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Bureau of Land Management**

Environmental Assessment

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**Freeport-McMoRan Cobre Mining Company
Mine Plan of Operations Amendment No. 5**

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ABBREVIATIONS AND ACRONYMS

ABBREVIATIONS

CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
dB	decibel
dBA	A-weighted decibel
kV	Kilovolt
NO ₂	nitrogen dioxide
No.	number (as in Amendment No. 5)
NO _x	mono-nitrogen oxides (nitric oxide and nitrogen dioxide)
PM _{2.5}	particulate matter less than 2.5 microns in diameter
PM ₁₀	particulate matter less than 10 microns in diameter
SO ₂	sulfur dioxide
µg	microgram
µm	micrometer

ACRONYMS

AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACEC	Area of Critical Environmental Concern
ACS	American Community Survey
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
amsl	above mean sea level
APA	American Psychological Association
AQS	Air Quality System
ARD	Air Resources Division (of the NPS)
BISON-M	Biota Information System of New Mexico
BLM	Bureau of Land Management, U.S. Department of the Interior
BMP	best management practices
CAA	Clean Air Act
CCP	closure closeout plan
CDP	Census designated place
CEQ	Council on Environmental Quality
Census	United States Department of Commerce Census Bureau
CFR	Code of Federal Regulations
CLF	Chiricahua leopard frog
Chino	Freeport-McMoRan Chino Mines Company
Cobre	Freeport-McMoRan Cobre Mining Company
Cobre's	
Continental Mine	Cobre's mining operations
Corps	U.S. Army Corps of Engineers
CRS	Visual Resource Contrast Rating System
DR	Decision Record
DRC	Dos Rios Consultants, Inc.
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FHWA	U.S. Department of Transportation, Federal Highway Administration

FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
GHGs	greenhouse gases
HDPE	High Density Polyethylene
HUC	Hydrologic Unit Code
IBA	Audubon Important Bird Areas
ID	Interdisciplinary (as in BLM ID team)
IGRA	Integrated Global Radiosonde Archive
ISO	International Organization for Standardization
KOP	Key Observation Points
LOS	letter of service
MBTA	Migratory Bird Treaty Act of 1918
MMD	New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division
mph	miles per hour
MPO	Mine Plan of Operations
MSGP	Multi-Sector General Permit
MSHA	Mine Safety and Health Administration
MSO	Mexican spotted owl
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NMAAQS	New Mexico Ambient Air Quality Standards
NMAQB	New Mexico Air Quality Bureau
NMDA	New Mexico Department of Agriculture
NMDOT	New Mexico Department of Transportation
NMGFD	New Mexico Game and Fish Department
NMGS	Northern Mexican gartersnake
NMED	New Mexico Environmental Department
NMPIF	New Mexico Partners in Flight
NMWRRS	New Mexico Water Rights Reporting System
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	U.S. Department of Agriculture, Natural Resources and Conservation Service
NRHP	National Register of Historic Places
NWMA	New Mexico Noxious Weed Management Act
OMB	Office of Management and Budget
PFYC	Potential Fossil Yield Classification
PNM	Public Service Company of New Mexico
Project Footprint	The combined acreage of disturbance for the Proposed Action Alternative on privately owned and BLM-administered land
PSD	Prevention of Significant Deterioration
RMP	Resource Management Plan
SMI	Shepherd Miller, Inc.
St. Anthony's Church	Saint Anthony's Church and Shrine
State Highway	New Mexico State Highway (e.g. State Highway 152)
SWPPP	Stormwater Pollution Prevention Plan
SWRDF	South Waste Rock Disposal Facility
SWReGAP	Southwest Regional Gap Analysis Project
TDS	total dissolved solids
TIMS	Traffic Information Management Systems

TNM	Traffic Noise Model
TSP	total suspended particulates
US 180	US Highway 180
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USSR&M	U.S. Smelting, Refining and Mining Company
VRM	Visual Resource Management
WCRM	Western Cultural Resource Management, Inc.
WSA	Wilderness Study Area

Chapter 1

1. INTRODUCTION

This chapter introduces the proposed Federal action and provides background and general information regarding the project's history and location. Chapter 1 also reviews in detail the scope of this environmental review and the nature of the decision to be made by the U.S. Department of the Interior, Bureau of Land Management (BLM), Las Cruces District Office. Included in this chapter are a summary of the public participation efforts and a list of the key issues identified by the Public and by the BLM interdisciplinary (ID) team that are carried forward for analysis in this Environmental Assessment (EA).

This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended and pursuant to the BLM surface management regulations in Title 43 of the Code of Federal Regulations (CFR), Part 3809 (43 CFR 3809). The purpose of this EA is to provide the Public and interested agencies (the Public) an opportunity to review BLM's analysis of the potential effects of the Proposed Action and the No Action Alternatives, and to allow the Public an opportunity to provide input that will inform BLM's decision regarding Freeport-McMoRan Cobre Mining Company (Cobre) Mine Plan of Operations (MPO) Amendment Number (No.) 5.

1.1 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

Cobre submitted the MPO Amendment No. 5, dated December 13, 2012, to the BLM, Las Cruces District Office. MPO Amendment No. 5 proposes future mining and related operations on approximately 36 acres of lands administered by the BLM at and in the vicinity of Cobre's mining operations (Cobre's Continental Mine).

This EA evaluates and analyzes the environmental consequences of the proposed mining and related operations on lands administered by the BLM, including an analysis of the direct, indirect, and cumulative effects of the Federal action that would result from the implementation of the Proposed Action and No Action Alternatives. The EA is organized into the following sections:

- **Chapter 1.** Introduction: Describes the history of the project, the purpose of the Proposed Action, the need for Federal review and action, the regulatory framework for BLM's decision-making process, the public participation process, and the scoping issues identified by the Public and the BLM ID team for analysis and consideration in this EA.
- **Chapter 2.** Description of Alternatives, including the Proposed Action: Provides a detailed description of the Proposed Action (including environmental controls and monitoring measures), and No Action Alternatives considered in the EA, as well as alternatives considered but eliminated from further review in this EA. A tabular summary of the impact analysis is provided.
- **Chapter 3.** Affected Environment and Environmental Consequences: Describes the existing condition of the natural and human environment in the project area and analysis of the environmental consequences of the No Action and Proposed Action Alternatives considered in this EA for each of the issues identified during the internal and external scoping process for analysis.

- **Chapter 4.** Consultation and Coordination: Provides a list of agencies consulted during the development of the EA and a summary of public involvement efforts.
- **Chapter 5.** References: Documents cited in this document.
- **Appendix A** provides a list of all those who submitted written comments during scoping and BLM's Responses to Public Comments.
- **Appendix B** provides a list of all those who submitted written comments during the review of the EA and *Finding of No Significant Impact* (FONSI) and the BLM's Responses to those comments.
- **Appendix C** provides a list of Project-specific Special Status Species in Grant County and a list of Birds of Conservation Concern in Conservation Regions 34 and 35.
- **Appendix D** provides a list of Noxious Weed Species for the State of New Mexico.

1.2 PROJECT BACKGROUND AND HISTORY

Cobre's Continental Mine is located about 12 miles east of Silver City in Grant County, New Mexico (*Figure 1-1*). Cobre's Continental Mine facilities include the Continental Mine Pit, which is an existing open pit copper mine, a mill, a tailings impoundment, and rock stockpiles. Mining products produced at Cobre's Continental Mine in addition to copper include zinc, silver, gold, and magnetite iron ore. Cobre's Continental Mine is in designated standby status in accordance with applicable New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division (MMD) regulations, and there are no active copper mining operations currently taking place. Aside from those activities required to maintain Cobre's current status, the only other active operation is removal and shipping of stockpiled magnetite off site via truck.

Portions of Cobre's Continental Mine have been part of commercial mining activities since 1858, and have been producing commercial amounts of copper since that time (Hart 1984). An estimated 1 million pounds of copper ore have been produced between 1858 and 1861 (Forrester 1972). Magnetite iron ore has also been mined at the site. Magnetite production reached its peak at 200,000 tons per year between 1916 and 1931, when the mine was owned and operated by the Hanover Bessemer Iron and Copper Company, an eventual subsidiary of U.S. Smelting, Refining and Mining Company (USSR&M) (Forrester 1972). The mine was subsequently operated by a series of lessees until additional significant copper mineralization was discovered around 1947. Following this discovery, copper ore was produced at the rate of 250 tons per day and processed at the USSR&M's Bullfrog Mill, located approximately 6 miles south of the present day Continental Mine Pit.

The establishment of the Continental Mine, now Cobre's Continental Mine, started in 1964, commencing with the construction of a production shaft and underground workings (Hart 1984). Completed in 1967, Mill No. 1 had the capacity to leach or mill up to 4,000 tons per day of ore mined from the underground workings. Mill No. 1 has since been decommissioned and removed from service; components of the Mill have been dismantled, but the building remains standing. Mill No. 2 was completed in 1973 to receive ore derived from the newly constructed open pit. Mill No. 2 has a capacity of 8,000 tons per day and remains in an operational state.

From 1974 to 1992, the mine was owned by a series of companies, including U.V. Industries, Sharon Steel, and Bayard Mining Corporation. Cobre Mining Company acquired the property in the early 1990s

and reinitiated mining operations. A subsidiary of Phelps Dodge Corporation acquired Cobre Mining Company in 1998. Following the 2007 merger of Phelps Dodge Corporation and Freeport-McMoRan Copper & Gold Inc. (now Freeport-McMoRan, Inc.), Cobre Mining Company was renamed as Freeport-McMoRan Cobre Mining Company (Cobre).

The utilization of BLM-administered land by Cobre has been conducted under an MPO initially approved by the BLM in 1993 and amended three times since its original approval. A fourth amendment to this plan was filed by Phelps Dodge in 1999, and an Administrative Draft EA was produced; however, that amendment was withdrawn, and the BLM NEPA review was never completed. **Table 1.2-1** provides a brief summary of the 1993 MPO and amendments. Surface management in the area of Cobre's Continental Mine is depicted in **Figure 1-2**. Existing site features, including mine features, roadways, and other structures are depicted in **Figure 1-3**.

Table 1.2-1 Chronology of the mine plans of operations and amendments for Cobre's Continental Mine

Plan or Amended Plan	Date	Activities	Outcome
Plan Of Operations	1993	Reinitiation of mine operations required expansion onto Federal lands	BLM-approved EA and Decision Notice 1993
Plan Of Operations Amendment No. 1	March 1994	Expansion of the Main Tailings Impoundment	BLM-approved April 1994
Plan Of Operations Amendment No. 2	May 1994	New access roads and drill pads	BLM-approved September 1994
Plan Of Operations Amendment No. 3	August 1995	Authorize the continuation of mining during the development, review, and completion of a revised Plan of Operations to address and consolidate planned operations on Federal Lands over the life of the Continental Mine for which an Environmental Impact Statement would be prepared. Specific activities on BLM-administered land include: expand the tailings impoundment, expand extraction of the Continental Mine Pit, and expand the South Waste Rock Disposal Facility (SWRDF).	BLM-approved EA and Decision Notice February 1997
Plan of Operations Amendment No. 4	1999	Proposed expansion activities on private and public lands: excavation of the Hanover Mountain Deposit, development of the Fierro Leach Pad; construction of leach solution pipeline to the Chino ¹ Solution Extraction/Electro-winning facility; development of topsoil stockpile locations; expansion of the SWRDF; and relocation of administrative facilities.	Administrative Draft EA May 2000 Due to internal business decisions and market conditions final EA and Plan of Operations were not ultimately completed.
MPO Amendment No. 5	December 2012	Proposed Action evaluated in this EA.	This amendment is proposed to modify the currently approved Plan of Operations.

¹ Chino = Freeport-McMoRan Chino Mines Company

In addition to the documents listed in *Table 1.2-1* and the currently approved Plan of Operations, as amended, that guides mine operations on public land at Cobre's Continental Mine, another updated Plan of Operations was submitted to the BLM in 1995 for proposed expanded operations. The BLM initiated NEPA review for that proposed plan and produced a preliminary draft environmental impact statement (EIS) in 1998 (BLM 1998); however, the EIS was never completed because the price of copper dropped significantly and mine operation would not have been economical at that time.

With this proposed MPO Amendment No. 5, Cobre is requesting authorization to conduct the following mining and mining-related activities on BLM-administered land:

- Mine two isolated fragments of BLM-administered land within Hanover Mountain that total 0.29 acres;
- Construct the North Overburden Stockpile and associated haul road on 19.0 acres of BLM-administered land;
- Construct an approximately 3.6-mile long haul road (proposed Haul Road) from Cobre's Continental Mine to the Freeport-McMoRan Chino Mines Company (Chino) operation. The proposed Haul Road would include small separate fragments of approximately 8.7 acres of BLM-administered land;
- Expand the SWRDF onto approximately 6.3 acres of BLM-administered land adjacent to the southwest limits of the existing facility;
- Obtain authorization for SWRDF Dam 2 occupancy of approximately 0.6 acres of BLM-administered land; and
- Construct a Utility Corridor along an alignment that includes approximately 1.3 acres of BLM-administered land.

The estimated total new surface disturbance on BLM-administered land for the proposed facilities would be approximately 36 acres within unpatented mining claims held by Cobre.

Implementation of the activities described in Cobre's MPO Amendment No. 5 would eliminate the need for construction of the Fierro Leach Pad¹ and expansion of the Main Tailings Impoundment.² The Fierro Leach Pad and Main Tailings Impoundment are currently authorized by required state and Federal permits.

In addition, the following activities that had been planned for construction on private lands owned by Cobre would no longer be required:

- Construction of a Solution Extraction/Electro-winning facility located east of Fierro Road just north of the Fierro Cemetery;
- Installation of leaching-related pipeline corridors;

¹ A portion of the Fierro Leach Pad, the Bluebird Parcel, was authorized as a waste rock facility under the original MPO.

² The Main Tailings Impoundment expansion was approved as part of Amendment No. 1 authorized in April 1994.

- Construction of the Humboldt Leach Pad³; and
- Upgrade and expansion of the Cobre Concentrator (Mill No. 2).

1.3 PURPOSE AND NEED FOR ACTION

The purpose of MPO Amendment No. 5 is to mine mineral resources at Hanover Mountain and leach or mill ore from both the Hanover Mountain Deposit and the Continental Mine Pit in an efficient, cost-effective manner in order to produce copper cathodes and copper concentrate at existing facilities located at Chino. Mining and mining-related activities outlined in MPO Amendment No. 5 require authorization for use of BLM-administered land. The need for the proposed Federal action is the requirement that the BLM respond to a proposed MPO to conduct mining operations on BLM-administered land pursuant to U.S. Mining Laws and in accordance with Federal regulations found at 43 CFR 3809.

1.4 CONFORMANCE WITH BLM LAND USE PLAN

The BLM has developed the Mimbres Resource Management Plan (RMP) to guide long-term management of public lands that it administers in the Mimbres Resource Area. The Mimbres RMP contains no constraints that conflict with proposed mining activities. Management activities within the areas proposed for use include mining, grazing, and wildlife habitat. Activities associated with mineral resource development described in Cobre's MPO Amendment No. 5 are in conformance with the Mimbres RMP (BLM 1993:2–5). As stated in the RMP Amendment, "Mineral development on the public land has been and is being carried out under 43 CFR 3809, Mine Plan of Operations (MPO), which is submitted by a mining company" (BLM 2009:1).

1.5 RELATIONSHIP TO OTHER PLANS, STATUTES, AND REGULATIONS

Because portions of the proposed mining operations would be located on unpatented mining claims held by Cobre and land administered by the BLM, these operations must comply with procedures and standards described in the BLM surface management regulations for mining of public lands, 43 CFR 3809. Surface management regulations recognize the statutory right, under the General Mining Law of 1872, of mining claim holders to develop Federal mineral resources and to utilize Federal land for mining purposes. Under these regulations, the BLM is required to review Cobre's MPO Amendment No. 5 to ensure that: 1) adequate provisions are included to minimize, where feasible, adverse environmental impacts to surface resources on public lands; 2) measures are included to provide for reclamation, where practicable; and 3) the proposed operations comply with other applicable Federal, state, and local laws and regulations.

The proposed activities on BLM-administered land are also subject to review and approval by the BLM pursuant to the following laws and policies:

- Mining and Minerals Policy Act of 1970, as amended;

³ The Humboldt Leach Pad is located on private lands owned by Cobre, and impacts associated with the development of this facility were analyzed in the preliminary draft EIS (BLM 1998).

- Federal Land Policy and Management Act of 1976 (FLPMA), as amended; and
- BLM’s Mimbres Resource Management Plan (as amended) (BLM 1993, 2009).

The proposed activities and their approval by BLM constitute a Federal action subject to NEPA. The Las Cruces District Office of the BLM is the lead Federal agency for this EA.

Some of the proposed actions associated with Cobre’s MPO Amendment No. 5 will cross surface water features that have been preliminarily identified by the U.S. Army Corps of Engineers (Corps) as waters of the United States. The Corps is responsible for permitting associated with Section 404 of the Clean Water Act that regulates the discharge of fill material into waters of the United States. Cobre has initiated coordination efforts with the Corps to secure this permit, and will be responsible for adhering to the terms and conditions of the permit.

1.6 SCOPE OF THE FEDERAL ACTION

Our determination of 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.” Actions on privately owned lands that are related to the Federal decision to be made were determined to be *connected actions*⁴ and part of the scope of the Federal action reviewed in this EA. These connected actions on privately owned lands include the proposed Haul Road (approximately 95.0 acres), authorization of the existing SWRDF Dam 2 (approximately 0.1 acres); and the upgrade and relocation of the Utility Corridor (approximately 12.0 acres). Additionally, Cobre seeks authorization under 43 CFR 3809 for portions of the existing Bullfrog Pipeline, which are currently operated within right-of-way NM 000555 granted by the BLM. Portions of the existing Bullfrog Pipeline located along the eastern edge of the SWRDF would be relocated within the proposed Utility Corridor, which crosses privately owned lands and some small parcels of BLM-administered land.

The combined acreage of disturbance on privately owned land on which connected actions have been determined to occur, and BLM-administered land of approximately 143.3 acres creates the Project Footprint for the Proposed Action Alternative and falls within the Federal scope of analysis.

1.7 DECISION FRAMEWORK

The BLM Las Cruces District Office District Manager is the deciding officer responsible for evaluation of Cobre’s MPO Amendment No. 5. Based on the analysis provided in this EA, the BLM District Manager will first determine if an EIS is required. Based on the analysis of impacts presented in this EA, the BLM District Manager determined that impacts are not *significant* as defined by CEQ (40 CFR 1508.27). Because the threshold for significance is not exceeded, then the BLM has prepared a FONSI to explain

⁴ *Connected Actions* are defined by CEQ as closely related actions that “(i) Automatically trigger other actions which may require environmental impact statements, (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously, (iii) are interdependent parts of a larger action and depend on the larger action for justification.”

why implementation of the MPO is not a major Federal action and does not require more in-depth analysis. The BLM District Manager will prepare a *decision record* (DR) to document and explain the reasoning for the decision. The DR will include a description of the selected alternative; the rationale for the decision; a description of alternatives and monitoring plans; a summary of public involvement efforts, comments received; and a description of protest and appeal opportunities. The BLM District Manager is responsible for determining if approval of Cobre's MPO Amendment No. 5 would be consistent with the Mimbres RMP.

The FONSI is appropriate because the agency's decision has been determined not likely to significantly affect the environment (40 CFR 1508.27). In gauging significance, the agency considered both context and intensity, as defined in BLM's NEPA Handbook, H-1790-1 (2008). Given the need for the Federal action, the BLM District Manager reviewed Cobre's MPO Amendment No. 5, alternatives, and environmental consequence and approved the project as proposed; with minor amendments to minimize or eliminate adverse environmental impacts from mineral development activities on BLM-administered land. BLM is coordinating with Cobre to determine the appropriate type and amount of financial assurance to cover the costs of reclamation.

1.8 IDENTIFICATION OF ISSUES

As required by NEPA, the BLM solicited input from the Public on the proposed project to assist in identifying key issues, defining the scope of the project, and conducting the environmental analysis. A more detailed description of the scoping process is summarized in *Chapter 4*, and responses to all comments received are provided in *Appendix A* of this EA. 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. Using the comments submitted during the scoping period and input from the BLM ID team, a list of issues to address in the EA (Key Issues) was developed in accordance with guidelines set forth in the BLM NEPA Handbook H-1790-1. Key Issues are defined as those used to formulate alternatives to the Proposed Action, prescribe mitigation and monitoring measures, or guide the analysis of the environmental effects of the Proposed Action and alternatives.

Issues were considered non-significant, or were not key issues, if they were:

- Beyond the scope of the Proposed Action
- Irrelevant to the decision to be made
- Already decided by law, regulation, or policy
- Conjectural in nature or not supported by scientific evidence

As described in Chapter 4, the EA and FONSI were provided for public review and comment. Comment responses are provided in *Appendix B*.

1.8.1 Issues Analysis

The ID team of resources specialists from the BLM Las Cruces District Office reviewed the proposed activities to identify resource concerns. As a result of the analysis of the comments received from the Public and from the BLM ID Team, the resources described below are not considered further in this

analysis because they are not present in the project area, or because no issues were identified in association with the Proposed Action or No Action Alternatives.

Special Designation Areas

There are no special designation areas located within or adjacent to the proposed activities, including Wilderness Study Areas (WSAs) and Area[s] of Critical Environmental Concern (ACECs).

Recreation

Recreational opportunities within and adjacent to the proposed activities are limited, and higher value recreation areas are located in the region. This project would not reduce or adversely affect recreational opportunities on a local or regional level.

Livestock and Grazing

Small portions of two grazing leases are located within and adjacent to the proposed activities, one of which is held by Freeport-McMoRan. The Proposed Action Alternative would not result in a modification to currently permitted grazing activities.

Fire Management

There are no fire management areas located within or adjacent to the project area. In the event of a wildfire, access to the area is feasible and would not be blocked by the proposed activities.

Wild and Scenic Rivers

There are no rivers designated as wild and scenic within or adjacent to the proposed activities.

1.8.2 Issue Statements

The following issue statements have been formulated based on the scoping comments received from the Public and review of the Proposed Action Alternative by the ID team of BLM resources specialists in the Las Cruces District Office.

Issue 1: Air Quality

Activities associated with mine construction and operations may result in increased levels of emissions.

Issue 2: Noise

Activities associated with mine construction and operations may result in increased noise levels that could disturb residents within Hanover Valley and visitors to Saint Anthony's Church and Shrine (St. Anthony's Church) and the Fierro Cemetery, as well as those visiting surrounding public lands.

Issue 3: Vibration

Vibration levels could affect the integrity of adjacent historic structures, including St. Anthony's Church.

Issue 4: Visual Resources

Construction and use of the proposed Haul Road may affect the viewshed to the east for residents of Hanover Valley and travelers along Fierro Road and New Mexico State Highway (State Highway) 152.

Issue 5: Traffic

Noise, congestion, and traffic delays may be problematic for those who live in the area during the construction and operation phases of the Proposed Action Alternative.

Issue 6: Socioeconomic Resources

Activities associated with mine construction and operations may affect socioeconomic conditions such as employment, income, related and supporting businesses, tax revenues for governments, and public services.

Issue 7: Soils

Activities associated with mine construction and operations may affect soils resulting in soil loss and erosion.

Issue 8: Geology

Activities associated with mine construction and operations would affect the local geological mineral resources and slope stability in the area.

Issue 9: Surface Water Resources

Activities associated with mine construction and operations may affect surface water quality and quantity.

Issue 10: Groundwater Resources – Quality and Quantity

Activities associated with mine construction and operations may affect groundwater quality.

Activities associated with mine construction and operations may affect groundwater quantity, especially in light of climate change.

Issue 11: Vegetation

Activities associated with mine construction and operations will result in the loss of vegetation.

Issue 12: Wildlife

Activities associated with mine construction and operations may result in adverse impacts to wildlife and wildlife habitat.

Issue 13: Special Status Species

Activities associated with mine construction and operations may result in the loss of habitat for special status species or cause direct mortality to individuals of such species.

Issue 14: Noxious Weeds

Activities associated with mine construction and operations may facilitate the spread of noxious weeds.

Issue 15: Cultural Resources

Mine construction and operations may affect cultural resources.

Issue 16: Paleontological Resources

Mine construction and operations may affect paleontological resources.

Issue 17: Lands/Realty

Cobre seeks to obtain revisions to surface land management and realty approvals associated with the Bullfrog Pipeline and the SWRDF Dam 2.

Issue 18: Environmental Justice

Disproportionate, adverse effects may occur to low-income and minority populations.

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Chapter 2

2. DESCRIPTION OF ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for Cobre's Continental Mine Plan of Operations Amendment No. 5. It defines the differences between the alternatives and provides the basis for evaluation of the alternatives. Section 2.1 describes the No Action Alternative and the Proposed Action Alternative. This includes environmental controls and monitoring measures proposed by the Applicant. Section 2.2 describes alternatives considered but eliminated from detailed analysis during preparation of this EA. Table 2-3.1 presented in Section 2.3 provides a summary of the impact analysis, which is discussed in detail in Chapter 3.

2.1 ALTERNATIVES CONSIDERED IN DETAIL IN THIS EA

NEPA requires the BLM to consider a No Action Alternative, the Proposed Action Alternative, and other alternatives that may be identified that meet the project's purpose and need. Cobre has existing entitlements and authorizations from the state of New Mexico and the BLM to commence mining under the existing, approved MPO as previously amended (**Figure 2-1**). Therefore, under either the No Action Alternative (**Figure 2-1**) or Proposed Action Alternative (**Figure 2-2**) considered in this EA, Cobre plans to restart operations at Cobre's Continental Mine. **Table 2.1-1** provides a summary of the mine components common to both the No Action and Proposed Action Alternatives and those elements unique to each of the alternatives. Impact analyses resulting from implementation of the No Action and Proposed Alternatives are described in **Chapter 3**. A comparative summary of impacts associated with each of the alternatives is presented at the end of **Chapter 2**.

Table 2.1-1 Summary of the No Action and Proposed Action Alternatives and elements common to both alternatives¹

Plan of Operations Element	No Action Alternative ²	Proposed Action Alternative ³
PRINCIPAL MINING COMPONENTS		
Continental Mine Pit	Expand mining of Continental Mine Pit	Expand mining of Continental Mine Pit
Hanover Mountain Deposit	Mine only the privately owned portion of the Hanover Mountain Deposit	Mine the privately owned portion of the Hanover Mountain Deposit; Mine the BLM-administered slivers (0.29 acres) on Hanover Mountain
South Waste Rock Disposal Facility (SWRDF)	Merge existing waste rock disposal areas to construct the SWRDF and expand onto privately owned lands adjacent to the existing boundary	Merge existing waste rock disposal areas to construct the SWRDF; Expand to include approximately 6.3 acres on BLM-administered land
Humbolt Leach Pad	Construct on privately owned lands	Not required
Fierro Leach Pad	Construct on privately owned lands and previously authorized BLM-administered land	Not required
Crusher and Concentrator	Expand and operate Mill No. 2	Not required
Solution Extraction/Electro-winning facility	Construct a Solution Extraction/Electro-winning facility on privately owned land	Not required
Main Tailings Impoundment	Expand the Main Tailings Impoundment on privately owned lands and previously authorized BLM-administered land	Not required
ANCILLARY AND SUPPORT FACILITIES		
Administrative Offices	Construct new facilities along Fierro Road	Construct new facilities along Fierro Road
North Overburden Stockpile and Haul Road	Would not be constructed. Reclamation cover materials would be stored on privately owned lands	Construct on BLM-administered land
69-kilovolt (kV) Line Relocation	Relocate along Fierro Road on privately owned lands	Relocate within a proposed Utility Corridor, crossing several small parcels of BLM-administered land
SWRDF Dam 2	Address inadvertent encroachment with the BLM	Authorize under BLM's 43 CFR 3809 regulations
Proposed Haul Road to Chino	Not required	Construct an approximately 3.6-mile-long haul road crossing private and public lands
Bullfrog Pipeline	No change in current alignment Portions of the Bullfrog Pipeline would continue to be authorized under a Title V Right-of-way issued by BLM	A portion of the pipeline would be relocated within the proposed Utility Corridor The Bullfrog Pipeline would be authorized under BLM's 43 CFR 3809 under MPO Amendment No. 5

¹ Elements common to both alternatives are in **bold** font.

² With the exception of SWRDF Dam 2, activities already authorized by Federal and state permits

³ Activities that are common to the No Action Alternative have already been authorized by Federal and state actions. The remaining activities are identified in MPO Amendment No. 5; some or part of these activities may have already been authorized by Federal and state actions.

2.1.1 Alternative 1 – No Action

Under the No Action Alternative, Cobre’s Continental Mine would function as a stand-alone facility for the production of copper from mined materials out of the Continental Mine Pit and from privately owned portions of the Hanover Mountain Deposit. Cobre currently holds all state and Federal permits and authorizations for activities described under the No Action Alternative as depicted on **Figure 2-1**. Some state permitting for these activities would need to be renewed and revised. The features of the No Action Alternative are as follows:

2.1.1.1 Continental Mine Pit

Material would continue to be mined and stockpiled for leaching or milling at existing and planned facilities at Cobre’s Continental Mine. As authorized under the current MPO, as amended, the Continental Mine Pit would be expanded to the west onto BLM-administered land.

2.1.1.2 Mining of the Hanover Mountain Deposit

Mining would occur as currently authorized under state permits at the Hanover Mountain Deposit, with the exception of two slivers of BLM-administered land totaling approximately 0.29 acres (**Figure 2-3**). Hanover Mountain is approximately 141 acres in size. There are existing mine-related facilities on approximately 15 acres of currently disturbed land on the south and west sides of Hanover Mountain that are not included in this analysis. Waste rock and overburden generated from the mining of privately owned lands on Hanover Mountain would be transported to the SWRDF southwest of Hanover Mountain on privately owned lands or BLM-administered land that has been previously authorized for mining purposes.

Four types of material would be mined at the Hanover Mountain Deposit: leach ore, mill ore, soil/rock with potential to be used for site reclamation (growth media), and waste rock. Mining of the mountain would commence from the top versus the side, which would reduce the overall steepness of the high-wall. After excavation is complete, the Hanover Mountain Deposit would consist of a series of broad benches that step down (from west to east) in approximately 50-foot vertical increments resulting in an eastward surface water drainage pattern. The overall vertical elevation difference from west to east would be approximately 250 feet.

Mine planning is based on several factors such as copper price, existing topography, geotechnical stability, geology, and mineralogy. Using these factors, a mine design, equipment fleet, and mining schedule is planned; however, due to changing economic conditions, the design and schedule may vary. The mine operations under this plan would be continuous with two 12-hour shifts per day, 365 days per year. The mine production rate would vary from 20,000 to 125,000 tons per day.

To break apart the rock to facilitate excavation, blasting activities would be required at both the Continental Mine Pit and the Hanover Mountain Deposit. Blasting activity would normally be carried out during daylight hours on weekdays; however, there could be periodic circumstances where weekend blast activity would be necessary.

During the mining operation of the Hanover Mountain Deposit, stormwater would be collected and managed using a system that may consist of, but not be limited to, holding ponds, diversion ditches, pumps, electric power supply, and pipelines that would be integrated into the existing water-management systems. The maximum depth of mining at the Hanover Mountain Deposit is currently constrained by the terms of State Permit DP-1056 to not extend below the elevation of Hanover Creek located east of Hanover Mountain. If Cobre chooses to mine below that level, Cobre would need to modify/revise the relevant state permits and their MPO for the BLM. Access to mining areas would be through the existing and/or approved haul and access roads. Equipment fleets vary based on economic conditions, mine schedule, and availability. Equipment that would likely be used for mine production is listed below:

- One Caterpillar 994 wheel loader
- One Caterpillar 992 loader
- Two P&H 4100 electric mining shovels, or equivalent
- Haul truck fleet of Caterpillar trucks ranging from 75-to 275-ton capacity
- Drill fleet, consisting primarily of PV275 Pit Viper drills or equivalent
- Road maintenance fleet, consisting of motor graders, bulldozers, and water trucks
- Mine service trucks, maintenance equipment, and maintenance shops

2.1.1.3 Leach Pads and Solution Extraction/Electro-winning Facility

Leach ore mined from the Continental Mine Pit and the Hanover Mountain Deposit would be placed on the proposed Fierro and Humbolt Leach Pads (*Figure 2-1*). The Fierro Leach Pad would be located on private, patented land and on the BLM-administered Blue Bird parcel, which is located north of the SWRDF and has been previously authorized by the BLM for mining purposes. The Humbolt Leach Pad would be located on private lands at the southwest corner of the mine facility. Pregnant leach solution would be delivered to a Solution Extraction Electro-winning facility constructed on privately owned lands east of the Fierro Leach Pad.

