September 2026

Revised Closure Plan
Iron Duke Mine
Sections 3 and 4, T 22S, R 8E
Pemit No. OT006MN

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Revised RECLAMATION PLAN
Iron Duke Mine, Permit No. OT006MN.

1- Project Description

The Iron Duke Mine is owned by Gulf Coast Mining Group, LLC (Gulf Coast). On January 24, 2012, Gulf Coast was issued Permit No. OT0066M for a Minimal Impact New Mining Operation by the Mining and Minerals Division (MMD) of the New Mexico Energy, Minerals, and Natural Resources Department. The mine is located in Sections 3 and 4 of T 22S, R 08E in Otero County, New Mexico. Guld Coast owns the Cinco de Mayo, Iron Duke, Virginia, and Barbara patented claims. In addition, Gulf Coast owns the Evergreen #1 through #8 claims.

MMD requested an updated closure plan for the Iron Duke Mine in June 2025.

The mine is accessed via existing access roads across lands managed by the New Mexico State Land Office (SLO) and the Federal Bureau of Land Management (BLM).

2- Site Specific Criteria

Setting
Sections 3 and 4 are located within the outcropping bedrock of the Jarilla Mountains that compose the Orogrande Mining District. The Jarilla Mountains are a small, uplifted range in the southeastern quadrant of the Tularosa Basin. The Basin is an enclosed drainage within the Basin and Range physiographic province. The Basin's dimensions are approximately150 miles north to south and up to 50 miles wide. Its southern floor is near flat.

Geology
The Jarilla Mountains have an extent of about 10 miles north to south and are about 6 miles wide. They consist of upper Paleozoic sedimentary beds that have been intruded by a series of Tertiary age igneous rocks. The intrusions uplifted the older sedimentary beds creating a domal feature protruding above the Tularosa Basin floor (Schmidt, 1964).

The contact between the sedimentary beds (primarily limestones) and the igneous rocks is characterized by contact metamorphism and mineralization. Three types of ore have been identified in the Jarilla Mountains: iron deposits, copper/gold/silver/lead lodes, and placer lodes.

Mining Activities
At the Iron Duke Mine, the top of the peak is composed of Paleozoic limestones with the newer intrusives immediately below. The ore that was historically mined about a century ago is the iron bearing rock in this contact zone. The ore was most likely moved down to the foot of peak using a cable rail system; and then to Orogrande by use of the rail line at the foot of the cable rail grade. The subgrade waste rock was dumped down the slopes of the peak both to the north and south sides.

The current mining project at the Iron Duke Mine is removal of the subgrade waste rock from the slope sides. There is no excavation, digging of trenches, or drill holes associated with this activity. Removal of the waste rock exposes the former slope surface and profile.

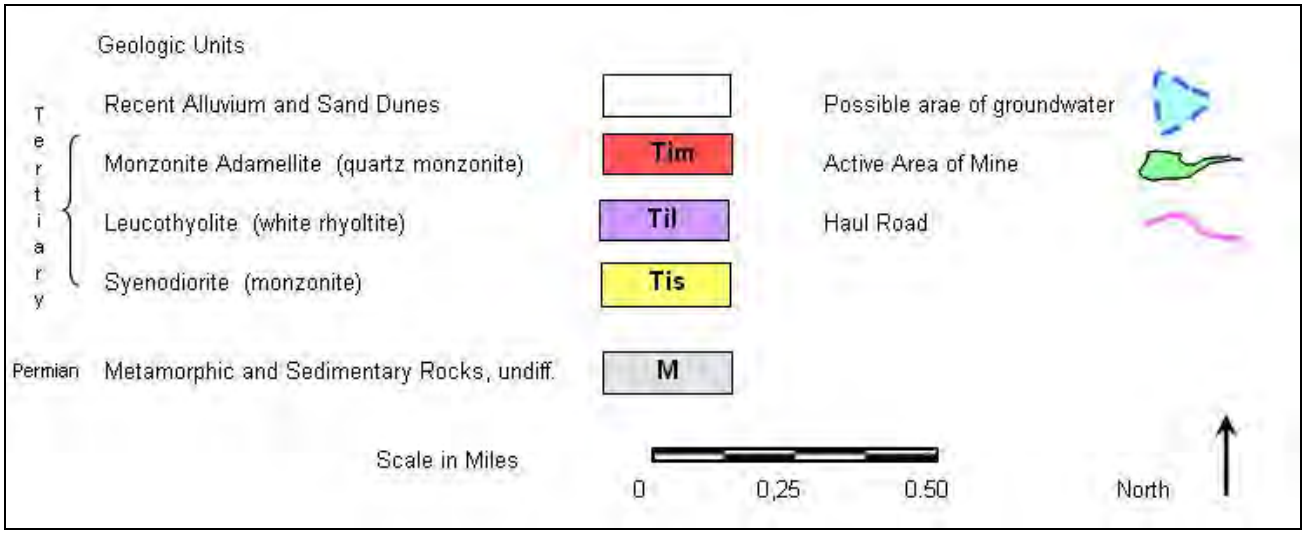
Groundwater
As stated above, the patented mining claims are located within the outcropping bedrock of the Jarilla Mountains. At the topographic high point of the Iron Duke Mine, the Monzonite Stock (Tm) in Figure 1 (below), is exposed beneath the limestones and on the slopes of the uplift. In our opinion, the Monzonite Stock is not an aquifer and ground water, as defined by New Mexico Regulations, is not present beneath the proposed mining/reclamation project.

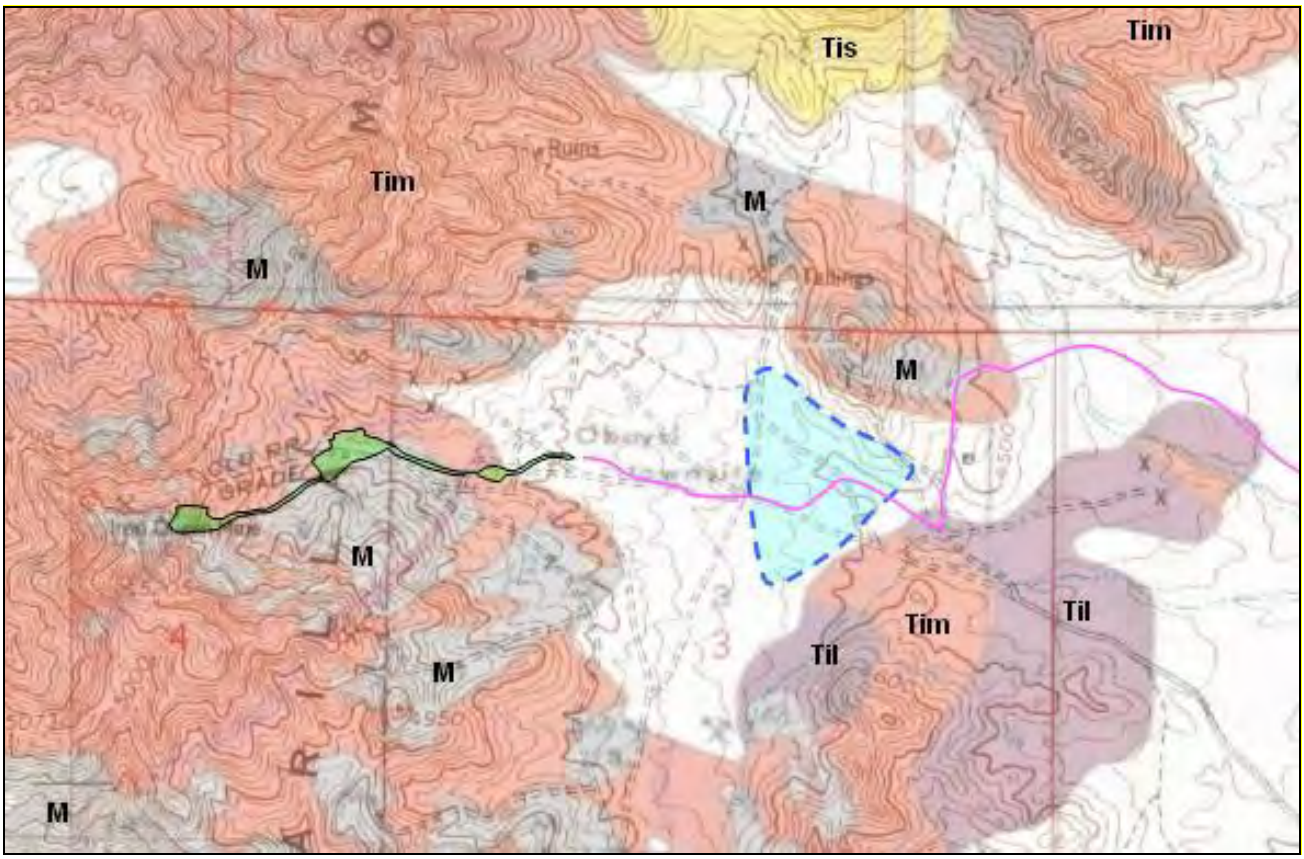
A larger scale view of the Jarilla Mountains shows that Quaternary alluvium (Q) has been deposited in the bottoms of the eroded drainages of the Monzonite core that lead to the Tularosa Basin floor (Schmidt, 1964). The depth of the alluvium is not known but likely increases from several feet to possibly several hundred feet down stream. Factors affecting this include the drainage areas and gradients of the drainages.

The closest water wells to the Iron Duke Mine are in the mapped alluvium of Water Canyon, two drainages and about two miles to the north. Depth to water in the closest well, north of the mine, is 74 feet from the OSE database. There is no data for the well located in the alluvium near the mouth of Water Canyon. At the two wells about 3.5 miles northeast of the mine (and east of Water Canyon), depths to water are 70 feet and 400 feet. We conclude that the "shallow" well is completed within the stream alluvium and fan deposits and that the "deep" well accesses a "regional" aquifer. It is likely to be confined groundwater.

Should there be groundwater within the drainage east of the patented mining claims, we consider it to be most likely found in the blue shape within the mapped alluvium deposited on top of the monzonite stock. By the nature of the activities, there are no dewatering activities associated with the mining/reclamation project.

Figure 1: *Geologic map of area around the Iron Duke Mine.*





(From Schmitt, 1964 and http://geoinfo.nmt.edu/publications/openfile/downloads/OFR300-399/351-375/370/ofr_370.pdf)

The source of ground water information is the OSE database, the geologic map (Figure 1) and our site visit.

Description of Iron Duke Mine Plates
For the reader's use we provide a brief description of the plates..

- Plate 1 shows the location of the Iron Duke Mine, about 34 miles southeast of Alamogordo and 39 miles east of Las Cruces.
- Plate 2 shows the 1924 survey with an overlay showing the patented claims, Evergreen Claims, and Mining Survey claims. The areas in use for the current mining activity are also shown. Note that the overlay of the patented claims and the Evergreen claims is a schematic drawing.
- Plate 3 shows a topographic map of the Jarilla Mountains showing sections, patented mining claims, the Evergreen claims and closest OSE and USGS water wells
- Plate 4a shows the waste rock mining areas, pads, and roads. They are color coded on an aerial photograph. A key to the numbered features is provided on Plate 4b along with their areas.

- Plate 5 shows the Iron Duke Project with a half-mile buffer zone shown on an aerial photo. The active mining areas are shown in green. In addition, a geologic map is also overlain on the image. The drainage divide of the Jarilla Mountains is shown as a dark blue line. The areas used in the current mining activity are all on the east side of the divide.
- Plate 6 is a 2022 aerial photograph with roads present in 1941 shown as dashed red lines. The various mining claims and the active mining areas are also shown. The two waste rock piles are shown in green. Roads present prior to 1976 are subject to Otero County concerning status
- Plate 7 shows the vegetation reference area on an aerial photograph along with the various mining claims. Iron Duke project areas are outlined in purple.

Berming Plates.

- Plate 8a shows berming details for the Iron Duke Waste Rock Area (No. 13). Plate 8b presents a cross section.
- Plate 9a shows berming details for the Lower Iron Duke Pad (No.15) and Road Section No. 16. Plate 9b is a cross section.
- Plate 10a shows berming details for the Processing (No. 3) Pad while Plate 10b is a cross section. Plate 10c shows berming of the additional disturbed area east of the Processing Pad and Plate 10d is a cross section of the same feature.
- Plate 11a shows berming details for the Entrance Pad (No. 4) and Road Sections No.s 10 and 11. Plate 11b is a cross section of Road Section 10.

Description of Areas within the Iron Duke Project

Mining Areas

There are two areas of historic waste rock. On the southeast side of the ridge line is the Iron Duke Waste Rock Dump. On the north side of the ridge line is the larger North Side Waste Rock Dump. No activities are planned in this second area. These areas are No. 13 and 14 on Plate 4, respectively.

The Iron Duke Waste Rock Pile is the active mining area. It has an area of 0.9 acres. Topographical relief is from about 5010 feet to 4840 feet giving a vertical relief of 170 feet. The length of the slope is 330 feet. The gradient of the slope is about (170 ft/330 ft =) 0.51. This corresponds to a slope angle of about 27 degrees.

The North side Waste rock Pile has an area of 2.27 acres with a relief of from 4920 feet to 4800 feet, 120 vertical feet. As the area has a down-slope length of 260 feet yielding a gradient of (120/260 =) 0.46. This corresponds to a slope angle of about 24 degrees.

Pads and Staging Areas

There are six pads and staging areas. They are shown with identifying numbers on Plate 4a. Plate 4b provides names and area in acres. Pads used in the current mining project are:

- The easternmost and lowest pad has the entrance gate and a parking area (No. 4). The pad has an area of 0.61 acres with a relief of about 10 feet from the southwest to the northeast. Of note is that there are some mounds of materials present in this area that are not native. It is thought that these materials were used or stockpiled for the former rail grade about 150 feet to the southwest.

- About 850 feet northwest of this pad is the Processing Pad (No. 3). It is used for processing, stockpiling, and loading ore for transport. Its area is 2.86 acres with about 40 feet of relief from the west-southwest to the east-northeast.
- About 700 feet southwest of the processing pad is a pad (No. 15 on Plate 4) at the base of the Iron Duke Waste Rock Pile. Its area is 0.19 acres. It connects the No. 16 road leading to the eastern end of the Iron Duke Waste Rock Area.

Areas not used in the current mining project are:

- Adjoining the Iron Duke Waste Rock Pile on its eastern side is the Upper Iron Duke Pad (No. 2). There are no plans for its use as the waste rock is most efficiently removed from below. Its area is 0.29 acres.
- The Upper Staging Area (No. 1) is also not used as the Iron Duke Waste Rock is accessed from below. There are no plans for its use. Its area is 0.37 acres.
- The Cinco de Mayo Access and Upper Pad (No. 5) is associated with the North side Waste Rock Pile. No use has been made of it and it is undisturbed. Its area is 0.30 acres.

Roads and Access,

There are eight road segments within the project. Three of them are used in the current miming activity. Again, the feature numbers all refer to Plates 4a and 4b.

- The Drainage Crossing (No. 11) connects the entrance pad of the mine with the haul road on the north side of the arroyo. Its area is about 0.53 acres with a length of 0.14 miles
- The segment connecting the Entrance Pad with the Processing Pad (No. 10) has an area of 0.47 acres with a length of 0.13 miles.
- The access road (No. 16) from the Processing Pad to the Lower Iron Duke Pad has an area of 0.46 acres and a length of 0.26 miles. The Lower Iron Duke Pad (No. 15) functionally acts as a road to the Iron Duke Waste Rock. The pad's length is 0.12 miles.

The following five roads are not used in the current mining project.

- Road segment No. 7 accesses the uppermost portion areas of the project area. The road leaves the Processing Pad (No. 3) and gains the ridgeline to the north. It then follows the ridgeline to the southwest. It's area is 1.26 acres with a length of 0.46 miles
- Road segment No. 8 connects the top of Road segment No. 7 to the head of the cable rail grade (No.6) and to the Upper staging Area (No.1). Its area is 0.1 acres with a length Roadof 0.04 miles.
- The former cable rail grade accessing the top of the ridgeline from the Processing Pad (No. 6) has an area of 0.24 acres and a length of 0.12 miles
- Road segment (No. 9) connects the upper end of the North Side Waste Rock (No.14) to the Upper Staging Area (No. 1). Its area is 0.1 acres with a length of 0.04 miles.
- Road segment (No. 12) provides a route from the top of the North Side Waste Rock to the top of the Iron Duke Waste Rock (No.13). Its length is 0.03 miles and an area of 0.04 acres

RS 2477 Roads

Numerous roads were present in aerial photographs taken in 1941 and 1946. These roads are shown on Plate 6 as dashed red lines. These roads are noted as Otero County has some jurisdiction of these roads. Relevant RS 2477 roads in the active project are

- The road (No. 10) connecting the entrance pad to the processing pad uses about 0.04 miles of the former rail grade connecting the Iron Duke Mine to Orogrande. The rails were most likely removed before 1941. The former rail grade is present as a road in all aerial photographs since 1941
- Road section No. 11 goes eastwards from the mine entrance. It then crosses to the north side of the primary arroyo and continues eastward on the north side of the drainage. This crossing and the haul road on the north side of the drainage both existed in 1941.
- The access road to the upper areas of the mine (No. 7) existed prior to 1941. Its length is about 0.47 miles with an elevation gain of about 160 feet.
- The inclined former cable rail grade connects the eastern end of the processing pad with the upper mountain. Its length is about 0.16 miles with an elevation gain of about 210 feet. The gradient is (210/843 =) 0.25. Because of this gradient, the road segment is not usable by common vehicles.

