789

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

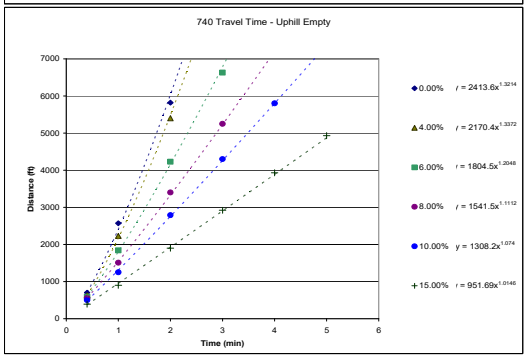
Source: Caterpillar Performance Handbook Edition 35



740 Haul Truck Travel Time - Uphill Empty								
Total Resistance (%) (rolling + grade)	Time (min)						k	p
	0.5	1	2	3	4	5		
0	700	2,570	5,820				2413.6	1.3214
4	630	2,230	5,400				2170.4	1.3372
6	590	1,840	4,230	6,630			1804.5	1.2048
8	560	1,510	3,400	5,250	7,120		1541.5	1.1112
10	500	1,250	2,790	4,300	5,800		1308.2	1.074
15	390	900	1,900	2,920	3,930	4,930	951.69	1.0146

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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Productivity - Wheel Loaders

Wheel Loader Specifications

Description	924G	928G	950G	966G	972G	972G (2)	980G	988G	988G(2)	990	992G	992G(2)	994D	L2350
Payload Capacity (cy)														
Struck	2.2	2.5	3.46	4.46	4.71	4.71	6.34	6.9	6.9	9.5	13.2	13.2	18	
Heaped	2.7	3.25	4	5.25	5.5	5.5	7.25	8.33	8.33	11.25	16	16	22.5	
Average	2.45	2.875	3.73	4.855	5.105	5.105	6.795	7.615	7.615	10.375	14.6	14.6	20.25	53
Matched Truck	N/A	N/A	N/A	725	730	735	N/A	740	769D	773D	777D	785C	793C	797B
Average Cycle Time (min)	0.45	0.45	0.5	0.5	0.5	0.5	0.55	0.55	0.55	0.55	0.6	0.6	0.6	0.75
Passes to Fill Truck	N/A	N/A	N/A	3	4	5	N/A	4	3	4	5	6	7	5
Altitude Deration Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Operator Efficiency	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Time to Fill Truck	N/A	N/A	N/A	1.5	2	2.5	N/A	2.2	1.65	2.2	3	3.6	4.2	3.75
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Loader matched to small truck fleet
Loader matched to medium truck fleet
Loader matched to large truck fleet
Loader matched to extra large truck fleet

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered
992G (2) - can be used to load 785 with 6 passes

Source: Caterpillar Performance Handbook Edition 35; LeTourneau/actual Chilean mine operating data for L2350.

Wheeled Loaders	General Purpose	Spade Nose-Rock
928G	3.25 cubic yard	not available
966G	5.0 cubic yard	not available
972G	5.5 cubic yard	not available
988G	not available	8.3 cubic yard
992G	not available	16.0 cubic yard

note: capacities are 2:1 heaped, SAE standards
NOTES: Buckets for both Track Excavators and Wheel Loaders are offered by CECo & available for the rental rates quoted. Bucket sizes and capacities obtained from CATERPILLAR PERFORMANCE HANDBOOK, ED 34; Section 12, Wheel Loader and Section 4, Excavators

Bucket capacity and width dictated by material weight and configuration, ie., shot, loose, light bank, stockpile, rock, etc. Typical Nevada applications were used to determine above bucket capacities as related to materials & densities. Job site specifics may alter specific bucket requirements. (Cashman Equipment, Elko, Nevada - February 21, 2005)

Productivity - Shovels

Shovel Specifications (Komatsu equivalent)

Description	PC2000	PC3000	PC4000	PC5500	PC8000
Payload Capacity (cy)					
Struck	10.46	18.84	26.16	33.48	47.09
Heaped	14.39	25.9	35.97	46.04	64.75
Average	12.43	22.37	31.07	39.76	55.92
Matched Truck	740	777D	785C	793C	797B
Average Cycle Time (min)	0.49	0.49	0.59	0.59	0.69
Passes to Fill Truck	2.05	2.84	3.38	4.69	5.11
Altitude Deration Factor	1	1	0.9	1	1
Operator Efficiency	1	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83	0.83
Time to Fill Truck	1.68	2.33	3.32	4.61	5.86
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5

Shovel matched to small truck fleet
Shovel matched to medium truck fleet
Shovel matched to large truck fleet
Shovel matched to extra large truck fleet

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered
992G (2) - can be used to load 785 with 6 passes

Source: Caterpillar Performance Handbook Edition 35; Komatsu actual Peruvian mine (Lagunas Norte) operating data for PC4000.