2.1.1.4 Main Tailings Impoundment and Mill No. 2

The only tailings storage facility at Cobre's Continental Mine, the Main Tailings Impoundment, is located in the northwest portion of the mine. This tailings impoundment would be expanded to the west and northwest onto previously authorized BLM-administered land and privately owned land in accordance with the existing MPO, as previously amended. The existing concentrator would be upgraded and expanded. Ore would be transported to Mill No. 2 for crushing and milling, and tailings would be delivered to the existing impoundment.

2.1.1.5 South Waste Rock Disposal Facility

Waste rock from the Continental Mine Pit and Hanover Mountain Deposit would be hauled to the existing waste rock stockpiles located at the south end of the facility. Small individual areas currently known as the East, West, South, Buckhorn, and Union Hill waste rock facilities would be merged into one unit (the SWRDF) (*Figure 2-1*). Cobre is currently approved for the merging and expansion of these facilities

(BLM 1997). The SWRDF would be expanded onto approximately 24.1 acres of privately owned lands along the eastern and western edges of the existing facility.

2.1.1.6 South Waste Rock Disposal Facility Dam 2

SWRDF Dam 2 is an existing facility that occupies approximately 0.6 acres of BLM-administered land and 0.1 acres of lands owned by Cobre (**Figure 2-4**). This dam was built in response to an administrative order on consent between the Environmental Protection Agency (EPA) and Cobre in the late 1990s to collect stormwater from the SWRDF. Portions of the dam were inadvertently built on land administered by the BLM. Under the No Action Alternative, SWRDF Dam 2 would continue to be an inadvertent encroachment, and Cobre would work with the BLM to resolve the issue.

2.1.1.7 69-kV Powerline Reroute

The proposed reroute of utility infrastructure—a 69-kilovolt (kV) electrical transmission line—is shown in **Figure 2-1**. The reroute would relocate the 69-kV line that currently passes through the expanded footprint proposed for the SWRDF. The reroute would involve placement of 3.6 additional miles of new pole sets that would follow Fierro Road for approximately 2.6 miles. The new line would consist of either single-pole or double-pole structures spaced approximately 200 to 400 feet apart. An access road would be constructed along those portions of the power line that do not already parallel the highway, a distance of about 1 mile. As described in the current approved MPO, this alignment would occur entirely on lands owned by Cobre or for which Cobre has suitable lease for placement and operation of the power line.

2.1.1.8 Administrative Buildings

The administration building and other infrastructure for operations at Cobre's Continental Mine would be relocated to facilitate access to private lands on Hanover Mountain for mining. The new administrative buildings would be constructed on an approximately 0.3-acre parcel of privately owned land along Fierro Road (**Figure 2-1**) to minimize commingling of highway vehicles with the large off-road haulage equipment.

2.1.1.9 Ore and Waste Rock Handling

Ore and waste rock would be handled based on analytical results of the chemical components measured from blast hole samples. Once mined, ore would be transported to the appropriate on-site facility for copper production. Rock mined from the Continental Mine Pit and the Hanover Mountain Deposit without economic mineral value would be placed on private and BLM-administered land at existing stockpiles (**Figure 2-1**). Waste rock with the potential to result in an exceedance to groundwater standards would be managed in accordance with the waste rock handling plan required by the New Mexico Environmental Department (NMED). This plan provides detailed rock characterization information, a conceptual placement design, performance evaluation, and monitoring criteria. The plan also outlines the procedures for placing potentially acid-generating rock from the Hanover Mountain Deposit where it would be covered with acid-neutralizing rock from the Continental Mine Pit.

2.1.1.10 Safety and Security

Activities at Cobre's Continental Mine are regulated by the Mine Safety and Health Administration (MSHA) under regulations (primarily 30 CFR Parts 47, 48, 56, 58 and 62) that set the standard for safety training, personal protective equipment, specific guidance for virtually every major aspect of mining-related work, and health standards governing occupational exposure to regulated substances and noise. The mine safety staff train employees and assist in implementing MSHA regulations. Operations are conducted in a manner designed to meet Freeport-McMoRan's corporate safety mission statement, which is as follows: *To maintain an injury-free and productive workplace by actively promoting safety and health measures with contractors and suppliers. Freeport-McMoRan seeks to establish relationships with its contractors and suppliers based on mutual trust, cooperation and communication, as we strive to achieve our corporate vision of zero incidents, injuries, fatalities and occupational illnesses.*

Cobre maintains security plans that define the approaches used to prevent unauthorized access to its property. Through mandated training programs, all employees and contractors are trained to observe and report suspicious or unusual activity that threatens safety or security. Security personnel control access to the facility 24 hours per day.

Where appropriate, fencing has been or would be constructed around the perimeter of the mining areas to prevent the Public, big game, and cattle from wandering onto the active mining area.

2.1.1.11 Reclamation and Closure

Reclamation of disturbed areas would be in compliance with all state and Federal regulations, including the New Mexico Mining Act, the New Mexico Water Quality Control Commission regulations, and the FLPMA. Under FLPMA, the BLM is responsible for preventing undue or unnecessary degradation of BLM-administered land, which may result from operations authorized by the mining laws. The mine reclamation plan, called the closure closeout plan (CCP), would be provided to the MMD in accordance with the New Mexico Mining Act and to the NMED, Ground Water Quality Bureau. Included in the CCP is a financial assurance cost estimate that is calculated based on the approved reclamation plan. The funds would cover the cost for a third party to implement the reclamation plan, but only in the case that the mine is unable to implement closure. The CCP undergoes state, Federal, and public review.

2.1.2 Alternative 2 – Proposed Action

The following sections provide a description of the activities proposed in Cobre's MPO Amendment No. 5 including those activities that would occur on BLM-administered land and the associated activities on private lands, including those determined to be connected actions subject to BLM review in accordance with the requirements of NEPA (the Proposed Action Alternative; *Figure 2-2*).

Under proposed MPO Amendment No. 5, the Proposed Action Alternative, Cobre's Continental Mine would resume operation of the Continental Mine Pit and initiate operations at the Hanover Mountain Deposit, as described in *Section 2.1.1*. However, ore would be delivered to existing facilities at the Chino Mine, eliminating the need for the following state-permitted features included under the No Action

Alternative: construction of a stand-alone Solution Extraction/Electro-winning facility; construction of the Fierro and the Humbolt Leach Pads; expansion of the Main Tailings Impoundment; and upgrade and expansion of the Cobre concentrator. Cobre copper ore that is suitable for leaching would be mainly extracted at the Chino Solution Extraction/Electro-winning facility, and during that same period the Chino Mine ore, which is not suitable for leaching, would be extracted at the concentrator. This would allow both facilities to run at their current rates. The Chino mine life is not affected by mining at Cobre's Continental Mine or by the processing of Cobre ore at Chino. Chino Mine does not require any new state or Federal permits to receive ore from Cobre's Continental Mine.

Some of the activities that would occur on privately owned lands have been determined by the BLM to be connected actions per CEQ guidelines and subject to BLM review under NEPA. The approximate acreages of the proposed activities on BLM-administered land and connected actions on private land are summarized as follows:

- Hanover Mountain Deposit: 0.29 acres on BLM-administered land;
- North Overburden Stockpile: 19.0 acres on BLM-administered land;
- Proposed Haul Road: 103.7 acres – (8.7 acres on BLM-administered land and 95.0 acres on lands owned by Freeport-McMoRan) ;
- SWRDF: 6.3 acres on BLM-administered land;
- SWRDF Dam 2: 0.7 acres (0.6 acres on BLM-administered land and 0.1 acres on lands owned by Cobre); and
- Proposed Utility Corridor: 13.3 acres (1.3 acres on BLM-administered land and 12.0 acres on lands owned by Freeport-McMoRan).

The summary of acreage disturbance under the Proposed Action Alternative on BLM-administered land and privately owned lands would be:

- New surface disturbance on unpatented mining claims held by Cobre on BLM-administered land under MPO Amendment No. 5 is approximately 36 acres.
- New surface disturbance for connected activities on private lands owned by Freeport-McMoRan is approximately 107 acres.
- New surface disturbance on other lands owned by Freeport-McMoRan is approximately 131 acres, which has already been authorized for mining activities.
- Total existing and new surface disturbance on BLM-administered land is 275 acres. This includes 239 acres already authorized for mining activities and 36 acres described under this Proposed Action Alternative.
- Total existing and new surface disturbance on privately owned lands is 1,051 acres. This includes 944 acres already authorized for mining activities and 107 acres described under this Proposed Action.
- Total acreage of authorized disturbance at Cobre's Continental Mine on public and private lands would be approximately 1,327 acres upon approval of MPO Amendment No. 5.

2.1.2.1 Continental Mine Pit

As described in *Section 2.1.1.1*, excavation activities would occur at the Continental Mine Pit as authorized under the existing MPO. Cobre currently holds all state and Federal permits and authorizations required in connection with copper production from the Continental Mine Pit.

2.1.2.2 Mining of BLM Lands within the Hanover Mountain Deposit

There are two slivers of BLM-administered land totaling 0.29 acres within Hanover Mountain which have not been previously authorized for mining activity. Excavation of the approximately 141 acres of privately owned land on Hanover Mountain is described in *Section 2.1.1.2*. Under the Proposed Action Alternative, Cobre would be authorized to access the BLM-administered land and utilize the full mineral potential at Hanover Mountain.

2.1.2.3 The North Overburden Stockpile (Reclamation Material Stockpile)

The North Overburden Stockpile footprint is planned on approximately 19.0 acres of BLM-administered land (*Figure 2-2*) and would be used to store reclamation cover material, such as soil and rock, taken from the mining of the Hanover Mountain Deposit. Cobre holds the State of New Mexico permits to allow the construction, operation, and reclamation of this facility under applicable state laws.

Cobre would construct the North Overburden Stockpile from surface material excavated from Hanover Mountain that is deemed suitable for reclamation cover. In general, cover material to be excavated consists of approximately 6 inches to 1 foot of topsoil and 8 to 9.5 feet of unmineralized overburden. The cover material thickness may vary by location and material suitability. Prior to mining overburden at Hanover Mountain, large woody debris (e.g., trees and shrubs) would be removed and placed in one or more accumulation sites. As mining progresses, Cobre would segregate the suitable cover material from the underlying waste rock and ore using standard mining equipment.

The conceptual design of the North Overburden Stockpile is shown in *Figure 2-5*. The inter-bench slopes of the stockpiles are at 2:1 (horizontal:vertical) with a 25-foot offset every 50 feet in elevation. This slope angle is stable based on observation and studies of other stockpiles derived from the Colorado Formation at Cobre's Continental Mine that have been standing at an angle of repose (approximately 1.5:1) for over 40 years. The maximum height of the North Overburden Stockpile is approximately 180 feet above natural topography. As configured, the North Overburden Stockpile would contain approximately 2.2 million cubic yards of cover material. A haul road would be constructed to transport cover material from Hanover Mountain to the North Overburden Stockpile. The haul road, constructed along a ridge, would be about 120 feet wide to allow for two-way traffic.

The North Overburden Stockpile would be constructed from suitable reclamation cover material, which may include some large woody materials (e.g., trees and shrubs). Reclamation material acts as a cover to support revegetation and is typically placed over waste and leach stockpiles when the mine closes. Stormwater runoff that flows off the stockpile outslope would be managed to reduce the introduction of suspended sediment into nearby drainages. This is typically accomplished by installation of berms, settling ponds, or diversions where needed at the base of the stockpile (*Figure 2-5*).

2.1.2.4 Haul Road to Chino Mine

An approximately 3.6-mile long road (proposed Haul Road) would be constructed that would run east from Hanover Mountain, crossing Fierro Road and Hanover Creek, then south to cross State Highway 152, to existing Chino facilities (**Figure 2-2**). The proposed Haul Road would result in impacts to approximately 8.7 acres of isolated fragments of BLM-administered land and 95 acres of lands owned by Cobre. The roadbed would be approximately 120 feet wide, including 8-foot high berms, to allow for the transport of ore to the existing facilities at the Chino Mine for processing (**Figure 2-6**). The width of the road would vary depending on construction requirements and the placement of surface water management features, such as ditches and culverts. A pull-out area is located approximately midway along the roadway for emergency vehicle parking and maintenance. Two overpasses would be constructed along the proposed Haul Road for mine traffic; one on the north end to cross over Fierro Road and Hanover Creek and one on the south end to cross over State Highway 152. The proposed Haul Road would also be the primary access to Cobre's Continental Mine for mine employees and contractor traffic.

2.1.2.5 South Waste Rock Disposal Facility

As described for the No Action Alternative, waste rock from the Continental Mine Pit and Hanover Mountain Deposit would be hauled to the existing waste rock stockpiles located at the south end of the facility. Small individual areas currently known as the East, West, South, Buckhorn, and Union Hill waste rock facilities would be merged into one unit known as the SWRDF (**Figure 2-2**). Cobre is currently approved for the expansion of these facilities (BLM 1997). As part of the Proposed Action Alternative, the SWRDF expansion would include the addition of approximately 6.3 acres of BLM-administered land.

The SWRDF expansion on BLM-administered land is located in the Buckhorn Gulch sub-basin. Within the Buckhorn Gulch sub-basin, the expansion area would be located along the north and east sides of the sub-basin, proximal to Buckhorn Spring and a short stretch of perennial flow within Buckhorn Gulch. The proposed expansion area footprint would be set back to the natural break in slope in this area, a distance of approximately 100 feet from the drainage bottom. This setback design is a minor modification to the design presented in the MPO Amendment No. 5. The existing SWRDF stormwater containment system would continue to operate by diverting and capturing stormwater.

2.1.2.6 South Waste Rock Disposal Facility Dam 2

As described under **Section 2.1.1.6**, SWRDF Dam 2 is an existing facility that occupies approximately 0.6 acres of BLM-administered land and 0.1 acres of land owned by Cobre (**Figure 2-4**). This dam was built in response to an administrative order on consent between EPA and Cobre in the late 1990s to collect stormwater from the SWRDF. Portions of the dam were inadvertently built on land administered by the BLM. Authorization to occupy 0.6 acres of BLM-administered land is requested as part of the MPO No. 5 Amendment, to resolve the current inadvertent encroachment.

2.1.2.7 Utility Corridor

The rerouting of the 69-kV electrical transmission line and a portion of the waterline within the proposed Utility Corridor would cross four BLM parcels totaling approximately 1.3 acres. The transmission line

would terminate at a new substation located on privately owned land that is within the footprint of existing mine operations at Cobre's Continental Mine (*Figure 2-7*).

The existing Bullfrog Pipeline is currently used to transfer stormwater and seep water from Cobre facilities to Chino where it is recycled as mine make-up water and used for dust suppression on haul roads (*Figure 2-8*). A portion of the Bullfrog Pipeline along the eastern edge of the SWRDF would be realigned within the proposed Utility Corridor.

2.1.2.8 *Administrative Buildings and Other Ancillary Facilities*

As described for the No Action Alternative, the office buildings currently located along the west and south sides of Hanover Mountain would be demolished and relocated on 0.3 acres of privately owned land.

Currently Cobre is authorized to occupy BLM-administered land with the Bullfrog Pipeline by a Title V Right-of-way permit that must be reauthorized every 5 years. With the approval of MPO Amendment No. 5, the Bullfrog Pipeline would be authorized under BLM's 43 CFR 3809. This authorization would allow Cobre to relinquish its Title V Right-of-way.

2.1.2.9 *Ore and Waste Rock Handling*

Under the Proposed Action Alternative, ore would be transported along the proposed Haul Road to Chino. Barren or uneconomic rock would be handled as described under the No Action Alternative (*Section 2.1.1.9*), but in addition expanding the footprint of the SWRDF onto approximately 6.3 acres of BLM-administered land (*Section 2.1.2.5*).

2.1.2.10 *Safety and Security*

Activities planned for this component of the operation would be the same as those described for the No Action Alternative (*Section 2.1.1.10*).

2.1.2.11 *Reclamation and Closure*

As described in *Section 2.1.1.11*, a reclamation plan for the mine would be designed, and a financial cost estimate would be calculated to provide sufficient funds to cover the cost of a third-party consultant to complete the reclamation work in a mine default scenario. The financial assurance would cover all reclamation activities associated with disturbance of BLM-administered lands covered by this proposed MPO Amendment No. 5. A site-wide reclamation plan is also provided to the MMD and NMED for state approval that addresses the reclamation plan, financial assurance, and long-term monitoring. The goals of Cobre's state CCP are to promote a viable post-mining land use, reduce impacts to surface water and groundwater, and promote post-mining public safety. Practices for large earthen features (e.g., waste rock stockpiles and tailings facilities) would generally include: 1) diverting upgradient stormwater run-on, 2) grading the facilities to a stable slope to promote positive stormwater drainage, 3) applying a vegetated cover system, and 4) establishing subsurface water controls (e.g., seep collection) where appropriate. The purposes of the vegetative cover systems would be to establish a self-sustaining ecosystem, stabilize

slopes, and reduce meteoric water infiltration into the underlying facility. The cover material for the vegetative cover system comes from mined materials that meet MMD cover material guidelines. The reclamation design would include a network of channels and best management practices (BMPs) that would be used to direct stormwater off the reclaimed stockpile and tailing dam facility. Once surface water quality from reclaimed areas meets applicable surface water quality standards, it would be allowed to discharge. Roads would be either left in place for long-term maintenance and access, or would be reclaimed. Road reclamation typically includes grading where necessary to promote positive drainage off the road surface to minimize the concentration of stormwater runoff. The resulting surfaces would then be revegetated.

Closure of stockpiles and tailings impoundments relies on reclamation covers and complementary surface and subsurface water-control measures and water treatment. The cover systems would be placed on mining substrates graded to stabilize the slopes and allow stormwater to drain while minimizing soil loss from erosion. The cover systems would be revegetated to establish a self-sustaining ecosystem and meet the approved post-mining land use. Revegetation practices include (in general order): 1) rip; 2) scarify; 3) seed [drill, broadcast, or hydroseed]; 4) mulch; and 5) crimp. Surface water-control structures (open channels and down drains) would be designed to convey water in a manner that maintains the integrity of the reclamation covers. Subsurface water-control measures would be operated to limit the impacts to surface water and groundwater.

The primary reclamation seed mix (*Table 2.1-2*) for the mines generally includes cool and warm season grasses, perennial shrubs, and forbs. The species selected have been successfully used in mine reclamation and range improvement projects in many parts of New Mexico. The seed mix was selected to provide early establishment of ground cover, erosion control, and diversity in growth forms. The seed mix is designed for application prior to the summer rains, and the seeding is typically completed in early- to mid-July. The ratio of cool season to warm season grasses may be adjusted if the seeding is conducted after the summer rains. The final seed mix can vary depending on availability and would be reviewed and approved by the MMD and BLM, as appropriate.

Table 2.1-2 Primary seed mix and seeding rates

Species	Life-Form	Duration	Seasonality	Rate ^(1, 2)
Blue grama (<i>Bouteloua gracilis</i>)	Grass	Perennial	Warm	0.25
Side-oats grama (<i>Bouteloua curtipendula</i>)	Grass	Perennial	Warm	1.25
Green sprangletop (<i>Leptochloa dubia</i>)	Grass	Perennial	Warm	0.15
Galleta (<i>Pleuraphis jamesii</i>)	Grass	Perennial	Warm	0.40
Sand dropseed (<i>Sporobolus cryptandrus</i>)	Grass	Perennial	Intermediate	0.05
Bottlebrush Squirreltail (<i>Sitanion hystrix</i>)	Grass	Perennial	Cool	1.25
Indian Ricegrass (<i>Oryzopsis hymenoides</i>)	Grass	Perennial	Cool	1.75

Table 2.1-2 Primary seed mix and seeding rates

Species	Life-Form	Duration	Seasonality	Rate ^(1, 2)
Streambank wheatgrass (<i>Elymus lanceolatus</i>)	Grass	Perennial	Cool	1.50
Apache plume (<i>Fallugia paradoxa</i>)	Shrub	Perennial	NA	0.10
Mountain mahogany (<i>Cercocarpus montanus</i>)	Shrub	Perennial	NA	0.10
Winterfat (<i>Eurotia lanata</i>)	Shrub	Perennial	NA	1.50
Four-wing saltbush (<i>Atriplex canescens</i>)	Shrub	Perennial	NA	0.25
White prairie clover (<i>Dalea candida</i>)	Forb	Perennial	NA	0.20
Prairie coneflower (<i>Ratibida columnifera</i>)	Forb	Perennial	NA	0.20
Blue flax (<i>Linum lewisii</i>)	Forb	Perennial	NA	0.15

Final seed mix to be developed and approved by state agencies and the BLM.

¹ Seed mix and rates are subject to change based on future investigations and availability.

² Rate is in pounds of pure live seed per acre; Substitutions may change seeding rates.

NA = not applicable

The Hanover Mountain Deposit would be closed in accordance with the approved CCP. The main revegetation activities for BLM-administered and privately owned lands would include: 1) grading the surface to promote drainage from the mine, 2) placing cover material, 3) constructing stormwater channels, 4) ripping and seeding the cover material, and 5) monitoring the revegetation and reporting the results.

After the growth media stockpiled at the North Overburden Stockpile has been removed for mine reclamation, stormwater control structures associated with the North Overburden Stockpile would be removed, and the disturbed areas of the former overburden stockpile would be regraded and revegetated using conventional seeding techniques.

The proposed Haul Road would be reclaimed in accordance with state regulations. Reclamation would include removal of unnecessary water management features and grading to promote positive stormwater drainage off of the road to minimize erosion. The resulting surfaces would be revegetated using conventional seeding techniques.

After its use in post-reclamation water management, the SWRDF Dam 2 would be reclaimed. The concrete dams would be broken up and disposed of in the SWRDF. Reclamation would be completed to create positive stormwater drainage. The area would be covered and reseeded in accordance with state regulations to establish a vegetated cover compatible with the post-mining land use.

Cobre maintains financial assurance with the BLM, MMD, and NMED for closure and mine site reclamation that includes authorized activities on Federal lands in accordance with the requirements of state permits. Cobre typically retains a third-party engineer to prepare a reclamation cost estimate, including contingency, for the activities that are approved to occur on BLM-administered land pursuant to 43 CFR 3809 regulations. All closure and post-closure activities would be in accordance with the BLM

and state reclamation rules. This and future reclamation plans may incorporate new technology and be adjusted with state and Federal approval where applicable. No surface-disturbing activities associated with this proposed amendment to the MPO would be initiated until adequate financial assurance is accepted by the BLM and other agencies.

The reclaimed areas would be monitored periodically after the final grading and the initial establishment of vegetation as regulated by state agencies and the BLM. Regular inspections would be made to determine the success of the seeding and cover stability. Revegetation monitoring in the Cobre MPO Amendment No. 5 area would be conducted as part of the monitoring plans described in the state and Federal mining permits. State vegetation monitoring would be conducted periodically. A release of financial assurance instruments would be requested from the BLM and the state upon completion of reclamation activities.

Post-closure surface water monitoring locations and schedules would be determined based on Cobre's obligations under state and Federal permits. Additionally, post-closure monitoring is also required under Cobre's supplemental discharge permit for closure (DP-1403). Cobre's Continental Mine Stormwater Pollution Prevention Plan (SWPPP) would be modified as necessary to identify sampling locations and to address the frequencies for stormwater runoff as well as for periodic inspections of the reclamation area.

The state-approved Cobre CCP and other operational permits allow for excess stormwater and/or seepage waters generated from the Cobre facilities that do not meet applicable water quality standards to be collected by Cobre and piped to Chino via the Bullfrog Pipeline. Once Chino enters closure and a water-treatment facility is constructed, the collected Cobre waters would be sent to the Chino water-treatment facility.

Groundwater quality in the vicinity of Cobre's Continental Mine operations would be monitored throughout operations and the post-closure period as required under the discharge permits issued by the NMED. A monitoring well network is already in place at Cobre's Continental Mine, but would be expanded to facilities with the potential to affect groundwater as facilitated by the discharge permits issued by the NMED. The monitoring schedule, analytical requirements, location, and construction specifications for the discharge permits have been determined in consultation with the NMED. As part of the compliance with the discharge permits, Cobre has agreed to numerous conditions for monitoring, contingencies, closure, and financial assurance for various facilities and activities that have the potential to affect groundwater quality. Thus, Cobre would monitor for existing and potential groundwater exceedances and report the results to the NMED. The results of the water quality monitoring as well as the construction or abandonment of monitoring wells associated with discharge permits are reported to the NMED Groundwater Quality Bureau and the Office of State Engineers. If a corrective action plan is required, mitigation measures would be acted on pursuant to discharge permit requirements. Post-closure monitoring would be performed in accordance with the issued permits. Contingencies if groundwater impacts are detected would fall under the groundwater abatement regulations of the New Mexico Water Quality Act.

2.1.2.12 Environmental Controls and Monitoring Measures

The MPO Amendment No. 5 identifies environmental controls and monitoring measures developed by Cobre as approved in their various state permits to prevent or minimize the anticipated environmental effects of proposed activities on lands administered by the BLM (Cobre 2012: Chapter 4). These are BMPs in the Proposed Action Alternative of this EA and are briefly summarized below.

Wildlife

Wildlife monitoring of reclaimed areas would be conducted in accordance with the MMD permit GR002RE. This measure is a minor modification from that presented in the MPO Amendment No. 5. Wildlife habitat features such as rock piles and/or brush piles may be constructed within reclamation areas if suitable materials are available from the closure construction process.

Cobre will evaluate all applicable water bodies and electrical systems for avian risk and will implement appropriate protection measures to reduce risk as needed. As described below for surface water, water quality monitoring will be conducted. This information is added to the EA to clarify procedures not described in the MPO Amendment No. 5 submittal.

Revegetation

Vegetation monitoring at Cobre's Continental Mine currently consists of multiple 1-acre plots that test reclamation cover materials and of general rangeland condition monitoring related to ongoing cattle grazing leases on the Cobre property within the project area. Also, a fenced vegetation reference area (*Figure 2-1*) has been established to be used in the evaluation of revegetation success. Monitoring parameters generally include vegetation cover, density, species identification, and distribution.

The major revegetation monitoring efforts within the project area would take place on closed facilities where there is an identified post-mining land use that includes the reestablishment of vegetation to create wildlife habitat. Revegetation monitoring begins within 5 years after seeding as stipulated in the MMD permit (see *Section 2.1.2.11*). Revegetation success for financial assurance release would be determined by a quantitative revegetation comparison of the reclamation site to the reference areas for 2 consecutive years. Revegetation monitoring would include, at a minimum, canopy cover, plant diversity, and shrub density. Methods to determine canopy cover and survey shrub density would be those techniques approved by the MMD.

Noxious Weeds

Noxious weed surveys would be conducted before construction of the proposed facilities begins. Infested areas (including a buffer of potential seed bank, if present) would be staked and identified on construction drawings.

Borrow sources for gravel fill and cover materials would be evaluated for the presence of noxious weeds prior to disturbance and importation onto the site.

A weed management plan would be developed for any areas where Class A and B weeds are identified in construction or borrow areas. Classes of weeds are defined in *Section 3.14* of this EA. Activities that may be included in the species-specific weed management plan could involve quarantine, chemical, and/or

physical treatments depending on the nature of the infestation and would reference the New Mexico Department of Agriculture for controlling designated species. The plan could also include provisions for vehicle and equipment inspections and cleaning. Weed-free seed mixes and mulch are used for all applications. Cobre will coordinate with the BLM to ensure that the appropriate BMPs are implemented to minimize weed introduction and dispersal.

Water Resources – Surface Water

Approval of the proposed Cobre MPO Amendment No. 5 would require modification to Cobre's SWPPP for the proposed Haul Road, including crossings of several small erosional features and some ephemeral drainages. During construction, BMPs would be installed for temporary stormwater controls like berms, catchment basins, road grading, and wattles. During operation, stormwater would be managed with engineered berms, cross-culverts, channel riprap, diversion ditches, and sediment ponds. As needed other methods may also be utilized. All stormwater controls would be documented and stormwater outfalls inspected and sampled in accordance with Multi-Sector General Permit (MSGP) conditions.

Stormwater flowing from mined surfaces at the Hanover Mountain Deposit is predicted to have degraded water quality. The water would be contained and pumped via the Bullfrog Pipeline to Chino for reuse. The current closure plan specifies that Cobre would install a lined stormwater management pond, Hanover Mountain Detention Pond (*Figure 2-8*), at the outflow location from mining activities at Hanover Mountain. The pond would be located on private lands owned by Cobre. The pond would be installed at a time when stormwater would no longer be captured in the mine and would be reclaimed after the Hanover Mountain Deposit reclamation is complete. The Hanover Mountain Detention Pond would be engineered to meet all rules and conditions specified in the Cobre mining permits. The pond would discharge via a pump and pipeline to the Surge Tank (*Figure 2-8*).

The North Overburden Stockpile would be constructed from reclamation cover material; therefore, the surface and groundwater would not be affected by the stockpile material. Stormwater runoff would be managed and the SWPPP updated in accordance with the EPA MSGP.

The existing SWRDF stormwater containment system would continue to operate by diverting and capturing stormwater. Buckhorn Gulch and Buckhorn Spring would continue to be monitored in accordance with all state permits. This information is added to the EA to clarify procedures not described in the MPO Amendment No. 5 submittal.

Water Resources – Groundwater

A monitoring well network is already in place at Cobre's Continental Mine, but may need to be expanded to facilities with the potential to affect groundwater as facilitated by the discharge permits issued by the NMED. Monitoring wells are strategically located to detect potential influences from mine facilities. Monitoring is required by NMED throughout the life of mine and into the post-closure period. The proposed Cobre MPO Amendment No. 5 would follow these same protocols and policies established for the other mine areas.

- Groundwater monitoring locations for the Hanover Mountain Deposit are identified in the NMED in DP-1056.

- Groundwater monitoring locations for the SWRDF are identified in the NMED in DP-181 and DP-1056.
- No impacts to groundwater quality are expected to occur in association with the construction of the North Overburden Stockpile, the proposed Haul Road, and the proposed Utility Corridor expansion.

Air Quality

The proposed Haul Road and North Overburden Stockpile haul road would be watered regularly to reduce dust emissions during construction and operations.

Watering of work surfaces where practical and approved by permits would likely be conducted to control dust. Sufficient water would be applied to control particulate emissions outside of the property boundary.

Cultural Resources

One of the eight identified archaeological sites within the inventoried proposed Haul Road corridor is eligible for the National Register of Historic Places (NRHP). This is prehistoric site LA173555 located on BLM-administered land, which consists of a Mimbres fieldhouse with an associated artifact scatter. Cobre would install a permanent fence along the margins of the existing dirt road to prevent accidental ingress into the site (Ackerly personal communication, 11/01/13).

If previously unidentified cultural resources are encountered on land managed by the BLM during implementation of the Proposed Action Alternative, ground-disturbing activities in the immediate vicinity of these discoveries would cease, and the BLM would be notified to properly assess the discovery.

Survey Monuments

During ground-disturbing activities, Cobre would, to the extent possible, protect survey monuments, reference monuments, bearing trees, and other survey reference points. Should it be necessary to remove a survey point during operations, the appropriate BLM officer would be notified, and the written requirements for the restoration or reestablishment of the survey point would be followed.

Paleontological Resources

In the unlikely event that a protected fossil resource would be encountered on land managed by the BLM during the implementation of the Proposed Action Alternative, ground-disturbing activities in the immediate vicinity of such discovery would cease, and the BLM would be notified to properly assess the discovery. Following the discovery of a protected fossil resource, Cobre would mitigate potential adverse effects to the discovery by complying with applicable law, including BLM rules, regulations, policies and protocols, before continuing ground-disturbing activities in the immediate vicinity of the discovery. This measure is a standard BLM requirement and is a modification from the MPO Amendment No. 5.