BOW Corporation Right of Way
Parts of road segments No. 11 and No.7 traverse M.S. 1248 and M.S. 1247, respectively (Plate 2) These patented claims are owned by the BOW Corporation. Gulf Coast cannot access their claims without a right of way from Bow Corporation. Similarly, the BOW Corporation cannot access some of their claims without right of way from Gulf Coast. The claims provide mutual right of way to each other.

3- Description of Mining Activities

Removal of waste rock is accomplished by gathering a load within the bucket of the front end loader. It is transported down to the processing pad by the loader and placed in the unprocessed stockpiles depending upon if it is limestone or the metamorphosed material from the contact zone between the limestone and the monzonite intrusives. Within the aerial images of the processing pad, dark stockpiles are iron ore while gray stockpiles are limestone.

At suitable times the ore is run through the ball mill, a motor driven, horizontally rotating, steel cylinder. The cylinder has steel balls inside the rotating cylinder along with the ore. The resulting collisions break the ore into ever smaller pieces. In this case, the ore is ground to a 200 mesh size. The ore is magnetically separated by grade and stored in shipping containers. The ore leaves the mine in the containers via a roll back tilt bed truck.

Volumes of mined materials on the processing pad can be approximated by stockpile areas on the processing pad. Obviously, this figure varies frequently. In 2013, there were 1088 square yards of material in 3 stockpiles. In 2016, the square yardage was 1692 in three stockpiles. In 2019, the square yardage was 1886, again in three stockpiles. In 2023, 1391 square yards were present in four stockpiles.

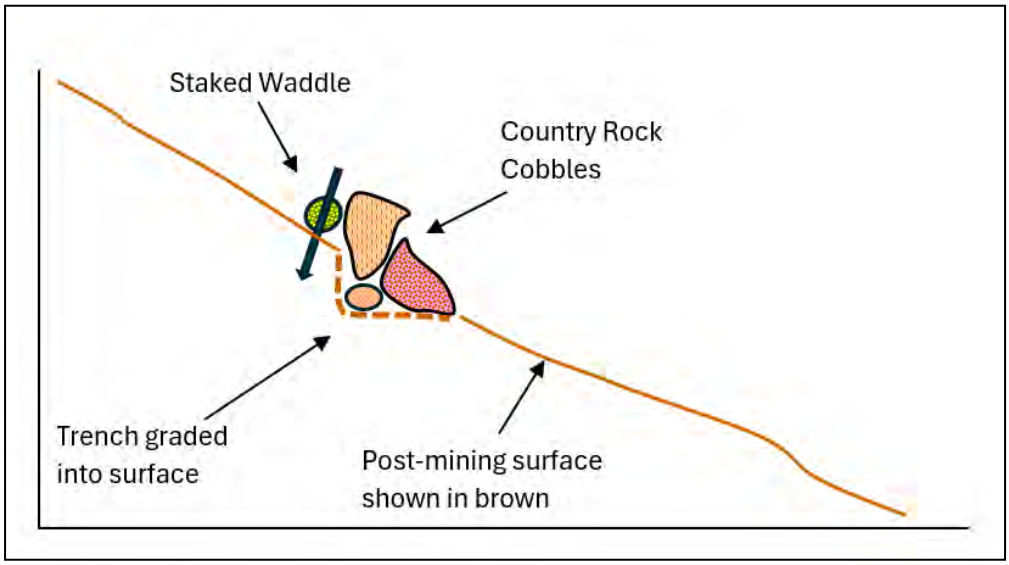
4-Operational Measures

Iron Duke Waste Rock Area
During the active mining of the site, the following practices will occur.

- A perimeter berm is maintained on the downside slopes of the waste rock areas to prevent runoff and control fine material movement.

- As useful, perimeter berms are maintained on the upside slopes of the waste rock area to prevent run on.
- When areas have been cleared of waste rock and are no longer needed to allow vehicle movement, berms will be constructed across the former waste rock area at vertical intervals of about 40 feet. The berms are oriented diagonally across the area to reduce the gradient that surface water will flow to be shallower than 3:1. See Plates 8a.
- To construct the berms, shallow trenches are graded across the hill side where possible. Cobbles of country rock will be placed in the trenches to slow and direct storm water runoff. See Figure 2.
- On the uphill side of these berms, waddles will be staked across the footing of the berm to control movement of fine- grained materials and provide additional stability to the berms

Figure 2: *Schematic of berm construction within Waste Rock Area.*

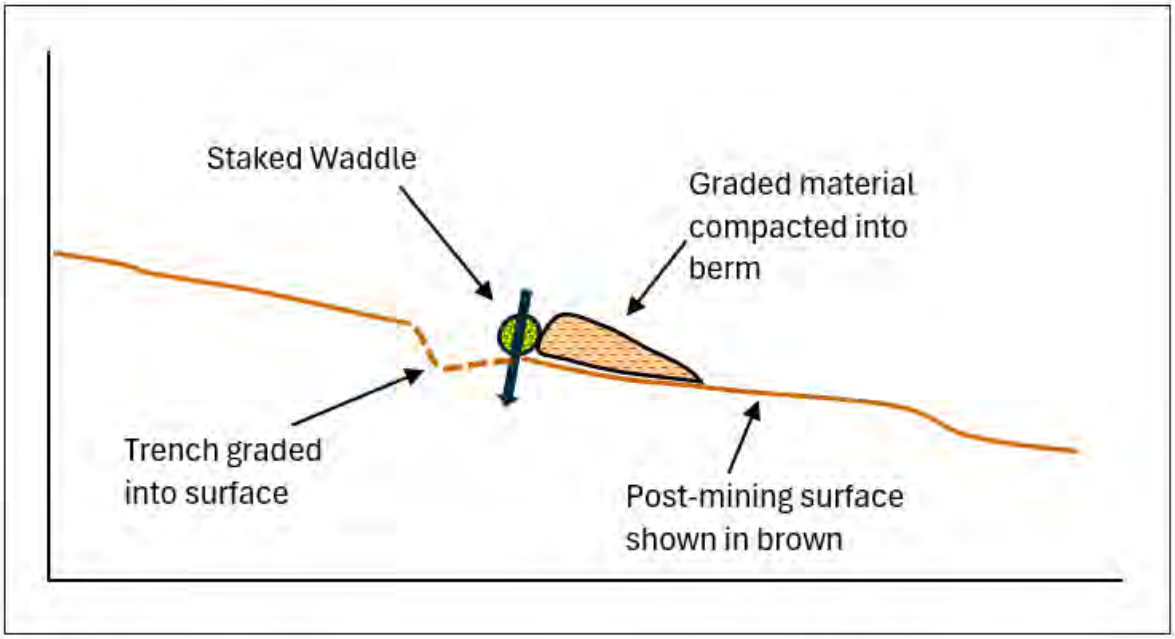


Pads

During the active mining of the site, the pads will have.

- Perimeter berms will be maintained on the down slope sides of the pads to control runoff. and fine material movement.
- As useful, perimeter berms are maintained on the upside slopes to prevent run on.
- Berms will be constructed across the pads at vertical intervals of about 25 feet. The berms are oriented diagonally across the pads to reduce the gradient that surface water will flow.
- Because of the lower gradient, berm construction is as shown in Figure 3. When necessary, a shallow trench will be graded to assist with berm anchoring as shown.

Figure 3: *Berm construction on pads*



Roads
During the active mining of the site, the following practices will occur.

- The roads will be graded to fill erosional features. They will also be bermed to lessen the gradient of runoff flow.
- Riprap will be used as necessary to join berms with channels on the slopes.

5- Revision of Disturbed Areas Comprising the Iron Duke Project

Within the original Permit area, there were 18 identified roads, pads and staging areas, and mining areas. Since then, the Processing Pad has been enlarged with MMD permission. Table 1 presents the areas of the various features within the original permit. The numbers on Plate 4a correspond to Area Description numbers in Table 1.

MMD has provided comments for us during the process of drafting a revised closure document. MMD considers that the disturbed areas occupy 13.53 acres within the permit area. A disturbed area is defined in this way:

"If a road existed and was bladed/widen, used as storage, or otherwise disturbed, the operator has assumed responsibility for that disturbance."

Within the comments are MMD drawings showing the bounds of the disturbed areas contained within five shapes. We have revised our original permit areas along with additional areas to

Table 1

Aewa Number	Area Description	2012	2026	MMD Iron Duke Areas (2026)						Undisturbed Areas	Areas to be reclaimed to reduce the Iron Duke
		Original Permit Area	Revised Area	Entrance	LowerPad	Access Rd and WR	Roads	Upper Roads and Phase2			
1	Pad and Access	0.26	0.37			0.37					
2	Disturbed area East of Iron Duke WR (is comtained within No. 24)	0.20	0.29			0.29					
3	Processing Pad	2.65	2.86		2.86						
4	Entrance Pad	0.42	0.61	0.61							0.25
5	North Side Waste Rock Access Pad (undeveloped)	0.30	0.30					0.30		0.30	
6	Former Cable Rail Grade (unused)	0.41	0.24		0.24						0.24
7	Road Section (accesses top of mountain)	1.11	1.26				1.26				
8	Road Section	0.09	0.10				0.10				
9	Road Section (North Side Waste Rock Access)	0.08	0.08					0.08			
10	Road Section	0.16	0.47	0.47							
11	Road Section	0.40	0.53	0.53							
12	Road Section, (Connects Both Waste Rock Areas)	0.20	0.04					0.04			
13	Iron Duke Waste Rock Area	0.90	1.00			1.00					
14	North Side Waste Rock Area	2.27	2.27					2.27		2.27	
15	Access Pad to Iron Duke WR	0.28	0.19			0.19					
16	Road Section	0.38	0.46			0.46					
17	North Side Auxiliary Access	0.21	0.21					0.21		0.21	
18	Iron Duke Auxiliary Access	0.14	0.14			0.14					
19	Gully, East of Processing Pad		0.22		0.22						0.22
20	Road Section (former rail bed)		0.19		0.19						0.19
21	Disturbed Area north of Iron Duke WR		0.30			0.30					0.30
22	Disturbed Area north of Iron Duke WR		0.10			0.10					0.10
23	Disturbed Area north of Iron Duke WR		0.32			0.32					0.32
24	Disturbed Area east of Iron Duke WR		0.29			0.29			Total		
	Total	10.46	12.84	1.61	3.51	3.46	1.36	2.90	12.84	10.06	1.62
	MMD Areas (from Comments, June 2026)			1.58	4.10	3.50	1.54	2.81	13.53	10.75	

match MMD's drawings. Table 1 shows these revised areas along with the original permit areas on the left side of the Table. On the right side of Table 1, we have categorized the revised and additional areas in color coded columns to match the five MMD areas of disturbance..

As can be seen by comparing totals, the greatest disparity in the estimates is 15% for the Lower Pad. Comparing the total of all areas, our estimates are smaller than the MMD total by an average of (12.74 acres/13.53 acres =0.942).

MMD is not including the North Side Waste Rock Areas and its attendant access areas.within the disturbed mining area (No.s 5, 14, 17). The resulting mining area becomes (13.53 acres – 2.36 acres=) 11.17 acres. Hence, reclaiming 1.2 acres is considered sufficient to bring the mine area within permit compliance of being less than 10 acres.

We propose to reclaim the areas shown in the far right column of Table 1. The areas are:

- Three disturbed areas above the Iron Duke Waste Rock Pile (No.s 21, 22, 23)
- A segment of former rail bed (No. 20) southeast of the Processing Pad
- A gully (No.20) east of the Processing Pad
- The former cable rail grade (No.6) from the Processing Pad to the top of the mountain
- The entrance pad (No.4) will be reduced in area

These areas sum to a total of 1.62 acres. Noting that our total area estimates are 94% the size of the MMD area estimates, the ratio below compares our estimated area with the necessary 1.2 acres.

Reclaimed acres/1.20 acres = (1.62 acres * 0.942)/ (1.20 acres)
= 1.27

We trust that reclaiming an area 1.27 times larger than the minimum necessary area will bring the mine area within compliance to everyone's satisfaction.

Reclamation of these areas will follow the Closeout Protocols described in Section 7 depending on the type of area. In particular, the hummocky disturbed areas (such as No.1 and areas immediately north of the Iron Duke Waste Rock) will be smoothed and graded to conform with the surrounding terrain. Berms of the type shown in Figure 4 will be placed across the steeper slopes to slow runoff prior to seeding and mulching.

6- Post-Closure Use

Objective

The intent of this reclamation is to re-establish the pre-mining drainage patterns and vegetation that existed prior to the introduction of the waste rock from the historic mining activities. The larger area is currently grazed by wildlife. After mining/reclamation is complete, the reclaimed areas will also be available to wildlife.

At this time, Gulf Coast is not aware of any cultural resources in the area of the proposed action.

Topsoil

The historic mining activities did not salvage topsoil. Based upon the obvious area of rock removal, the historic mining activity near the top of the peak laterally followed the contact between the

overlying sedimentary beds (primarily limestone) and the igneous intrusive rocks. Most likely, whatever topsoil covered the contact zone between the sedimentary beds and the intrusives in the mining area was dumped over the slope sides along with the waste rock.

The removal of the waste rock from the slope sides at the Iron Duke Mine exposes the land surface that was present about a century ago, albeit with some additional topsoil. In many areas of the Jarilla Mountains, including the Iron Duke Mine, topsoil is either thin or not present.

7- Description of Closeout Activities

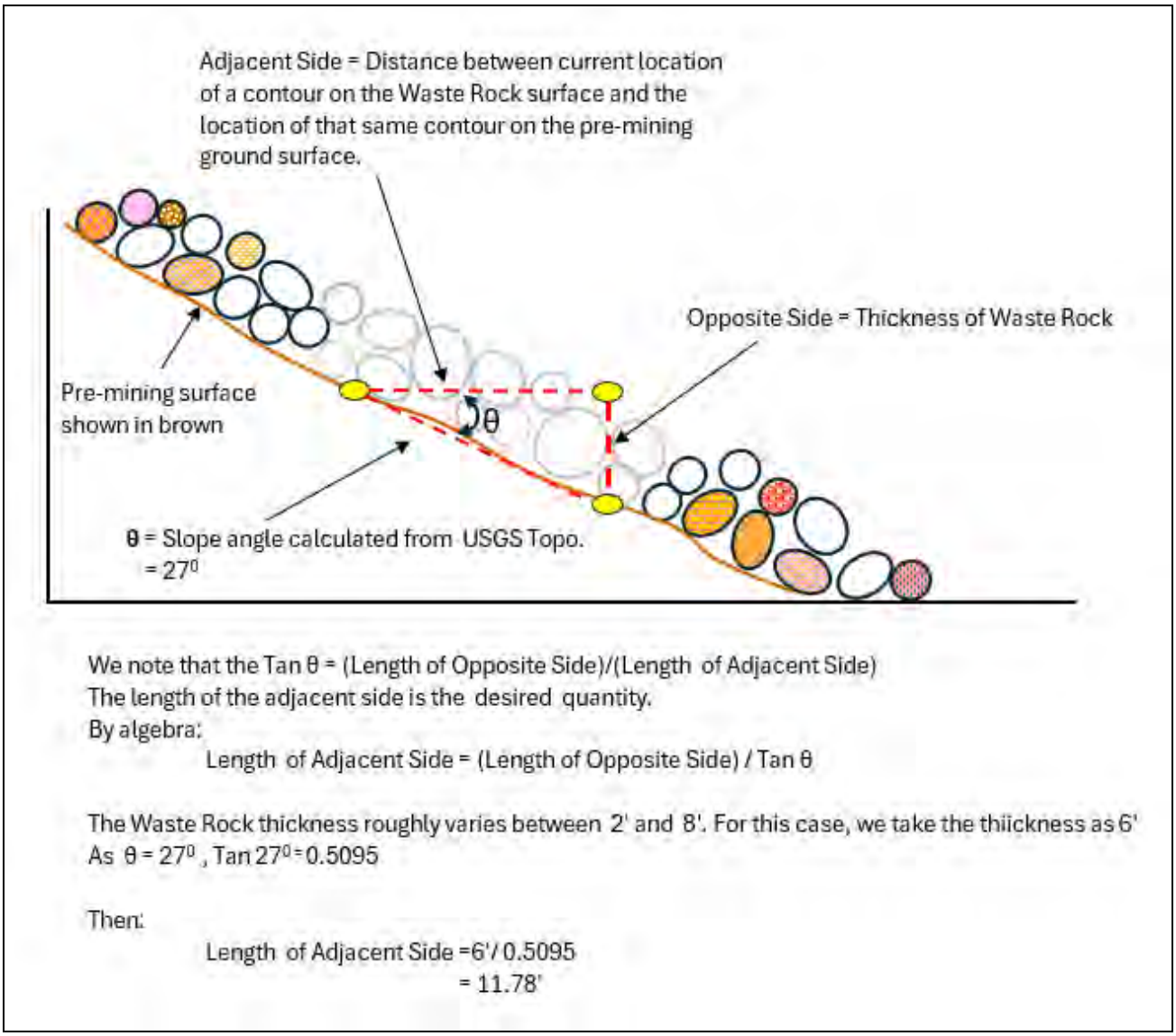
The areas will be closed starting from the top and working progressively downwards. Pads and roads on the patented mining claims will be re-seeded during the reclamation process to minimize erosion and sediment loading to arroyos.

