USDA Forest Service
Tonto National Forest
Arizona

August 6, 2018

Process Memorandum to File

Scenic Resources Analysis: Assumptions; Methodology Used; Relevant Regulations, Laws, and Guidance; and Key Documents

This document is deliberative and is prepared by the third-party contractor in compliance with the National Environmental Policy Act and other laws, regulations, and policies to document ongoing process and analysis steps. This document does not take the place of any Line Officer's decision space related to this project.

Prepared by:
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SWCA Environmental Consultants

Revision History

Date	Personnel	Revisions Made
08/06/2018	Emily Newell	Process memorandum created.
10/29/2018	Emily Newell	Revisions to memorandum title, revision history table added, edits to purpose of process memorandum section, references and key documents section added.
11/24/2018	Emily Newell	Information added from technical report.
1/14/2019	Jill Grams	Information added to the technical report.
6/10/2019	Jill Grams	Information added to the technical report.
8/6/2019	Donna Morey	Updated process memorandum to draft environmental impact statement (EIS) section.
6/28/2020	Jill Grams/Chris Bockey	Updated process memo and draft EIS (DEIS) following DEIS comment period.
8/13/2020	Jill Grams/Chris Bockey	Updated process memo and DEIS following U.S. Forest Service review of comment response.
12/30/2020	Chris Garrett	Final update for consistency prior to final EIS release.
2/4/2025	Chris Garrett	Updated to include Scenery Management System/scenic integrity objectives due to implementation of 2023 "Tonto National Forest Land Management Plan."

Purpose of Process Memorandum

In order to provide a concise and accessible summary of resource impacts, certain detailed information has not been included directly in the environmental impact statement (EIS). The purpose of this process memorandum is to describe additional supporting resource information in detail. The scenic resources section of chapter 3 of the EIS includes brief summaries of the information contained in this process memorandum. This process memorandum covers the following topics:

- Resource analysis area
- Analysis methodology
    - Viewshed analysis
    - Key observation points (KOPs) and contrast rating analysis
    - Visual simulations
    - Additional detail for scenery resources in the analysis area

- Regulations, laws, and guidance
- Key documents and references cited
- Appendix A: Viewshed analyses for each alternative
- Appendix B: Contrast rating worksheets for each KOP
- Appendix C: Visual simulations
- Appendix D: Additional visual simulations for Skunk Camp
- Appendix E: Visual impact of fog plume at East Plant Site

Detailed Information Supporting Environmental Impact Statement Analysis

Resource Analysis Area

The analysis area is defined by buffers around project components, which vary in size:

- 6 miles – tailings facility alternatives
- 2 miles – slurry pipeline corridors
- 2 miles – East Plant Site and subsidence area
- 2 miles – West Plant Site
- 2 miles – transmission lines
- 1 mile – Magma Arizona Railroad Company corridor
- 1 mile – filter plant and loadout facility

The most expansive buffer is that for the tailings facilities, which will be visible from a larger area than most other project components. The 6-mile visual resource analysis buffer was chosen based on the location of sensitive viewing locations, regional topography, and the potential for viewing the proposed tailings facilities in the regional landscape. Based upon U.S. Forest Service (Forest Service) and Bureau of Land Management (BLM) methodologies, background viewing distance ranges from 4 to 15 miles; using the information listed above and the viewshed analysis, 6 miles was determined to represent potential background views of the proposed tailings facilities from sensitive viewing locations. The 6-mile buffer around the tailings facilities represents the modeled potential visibility within the landscape from sensitive viewpoints identified through review and coordination with agencies as to the locations where people gather, travel, recreate, or live in the vicinity of the proposed project. Although the viewshed analyses (described below) for the tailings facilities illustrate modeled visibility beyond 6 miles, the modeling process is considered bare earth and does not incorporate landscape features such as vegetation and structures on the landscape or atmospheric conditions such as sun angle, haze and shadow, which are influencing factors when considering degree of visibility. Based on observed visibility conditions during the analysis phase, it was determined that views of the casual observer would be influenced by atmospheric conditions and intervening vegetation in relation to viewer distance. At a distance beyond 6 miles it is not anticipated that the tailings facilities would

be discernible to the casual observer and would begin to be absorbed visually into the surrounding landscape as viewing distance increases beyond 6 miles.

Analysis Methodology

Viewshed Analysis

Viewsheds of the proposed action and alternative tailings facilities were developed for the analysis area by modeling the approximate heights of the tailings facilities and determining, based upon landform and elevation, the locations in the surrounding landscape where the facilities could theoretically be visible. The viewshed model is based on elevation and landform and does not account for vegetation, structures, and other landscape elements that could obstruct views. The viewsheds provide an approximation of the facility visibility within the analysis area. The viewshed analyses for each alternative are included in appendix A of this memorandum. The map key illustrates the range of visibility of the tailings facility across the landscape. The model contains 20 "viewpoints" placed on the top elevation of each facility. The range of visibility in the map legends represent how many of these viewpoints would be potentially visible from any given location. The ranges are 1 to 5, 6 to 10, 11 to 15 and 16 to 20, with the higher numbers representing more visible viewpoints at the top of the facility.

Key Observation Points and Contrast Rating Analysis

Portions of the scenic resources impact assessment is based upon the BLM Visual Resource Management (VRM) system, as outlined in BLM Manual 8400, "Visual Resource Management" (Bureau of Land Management 1984, 1986a, 1986b). Specific techniques used to assess visual impacts are described below.

The visual resource contrast rating system, as outlined in BLM Manual 8431, "Visual Resource Contrast Rating" (Bureau of Land Management 1986a), is a project-level planning and analysis tool used for systematically assessing project scenery impacts. The system determines the degree that a proposed project would affect the scenic quality of a landscape based upon the visual contrast created between the proposed project and the existing landscape. Contrast is measured by comparing the proposed project features with the major features in the existing landscape using basic design elements of form, line, color, and texture.

The contrast rating analysis was conducted for 31 KOPs (see figure 3.11-1 in the final EIS [FEIS]) representing sensitive views of the proposed action and alternative tailings facilities from residential areas, travel routes, and recreation areas. The contrast rating worksheets for each KOP are provided in appendix B.

Visual Simulation

Photographs or Google Earth images taken from each KOP that illustrate the current landscape view are provided in appendix C. The KOPs represent a sample of casual observers, including local, sensitive, and transitory observers. The observers differ in their distance from the project area and dominance and duration of view.

To support the contrast rating analysis and disclose potential visibility of the proposed action and alternative tailings facilities, photographic simulations of the theoretical views of the proposed action and alternatives from the KOPs were developed (see appendix C). The simulations are intended to provide a theoretical view of the tailings facilities post reclamation. Most of the simulations were completed using on-site photography. Some simulations were completed using a "block model" process in Google Earth that illustrates the model of the tailings facility within Google Earth imagery.

Simulation color, vegetation, and contrast were completed using representative analog conditions found at similar reclamation areas in the region. Resolution Copper has completed reclamation and revegetation of several legacy tailings facilities at the West Plant Site. These areas were used to present the vegetation density, color, and scale in the visual simulations (figure 1).

Figure 1. Tailings facility reclamation and revegetation at West Plant Site used to inform visual simulation of proposed tailings facilities

Appendix D contains additional simulations that were completed for the FEIS analysis and documentation. Simulations for Skunk Camp, the preferred alternative, were added to illustrate the visualization of the tailings facility and the impact of concurrent reclamation activities over time at 15-, 20-, and 30-year mine-life intervals. Simulations that illustrate the fog plume in the area of the East Plant Site were also added.

Appendix E contains additional analyses, including visual simulations, that were completed for the FEIS to present the potential impacts of fog plumes in the East Plant Site area.

Additional Detail for Scenic Resources in the Analysis Area

Arizona National Scenic Trail Passage Scenery Description

The analysis area contains approximately 55 miles of the Arizona National Scenic Trail (Arizona Trail) in four "passages" described below.

Passage 15 Tortilla Mountains. The Tortilla Mountains passage is approximately 28 miles long with the northern portion falling within the analysis area. Scenery along the trail in the scenic resources analysis area includes views of Ripsey Wash, the Gila River, and a background view of the White Canyon Wilderness.

Passage 16 Gila River Canyons. The Gila River Canyon passage is approximately 26 miles long and extends from the Gila River crossing at Kelvin Bridge to the Tonto National Forest boundary. A majority of this passage presents views of the Gila River riparian habitat with typical Sonoran Desert vegetation, canyons, and rock outcrops on the north end.

Passage 17 Alamo Canyon. The Alamo Canyon trail passage is approximately 12 miles long. Views along this passage, within the analysis area, include Picketpost Mountain along the northern portion of the trail and the Superstition Mountains in the northern background. The scenic passage ends at the Picketpost Trailhead and contains typical Sonoran Desert vegetation. Picketpost Trailhead, located at the southern end of Passage 17, is a popular trailhead and access point for the Arizona Trail. Located approximately 0.5 mile from U.S. Route 60, the developed area contains an information kiosk, restrooms, and parking and allows for Arizona Trail access to the north and south. Views from the heavily used trailhead include the Superstition Mountains to the north and Picketpost Mountain.

Passage 18 Reavis Canyon. The scenic Reavis Canyon trail passage runs from the valley floor at the Picketpost Trailhead to near the top of the Superstition Mountains. Views along this passage are dominated by mountains and high-point features of Picketpost Mountain, Apache Leap Escarpment, Montana Mountain, and the Superstition Mountains. U.S. Route 60, dirt roads, and railroad and pipeline crossings dominate the foreground views at the southern end of the passage near the Picketpost Trailhead. Rogers Canyon Trailhead lies at the northern end of Passage 18 and provides access to the Superstition Wilderness and the northern segment of Passage 18 near Montana Mountain.

Regulations, Laws, and Guidance

Federal

Forest Service Visual Management System

The 1985 "Tonto National Forest Land and Resource Management Plan" used the Visual Resource Management system (U.S. Forest Service 1974) for management of forest scenic resources. As this

represented the version of the Tonto National Forest management plan when the Resolution Copper Project National Environmental Policy Act (NEPA) process started, the EIS originally focused solely on this system, and it remains in the document. The Visual Resource Management system establishes Visual Quality Objectives for the forest and designates an acceptable degree of alteration of the characteristic landscape (table 1). This method measures the degree of alteration in terms of visual contrast with the surrounding landscape generated by introduced changes in form, line, color, and texture.

Table 1. Forest Service Visual Quality Objective Classification Descriptions

Visual Quality Objective Category	Description
Preservation	Allows ecological change only and management activities that are not noticeable to observers. Applies to wilderness areas, primitive areas, other special classified areas.
Retention	Allows management activities that are not evident to the casual forest visitor. Under Retention, activities may only repeat form, line, color, and texture that are frequently in the characteristic landscape. Changes in the qualities of size, amount, intensity, direction, pattern, etc., should not be evident.
Partial Retention	Allows management activities that may be evident to the observer but must remain subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape.
Modification	Allows management activities that may dominate the characteristic landscape but that must, at the same time, use naturally established form, line, color, and texture. Activities that consist predominantly of introduction of facilities such as buildings, signs, roads, etc., should borrow naturally established form, line, color, and texture so completely and at such scale that their visual characteristics are compatible with the natural surroundings.
Maximum Modification	Allows management activities of vegetative and landform alterations that dominate the characteristic landscape. When viewed as foreground or middle ground, they may not appear to borrow completely from naturally established form, line, color, or texture.

Bureau of Land Management Visual Resource Management

The BLM uses the VRM system to manage visual resources on public lands (Bureau of Land Management 1984, 1986a, 1986b). The VRM system provides a framework for managing visual resources on BLM-administered lands. The four VRM class objectives describe the different degrees of modification allowed to the basic elements of the landscape (i.e., line, form, color, and texture) (table 2).

Table 2. Visual Resource Management Class Descriptions

VRM Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and should not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention; however, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the landscape.

Forest Service Scenery Management System

In December 2023, the Tonto National Forest finalized a new land and resource management plan (Forest Service 2023), which manages scenery resources under the more recent Scenery Management System (SMS) with revised management prescriptions for the Tonto National Forest. Based on these changes in management, the EIS has been revised to use the SMS and reflect current management for the Tonto National Forest. The SMS establishes scenic integrity objectives (SIOs) through the forest planning process to identify the future desired conditions of a given landscape area (desired scenic character). This method measures the level of deviation from the desired scenic character and allowed level of dominance (or contrast) with the existing natural landscape's form, line, color, and texture. For consistency with the previous FEIS, management associated with the former VQOs also remains in the document in the description of the affected environment, with a cross-walk to the newer SMS. Details of the SMS categories and the crosswalk with VQOs is shown in tables 3 and 4.

Table 3. Scenery Management System Scenic Integrity Objectives

SIO Category	Description
Very High	The valued landscape character "is" intact with only minute if any deviations. The existing landscape character and sense of place are expressed at the highest possible level.
High	The valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

SIO Category	Description
Moderate	The valued landscape character “appears slightly altered.” Noticeable deviations must remain visually subordinate to the landscape character being viewed. See section below on meeting integrity levels.
Low	The valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complementary to the character within.
Very Low	The valued landscape character “appears heavily altered.” Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.
Unacceptably Low	The valued landscape character being viewed appears extremely altered. Deviations are extremely dominant and borrow little if any form, line, color, texture, pattern or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level should only be used to inventory existing integrity. It must not be used as a management objective.

Table 4. Crosswalk between VQOs and SIOs

VQO Category	SIO C
Preservation	Very High
Retention	High
Partial Retention	Moderate
Modification	Low
Maximum Modification	Very Low
Not applicable	Unacceptably Low

State of Arizona Scenic Road Designation

Arizona Revised Statutes 41-512 through 41-518 provide for the establishment of parkways, historic roads, and scenic roads. The Arizona Department of Transportation implements and administers the law. The “Scenic Road” designation includes a roadway (or segment of a roadway) that offers a memorable visual impression, is free of visual encroachment, and forms a harmonious composite of visual patterns. The analysis area contains the Gila-Pinal Scenic Road and the Copper Corridor Scenic Road West, described in section 3.11.3.2 of the FEIS.

Local Lighting Ordinances

The Pinal County Outdoor Lighting Code and the Gila County Outdoor Light Control Ordinance contain guidelines and lighting requirements for projects that are proposed in the counties.

Key Documents and References Cited for Scenic Resources

The following list is meant to highlight key process or analysis documents available in the project record. It should not be considered a full list of all available documentation considered within this process memorandum or the EIS analysis.

Arizona Department of Transportation. 2018. Scenic Roads. Available at: https://www.azdot.gov/about/historic-roads/scenic-roads/list-of-scenic-roads. Accessed January 2, 2019.

Bureau of Land Management. 1984. *Manual 8400 - Visual Resource Management*. Rel. 8-24. Washington D.C.: Department of the Interior, Bureau of Land Managment. April 5.

——. 1986a. *Manual 8431 - Visual Resource Contrast Rating*. Rel. 8-30. Washington D.C.: Bureau of Land Management. January 17.

——. 1986b. *Manual H-8410-1 - Visual Resource Inventory*. Rel. 8-28. Washington, D.C.: Department of the Interior, Bureau of Land Management. January 17.

Dark Sky Partners LLC. 2018. *Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness: Final Report*. Prepared for Resolution Copper. Tucson, Arizona: Dark Sky Partners LLC. February.

M3 Engineering and Technology Corporation. 2018. *Outdoor Lighting and Pinal County Outdoor Lighting Code*. M3-PN140023.605. Revision 3. Technical Memo. Chandler, Arizona: M3 Engineering. July 23.

Resolution Copper. 2016. *General Plan of Operations Resolution Copper Mining*. Superior, Arizona. May 9.

Tipple, N. 2020. *Visual Impact of Fog Plume*. Response to Data Request #4 VR-1. Technical Memorandum. Denver, Colorado: Air Basics, Inc. June 25.

Truescape. 2019. *Aerial Visual Simulation of Skunk Camp Pipeline in Vicinity of U.S. 60*. Christchurch, New Zealand: Truescape. July 10.

———. 2019. *Alternative TSF KOPs: Block Models - Existing and Proposed*. Christchurch, New Zealand: Truescape. February 19.

———. 2019. *EPS Transmission and Skunk Pipeline Simulations: TrueView Photo Simulations - Existing and Proposed*. Christchurch, New Zealand: Truescape. June 17.

U.S. Forest Service. 1974. *National Forest Landscape Management. Vol. 2, Chapter 1, The Visual Management System*. Agriculture Handbook 462. Washington, DC: U.S. Forest Service. April.

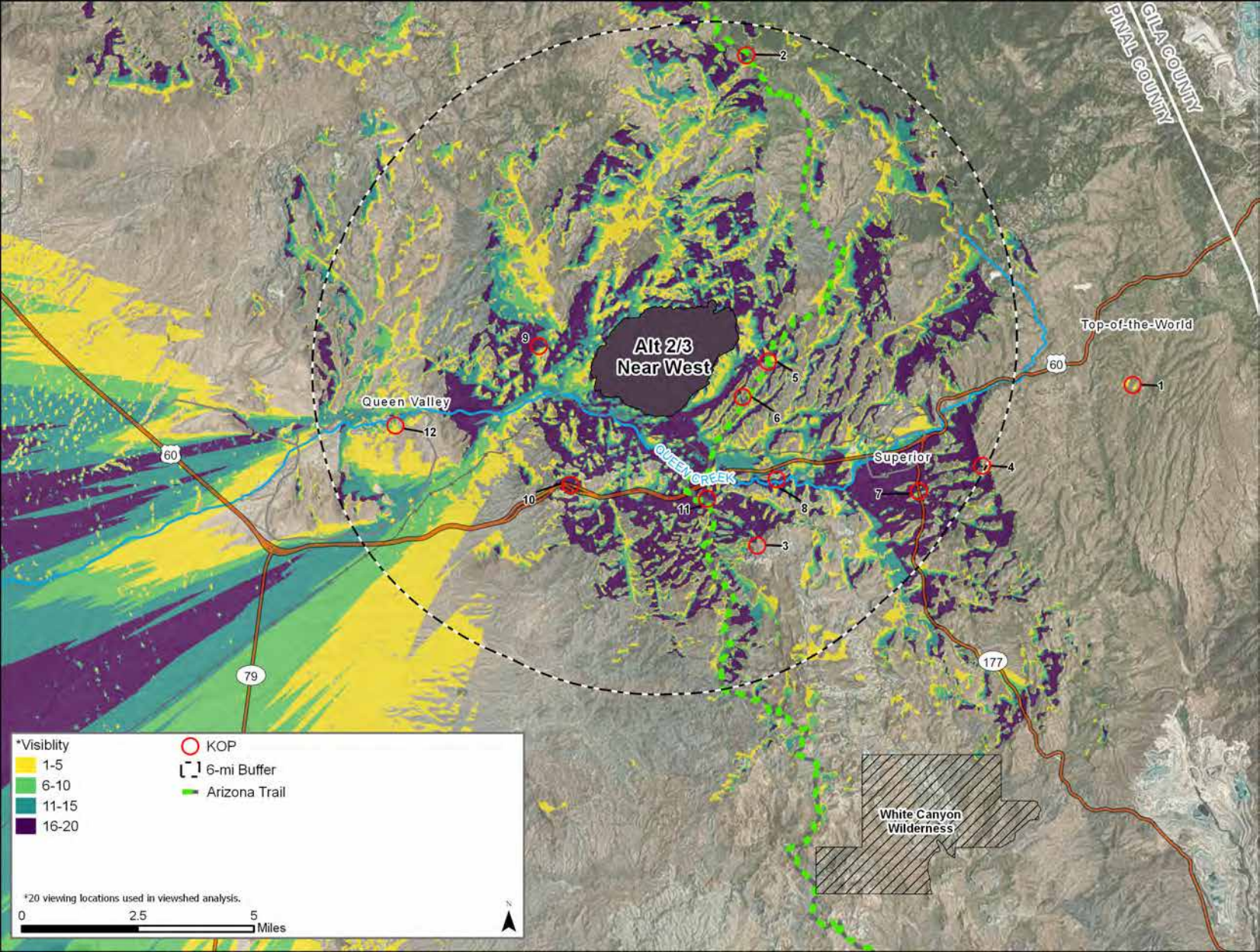
———. 1985. Tonto National Forest Land and Resource Management Plan. U.S. Forest Service, Southwestern Region. October.

———. 2018. Arizona National Scenic Trail. Available at: https://www.fs.usda.gov/main/azt/home. Accessed January 2, 2019.

———. 2023. *Tonto National Forest Land Management Plan: Coconino, Gila, Maricopa, Pinal, and Yavapai Counties, Arizona*. MB-R3-12-13. Phoenix, Arizona: Tonto National Forest. December.

Appendix A.

Disclaimer: The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The U.S. Forest Service has made every effort to ensure that the information in the Process Memorandum Scenic Resources Analysis is accessible. However, these appendices are not fully compliant with Section 508, and readers with disabilities are encouraged to contact John Scaggs by phone at 602-225-5292 or by email at john.scaggs@usda.gov if they would like access to the information.


Alt 2/3
Near West
Queen Valley
Superior
Top-of-the-World
QUEEN CREEK
PINAL COUNTY
GILA COUNTY
White Canyon
Wilderness
60
79
177
1
2
3
4
5
6
7
8
9
10
11
12
*Visiblity
1-5
6-10
11-15
16-20
KOP
6-mi Buffer
Arizona Trail
*20 viewing locations used in viewshed analysis.
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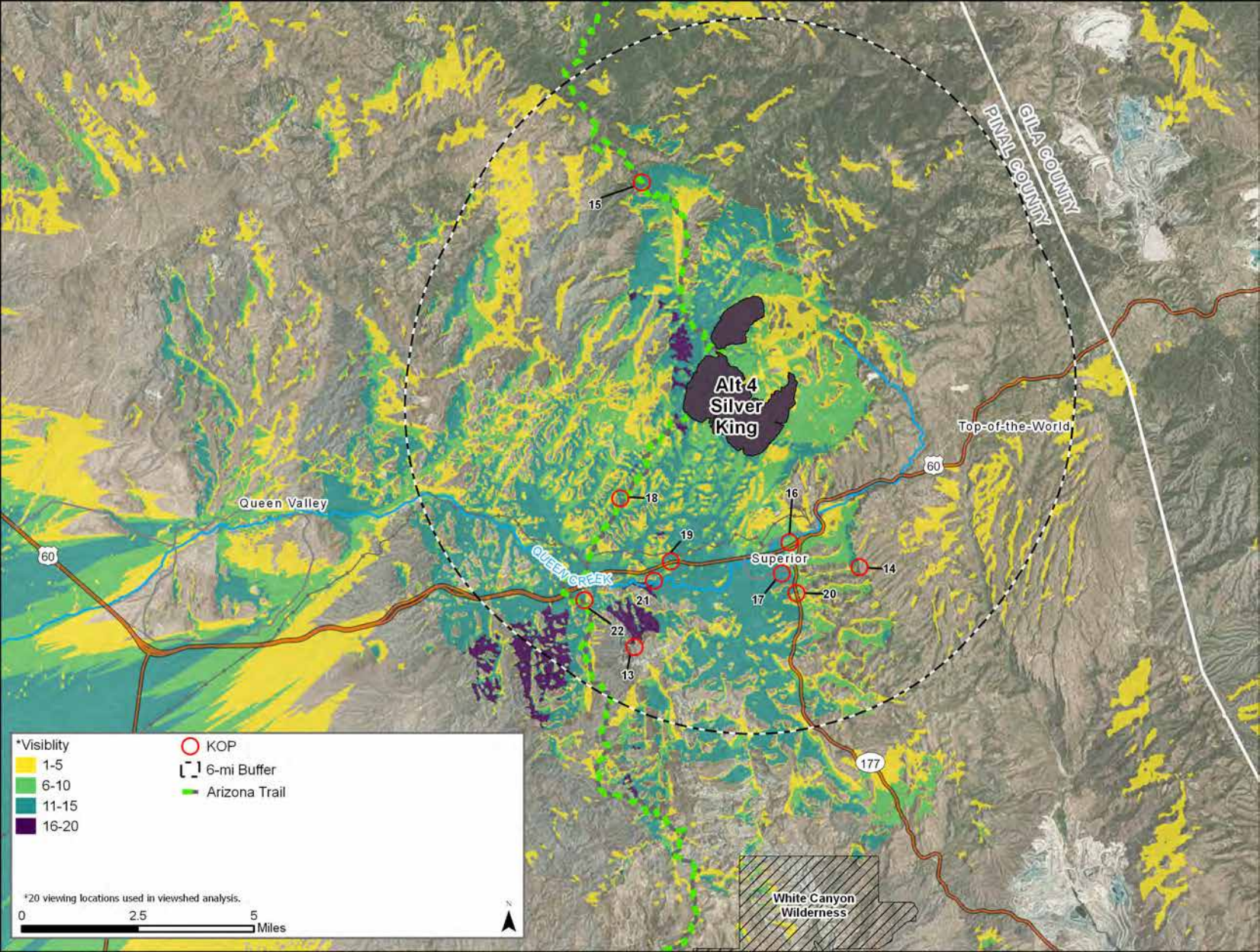
2.5
5
Miles
N


Alt 4
Silver
King
PINAL COUNTY
GILA COUNTY
Top-of-the-World
Queen Valley
QUEEN CREEK
Superior
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19
14
17
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21
22
13
White Canyon
Wilderness
*Visiblity
1-5
6-10
11-15
16-20
KOP
6-mi Buffer
Arizona Trail
*20 viewing locations used in viewshed analysis.
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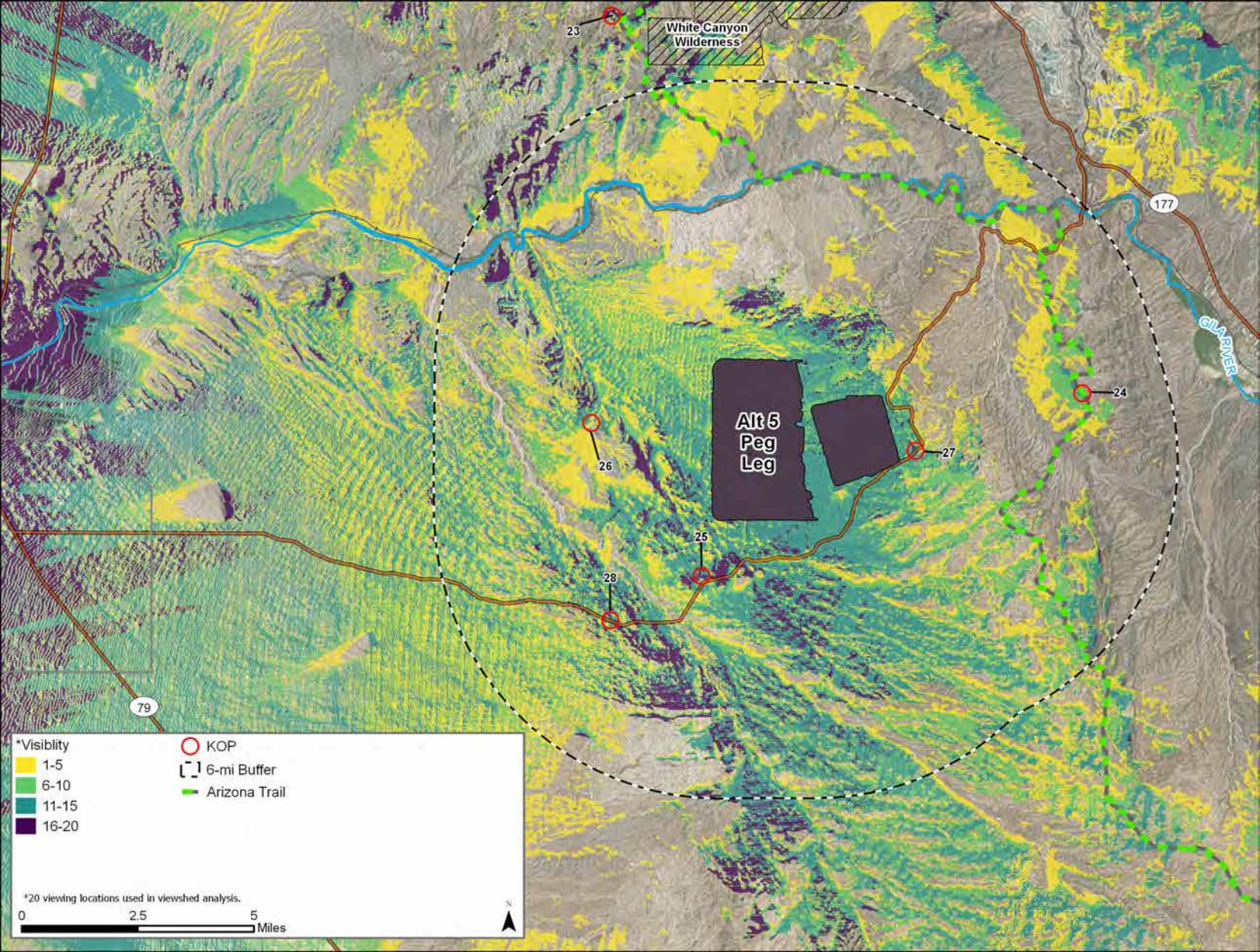
White Canyon Wilderness
23
177
GILA RIVER
24
Alt 5
Peg
Leg
26
27
25
28
79
*Visiblity
1-5
6-10
11-15
16-20
KOP
6-mi Buffer
Arizona Trail
*20 viewing locations used in viewshed analysis.
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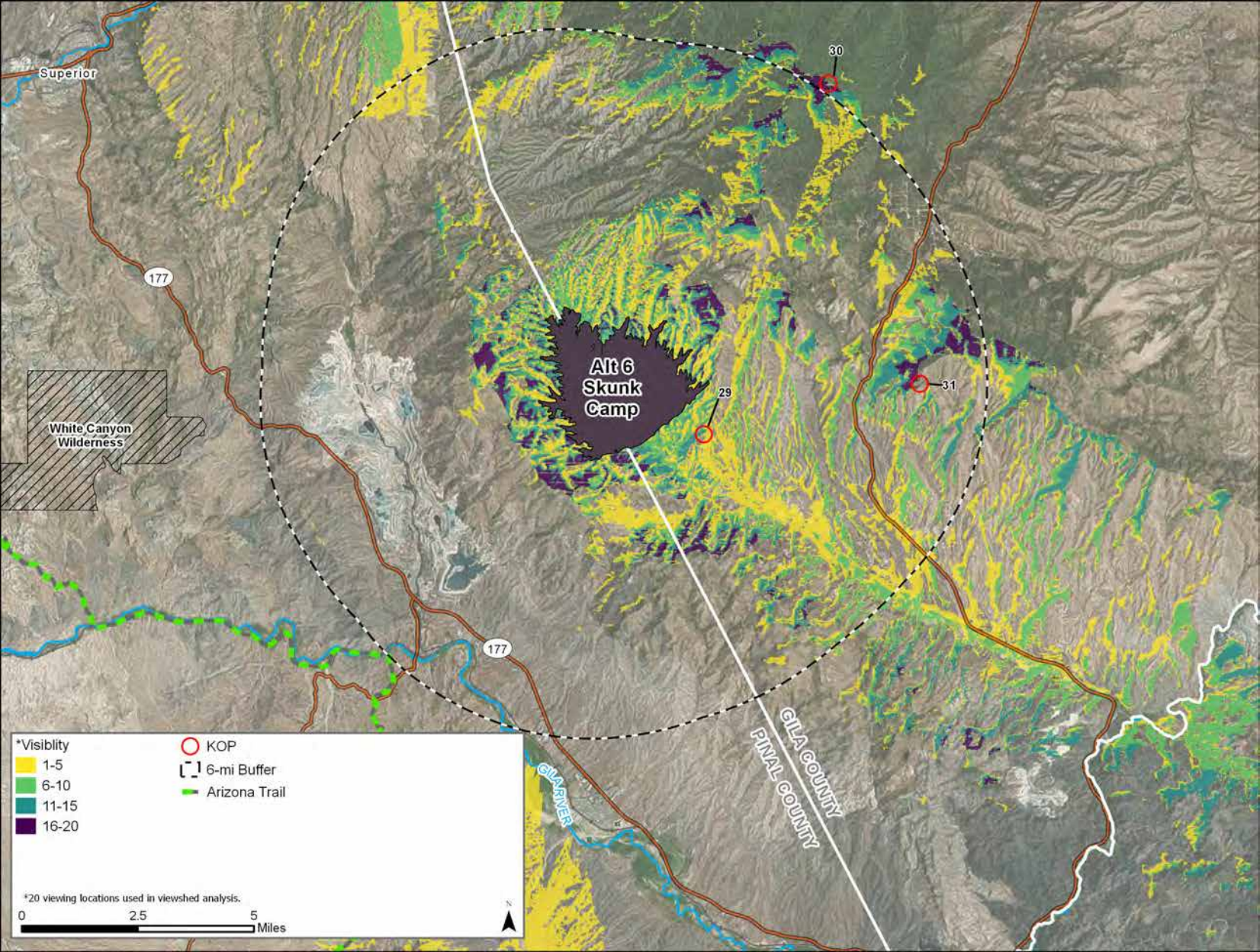
Superior
177
White Canyon Wilderness
Alt 6 Skunk Camp
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29
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GILA COUNTY
PINAL COUNTY
GILA RIVER
*Visiblity
1-5
6-10
11-15
16-20
KOP
6-mi Buffer
Arizona Trail
*20 viewing locations used in viewshed analysis.
0
2.5
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Miles
N

Appendix B.