2.2 ALTERNATIVES NOT CONSIDERED IN DETAIL IN THIS EA

2.2.1 Proposed Haul Road Alternative Alignments

2.2.1.1 *Haul Road Alignment A*

An alignment for the proposed Haul Road was evaluated that was similar to the alignment in the current MPO under review with the exception of the north end. The northern portion of Haul Road Alignment A turned south from the existing guard station, ran adjacent to Hanover Creek for a short distance, and then curved slightly east continuing south along the east edge of the Fierro Cemetery. Haul Road Alignment A was eliminated from further consideration due to potential noise and visual impacts to visitors to St. Anthony's Church, Fierro Cemetery, and Hanover Creek. The northern portion of the roadway was shifted to the east to increase the distance of the proposed Haul Road alignment from the church, Fierro Cemetery, and Hanover Creek as described in the MPO Amendment No. 5.

2.2.1.2 *Haul Road Alignment B*

An alignment for the proposed Haul Road was evaluated that was similar to the alignment in the current MPO under review with the exception of the south end. The southern portion of Haul Road Alignment B, between Sections 15 and 22, curved to the east. Haul Road Alignment B was eliminated from further consideration due to potential effects to sensitive cultural and biological resources and more extensive ground disturbance. The southern portion was shifted to the west and straightened to reduce the length of the proposed Haul Road to reduce the potential effects.

2.2.2 Conveyance of Pregnant Leach Solution and Raffinate to and from the Chino Solution Extraction/Electro-winning facility

As described in MPO Amendment No. 4 (Administrative Draft, Table 1-1), a leach solution pipeline was considered that would be constructed for a distance of approximately 5.5 miles between the proposed Fierro Leach Pad and the existing Solution Extraction/Electro-winning facility at Chino. The 75-foot-wide leach solution line corridor would consist of a 20-foot-wide access road, a containment system, and two above-ground pipelines (pregnant leach solution and raffinate). This alternative would not require the construction of a Solution Extraction/Electro-winning facility at Cobre's Continental Mine, but would require the construction of the leach pads. Disturbance associated with the Fierro Leach Pad includes approximately 26 acres on privately owned land. The pipeline route would result in the disturbance of about 50 acres of private lands, 19 acres of which are currently disturbed. The pipelines would cross over Hanover Creek, Hanover Road, the Southwestern Railroad line, Iglesia Road, and State Highway 152. This alternative was eliminated from further consideration, and the Proposed Action Alternative was developed to avoid the need to leach copper at Cobre's Continental Mine by taking advantage of existing facilities at Chino. Chino has large, existing facilities permitted to mill or leach the ore. Leaching or milling of ore at Cobre's Continental Mine, on the other hand, would require construction and expansion of existing facilities. Implementation of this alternative, therefore, would have high construction, operating, and closure costs, and would create greater environmental risks when compared with other options. This option was dropped from further consideration to avoid the additional expansion of facilities and management systems as described previously.

2.2.3 Conveyance of Mined Materials from the Hanover Mountain Deposit Via Rail

There is an existing railway, not owned or operated by Cobre, which is not currently being used. Several commenters identified the railway as a possible alternative means of transporting mined materials to avoid the need for the proposed Haul Road. When this option was evaluated, the proposed construction costs, handling, and technological difficulties for multiple loading and unloading facilities at Cobre's Continental Mine and Chino made this alternative impracticable.

2.3 SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS

Table 2.3-1 provides a summary of the effects of implementing each alternative by key issue. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively between the No Action and Proposed Action Alternatives.

Table 2.3-1 Summary of environmental effects of the No Action and Proposed Action Alternatives considered in this EA

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
<p>Issue 1: Air Quality (Section 3.1)</p>	<p>Results of air dispersion modeling demonstrate that emissions under the No Action Alternative would be in compliance with National Ambient Air Quality Standards (NAAQS), New Mexico Ambient Air Quality Standards (NMAAQS), and Prevention of Significant Deterioration (PSD) increments.</p> <p>While electricity generation might decrease slightly at Chino, the increase in electricity required to operate a separate Mill and Solution Extraction/Electro-winning facility at Cobre, would outweigh any such decrease at Chino.</p> <p>Total annual greenhouse gas (GHG) emissions as carbon dioxide (CO₂) Equivalent (CO₂e) from the entire mine operation at the Cobre Continental Mine under the No Action Alternative are estimated to be 132,496 tons per year (Cobre 2014a). This value includes all tailpipe emissions from mine equipment and estimates of CO₂e emissions from offsite power suppliers associated with operations of milling and Solution Extraction/Electro-winning processes (Cobre 2014a). The No Action Alternative is anticipated to contribute an insignificant fraction of estimated global, national, and regional GHG emissions.</p> <p>No significant adverse cumulative effects are expected to air resources from implementation of mining at the Cobre Continental Mine under the No Action Alternative (Section 3.19.1).</p>	<p>Results of air dispersion modeling demonstrate that emissions under the Proposed Action Alternative would be in compliance with NAAQS, NMAAQS, and PSD increments.</p> <p>The Chino Mill and Solution Extraction/Electro-winning facilities are currently operating at capacity. Therefore, processing Cobre ore at the Chino facilities would not increase Chino operational levels or electricity usage. This alternative will instead result in a net decrease in operational levels and electricity usage because a separate Mill and Solution Extraction/Electro-winning facility would not be needed to process ore at Cobre. The Chino mine life is not affected by mining at Cobre or by processing of Cobre ore at Chino.</p> <p>Total annual GHG emissions as CO₂e from the entire mine operation at the Cobre Continental Mine under the Proposed Action Alternative are estimated to be 93,556 tons per year (Cobre 2014a). This includes tailpipe emissions from mine equipment but does not include CO₂e from offsite power suppliers for operation of the milling and solution extraction/electro-winning processes at Chino because those facilities would operate under either the No Action Alternative or under the Proposed Action Alternative</p> <p>The Proposed Action Alternative is anticipated to contribute an insignificant fraction of estimated global, national, and regional GHG emissions.</p> <p>No significant adverse cumulative effects are expected to air resources from implementation of mining at the Cobre Continental Mine under the Proposed Action Alternative (Section 3.19.1).</p>
<p>Issue 2: Noise (Section 3.2)</p>	<p>Increases in noise levels are expected from implementation of the No Action Alternative. Noise modeling was completed at selected public receptors. Modeled results are below the values typically required by the Federal Highway Administration for mitigation. Modeling results are summarized below.</p> <p>Modeled Average Production Noise Levels: Range: 41.8 to 56.7 A-weighted decibels (dBA) Average: 51.4 dBA</p> <p>Modeled Peak Production Noise Levels: Range: 41.9 to 57.1 dBA Average: 52.3 dBA</p> <p>Noise effects of the No Action Alternative were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>	<p>Increases in noise levels are expected from implementation of the Proposed Action Alternative. Noise modeling was completed at selected public receptors. The Proposed Action Alternative is expected to generate slightly higher noise levels (0.7 dBA in average conditions and 1.4 dBA in peak production conditions) at some modeled receptors. Modeled results are below the values typically required by the Federal Highway Administration for mitigation. Modeling results are summarized below.</p> <p>Average Production Conditions: Range: 43.5 to 57.4 dBA Average: 51.4 dBA</p> <p>Peak Production Conditions: Range: 44.4 to 58.5 dBA Average: 52.5 dBA</p> <p>Noise effects of the Proposed Action were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
Issue 3: Vibration (Section 3.3)	<p>Under the No Action Alternative vibration associated with blasting activities is not anticipated to affect structures in Hanover and Fierro due to distances from the mine. Safe seismic disturbance and air blast limits associated with blasting of mine rock would be established to prevent potential damage to buildings along Fierro Road including St. Anthony’s Church. Some vibrations associated with heavy truck traffic along Fierro Road may be perceptible to residents.</p> <p>The potential for perception of vibration from vehicle traffic along Fierro Road is greatest in the No Action Alternative. Vibration impacts are not expected to be substantial, to cause damage to buildings, or to be greater than levels that have been experienced by recent rail or truck traffic used to haul magnetite.</p> <p>Vibration effects of the No Action Alternative were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>	<p>Under the Proposed Action Alternative, vibration associated with blasting activities is not anticipated to affect structures in Hanover and Fierro due to distances from the mine. Safe seismic disturbance and air blast limits associated with blasting of mine rock would be established to prevent potential damage to buildings along Fierro Road including St. Anthony’s Church. The majority of heavy truck traffic would use the proposed Haul Road to access the mine and would not result in increased vibration levels affecting structures along Fierro Road.</p> <p>The potential for perception of vibration from traffic along Fierro Road would be much less than the No Action Alternative, as most traffic would be accessing Cobre’s Continental Mine via the proposed Haul Road.</p> <p>Vibration effects of the Proposed Action Alternative were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>
Issue 4: Visual Resources (Section 3.4).	<p>The No Action Alternative would create moderate contrasts to the existing landscape; however, the activities are consistent with the mined landscape of the area. Actions on privately owned lands including the mining of the Hanover Mountain Deposit, the construction of the Solution Extraction/Electro-winning facility, and the development and expansion of the Fierro Leach Pad would be visible to residents and visitors to Hanover Valley, specifically to St. Anthony’s Church and Fierro Cemetery. Two spires 0.29 acres across BLM-administered land plus a buffer on privately owned land totaling 1-acre on Hanover Mountain would remain.</p> <p>Construction of the Humbolt Leach Pad would be adjacent to the existing mine facilities and existing topography would block this facility from view at key observation points evaluated for this EA.</p> <p>Potential visual resource effects were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>	<p>The Proposed Action Alternative would have fewer visual impacts than the No Action Alternative because it would not require construction of the Solution Extraction/Electro-winning facility, the construction and expansion of the Fierro Leach Pad, or construction of the Humbolt Leach Pad. The 1-acre area within Hanover Mountain described under the No Action Alternative would be mined.</p> <p>The primary feature that would result in changes to the existing landscape is the proposed Haul Road. Portions of the proposed Haul Road and the associated overpass of State Highway 152 would be visible to travelers along State Highway 152 and to residents and visitors to the Hanover Valley. This portion of State Highway 152 is also part of the designated New Mexico Department of Transportation (NMDOT) scenic highway, Trail of the Mountain Spirits. The BLM has designated the Area as Visual Resource Management (VRM) Class II; however both NMDOT and the BLM recognize the historic and current mined landscape of the area, and the proposed Haul Road is compatible with these landscapes.</p> <p>Potential visual resource effects were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
<p>Issue 5: Traffic (Section 3.5)</p>	<p>All access to the mine would utilize Fierro Road. There would be an anticipated 394 employees commuting to work daily on Fierro Road. Operations run 24 hours per day/7 days per week with the majority of traffic occurring during shift changes.</p> <p>Commuter trips on Fierro Road (estimates per day) Average Production: 378 one-way trips Peak Production: 520 one-way trips</p> <p>Other traffic (Peak or Average Production Conditions) 60 visitors per day (120 one-way trips) 1 medium truck per day (2 one-way trips) 17 fuel deliveries per week (34 one-way trips) 5 ammonium nitrate deliveries per week (10 one-way trips)</p> <p>Heavy Trucks (per day) Average Production: 16 trucks (32 one-way trips) Peak Production 39 trucks (78 one-way trips)</p> <p>There would be a temporary increase in traffic volumes during construction of the new facilities.</p> <p>Potential traffic impacts from the No Action Alternative were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>	<p>A majority of employee and other traffic accessing Cobre’s Continental Mine would utilize the proposed Haul Road. There would be an anticipated 166 mine employees commuting to work. Operations run 24 hours per day/7 days per week with the majority of traffic occurring during shift changes. The Proposed Action Alternative would result in fewer traffic related impacts to Fierro Road.</p> <p>Commuter trips on Fierro Road (estimates) 10 to 15 Administrative personnel per day (20–30 one-way trips) 20 visitors per day (40 one-way trips) 10 fuel and ammonium nitrate deliveries per week (20 one-way trips)</p> <p>Traffic on the proposed Haul Road Average Production Conditions: 5 loaded and 5 empty haul trucks per hour; 5 water trucks per day Peak Production Conditions: 13 loaded and 13 empty haul trucks per hour 13 water trucks per day</p> <p>The majority of shift employees would carpool and access Cobre’s Continental Mine via the proposed Haul Road resulting in approximately 2 to 3 vans traveling along the proposed Haul Road at shift changes.</p> <p>There would be a temporary increase in traffic volumes during construction of the new facilities.</p> <p>Potential traffic impacts from the Proposed Action Alternative were considered a localized condition, were not considered of local, regional or national significance, and were not considered in the cumulative effects analysis.</p>
<p>Issue 6: Socioeconomic Resources (Section 3.6)</p>	<p>Start-up operations with ore processing at Cobre would require an estimated 394 employees, including administrative personnel. It is anticipated that a majority of the work force would be hired locally (Grant County).</p> <p>Construction of the proposed facilities would result in employment opportunities for the expected life of mine.</p> <p>The No Action Alternative would generate new property and severance tax revenue for Grant County and New Mexico State totaling \$8 million.</p> <p>Potential socioeconomic impacts of the No Action Alternative were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>	<p>Start-up operations with ore processing would require an estimated 166 employees plus 13 to 15 administrative personnel. It is anticipated that a majority of the work force would be hired locally (Grant County).</p> <p>Construction of the proposed facilities would result in employment opportunities for the expected life of the mine.</p> <p>The Proposed Action Alternative would generate new property and severance tax revenue for Grant County and New Mexico State totaling \$8 million.</p> <p>Potential socioeconomic impacts of the Proposed Action Alternative were not considered of local, regional, or national significance and were not considered in the cumulative effects analysis.</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
Issue 7: Soils <i>(Section 3.7)</i>	<p>Expected impacts to soils include the loss of currently undisturbed native soils from vegetation clearing; construction activities, including cut and fill grading; excavating; and salvaging and storing of suitable growth material. Soils that would be altered or removed under the No Action Alternative are associated primarily with the excavation of the privately owned portion of Hanover Mountain (approximately 140.1 acres), development of the Humbolt Leach Pad (approximately 149.5 acres), the expansion and development of the Fierro Leach Pad (approximately 56.4 acres), and construction of the Solution Extraction/Electro-winning facility (approximately 13.7 acres). Total acreage disturbed would be approximately 102.4 acres greater under the No Action Alternative than under the Proposed Action Alternative.</p> <p>Expansion of the SWRDF and construction of the administration buildings would account for some loss of soils but are located in areas that have been previously disturbed. Relocation of the 69-kV powerline would result in limited areas of disturbance at the pole locations and along access roads.</p> <p>Prior to construction and mining of the privately owned portion of Hanover Mountain and development of the Fierro and Humbolt Leach Pads, suitable growth media would be salvaged and stored at designated sites on privately owned lands within Cobre’s Continental Mine for future reclamation and closure activities.</p> <p>Cobre’s Continental Mine is managed in accordance with approved stormwater management plans. Stormwater controls and management practices associated with such plans limit water and wind erosion both within and outside of the mine.</p> <p>Measures to stabilize and protect growth material stockpiles would be implemented in accordance with MMD guidelines to minimize soil loss.</p> <p>Potential impacts to soil resources from the No Action Alternative were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>	<p>Expected impacts to soils are similar to those described for the No Action Alternative. Under the Proposed Action Alternative soils disturbance would occur from the grading and construction of the proposed Haul Road (approximately 104 acres), expansion of the SWRDF (approximately 6.3 acres), construction and use of the North Overburden Stockpile (approximately 19.3 acres), and mining of BLM slivers on Hanover Mountain (0.29 acres). Total estimated soils disturbance would be approximately 102.4 acres less under the Proposed Action Alternative than the No Action Alternative because the Fierro Leach Pad would not be developed and expanded and the Humbolt Leach Pad and Solution Extraction/Electro-winning facility would not be constructed.</p> <p>Prior to construction and mining of both the privately owned portion and BLM slivers on Hanover Mountain, suitable growth media would be salvaged from the previously undisturbed areas and stored at the North Overburden Stockpile for future reclamation and closure activities.</p> <p>Cobre’s Continental Mine is managed in accordance with approved stormwater management plans. Stormwater controls and management practices associated with such plans limit water and wind erosion both within and outside of the mine.</p> <p>Measures to stabilize and protect growth material stockpiles would be implemented in accordance with MMD guidelines to minimize soil loss.</p> <p>Potential impacts to soil resources from the Proposed Action Alternative were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
<p>Issue 8: Geology (Section 3.8)</p>	<p>Economic recovery of the copper currently authorized under the No Action Alternative would result in the removal of 123 million tons of ore and 81 million tons of waste rock. Two slivers of BLM-administered land would be avoided within the Hanover Mountain Deposit leaving two spires of rock within the footprint of the Hanover Mountain Deposit.</p> <p>Mining of the Continental Mine Pit and Hanover Mountain and the resulting formation of high-walls would be conducted in accordance with safe mining practices and MSHA regulations. The construction of stable high-walls in this manner limits potential slope instability and erosion issues potentially involved in mining the Continental Mine and the privately owned portions of Hanover Mountain. One notable exception is that avoidance of the BLM managed acreage on Hanover Mountain would create a tall high-wall (BLM spires).</p> <p>Potential impacts to geologic resources from the No Action Alternative were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>	<p>Economic recovery of the copper currently authorized by the Proposed Action Alternative would result in the removal of an additional 360,000 tons of ore and waste rock from the 0.29 acres of BLM-administered land plus an approximate 1-acre buffer on privately owned land at Hanover Mountain over the No Action Alternative.</p> <p>Mining of the Continental Mine Pit and Hanover Mountain and the resulting formation of high-walls would be conducted in accordance with safe mining practices and MSHA regulations. The construction of stable high-walls in this manner would limit potential slope instability, and the potential erosion issues involved in mining the Continental Mine Pit, and the BLM-administered slivers of Hanover Mountain would be removed.</p> <p>The proposed Haul Road alignment passes through or near numerous reclaimed historical underground mine workings in the Snowflake, Pewabic/Philadelphia, and Kearney areas. A geotechnical evaluation would be conducted prior to construction to ensure the integrity of the proposed Haul Road.</p> <p>Potential impacts to geologic resources from the Proposed Action Alternative were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>
<p>Issue 9: Surface Water Resources (Section 3.9)</p>	<p>Surface water quantity impacts from the No Action Alternative include:</p> <ul style="list-style-type: none"> • Temporary loss of runoff to Hanover Creek Watershed of approximately 4.64 acre-feet per year. • Reduced flow from seeps HSN-1 and HSN-2 • Permanent loss of the perennial reach of Poison Spring • Temporary loss of runoff of 1.66 acre-feet per year to the North Star Basin Watershed <p>Cobre holds water rights issued by the State Engineers office for these waters.</p> <p>No adverse effects to surface water quality are expected from implementation of the No Action Alternative.</p> <p>No significant adverse cumulative effects are expected to surface water resources from implementation of mining at the Cobre Continental Mine under the No Action Alternative (Section 3.19.3).</p>	<p>Surface water quantity:</p> <ul style="list-style-type: none"> • Temporary loss of runoff to Hanover Creek Watershed of 0.1 acre-feet per year. • Reduced flow from seeps HSN-1 and HSN-2 <p>Cobre holds water rights issued by the State Engineers office for these waters.</p> <p>No adverse effects to surface water quality are expected from implementation of the Proposed Action Alternative.</p> <p>No significant adverse cumulative effects are expected to surface water resources from implementation of mining at the Cobre Continental Mine under the Proposed Action Alternative (Section 3.19.3).</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
<p>Issue 10: Groundwater Resources-Quality and Quantity (Section 3.10)</p>	<p>The No Action Alternative would result in the loss of 25.9 acre-feet per year to the local groundwater system during operation. Water would be captured by the lined leach pad facilities and used for copper production.</p> <p>Cobre holds water rights issued by the State Engineer’s office for both the use of these waters and any respective impacts to recharge.</p> <p>No adverse impacts to groundwater quality are expected from implementation of the No Action Alternative. All elements of this alternative would be managed in accordance with the requirements of applicable state and Federal regulations.</p> <p>No significant adverse cumulative effects are expected to groundwater resources from implementation of mining at the Cobre Continental Mine under the No Action Alternative (<i>Section 3.19.4</i>).</p>	<p>The Proposed Action Alternative would result in the loss of approximately 0.75 acre-feet per year to the local groundwater system because the Fierro and Humbolt leach pads (and their respective liners) would not be constructed under this action and therefore would not act to capture groundwater.</p> <p>Cobre holds water rights issued by the State Engineer’s office for both the use of these waters and any respective impacts to recharge.</p> <p>No adverse impacts to groundwater quality are expected from implementation of the Proposed Action Alternative. All elements of this alternative would be managed in accordance with the requirements of applicable state and Federal regulations.</p> <p>No significant adverse cumulative effects are expected to groundwater resources from implementation of mining at the Cobre Continental Mine under the Proposed Action Alternative (<i>Section 3.19.4</i>).</p>
<p>Issue 11: Vegetation (Section 3.11)</p>	<p>Estimated acreages of major land cover types that would be affected by activities associate with the No Action Alternative consist of approximately 348 acres of vegetation consisting of Pinyon-Juniper, Ponderosa Pine, Madrean Juniper Savanna, and Inter-Mountain Basins Semi-Desert Grassland.</p> <p>Approximately 2.1 acres of riparian vegetation located along the Poison Spring Drainage would be removed due to construction and expansion of the Fierro Leach Pad. Approximately 0.3 acres of the Poison Spring Drainage would be crossed by the SWRDF expansion on privately owned land.</p> <p>Reclamation and revegetation would be done in accordance with state permits following closure of the mine. Financial assurance would be held with the MMD and BLM for revegetation until the MMD standards have been achieved.</p> <p>No significant adverse cumulative effects are expected to vegetation resources from implementation of mining at the Cobre Continental Mine under the No Action Alternative (<i>Section 3.19.2</i>).</p>	<p>There are fewer acres of vegetation loss under the Proposed Action Alternative than under the No Action Alternative. An estimated loss of approximately 265 acres (about 36 acres of BLM-administered land and 229 acres of privately owned land) of major land cover types would be affected by activities associated with the Proposed Action Alternative consisting of primarily Madrean Pinyon-Juniper Woodland, Madrean Juniper Savanna, and Inter-Mountain Basins Semi-Desert Grassland, with limited Ponderosa Pine Forest on the north side of Hanover Mountain. This includes the privately owned lands at Hanover Mountain as described under the No Action Alternative.</p> <p>Approximately 0.3 acres of riparian vegetation (0.15 along the Poison Spring Drainage and 0.15 along Buckhorn Gulch) are located along the proposed Utility Corridor that can be avoided during the placement of the power poles. Approximately 0.24 acres of riparian vegetation is located along Poison Springs Gulch at the proposed crossing of the Bullfrog Pipeline. Some vegetation management within riparian habitat may be required within the proposed Utility Corridor.</p> <p>Under the Proposed Action Alternative, the Fierro Leach Pad would not be constructed. As a result, the approximately 2.1 acres of riparian vegetation that would be removed along Poison Spring Drainage under the No Action Alternative would not be removed under the Proposed Action Alternative.</p> <p>Reclamation and revegetation would be done in accordance with state permits following closure of the mine. Financial assurance would be held with the MMD and BLM for revegetation until the MMD standards have been achieved.</p> <p>No significant adverse cumulative effects are expected to vegetation resources from implementation of mining at the Cobre Continental Mine under the Proposed Action Alternative (<i>Section 3.19.2</i>).</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
<p>Issue 12: Wildlife (Section 3.12)</p>	<p>Wildlife species known or expected to occur in the vicinity of the No Action Alternative are typical of those associated with the land cover types. Mule deer, Coues white-tailed deer, and elk are the principal big game species in this region. Resident, mobile wildlife including Coues white-tailed deer, mule deer, elk, and mountain lion, along with migratory birds, and to a lesser extent small mammals and reptiles, would move to adjacent areas during construction and operation. The loss of approximately 348 acres of habitat on privately owned land would occur at the locations for the mine facilities to be constructed under the No Action Alternative. This action would reduce the overall carrying capacity of the region surrounding the disturbance area for the common wildlife species expected to regularly use these habitats in proportion to the acreage of lost habitat. For most of these areas, indirect effects to adjacent undisturbed habitats are expected to be minimal. Successful reclamation following mine closure would provide habitat for wildlife and result in a self-sustaining ecosystem in accordance with the MMD rules.</p> <p>The increased traffic along Fierro Road from current conditions and, to a much lesser extent, the increased operations traffic within the mine are expected to result in increased collision hazards between wildlife in the area and mine-related traffic with associated losses of wildlife and property damage normally experienced by wildlife-vehicle encounters. Potential impacts from operations within the mine along the haul road and along Fierro Road are expected to be relatively minor considering that the posted and enforced speed limits range between 15 and 35 miles per hour (mph).</p> <p>High-use areas for deer and elk have been identified west of the approximately 5-acre expansion area on privately owned land for the SWRDF along Buckhorn Gulch. Buckhorn Springs and Buckhorn Gulch support riparian habitats that generally provide resources for a higher diversity of wildlife species but would be avoided by the proposed expansion.</p> <p>The 69-kV powerline would be built in accordance with state and Federal electric codes, and standard raptor-proof protective designs would be incorporated into the line design. The poles provide potential perch sites for foraging raptors. Direct loss of habitat would occur at pole locations and along maintenance roads. Impacts to vegetation during operations would occur for maintenance activities. Cobre would evaluate all water bodies and electrical systems for avian risk and would implement appropriate protection measures to reduce risk as needed in accordance with the environmental controls and monitoring measure outlined in <i>Chapter 2</i>. This would reduce risks to resident and migrating avian populations in the vicinity of the proposed mining operation.</p> <p>No significant adverse cumulative effects are expected to wildlife resources from implementation of mining at the Cobre Continental Mine under the No Action Alternative (<i>Section 3.19.2</i>).</p>	<p>Wildlife species known or expected to occur in the vicinity of the Proposed Action Alternative are the same as for the No Action Alternative. There are fewer acres of habitat loss under the Proposed Action Alternative than under the No Action Alternative. Approximately 265 acres of habitat loss, as described for vegetation (Issue 11) would occur at the locations for the mine facilities to be constructed under the Proposed Action Alternative. This action would reduce the overall carrying capacity of the region surrounding the Project Footprint for the common wildlife species expected to regularly use these habitats in proportion to the acreage of lost habitat. For most of these areas indirect effects to adjacent undisturbed habitats are expected to be minimal. Successful reclamation following mine closure would provide habitat for wildlife and result in a self-sustaining ecosystem in accordance with the MMD rules.</p> <p>While the Proposed Action Alternative would result in a slight increase in traffic over current conditions on Fierro Road, such increase is significantly less than under the No Action Alternative. Therefore wildlife-vehicle collisions are not expected to change considerably from current conditions and are anticipated to be less than for the No Action Alternative.</p> <p>The risk of wildlife-mine vehicle collision along the proposed Haul Road with top speeds of 35 mph is lower than the risk along the higher speed state highways and other roadways. The proposed Haul Road may limit east-west wildlife movement patterns; although, this effect is not expected to result in population-level effects or to preclude deer and elk from moving between winter and summer foraging habitats.</p> <p>High-use areas for deer and elk have been identified west of the proposed 6.3-acre expansion area for the SWRDF along Buckhorn Gulch. Buckhorn Springs and Buckhorn Gulch support riparian habitats that generally provide resources for a higher diversity of wildlife species but would be avoided by the proposed expansion.</p> <p>Loss of wildlife habitat would occur within the proposed Utility Corridor. The 69-kV powerline would be built in accordance with state and Federal electric codes, and standard raptor-proof protective designs would be incorporated into the line design. The poles provide potential perch sites for foraging raptors. Direct loss of habitat would occur at pole locations and along maintenance roads.</p> <p>Cobre would evaluate all water bodies and electrical systems for avian risk and would implement appropriate protection measures to reduce risk as needed in accordance with the environmental controls and monitoring measure outlined in <i>Chapter 2</i>. This would reduce risks to resident and migrating avian populations in the vicinity of the proposed mining operation.</p> <p>No significant adverse cumulative effects are expected to wildlife resources from implementation of mining at Cobre’s Continental Mine under the Proposed Action Alternative (<i>Section 3.19.2</i>).</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
<p>Issue 13: Special Status Species (Section 3.13)</p>	<p>No Federally listed plant or animal species, or designated critical habitat for such species, are known or suspected to occur within the No Action Alternative activity area, and the No Action Alternative would not affect any Federally listed species or critical habitat.</p> <p>Several special status bat species (BLM sensitive) are known to occur within the No Action Alternative activity area. Bat species known to use seven roost sites on privately owned land on Hanover Mountain include Townsend’s big-eared bat (two of the sites), small-footed western myotis, occult little brown bat, and fringed myotis. Historic underground mine openings in the area created a large number of possible bat roosts that remain available for use today. As part of Cobre’s on-going efforts to manage adits occupied by bats in the area, exclusion features will be placed on the seven known bat roosts that occur on Hanover Mountain prior to the start of mining activities. Bats that are excluded from these locations are expected to utilize suitable habitat in other bat gated sites located on other lands owned by Cobre that are currently being under used.</p> <p>There are no known records of goshawk from Hanover Mountain or other areas affected by the No Action Alternative. Approximately 12 acres of habitat characterized as good nesting habitat for northern goshawk has been delineated on the north side of Hanover Mountain. This habitat would be impacted by mining of the Hanover Mountain Deposit.</p> <p>No significant adverse cumulative effects are expected to special status species from implementation of mining at Cobre’s Continental Mine under the No Action Alternative (Section 3.19.2).</p>	<p>No Federally listed plant or animal species, or designated critical habitat for such species, are known or suspected to occur within the Proposed Action Alternative activity area, and the Proposed Action Alternative would not affect any Federally listed species or critical habitat.</p> <p>As under the No Action Alternative, several special status bat species (BLM sensitive) are known to occur within the Proposed Action Alternative activity area on privately owned land.</p> <p>As part of Cobre’s on-going efforts to manage adits occupied by bats in the area, exclusion features will be placed on known bat roosts that occur on Hanover Mountain and along the proposed Haul Road prior to the start of mining activities. Bats that are excluded from these locations are expected to utilize suitable habitat in other bat gated sites located on other lands owned by Cobre that are currently being under used.</p> <p>Known bat roost sites along or in the vicinity of the proposed Utility Corridor and the existing Bullfrog Pipeline corridor are not expected to be adversely impacted by the Proposed Action. Bat gates are installed on two openings.</p> <p>No significant adverse cumulative effects are expected to special status species from implementation of mining at Cobre’s Continental Mine under the Proposed Action Alternative (Section 3.19.2).</p>
<p>Issue 14: Noxious Weeds (Section 3.14)</p>	<p>Tamarisk, tree of heaven, and giant cane occur along Poison Spring Drainage and would be removed as a result of construction and expansion of the Fierro Leach Pad. Tamarisk and Siberian elm occur along Hanover Creek at the crossing of the proposed realignment of the 69-kV powerline.</p> <p>The No Action Alternative is not anticipated to contribute to the spread of noxious weeds on a local or regional basis.</p> <p>The potential for the No Action Alternative to contribute materially to the spread of noxious weeds was not considered of local, regional, or national significance and was not considered in the cumulative effects analysis.</p>	<p>A local area of cheatgrass occurs west of the south end of the proposed Haul Road in association with a stock tank that would not be disturbed. The proposed Utility Corridor intersects Poison Spring Drainage and Buckhorn Gulch, areas that support riparian habitats including tamarisk. These riparian areas would be spanned by the transmission lines. Relocation of the Bullfrog Pipeline at these crossings would result in minimal disturbance to vegetation.</p> <p>The Proposed Action Alternative is not anticipated to contribute to the spread of noxious weed species on a local or regional basis.</p> <p>The potential for the Proposed Action Alternative to contribute materially to the spread of noxious weeds was not considered of local, regional, or national significance and was not considered in the cumulative effects analysis.</p>

Resource/Issue	Summary of Environmental Effects	
	Alternative 1 – No Action	Alternative 2 – Proposed Action
Issue 15: Cultural Resources (Section 3.15)	<p>Within the proposed area for construction of the Humbolt Leach Pad, one prehistoric site has been recommended NRHP eligible (LA111406) and one historical site has been recommended potentially eligible (LA111405). Construction of the Humbolt Leach Pad would adversely affect these two sites.</p> <p>No cultural resources have been identified at Hanover Mountain or the SWRDF expansion on privately owned land.</p> <p>While no known cultural resources have been identified within the privately owned lands within the proposed area for construction and expansion of the Fierro Leach Pad or the Solution Extraction/Electro-winning facility, should this circumstance change Cobre will comply with applicable state and Federal requirements and standards.</p> <p>Known and reasonably anticipated potential impacts to cultural resources that might result from implementation of the No Action Alternative were not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>	<p>No cultural resources have been identified at Hanover Mountain or the SWRDF expansion on BLM-administered lands.</p> <p>There is a portion of one NRHP-eligible property (LA107552) located on BLM-administered land that is adjacent to the footprint of the haul road from the North Overburden Stockpile to Hanover Mountain. Cobre installed a fence around the site in 2013 to ensure avoidance; therefore, there would be no adverse effects on cultural resources.</p> <p>One archaeological site within the proposed Haul Road corridor is eligible for the NRHP. This prehistoric site LA173555, located on BLM-administered land, is a Mimbres fieldhouse with an associated artifact scatter. A permanent fence along the margins of the existing dirt road would be constructed to protect this site, and no additional monitoring or mitigation measures were recommended.</p> <p>No NRHP-eligible properties were identified in the proposed Utility Corridor.</p> <p>Potential impacts to cultural resources from the Proposed Action Alternative have been avoided through mitigation, are not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>
Issue 16: Paleontological Resources (Section 3.16)	<p>Paleontological resources are not known to occur within the area and no adverse direct, indirect, or cumulative effects are anticipated.</p>	<p>Paleontological resources are not known to occur within the area, and no adverse direct, indirect, or cumulative effects are anticipated.</p>
Issue 17: Lands/Realty (Section 3.17)	<p>The portions of Bullfrog Pipeline occupying BLM-administered land would continue to be authorized under a right-of-way permit.</p> <p>SWRDF Dam 2 would continue to be an inadvertent encroachment on BLM-administered land and would require further coordination with the BLM to correct.</p> <p>Real estate issues for this EA are not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>	<p>The portions of Bullfrog Pipeline occupying BLM-administered land would be authorized under 43 CFR 3809.</p> <p>SWRDF Dam 2 would be authorized by the BLM in accordance with regulations established at 43 CFR 3809.</p> <p>Real estate issues for this EA are not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>
Issue 18. Environmental Justice (Section 3.18)	<p>The percentage of individuals who identify themselves on the census as Hispanic in the Hanover Census designated place (CDP) is substantially greater than the percentage of Hispanic individuals reported both from Grant County and from New Mexico. Those residents within the Hanover CDP along Fierro Road could be adversely impacted by increased traffic anticipated to occur from implementation of the No Action Alternative. Adverse impacts to this population from project impacts to air resources, surface water resources, and groundwater resources are not anticipated.</p> <p>Environmental Justice questions are not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>	<p>While a minor increase in traffic along Fierro Road would occur over existing levels under the Proposed Action, the impacts to the protected population from increased traffic on Fierro Road would be substantially less than those impacts anticipated under the No Action Alternative. Adverse impacts to this population from project impacts to air resources, surface water resources, and groundwater resources are not anticipated.</p> <p>Environmental Justice questions are not considered of local, regional, or national significance, and were not considered in the cumulative effects analysis.</p>

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Chapter 3

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 AIR QUALITY

3.1.1 Affected Environment

The climate of southwestern New Mexico in the project area is characteristic of the high desert regions of the arid Southwest. Elevation differences are the determining factor for variations in climate throughout the region; higher elevations receive more precipitation and maintain lower temperatures than the valley floors. Average annual rainfall at the Fort Bayard, New Mexico National Weather Service Station located approximately 5 miles west of the project area is 15.7 inches (reporting period 1897 through 1993). July and August are the wettest months with average rainfall between 3.2 and 3.4 inches per month during the reporting period (*Figure 3.1-1*). Annual snowfall averages 10.4 inches, falling mostly between December and March. Average maximum temperature varies from 52 °F in December and January to 87 °F in June and July. Average minimum temperatures vary between 25 °F in January and 58 °F in July (Cobre 2012).