Excavation and Backfilling
No excavation, blasting, or in-place ore removal occurs during the waste rock removal process. As such, no backfilling is necessary in the waste rock areas.

Waste Rock Area Stabilization
To preserve topsoil on the now exposed surface after removal of the waste rock, slope stabilization will occur as areas of waste rock have been cleared and are no longer needed for vehicle movement. All other reclamation will occur within 1 year of completion of activities on the patented mining claims. Reclamation and re-seeding of roads and pads not located on the patented mining claims that are no longer used will occur in the latter half of summer to take advantage of the late summer moisture pattern.

Contour Location of the Waste Rock Area
Removal of the Waste Rock will expose the pre-mining surface of about 1900. Unlike many mining activities, the post-mining surface will very closely approximate the pre-mining surface. The thickness of the waste rock materials varies from near zero to possibly 8 feet. Figure 3, below, demonstrates that the landscape form will vary with the thickness of the waste rock. Existing USGS topographic maps were drawn on top of the waste rock material. The post mining surface contours will move to the west from about 2 feet to perhaps 15 feet, a distance too small to show in a meaningful way on the plates.

Figure 4: ***Location of post-mining contours relative to their current location***



8- Closeout Protocols

Iron Duke Waste Rock Area
After mining operations have ceased, closure of the waste rock area will proceed in the following order.

- While the surface of the former waste rock area is being smoothed and bermed (see below), the perimeter berms will be maintained. Afterwards, they will be removed (also below).
- The diagonally placed berms interior to the former waste rock area to reduce the surface water gradient will be examined in relation to the existing drainage channels outside of the waste rock area. If necessary their placement will be adjusted to direct flow to these channels.
- Riprap will be placed at theses junctions where necessary.
- After the previous steps are complete, the perimeter berms around the waste rock area will be disassembled. Surfaces will be smoothed to conform with the surrounding topography. The berm rock will be used to provide additional armor to the waste rock area.

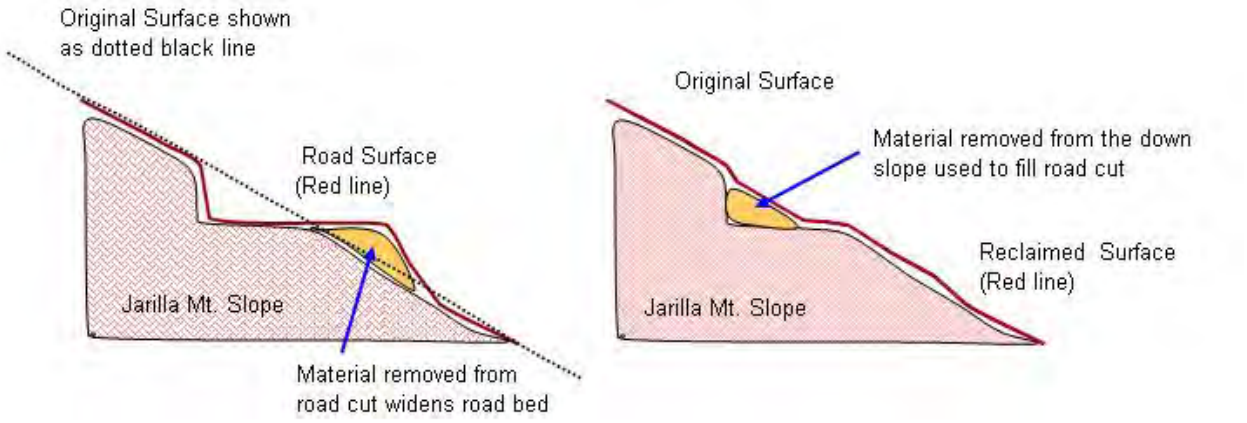
Pad Reclamation
Pad reclamation will be similar to the waste rock area reclamation with several differences related to the pad material and to the lower gradient.

- The perimeter berms will be maintained until the interior closure shaping of the pads is complete.
- The diagonally placed berms on the pads to reduce the surface water gradient will be examined in relation to the existing drainage channels outside the pads. If necessary their placement will be adjusted to direct flow to these channels.
- Riprap will be placed at these junctions as necessary
- On pads (such as No.15) which encroached into an arroyo, the original contours will be recreated. Additional rip rap may be necessary to prevent excessive channel erosion
- After the previous steps are complete, the perimeter berms around the pads will be disassembled. The pad surface will be graded to conform with the surrounding topography. The former berm surface will be smoothed.. The berm rock will be used to armor the pad as possible.

Roads
Upon completion of mining activities, Road section 16 will be removed. This will be completed as shown in Figure 5.

- The material that was pushed over the downhill side (adding to the road width), will be pushed up into the road cut made to establish the road bed originally. In this way, the original slope and shape of the hillside can be re-established.
- Where coarse material is available, it will be placed on the fill in the road cut to armor the softer material.
- At appropriate places, riprap will be placed where runoff will be entering the arroyo below the road.

Figure 5: *Schematic drawing of former road reclamation*



Scarification
Following the grading and contouring described above, the company will carefully examine the nature of residual soil. In those areas with very thin topsoil, we do not anticipate that seed bed preparation (e.g. scarification) will provide any benefit.

Reseeding
Plant species used for reseeding are those recommended by the Bureau of Land Management for the Orogrande area (Jarilla Mountains). The application rate is 11 pounds of pure live seed/acre. The species are:

- Bush Muhly
- Sideoats Gramma
- Sand Dropseed
- Scarlett Globemallow
- Plains Bristle Grass
- Fourwing Saltbush

The seed will be broadcast. Mulch will be applied on top of the seed On the steepest slopes of the site, given the wind conditions, mulch will probably provide no benefit.

Equipment Removal
All non mobile equipment is present on the Processing Pad (No. 4). When mining is completed, all of the operating equipment, containers, and portable buildings will be removed. Shipping containers will be removed with a roll back, tilt bed truck. Any frac tanks will be removed with a semi truck. Office trailers will be towed out with a pickup truck. The ball mill and the magnetic separator are moved with a tilt bed truck.

Access Roads
Pre-existing roads at the site have been graded to make them usable to equipment. Roads are graded and bermed appropriately to control runoff events. Road areas are shown on Plate 4.

New roads at the site include the access road (No. 16) to the lower Iron Duke Pad (No. 15) from the Processing Pad (No. 3). After completion of activities on the Iron Duke Waste Rock Area, the access

road (No. 16) and the lower Iron Duke Pad (No. 15) will be re-contoured to match the original surface as best possible (Figure 5). These two areas are on BLM land. BLM is accepting the two areas on Gulf Coast's NOI form with an area of 0.56 acres.

These areas will be reclaimed with approximately the reverse process by which they were graded. The material from the downhill side of the road is graded into the uphill side of the road (Figure 5). The reshaped slope will be reseeded at the start of the monsoon season

Vegetation Reference Area

Plate 9 shows the proposed vegetative reference area. As can be seen it is east of the mining areas and is entirely contained within the patented Virginia and Barbara claims. The area is a slope with gradients representative to those in the mining areas. As there is a small drainage through this area, the slopes locally face from southwest to east-southeast, similar to the mining area. Because of the historic mining activities, there are a number of small, historic, exploratory excavations nearby. Due to their age and size, they have localized effects. There are no modern disturbances above this proposed reference area.

9- Schedule of Closeout Activities

During the waste rock removal process, the waste rock area will be stabilized as areas have been cleared and are no longer needed for vehicle movement.

Upon completion of reclaiming the waste rock area :

- The reclamation of Areas No. 15 and 16 can proceed. This is expected to take 3 months
- With the upper mountain reclamation complete, equipment from the lower pads can be removed and the pads can be reclaimed.
- The relevant RS 2477 road sections will receive maintenance.

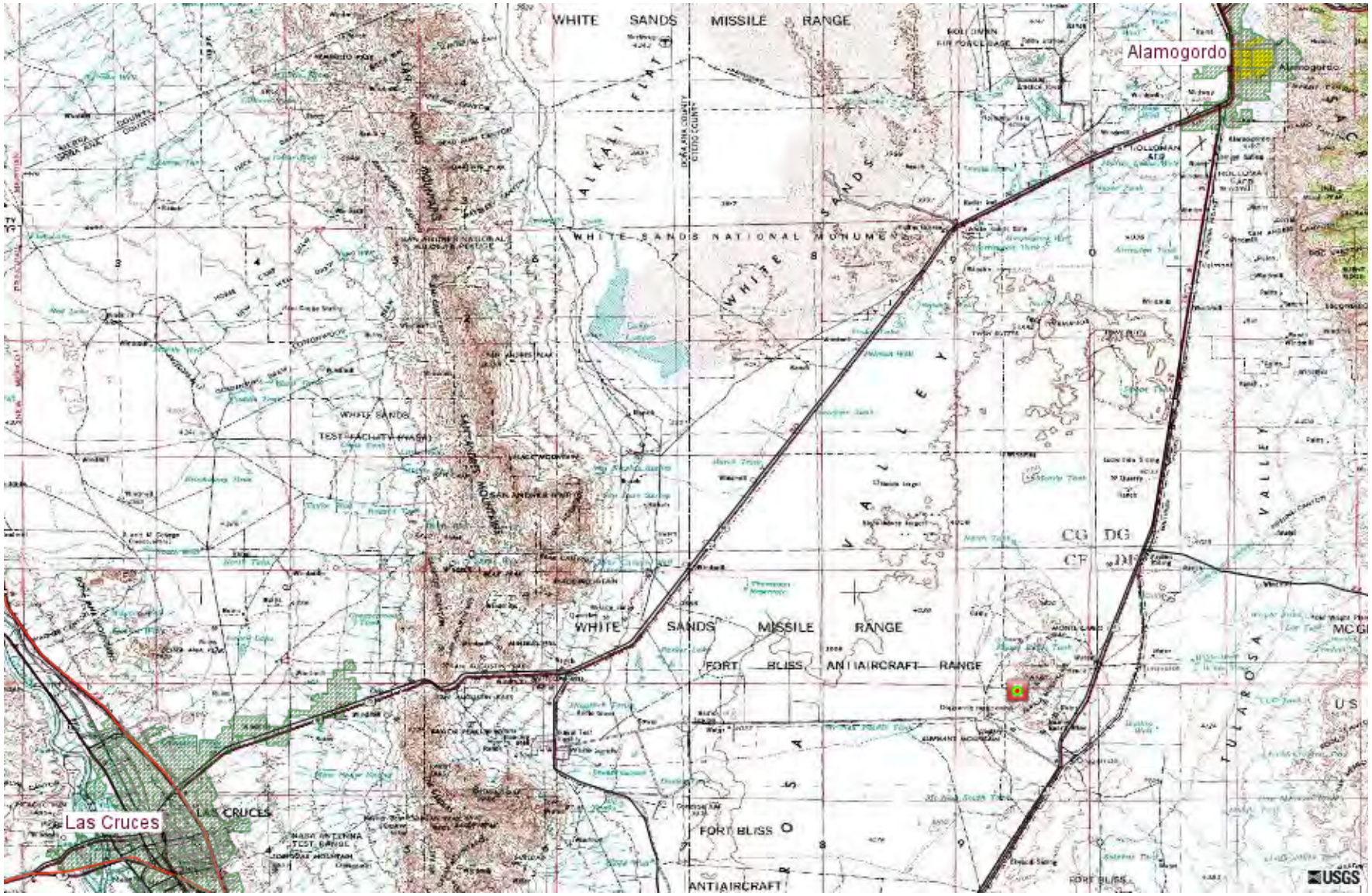
These latter two activities are scheduled to take four months.

10- References

Schmidt, P.G., Craddock, C. (1964). The Geology of the Jarilla Mountains, Otero County, New Mexico. State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro, New Mexico. Bulletin 82, pp. 38, 43

Plates

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

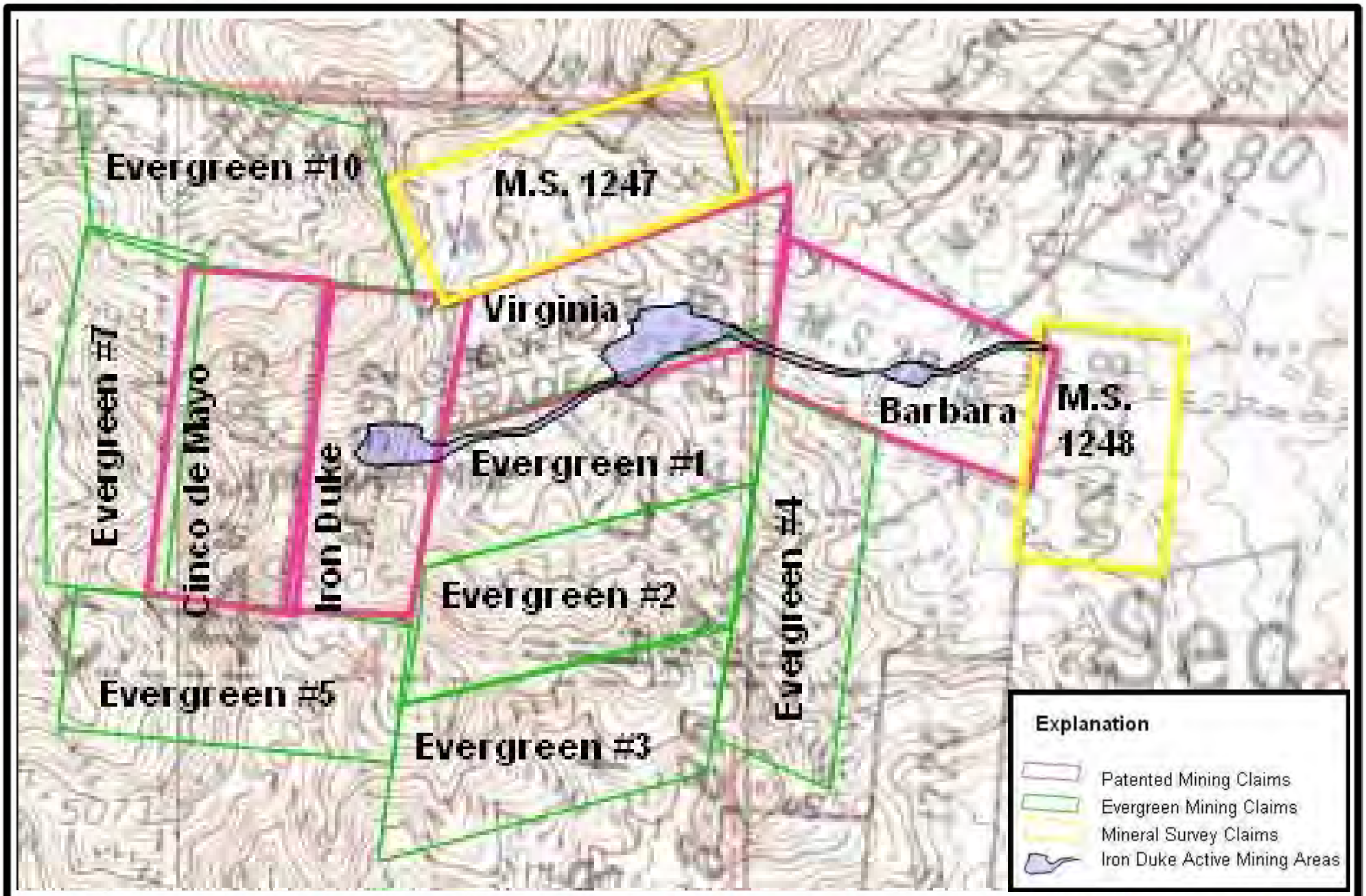


0 5 10mi

N W E S

R.T. Hicks Consultants, Ltd	Location Map	Plate 1
	Gulf Coast Mining Group LLC	Aug. 2025