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 15, 2018
8:43AM

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
1 - FSR 2466 East of Subsidence Zone
Medium Simulation

3. VRM Class
VQO - Partial Retention, Preservation, Modification

4. Location

Township 001S

Range 013E

Section 26

5. Location Sketch
Represents vies of the subsidence zone from the east looking west. OHV users and recreationists accessing the Devil's Canyon area. This image also represents the view of the Skunk Camp Pipeline - South.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rough, angular, and rolling terrain	Spherical, asymmetrical,	Simple, bold, curving (road, transmission lines)
LINE	Rugged, bold, and irregular	Weak, simple, diffused	Curving, hard, and smooth (road, transmission lines)
COLOR	Foreground land is light, warm pastel yellows. Midground earth is dull, light red browns.	Contrasting vibrant, saturated, harmonious secondary color blends of greens and dull, flat purple-greys.	Monotone dull warm and cool grey (road, transmission lines)
TEX-TURE	Course, sparse, uneven	Medium, dense, gradation	Fine, ordered, subtle (road, transmission lines)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Solid, linear, contrasting (pipeline) Simple, dimensional shape, curving (subsidence)
LINE	N/A	N/A	bold, simple, hard, continuous (pipeline) flowing, continuous, concave (subsidence)
COLOR	N/A	N/A	Bright cool silver (pipeline) light bright grey with harmonious deep reds and deep greens(subsidence)
TEX-TURE	N/A	N/A	Uniform, smooth (pipeline) Fine, gradational, subtle (subsidence)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										X		
Line										X		
Color									X			
Texture										X		

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

Changes in this viewshed are noticeable to observers and these alterations will be long term contrasting structures and landform changes. The land form, pipelines, and transmission lines have smooth, regular lines and forms that are not subordinate or have characteristics of the natural surroundings. The color and form of the subsidence area is in a scale and color that is not compatible with natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Use Non-reflective Materials, Coatings, and/or Paint
- Colors for paints, stains, coatings, and other surface color treatments to be used on structures should be selected from the BLM Standard Environmental Colors Chart. Paint structures to match the surroundings as directed by the Forest Service.
- Develop a color treatment plan as directed by the Forest Service. Test Color Selections
- Color treat grouped structures using the same color
- Paint or specify pipeline colors with a BLM Standard Environmental Colors Chart paint to match surroundings as recommended by the Forest Service
- Painted, stained, or coated surfaces should be kept in good repair, and the surface treatment should be reapplied when necessary, as the surface color fades or the coating flakes or otherwise deteriorates

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
KOP 2- Arizona Trail northwest of Montana Mountain
Block Model

3. VRM Class
Forest Service VQO - Partial Retention, Preservation, Modification

4. Location

Township 001N

Range 012E

Section 19

5. Location Sketch
Represents views from the Arizona Trail from higher elevation as the trail approaches from the north. Visible in background. This segment of the Arizona is heavily used. The KOP is located at a pull-out/viewpoint area above the tailings facility approximately 0.5 miles northwest of Montana Mountain

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Irregular, diverse, pyramidical background. Simple, horizontal, smooth midground. Complex, diagonal foreground.	Simple, strip, asymmetrical, diverse	Curving, low, compatible, asymmetrical(roads)
LINE	Complex, bold, digitate edge	Simple, Diffused edge	Flowing, simple, soft (roads)
COLOR	Warm, subtle, yellow-reds	Cool, low chroma, grey greens	Contrasting cool greys(roads)
TEXTURE	Coarse, contrasting, medium density	Dense, patchy, foreground and sparse background.	Sparse, contrasty, matte (roads)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Flattened, simple, contrasting, bold (tailings)
LINE	N/A	N/A	Bold, horizontal, smooth, geometric (tailings)
COLOR	N/A	N/A	Light dull, warm contrasting gray (tailings)
TEXTURE	N/A	N/A	Smooth uniform ordered contrasting (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									x	x		
Line									x			
Color									x			
Texture									x			

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The structural change in the landscape would be noticeable to observers and would be greater than an ecological change. The alteration of the landform will contrast with the surrounding form, line, and color of the landscape. The smooth and geometric form and line of the tailings are not borrowing from the surrounding complex and irregular forms. Tailings will not be borrowing from the area in a scale that would be compatible with the surrounding landscape.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. **Project Name**
Resolution Copper Mine

2. **Key Observation Point**
3- Picket Post Mountain
Block Model

3. **VRM Class**
Forest Service VQO –Partial Retention, Retention, Preservation, Modification

4. **Location**

Township 002S

Range 012E

Section 18

5. **Location Sketch**
Represent views from a high point in the region that is frequently visited by recreationists. Also represents tribal concerns. Not access via an officially designated Forest Service trail. However, the route has a lot of recreation use as exhibited by the visitor log at the top of the mountain. Tailings facility visible from top of mountain and along the hiking route.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rough, irregular, concave, asymmetrical	Regular, indistinct, rolling	Curving, low, compatible, asymmetrical(roads)
LINE	Diagonal midground, jagged background, curving foreground.	Smooth, continuous, flowing	Flowing, simple, soft (roads)
COLOR	Warm, soft, reddish brown	Cool, pale, blue greens	Contrasting cool greys(roads)
TEXTURE	Gradation of smooth, fine grain to clumped, coarse, and rough terrain	Even, medium density with slight gradation	Sparse, contrasty, matte (roads)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	smooth, bold, geometric, simple, contrasting (tailings)
LINE	N/A	N/A	Hard, horizontal, straight, regular (tailings)
COLOR	N/A	N/A	Bright glaring warm grays (tailings)
TEXTURE	N/A	N/A	Fine, smooth, uniform, ordered, contrasting (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. **DEGREE OF CONSTRAST**

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									x			
Line									x			
Color									x			
Texture									x			

2. **Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)**

3. **Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. It's large scale with a color and form contrast the surrounding area will dominate the viewshed.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: 11-01-2018
District: Tonto National Forest
Resource Area:
Activity (program):

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Project EIS

2. Key Observation Point
KOP 4- Apache Leap
Block Model Simulation (Simulation PDF page 8)

3. VRM Class
Forest Service VQO - Modification, Partial Retention, Preservation

4. Location
Township 002S
Range 012E
Section 01

5. Location Sketch
Represents recreationists and tribal concerns from location where future public access and recreation is anticipated to continue.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rough, irregular, concave, asymmetrical, with strips of smooth concave midground areas	Regular, indistinct, rolling	Regular and asymmetric (buildings, roads)
LINE	Horizontal and simple with a digitate edge midground, jagged, undulating background, rugged irregular diagonal foreground.	Smooth, continuous, flowing	Bold, complex, transitional edge (buildings, roads)
COLOR	Warm, soft, pale yellow to deep reddish brown	Cool, pale, blue greens	Cool contrasting very light greys (buildings, roads)
TEXTURE	Gradation of rough to smooth in patchy horizontal striped contrasting pattern	Even, medium density with slight gradation	Clumped, contrasting, uniform (buildings, roads)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Definite, flattened, contrasting, geometric (tailings)
LINE	N/A	N/A	Horizontal, hard, converging, simple (tailings)
COLOR	N/A	N/A	Bright glaring warm grays (tailings)
TEXTURE	N/A	N/A	Fine, smooth, uniform, ordered, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										x		
Line										x		
Color										x		
Texture										x		

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names: J. Grams, E. Hunt
Date: 11-01-2018

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. It's large scale, roughly the size of the surrounding community, with a color and form that contrasts the natural landforms and dominate the viewshed.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 13, 2018 14:25 PM

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
5- Arizona Trail- Barnett Camp
Medium Simulation

3. VRM Class
Forest Service VQO - Partial Retention, Modification

4. Location

Township 001S

Range 012E

Section 29

5. Location Sketch
Represents views from Arizona Trail, a National Scenic Trail, in the vicinity of tailings infrastructure. SWCA recommends a KOP from this vicinity, but altering the view to represent the tailings infrastructure (pipeline, roads, bridge, etc.)

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rough, jagged, steep (background) Rolling, pyramidal (midground) Asymmetrical, domed (foreground)	Asymmetrical, low, dimensional shape	N/A
LINE	Complex, angular, bold (background) Simple, flowing, bold (midground) Simple and convex (foreground)	Diffused, smooth, continuous, irregular	N/A
COLOR	Hazey blues and browns (background) Subtle red brown with light grey (mid) Light and soft warm yellow grey (fore)	Vivid yellow green	N/A
TEXTURE	Coarse and contrasty (background) Medium density (midground) continuous and smooth (foreground)	Medium even and random density	N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Geometric, cubic, vertical and horizontal, contrasting, flat and angular (tailings and pipe bridge)
LINE	N/A	N/A	Bold and simple, angular, hard and converging. Tall vertical element dominates the horizon. (tailings and pipe bridge)
COLOR	N/A	N/A	Cool, muted, flat, blue grey (tailings and pipe bridge)
TEXTURE	N/A	N/A	ordered, fine, smooth, uniform, matte (tailings and pipe bridge)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form									X			
Line									X			
Color									X			
Texture									X			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ Yes ☐ No **(Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The bridge in the simulation dominates the view and would be a long-term contrasting structure in the view. The dominating cool grey colors of the structure clearly stand out against the warm colors and nongeometric forms of the landscape. The new structures in the landscape are not subordinate to the existing landscape characterizations or borrow form or colors from the surrounding view.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Use Non-reflective Materials, Coatings, and/or Paint
- Colors for paints, stains, coatings, and other surface color treatments to be used on structures should be selected from the BLM Standard Environmental Colors Chart. Paint structures to match the surroundings as directed by the Forest Service.
- Develop a color treatment plan as directed by the Forest Service. Test Color Selections
- Color treat grouped structures using the same color
- Paint or specify pipeline colors with a BLM Standard Environmental Colors Chart paint to match surroundings as recommended by the Forest Service
- Painted, stained, or coated surfaces should be kept in good repair, and the surface treatment should be reapplied when necessary, as the surface color fades or the coating flakes or otherwise deteriorates

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels, and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 13, 2018 16:11pm

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
6- Arizona Trail- Ridge
Medium Simulation

3. VRM Class
Forest Service VQO - Modification , Partial Retention

4. Location

Township 001S

Range 012E

Section 31

5. Location Sketch
The trails follow a ridgeline east and in near proximity of the tailings. A viewpoint from this location represents the closest view of the tailings that will occur continuously for approximately 1.5 miles of trail in this vicinity.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	rugged, jagged, steep (background) Rolling, moderate (midground) Asymmetrical, flat (foreground)	Asymmetrical, low, dimensional shape	N/A
LINE	Complex, angular, bold (background) Simple, horizontal, bold (midground) Bold horizontal(foreground)	Diffused, weak continuous, flowing	N/A
COLOR	Hazey blues and browns (background) Subtle red brown with light grey (mid) Light and soft warm yellow grey (fore)	Vivid yellow green to deep saturated green	N/A
TEXTURE	Coarse and contrasty (background) Medium density (midground) continuous and smooth (foreground)	Medium even and random density	N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Bold, flattened, contrasting (tailings)
LINE	N/A	N/A	Bold, horizontal, simple, smooth, hard, geometric (tailings)
COLOR	N/A	N/A	Subtle red brown with light grey (tailings)
TEXTURE	N/A	N/A	Smooth, ordered, contrasting, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									x			
Line									x			
Color									x			
Texture									x			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings. The horizontal form of the tailings alters by breaking up the existing horizon with a contrasting simple line.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project as proposed would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 13, 2018 16:11pm

District
Highway 177

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
7- Highway 177 from Kearny
Medium Simulation

3. VRM Class
Forest Service VQO - Modification , Partial Retention, Preservation

4. Location

Township 002S

Range 012E

Section 10

5. Location Sketch
Represents views from the approach to Superior and the Superior area.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	jagged, asymmetric (background) diverse, rugged (midground) dimensional simple shape (foreground)	Contrasting, vertical and rounded, amorphous	Simple, angular, low(road) Amorphous geometric and low (buildings)
LINE	jagged, complex, hard(background) Rugged, complex, broken (midground) Simple, rolling, smooth (foreground)	Irregular, undulating, complex, diagonal, converging	Bold, straight, regular(road) Angular, geometric, irregular (buildings)
COLOR	Flat, muted, blue brown(background) Cool dull blue browns(midground) Soft light yellow brown(foreground)	Deep cool saturated green, vibrant luminous brilliant yellow	Cool blue-grey(road) Cool, light greys (buildings)
TEX-TURE	Uneven, coarse, (background-midground) Smooth, medium, random (foreground)	Medium density, contrasting, random	Continuous, contrasting, directional(road) Patchy, contrasting, scattered (buildings)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Simple, flattened, compatible (tailings)
LINE	N/A	N/A	Horizontal, continuous, geometric(tailings)
COLOR	N/A	N/A	Bluegreen, cool, (tailings)
TEX-TURE	N/A	N/A	Smooth, subtle, matte (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES											
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form											x	
	Line											x	
	Color											x	
	Texture											x	

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
March 9, 2016 11:27am

District
Boyce Thompson Arboretum

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
8- Picket Post House- (Boyce Thompson)
Medium Simulation

3. VRM Class
Forest Service VQO - Modification , Partial Retention, Preservation

4. Location

Township 002S

Range 012E

Section 06

5. Location Sketch
Represents view from Boyce Thompson Arboretum.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Amorphous, high and low, diverse, convex, cylindrical	Diverse, irregular, few, patchy	Linear, vertical and diagonal, geometric, numerous (trail and structures) Asymmetrical, bold, angular (building)
LINE	Undulating, rugged,	Weak, irregular, broken, converging	Irregular, angular and curving (trail and structures) Hard, diverging, geometric (building)
COLOR	Light, warm grays and browns, harmonious	Blue-green and yellow-green, cool, harmonious	Warm grey browns (trail and structures) Contrasting orange and white with harmonious warm browns (building)
TEXTURE	Random, clumped, gradational, coarse	Clumped, sparse, contrasting, random, discontinuous, patchy	Patchy, scattered and stippled (trail and structures) Clumped, uniform, fine texture (building)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Smooth, large, strip (tailings)
LINE	N/A	N/A	Bold, hard, parallel, geometric (tailings)
COLOR	N/A	N/A	Warm brown grey with cool greens (tailings)
TEXTURE	N/A	N/A	Uniform, directional, continuous, contrasting, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form									x			
Line									x			
Color									x			
Texture										x		

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. This structure will partially alter the horizon line in this viewscape from rugged and coarse to uniform and smooth. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
March 8, 2016 11:10am

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
9- FSR 172
Medium Simulation

3. VRM Class
Forest Service VQO - Modification , Partial Retention, Preservation

4. Location

Township 001S

Range 11E

Section 28

5. Location Sketch
Represents views from OHV roads in the vicinity of the tailings facility.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, rough, asymmetrical, patchy	Patchy, irregular, and amorphous	Linear, contrasting, gentle (road)
LINE	Irregular, angular, undulating	Diffused edge, weak, and undulating	Bold, simple, continuous (road)
COLOR	Warm deep browns, harmonious monotone blues	Muted blue greens with dark deep brown greens	Muted warm grey (road)
TEXTURE	Uneven and random, rough and sparse	Dense-medium density with gradation	Matte, stiped, ordered, gradation, directional (road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Geometric bold, smooth, flattened(tailings)
LINE	N/A	N/A	Horizontal, simple, continuous (tailings)
COLOR	N/A	N/A	Cool deep soft greens(tailings)
TEXTURE	N/A	N/A	Fine, ordered, matte, smooth (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									x			
Line									x			
Color									x			
Texture									x			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. This structure will completely alter the background horizon in this viewscape from rugged and coarse to uniform and smooth. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

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- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

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  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
March 8, 2016 09:55am

District
US 60

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
10- US60 Milepost 219
Medium Simulation

3. VRM Class
Forest Service VQO - Modification, Partial Retention, Preservation

4. Location
Township 002S
Range 011E
Section 09

5. Location Sketch
Represents sensitive views from US60 in the vicinity of Gonzales Pass.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, high, strip, rough, rugged (background) Conical, irregular, numerous (mid/fore)	Gentle, moderate, rolling, low	Irregular, low, concave (dirt road) Bold, linear, contrasting (paved road)
LINE	Bold, angular, jagged (background) Simple, surveying, smooth (mid/fore)	Diffused, simple, soft	Curving and broken (dirt road) Smooth, diagonal, straight (paved road)
COLOR	Cool blues fading into warm browns (background) Warm monotone yellow-brown greys (mid/fore)	Deep green with vibrant yellow green	Warm grayish, dull (dirt road) Deep grey with warm vibrant brown (paved road)
TEXTURE	Coarse, continuous, rough(background) Smooth, medium, striped(mid/fore)	Doffed, medium, gradational	Contrast, sparse, matte, uniform (dirt road) Smooth, directional, uniform (paved road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Flat, large, geometric, trapezoid, smooth (tailings)
LINE	N/A	N/A	Bold, horizontal, simple, geometric (tailings)
COLOR	N/A	N/A	Light warm grey with vivid blue greens (tailings)
TEXTURE	N/A	N/A	Fine, smooth, contrasting, ordered (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES											
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form									x	x		
	Line									x			
	Color									x	X		
	Texture										x		

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structures (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
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- Minimize the project footprint and associated disturbance during construction, operations, and closure.

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- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
October 14, 2015 14:23pm

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
11- Arizona Trail at Picket Post Trailhead
Medium Simulation

3. VRM Class
Forest Service VQO - Modification , Partial Retention, Preservation

4. Location

Township 002S

Range 011E

Section 12

5. Location Sketch
Represents views from a popular recreation staging area for the Arizona Trail. Heavily used area, popular trailhead. Visible in mid-ground. ATA has said this is their most popular trailhead for the whole Arizona Trail.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Angular, amorphous, jagged(background) Small, moderate, rolling (mid/foreground)	Irregular, contrasting, vertical and spherical	Geometric, diagonal, symmetrical, strip (road, parking lot, fence)
LINE	Jagged, complex, broken (background) Broken, simple, curving (mid/foreground)	Angular and converging, irregular	Diagonal, straight, parallel, geometric (road, parking lot, fence)
COLOR	Dark blue with blue brown, monotone (background) Warm red grey, dull (mid/foreground)	Soft blue-green, deep warm dark browns, and muted golden warm yellows	Warm deep grey, deep saturated brown/black (road, parking lot, fence)
TEXTURE	Rough, coarse, contrasting (background) Smooth, gradational, medium (mid/foreground)	Gradational and patchy, contrasting, medium, and clumped	Fine, uniform, ordered, contrasting (road, parking lot, fence)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Flattened, gentle, simple, contrasting, high (tailings)
LINE	N/A	N/A	Horizontal, smooth, simple, geometric (tailings)
COLOR	N/A	N/A	Muted blue green with warm grey (tailings)
TEXTURE	N/A	N/A	Smooth, uniform, ordered (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										X		
Line										x	x	
Color										X	x	
Texture										x		

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ Yes ☐ No **(Explain on reverse side)**

Evaluator's Names	Date
J. Grams	11-01-2018
E. Hunt	

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the surrounding landscape. This structure will alter the background horizon in this viewscape's focal point, the terminus of the road, from rugged and coarse to predominantly uniform and smooth. It's large scale with a color and form contrasting the natural landforms, this structure is not compatible with the natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

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- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
October 15, 2015, 10:13am

District
Town of Queen Valley

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
12- Queen Valley, North Charlotte Street
Medium Simulation

3. VRM Class
Forest Service VQO - Modification, Partial Retention

4. Location

Township 001S

Range 010E

Section 35

5. Location Sketch
Need a KOP that represents where facility is most visible in Queen Valley and assume that the preliminary one provided by Resolution Copper meets these criteria. The viewpoint on Charlotte Street appears to be in the highpoint area for Queen Valley.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rugged, angular (background) rolling, amorphous, jagged(midground) flattened, horizontal, contrasting (foreground)	Vertical, numerous, conical	Geometric, asymmetrical, simple (buildings, roads, power lines)
LINE	Irregular, complex, geometric (back) Rugged, undulating, hard (mid) Simple, horizontal, straight (fore)	Irregular, diagonal, broken	Linear converging geometric straight lines (buildings, roads, power lines)
COLOR	Monotone cool blue-browns (back) Warm browns (mid) Cool dull, light grey (fore)	Bright vibrant yellow greens	Muted yellows, cool deep greys, cool light greys (buildings, roads, power lines)
TEXTURE	Nondirectional, rough, coarse (back) Rough, patchy, contrasting (mid) Uniform, smooth, fine (fore)	Scattered, clumped, discontinuous, patchy	Scattered, random, medium (buildings, roads, power lines)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Flat, small, linear (tailings)
LINE	N/A	N/A	Regular, horizontal, continuous, geometric (tailings)
COLOR	N/A	N/A	Light monotone muted warm browns and dull greys(tailings)
TEXTURE	N/A	N/A	Smooth, ordered, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form											x	
	Line											x	
	Color											x	
	Texture											x	

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape but do mimic the built landscapes bold simple forms in the foreground. This structure will alter the background horizon in this viewscape's focal point, between the two midground mountains, from warm deep browns and muted blues to predominantly light greys and browns. It's large scale with a color and form contrasting the natural landforms, this structure is not compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

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- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
13- Picket Post Mountain
Block Model Simulation

3. VRM Class
VQO- Retention, partial retention, modification

4. Location

Township 002S

Range 012E

Section 18

5. Location Sketch
Represent views from a high point in the region that is frequently visited by recreationists. Also represents tribal concerns. Not access via an officially designated Forest Service trail. However, the route has a lot of recreation use as exhibited by the visitor log at the top of the mountain. Tailings facility visible from top of mountain and along the hiking route.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Jagged, horizontal, pyramidical (background) Angular, bold, linear (fore and mid ground)	Short, low, compatible	Definite, amorphous, curving, and contrasting (roads)
LINE	Bold, irregular, rugged, complex, continuous (back) Bold straight, simple (fore and mid)	Weak, irregular, simple	Bold, curving, subangular, soft, flowing (roads)
COLOR	Warm greys with red browns	Vibrant cool greens	Warm light grey, monotone
TEXTURE	Coarse, rough, contrasting (back) Smooth, digitate edge (texture)	Medium, gradational, continuous	Smooth, nondirectional, contrasting (roads)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Bold, flat, smooth simple, regular, geometric, contrasting (tailings)
LINE	N/A	N/A	Bold, straight, horizontal, simple, angular (tailings)
COLOR	N/A	N/A	Bright glaring pastel warm grays (tailings)
TEXTURE	N/A	N/A	Fine, smooth, ordered, contrasting, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES												2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
ELEMENTS	Form									X				Evaluator's Names: J. Grams, E. Hunt — Date: 11-01-2018
	Line									X				
	Color									x				
	Texture									x				

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
14- Apache Leap – Tailings
Block Model Simulation

3. VRM Class
VQO- Retention, partial retention, Modification

4. Location

Township 002S

Range 012E

Section 01

5. Location Sketch
Represents recreationists and tribal concerns from location where future public access and recreation is anticipated to continue.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Definite, rugged, steep, solid, irregular, diagonal	Indistinct, compatible, nondirectional	Curving, rolling, rolling (road and trails) Geometric, cubic, asymmetrical (buildings/town)
LINE	Rugged, diagonal, irregular (back) Digitate edge, horizontal (mid) Angular, irregular, complex (fore)	Weak, simple	Bold, curvilinear, undulating (road and trails) Broken, geometric, complex (buildings/town)
COLOR	Warm yellow orange greys with soft greens	Cool vibrant greens	Light monotone grey (road and trails) Matte greys and warm browns, (buildings/town)
TEXTURE	Gradational, rough, striated, and contrasting	Patchy and gradational, continuous, random, medium texture	smooth, random, matte, subtle (road and trails) clumped, ordered, contrasting (buildings/town)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Definite, angular, flattened, horizontal, smooth (tailings)
LINE	N/A	N/A	Regular, smooth, hard, simple (tailings)
COLOR	N/A	N/A	dull harmonious warm grays (tailings)
TEXTURE	N/A	N/A	Smooth, contrasting, uniform, striped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										X		
Line										X		
Color										X		
Texture										x		

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Preservation class allows for ecological changes with no alterations of management activities, except for very low visual-impact recreation facilities. Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
15- Arizona Trail – Montana Mountain (Silver King view)
Block Model Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 001N

Range 012E

Section 30

5. Location Sketch
Represents views from the Arizona trail from a higher elevation as the trail passes Montana Mountain.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Diverse, irregular, pyramidical and flattened, complex digitate edges	Continuous, rolling, amorphous	Strip and patchy, amorphous, rolling and flat (roads, buildings)
LINE	Rugged and undulating, converging diagonals and horizontal lines	Irregular, flowing, soft	Curving and converging, flowing (roads, buildings)
COLOR	Warm yellow-brown and red-brown shades from light muted to deep darks.	Vibrant to muted cool blue greens	Light muted cool grey (roads, buildings)
TEXTURE	Medium, uneven, random, and dotted	Uneven and gradational	Directional, contrasting, patchy, matte (roads, buildings)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Angular, flattened, solid, smooth, moderate (tailings)
LINE	N/A	N/A	Regular, smooth, hard, simple, geometric (tailings)
COLOR	N/A	N/A	Bright glaring warm grays (tailings)
TEXTURE	N/A	N/A	Smooth, ordered, uniform, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form										X		
Line									X			
Color										X		
Texture									X			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ Yes ☐ No **(Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
October 12, 2015 15:09pm

District
Private/ Town of Superior

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
16- Town of Superior, South Stone Ave
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 002S

Range 012E

Section 03

5. Location Sketch
Need a KOP in the Superior Town area that best represents scenery impacts of Silver King facility. I have reviewed the existing photo points and have been unable to determine the best one or if the photography from the point is looking toward Silver King.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, jagged, irregular, diagonal (background) Horizontal, contrasting, simple (foreground)	Contrasting, amorphous, diverse	Contrasting, vertical and horizontal, directional, strips(road and infrastructure) Rectangular, cubic, geometric(buildings)
LINE	Jagged, complex, hard (back) Regular, smooth, simple (fore)	Irregular, undulating, broken, converging	Bold, straight, angular, vertical, simple (road and infrastructure) Regular, geometric, straight, hard (buildings)
COLOR	Warm red browns and warm light grey (back) n/a (fore)	Deep vibrant green to dull yellow	Deep greys and muted blacks and greys, warm deep browns(road and infrastructure) Warm red browns, dull cool greys (buildings)
TEX-TURE	Coarse, nondirectional, contrasting, matte (back) Fine, smooth, ordered, sparse (fore)	Scattered, contrasting, sparse, medium	Striped, ordered, directional, coarse (road and infrastructure) Patchy, coarse, directional, ordered (buildings)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Gentle, simple, horizontal (tailings)
LINE	N/A	N/A	Regular, smooth, converging, geometric (tailings)
COLOR	N/A	N/A	warm grey with vibrant green (tailings)
TEX-TURE	N/A	N/A	uniform, smooth, fine (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										x		
Line										x		
Color										x		
Texture										x		

