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American Magnesium Foothill Dolomite Mine Project

Environmental Assessment

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Luna County, New Mexico

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CHAPTER 1.

American Magnesium, LLC (American Magnesium), has submitted a Plan of Operations (PoO) to Bureau of Land Management (BLM) to mine a total of 40 acres on BLM land located in the Florida Mountains Mining District, Luna County, New Mexico (referred to as the project or Proposed Action). Of the total 40-acre project area, approximately 30 acres would consist of surface mining, one laydown yard for a mobile office and equipment, and a reclamation reference area (Figure 2). In addition, American Magnesium proposes to construct a new access road from the unnamed BLM road to the proposed mining area.

1.1. Background

American Magnesium submitted a PoO for the proposed project. This PoO is publicly available on the State of New Mexico Mineral and Mining Division (MMD) website, and the link is provided in Chapter 6 - References (Daniel B. Stevens & Associates) and referenced throughout this environmental assessment (EA). In April 2017, the proposed project was considered incomplete, and American Magnesium updated the PoO in July 2017. In December 2017, the BLM provided comments on the revised PoO which detailed additional information required before the PoO would be considered complete. Between July 2018 and April 2019, American Magnesium revised the PoO two additional times after BLM and MMD comments. American Magnesium addressed final comments from MMD in May 2019.

This EA has been developed to disclose potential impacts from the mining construction and operations, as required under the National Environmental Policy Act of 1969 (NEPA). The proposed mine and vicinity are shown in Figure 1. The following federal regulations and BLM policies provide the regulatory framework and authority for the BLM's jurisdiction over the mining locatable minerals under the Proposed Action:

- General Mining Law of 1872, as amended (30 United States Code [USC] 22 *et seq.*) Federal Land Policy and Management Act of 1976 (FLPMA), as amended; and
- BLM's Mimbres Resource Management Plan (RMP) (as amended) (BLM 1993).

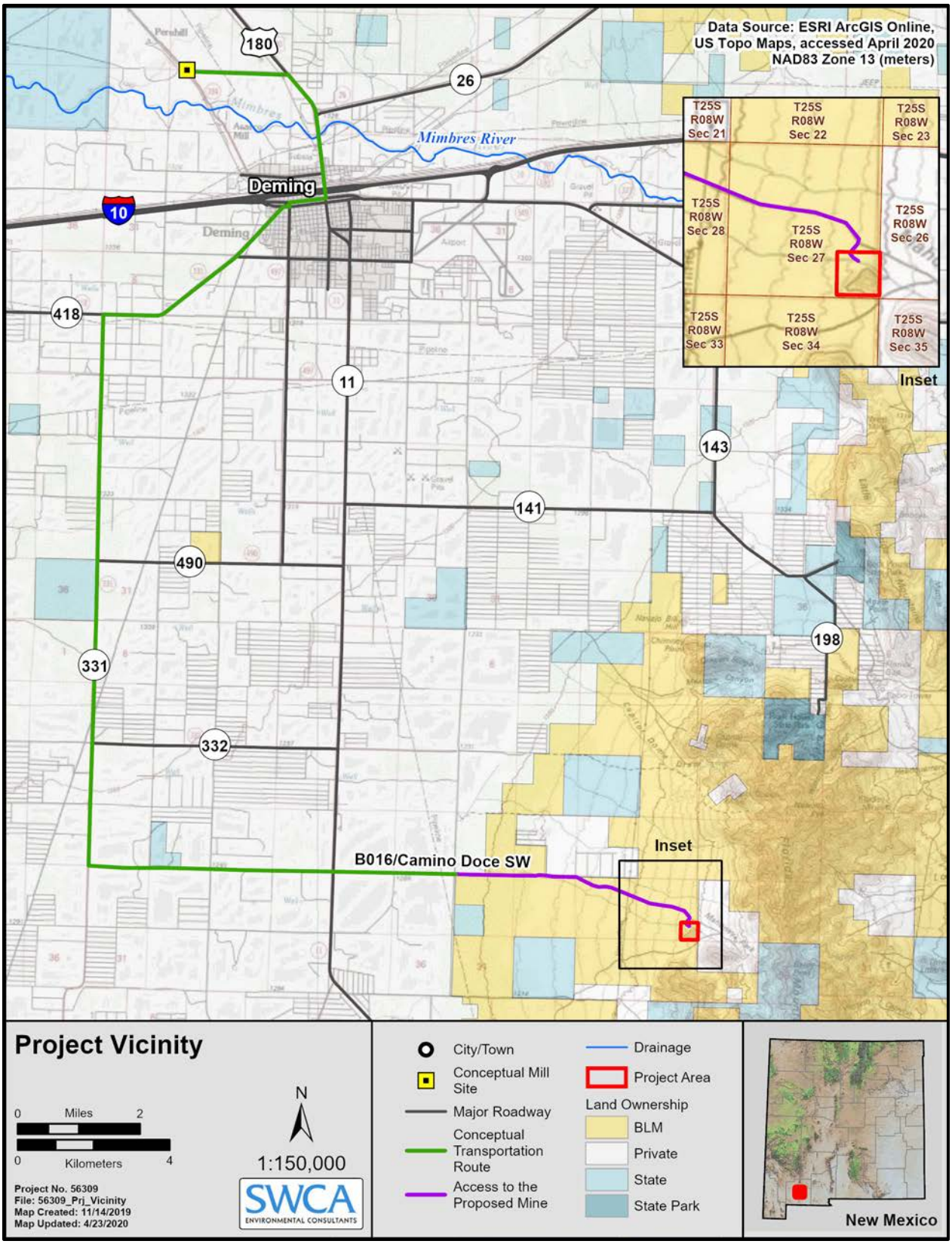

Figure 1. Proposed project vicinity.

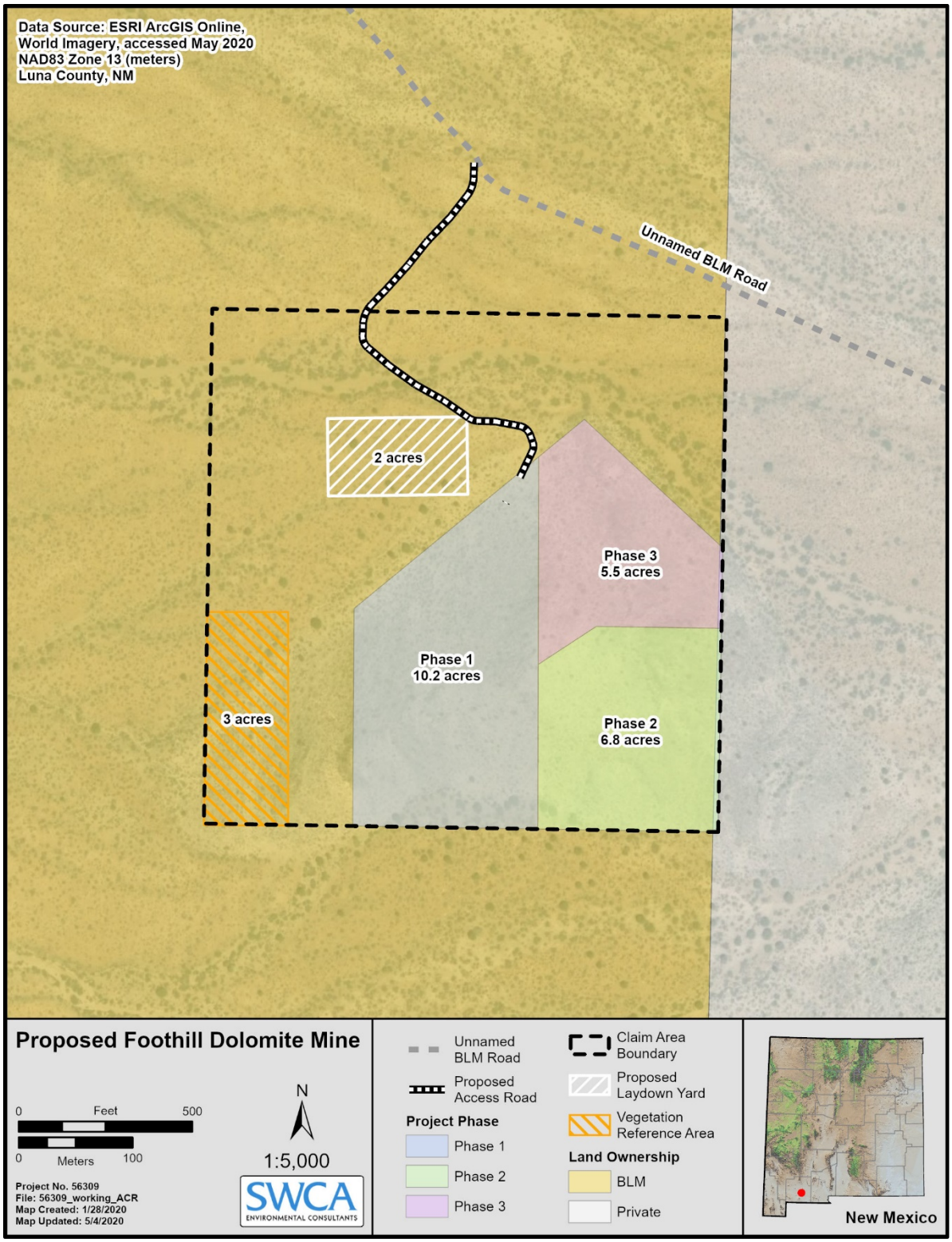

Figure 2. Proposed project area.

1.2. Purpose and Need

The purpose is to implement the land use decisions to accomplish the goals and objectives, allowable uses, and management actions set out by the RMP and the General Mining Law of 1872, as amended, while providing opportunity for the development of locatable magnesium resources on public lands.

The need for the proposed Federal action is the requirement that BLM respond to a proposed Plan of Operation to conduct mining operations on public lands pursuant to U.S. Mining Laws and in accordance with Federal regulations found in 43 CFR 3809.

1.3. Decision to be Made

The BLM will decide to approve the PoO as submitted; approve the PoO subject to certain conditions imposed to ensure the operation meets the performance standards and does not result in unnecessary or undue degradation of public lands; or reject or withhold approval of the PoO.

1.4. Plan Conformance and Relationship to Statutes and Regulations

1.4.1. Plan Conformance

The Proposed Action conforms to the mineral program resource management guidance provided under the Mimbres RMP (BLM 1993). The BLM's objective in the management of its locatable minerals is to provide for public use of locatable minerals consistent with the laws that govern these activities and to minimize environmental damage (BLM 1993:2-3).

1.4.2. Relationship to Statutes and Regulations

The project has been designed to conform to these applicable statutes and regulations:

- Mining and Minerals Policy Act of 1970: Law established to develop domestic mineral sources in an orderly manner.
- National Materials and Minerals Policy Research and Development Act of 1980: An Act to provide for a national policy for materials and to strengthen the materials research, development, production capability, and performance of the United States, and for other purposes.
- Clean Air Act of 1990 (42 USC 85): Provides the principal framework for national, state, and local efforts to protect air quality.
- Clean Water Act (CWA), Section 404 (33 USC 1344): Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water resources.
- National Pollutant Discharge Elimination System (NPDES) (40 CFR 122.26(b)(14)(i)-(xi)).
- BLM Surface Management Regulation (43 CFR 3809), as amended.
- New Mexico Mining Act Reclamation Program (19.10.3 NMAC): Regulation of most hard rock mining reclamation activities; some exemptions apply.
- Endangered Species Act of 1973 (ESA) (16 USC 1531 et seq.): Directs federal agencies to ensure their actions do not jeopardize threatened and endangered species.
- Migratory Bird Treaty Act of 1918 (MBTA) (16 USC 703–708/710–712): Protects migratory birds.

- Archeological Resources Protection Act (ARPA), 1979, as amended, and other cultural protection laws and regulations
- Section 106 of the National Historic Preservation Act of 1966 (54 USC 306108) and its implementing regulations (36 CFR 800): Requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

This EA has been prepared in conformance BLM regulations for review of locatable minerals projects and in accordance with the NEPA and its implementing regulations. This EA has been prepared in accordance with the BLM NEPA Handbook (H-1790-1) (BLM 2008).

1.5. Scope of Analysis

The scope of the federal action considered in this EA follows the regulations of the Council on Environmental Quality (CEQ) for NEPA (40 CFR 1500 et seq.). Specifically, 40 CFR 1508.25 defines the scope of the review as consisting of "the range of actions, alternatives, and impacts to be considered." BLM Instructional Memorandum 2018-023 directs the BLM to analyze related actions that are non-federal, and therefore outside BLM jurisdiction, as potential indirect effects of the federal Proposed Action when appropriate, or as cumulative actions with cumulative effects. For this project, the BLM has considered the conceptual transportation of the ore and the conceptual processing of the ore (milling) as likely indirect effects of the federal Proposed Action under review. Please see Chapter 2 for a full description of the Proposed Action and the conceptual related actions.

1.6. Scoping and Issues

1.6.1. Internal Scoping

The BLM held a project meeting with the Las Cruces NEPA Interdisciplinary Teams on July 24, 2019, to identify preliminary issues for analysis and to identify the rationale for issues not retained for detailed analysis.

1.6.2. External Scoping

The BLM solicited input from the public on the proposed project to assist in identifying key issues and defining the scope of the project and environmental analysis. The BLM administered one scoping period for the project, which was held on July 25, 2019. Project information was sent to 111 recipients from the BLM's interested party mailing list. This scoping period resulted in 49 comment letter submissions.

Individual comments within each letter were identified, and each comment was analyzed per BLM's criteria for determining key issues for consideration in the EA. See Appendix A for a summary of the scoping process and the comments received. This input was used to identify the issues analyzed in Chapter 3.

1.6.3. Issues

Using the input from the BLM ID Team during internal scoping and from the public during external scoping, a list of issues to address in the EA was developed in accordance with guidelines found in the BLM NEPA Handbook H-1790-1 (BLM 2008). Project design features (Section 2.1.7) were reviewed and evaluated for sufficiency to mitigate or minimize impacts. Where project design features would not immediately mitigate impacts of the action below significance, or if the public scoping indicated a need for analysis to determine impact significance, these issues were retained for detailed analysis.

The key issues identified during internal scoping and analyzed in this EA are summarized in Table 1. The indicators provided are used in Chapter 3 to describe the affected environment for each issue, and in Chapter 4 to measure changes in each issue and assess the impact of the Proposed Action relative to the No Action Alternative.

Table 1. Issues Identified for Detailed Analysis

Issue Number	Issue Statement	Impact Indicator
Issue 1	How would excavation of locatable minerals impact the scenic quality for users of surrounding BLM land and residents on nearby private land?	Degree of visual contract; conformance to Visual Resource Management Class III Objectives
Issue 2	How would truck traffic along the transportation route affect traffic and public safety?	Vehicle and collision counts
Issue 3	How would surface water quality and groundwater quality and erosion in downstream ephemeral drainages be maintained during stormwater events?	Acres of disturbance to the watershed; potential changes to stormwater and groundwater quality
Issue 4	How would construction and operation of the mine contribute to fugitive dust emissions?	Acres of disturbance; PM_{10} emissions, number and distance of sensitive receptors from mining operations
Issue 5	How would emissions from construction and operation of the mine contribute to greenhouse gas (GHG) emissions and climate change?	GHG emissions (carbon dioxide equivalent [CO_2e])
Issue 6	How would noise created by surface mine blasting and heavy equipment operations affect nearby residents?	Decibels
Issue 7	How would home values within 3 miles of the mine site be impacted by mine operations?	Increases/decreases in property values for other mines; see also impact indicators for scenic quality, noise, air, and traffic
Issue 8	How would the development and operation of the mining operation affect recreational hunting opportunities of Persian Ibex within the Florida Mountains?	Increase in anthropogenic disturbance; recreational access; see also impact indicators for noise and traffic
Issue 9	How would the proposed action affect the wilderness characteristics of size, naturalness, outstanding opportunities for solitude or primitive and unconfined recreation, and supplemental values/special features in the adjacent Florida Mountains Wilderness Study Area (WSA)?	Effects to naturalness, outstanding opportunities for solitude, or primitive and unconfined recreation, and supplemental values
Issue 10	How would the creation of jobs for the mine, and those related to the transportation and processing of ore, affect employment in Luna County?	Number of new jobs

1.6.4. Issues Not Presented in Detail

An issue was dismissed from detailed analysis if the issue was not present or would not be impacted, or if potential impacts would be mitigated through implementation of project design features. The following issues are not discussed in further detail in this EA for the reasons described in Table 2.

Table 2. Issues Not Analyzed in Further Detail in the EA

	Issue Statement	Rationale for Not Retaining Issue for Detailed Analysis in the EA
ELM-1	How would mining activities impact cultural resources?	Class III archaeological surveys were completed to identify significant cultural resources that could be impacted by the project. A cultural resource inventory

	Issue Statement	Rationale for Not Retaining Issue for Detailed Analysis in the EA
		of the mining site was completed (BLM Project # 030-16-008, NMCRIS # 136415). The survey was negative with no historic properties identified. A cultural resource inventory was also completed of the new access road to the mining area (BLM Project # 030-19-016, NMCRIS # 142416). The survey was negative with no historic properties identified. As there were no significant cultural resources identified within the project area, there are no expected impacts to cultural resources.
ELM-2	How would the removal of vegetation and disturbance created from mining activities impact vegetative species, including special-status species, within the project area?	"The project area is located in the Chihuahuan Deserts: Low Mountains and Bajadas ecoregion, which comprises 2,079,360 acres and ranges in elevation from 3,150 to 7,280 feet (EPA 2017a). At low elevations, it is characterized by desert shrubs such as lechuguilla (*Agave lechuguilla*), yucca (*Yucca* sp.), ocotillo (*Fouquieria splendens*), lotebush (*Ziziphus obtusifolia*), and pricklypear (*Opuntia sp*.) with a thinly dispersed covering of gramas and other grasses. At higher elevations, oneseed juniper (*Juniperus monosperma*) and two needle pinyon (*Pinus edulis*) make up this ecoregion (EPA 2017a). General biological surveys were conducted on July 28, 2016, and November 28, 2018, by EnviroSystems Management Inc. and the BLM, respectively. The proposed project area includes sandy soils and the rocky slopes of the dolomite hill. The sandy soils are primarily longleaf jointfir (*Ephedra trifurca*) shrubland, with honey mesquite (*Prosopis glandulosa*) dominant along the drainage and broom snakeweed (*Gutierrezia sarothrae*) common throughout. The rocky slopes are very diverse, and variable depending on slope, aspect, and amount of soil development. They do not have any consistent dominant species, but common stool (*Dasylirion wheeleri),* redberry juniper (*Juniperus arizonica*), yellow trumpet bush (*Tecoma stans*), ocotillo (*Fouquieria splendens*), candy barrelcactus (*Ferocactus wislizeni*), sideoats grama (*Bouteloua curtipendula*), and black grama (*Bouteloua eriopoda*) are prominent. Some of the plants on these slopes are rarely seen in LCDO: resinleaf brickellbush (*Brickellia baccharidea),* yellow trumpetbush, Orcutt's foxtail cactus (Coryphantha orcuttii), pinkflower hedgehog cactus (*Echinocereus fendleri* var. fendleri), Graham's nipple cactus (*Mammillaria grahamii*), Arizona sandmat (Chamaesyce arizonica), yellow Indian mallow (*Abutilon malacum*), southwestern false cloakfern (*Argyrochosma limitanea*), hybrid cloakfern (*Astrolepis integerrima*), slender lipfern (*Cheilanthes feei*), and tuber anemone (*Anemone tuberosa*). Circa 35,000 acres of exposed limestone and dolomite occur within the portion of the Chihuahuan Desert in Grant, Hidalgo, and Luna counties, of which ca. 22.5 acres would be lost."
ELM-3	How would the removal of vegetation and disturbance created from mining activities impact wildlife species, including special-status species, within the project area?	The project area is located in the Chihuahuan Deserts: Low Mountains and Bajadas ecoregion, which comprises 2,079,360 acres and ranges in elevation from 3,150 to 7,280 feet (EPA 2017a). The ecoregion contains habitat that supports a variety of wildlife species. General biological surveys were conducted on July 28, 2016, and November 28, 2018, by EnviroSystems Management Inc. and the BLM, respectively. The biological surveys did not identify special-status species within the proposed project area. There were no special-status species observed during the 2016 and 2018 biological surveys. Based on the habitat types present in the project area, 27 special status species have the potential to occur in the project area. Of these 27 species the Biological Evaluation Report concluded a finding of no effect for 21 species; a determination of may affect, not likely to adversely affect for five species; and a determination of not likely to jeopardize for one species. (Daniel B. Stephens & Associates, Inc. 2019a). The analysis of effects and determination effects on federally listed threatened, endangered, and proposed species can be found in the Biological Evaluation Report, located in Appendix E of the PoO (Daniel B. Stephens & Associates, Inc. 2019a). In addition, a desktop review of the U.S. Fish and Wildlife Service (USFWS 2019b) Information for Planning and Conservation (IPaC) list and Biota Information System of New Mexico (BISON-M) New Mexico State–listed species was conducted. According to IPaC, two bird species—northern aplomado falcon (*Falco femoralis septentrionalis*) and yellow-billed cuckoo (*Coccyzus americanus*)—have the potential to occur in Luna County. However, the project area does not contain suitable habitat required for the yellow-billed cuckoo. In addition, although the project area does contain scattered trees and

	Issue Statement	Rationale for Not Retaining Issue for Detailed Analysis in the EA
		shrubs, there is no suitable grassland habitat within the proposed project area which would provide adequate avian prey for the Aplomado falcon. Therefore, the project area does not contain suitable habitat for the Aplomado falcon. In addition, adults would be able to relocate to another similar habitat outside of the project area. In addition, there is no USFWS critical habitat within the proposed project area (Daniel B. Stephens & Associates, Inc. 2019a). The BLM sensitive species list for Luna County, including the potential for occurrence, is included in the Biological Evaluation Report, located in Appendix E of the PoO (Daniel B. Stephens & Associates, Inc. 2019a).
ELM-4	How would haul truck traffic from the mine impact accessibility to the Florida Mountains during the Gem and Mineral Show?	This location has no organized field trips during the Gem and Mineral Show. In addition, to is not known for mineral gathering opportunities and does not prevent users from accessing the well-known areas in the nearby Little Floridas or Burlick Hills.
ELM-5	How would vibration from blasting during mining operations impact the residential structures within 2 miles of the project?	The project is located in a sparsely populated area surrounding the Florida Mountains. Blasting of material would be required within the project area and is estimated at volumes of approximately 25,000 tons per month (single blasting event per month). Vibration associated with blasting activities at this volume is not anticipated to affect residential structures beyond 1,000 feet from the proposed project (Zeigler 2019). There are no residential homes within 1,000-feet of the project area. The closest structure is approximately 0.6 mile from the project area, which is outside of the estimated distance in which vibration from blasting can be felt. Safe seismic disturbance and air blast limits associated with blasting of mining minerals would be established by the professional contractor at the time of blasting. All blasting will be conducted under an approved blasting plan located in Appendix B of the PoO.
ELM-6	How would surface disturbance from mining activities impact paleontological resources within the project area?	The project is located in Potential Fossil Yield Classification (PFYC) 2, (low) and 3 (moderate), indicating that there is low to moderate potential of scientifically important paleontological resources being present. The BLM paleontologist visited the project area on 11/28/2018 and did not observe any paleontological resources in the Silurian-age Fusselman Dolomite and only common or poorly preserved invertebrates and burrows in the Ordovician-age Montoya Group. So long as the design features are followed, scientifically important paleontological resources would be protected.
ELM-7	How would the removal of the vegetation impact the availability of forage for grazing?	The project intersects two grazing allotments: West Florida Ranch (BLM allotment number 02008) and Mahoney Park (BLM allotment number 26791). The majority of the project falls within the Mahoney Park allotment. A small portion of the 3-acre reclamation reference area, which would remain undisturbed, is within the West Florida Ranch allotment. The Mahoney Park allotment is approximately 2,214 acres. The project would result in a loss of 40 acres, which is approximately 0.01% of the total allotment area. The exclusion of livestock from the mine claim area would last for the duration of the project (20 years).
ELM-8	How would mining activities affect Native American Religious Concerns?	The BLM conducts Native American consultation regarding Traditional Cultural Properties (TCP) and sacred sites during land-use planning and its associated environmental impact review. As there were no significant cultural resources of Native American affiliation identified within the project area, there are no anticipated impacts to Native American Religious Concerns.
ELM-9	How would haul truck traffic from the mine impact public user access along the unnamed BLM road and County Road B016?	The project will require the use of existing access roads, County Road B016 and unnamed BLM road, to access the project area. These routes are currently utilized by the public for hiking, birding, and other recreational opportunities; however, the extent to which public users frequent the project area relative to other access points around the Florida Mountains is unknown. No closures or changes to public access along County Road B016 and the unnamed BLM road would result from construction and operation of the project. Public users may experience an increase in vehicular traffic during mine operational hours, but these would not prohibit any access other than brief periodic waits for haul traffic (see Section 3.2, Issue 2: Traffic and Public Safety) for details on these impacts. Such effects to recreational hunters and specially permitted outfitting businesses are discussed in Section 10 (Issue 8: Recreational Hunting of the Persian Ibex) below.