P:\OrograndeThree\OrograndeThree.aprx



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S

0 485 970 Feet

Scale: 1:8,000

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

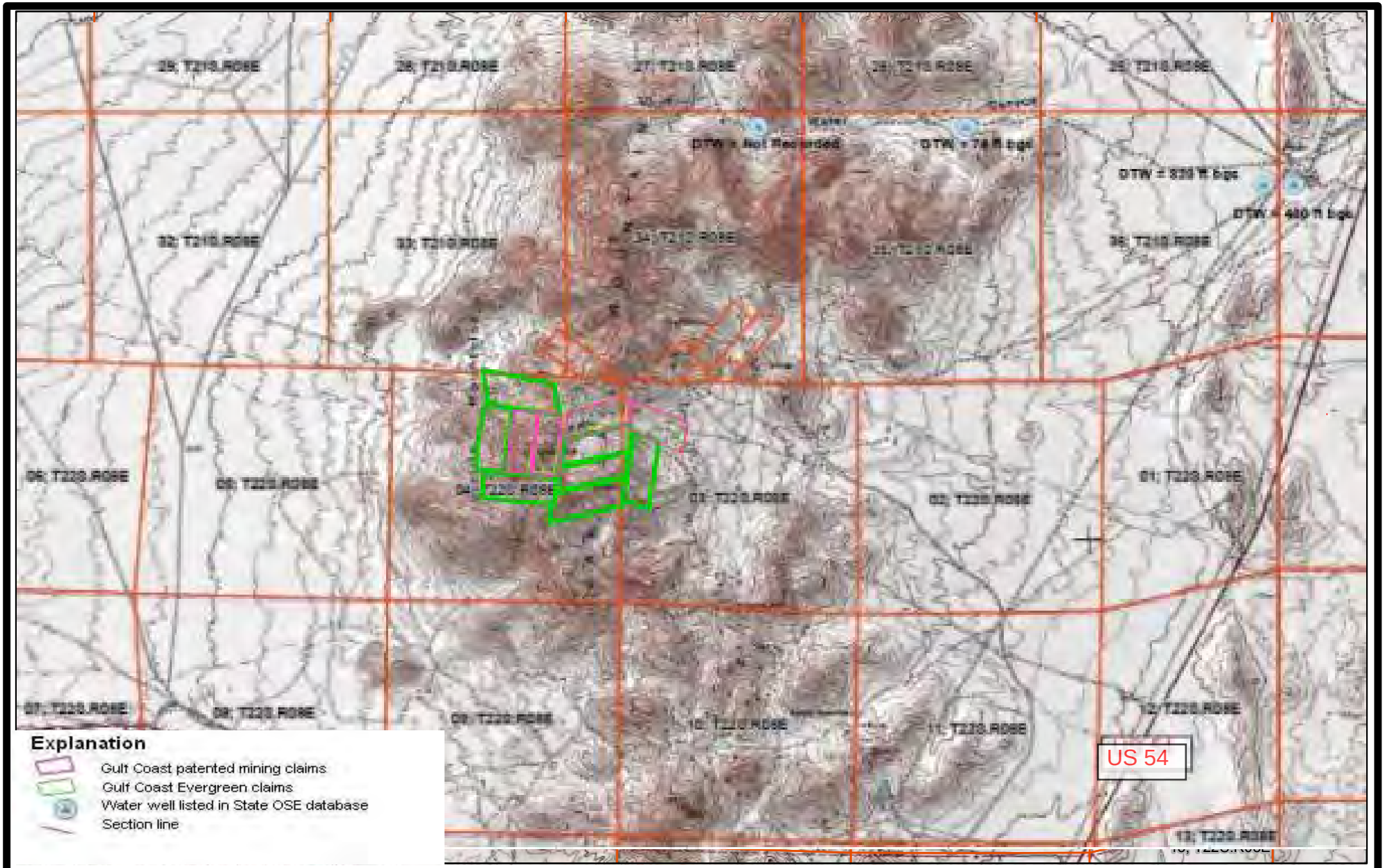
1924 Survey on USGS Topo Map

Iron Duke Mine

Plate 2

August 2025

Path: S:\Projects\gulfCoast\oroGrande\Plates\plate1.mxd



Base Map: esri.com

N
W E
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0 1,500 3,000
Feet

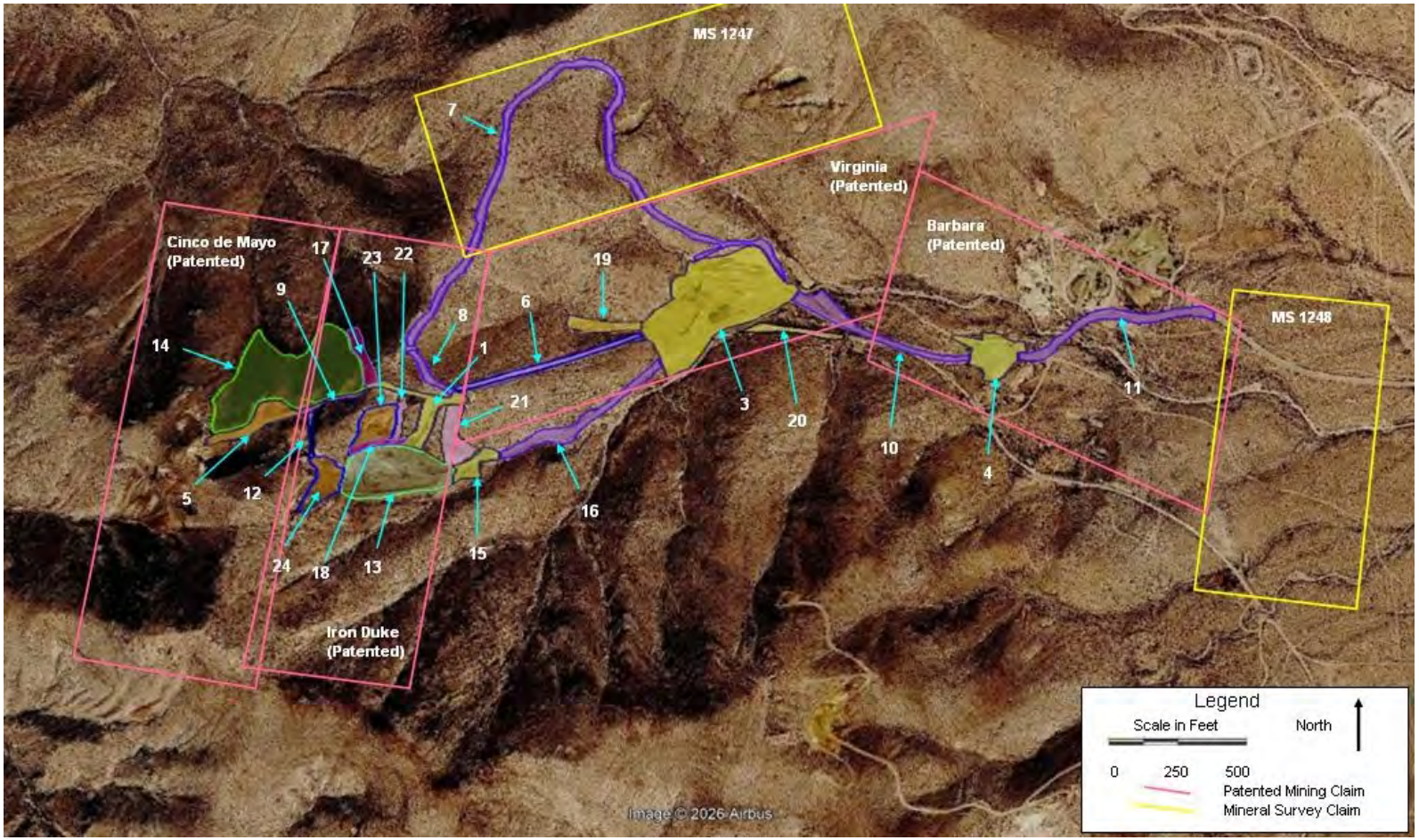
R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Topo Map With MS Claim Overlay and OSE Wells

Plate 3

Gulf Coast Mining Group, LLC
Barbara, Cinco de Mayo, Iron Duke, & Virginia MS Claims

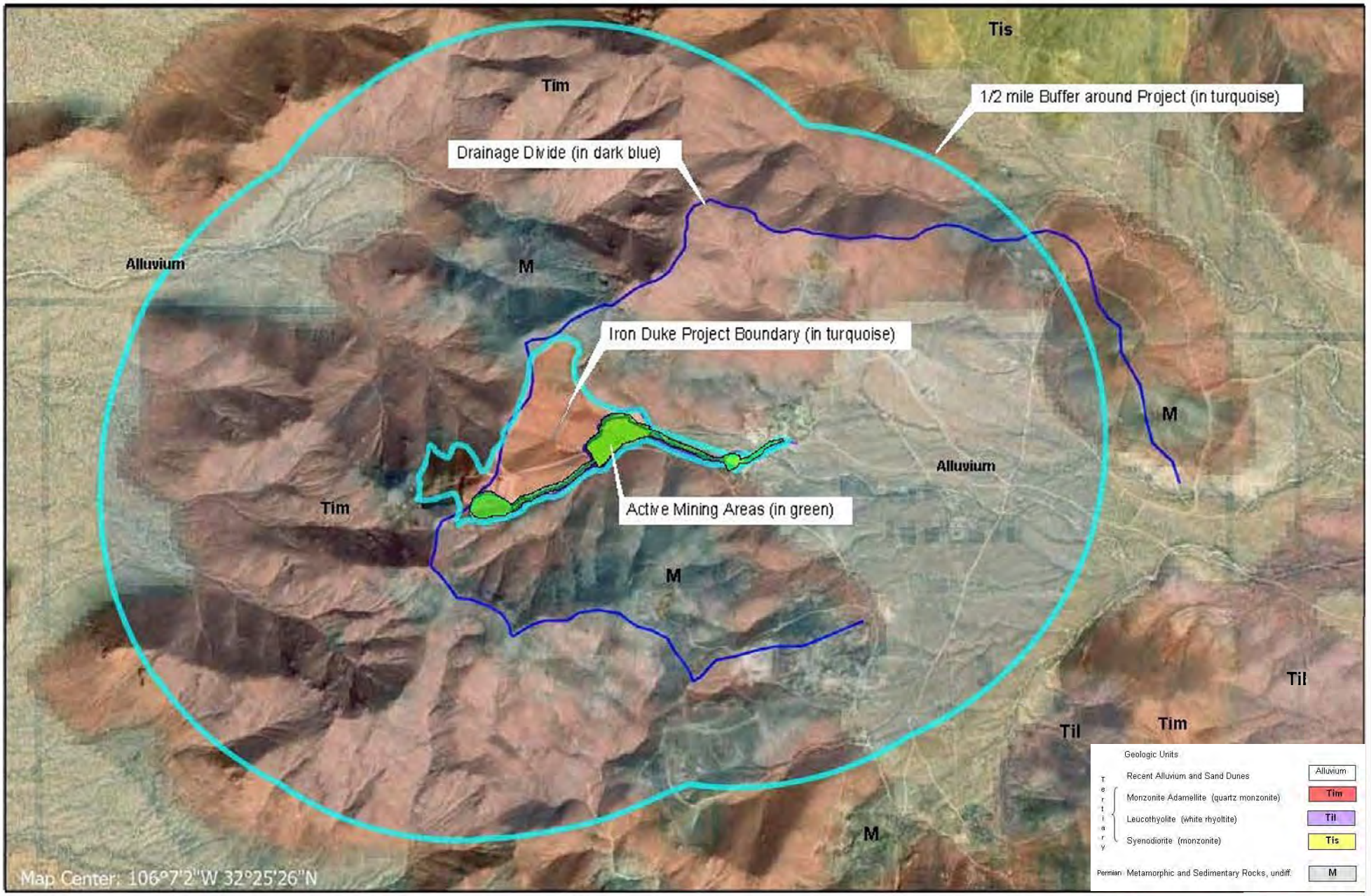
June 29, 2011



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Identification of All Roads, and Pads in Permit Area. Iron Duke Project**	**Plate 4a**
	Gulf Coast Mining Claims, LLC	**August, 2026**

Area Number	Area Description	2012 Original Permit Area	2026 Revised Area	Descroiption
1	Pad and Access	0.26	0.37	Pads and Staging Area
2	Disturbed area East of Iron Duke WR (is comtained within No. 24)	0.20	0.29	Pads and Staging Area
3	Processing Pad	2.65	2.86	Pads and Staging Area
4	Entrance Pad	0.42	0.61	Pads and Staging Area
5	North Side Waste Rock Access Pad (undeveloped)	0.30	0.30	Pads and Staging Area
6	Former Cable Rail Grade (unused)	0.41	0.24	Roads and Access
7	Road Section (accesses top of mountain)	1.11	1.26	Roads and Access
8	Road Section	0.09	0.10	Roads and Access
9	Road Section (North Side Waste Rock Access)	0.08	0.08	Roads and Access
10	Road Section	0.16	0.47	Roads and Access
11	Road Section	0.40	0.53	Roads and Access
12	Road Section, (Connects Both Waste Rock Areas)	0.20	0.04	Roads and Access
13	Iron Duke Waste Rock Area	0.90	1.00	Mining/Reclamation Areas
14	North Side Waste Rock Area	2.27	2.27	Mining/Reclamation Areas
15	Access Pad to Iron Duke WR	0.28	0.19	Roads and Access
16	Road Section	0.38	0.46	Roads and Access
17	North Side Auxiliary Access	0.21	0.21	Auxiliary Area
18	Iron Duke Auxiliary Access	0.14	0.14	Auxiliary Area
19	Gully, East of Processing Pad		0.22	Disturbed Area
20	Road Section (former rail bed)		0.19	Roads and Access
21	Disturbed Area north of Iron Duke WR		0.30	Disturbed Area
22	Disturbed Area north of Iron Duke WR		0.10	Disturbed Area
23	Disturbed Area north of Iron Duke WR		0.32	Disturbed Area
24	Disturbed Area east of Iron Duke WR		0.29	Disturbed Area
	Total	10.46	12.84	

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Feet

R.T. Hicks Consultants, Ltd
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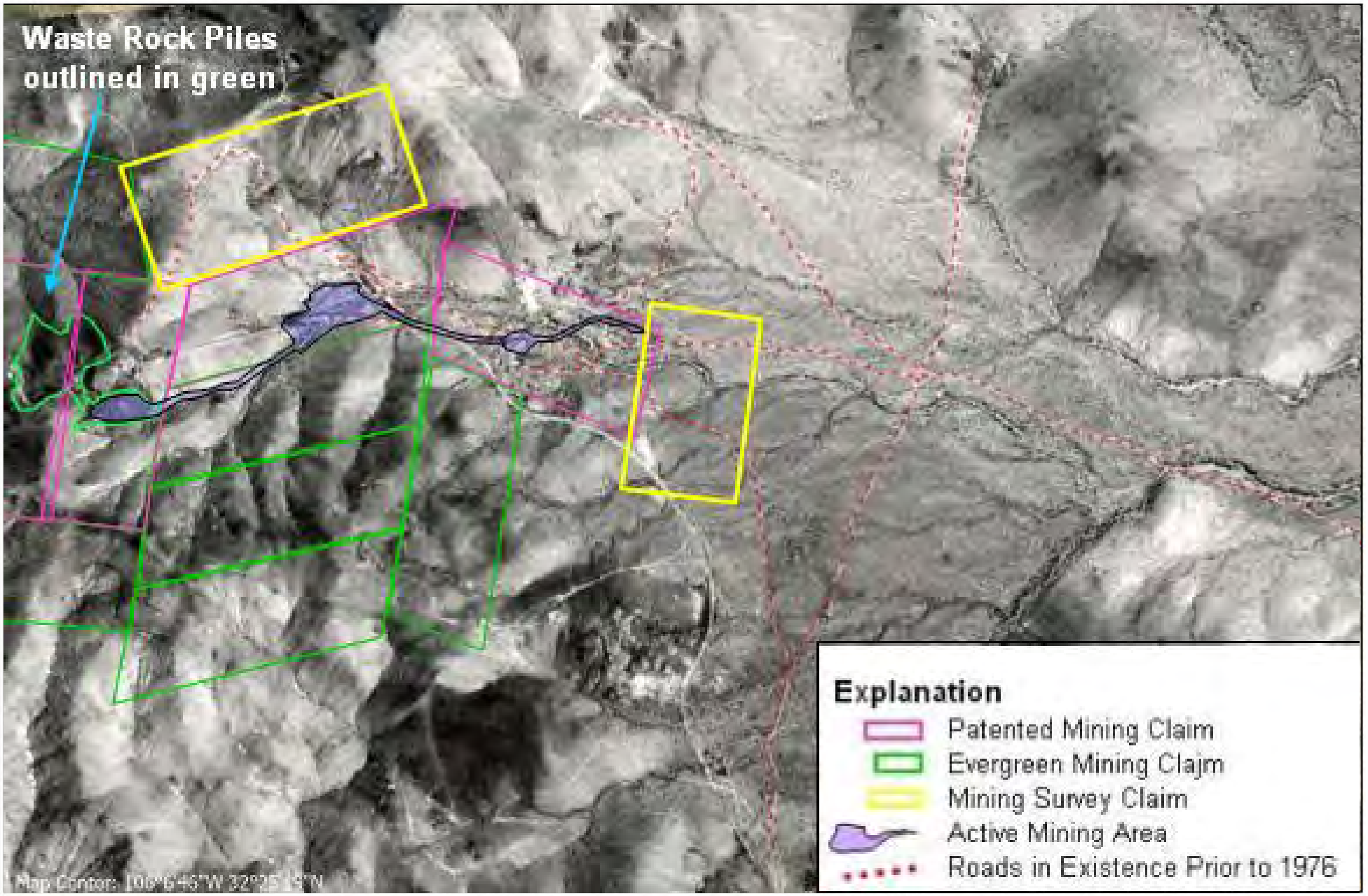
Half Mile Buffer Around the Iron Duke Project
Geology shown on an Aerial Photo