Winds tend to be moderate in this region with higher speed winds occurring during the springtime (BLM 1997 [as cited in Cobre 2012]). Wind data representative of the site is collected at the Hurley, New Mexico station located about 12 miles south of Cobre's Continental Mine in the town of Hurley (*Figure 3.1-1*). An annual wind rose prepared from the Hurley station meteorological data for calendar year 2009 is presented in *Figure 3.1-2*. Half (50 percent) of hourly recorded winds in the 2009 calendar year were from the northwest quadrant and hourly average wind speed is 2.9 meters per second (Ryan 2014a). Cobre's Continental Mine is located in an area that meets the National Ambient Air Quality Standards (NAAQS) for all *criteria* pollutants, commonly referred to as an Attainment Area. EPA maintains ambient air monitoring data reported by the NMED including particulate matter less than 10 microns (PM₁₀) in aerodynamic diameter. Ambient air monitoring stations equipped to monitor for PM₁₀ are located in Hurley, Silver City, and Deming, New Mexico (EPA 2013a, 2013b, and 2013c; *Figure 3.1-1*). A summary of particulate monitoring data collected at the sites from 2009 through 2012 is provided in *Table 3.1-1*.

Table 3.1-1 Annualized PM₁₀ monitoring data (2009–2012)

Station ¹	Approximate Distance and Direction from Project Area	Annual Mean Concentration (µg/m ³) ²			
		2009	2010	2011	2012
Hurley (AQS 35-017-1003)	12 miles, south	12.84	11.16	11.32	11.75
Silver City ³ (AQS 35-017-1002)	12 miles, southwest	15.56	15.63	13.82	-
Deming (AQS 35-029-001)	45 miles, southeast	16.15	18.17	25.75	13.93

Source: EPA Air Data (EPA 2013a, 2013b, and 2013c)

¹ AQS = Air Quality System

² Values represent PM₁₀ Total 0 to 10 µm (µg = microgram; µm = micrometer)

³ PM₁₀ monitoring data were only available through 2011 for the station located in Silver City

The Federal Prevention of Significant Deterioration (PSD) program is intended to protect air quality from significantly deteriorating in areas where the air quality is in compliance with NAAQS. Areas that comply with NAAQS are divided into three classes defined by the amount of incremental degradation allowed for the area (i.e., PSD increments). Cobre's Continental Mine is located in a PSD Class II area, which allows for a moderate amount of air quality degradation. The nearest PSD Class I area is the Gila Wilderness Area, approximately 12 miles north of Cobre's Continental Mine (*Figure 3.1-3*).

3.1.2 Environmental Consequences: Direct and Indirect Effects

To assess the potential air quality impacts under the No Action and the Proposed Action Alternatives, an emissions inventory was completed for the purposes of conducting EPA approved air dispersion modeling (American Meteorological Society/Environmental Protection Agency Regulatory Model [AERMOD][Ryan 2014a, 2014b]). Emissions inventory data were used in the EPA-approved models that simulated dispersal of the pollutants in the area. Representative 2009 hourly meteorological data from the Hurley meteorological station (*Figures 3.1-1 and 3.1-2*; Ryan 2014a, 2014b) previously approved for use by the New Mexico Air Quality Bureau (NMAQB) were used for modeling purposes. The hourly meteorological data used in the model consisted of wind speed and wind direction for speed and directional transport of air emissions. Fifty percent of hourly recorded winds in the 2009 calendar year were from the northwest quadrant (ranging from wind out of the west to wind out of the north). The hourly average wind speed for the 2009 calendar year equals 2.9 meters per second (Ryan 2014a and b). Upper meteorological data were obtained from the National Climatic Data Center website which provides an Integrated Global Radiosonde Archive (IGRA) of radiosonde, the equipment used for collecting data, and pilot balloon observations at over 1,500 globally distributed stations. Santa Teresa in south-central New Mexico and Albuquerque in central New Mexico are the nearest IGRA stations. The Santa Teresa IGRA station dataset for the 2009 calendar year was used for the modeling as previously approved by the NMAQB. This dataset was selected because the data are representative of the Cobre rural area and are closer to the project area.

To assess compliance with the New Mexico Ambient Air Quality Standards (NMAAQs) and NAAQS, AERMOD modeling results were added to background concentrations as appropriate using either NMED designated concentrations or data recorded by ambient air monitors in the vicinity of the No Action and Proposed Action Alternatives (Ryan 2014a). Background concentrations of nitrogen dioxide (NO₂) and sulfur dioxide (SO₂) were obtained from nearby ambient air monitors. The Deming Airport monitoring site is the closest site to the proposed activities that provides records of NO₂ hourly concentrations. Background concentrations of NO₂ for the period of 2007 through 2009 were used for the purposes of assessing compliance with the NMAAQs and NAAQS. The Hurley monitoring site provided background concentrations of SO₂ from 2004 through 2008. Background concentrations of total suspended particulates (TSP) were estimated using Hurley station PM₁₀ data and methods described by NMED guidance documents. Background concentrations for carbon monoxide (CO) and particulate matter less than 2.5 microns in diameter (PM_{2.5}) were obtained from the NMED modeling guidelines (Ryan 2014a, 2014b).

To assess compliance with PSD increments, Class I air quality impacts were evaluated at the ambient air receptors established by the National Park Service (NPS) Air Resources Division (ARD) that uniformly cover the Gila Wilderness Area (*Figure 3.1-3*). Class II ambient air receptors were generally selected to provide coverage surrounding potential sources of emissions from proposed activities and extended 2 kilometers outward from ambient air fence lines (Ryan 2014a and 2014b). Receptors were modeled in the areas of St. Anthony's Church, Fierro Cemetery, State Highway 152, and residences located along Fierro Road in Hanover Valley for the No Action Alternative (*Figure 3.1-4*) and for the Proposed Action Alternative (*Figure 3.1-5*).

Greenhouse gas (GHG) emissions generated as part of the No Action and Proposed Action Alternatives were calculated using established Federal regulatory GHG emissions factors (40 CFR 98) and planned annual process rates (primarily diesel gallons consumed per hour) for comparison of GHG emissions among project alternatives. For the No Action Alternative, GHG emissions estimates also included emissions associated with the generation of electrical power necessary to operate the Mill and Solution Extraction/Electro-winning facilities.

The GHG emissions estimate for the Proposed Action Alternative does not include emissions from offsite power supplies for Mill and Solution Extraction/Electro-winning facilities at Chino (Cobre 2014a). The Chino Mill and Solution Extraction/Electro-winning facilities are currently operating at capacity. Under the Proposed Action Alternative, processing Cobre Ore at Chino facilities would not increase Chino operational levels (including electricity usage), and would also eliminate the need to construct and operate a mill and Solution Extraction/Electro-winning plant at Cobre. If the Proposed Action Alternative were not approved, there might be a slight decrease in electricity usage at the Chino electro-winning facility under the No Action Alternative; but because the plants would be operated with or without the Cobre material, this nominal decrease in electricity would be insignificant compared to Chino's total electricity usage. The electricity required to operate the Cobre Mill and Solution Extraction/Electro-winning facility under the No Action Alternative would be greater than any negligible decrease in electricity usage at the electro-winning facility at Chino. The Chino mine life is not affected by mining at Cobre or by processing of Cobre ore at Chino.

3.1.2.1 *Alternative 1 – No Action*

The restart of copper mining activities at Cobre's Continental Mine at the Continental Mine Pit and the Hanover Mountain Deposit under the No Action Alternative would be subject to air quality permitting and applicable regulatory requirements, including emission limitations and standards, operational restrictions, emission controls, and associated testing, monitoring, recordkeeping, and reporting. Increased levels of fugitive dust and mobile vehicular tailpipe emissions are expected.

Air emissions inventory and air modeling analysis presented in this section evaluated the entire mine operation at Cobre's Continental Mine based upon implementation of the No Action Alternative (Ryan 2014a). Emissions inventory and air modeling does not include current magnetite operations at the mine because, under the No Action alternative, the Fierro Leach Pad would be constructed over the magnetite tailings. The emissions inventory does include future activities from copper mining of the Hanover Mountain Deposit and the Continental Mine Pit including haul truck transport of copper ore to

leach piles and waste material to waste rock disposal facilities. Cobre’s facility-wide potential criteria pollutant emissions from the existing activities that would remain, and new sources resulting from the proposal to mine copper at the Hanover Mountain Deposit and to resume copper mining at the Continental Mine Pit are summarized in **Table 3.1-2** (Ryan 2014a). Air emissions inventory and subsequent air dispersion modeling for the No Action Alternative do not include short-term, temporary air pollutant emissions from construction of the Solution Extraction/Electro-winning facility and off-site tail pipe emissions from increased mine-related vehicle traffic along Fierro Road (approximately 39 heavy trucks per day, 100 vehicles per shift change, and 60 visitors per day as described in **Section 3.5**), which would all occur as part of the No Action Alternative. Total potential emissions are reported for CO, mono-nitrogen oxides (nitric oxide and nitrogen dioxide) (NO_x), SO₂, PM_{2.5}, PM₁₀, and TSP.

Currently authorized mining activities that would be implemented as part of the No Action Alternative would involve the use of explosives to break up the Hanover Mountain Deposit and Continental Mine Pit ore bodies followed by mine equipment with engine exhaust, including haul trucks, to transport the rock over unpaved roads to various destinations. Explosives at a maximum use of 55,000 pounds an hour and 110,000 pounds a day from Monday through Friday represent 49 percent and 95 percent of Cobre facility-wide potential CO and SO₂ emissions, respectively. Engine exhaust from operating motor vehicles (primarily haul trucks) would result in 49 percent and 89 percent of Cobre facility-wide potential CO and NO_x emissions, respectively. Unpaved road dust from haul truck traffic that would originate during mining of the Hanover Mountain Deposit and the Continental Mine Pit is the largest source of Cobre facility-wide potential PM_{2.5} (72 percent), PM₁₀ (80 percent), and TSP (84 percent) emissions.

Table 3.1-2 Potential Cobre facility-wide criteria pollutant emissions for the No Action Alternative (tons per year). Under the No Action Alternative, the Fierro leach stockpile would be located over the magnetite facility; therefore, existing operations do not include emissions from the magnetite operations.

Operating Divisions	CO	NO_x	SO₂	PM_{2.5}	PM₁₀	TSP
Proposed Copper Mining						
Explosives	330	38	14			
Engines Exhaust	334	510	0.5			
Mining				13	133	518
Existing Activities	9	23	0.1	1	3	12
Total	673	571	15	14	136	530

Source: Ryan 2014a

Results of the air dispersion modeling demonstrate that emissions under the No Action Alternative would be in compliance with NAAQS, NMAAQs, and PSD increments at the Gila Wilderness and at receptors modeled in the areas of St. Anthony’s Church, Fierro Cemetery, State Highway 152, and nearby residences. Relative levels of compliance and the percentage of the established regulatory threshold for NAAQS, NMAAQs, and PSD increments are summarized in **Table 3.1-3**. The No Action Alternative will not exceed PSD increments for PM₁₀ and PM_{2.5} emissions, and is therefore not expected to trigger any change in the current Attainment Area status for the region.

Total annual GHG emissions as carbon dioxide equivalent (CO₂e) for the No Action Alternative are estimated to be 132,496 tons per year (Cobre 2014a). This value includes all GHGs from non-fugitive, fugitive, emergency generator equipment, tailpipe emissions, and GHG estimates from direct and indirect

power sources associated with operations at the Mill and Solution Extraction/Electro-winning facility required to implement the No Action Alternative (Cobre 2014a). The CO_{2e} emissions under the No Action Alternative are 0.00026, 0.00184, and 1.74 percent of Global, National, and New Mexico CO_{2e} emissions, respectively (EPA 2014, NMED 2010).

Table 3.1-3 Summary of AERMOD results for the No Action Alternative^{1,2}

Criteria Pollutant	NMAAQS & NAAQS Concentrations
CO	Facility sources & background < 55% of NMAAQS & NAAQS
NO ₂	Facility sources & background < 45% of NMAAQS & NAAQS
SO ₂	Facility sources & background < 15% of NMAAQS & NAAQS
Criteria Pollutant	PSD Class I Increment Concentration(s)
NO ₂	Facility impact < Significance Level
PM ₁₀	Facility PSD sources impacts < 5% of Increment Levels
SO ₂	Facility PSD sources impacts ≤ 20% of Increment Levels
Criteria Pollutant	PSD Class II Increment Concentration(s)
NO ₂	Facility PSD sources impacts < 90% of Increment Level
PM ₁₀	Facility PSD sources impacts ≤ 99% of Increment Levels
SO ₂	Facility PSD sources impacts < 25% of Increment Levels
Criteria Pollutant	NAAQS Concentrations
PM _{2.5}	Facility sources impacts & background < 70% of NAAQS
Criteria Pollutant	NMAAQS Concentrations
TSP	Facility sources impacts & background < 90% of NMAAQS

Source: Ryan 2014a

¹ Potential of Cobre facility-wide emissions evaluated for compliance with CO, NO₂, SO₂ NMAAQS and NAAQS; PM_{2.5} and PM₁₀ NAAQS; TSP NMAAQS; and PSD Class I and Class II NO₂, PM₁₀, and SO₂ increments.

² Modeled emissions levels were added to background concentrations as appropriate using NMED designated concentrations as well as data collected from ambient air monitors in the vicinity of the project area.

3.1.2.2 *Alternative 2 – Proposed Action*

Mining activities at Cobre’s Continental Mine under the Proposed Action Alternative would be subject to air quality permitting and applicable regulatory requirements, including emission limitations and standards, operational restrictions, emission controls, and associated testing, monitoring, recordkeeping, and reporting. Increased levels of fugitive dust and mobile vehicular tailpipe emissions are expected.

Air emissions inventory and air modeling analysis presented in this section evaluated the entire mine operation at Cobre’s Continental Mine based upon implementation of the Proposed Action Alternative (Ryan 2014b). Emission inventory and air modeling included the ongoing magnetite operations at the mine and future activities from copper mining of the Hanover Mountain Deposit and the Continental Mine Pit with haul truck transport of copper ore south across State Highway 152 via the proposed Haul Road. Total criteria pollutant emissions from the existing magnetite recovery operation and the proposed mining activities are summarized in **Table 3.1-4** (Ryan 2014b). The air emission inventory and subsequent air dispersion modeling for the Proposed Action Alternative do not include potential short-term, temporary emissions from construction of the proposed Haul Road or from off-site tail pipe emissions from mine-related vehicle traffic along Fierro Road (13 to 15 cars and light trucks for staff,

10 large trucks, and 20 visitors per day)⁵ that would result from implementation of the Proposed Action Alternative. Potential Cobre facility-wide emissions under the Proposed Action Alternative are reported for CO, NO_x, SO₂, PM_{2.5}, PM₁₀, and TSP.

Table 3.1-4 Potential Cobre facility-wide criteria pollutant emissions for the Proposed Action Alternative (tons per year). Under the Proposed Action Alternative existing activities include emissions from the magnetite operation, which is assumed to continue under the Proposed Action Alternative.

Operating Divisions	CO	NO _x	SO ₂	PM _{2.5}	PM ₁₀	TSP
Proposed Copper Mining						
Explosives	330	38	14			
Engines Exhaust	465	779	1			
Mining ¹				18	167	638
Existing Activities	40	58	0.9	1	3	12
Total	835	875	16	19	170	650

Source: Ryan 2014b

¹ Mine equipment particulate emissions incorporate exhaust emissions

As under the No Action Alternative, mining activities under the Proposed Action Alternative would involve the use of explosives to break up the Hanover Mountain Deposit and Continental Mine Pit ore bodies followed by haul trucks to transport the rock over unpaved roads to various destinations. Explosives at a maximum use of 55,000 pounds an hour and 110,000 pounds a day from Monday through Friday represent 40 percent and 88 percent of Cobre facility-wide potential CO and SO₂ emissions, respectively. Engine exhaust from operating motor vehicles (primarily haul trucks) would result in 56 percent and 89 percent of Cobre facility-wide potential CO and NO_x emissions, respectively. Unpaved road dust from haul truck traffic that originates at Hanover Mountain and the Continental Mine Pit would be the largest source of Cobre facility-wide potential PM_{2.5} (70 percent), PM₁₀ (78 percent), and TSP (83 percent) emissions.

Results of the air dispersion modeling demonstrate that emissions under the Proposed Action Alternative would be in compliance with NAAQS, NMAAQs, and PSD increments at the Gila Wilderness and at receptors modeled in the areas of St. Anthony’s Church, Fierro Cemetery, State Highway 152 and the intersection of the proposed Haul Road, and nearby residences located along Fierro Road. Relative levels of compliance, the percentage of the established regulatory threshold for NAAQS, NMAAQs, and PSD increments are summarized in **Table 3.1-5**. The Proposed Action Alternative would not exceed PSD increments for PM₁₀ and PM_{2.5} emissions, and is therefore not expected to trigger any change in the current Attainment Area status for the region.

⁵ Most shift work staff would use vans traveling on the proposed Haul Road to get to and from work at shift change.

Table 3.1-5 Summary of AERMOD results for the Proposed Action^{1,2}

Criteria Pollutant	NMAAQS & NAAQS Concentrations
CO	Facility sources & background < 55% of NMAAQS & NAAQS
NO ₂	Facility sources & background < 45% of NMAAQS & NAAQS
SO ₂	Facility sources & background < 20% of NMAAQS & NAAQS
Criteria Pollutant	PSD Class I Increment Concentration(s)
NO ₂	Facility impact < Significance Level
PM ₁₀	Facility PSD sources impacts < 5% of Increment Levels
SO ₂	Facility PSD sources impacts < 25% of Increment Levels
Criteria Pollutant	PSD Class II Increment Concentration(s)
NO ₂	Facility PSD sources impacts < 90% of Increment Levels
PM ₁₀	Facility PSD sources impacts ≤ 99% of Increment Levels
SO ₂	Facility PSD sources impacts < 25% of Increment Levels
Criteria Pollutant	NAAQS Concentrations
PM _{2.5}	Facility sources impacts & background < 80% of NAAQS
Criteria Pollutant	NMAAQS Concentrations
TSP	Facility sources impacts & background ≤ 80% of NMAAQS

Source: Ryan 2014b

¹ Potential Cobre facility-wide emissions were evaluated for CO, NO₂, SO₂ NMAAQS and NAAQS; PM_{2.5} and PM₁₀ NAAQS; TSP NMAAQS; and PSD Class I and Class II NO₂, PM₁₀, and SO₂ increments.

² Modeled emission levels were added to background concentrations as appropriate using NMED designated concentrations as well as data collected from ambient air monitors in the vicinity of the project area.

Under the Proposed Action Alternative total annual GHG emissions as CO₂e are estimated to be 93,556 tons per year (Cobre 2014a). This value includes all GHG from non-fugitive, fugitive, emergency generator equipment, tailpipe emissions, and GHG estimates (Cobre 2014a). The CO₂e emissions under the Proposed Action Alternative are 0.00018, 0.00130, and 1.23 percent of Global, National, and New Mexico CO₂e emissions, respectively (EPA 2014, NMED 2010).

3.2 NOISE

3.2.1 Affected Environment

3.2.1.1 Human Perception of Sound

The human ear is sensitive to sound (air pressure fluctuations) over a wide range of frequencies and an extremely wide range of energy levels. Sound levels are expressed in decibels (dB), a logarithmic scale, where the quietest audible sound is defined as 0 dB and the loudest tolerable is about 120 to 140 dB. When sound levels are being considered in relation to human hearing ability, the measured sound levels are adjusted to indicate how loud they are perceived to be. This is done by using the “A” weighting audibility scale, reported as dBA levels. All sound levels reported in this analysis are A-weighted; differences between sound levels are reported in unweighted decibels. *Table 3.2-1* shows some examples of sound sources and typical sound levels.

Table 3.2-1 Examples of sound sources and typical sound levels

Description of Sound Source	Sound Level (dBA)
Threshold of pain	140
Jet flyover (1,000 feet)	120
Rock band (15 feet)	110
Gas lawn mower (3 feet)	100
Food blender (3 feet)	90
Noisy urban daytime	80
Vacuum cleaner (10 feet)	70
Normal speech (3 feet)	67
Heavy traffic (300 feet)	60
Dishwasher next room	50
Urban nighttime	40
Quiet bedroom at night	30
Threshold of hearing	0

Source: ADOT 2008

In the analysis, noise impacts are evaluated through the increase or decrease from existing levels. An increase of 3 dBA is thought to be the threshold at which a change will be noticed for a sound with the same frequency content or timbre, an increase of 5 dBA is easily noticed, and an increase of 10 dBA is perceived as a doubling of the sound level (U.S. Department of Transportation, Federal Highway Administration [FHWA] 1980).

3.2.1.2 Existing Noise Characteristics of the Area

Cobre’s Continental Mine is located in a sparsely populated, rural valley within a historic mining district. Based on a population density of less than 20 people per square mile, and using typical sound levels calculated by the National Academy of Sciences for areas with no noise sources other than transportation noise (National Academy of Sciences 1977), Hanover Valley would be expected to have a noise level of 35 dBA or lower without the presence of mine activity. Sound measurements taken at eight locations in the vicinity of the proposed activities to support the noise model (*Section 3.2.2.1*) ranged from 27.3 dBA to 53.4 dBA.

Cobre’s Continental Mine operation is not currently excavating, leaching, or milling copper ore. Magnetite ore is being hauled from the site via truck along Fierro Road. Activities corresponding to keeping the mine ready for the startup of operations do not contribute noticeably to ambient noise levels due to the distance of the nearest receptor, the topographic relief of the area, and the intermittent nature of the current activities. Other noise is generated by vehicle traffic on Fierro Road between the mine site and Hanover associated with the removal of the magnetite ore for off-site processing.

3.2.1.3 Defining Noise Impacts

No BLM regulatory noise limits or criteria for noise impact governing the proposed modifications to the MPO Amendment No. 5 have been identified. Therefore, noise levels resulting from the No Action and Proposed Action Alternatives are compared to criteria from other regulatory bodies and to studies of the

effects of noise on people. Noise effects can be categorized into three groups: 1) hearing damage, 2) activity interference, and 3) general annoyance (FHWA 1980).

Noise Levels Associated with Hearing Damage

The Walsh-Healey Public Contracts Act of 1969 and the Occupational Safety and Health Act of 1970 established maximum permissible noise exposure for persons working in a high noise environment. The lowest regulated sound level is 90 dBA, and it is associated with a maximum exposure of 8 hours per day. Sustained exposure to noise levels exceeding 90 dBA can cause hearing damage.

Noise Levels Associated with Activity Interference

Excessive noise levels can interfere with activities such as listening to music, watching television, or sleeping, but the most obvious and most studied activity interference is verbal communication. The FHWA regulates noise levels from Federally funded highway projects based on noise levels associated with interference with speech communication (FHWA 1995). *Table 3.2-2* defines four activity categories and shows the FHWA's Noise Abatement Criteria (NAC) for these categories.

Table 3.2-2 FHWA Noise Abatement Criteria: The dBA threshold for mitigation of noise on various activity categories from Federally funded highway projects.

Activity Category	Peak Hour Average Sound Level (dBA)	Description of Activity Category
A	57	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72	Developed lands, properties, or activities not included in Categories A and B.
D	--	Undeveloped lands.

Source: Table 1 of 23 CFR 1 Part 772

Most of the locations that are assessed for noise levels for this analysis would fall under Activity Category B (residences, church, and cemetery), and a few locations would fall under Activity Category C (post office). The NAC limit for Activity Category B is 67 dBA, and for Activity Category C is 72 dBA average sound levels for the peak noise hour.

Noise Levels Associated with General Annoyance

The sound level limit for general annoyance is subjective. Factors that contribute to potential annoyance levels include the type of noise, the time of day, background noise, and the mental state of the person hearing the noise. For outdoor activity areas such as school yards and playgrounds, the EPA suggests that a 24-hour average sound level becomes an annoyance at 55 dBA (EPA 1978). If a sound can be identified as coming from a specific source, then that source has the potential to be a general noise annoyance (FHWA 1980).

3.2.1.4 Existing Sound Levels in Hanover Valley

Sound levels were calculated at specific locations in Hanover Valley called receivers. A receiver is a location within the model representing a residence or group of residences, the church, the cemetery, or

other location. **Figure 3.2-1** shows the location of the 48 receiver locations used in the computer models for this noise study (WestLand 2013a).

Sound level measurements were made at eight locations within Hanover Valley (**Figure 3.2-2**). The measurements were taken at representative areas that have differing existing noise sources based upon the presence and concentration of dwellings and varying topography. These areas are generally located at the north end of the valley in the Fierro area, in the Hanover area, and in Turnerville, which is south of State Highway 152 near the proposed overpass location. The average sound levels are shown in **Table 3.2-3**.

Table 3.2-3 Assignment of existing sound levels based on sound level measurements

Receiver	Measurement Locations	Average Measured Sound Level (dBA)
1	1	33.1
2	2	27.3
3 - 12	3 & 4	40.6
13	5	32.9
14 - 41	6 & 7	46.8
42	7 & 8	44.4
43 - 48	8	40.6

Source: WestLand 2013a; Table 11.

3.2.2 Environmental Consequences: Direct & Indirect Effects

3.2.2.1 Methods for Noise Analysis

The noise analysis of the potential impacts was performed using a combination of existing sound level measurements and computer modeling (WestLand 2013a). Measurements were taken at three different times to capture some of the variability in the existing natural and man-made noise levels that occur throughout the day and evening. Additionally, in order to populate the noise model, noise measurements of haul trucks and other equipment were taken at Chino Mine to simulate noise generated by such equipment once operations resume at Cobre.

Noise modeling software was used to predict sound levels due to the proposed activities associated with the No Action and the Proposed Action Alternatives. With the exception of traffic on public roads, sound levels due to these activities were estimated using a computer implementation of the noise attenuation algorithms in International Organization for Standardization (ISO) 9613-2:1996 (ISO 1996). The software used for this study was SoundPLAN essential 2.0™. Sound levels due to traffic on Fierro Road and on State Highways 152 and 356 were predicted using SoundPLAN essential’s implementation of the FHWA’s Traffic Noise Model (TNM) algorithms. To calculate the sound level at a receiver, these models use information about the noise source or sources, the distance from the source to the receiver, the intervening topography, ground impedance, and atmospheric attenuation.

3.2.2.2 Alternative 1 – No Action

Sound levels predicted for activities associated with the No Action Alternative were based on the sum of sound levels from five sources:

1. Existing sound levels,
2. Activities associated with mining at the Continental Mine Pit and the Hanover Mountain Deposit,
3. Crushing, milling, and other related activities,
4. Haul roads within the Continental Mine Pit and the Hanover Mountain Deposit, and
5. Increased employee and contractor traffic on Fierro Road and State Highways 152 and 356.

Figure 3.2-3 depicts the locations of Hanover Mountain, the mill associated with crushing and milling activities, Fierro Road, State Highways 152 and 356, and the haul roads internal to mine operations, which have been broken into five segments (A through E) for evaluation of activities. The predicted average and peak sound levels for the No Action Alternative are based on the existing levels for each receiver as shown in **Table 3.2-4**, and on a model representing the five activities listed. Noise was not analyzed for the temporary activities associated with construction of the Solution Extraction/Electro-winning facility, leach stockpiles, and mill improvements.