	Issue Statement	Rationale for Not Retaining Issue for Detailed Analysis in the EA
ELM-10	How would mining operations impact the identified values of the Florida Mountains ACEC?	The Florida Mountains ACEC is approximately 15,660 acres and is located within the Florida Mountains WSA. The proposed management goals are to manage for the protection of scenic and biological values (BLM 1993). The proposed project is located approximately 0.5-mile away from the nearest Florida Mountains ACEC boundary and there would be no mining activities within the Florida Mountains ACEC. Therefore, there would be no impacts to scenic and biological values within the Florida Mountains ACEC as a result of the project.

* Supporting documentation for these statements are included in the project record.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1. Proposed Action

American Magnesium proposes to produce up to 300,000 tons of dolomite per year across approximately 40 acres of BLM land (Figure 2). Within the 40-acre proposed project site, approximately 30 acres would be utilized for mineral extraction. Dolomite containing magnesium would be excavated in three phases as shown in Figure 2. In addition, the proposed project would include an approximately 2-acre laydown yard for a mobile office, equipment storage, sanitation facilities, stockpile areas and topdressing. The proposed project would also require improvements to existing BLM roads and a new access road, as well as construction of drill sites, resource verification drilling, and excavation and removal of dolomite resources. At the end of proposed mining activities, the project area would be reclaimed in accordance with BLM/MMD requirements.

2.1.1. Mining Operations

Blasting, hauling, and mining operations are planned to be conducted during daylight hours. No nighttime operations or 24-hour operations are anticipated. Within the 40-acre proposed project site, approximately 30 acres would be utilized for mineral extraction. The 40-acre site would be fenced with BLM approved wire fencing. The Phase 1 mining area consists of 10.2 acres, Phase 2 consists of 6.8 acres, and Phase 3 consists of 5.5 acres. Resource verification would occur during Phases 1 and 2 but not for Phase 3. A near-vertical, approximately 20-foot highwall and 5-foot-wide benches would be developed during active mining operations. When the edge of the mining phase is reached, the highwalls would be sloped toward the center of the mine. A 2:1 slope would be applied, which is consistent with the surrounding topography.

Estimated daily water use will be 5,000 gallons, or as needed, for dust suppression, site reclamation activities, resource verification and mining activities. Water would be purchased from a permittable water source; therefore, no on-site water supply wells will be required. Water would be brought on site using a 5,000-gallon water truck, portable water tank or similar vessel.

Please refer to the PoO for additional details on mining operations (Daniel B. Stephens & Associates, Inc. 2019a). Table 3 includes the basic disturbance figures.

Table 3. Disturbance Related to the Proposed Action

Project Element	Land Ownership	Phase 1 (acres)	Phase 2 (acres)	Phase 3 (acres)	Total Acres of Disturbance
Drill sites (pads)/mining area	BLM	10.2	6.8	5.5	22.5
Laydown yard area	BLM	2.0	0.0	0.0	2.0
Newly constructed road (including cut/fill)	BLM	1.5	0.0	0.0	1.5
Existing access road to be improved (including pullouts and cut/fill)	BLM	4.0	0.0	0.0	4.0
Total area of project footprint		**17.7**	**6.8**	**5.5**	**30.0**

2.1.2. Access Roads

The proposed project would be accessed from Highway 331. The proposed project would be reached by traveling east for 8 miles on County Road B016 (Camino Doce Road Southwest) and approximately 2 miles southeast on an existing unnamed BLM road (see Figure 1). There are currently no access road improvements anticipated for County Road B016. The 2 miles of existing unnamed BLM Road would require improvements, including widening to 16 feet, developing several 8-foot-wide by 75-foot-long pullouts on the southside of the road for passing haul trucks, surfacing with base coarse rock, and all associated cut and fill. To limit new disturbance, American Magnesium would develop existing pullouts. The base coarse rock would be added to the proposed access road (approximately 1,334 feet long) and 2 miles of the unimproved BLM road on BLM lands. All improvements to the unnamed BLM Road would result in a total of 4.04 acres of new disturbance. The widened road surface would be sloped approximately 2 to 4 degrees to the south to promote drainage. Other road drainage features may be utilized, including water bars, grade dips, and water turnouts. Current conditions and topography do not indicate the needs for low-water crossings and culverts. However, low-water crossings may be installed, if necessary. In addition, gravel may be used to improve road stability and control dust. Refer to section 2.4.1 (Improvements to the Existing BLM Road, page 7) and 2.8 (Site Access and Proposed Constructed Road, pages 18-21) in the PoO and Appendix A1-Roadway Improvements for more details on road construction. Roadwork would be conducted using a bulldozer, road grader, and haul trucks. The WSA boundary is located at the northern edge of the existing BLM road. Prior to any road improvements, the WSA boundary would be marked for avoidance. To avoid direct and indirect impacts to the WSA boundary, no road improvements or drainage features would be constructed on the northern edge of the existing BLM road at the boundary of the Florida Mountains Wilderness Study Area (WSA).

A new proposed access road, approximately 1,334 feet long and 16 feet wide, would be constructed from the existing unnamed BLM road to the proposed mine site. The new access road would result in of 1.5 acres of new disturbance and would require vegetation removal and cut and fill to allow for equipment and transportation truck access. The new proposed road would be sloped to the west to promote drainage. Installation of single culverts would also be required to cross approximately three drainages. A 6 to 8-inch-thick concrete slab ford would be constructed to cross a 70-foot-wide ephemeral wash located north of the proposed mine site. The concrete slab ford would also include upstream and downstream cutoff walls several feet deep for scour protection.

In addition, roads would be constructed to provide access to exploratory boreholes during resource verification. The access roads would be approximately 12-feet wide to accommodate the track mounted drill rigs. It is anticipated that exploratory boreholes would be drilled in the centers of resource verification access roads and that individual drill pads would fit within the access roads and not require additional disturbance. It is also anticipated that some exploratory borehole locations will be accessed without constructing a road. Based on this assumption, a total of 10, 626 linear feet of access road would be constructed (American Magnesium 2019). The total disturbance for the resource verification access roads would be 2.9 acres within the proposed mining area (American Magnesium 2019).

Refer to section 2.4.2 (Construction of New Mine Site Access Road, page 8) of the PoO for more details on access road construction (Daniel B. Stephens & Associates, Inc. 2019a). All improved and newly constructed access roads would follow the BLM's Gold Book: *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development Chapter 4* requirements and procedures for construction, maintenance, and abandonment of developed roads.

2.1.3. Laydown Yard

The proposed 2-acre laydown yard would provide a space for mining equipment, an office trailer, portable sanitation facilities, topsoil stockpile and a water tank. The proposed laydown yard location

would require removing vegetation, blading the area, and removing topsoil. A portion of the laydown yard would be used to stockpile topsoil. The laydown yard would slope to the west-southwest for drainage. In addition, the perimeter of the laydown yard would be fenced with chain-link fencing topped with three-strand barbed wire. Please refer to section 2.4.3 (Development of a Laydown Yard, page 9) of the PoO for more details on the development of a laydown yard.

Salvageable topsoil and other material capable of supporting vegetation, herein referred to as topdressing, would be collected and stockpiled within the proposed laydown yard area. It is estimated that approximately 23,000 cubic yards of topdressing would be available from the various areas disturbed including road construction, laydown area, and mine construction. The stockpiled topdressing would be contoured to minimize erosion and would be seeded with the reclamation seed mixture approved by the BLM and the MMD. As new material is added, the stockpile would be reseeded to prevent erosion. Please refer to section 2.4.4 (Handling of Salvageable Topdressing, page 9) of the PoO for additional details on handling of salvageable topdressing.

2.1.4. Resource Verification

Resource verification drilling would be required to confirm the quantity and quality of the magnesium content as well as thickness of overburden. The drilling would occur in Phases 1 and 2. Due to the steepness of the slope in Phase 3, drilling would not occur. Drill holes would not exceed 100 feet in depth from the surface. Any salvageable topdressing obtained during resource verification would be stockpiled in the laydown yard. Each drill hole would be permanently sealed from bottom to top using a neat cement slurry grout.

Roads would be constructed to provide access to exploratory boreholes during resource verification. The access roads would be approximately 12-feet wide to accommodate the track mounted drill rigs. It is anticipated that exploratory boreholes would be drilled in the centers of resource verification access roads and that individual drill pads would fit within the access roads and not require additional disturbance. It is also anticipated that some exploratory borehole locations will be accessed without constructing a road. Based on this assumption, a total of 10, 626 linear feet of access road would be constructed (American Magnesium 2019). The total disturbance for the resource verification access roads would be 2.9 acres within the proposed mining area (American Magnesium 2019).

Resource verification would be performed using diamond-bit wet drill rigs or dual-tube reverse circulation (RC) air-rotary rigs. The RC rigs would be used in the event that the diamond-bit rig is unable to achieve the 100-foot depth desired. The wet drill rig is common to use to suppress dust during drilling. The drill rigs would be track mounted and can be used in rough terrain. The drill rigs may be driven across the mine site, in level terrain, within the proposed 40-acre project site. On the steeper locations, a bulldozer may be required to blade a temporary access road. In addition, a limited amount of blasting may be necessary to provide equipment access to drill locations. Please refer to Section 2.4.5 (Resource Verification, page 11-12) of the PoO for additional details on resource verification. If mining does not occur after resource verification, reclamation of any disturbed areas would be completed.

2.1.5. Excavation and Removal of Locatable Mineral Resources

Mining would occur during Phase 1 first, followed by Phase 2 and Phase 3, depending on resource verification results. During Phase 1, resources would need to be accessed using an access road with a slope of approximately 10% within the project area. The dolomite would be loosened and broken up using blasting explosives. Blasting would be done by a professional contractor who is licensed in the use of explosives and would be conducted by an approved blasting plan. A series of interim, near-vertical, 20-foot-high walls that slope 2:1 toward the center of the mine, with 5-foot-wide horizontal benches would

be developed along the east side of Phase 1. American Magnesium plans to concurrently reclaim the horizontal benches as they are created.

Blasting would occur approximately once a month during normal operating hours, and a typical blast would use approximately 15,500 pounds of explosives depending on conditions. Each blasting event will consist of the advancement of boreholes (i.e., drilling), loading of the boreholes with explosives, and detonation of the blast. Each event will take approximately one to two weeks to complete. Most of this time will be spent advancing the boreholes. Borehole depths will be approximately 23 feet. After all the boreholes are drilled, they will be loaded with explosives (e.g., ANFO or HANFO) and stemmed with crushed rock to contain the charge for better breakage. Loading of the boreholes with explosives is typically completed the same day of the blast. Blasting is expected to be completed with a single shot per event. Certified blasting personnel with MSHA training will be used to prepare the boreholes and detonate the blasts. Blasting is necessary to loosen and breakup the dolomite rock so that it can be mined and loaded into trucks and transported off-site.

Depending on production rate, mined material may need to be temporarily staged on-site prior to transport. In the event that an on-site crusher is required to break the magnesium into smaller pieces suitable for transportation, American Magnesium would request a modification to the PoO. The analysis herein assumes the on-site crusher would be used.

Once the perimeter of the mining limit within Phase 1 is reached, the perimeter walls would consist of 20-foot-tall walls that slope 2:1 toward the center of the mine. The steep interim wall in the central portion of the mine would be removed during Phases 2 and 3. In addition, at the end of mining (approximately Year 20), the interim walls at the center of the mine would be removed and the mine would be a flat-bottomed bowl. Please refer to section 2.4.6 (Excavation of Removal of Dolomite Resource, page 12-15) of the PoO for additional details on excavation and removal of locatable mineral resources.

2.1.6. Reclamation

Reclamation would be completed to the standards described in 43 CFR 3809.420(3) and MMD Part 3 requirements. Reclamation would also meet the reclamation objectives as outlined in the U.S. Department of Interior Solid Minerals Reclamation Handbook #H-3042-1 (BLM 1992) and Surface Management Handbook H-3809-1 (BLM 2012). All drill sites, pits, excavation disturbances, the laydown yard, newly constructed road segments, and road improvements would be recontoured and reseeded unless otherwise directed by BLM.

Reclamation would be designed to achieve land uses consistent with the BLM- and MMD-approved post-mining land uses and any applicable land use management plans for the area. Reclamation is intended to return disturbed land to a level of productivity comparable to pre-resource verification levels.

Year 5 Reclamation Plan

At the end of year 5, AmMg anticipates that the site disturbances will include the 1,334-foot-long mine site access road (including a concrete slab crossing of the dry arroyo), the 2-acre laydown yard, approximately 86 exploratory boreholes, the on-site road to the active mine are, and the mine are itself. At the time, AmMg assumes that the improvements to the BLM road will be left in place. The exploratory boreholes will be backfilled with neat cement and will have been plugged after completion. The mine itself is anticipated to consist of a 10.2-acre area including 20-foot-high walls with 5-foot wide benches. Please refer to Figures A2 – 2a and A2 – 2b in Appendix A2 of the PoO.

Reclamation of the mine area at the end of Year 5 will include blasting the interim (eastern) wall to lower the wall and create a 1:2 slope. As this work progresses, the cutoff road and roads from verification

drilling along the south and east sides of the hill will be reclaimed and reestablish the original slope. The 1:21 wall along the north and northwest perimeter of the mine will not be recontoured. AmMg expects that the dolomite walls will be competent and stable, and that they will not require recontouring. Once recontouring within the mine and on the south and east sides of the foothill is complete, the seedbed would be prepared, seeded and mulched as describes in section 3.3 Revegetation (page 52 - 54) of the PoO.

Year 20 Reclamation Plan

At the end of Year 20, AmMg anticipates that the site disturbances will include the 1,332-foot-long mine access road (including concrete slab crossing of the dry arroyo), the 2-acre laydown yard, the on-site road to the active mine area, and the mine area itself.

During final reclamation, the walls of the mine would be sloped at approximately 1:3 to form a relatively flat-bottomed bowl that would open to the southwest to allow for adequate drainage of the site. Please refer to section 3.5 (Year 20 Reclamation Plan, page 56- 57) and 3.5.5 (Mine Reclamation, page 58) of the PoO for further information regarding the final abandonment of the mine. A plan view maps showing the Year 20 reclamation plan is provides as Figure A2 – 3c in Appendix A2 of the PoO.

Once disturbed areas have been recontoured, the seedbed will be prepared. Seedbed preparation will be conducted when surface and subsurface soil moisture conditions are dry in order to avoid soil compaction. The surface will be ripped or scarified to a depth of approximately 8 to 12 inches and disked to a depth of approximately 6 inches. Cover materials will be hauled from the topdressing stockpile, and a minimum of 12 inches of topdressing and any required soil amendments will be placed on the top surface and slopes. The topdressing and soil amendments will be disked to a depth of approximately 6 inches. Wherever possible, seedbed preparation will be done along contour. Bulldozers and motor graders will be used to smooth the surfaces and facilitate access for cover placement and revegetation activities. Hauling and placement of topdressing will be accomplished using a variety of equipment, including haul trucks, scrapers, and excavators. Please refer to section 3.3 (Revegetation, page 52 – 54) and the Proposed Seed List and Seeding Rates for Reclamation (page 53) of the PoO for further information regarding vegetation end result of the mine.

American Magnesium proposes to establish a 3-acre fenced reference area to the southwest of the mine area that will be used to measure revegetation success standards. The reference area will be used to address the requirement that vegetation in reclaimed areas meet revegetation success standards in 19.10.603.G NMAC.

A BLM- and MMD-approved seed mixture would be used during reclamation. Wherever possible, seed will be planted along contour using a rangeland drill or similar equipment. When drill seeding cannot be accomplished, broadcast seeding will be employed. For broadcast seeding, the drill seeding rate will be doubled and areas will be raked with a chain- or tire-harrow to lightly cover the seed and achieve good soil–seed contact. Hydroseeding will only be used on steep slopes that cannot be safely seeded using the drill or broadcast seeding methods. Following seeding, certified weed-free mulch will be uniformly spread at a rate of about 2 tons per acre. Mulch may contain a minimum of viable seeds associated with the source (i.e., barley or wheat). Please refer to table 11, Proposed Seed List and Seeding Rates for Reclamation located on page 53 of the PoO for further details.

Long-stem mulch will be given preference over shorter materials. The mulch will be then be crimped with a straight-disc harrow or similar equipment to fix it in place. Seeding is typically done once, right before the monsoon season. Yearly visits to the site will be conducted to monitor the success of the revegetation for a period of 3 years or until revegetation is successful. Reapplication of seed will be conducted in areas where success levels are not being met. All mine-related roads that were not in existence at the

commencement of operations will be reclaimed, and the existing road that was widened may be reclaimed to the previous width, as directed by BLM. Concrete slab fords and any culverts placed during road construction will be removed unless BLM requests that they be left in place. Please refer to Section 3 of the PoO for additional details on reclamation.

2.1.7. Project Design Features

In order to reduce impacts to resources, American Magnesium has committed to following best management practices (BMPs) wherever possible:

2.1.7.1. General

- American Magnesium commits to compliance with all applicable environmental laws and regulations regarding protection measures, including but not limited to water and air quality protection, to prevent unnecessary or undue degradation during construction, operation, and reclamation of the proposed project. The measures are derived from the general requirements established in the BLM's Surface Management Regulations at 43 CFR 3809 and water, air quality, and other environmental protection regulations, including the reclamation requirements applicable to minimal impact new mining operations under the New Mexico Mining Act Reclamation Program rules administered by MMD.

2.1.7.2. Cultural Resources

- Pursuant to 43 CFR 10.4(g), American Magnesium will notify the BLM authorized officer, by telephone and with written confirmation, immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2). Further, pursuant to 43 CFR 10.4(c) and (d), the operator will immediately stop all activities in the vicinity of the discovery and not commence again for 30 days or when notified to proceed by the BLM authorized officer.
- Any cultural resource discovered by the permit holder, or by any person working on their behalf, during the course of activities on federal land will be reported, as required by any applicable cultural resources laws applicable to the site including, at a minimum, the authorized officer by telephone with written confirmation. The permit holder will suspend all operations in the immediate area of such discovery and protect it until an evaluation of the discovery can be made by the authorized officer. This evaluation will determine the significance of the discovery and the mitigation measures or documentation requirements that are necessary to allow activities to proceed. The holder is responsible for the cost of evaluation and mitigation. In instances for which applicable cultural resource laws require the immediate cessation of operations, operations will resume only upon written authorization to proceed from appropriate officials vested with such authorization authority under applicable laws.

2.1.7.3. Paleontological Resources

- The operator shall immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this authorization. The operator shall suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and shall protect the discovery from damage or looting. The operator may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered locality or be continued elsewhere. The Authorized Officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be

determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

2.1.7.4. Air Quality

- Application of water from a water truck as a method of dust control, including use of water around the area to be blasted to reduce potential for dust
- Base course or gravel on the proposed access road (approximately 1,334 feet long) and 2 miles of the unnamed BLM road on BLM lands to reduce potential for dust
- Wet suppression and vacuum controls during drilling
- No blasting during high wind events (over 25 mph)
- Baghouse technology for offsite crushing
- Development of a Health and Safety Plan that includes identification of appropriate personnel protective equipment for personnel handling dolomite
- Covered haul trucks
- Vehicle speed to 15 mph on unpaved roads
- Fugitive dust should remain localized; however, if air quality concerns do arise, air samplers may be placed in appropriate locations outside of mining activities to determine effects to ambient air quality in the region.
- Using water to suppress fugitive dust on County Road B016, is expected to be effective for fugitive dust suppression. However, if air quality concerns do arise on the unpaved portion of County Road B016, base coarse may be used, in addition to water, for fugitive dust suppression.

2.1.7.5. Vegetation and Noxious Weeds

- Noxious weeds will be controlled through implementation of the following BMPs:
    - Concurrent reclamation efforts to the extent feasible.
    - Operator control.
    - Removal of invasive, nonnative, and noxious weeds on reclaimed areas.
    - Washing heavy equipment prior to entering the project area.
    - Avoiding areas of known invasive, nonnative, and noxious weeds during periods when the weeds could be spread by vehicles.
- Any natural soil amendments used will be certified free of invasive and noxious weeds.

2.1.7.6. Wildlife

- Access to the proposed mine site will be fenced to prevent wildlife from entering the proposed project area.
- Reclamation will be conducted to achieve a stable configuration and self-sustaining ecosystem for wildlife.

- Wildlife signage along the unnamed BLM road and proposed new access road will be used to avoid vehicle collisions with wildlife.

2.1.7.7. Migratory Birds

- To avoid potential impacts to and unintentional take of migratory bird species, a survey for nesting birds will be completed to ensure that none are on the mine site. In the event nesting migratory birds are discovered on the proposed project area, potential impacts to and unintentional takes of migratory bird species can be mitigated by limiting initial ground-disturbing activities to outside of the breeding season (March 1–August 31).

2.1.7.8. Reclamation and Revegetation

- Excess material from the road improvement suitable for use as topdressing (defined in 19.10.1.7.T(1) NMAC as "geological material and other amendments capable of supporting vegetation") will be collected, transported to the laydown yard, and stockpiled for future use during reclamation activities.
- Disturbed areas that are not needed for future operations will be reclaimed; interim reclamation will be performed in areas that receive intermittent use. The disturbed area will be reseeded with a certified weed-free native seed mixture and mulched with a certified weed-free mulch. A tackifier may be used to enhance stability of the seedbed.
- Reclamation will occur concurrently during operations at the earliest economically and technically feasible time.
- Proposed project areas will be restored to a safe and stable condition that blends with the surrounding undisturbed area and that meets BLM and MMD requirements to achieve a self-sustaining ecosystem appropriate for the surrounding area that is consistent with approved post-mining land uses.
- A fenced vegetation reference area will be established to be used in the evaluation of revegetation success.
- Reclamation will be conducted in accordance with success standards outline in 19.10.603.G NMAC, which specify the following:
    - Total herbaceous cover and productivity shall be equal to 90% of the reference area within a 90% statistical confidence.
    - The diversity of plant life forms (woody plants, grasses, and forbs) shall determine what is reasonable given the physical environment of the reclamation.
    - Woody plant species shall be established to an approved density with an 80 percent statistical confidence.
- Monitoring parameters, including vegetative cover and plant diversity, and other standards designated by the BLM will be used to determine the success of the revegetation.
- Topsoil and subsoil will be replaced and contoured to achieve safe slopes, erosion control, long-term stability, and preservation of surface water flow patterns.

2.1.7.9. Grazing

- American Magnesium will take measures to protect the allotment boundary for damages. If the allotment boundary on the West side is damaged in any way near the proposed mine as a result of the mine activity, the operator is responsible for repairing the allotment boundary immediately.

The operator must notify the BLM office and the private surface landowner or the grazing allotment holder if any damage occurs to any range improvements. The operator will also ensure that the gate in the allotment boundary remains closed during operations and/or will be responsible for installing a cattle guard.

2.1.7.10. Water Quality

- American Magnesium will develop a written Stormwater Pollution Prevention Plan (SWPPP).
- Drill cuttings will be contained on-site. If a RC drill is used, the fluids will be managed using appropriate control measures.
- Only nontoxic fluids will be used in the drilling process.
- Sediment traps will be used as necessary and filled at the end of the drilling program.
- Following resource verification activities, each drill hole will be permanently sealed from bottom to top with a neat cement slurry grout in accordance with 19.10.3.302.L. NMAC. If groundwater is encountered or the project is interrupted for more than 120 days, drill holes will be plugged pursuant to 19.27.4. NMAC. As discussed in Section 3.5.2, there is little chance that groundwater will be encountered during drilling given the proposed 100-foot depth of the drill holes and the projected depth of the water table.
- Stormwater pollution prevention BMPs will be used at the mine and laydown yard sites to minimize erosion from stormwater (see Section 3.5.2). An SWPPP, including a Sediment Control Plan, will be prepared and implemented once final engineering of layout of facilities, the mine site, and road improvements have been confirmed.
- Direct runoff of water used for dust control will be limited to the extent practicable and will not cause downstream erosion or flooding or cause an exceedance of applicable water quality standards.
- Sediment control will be achieved through the use of BMPs including regrading, fabric and/or hay bale filter fences, seeding and mulching, siltation or filter berms, silt fences, straw bale dams, diversion ditches with energy dissipaters, rock check dams at appropriate locations during construction and operation, and downgradient drainage channels in order to prevent unnecessary or undue degradation
- Diversion structures, including existing natural structures, will divert runoff away from disturbed areas.
- All sediment control structures will be monitored and maintained on a regular basis.
- During reclamation, all areas where water could pond will be recontoured and graded, and surfaces will be covered with topdressing and vegetated.