Plate 5

Gulf Coast Investments LLC

Dec. 2025

P:\OrograndeThree\OrograndeThree.aprx



N
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0 500 1,000 Feet

Scale: 1:10,500

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Albuquerque, NM 87104
Ph: 505.266.5004

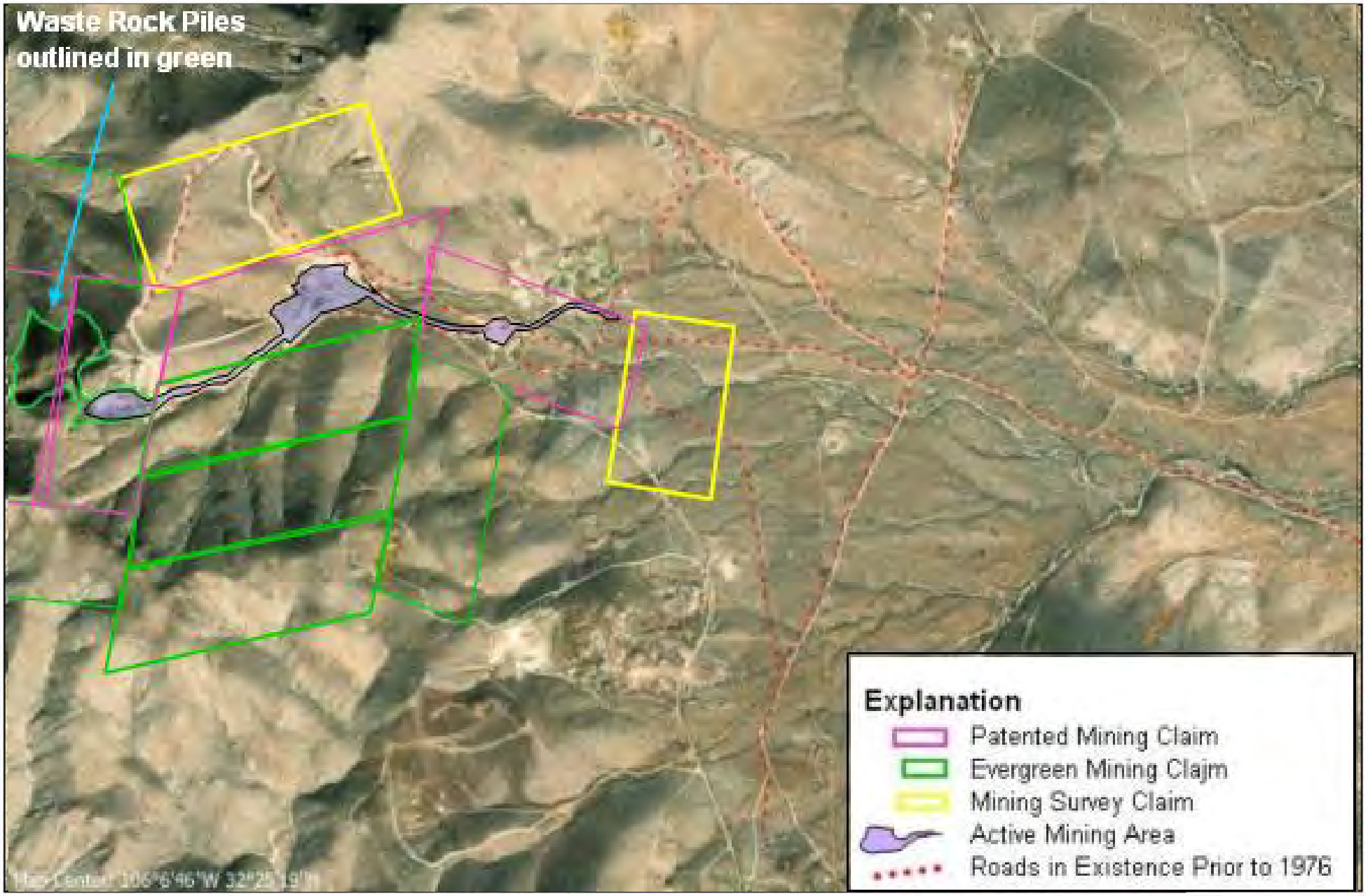
1941 Aerial with Roads (in red)

Iron Duke Mine

Plate 6a

July 2025

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N
W E
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0 500 1,000 Feet

Scale: 1:10,500

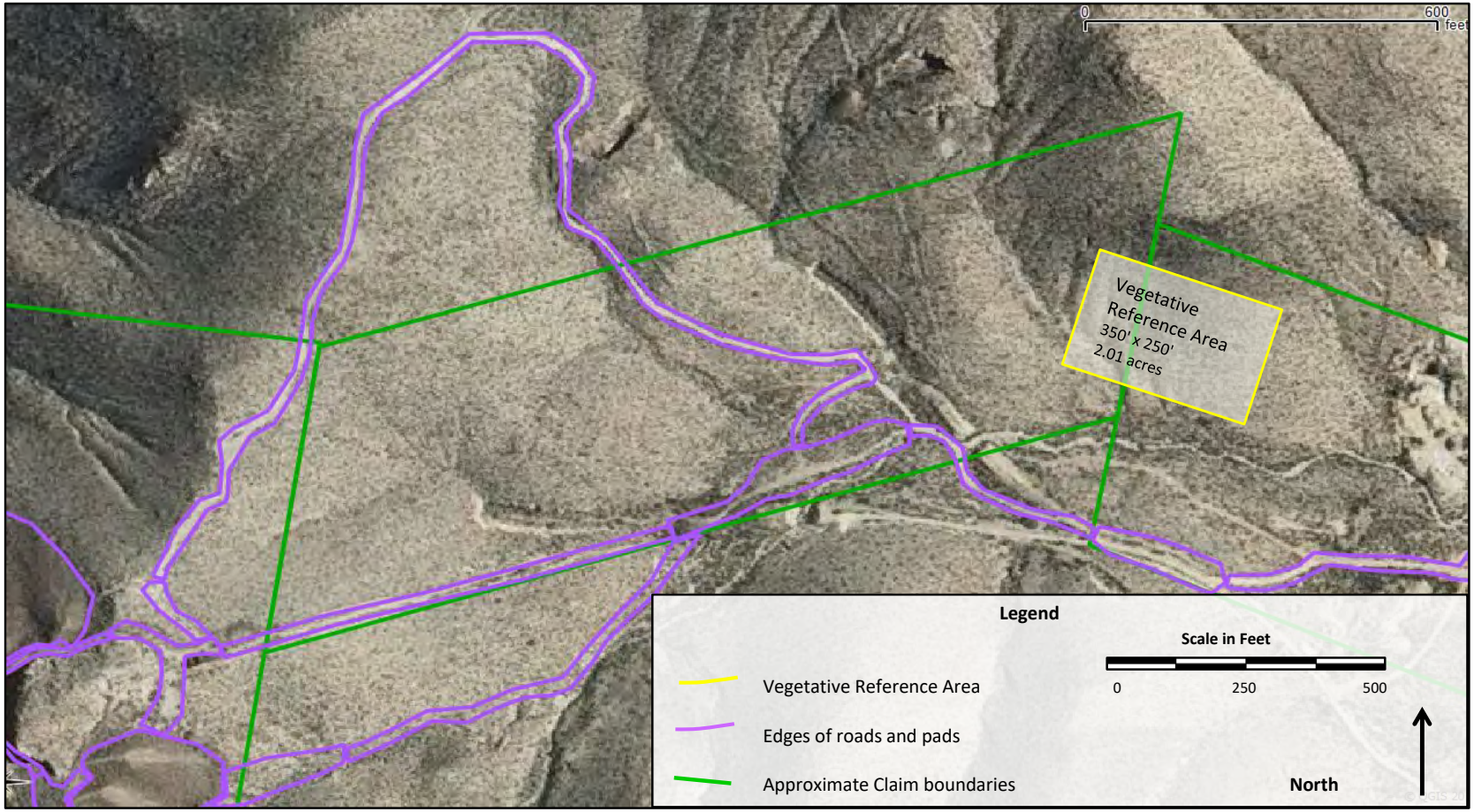
R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