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture while modifying the horizon. This structure will block the view of where jagged mountains meet the flat midground creating a contrast the pattern of form and color in the background. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
October 12, 2015 16:02pm

District
Private/ Town of Superior

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
17- Town of Superior, Baseball Field
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 002S

Range 012E

Section 03

5. Location Sketch
Need a KOP in the Superior Town area that best represents scenery impacts of Silver King facility. I have reviewed the existing photo points and have been unable to determine the best one or if the photography from the point is looking toward Silver King.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Jagged and angular (mid and back ground) Horizontal, regular, flattened (foreground)	Nondirectional, asymmetrical, diverse, complex	Asymmetrical, irregular, linear, rectangular (buildings, transmission lines, roads)
LINE	Irregular, diagonal, jagged (background) irregular, undulating, complex (mid) simple, horizontal (fore)	Irregular, undulating, broken	Regular, straight, angular, simple, hard, geometric (buildings, transmission lines, roads)
COLOR	Muted warm greys, warm yellow-red browns, and harmonious deep blues	Vivid saturated greens, cool flaring yellow greens	Dull blue greys and soft warm browns (buildings, transmission lines, roads)
TEXTURE	Coarse, continuous, random (back) discontinuous, clumped (mid) directional, continuous, striped (fore)	Nondirectional, rough, medium, random, contrasting	Patchy, random, contrasting (buildings, transmission lines, roads)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	High, gentle, smooth (tailings)
LINE	N/A	N/A	Bold, regular, horizontal, simple (tailings)
COLOR	N/A	N/A	Warm red-browns with vibrant greens (tailings)
TEXTURE	N/A	N/A	Uniform ordered (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form									X			
	Line									x			
	Color										x		
	Texture										x		

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ Yes ☐ No **(Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. This structure will block the view of jagged mountains in the background and midground therefore changing the shape of the natural horizon. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

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- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
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  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 13, 2018 16:00pm

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
18- Arizona Trail Ridge
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 001OS

Range 012E

Section 31

5. Location Sketch
The trails follow a ridgeline east and in near proximity of the tailings. A viewpoint from this location represents the closest view of the tailings that will occur continuously for approximately 1.5 miles of trail in this vicinity.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, rugged, complex, tall (background) contrasting, simple, domed, smooth (mid and foreground)	Rolling, numerous, compatible	Indistinct, short, patchy (buildings)
LINE	Bold, angular, complex, hard (back) Flowing, simple, soft (mid/fore)	Flowing, complex, soft, regular	Weak and irregular (buildings)
COLOR	Range of matte warm reds, yellows, and browns with harmonious blues	Vibrant yellow greens with deep dark grey blacks	Light, dull, cool greys (buildings)
TEXTURE	Coarse, random, rough (back) Smooth, medium, continuous, striated (mid/fore)	Gradational, continuous, ordered, medium	Dense, contrasting, stippled (buildings)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Long, rectangular, solid, simple (tailings)
LINE	N/A	N/A	Straight, regular, bold, continuous (tailings)
COLOR	N/A	N/A	Muted, soft, hazy, warm browns with soft greens (tailings)
TEXTURE	N/A	N/A	Smooth, fine, ordered, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES											
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form									X			
	Line									X			
	Color									X			
	Texture									x			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. This structure will partially change the view of jagged mountains in the background and midground therefore changing the shape of the natural horizon. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 14, 2018 15:47pm

District
US 60

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
19- US 60 - Near Silver King Wash
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 002S

Range 012E

Section 05

5. Location Sketch
Represents views of the Silver King Alternative tailings from US 60 as it approaches Superior.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rugged, bold, high, angular (background) simple, gentle (midground) irregular, rough (foreground)	Complex, diverse, strips, angular and amorphous	Symmetrical, strip, bold (road and guardrail) Angular, vertical, regular (transmission lines)
LINE	Bold, angular, vertical, complex (back) smooth, undulating, smooth, simple (mid)	straight but also complex, irregular, continuous	Soft delicate regular complex geometric (trans) bold, smooth, continuous, geometric (road)
COLOR	Warm yellow-red browns with compatible blues (back) warm reddish dull and light (mid)	Vibrant greens with dull blue greens and soft dully yellows	Compatible warm browns (trans) Cool deep greys and warm reddish browns (roads)
TEX-TURE	Coarse, rough, random (back) Smooth, continuous, subtle, uniform (mid) Patchy rough striated (fore)	Random, contrasting, scattered with gradation, medium	Ordered, uniform, coarse, striped (trans) contrasting, directional, uniform, striped (road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Bold, tall, geometric, linear, contrasting, smooth (tailings)
LINE	N/A	N/A	Regular, horizontal, smooth, simple (tailings)
COLOR	N/A	N/A	Warm greys and browns spotted with deep greens (tailings)
TEX-TURE	N/A	N/A	Fine, uniform, ordered (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									X			
Line									X			
Color									X	x		
Texture									x			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. This structure will change the view of jagged mountains in the background and midground therefore changing the shape of the natural horizon. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 14, 2018 15:11pm

District
Highway 177

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
20- Highway 177 from Kearny
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 002S

Range 012E

Section 10

5. Location Sketch
Represents views from the approach to Superior and the Superior area.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Jagged, steep, tall, contrasting, bold (back and midground) Rolling, amorphous, domed (foreground)	Patchy, irregular, contrasting	Bold, low, flattened, geometric, regular, symmetrical (road and guardrail)
LINE	Bold, irregular, complex, broken (back and mid) weak, flowing, simple (fore)	Undulating, rugged, broken	Bold, straight, smooth, simple, hard, continuous (road and guardrail)
COLOR	Deep grey blues blending into warm red browns (back and mid) dull warm yellow greys (fore)	Dull golden yellows, yellow blue greens, vibrant greens, deep browns	Warm deep greys and cool grey with warm browns (road and guardrail)
TEX-TURE	Coarse, rough, patchy, random (back and mid) fine, smooth, contrasting (fore)	Contrasting, gradational and patchy, random	Fine, directional, continuous, striped (road and guardrail)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Flat, bold, steep, contrasting, vertical, smooth (tailings)
LINE	N/A	N/A	Regular, smooth, continuous, smooth (tailings)
COLOR	N/A	N/A	Warm grey brown dotted with deep green (tailings)
TEX-TURE	N/A	N/A	Smooth, fine, ordered, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									X			
Line									X			
Color									x			
Texture									x			

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. This structure will block the view of jagged mountains in the background and midground therefore changing the shape of the natural horizon and altering the feeling of the point of convergence within the viewscape. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 15, 2018 11:12am

District
Boyce Thompson Arboretum

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
21- Picket Post House - (Boyce Thompson)
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 002S

Range 012E

Section 06

5. Location Sketch
Represents views from Boyce Thompson Arboretum.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Jagged, steep, tall, contrasting, bold (back) flattened, gentle, smooth (midground) Rolling and flat, amorphous, rough (foreground)	Low, vertical in foreground, diverse, irregular	Angular, rough and smooth, high and diverse, contrasting, asymmetrical (house area) vertical, contrasting, linear (electric poles)
LINE	Bold, irregular, complex, angular (back) simple, continuous, bold (mid) curvilinear, convex (fore)	Weak, undulating, simple,	Irregular, complex, hard, broken, converging (house) bold, regular, straight, parallel (poles)
COLOR	Deep grey blues blending into warm red browns (back)warm light dull browns (mid) dull warm grayish red yellow (fore)	Brilliant cool greens with yellow and brown greens	Earthen warm light dull brown, warm dull terracotta red, brilliant white (house) deep dark saturated brown (poles)
TEXTURE	Coarse, rough, patchy, random (back) smooth, uniform (mid) medium, contrasting, gradational, contrasting(fore)x	Gradational, dense to medium, scattered, random	Fine, rough discontinuous, scattered, contrasting, ordered (house) uniform, continuous, matte (poles)

SECTION xC. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Geometric, steep, contrasting, regular (tailings)
LINE	N/A	N/A	Bold, angular, smooth, converging (tailings)
COLOR	N/A	N/A	Earthen warm light dull brown dotted with muted greens (tailings)
TEXTURE	N/A	N/A	Smooth, uniform, ordered, contrasting (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form									x			
Line									x			
Color									X			
Texture									x			

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No** **(Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. This structure will block the view of jagged mountains in the background and midground therefore changing the shape of the natural horizon while using color and texture patterns that are not within or subordinate to the natural landscape. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
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  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 13, 2018 13:16pm

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
22- Arizona Trail at Picket Post Trailhead
Medium Simulation

3. VRM Class
Forest Service VQO – Modification and Partial Retention

4. Location

Township 002S

Range 011E

Section 12

5. Location Sketch
Represents views from a popular recreation staging area for the Arizona Trail. Heavily used area, popular trailhead. Visible in mid-ground. ATA has said this is their most popular trailhead for the whole Arizona Trail.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Jagged, rough, complex, high, contrasting (background) simple, domed, curving (mid and foreground)	Diverse, complex, amorphous, conical and linear	Geometric, regular, contrasting, flattened (road)
LINE	Bold, jagged, broken geometric (back) undulating, smooth, convex (mid) straight, regular, smooth, continues (fore)	Weak, complex, broken, irregular	Regular, straight, smooth, simple, continuous (road)
COLOR	Muted warm blues and browns (back) warm soft dull red brown (mid) dull light yellow brown (fore)	Vibrant brilliant blue greens and yellow greens with contrasting deep dark browns	Warm dull greys (road)
TEXTURE	Coarse, rough, random (back) medium, gradational, striped (mid and fore)	Medium, patchy and gradational, contrasting, clumped	Fine, uniform, directional, ordered (road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Smooth, rectangular, contrasting regular, smooth (tailings)
LINE	N/A	N/A	Angular, smooth, simple, hard, geometric (tailings)
COLOR	N/A	N/A	Warm dull brown with muted blues spotted with muted greens (tailings)
TEXTURE	N/A	N/A	Fine, smooth, ordered, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										x		
Line										X		
Color										X		
Texture										x		

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names — **Date**
J. Grams — 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape. This structure will contrast the surrounding landscape through pattern of color and texture. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Partial Retention designates that activities be "visually subordinate" to the characteristic landscape. Modification class allows for activities to visually dominate the original characteristic landscape while the designed vegetation and land forms must borrow from naturally established visual characteristics. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

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- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
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  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tucson BLM

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
23- Arizona Trail – Peg Leg North
Block Model Simulation

3. VRM Class
III

4. Location

Township 003S_____

Range 012E_____

Section 17_____

5. Location Sketch
Represents one of the few locations that the Peg Leg tailings would be visible from the Arizona Trail. Because of the general land form, the facility in generally not visible from the trail. Point is approximately 7.5 miles from the tailings facility.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, prominent, irregular, diverse, flattened and pyramidal (background) flattened, gentle, geometric, horizontal, strip (midground) conical, irregular, amorphous, complex, rugged (foreground)	Amorphous, indistinct, dimensional shape	Definite, rolling, smooth, curving (trails and roads)
LINE	Bold, angular, rugged and smooth (back) regular, horizontal, simple (mid) undulating, complex, concave, and irregular (fore)	Weak, irregular, flowing	Irregular, curvilinear, flowing, smooth (trails and roads)
COLOR	Muted deep blues with dull and grayish warm yellow-red browns	Muted dull blue green	Muted grayish dull light-yellow brown (trails and roads)
TEXTURE	Patchy discontinuous contrasting (back) smooth, continuous, striped (mid) clumped, rough, nondirectional, coarse (fore)	Gradational, continuous, scattered, dotted	Smooth, subtle, fine (trails and roads)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Low, angular, horizontal, flattened, smooth (tailings)
LINE	N/A	N/A	Regular, smooth, flowing, simple (tailings)
COLOR	N/A	N/A	Bright glaring warm grays (tailings)
TEXTURE	N/A	N/A	ordered, continuous, striped, uniform, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form										x		
Line										X		
Color										x		

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

	Texture										x			

SECTION D. (Continued)

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape and will contrast the surrounding landscape. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Visual Resource Management Class III objective designates that the landscape is to "partially retain its existing character" through moderate changes. The alterations should not dominate the viewscape while repeating elements of the existing landscape. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

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- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Tucson BLM

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
24- Arizona Trail - Tortilla Mountains
Block Model Simulation

3. VRM Class
III

4. Location

Township 04S

Range 013E

Section 36

5. Location Sketch
High point east of Peg Leg facility. Not very visible because of design.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Diverse, jagged and flat, pyramidical, flattened, horizontal (background) rugged and domed, numerous, concave, asymmetrical (mid and foreground)	irregular, rolling, amorphous, dimensional	n/a
LINE	Bold, horizontal simple and jagged angular, geometric (back) irregular, subangular, complex, asymmetrical (mid/fore)	Irregular, asymmetrical, continuous, weak	n/a
COLOR	Deep warm browns fading into warm muted light warm grayish browns	Cool saturated blue-greens	n/a
TEXTURE	Patchy medium sparse and contrasting (back) coarse, random, continuous	Medium, patchy, nondirectional	n/a

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Low, angular, horizontal, flattened, smooth (tailings)
LINE	N/A	N/A	Regular, smooth, flowing, simple (tailings)
COLOR	N/A	N/A	Bright glaring warm grays (tailings)
TEXTURE	N/A	N/A	ordered, continuous, striped, uniform, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form										X		
Line										X		
Color										X		
Texture										x		

2. Does project design meet visual resource management objectives? ☐ **Yes** ☑ **No** **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☑ **Yes** ☐ **No** **(Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 14, 2018
11:43 AM

District
Tucson BLM

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. **Project Name**
Resolution Copper Mine

2. **Key Observation Point**
25- Cochran OHV Parking - boulder area
Medium Simulation

3. **VRM Class**
III

4. **Location**

Township 005S

Range 012E

Section 15

5. **Location Sketch**
Cochran Road is a popular recreation area west of the Peg Leg tailings alternative. An OHV parking area located at the intersection with the Florence Kelvin Highway is heavily used. Boulders in the area provide a highpoint view of the tailings. Approximately 1.5 miles from tailings facility; foreground view.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Jagged, rugged, complex, steep (background) rough, complex, irregular, contrasting (midground) smooth, complex, and rounded amorphous (foreground)	Indistinct, moderate, low, numerous, nondirectional	N/A
LINE	Broken, undulating jagged angular (back) irregular, rugged, complex, converging (mid) irregular, subangular, complex, broken (fore)	Irregular, flowing, broken	N/A
COLOR	Warm red browns with muted blues (back) warm yellow-red dull browns (mid) warm dull yellow very light browns (fore)	Vibrant and brilliant greens, cool greys	N/A
TEXTURE	Coarse, patchy, discontinuous (back) contrasting, rough, clumped (mid) random, coarse, dense, granular (fore)	Dense to medium, patchy, nondirectional, random	N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Bold, flat smooth, regular, contrasting (tailings)
LINE	N/A	N/A	Bold, straight, smooth, simple, geometric (tailings)
COLOR	N/A	N/A	Warm gray with deep vibrant greens (tailings)
TEXTURE	N/A	N/A	Smooth, fine, uniform, ordered, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. **DEGREE OF CONSTRAST**

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form									x			
Line									X			
Color									x			
Texture									x			

2. **Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)**

3. **Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's color, line, and form that do not borrow or repeat characteristics from the natural landscape and will contrast the surrounding landscape. The structure will interfere and change the pattern of the horizon by blocking the view of the jagged mountains in the background. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Visual Resource Management Class III objective designates that the landscape is to "partially retain its existing character" through moderate changes. The alterations should not dominate the viewscape while repeating elements of the existing landscape. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 14, 2018
12:40PM

District
Tucson BLM

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. **Project Name**
Resolution Copper Mine

2. **Key Observation Point**
26- Cochran Road OHV Dispersed Site
Medium Simulation

3. **VRM Class**
III

4. **Location**

Township 004S

Range 012E

Section 31

5. **Location Sketch**
Dispersed camping location adjacent to Cochran Road. Approximately 3 miles from tailings facility; middle ground view.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	definite, rough, irregular, contrasting (background) smooth, simple, geometric, conical and flattened (mid and foreground)	Indistinct, gentle, numerous, amorphous	Vertical, linear, high, rectangular, contrasting (transmission line)
LINE	Angular, horizontal, rugged, hard (background) simple, hard, continuous, bold (fore and mid)	Weak, flowing, continuous, simple	Bold, vertical, simple, hard, geometric (transmission)
COLOR	Warm red browns with muted harmonious blues (back) war yellow-red browns to yellow grayish (mid/fore)	Vibrant saturated yellow greens	Deep dark saturate brown/black (transmission)
TEXTURE	Course, patchy, horizontal (back) smooth, patchy, contrasting, sparse (mid and fore)	Medium, uniform, continuous, dense, dotted	Uniform, directional, ordered, sparse, striped (transmission)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Simple, horizontal, parallel (tailings)
LINE	N/A	N/A	Bold, regular, horizontal, simple, hard, continuous (tailings)
COLOR	N/A	N/A	Warm grey with dull greens (tailings)
TEXTURE	N/A	N/A	Smooth, uniform, ordered, fine (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form									X			
Line									X			
Color									X			
Texture									x			

2. **Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)**

3. **Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's bright color, contrasting line, and geometric forms do not borrow or repeat characteristics from the natural landscape. It's contrasting large scale, color, and would dominate the landscape and would not be compatible with the natural surroundings.

Visual Resource Management Class III objective designates that the landscape is to "partially retain its existing character" through moderate changes. The alterations should not dominate the viewscape while repeating elements of the existing landscape. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 14, 2018
10:30AM

District
Tucson BLM

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. **Project Name**
Resolution Copper Mine

2. **Key Observation Point**
27- Florence Kelvin Highway – East Side
Medium Simulation

3. **VRM Class**
III

4. **Location**

Township 005S

Range 013E

Section 05

5. **Location Sketch**
Represents views from highway on the east side of the tailings facility. High point on road looking towards facility. Facility visible in mid-ground at approximately 2.5 miles distance.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	rugged and flattened, angular, asymmetrical (background) flattened and conical, low, simple, definite, simple (mid and foreground)	Rolling, amorphous, irregular, diverse, nondirectional	Flat, bold, gentle, simple, linear(road)
LINE	Weak, irregular, straight, rugged and smooth (back) horizontal, flowing, simple (mid and fore)	Broken, perpendicular, horizontal and vertical	Smooth, simple, hard, straight (road)
COLOR	Warm, pastel, muted yellow gray browns	Brilliant cool greens with warm yellow greens	Warm, muted, dull, yellow gray brown (road)
TEX-TURE	Gradational, contrasting, scattered, fine	Medium, scattered, dense, nondirectional, random	Fine, smooth, uniform, ordered, striped (road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	bold, flat, smooth, moderate, solid and simple (tailings)
LINE	N/A	N/A	bold, regular, smooth, simple, geometric, parallel (tailings)
COL OR	N/A	N/A	warm yellow grey spotted with vibrant greens (tailings)
TEX-TURE	N/A	N/A	fine, smooth, uniform, ordered, contrasting (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. **DEGREE OF CONSTRAST**

		FEATURES											
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form									X			
	Line									X			
	Color									X			
	Texture									x			

2. **Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)**

3. **Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

The addition of the structure (tailings) to the landscape would be greater than ecological change and would be noticeable to observers. This structure's bright color, contrasting line, and geometric forms do not borrow or repeat characteristics from the natural landscape. The simple horizontal structure will block the existing horizon that is defined by rugged mountains in the background. It's contrasting large scale, color, and form would dominate the landscape and would not be compatible with the natural surroundings.

Visual Resource Management Class III objective designates that the landscape is to "partially retain its existing character" through moderate changes. The alterations should not dominate the viewscape while repeating elements of the existing landscape. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
- Perform a critical examination of illumination levels and reduce where appropriate. Many specific illumination recommendations provided for typical community applications (e.g. roadways, parking lots, etc.) may not be applicable to needs at industrial sites such as a mine. Further, lighting recommendations included in MSHA publications (CFR Title 30 Part 56) do not require specific illumination levels, suggesting only that the illumination "sufficient to provide safe working conditions" is needed.
  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
August 14, 2018
12:40pm

District
Tucson BLM

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. **Project Name**
Resolution Copper Mine

2. **Key Observation Point**
28- Florence Kelvin Highway – South
Medium Simulation

3. **VRM Class**
III

4. **Location**

Township 005S

Range 012E

Section 20

5. **Location Sketch**
Represents view of tailings facility from the Florence Kelvin Highway on the south side of the tailings facility.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Definite, rough, irregular, complex (background) horizontal, regular, flattened, gentle (mid and foreground)	Irregular, diverse, gentle, asymmetrical	Flat, regular, geometric simple, horizontal (road)
LINE	Irregular, angular, undulating (background) horizontal, smooth, simple, continuous (mid/fore)	Curvilinear, smooth, soft, weak	Bold, simple, hard, continuous (road)
COLOR	Warm red browns with muted blues (background) cool grays with warm light dull yellows (mid/fore)	Dull yellow greens and vibrant greens	Deep grays and blacks (road)
TEXTURE	Coarse, rough, random (background) continuous, fine, smooth, uniform, ordered (mid/fore)	Medium, rough, nondirectional, contrasting	Smooth, fine, uniform, ordered, contrasting, striped (road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	low, smooth, indistinct, geometric, regular (tailings)
LINE	N/A	N/A	regular, straight, horizontal, simple (tailings)
COLOR	N/A	N/A	muted greens and warm grayish browns (tailings)
TEXTURE	N/A	N/A	fine, smooth, uniform, ordered (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. **DEGREE OF CONSTRAST**

		FEATURES											
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form												X
	Line												X
	Color												X
	Texture												X

2. **Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)**

3. **Additional mitigating measures recommended? ☑ Yes ☐ No (Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

Comments from item 2.

This structure's bright color, contrasting horizontal simple lines, and geometric form does not borrow or repeat characteristics from the natural landscape. It's contrasting large scale, color, and form will not be compatible with the natural surroundings.

Visual Resource Management Class III objective designates that the landscape is to "partially retain its existing character" through moderate changes. The alterations should not dominate the viewscape while repeating elements of the existing landscape. The project, as proposed, would not meet this requirement.

Additional Mitigating Measures (See item 3)

Mitigation measures that can be used to reduce the visual impact are the following:

- Implement dust and wind erosion control measures

- Avoid siting roads on steep side slopes and ridge faces. Site roads along ridgetops. Site access roads to minimize cut and fill
- Immediately revegetate temporary disturbance areas that are no longer needed for mining activity
- Minimize the project footprint and associated disturbance during construction, operations, and closure.

- The report Impact Assessment of the Proposed Resolution Copper Mine on Night Sky Brightness (Dark Sky Partners 2018) contains the following mitigation recommendations:
- Perform a critical examination of where lighting is needed for operational effectiveness and safety. For example, lighting along roadways where only vehicular traffic exists with no potential pedestrian conflicts, may provide no safety benefit.
- Perform a critical examination of where color perception is needed for operational effectiveness and safety. Replace lighting in non-critical areas with lower-impact lighting such as PC amber (providing some color discrimination) or direct-emission (also called "narrowband" or "limited wavelength" or "580 nm") amber LEDs.
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  Perform a critical examination of operations to determine if some lighting may be installed with control systems that either provide the ability to turn lighting off at particular times of night, or activate light based on motion detected within the work area.

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Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District
Private/State

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
29- Dripping Springs Road
Medium Simulation

3. VRM Class
N/A

4. Location

Township 003S

Range 014E

Section 13

5. Location Sketch
Represents full view of Skunk Camp TSF looking North

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, rough, irregular, pyramidical (background) definite, smooth, simple, linear (mid and foreground)	Indistinct, rolling, regular,	Curving, simple, rolling, bold (road)
LINE	Irregular, jagged, undulating, complex (back) simple, hard, horizontal, flowing (mid/fore)	Weak, simple, subangular	Curvilinear, flowing, simple, parallel (road)
COLOR	Warm yellow-red muted light browns	Vibrant yellow greens with grayish browns	Warm dull red-yellow gray brown (road)
TEXTURE	Coarse, gradational, random, striped (back) fine, continuous, smooth (mid/fore)	Gradational, patchy, medium, ordered, stippled	Ordered, directional, uniform, smooth (road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	bold, smooth, steep, solid, simple, geometric, contrasting (tailings)
LINE	N/A	N/A	bold, regular, horizontal, simple, hard, converging (tailings)
COLOR	N/A	N/A	warm very light gray browns dotted with greens (tailings)
TEXTURE	N/A	N/A	fine, smooth, ordered, contrasting, uniform (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES												2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) *NOT APPLICABLE*
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side) *NOT APPLICABLE*
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
ELEMENTS	Form									x				**Evaluator's Names** J. Grams, E. Hunt — **Date** 11-01-2018
	Line									x				
	Color									x				
	Texture									x				

SECTION D. (Continued)

Comments from item 2.

Not Applicable.

Additional Mitigating Measures (See item 3)

Not Applicable.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Private/State

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
30- Pinal Peak
Block Model Simulation

3. VRM Class
N/A

4. Location

Township 002S

Range 015E

Section 37

5. Location Sketch
From Skunk Camp Block Model PDF provided by Trudscape.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Bold, asymmetrical, diverse, rough and flatted (background) concave, asymmetrical, amorphous, complex (mid and foreground)	Moderate, amorphous, asymmetrical	n/a
LINE	Irregular, angular and smooth, complex broken (background) subangular, undulating, converging, irregular (mid/fore)	Weak, irregular, undulating	n/a
COLOR	Deep dark black browns, warm yellow-red muted light grayish browns	Vibrant deep greens	n/a
TEX-TURE	Coarse, patchy, discontinuous, random, striped (back) striped, contrasting, directional, medium (mid/fore)	Gradational, medium, random	n/a

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Definite, horizontal, low, smooth (tailings)
LINE	N/A	N/A	Regular, smooth, simple, flowing (tailings)
COL OR	N/A	N/A	Bright contrasting warm grays (tailings)
TEX-TURE	N/A	N/A	Smooth, nondirectional, uniform, clumped (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form									X			
Line									X			
Color									x			
Texture									X			

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) *NOT APPLICABLE*

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)
NOT APPLICABLE

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

SECTION D. (Continued)

Comments from item 2.

Not Applicable.

Additional Mitigating Measures (See item 3)

Not Applicable.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
11-01-2018

District
Private/State

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
31- San Carlos 2A
Block Model Simulation

3. VRM Class
N/A

4. Location

Township 003S

Range 014E

Section 23

5. Location Sketch
From Skunk Camp Block Model PDF provided by Truescape. San Carlos 2A is the preferred location.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Asymmetrical, bold, rolling, curving, diagonal	Rolling, moderate, amorphous, irregular	N/A
LINE	Irregular, diagonal, subangular, sloping, complex, soft	Weak, complex, soft, converging	N/A
COLOR	Muted and dull warm browns and grays	Muted cool soft dull greens	N/A
TEXTURE	Medium, gradational, continuous, striped	Medium, gradational, continuous, dotted	N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Bold, angular, solid, horizontal, smooth, linear (tailings)
LINE	N/A	N/A	Regular, smooth, hard, simple (tailings)
COLOR	N/A	N/A	Bright light warm grays (tailings)
TEXTURE	N/A	N/A	Smooth, fine, uniform, clumped, ordered (tailings)

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form									X			
	Line									X			
	Color									x			
	Texture									x			

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No **(Explain on reverse side)**

3. Additional mitigating measures recommended? ☐ Yes ☐ No **(Explain on reverse side)**

Evaluator's Names **Date**
J. Grams 11-01-2018
E. Hunt

SECTION D. (Continued)

Comments from item 2.

Not Applicable.

Additional Mitigating Measures (See item 3)

Not Applicable.