2.1.7.11. Spill Prevention

- In the event that hazardous or regulated materials are spilled, immediate measures will be taken to control and clean up the spill as detailed in the spill prevention, control, and countermeasures (SPCC) plan.
- Equipment will be regularly inspected and properly maintained to limit adverse impacts from any unintentional release.

- All containers of hazardous substances will be labeled and handled in accordance with requirements of the New Mexico Department of Transportation (NMDOT) and Mining Safety and Health Administration (MSHA).
- Safety Data Sheets (SDS) will be maintained on-site at all times in accordance with MSHA's Hazard Communication for the Mining Industry (30 CFR 47).
- Implementation of a health and safety manual and hazard communication program will provide employees with education and awareness of hazardous materials management, thereby further minimizing the potential for spills at the mine area.
- Oil absorbent boom, sorbent materials, and other spill response materials will be maintained on-site and within vicinity to daily work activities. The spill response materials will be checked monthly during the duration of the proposed project and replenished as needed.
- In accordance with 40 CFR 112.7(d)(2), American Magnesium commits to providing the labor, equipment, and materials required to expeditiously control and remove any quantity of oil spilled during the implementation of this project.
- Documentation of inspections will be maintained at all times. Daily visual inspections will be conducted for both on-site equipment and the complete project site prior to operation and will include the following visual monitoring:
    - Signs of fuel or oil leakage from onsite vehicles and equipment.
    - Staining and discoloration of site soils.
    - Excessive ponding of stormwater.
    - The presence of visible accumulation of petroleum hydrocarbons.
- Annual SPCC inspections of the project area will be conducted to verify the following:
    - The SPCC plan is maintained.
    - The description of the on-site chemicals and equipment is accurate.
    - Applicable SDSs are maintained on-site.
    - Site maps are current and reflect accurate on-site conditions.
    - Controls to reduce the potential for spills identified in this plan are being implemented.
- All project personnel will be briefed about spill control procedures prior to mobilization to the project area, at the initial site briefing, and through daily tailgate safety meetings.
- Fuels and oils will be stored in containers on support or crew trucks for fueling of equipment. Fuel delivery systems on vehicles and drill rig would store approximately 500 gallon of diesel fuel. Fuel delivery systems for light vehicles would store approximately 100 gallons of gasoline. Drill rigs or drill trucks would store approximately 100 pounds of lubricating grease. Vehicles and containers will not be stored where a leak or spill could enter a stormwater conveyance or arroyo.
- Site personnel will monitor fuel storage, delivery, and construction equipment for leaks. Any leaks will be immediately addressed and repaired. Any leaks and leak repair procedures will be documented according to Section 6.3 of the SPCC plan (Daniel B. Stephens & Associates, Inc. 2019a)
- All spills or leaks, regardless of their quantity, will be reported to the New Mexico Environment Department (NMED).

2.1.7.12. Visual

- The existing unnamed BLM road follows the lay of the land; the BLM road will be widened rather than creating a new road. Existing vehicle pullouts created by users of the BLM road will be developed to provide pullouts for haul trucks.
- The proposed mine access road will leave the BLM road at a bend and follow the shortest route from the BLM road to the mine site without taking a straight path. The road will follow the lay of the land to limit the need to install culverts. A concrete slab ford will be constructed at grade across the dry arroyo.
- The laydown yard will be placed on a raised bench to minimize surface disturbance.
- The road to access the mine itself will be constructed to follow the contour of the hillside.
- Unnecessary disturbance will be reduced by working within previously disturbed areas when possible. Disturbed areas will be kept as small as possible while still meeting the operational needs.
- The proposed project area will be kept clean. Unused equipment and materials that may or may not be needed in the future will be removed.

2.1.7.13. Public Safety

- American Magnesium will block public use of the proposed 1,334-foot-long mine access road that will be constructed from the BLM road to the mine site.
- Measures to prevent unauthorized access to the mine site may include a tamper-resistant lockable gate, wire fencing, and appropriate signage.
- Barbed wire fencing or chain-link fencing may be used to prevent the public from entering disturbed areas. Constructed fences would be monitored and repaired on a regular basis.
- Gates or cattle guards will be installed along roadways within the proposed project area, as appropriate.
- In the event that livestock enter the proposed area of disturbance via a gate or opening in a fence, the grazing permittee will be contacted immediately.
- All solid wastes will be disposed of in a state, federal, or local designated site.

2.1.8. Related Actions

2.1.8.1. Transportation of the Ore

At full production, American Magnesium expects to produce approximately 300,000 tons per year of magnesium. American Magnesium estimates that a small fleet of haul trucks will make an average total of 46 round trips per day (Daniel B. Stephens & Associates, Inc. 2019a). This is roughly one truck passing any given point on the transportation route approximately once every 12 minutes, if operating between 8 a.m. and 5 p.m. each day. Assuming that the facility operates 5 days per week and 52 weeks per year, the average number of round trips per year would be approximately 13,043. Within the project area, but outside the active quarry area, the speed limit will be 25 miles per hour (mph). Within the active quarry area, the speed limit will be 15 mph.

The estimated daily water use for dust suppression along the dirt access road, unnamed BLM road and County Road B016 is expected to be 28,000 gallons per day, which would occur once per day on each

side of the road. No water well would be drilled. The water used for dust suppression is expected to be sourced from a permittable source, which may include a single permittable source or multiple permittable sources.

No transportation route has been fully identified or approved by the City of Deming or Luna County. Multiple haul route options may be feasible, including use of a potential federal truck route from the Columbus port-of-entry that would bypass Deming. At the time of writing, the route proposed here (see Figure 1) is purely a conceptual route that will undergo future reviews by the City and County for factors such as road condition and viability, existing use types, geotechnical analysis results and subsequent need for upgrading, and maintenance requirements. However, the use of County Road B016 and the unnamed BLM road would be required an any transportation route identified because they are the primary roads to access transportation routes to the conceptual Peru Mill Site. The BLM does not have jurisdiction over the transportation of the ore using public roads, and for the purpose of this analysis, it is assumed that no ore transportation would begin until all of the appropriate permits are obtained. According to American Magnesium, transportation of the ore would generate approximately 15 new full-time trucking jobs. The conceptual haul route, starting at the proposed mine site, would be approximately 27 miles from mine site to conceptual Peru Mill Site, and would traverse the existing unnamed BLM road, County Road B016/Camino Doce Rd SW, Hermanas Rd SW, County Rd CO 91, W Spruce St, S 8t^{h} St, W Pine St, North Gold Ave (US-180), and Arrowhead Drive Northwest (see Figure 1).

2.1.8.2. Processing of the Ore

American Magnesium expects to identify a potential processing facility site and apply for a permit to process the magnesium ore, in 2020. One conceptual mill site could be located on private land at the Peru Industrial Site. American Magnesium has not applied for use of this location yet, nor will they apply for it until all of their pre-permitting feasibility studies are completed. While the BLM does not have jurisdiction over the approval or permitting of a mill site off of BLM lands, the MMD together with the City and County, would have such jurisdiction. Prior to fully defining any potential mill site or activity, the BLM assumes that American Magnesium would work with MMD and other local agencies to permit any processing facility locally. To consider the potential indirect effects of processing the ore retrieved at the proposed mine, including processing of the ore, the BLM has gathered the following general information regarding processing.

The milling process involves the calcining of dolomite to dolime (magnesium and calcium oxide) in a rotary kiln. The dolime will be reduced to magnesium metal crowns using ferrosilicon in a retort furnace. The crowns would be processed into magnesium ingots and alloys ready for sale mainly in the American market. The total production rate of the conceptual facility is expected to be 30,000 tons/year. Based on this production rate, the annual utility usage volumes and projected emissions of carbon dioxide (CO_2) are listed in Table 4.

Table 4. Utility Usage and Emissions Associated with the Proposed Action

Usage Type and Unit of Measure	Annual Volume
Water (gallons)	17 million
Electricity (megawatt hours)	73,000
Natural gas (British thermal units)	4.2 billion
Emissions (CO2e) (tons/year)	181,000

Major byproducts of the proposed milling process include CO_2 and calcium silicate (Ca_2SiO_4). Pending a full feasibility analysis, American Magnesium is considering using greenhouses to consume the CO_2 and would sell the Ca_2SiO_4 byproduct to local cement companies. Any carbon capture system or byproduct market feasibility would be defined at the time of permitting the conceptual mill through the MMD. According to American Magnesium's preliminary processing feasibility study, the conceptual mill facility would generate approximately 550 new full-time jobs to be sourced in Luna County (TRU Group 2013). The BLM does not have jurisdiction over the approval and permitting of the processing facility, unless it is proposed on BLM managed public lands. However, American Magnesium would not begin mine operations until the processing of the ore has been permitted by the appropriate agencies including municipal and state agencies.

2.2. No Action Alternative

The No Action Alternative is to deny the proposed Plan of Operations. If the Plan of Operations is not approved by the BLM, American Magnesium would have to pursue alternative methods for mining and extracting magnesium.

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CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1. Introduction

This chapter describes the existing conditions relevant to the issues presented in Table 1 and discloses the potential direct, indirect, and cumulative impacts of the Proposed Action and alternatives on those issues.

3.2. Cumulative Actions

A cumulative impact, as defined in 40 CFR 1508.7, is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions, regardless of which agency (federal or non-federal) or person undertakes such other action. The time frame for the cumulative impact analysis is 30 years (i.e., the projected lifetime of the quarry).
A description of the cumulative impacts for each issue is described within each issue brought forward for detailed analysis. The geographic scope for cumulative effects is identified for each issue analyzed below.

3.2.1. Past and Present Actions

Past and present actions in the analysis area include housing developments, past mining activity, and the Peru Mill Industrial Park.

3.2.2. Reasonably Foreseeable Future Actions

The BLM has identified four actions that are reasonably foreseeable in the vicinity of the project area:

1. Potential new housing on vacant lots along County Road 331, County Road 11, and County Road 549 with associated infrastructure such as roads, driveways, and utilities. Approximately 3,015 buildable lots are listed for sale along these roads south and east of Deming (Zillow 2019).
2. Recreation.
3. Agricultural industries.
4. Border infrastructure improvements including border wall construction and communications sites.
5. Mineral development on valid mining claims (BLM 1988).

3.3. Issue 1: Scenic Quality

How would excavation of locatable minerals impact the scenic quality for users of surrounding BLM land and residents on nearby private land?

The primary impact-causing element is the visible exposure of the mineral after vegetation removal and during mineral extraction activities, as well as after final reclamation when the foothill is removed altogether, and the surface of the remaining flat-bottomed bowl has been fully revegetated. Operations elements include the introduction of portable structures, heavy equipment, vehicles, and haul trucks into the viewshed of the area. The analysis area for visual resources is the combined viewsheds from the key observation points (KOPs), which are located north and west of the project area. These KOPs (Figure 3) were selected based on public comments and BLM ID Team input and reflect visually sensitive views of the analysis area. The visual analysis indicator is the degree of contrast in line, form, color, and texture from the introduction of the new components as viewed from the KOPs at 5 years into project operations and again after site reclamation.

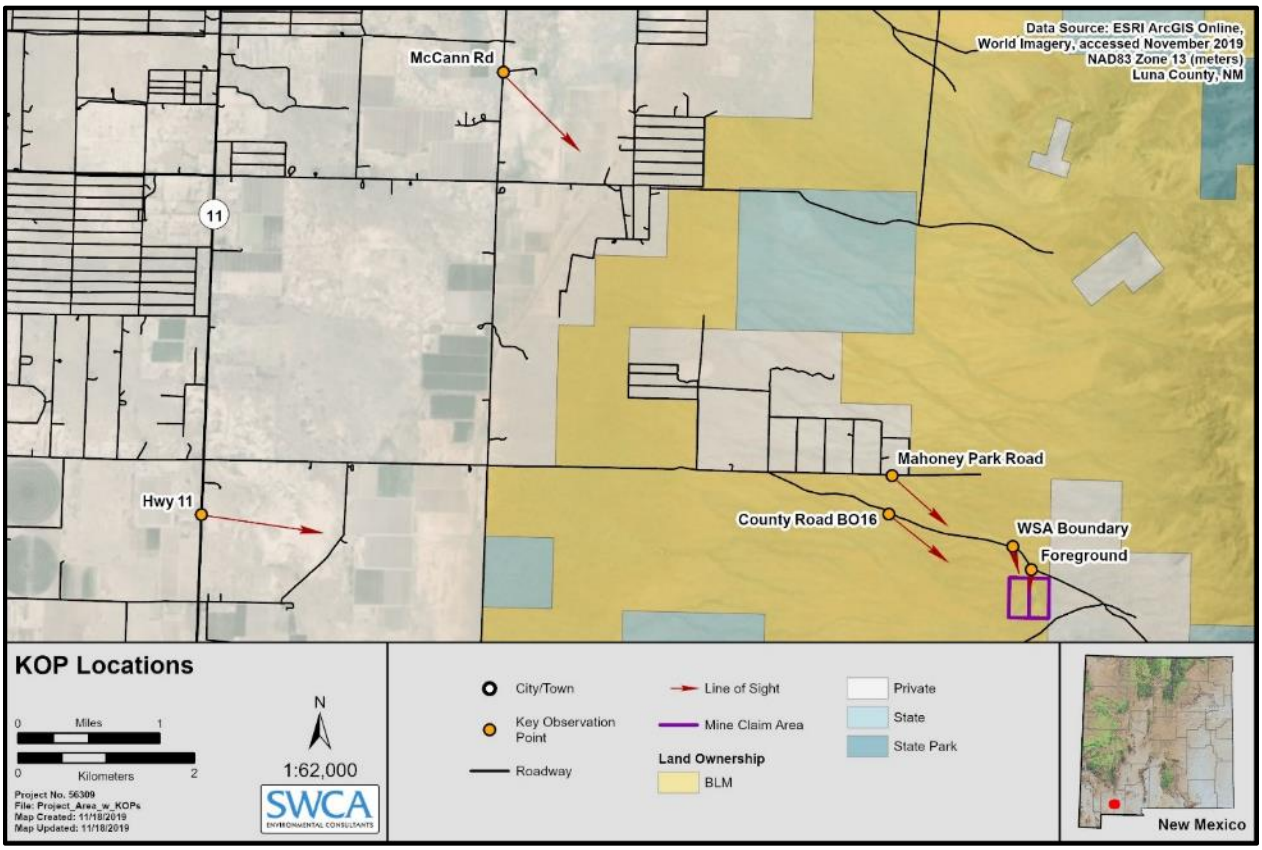

Figure 3. Key observation points.

3.3.1. Affected Environment

Visual resources include the natural and human-modified landscape. The existing visual quality of the project area is influenced by the presence of the Florida Mountains east of the proposed project area and open BLM land, agriculture, and rural residential homes to the west.

The project is within the Florida Mountains Scenic Quality Rating Unit (SQRU 29) as described in the Las Cruces District Office Visual Resource Inventory (BLM 2010). Florida Mountains have a B Scenic Quality Classification along with a High Sensitivity Level Rating. The Florida Mountains create a dominant line and form on the east side of the landscape because of their proximity and size.

The project area is in a foreground-middle ground zone, a classification by the BLM that defines the project area as visible for 5 to 10 miles. Within this distance, the most visible features, aside from the mountains, are existing small-to-medium residences, paved and unpaved roads, existing transmission infrastructure, and agricultural fields. Predominant colors include tans and browns from the sandy soils and gray tones from exposed dolomite within the Florida Mountains; light to medium greens and yellows from the vegetation; adobe, grey, and cream colors from the homes and human-made structures; and the occasional red or yellow from signs or vehicles.

The casual observers in this area are residents living in the foothill neighborhoods, as well as any visitors using Mahoney Park Road or other roads to access the Florida Mountains. Visitors travel by personal vehicles and off-highway vehicles along County Road B016 and the unnamed BLM road to access the

Florida Mountains for scenic and recreational activities, including hiking, hunting, rock hounding, and photography. This range of individuals defines the casual observer.

Visual Resource Management Classes and Objectives

The BLM is responsible for managing public land for multiple uses while ensuring that the scenic values of public land are considered before authorizing actions on public land. The BLM accomplishes this through the Visual Resource Management (VRM) system. BLM-administered land is categorized into one of four VRM classes, as described in BLM Manual H-84po10-1 (BLM 1986) and is managed in accordance with the class objectives. The project is within a VRM Class III area, as described in the Mimbres RMP (BLM 1993). The objective of this class is to partially retain the existing character of the landscape. The allowed 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.

3.3.2. Environmental Impacts

3.3.2.1. Impacts of the Proposed Action

BLM's VRM program (BLM 1986) includes a standardized system for reviewing land actions for RMP conformance. The analysis area for visual impacts are the viewsheds from six KOPs identified using public input and information from the BLM. Public input from the scoping period indicated that the primary visual issue was impact to residents' views of the Florida Mountains and vehicular views from roads in the analysis area.

Six KOPs were chosen to represent views from private residences in the area around the proposed mine site (see Figure 3 above). Photographic simulations and visual contrast rating worksheets for each KOP are provided in Appendix B. For the four KOPs closest to the proposed mine site, two timeframes are analyzed: 1) at the 5-year mining operation interval and 2) after project completion and final reclamation. The two timeframes represent the evolution of the viewshed impacts through the life of the project. Associated public concerns regarding property values partially dependent on the quality of those views are discussed in Section 3.9.

Table 5 provides an impact summary from introduced contrasts at each KOP. KOPs from the unnamed BLM road (foreground), WSA boundary, County Road B016, and Mahoney Park Road illustrate views for recreationists, hunters, and commercial outfitters who would see the mine site while using the unnamed BLM road, as well as the views from nearby residences approximately 1 mile from the project site. These KOPs illustrate the mine at the foreground/middle ground. The KOPs on McCann Road and Highway 11 represent views from a greater distance and from paved rural roadways where most area viewers would be. The visual contrast rating worksheets and photographic simulations for each KOP are presented in Appendix B.

Table 5. Summary of Impacts to KOP Viewsheds

KOP	Time Frame	Feature-Element*	Degree of Contrast	Conformance to VRM Class III Objectives
McCann Road	5-year	Land - form, line, color, texture	Weak	Yes

KOP	Time Frame	Feature-Element*	Degree of Contrast	Conformance to VRM Class III Objectives
Highway 11	5-year	Land - form, line, color, texture	Weak	Yes
Mahoney Park Road	5-year	Land - form, line	Moderate to Weak	Yes
		Land - color	Moderate	
		Land - texture	Weak	
		Vegetation - form, line, color, texture	Weak	
		Structures - form, line, color, texture	Weak	
	Reclaimed	Land - form, line, color, texture	Weak	Yes
		Vegetation - form, line, color, texture	Weak	
County Road B016	5-year	Land - form, line, color	Moderate to Weak	Yes
		Land - texture	Weak	
		Vegetation - form, line, color, texture	Weak	
		Structures - form, line, color, texture	Weak	
	Reclaimed	Land - form, line, color, texture	Weak	Yes
		Vegetation - form, line, color, texture	Weak	
WSA Boundary	5-year	Land - form, line	Moderate	Yes
		Land - color	Moderate to Weak	
		Land - texture	Weak	
		Vegetation - form, line, color, texture	Weak	
		Structures - form, line	Moderate to Weak	
		Structures - color	Moderate	
		Structures - texture	Weak	
	Reclaimed	Land - form, line, color, texture	Weak	Yes
		Vegetation - form, line, color, texture	Weak	

KOP	Time Frame	Feature-Element*	Degree of Contrast	Conformance to VRM Class III Objectives
Foreground	5-year	Land - form, line	Moderate	Yes
		Land - color, texture	Moderate to Weak	
		Vegetation - form, line, color, texture	Weak	
		Structures - form, line	Moderate to Weak	
		Structures - color	Moderate	
		Structures - texture	Weak	
	Reclaimed	Land - form, line, color, texture	Weak	Yes
		Vegetation - form, line, color, texture	Weak	
	Proposed, Reclaimed	Landforms and revegetation		

* Feature-Element and Degree of Contrast rated as "None" are not listed

KOP McCann Road: The overall, short-term contrasts created by the mining project would be weak (See Appendix B for visual contrast rating worksheet). From this KOP, the structures and vegetation are indistinct. Long-term impacts to the viewshed from this location were not simulated or evaluated on a visual contrast rating worksheet because the short-term project would create weak to no contrasts in the landscape. Given the distance (5.25 miles), the mine would meet VRM Class III objectives while in operation and after the project area is successfully reclaimed.

KOP Highway 11: The overall, short-term contrasts created by the mining project would be weak (See Appendix B for visual contrast rating worksheet). From this KOP, the structures and vegetation are indistinct. The greatest short-term contrast would be from ground disturbance and vegetation removal. The long-term impacts to the viewshed from this location were not simulated or evaluated on a visual contrast rating worksheet because the project would create weak to no contrasts in the landscape. Given the distance (5.78 miles), the mine would meet VRM Class III objectives while operating and after the project area is successfully reclaimed.

KOP Mahoney Park Road: The short-term contrasts created by the mining project would be moderate to weak (See Appendix B for visual contrast rating worksheet). The greatest contrasts would be from ground disturbance, active mining, and vegetation removal in the viewshed. Introduction of temporary structures would create weak contrasts. The land color during mining operations, a warm grey, contrasts moderately with the surrounding foothills. The mining benches introduce moderate to weak form and line contrasts into the landscape. Given the proximity of the KOP to the mine site (1.25 miles), the Proposed Action would attract attention, but would not dominate the viewshed during operations.

The long-term impacts viewed from this KOP would be weak because project area reclamation would include revegetation and topsoil replacement that would repeat the adjacent undisturbed landscape features. Following successful reclamation, all contrasts would be reduced to weak. The active and reclaimed project site would meet VRM Class III objectives.

KOP County Road B016: The short-term contrasts created by the mining project would be moderate to weak (See Appendix B for visual contrast rating worksheet). The existing structure in the landscape, the simple, linear unpaved road, contrasts with the grey, tall, geometric proposed forms. The short-term contrasts result from ground disturbance, active mining, and vegetation removal. From this view, the new landform created by mining activities is clearly humanmade because of its geometric and regular shape. Introduction of temporary structures would create a weak contrast due to the distance to the viewer would create a weak contrast. Given the proximity of the KOP to the mine site (1.06 miles), the Proposed Action would attract attention, but should not dominate the viewshed during operations. VRM Class III objectives would be met.

The long-term impacts to the viewshed from this location would be weak because project area reclamation would include topsoil replacement and revegetation that would blend with adjacent undisturbed areas. Following successful reclamation, the reclaimed mine project would not attract the attention of the casual observer and would not dominate the viewshed. The reclaimed project site would meet VRM Class III objectives.

KOP WSA Boundary: The KOP is 0.31 mile from the proposed mine site. The short-term contrasts created by the mining project would be moderate to weak (See Appendix B for visual contrast rating worksheet). These contrasts result from soil disturbance, introduced geometric landforms, temporary structures, active mining, and vegetation removal. The Proposed Action would attract the attention of the casual observer but would not dominate the viewshed during operations. VRM Class III objectives would be met during operations.

The long-term impacts to the viewshed from this location would be weak because successful reclamation of the project area would include top soil replacement and revegetation that would blend with adjacent undisturbed areas. The reclaimed mine project would not attract the attention of the casual observer and would not dominate the viewshed. The reclaimed project site would meet VRM Class III objectives.

KOP Foreground: The short-term contrasts created by the mining project would be moderate to weak (See Appendix B for visual contrast rating worksheet. This KOP is the closest to the project area, 0.14 mile. These contrasts, seen in the 5-year simulation, result from access road construction, ground disturbance, temporary structures, active mining, and vegetation removal. The vegetation would be gradually replaced on the benches during operations, reducing the degree of contrast. The active mine project would attract the attention of the casual observer but should not dominate the landscape. VRM Class III objectives would be met.

The long-term visual contrasts would be weak because successful project area reclamation would include top soil replacement and revegetation that would blend with adjacent undisturbed areas. The reclaimed mine project would not attract the attention of the casual observer and would not dominate the viewshed. The reclaimed project site would meet VRM Class III objectives.

No other reasonably foreseeable projects are known to be proposed in the KOPs' viewshed that could contribute to cumulative effects. The Proposed Action would add new form, line, color, and texture elements to the landscape, creating an incremental addition to the past and present actions, including livestock grazing and legacy mining, resulting in a cumulative impact to the viewshed. VRM Class III objectives would be met.

3.3.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no mineral extraction or mining operations would occur. The proposed mining location would remain unchanged. VRM Class III objectives would be met.

3.4. Issue 2: Traffic and Public Safety

How would truck traffic along the proposed transportation route affect traffic and public safety?