2022 Aerial with 1941 Roads (in red)

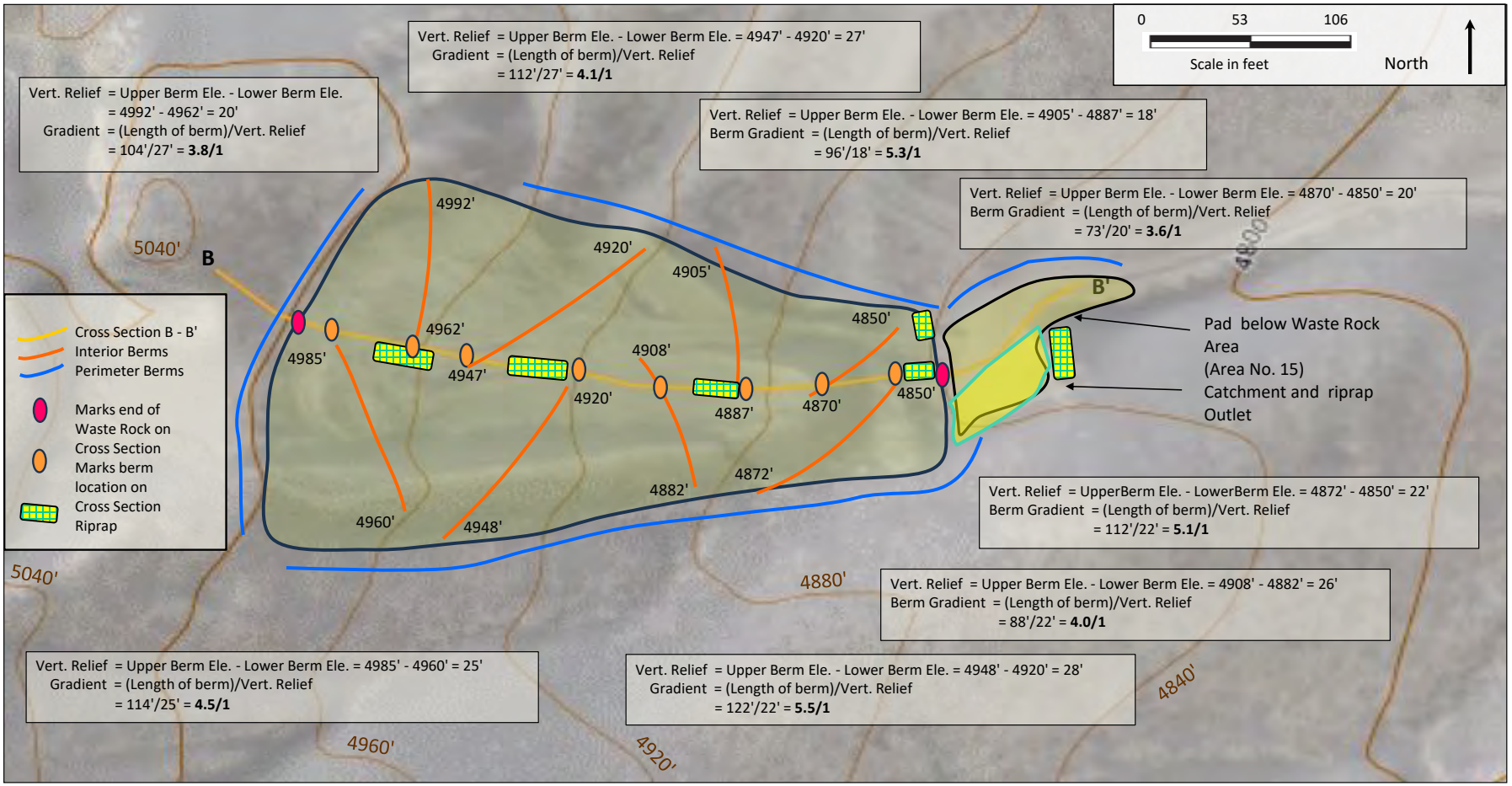
Plate 6b

Iron Duke Mine

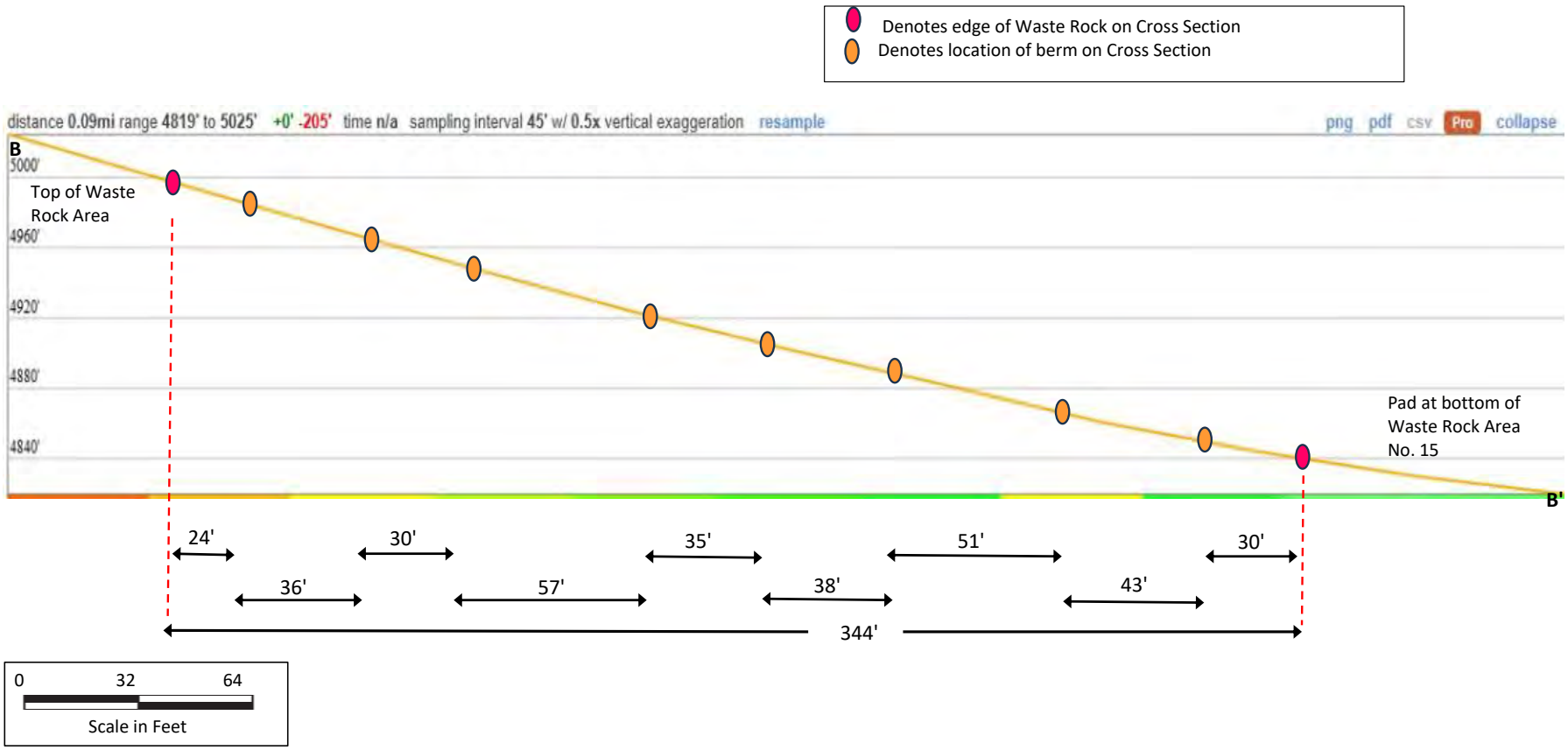
July 2025



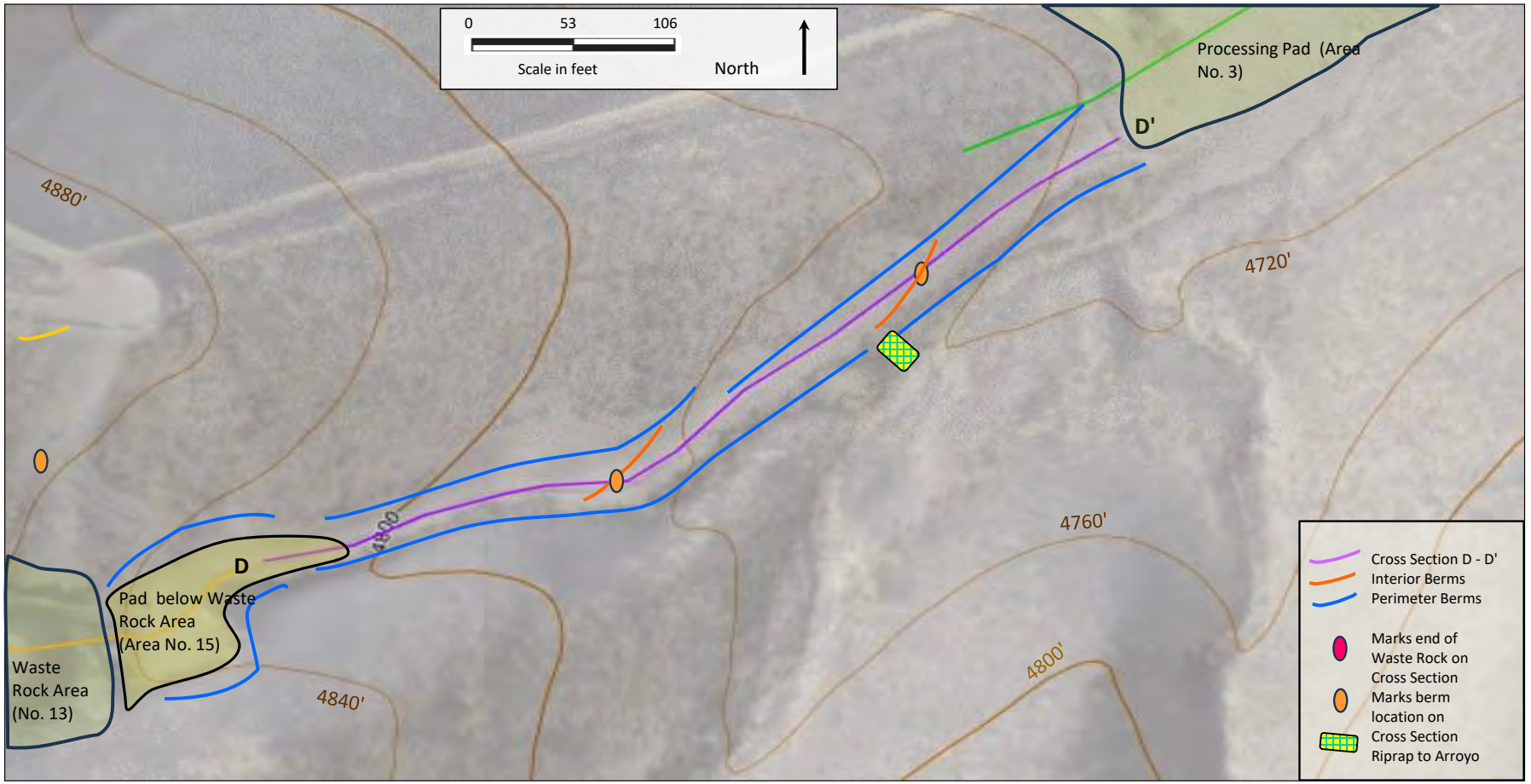
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Vegetative Reference Area in Relation to Mining Areas**	**Plate 7**
	Gulf Coast Mining Claims, LLC	**December, 2025**



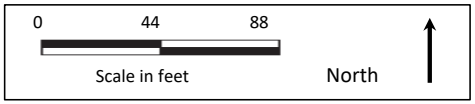
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Schematic Plan of Berming on the Iron Duke Waste Rock Area**	**Plate 8a**
	Gulf Coast Mining Claims, LLC	**February 2026**



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Cross Section with Berm Locations of the Iron Duke Waste Rock Area**	**Plate 8b**
	Gulf Coast Mining Claims, LLC	**February 2026**



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Schematic Plan of Berming on Road Section, Area No. 16**	**Plate 9a**
	Gulf Coast Mining Claims, LLC	**February 2026**





Cross Section D D'
Interior Berms
Perimeter Berms

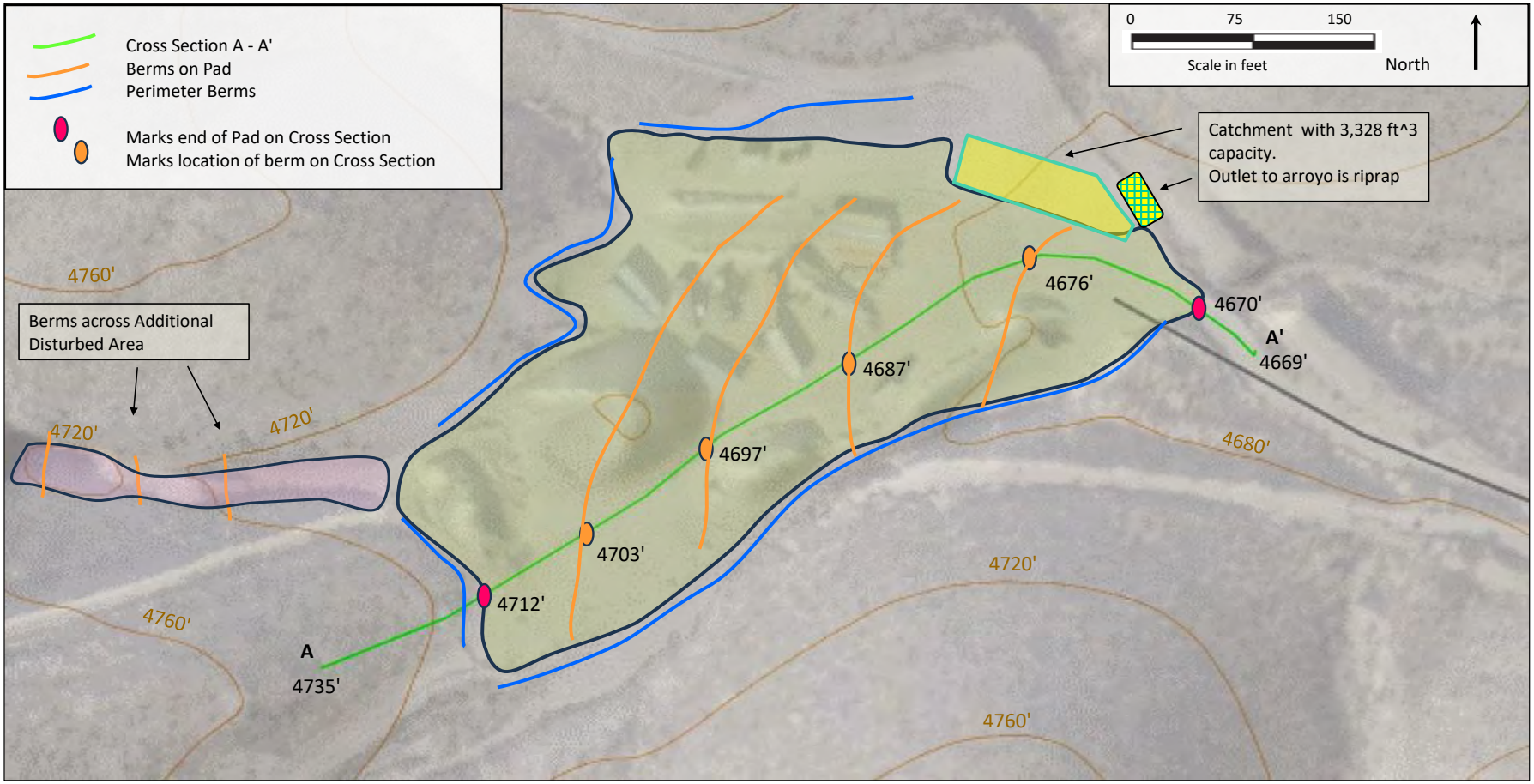
Marks berm location on Cross Section

Marks lower end of Pad, Area No.15

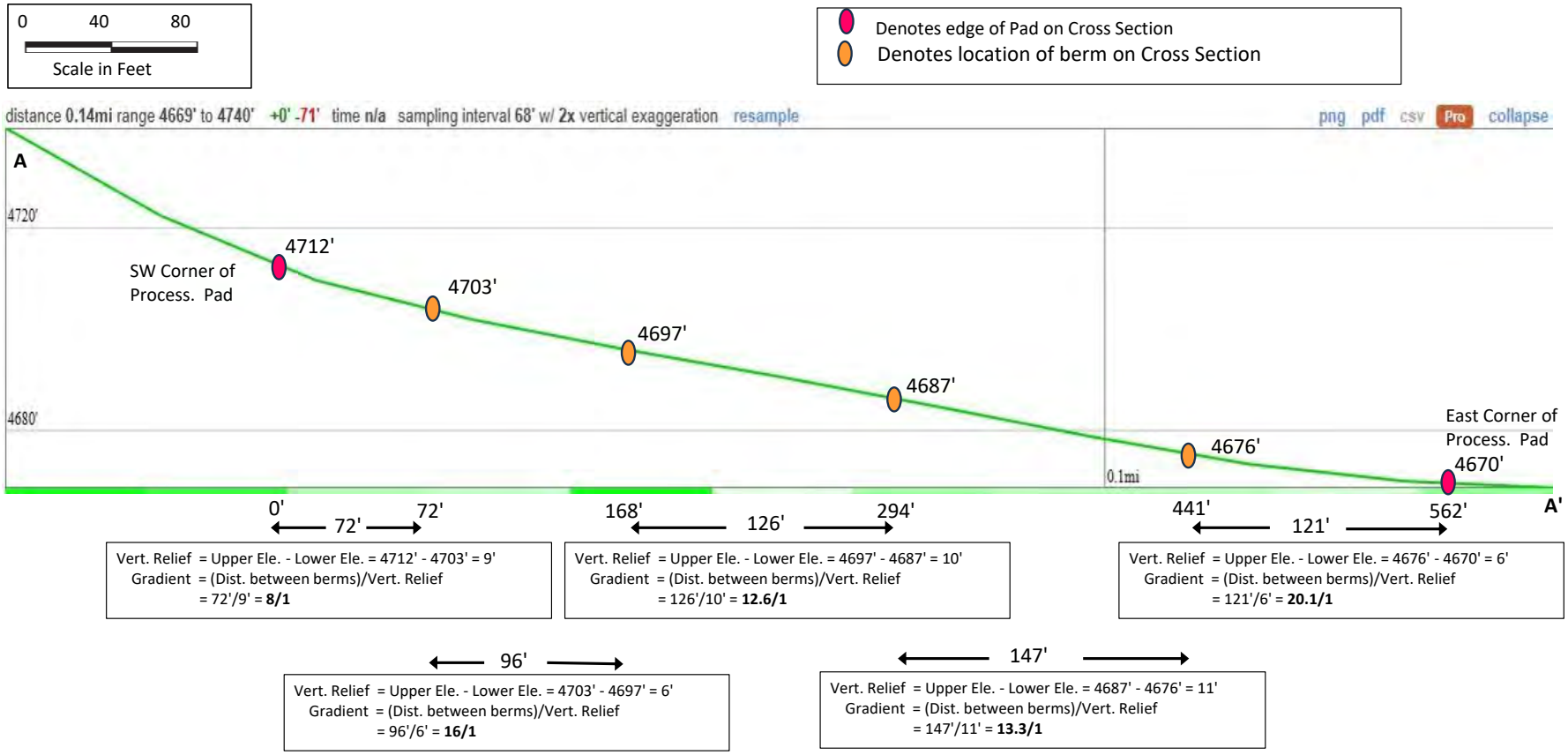
Riprap to Arroyo

Vert. Relief = Upper Ele. - Lower Ele. = 4812' - 4716' = 96'
Road Gradient = (Length of road)/Vert. Relief
= 633'/96' = **6.5/1**

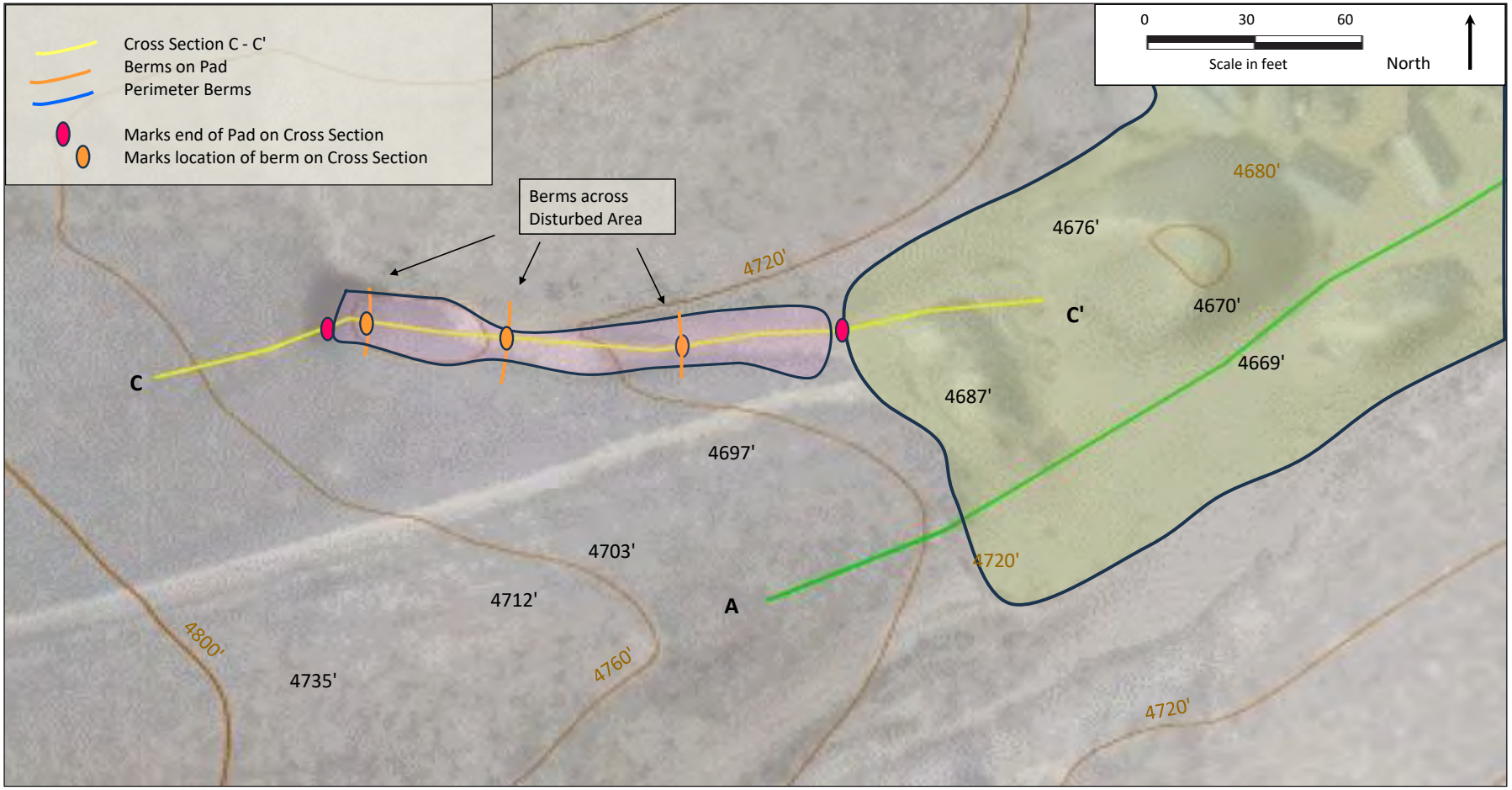
R.T. Hicks Consultants, Ltd **901 Rio Grande Blvd NW, Suite F-142** **Albuquerque, NM 87104** **505-266-5004**	**Cross Section of Road Section No.16, Iron Duke Project**	**Plate9b**
	Gulf Coast Mining Claims, LLC	**February 2026**