Table 3.2-4 Predicted average sound levels for the No action Alternative for average and peak production conditions

Receiver	Sound Level (dBA)										
	Ave	Peak									
1	56.5	57.1	13	47.8	48.4	25	49.2	50.7	37	48.3	49.0
2	56.7	56.8	14	48.4	48.8	26	51.5	54.1	38	48.2	48.7
3	56.1	56.6	15	49.4	50.1	27	48.7	49.1	39	48.2	48.6
4	55.7	55.9	16	49.6	50.6	28	49.1	50.5	40	48.4	49.0
5	56.2	56.8	17	49.1	49.5	29	48.7	49.0	41	48.3	48.7
6	55.4	55.9	18	48.2	49.5	30	48.6	48.9	42	52.5	55.8
7	55.5	56.2	19	48.4	49.1	31	51.7	54.3	43	46.9	49.3
8	54.5	54.7	20	49.0	49.4	32	48.4	48.9	44	53.5	56.6
9	53.3	53.5	21	48.8	49.1	33	48.9	50.0	45	46.0	48.0
10	52.5	52.8	22	48.0	48.6	34	48.5	49.2	46	48.6	51.3
11	51.7	52.0	23	48.1	49.1	35	48.4	48.7	47	44.4	46.1
12	51.0	51.4	24	48.8	49.2	36	49.8	51.5	48	41.8	41.9

Source: WestLand 2013a; Tables 12 and 13

Predicted sound levels associated with the No Action Alternative range from 41.8 to 56.7 dBA with an average of 51.4 dBA for average production conditions, and range from 41.9 to 57.1 dBA with an average of 52.3 dBA for peak production conditions. The average for a group of sound levels is not calculated by averaging the sound levels, but by averaging the energy associated with each level. Further information on how these levels were calculated is available in the noise analysis (WestLand 2013a).

There would be an increase in noise levels as a result of the No Action Alternative. The predicted sound levels would not exceed values for hearing damage or for activity interference at any receiver location for either average or peak production conditions. At some receiver locations the predicted sound level

exceeds the general annoyance level of 55 dBA. The maximum predicted sound level during peak production of 57.1 dBA is less than the sound of normal speech from 3 feet which is 67 dBA (*Table 3.2-1*). Activities associated with the No Action Alternative would be audible at all receiver locations during times of relative quiet. Other activities associated with the No Action Alternative would result in short-term increases in noise levels. Temporary increases in noise levels are likely to occur during blasting and increased levels of vehicle traffic on Fierro Road (BLM 2000).

3.2.2.3 Alternative 2 – Proposed Action

Sound levels predicted for the Proposed Action Alternative are based on the sum of sound levels from four sources (*Figure 3.2-4*):

1. Existing sound levels,
2. Activities associated with mining at the Continental Mine Pit and the Hanover Mountain Deposit,
3. Haul roads within Cobre’s Continental Mine Pit and Hanover Mountain Deposit, and
4. Activities associated with the operation of the proposed Haul Road to Chino.

Under the Proposed Action Alternative, a majority of the mine-related traffic would use the proposed Haul Road; therefore, increased traffic on Fierro Road was not included in the model. A computer model was used to predict the average sound levels from activities associated with the Proposed Action Alternative. Average sound levels were calculated for the average production condition and the peak production condition. Sound levels were calculated at 48 receiver locations. The receiver locations are shown in *Figure 3.2-1*. Noise associated with the temporary activities related to construction of the proposed Haul Road was not analyzed due to their short duration.

Table 3.2-5 presents the calculated sound levels resulting from an average production and peak production condition under the Proposed Action Alternative predicted by the computer model.

Table 3.2-5 Predicted average sound levels for the Proposed Action Alternative for average and peak production conditions

Receiver	Sound Level (dBA)										
	Ave	Peak									
1	55.8	57.2	13	49.9	52.2	25	49.0	50.5	37	48.5	49.5
2	57.4	58.5	14	50.0	51.9	26	48.7	50.3	38	48.8	49.8
3	55.9	56.7	15	50.5	52.2	27	49.5	50.9	39	48.9	50.1
4	56.0	56.9	16	50.1	51.8	28	48.9	50.5	40	48.5	49.4
5	55.9	56.7	17	50.1	51.7	29	49.4	50.7	41	48.5	49.4
6	55.4	56.3	18	48.6	50.3	30	49.3	50.5	42	46.6	47.6
7	55.1	56.0	19	49.3	51.0	31	48.9	50.2	43	43.8	45.0
8	55.2	56.5	20	50.0	51.5	32	49.0	50.3	44	43.5	44.4
9	54.3	55.9	21	49.5	50.6	33	48.8	49.9	45	44.0	45.4
10	53.5	55.1	22	48.7	50.1	34	48.7	49.8	46	43.8	45.5
11	52.7	54.3	23	48.8	50.5	35	49.2	50.5	47	43.9	46.0
12	51.9	53.5	24	49.6	50.9	36	48.7	49.7	48	46.1	49.1

Source: WestLand 2013a; Tables 14 and 15

Predicted sound levels associated with the Proposed Action Alternative range from 43.5 to 57.4 dBA with an average of 51.4 dBA for average production conditions, and range from 44.4 to 58.5 dBA with an average of 52.6 dBA for peak production conditions. The average for a group of sound levels is not calculated by averaging the sound levels, but by averaging the energy associated with each level. Further information on how these levels were calculated is available in the noise analysis (WestLand 2013a).

The predicted sound levels do not exceed values for hearing damage or for activity interference at any receiver location for either average or peak production conditions. At some receiver locations the predicted sound level exceeds the general annoyance level of 55 dBA. The maximum predicted sound level during peak production of 58.5 dBA is less than the sound of normal speech from 3 feet which is 67 dBA (*Table 3.2-1*). Activities associated with the Proposed Action Alternative would be audible at all receiver locations during times of relative quiet. Other activities associated with the Proposed Action Alternative would result in short-term increases in noise levels. Temporary increases in noise levels are likely to occur during blasting (BLM 2000).

3.3 VIBRATION

3.3.1 Affected Environment

Houses and other structures near Fierro Road, including St. Anthony's Church, are currently subjected to vibration from traffic along Fierro Road. Existing road traffic is primarily comprised of passenger vehicles from area residents, visitors, and employees at Cobre's Continental Mine. Magnetite and diesel truck shipments range from 0 to 25 trips per day along Fierro Road. Traffic vibrations are mainly caused by heavy vehicles; passenger cars and light trucks rarely induce vibrations that are perceptible in buildings, and the most stringent vibration standard is more than 30 times the human perception level (Hunaidi 2000).

3.3.2 Environmental Consequences: Direct & Indirect Effects

3.3.2.1 *Alternative 1 – No Action*

Blasting would be required at the Continental Mine Pit and the Hanover Mountain Deposit. Blast hole size is dictated by explosive density and explosives used per ton of broken rock. Cobre or an explosives contractor would be responsible for conducting the blasting in accordance with all applicable rules and regulations. Safe seismic disturbance limits would be established to prevent damage to buildings. Blasting is generally done during the day and would be scheduled to occur on weekdays whenever possible to avoid potential disturbance to residents or visitors in the vicinity of the mining activity (Cobre 2012). Generally, individuals are home or visiting the area in the evening or on weekend days; therefore, scheduling blasting during weekdays is preferable.

There would be an increase in vehicle traffic along Fierro Road that could result in additional vibration in the immediate vicinity of the road (see *Section 3.5*). During times of average production, traffic along Fierro Road is expected to increase as a result of approximately 394 employees reporting to work. Traffic volumes would be greatest during the shift changes and for a given day there would be an estimated increase of 498 one-way trips along Fierro Road during average production conditions. This number of

staff would increase or decrease depending on production rates and carpooling opportunities. This increase includes two medium trucks and 32 heavy trucks per day. During 1 year of peak production, traffic (one-way trips) would be expected to increase by 640 automobiles per day, 2 medium trucks per day, and 79 heavy trucks per day (Humphrey 2013). These numbers represent the maximum potential traffic counts because employee carpooling, which would reduce the number of vehicles, was not included in the analysis. Cars and light trucks rarely induce vibrations that are perceptible in buildings (Hunaidi 2000), but there is the potential for an increase in vibration from the increase in heavy trucks. The amount of vibration depends on many factors such as vehicle speed, distance to structures, the roughness of the road, the soil type, and soil stratification. Speed limits adhered to along Fierro Road would reduce vibration levels associated with traffic, and adverse effects to structures along Fierro Road are not anticipated to occur as a result of the No Action Alternative.

3.3.2.2 *Alternative 2 – Proposed Action*

Under the Proposed Action, blasting would be done as described for the No Action Alternative. A majority of mine-related traffic would be utilizing the proposed Haul Road to access the mine facility (see **Section 3.5**); therefore, only a small increase over current levels of traffic along Fierro Road is expected associated with administrative personnel, visitors, and some delivery trucks accessing the administration offices along Fierro Road. Traffic induced vibrations are mainly caused by heavy vehicles, while passenger cars and light trucks rarely induce vibrations that are perceptible in buildings, and the most stringent vibration standards are more than 30 times the human perception level (Hunaidi 2000). Vibrations associated with increased truck traffic would be unlikely to result in potential adverse effects to structures along Fierro Road due to the location of these structures relative to the proposed Haul Road.

3.4 **VISUAL RESOURCES**

3.4.1 **Affected Environment**

3.4.1.1 *Landscape Characteristics*

Cobre's Continental Mine is located in Hanover Valley near Hanover Creek, a shallow, north-south trending drainage within the Piños Altos Mountains (**Figure 3.4-1**). Hanover Valley forms the northern end of the historic Central Mining District, where mining has been practiced since the 1800s (**Figure 3.4-1**). The landscape within Hanover Valley and surrounding area has been shaped by the extensive historical mining activities; the proposed mining activities are continuations of these past mining activities.

3.4.1.2 *Existing Visual Impacts*

Given its history, Hanover Valley and surrounding areas exhibit signs of extensive human development. In addition to the mined landscape, developed structures in the area include state highways a county-maintained road; and the communities of Hanover and Fierro (**Figure 3.4-1**). Hanover and Fierro were first established along Fierro Road and Hanover Creek in association with historic mining activities. Hanover came into existence in the 1890s. Fierro had its beginnings in 1841 when a German immigrant began mining in the area. The Colorado Fuel and Iron Company also had mining interests in the area

during World War I and World War II (Rocky Mountain Profiles 2013). The mines employed thousands of workers and many settled in the Hanover and Fierro areas between the late 1800s and mid-1900s. Roadways in the area were initially constructed to access the mining operations.

In addition to the unincorporated communities of Hanover and Fierro, there is low-density residential development on the lower slopes of Hanover Valley. Widely scattered remains of previous mining activities such as residences, access roads, adits, reclaimed areas, and stockpiles are visible on many of the upper slopes of Hanover Valley. Where development in Hanover Valley and surrounding areas has been more limited, the natural landscape is still intact and is characterized by Pinyon-Juniper Woodlands and open meadows over low, rounded hills. The predominant colors are varying shades of greens and browns, and the texture can be generally characterized as rough because pinyon and juniper trees tend to grow as somewhat isolated individuals across the landscape.

In contrast to these areas of relatively low-level development, at the mine facilities at the Cobre's Continental and Chino Mines, very little of the natural landscape remains. These areas are characterized by large open pits and extensive rock stockpiles and tailings facilities. The natural topography has been almost completely transformed into a series of uniformly steep-sided slopes topped by large horizontal plateaus. The predominant colors are bright shades of yellows and reds or dark grays, and the texture is fine since the slopes are composed of crushed minerals. This portion of the scenic byway along State Highway 152 focuses on the mining history of Hanover Valley and the mined landscape of the area (Trail of The Mountain Spirits Scenic Byway Committee 2004).

Hanover Mountain is located within Cobre's permitted mine boundary and northeast of the Continental Mine Pit. Currently, there are historical mine openings, exploratory drill roads, and evidence of human activities that have occurred more recently on Hanover Mountain (*Figure 3.4-1*). The current administrative buildings for Cobre's Continental Mine are located on the western slope of Hanover Mountain, and the gatehouse is located at the southern end.

3.4.1.3 Visual Analysis Methods

The framework for the visual analysis of the proposed Haul Road relies on two regulatory systems developed by the BLM: the Visual Resource Management (VRM) objectives classification for managed lands and the Visual Resource Contrast Rating System (CRS) for the visual effects of proposed activities. The VRM classification characterizes the visual components of existing landscapes at the planning level and provides guidelines for managing the scenic values of public lands. The CRS is to be used for proposed activities to determine if resulting modifications are consistent with the VRM objectives for the existing local landscape.

Visual resources on BLM-administered land are managed within the context of the VRM system, as described in BLM Manual 8400 (BLM 1986). The VRM system requires the inventory of scenic values based on scenic quality, viewer sensitivity, and distances of views. Based on this inventory, landscapes are assigned to one of four visual resource classes, each of which provides objectives for the management of visual quality.

The proposed MPO Amendment No. 5 activities are located within an area that the BLM has defined as the Hanover Area. The BLM has designated the Hanover Area as VRM Class II, which means the level of acceptable change to the existing landscape is low, with the objective of retaining the existing character of the landscape (BLM 1993; BLM 2009). Despite this designation, the Mimbres RMP (BLM 1997) describes the existing character of the landscape as follows: “the dominant visual features are the extensive disturbances associated with mining...such as open pits, mining head frames and buildings, waste rock piles and tailings facilities.”

3.4.1.4 Selection of Key Observation Points

To assess the degree of visual contrast that may occur, “the most critical viewpoints” must first be identified from which changes to the existing landscape can be compared. As defined in BLM’s Manual (Manual H-8410.1), Key Observation Points (KOPs) are typically located along commonly travelled routes or at other locations that are frequently visited. WestLand coordinated with BLM to identify five KOPs for the visual analysis of the proposed Haul Road (*Figure 3.4-2*) for the Proposed Action Alternative. These five KOPs are the locations most commonly traveled and visited within Hanover Valley and along State Highway 152 from which it was determined the proposed Haul Road could be potentially observed. Four KOPs are located along State Highway 152 (*Figures 3.4-2, 3.4-3, and 3.4-4*), and one KOP is located along Fierro Road (*Figure 3.4-5*). The basis for the selection of each of the five KOPs for the analysis is:

1. KOP A (the Kneeling Nun turnout) is located on State Highway 152, southwest of Cobre’s Continental Mine and is a stopping point for travelers.
2. KOPs B, C, and D were selected for linear visibility analysis along State Highway 152. These KOPs are located at sites from which the alignment of the proposed Haul Road would be within the foreground and directly in front of the viewer. KOPs B and C apply to eastbound travelers and KOP D to westbound travelers.
3. KOP E is located in front of Saint Anthony’s Church, located within the local community near the north end of Fierro Road, south of the current entrance to Cobre’s Continental Mine. It is located on the opposite side of Hanover Valley from the alignment of the proposed Haul Road.

Field data were collected from each point and recorded on Contrast Rating Worksheets for each of the five KOPs. The worksheets presenting the results of the CRS analysis and anticipated visual impacts are provided in the Visual Resource Report (WestLand 2013b).

No KOPs were identified along Fierro Road or at the Fierro Cemetery because views from these areas to the proposed Haul Road are at an upward angle and would be blocked by topographic features and existing vegetation. No visual impacts are anticipated to occur. Also, the alignment for the proposed Haul Road would, for most of its length, parallel the direction of travel along Fierro Road; therefore, views would not be directly in front of the traveler on Fierro Road and would be blocked by existing topographic features and vegetation.

3.4.2 Environmental Consequences: Direct & Indirect Effects

3.4.2.1 Alternative 1 – No Action

Visual impacts were analyzed for activities that have been previously authorized on BLM-administered land and lands owned by Cobre that would occur under the No Action Alternative (*Figure 2-1*).

Overall, the No Action Alternative would create moderate contrasts with the existing landscape as evaluated in the Administrative Draft EA (BLM 2000). In that analysis, it was determined that the mining of privately owned portions of Hanover Mountain and construction of the Fierro Leach Pad would result in changes to the foreground and middle-ground views for travelers along Fierro Road and for visitors to St. Anthony’s Church and Fierro Cemetery. This area contains extensive previous mining disturbances, and the new facilities would be consistent with the existing disturbances. Additionally, due to the elevation of the Hanover Mountain Deposit, the surrounding mined landscape, and the distance to State Highway 152, visual impacts associated with the mining of Hanover Mountain are anticipated to be negligible for travelers along State Highway 152. Construction of the administration buildings would be visible along Fierro Road but would be consistent with other structures within the area.

The Solution Extraction/Electro-winning facility would be constructed on a previously approved location on privately owned land adjacent to the Fierro Cemetery. Although it is consistent with the existing mined landscape, this facility would be visible to visitors to St. Anthony’s Church and Fierro Cemetery in Fierro, as well as to residents of Fierro.

The Humbolt Leach Pad would be located on the southwest side of the existing SWDRF and would be consistent with the existing mined landscape. The existing mine features would block views of the Humbolt Leach Pad from Fierro Road. Mine features as well as natural and topographic features, such as Humbolt Mountain, would block views of the Humbolt Leach Pad from travelers along State Highway 152.

Expansion of the SWDRF on privately owned lands along the eastern and western edges of the SWDRF, authorization of SWDRF Dam 2, and relocation of the Utility Corridor were not included as part of the visual impact analysis because they would be implemented within or immediately adjacent to the existing mine features at Cobre’s Continental Mine and would not alter the overall viewshed.

3.4.2.2 Alternative 2 – Proposed Action

Visual impacts were analyzed for the activities described for the Proposed Action Alternative as depicted in *Figure 2-2*. Activities described under the Proposed Action Alternative would be constructed in an area currently characterized by ongoing mining operations and human occupancy, and the proposed activities would be visually consistent with the existing landscape. Disturbances from past and ongoing mining activities can be seen from each of the five KOPs selected for this visual analysis. As discussed in *Section 3.4.1.3*, BLM parcels within Hanover Valley are categorized as VRM Class II under BLM’s rating system. Class II areas are to be managed to retain the existing visual character of an area and do not preclude mining activities (BLM 2000).

Hanover Mountain

The Proposed Action Alternative includes mining of 0.29 acres of BLM-administered land and adjacent private buffer lands located on Hanover Mountain. Mining of this acreage under the Proposed Action Alternative would remove the BLM spires that would be left after mining of the private acreage of Hanover Mountain under the No Action Alternative. Removing these spires would remove them from the view shed reducing the overall visual impact of mine activity as compared to visual impacts associated with the No Action Alternative.

Proposed Haul Road

Visual impacts during construction and operation of the proposed Haul Road were evaluated in a separate report (WestLand 2013b). Construction activities would be visible to visitors and residents in the area, particularly construction of the overpass at State Highway 152. The alignment of the proposed Haul Road parallels the eastern flank of Hanover Valley, running a distance of approximately 3.6 miles between the existing mine facilities at Cobre's Continental Mine and Chino Mine. At the proposed peak rate of use, the frequency of haul trucks and water trucks over the proposed Haul Road is estimated to be: 13 loaded and 13 empty haul trucks per hour plus 13 (loaded) water trucks per day. An overpass would be constructed as part of the proposed Haul Road at its intersection with State Highway 152 to allow haul trucks and other mine-support vehicles to cross the highway. These vehicles, passing every 1 to 2 minutes during peak operation years, would be visible to motorists traveling along State Highway 152. Overpasses would also be constructed at the north end of the proposed Haul Road crossing Fierro Road and Hanover Creek just south of Hanover Mountain. The results of the visual analysis from the identified KOPs for the proposed Haul Road are summarized in *Table 3.4-1*.

In addition to field data, the visual analysis was conducted using geographic information system software to create maps that depict the portions of the proposed Haul Road that would be visible from State Highway 152 and from St. Anthony's Church. KOPs A and E are fixed points identified to assess the views of the proposed Haul Road along State Highway 152 and from St. Anthony's Church, respectively. Since most travelers view scenery while driving, it is valuable to assess the visual impacts to travelers for the entire stretch of road from which the Proposed Action Alternative is visible, instead of relying on isolated or fixed viewpoints (hence, its description as a linear KOP). *Figures 3.4-3* and *3.4-4* present the results of this linear analysis for KOPs B and C (eastbound) and KOP D (westbound). For the linear analysis, KOPs B, C, and D represent the locations from which mine facilities could first be viewed by traveling motorists. These figures combine all possible views of the proposed Haul Road from State Highway 152 when travelling east and west. In reality, the traveler would view only a portion of the proposed Haul Road from any given location on the roadway. The visual analyses from these three KOPs did not consider vegetation, but rather were based solely on topography. If vegetation were also considered in the analysis, visual impacts associated with the proposed Haul Road would likely be less than those depicted on the maps.

Table 3.4-1 provides a summary of the results of the visual impact analysis conducted for both the fixed (KOPs A and E) and linear conditions (KOPs B, C, and D) at the five KOPs. Contrast Rating Worksheets, including photographs, were developed for each KOP in accordance with BLM guidelines (WestLand 2013b).

Table 3.4-1 Summary of visual impacts from the five KOPs, including fixed (KOPs A and E) and linear (KOPs B, C, and D) impact analyses.

KOP	Description of Visual Impacts
A	<p>The Kneeling Nun pull-out affords good views in all directions from State Highway 152. Although the top of Hanover Mountain is visible at a distance from this point, the proposed Haul Road would not be visible from this location.</p>
B	<p>This location marks the first point from which eastbound travelers on State Highway 152 would be able to see the cut and fill slopes associated with the proposed Haul Road. From this KOP, the view of the proposed Haul Road would be directly in front of the viewer, the direction motorists face most often while driving. At the posted speed limit of 45 miles per hour (mph), eastbound travelers in the vicinity of this KOP could view the proposed Haul Road for 58 seconds. The degree to which the traveler would notice the proposed Haul Road would be influenced by the color of the cut and fill slopes associated with the proposed Haul Road: the brighter the color of the rock, the greater the contrast between the proposed Haul Road and existing slopes.</p> <p>By the time that eastbound motorists on State Highway 152 encounter this view, they would have also observed the extensive landforms associated with the Chino Mine that dominate views to the south of State Highway 152. The scale of these workings, as well as their highly unnatural forms, lines, and colors stand in stark contrast to the surrounding rural landscape. Contrasts that would be created by the proposed cut and fill slopes associated with the proposed Haul Road would be consistent with these existing mine features. Since the majority of the alignment of the proposed Haul Road would be at a greater elevation than the highway at this location, most of the roadbed would be hidden from the views of motorists on State Highway 152 due to the angle of the viewer.</p>
C	<p>This location marks the first point at which eastbound travelers would be able to see the overpass structure associated with the proposed Haul Road. The view of the overpass would be directly in front of the traveler and be silhouetted against the sky at an approximate height of 60 feet above the existing roadway. At a posted speed limit of 45 mph, this view would last for approximately 28 seconds. In the center of the overpass would be a semi-circular opening for traffic. Construction materials for the overpass would be interlocking masonry units of a color yet to be determined. The materials and forms associated with the overpass would contrast with the surrounding landscape.</p> <p>As described above, travelers on State Highway 152 would already be familiar with the scale and highly unnatural forms, lines, and colors associated with the Chino Mine, which dominate the landscape to the south of the highway. Contrasts that would be created by the overpass and its use by mining equipment would be consistent with these existing features and functions.</p>
D	<p>This location marks the first point at which westbound travelers would be able to see the proposed Haul Road. The proposed overpass structure and the approaches associated with the overpass would also be visible from this point. Similar to the description of KOP C, the overpass and moving mine equipment would contrast with the existing landscape, although the overpass would not be in silhouette against the sky from this location. The fill slopes associated with the proposed overpass approaches would contrast with existing slopes to the north of State Highway 152 as described in KOP B. Proposed fill slopes to the south of State Highway 152 would be consistent with existing mine workings visible from the highway.</p> <p>As described above, westbound travelers on State Highway 152 would already have observed the Chino Mine and associated landforms. Contrasts that would be created by the proposed Haul Road, the overpass, and by moving mining equipment would be consistent with these existing features and functions. Views of the overpass would be relatively short (approximately 20 seconds) at the posted speed limit of 55 mph.</p>
E	<p>The front entry of Saint Anthony's Church affords a long view down valley to the south. As shown in <i>Figure 3.4-5</i>, the cut and fill slopes associated with the proposed Haul Road would be visible from this KOP as would portions of the roadbed and berm and moving haul trucks. The degree of contrast produced by the proposed Haul Road would be influenced by the color of the cut and fill slopes associated with the road: the brighter the color of the rock, the greater the contrast between the proposed Haul Road and existing slopes.</p> <p>Including the mining of Hanover Mountain, the church would be surrounded on three sides by ongoing large-scale mine activities. The proposed Haul Road would be consistent with these activities.</p>

The proposed Haul Road would increase the size of the visual footprint created by mining activities, but this increase would be relatively small compared to the disturbed landscapes that are already visible. The visual footprint of the proposed Haul Road amounts to approximately 8 percent of the total future projected disturbance. Additionally, the cut and fill slopes associated with the proposed Haul Road and the equipment operating on it would be similar in form, line, color, and texture to existing mining features. The overpass portion of the proposed Haul Road is a large feature that would be visible for a limited time to travelers along State Highway 152. Of the total length of approximately 3.6 miles, 1.2 miles of the proposed Haul Road would be potentially visible when driving east and less than 0.5 miles would be potentially visible when driving west.

This portion of State Highway 152 is also part of the scenic highway, Trail of the Mountain Spirits, designated by the New Mexico Department of Transportation (NMDOT). The BLM has designated the Area as VRM Class II; however both NMDOT and the BLM recognize the historic and current mined landscape of the area. Work proposed under the Proposed Action Alternative is compatible with the current land use.

North Overburden Stockpile and Associated Haul Road

Construction and the temporary use of the North Overburden Stockpile to store cover material would be conducted for the Proposed Action Alternative and would include a short haul road from Hanover Mountain to the stockpile. This proposed facility was reviewed and would be within a valley area north of Cobre's Continental Mine; therefore, it would not be visible from the KOPs due to barriers formed by topography and vegetation.

SWRDF, Proposed Utility Corridor, and SWRDF Dam 2

Expansion of the SWDRF onto BLM-administered lands and relocation of the Utility Corridor would be implemented within or immediately adjacent to the existing facilities at Cobre's Continental Mine and would not alter the overall viewshed. Authorization of SWDRF Dam 2 would not result in any additional construction or ground disturbance, and would not result in any additional visual impacts.

3.5 TRAFFIC

3.5.1 Affected Environment

The only direct access to Cobre's Continental Mine is via Grant County Road 3-5 (Fierro Road) as it passes through Hanover Valley and the communities of Hanover and Fierro (*Figure 2-2*). There are three major roadways serving Fierro Road and ultimately Cobre's Continental Mine. These roadways include US Highway 180 (US 180) and State Highways 152 and 356. Posted speed limits in the Hanover Valley area are 35 mph on Fierro Road except near the U.S. Post Office where they slow to 15 mph. Speed limits vary between 45 and 55 mph on State Highways 152 and 356. State Highway 365 slows to 30 mph through the town of Bayard.

US 180 is a major northwest-southeast traveling two-lane, paved highway that connects Silver City and Deming, running through the communities of Hurley and Bayard. In 2012, the annual average daily traffic (AADT) along US 180 was reported to be approximately 544 in the NMDOT Traffic Information Management Systems (TIMS) along US 180 in the vicinity of Santa Clara and Bayard. From US 180,

access to the Cobre's Continental Mine area could be from either State Highway 152, via Santa Clara or State Highway 356 via Bayard.

State Highway 152 is an east-west traveling, two-lane paved highway that passes through Hanover, connecting Santa Clara with Interstate 25 to the east in Sierra County, approximately 15 miles south of the City of Truth or Consequences. Approximately 1,668 AADT for 2012 were reported in the NMDOT TIMS for State Highway 152 in this area.

State Highway 356 is a north-south traveling, two-lane paved highway starting at Bayard at the south and terminating at the intersection with State Highway 152 on the north, near Hanover. This roadway continues north of State Highway 152 as Fierro Road. Approximately 1,147 AADT count for 2012 was reported in the NMDOT TIMS for State Highway 356 in this area.

Fierro Road is a paved two-lane road that connects the intersection of State Highway 152 and State Highway 356 in Hanover to Cobre's Continental Mine main entrance, a distance of approximately 3 miles. Approximately 0.2 miles north of the main mine entrance, the pavement ends and the road becomes dirt surfaced. Approximately 1 mile north of the main entrance, Fierro Road becomes a forest access road (Forest Service Road 778) continuing to the north on the Gila National Forest. Forest Service Road 778 provides limited access to dispersed recreational activities (e.g., there are no designated campgrounds or recreational facilities). Fierro Road is the only access to the mine and is used by approximately 15 to 18 Freeport-McMoRan employees and 20 contract employees currently working at the Cobre's Continental Mine. There are no traffic counts available for Fierro Road.

Traffic volumes on the existing roadways are currently below capacity and are expected to remain below capacity for the foreseeable future. A letter of service (LOS) designation is defined by highway engineers as "qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers" and is used to describe the capacity of a highway (McShane and Roess 1990). The LOS is based on several factors including speed, travel time, delays, and density. The LOS is A for all the roads in the area. A LOS A is a stretch of highway with generally free-flowing traffic, minimal change for delays, and high speed travel. These roads were developed as access roads to mining operations in the Central Mining District.

3.5.2 Environmental Consequences: Direct & Indirect Effects

3.5.2.1 *Alternative 1 – No Action*

The No Action Alternative would require all construction and mine operations traffic associated with the startup of mining activities at Cobre's Continental Mine to use Fierro Road to access the facility. Commuter (employee) traffic on Fierro Road would be associated with mine operations, the Solution Extraction/Electro-winning facility, and the concentrator. Under the No Action Alternative, there would be an anticipated total of 394 employees. This would include a staff of 15 administrative employees working a single 8-hour shift per day, Monday through Friday. Mine operations occur 24 hours per day, 7 days per week. The greatest increase in traffic levels would occur during shift changes in the morning and evening hours. The projection of the average number of commuter trips (employees) over the life of the mine is 378 round trips per day (Humphrey 2013). Trips would range from a low of 134 trips during

low-volume conditions to a high of 520 trips during peak conditions (Humphrey 2013). This traffic summary assumes that one employee equals one vehicle, without consideration of carpooling and, therefore, represents the maximum number of potential employee vehicles contributing to increased traffic on Fierro Road.

In addition to the employee traffic, other mine-related traffic would be required to support mine operations. An estimated 60 visitors and one medium truck would be expected per weekday under both average and peak production conditions. **Table 3.5-1** provides a summary of heavy truck traffic on Fierro Road and identifies the anticipated access from other public roads (Cobre 2014e). In addition to the traffic listed in **Table 3.5-1**, an estimated 17 fuel deliveries and 5 ammonium nitrate deliveries would be expected each week.

Table 3.5-1 Estimation of heavy truck traffic on Fierro Road to support mine operations under the No Action Alternative

Heavy trucks per weekday	
Average Production	
Via State Highway 356	8
Via State Highway 152 west of Fierro Road	8
Total on Fierro Road	16
Peak Production	
Via State Highway 356	19
Via State Highway 152 west of Fierro Road	20
Total on Fierro Road	39

There would be an increase in traffic levels on Fierro Road, at the intersection of State Highways 356 and 152, and along State Highway 152 during construction and operation of the proposed activities described under the No Action Alternative. Operations run 24 hours per day, 7 days per week on 12-hour shifts. Traffic would be heaviest along Fierro Road at shift changes and could result in some congestion and traffic back-ups along Fierro Road. Noise that would be associated with increased traffic levels along these roadways is presented in **Section 3.2** of this EA.

3.5.2.2 *Alternative 2 – Proposed Action*

The proposed Haul Road would be constructed to convey mined materials from Cobre’s Continental Mine to Chino Mine for milling or leaching. The proposed Haul Road would start at the southeast end of Hanover Mountain, cross over Fierro Road and Hanover Creek, then head south over State Highway 152 to the Chino Mine facilities. The crossings of Fierro Road and State Highway 152 would be grade separated and eliminate conflicts between mine traffic, local traffic, and vehicles accessing US Forest Service land. During construction of the proposed Haul Road, there would be some use of Fierro Road for construction and mine operations traffic; however, during operations, the majority of mine-related traffic would use the proposed Haul Road. Some administrative staff would continue to use Fierro Road to access the proposed administration buildings.

As described, the proposed Haul Road would be approximately 3.6 miles in length. The cross-section of the proposed Haul Road consists of a 120-foot wide roadbed that includes 8-foot high berms in the fill

sections. The berms would reduce the noise and visual impacts to the surrounding area, including residences, St. Anthony's Church, and Fierro Cemetery as discussed in the noise and visual resource sections of this EA (*Sections 3.2 and 3.4*, respectively).