The primary analysis area for truck traffic along the proposed transportation route from the proposed mine site to the potential ore processing facility would include the use of an existing unnamed BLM road, County Road B016, New Mexico 331, New Mexico 418, South 8th Street, West Pine Street, North Gold Avenue (NM-180), and Arrowhead Drive Northwest (Figure 1).

Data for the proposed transportation route was obtained from the New Mexico Department of Transportation for the year 2018. The data includes Annual Average Daily Traffic (AADT), which is the total volume of traffic on a highway or road segment for one year, divided by the number of days in the year (NMDOT 2012), and represents traffic on a typical day of the year (NMDOT 2012). Lastly, crash data was obtained through The University of New Mexico's Traffic Research Unit 2018 Traffic Crash Maps for Luna County (University of New Mexico 2018).

3.4.1. Affected Environment

The existing unnamed BLM Road is a two-lane, southeast to southwest dirt road. This road, which would connect the proposed project area to County Road B016, is approximately 2.0 miles long. AADT trends, crash data, or suggested speed limits are not available for this road. Traffic use on this road is assumed to those using this rural area for recreational purposes or for access to the Florida Mountains Wilderness Study Area.

County Road B016 (Camino Doce Road Southwest) is an east to west road connecting the existing unnamed BLM road to NM-331. This road is a two-track dirt road for approximately 2.0 miles starting at the unnamed BLM road, to the intersection of McCan Road Southeast. This road then turns into a two-lane paved road at the intersection of McCan Road Southeast until the intersection of NM-331 for approximately 6.0 miles, which is the western terminus for this road. The proposed transportation route travels along County Road B016/Camino Doce Road for a total of approximately 8.0 miles. Typical traffic on this road is assumed to be agricultural uses, and residents or recreationists of this rural area. In 2018, the AADT trend along County Road B016/Camino Doce Road between the unnamed BLM road and NM-331 was reported to be approximately 388 (NMDOT 2018). For the year 2018, there were between one and three crashes on this road, at the intersection of County Road B0-16 and New Mexico Highway 11 (Columbus Road) (University of New Mexico, 2018). Required speed limit information is not available for this road.

New Mexico Highway 331 (NM-331; Hermanas Road Southwest, County Road Co-91, and Creosote Road Southwest) is a north to south, two-lane, paved state highway connecting New Mexico Highway 9 at its southern end to New Mexico Highway 418 (NM-418) at the northern end in Deming, NM. This road is located in a rural area of Luna County, and is adjacent to agricultural areas and sporadically placed residences; typical traffic on this road is assumed to be representative of the land uses in this area (agriculture, recreation, residences). Traffic from the Proposed Action would be entering NM-331 at the intersection of Camino Doce Road, heading north towards Deming, NM, and would then head east on NM-418. Traffic from the Proposed Action would be traveling along NM-331 for approximately 9.0 miles. In 2018, the AADT trend along NM-331 between Camino Doce Road and NM-418 was reported to

be approximately 388 (NMDOT 2018). For the year 2018, there were between 3 and 9 crashes on this road (University of New Mexico, 2018). The posted speed limit is 55mph.

New Mexico Highway 418 (NM-418; County Road Co-91; West Spruce Street) is an east to west, two-lane, paved highway, connecting to Interstate 10 (I-10) and Deming, NM at its eastern end, and I-10 at its western end. At its eastern end, NM-418 is adjacent to private businesses, Bataan Elementary School, Red Mountain Middle School, and residential areas. Its western end is in a rural area of Luna County, and is adjacent to agricultural areas and sparsely populated residences. Traffic on this highway is assumed to be consistent with the various land uses in the area. Traffic from the Proposed Action would be traveling along NM-418 for approximately 3.6 miles and would enter at NM-311 and terminates at Spruce Street before turning north onto 8th Street. The posted speed limit of this road is between 45 and 55 mph and slows to 15 mph during posted hours south of Bataan Elementary School, as the road approaches a school zone. During all other hours, the speed limit is 35 mph. The speed limit then increases to 35 mph north of Red Mountain Middle School. In 2018, the AADT trend along NM-418 between NM-331 and South 8th Street was reported to be between 594 and 2,002 (NMDOT 2018). For the year 2018, there were between 4 and 12 crashes on this road (University of New Mexico, 2018).

South 8th Street is a north to south, two-lane, paved local road, connecting to I-10 at its northern end, and connecting to rural agricultural areas at its southern end, with portions of the town of Deming in between. Traffic on this road is assumed to be consistent with the various land uses in the area. Traffic from the Proposed Action would be traveling along South 8th Street between West Spruce Street and West Pine Street (NM-418) for approximately 0.1 mile. The portion of the proposed transportation route along South 8th Street is adjacent to private businesses. The posted speed limit for this road is 35 mph. In 2018, the AADT trend along South 8th Street between NM-418 and West Pine Street was reported to be between 3,959 and 4,137 (NMDOT 2018). Crash data was not available for the portion of the proposed transportation route along this road.

West Pine Street is an east to west, paved, four-lane divided highway connecting to East Pine Street (I-10) at its eastern end, and I-10 at its western end, with portions of the town of Deming in between. West Pine Street is adjacent to private businesses, fast-food restaurants, churches, and residences. Local traffic on this road is assumed to be consistent with the various land uses in the area. Traffic from the Proposed Action would be traveling along West Pine Street between South 8th Street and North Gold Avenue for approximately 0.6 miles, and the posted speed limit is between 30 mph and 35 mph. In 2018, the AADT trend along West Pine Street between South 8th Street and North Gold Avenue was reported to be between 3,046 and 8,108 (NMDOT 2018). For the year 2018, there were between 47 and 102 crashes on this road (University of New Mexico, 2018).

North Gold Ave (US-180) is a paved, four-lane divided highway that provides access to I-10 and residential and rural areas north and south of I-10. Traffic from the Proposed Action would be traveling on this road for approximately 2.2 miles, between West Pine Street and Arrowhead Drive Northwest. This proposed route is adjacent to private businesses (gas stations, restaurants, Columbus Electric Co-Op), Interstate-10, and rural residential areas. The posted speed limit on North Gold Ave is 35 mph between West Pine Street and Arrington Road, and increases to 45 mph between Arrington Road and Arrowhead Drive Northwest. Traffic on North Gold Ave is assumed to be consistent with the various land uses in the area. In 2018, the AADT trend along North Gold Ave between I-10 and Arrowhead Drive Northwest was reported to be between 8,530 and 15,744 (NMDOT 2018). For the year 2018, there were between 4 and 12 crashes on this road (University of New Mexico, 2018).

Arrowhead Drive Northwest is a two-lane (no center stripe) rural road. It is paved for approximately 0.92 miles beginning at North Gold Avenue, then transitions to a dirt road, after the Luna Energy Facility, for approximately 0.75 miles until ending at the proposed ore processing facility at State Route 394; which is also the northern terminus for the proposed transportation route. Traffic from the Proposed

Action would be traveling on this route for approximately 1.7 miles. Improvements on this road may be required. The route is in a rural area of Luna County and traffic is assumed to be local, those looking to recreate in this area, or employees of the Luna Energy Facility. A cattle guard is present where Arrowhead Drive Northwest meets North Gold Avenue. AADT trends, crash data, or suggested speed limits are not available for this road.

3.4.2. Environmental Impacts

3.4.2.1. Impacts of the Proposed Action

There would be indirect effects of proposed route as BLM does not have jurisdiction along the roads and highways proposed for the potential transportation route, and therefore cannot provide mitigation of the proposed transportation route. New Mexico Department of Transportation would be required to approve any terms and mitigation measures for the proposed transportation route.

It is expected that up to 10 haul trucks will make an average of 46 round trips per day (Daniel B. Stephens & Associates, Inc. 2019). This translates to 92 single trips per day from the mine site to the potential ore processing facility, and from the ore processing facility back to the mine site. If the mine site and ore processing facility operate between 8 am and 5 pm each day, 5 days per week, 52 weeks per year, the average number of round trips per year would be roughly 12,000 round trips per year, or 24,000 single trips per year.

There is no AADT data for the unnamed BLM Road to anticipate the increase of use on the road. The unnamed BLM Road is used by recreationalist to access the Florida Mountains for hunting and other outdoor recreation opportunities. The additional truck traffic on the unnamed BLM access road would increase the usage of the road and could potentially result in a crash. However, improvements would be made along the unnamed BLM Road including widening to 16 feet and developing several 8-foot-wide by 75-foot-long pullouts for passing haul trucks.

The current AADT throughout the proposed transportation route would have a 24 percent increase in traffic each day due to the Proposed Action on County Road B016 and NM-331, between a 5 percent and 15 percent increase each day on NM-418, a 2 percent increase each day on South 8th Street, between a 1 percent and 3 percent increase each day on West Pine Street, and a 1 percent increase each day on North Gold Avenue. This increase in AADT could result in an increase of 1 crash on County Road B016, 3 crashes on NM-331, 1 crash on NM-481, 4 crashes on West Pine Street, and 1 crash on North Gold Avenue.

Past and present actions in the analysis area and cumulative impacts of the Proposed Action are detailed in Section 3.2. With consideration of the reasonably foreseeable future actions, existing conditions of the analysis are expected to continue and increase as additional residential and recreation areas, agricultural industries, and infrastructure improvements are executed

Mitigation and Residual Impacts

Any mitigation of the proposed transportation route would be applied and required by the City of Deming, Luna County, and NMDOT. There would be no residual impacts from the proposed transportation route.

3.4.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project and the proposed transportation route would not occur. Baseline conditions of the proposed transportation route

would remain unchanged, and there would be no additional heavy vehicles introduced on the roads and highways listed in Section 3.4.1.

3.5. Issue 3: Water Quality

How would surface water quality and groundwater quality and erosion in downstream ephemeral drainages be maintained during stormwater events?

Surface water quality and groundwater quality may be impacted from mining activities such as boring, ground-disturbing activities, and vehicles and equipment operation and maintenance. The primary impact-causing element is the potential erosion during vegetation removal and mineral extraction activities, and potential oil spills and leaks from equipment operation and maintenance, in addition to stormwater runoff during rain events. The analysis area for stormwater resources is the Mimbres watershed. The impact indicator would be the potential changes stormwater and groundwater quality.

3.5.1. Affected Environment

The Proposed Action is located within the 4,633-square-mile Mimbres Watershed, which is located within Dona Ana, Grant, Luna, and Sierra Counties. The majority of the watershed falls within Luna County (NRCS n.d.). The Mimbres Watershed ranges in elevation from approximately 3,950 feet southeast of Columbus to approximately 10,160 feet in the Black Range. The Mimbres Watershed is an almost entirely closed, partially drained system. The climate is semiarid with approximately 11 inches of annual precipitation (annual average for the United States is approximately 38 inches) (U.S. Climate Data 2019).

Surface water in the proposed project location consists of ephemeral stream channels flow west from the Florida Mountains, into an alluvial fan to a relatively flat basin with no large bodies of surface water. The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory mapper identifies these and numerous other ephemeral washes that drain the Florida Mountains as intermittent riverine habitats that may be seasonally flooded (USFWS 2019b). The closest waters of the U.S. is the Mimbres River located approximately 13.8 miles northwest of the proposed project. Surface water from east of the proposed project is routed around the proposed mining area by existing ephemeral drainages and therefore does not come in contact with the proposed mining area.

Water quality monitoring in the Mimbres Watershed was conducted in 2011. Water quality parameters included dissolved oxygen, pH, temperature, turbidity, and conductivity, as well as sampling for ions, total nutrients, dissolved metals, and *E.coli* (NMED 2011). In addition, American Magnesium tested the Silurian Fusselman Dolomite throughout the proposed mining area to evaluate the potential for stormwater runoff to be impacted from naturally occurring constituents within the targeted mining material.

Section 402 of the CWA establishes the NPDES to address water pollution concerns by regulating point sources that discharge into waters of the United States (EPA2019i; NMED 2019c). Federal regulations require stormwater discharges associated with specific categories of industrial activity to be covered under NPDES permits. Mineral mining is considered a Category III industrial activity under NPDES (EPA 2019i). In addition, the proposed project would be regulated by the New Mexico Groundwater Quality Bureau (NMGQB), which regulates Mining Environmental Compliance under the Ground and Surface Water Protection Regulations (20.6.2 NMAC). In addition, the proposed project would operate in accordance with CWA NPDES regulations, which would include the preparation of a SWPPP (Daniel B. Stephens & Associates, Inc. 2019a). The purpose of a SWPPP is to identify potential sources of stormwater pollution practices to reduce pollutants in stormwater discharges and to outline procedures the operator would implement to comply with the terms and conditions of the NPDES permit (EPA 2007).

Section 311 of the CWA establishes Oil Pollution Prevention regulations to prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil. The regulation requires facilities to develop and implement SPCC plans and establishes procedures, methods, and equipment requirements. American Magnesium has prepared a SPCC plan in accordance with Section 311 of the CWA, which describes the reporting requirements and response actions that would take place in the event of a spill, release, or other unexpected condition, as well as procedures for cleanup and disposal (Daniel B. Stephens & Associates, Inc. 2019a).

The 1978 New Mexico Water Quality Act (NMWQA) established the NMED Water Quality Control Commission to "prevent or abate water pollution in the state or in any specific geographic area or watershed of the state […] or for any class of waters" (New Mexico Statutes Annotated [NMSA] 1978). The NMED Water Quality Control Commission specifies the standard for water quality from new sources to reduce water contaminants through BMPs, operating methods, or control technology.

The proposed project would be regulated by the NMGQB, which protects the environmental quality of New Mexico's groundwater resources as mandated by the Water Quality Act and the New Mexico Ground and Surface Water Protection Regulations (20.6 NMAC) (NMED 2019). NMGQB ensures that groundwater quality standards outlined in in Section 20.6.2.3103 NMAC are met for projects with the potential to impact ground water quality.

3.5.2. Environmental Impacts

3.5.2.1. Impacts of the Proposed Action

The Proposed Action includes vegetation removal and disturbance of 30 acres including within the mine claim and for the proposed access road, which is less than 0.01% of the Mimbres Watershed. To manage any stormwater runoff, American Magnesium would develop a SWPPP in accordance with NPDES standards. The SWPPP would include measures to address water pollution concerns by regulating point sources and non-point sources. Point sources from the proposed project would include potential erosion from quarry benches and the topsoil stockpile, and erosion during the construction of the new access road and culvert. Non-point sources would include any erosional runoff from outside proposed project area.

Point sources may require scheduled monitoring in accordance with NPDES standards. Point source BMPs would include seeding and mulching of disturbed areas, silt fences, straw bale check dams, diversion ditches with energy dissipaters, and rock check dams (Daniel B. Stephens & Associates, Inc. 2019a). There are no non-point source discharges anticipated that will require scheduled monitoring. However, non-point sources will be managed via recommendations contained in the SWPPP to the extent that they may occur during resource verification, mining development, mining, or reclamation with the use of BMPs as necessary, including seeding and mulching of disturbed areas, silt fences, straw bale check dams, diversion ditches with energy dissipaters, and rock check dams (Daniel B. Stephens & Associates, Inc. 2019a). The SWPPP may require total suspended solids and total dissolved solids sampling of runoff following large rain-producing storm events (typically, following periods of rainfall exceeding 0.25 inch in a 24-hour period), as defined in the SWPPP. Any potential stormwater sampling would be done in accordance with sampling standards outlined in the NMWQA (NMSA 1978). Additional monitoring requirements and effluent limitations would be determined by the EPA during development of the required SWPPP.

The topsoil stockpile would be seeded with a reclamation seed mixture. American Magnesium would manage any erosion or stormwater runoff from the stockpile in accordance with NPDES requirements. No impacts to surface water quality or quantity are expected from the construction and maintenance of the topsoil stockpile.

The estimated daily water use will be 5,000 gallons, or as needed, for dust suppression, site reclamation activities, resource verification, and mining activities. The estimated daily water use for dust suppression along the dirt access road, unnamed BLM road and County Road B016 is expected to require 28,000 gallons per day. t. No water well would be drilled. The water used for dust suppression is expected to be sourced from a permittable source, which may include a single permittable source or multiple permittable sources. The use of water for dust suppression is not expected to create runoff from the proposed project area. Therefore, there are no impacts to surface water quality from the use of water for dust suppression within the proposed project area.

The new access road leading to the proposed mining area would cross an unnamed ephemeral drainage. The new access road would be constructed to the BLM Gold Book Standards (U.S. Department of the Interior and U.S. Department of Agriculture 2007). The new access road will require the installation of single culverts to cross two or three narrow, steep-sided gullies (Daniel B. Stephens & Associates, Inc. 2019a). In addition, the new access road would require a concrete slab ford (low-water crossing) be constructed at grade to cross a section of ephemeral wash that is about 70 feet wide and located between the BLM road and the mine site (Daniel B. Stephens & Associates, Inc. 2019a). The culvert would be designed and installed to convey stormwater runoff under the haul road. The road crossing would be constructed to convey water from a 100-year 24-hour storm event. Project design features outlined in Section 2.1.2 would be implemented to minimize the surface disturbance and erosion potential on the access roads. The SWPPP would outline stormwater monitoring requirements, in accordance with NPDES, along the road. In the event that water quality results exceed stormwater quality standards, new BMPs would be implemented along the access road. No impacts to surface water quality are expected from construction and operation of the new access road leading to the proposed mining area.

Sediment control in the mine area will be achieved by using berms, silt fences, straw bale dams, diversion ditches with energy dissipaters, and rock check dams at appropriate locations to control discharges of pollutants (Daniel B. Stephens & Associates, Inc. 2019a). Catch benches on walls will be left in place to interrupt surface sheet flow. Sediment control structures will be inspected and maintained on a regular basis. At this time, American Magnesium would not collect stormwater runoff from the proposed mining area or laydown yard (Daniel B. Stephens & Associates, Inc. 2019a). However, the NMED Water Quality Control Commission may require stormwater testing requirements to be included in the SWPPP.

The SPCC plan prepared for the proposed project addresses reporting requirements and response actions that would take place in the event of a spill, release, or other upset condition, as well as procedures for cleanup and disposal (Daniel B. Stephens & Associates, Inc. 2019a). Anticipated total oil storage capacity contained on-site would be 700 gallons. Fuel delivery systems on vehicles and drill rig would store approximately 500 gallon of diesel fuel. Fuel delivery systems for light vehicles would store approximately 100 gallons of gasoline. Drill rigs or drill trucks would store approximately 100 pounds of lubricating grease. All petroleum products, kerosene, and reagents used for blasting activities will be stored in aboveground tanks within a secondary containment area capable of holding 110% of the volume of the largest vessel in the area. Fuel spills from diesel and gasoline storage required by on-site equipment fall into two main categories: “minor incidental” and “major incidental” spills. Minor incidental spills result from incidents such as operator handling of transfer equipment during fueling, broken hydraulic lines, or engines that leak oil (Daniel B. Stephens & Associates, Inc. 2019a). Spill response materials of sufficient quantity to prevent a typical discharge will be maintained on-site. In accordance with 40 CFR 112.7(c)(1)(vii), sorbent materials will provide sufficient containment for the activities within the proposed project area (EPA 1996). Oil absorbent boom, sorbent materials, and other spill response materials will be maintained on-site and within vicinity. Daily visual inspections will be conducted for both on-site equipment and the complete project site prior to operation. Annual inspections will be conducted to ensure that SPCC requirements are being met (Daniel B. Stephens & Associates, Inc.

2019a). With the implementation of the SPCC, no impacts to surface water quality are expected from mining activities within the proposed project area.

In August 2019, American Magnesium conducted a ground water quality study to evaluate the potential for naturally occurring constituents to be leached from the Silurian Fusselman Dolomite. Silurian Fusselman Dolomite does not contain sulfide minerals (e.g., pyrite) that might generate acid. Exposure and mining of the Silurian Fusselman Dolomite will not create acid-generating or deleterious materials. The 2019 lab results indicate that stormwater runoff from the naturally occurring Silurian Fusselman Dolomite would not impact stormwater quality (Daniel B. Stephens & Associates, Inc. 2019b). Therefore, testing of surface runoff from the mine site would not be required. In September 2019, the NMGQB confirmed that the proposed project is exempt from the groundwater discharge permit requirements pursuant to Subsection A of 20.6.2.3105 NMAC because stormwater discharge does not exceed the groundwater standards found in Section 20.6.2.3103 NMAC. Therefore, with the implementation and maintenance of sediment control structures and other BMPs outlined in the SPCC and SWPPP, no change to groundwater quality in the watershed is expected to occur from the Proposed Action.

Past and present actions, including projects with the potential to create ground disturbance within the Mimbres Watershed (i.e., agriculture, road construction, and housing development), are generally regulated by NMED and NMWQB, who uphold the federal CWA regulations, including NPDES. The conformance with these regulations contributes to the existing stormwater and groundwater quality in the analysis area. The cumulative impacts of the proposed project, when considered with existing development and reasonably foreseeable future actions, would occur during rain events with potential for runoff to ephemeral drainages in the Mimbres Watershed, in addition to activities (i.e., stock ponds, agricultural irrigation, etc.) that may contribute to contaminants leaching into groundwater resources.

3.5.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no mineral extraction or mining operations would occur. The proposed mining location would remain unchanged, and there would be no ground-disturbing activities that may contribute to stormwater quality impairment.

3.6. Issue 4: Fugitive Dust Dispersion

How would construction and operation of the mine contribute to fugitive dust emissions?

The impact-causing elements producing fugitive dust include materials excavation; surface disturbance; blasting at the mine site; ore hauling on area roads, particularly dirt roads; and the potential of ore dust to migrate from haul trucks. The analysis area for impacts on air quality consists of Luna County and focuses on particulate matter 10 microns in diameter or smaller (PM_{10}) (fugitive dust) using acres of disturbance and vehicle travel as the analysis indicator. The spatial scope of analysis was identified based on the regional nature of air pollution and to facilitate analysis using the best available air quality data, which are generally provided at the county level.

The following analysis of impacts to air quality discloses direct, indirect, and cumulative emissions, with consideration of the following design features that American Magnesium has incorporated into the PoO (Daniel B. Stephens & Associates, Inc. 2019a) to reduce the air quality impacts:

1. Application of water from a water truck as a method of dust control, including use of water around the area to be blasted to reduce potential for dust
2. Wet suppression and vacuum controls during drilling
3. No blasting during high wind events (over 25 mph)

4. Baghouse technology for offsite crushing
5. Development of a Health and Safety Plan that includes identification of appropriate personnel protective equipment for personnel handling dolomite
6. Covered haul trucks
7. Vehicle speed to 15 mph on unpaved roads.

Because in Luna County the main pollutant of concern is PM_{10} (dust), the analysis generally focuses on surface disturbance and dust-causing events. The potential for NAAQS exceedances or impacts to air quality index (AQI) values would depend on the type and level of activity and the degree to which dust-causing activities are concurrent. The analysis assumes an on-site primary crusher will not be needed. The analysis also considers American Magnesium's plans for interim reclamation outlined in the PoO (Daniel B. Stephens & Associates, Inc. 2019a).

3.6.1. Affected Environment

Air quality is determined by the quantity and chemistry of atmospheric pollutants in consideration of meteorological factors (i.e., weather patterns) and topography, both of which influence the dispersion and concentration of those pollutants. At an elevation of 4,330 feet, Luna County has an arid continental climate with low humidity and average annual rainfall of 9 inches. Winds average around 10 miles per hour for the year, with the prevailing direction being westerly. Late winter and spring are the seasons most closely associated with moderate to strong winds, which can bring blowing dust (NMED 2019a).

3.6.1.1. National Ambient Air Quality Standards

The Clean Air Act, which was last amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA 2019a).

The EPA has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants: carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), PM10, particulate matter equal to or less than 2.5 microns in diameter (PM2.5), sulfur dioxide (SO2), and lead (Pb) (EPA 2019b). The EPA has established NAAQS for criteria pollutants that are protective of human health and the environment. The EPA has delegated the responsibility of regulation and enforcement of the NAAQS to the state level and has approved the New Mexico State Implementation Plan (SIP), which allows the State to enforce both the New Mexico Ambient Air Quality Standards (NMAAQS) and the NAAQS on all public and private land with the exception of tribal land and land within Bernalillo County. The NMED Air Quality Bureau is responsible for implementation of the SIP and enforcement of air quality standards.

Areas that are in attainment of the NAAQS are categorized as either Class I, Class II, or Class III, which determines the increment of air quality deterioration allowed. All areas that attain the NAAQS and are not specifically designated as Class I areas under the Clean Air Act are considered to be Class II for air quality, where a moderate amount of degradation is permitted. The Luna County analysis area is in attainment for the NAAQS, and the NMAAQS and is categorized as a Class II area (EPA 2019b; NMED 2018).

3.6.1.2. Human-Caused Emissions Estimates

Along with criteria pollutant concentrations as measured by air monitors, the EPA provides data on human-caused criteria pollutant emissions, expressed in tons per year or total volume of pollutant released into the atmosphere. Human-caused emissions data point to which industries and/or practices are contributing the most to the general level of pollution. Total human-caused emissions within the analysis area are reported in Table 6 based on 2014 National Emissions Inventory in tons per year (EPA 2014a).