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
6-15-2019

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
32- Tailings Pipeline U.S. 60
Photograph Simulation and Google Earth Aerial View Simulation

3. VRM Class
N/A

4. Location
Township 001S
Range 013E
Section 28

5. Location Sketch
From US 60 provided by Truescape simulations.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rolling and angular.	Moderate, amorphous, asymmetrical	n/a
LINE	Angular, irregular.	Weak, irregular, undulating	n/a
COLOR	Tans, browns.	Vibrant deep greens	n/a
TEXTURE	Coarse, uneven.	Gradational, medium, random	n/a

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Smooth	Sparse	N/A
LINE	Straight, linear	Sparse	N/A
COLOR	Tan, light brown	Sparse	N/A
TEXTURE	Smooth	Sparse	N/A

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form									X			
Line									X			
Color									x			
Texture									X			

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) YES

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)

Evaluator's Names
J. Grams
E. Hunt

Date
6-15-2019

SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3)

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U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date
6-15-2019

District
Tonto National Forest

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Resolution Copper Mine

2. Key Observation Point
33- U.S. 60 Transmission Lines
Photograph Simulation

3. VRM Class
N/A

4. Location
Township 001S
Range 013E
Section 29

5. Location Sketch
From US 60 provided by Truescape simulations.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rolling and angular.	Moderate, amorphous, asymmetrical	Straight, bold
LINE	Angular, irregular.	Weak, irregular, undulating	Regular
COLOR	Tans, browns.	Vibrant deep greens	Gray
TEXTURE	Coarse, uneven.	Gradational, medium, random	Even, regular

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	N/A	N/A	Straight, bold
LINE	N/A	N/A	Regular
COLOR	N/A	N/A	Gray
TEXTURE	N/A	N/A	Even, regular

SECTION D. CONTRAST RATING ☐ SHORT TERM ☑ LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form									X			
Line									X			
Color									x			
Texture									X			

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) Yes

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)

Evaluator's Names
J. Grams
E. Hunt

Date
6-15-2019

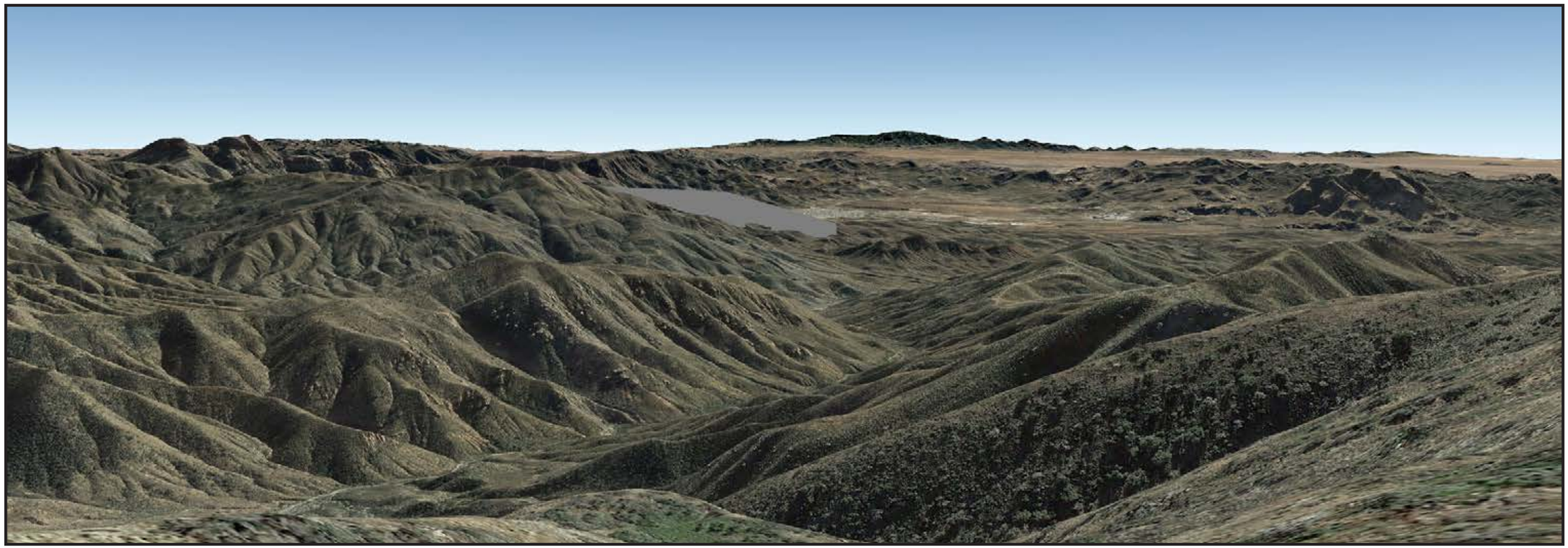
SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3)

U.S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Appendix C.



Block Models - Existing & Proposed
19 February 2019

www.truescape.com

Overall KOP Locations

Truescape®

Alternative 2

- Arizona Trail Northwest of Montana Mountain
- Picket Post Mountain
- Apache Leap

Alternative 4

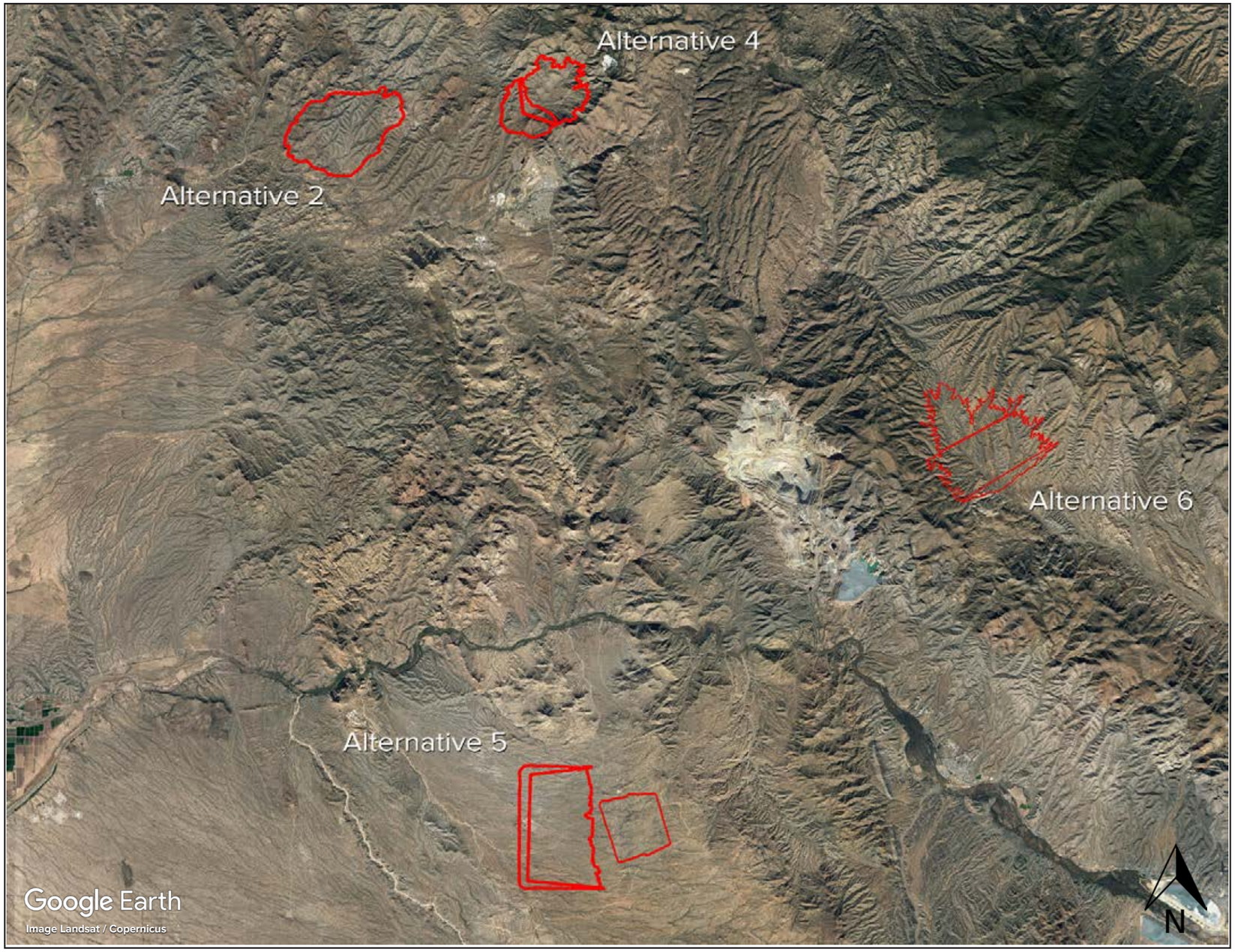
- Picket Post Mountain
- Apache Leap
- Arizona Trail - Montana Mountain

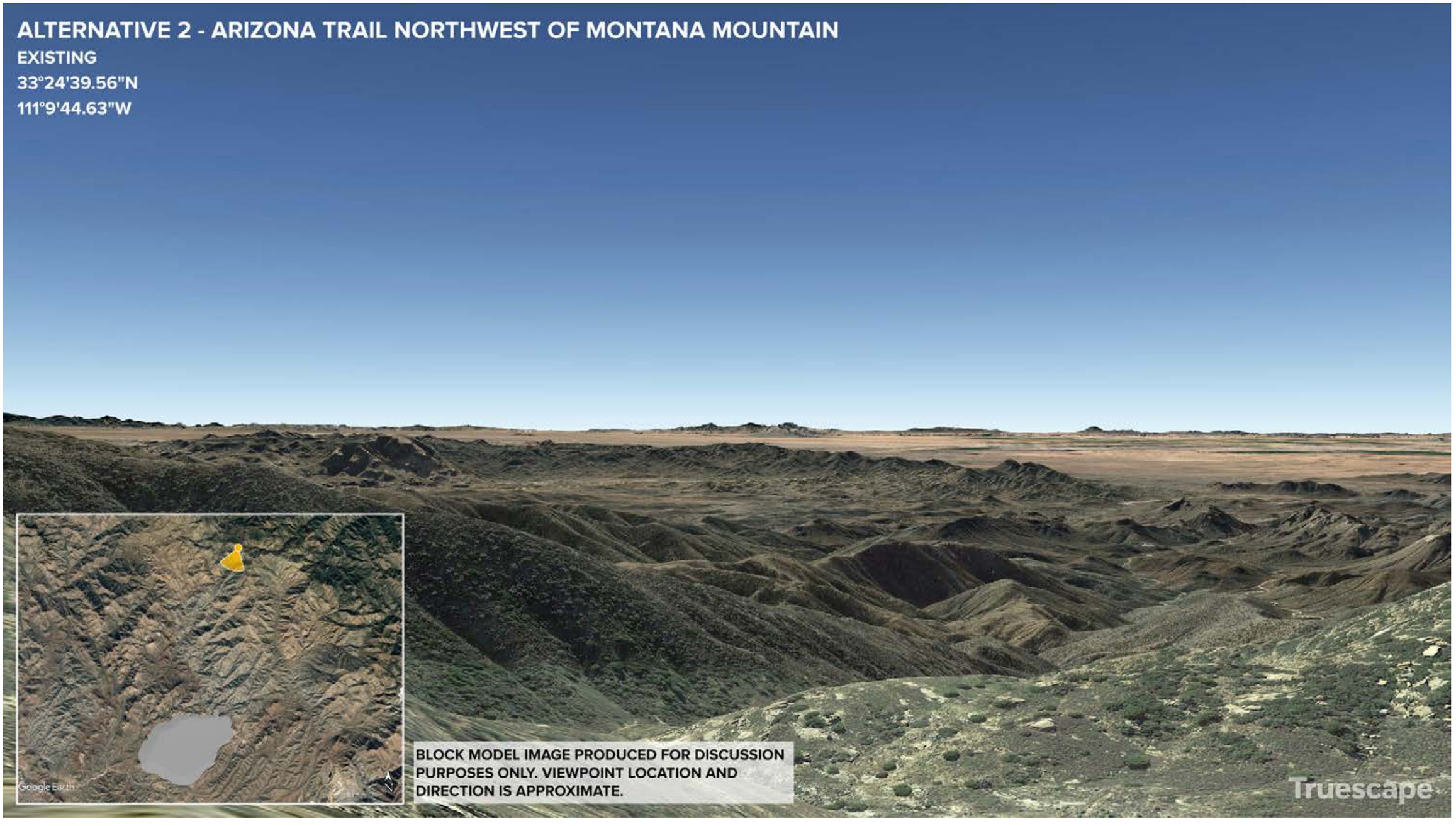
Alternative 5

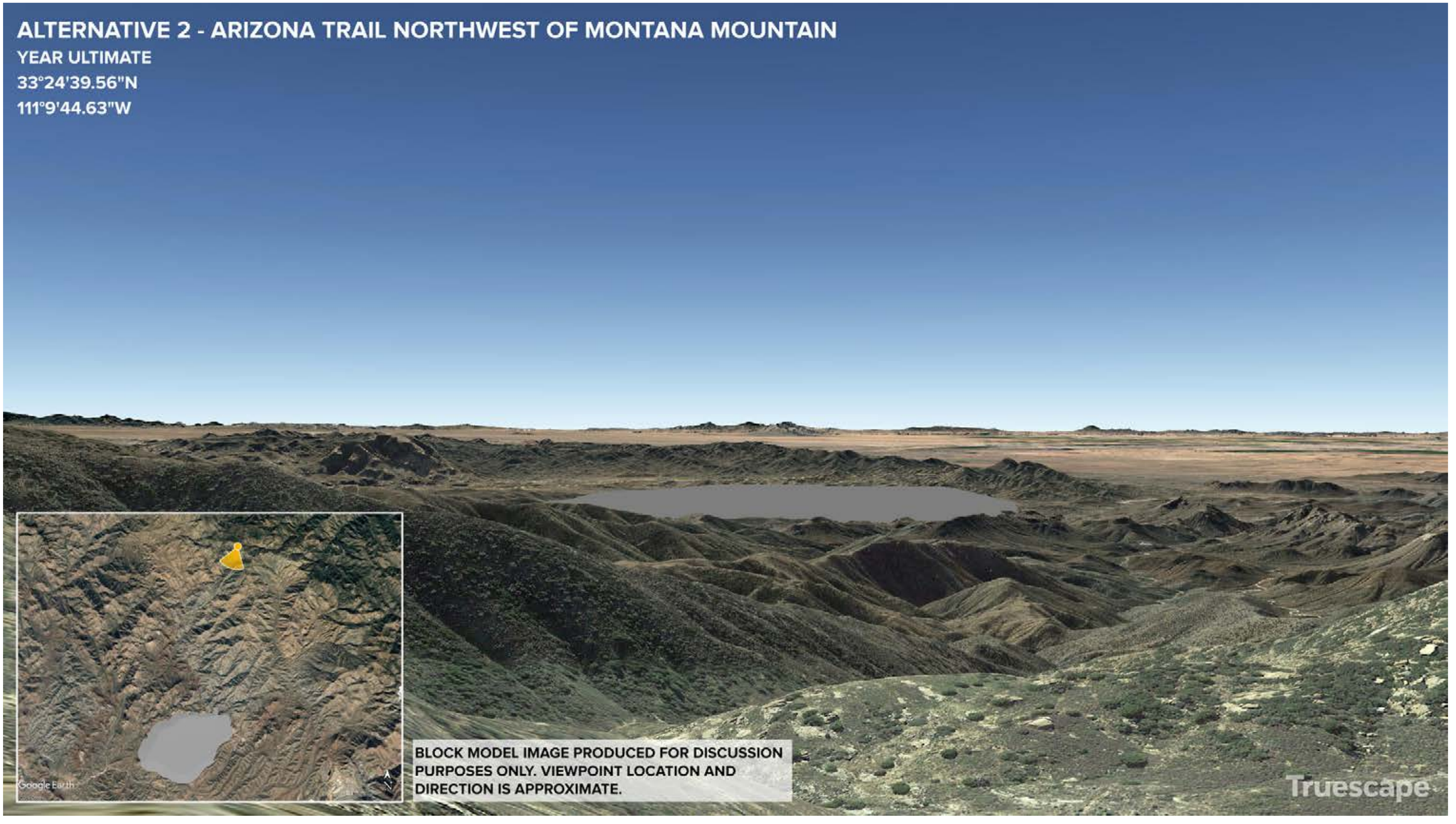
- Arizona Trail - Peg Leg North
- Arizona Trail - Tortilla Mountains

Alternative 6

- Pinal Peak
- San Carlos 2A

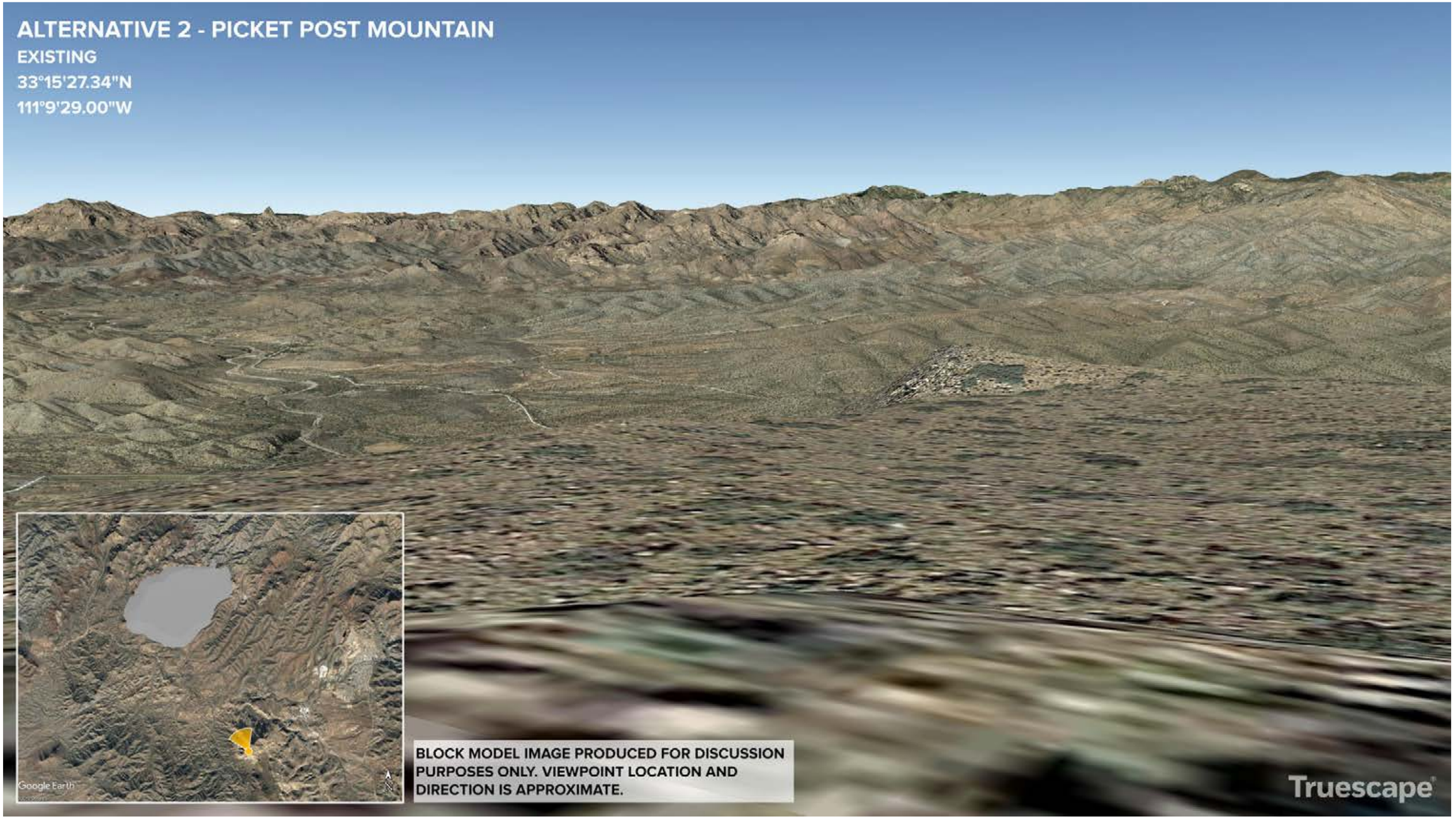



ALTERNATIVE 2 - ARIZONA TRAIL NORTHWEST OF MONTANA MOUNTAIN
EXISTING
33°24'39.56"N
111°9'44.63"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape


ALTERNATIVE 2 - ARIZONA TRAIL NORTHWEST OF MONTANA MOUNTAIN
YEAR ULTIMATE
33°24'39.56"N
111°9'44.63"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape

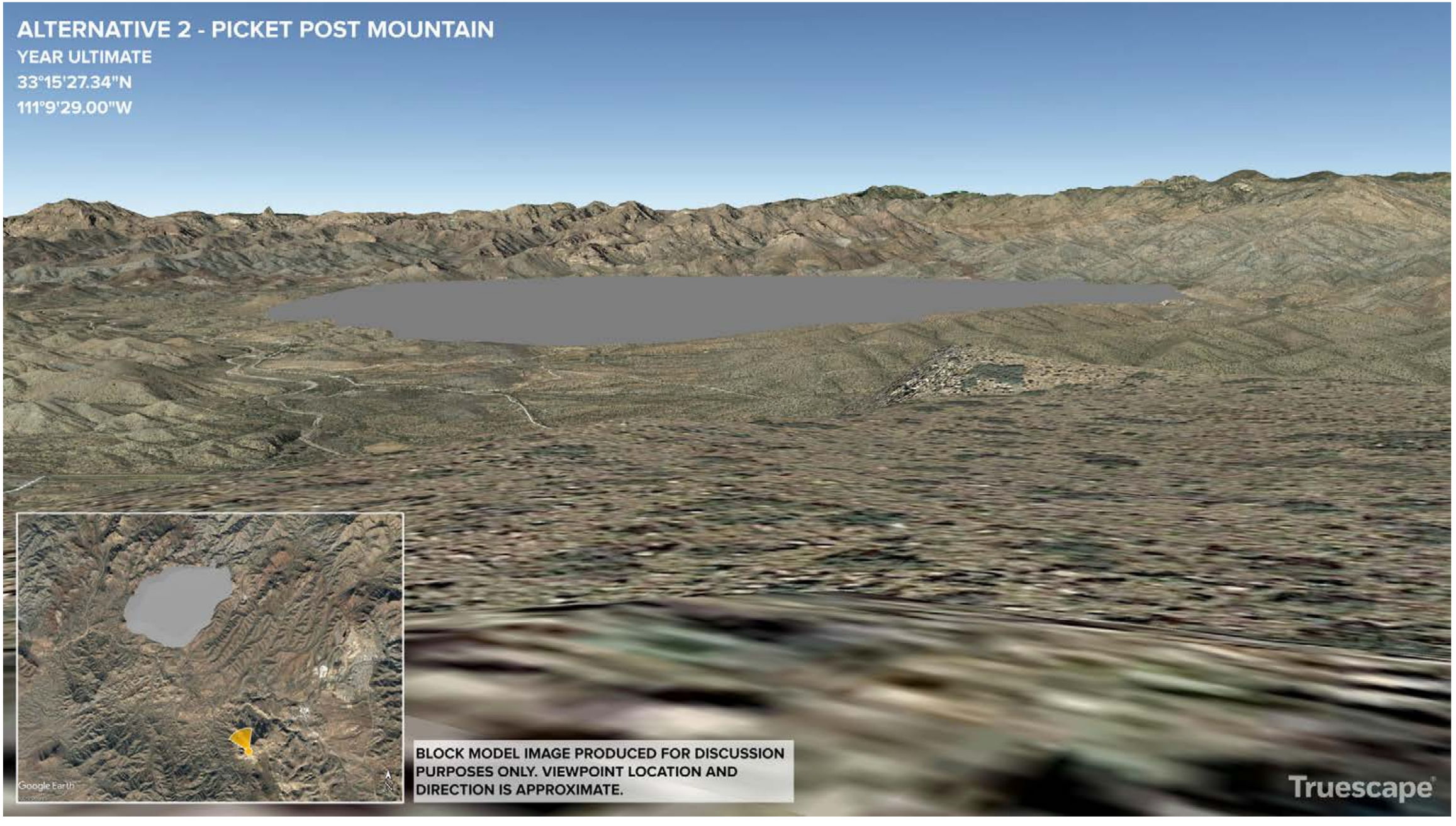
Alternative 2 - Picket Post Mountain - Existing

Truescape®



Alternative 2 - Picket Post Mountain - Proposed

Truescape®

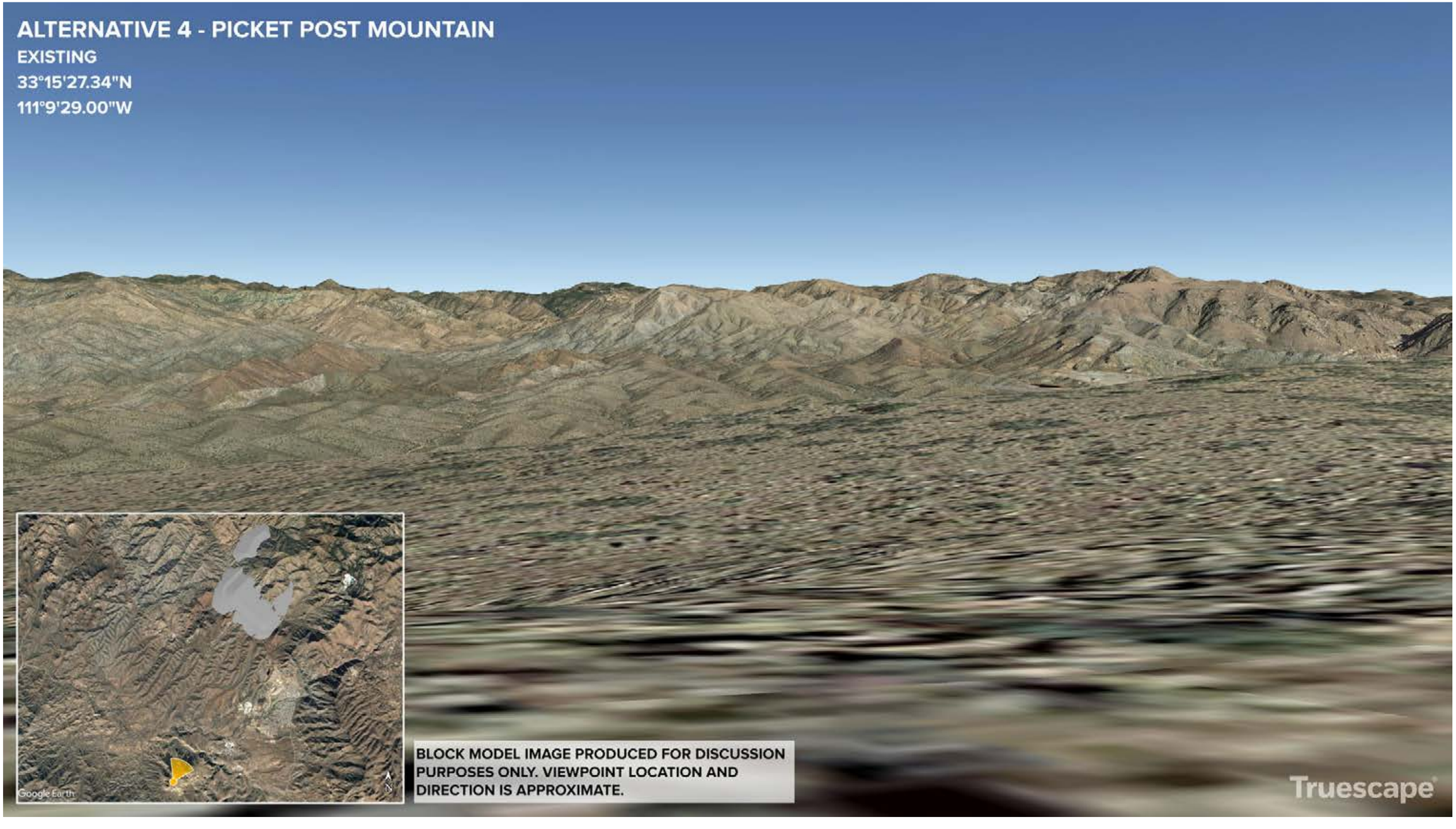



ALTERNATIVE 2 - APACHE LEAP - TAILINGS
EXISTING
33°16'57.52"N
111° 4'27.57"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape


ALTERNATIVE 2 - APACHE LEAP - TAILINGS
YEAR ULTIMATE
33°16'57.52"N
111° 4'27.57"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape

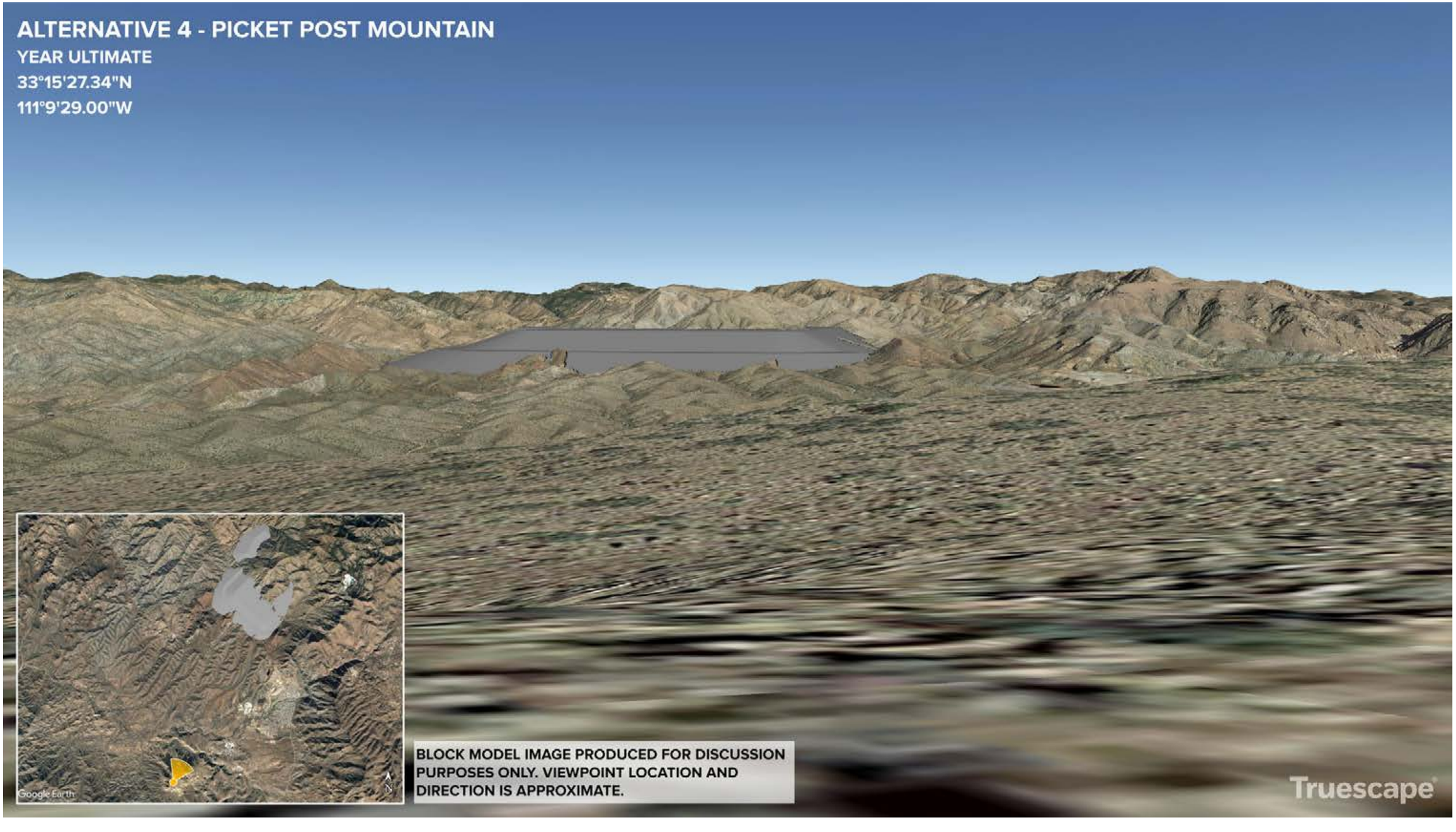
Alternative 4 - Picket Post Mountain - Existing