Productivity - Motor Graders

Motor Grader Specifications

Description	120H	14G/H	16G/H	24M
Grader Width (ft)	8	9.25	10.08	14.04
Blade Width (ft)	12	14	16	16
Ripper Width (7 shanks) (ft)	7.6	8.5	9.75	12.83
Road Maintence Speed (mph)				
Minimum	3	3	3	3
Maximum	9.5	9.5	9.5	9.5
Average	6.25	6.25	6.25	6.25
Hourly Production	33,000	33,000	33,000	33,000
Ripping Speed (mph)	1	1	1	1
Minimum	0	0	0	0
Maximum	3	3	3	3
Average	1.5	1.5	1.5	1.5
Altitude Deration Factor	1	1	1	1
Hourly Production (with job efficiency correction & altitude deration factors) (excluding manuever time)	6,574	6,574	6,574	6,574
Maneuver time per pass (min)	0.5	0.5	0.5	0.5
Operator Efficiency	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83

Source: Caterpillar Performance Handbook Edition 35

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Productivity - Excavators

Track Excavator Specifications

Description	312C	320C	325C	330C	345B	365BL	385BL
Bucket Capacity (cy)	0.68	1.57	2.22	2.22	3	4.6	7.3
Fill Factor	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Average Bucket Load (cy)	0.612	1.413	1.998	1.998	2.7	4.14	6.57
Soil Type	packed earth	hard clay	hard clay	hard clay	hard clay	hard clay	hard clay
Job Condition	med-hard	med-hard	med-hard	med-hard	med-hard	med-hard	med-hard
Cycle Times (minutes) - based on hard clay							
Load Bucket	0.07	0.09	0.09	0.09	0.13	0.1	0.19
Swing Loaded	0.06	0.06	0.06	0.07	0.07	0.09	0.06
Dump Bucket	0.03	0.03	0.04	0.04	0.02	0.04	0.03
Swing Empty	0.05	0.05	0.06	0.07	0.06	0.07	0.07
Total Cycle Time	0.21	0.23	0.25	0.27	0.28	0.3	0.35
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Operator Efficiency	1	1	1	1	1	1	1
Altitude Deration Factor	1	1	1	1	1	1	1
Corrected Productivity (LCY/hr)	145	306	398	369	480	687	935
Exploration Road Cycle Time (1) (min)	N/A	0.38	0.4	N/A	0.42	N/A	N/A
Exploration Road Corr Prod (LCY/hr)	N/A	185	249	N/A	320	N/A	N/A
Track Width (ft)	8.17	9.17	9.83	10.5	11.42	11.5	11.5
Ditch/Trench Excavation							
Bucket Capacity (cy)	0.42	0.58	0.88	0.89	2.09	3.27	2.75
Fill Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Corrected Productivity (LCY/hr)	50	63	88	82	186	271	196

Source: Caterpillar Performance Handbook Edition 35

Track Excavators	Hvy Duty Rock	Extreme Service Exc (e.g. haulroad recontour)	Hvy Duty Trench
312C	30", 0.68 cubic yd	47", .0.94 cubic yd	22", .42 cubic yd
320C	30", 0.90 cubic yd	55.1", 1.57 cubic yd	23.6", .58 cubic yd
325C	36", 1.25 cubic yd	60", 2.22 cubic yd	30", .88 cubic yd
330C	36", 1.25 cubic yd	60", 2.22 cubic yd	30", .89 cubic yd
345B	43.2", 1.69 cubic yd	65", 3.0 cubic yd	48", 2.09 cubic yd
365BL	60", 3.25 cubic yd	82", 4.6 cubic yd	59", 3.27 cubic yd
385BL	85", 6.30 cubic yd.	96.0, 7.30 cubic yd	57", 2.75 cubic yd