Table 6. Human-Caused Emissions Estimates in the Analysis Area (tons/year)

County	NO_x	CO	VOCs	PM_{10}	$PM_{2.5}$	SO_2
Luna	4,394	9,310	51	9,396	1,402	51

Source: EPA (2014a).

Note: Values include Tier 1 summaries for Luna County, including combustion, industrial, on-road/non-road, and miscellaneous sectors. Biogenic sources are not included.

3.6.1.3. Air Quality Index values

Air quality in a given region can also be measured by its AQI value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI <50), moderate (50–100), unhealthy for sensitive groups (100–150), unhealthy (>150), very unhealthy (201–300), and hazardous (301–500) (AirNow 2019). The AQI is a national index; therefore, the air quality rating and the associated level of health concern is the same throughout the country. The AQI is an important indicator for populations sensitive to air quality changes (EPA 2019c). AQI values for Luna County were mainly in the good range (<50) in 2018, with 96% of the days having an AQI in that range. The median AQI in 2018 was 16, which indicates "good" air quality (EPA 2019c). Table 7 lists the number of days for which the AQI was "unhealthy for sensitive groups" or worse for the past 10 years.

Table 7. Number of Days Classified Above AQI 100 for the Analysis Area (2008–2018)

Location	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Luna County	24	1	4	9	11	11	4	0	3	5	3

Source: EPA (2019d).

3.6.1.4. Criteria Pollutant of Concern: Particulate Matter

While Luna County is an attainment area and has AQI values that are mainly in the good range, particulate matter (and more specifically PM_{10}) is a pollutant of concern in Luna County. Particulate matter is a mixture of solid particles and liquid droplets in the air. PM_{10} refers to particulate matter 10 micrometers or less in diameter (commonly considered "dust"). $PM_{2.5}$ refers to particulate matter that measures 2.5 micrometers or less (i.e., fine particles), which are the main cause of reduced visibility (haze) in the United States (EPA 2019e). The EPA regulates PM_{10} and $PM_{2.5}$ because these particulates are inhalable into the lungs and can cause serious health effects (NMED 2019b). Particulate matter emissions often result from activities like construction, traffic on unpaved roads, fields, and wildfires but

may also be formed by reactions between other chemicals, specifically between SO_2 and NO_x, which are emitted from vehicles, power plants, and other industrial processes (EPA 2019d). Particulate matter is of heightened concern when emissions are near sensitive receptors, such as residences, because particulate matter can be present in higher concentrations in a localized area prior to settling or dispersion.

The EPA has set standards for both short-term (24-hour) and long-term (annual) average concentration of PM_{10}. Concentration of PM_{10} is measured in units of micrograms of particulate matter per cubic meter of air ($\mu g/m^3$). To meet the 24-hour standard, the 3-year average of the number of 24-hour values greater than 150 $\mu g/m^3$ must be less than or equal to one. To meet the annual standard, the 3-year average of the annual mean PM_{10} values must not exceed 50 $\mu g/m^3$ (NMED 2019b).

NMED monitors concentrations of particulate matter at a monitoring station at the Deming Airport (NMED 2019a). During 2003, two exceedances of the 24-hour standard for PM_{10} were measured at an NMED monitoring site in Luna County (160 and 181 $\mu g/m^3$). Wind speeds during the first event were equal to or greater than 20 mph for at least 14 hours, with a top wind speed of 40 mph. During the second event, winds did not exceed 40 mph but were equal to or greater than 10 mph for 6 hours, and data suggested that the winds were carrying dust from areas east, south, and southeast of Luna County. Recorded winds speeds measured in Doña Ana County (located immediately to east of Luna County) included wind speeds of 29 mph and 37 mph. The NMED Air Quality Bureau has concluded that that the exceedances resulted from high winds lifting dust into the air from areas of exposed soil (NMED 2004). Areas where the soil is loose, dry, and barren of rock vegetation and other cover are highly susceptible to blowing. Some of these areas exist naturally in the desert landscape of Luna County; others may be created or made to emit for dust by human activities (NMED 2004).

Federal law and policies recognize that declaring a nonattainment area and requiring stringent pollution controls on industrial sources is not appropriate when standards are violated due to natural events such as blowing dust from high winds. EPA's Natural Events Policy calls for states to develop a Natural Events Action Plan (NEAP) to protect public health. The NMED developed NEAP for Luna County in 2003, which included measures to protect public health by educating the public and taking reasonable measures to control the sources of windblown dust that are the result of human activities and that contribute significantly to the problem (NMED 2004). The NMED's Luna County Air Quality website also posted a list of Suggested Best Available Control Measures (BACM). While the list was initially developed for Doña Ana County, it has relevance for the Luna County and may fulfill the NEAP requirements to identify and implement BACM. Suggested BACM include using revegetation; using mulches, dust suppressants, soil stabilizers, and windbreaks; paving or gravelling roads, reducing speed limits; covering haul vehicles; and minimizing or stopping dust-producing activities during high wind events (NMED 2000).

More recently, the EPA has reported an average of 3.7 exceedances of the PM_{10} standard between 2016 and 2018 (EPA 2019f). In 2018, NMED published a High Wind Fugitive Dust Mitigation Plan (DMP) for Doña Ana and Luna Counties. The plan includes mandatory and voluntary measures to reduce dust. Mandatory measures are contained in local dust ordinances and a new Fugitive Dust Rule, which was promulgated as 20.2.23 NMAC in 2018. Voluntary measures were generally limited to agricultural operations. NMED also plans to consult with NMDOT to develop guidance for dust control BMPs for maintenance of existing unpaved roadways.

Luna County Ordinance 75, the county ordinance related to dust, requires all construction projects (including those on federal lands) that clear land of its natural vegetation to prepare a County-approved plan to prevent soil, sand, dust, building materials, construction waste, or other materials from being blown by the wind. The Ordinance states the requirement applies to "all construction, whether residential or commercial or other use~ including any additions, expansions, repairs, remodel, or renovation to any building or structures in Luna County". As such, this ordinance would not apply to the mining activities

associated with the project but would apply to new road development and offsite mill facility construction.

In addition to Luna County Ordinance 75, the New Mexico Administrative Code (NMAC) 20.2.23 Fugitive Dust Control, requires development of a Dust Mitigation Plan (DMP) for operations that include disturbed surface areas or inactive disturbed surface areas equal to or greater than 1 acre; or any commercial or industrial bulk material processing, handling, transport, or storage operations. Agricultural facilities, roadways, and operations issued permits pursuant to the state of New Mexico Air Quality Control Act, Mining Act, or Surface Mining Act are exempt from this requirement. As such, the project would also be exempt from the requirement to develop a DMP or implement the control measures contained in 20.2.23 NMAC.

BLM can reasonably rely on required compliance with federal, state and local regulations, rules, acts, ordinances, design features and the Best Available Control Measures (BACMs) identified in the Environmental Assessment to ensure that fugitive dust from mining activities does not cause or contribute to any significant impacts.

3.6.1.5. Sensitive Receptors

Sensitive receptors are those for which occupants may be more susceptible to adverse effects, whether it be from pollutants, chemicals, hazards, noise, or other factors. Sensitive receptors could include children, elderly, and/or facilities such as schools and daycare facilities. The analysis assumes that all potential residences may contain sensitive receptors.

There are approximately 15 developed residential lots within 1 mile of the proposed BLM access road, many of which contain multiple buildings that may or may not be occupied. Most of these residential lots are located near or along County Road B016/Mahoney Park Road[1]. Four developed residential lots are within 1,000 feet of County Road B016. The two closest residences in this area are located about 1.3 miles from the mine site and about 525 feet and 727 feet east of the intersection of County Road B016 and the existing BLM access road.

While not part of the proposed action, a potential 27-mile delivery route to a conceptual mine site in Deming has been identified for the purposes of analysis (see Chapter 2 and Issue 2). This route passes through agricultural, residential, and light industrial areas. Two miles of County Road B016 and approximately 0.75 mile of Arrowhead Drive Northwest are not currently paved; the remainder of the conceptual route (excluding the existing BLM road and new access road, which would be developed as part of the Proposed Action) is paved. There are 30 residential locations near or along the unpaved portion of County Road 34, County Road B016, and Mahoney Park Road.

3.6.2. Environmental Impacts

3.6.2.1. Impacts of the Proposed Action

Table 8 provides a summary of particulate matter (PM) emissions from construction and operation of the Proposed Action and compares the Proposed Action PM emissions to the 2014 (latest available data) U.S. EPA's National Emissions Inventory (NEI) PM emissions for Luna County. The detailed information on these calculations can be found in Appendix C.

[1] Although there is a private property within 1 mile of the mine site itself, located about 0.6 mile east of the proposed mine, the building is not a residential home and is uninhabited.

*Wind Disturbed Areas were originally calculated in Tons Per Year. Converted to Tons Per Month by dividing by 12. Taking this total and dividing by the U.S. EPA 2014 Luna County NEI PM Tons Per Month

Table 8. Proposed Action Estimates for Particulate Matter (tons per year)

Source Description	PM	PM_{10}	$PM_{2.5}$
Luna County Annual Emissions (EPA 2014a)		9,396	1,402
Construction (year 1, estimated to occur during a 6-month time period)			
Improvements to existing unimproved BLM road	17.91	7.56	1.42
Construction of proposed new mine site access road	11.25	5.09	1.16
Development of laydown yard	11.07	5.02	1.16
Salvageable topdressing from Mine Phase I Construction	12.44	5.53	1.21
Salvageable topdressing from Mine Phase 2 Construction	11.57	5.21	1.17
Wind Erosion Disturbed Area	28.82	14.41	2.16
Total Construction ‡	***93.06***	***42.82***	***8.28***
Percent Increase Luna County Annual Emissions		***0.45%***	***0.59%***
Onsite Operations			
Front-end Loader Travel during Quarry Truck Loading	0.60	0.22	0.022
Quarry Truck Travel	27.92	10.27	1.03
Front-end Loader Travel during Mine Site Aggregate Plant Loading	0.60	0.22	0.022
Mine Site Aggregate Processing	5.23	2.54	0.54
Front-End Loader Travel during Haul Truck Loading	0.60	0.22	0.022
Blasting	0.23	0.12	0.0070
Drilling of Blast Boreholes	0.024	0.02	0.02
Grader Road Maintenance	0.39	0.17	0.012
Onsite Operations Subtotal	***35.60***	***13.78***	***1.67***
Transportation Operations			
Haul Truck Travel--Paved Road	57.1	11.43	2.81
Haul Truck Travel-Unpaved Road	237.83	74.77	7.48
Transportation Operations Subtotal	***294.93***	***86.20***	***10.29***

Offsite Smelter Plant Operations			
Smelter Aggregate Processing (Total)	3.84	2.99	2.34
Total Operations ‡	**334.36**	**102.97**	**14.30**
Percent Increase Luna County Annual Emissions		**1.10%**	**1.02%**
Construction and Operations‡	**427.42**	**145.79**	**22.58**
Percent Increase Luna County Annual Emissions		**1.55%**	**1.61%**

Emissions calculated using EPA AP-42 emission factors. Dust control assumptions include the following: Drilling- wet suppression and vacuum controls resulting in 99% control efficiency (AQ-2); Transportation- 60% road dust control efficiency. The unpaved section of County Road B016 is assumed to have a 20% silt content. Unpaved roads that would be improved with gravel or base course are assumed to have a 4.8 silt content.

‡Construction and operation totals may not equal the sum of all individual entries due to rounding.

Construction

The PoO (Daniel B. Stephens & Associates, Inc. 2019a) contains a description of the activities and equipment that would be used during construction. During the first two months of construction, activities would focus on preliminary development of a 1,334 feet long access road, followed by Phase I resource verification, which would comprise drill site road construction, grading and development of a 2-acre laydown area, construction of 51 drill pads, and drilling operations. Blasting may be required for some portions of resource verification road construction. Once resource verification occurs, activities would focus on further development of the new 1,334 feet long access road and maintenance/improvement of a 2-mile existing BLM road. These activities are estimated to take about 2 months. County Road B016 would not require improvements.

As noted in Table 8, emissions associated with construction would comprise 0.45% of Luna County annual PM_{10} emissions and about 0.59% of Luna County annual $PM_{2.5}$ emissions. The closest sensitive receptors to the mine site are a ranch located 0.6 mile east of the mine site (behind the foothill that would be mined; however this does not appear to be a residential ranch or be inhabited) and about four developed residential lots (some containing multiple buildings that may be occupied) located along County Road B016, about 0.1 to 0.25 mile to the northeast of the intersection of County Road B016 and the existing BLM access road. There are also six developed residential lots (which also contain multiple buildings that may be occupied) located 0.4 to 0.75 mile to the northwest from the existing BLM access road. Because winds are predominately from the west, much of the dust from surface disturbance can be expected to move away from closest residential lots near County Road B016; the foothill itself may act as windbreak for the ranch. However, during wind events (especially those involving winds from the east or south), it can reasonably be expected that some or all of 10 residential lots along and near County Road B016 may experience some increased dust, particularly from the improvement of the existing BLM road. Dust from surface disturbance would be reduced through dust control measures within the project area and roads (see air quality design feature 1).

Operation

Onsite-mining operations would include monthly blasting events to loosen and break up the dolomite rock; on-site crushing of composite; and staging and loading into road haul trucks for transportation off-site. Up to 15 cubic yards of material could require staging at any given time before transport. Operations would also include some resource verification activities in areas to be mined during future phases. Each of these activities would result in particulate matter emissions. Additionally, disturbed areas such as laydown yards, roads or stockpiles all create potential for dust that could affect residents, particularly during wind events. Water would be used on disturbed areas for dust control (air quality design feature 1), and no blasting would occur when winds are over 25 miles per hour (air quality design feature 3).

American Magnesium also proposes to reclaim the horizontal benches as they are created to minimize exposed disturbance areas that create dust. On-site crushing would be accomplished using baghouse technology (see air quality design feature 4). Onsite and offsite operation emissions associated mine site processes (aggregate processing, grader use, blasting and drilling), transportation, and smelter processing are included in Table 8.

As shown in Table 8, onsite mining would result in 13.78 tpy of PM_{10} emissions which is about a 0.15% increase in yearly PM_{10} emissions and 1.67 tpy of $PM_{2.5}$ emissions, which is about 0.12% percent increase in $PM_{2.5}$ emissions. An air quality permit would be required for the onsite crusher. BLM can reasonably rely on compliance with regulatory operating permits to ensure both direct and indirect emissions of regulated air pollutants to not cause or contribute to any significant air quality impacts.

Air dispersion modeling analysis was performed to determine the impacts from blasting on the surrounding area using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 19191. Two models were run to determine the direction of the plume and the concentrations at surrounding receptors. These models included averaging periods of 1-hour and 24-hours. For the 1-hour averaging period, the model was run as if the blast could occur any hour between 7 AM and 5 PM; the 24-hour averaging period, the model was run as if the blast occurred at 7 AM daily, to give a worst-case scenario due to inversion layers and low wind speeds. Results of the 1-hour averaging period modeling shows the majority dust plume would follow the terrain to the southeast within the first hour of the blast. See Appendix C Figures 4 through 7 for more information.

Although dolomite is classified as a relatively non-toxic, nuisance dust, the material SDS for dolomite and limestone identify these materials as carcinogens and notes the potential for silicosis or other respiratory ailments to occur with repeated or prolonged exposure (LaFarge 2012). It is important to note that SDS hazard information represent risks associated daily, prolonged occupational exposure without protective equipment, rather than exposure to ambient atmospheric conditions. As discussed in the PoO, the analysis of one sample from the site showed that all metal concentrations are below laboratory reporting limits except for aluminum, boron, and selenium. Use of protective wear according to the SDS would minimize risk of exposure to potentially toxic metals for on-site workers (see air quality design feature 5).

Once the dolomite is mined, it would be transported off-site for further processing. American Magnesium estimates an average of 46 round trips per day (13,043 round trips per year) along an approximately 27-mile transportation route to conceptual location for a 6-acre magnesium smelter complex in northwest Deming (see Chapter 2). Transportation of an average of 46 truck trips per day would result in dust throughout the day from traffic on unpaved and unpaved roads (approximately 4 and 23 miles, respectively). Haul trucks would be covered (see air quality design feature 6) and truck speeds would be limited to 15 miles per hour on unpaved roads (see air quality design feature 7). As shown in Table 8, annual transportation would result in 86.20 tpy of PM_{10} (a 0.92% increase in yearly Luna County PM_{10} emissions) and 10.29 tpy of $PM_{2.5}$ (a 0.73% increase in yearly Luna County $PM_{2.5}$ emissions).

At the offsite smelter complex, dolomite would be unloaded from the trucks, fed into a conveyer to areas within the complex, where it would undergo additional processing. Process emissions, including those related to onsite crushing, would be controlled by standard cyclone and baghouse technology (see air quality design feature 4). As shown in Table 8, smelter processing would result in 2.99 tpy of PM_{10} and 2.34 tpy of $PM_{2.5}$. Permit approvals by MMD and NMED Air Quality Bureau would be required for any emissions produced by the mill facility in the future.

Considered together, all operation emissions would result in 102.97 tpy of PM_{10} and 14.30 tpy of $PM_{2.5}$ annually. This comprises a 1.10% and 1.02% increase in Luna County annual PM_{10} and $PM_{2.5}$ emissions,

respectively. These emissions would occur for the life of the project. During the first year of the project, both construction and operations activities would occur. Emissions during year one would be 145.79 tpy of PM_{10} and 22.58 tpy of $PM_{2.5}$. This is a 1.55% increase in annual Luna County PM_{10} emissions and an increase of 1.61% in Luna County $PM_{2.5}$ emissions. This represents a conservative emissions scenario that assumes both activities would happen *in full* in the same year, whereas it is likely that operation emissions would be less than reported in Table 8 in the first year.

As described in Section 3.6.1, air quality is generally good in Luna County, with the exception of elevated PM_{10} levels that are the result of wind events. With the consideration of design features American Magnesium has in place to minimize dust, the calculated 1.55% and 1.61% percent increase in annual PM_{10} and $PM_{2.5}$ (when construction and operation activities are combined), a realistic temporal separation between construction versus operations activities, as well as a geographical separation of operation emissions (onsite, transportation route, and offsite emissions), the project is not expected to result in future PM_{10} and $PM_{2.5}$ exceedances. However, as discussed above, during wind events, it can reasonably be expected that some dust, particularly from the unpaved section of County Road B016, unnamed BLM road and the access road, could be transported to residential areas along County Road B016.

The cumulative impacts scenario described in Section 3.2 identifies several projects that are reasonably foreseeable within the time frame of the proposed action, including continued agriculture and residential development, and border wall and communications site construction. Past, present, and reasonably foreseeable future actions would cumulatively add to air emissions. In general, the major pollutant of concern in Luna County is PM_{10} (dust). Any projects with substantial surface disturbance have the potential to contribute to future PM_{10} exceedances if measures are not put in place to control dust, especially during wind events. As outlined in Section 3.6.1, Luna County Ordinance 75 would require a County-approved dust control plan for construction projects in the county. New Mexico Administrative Code (NMAC) 20.2.23 requires development of a DMP for operations resulting in surface disturbance over 1 acre; however, agricultural facilities, roadways, and mining projects are exempt from the 20.2.23 NMAC requirement. As such, agriculture, unpaved roads, and mining projects are likely to continue to be the biggest contributors to air emissions in Luna County, unless those projects include measures to control dust during wind events. The Proposed Action includes some dust-causing activities that cannot be avoided (such as blasting); however, design features have been included in the PoO to minimize particulate matter emissions.

3.6.2.2. Mitigation and Residual Impacts

Emissions of fugitive dust from disturbed surfaces will be minimized to the extent possible by the application of water from a water truck as a method of dust control (see design features). The estimated daily water use will be 5,000 gallons, or as needed, for dust suppression, site reclamation activities, resource verification, and mining activities. The estimated daily water use for dust suppression along all roads including the access road, unnamed BLM road and County Road B016 is expected to require 28,000 gallons per day. The water used for dust suppression is expected to be sourced from a permittable source. No water well would be drilled. The water used for dust suppression is expected to be sourced from a permittable source, which may include a single permittable source or multiple permittable sources.

To further reduce impacts, American Magnesium also proposes to use base course for the access road and 2-miles of the unnamed BLM road. Application of this design feature would reduce silt content of the road. The combination of base course and application of water for dust control would result in control that is approximately 20% greater than water alone (WRAP 2006).

Any construction project that would result in removal of vegetation, such as new road development or the offsite mill facility development, would be required to comply with Luna County Ordinance 75 dust control plan requirements. Additionally, NMED AQB has not yet issued air quality permits for the project. American Magnesium would adhere to any additional requirements identified during these

permitting processes to reduce fugitive dust. These may include development of DMP that incorporates the measures identified in this EA as well as additional relevant measures from 20.2.23 NMAC, the BACMs identified on NMED's Luna County Air Quality website, or other identified best management practices to further reduce dust, such as the placement of gravel or base course or dust suppressant on the unpaved portion of County Road B016 to improve road stability, minimize maintenance, and control dust.

Any additional requirements, if applied, would further reduce dust levels beyond those disclosed in the analysis. For example, application of a base course (in conjunction with water for dust control) on the unpaved section of County Road B016 would increase road dust control efficiency by approximately 20% over water alone (WRAP 2006). As such, no additional mitigation is proposed.

The following mitigation is proposed if identified dust abatement measures are not sufficient to reduce dust impacts to sensitive receptors along the unpaved section of County Road B016:

- AQ-1: Placement of gravel or base course or other type of dust suppressant on the unpaved portion of County Road B016 to improve road stability, minimize maintenance, and control dust.

Development of a DMP would allow for adaptive management as needed to further minimize dust. Application of a base course (in conjunction with water for dust control) on County Road B016 would increase road dust control efficiency by approximately 20% over water alone (WRAP 2006). The need for this mitigation would be jointly determined by the BLM and Luna County. Additionally, the dust control plan requirements outlined in Luna County Ordinance 75 would apply to any work on the county road improvements.

3.6.2.1. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no mineral extraction or mining operations would occur. There would be no surface disturbance or blasting at the proposed mining location. The new access road would not be constructed, there would be no improvements to the existing BLM road, and no new haul trucks would be traversing area roads. Dust levels may be elevated from existing conditions by other reasonably foreseeable future actions. It is expected that elevations of PM10 would continue at current levels due to the combination of surface disturbance and wind. Controls would continue to be applied according to the 2018 Luna County DMP, Luna County Ordinance 75, and 20.2.23 NMAC.

3.7. Issue 5: Greenhouse Gas Emissions

How would emissions from construction and operation of the mine contribute to greenhouse gas emissions and climate change?

Construction and operation of the mine would result in GHGs from fossil fuel combustion required for vehicle and equipment operations. Transportation of dolomite for off-site milling will result in GHG emissions. Processing at the conceptual magnesium metal complex would also require fossil fuels that contribute to GHG emissions. The analysis areas associated with this issue are the United States and the globe. These geographic scales are used in this analysis to provide multiple levels of context associated with GHG emissions as a result of mining and magnesium production. In addition, the effects of GHG emissions are global in nature. Impact indicators are metric tons of carbon dioxide equivalent (CO_2e).

3.7.1. Affected Environment

The following information provides an overview of GHGs, their relationship to climate change, and their effects on national and global climate. A more detailed discussion is contained in the Air Resources Technical Report (BLM 2019).

3.7.1.1. Climate Change and Greenhouse Gases

Climate change is a statistically significant and long-term change in climate patterns. The terms climate change and "global warming," though often used interchangeably, are not the same. Climate change is any deviation from the average climate via warming or cooling and can result from both natural and human (anthropogenic) sources. Natural contributors to climate change include fluctuations in solar radiation, volcanic eruptions, and plate tectonics. Global warming refers to the apparent warming of climate observed since the early twentieth century and is primarily attributed to human activities such as fossil fuel combustion, industrial processes, and land use changes (BLM 2019).