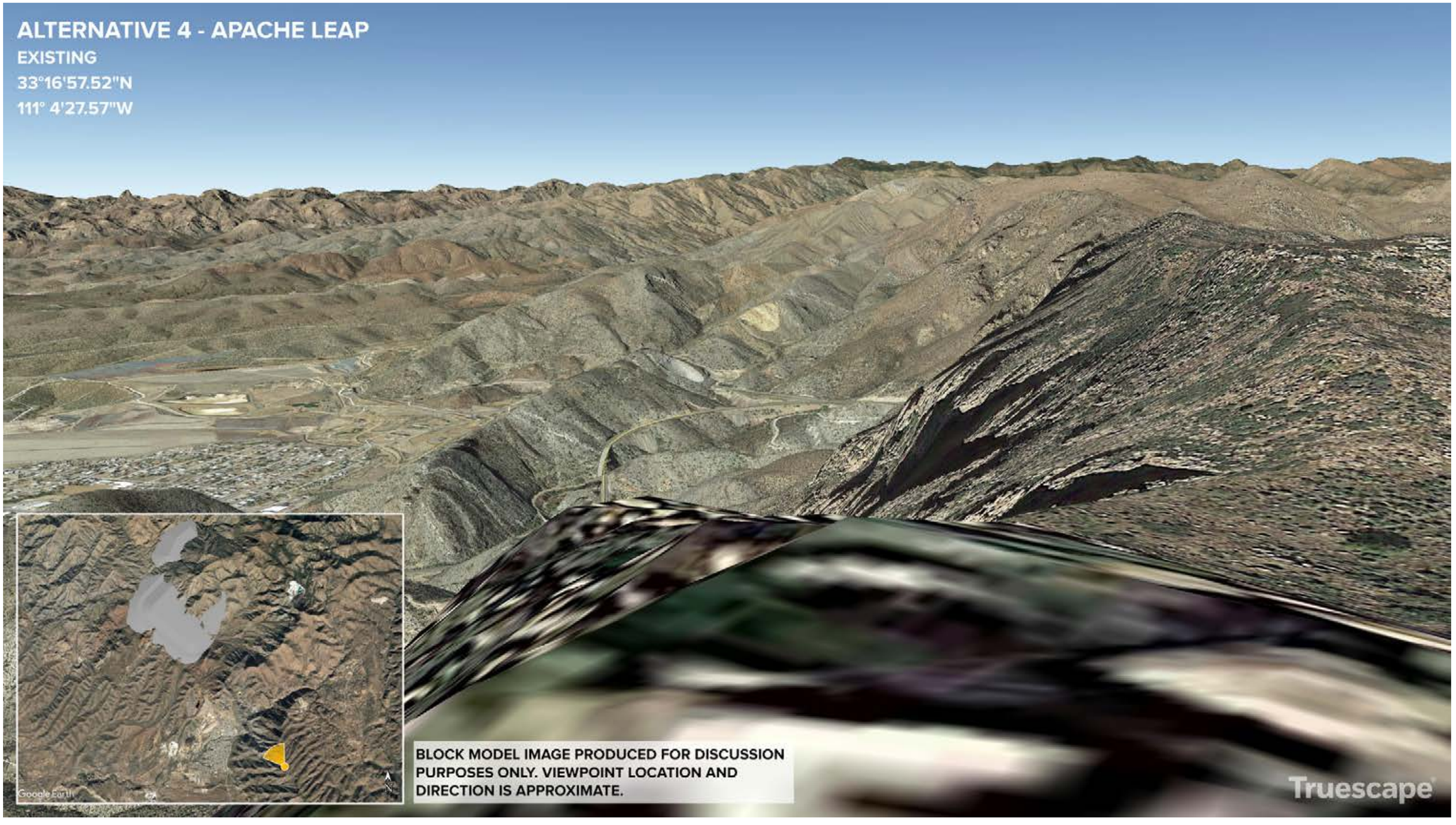
Truescape®



Alternative 4 - Picket Post Mountain - Proposed

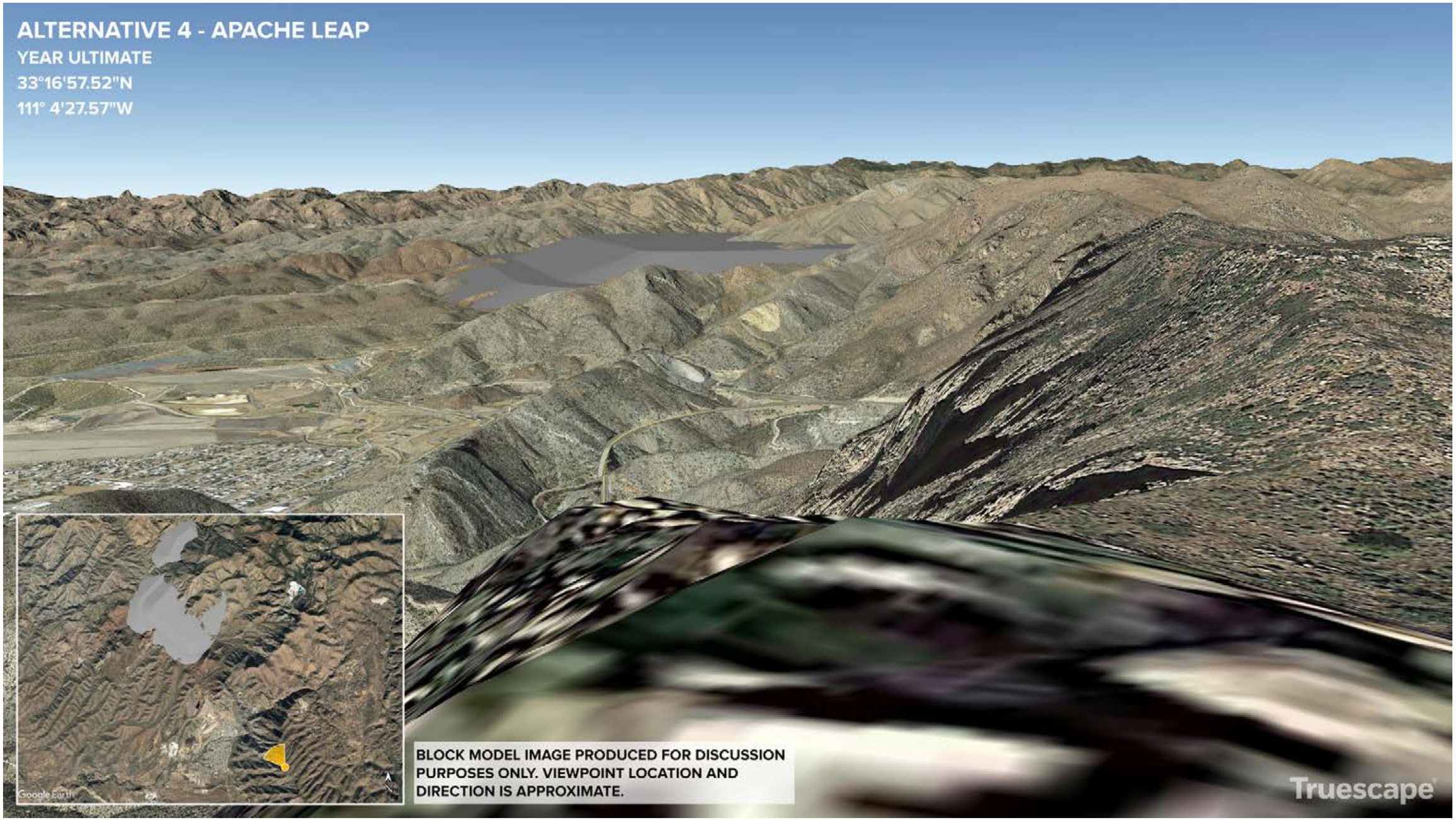
Truescape®

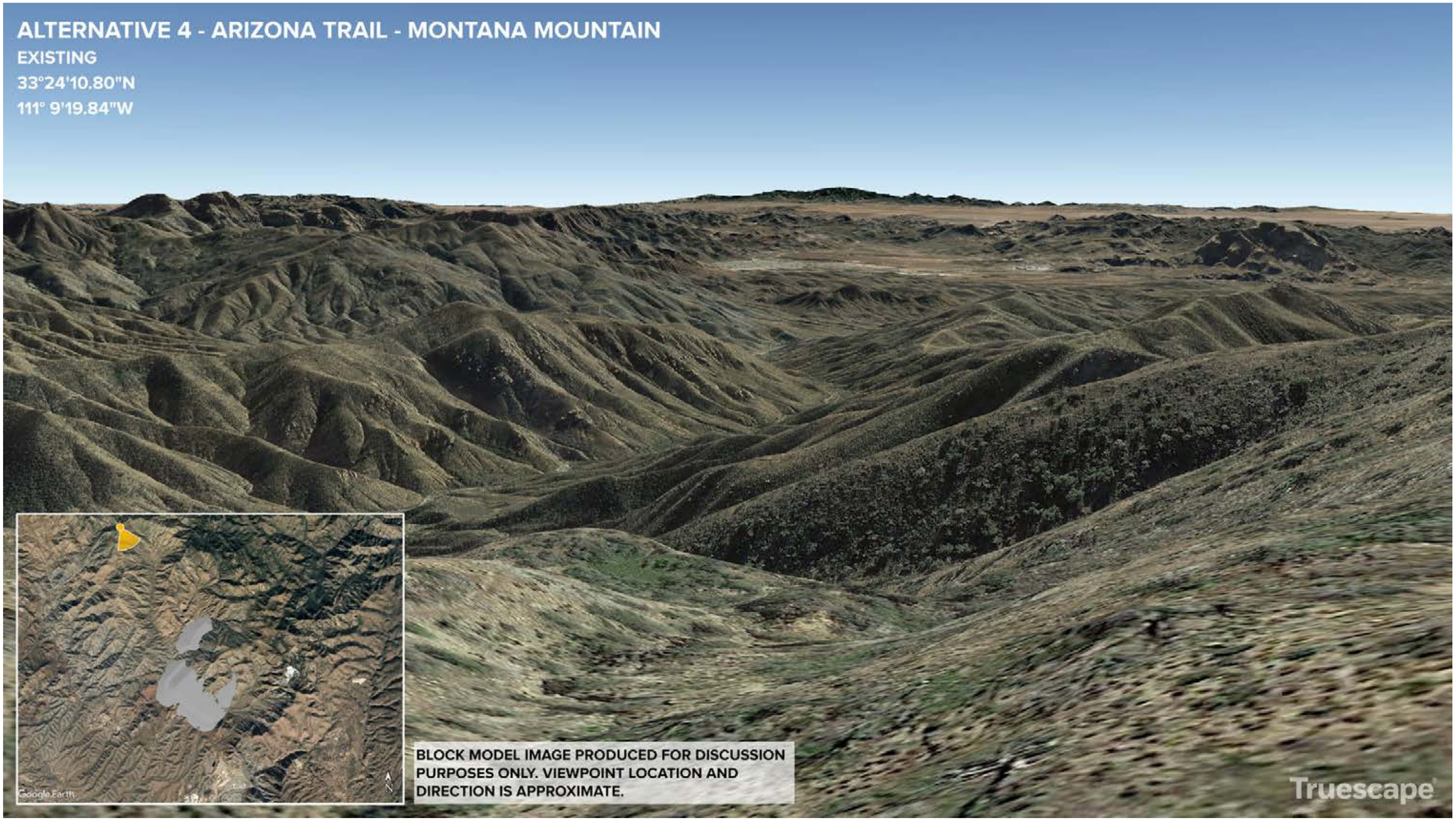



ALTERNATIVE 4 - APACHE LEAP
EXISTING
33°16'57.52"N
111° 4'27.57"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape®

Alternative 4 - Apache Leap - Proposed

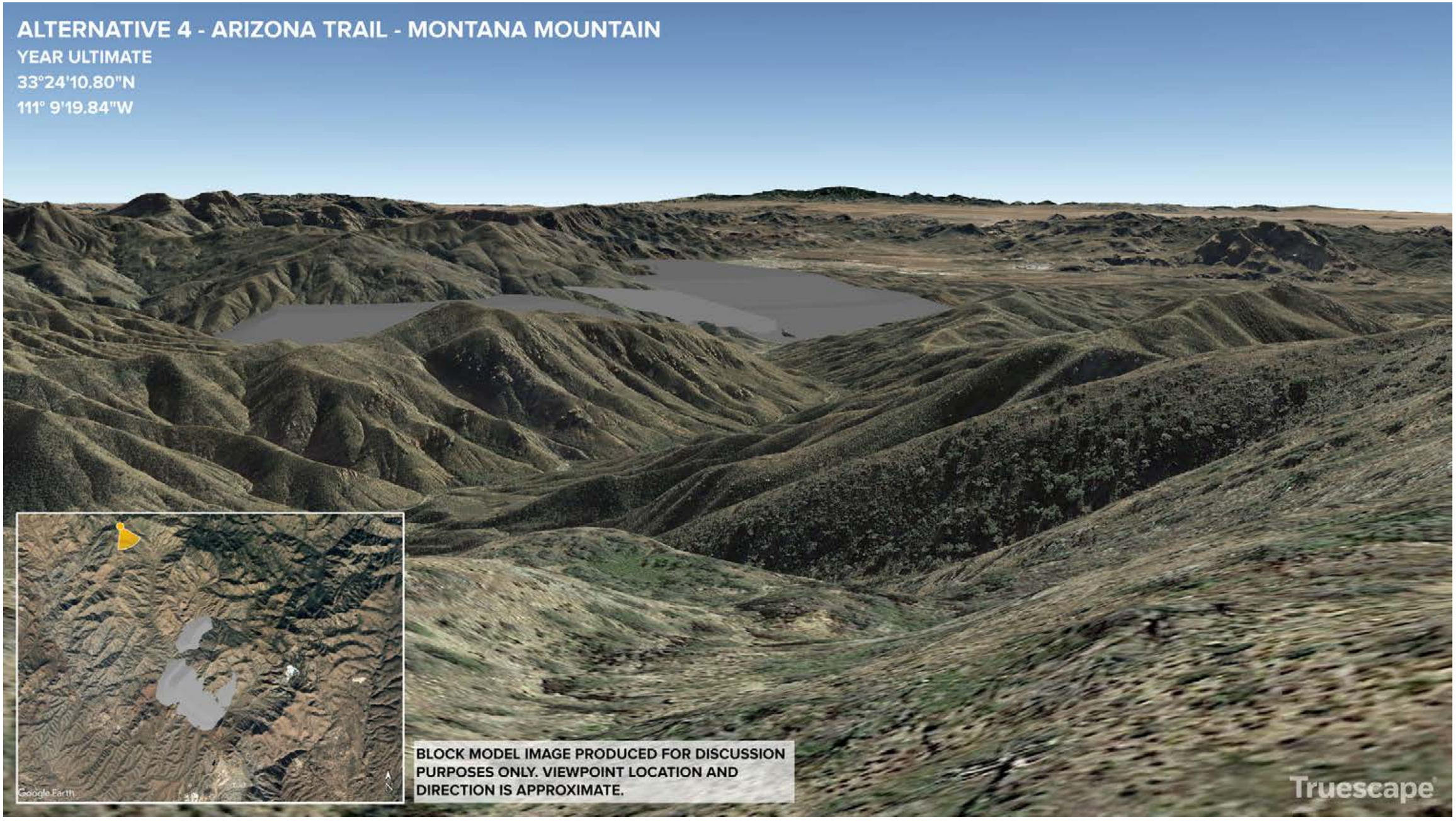
Truescape®

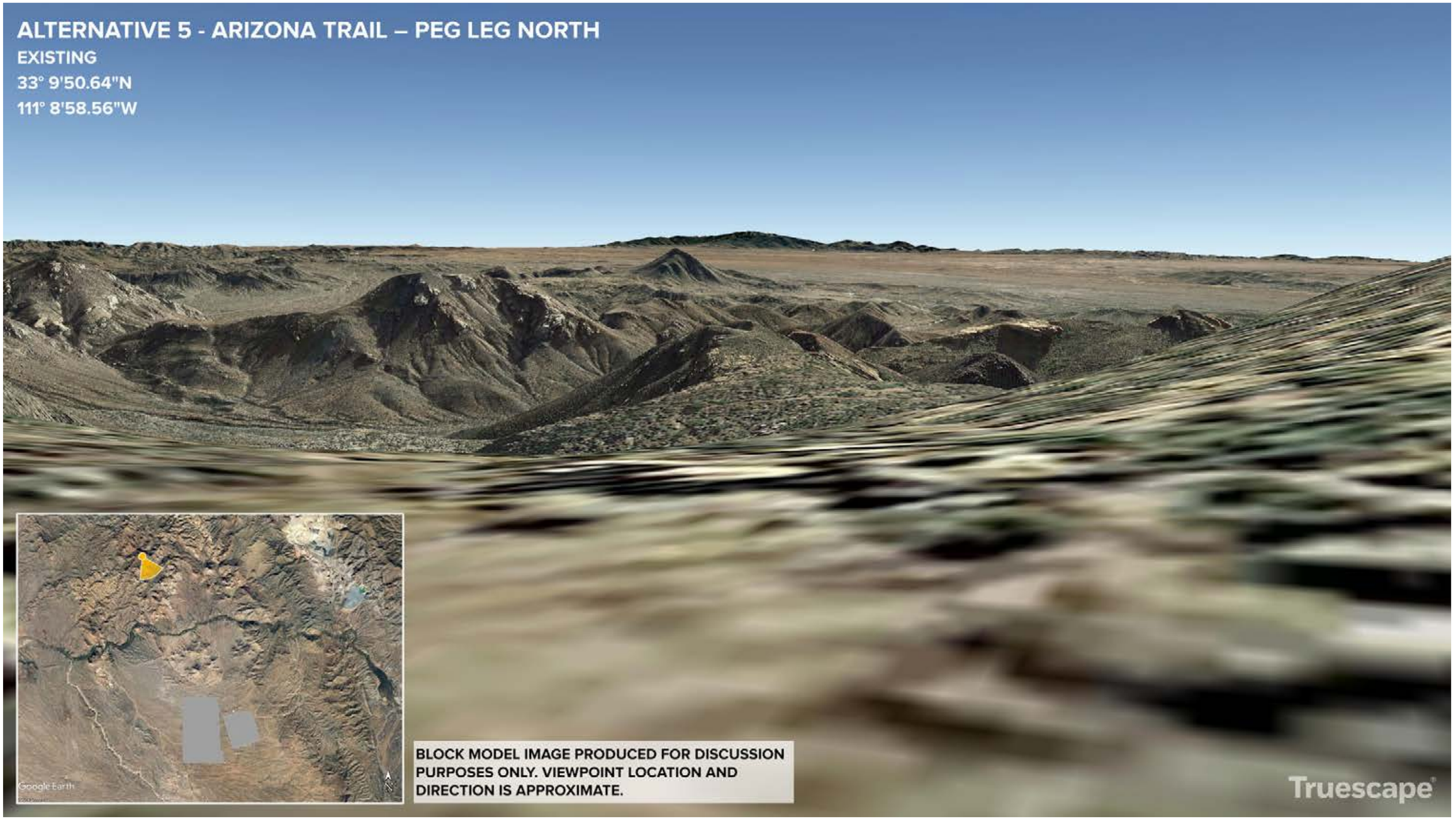



ALTERNATIVE 4 - ARIZONA TRAIL - MONTANA MOUNTAIN
EXISTING
33°24'10.80"N
111° 9'19.84"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape

Alternative 4 - Arizona Trail Mountain - Proposed

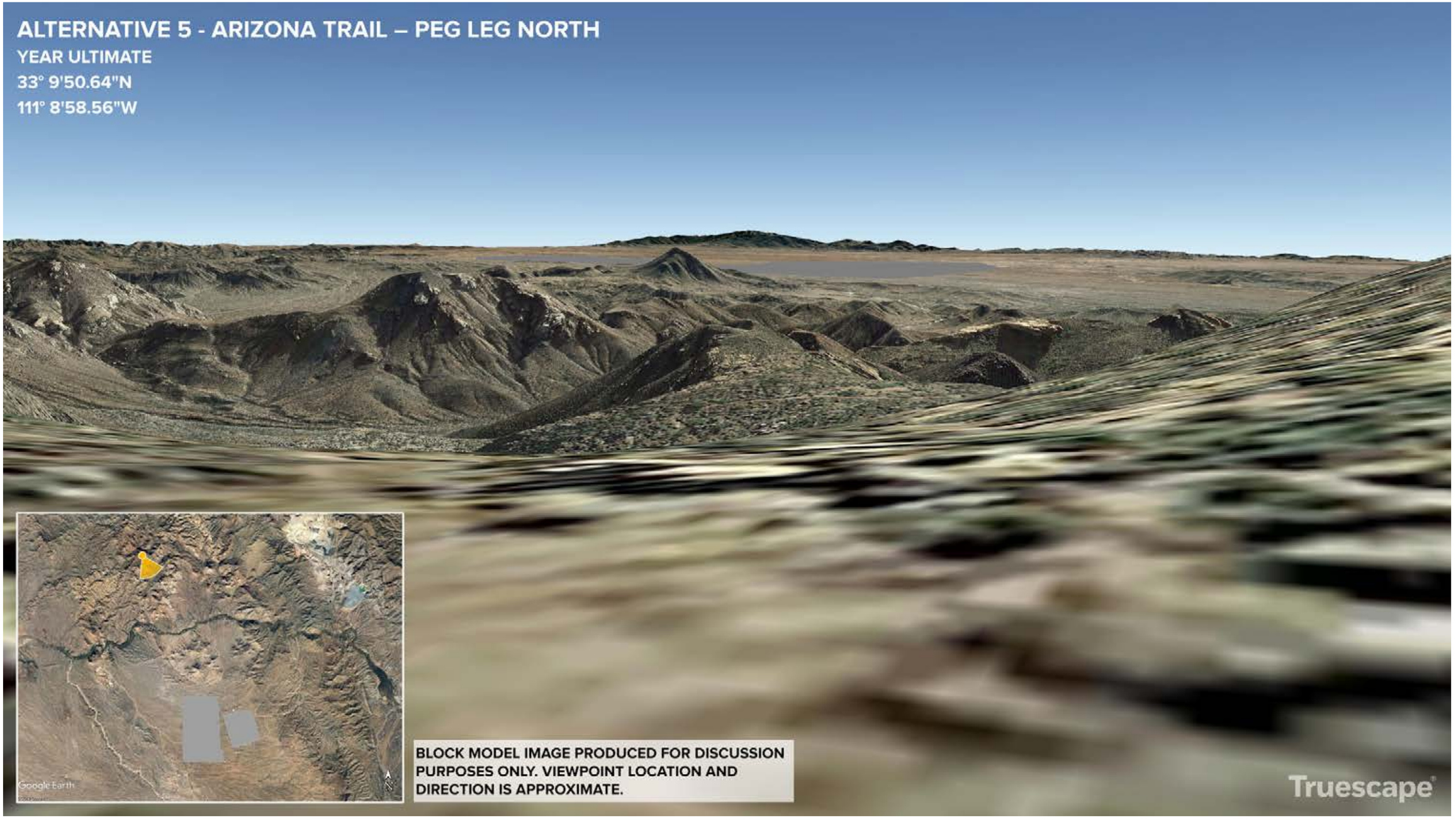
Truescape®




ALTERNATIVE 5 - ARIZONA TRAIL – PEG LEG NORTH
EXISTING
33° 9'50.64"N
111° 8'58.56"W
Google Earth
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape®

Alternative 5 - Arizona Trail - Peg Leg North - Proposed

Truescape®



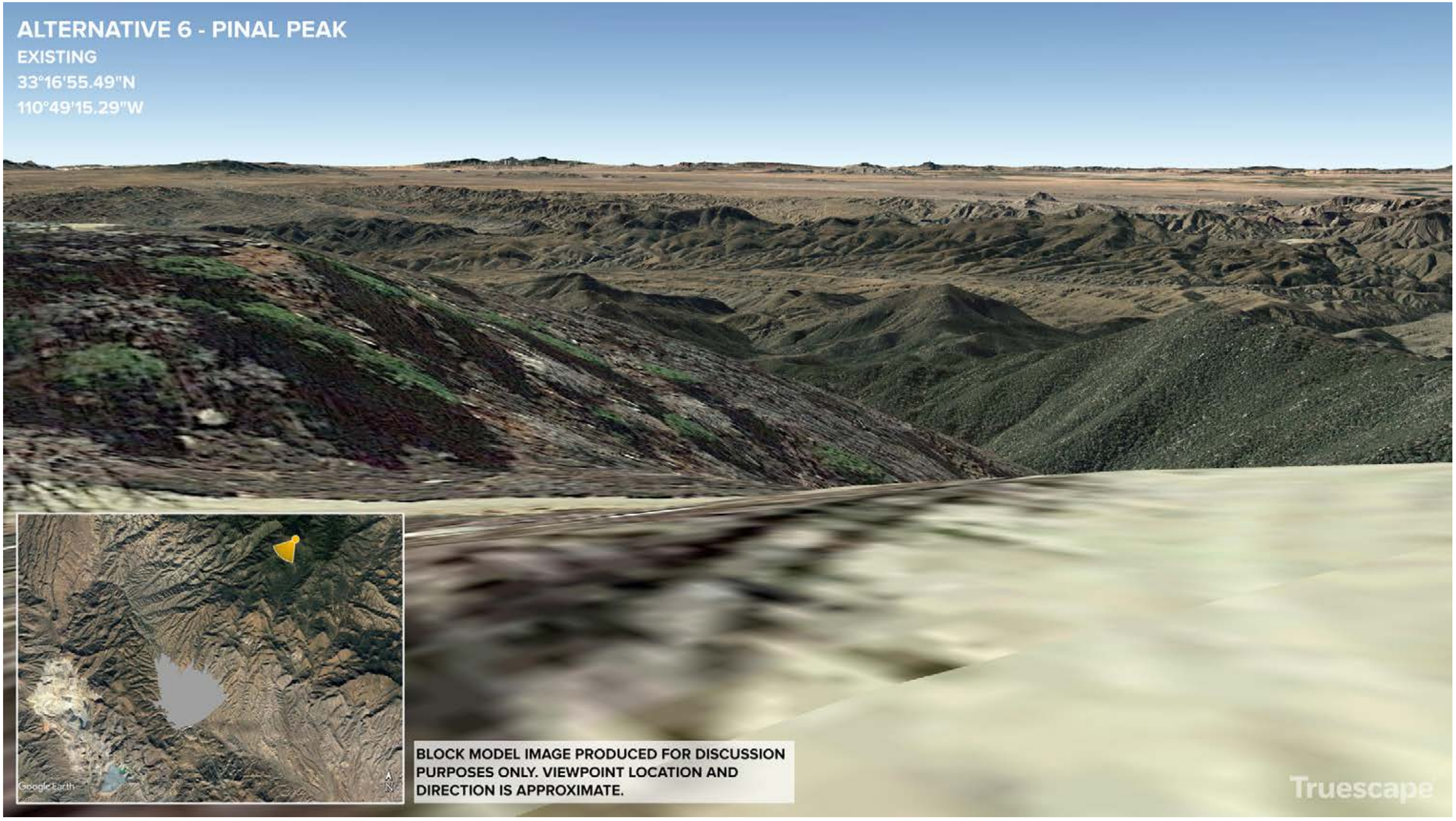

ALTERNATIVE 5 - ARIZONA TRAIL - TORTILLA MOUNTAINS
EXISTING
33° 2'45.40"N
110°58'28.91"W
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape