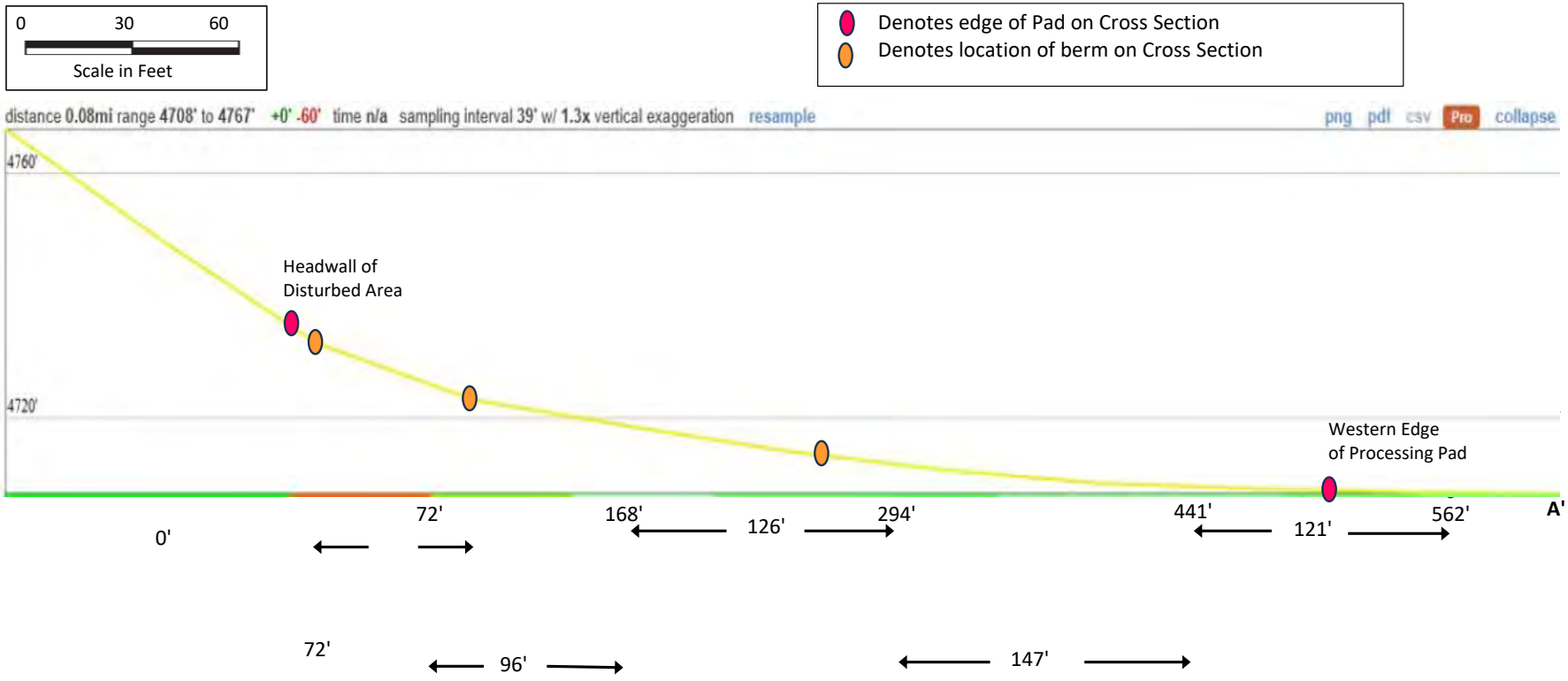
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Schematic Plan of Berming on the Processing Pad, Iron Duke Project**	**Plate 10a**
	Gulf Coast Mining Claims, LLC	**February 2026**



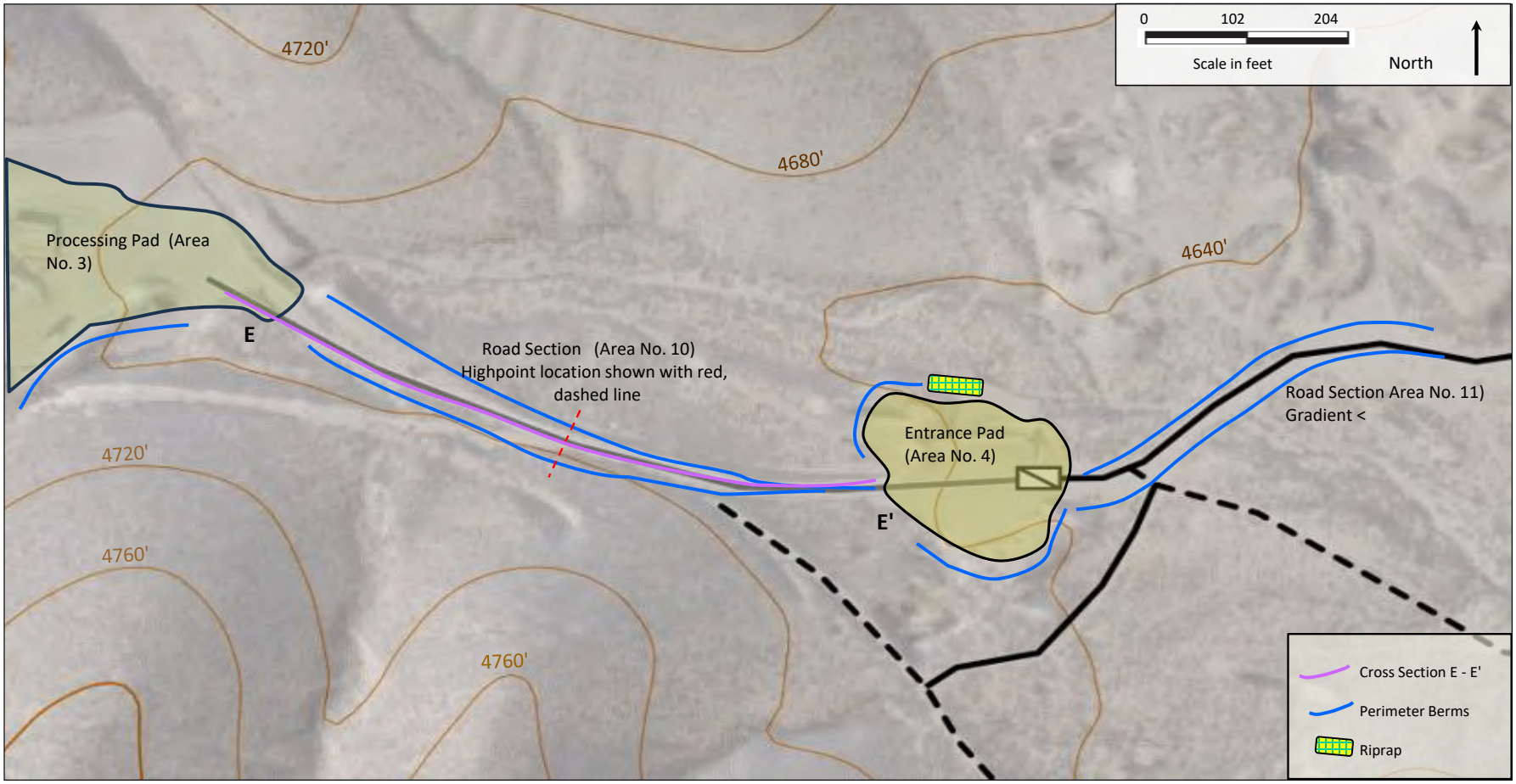
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Cross Section and Berm Locations on Processing Pad. Iron Duke Project**	**Plate 10b**
	Gulf Coast Mining Claims, LLC	**February 2026**



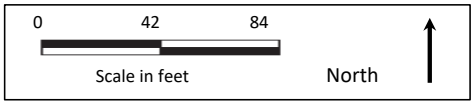
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Schematic Plan of Berming on Disturbed Area West of Processing Pad, Iron Duke Project**	**Plate 10c**
	Gulf Coast Mining Claims, LLC	**February 2026**

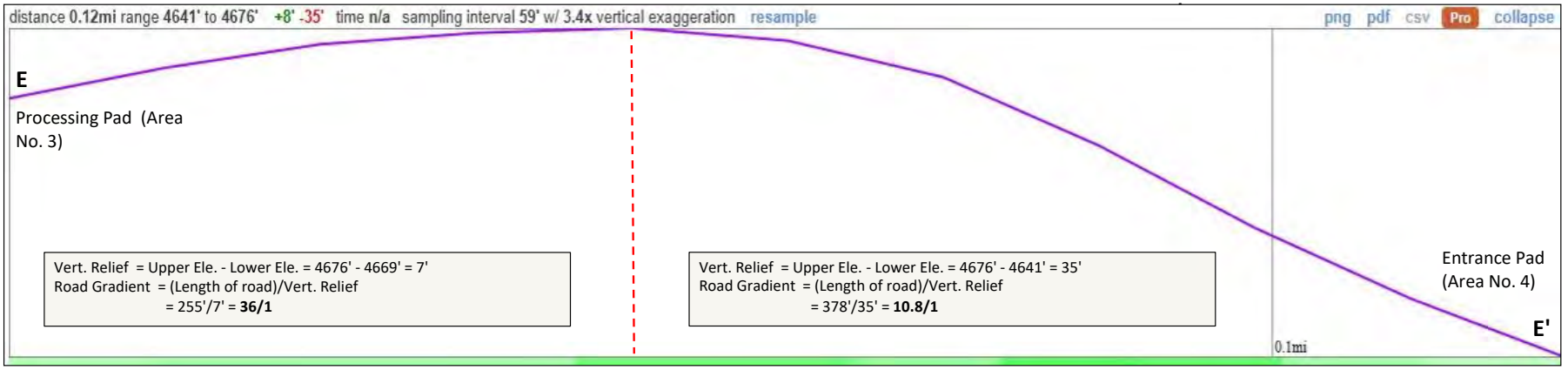


R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Cross Section and Berm Locations on Processing Pad. Iron Duke Project**	**Plate 10d**
	Gulf Coast Mining Claims, LLC	**February 2026**



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Schematic Plan of Berming on Road Section, Area No. 16**	**Plate 11a**
	Gulf Coast Mining Claims, LLC	**February 2026**





Cross Section E-E'

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW, Suite F-142 Albuquerque, NM 87104 505-266-5004	**Cross Section of Road Section No.10, Iron Duke Project**	**Plate 11b**
	Gulf Coast Mining Claims, LLC	**February 2026**

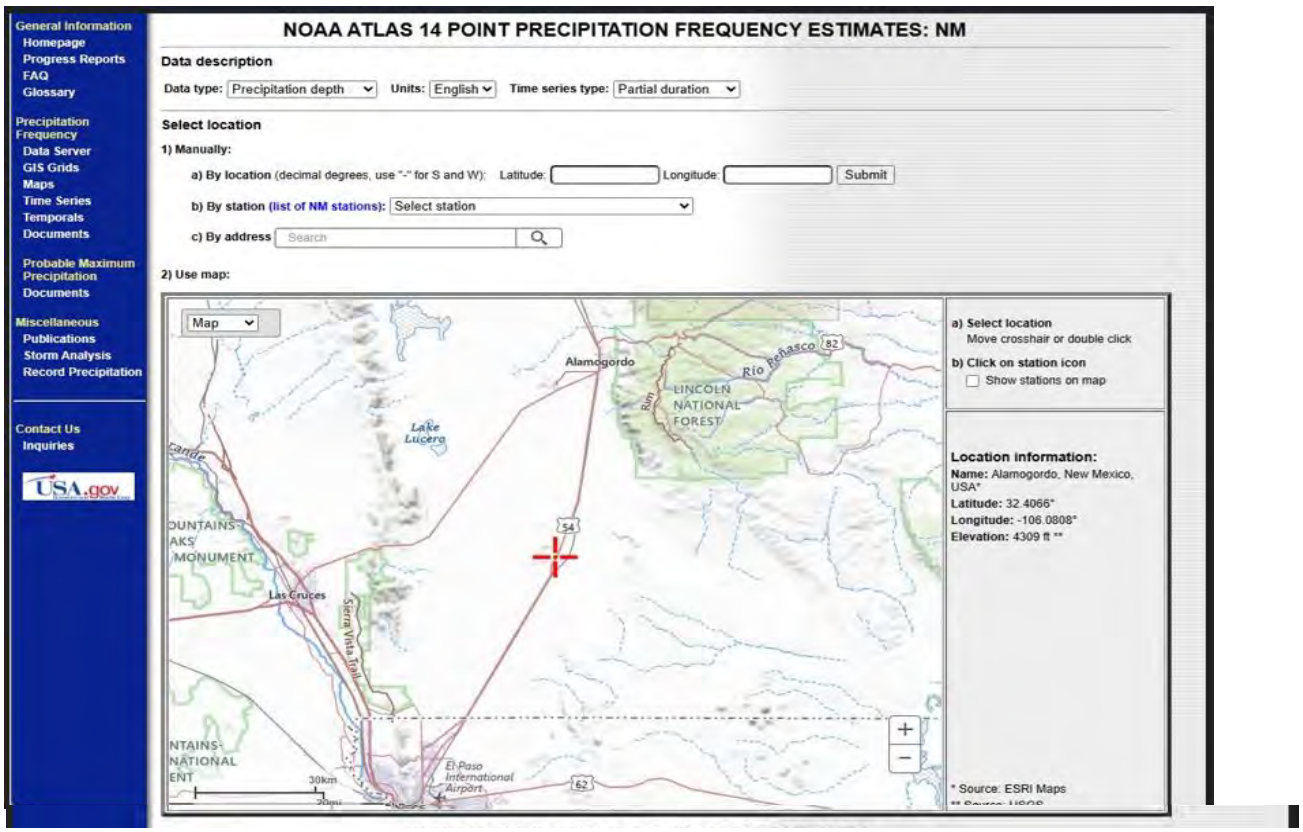
Appendix Miscellaneous

1946 Aerial Photograph

Weather Data for Alamogordo NM

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104


26
25
24
23
OROGRANDE
32°22'30"N 3.16 47
32°22'30"N


General Information
Homepage
Progress Reports
FAQ
Glossary
Precipitation Frequency
Data Server
GIS Grids
Maps
Time Series
Temporals
Documents
Probable Maximum Precipitation
Documents
Miscellaneous
Publications
Storm Analysis
Record Precipitation
Contact Us
Inquiries
USA.gov
NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: NM
Data description
Data type: Precipitation depth
Units: English
Time series type: Partial duration
Select location
1) Manually:
a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit
b) By station (list of NM stations): Select station
c) By address Search
2) Use map:
Map
Alamogordo
Lake Lucero
LINCOLN NATIONAL FOREST
Las Cruces
Sierra Vista Trail
El Paso International Airport
54
82
62
30km
a) Select location
Move crosshair or double click
b) Click on station icon
Show stations on map
Location information:
Name: Alamogordo, New Mexico, USA*
Latitude: 32.4066°
Longitude: -106.0808°
Elevation: 4309 ft **
* Source: ESRI Maps