The greenhouse effect is a natural process that warms the earth's surface. When the sun's energy reaches the earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-radiated by GHGs. The greenhouse effect refers to the process by which GHGs in the atmosphere absorb heat energy radiated by earth's surface. Without the natural greenhouse effect, the average surface temperature of the earth would be about 0 degrees Fahrenheit. Water vapor is the most abundant GHG[2], followed by CO_2, methane (CH_4), nitrous oxide (N_2O), and several trace gases (BLM 2019). Atmospheric concentrations of naturally emitted GHGs have varied for millennia, and earth's climate has fluctuated accordingly; however, since the beginning of the industrial revolution, human activities have significantly increased GHG concentrations and introduced human-made compounds that act as GHGs in the atmosphere. CO_2 is primarily emitted from fossil fuel combustion but has a variety of other industrial sources. CH_4 is emitted from oil and natural gas systems, landfills, mining, agricultural activities, and waste and other industrial processes. N_2O is emitted from anthropogenic activities in the agricultural, energy-related, waste, and industrial sectors. The manufacture of refrigerants and semiconductors, electrical transmission, and metal production emit a variety of trace GHGs (including hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]). These trace gases have no natural sources and come entirely from human activities. CO_2, CH_4, N_2O, and the trace gases are considered well-mixed and long-lived GHGs (BLM 2019). CO, NO_x and non-CH_4 VOCs do not have a direct effect on climate change but indirectly affect the absorption of radiation by impacting the formation or destruction of GHGs. Fossil fuel combustion and industrial processes account for the majority of emissions of these indirect GHGs; however, these gases are short-lived in the atmosphere (BLM 2019). GHGs have various capacities to trap heat in the atmosphere, known as global warming potentials (GWPs). Because CO_2 has a GWP of 1, reporting of GHGs is generally standardized to a carbon dioxide equivalent (CO_2e), or the equivalent amount of CO_2 mass the GHG would represent.

While current global climate models are unable to forecast local or regional effects on resources, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change from GHG emissions over time. Data indicate that in the region encompassing southern Colorado and New Mexico, average temperatures rose just under 0.7 degrees Fahrenheit per decade between 1971 and 2011, which is approximately double the global rate of temperature increase. Climate modeling suggests that average temperatures in this region may rise by 4 to 6 degrees Fahrenheit by the end of the twenty-first century, with warming increasing from south to north. By 2080–2090, the southwestern United States will see a 10% to 20% decline in precipitation, primarily in winter and spring, with more precipitation falling as rain (BLM 2019). A recent Bureau of Reclamation

[2] Water vapor is often excluded from the discussion of GHGs and climate change since its atmospheric concentration is largely dependent upon temperature rather than being emitted by specific sources.

(BLM) report (2013, as cited in BLM 2019) made the following projections through the end of the twenty-first century for the Upper Rio Grande Basin (southern Colorado to central southern New Mexico) based on the current and predicted future warming:

- There will be decreases in overall water availability by one-quarter to one-third.
- The seasonality of stream and river flows will change, with summertime flows decreasing.
- Stream and river flow variability will increase. The frequency, intensity, and duration of both droughts and floods will increase (BLM 2019).

3.7.1.2. Current GHG Emissions

Table 9 below shows estimated global emissions. GHG emissions for the United States and the relative contribution of the metals sector and magnesium production sector to those totals. Emissions are expressed in million metric tons (MMT) of CO_2e.

Table 9. Estimated Annual GHG Emissions

Annual GHG Emissions	Emissions (MMT CO_2e/year)	U.S. Emissions (%)	Global Emissions (%)
Global emissions, from all sources, 2017‡	53,500	N/A	100
U.S. emissions, from all sources, 2017**	6,456	100	12
U.S. emissions, metals sector, 2018++	94	1.5	0.2
U.S. emissions, magnesium production, 2018	1.2	0.02	0.002

Sources: BLM (2018a), EPA (2019g, 2019h)

‡Includes land use changes. 2018 data not yet available.

*2018 data not yet available.

++1.6 MMT CO_2e from CO_2, 0.4 MMT from HFCs, 1.6 MMT from PFCs, and 0.7 MMT from SF_6.

3.7.2. Environmental Impacts

3.7.2.1. Impacts of the Proposed Action

Construction and operation of the mine would result in GHGs from fossil fuel combustion required for vehicle and equipment operations. Vehicle and equipment during the 6-month construction period is expected to include a bulldozer, a grader, an excavator, and haul trucks for road construction; and a tracked excavator, drill rig, compressor, three trucks, and an all-terrain vehicle (ATV) for resource verification (drilling). Using EPA's Emission Factors for Greenhouse Gas Inventories (EPA 2014b) emission factors for diesel fuel and assuming an estimated 141,151 gallons of diesel fuels, construction would result in about 144 metric tons of CO2e (CO2, N2O, and CH4) during the first 6 months of the project.

Vehicles and equipment during operations would include 10 haul trucks, one water truck, two ATVs, an excavator, a grader, a backhoe, and a broadcast seeder. Using EPA's Emission Factors for Greenhouse Gas Inventories (EPA 2014b) emission factors for diesel fuel and assuming an estimated 158,430 gallons of diesel fuels, operations would result in about 1,618 metric tons of CO2e (CO2, N2O, and CH4) each year for the 20-year life of the project.Transportation of dolomite for off-site milling will result in GHG emissions. GHG calculations for product transportation are dependent upon mileage and vehicle type. American Magnesium estimates 13,043 round trips per year along an approximately 27-mile route to the conceptual processing facility. Using EPA's Emission Factors for Greenhouse Gas Inventories (EPA

2014b emission factors for diesel fuel and assuming an average fuel economy of 6 miles per hour (USEIA 2019), annual transport of dolomite would result in about 1,199 metric tons of CO_2e (CO_2, N_2O, and CH_4) each year for the 20-year life of the project.

The smelting process at the conceptual magnesium metal complex would also contribute to GHG emissions. Direct emissions of fuel combustion are the major contributor to emissions from magnesium production utilizing the Pidgeon process (Gao et al. 2007). A feasibility report prepared for the conceptual magnesium metal complex (TRU Group 2013) estimates that the smelting process would result in 181,000 tons of CO_2 per year (0.16 MMT of CO_2e). This emission, which would result in a 14% increase in emissions from the magnesium industry and a 0.17% increase in the metals sector. Fuels reduction and efficiency improvements are the primary means of reducing CO_2 emissions from magnesium processing (Gao et al. 2007). American Magnesium is also considering using greenhouses to consume the CO_2.

The 2013 Feasibility Report indicates the conceptual magnesium metal complex could emit 60 tons of SF_6 per year (TRU Group 2013). Within the magnesium industry, a cover gas of dilute SF_6 in dry air and/or CO_2 is typically used to protect molten metal from oxidation and potentially violent burning. Studies conducted to characterize the reaction byproducts of SF_6 and molten magnesium determined that most of the SF_6 introduced to the molten metal surface is emitted to the atmosphere and that only a small portion reacts or decomposes (EPA 2017b). SF_6 has a GWP 22,800 times as strong as CO_2 and a 3,200-year atmospheric lifetime (EPA 2019f). As noted in the Feasibility Report, this gas is considered have an extreme effect on the ozone layer (TRU Group 2013). The 2013 Feasibility Report recommended substitution of SF_6 with a non-GHG when technology permits (TRU Group 2013). Reducing SF_6 emissions would yield significant environmental benefits (EPA 2017b).

Considered together, construction, operations, transportation and smelting would result in about 0.18 MMT CO2e annually (construction occurring in year 1 only). Total GHG emissions would comprise about 0.003% of all U.S. emissions and 0.0003% of global emissions.

Current GHG emissions are presented in Section 3.7.1.2. The cumulative impacts scenario described in Section 3.2 identifies several projects that are reasonably foreseeable within the time frame of the Proposed Action, including continued agriculture, residential development, and border wall and communications site construction. GHG emissions would result from all of these activities and, in conjunction with the Proposed Action, would contribute to annual GHG emissions. Within the magnesium industry as a whole, the use of SF_6 is targeted for replacement by the magnesium industry (TRU Group 2013). Studies have identified technically proven alternative cover gas options for eliminating the use of SF_6, and the magnesium industry made significant progress in deploying alternative cover gas technologies and optimizing SF_6 cover gas concentrations, flow rates, and delivery mechanisms, as well as identifying and repairing leaks in SF_6 gas distribution systems, providing both economic and environmental benefits (EPA 2017b). These charges are expected to reduce GHG emissions from the use of SF_6 over current conditions.

Mitigation and Residual Impacts

Fuels reduction and efficiency improvements are the primary methods of controlling GHG emissions from equipment and vehicle operations; thus, the following mitigation measure is recommended:

- GHG-1: Fossil fuel–fired construction equipment would be maintained in accordance with manufacturers' recommendations to minimize construction-related combustion emissions. Combustion emissions would be further controlled through engine manufacturing requirements for both mobile sources and portable equipment such as air compressors. Idling time of equipment would be limited, unless idling must be maintained for proper operation (e.g., trenching, hoisting, drilling).

Application of this measure would help to minimize GHG emissions during mine construction and operation as well as during product transport.

3.7.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no construction activities, mineral extraction or mining operations, or transportation processing activities would occur. GHG emissions would occur from ongoing existing activities and as a result of reasonably foreseeable future actions.

3.8. Issue 6: Noise Disturbance

How would noise created by surface mine blasting and heavy equipment operations affect nearby residents?

Noise disturbance from the proposed mine may affect nearby residents by impacting background (ambient) noise levels. The primary impact-causing elements, as the main sources of noise, are blasting and heavy equipment operation associated with activities at the proposed mine site. Noise impacts are measured by comparing the estimated levels of noise generated from surface mine blasting and heavy equipment operations (from road construction and mining operations) with current ambient noise conditions. The analysis area for these impacts is defined as a 3-mile radius surrounding the proposed project area. The analysis area is based on the rate of noise attenuation and the distance at which the most consistent levels of noise generated from project activities (heavy equipment operations) would decrease to low levels (such as that equivalent to a conversation held indoors). The time period over which these impacts are assessed is 24 hours, which is consistent with standard noise impacts assessments.
The analysis will discuss short-term impacts from blasting once per month, and long-term impacts during the duration of the mining activities.

This analysis is based on the following assumptions:

- The rate of noise attenuation is established as a reduction of 6 A-weighted decibels as distance from the source is doubled (U.S. Department of Transportation 2011).
- Impacts are calculated by assessing the rate of noise attenuation and the rules for combining sound levels by decibel addition for heavy equipment operations based on maximum noise levels at a reference distance of 50 feet from the source (Thalheimer 2000).
- The approximate noise level relative to general annoyance for surface mine blasting as established by the U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM) is 115 peak decibels (USACHPPM 2005).
- Noise levels assessed for project activities do not include effects of shielding/blocking of sound due to walls, fences, or other residences and/or buildings, and do not account for attenuation that may occur by atmospheric absorption, which is influenced by air pressure, wind, temperature, humidity, and other environmental factors.

3.8.1. Affected Environment

3.8.1.1. Noise and Sound Measurement

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. When assessing impacts to ambient noise conditions relative to the levels of noise associated with the propose mine, it is important to

understand sound levels and human perception of sound. Sound levels are expressed in decibels (dB), a logarithmic scale, where the quietest audible sound is defined as 0 dB to upwards of 140 dB (the threshold of pain) and beyond. An equivalent sound level expressed in decibels on the A-weighted scale (dBA), corresponds to the average sound level as perceived by the human ear. A change in noise level of at least 5 dBA is required before any noticeable difference can be detected, with a 10-dBA change being perceived as "half as/twice as loud" to the average individual (EPA 1974; U.S. Department of Transportation 2011). Noise exposure is dependent on the time spent near and the distance from the source of noise generation. Impacts to ambient noise conditions occur from the introduction of audible noise (measured in dBA) and the duration of the noise as heard from a specific location.

Because decibels are logarithmic, combined sound levels are not added together arithmetically. Overall, when two decibel values differ by 0 or 1 dB, the sound level from the combined sources is increased by 3 dB. Where two sources differ by 2 or 3 dB, the overall combined sound level is increased by 2 dB, and likewise, when two sources differ by 4 to 9 dB, the combined decibel level is only 1 dB as the "louder" source begins to subsume the "quieter" source. As such, these sound increases are barely perceptible by the human ear (U.S. Department of Transportation 2011:9–10). Table 10 shows some examples of sound sources and typical sound levels.

Table 10. Example of Sound Sources and Typical Sound Levels

Descriptions of Sound Source	Sound Level (dBA)
Threshold of pain	140
Chainsaw or ambulance siren	120
Car horn, power saw or leaf blower	110
Gas lawn mower	100
Garbage disposal or large truck	90
Noisy urban daytime or doorbell	80
Freeway traffic	70
Normal speech	67
Hair dryer	60
Refrigerator or a large office	50
Urban nighttime or a quiet residential area	40
Quiet bedroom at night	30
Threshold of hearing	0

Source: Adapted from Center for Hearing and Communication (2019).

In general, the louder the sound, the less time required before damage to hearing will occur. Continued exposure to noise levels above 70 dB over a prolonged period of time may start to damage hearing (Centers for Disease Control and Prevention [CDC] 2019). According to NIOSH, the maximum exposure time at 85 dBA is 8 hours to prevent hearing damage, while levels above 140 dBA can cause hearing damage after just one-time exposure and should be avoided (NIOSH 1998).

3.8.1.2. Regulatory Framework

The primary responsibility for control of noise rests with state and local governments. In response to the Federal Noise Control Act of 1972 and to ensure assistance and guidance to states and localities, the EPA has published guidelines with goals for exterior noise levels for residential land use of less than 55 dBA

over a 24-hour period (EPA 1978). Although this is not an enforceable regulation, 55 dBA is generally accepted as a target noise level for environmental noise assessment and serves as a guideline against which anticipated noise levels from continuous sources associated with the proposed project are compared. There are no BLM regulatory noise limits or criteria for noise impacts applicable to the proposed project area.

OSHA occupational noise regulations at 29 CFR 1926.52(d)(1) provide permissible noise exposure, which ranges from 8 hours at 90 dBA to 15 minutes or less at 115 dBA. Regulations at 29 CFR 1926.52(e) state that exposure to impulsive or impact noise may not exceed a 140-dB peak sound pressure level. Federal standards related to blasting at 30 CFR 816.61 require blasting to conducted between sunrise and sunset, unless nighttime blasting is approved by the regulatory authority based upon a showing by the operator that the public will be protected from adverse noise and other impacts. New Mexico has adopted the federal OSHA regulations on noise in the New Mexico Occupational Safety and Health Act, NMSA 50-9-13 and 11 NMAC 5.2.9. No additional state requirements apply.

Luna County has a noise ordinance prohibiting the use unmuffled retarders or compressor brakes ("jake brakes") in public rights-of-way except on roads for which NMDOT requires the use of such methods to reduce speed. Luna County does not have any noise restrictions related to blasting.

No BLM regulatory noise limits or criteria for noise impacts to the proposed project have been identified. Therefore, noise impacts to ambient noise condition levels resulting from the No Action and Proposed Action are compared with criteria from other regulatory bodies and with studies of the effects of noise on people. Based on the Federal Highways Administration (FHWA) Noise Abatement Criteria (NAC), noise impact effects can be categorized into three general groups: 1) hearing damage, 2) activity interference, and 3) general annoyance (FHWA 2017). These criteria provide a general framework within which noise disturbances can be categorized for the purposes of comparison.

3.8.1.3. Existing Noise Characteristics of the Area

There are approximately 13 developed residential lots located within the analysis area (3-mile radius of the mine site), many of which contain multiple buildings that may or may not be occupied. The closest of these (a ranch that does not appear to contain a residence) is approximately 0.6 mile from the proposed mine site. Ambient noise levels within analysis area have not been measured; however, rural background noise in wilderness and rural areas is generally 40 dBA (EPA 1978). Ambient noise levels are intermittently higher in areas closer to Deming and other areas where farming and agricultural activities are occurring (e.g., operation of tractors and other equipment) and lower elsewhere due to undeveloped land and the absence of regular human activity. There are county roadways, including County Road B016, that also contribute to existing noise conditions. In general, ambient noise levels in and around the analysis area are dependent upon human-made and natural sources, as well as weather conditions on any given day.

3.8.2. Environmental Impacts

In terms of surface mine blasting, there are no current regulations that limit the noise produced by surface mine blasting relative to residential development under the Proposed Action like there are for occupational exposure. Therefore, to consider impacts to such within the analysis area, the approximate noise level relative to general annoyance from surface mine blasting established by the U.S. Army (USACHPPM)—115 peak dB (or 115 dB peak pressure [dBP] in unweighted decibels)—is used as a baseline for comparison (BLM 2008; USACHPPM 2005).

In order to establish federal noise emission control requirements in response to the Federal Noise Control Act of 1972 and to ensure assistance and guidance to states and local municipalities, the EPA has

published guidelines with goals for exterior noise levels for residential land use of less than 55 dBA over a 24-hour period (EPA 1978). Although this is not an enforceable regulation, 55 dBA is generally accepted as a target noise level for environmental noise assessment and serves as a guideline against which anticipated noise levels from continuous sources associated with the proposed project are compared.

3.8.2.1. Impacts of the Proposed Action

Because the proposed mine is located in a relatively undeveloped area, baseline noise levels are low (generally 40 dBA), with temporary, intermittent increases near county roads and/or agricultural areas due to vehicular traffic and equipment operation. The Proposed Action would introduce noise sources primarily from temporary, intermittent surface mine blasting and on a more continuous basis from heavy equipment operations during initial road construction as well as daily mining activities.

Surface Blasting

Noise prediction relies on a variety of factors, including the types of equipment to be used, the nature of operations, and blasting (including ground vibration and overpressure factors). Predictive modeling in terms of noise levels introduced under the Proposed Action are not available because the types and sizes of equipment may change. However, noise modeling results are available for similar projects involving surface mine blasting and heavy equipment operation. While not a direct comparison, such studies provide the best available science to reasonably represent anticipated noise impacts in the analysis area from blasting activities.

Impacts from surface mine blasting depend on the maximum instantaneous charge per blast, distance from the site of the blast, and any barriers that may be present (e.g., topographic features, buildings/structures). Currently, there are no regulations that regulate or limit the noise produced by surface mine blasting under the Proposed Action; however, the U.S. Army has determined that an approximate noise level relative to general annoyance is a peak of 115 dB (or 115 dBP in unweighted decibels) (BLM 2008). Noise modeling conducted for similar mining activities have shown that the peak noise levels for surface mine blasting is 112 dB at 0.5 mile of the blast location, which is just below the threshold of annoyance established by the U.S. Army (BLM 2008:3–69). Table 11 provides a summary of estimated peak noise levels from surface mine blasting as adapted from the noise studies completed for similar blasting activities (BLM 2008).

Table 11. Summary of Peak Blast Noise Levels by Distance

Distance (miles)	Peak Blast Noise Level (dB)
0.5	112
1.0	107
1.5	104
2.0	102
2.5	101
3.0	100

Source: Adapted from Table 3-18 from BLM (2008:3–69).

Based on these levels, it is expected that impacts to ambient noise conditions in the analysis area under the Proposed Action would not exceed the 115-dB peak level established for general annoyance relative to mine blasting for the developed residential lots in the analysis area, the closest of which is

approximately 1.1 mile from the proposed mine site. Blasting operations would be conducted approximately once per month and during daylight hours unless there are specific issues to health and safety. Therefore, the increased noise disturbance from such activities would be temporary and sporadic. No nighttime blasting is planned; therefore, no impacts to ambient noise levels would occur for periods during which most residents are most likely to be asleep and/or otherwise experiencing little noise disturbances overnight.

Heavy Equipment Operations

Mining Operations (excluding blasting)

Under the Proposed Action, the more consistent sources of noise would result from the operation of heavy equipment (e.g., front-end loaders, rotary drills, bulldozers, graders, and haul trucks on-site). Noise produced by diesel-powered heavy equipment used at surface mines is typically 85 dBA at a distance of 50 feet (BLM 2008; Thalheimer 2000).

Based on noise attenuation, as distance is doubled from the source, the perceived noise level as measured in dBA decreases by 6 dBA. This concept is known as geometric spreading and does not take into account any potential barriers or other features that result in the reduction of sound. Assuming a geometric spreading only, Table 12 provides a summary of noise levels resulting from heavy equipment use during mining operations based on distance from the source.

Table 12. Summary of Heavy Equipment Noise Levels (Mining Operations) by Distance

Distance in feet (miles [approximate])	Noise Level (dBA)
50 (0.01)	85
100 (0.02)	79
200 (0.04)	73
400 (0.08)	67
800 (0.15)	61
1,600 (0.3)	55
3,200 (0.6)	49
6,400 (1.2)	43
12,800 (2.4)	37
25,600 (4.8)	31

Source: Levels for standard heavy equipment are found in Thalheimer (2000), and the baseline level of 85 dBA for standard mining equipment is taken from BLM (2008).

Based on the noise levels presented in the table above, the impacts to ambient conditions would result in an increase of 85 dBA within 50 feet of the operating equipment, and would not drop to 55 dBA (the EPA's guideline for outdoor noise levels [24-hour average]) until 1,600 feet (or 0.3 mile) from the location of operation within the proposed mine. The closest developed residential lot in the analysis area is approximately 1.3 miles from the proposed mine, where noise from heavy equipment (mining operations specifically) would be between 43 and 37 dBA, which is under the EPA's recommended level of 55 dBA. Additionally, as mining operations would occur during daytime hours and no nighttime activities or 24-hour operations would occur, any increase in ambient noise conditions from heavy-equipment use during mining operations, regardless of distance, would not persistent between sundown and sunrise. Because there would be periods of quiet throughout the course of a day, any levels in exceedance of 55 dBA would not be over a 24-hour period.

Road Construction

In general, the dominant noise sources during construction (estimated to last about 6 months) would be diesel engines associated with heavy equipment, particularly if the engine is poorly muffled. Average noise levels for standard construction equipment (front-end loader, grader, crew truck) would introduce a maximum noise level of 90 dBA based on the rule of decibel addition based on a reference distance of 50 feet (Thalheimer 2000; U.S. Department of Transportation 2011). Noise levels from a point source such as concentrated construction activity would again decrease by 6 dBA for every doubling of the distance away from the source following noise attenuation principles. Based on this, it is estimated that road construction with standard equipment would produce a level of 90 dBA at 50 feet, which would exceed the EPA guideline for residential noise (55 dBA) until approximately 0.6 mile from the noise source (3,200 feet). While the closest residences are located approximately 1.3 miles from the mine site itself, there are several residences located very near the junction of County Road B016 and the BLM access roads that would be improved. While American Magnesium is improving the portion of the BLM road closest to this junction, noise levels at the nearest developed residential lot (approximately 515 feet away) could be up to between 66 and 72 dBA. These impacts would be temporary, lasting only the duration of road construction (approximately 6 months), and noise levels would drop as the area of construction activity moves closer to the mine.

During operations, there would be daily noise from operations of quarry drills, haul trucks bulldozers, and other equipment (see Table 5 of the PoO). There would also be noise during blasting activities, which are estimated to occur once per month. A quarry or rock drill is estimated to have a decibel level of about 98 dBA (Harris, Miller, Miller, and Hanson, Inc. 2006). Using the noise attention methodology described above, a rock drill would produce noise levels at the four closest residences (which are about 1.3 miles from the mine) of about approximately 55 to 56 dB, which would be at or would slightly exceed EPA guideline for residential noise (55 dBA). Noise levels at the other homes in the area would be below 55 dBA.

There is limited published information of actual or modeled noise levels associated with blasting at dolomite mines. OSHA occupational noise regulations 29 CFR 1926.52(e) state that exposure to impulsive or impact noise may not exceed 140 -peak sound pressure level. Luna County does not have any noise restrictions limiting blasting noise beyond this level; therefore, it is assumed that there is potential for noise levels of up to the maximum allowable impulsive noise level of 140 dB near the blast site. While dBA and dB noise measurements are not comparable, the concept of geometric spreading may also be used for dB noise measurements. The OSHA Handbook notes that as a principle of physics, the sound pressure level decreases 6 dB, on a Z-weighted (i.e., unweighted) scale, each time the distance from the point source is doubled (OSHA 2013). Assuming a noise level of 140 dB 100 feet from the blast site, noise levels would attenuate out to 112 dB approximately 0.5 mile from the blast, 106 dB 1 mile from the blast, and 100 dB 2 miles from the blast. These calculations are generally supported by a 2008 limestone mining environmental impact statement for a dolomite mining project in Montana, which estimated a noise level of 112 dB at 0.5 mile from the blast, attenuating out to 107 dB at 1 mile, 102 dB at 2 miles, and 100 dB at 3 miles from the blast (BLM 2008). Based on the calculations presented above and the distances of residences around the mine, it is estimated that the noise levels would remain below the 115-dB annoyance level at all residences near the mine during blasting. However, it is also important to note that the noise levels associated with blasting may vary due to atmospheric conditions at the time of blast including wind speed and direction, temperature, and relative humidity. The noise from blasting, which is expected to last seconds, would occur once a month.