Alternative 5 - Arizona Trail - Tortilla Mountains - Proposed

Truescape®

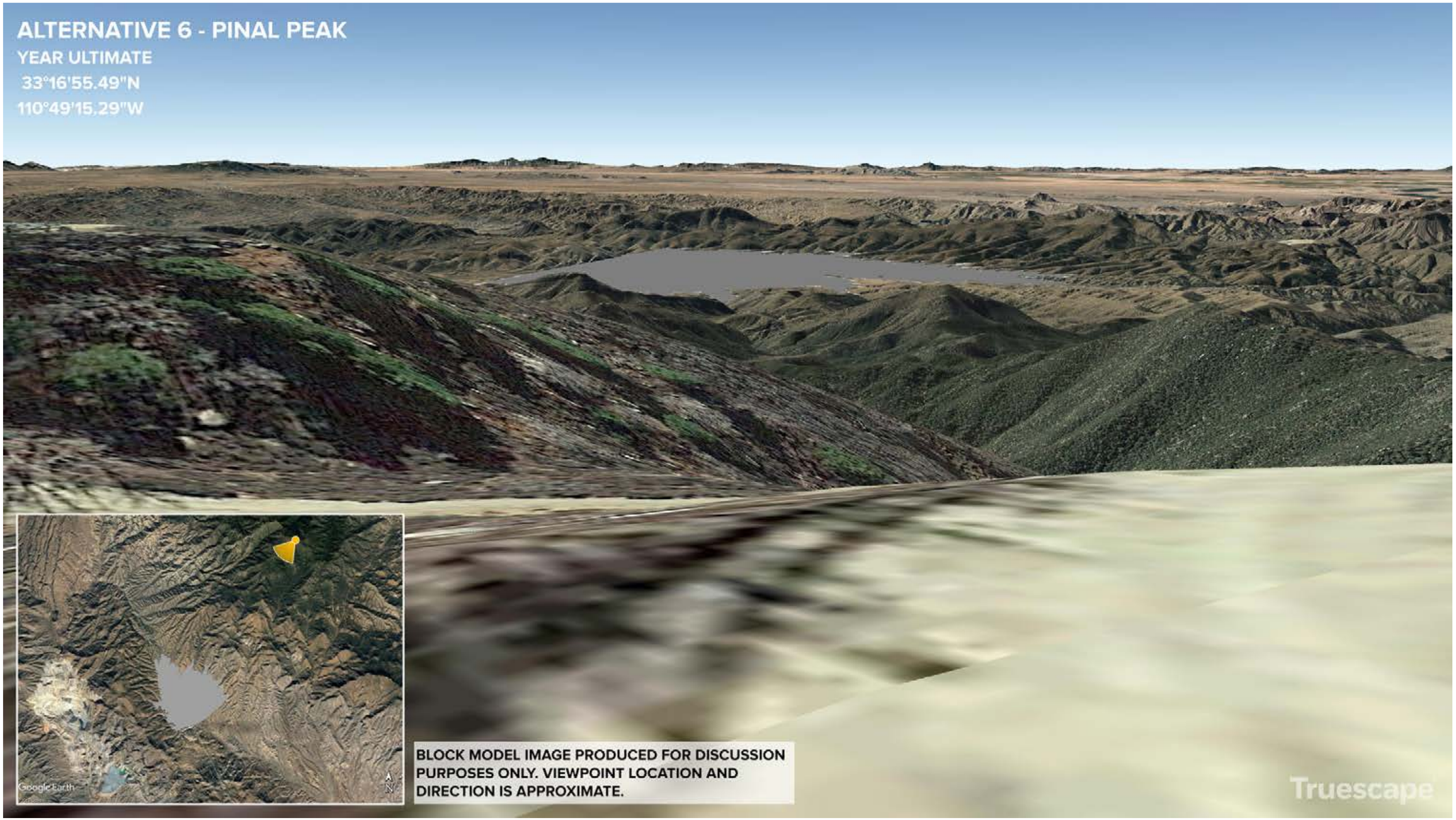
Alternative 6 - Pinal Peak - Existing

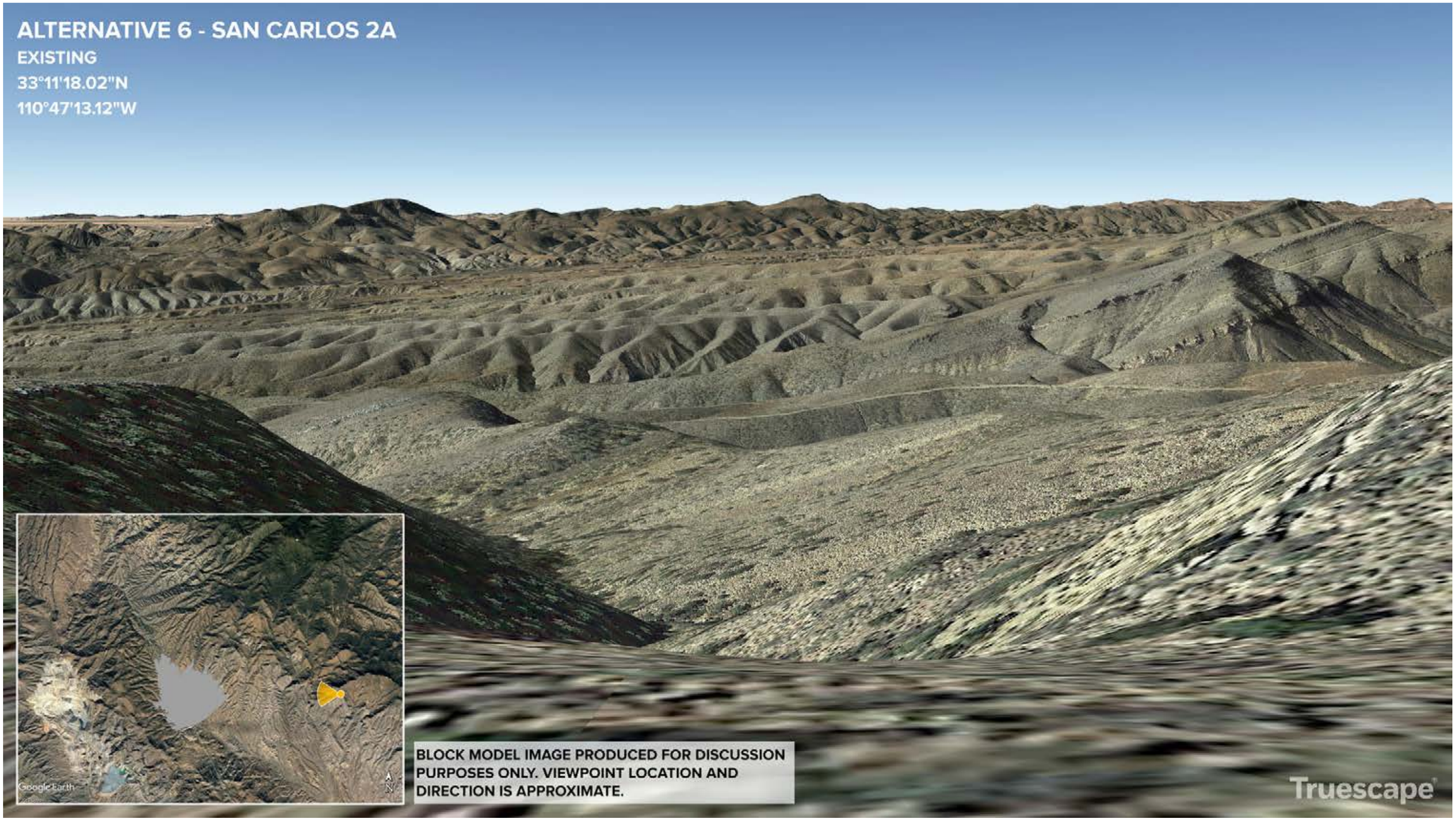
Truescape®



Alternative 6 - Pinal Peak - Proposed

Truescape®




ALTERNATIVE 6 - SAN CARLOS 2A
EXISTING
33°11'18.02"N
110°47'13.12"W
Google Earth
N
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape®

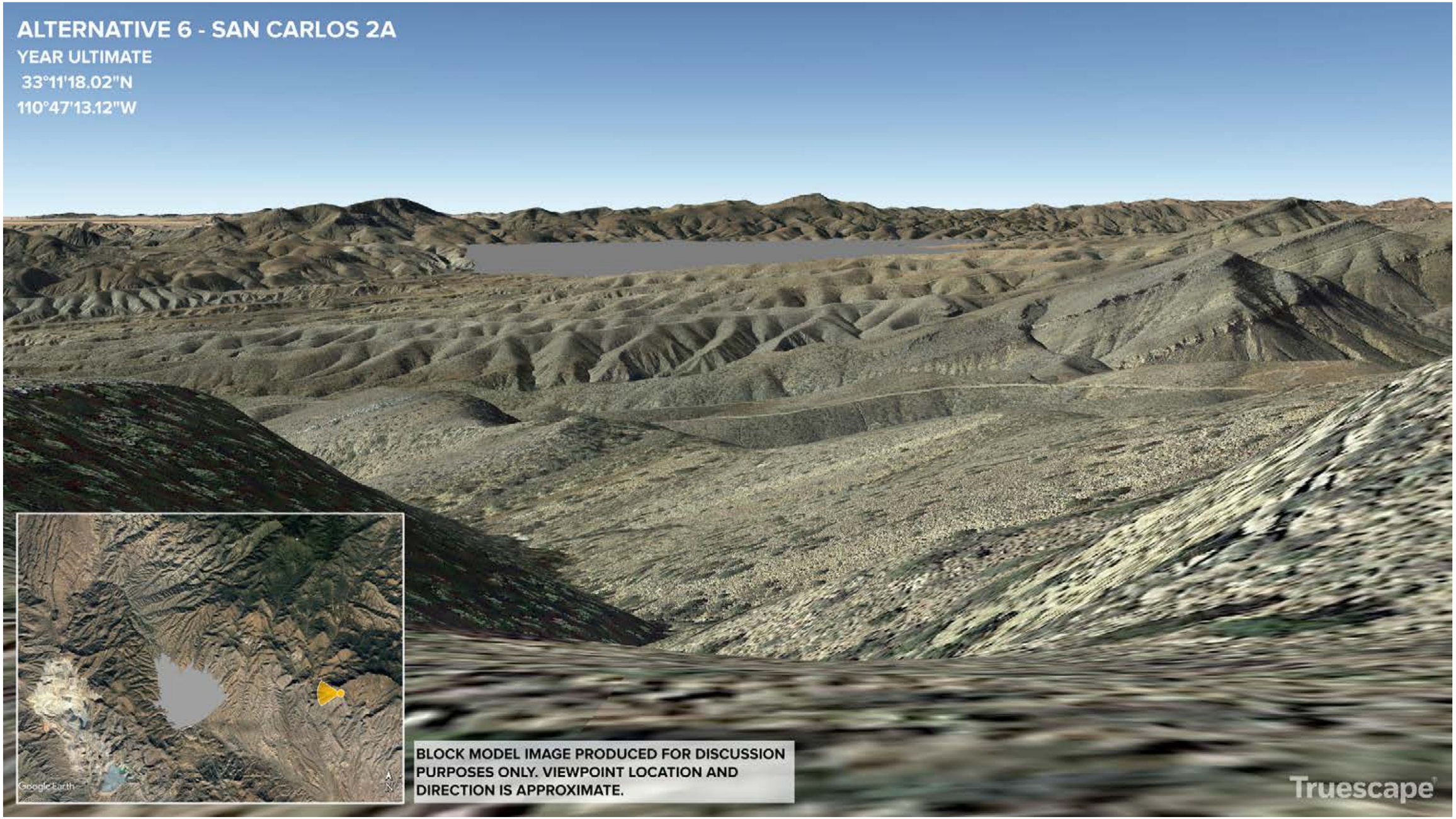

ALTERNATIVE 6 - SAN CARLOS 2A
YEAR ULTIMATE
33°11'18.02"N
110°47'13.12"W
Google Earth
N
BLOCK MODEL IMAGE PRODUCED FOR DISCUSSION PURPOSES ONLY. VIEWPOINT LOCATION AND DIRECTION IS APPROXIMATE.
Truescape®

Photo Simulations - Existing & Proposed
20 February 2019

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Overall KOP Locations

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Alternative 2

- Arizona Trail at Barnett Camp
- Arizona Trail - Ridge
- Highway 177 from Kearny
- Pickett Post House (Boyce Thompson)
- Forest Road 172
- US 60, Milepost 219
- Arizona Trail at Picket Post Trailhead
- Queen Valley - North Charlotte Street

Alternative 4

- Superior, South Stone Avenue
- Superior, Baseball Field
- Arizona Trail – Ridge
- US 60, Near Silver King Wash
- Highway 177 from Kearny
- Picket Post House (Boyce Thompson)
- Arizona Trail at Picket Post Trailhead

Alternative 5

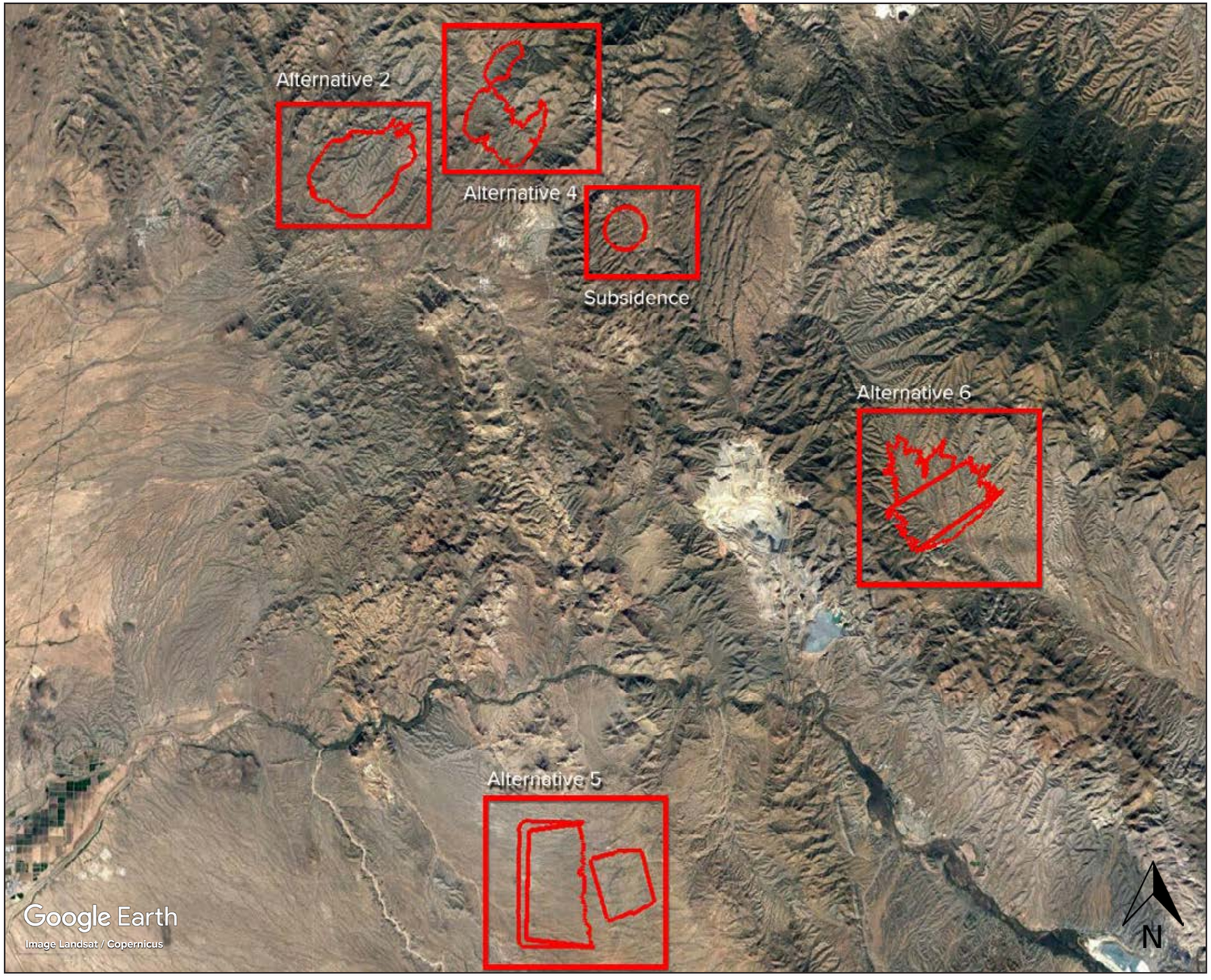
- Cochran OHV Parking - Boulder Area
- Cochran Road - OHV Dispersed Site
- Florence Kelvin Highway - East Side
- Florence Kelvin Highway - South

Alternative 6

- Dripping Springs Road

Subsidence

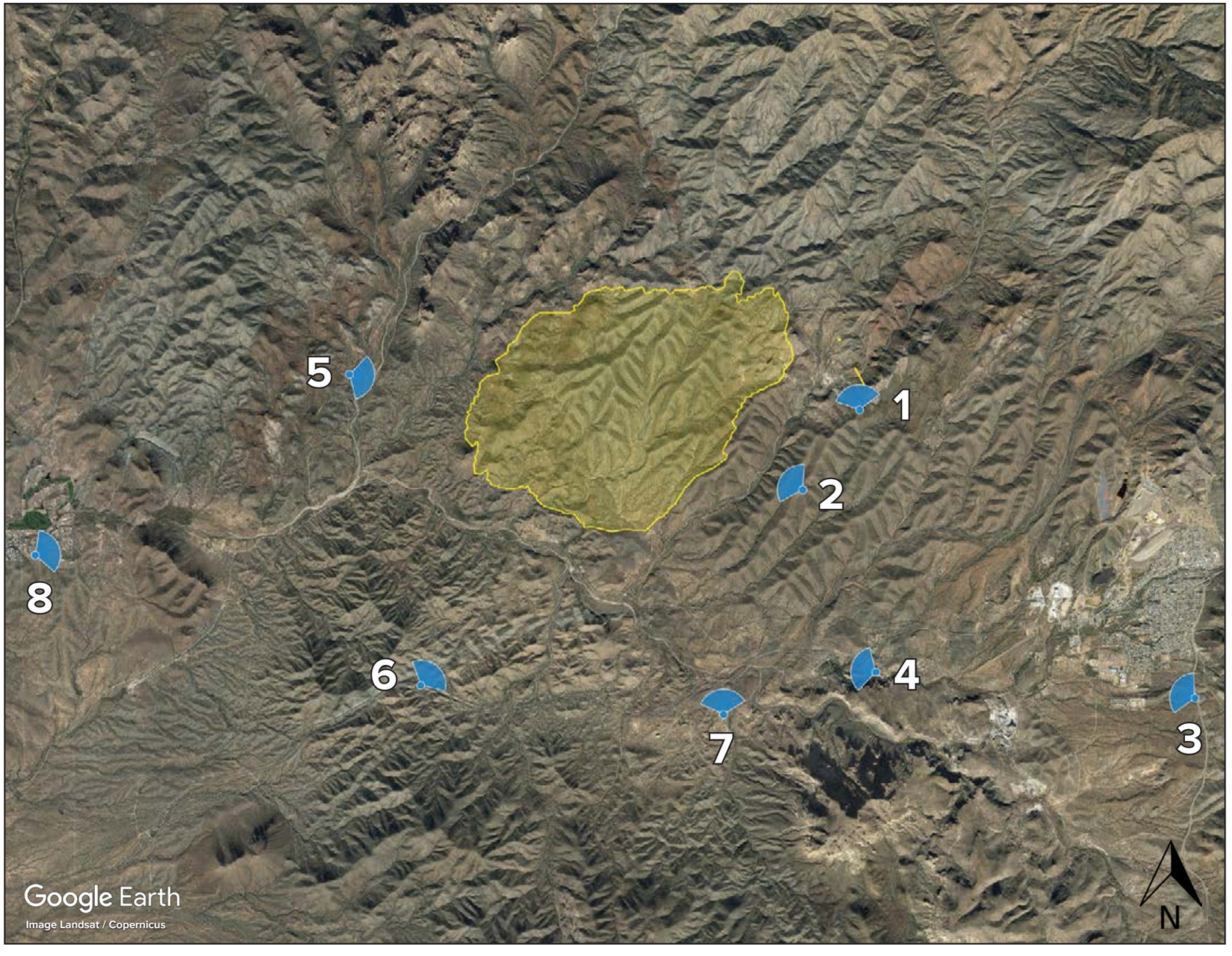
- FSR 2466 East of Subsidence Zone



Alternative Tailings 2 Locations

Truescape®

1. Arizona Trail at Barnett Camp
2. Arizona Trail - Ridge
3. Highway 177 from Kearny
4. Pickett Post House (Boyce Thompson)
5. Forest Road 172
6. US 60, Milepost 219
7. Arizona Trail at Picket Post Trailhead
8. Queen Valley - North Charlotte Street



Alternative TSF & Subsidence KOPs

Alternative Tailings 2

Arizona Trail at Barnett Camp

Viewpoint Location Project Area

Longitude:	**111° 09' 15.0048" W**
Latitude:	**33° 18' 54.7175" N**
Elevation of Viewpoint Position (ft):	**2750.4**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**13 August 2018 at 14:25 PM**
Orientation of View:	**N**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

Truescape®

www.truescape.com

DATE	SHEET
20 February 2018	4

Alternative Tailings 2

Arizona Trail - Ridge

Longitude:	**111° 09' 48.6132" W**
Latitude:	**33° 18' 14.7867" N**
Elevation of Viewpoint Position (ft):	**2766.7**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**13 August 2018 at 16:11 PM**
Orientation of View:	**WNW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 2

Highway 177 from Kearny

Longitude:	**111° 05' 52.4039" W**
Latitude:	**33° 16' 28.4160" N**
Elevation of Viewpoint Position (ft):	**2842.6**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**8 March 2016 at 14:23 PM**
Orientation of View:	**WNW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 2

Picket Post House (Boyce Thompson)

Longitude:	**111° 09' 3.1112" W**
Latitude:	**33° 16' 41.8758" N**
Elevation of Viewpoint Position (ft):	**2485.7**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**9 March 2016 at 11:27 AM**
Orientation of View:	**WNW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 2

Forest Road 172

Longitude:	**111° 14' 21.8399" W**
Latitude:	**33° 19' 11.6040" N**
Elevation of Viewpoint Position (ft):	**2173.1**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**8 March 2016 at 11:10 AM**
Orientation of View:	**ESE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 2

US 60, Milepost 219

Longitude:	**111° 13' 39.4680" W**
Latitude:	**33° 16' 35.5800" N**
Elevation of Viewpoint Position (ft):	**2549.4**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**8 March 2016 at 09:55 AM**
Orientation of View:	**NE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 2

Arizona Trail at Picket Post Trailhead

Longitude:	**111° 10' 36.4609" W**
Latitude:	**33° 16' 20.0299" N**
Elevation of Viewpoint Position (ft):	**2391.9**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 October 2015 at 14:23 PM**
Orientation of View:	**N**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 2

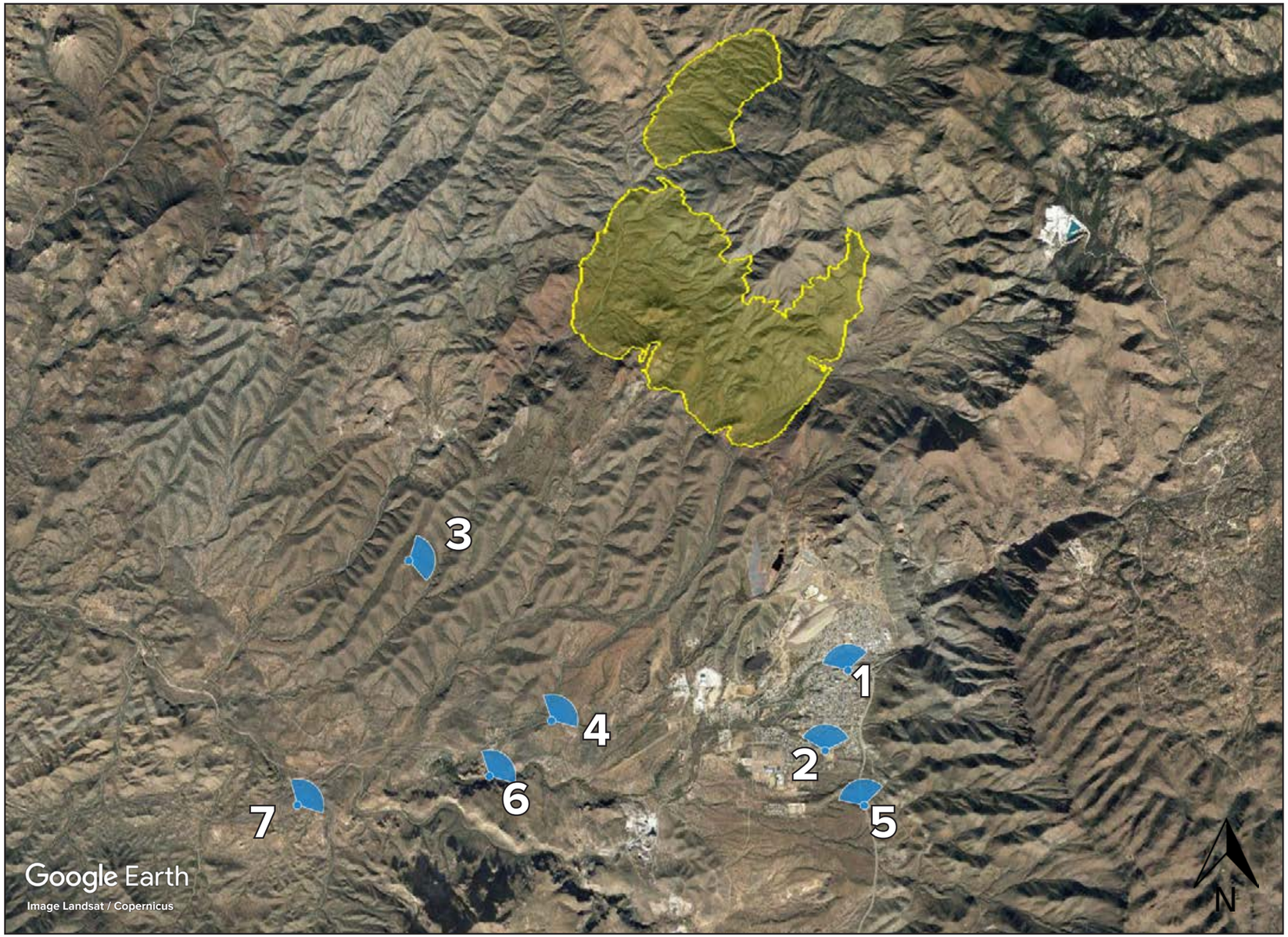
Queen Valley - North Charlotte Street

Longitude:	**111° 17' 34.1185" W**
Latitude:	**33° 17' 41.7727" N**
Elevation of Viewpoint Position (ft):	**2108.8**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**15 October 2015 at 10:13 AM**
Orientation of View:	**ENE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4 Locations

Truescape®

1. Superior, South Stone Avenue
2. Superior, Baseball Field
3. Arizona Trail – Ridge
4. US 60, Near Silver King Wash
5. Highway 177 from Kearny
6. Picket Post House (Boyce Thompson)
7. Arizona Trail at Picket Post Trailhead



Alternative Tailings 4

Superior, South Stone Avenue

Longitude:	**111° 06' 1.3696" W**
Latitude:	**33° 17' 25.6512" N**
Elevation of Viewpoint Position (ft):	**2821.4**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**12 October 2015 at 15:09 PM**
Orientation of View:	**NNW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4

Superior, Baseball Field

Longitude:	**111° 06' 11.6843" W**
Latitude:	**33° 16' 50.3457" N**
Elevation of Viewpoint Position (ft):	**2801.8**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**12 October 2015 at 16:02 PM**
Orientation of View:	**N**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4

Arizona Trail - Ridge

Longitude:	**111° 09' 48.6132" W**
Latitude:	**33° 18' 14.7867" N**
Elevation of Viewpoint Position (ft):	**2766.7**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**13 August 2018 at 16:00 PM**
Orientation of View:	**ENE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4

US 60, Near Silver King Wash

Longitude:	**111° 08' 40.3785" W**
Latitude:	**33° 17' 3.8626" N**
Elevation of Viewpoint Position (ft):	**2566.0**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 15:47 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4

Highway 177 from Kearny

Longitude:	**111° 05' 52.0091" W**
Latitude:	**33° 16' 28.3472" N**
Elevation of Viewpoint Position (ft):	**2928.2**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 15:11 PM**
Orientation of View:	**NNW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4

Picket Post House (Boyce Thompson)

Longitude:	**111° 09' 3.1674" W**
Latitude:	**33° 16' 41.8822" N**
Elevation of Viewpoint Position (ft):	**2581.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**15 August 2018 at 11:12 AM**
Orientation of View:	**NE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 4

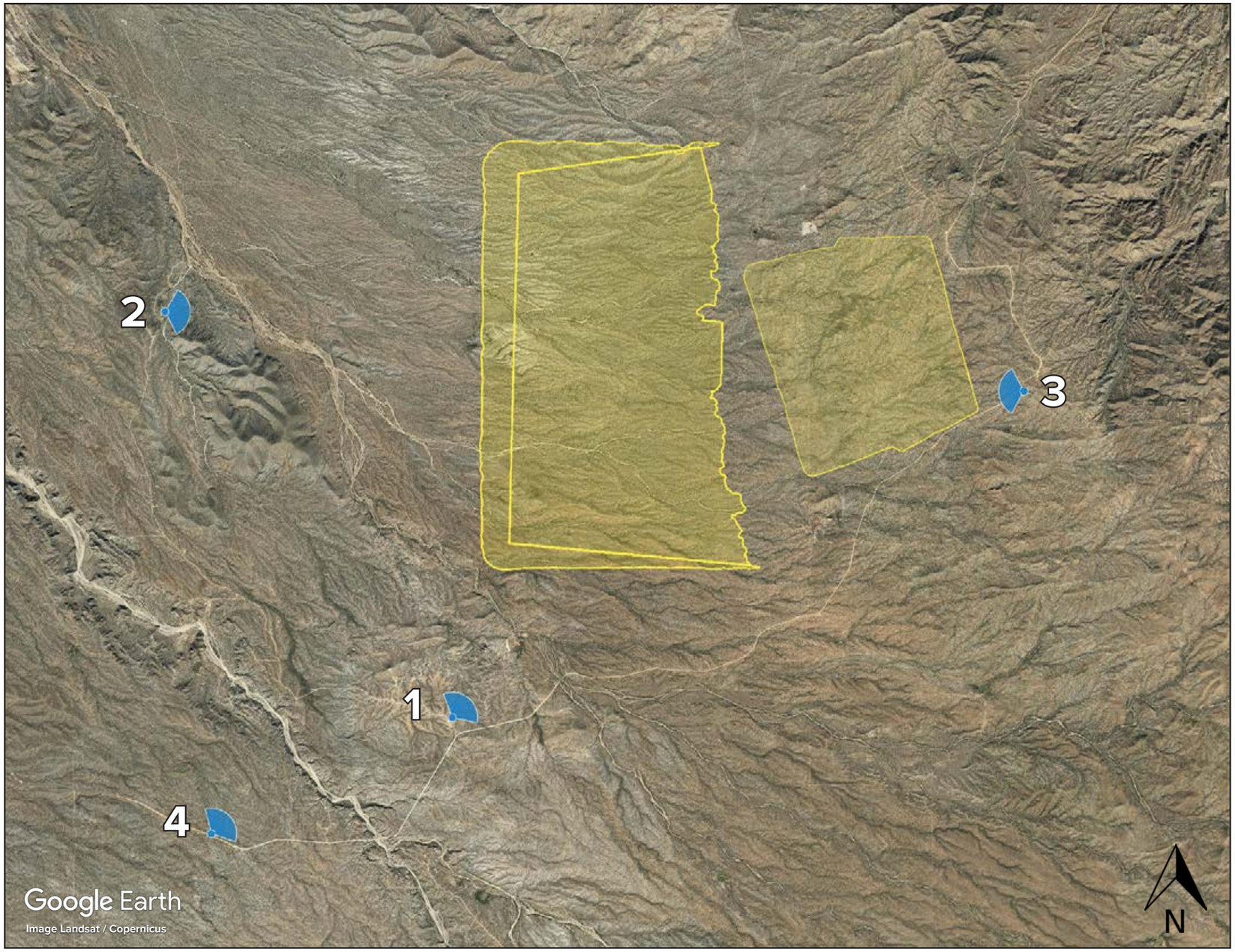
Arizona Trail at Picket Post Trailhead

Longitude:	**111° 10' 36.3223" W**
Latitude:	**33° 16' 20.0788" N**
Elevation of Viewpoint Position (ft):	**2403.7**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**13 August 2018 at 13:16 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 5 Locations