Note: capacities are 2:1 heaped, SAE standards
NOTES: Buckets for both Track Excavators and Wheel Loaders are offered by CECo &

available for the rental rates quoted. Bucket sizes and capacities obtained from CATERPILLAR PERFORMANCE HANDBOOK, ED 34; Section 12, Wheel Loader and Section 4, Excavators
Bucket capacity and width dictated by material weight and configuration, ie., shot, loose, light bank, stockpile, rock, etc. Typical Nevada applications were used to determine above bucket capacities as related to materials & densities. Job site specifics may alter specific bucket requirements (Cashman Equipment, Elko, Nevada - February 21, 2005)

(1) Exploration cycle time assumes feathering/smoothing performed by excavator

Concrete Breaking Production

Track Excavator w/Hammer Specifications

Description	325C	345B	385BL
Hydraulic Hammer	H120D s	H160D s	H180D s
Material	reinforced concrete		
Min Shift Production (yd3/8hr)	160	300	350
Max Shift Production (yd3/8hr)	300	850	1,550
Avg Shift Production (8hr)	230	575	950
Job Efficiency	0.83	0.83	0.83
Altitude Deration Factor	1	1	1

Source: Caterpillar Performance Handbook Edition 35

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Drill Hole Plugging Productivity

Drill Hole Plugging Productivity		
Description	**Drill Rig**	**Pump Rig**
Move-to-hole, set-up, tear-down [1,7]	2	2
Trip in tremmie pipe [1]	500	
Pulling casing (threaded, not cemented)	200	
Single-pass perforating (water wells)	Productivity(all p	Passes
4	60	4
6	60	4
8	50	4
12	45	6
18	40	9
24	28	12
Perforation setup,trip in/out,tear-down	2	
Perforation tool cost (wear cost)[3]	2.5	
Inert Material Placement (backfill)		
Grouting/Cement [4,7] (cy/hr)		5.33
Cuttings (see below) (cy/hr)		3.5

Sources:
1. Drillers daily logs from Newmont, Barrick, New West Gold, Agnico Eagle, Idaho General Mines Inc.
2. Drillers daily logs from Newmont, Barrick, Target Minerals
3. Drillers daily logs from Newmont
4. WDC Exploration, Dec 2005

Sournce: WDC Exploration, Dec 2005

Cuttings Placement Productivity		
Shift productivity (Means 02210-700-0120; Crew B11M)	28	cy / shift
Shift length	8	hours
Estimated Hourly Productivity	3.5	cy / hour