Transportation of Ore

As a related action, haul truck noise resulting from the transportation of mined ore is anticipated to have a maximum level of 85 dB at 50 feet from the source (Thalheimer 2000), which would decrease to 79 dB at

100 feet, 73 dB at 200 feet, and 67 dB at 400 feet from the roadway (see Table 12 above). Therefore, the anticipated five roundtrips every hour would result in intermittent increases to ambient noise conditions by one haul truck passing any given point on the transportation route approximately once every 12 minutes. As most sensitive receptors (e.g., schools, houses of worship, high-density residential areas) are at distances greater than 50 feet from the travel surface along the roadway, the perceived noise equivalent would be similar to that of a noisy urban area during daytime hours (at 80 dBA) and freeway traffic (at 70 dBA) (see Table 10 above). Noise from haul trucks would be more intrusive in areas that are characteristically quiet in the analysis area (generally 40 dBA) and would exceed the EPA's goal for exterior noise levels for residential land use of less than 55 dBA, these noise-level increases would occur periodically and would not be sustained longer than the time it would take for a haul truck to drive by. The increased noise from the transportation of ore in more populated areas closer to and in Deming would be less perceptible due to the higher levels of existing urban noise (generally 80 dBA). Because mining operations are planned to be conducted during daylight hours, haul truck noise would not occur during nighttime hours and would not be sustained over a 24-hour period under the Proposed Action.

Cumulative Impacts

Overall, the impacts from surface mine blasting and heavy equipment operations during mining activities, as these would occur for the life of the proposed mine (40 years), would incrementally contribute to ambient background conditions in consideration of reasonably foreseeable future actions including housing construction and vehicle traffic, as well as the indirect, incremental addition of sporadic noise introduced by haul trucks operating along the roadway.

More specifically, the cumulative impacts of surface mine blasting and heavy equipment operations on background noise levels would occur when actions are undertaken at the same time and in relatively close proximity. As stated above, surface mine blasting would be sporadic and short in duration (seconds). Road construction would be more persistent; however, it would be short-term lasting approximately 6 months and would not result in any long-term changes to future ambient conditions. Heavy equipment operation from mining activities would be the primary factor driving future background noise levels in the analysis area, which would introduce a daytime noise level of 90 dBA at 50 feet from the site of operations. When added to other heavy equipment noise, based on standard construction equipment, the result would be a combined increase of 93 dBA based on the rule of decibel addition (U.S. Department of Transportation 23011) if simultaneous operations were occurring within 50 feet of a residence. This increase of 3 dBA for these combined noise levels would not be perceptible because a change in noise level of at least 5 dBA is required before any noticeable difference can be detected (EPA 1974; U.S. Department of Transportation 2011). As all residences within the analysis area would be farther than 50 feet from the source of construction noise, these combined noise levels would fall to 51 dBA (level at 1.2 miles) before reaching the nearest residence closest to mining operations at 1.3 miles, which is below the recommended level of 55 dBA as established by the EPA (see Table 9 above).

3.8.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed mining and, therefore, there would be no noise created by blasting or heavy equipment use within the proposed project area. Noise within the analysis area would not be affected by the Proposed Action and would not contribute to the degradation of quality of life.

3.9. Issue 7: Residential Property Values

How would the value of homes within 3 miles of the proposed mine site be impacted by mine operations?

Several factors related to mining operations have the potential to contribute to effects on residential property values. These include viewshed impacts, noise, dust, traffic, or other factors that may detract from quality of life. The analysis area for these impacts is defined as a 3-mile buffer extending from the proposed project area (including the new access road), though viewsheds from residences farther away than 3 miles were also considered. The size of the analysis area was chosen based on prior research regarding the distances from quarries at which that home values were potentially impacted. Impact indicators include level of contrast (viewshed), decibels (noise), and proximity of residences to mine operations (dust) as well as increases/decreases in property values near other mines.

3.9.1. Affected Environment

Residential development in the eastern part of Luna County, in proximity to the Florida Mountains, has been relatively stable. However, Luna County has seen a population decrease of 1.25%, which may imply that the need for new residential development is minimal. Private land parcels between the western foot of the Florida Mountains and the city of Deming have been subdivided and developed (Data USA 2019).

There are approximately 13 existing homes within 3 miles of the proposed project that are mostly surrounded by private, agricultural, and BLM-managed land.

Quality of life characteristics in the area that contribute to property values include the pleasing views of the mountains, quietude, and recreational opportunities in the Florida Mountains; however, it is important to note that home valuations are based a variety of factors beyond quality of life. These include proximity to employment centers, local amenities, and transportation routes; zoning and taxes; age and condition of homes; and regional factors such as population, housing demand, and economic conditions. There is no available market response data available for the city of Deming or Luna County that has assessed market values of residential homes based on close proximity to existing mining development.

3.9.2. Environmental Impacts

3.9.2.1. Impacts of the Proposed Action

Several factors can contribute to effects on residential property values, including distance of the property from mining operations, the visual appearance of infrastructure, and the visual appearance of the mining operation in relation to the surrounding landscape, undesirable noise (from heavy equipment, blasting, and transportation trucks), and overall impacts to quality of life. Analyses contained in other sections of this EA contain the following relevant conclusions:

- Vibration: Blasting will not be felt at residences, all of which are located over 1 mile away (see ELM-4).
- Scenic Quality: Along County Road B016 and Mahoney Park Road, the mine would dominate the viewshed and therefore would not conform to VRM III objectives while it is in operation but would conform to VRM III objectives when the project area is reclaimed (see Issue #1).
- Air Quality: Some or all of 10 residential lots along and near County Road B016 may experience increased dust, particularly from the improvement of, and traffic on, the existing BLM road. Some dust from blasting may be transported to residential areas located about 1 mile to the north of the mine site during high wind events (see Issue #4).
- Noise: Although the noise level heard by the nearest residence is expected to exceed the current noise levels, the 55-dBA 24-hour average at which sound becomes an annoyance would not be exceeded (see Issue #6).

As outlined above there is potential for viewshed, air quality, and noise impacts to residences closest to the mine. All of these issues may lead to some reduction in quality of life in these areas while the mine is operating.

Analysis of effects to property values from quarries generally relies on market response to a proposed quarry and the market values after a quarry has been in operation as impact indictors, and therefore, must draw on adequate established data for evaluation. While there have been no published studies conducted in the vicinity of the proposed project or the Luna County area addressing impacts to market values of private property (residential or otherwise) from quarries, there has been a substantial amount of research conducted over the past several decades examining the effects of quarries on residential property values in other parts of the country. This EA therefore incorporates the Grant (2017) and Phoenix Center (2018) studies as the best available research regarding potential impacts to residential property values from proximal quarries for the purposes of analysis. The result of this research is summarized below.

- Recent publications focus on literature reviews and evaluation of analysis methods to asses these impacts (Phoenix Center 2018). Research that has been conducted to quantify impacts to residential home values have used limited data sets, do not have experimental data, and rely on observational data (which can result in selection bias). Research suggests that the opposition to quarries is based on the *Impact of an Operational Gravel Pit on House Values, Delaware County, Ohio* by Professor Diane Hite report (herein referred to as Hite's study). The report reviews 2,812 home sales observations within 5-miles of a quarry using a hedonic price statistical model (Hite 2006). When the methods were repeated, Phoenix Center determined an unconventional regression model was used and results were not reflective of actual market condition on repeated study (Phoenix Center 2018). In addition, Grant (2017) identified several limitations to Hite's study, including the active status of the quarry during the study, proximity to urban areas or highways, and the fact that only gravel pits (excluding quarries) were included. It is important to note that this study appears in an Amsterdam-Churchill proceeding, which has been used in other documents to oppose quarries; however, the original analysis has not been located.
- The Phoenix Center (2018) reviewed several consulting reports and found that none reported decreasing home values due to proximity to a quarry. Similarly, Grant (2017) studied the values of 9,000 properties in proximity to quarries in Wellington County in Ontario over a 12-year period and did not find evidence that there was a strong negative effect on property values. Grant (2017) noted that there was a 3% increase in property value within 0 to 0.3 mile, and there was an 3% to 4% increase in property value up to 1.8 miles away from a quarry.
- The Phoenix Center (2018) conducted four studies to analyze two quarries, located in Delaware, Ohio, and Murfreesboro, Tennessee, using the Hite's study's methods, as well as two quarries, located in Alabama and California, using the difference in differences estimator to quantify the price–distance relationship before and after operations begin. Using the same location and methods of the Hite's study, the results from both quarries suggested that residential home values fell as the distance from the quarry increased. In the Delaware, Ohio, example, the Phoenix Center (2018) found that a home sold approximately 3 miles away from the quarry had a value that was 22% lower than that of a home within 0.5 mile of the quarry. A similar negative coefficient on distance was observed in the Murfreesboro, Tennessee, analysis as well. In addition, population movements within Rutherford County, Tennessee, were analyzed and showed that over time there was an increase of population near the quarry, which suggests that the quarry was not considered a disamenity (Phoenix Center 2018). The quarries in Gurley, Alabama, and Madera, California, were tested using the price–distance approach, which suggested that home prices rise as distance from the quarry increase before the quarry is operational. However, in the Gurley, Alabama, example, the positive effect of distance was attenuated. The Madera, California, quarry was not operational at the time of the study, and it is

therefore unknown if the quarry has positive or negative effects on home values. Overall, the 2018 study concluded that 1) the Hite's study and its method are unreliable, 2) quarries may increase home prices overall, and 3) further research and analysis are needed.

There are 13 residences within 3miles of the proposed project area. According to current research (Grant 2017; Phoenix Center 2018), there would be little to no impact to residential property values in the analysis area resulting from the operation of the proposed project. However, there is no published data on the impacts to residential home values in proximity to quarries in Luna County or Deming, New Mexico, so the nature and degree of effects from the mining operations on residential home values within 3 miles of the proposed project are unknown for the Luna County and Deming area. Additionally, it is important to reiterate that this impact assessment does not consider effects certain to occur as a result of the proposed project due to the number of variables that factor into home valuation (see Section 3.9.1).

Past and present actions with the potential to impact home values in the analysis area (such as agriculture) contribute to the existing home values in the area. Although the cumulative impacts of the proposed project, when considered with existing development and reasonably foreseeable future actions, may cause home values to fluctuate initially, no negative long-term home value change is expected. Cumulatively, home values in the area will continue to be a result of many factors that include not only area development and perceived quality of life but also proximity to infrastructure, age and condition of homes, and regional economic factors (see Section 3.9.1).

3.9.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO, and therefore, there would be no extraction within the proposed project area, no new access road would be built, and there would be no road improvements on the BLM unnamed access road. Residential property values in proximity to the proposed project location would not be affected.

3.10. Issue 8: Recreational Hunting of Persian Ibex

How would the development and operation of the proposed mining operation affect recreational hunting opportunities of Persian ibex within the Florida Mountains?

Noise disturbance and loss of available habitat are the impact-causing elements that could deter populations of existing Persian ibex (*Capra aegagrus aegagrus*) to utilize the foothills area and affect associated hunting opportunities within the Florida Mountain range. The analysis area is the 75,310-acre boundary of the Florida Mountain range. Although the majority of the Florida Mountain range is located on BLM land, the New Mexico Department of Game and Fish (NMDGF) manages this species population and distributes Persian ibex hunting permits and special recreational permit to individual hunters and hunter outfitting businesses (outfitters), respectively. The analysis will discuss the potential impacts to recreational opportunities in terms of potential displacement of Persian ibex as well as hunter and outfitter access to the analysis area.

3.10.1. Affected Environment

An exotic population of Persian ibex occurs in the Florida Mountain range of New Mexico and is managed by NMDGF as a popular recreational hunting opportunity (NMDGF 2019a, 2019b). Although this species is exotic and introduced to New Mexico, the Florida Mountains provide suitable habitat in the form of high elevation cliff and ridgelines. The Florida Mountains are an isolated 12-mile long rocky range characterized by steep canyons and vertical cliffs with alluvial fans and foothills transitioning to a valley floor. The Florida Mountains have a relatively low current development, and therefore, baseline

noise levels are low, with expected noise levels of 35 dBA or lower without the presence of the proposed mine activity; see Section 3.8 for further details regarding existing noise level conditions.

This species became established in New Mexico after a small population was imported from Iran and released into the Florida Mountains in 1970, followed by a significant population release soon after (NMDGF 2019a). The Persian ibex has provided an opportunity for recreational hunting and public hunts annually since 1974 (NMDGF 2019a). NMDGF management of the Florida Mountain Persian ibex population is focused on maintaining the population to provide recreational hunting, and controlling the range extent to the Florida Mountains and preventing expansion into lower areas of adjacent ranges (NMDGF 2019b). To accomplish this, NMDGF completes annual aerial helicopter surveys to monitor current populations and inform the annual number of hunting licenses available. Observations from these surveys in 2016 and 2018 were 818 and 460 individuals, respectively (NMDGF 2019b). However, due to the remote nature of this species managed range, NMDGF assumes that annual surveys do not provide an accurate total population estimate (NMDGF 2019b).

Recreational hunting of Persian ibex in New Mexico is controlled by the sale of a limited number of annual tags for the Florida Mountains as well as additional "off-mountain" over-the-counter tag that allows the take of Persian ibex that have left the boundaries of their managed range (NMDGF 2019b, 2019c, 2019d, 2019e). Recreational hunting of this species is also supported by local hunting outfitters that provide guided hunts within the area. BLM also manages the recreational access of Persian ibex hunting by issuing special recreational permits to outfitting and guide businesses which operate on BLM-managed lands within the Florida Mountains. A primary access point for outfitters and individual recreational hunters to the Florida Mountains is along County Road B016 and the existing unnamed BLM road (Figure 1).

Figure 4 shows the number of licenses sold and results of Persian ibex hunts between 2016 and 2019. The total number of ibex hunting licenses for the2016/2017, 2017/2018, and 2018/2019 seasons were 539, 742, and 366, respectively. It can be assumed that each license accounts for an individual hunter utilizing the Florida Mountains for ibex hunting in the specified years.

2016-17 New Mexico Ibex Hunter Harvest Report, New Mexico Department of Game and Fish

Florida Mountains & Off-Mountain Hunts

	AREA	Hunt code	Weapon	Hunt dates	Licenses Sold or Converted	Bag Limit	No. of Hunters Reported	% Reprtd	Success Rate	Estimated Harvest Males	Estimated Harvest Females	Satisfaction Rating	Number of Days Hunted
All Hunts	Florida Mtns, Youth Only	IBX-1-500	Any Legal	Dec 27-Jan 10, '17	16	ES	14	88	71%	11	0	4.42	5.42
	Florida Mtns, Enhancement	IBX-1-501	Any Legal	TBD	2	ES	2	100	100%	2	0	5.00	2.00
	Florida Mtns, Once-In_Lifetime	IBX-1-525	Any Legal	Nov 15-29	26	ES	24	92	78%	20	0	4.35	3.65
	Florida Mtns, Pop. Mgmnt Incentive	IBX-1-526	Any Legal	Feb. 1-Feb. 14, '17	5	ES	5	0	75%	3	0	4.25	4.00
	Off-Mountain Hunt, Non-Draw	IBX-1-528	Any Legal	Apr 1 - Mar 31, '17	28	ES	25	89	19%	2	1	2.56	4.75
	Florida Mts.	IBX-1-601	Any Legal	TBD	1	ES	1	100	100%	1	0	5.00	2.00
	Florida Mtns	IBX-2-535	Bow	Oct 1-15	100	ES	94	94	13%	9	0	3.54	5.86
	Florida Mtns	IBX-2-536	Bow	Jan 15-29, '17	100	ES	94	94	70%	4	1	4.14	5.97
	Florida Mtns	IBX-3-540	Muzzle	Dec 6-20	26	ES	26	100	60%	14	1	4.12	4.88
	Florida Mtns	IBX-1-520	Any Legal	Feb. 15-Mar. 1, '17	50	F-IM	48	96	47%	3	13	4.06	2.85
	Florida Mtns Pop. Mgmt.	IBX-1-9000	Any Legal	Mar. 4-8, '17	60	F-IM	60	100	41%	3	20	3.62	2.57
	Florida Mtns Pop. Mgmt.	IBX-1-9001	Any Legal	Mar. 11-15, '17	67	F-IM	66	99	49%	9	21	4.15	2.21
	Florida Mtns Pop. Mgmt.	IBX-1-9002	Any Legal	Mar. 18-22, '17	58	F-IM	55	95	37%	5	16	3.69	2.15
	Ibex Hunts Total				539		514	95%		86	73	4.07	3.72

2017-18 New Mexico Ibex Hunter Harvest Report, New Mexico Department of Game and Fish

Florida Mountains & Off-Mountain Hunts

	AREA	Hunt code	Weapon	Hunt dates	Licenses Sold or Converted	Bag Limit	No. of Hunters Reported	% Reprtd	Success Rate	Estimated Harvest Males	Estimated Harvest Females	Satisfaction Rating	Number of Days Hunted
All Hunts	Florida Mtns, Youth Only	IBX-1-500	Any Legal	Dec 27-Jan 10, '18	16	ES	16	100	80%	12	0	3.67	2.13
	Florida Mtns, Enhancement	IBX-1-501	Any Legal	TBD	2	ES	1	50	100%	2	0	5.00	1.00
	Florida Mtns, Once-In_Lifetime	IBX-1-525	Any Legal	Nov 15-29	26	ES	26	100	85%	22	0	4.77	3.88
	Florida Mtns, Pop. Mgmnt Incentive	IBX-1-526	Any Legal	Feb. 1-Feb. 14, '18	5	ES	5	100	40%	2	0	4.60	5.80
	Off-Mountain Hunt, Non-Draw	IBX-1-528	Any Legal	Apr 1 - Mar 31, '18	24	ES	22	92	13%	2	0	3.19	5.31
	Florida Mts.	IBX-1-601	Any Legal	TBD	1	ES	1	100	100%	1	0	4.00	1.00
	Florida Mtns	IBX-2-535	Bow	Oct 1-15	100	ES	96	96	16%	11	0	3.90	5.77
	Florida Mtns	IBX-2-536	Bow	Jan 15-29, '18	100	ES	96	96	1%	0	1	3.51	6.64
	Florida Mtns	IBX-3-540	Muzzle	Dec 6-20	26	ES	26	100	46%	11	0	3.92	5.33
	Florida Mtns	IBX-1-520	Any Legal	Feb. 15-Mar. 1, '18	49	F-IM	45	92	48%	4	13	3.97	3.21
	Florida Mtns Pop. Mgmt.	IBX-1-9000	Any Legal	Mar. 3-7, '18	129	F-IM	127	98	35%	10	34	3.59	2.27
	Florida Mtns Pop. Mgmt.	IBX-1-9001	Any Legal	Mar. 10-14, '18	132	F-IM	126	95	31%	9	29	3.49	2.29
	Florida Mtns Pop. Mgmt.	IBX-1-9002	Any Legal	Mar. 17-21, '18	132	F-IM	127	96	48%	10	49	3.72	1.98
	Ibex Hunts Total				742		714	96%		98	126	3.70	3.50

2018-19 New Mexico Ibex Hunter Harvest Report, New Mexico Department of Game and Fish

Florida Mountains & Off-Mountain Hunts

	AREA	Hunt code	Weapon	Hunt dates	Licenses Sold or Converted	Bag Limit	No. of Hunters Reported	% Reprtd	Success Rate	Estimated Harvest Males	Estimated Harvest Females	Satisfaction Rating	Number of Days Hunted
All Hunts	Florida Mtns, Youth Only	IBX-1-500	Any Legal	Dec 27-Jan 10, '19	16	ES	15	94	53%	9	0	4.33	4.20
	Florida Mtns, Enhancement	IBX-1-501	Any Legal	TBD	2	ES	1	50	100%	2	0	1.00	9.00
	Florida Mtns, Once-In_Lifetime	IBX-1-525	Any Legal	Nov 15-29	26	ES	26	100	54%	13	0	3.90	5.67
	Florida Mtns, Pop. Mgmnt Incentive	IBX-1-526	Any Legal	Feb. 1-Feb. 14, '19	5	ES	5	100	100%	5	0	4.40	2.60
	Off-Mountain Hunt, Non-Draw	IBX-1-528	Any Legal	Apr 1 - Mar 31, '19	40	ES	36	90	10%	2	0	2.09	7.29
	Florida Mts.	IBX-1-601	Any Legal	TBD	1	ES	0	0	0%	0	0	0.00	0.00
	Florida Mtns	IBX-2-535	Bow	Oct 1-15	100	ES	94	94	10%	7	0	3.69	6.04
	Florida Mtns	IBX-2-536	Bow	Jan 15-29, '19	100	ES	96	96	5%	4	1	3.94	6.33
	Florida Mtns	IBX-3-540	Muzzle	Dec 6-20	26	ES	23	88	57%	15	0	4.28	4.56
	Florida Mtns	IBX-1-520	Any Legal	Feb. 15-Mar. 1, '19	50	F-IM	49	98	25%	0	8	4.28	4.56
	Ibex Hunts Total				366		345	94%		57	9	3.78	5.80

Figure 4. Persian ibex hunting licenses for 2016, 2017, and 2018.

*Bag Limit Definitions: F-IM: Any family or immature ibex. ES: Any ibex of either sex.

Figure sources: NMDGF 2019c, 2019d, 2019e

3.10.2. Environmental Impacts

Of the 75,310 acres that encompass the Florida Mountains, approximately 30 acres, or 0.01% of the analysis area, would be developed in association with the Proposed Action. The proposed project is located within the foothills of the Florida Mountains within desert scrub vegetation. The proposed project area does not contain exposed rock cliffs or ridgelines that are preferred by Persian ibex; however, there is undeveloped habitat surrounding and adjacent to the proposed project area. The vegetation removal proposed occurs outside of the cliff and ridgeline habitat preferred by the species and is unlikely to influence herd movement or distribution within the analysis area related to foraging opportunities.

Per EPA (1978) rural background noise in wilderness and rural areas is generally 40 dBA. Noise levels from a point source such as concentrated construction activity would again decrease by 6 dBA for every doubling of the distance away from the source following noise attenuation principles. Therefore, it is estimated that road construction with standard equipment would produce a level of 90 dBA at 50 feet and drop to lower levels farther out from the source, reaching the ambient background level in wilderness and rural areas (40 dBA) beyond an approximate distance of 3.2 miles from the site of construction. These impacts would be temporary, lasting only the duration of road construction (approximately 6 months) and noise levels would drop as the area of construction activity moves closer to the mine.

The primary source of long-term noise under the Proposed Action that would result from the operation of heavy equipment (e.g., front-end loaders, rotary drills, bulldozers, graders, and haul trucks on site) during mining activities. Noise produced by diesel-powered heavy equipment used at surface mines is typically 85 dBA at a distance of 50 feet (BLM 2008; Thalheimer 2000). Impacts to ambient conditions from mining operations would result in an increase of 85 dBA within 50 feet of the operating equipment. Noise introduced from daily mining operations would not drop to 40 dBA (again, the general levels of ambient background noise in wilderness and rural areas) until approximately 1.8 miles from the site of operations.

In terms of surface mine blasting as discussed above, assuming a noise level of 140 dB 100 feet from the blast site, noise levels would attenuate out to 112 dB approximately 0.5 miles from the blast, 106 dB 1 mile from the blast, and 100 dB 2 miles from the blast. While surface blasting would introduce the highest noise levels in the analysis area and be potentially audible at long distances (at 32 miles, the level would be 76 dB), this intrusion would be sporadic, occurring once a month and expected to last seconds in duration. Additionally, no nighttime blasting is planned, therefore, no impacts to ambient noise levels would occur during periods when sensitive receptors in the analysis area would experience little noise disturbances overnight.

As Persian ibex are an exotic species within the United States are only managed within the Florida Mountains, there are limited data available regarding impacts and behavior change to anthropogenic noise disturbance. However, bighorn sheep (*Ovis canadensis*) are a related species, native to New Mexico, with similar habitat requirements and behaviors. Within the southwest United States, bighorn sheep have been evaluated for impacts and behavioral change from mining activities (Jansen et al. 2009). In the presence of mining activity, bighorn sheep have been known to habituate to predictable anthropogenic mining activities (such as vehicular traffic, construction, and consistent increased noise); however, when proximal to disturbance, they have been shown in some cases to have increased “vigilance time” but were not deterred from foraging locations (Jansen et al. 2007). While big game species, such as Persian ibex or bighorn sheep, do not have specific wildlife management noise disturbance tolerance thresholds, it can be assumed that increased noise disturbance above ambient levels has a potential to impact ungulate wildlife species, at least until the point at which adjacent population acclimate to increased anthropogenic disturbance such as vehicular traffic, construction noise, and mining activities.

If Persian ibex are within receiving distance for increased noise, expected reaction to noise disturbance would be limited to temporary movement of herds away from the area of disturbance and/or increased

vigilance behavior. However, anecdotal evidence from NMDGF management staff shows that Persian ibex in the Florida Mountains return to areas of significant noise disturbance (NMDGF 2019b). This behavior has been observed when population estimates are conducted by close flyovers with helicopters that produce significant increased noise and displace Persian ibex from their observation points (NMDGF 2019b). However, the noise created by the proposed mining activities are not likely to be disruptive to Persian ibex populations (Nave 2016). In addition, Persian ibex are not likely to be within the proposed project location due to lack of suitable habitat, and there are unlikely to be impacts to this species including temporary displacement.