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 1, Version 5

PF tabular | PF graphical | Supplementary information

Print page

PDS-based 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	0.229 (0.202-0.261)	0.296 (0.263-0.337)	0.401 (0.354-0.455)	0.480 (0.423-0.546)	0.586 (0.513-0.667)	0.672 (0.586-0.766)	0.762 (0.660-0.865)	0.855 (0.737-0.974)	0.984 (0.835-1.12)	1.09 (0.918-1.24)
10-min	0.349 (0.307-0.397)	0.451 (0.400-0.513)	0.610 (0.539-0.693)	0.730 (0.643-0.832)	0.892 (0.781-1.02)	1.02 (0.892-1.17)	1.16 (1.00-1.32)	1.30 (1.12-1.48)	1.50 (1.27-1.70)	1.66 (1.40-1.89)
15-min	0.433 (0.381-0.492)	0.559 (0.496-0.636)	0.756 (0.668-0.859)	0.905 (0.797-1.03)	1.11 (0.968-1.26)	1.27 (1.11-1.45)	1.44 (1.24-1.63)	1.61 (1.39-1.84)	1.86 (1.58-2.11)	2.05 (1.73-2.34)
30-min	0.583 (0.513-0.663)	0.753 (0.668-0.856)	1.02 (0.900-1.16)	1.22 (1.07-1.39)	1.49 (1.30-1.70)	1.71 (1.49-1.95)	1.94 (1.68-2.20)	2.17 (1.87-2.48)	2.50 (2.12-2.84)	2.76 (2.33-3.16)
60-min	0.721 (0.635-0.820)	0.932 (0.827-1.06)	1.26 (1.11-1.43)	1.51 (1.33-1.72)	1.84 (1.61-2.10)	2.11 (1.84-2.41)	2.40 (2.08-2.72)	2.69 (2.32-3.06)	3.10 (2.63-3.52)	3.42 (2.89-3.90)
2-hr	0.843 (0.744-0.960)	1.10 (0.973-1.25)	1.48 (1.31-1.69)	1.78 (1.56-2.02)	2.18 (1.90-2.47)	2.49 (2.15-2.82)	2.82 (2.42-3.18)	3.16 (2.68-3.57)	3.62 (3.04-4.09)	3.98 (3.31-4.50)
3-hr	0.907 (0.807-1.03)	1.17 (1.04-1.33)	1.56 (1.38-1.77)	1.86 (1.64-2.10)	2.27 (1.99-2.56)	2.59 (2.25-2.92)	2.92 (2.52-3.29)	3.27 (2.80-3.68)	3.74 (3.16-4.22)	4.11 (3.43-4.63)
6-hr	1.04 (0.932-1.17)	1.33 (1.19-1.50)	1.74 (1.55-1.97)	2.05 (1.82-2.31)	2.48 (2.18-2.77)	2.81 (2.46-3.14)	3.14 (2.73-3.51)	3.48 (2.99-3.90)	3.93 (3.35-4.42)	4.29 (3.63-4.81)
12-hr	1.14 (1.02-1.27)	1.46 (1.30-1.63)	1.89 (1.68-2.10)	2.22 (1.97-2.47)	2.64 (2.34-2.94)	2.97 (2.62-3.30)	3.30 (2.89-3.67)	3.63 (3.16-4.03)	4.07 (3.50-4.52)	4.40 (3.77-4.91)
24-hr	1.30 (1.16-1.46)	1.65 (1.47-1.86)	2.11 (1.87-2.38)	2.47 (2.18-2.78)	2.93 (2.58-3.32)	3.29 (2.88-3.74)	3.65 (3.18-4.18)	4.02 (3.47-4.62)	4.50 (3.85-5.23)	4.87 (4.13-5.72)
2-day	1.38 (1.23-1.54)	1.74 (1.56-1.96)	2.23 (1.99-2.50)	2.61 (2.32-2.93)	3.13 (2.76-3.52)	3.53 (3.09-3.99)	3.94 (3.42-4.48)	4.36 (3.74-4.99)	4.92 (4.16-5.69)	5.36 (4.48-6.27)
3-day	1.47 (1.32-1.64)	1.86 (1.68-2.08)	2.39 (2.14-2.67)	2.80 (2.50-3.12)	3.34 (2.97-3.74)	3.76 (3.31-4.22)	4.19 (3.66-4.73)	4.62 (3.99-5.25)	5.20 (4.43-5.97)	5.66 (4.77-6.55)
4-day	1.57 (1.41-1.74)	1.98 (1.79-2.20)	2.55 (2.30-2.83)	2.98 (2.67-3.31)	3.56 (3.17-3.96)	4.00 (3.54-4.46)	4.44 (3.89-4.98)	4.89 (4.25-5.52)	5.48 (4.70-6.25)	5.95 (5.06-6.84)
7-day	1.81 (1.64-2.00)	2.30 (2.08-2.54)	2.96 (2.67-3.28)	3.47 (3.12-3.84)	4.16 (3.72-4.61)	4.70 (4.18-5.22)	5.26 (4.64-5.87)	5.82 (5.08-6.53)	6.58 (5.66-7.47)	7.17 (6.09-8.21)
10-day	1.98 (1.78-2.22)	2.53 (2.27-2.81)	3.27 (2.94-3.64)	3.86 (3.45-4.29)	4.65 (4.12-5.18)	5.26 (4.62-5.90)	5.90 (5.14-6.64)	6.55 (5.66-7.43)	7.43 (6.34-8.48)	8.11 (6.84-9.36)
20-day	2.49 (2.25-2.75)	3.16 (2.87-3.50)	4.08 (3.69-4.51)	4.76 (4.29-5.26)	5.67 (5.09-6.28)	6.35 (5.67-7.05)	7.05 (6.26-7.85)	7.74 (6.83-8.65)	8.65 (7.54-9.77)	9.34 (8.07-10.6)
30-day	2.90 (2.63-3.20)	3.70 (3.36-4.06)	4.72 (4.28-5.18)	5.48 (4.97-6.01)	6.47 (5.84-7.10)	7.20 (6.47-7.92)	7.92 (7.07-8.77)	8.63 (7.65-9.63)	9.56 (8.38-10.8)	10.2 (8.90-11.6)
45-day	3.50 (3.18-3.84)	4.44 (4.05-4.88)	5.62 (5.12-6.18)	6.47 (5.88-7.10)	7.55 (6.84-8.31)	8.35 (7.53-9.19)	9.12 (8.20-10.1)	9.85 (8.80-10.9)	10.8 (9.56-12.1)	11.5 (10.1-12.9)
60-day	4.00 (3.66-4.38)	5.08 (4.65-5.54)	6.42 (5.87-7.02)	7.37 (6.73-8.05)	8.56 (7.79-9.35)	9.42 (8.54-10.3)	10.2 (9.26-11.2)	11.0 (9.91-12.1)	12.0 (10.7-13.3)	12.7 (11.2-14.1)

[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.

Estimates from the table in CSV format: Precipitation frequency estimates | Submit

Note: Temporary disruptions may occur Wednesdays from 4-7 pm ET during routine maintenance.

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Revised RECLAMATION PLAN
Iron Duke Mine, Permit No. OT006MN.

Calculated Estimate of Runoff at the Site

Additional Runoff Created by the Mining Activities
Areas used in the mining activities contribute additional runoff to the watershed as compared to the pre-mining landscape. This pre-mining landscape is the standard to which runoff control is compared.

As can be seen on Plate 5, the primary drainage of the canyon containing the Iron Duke Mine flows northeastwards from the southwestern corner of the drainage divide. At about 0.31 miles northeast of its origin, it is joined by the drainage carrying the additional runoff from the Iron Duke Mine Area s (Nos. 13, 15, 16, 21, 22). As it continues downwards for the next 0.16 miles, it receives flows from the eastern end of Road Section No. 16 and from the southern side of the Processing Pad (No.3). See Figure 1.

Just east of the Processing Pad, the arroyo is joined by drainages from the west that contain all other areas of the Iron Duke Mine that are east of the drainage divide. The arroyo flows east for another 0.17 miles and is north of the Iron Duke exit roads. At this point, Road Section No.11 crosses the arroyo and stays north of the arroyo.

The additional runoff from the activities can be calculated by subtracting the pre-mining runoff from the runoff from the affected landscape to determine the additional runoff volume.

To calculate runoff for such an event, we employed the Rational Method in which:

$$Q = I * C * A$$

with : Q = discharge in cubic feet per second [cfs]
I = rainfall intensity [in/hr]
C = composite runoff coefficient. It is the proportion of water that runs off the site out of the total precipitation event. The number is between 0 and 1 [unitless]
A = watershed area in acres [ac]. It is measured in the horizontal plane.

As a side note, an examination of the units in the equation shows an inaccuracy. For an equation to be true, the units on both sides of an equation must be the same. Consider the right-hand side (RHS) of the Rational Method equation. The units are: in/hr * [vol of water/vol of water] * acres. Initially, this does not appear to be ft^3/sec.

Multiplying the RHS by the following factors gives:

RHS = I (in/hour) * 1/12 (foot/in) * 1/3600 (hour/sec) * A (ac) * 43560 (ft^2/ac)
= I * 1/(12 *3600) (foot/sec) * A *43560 (ft^2)
= I *A * (43560/43200) (ft^3/sec)
= I * A * 1.0083 (ft^3/sec)

The small factor of 1.0083 is commonly ignored.

Weather Data for the Site

We obtained weather data from NOAA for Alamogordo, NM, about 31 miles north of the site. It is the closest location to the Iron Duke Project for which this data exists. Average rainfall for Alamogordo is about 9 inches. The weather data is in Appendix Miscellaneous.

The 24-hour duration rainfall event with a recurrence time of 100-years is 3.65 inches (90% confidence interval). The inches/hour rate is given by:

I = 3.65 inches/24 hours
= 0.152 inches/hour

Runoff Coefficients

The runoff coefficient, C, is the sum of four terms: Cs, Ci, Cv, and Cs: i.e.

C = Cs + Ci + Cv + Cr

(See Thomasson, 2019)

A larger C value is a measure of more water running off a landscape. For rural watersheds they are considered to have these properties:

Cs – surface storage is a measure of depressions holding water on the surface. This coefficient is small in floodplains (0.04 – 0.06) and large (0.10-0.12) in areas with negligible surface depressions, shallow drainages, and no marshes.

Ci - soil infiltration corresponds to the soils ability to accept infiltration. This coefficient is small (0.04 - 0.06) in soils such as deep sands or other soils that accept water readily with a high porosity and large (0.10-0.12) in areas of either no soil cover or minimal soil cover.

Cv – varies with vegetal cover of the watershed. It is small (0.04-0.06) in areas with 90% grass cover or an equivalent woodland and is large (0.12 – 0.16) in areas with no effective plant cover or bare to very sparse cover.

Cr – accounts for the relief of the area. It is small (0.08 – 0.14) for relatively flat land with slopes of 0 - 5% and is large (0.28 – 0.35) for rugged terrain with slopes greater than 30%.

Note that C, the sum of the four runoff coefficients for rural watersheds, ranges from a minimum of 0.20 to 0.79. To provide an additional scale, a C = 0.0 would correspond to a rain event over the ocean while a C = 1.0 corresponds to a rain event upon a completely impervious surface (with no pores of any size or bonding of water molecules). A complete description of the coefficients is available in the reference.

To simulate the terrain prior to the mining activities, we have set the runoff coefficients as:

Cs – we used a low value for surface storage, 0.09, corresponding to a well-defined system of small drainages with no ponds or marshes.

Ci – the soil infiltration coefficient is taken as 0.12, a large value due to the thinness of the soil on the steeper slopes. For the shallower slopes with a much greater depth of sandy alluvium, we assigned 0.08.

Cv – due to the sparse vegetal cover, we assigned a large value to Cv of 0.12 as less than

20% of the area has good cover.

Cr – This was taken as 0.35 for the steepest areas (> 30% slope) and as 0.25 for the Intermediate slopes (10%-30%). Cr = 0.16 was used for the remaining areas (slopes between 5-10%).

To simulate the terrain during the current mining activities, we have altered the runoff coefficients as described below

Cs – surface storage is left at 0.09 as the activities are not creating depressions.

Ci – the soil infiltration coefficients have been left as explained for pre-mining time.

Cv – we increased the coefficient to 0.16 corresponding to no vegetal cover.

Cr – These values were not altered as the activities at the site are not changing the slope angle in any large way.

The calculation of the runoff coefficients are shown in Table 1, below.

Slopes of Mining Areas

For removal of the waste rock from the Iron Duke Waste Rock Area, the following areas are active: (They are shown on Plate 4)

- The easternmost and lowest pad has the entrance gate and a parking area (No. 4). The pad has an area of 0.42 acres with a relief of about 10 feet from the southwest to the northeast, a 5.2% slope.
- About 850 feet northwest of this pad is the Processing Pad (No. 3). It is used for processing, stockpiling, and loading. Its area is 2.65 acres with about 40 feet of relief from the west-southwest to the east-northeast. The slope averages about 7.75%.
- About 700 feet southwest of the Processing Pad is the No. 15 Pad at the base of the Iron Duke Waste Rock Pile. Its area is 0.16 acres. It connects with the No. 16 Road leading to the Processing Pad. Relief is about 158 feet over a length of 344 feet giving a slope of 46%.
- The No. 16 Road connects the No. 15 Pad with the Processing Pad (No. 3). It has an area of 0.38 acres. The vertical relief of 96 feet over its 633-foot length results in an average slope of 15%.
- Connecting the Processing Pad to the Entrance Pad is Road Section No.10 with an area of 0.16 acres. It has an intermediate highpoint and slopes of 2.7% to the east and 9.2% to the east
- Connecting the Entrance Pad to the Haul Road outside of the mine area is Road Section No.11 with an area of 0.40 acres. Total relief is about 15 feet over 850 feet as it crosses the arroyo. Average slope is about 3.5% although locally higher for short lengths.

These last two road sections (No.s 10 and 11) are RS 2477 roads. As such, they will be left in place at the completion of the project.

Table 1: *Calculation of Runoff Coefficients Components*

Runoff Coefficients	Pre-Mining Coefficient Values			Current Values		
	Slope %			Slope %		
	>30%	30% - 10%	10% - 5%	>30%	30% - 10%	10% - 5%
Cs	0.09	0.09	0.09	0.09	0.09	0.09
Ci	0.12	0.12	0.08	0.12	0.12	0.08
Cv	0.12	0.12	0.12	0.16	0.16	0.16
Cr	0.35	0.25	0.15	0.35	0.25	0.15
C= Cs+Ci+Cv+Cr	0.68	0.58	0.44	0.72	0.62	0.48

Areas 13, 15, 16	0.68			0.72		
Area 3		0.58			0.62	
Areas 4, 10, 11			0.44			0.48

Calculated Runoff and Additional Runoff Created by the Mining Activities

To calculate runoff from the areas prior to mining activities, the appropriate runoff coefficients were used along with the areas and the rainfall event to calculate each area's runoff. We also include the result as feet^3/hour. The same calculation was made using the coefficients relevant to the current situation at the site.

Table 2*: Calculation of runoff prior to mining and at the current time***.**

Pre Mining	C	A	I	Runoff	
	[-]	[acres]	[in/hour]	[ft^3/sec]	ft^3/hour
Area 3	0.58	2.65	0.152	0.234	841.0
Area 4	0.44	0.42		0.028	101.1
Area 10	0.44	0.16		0.011	38.5
Area 11	0.44	0.4		0.027	96.3
Area 13	0.68	0.9		0.093	334.9
Area 15	0.68	0.28		0.029	104.2
Area 16	0.68	0.38		0.039	141.4

Current	C	A	I	Runoff	
	[-]	[acres]	[in/hour]	[ft^3/sec]	ft^3/hour
Area 3	0.62	2.65	0.152	0.250	899.0
Area 4	0.48	0.42		0.031	110.3
Area 10	0.48	0.16		0.012	42.0
Area 11	0.48	0.4		0.029	105.1
Area 13	0.72	0.9		0.098	354.6
Area 15	0.72	0.28		0.031	110.3
Area 16	0.72	0.38		0.042	149.7

As can be seen, the largest runoffs are from the largest areas. To identify the difference between the pre-mining runoff quantities and now, we subtract the former from the latter.

Table 3: *Additional runoff due to mining activities*

Runoff Difference due to Mining Activities	Current Runoff	Pre-Mining Runoff	Change due to Activities
	ft^3/hour		
Area 3	899.0	841.0	58.0
Area 4	110.3	101.1	9.2
Area 10	42.0	38.5	3.5
Area 11	105.1	96.3	8.8
Area 13	354.6	334.9	19.7
Area 15	110.3	104.2	6.1
Area 16	149.7	141.4	8.3

The largest source of additional runoff compared to runoff from the pre-mining surface is the Processing Pad. The runoff calculation predicts an additional 58 ft^3/hour or (58.3 ft^3/hour *24 hours =) 1399.2 ft^3/24-hour event. This volume accounts for more than half of the additional runoff as the sum of additional runoff from all of the areas is about 113 ft^3/hour.

Catchment Depressions to Control Runoff

Processing Pad (Area No. 3)
To control runoff on the Processing Pad, we propose increasing the catchment on the eastern side of the Processing Pad to a volume of (899 Ft^3 * 24 hours* 0.15 =) 3,236 ft^3. This will intercept 15% of the runoff from a 24-hour precipitation event with a recurrence interval of 100 years. This volume is several times the additional runoff from the Processing Pad because of activities at the site (58 ft^3/hour *24 hours = 1392 ft^3).

The catchment will be constructed with the following properties.

i) The sides and bottom will have a slope of 3:1 and will be covered with riprap (A basin 105 feet long by 30 feet wide with a depth of 1.5 feet at the upper end and 3.5 feet at the lower end has a capacity of 3328 ft^3).
ii) The outlet to the arroyo (over riprap) is set so that it is one-foot lower than the catchment rim. In this way an amount of water greater than the additional runoff from the mining activities is kept in the catchment during the rainfall event. Because of this, the outflow to the arroyo during the precipitation event is not greater than that discharged to the arroyo prior to the mining development.

Iron Duke Waste Rock Area and Lower Iron Duke Pad Areas (No.13 and 15)
To control runoff from the Waste Rock Area, we propose placing a catchment on the Lower Iron Duke Pad (Area No. 15) at the east end of the Waste Rock Area. It will be sized to intercept 15% of

the runoff volumes of both the Waste Rock Area (354 ft^3 * 24 hours* 0.15 =) 1,274 ft^3 and the Lower Iron Duke Pad (110 ft^3 * 24 hours* 0.15 =) 397 ft^3. The combined volume is 1,671 ft^3. As before, the catchment intercepts several times the additional runoff from both areas due to the mining activities.

In a similar way, the catchment will be constructed with the following properties.

i) The sides and bottom will have a slope of 3:1 and will be covered with riprap (A basin 65 feet long by 26 feet wide with a depth of 1.5 feet at the upper end and 3.5 feet at the lower end has a capacity of 1709 ft^3).
ii) The outlet to the arroyo (over riprap) is set so that it is one-foot lower than the catchment rim. In this way an amount of water greater than the additional runoff from the mining activities is kept in the catchment during the rainfall event. Because of this, the outflow to the arroyo during the precipitation event is not greater than that discharged to the arroyo prior to mining development.

The catchment contains several times more than the additional runoff (19.7 ft^3/hour * 24 hours + 6.1 ft^3 * 24 hours=) 619.9 ft^3) generated by the changes in runoff characteristics from the mining activities.

Entrance Pad (Area No. 4)
Runoff from the precipitation event on the Entrance Pad is 110 ft^3/hour, about two ft^3/min. To control this, we propose berming to move the water to a section of riprap leading into the arroyo. The additional runoff due to the site activities is 9.2 ft^3/hour, about a gallon/minute.

Road Segments (Area No.s 10, 11, 15)
Runoffs from the road segments are all less than that from the entrance pad. Berms will be placed to control the runoff with riprap placed where the runoff can be directed into the natural drainage channels.

Disturbed Area East of Processing Pad
Runoff on the disturbed area east of the Processing Pad will be controlled with berms laterally crossing the feature.

Reference

Thomasson, C. P.E., (Revised September 2019), Hydraulic Design Manual, Chapter 4: Hydrology, Section 12, Rational Method, Runoff Coefficients, 4-54. Texas Department of Transportation Manual System