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Altitude Deration Table

MODEL	Elevation 0-760 m (0-2500') CAT	User	760-1500 m (2500-5000') CAT	User	1500-2300 m (5000-7000') CAT	User	2300-3000 m (7500-10,000') CAT	User	3000-3800 m (10,000-12,000') CAT	User	3800-4600 m (12,500-15,000') CAT	User
Bulldozers												
D6R	100		100		100		100		92		84	
D6R w/ Winch	100		100		100		100		92		84	
D7R	100		100		100		100		100		96	
D8R	100		100		100		93		85		77	
D9R	100		100		100		93		85		77	
D10R	100		100		100		100		97		89	
D11R	100		100		100		93		85		77	
Wheeled Dozers												
824G	100		100		100		100		92		84	
834G	100		100		100		100		92		84	
844	100		100		100		100		100		96	
854G	100		100		100		93		85		77	
Graders												
120H	100		100		100		100		96		93	
14G/H	100		100		100		100		98		96	
16G/H	100		100		100		100		98		96	
24M	100		100		100		100		98		96	
Excavators												
312C	100		100		100		83		78		73	
320C	100		100		90		87		83		76	
325C	100		100		100		100		100		100	
330C	100		100		100		100		100		100	
345B	100		100		100		100		93		93	
365BL	100		100		100		86		86		86	
385BL	100		100		100		93		85		78	
Scrapers												
631G	100		100		100		100		97		90	
637G	100		100		100		95		87		80	
Loaders												
924G	100		100		100		100		97		89	
928G	100		100		100		100		92		85	
950G	100		100		100		100		100		100	
966G	100		100		100		100		96		88	
972G	100		100		92		84		77		70	
980G	100		100		100		100		96		88	
988G	100		100		100		95		85		75	
990	100		100		100		100		92		85	
992G	100		100		100		100		93		87	
994D	100		100		100		100		96		88	
L2350	100		100		100		100		96		90	
Shovels												
PC2000	100		100		100		100		96		90	
PC3000	100		100		100		100		96		90	
PC4000	100		100		100		100		96		90	
PC5500	100		100		100		100		96		90	
PC8000	100		100		100		100		96		90	
Other Equipment												
420D 4WD Backhoe	99		97		95		91		91		91	
428D 4WD Backhoe	99		97		95		91		91		91	
CS533E Vibratory Roller	100		100		98		95		91		86	
CS633E Vibratory Roller	100		100		100		100		91		86	
CP533E Sheepsfoot Compactor	100		100		98		95		91		100	
CP633E Sheepsfoot Compactor	100		100		100		100		91		86	
Light Truck - 1.5 Ton												
Supervisor's Truck												
Flatbed Truck												
Air Compressor + tools												
Welding Equipment												
Heavy Duty Drill Rig												
Pump (plugging) Drill Rig												
Concrete Pump												
Gas Engine Vibrator												
Generator 5KW												
HDEP Welder (pipe or liner)												
5 Ton Crane												
20 Ton Crane												
50 Ton Crane												
120 Ton Crane												
Trucks												
725	100		100		100		100		100		95	
730	100		100		100		100		100		95	
735	100		100		100		100		99		91	
740	100		100		100		100		99		91	
769D	100		100		100		93		88		82	
773E	100		100		100		100		93		85	
777D	100		100		100		100		93		87	
785C	100		100		100		93		86		80	
793C	100		100		100		100		100		93	
797B	100		100		100		100		100		93	
613E (5,000 gal) Water Wagon	100		100		100		100		95		87	
621E (8,000 gal) Water Wagon	100		100		100		100		97		90	
777D Water Truck	100		100		100		100		93		87	
785C Water Truck	100		100		100		93		86		80	
Dump Truck (10-12 yd^3) (5)												

Notes:
User entered deration value will override values from CAT Performance Handbook, except L2350 Loader: data from actual mine performance in Chile.
Komatsu altitude deration assumed from LeTourneau L2350

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Closure Cost Estimate
Seed Mixture

Project Name: No Agua Reclamation - Reclamation Plan
Date of Submittal:
File Name: No Agua 2025 SRCE-rev-1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: No Agua 2023 RS Means Cost Data File.xlsm
Cost Estimate Type: Surety Cost Basis: RS Means 9/2025

Seed Mixture

Common Name	Scientific Name	Species Number of Seeds / lb	Species % in Mix	PLS/acre	Cost/Lb	Cost/Acre
Grasses						
Ephraim Crested Wheatgrass	*Agropyron Cristatum var. Ephraim*					
Thickspike Wheatgrass	*Agropyron dasystrachyum*	154,000	4.40	1.24		
Bluebunch Wheatgrass	*Agropyron spicatum*	117,000	23.42	8.65		
Great Basin Wildrye	*Elymus cinereus*	95,000	8.15	6.18		
Big Bluegrass	*Poa ampla*	917,000	13.11	0.62		
Indian Ricegrass	*Oryzopsis hymenoides*	188,000	5.38	1.24		
Sandberg Bluegrass	*Poa secunda*	925,000	13.23	0.62		
Forbs						
Blue Flax				0.62		
Small Burnet	*Sanguisorba minor*	55,000	1.57	1.24		
Forage Kochia	*Kochia prostrata var. Immigrant*	407,700	2.33	0.25		
Palmer Penstemon	*Penstemon palmeri*	610,000	3.49	0.25		
Shrubs						
Fourwing Saltbush	*Atriplex canescens*	52,000	5.95	1.85		
Antelope Bitterbrush	*Purshia tridentate*	15,000	0.43	2.47		
Winterfat	*Eurotia lanata*	111,000	1.59	0.62		
Wyoming Big Sagebrush	*Artemesia tridentata wyomingensis*	2,500,000	7.15	0.12		
Total				$25.97		$0.00

Source:

Notes:

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