If Persian ibex populations are displaced due to anthropogenic activity, including mine construction and operations and increased vehicular traffic, this displacement is likely to be temporary as herds acclimate to the increased disturbance. Because there is significant habitat present adjacent to the proposed disturbance area, temporary movement is not likely to adversely impact individuals by causing a lack of available food or water sources or preferred habitat.

3.10.2.1. Impacts to Recreational Opportunities

If Persian ibex populations are temporarily displaced or exhibit behavioral changes due to the presence of surface- or noise-disturbing activities, this may impact hunting opportunities within the proximity of the proposed project. It can be assumed that increased ambient noise would occur within the vicinity of the proposed project area due to construction and general operating noise. However, similar species have been shown to acclimate to general construction noise. The amount of increased noise estimated from the increase in vehicular traffic and use of general machinery is not expected to result in displacement or habitat avoidance of Persian ibex herds or individuals within their occupied range. Thus, no change in annual license sales or recreational value of annual licenses or decrease in use of the area for hunting Persian ibex, is expected. In addition, although unlikely due to habitat occurring outside of noise disturbance areas, if Persian ibex temporarily displace to adjacent habitat, hunting opportunities would not be lost as hunting licenses allow hunting across the entire range.

The proponent is proposing the use of existing access roads, County Road B016 and unnamed BLM road, to access the proposed project area and transport produced ore to a processing facility (Figure 1). These routes are currently utilized by hunters and outfitters to access the vicinity of the proposed project are during hunting seasons, but the proportion of hunting that occurs within this area, compared with the entire Florida Mountain range, is unknown. However, no closures or changes to public access along County Road B016 and the unnamed BLM road would result from construction and operation of the proposed project. Thus, established access routes for recreational hunters and outfitting businesses with special recreational permits would not be impacted. Recreational hunters and outfitters utilizing County Road B016 and unnamed BLM road may experience and increase in vehicular traffic during mine operational hours, see Section 3.4 Issue 2: Traffic and Public Safety for additional information.

Past and present actions, including projects with the potential to impact Persian ibex hunting opportunities in the analysis area, including roads, residential development, and helicopter surveys, contribute to the existing disturbances, which may cause impacts to hunting opportunities. The cumulative impacts of the proposed project, when considered with existing disturbances to the Persian ibex and reasonably foreseeable future actions, may cause some Persian ibex displacement away from the proposed project area initially; however, no negative long-term change that would cause a decrease in recreational hunting opportunities is expected.

3.10.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no mineral extraction or mining operations would occur. There would be no surface or noise disturbance

activities, and the population of Persian ibex would likely remain similar to their current distribution within the Florida Mountains. In addition, there would be no increase to vehicular traffic along recreational access routes along County Road B016 and unnamed BLM road. Therefore, as a result of the No Action Alternative, there would be no potential impacts to Persian ibex hunting activities within the Florida Mountains.

3.11. Issue 9: Florida Mountains WSA

How would the proposed action affect the wilderness characteristics of size, naturalness, outstanding opportunities for solitude or primitive and unconfined recreation, and supplemental values/special features in the adjacent Florida Mountains Wilderness Study Area (WSA)?

WSAs were designated through a process of inventory, evaluation, and review. BLM "will protect the wilderness characteristics of all WSAs in same or better than they were on October 21, 1976 […] until Congress determines whether or not they should be designated as wilderness." (BLM 201b2).

The proposed project is located adjacent to the Florida Mountains WSA. Mining operations would have the potential to impact the wilderness characteristics, including naturalness, outstanding opportunities for solitude or primitive and unconfined recreation, and supplemental values/special features. The analysis area is the Florida Mountains WSA. The indicators used for analysis are the degree of impairment to each of the identified wilderness characteristics, including supplemental values/special features.

3.11.1. Affected Environment

The Mimbres Resource Area contains 14 WSAs designated in 1980 totaling 382,909 acres (BLM 1980). The BLM completed the New Mexico Statewide Wilderness Study and Wilderness Analysis Reports in January 1988 that included the recommendation for approximately 75,310 acres of the Florida Mountain range to be managed as a WSA due to the naturalness, opportunities for recreation and solitude, and biological values (BLM 1988). The Florida Mountains WSA was re-evaluated in 1991 with a reduction of managed acreage (BLM 1991). The Florida Mountains WSA as identified in the 1993 Mimbres RMP contains approximately 22,336 acres of BLM land. The RMP states this WSA will be managed per the BLM's Interim Management Guidelines for areas studied under Section 202 of FLPMA until the study is complete and the areas are either designated as wilderness or released by Congress. WSAs are currently managed according to BLM Manual 6330 - Management of Wilderness Study Areas (BLM 2012b).

The proposed project is located approximately 620 feet south of the Florida Mountains WSA boundary (Figure 5). The impacts to a WSA from a project outside the WSA need to be included in the NEPA analysis.

For the purposes of this analysis, BLM Manual 6330 and BLM Manual 6310 define wilderness characteristics as defined in Section 2(c) of the Wilderness Act and incorporated in FLPMA (BLM 2012b, BLM 2012c) as follows:

- Naturalness: An area that "generally appears to have been affected primarily by the forces of nature, with the imprints of man's work substantially unnoticeable."
- Outstanding opportunities: An area that "has outstanding opportunities for solitude or a primitive and unconfined type of recreation."
    - Solitude: The state of being alone or remote from others; isolation. A lonely or secluded place.

- Primitive and Unconfined Recreation: Non-motorized, non-mechanized (except as provided by law), and undeveloped types of recreational activities.

- Supplemental values: An area that may contain "ecological, geological, or other features of scientific, educational, scenic, or historical value." Threatened, endangered, and candidate species should be considered supplemental values.

Naturalness

As discussed in the 1988 and 1991 New Mexico Wilderness Studies, the overall appearance of the Florida Mountains WSA is natural. However, the eastern portion has been impacted by mining, roads, grazing, and associated rangeland developments, which diminish the quality of naturalness.

Outstanding Opportunities for Solitude

Within the Florida Mountains WSA, there is one approximately 3,000-acre area around South Peak, where one may escape all signs of humans for true solitude (BLM 1991). Outstanding opportunities for solitude can also be found in the many secluded canyons and ridges. The 1991 New Mexico Wilderness Study Report suggests that any mining activity proposed within and outside of the WSA would be regulated to prevent unnecessary or undue degradation of the natural environment (BLM 1991).

Outstanding Opportunities for Primitive and Unconfined Recreation

The Florida Mountains WSA offers a variety of outstanding primitive recreational opportunities, including rock climbing, horseback riding, hunting, birding, photography and other naturalist activities (BLM 1991). The Florida Mountains WSA contains rugged mountains with steep ridges and canyons that offer opportunity for primitive and unconfined recreation in addition to outstanding opportunity for solitude (BLM 1988).

Supplemental Values/Special Features

The Florida Mountains WSA also contains special features such as ecological and scenic features. The WSA contains suitable habitat for a New Mexico State-listed species, night blooming cereus. The peaks and slopes of the Florida Mountains creates a high scenic quality within the WSA (BLM 1991). The higher elevations of the WSA contain steep, angular, red and gray rock outcroppings.

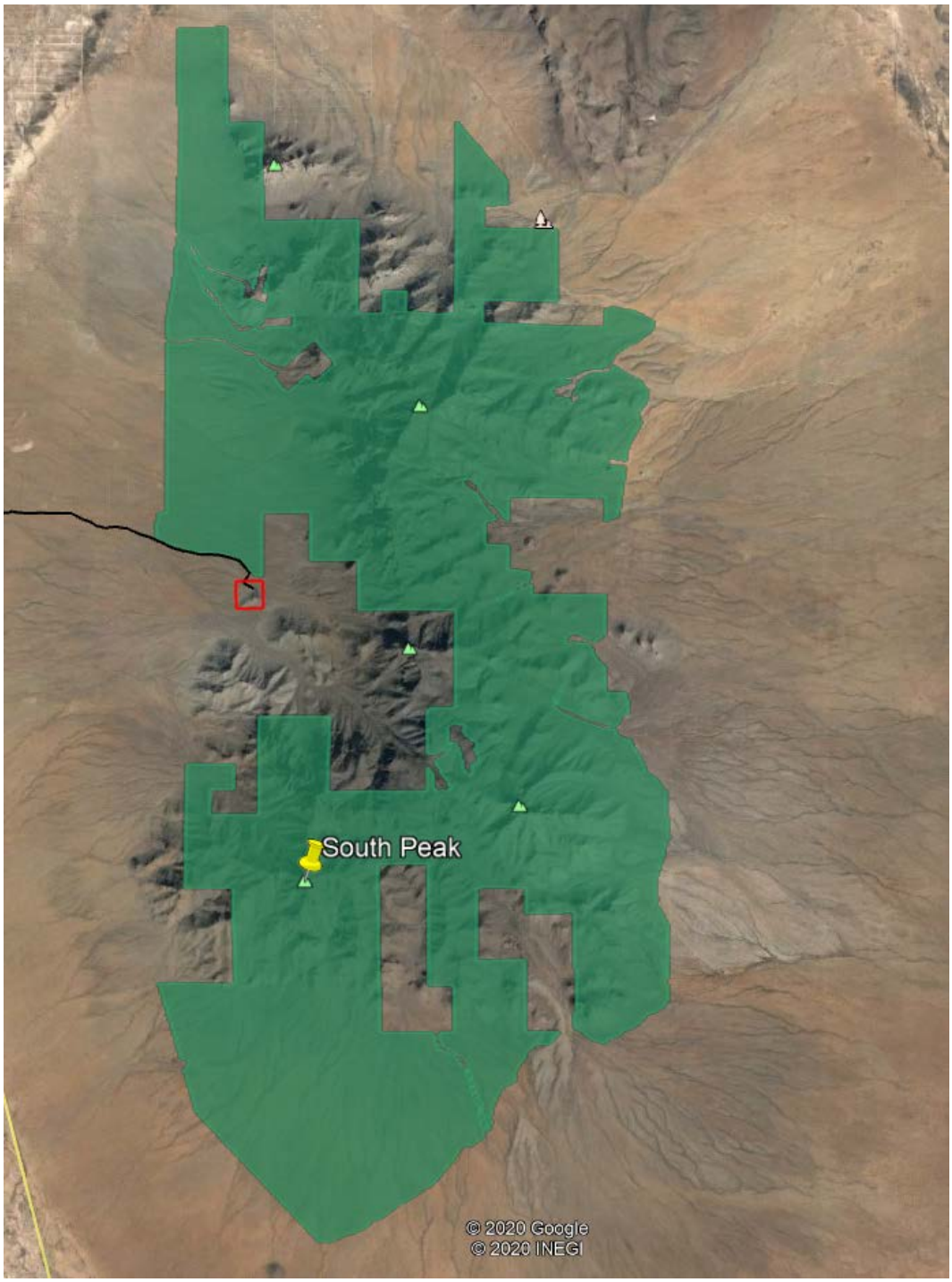

Figure 5. Aerial view of the proposed project within the vicinity of the Florida Mountains WSA in Luna County. The proposed project area is outlined in red; the proposed access road is black; and the Florida Mountains WSA is green. South Peak, an identified area of outstanding opportunities for solitude, is located approximately 2.8 miles south-southeast of the proposed project.

3.11.2. Environmental Impacts

3.11.2.1. Impacts of the Proposed Action

Access Road Improvements

Most of the land surrounding the proposed project is excluded from the Florida Mountain WSA. However, the unnamed BLM road to be "improved" follows the WSA boundary for approximately 1.27 miles and would be used to transport mining materials to the proposed mill site. The WSA boundary is "the edge of disturbance of that road that existed at the passage of FLPMA" (October 21, 1976) (BLM 2012b). In this case, the WSA boundary is the northern edge of the existing unnamed BLM road, except where vehicle use has deviated into the WSA. Prior to any road improvements, the correct WSA boundary will be marked for avoidance. To avoid direct and indirect impacts to the WSA boundary, no road improvements or drainage features will be constructed on the northern edge of the unnamed BLM road at the boundary of the Florida Mountains WSA. With these design features in place, the proposed project would not reduce the size of the Florida Mountains WSA. The proposed access road would not cause any additional impacts to the naturalness within the Florida Mountains WSA because it would be located outside of the WSA. Improvements to and maintenance of the unnamed BLM road would cause temporary impacts to outstanding opportunities for solitude during construction of road improvements and during periodic road maintenance required to maintain the integrity of the road. Primitive and unconfined recreation may be enhanced through improved access to the Florida Mountains WSA. Improvements to the unnamed BLM road are not likely to impact identified supplemental values/special features because the road improvements would occur outside the WSA.

Naturalness

Visual impacts and the introduction of the proposed project to the landscape would affect the area visible from the Florida Mountains WSA. However, there would be no mining activities within the WSA and, therefore, no impacts to WSA naturalness.

Outstanding Opportunities for Solitude

Outstanding opportunities for solitude would be impacted from the presence of the proposed project and the large increase in transportation traffic heard and seen near the western boundary of the Florida Mountains WSA. In addition, outstanding opportunities for solitude within the Florida Mountains WSA, including ridges and canyons, would potentially be impacted when the proposed project is visible and blasting and operating operations may be heard. Views of the proposed mining area from canyons to the southeast may be blocked by foothills, while views from canyons to the east and northeast would not be blocked. The proposed project area would not be visible from South Peak; therefore, there would be no loss to solitude at South Peak (Google Earth Pro 2019). Impacts to solitude would occur along the west central portion of the WSA during normal mine operation hours through the 20-year life of the mine. Because the proposed mine is expected to operate weekdays only, impacts to outstanding opportunities to solitude should occur only during the week. There should be no effects to outstanding opportunities for solitude during the weekends. Once the proposed project area is reclaimed, there would be no noise or truck traffic impacts along the WSA boundary or other areas within the west central portion of the WSA. See Section 3.8 for additional information on noise impacts at various distances.

Outstanding Opportunities for Primitive and Unconfined Recreation

Outstanding opportunities for primitive and unconfined recreation within the WSA would not be affected by the proposed activity.

Supplemental Values/Special Features

The proposed project is located adjacent to the Florida Mountains WSA. Therefore, there would be no impacts to supplemental values located within the Florida Mountains WSA.

Past and present actions, including projects with the potential to diminish solitude opportunities within the analysis area, including mining disturbance, contribute to the cumulative diminished solitude opportunities of the Florida Mountains WSA. The proposed project would contribute to the current and reasonably foreseeable future diminished quality of solitude within the analysis area from potential home construction, motor vehicle traffic along the unnamed BLM road from hunters and recreationists, and any future development of current mining claims

3.11.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no mineral extraction or mining operations would occur. There would be no related activities requiring mined ore to be hauled. As a result of the No Action Alternative, there would be no additional activities that could diminish wilderness characteristics within the Florida Mountains WSA. Current disturbances within the Florida Mountains WSA would remain.

3.12. Issue 10: Jobs and Employment

How would the creation of jobs for the proposed mine, and those related to the transportation and processing of ore, affect employment in Luna County?

This section discusses the potential impacts to employment that may result from the proposed project, which would occur through the change in the number of new jobs available (and therefore a change in employment opportunities) as a direct result of mining operations (i.e., the excavation and removal of mineral resources). Indirect impacts to employment would result from activities related to transportation of the mined ore from the mine site to the conceptual off-site facility and processing of the ore into final product for sale (see Section 2.1.3 above).

The analysis area for these impacts is defined as Luna County. The analysis discusses direct and indirect impacts to county-wide employment in terms of the number of available jobs as a representation of future employment opportunities for the duration of the proposed mining activities and related actions, anticipated to be 20 years. Cumulative impacts will be assessed in consideration of past and present actions (reflected in Affected Environment) and reasonably foreseeable future actions discussed in Section 3.2.2 above.

The analysis of impacts to employment in Luna County (the analysis area) uses the following assumptions:

- The number of jobs associated with the proposed mining operations, as well as those related to the transportation and processing of mined ore, would be for the life of the project (20 years).
- The three areas of employment—mining operations, transportation of ore, and ore processing—correlate with three major industry sectors as defined by the Bureau of Labor Statistics under the North American Industry Classification System (NAICS), including Mining, Quarrying, and Oil and Gas Extraction (herein referred to as the Mining industry, NAICS 21); Transportation and

Warehousing (herein referred to as the Transportation industry, NAICS 48–49); and Manufacturing (herein referred to as the Manufacturing industry, NAICS 31–33), respectively[3].

- All new jobs created under the Proposed Action would be filled, and by persons who are or would be residents of Luna County upon employment.
- The conceptually proposed processing facility would eventually be permitted and constructed in Luna County.

3.12.1. Affected Environment

Luna County's employment is reliant on several factors, including existing conditions and industry sector trends. While it is difficult to account for all possible factors that affect employment within a given community, area, or region, the number of available jobs relative to anticipated job creation can provide valuable information relative to future employment conditions.

While the majority of land in Luna County is used for grazing and irrigated farming activities, the farming sector is not one of the top employers in the county at just an average of 3.8% of overall employment in the county (2001–2017) (Commerce 2018b; Luna County 2012). In fact, the number of agricultural jobs has been declining steadily for nearly the past two decades, from 4.8% of the job market in 2001 to 3.4% in 2017 (Commerce 2018b). Since 2000, Luna County's primary employment sector has been the service industry, specifically retail trade at 13.5%, with the top employer in non-services-related industries being the manufacturing sector, representing an average of 11% of the overall job market from 2001 until 2017 (Commerce 2018b)[4].

From 2001 to 2017 in Luna County, the Mining industry (non-services related) employed an average of 32 people per year (approximately 0.3% of total employment), while the Transportation industry (services related) employed an average of 287 people per year (3.1% of the employment market). Within that same time frame, 1,015 people per year were employed by the Manufacturing industry (non-services related), constituting 11% of overall employment in Luna County (Commerce 2018b).

3.12.2. Environmental Impacts

3.12.2.1. Impacts of the Proposed Action

With the introduction of new industry comes increased demand for labor to support those activities. As stated above, potential impacts to employment would occur through the change in the number of new jobs available (and therefore a change in employment opportunity) as a direct result of mining operations (i.e., the excavation and removal of mineral resources). In all, the Proposed Action together with the related actions of transportation and processing of the ore recovered from the mine, would result in the creation of 14 employment opportunities for mine operations (Daniel B. Stephens & Associates, Inc. 2019a), 15 for ore transportation, and 550 for processing of the ore (TRU Group 2013).

There has been a characteristically low number of jobs in the Mining sector in Luna County, which averaged 32 people per year (approximately 0.3% of total employment) from 2001 to 2017. Assuming the 2001 to 2017 average remains the same over the next 20 years, the 14 new mining jobs created under the

[3] Statistical data for the Mining industry represent activities that are specific to nonmetallic mineral mining and quarrying because oil and gas extraction and/or metal ore mining are not pertinent economic subsectors for Luna County (Commerce 2018a). Specific data for the Truck Transportation subsector (NAICS 484) and the Nonmetallic Mineral Product Manufacturing subsector (NAICS 327) are not available at the county level; therefore, the analyses described herein incorporate employment statistics for the broader major industry sectors— Transportation and Warehousing (NAICS 48–49) and Manufacturing (NAICS 31–33), respectively—as the best available information regarding potential impacts to employment for these related activities.
[4] Averages are calculated using the number of jobs in each industry for the years 2001, 2010, and 2017, respectively.

Proposed Action would constitute a 43.8% increase in the number of available jobs in this industry for the life of the proposed mine.

Indirect impacts to employment would occur from related activities, including 15 truck drivers to support an estimated 46 round trips per day to haul mined ore from the mine site to the conceptual off-site mill facility. With an average of 287 persons per year employed in the Transportation industry in Luna County between 2001 and 2017, the addition of 15 jobs to this overall average would represent a 5.2% increase in employment opportunity in this sector for the next 20 years. In terms of the Manufacturing industry, which is already the top non-services-related employment sector in Luna County, the creation of 550 jobs at the conceptual mill processing facility would represent an over 50% increase (54.2%) in available jobs in one of Luna County's top industry areas for the life of the proposed mine.

Past and present actions, including jobs currently available, have contributed to the existing state of employment in the analysis area. The cumulative impacts of the proposed project, when considered with existing employment conditions and reasonably foreseeable future actions, would occur where the availability of jobs changes (i.e., either increases or decreases) in Luna County concurrently with the operational period of the proposed mine and related activities. Cumulatively, the creation of jobs and the relationship to the stability of the local employment and opportunity are a collective result of many factors, including the number of persons in the workforce, as well as the rate of those entering and those leaving the workforce over time in the analysis area, and trends in unemployment rates and future growth projections for the economy on the local, regional, and national level.

3.12.2.2. Impacts of the No Action Alternative

Under the No Action Alternative, the BLM would not approve the PoO for the proposed project, and no mineral extraction or mining operations would occur. There would be no related activities needed to haul mined ore nor would any off-site facility be required for ore processing. As a result of the No Action Alternative, there would be no new jobs created for mining operations, or those related to the transportation and processing of mined ore. Current conditions for employment and the number of available jobs in the Mining, Transportation, and Manufacturing sectors would remain consistent with current trends.

CHAPTER 4. CONSULTATION AND COORDINATION

All interested parties were notified of the availability of the EA for public review. Letters were mailed to addresses of record and notices were posted to newsletter and newspaper outlets (see summary in Section 1.6.2). Notification includes interested stakeholders, leaseholders, grazing permit holders, and any other party that has notified the BLM of the desire to receive notification about the project.

Luna County, the City of Deming, and representatives from the New Mexico MMD were invited to be cooperating agencies via letter in October 2019. All three agencies accepted. A cooperating agencies meeting was held with these entities on October 24, 2019, and follow-up meetings have also been held.

The BLM is consulting with the New Mexico Historic Preservation Division and tribal entities on cultural resource clearances throughout the process.

On 11/21/19 BLM LCDO sent notification letters to Fort Sill Apache Tribe, Hopi Tribe, Mescalero Apache Tribe, White Mountain Apache Tribe, and Ysleta del Sur Pueblo inviting comments regarding the proposed project. On 12/6/2019 White Mountain Apache Tribe sent a letter to BLM LCDO with the response that the proposed project will "not have adverse effect on any known White Mountain Apache tribe's historic properties and/or traditional cultural properties". The Hopi Tribe responded on 11/2/2019 with no comments regarding the proposed project. The Ysleta del Sur Pueblo responded on 1/9/2020 and did not "have any comments on the proposed undertaking and believe that this project will not adversely affect traditional, religious, or culturally significant sites, and have no opposition to it". The Ysleta del Sur Pueblo requested consultation "should any human remains or artifacts unearthed during this project be determined to fall under NAGPRA guidelines". BLM has not received a response from Fort Sill Apache Tribe or Mescalero Apache Tribe.

CHAPTER 5. LIST OF PREPARERS

The BLM established an ID Team made up of BLM staff specialists who developed the EA. The BLM worked with cooperating agencies and a third-party contractor to develop the content and analysis in the EA. Table 13 presents a list of preparers who participated in the development of this EA.

Table 13. List of EA Preparers

Name	Title	Organization or Agency
Leighandra Keeven	Project Lead, Geologist	BLM – LCDO
Anthony Hom	Lands and Minerals Supervisor	BLM – LCDO
Dave Wallace	Assistant District Manager	BLM – LCDO
Carty Carson	District Park Ranger; Visual Resources	BLM – LCDO
Gordon Michaud	Soil Scientist; Air Quality	BLM – LCDO
Corey Durr	Hydrologist	BLM – LCDO
Trinity Miller	Archaeologist; Tribal	BLM – LCDO
Evelyn Treiman	Outdoor Recreation Planner; Wilderness & Visual Resources	BLM - LCDO
Steven Torrez	Planning and Environmental Coordinator	BLM - LCDO
Cody Howard	Wildlife Biologist	BLM - LCDO
Colin Dunn	Paleontologist	BLM - LCDO
Marten Schmitz	Outdoor Recreation Planner	BLM - LCDO
Patrick Alexander	Botanist	BLM - LCDO
Jana Onsurez	Rangeland Management Specialist	BLM - LCDO
Paige Marchus	NEPA Lead	SWCA Environmental Consultants
Alex Simons	Planning Specialist	SWCA Environmental Consultants
Annie Lutes	Socioeconomics	SWCA Environmental Consultants
Jenn Clayton	Wildlife Biologist	SWCA Environmental Consultants
Evan Crawford	Noise	SWCA Environmental Consultants
Janet Guinn	Air Resources and NEPA Review	SWCA Environmental Consultants
Brianna Zurita	Environmental Planner; Transportation	SWCA Environmental Consultants

LCDO = Las Cruces District Office

CHAPTER 6. REFERENCES

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APPENDIX A- SCOPING PROCESS AND RESPONSE SUMMARY

APPENDIX B – VISUAL RESOURCES ANALYSIS AND SIMULATIONS

APPENDIX C – AIR QUALITY IMPACTS MEMO