Truescape®

1. Cochran OHV Parking - Boulder Area
2. Cochran Road - OHV Dispersed Site
3. Florence Kelvin Highway - East Side
4. Florence Kelvin Highway - South



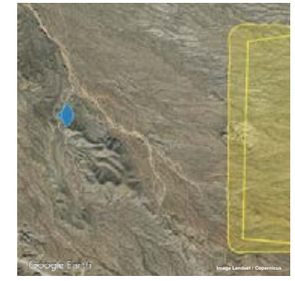
Alternative Tailings 5

Cochran OHV Parking - Boulder Area

Longitude:	**111° 06' 57.4751" W**
Latitude:	**32° 59' 19.6398" N**
Elevation of Viewpoint Position (ft):	**2706.4**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 11:14 AM**
Orientation of View:	**NE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 5

Cochran Road - OHV Dispersed Site



Longitude:	**111° 09' 25.2601" W**
Latitude:	**33° 02' 11.8240" N**
Elevation of Viewpoint Position (ft):	**2246.1**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 11:50 AM**
Orientation of View:	**E**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 5

Florence Kelvin Highway - East Side

Longitude:	**111° 02' 11.7476" W**
Latitude:	**33° 01' 40.6180" N**
Elevation of Viewpoint Position (ft):	**3201.4**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 10:30 AM**
Orientation of View:	**WNW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

Alternative Tailings 5

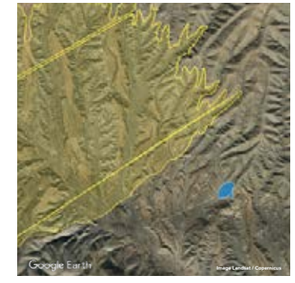
Florence Kelvin Highway - South

Longitude:	**111° 08' 59.4922" W**
Latitude:	**32° 58' 29.7253" N**
Elevation of Viewpoint Position (ft):	**2614.8**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 12:40 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

1. Dripping Springs Road

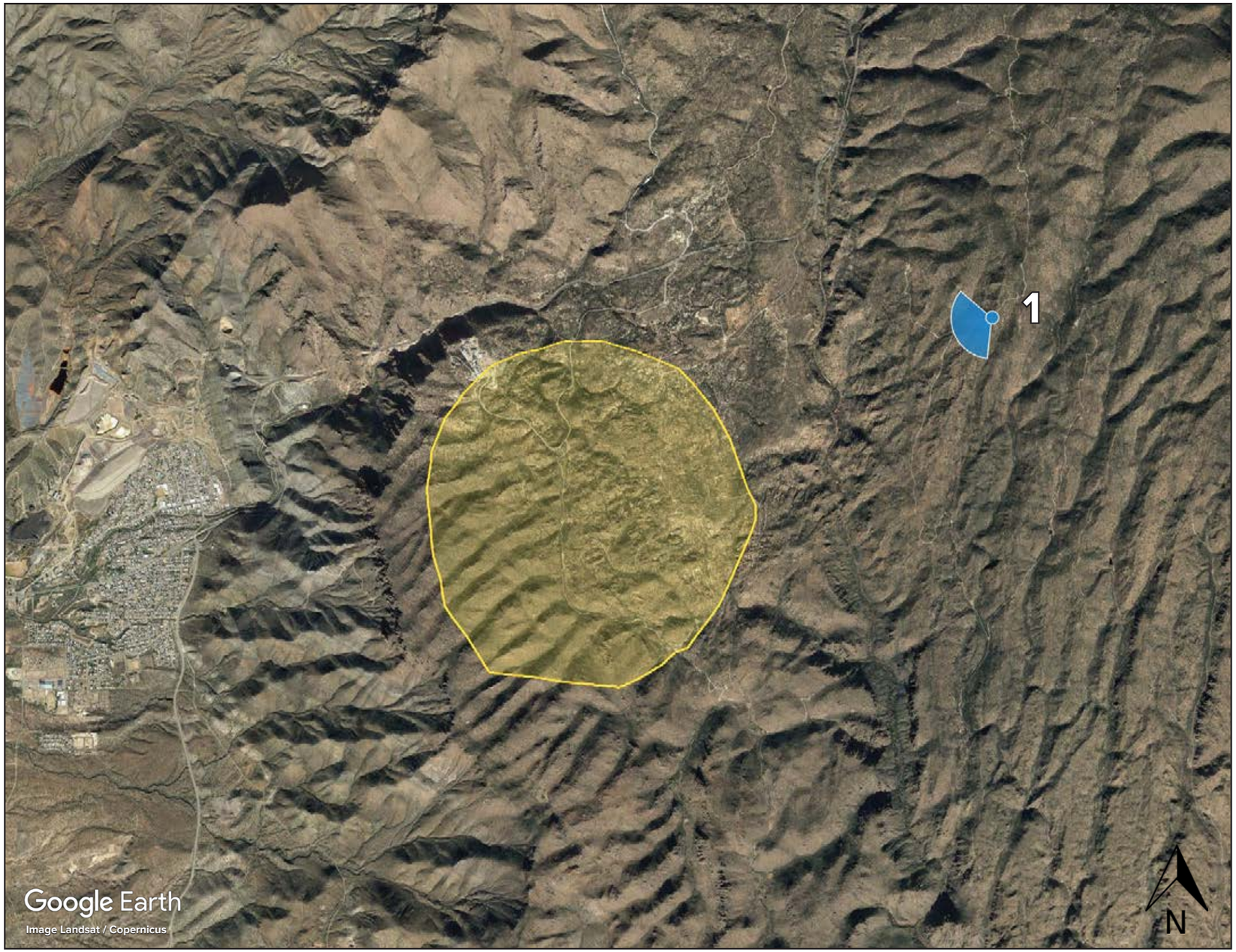
Alternative Tailings 6

Dripping Springs Road



Longitude:	**110° 52' 2.6432" W**
Latitude:	**33° 10' 20.5463" N**
Elevation of Viewpoint Position (ft):	**3226.1**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 08:40 AM**
Orientation of View:	**NW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

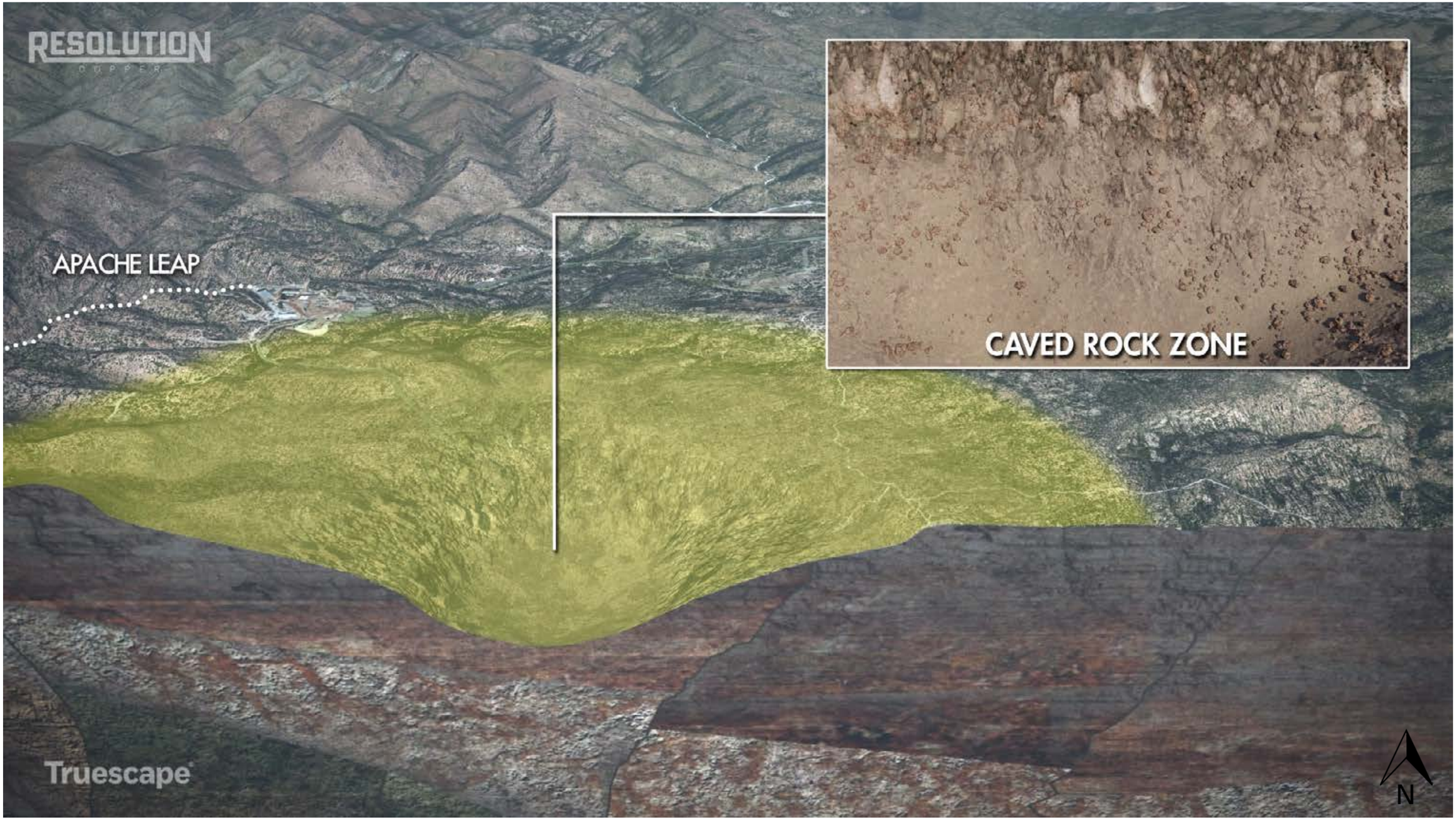
1. FSR 2466 East of Subsidence Zone



Subsidence Zone

FSR 2466 - East of Subsidence Zone

Longitude:	**111° 01' 5.5698" W**
Latitude:	**33° 18' 28.6831" N**
Elevation of Viewpoint Position (ft):	**4679.4**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**15 August 2018 at 08:43 AM**
Orientation of View:	**WSW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**


RESOLUTION
COPPER
APACHE LEAP
CAVED ROCK ZONE
Truescape
N

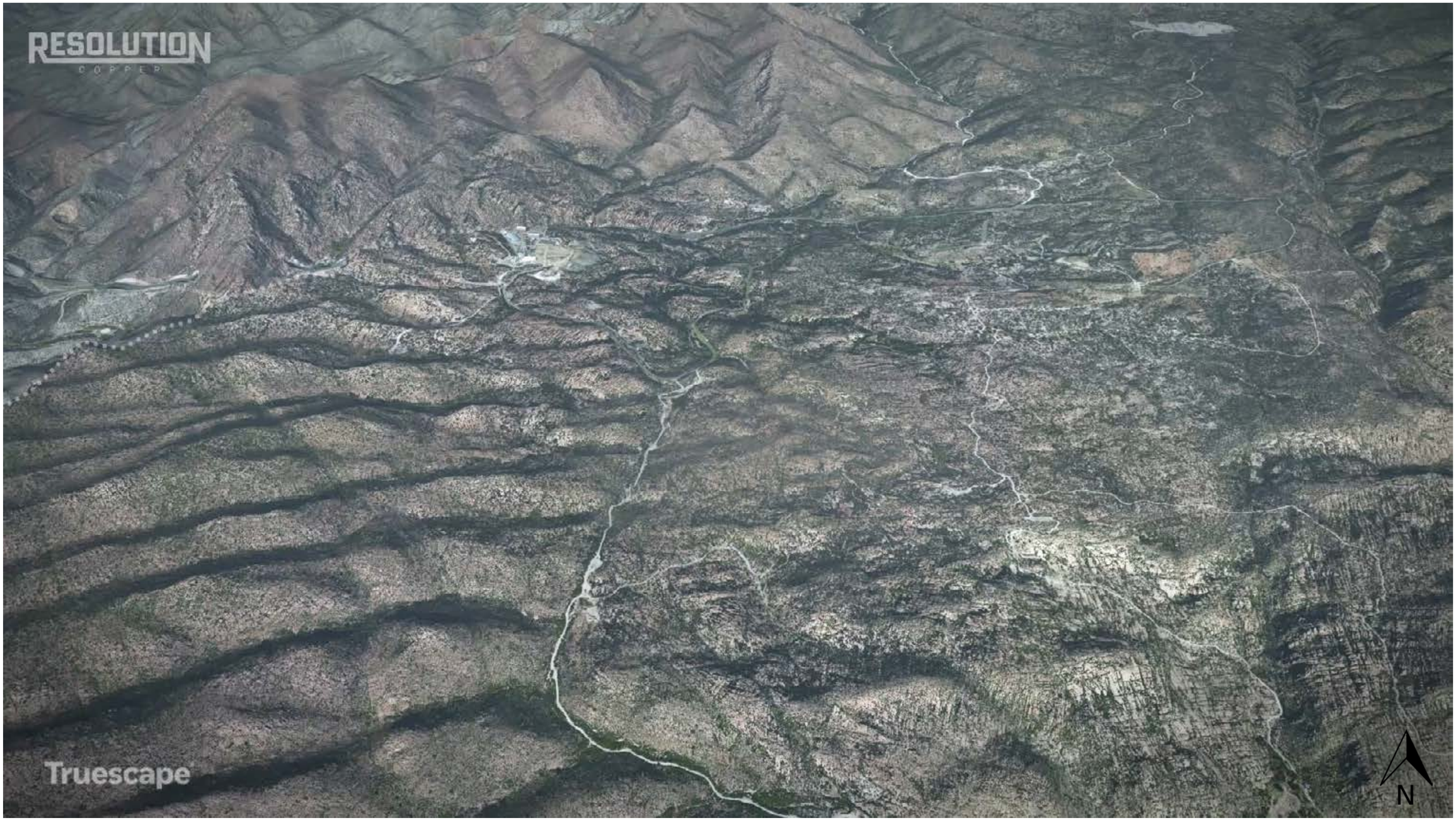

RESOLUTION
COPPER
APACHE LEAP
FRACTURED ZONE
Truescape
N

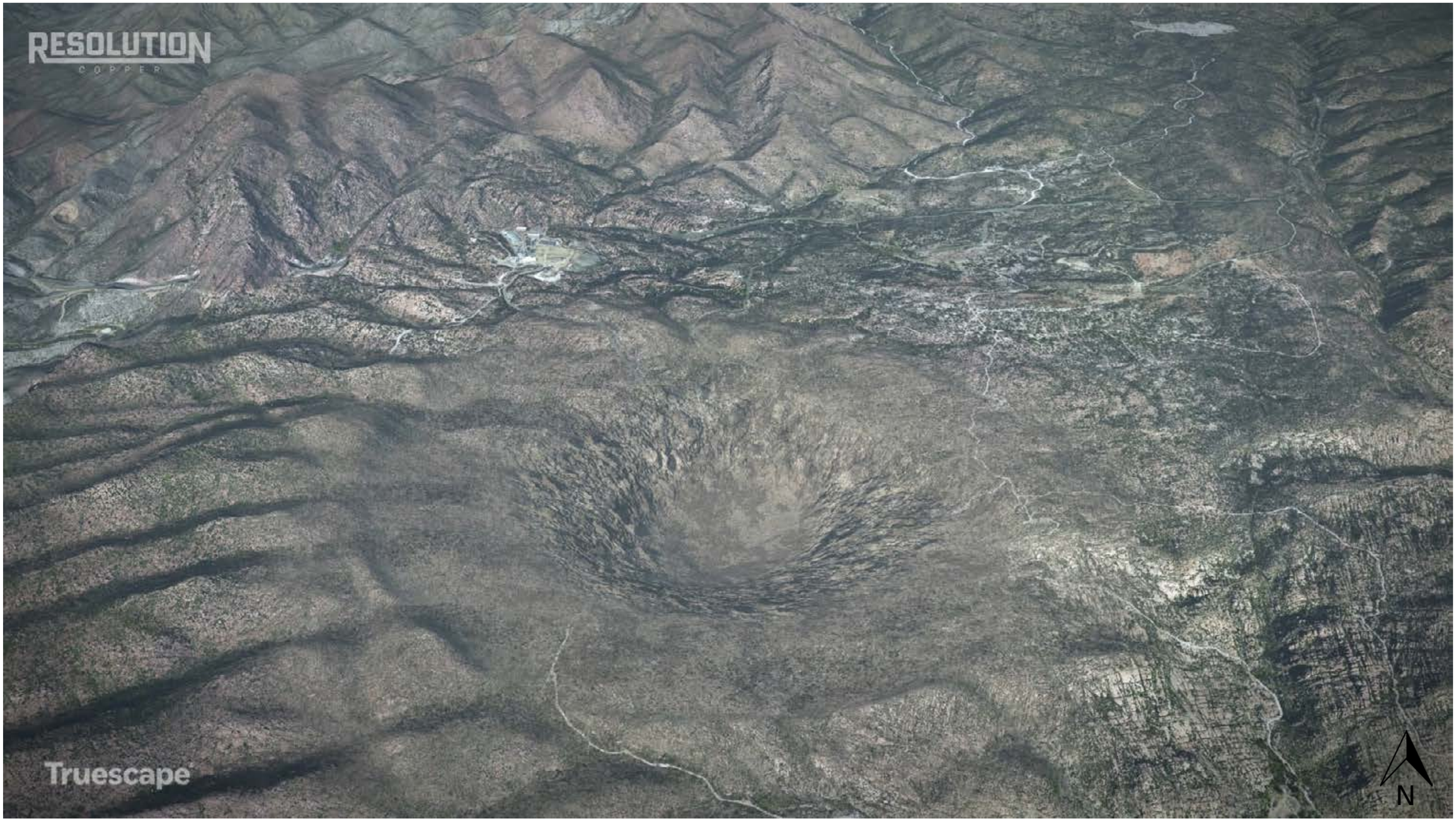
Subsidence - Continuous Subsidence Zone

Truescape®

Subsidence - Before Mining

Truescape®




RESOLUTION
COPPER
Truescape
N

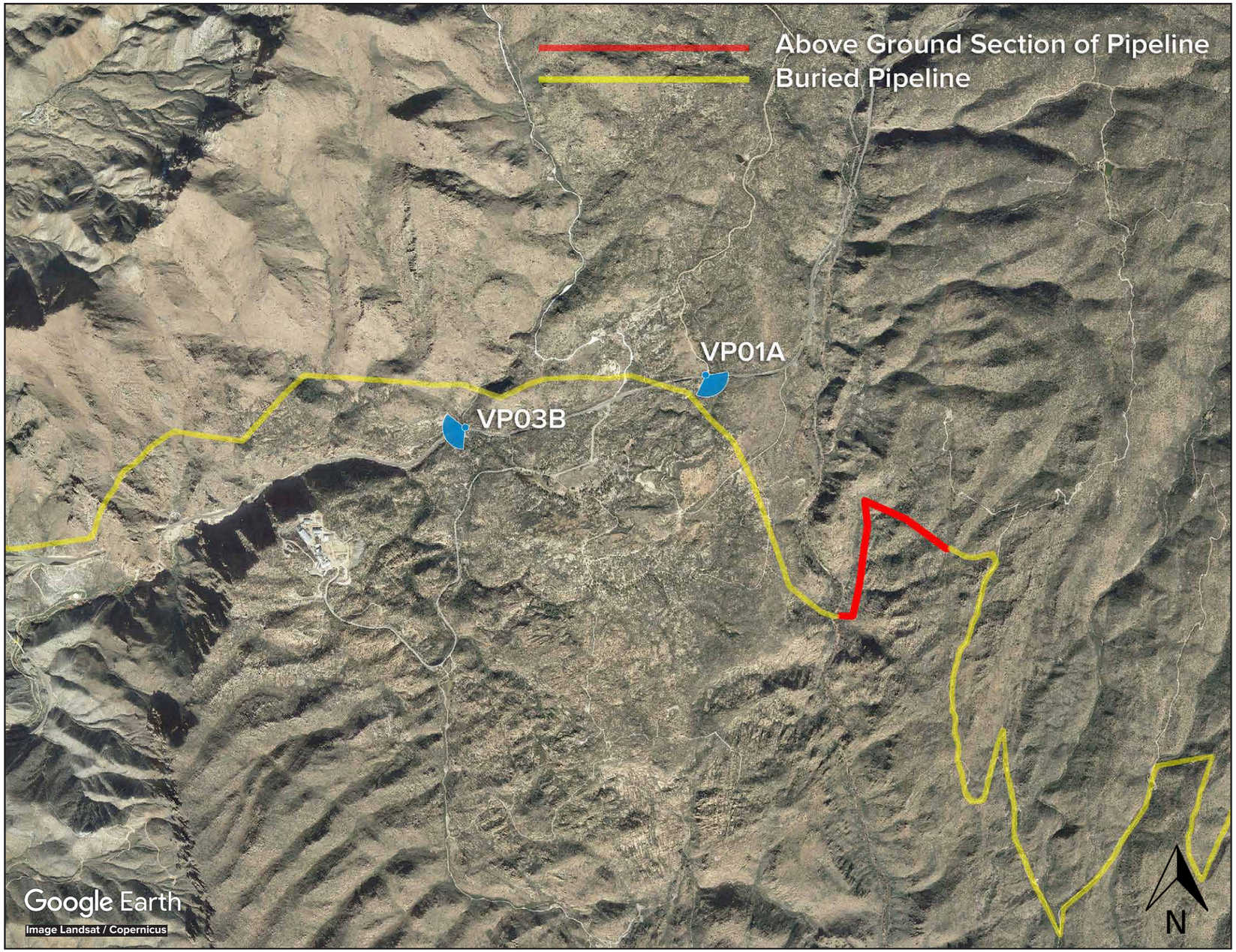
TrueView Photo Simulations - Existing & Proposed
17 June 2019

truescape.com

Viewpoint Locations

Truescape®

Viewpoint 01A - Corner of N Cerro Rd and US 60
Viewpoint 03B - US 60 vehicle pullover near Queen Creek



Viewpoint VP01A - Corner of N Cerro Rd and US 60, Looking Southeast - **Existing View**

Viewpoint VP01A - Corner of N Cerro Rd and US 60, Looking Southeast - **Proposed View (pipeline not visible)**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

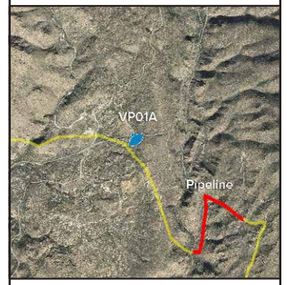
RESOLUTION COPPER

EPS Transmission and Skunk Pipeline Simulations

Viewpoint VP01A

Corner of N Cerro Rd and US 60

Viewpoint Location



Easting Position (SPCS, Arizona Central (FIPS 202)):	**967052.2**
Northing Position (SPCS, Arizona Central (FIPS 202)):	**843111.9**
Elevation of Viewpoint Position (NAD83):	**4072.4**
Height of Camera Above Ground (ft):	**1.7**
Date of Photography:	**23 May 2019 at 01:19 PM**
Orientation of View:	**SE**
Horizontal Field of View:	**124°**
Vertical Field of View:	**55°**

3D MODEL

NOTES:

Viewpoint locations have been precision surveyed by:

Robert Breen R.L.S.
Environmental Field Services LLC
1575 West American Ave. Suite D
Oracle, AZ 85623
Office 520-896-2784
Mobile 520-400-6156

No part of this photo simulation shall be altered in any way.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created Using
TrueView™ Technology
(Patent No.: US 8,184,906 B2)

Provided by

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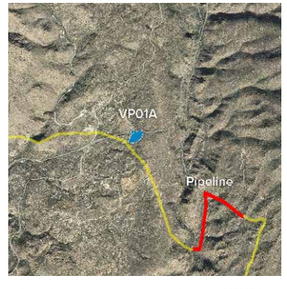
truescape.com

DATE	SHEET
17 June 2019	3

Viewpoint VP01A

Corner of N Cerro Rd and US 60



Easting Position (SPCS, Arizona Central (FIPS 202)):	**967052.2**
Northing Position (SPCS, Arizona Central (FIPS 202)):	**843111.9**
Elevation of Viewpoint Position (NAD83):	**4072.4**
Height of Camera Above Ground (ft):	**1.7**
Date of Photography:	**23 May 2019 at 01:19 PM**
Orientation of View:	**SE**
Horizontal Field of View:	**124°**
Vertical Field of View:	**55°**

Viewpoint VP01A - Corner of N Cerro Rd and US 60, Looking Southeast - **Overlay**

1 Aerial view pipeline corridor simulation using Google Earth.

Viewpoint VP03B - US 60 vehicle pullover near Queen Creek, Looking SouthWest - **Existing View**

Viewpoint VP03B

US 60 Vehicle pullover near Queen Creek

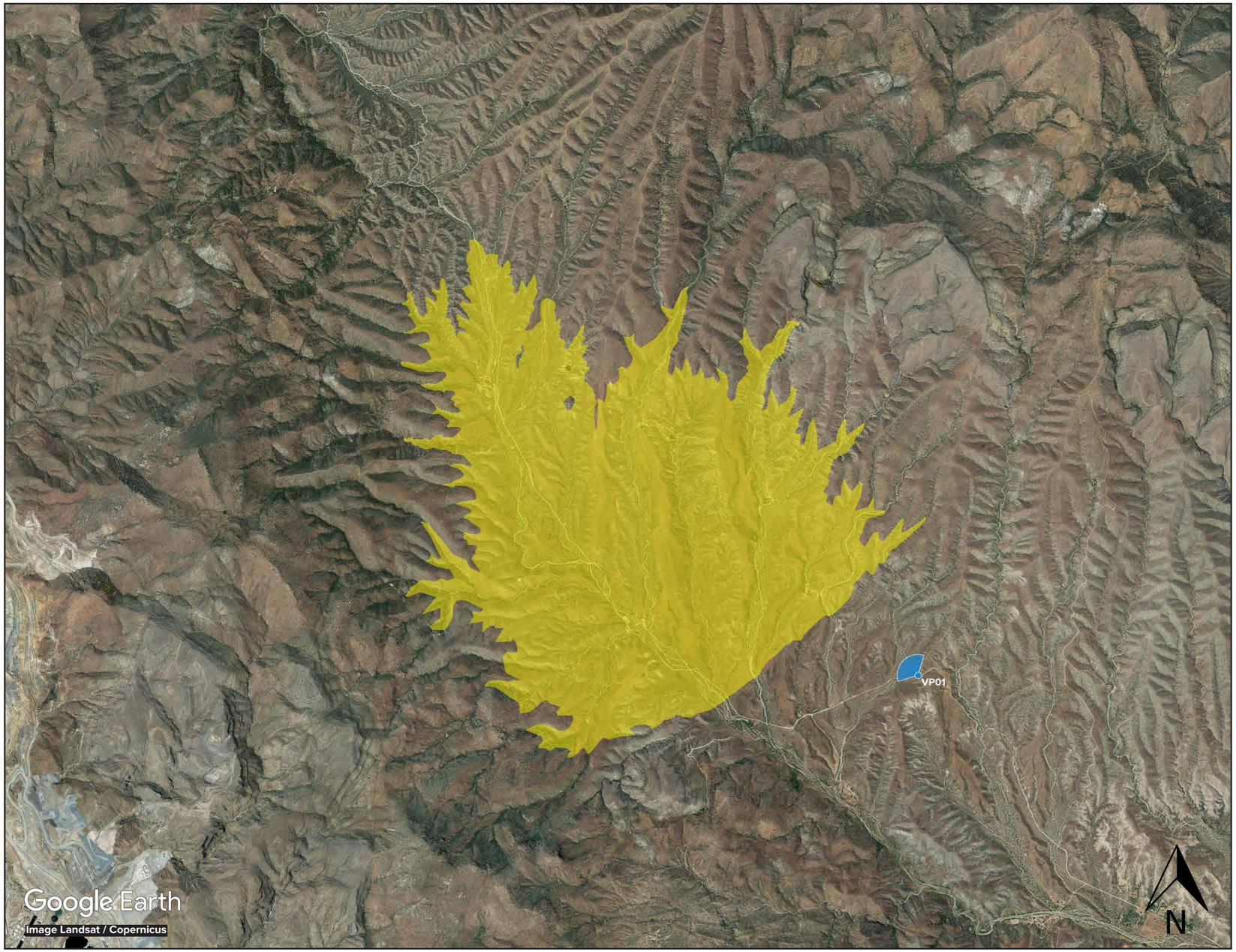
Easting Position (SPCS, Arizona Central (FIPS 202)):	962128.96
Northing Position (SPCS, Arizona Central (FIPS 202)):	**841958.48**
Elevation of Viewpoint Position (NAD83):	**3861.5**
Height of Camera Above Ground (ft):	**1.7**
Date of Photography:	**23 May 2019 at 02:19 PM**
Orientation of View:	**SW**
Horizontal Field of View:	**124°**
Vertical Field of View:	**55°**

Viewpoint VP03B - US 60 vehicle pullover near Queen Creek, Looking SouthWest - **Proposed View**

Photo Simulations - Existing & Proposed
08 May 2020

www.truescape.com

1. Dripping Springs Road



Viewpoint 01 - Dripping Springs Road - *Existing View*

Viewpoint Dripping Springs Road - *Proposed View - After 15 Years*

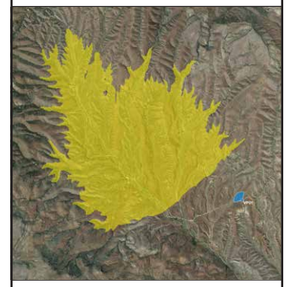
RESOLUTION COPPER

USFS Skunk Camp Reclamation Visuals

Viewpoint 01

Dripping Springs Road

Viewpoint Location Project Area



Longitude:	**110° 52' 2.6432" W**
Latitude:	**33° 10' 20.5463" N**
Elevation of Viewpoint Position (ft):	**3226.1**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 08:40 AM**
Orientation of View:	**NW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

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DATE	SHEET
08 May 2020	4

Viewpoint Dripping Springs Road - *Proposed View - After 20 Years*

Viewpoint Dripping Springs Road - *Proposed View - After 30 Years*

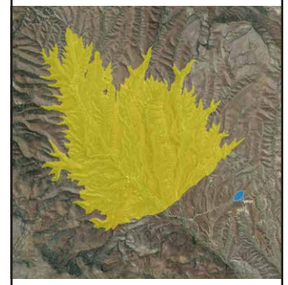
RESOLUTION COPPER

USFS Skunk Camp Reclamation Visuals

Viewpoint 01

Dripping Springs Road

Viewpoint Location Project Area



Longitude:	**110° 52' 2.6432" W**
Latitude:	**33° 10' 20.5463" N**
Elevation of Viewpoint Position (ft):	**3226.1**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**14 August 2018 at 08:40 AM**
Orientation of View:	**NW**
Horizontal Field of View:	**130°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

Truescape®

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DATE	SHEET
08 May 2020	4

Response to Data Request #4 VR-1. Visual Impact of Fog Plume

To: Kami Ballard, Environmental & Permitting Advisor, Resolution Copper

From: Nate Tipple, Air Quality Engineer, Air Basics, Inc.