The construction of the proposed Haul Road overpass structure over State Highway 152 would need a permit from the NMDOT District 1 Permits Engineer. The structure would be designed to meet all American Association of State Highway and Transportation Officials (AASHTO) standards, and NMDOT standards including Bridge Procedures and Design Guidelines, Standard Drawings, Specifications, and Design Directives. Traffic control for State Highway 152 during construction of the overpass would need to conform to the Manual on Uniform Traffic Control Devices (MUTCD) and NMDOT Design Directives, standards, and specifications. The traffic control would be set up to minimize the disruption of traffic during construction of the overpass. The construction of the arch along State Highway 152 would result in shoulder closures and a short detour. The south shoulder would be closed, and traffic would be detoured around the north side of the shoulder. Some minor interruptions to traffic for construction of the arch are anticipated. A flagman would direct traffic at the site to ensure highway and construction traffic safety. Prior to construction to inform the public, temporary signs would be placed at appropriate locations along State Highway 152. During mine operations, it is anticipated that approximately 166 mine personnel would be employed and work 12-hour shifts, 7 days per week. An estimated 42 employees per shift would travel in vans along the proposed Haul Road per day. Approximately 13 to 15 Cobre staff and contractors would use Fierro Road Monday through Friday to access the proposed administrative offices. An estimated 10 support vehicles including fuel deliveries and ammonium nitrate deliveries would use Fierro Road weekly (Cobre 2014e). Haul traffic during mine operations along the proposed Haul Road is estimated to be 5 loaded and 5 empty haul trucks per hour and 5 water trucks per day during times of average production. During peak production, traffic would consist of 13 loaded and 13 empty haul trucks per hour, and 13 water trucks for dust control per day. The analysis of noise and visual effects of the increased traffic levels are considered in *Sections 3.2 and 3.4* of this EA.

Traffic levels would increase slightly from current levels under the Proposed Action Alternative along local roads including State Highway 152, State Highway 356, and Fierro Road. However, traffic congestion would not occur along Fierro Road because most of the mine operations traffic, including employee and contractor vehicles, would be using the proposed Haul Road.

3.6 SOCIOECONOMIC RESOURCES

This section presents a socioeconomic evaluation for the unincorporated community of Hanover and for Grant County relative to the State of New Mexico. United States Department of Commerce Census Bureau (Census) data (U.S. Department of Commerce 2013b) and other online databases were used to obtain socioeconomic data. Census data used for this analysis includes the 2010 census and the 2008 through 2012 American Community Survey (ACS) accessed via the Census' American FactFinder website (U.S. Department of Commerce 2012a, 2013b) or the Economic Profile System-Human Dimensions Toolkit (Headwaters Economics 2013). There is no separate Census or Census designated place (CDP) for Fierro, although previous assessments identified approximately 10 residences, as well as St. Anthony's Church, within Fierro (BLM 2000).

3.6.1 Affected Environment

Located in Grant County, New Mexico, Cobre’s Continental Mine is about 16 miles northeast of the county seat, Silver City, and is approximately 3 miles north of Chino Mine in Hanover Valley. Hanover Valley is primarily rural in character and sparsely populated. Grant County’s population trended upward over the past several decades, but has declined 5 percent since 2000 (U.S. Department of Commerce 2013b). Since the early nineteenth century, the population of Silver City and the surrounding area has fluctuated with mining activities and commodity prices. Silver City is the largest population center in Grant County. Smaller population centers include the towns of Bayard, Santa Clara, and Hurley, which are located within 10 miles east and south of Silver City, respectively.

The unincorporated, residential communities in Hanover Valley are Hanover, which is 3 miles south of Cobre’s Continental Mine entrance and consists of approximately 20 residences; and Fierro, which is located just east of the mine site and consists of less than 10 residences. St. Anthony’s Church and the Fierro Cemetery, which are accessed by local residents and visitors from Fierro Road, are located in Fierro in proximity to existing mine facilities.

The population estimate of Hanover CDP is 167 (*Table 3.6-1*). Out of 167 individuals; 44 persons are of working age (18 to 44), 60 persons are nearing or at the earlier range of retirement age (ages 45 to 64), and there are 32 individuals over the age of 65 within the Hanover CDP (U.S. Department of Commerce 2013a). An estimated 26.3 percent of the population of Hanover CDP is within the working age group (18 to 44) compared to 35 percent for New Mexico. An estimated 55.1 percent of the population of Hanover CDP is nearing or at retirement age (45+) compared to 39.9 percent in New Mexico. The data indicate a generally older population within Hanover CDP as opposed to New Mexico.

Table 3.6-1 2011 Age distribution for Hanover CDP, Grant County, and New Mexico

Population Category	Hanover CDP	Grant County	New Mexico	Percentage of Total Population Hanover CDP	Percentage of Total Population Grant County	Percentage of Total Population New Mexico	Difference Between Hanover CDP and New Mexico
Under 18 Years	31	6,473	518,672	18.6%	21.9%	25.2%	-6.6%
18 to 34 Years	29	5,150	470,784	17.4%	17.4%	22.9%	-5.5%
35 to 44 Years	15	2,831	248,523	9.0%	9.6%	12.1%	-3.1%
45 to 64 Years	60	8,761	548,945	35.9%	29.7%	26.7%	9.2%
65 and over	32	6,473	272,255	19.2%	21.3%	13.2%	6.0%

Source: U.S. Department of Commerce 2014; all data are from the 2010 Census

Over 84 percent of the residents in Grant County have a high school diploma or higher degree, and 31 percent have a bachelor’s degree or higher (Headwaters Economics 2013). The percentages of high school and college graduates within Grant County are within two percentage points of the State of New Mexico as a whole indicating that there is not an education disparity between the two. (*Table 3.6-2*).

Table 3.6-2 2011 Educational attainment for Grant County and New Mexico

Educational Level	Grant County (2008-12 ACS)	New Mexico (2008-12 ACS)	Difference between Grant County and New Mexico
Total population 25 years or older	20,803	1,333,926	
No high school diploma	15.80%	16.6%	-0.8%
High school graduate	84.10%	83.4%	0.7%
Associate's degree	7.50%	7.5%	0%
Bachelor's degree	13.40%	14.6%	1.2%
Graduate or professional	10.80%	11.0%	0.2%

Source: Headwaters Economics 2013

Grant County is a rural county with a cultural and economic history dependent on agriculture, ranching, and mining. The Mimbres Valley to the east is an agricultural center. Cattle grazing and livestock production were introduced in Grant County in the 1870s (Grant County 1994) and is still an important part of the area's economy (Angelou Economics 2012). Mining has always been an important resource in the region. Since the early nineteenth century, the economy of Silver City and the surrounding area has fluctuated with mining activities and commodity prices.

In the past, local growth trends have been cyclical, typically expanding and contracting with the demand for copper and other metals. However, as the Silver City area has grown, it has become more diversified, and is less subject to large fluctuations in population due to changes in the mining industry (Mitchell et al. 2008). During the early 1980s approximately one-third of all employees within Grant County were employed by the mining industry; by 2007 this had declined to only 11 percent (Rasker et al. 2008). The diversification in the economy of Grant County is attributed to increases in the percentage of the workforce within the service sector, government, and Western New Mexico University as opposed to the mining industry (Headwaters 2013).

Freeport-McMoRan remains one of the primary employers across all sectors and plays an important role in providing personal income and tax revenues for Grant County. *Table 3.6-3* shows taxes paid, purchases, and wages for all Freeport-McMoRan mining operations in Grant County in 2012.

Table 3.6-3 Freeport-McMoRan economic impact in millions of dollars 2012

Category	Direct Impact*	Category	Secondary Impact*	Total Impact*
Impact on Grant County				
Compensation	112.3	Spending by employees	23.6	162.2
Business taxes	3.2	Spending from new tax revenues	4.8	
Vendor purchases	9.6	Spending from pension income	3.0	
		Vendor purchases	5.7	
Impact on New Mexico				
Compensation	147.3	Spending by employees	50.8	339.9
Business taxes	5.4	Spending from new tax revenues	43.5	
Vendor purchases	52.1	Spending from pension income	7.1	
		Vendor purchases	33.7	

Source: The L. William Seidman Research Institute, Arizona State University 2012

* All amounts are in millions of dollars

In 2011, Grant County’s resident civilian labor force numbered 13,121 persons, of whom 4.5 percent were unemployed (U.S. Department of Commerce 2013b). Currently, Grant County’s largest single employer is Freeport-McMoRan, with approximately, 1,650 employees and 300 contractors currently working at New Mexico mine operations (personal communication Lynn Lande 2014). Other major employers include Western New Mexico University, Gila Regional Medical Center, Silver Consolidated Schools, and Cobre Consolidated School District. Most jobs within Grant County come from the educational and healthcare, agricultural and mining, and retail sectors. Employment figures that represent averages for employment during the 5-year period from 2008 through 2012 are presented in **Table 3.6-4**.

Current operations at Cobre’s Continental Mine are minimal. There are an estimated 18 Freeport-McMoRan employees and 20 contract employees currently working at Cobre’s Continental Mine, including those involved in hauling magnetite off site via truck (Cobre 2014e). This workforce represents less than 2 percent of Freeport-McMoRan’s employment in Grant County.

Table 3.6-4 Grant County employment by industry, 2008 to 2012 ACS 5-year estimates

Sector	Number Employed	Percent
Agriculture, forestry, fishing, hunting, and mining	1,614	13.8
Construction	914	7.8
Manufacturing	194	1.7
Wholesale trade	79	0.7
Retail trade	1,149	9.8
Transportation, warehousing, and utilities	354	3.0
Information	209	1.8
Finance, insurance, real estate, rental, and leasing	506	4.3
Professional, scientific, management, administrative, and waste management services	702	6.0
Educational services, health care, and social assistance	3,846	32.9
Arts, entertainment and recreation, accommodation, and food services	886	7.6
Other services, except public administration	545	4.7
Public administration	703	6.0
Total	11,701	

Source: Headwaters Economics 2013

Approximately 67 percent of the households in Grant County earn income from labor or employment sources, 44 percent earn income from Social Security, 27 percent earn retirement income, and 14 percent receive assistance from the Food Stamps/Supplemental Nutrition Assistance Program (food stamps). The total income sources add up to more than 100 percent because they reflect multiple sources of income for single households and individuals holding more than one job (Headwaters Economics 2013). In 2012, the average per capita income in Grant County was \$22,415 or \$1,334 less than the per capita income of New Mexico at \$23,749 but within the margin of error stipulated within the ACS estimate.

As of 2012, Grant County had a total of 14,663 dwelling units, of which 12,307 were occupied (Headwaters Economics 2013). In Grant County, 2,356 (16.1 percent) were vacant and of this 862 dwellings were reported for recreational or seasonal use. At the time of the 2010 Census, the Hanover CDP had 96 total dwelling units, 73 of which were occupied, 3 reported for recreational or seasonal use,

and 23 (24 percent) were vacant (U.S. Department of Commerce 2013a). Cobre owns much of the housing in the Fierro-Hanover area, and much of the housing has been vacant since the mine closure in the 1980s.

Community resources in Hanover Valley include St. Anthony's Church near Cobre's Continental Mine on Fierro Road and the Fierro Cemetery. Most commercial facilities, including gas stations, stores, or restaurants are located in Bayard or Silver City. Recreational opportunities are limited within Hanover Valley but are present in adjacent areas within the Silver City District of the Gila National Forest and BLM – Mimbres Resource District.

3.6.2 Environmental Consequences: Direct & Indirect Effects

3.6.2.1 Alternative 1 – No Action

The upgrade and construction of the facilities described (see *Figure 2-1*) would result in short-term temporary employment opportunities in the local economy because of an increase in temporary construction jobs. The initiation of operations and on-site processing of the ore at Cobre's Continental Mine would require an estimated 394 full-time employees. The availability of local labor to fill the needed positions is difficult to predict and depends on other economic activity in the area and the skill level of local residents. It is anticipated that most workers would be hired locally; therefore, potential impacts to the local economy from increased annual demands for goods and services would be low. Direct and indirect impacts to the local and regional economy as a result of new employment opportunities are anticipated to be negligible and temporary.

The population within Hanover CDP does not differ significantly from Grant County and New Mexico with regards to education. In addition, the percentage of the population of Hanover CDP that is over 45 years of age is higher than in Grant County and New Mexico (*Table 3.6-1*). Individuals who are retired or nearing the age of retirement are vulnerable to changes with regards to socioeconomic status (American Psychological Association [APA] 2000). However, the No Action Alternative would not be anticipated to negatively impact the local and regional economy. Furthermore, an estimated \$8 million in Property and Severance and Resources taxes would be generated for Grant County and New Mexico as a result of the No Action Alternative (email E. Welker to L. Lande 5.23.14).

There is a post office along Fierro Road and one bar along State Highway 152 east of Fierro Road. There are currently no other commercial facilities, including stores and gas stations, along Fierro Road or within approximately 7.5 miles of the intersection of Fierro Road and State Highway 152. Additional mine-related traffic along State Highway 152 is not expected to generate increased income opportunities that would promote development of commercial facilities.

Using the increased vehicle traffic estimates provided in *Section 3.5*, a cost analysis was conducted to determine the potential increased service costs for the area. The analysis used the approximately 3-mile stretch of Fierro Road as the primary affected roadway. Roadway costs are variable based on location and road type. For the purposes of this analysis the roadway costs used were those presented within FHWA (1997) and Litman and Doherty (2011) and are based on U.S. highways. It should be noted that service costs are not the sole responsibility of the community where the action is located. In the case of

transportation, funding is allocated from both state and Federal sources to cover a portion of the costs (Litman and Doherty 2011). As such, for this analysis costs were limited to those not covered by state or Federal funding sources and were also limited to cost directly related to operation, maintenance, and law enforcement. Cost estimates were based on miles per vehicle and adjusted per vehicle type (FHWA 1997, Litman and Doherty 2011)⁶.

The analysis resulted in an estimated increase in costs to the local area⁷. The increases to road maintenance and upkeep based on the estimated average increases to traffic volume (**Section 3.5**) are \$3,316 per annum and \$5,101 per annum for the estimated peak traffic increases. The increases to roadway patrol and safety are \$1,020 per annum for the average traffic volume increases and \$1,569 for peak traffic volume increases. The resulting totals are an increase of \$4,337 per annum for the estimated average traffic increases and \$6,671 per annum for the estimated peak traffic increases.

During scoping, concerns were raised about the potential effects to St. Anthony's Church, an important feature of the community. There is a 1997 agreement between the Cobre Mining Company and the Fierro Preservation Association that identifies commitments by Cobre designed to preserve and maintain St. Anthony's Church and the cemetery in response to the proposed expanded mining activities at that time. These "proposed expanded mining activities" addressed in the Agreement would be on-site milling, leaching, and electro-winning, which are all part of the No Action Alternative. The agreement includes the establishment of a committee of community members and Cobre personnel that: "shall develop and enact whatever action is necessary to preserve the church structure and to stabilize the church walls and grounds to correct and prevent damage to the church structure by erosion..." Access to the church and cemetery would not be affected by the No Action Alternative.

3.6.2.2 *Alternative 2 – Proposed Action*

As in the No Action Alternative, under the Proposed Action Alternative mining of both the Continental Mine Pit and Hanover Mountain Deposit would commence, however, mine-related traffic would primarily use the proposed Haul Road. Mine operation activities under the Proposed Action Alternative would require approximately 166 full-time employees plus 13 to 15 administrative personnel. It is anticipated that most workers would be hired from the local work force; therefore, potential impacts to the local economy from increased annual demands for goods and services would be low. It is likely that some additional supervisors and administrative staff may be required that may be hired from outside Grant County. Therefore, direct and indirect impacts to the local and regional economy associated with new employment opportunities are anticipated to be negligible and temporary.

The population within Hanover CDP does not differ significantly from Grant County and New Mexico with regards to education. In addition, the percentage of the population of Hanover CDP that is over 45 years of age is higher than in Grant County and New Mexico (**Table 3.6-1**). Individuals who are retired or nearing the age of retirement are vulnerable to changes with regards to socioeconomic status (APA 2000). However, the Proposed Action Alternative is not anticipated to negatively impact the local

⁶ The estimate does not factor in changes to haul weight of delivery trucks or impacts based on traffic controls including lowered speed limits.

⁷ Local area is defined as the parties responsible for funding the portion of roadway costs not covered under Federal or state funding.

and regional economy. Furthermore, an estimated \$8 million in Property and Severance and Resource taxes would be generated for Grant County and New Mexico as a result of the Proposed Action Alternative (email E. Welker to L. Lande 5.23.14).

3.7 SOILS

3.7.1 Affected Environment

Six map units were identified in the vicinity of the proposed activities by the U.S. Department of Agriculture (USDA) Soil Conservation Service (Soil Conservation Service 1983) including the Santa Fe-Rock outcrop, Oro Grande-Rock outcrop, Gaddes-Santa Fe-Rock outcrop, Encierro-Rock outcrop, Sampson-Dagflat, and Santana-Rock outcrop complexes (*Figure 3.7-1*). General soil characteristics of each map unit, including erosion potential, are summarized in *Table 3.7-1*. Soil erosion is the removal of material from the surface soil, which is the part of the soil having an abundance of nutrients and organic matter vital to plant growth. The most common forces causing soil erosion are water and wind (Muckel 2004). Water and wind erosion hazards are determined by the soil type and by the slope of the terrain.

The Oro Grande-Rock outcrop complex and Santa Fe-Rock outcrop complex are the most commonly found mapped units in the project area. Much of the area has already been disturbed by previous and current mining activity and is mapped as the Pits-Dumps association. The Oro Grande-Rock outcrop complex and Santa Fe-Rock outcrop complex are typically composed of shallow, well-drained soils interspersed with barren bedrock outcrops.

Soils vary in depth, quality, and quantity across the project area (BLM 1998). A majority of the soils within the No Action and Proposed Action Alternative areas contain very gravelly, stony, or cobbly components and have soil depths of less than 20 inches. Soils occurring on relatively flat surfaces have low to moderate potential for water and wind erosion, whereas other areas are characterized by high wind erosion hazards (BLM 1998). Undisturbed soils in the area are evaluated to determine which areas would provide suitable materials for future reclamation activities. Salvageable material is generally found in grassland areas having gentle to concave slope with few surface rocks, while soil availability is limited on steeper slopes (BLM 1998). Materials determined to be suitable for future reclamation activities would be salvaged and stored at on-site locations.

In general, the soils within the project area are not considered suitable for agricultural uses, and there are no prime or unique agricultural lands within the project area.

Table 3.7-1 A summary of the characteristics, surface texture, and erosion potential of the native soil types found within the footprint of the No Action and Proposed Action Alternatives

Soil Type	Alternative		Terrain	Characteristics	Surface Texture	Avg. Soil Depth (inches)	Erosion Hazard (water/wind)
	No Action	Proposed Action					
Santa Fe-Rock outcrop complex 20-45% slopes; 25% rock outcrop	x	x	hills, mountains, ridges	well drained; shallow and rock outcrop	gravelly sandy loam; barren bedrock	16	moderate/high
Oro Grande-Rock outcrop complex 25-75% slopes; 30% rock outcrop	x	x	hills and mountains	well drained; shallow and rock outcrop	cobbly loam; barren bedrock	12	moderate/ slight
Gaddes-Santa Fe-Rock outcrop complex 15-45% slopes; 15% rock outcrop	x	x	ridges and hills	well drained; moderately deep	gravelly sandy loam; gravelly loam; gravelly clay loam; barren bedrock	18	moderate/high
Encierro-Rock outcrop complex 15-35% slopes; 25% rock outcrop	x	x	hills and ridges	well drained, shallow and rock outcrop	gravelly loam; barren bedrock	9	moderate/moderate
Sampson-Dagflat complex 3-12% slopes		x	bottom and side of intraridge valleys	well drained; deep	loamy sand; loam	45	moderate/high
Santana-Rock outcrop complex 1-25% slopes; 40% rock outcrop		x	hills and ridges	well drained, shallow and rock outcrop	loam; gravelly loam	12	moderate/moderate

Adapted from MPO Amendment No. 5 (Cobre 2012) and data from the Soil Conservation Service (1983).

3.7.2 Environmental Consequences: Direct & Indirect Effects

3.7.2.1 Alternative 1 – No Action

Implementation of the No Action Alternative would result in the loss of currently undisturbed native soils from vegetation clearing; construction activities, including cut and fill grading; excavating; and salvaging and storing suitable growth material. The acreage of each soil type by facility for the No Action Alternative is presented in *Table 3.7-2*. None of the soil types have been identified as suitable for agricultural crop production or are within an area considered prime or unique agricultural lands.

Undisturbed soils that would be altered or removed under the No Action Alternative are associated primarily with the excavation of the privately owned portion of Hanover Mountain, development of the Humbolt Leach Pad, the expansion and development of the Fierro Leach Pad, and construction of the Solution Extraction/Electro-winning facility. Expansion of the SWRDF along the eastern and western boundaries and construction of the administration buildings would account for some loss of soils but are located in areas that have been previously disturbed. Construction of the 69-kV powerline would result in limited areas of disturbance at the pole locations and along access roads.

Prior to construction and mining of the Hanover Mountain Deposit and development of the Fierro and Humbolt Leach Pads, suitable growth media would be salvaged from the previously undisturbed areas

and stored at designated sites on private lands within Cobre's Continental Mine for future reclamation and closure activities.

Table 3.7-2 Disturbance by soil types and areas within No Action Alternative activity areas¹

Mine Feature	Hanover Mountain	Fierro Leach Pad	Humbolt Leach Pad	SWRDF	SX/EW ² Facility	69-Kv Powerline Relocation ³	Administrative Buildings
Soil Type	Acreage by Soil Type						
Santa Fe-Rock outcrop complex	102	5.1	6.5	22	1	N/A	0
Oro Grande-Rock outcrop complex	36	0	143	2.1	0	N/A	0
Gaddes-Santa Fe-Rock outcrop complex	0.29	48	0	0	12.7	N/A	0
Encierro-Rock outcrop complex	0	0.3	0	0	0	N/A	0.3
Existing Mine Disturbed Area (per NRCS soils map)	1.8	3	0	0	0	N/A	0
NRCS Soil Mapping Not Available – Unmapped	0	0	0	0	0	N/A	0
Total Acres⁴	140.1	56.4	149.5	24.1	13.7	3.0⁵	0.3

¹ Surface disturbance within proposed facility footprints not mapped as "pit-dumps association" by the USDA Natural Resource Conservation Service (NRCS 2011), such as drill roads or existing dirt roads, are included in the soil type acreage.

² Solution Extraction/Electro-winning facility.

³ Disturbed soil acreage assumes a structure every 400 to 600 feet and the disturbance per pole would be 40 by 60 feet (BLM 1997).

⁴ Variations in total acreage from the description in *Chapter 2* are the result of rounding differences (Telesto 2014a).

⁵ Total acreage of disturbance by soil type does not include values for the 69-kV powerline, and the sum of impacts by soil type does not equal total acreages of soil impacts by mine feature.

Cobre's Continental Mine is managed in accordance with approved stormwater management plans. Within the mine, stormwater controls such as berms, catchment basins, and wattles would be used to limit water and wind erosion of exposed soil surfaces. Stormwater management features and practices limit the amount of water that falls on mine-impacted surfaces from leaving the mine facility. Increased soil erosion from wind and surface water outside of the mine facility boundaries would not be expected.

Excavation, transportation, and placement of cover materials would promote the breakdown of soil aggregates into loose soil particles. Removal of vegetation and movement of rock materials would increase the potential for wind and water erosion on the stockpiles (BLM 1998). Blading and or excavation of remaining subsoil materials to achieve desired grades and soil conditions could result in steeper slopes on exposed soils, mixing of soil materials, and the additional breakdown of subsoil aggregates.

Potential indirect effects of soil destabilization and erosion would include dust generation and off-site deposition. Off-site stream sedimentation would be minimized using standard erosion control practices (*Section 2.1.2.12*). Dust generated by vehicular traffic would be reduced by using standard dust abatement practices (*Section 2.1.2.12*).

Measures to stabilize and protect growth material stockpiles would be implemented in accordance with MMD guidelines to minimize soil loss.

Reclamation efforts would be implemented in accordance with all state permits and would be designed to stabilize soils and provide vegetative cover systems to establish a self-sustaining ecosystem (Cobre 2012).

3.7.2.2 Alternative 2 – Proposed Action

Native soil types impacted by the Proposed Action Alternative are listed in **Table 3.7-3**. Impacts would be similar to those described for the No Action Alternative for soil loss and erosion potential. Under the Proposed Action Alternative, soils disturbance would occur from the grading and construction of the proposed Haul Road, expansion of the SWRDF, construction and use of the North Overburden Stockpile, and mining of BLM slivers on Hanover Mountain. Potential slope instability and erosion issues associated with the BLM spires would be removed because these slivers would be mined.

None of the soil types present within the Proposed Action Alternative Footprint have been identified as suitable for agricultural crop production or are within an area considered prime or unique agricultural lands.

Prior to construction and mining of both the privately held portion and BLM slivers on the Hanover Mountain Deposit, suitable growth media would be salvaged from the previously undisturbed areas and stored at the North Overburden Stockpile for future reclamation and closure activities.

A vegetated cover system would be established on the North Overburden Stockpile in accordance with New Mexico rules and regulations. After closure activities have been completed, biological processes associated with soils within the footprint of the North Overburden Stockpile are expected to resume. As under the No Action Alternative, Cobre's Continental Mine is managed in accordance with approved stormwater management plans. Stormwater controls and management practices associated with such plans limit water and wind erosion both within and outside of the mine. Measures to stabilize and protect growth material stockpiles would be implemented in accordance with MMD regulations to minimize soil loss.

Construction of the proposed Haul Road would affect the six native soil types identified within the Project Footprint (**Table 3.7-3**). The proposed Haul Road would be constructed using conventional cut and fill grading techniques; importation of soil and road material is not expected. Soil and rock material from the cut slopes would be used for road surfacing materials and safety berms. Construction activities and compaction of soils within the proposed Haul Road would impede soil productivity functions within the road alignment. The proposed Haul Road would be reclaimed in accordance with New Mexico rules and regulations at closure.

Table 3.7-3 Disturbance by soil types and areas within Proposed Action Alternative activity areas^{1,2}

Mine Feature	Proposed Haul Road	Hanover Mountain ³	North Overburden Stockpile and Haul Road	SWRDF Expansion	SWRDF Dam 2	Proposed Utility Corridor	Admin Offices
Santa Fe-Rock outcrop complex	32	103	0.7	6.3	0.8	4	0
Oro Grande-Rock outcrop complex	0.6	35.9	18.6	0	0	1.5	0
Gaddes-Santa Fe-Rock outcrop complex	45	0.29	0	0	0	7.5	0.3
Encierro-Rock outcrop complex	19	0	0	0	0	0	0
Sampson-Dagflat complex	4.2	0	0	0	0	0	0
Santana-Rock outcrop complex	3.2	0	0	0	0	0	0
Existing Mine Disturbed Area ⁴	0	1.8	0	0	0	0	0
Total Acres	104	141	19.3	6.3	0.8	13	0.3

¹ Surface disturbance within proposed facility footprints not mapped as "pit-dumps association" by the Natural Resource Conservation Service, such as drill roads or existing dirt roads, are included in the soil type acreage.

² Variations in total acreage from the description in *Chapter 2* are the result of rounding differences (Telesto 2014a).

³ Impacted acreage by soil type at the Hanover Mountain Deposit includes the BLM-administered land and privately owned parcels as described for the No Action Alternative.

⁴ Per Soils Conservation Service (1983) soils map.

Expansion of the SWRDF on BLM-administered land would result in the loss within its footprint of native soils that are not salvaged for future reclamation and closure activities. Following covering and closure of the SWRDF expansion area, the physical, chemical, and biological activities normally associated with soil systems are expected to slowly resume within the cover material and to support the reclamation activities and post-mining land-use objectives.

Potential indirect effects of soil destabilization and erosion would include dust generation and off-site deposition. Off-site stream sedimentation would be minimized using standard erosion control practices (*Section 2.1.2.12*). Dust generated by vehicular traffic would be reduced by using standard dust abatement practices (*Section 2.1.2.12*).

Reclamation efforts would be implemented in accordance with all state permits and would be designed to stabilize soils and provide vegetative cover systems to establish a self-sustaining ecosystem (Cobre 2012). Information from site-specific soil surveys would be used to determine the amount of suitable growth material available for salvage and use during reclamation activities.

3.8 GEOLOGY

3.8.1 Affected Environment

The project area is located within a broad transitional zone between the Colorado Plateau and the Basin and Range Province (Jones et al. 1967). Within this region, northwest-trending faults, such as the Mimbres and Silver City Faults, and northeast-trending faults, such as the Barringer, Nancy, and

Groundhog Faults, define a broad area of uplift in the Central Mining District called the Santa Rita Horst. The Santa Rita Horst has a surface area of about 40 square miles (Hillesland et al. 1995; Jones et al. 1967). Seismic activity within the project area is low with generally long recurrence intervals. Earthquake magnitudes in the region have typically been less than 4.0 on the Richter scale (BLM 2000).

The geology of the northern part of the Central Mining District where the Cobre's Continental Mine is located is complex (*Figures 3.8-1 and 3.8-2*). Jones et al. (1967) provides a comprehensive chronology of structural and igneous events of the district. The structural features most relevant to Cobre's ore are the Barringer Fault and the Hanover Fierro Stock. The Hanover Fierro Stock consists primarily of granodiorite porphyry and is approximately 5,000 feet wide trending northerly for about 12,000 feet. The Barringer Fault is associated with strong iron-oxide staining and is up to 200 feet wide in the Continental Mine Pit. Both the Barringer Fault and the Hanover Fierro Stock have played major roles in the mineral enrichment of the area.

The stratigraphy in the vicinity of the proposed activities consists of Paleozoic carbonate rocks with minor shales and sandstones unconformably overlain by the late Cretaceous Colorado Formation siltstones and shales. These sedimentary rocks are highly faulted and intruded by late Cretaceous to early Tertiary (Laramide) stocks, sills, dikes, and laccoliths. Mineralization accompanied the Laramide intrusions. Tertiary volcanics were then deposited over the area. Late Tertiary to recent uplift and erosion have exposed the mineralized intrusives and adjacent sedimentary rocks and also resulted in the formation of fault bounded valleys filled with alluvium. Important stratigraphic units for mineralization at Cobre's Continental Mine are the Lake Valley, Oswaldo, and Syrena Formations. These are limestones with interbedded shales and are generally preferentially mineralized over the older Paleozoic dolomitic rocks, such as the El Paso, Montoya, and Fusselman Formations (BLM 2000).

3.8.2 Environmental Consequences: Direct & Indirect Effects

3.8.2.1 Alternative 1 – No Action

The Continental Mine Pit and Hanover Mountain Deposit would be mined under the No Action Alternative and result in the extraction of approximately 123 million tons of ore over the 10-year period. Approximately 2.16 million tons of cover material from Hanover Mountain would be removed and placed at existing authorized facilities on privately owned land. Additionally, an estimated 81 million tons of waste rock would be deposited on the SWRDF. About 1 acre (0.29 of BLM-administered land, plus the 25-foot buffer area) of the Hanover Mountain Deposit would not be mined under the No Action Alternative. Approximately 360,000 tons of ore and waste rock would be left in the slivers (Telesto 2014b). The visual effects of the removal of Hanover Mountain are addressed in *Section 3.4*. The ore bodies are located at or near the earth's surface due to Late Tertiary to relatively recent uplift and erosion. The local geological processes other than the removal of economically viable copper ore within the footprint of the No Action Alternative would not be affected.

The proposed expansion of the Continental Mine Pit would be constructed to provide stable open pit high-walls consistent with safe mining practices. The current pit design uses initial slopes of 45 degrees between ramps from the crest of the mine to the pit bottom and a 50-foot bench height for the proposed

resumption of mining activities. Standard mining practices would be employed during operations to monitor open pit stability to manage pit stability in accordance with applicable MSHA regulation and Cobre policy and regulations.