Date: June 25, 2020

This technical memorandum was prepared in response to Data Request #4 VR-1, submitted by the Tonto National Forest (TNF) on April 15, 2020:

> *VR-1. Visual impact of fog plume. Several comments were received concerning the potential for a fog plume to generate above the East Plant Site from the hot, moist mine exhaust (see GPO p. 103). To respond to this concern, we would like to assess:*
>
> - *The conditions and frequency under which the fog plume could occur (expanding on the details contained in the GPO);*
> - *An approximate visual simulation of the potential fog plume, from a number of the Key Observation Points (KOPs) identified in the Draft EIS (see figure 3.11.1-1). The following KOPs used for Alternative 2 (see table 3.11.4-5) are likely the most pertinent for this issue; KOPs 1,2,5,7,10,11.*

Resolution Copper's General Plan of Operation states that ventilation air exiting the exhaust shafts will be at or near saturation, which will lead to the formation of a fog plume that may be visible at certain times. As the ventilation air cools, if the dew point of the ventilation air is reached, the water vapor will begin to condense and form a cloud-like water vapor plume (fog plume). Given the relatively warm and saturated conditions expected from the mine exhaust vents as well as the meteorological conditions at the East Plant, a fog plume is expected to form when ambient conditions are cool and humid. The conditions and frequency under which a fog plume is expected to occur are further detailed in the sections below.

Conditions Conducive to Plume Formation

The conditions under which a fog plume will form can be estimated by using a psychrometric chart and the mine vent exhaust parameters. A visible plume can be expected to form in cool and humid conditions, lower than approximately 10˚C (50˚F), and higher than approximately 60% relative humidity. An analysis of the site-specific meteorological data from 2015 and 2016 demonstrates fog plume formation is more likely to occur during December and January when conditions are cooler and more humid. Warmer and drier conditions are not expected to result in a visible fog plume. This is consistent with observations from current site conditions and visibility of fog plume formation from existing shafts.

The presence of visible plumes can be predicted by plotting both the ambient and ventilation exhaust shaft conditions on a psychometric chart. For example, Figure 1 represents the site-specific conditions on December 31, 2016, at 11:00 am. The ambient temperature of 6.5˚C (44˚F) and 99.8% relative humidity indicate that a plume will be visible. By contrast, Figure 2 represents conditions on September 23, 2016, at 5:00 pm. The ambient temperature of 21.1˚C (70˚F) and 6.9% relative humidity indicate that no plume will be visible.

Figure 1. Psychometric Chart Predicting Visible Fog Plume

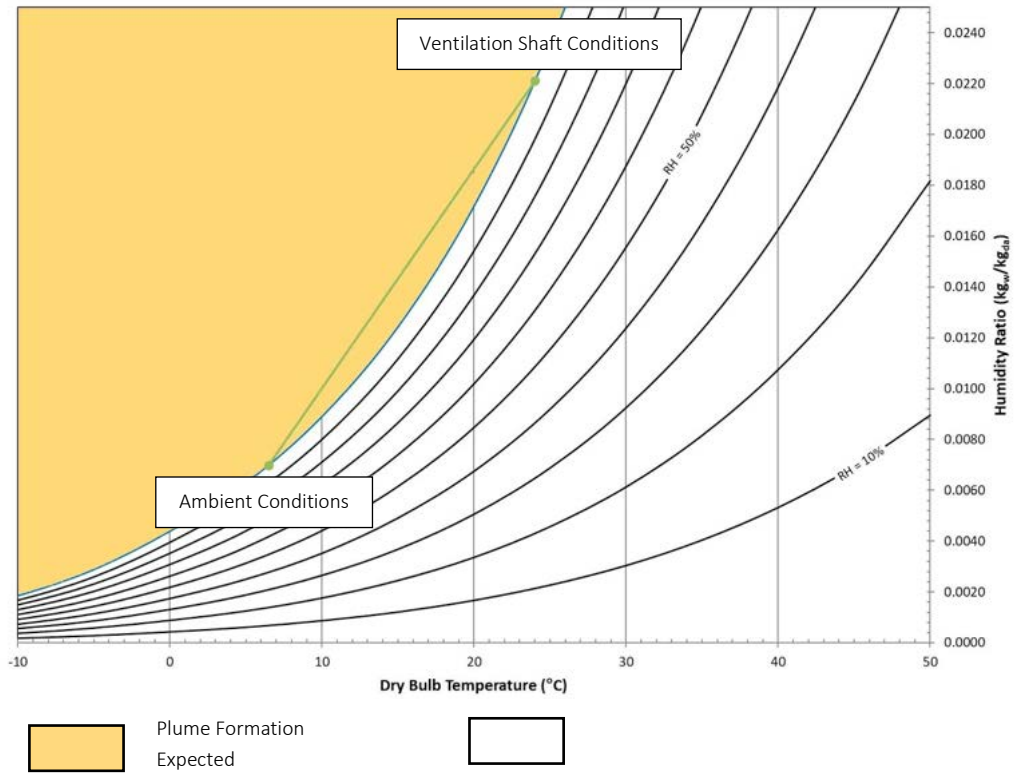
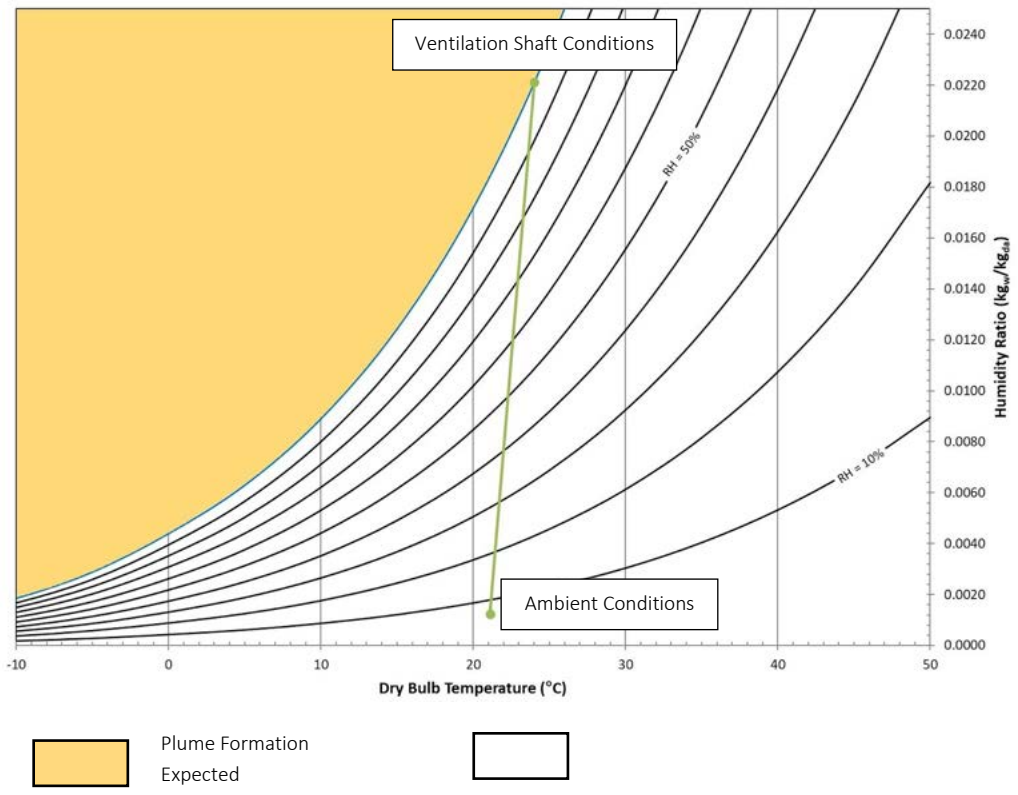


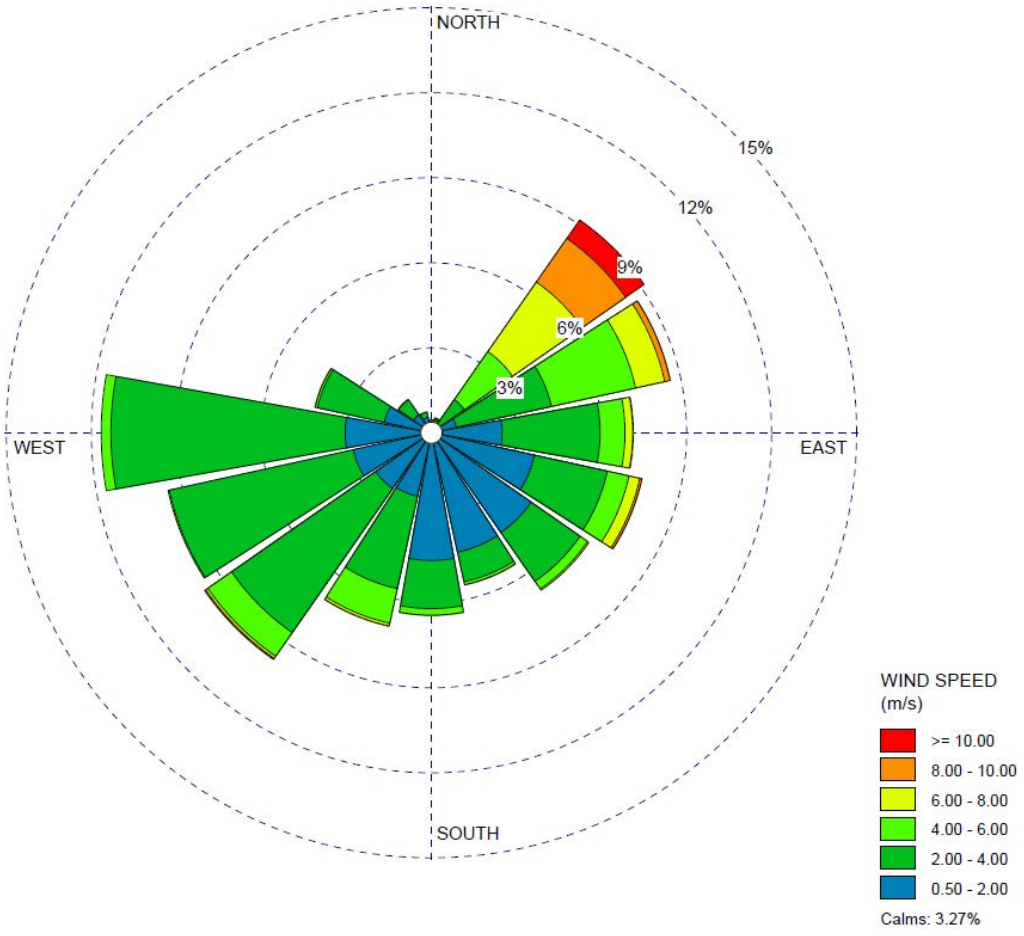
Figure 2. Psychometric Chart Predicting No Visible Fog Plume



Plume Frequency and Size

A fog plume model that is commonly used to support environmental assessments was employed to evaluate the frequency and associated size of the estimated fog plumes. The model utilized vent shaft parameters (location, size, ventilation rate, temperature) as well as site-specific hourly meteorological data from 2015 and 2016, the same years that were used for the air quality modeling impact analysis. A wind frequency distribution diagram of the data is provided in Figure 3. The results of the plume model were used to inform the visual simulations prepared by Truescape in Appendix A.

Figure 3. Wind Frequency Distribution Diagram for East Plant (2015 - 2016)



The fog plume model estimated the frequency of visible plumes and approximate dimensions for each exhaust shaft. Two representative scenarios were selected, 1% and 10%. As shown in the visual simulations, the 1% scenario represents plumes most visible from the requested KOPs, however, plumes of this size are expected fewer than four days per year. The 10% scenario represents a more common occurrence and smaller overall plume size. This scenario is expected to occur fewer than 37 days per year. The maximum plume dimensions for each scenario are provided in Table 1.

Table 1. Plume Sizes

Scenario	Plume Height (m)	Plume Length (m)
1%	110	200
10%	40	100

Approximate visual simulations of the fog plumes for both frequency scenarios were generated by Truescape and are attached as Appendix A. Plumes are not expected to be visible from KOPs 7 or 11 and are therefore not included in the visual simulations.

Appendix A – Approximate Visual Simulations of the Fog Plumes

Simulations - Existing & Proposed
6/25/2020

truescape.com

Viewpoint Locations

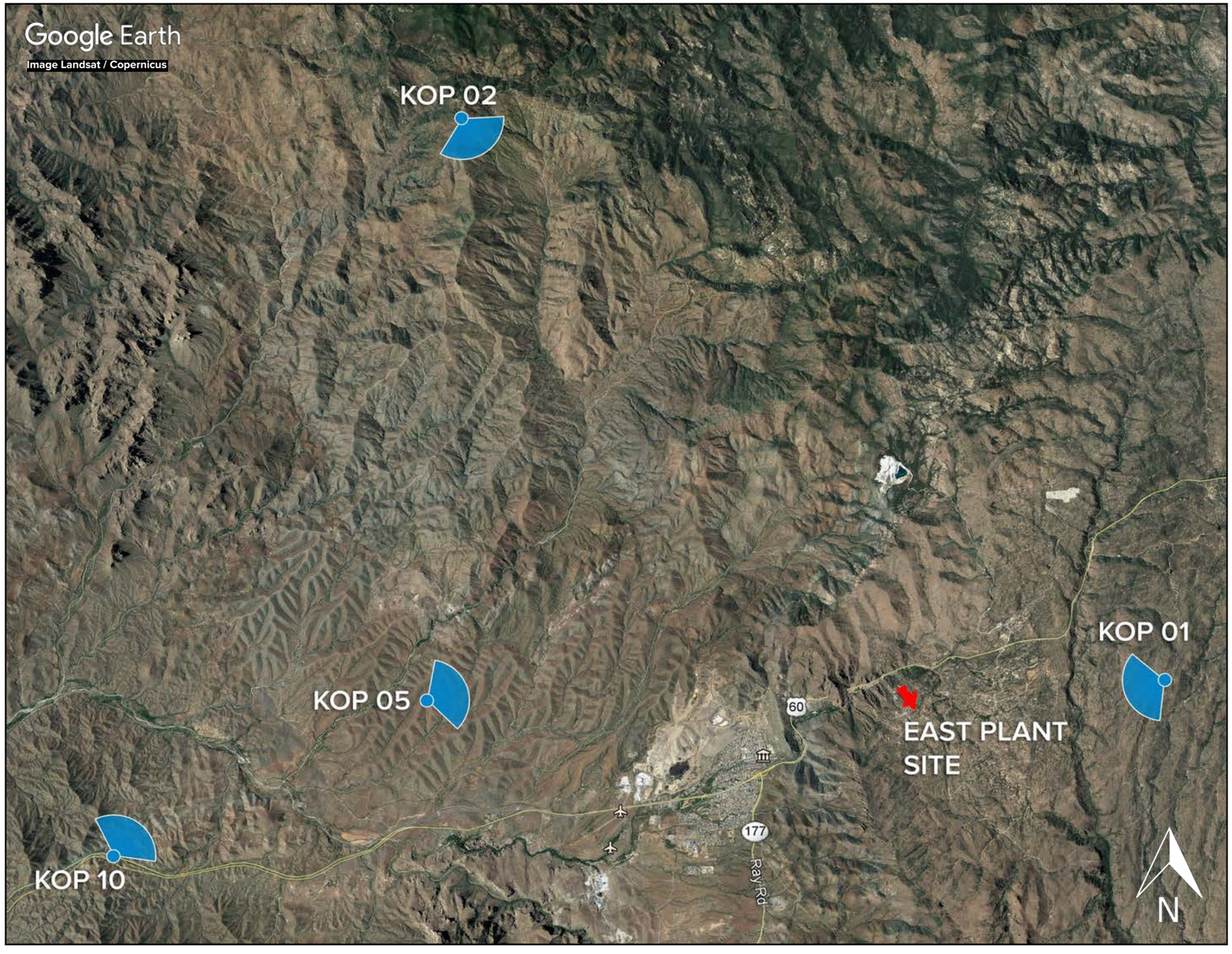
Truescape®

KOP 01 - FSR 2466 East of Subsidence Zone

KOP 02 - Arizona Trail - Montana Mountain

KOP 05 - Arizona Trail - Ridge

KOP 10 - US60, Milepost 219



KOP 01 - FSR 2466 East of Subsidence Zone - **Existing View**

KOP 01 - FSR 2466 East of Subsidence Zone - **Proposed View (with Plumes - 1% / 4 days - North East Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

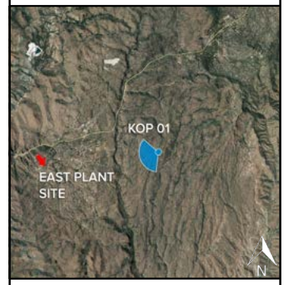
RESOLUTION COPPER

USFS VR-1
Shaft Plume Visuals

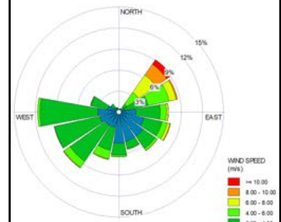
KOP 01

FSR 2466 East of Subsidence Zone

Viewpoint Location



Approximate Latitude:	33° 18' 28.6831" N
Approximate Longitude:	111° 01'5.5698"W
Orientation of View:	WSW
Distance to closest plume	4.54kms



WINDROSE REPRESENTS 2 YEAR PERIOD FROM 2015 TO 2016

VAPOR PLUMES

PLUMES FROM SHAFTS 9, 10 AND 14 ARE REPRESENTED AS PER TABLE BELOW.

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	5	6.7
10	100	40	5	8.5
14	100	40	10	10.5

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

Truescape®

truescape.com

DATE	SHEET
6 / 25 / 2020	3

KOP 01 - FSR 2466 East of Subsidence Zone - **Existing View**

KOP 01 - FSR 2466 East of Subsidence Zone - **Proposed View (with Plumes - 1% / 4 days - West South West Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

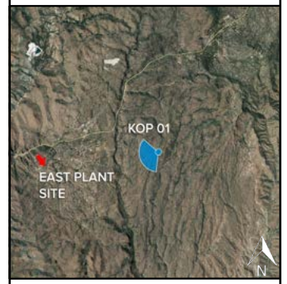
RESOLUTION COPPER

USFS VR-1
Shaft Plume Visuals

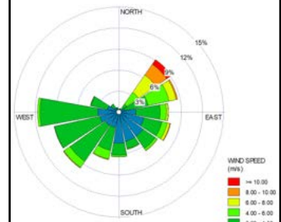
KOP 01

FSR 2466 East of Subsidence Zone

Viewpoint Location



Approximate Latitude:	33° 18' 28.6831" N
Approximate Longitude:	111° 01'5.5698"W
Orientation of View:	WSW
Distance to closest plume	4.54kms



WINDROSE REPRESENTS 2 YEAR PERIOD FROM 2015 TO 2016

VAPOR PLUMES

PLUMES FROM SHAFTS 9, 10 AND 14 ARE REPRESENTED AS PER TABLE BELOW.

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	5	6.7
10	100	40	5	8.5
14	100	40	10	10.5

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

KOP 01 - FSR 2466 East of Subsidence Zone - **Existing View**

KOP 01 - FSR 2466 East of Subsidence Zone - **Proposed View (with Plumes - 10% / 37 days - East Wind Direction) - Plumes visible**

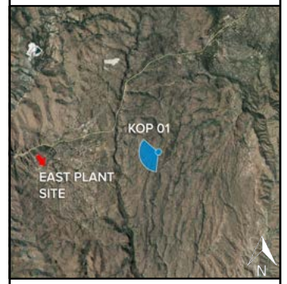
For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER

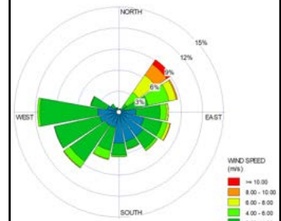
USFS VR-1
Shaft Plume Visuals

KOP 01

FSR 2466 East of Subsidence Zone



Approximate Latitude:	33° 18' 28.6831" N
Approximate Longitude:	111° 01'5.5698"W
Orientation of View:	WSW
Distance to closest plume	4.54kms



WINDROSE REPRESENTS 2 YEAR
PERIOD FROM 2015 TO 2016

VAPOR PLUMES

PLUMES FROM SHAFTS 9, 10 AND 14 ARE REPRESENTED AS PER TABLE BELOW.

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	5	6.7
10	100	40	5	8.5
14	100	40	10	10.5

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

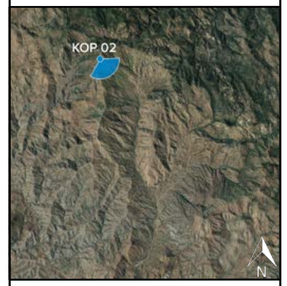
No part of this photo simulation shall be altered in any way.

KOP 02 - Arizona Trail - Montana Mountain - **Existing View**

KOP 02 - Arizona Trail - Montana Mountain - **Proposed View (with Plumes - 1% / 4 days - North East Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER



Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	70	20	6.7
10	200	90	25	8.5
14	200	110	25	10.5

NOTES:

Viewpoint location latitiude and longitude are approximate only.

KOP 02 - Arizona Trail - Montana Mountain - **Existing View**

KOP 02 - Arizona Trail - Montana Mountain - **Proposed View (with Plumes - 1% / 4 days - West South West Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

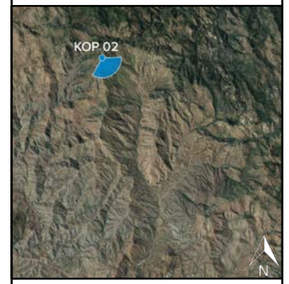
RESOLUTION COPPER

USFS VR-1
Shaft Plume Visuals

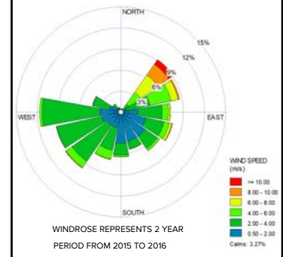
KOP 02

Arizona Trail - Montana Mountain

Viewpoint Location



Approximate Latitude:	33°24'10.80"N
Approximate Longitude:	111° 9'19.84"W
Orientation of View:	SE
Distance to closest plume:	13.57kms



WINDROSE REPRESENTS 2 YEAR
PERIOD FROM 2015 TO 2016

VAPOR PLUMES

PLUMES FROM SHAFTS 9, 10 AND 14 ARE REPRESENTED AS PER TABLE BELOW.

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	70	20	6.7
10	200	80	20	8.5
14	200	100	25	10.5

NOTES:

Viewpoint location latitude and longitude heading are approximate only.

KOP 02 - Arizona Trail - Montana Mountain - **Existing View**

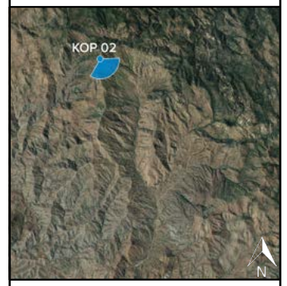
KOP 02 - Arizona Trail - Montana Mountain - **Proposed View (with Plumes - 10% / 37 days - East Wind Direction) - Plumes not visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER

KOP 02

Arizona Trail - Montana Mountain



Approximate Latitude:	33°24'10.80"N
Approximate Longitude:	111° 9'19.84"W
Orientation of View:	SE
Distance to closest plume:	13.57kms

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	5	6.7
10	100	40	5	8.5
14	100	40	10	10.5

NOTES:

Viewpoint location latitude and longitude heading are approximate only.

KOP 05 - Arizona Trail - Ridge - **Existing View**

KOP 05 - Arizona Trail - Ridge - **Proposed View (with Plumes - 1% / 4 days - North East Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

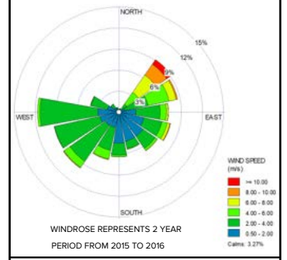
RESOLUTION COPPER

USFS VR-1
Shaft Plume Visuals

KOP 05

FSR 24[illegible] Eastern Subalpine Ridge Zone

Approximate Latitude: 33° 18' 24.78[illegible]" N
Approximate Longitude: 111°[illegible]'W
Orientation of View: [illegible]
Distance to closest plume: 8.5[illegible]kms



WINDROSE REPRESENTS 2 YEAR
PERIOD FROM 2015 TO 2016

VAPOR PLUMES

PLUMES FROM SHAFTS 9, 10 AND 14 ARE REPRESENTED AS PER TABLE BELOW.

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	20	6.7
10	200	80	25	8.5
14	200	100	20	10.5

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

KOP 05 - Arizona Trail - Ridge - **Existing View**

KOP 05 - Arizona Trail - Ridge - **Proposed View (with Plumes - 1% / 4 days - West South West Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER

KOP 05

Arizona Trail - Ridge

Approximate Latitude:	33° 18' 14.7867" N
Approximate Longitude:	111° 09' 48.6132"W
Orientation of View:	ENE
Distance to closest plume:	8.85kms

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	70	20	6.7
10	200	80	20	8.5
14	200	100	25	10.5

KOP 05 - Arizona Trail - Ridge - **Existing View**

KOP 05 - Arizona Trail - Ridge - **Proposed View (with Plumes - 10% / 37 days - East Wind Direction) - Plumes not visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

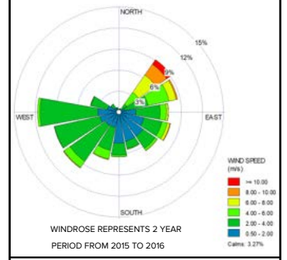
RESOLUTION COPPER

USFS VR-1
Shaft Plume Visuals

KOP 05

FSR 24[illegible] East of Subdivision Ridge Zone

Approximate Latitude:	33° 18' 24.78[illegible]" N
Approximate Longitude:	111°[illegible]'38" W
Orientation of View:	[illegible]
Distance to closest plume:	8.5[illegible]kms



WINDROSE REPRESENTS 2 YEAR
PERIOD FROM 2015 TO 2016

VAPOR PLUMES

PLUMES FROM SHAFTS 9, 10 AND 14 ARE REPRESENTED AS PER TABLE BELOW.

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	5	6.7
10	100	40	5	8.5
14	100	40	10	10.5

NOTES:

Viewpoint locations have been precision surveyed by:

Environmental Field Services LLC
Oracle, AZ

KOP 10 - US60, Milepost 219 - **Existing View**

KOP 10 - US60, Milepost 219 - **Proposed View (with Plumes - 1% / 4 days - North East Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER

KOP 10

US60, Milepost 219

Approximate Latitude:	33° 16' 35.5800" N
Approximate Longitude:	111° 13' 39.4680"W
Orientation of View:	NE
Distance to closest plume:	15.16kms

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	70	20	6.7
10	200	90	25	8.5
14	200	110	25	10.5

KOP 10 - US60, Milepost 219 - **Existing View**

KOP 10 - US60, Milepost 219 - **Proposed View (with Plumes - 1% / 4 days - West South West Wind Direction) - Plumes visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER

KOP 10

US60, Milepost 219

Approximate Latitude:	33° 16' 35.5800" N
Approximate Longitude:	111° 13' 39.4680"W
Orientation of View:	NE
Distance to closest plume:	15.16kms

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	70	20	6.7
10	200	80	20	8.5
14	200	100	25	10.5

KOP 10 - US60, Milepost 219 - **Existing View**

KOP 10 - US60, Milepost 219 - **Proposed View (with Plumes - 10% / 37 days - East Wind Direction) - Plumes not visible**

For on-screen display:
Scale bar to be 4 inches wide
Viewing distance is 19.7 inches

RESOLUTION COPPER

KOP 10

US60, Milepost 219

Approximate Latitude:	33° 16' 35.5800" N
Approximate Longitude:	111° 13' 39.4680"W
Orientation of View:	NE
Distance to closest plume:	15.16kms

Shaft Number	Plume Length (m)	Plume Height (m)	Plume Radius (m)	Diameter of shaft (m)
9	100	30	5	6.7
10	100	40	5	8.5
14	100	40	10	10.5