Proposed mining at Hanover Mountain would not form a traditional open pit. The pit floor elevation would be mined to 6,750 feet above mean sea level (amsl) in accordance with existing NMED permits. This elevation provides for positive drainage to prevent the formation of a pit lake. At reclamation the resulting land surface would be blended into surrounding topography so as not to impound or retain water or allow for inundation from Hanover Creek (Cobre 2012). The high-walls formed during mining of the Hanover Mountain Deposit, would be expected to be relatively short. The exposed geology of the high-walls would change as the mining activities progress, and refinements to the high-wall slope design would be made by the mine planners accordingly. However, one notable exception to this would be mining activities in the vicinity of two parcels of BLM-administered land within the footprint of the Hanover Mountain Deposit. Avoidance of these parcels would require creation of a tall high-wall as described below.

Until completion of cadastral survey in 2010, all of Hanover Mountain was thought to be privately held. The cadastral survey identified two parcels of BLM-administered land located on the south slopes of the mountain: one 0.02 acres in size and the second 0.27 acres in size (*Figure 2-3*). Under the No Action Alternative, these two parcels totaling 0.29 acres, plus a 25-foot buffer, would not be mined. Cobre has determined that avoidance of these parcels during mine operations on Hanover Mountain does not preclude economic mining of the private lands that make up the balance of Hanover Mountain Deposit (Telesto 2012). As the private lands on Hanover Mountain are mined, the two BLM parcels and adjoining private land would be left as spires within the Hanover Mountain Deposit (*Figure 2-3*). To proceed with mining without access to these parcels, a 25-foot buffer would be placed around each of the BLM parcels. As mining progressed a 0.8:1 horizontal to vertical high-wall that extends from the existing land surface to the pit bottom would be left. The maximum high-wall height would be approximately 350 feet. The rock beneath and surrounding the parcels is competent and is expected to stand at a 0.8:1 vertical slope (Telesto 2012). Approximately 1 acre would be removed from ore development by avoiding surface disturbance on the 0.02- and the 0.27-acre parcels. Fluctuations in the price of copper or improvements in technology may result in minor changes to the mine plan.

3.8.2.2 *Alternative 2 – Proposed Action*

Impacts to geologic resources from implementation of the Proposed Action Alternative would be similar to the impacts expected by implementation of the No Action Alternative with the exception of mining the BLM-administered slivers on Hanover Mountain. Mining of the Hanover Mountain Deposit under the Proposed Action Alternative would authorize access to 0.29 acres of BLM inholdings and eliminate the formation of two rock spires within Hanover Mountain. This would also provide access to an additional 1.0 acre of BLM land and private land for ore development. Approximately 360,000 tons of ore and waste rock from the slivers would be available for mining under the Proposed Action Alternative (Telesto 2014b). The Continental Mine Pit and Hanover Mountain Deposit will be mined under the No Action and

Proposed Action Alternatives with little difference to the resulting overall landscape. The visual effects are documented in this EA in **Section 3.4**.

The proposed Haul Road alignment passes through or near several historical underground mine workings in the Snowflake, Pewabic/Philadelphia, and Kearney areas but avoids the largest openings at the north end of the road alignment (Cobre 2012). Cobre (2012) has indicated in their MPO that the historical underground mine workings in these areas are not all well mapped and that there is the possibility that the vertical proximity of these workings may affect the geotechnical stability of the proposed Haul Road. To ensure the integrity and safety of the proposed Haul Road, Cobre would conduct a geotechnical evaluation prior to construction and implement monitoring and mitigation measures as determined by the results of the evaluation. This is an operational efficiency and safety concern and would not adversely affect the Public or adjacent undisturbed BLM-administered lands.

3.9 SURFACE WATER RESOURCES

3.9.1 Affected Environment

The majority of the Proposed Action and No Action Alternatives are located in the Hanover Creek watershed, which encompasses an area of 10.8 square miles. A small portion of the No Action Alternative, the Humbolt Leach Pad, crosses the Hanover Creek Watershed boundary into the North Star Basin Watershed. As part of Condition No. 32 of NMED permit DP-1403, Cobre is required to investigate all known areas of groundwater and surface water contamination and potential sources of contamination and define the extent and magnitude of contamination (Telesto 2011).

The Hanover Creek Watershed ranges in elevation from approximately 6,000 feet where Hanover Creek enters Whitewater Creek, to 7,820 feet north of Hanover Mountain in the Piños Altos Range. Hanover Creek runs north to south through the middle of Hanover Valley. It is intermittent with a short reach of perennial flow near its confluence with Poison Spring Drainage (**Figure 3.9-1**; Telesto 2011; Ecosphere 2014). The majority of the tributary drainages within the Hanover Creek Watershed are ephemeral, though there are a few springs, seeps⁸, and perennial or intermittent stream segments⁹. Hanover Creek joins Whitewater Creek near the town of Bayard. Whitewater Creek continues southward, joining the San Vicente Arroyo, before discharging to the Mimbres River about 23 miles south-southwest of Hurley and 28 miles from the proposed project area.

⁸ Seeps and springs occur where groundwater discharges to the surface. Seeps and springs are generally distinguished by the rate of discharge. A seep is a low-volume discharge that is not of sufficient volume to generate stream flow for any distance.

⁹ BLM definitions of perennial, intermittent, and ephemeral are followed in this document. Other state and Federal laws may use different criteria for classification of waters, which may result in different classifications from those provided here. Streams are classified as being perennial, intermittent, or ephemeral by the BLM following the conventions of the USGS (BLM 1998): *Perennial* - A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow. *Intermittent* or *seasonal* - A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. *Ephemeral* - A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

The Beartooth Creek sub-basin is within the North Star Basin Watershed. Beartooth Creek discharges to an ephemeral reach of Ansones Creek that joins a perennial stretch of Cameron Creek approximately 2.9 river miles downstream from the proposed Humbolt Leach Pad (Tierra 2012). Cameron Creek becomes intermittent/ephemeral near the town of Bayard and continues south to the San Vincent Arroyo, ultimately discharging to the Mimbres River south of the Grant County line.

The Hanover Creek and North Star Basin watersheds are 6,904 and 4,121 acres, respectively. For purposes of this discussion we have delineated 10 smaller sub-basins within the Hanover Creek Watershed and one within the North Star Basin Watershed (*Table 3.9-1*). These smaller watersheds, described in greater detail below, range in size from 228 to 1,970 acres. Existing mine facilities, flow regime of the principal drainage features, and the presence of seeps and springs within each of the smaller delineated watersheds within the Hanover Creek Watershed and the North Star Basin Watershed are described below.

Table 3.9-1 Summary of surface water features present within the project area, by watershed and delineated sub-basin

Watershed	Sub-Basin	Area (acres)	Surface Water Hydrologic Regime	Seeps and Springs
Hanover Creek (6,904 acres)	Cobre Continental Mine	1,169	Surface water managed in accordance with stormwater management plans; mine water managed in accordance with state law; Poison Spring is in this sub-basin, upgradient of the Main Tailings Impoundment	1
	Grape Gulch	559	Discharges to Hanover Creek; drainages are mostly ephemeral with a small section of perennial flow near headwaters	2
	North Hanover Creek	857	Headwaters of Hanover Creek; drainages are all ephemeral	3
	Jim Fair	367	Ephemeral drainages discharge to Hanover Creek; small intermittent reach of Hanover Creek at confluence with Poison Spring	0
	Snowflake Canyon	238	Ephemeral drainages discharge to Hanover Creek	0
	Philadelphia	798	Ephemeral drainages discharge to Hanover Creek	0
	South Hanover Creek	1,970	Ephemeral drainages discharge to Hanover Creek	0
	Union and Zinc Hills	269	Ephemeral drainages discharge to Hanover Creek	0
	Buckhorn Gulch	448	Discharges to Hanover Creek; drainages are mostly ephemeral with a small section of perennial flow at the confluence of the east and west forks	1
	Poison Spring	228	Discharges to Hanover Creek; small section of perennial flow 2,200 ft. upgradient of Hanover Creek	0
North Star Basin (4,121 acres)	Beartooth Creek	1,082	Ephemeral drainage discharges to ephemeral reach of Ansones Creek	0

Cobre's Continental Mine currently occupies 1,169 acres of the Hanover Creek Watershed (**Figure 3.9-1**). Surface water within the Continental Mine sub-basin is managed in accordance with stormwater management plans. Large portions of this basin are managed to contain surface water runoff, and these areas do not discharge to the balance of the Hanover Creek Watershed. Poison Spring discharges to the Poison Spring Drainage upgradient of the Main Tailings Impoundment, and surface flows in this channel flow into the Main Tailings Impoundment. Where stormwater discharges from this basin it is monitored and reported in accordance with the requirements of the EPA MSGP.

In the Hanover Creek Watershed, a small segment of perennial surface flow occurs near the headwaters of Grape Gulch; approximately 1 mile west of Hanover Creek. This flow appears to be associated with two springs: Grape Gulch and GAP-1 springs (Ecosphere 2014). Both springs and the area of perennial flow within the Grape Gulch sub-basin are located upgradient and outside of the disturbance area for the proposed activities.

Fierro Spring (also known as Posito Spring) is located at the headwaters of Hanover Creek in the North Hanover Creek sub-basin (Telesto 2011). Two natural seeps, HSN-1 and HSN-2, are located in an unnamed tributary to Hanover Creek northeast of Hanover Mountain (Telesto 2011). HSN-1 and HSN-2 have naturally occurring background concentrations of iron, manganese, and cobalt that exceed regulatory groundwater standards (Telesto 2011).

A small reach of Buckhorn Gulch, just south of the SWRDF, is perennial, with surface flow sustained for a short distance at the confluence of the east and west forks of the drainage near Buckhorn Gulch Spring (Telesto 2011, 2013a; Ecosphere 2014). Base flow from the spring ranges from less than 1 gallon per minute just prior to the monsoon season to as high as 10 gallons per minute after the monsoon season (Cobre 2014b). Stream flow downstream of Buckhorn Spring ranges from a few inches to several feet in width and depth depending on geometry of the underlying bedrock (Cobre 2014b). Upgradient of the spring, flow in Buckhorn Gulch Drainage is intermittent (Ecosphere 2014). Total dissolved solids (TDS) levels in this drainage can exceed 2,000 milligrams per liter (Telesto 2013a), and pH has ranged between 7.2 and 7.9 (Ecosphere 2014). There is a small reach of perennial flow in the Poison Spring Drainage (Telesto 2011). TDS levels in this area are historically high and often exceed 2,500 milligrams per liter (Telesto 2005, 2011; Ecosphere 2014), and pH is also elevated, averaging 9.3 (Jennings 1999; Ecosphere 2014).

All of the drainage features within the Jim Fair, Snowflake Canyon, Philadelphia, and South Hanover Creek sub-basins are ephemeral arroyos or vegetated swales with no known seeps or springs.

Under the No Action Alternative, a portion of the Humbolt Leach Pad would be constructed within the Beartooth Creek sub-basin of the North Star Basin Watershed. There are no known seeps or springs within this sub-basin, and all of the drainages within the sub-basin are ephemeral.

Current operations at Cobre's Continental Mine are regulated by NMED's Groundwater Quality Bureau, Mining Environmental Compliance Section. The Continental Mine operates under two NMED operational discharge permits, DP-181 and DP-1056, and a supplemental Discharge Permit, DP-1403. As described in Telesto (2011), DP-181 and DP-1056 were issued to "ensure that discharges of water contaminants from the Continental Mine Site into ground and surface water are controlled, so as to

protect ground and surface water for present and potential future use.” In addition, Cobre’s Continental Mine is operated under a MSGP in accordance with Clean Water Act National Pollutant Discharge Elimination System (NPDES) regulations.

3.9.2 Environmental Consequences: Direct & Indirect Effects

3.9.2.1 Alternative 1 – No Action

Adverse effects to surface water quality outside of the MSGP outfalls are not anticipated as a result of implementation of the No Action Alternative. Existing and new facilities would be managed in accordance with state and Federal surface and groundwater permits. Affected stormwater, seeps, and springs, and those waters that cannot be practicably released off property would be contained, monitored, and reported in accordance with state and Federal permit requirements. Surface waters that have the potential to exceed groundwater standards would be contained, and sediment transport would be limited using barriers like straw bales, berms, and retention ponds during construction and operational activities. The majority of the mine area would be managed to contain surface water and stormwater runoff or surface water from seeps or springs within active mine areas. Surface water contained within the mine area that is not suitable for discharge would be captured and diverted to Cobre’s water management system. Stormwater management features would be constructed for each new facility to capture surface water runoff in accordance with Cobre’s NMED discharge permits DP-181 and DP-1056, and the MSGP. Cobre holds surface water rights issued by the New Mexico Office of the State Engineer for the waters that would be temporarily and permanently collected or diverted by the No Action Alternative (Cobre 2014c).

The Hanover Mountain Deposit is located in both the North Hanover Creek and Grape Gulch sub-basins. The privately owned portions of the Hanover Mountain Deposit in both sub-basins would be mined resulting in the temporary loss of stormwater runoff to the down gradient systems. During mining, precipitation and snow melt runoff from the active mining area would be collected and transported to Cobre’s Continental Mine water management system. Shepherd Miller, Inc. (SMI) estimated that runoff from the vegetated slopes of Hanover Mountain is 0.21 inches per year (SMI 1999). During operations approximately 2.46 acre-feet per year could be temporarily lost from the Hanover Creek Watershed. Once surface water quality from reclaimed areas meets applicable surface water quality standards after reclamation, the stormwater management facilities associated with Hanover Mountain would be removed and stormwater runoff would be allowed to discharge into the North Hanover Creek and Grape Gulch sub-basins (Telesto 2009). The temporary loss of 2.46 acre-feet per year of runoff is relatively small when compared to the size of the Hanover Creek Watershed. Therefore, the impact on the local hydrologic system from this temporary loss is expected to be minimal.

Two seeps, HSN-1 and HSN-2, are located in the North Hanover Creek sub-basin, in an unnamed tributary to Hanover Creek, on the northeast flank of Hanover Mountain. The water source for these seeps is the North Cretaceous Aquifer (see *Section 3.10*). Water quality at HSN-1 and HSN-2 is poor and contains naturally occurring background concentrations of iron, pH, and cobalt that exceed regulatory groundwater standards (Telesto 2011). Although not within the footprint of the Hanover Mountain Deposit, the small volume of discharge from these seeps would likely be reduced by mine operations. No

impact to the local hydrologic system (quantity or quality) is expected from the loss of the small volume of flow from these seeps.

The Solution Extraction/Electro-winning facility would be located in the Jim Fair sub-basin and would result in the temporary loss of runoff from approximately 13.3 acres of the 367-acre Jim Fair sub-basin (*Table 3.9-1*). Assuming the same values as estimated for the vegetated portions of Hanover Mountain, 0.21 inches per year, temporary losses in the system would be approximately 0.23 acre-feet per year. After mine reclamation is complete, stormwater runoff would no longer be collected and would resume discharge to the Jim Fair sub-basin. There are no perennial surface waters or springs in the Jim Fair sub-basin, and the temporary loss of runoff from the construction and operation of the facility would be minimal. Therefore, no adverse impacts to surface water quality or quantity are expected from construction and operation of the Solution Extraction/Electro-winning facility.

The new administrative office would be located in the Poison Spring sub-basin. This facility is not considered an active mining area, and therefore it would not be necessary to contain runoff from the facility. Surface water runoff would be expected to increase in this area as a consequence of the increased impervious surface area within the footprint of planned administrative office and parking areas. No adverse impacts to surface water quality or quantity are expected from construction and operation of the new administrative office.

The expansion and development of the Fierro Leach Pad would be located in the Poison Spring sub-basin. Seeps associated with the Main Tailings Impoundment (i.e., Dam Toe Seep, Peach Tree Spring Seep, Estrada Seep, and Weber Pond) are located within the footprint of the Fierro Leach Pad expansion. The expansion footprint would cover approximately 56.7 acres (approximately 25 percent) of the 228-acre Poison Spring sub-basin. Construction of the Fierro Leach Pad would result in the incremental loss of surface water runoff from this sub-basin to downstream drainages. Water from a small perennial reach would be collected from under the Fierro Leach Pad liner and piped to the downstream toe of the leach pad. The small perennial reach and minimal riparian vegetation located on private land in this section of the Poison Spring sub-basin would be eliminated. Assuming the same values as estimated for the vegetated portions of Hanover Mountain, 0.21 inches per year temporary losses in the system would be approximately 1 acre-foot per year. Following closure, and once runoff of the reclaimed leach pad is demonstrated to meet surface quality standards, surface runoff from the reclaimed Fierro Leach Pad would be allowed to discharge to the natural surface water system (see *Section 3.11.2.1*).

The expansion and operation of the existing Main Tailings Impoundment would not adversely impact the upper perennial reach of either the Poison Spring sub-basin or the springs that exist in the upper portion of this sub-basin because the footprint of the Main Tailings Impoundment would not encroach upon these areas. The discharge of subsurface flow is expected to increase to the lower reach of the Poison Spring Drainage by approximately 500 cubic feet per day (BLM 1997). A more detailed discussion of the increased subsurface flows to the Poison Spring drainage is provided in the BLM Environmental Assessment for MPO Amendment No. 3 (BLM 1997).

The Humbolt Leach Pad would be located in the Buckhorn Gulch sub-basin and the Beartooth Creek sub-basin. Direct impacts from construction of the Humbolt Leach Pad would include temporary loss of

runoff from approximately 54 acres (approximately 12 percent) of the 448-acre Buckhorn Gulch sub-basin and approximately 95 acres (approximately 9 percent) of the 1,082-acre Beartooth Creek sub-basin. Assuming the same values for runoff as estimated for the vegetated portions of Hanover Mountain, 0.21 inches per year, temporary losses in the system would be approximately 0.95 and 1.66 acre-feet per year to the Buckhorn Gulch and Beartooth Creek sub-basins, respectively. After mine reclamation is complete, stormwater runoff would no longer be collected and would resume discharge to the respective sub-basin; therefore, the impact on the local hydrologic system from this temporary loss is expected to be minimal. The source of Buckhorn Gulch Spring is on the north or opposite side of the drainage from the site of the Humbolt Leach Pad; therefore, no adverse impacts to Buckhorn Gulch Spring and the small section of perennial flow as described in *Table 3.9-1* are expected.

Portions of SWRDF Dam 2 were inadvertently built on land administered by the BLM. This dam was originally built in response to an administrative order on consent between EPA and Cobre in the late 1990s to collect stormwater from the SWRDF. Under the No Action Alternative, the dam would not be authorized, but Cobre would work with BLM to resolve this issue under some other authority. If this facility were to be removed from BLM-administered public lands and not authorized under some other authority, surface water impacted by mine operations would no longer be captured by this facility.

Predictions of reductions to surface water runoff for the No Action Alternative are based entirely on the reduction in area available for runoff. Surface water flows in the natural drainage systems and from the mine after closure may be further reduced by the increased aridity of the region predicted by regional climate models.

3.9.2.2 *Alternative 2 – Proposed Action*

Adverse effects to surface water quality outside of the mine footprint are not anticipated as a result of implementation of the Proposed Action Alternative. Existing and new stormwater containment systems would be managed in accordance with state and Federal surface water and groundwater permits. Affected stormwater, seeps, and springs would be contained, monitored, and reported in accordance with all state and Federal permits. Surface waters that have the potential to exceed groundwater standards would be contained, and sediment transport would be limited using barriers like straw bales, berms, and retention ponds during construction and operations.

Adverse effects to surface water quantity are not anticipated as a result of implementation of the Proposed Action Alternative. Cobre holds surface water rights issued by the New Mexico Office of the State Engineer for the waters that would be temporarily and permanently collected or diverted by the Proposed Action Alternative (Cobre 2014a). A review of the State Engineer's records indicates there are no downstream non-mining surface water right holders that would be adversely affected (New Mexico Water Rights Reporting System [NMWRRS] 2014).

Under the Proposed Action Alternative, the Fierro Leach Pad would not be constructed. As a result, any incremental loss of surface water runoff from the Poison Spring sub-basin to downstream drainages, and permanent loss of a small perennial reach of this sub-basin with its associate riparian vegetation that may occur under the No Action Alternative, would not occur under the Proposed Action Alternative.

Mining the two slivers of BLM-administered land at Hanover Mountain would not change the surface water quantity and quality from what is described for the No Action Alternative. As with the No Action Alternative, at closure, the resulting land surface would be blended into the surrounding topography so as not to impound or retain stormwater or allow for inundation from Hanover Creek (Cobre 2012). Stormwater from the reclaimed mine surface may be allowed to discharge into the North Hanover Creek and Grape Gulch sub-basins (Telesto 2009) if it is demonstrated to meet applicable water quality standards. No adverse impacts to surface water quality or quantity are expected from mining the two slivers of BLM-administered land at Hanover Mountain.

The North Overburden Stockpile, constructed with reclamation cover material, would be located in the Grape Gulch sub-basin. Cobre would manage and release stormwater from the North Overburden Stockpile in accordance with all state and Federal permits. No adverse impacts to surface water quality or quantity are expected from construction and operation of the North Overburden Stockpile.

The haul road leading to the North Overburden Stockpile would be constructed with safety berms and a perimeter ditch that is conceptually depicted in the MPO (Cobre 2012: Figure 9). During mining and prior to mining the Hanover Mountain Deposit below the elevation of the North Overburden Stockpile, collected stormwater from the North Overburden Stockpile haul road would be discharged to the small drainage west of Hanover Mountain and monitored as a new stormwater outfall location. If stormwater quality (total suspended solids) does not meet stormwater quality requirements, it would be diverted to the existing stormwater management system to the southwest of Hanover Mountain and used as process water. Once Hanover Mountain is excavated below the elevation of the North Overburden Stockpile haul road, stormwater from the road can drain directly to the Hanover Mountain Deposit (Cobre 2012: Figure 6). No adverse impacts to surface water quality or quantity are expected from construction and operation of the haul road leading to the North Overburden Stockpile.

The proposed Haul Road to the Chino Mine would cross through the North Hanover Creek, Jim Fair, Snowflake Canyon, Philadelphia, and South Hanover Creek sub-basins. Where the proposed Haul Road crosses major ephemeral drainages, culverts would be designed and installed to convey stormwater runoff under the haul road. During operations, stormwater falling on the road would be managed with limited loss of surface flow to the down gradient ephemeral drainage systems. The proposed Haul Road would be constructed to cross Fierro Road and Hanover Creek. The Hanover Creek crossing would be constructed to convey the 100-year 24-hour storm event and would not be expected to impede surface water flows in this reach of Hanover Creek at discharges equal to or less than the design storm event.

The proposed Haul Road would be constructed using native soils along the alignment generated from cut slopes necessary to achieve desired grade. The majority of the geologic substrates along the proposed Haul Road alignment are not mineralized. Portions of the proposed Haul Road pass through mostly carbonate formations as well as portions of reclaimed historic mine workings. Haul road construction near reclaimed mine workings could expose mineralized material. Cobre would monitor construction activities to determine if any potentially acid generating materials are exposed during construction. If exposed, they propose to assess the likelihood of surface water impact from these materials. If impacts are likely, Cobre would mitigate by removal or installation of suitable cover material. Based upon the body of mine closure work done in the vicinity of the proposed Haul Road and materials sampling conducted in support of that

closure work, the potential for encountering net acid-generating material is small (Cobre 2014d). The discharge of sediment during construction and operations from the proposed Haul Road during storm events would be minimized by the installation of engineered stormwater controls like berms, catchment basins, and wattles (Cobre 2012). No adverse impacts to surface water quality or quantity are expected from construction and operation of the proposed Haul Road to the Chino Mine.

The SWRDF Dam 2 is an existing facility located in the Buckhorn Gulch sub-basin that was built to collect stormwater from the SWRDF in accordance with requirements established by an administrative order on consent between Cobre and the Environmental Protection Agency. Stormwater captured by this facility is incorporated into Cobre's water management system. There is no new construction associated with this facility. Continued operation of this facility would continue to reduce impacts to surface water quality in down-gradient drainages.

The SWRDF expansion on BLM-administered land is located in the Buckhorn Gulch sub-basin. Within the Buckhorn Gulch sub-basin, the expansion area would be located along the north and east sides of the sub-basin, east of Buckhorn Spring and a short stretch of perennial flow within Buckhorn Gulch Drainage. The proposed expansion area footprint would be set back to a natural break in slope in this area that is located approximately 100 feet from the drainage bottom. The currently operating stormwater containment system would remain in effect. Total reduction of annual runoff from the approximately 6.3 acres of BLM-administered land to be incorporated into the SWRDF within the Buckhorn Gulch sub-basin would be less than 0.11 acre-feet per year. After reclamation is complete, surface water runoff from the BLM-administered land would be released to Buckhorn Gulch.

The proposed Utility Corridor is located in Buckhorn Gulch, Union and Zinc Hills, and Poison Spring sub-basins, and the associated electrical substation is located in Poison Spring sub-basin. The corridor alignment would cross perennial stretches of Buckhorn Gulch and Poison Spring drainages. No direct or indirect impacts to surface water quality or quantity are anticipated for the proposed Utility Corridor and the substation construction and operation.

Predictions of reductions to surface water runoff for the Proposed Action Alternative are based entirely on the reduction in area available for runoff. Surface water flows in the natural drainage systems and from the mine after closure may be further reduced by the increased aridity of the region predicted by regional climate models.

3.10 GROUNDWATER RESOURCES

3.10.1 Affected Environment

The geologic setting within the project area has resulted in four distinct groundwater flow systems that include an alluvial and three bedrock systems (*Figure 3.10-1*; SMI 1999, Telesto 2011). As part of Condition No. 32 of NMED permit DP-1403, Cobre is required to investigate all known areas of groundwater and surface water contamination and potential sources of contamination and define the extent and magnitude of contamination (Telesto 2011). The alluvial flow system is hosted in Hanover Creek, Grape Gulch, Poison Spring Drainage, and Buckhorn Gulch (*Figure 3.10-2*). Groundwater in the alluvial system generally flows southward, with local flow direction dictated by the drainage course.

Groundwater in the alluvial flow system may originate from three sources: 1) upward flow from the underlying bedrock; 2) meteoric recharge via direct precipitation and stormwater runoff; and 3) seepage from the Main Tailings Impoundment (specific to Grape Gulch and Poison Spring Drainage; Telesto 2011).

The Barringer Fault is one of the major geologic features that determine the nature and flow regimes of bedrock groundwater systems within the area of the proposed activities. The Barringer Fault trends northeast to southwest, traversing the Continental Mine Pit and the southeastern portion of Hanover Mountain (*Figures 3.10-1 and 3.10-2*). Movement along the Barringer Fault resulted in vertical displacement of the northern fault block, which dropped down relative to the southern fault block resulting in juxtaposed geologic units (*Figure 3.10-1*; SMI 1999, Telesto 2011). The northern fault block consists of seven geologic strata of Cretaceous (younger and higher) and Paleozoic (older and deeper) age; the southern fault block is composed of five geologic strata of Paleozoic age. The Cretaceous age geologic units were removed by erosion southeast of the Barringer Fault (Telesto 2011).

Two bedrock flow systems occur northwest of the Barringer Fault including the North Cretaceous Aquifer and the North Paleozoic Aquifer. The younger Cretaceous aquifer overlies the older Paleozoic aquifer (*Figure 3.10-1*; SMI 1999, Telesto 2011). Southeast of the Barringer Fault there is only one bedrock flow system, the South Paleozoic Aquifer. The South Paleozoic Aquifer is within the same geologic formations as the North Paleozoic Aquifer (*Figure 3.10-1*).

Groundwater flow in the bedrock aquifers is locally influenced by the Barringer Fault, the Continental Mine Pit, and dewatering of historical underground mine workings (i.e. Continental Underground Mine, Hanover Mountain Underground Workings, and Hanover Empire-Zinc mining complex), and to a lesser extent by perched groundwater at Hanover Mountain (Telesto 2011).

The direction of regional groundwater flow in the bedrock flow systems is generally from northwest to southeast; however, flow is locally affected by a groundwater divide near the center of the Project Footprint. The groundwater divide was created by the Continental Pit, underground mine workings within the general vicinity of the Continental Pit, and underground workings located southeast of Hanover Mountain (Telesto 2011). The generalized location of this groundwater divide is depicted in *Figure 3.10-2*.

A groundwater mound centered under Hanover Mountain occurs in the North Cretaceous Aquifer (*Figure 3.10-2*; SMI 2000, Telesto 2011). Elsewhere in the North Cretaceous Aquifer, groundwater flows toward the groundwater hydrologic sink created by the Continental Mine Pit and vertically down into the North Paleozoic Aquifer (Telesto 2011). The North Paleozoic Aquifer groundwater flows toward the groundwater hydrologic sink created by the Continental Mine Pit and dewatering of the Continental Underground Mine workings (Telesto 2011). South of the groundwater divide the direction of groundwater flow is generally toward the southeast with flow converging on alluvial aquifers of Hanover Creek (*Figure 3.10-2*). Historical dewatering of the Hanover Empire Zinc underground mine workings creates a groundwater sink south of the Hanover-Fierro Stock (Telesto 2011). Water pumped from the underground mine workings is incorporated into Cobre's water management system.

The chemistry and quality of the groundwater in the project area is a result of the hydrologic, geologic, and geochemical settings, and of influences from historical and modern mining operations. Groundwater quality is generally above regulatory standards for sulfate and TDS (Telesto 2011). The Proposed Action and the No Action Alternatives occur within an extensive historical mining district dating from the 1800s that has experienced groundwater quality impacts associated with these historical mining activities and naturally occurring mineralization. Mitigation of affected groundwater at Cobre's Continental Mine is being comprehensively addressed through the NMED's groundwater abatement process (Telesto 2011).

Groundwater compliance standards and controls at Cobre's Continental Mine are regulated by NMED's Groundwater Quality Bureau, Mining Environmental Compliance Section. The Continental Mine operates under two NMED operational discharge permits, DP-181 and DP-1056, and a supplemental Closure Discharge Permit, DP-1403. As described in Telesto (2011), DP-181 and DP-1056 were issued to "ensure that discharges of water contaminants from the Continental Mine Site into ground and surface water are controlled, so as to protect ground and surface water for present and potential future use." DP-1056 authorizes mining of the Hanover Mountain Deposit, construction of the Fierro Leach Pad, and closure of both facilities. Supplemental Discharge Permit DP-1403 contains closure requirements "addressing Cobre's discharges of contaminants that may move directly or indirectly into groundwater from the Continental Pit, Tailings Impoundment, Waste Rock Piles, Fierro Leach Pad and associated facilities" (Telesto 2011). As required by DP-1403 closure plans were last updated in 2009 (Telesto 2009).

Past and current use of groundwater in the vicinity of the project includes private water wells along Hanover Creek for domestic or agricultural uses. Other groundwater uses in the area include agricultural irrigation and livestock watering. Additionally, Cobre and its predecessors have pumped water from the Continental Underground Mine, Bullfrog, Princess, and Hanover shafts as well as Cron Ranch for process water at the mill and dust suppression at the site. Cobre currently obtains drinking water from a well on the north side of Hanover Mountain (NMED 2004).

3.10.2 Environmental Consequences: Direct & Indirect Effects

3.10.2.1 Alternative 1 – No Action

Mining under the No Action Alternative would be conducted in accordance with DP-181, DP-1056 and DP-1403 issued pursuant to the New Mexico Water Quality Act, Water Quality Commission regulation. Mining of the privately held acreage of the Hanover Mountain Deposit would result in exposure of mineralized rock, which may have the potential to generate acidity. While groundwater recharge currently passes through these materials, increased exposure to oxygen could accelerate the rate of oxidation above natural levels. Water percolating through this material could transport constituents dissolved in the resulting low pH conditions. Because of 1) low pH conditions that occur naturally in the Hanover Mountain Deposit (SMI 1999); 2) the carbonate mineralization of rock between Hanover Mountain and the Continental Mine Pit (*Figure 3.8-1*); and 3) the relatively insignificant quantity of water contributed

by recharge from the mine surface¹⁰, the accelerated oxidation anticipated during mining activities is not expected to have any adverse impact to water quality within the hydrologic sink of the Continental Mine Pit. After closure, stormwater runoff would be directed through constructed channels off the mine and released to adjacent natural drainages once reclamation standards have been achieved (Telesto 2009).

Portions of the Fierro Leach Pad would be constructed on the existing Magnetite Tailing Impoundment that is currently being mined and transported off site. The Fierro Leach Pad would be constructed over a liner system consisting of a layer of compacted fill covered by a single 80-mil High Density Polyethylene (HDPE) liner. There would be a subsurface drain to capture groundwater in the alluvium under the liner and any seepage through the liner. This captured water would be incorporated into Cobre's water management system. The liner system and underdrain prevent leach solution from percolating to the underlying groundwater system. Therefore, adverse impacts to groundwater quality are not anticipated.

Construction of the lined facility would remove 57 acres of groundwater recharge surface area from the hydrologic system. Most of the groundwater flow below the location of the Fierro Leach Pad resides in the Lower Poison Spring Drainage alluvial groundwater flow system, which flows towards Hanover Creek and then southward to the hydrologic sink created by the historical dewatering of the Hanover-Empire Zinc workings (*Figure 3.10-2*; Telesto 2011). Assuming that recharge in the existing condition is similar to that predicted for post closure (D.B. Stevens 1999, SMI 2000), a loss of 1.5 inches per year over 57 acres would represent a loss of approximately 7.1 acre-feet per year to the local groundwater system from the construction of the Fierro Leach Pad. A minor amount of water would infiltrate the reclamation cover (approximately 0.16 inches per year [Golder 2006]). This water would report to the toe of the Fierro Leach Pad when captured by the liner. If the quality of the water reporting to the toe does not meet standards, it would be treated and released. Cobre's existing water rights allow for the capture and use of this water (Cobre 2014c).

The Solution Extraction/Electro-winning facility would be located south of the Barringer Fault and south of the groundwater divide (*Figure 3.10-2*). No release of impacted water is expected from the construction, operation, and closure of the Solution Extraction/Electro-winning facility, therefore no direct or indirect impacts to groundwater quality or quantity are expected.

Construction and operation of the Humbolt Leach Pad would be similar to that described for the Fierro Leach Pad. Likewise impacts are expected to be similar with the exception that the Humbolt Leach Pad would not be constructed on any existing facilities. Loss of groundwater recharge area and loss of groundwater to seepage in underdrains is assumed to be the same as for the Fierro Leach Pad—a loss of 1.5 inches per year over 150 acres, representing a loss of approximately 18.8 acre-feet per year to the local groundwater system. Similar to the Fierro Leach Pad, a minor amount of water would infiltrate the reclamation cover (approximately 0.16 inches per year [Golder 2006]); however, this water would report to the toe of the Humbolt Leach Pad when captured by the liner. If the quality of the water reporting to the toe does not meet standards, it would be treated and released, resulting in no net change in water quantity

¹⁰ Infiltration through the reclamation cover after reclamation is estimated at 0.16 inches per year (Golder 2006). At 155.8 acres of surface area, this equals approximately 2 acre-feet per year, which is approximately 2 percent of the total estimated flow to the Continental Mine Pit lake (Telesto 2008).

in the larger system. Regardless, Cobre's existing water rights allow for the capture and use of this water (Cobre 2014c).

The Fierro and Humbolt Leach Pads identified in the No Action Alternative would utilize approximately 207 acres of land that would reduce the amount of potential groundwater recharge by an estimated 25.9 acre-feet per year. Given the current future climate predictions, the quantity of water available for groundwater recharge could be further reduced due to decreased precipitation and higher temperatures causing increased evaporation rates. Assuming that regional climate models predicting increased aridity in the southwest are correct, the amount of recharge that would occur in the area of the No Action Alternative naturally, and the reduction in total quantity of recharge from implementation of the No Action Alternative would both be reduced (BLM 2014).

3.10.2.2 Alternative 2 – Proposed Action

The impacts to the groundwater system from development of the Proposed Action at Hanover Mountain would be essentially the same as those from the No Action Alternative. Mining the two slivers of BLM-administered land at Hanover Mountain in addition to the private lands that would be mined under the No Action Alternative is not expected to result in any material change in the quantity or quality of groundwater recharge, nor would it change the fate of recharged water that would report to the Continental Mine Pit.

The proposed North Overburden Stockpile would be located over the North Cretaceous groundwater flow system (**Figure 3.10-2**). The direction of groundwater flow in this part of the system is toward the south and down into the North Paleozoic system that flows into the groundwater hydrologic sink created by the Continental Mine Pit and dewatering of the Continental Underground Mine (Telesto 2011). The proposed North Overburden Stockpile would be composed of materials suitable for reclamation and closure. No adverse impact to groundwater quantity or quality would occur due to construction and operation of the North Overburden Stockpile.

Under the Proposed Action Alternative, the Fierro and Humbolt Leach Pads would not be constructed. As a result, the loss of approximately 25.9 acre-feet per year that would occur under the No Action Alternative would not occur under the Proposed Action Alternative.

The proposed Haul Road to the Chino Mine is primarily located over the South Paleozoic groundwater flow system. At the northern end of the proposed Haul Road it would cross the Hanover Creek Alluvial system on a bridge structure (**Figure 3.10-2**). The majority of the bedrock along the proposed Haul Road alignment is carbonate and not mineralized. Portions of the proposed Haul Road pass through mostly carbonate formations as well as portions of reclaimed historic mine workings. Haul road construction near reclaimed mine workings could expose mineralized material. Cobre would monitor construction activities to determine if any potentially acid generating materials are exposed during construction. If exposed, they propose to assess the likelihood of surface water impact from these materials. If impacts are determined to be likely, Cobre would take appropriate measures to address any potential impacts. Based upon the body of mine closure work done in the vicinity of the proposed Haul Road and materials sampling conducted in support of that closure work, the potential for encountering net acid-generating material is small

(Cobre 2014d). Therefore, no adverse impacts to groundwater quantity or quality are expected from the construction and operation of the proposed Haul Road to the Chino Mine.

The proposed SWRDF expansion on BLM lands would be located over the South Paleozoic groundwater flow system (*Figure 3.10-2*). The entire SWRDF facility is located southeast of the groundwater divide, thus the direction of groundwater flow is generally to the southeast with local topographic influence (Telesto 2011). Depth to groundwater below the location of the proposed expansion of the SWRDF facility on BLM lands is approximately 25 feet in the Buckhorn Gulch Drainage (Telesto 2013b). Some potentially acid-generating materials would be stored in the facility; however, these materials would be encapsulated or mixed within acid-neutralizing material in accordance with the NMED approved material handling plan (GeoTrans 2001, Golder 2009). Therefore, while the groundwater below the current stockpile exceeds groundwater quality standards for sulfate and TDS, the addition of waste rock to the SWRDF from the Proposed Action is not expected to change the quality of groundwater at this location. No change in the recharge to the local groundwater system is anticipated during operations. At closure with the reclamation cover, loss of recharge to the groundwater system from the BLM lands incorporated into the SWRDF is expected to be approximately 0.75 acre-feet per year.

The SWRDF Dam 2 is an existing facility that was built in response to an agreement order on consent between EPA and Cobre to collect stormwater from the SWRDF. Captured stormwater is incorporated into Cobre's water management system. There is no new construction associated with this facility. Continued operation of this facility is expected to have positive impact on groundwater quality.

The location of the proposed Utility Corridor is over the South Paleozoic and Alluvial groundwater systems (*Figure 3.10-2*). The construction and operation of the Utility Corridor is not expected to have any adverse effects to the South Paleozoic and Alluvial groundwater systems. No impacts to groundwater quantity or quality are expected from construction and operation of the Utility Corridor.

The Proposed Action Alternative would result in a nominal reduction in groundwater recharge at closure of approximately 0.75 acre-feet per year. Under the assumption that regional climate models that predict increased aridity in the Southwest are correct, the amount of recharge that would occur in the area of the Proposed Action naturally and the reduction in total quantity of recharge from implementation of the Proposed Action Alternative would both be reduced because of the increased temperatures and decreased precipitation predicted by these regional models (BLM 2014). Cobre holds water rights issued by the State Engineer's office for both the use of these waters and any respective impacts to recharge.

3.11 VEGETATION RESOURCES

3.11.1 Affected Environment

Five vegetation cover types and two cover types indicative of human activities have been identified within the areas of disturbance for activities described for the No Action and Proposed Action Alternatives and are described below. Site specific descriptions of each area are based on data gathered during site visits completed by biologists from Ecosphere between February and May of 2012 (Ecosphere 2014).

Madrean Pinyon-Juniper Woodland is the most common vegetation cover type within the disturbance area. Characteristic plants include pinyon pine, alligator juniper, evergreen oaks, beargrass, sotol, agaves, and perennial grasses, principally grama grasses. Vegetation cover for Madrean Pinyon-Juniper Woodland was visually estimated and ranged from 25 to 50 percent cover depending on the slope.

Rocky Mountain Ponderosa Pine Woodland is dominated by ponderosa pine with smaller numbers of pinyon pine, alligator juniper, and one-seed juniper. The understory is characterized by hairy mountain mahogany, Gambel oak, and species of perennial native grasses. This community is found on level or north-facing slopes and overlaps with Pinyon-Juniper Woodland. Rocky Mountain Ponderosa Pine Woodland was visually estimated and ranged from 20 to 70 percent cover for overstory canopy areas and 20 percent cover for understory.

Madrean Juniper Savanna is dominated by widely spaced alligator and one-seed junipers (5 to 25 percent cover), with a moderate to high density understory of native grasses (greater than 25 percent cover). This community is found primarily on flat ridge tops and lower slopes of foothills in the southern portion of Hanover Valley.

Within the vicinity of the proposed activities Inter-Mountain Basins Semi-Desert Grassland is found as relatively small patches interspersed within the pinyon-juniper and savannah communities along the proposed Haul Road. The characteristic plains grassland species, blue grama, is often found in this grassland along with shrub and subshrub species such as four-wing saltbush, rabbit brush, broom snakeweed, and winter fat. Cover was visually estimated at 30 to 50 percent depending on the grazing regime.

Riparian habitat in the project area is limited to isolated riparian communities found around Buckhorn Spring and along Buckhorn Gulch, the lower section of the Poison Spring Drainage near its confluence with Hanover Creek, and along reaches of Hanover Creek where perennial or intermittent water exists. Dominant native tree species observed in riparian plant communities include Fremont cottonwood, eastern cottonwood, narrowleaf cottonwood, Goodding's willow, and boxelder. Along Hanover Creek much of the riparian plant community has been disturbed, and in many locations no understory species are present. In locations that are in good condition and have not experienced high pedestrian traffic volumes, such as Buckhorn Gulch, shrubs, grasses and forbs are present. Native shrub and understory species observed include coyote willow, seepwillow, and skunkbush or three-leaf sumac, and grasses such as alkali grass, bullgrass muhly, salt grass, alkali sacaton, and squirreltail. Also observed in relatively undisturbed areas along Buckhorn Gulch in association with perennial or intermittent water sources were various sedge and rush species, spikerush, smartweed, cattail species, yellow sweetclover, and burdock.

Exotic and introduced plant species that occur frequently within the riparian areas found along Hanover Creek include Siberian elm, tree of heaven, and tamarisk, all classified as noxious weed species (*Section 3.14*); and common mullein, which is a weedy species often associated with disturbed areas. Tamarisk were observed at scattered locations along the Buckhorn Gulch and the Poison Spring Drainage.

3.11.2 Environmental Consequences: Direct & Indirect Effects

3.11.2.1 Alternative 1 – No Action

Under the No Action Alternative, previously authorized activities on privately owned and BLM-administered land (*Figure 2-1*) would occur resulting in the loss of native plant communities within these areas. All of the upland habitats affected by the No Action Alternative are common and widespread in the Southwest and in Grant County, New Mexico. Affects to riparian habitat from the No Action Alternative are limited to small patches of cottonwood, willow, boxelder, and non-native species such as tamarisk along Buckhorn Gulch and the Poison Spring Drainage. *Table 3.11-1* provides a summary of the estimated acreages of the major land cover type within each proposed activity area.

Under the No Action Alternative, the privately owned portions of Hanover Mountain would be excavated, resulting in the complete removal of vegetation from this site. Some vegetation would remain on approximately 1 acre within Hanover Mountain which includes 0.29 acres of BLM lands and an approximately 25-foot buffer on privately owned land that would not be mined under the No Action Alternative.

The Solution Extraction/Electro-winning facility would be located just east of the existing Cobre Mine Administration Office and St. Anthony's Church in the community of Fierro and north of the Fierro Cemetery. Direct impacts resulting from construction of this facility would result in the removal of Pinyon-Juniper Woodland and Rocky Mountain Ponderosa Pine Woodland (*Table 3.11-1*). The new administrative office would be located on the west side of Fierro Road and east of existing mine facilities. Construction of the building, associated parking, and any other facilities at this location would result in the removal of Pinyon-Juniper Woodland, although much of this area is currently disturbed. The acreages of upland habitat that would be affected are provided in *Table 3.11-1*.

Table 3.11-1 Estimated acreage of land cover types likely to be affected by activities associated with the No Action Alternative on privately owned or previously approved BLM-administered land.

Activity	Acreage Affected by Land Cover Type						Total
	Pinyon-Juniper	Ponderosa Pine	Madrean Juniper Savanna	Inter-Mountain Basins Semi-desert Grassland	Riparian	Disturbed	
Hanover Mountain	110.3	27.8	0	0	0	1.8	139.9
Solution Extraction/ Electro-winning Facility	12.3	1.0	0	0	0	0	13.3
Administrative Office	0.3	0	0	0	0	0	0.3
SWRDF Expansion	9.3	0.5	6.9	0	0.03	7.5	24.2
Fierro Leach Pad	24.3	1.6	0	0	2.1	28.9 ¹	56.9
Humbolt Leach Pad	64.1	85.1	0	0	0	0	149.2
Substation	1.7	0	0	0	0	3.8	5.5
TOTAL	222.3	116.0	6.9	0	2.13	42.0	389.3

Source: Southwest Regional Gap Analysis Project (SWReGAP) 2013/Ecosphere 2014 - acreages have been calculated from digital imagery and rounded.

Note: Mill No. 2 is located entirely within the existing mine footprint, is currently disturbed, and no additional vegetated areas would be affected. The 69-kV line reroute is not included here; vegetation loss would be limited to the location of the power poles and access roads for maintenance.

¹ Area of the proposed Fierro Leach Pad expansion within the existing footprint of Cobre's Continental Mine

Expansion of the SWRDF would occur on privately owned lands along the eastern edge and on several small parcels along the western edge of the existing SWRDF. Much of the area has experience some level of disturbance given the proximity to existing mine facilities; however some Pinyon-Juniper Woodland would be lost. Also, approximately 0.03 acres of riparian area along Poison Spring Drainage would be affected.

The Fierro Leach Pad would be constructed and expanded to the east to create a leach pad for materials excavated from the Continental Mine Pit and Hanover Mountain Deposit (*Figure 2-1*). Although, there is existing disturbance in the area associated with past mining activity, this expansion would result in the loss of Pinyon-Juniper Woodland and some Rocky Mountain Ponderosa Pine Woodland. Riparian habitat along the Poison Spring Drainage would also be directly affected by the expansion of the Fierro Leach Pad; however this area supports tamarisk and other exotic species. The acreages of upland and riparian habitat affected by the expansion of the Fierro Leach Pad are provided in *Table 3.11-1*.

The Humbolt Leach Pad would be constructed on privately owned land located north of Humbolt Mountain and west and south of the SWRDF (*Figure 2-1*). Development of the Humbolt Leach Pad would result in the loss of Pinyon-Juniper Woodland and Rocky Mountain Ponderosa Pine Woodland habitats. The total acreages of habitat loss by cover type within the Humbolt Leach Pad are provided in *Table 3.11-1*.

3.11.2.2 Alternative 2 – Proposed Action

Table 3.11-2 summarizes the acreages of land cover types likely to be affected by implementation of the Proposed Action Alternative. Mining the two slivers of BLM-administered land at the Hanover Mountain

Deposit would result in the additional loss of small areas of Pinyon-Juniper Woodland. Other impacts associated with mining of the Hanover Mountain Deposit on privately owned land are described for the No Action Alternative (*Section 3.11.2.1*), which would also occur under the Proposed Action Alternative. The acreages of upland habitat affected are provided in *Table 3.11-2*.

The acreages of land cover types that would be impacted by development the North Overburden Stockpile are provided in *Table 3.11-2*. Direct impacts at the North Overburden Stockpile would include loss of Rocky Mountain Ponderosa Pine Woodland and Pinyon-Juniper Woodland (*Table 3.11-2*).

Table 3.11-2 Estimated acreages of land cover types likely to be affected by implementation of the Proposed Action Alternative. These acreages include BLM-administered land and privately owned land within each facility

Action	Acreage Affected by Land Cover Type ¹						Total
	Pinyon Juniper	Ponderosa Pine	Madrean Juniper Savanna	Inter-Mountain Basins Semi-desert Grassland	Riparian	Disturbed	
Hanover Mountain ²	111.6	27.8	0	0	0	1.8	141.2
North Overburden Stockpile	14.9	0.9	0	0	0	3.2	19
Haul Road	70.1	0.7	18.1	3.0	0	11.9	103.8
South Waste Rock Disposal Facility	3.1	0	2.3	0	0	0.9	6.3
Utility Corridor	3.2	0.2	6.2	0	0.5 ³	3.4	13.5
Substation	1.7	0	0	0	0	3.8	5.5
TOTAL	204.6	29.6	26.6	3.0	0.5	25.0	289.3

¹ Acreage variations are due to calculation methods and rounding (Telesto 2014a).

² This includes the acreage of private lands that would be mined under the No Action Alternative. Unlike the No Action Alternative, mining of the private lands within Hanover Mountain has to occur to allow for mining of the 0.29 acres of BLM lands that occur within the footprint of the Hanover Mountain Deposit.

³ While this acreage is located within the corridor, not all of the acreage would be impacted. Construction of the Bullfrog Pipeline may result in the minimal loss of some riparian vegetation within the Utility Corridor

Construction of the approximately 3.6-mile proposed Haul Road would include removal of Rocky Mountain Ponderosa Pine Woodland, Pinyon-Juniper Woodland, Madrean Juniper Savanna, and Inter-Mountain Basins Semi-desert Grassland (*Table 3.11-2*). There is an existing dirt road along portions of the alignment that is already devoid of vegetation. Some open, undisturbed land is located to the east, and Hanover Creek runs west of the proposed alignment. The roadway would be elevated above the valley floor and follow existing dirt roads in some areas. The acreages of upland habitat affected are provided in *Table 3.11-2*.

The expansion of the SWRDF would result in the loss of vegetation including Pinyon-Juniper Woodland, Rocky Mountain Ponderosa Pine Woodland, and areas previously mined or quarried. The 6.3-acre expansion proposed near Buckhorn Gulch and Buckhorn Spring is located outside of the 100-year

24-hour flood limits of Buckhorn Gulch (Cobre 2014b). The band of riparian vegetation along this reach of Buckhorn Gulch is relatively narrow and confined to areas immediately adjacent to the channel, thus based upon the mapping provided in Cobre 2014b, no direct impacts to riparian vegetation are expected from expansion of the SWRDF. Additionally, there are no anticipated adverse effects to water quality and, therefore, there would be no indirect effects to riparian vegetation.

SWRDF Dam 2, used for stormwater management of the SWRDF, has already been constructed and occupies approximately 0.7 acres of former Pinyon-Juniper Woodland (*Table 3.11-2*). No additional loss of vegetation would occur as a result of the authorization to occupy the SWRDF Dam 2.

The proposed Utility Corridor and substation would disturb or result in the loss of Pinyon-Juniper Woodland, Rocky Mountain Ponderosa Pine Woodland, and existing disturbed lands (*Table 3.11-2*). The proposed Utility Corridor for relocation of the 69-kV line crosses 0.3 acres of riparian habitat (0.15 along Buckhorn Gulch and 0.15 acres along Poison Spring Drainage [Ecosphere 2014]). Although the 69-kV line would span the drainages, clearing of some riparian trees within the corridor may be required to pull the conductor during construction and to maintain a safe distance between the conductor and vegetation during operations. Therefore, only minimal disturbance to the riparian vegetation is anticipated. The Bullfrog Pipeline relocation would cross approximately 0.2 acres of riparian habitat associated with the Poison Spring Drainage (Ecosphere 2014). Installation of the Bullfrog Pipeline would result in the minimal loss of some riparian vegetation at the Poison Spring Drainage.

3.12 WILDLIFE RESOURCES

3.12.1 Affected Environment

Wildlife known or expected to occur in Hanover Valley is typical of those associated with the land cover types previously described. Sixty-nine wildlife species were observed during recent field studies (Ecosphere 2014).

Mule deer, Coues white-tailed deer, and elk are the principal big game species in this region. No seasonal ranges or important migration corridors for deer or elk have been identified or designated by BLM, United States Forest Service (USFS), or New Mexico Game and Fish Department (NMGFD) within or in the vicinity of the project area. Although no big game studies have been conducted in the vicinity of Cobre's Continental Mine, USFS and NMGFD estimate that approximately 150 elk are found in the region and generally use the area between Fort Bayard (about 5 miles southwest of Cobre) in the fall and move back towards Hanover Mountain and Hanover Valley area for calving and summer use.

Within the area studied by Ecosphere, six areas were mapped with higher levels of deer and elk use than adjacent surrounding areas; these areas generally included bedding areas associated with water sources and cold season use locations. Wildlife sign and numbers were observed at higher frequencies along the Hanover Creek riparian corridor and along ephemeral drainages crossing the proposed Haul Road alignment. The highest concentration of wildlife sign and animal sightings was on the north-facing slopes of Hanover Mountain. Small mammals known in or near the area include deer mouse, western harvest mouse, wood rat, pocket gopher, cliff chipmunk and rock squirrel.

Avian foraging and nesting habitat is present throughout Hanover Valley for a variety of birds, including several species of raptors, upland game birds, and passerines. Bird observations were recorded by Ecosphere (2014) coincidentally with other biological surveys conducted in the vicinity of the proposed activities. Raptors observed within the project area include red-tailed hawk, American kestrel, prairie falcon, great-horned owl, and barn owl. One active red-tailed hawk nest was documented near the Copper Queen Mine on the east side of Hanover Creek. Nest sites for other raptor species were not documented during baseline studies completed by Ecosphere (2014). Potential habitat for northern goshawk was identified along the northern slope of Hanover Mountain. Historical records show that peregrine falcons have nested on the Kneeling Nun geologic feature, about 5 miles southeast of Hanover Mountain.

Because no large permanent water sources are present in Hanover Valley, no nesting or foraging areas have been identified for water fowl or shorebirds. There are no designated or nominated Audubon Important Bird Areas (IBA) located within the project area. The nearest IBA is the Mimbres River Area, located approximately 8 miles east of the project area. The project area does not provide important wintering habitat for unique bird species or a high diversity of bird species, and significant concentrations of birds do not occur in the area due to the lack of winter forage and permanent water sources.

No perennial streams or ponds with flow volumes or depths sufficient to sustain viable fish populations are present in the project area, and no fish were observed during field studies.

No specific presence/absence surveys have been conducted to document the presence of amphibians and reptiles. The potential for the presence of amphibians is limited due to the general lack of aquatic habitat in the area; the high level of TDS in available water sources results in unsuitable habitat for amphibians within most perennial water sources in the vicinity. The only amphibian observed during baseline studies completed for this EA was a canyon treefrog, and tadpoles of this species found in pools in Buckhorn Gulch just southwest of the proposed expansion of the SWRDF. Reptiles in the area include the New Mexico whiptail lizard, alligator lizard, striped whipsnake, black-necked gartersnake, short-horned lizard, eastern fence lizard, and bullsnake. Several types of rattlesnake were encountered near abandoned mine features during bat surveys (Ecosphere 2014; WestLand 2014).

3.12.2 Environmental Consequences: Direct & Indirect Effects

3.12.2.1 *Alternative 1 – No Action*

Resident, mobile wildlife including Coues white-tailed deer, mule deer, elk, and mountain lion, along with migratory birds, and to a lesser extent small mammals and reptiles, are expected to use adjacent areas of suitable habitat during construction and operation. The total acreage of wildlife habitat lost from development of the No Action Alternative by vegetation type is summarized in *Table 3.11-1*. This action would reduce the overall carrying capacity of the region surrounding the project area for the common wildlife species expected to regularly use these habitats in proportion to the acreage of lost habitat within the project area. Higher-use areas for deer and elk have been identified west of the proposed 5-acre expansion area along Buckhorn Gulch. Buckhorn Gulch and Buckhorn Springs would be avoided by the proposed expansion as described in *Section 2.1.2.12*. For most of these areas indirect effects to adjacent undisturbed habitats are expected to be minimal except for the short-term disturbances associated with construction of the facilities approved for the No Action Alternative.

The 69-kV powerline would be built in accordance with state and Federal electric codes, and standard raptor-proof protective designs would be incorporated into the line design. The poles provide potential perch sites for foraging raptors. Direct loss of habitat would occur at pole locations and along maintenance roads. Impacts to vegetation during operations would occur for maintenance activities.

The resumption of mining activities at Cobre's Continental Mine under the No Action Alternative would result in increased traffic levels along Fierro Road associated with mine construction and operations as described in *Section 3.5*. The road runs north-south along the eastern side of existing mine features at Cobre's Continental Mine. Mine operations would be ongoing 7 days a week, 24 hours a day, and increases in traffic would be most noticeable at shift changes. The increased traffic along Fierro Road and to a much lesser extent the increased operations traffic within the mine are expected to result in increased collision hazards between wildlife in the area and mine-related traffic with associated losses of wildlife and property damage normally experienced by wildlife-vehicle encounters. Potential impacts from operations within the mine along haul roads and along Fierro Road are expected to be relatively minor considering the posted and enforced speed limits.

Cobre would evaluate all water bodies and electrical systems for avian risk and would implement appropriate protection measures to reduce risk as needed in accordance with the mitigation and monitoring measure outlined in *Chapter 2*. This would reduce risks to resident and migrating avian populations in the vicinity of the proposed mining operation.

3.12.2.2 Alternative 2 – Proposed Action

Resident wildlife including Coues white-tailed deer, mule deer, elk, and mountain lion, along with migratory birds, and to a lesser extent small mammals and reptiles, are expected to use suitable habitat within adjacent areas. Higher-use areas for deer and elk have been identified west of the proposed 6.3-acre expansion area along Buckhorn Gulch. Buckhorn Gulch and Buckhorn Springs would be avoided by the proposed expansion as described in *Section 2.1.2.12*. The total acreage of wildlife habitat lost from development of the Proposed Action Alternative by vegetation type is summarized in *Table 3.11-2*. This action would proportionally reduce the overall wildlife carrying capacity of the region surrounding the Project Footprint for the common wildlife species expected to regularly use these habitats. For most of these areas indirect effects to adjacent undisturbed habitats are expected to be minimal except for the short-term disturbances associated with construction activities and operations at the perimeter of the facilities proposed for the Proposed Action Alternative.

Loss of vegetation along the proposed Haul Road corridor would result in the direct loss of less mobile species in the area and displacement of mobile species including large mammals and birds. Wildlife that access the footprint of the proposed Haul Road may be hit by mine equipment and small truck traffic. The risk of wildlife-mine vehicle collision along the proposed Haul Road with top speeds of 35 mph is much lower compared to state highways and other higher speed roadways. The proposed Haul Road may limit east-west wildlife movement patterns due to traffic. In the context of the landscapes within which the proposed Haul Road would be constructed, this effect is not expected to result in population-level effects due to extensive suitable habitat around the mine and road, nor is it expected to preclude deer and elk from moving between winter and summer foraging habitats.

The 69-kV powerline would be built in accordance with state and Federal electric codes, and standard raptor-proof protective designs would be incorporated into the line design (Cobre 2012). The construction of this line as proposed using raptor-proof protective designs minimizes the risk of raptor mortality from electrocution. The poles may provide potential perch sites for foraging raptors, and some modest increase in raptor foraging activity along the new alignment may occur. Limited, direct loss of habitat during construction would occur where poles are placed, where access roads are created to access the pole locations, during conductor installation, and for future maintenance activities. Impacts to vegetation during operations over the life of the mine would occur as necessary to maintain adequate clearance between trees and the conductor. Loss of some wildlife habitat would also occur along the proposed realignment of portions of the Bullfrog Pipeline within the northwest section of the proposed Utility Corridor between Fierro Road and the expansion of the SWRDF.

Cobre would evaluate all water bodies and electrical systems for avian risk and would implement appropriate protection measures to reduce risk as needed in accordance with the environmental controls and monitoring measures outlined in *Chapter 2*. This would reduce risks to resident and migrating avian populations in the vicinity of the proposed mining operation.

Successful reclamation following mine closure would provide habitat for wildlife and restore the productivity lost from implementation of the Proposed Action Alternative. As outlined in the MPO, Cobre shall document wildlife use within the reclaimed area pursuant to the requirements of their MMD permit and meet the approved MMD revegetation standards prior to release of the revegetation financial assurance provided for the MMD permit.

3.13 SPECIAL STATUS PLANT AND ANIMAL SPECIES

3.13.1 Affected Environment

A screening analysis was conducted to determine the potential for special status species to occur within the project area. Special status species are defined as those species Federally listed by the United States Fish and Wildlife Service (USFWS) as threatened or endangered, proposed for Federal listing, USFWS candidate species, USFWS species of concern, and those listed by the BLM as sensitive or species of concern. Other species considered in this analysis include species listed by the State of New Mexico, and species protected by the Migratory Bird Treaty Act of 1918 (MBTA). The full suite of species evaluated in Ecosphere 2014 is provided in *Appendix C*.

The project area does not occur within or proximate to any Federally designated or proposed critical habitat. Of the 18 species identified by USFWS (2013b) as having the potential to occur in Grant County, four species were determined to have some potential to occur in the vicinity of the project: Chiricahua leopard frog, Mexican gartersnake, Mexican spotted owl, and Mexican gray wolf (*Table 3.13-1*). This determination was based upon historic records, documented observations in the region, and presence of habitat similar in structure and character to habitat known to support these species.

No Mexican spotted owls or their nests have been documented from the project area. Mexican spotted owls are most common in mixed-conifer forests dominated by Douglas-fir and or white fir and canyons with varying degrees of forest cover (Ecosphere 2014). Mexican spotted owls also occur in ponderosa

pine-Gambel oak habitats, typically where the understory vegetation is well developed; nesting and roosting habitat is typically within closed canopy forest or rocky canyons. Habitat that is similar in structure and composition to habitats known to support nesting Mexican spotted owl is limited within the area evaluated by Ecosphere (2014) to the north side of Hanover Mountain. Mexican spotted owls have been observed in the Piños Altos Range 10 miles north of Hanover Mountain, and it is possible that individuals could occur within limited portions of the project area during the winter months.

Mexican gray wolf has been reintroduced into the Apache and Gila National Forests in Arizona and New Mexico as an experimental and non-essential population. Wolves have been observed approximately 12 miles north of the project area (USFWS 2010), but no wolves have been documented within the area evaluated by Ecosphere (2014). Habitat is considered marginal; use by wolves is expected to be limited due to existing disturbance in the area, high level of human activity (such as the proximity of State Highway 152), and limited prey base. Although not specifically identified as a limiting factor for wolves, the lack of perennial water sources in the area may also affect the potential presence of wolves in the area. Dispersing wolves could potentially use this area as a travel corridor.

Chiricahua leopard frog (CLF) has never been documented in the project area (Ecosphere 2014). The project area is located within CLF Recovery Unit 8 (USFWS 2007), and the nearest designated CLF Critical Habitat is located on privately owned land at Ash and Bolton Springs (Unit 39). These springs are located approximately 6 miles south of the southern extent of that portion of the proposed Bullfrog Pipeline on BLM-administered land (Ecosphere 2014). A description of the Bullfrog Pipeline is included in *Section 2.1.27*. No CLF habitat is present at this location. During previous surveys, Jennings identified two locations in the project area that represented potential CLF habitat: 1) portions of the Poison Spring Drainage, and 2) Buckhorn Spring and its associated downstream riparian area in Buckhorn Gulch. However, water quality in these areas “likely preclude the long-term use of these aquatic habitats by CLF” (Jennings 2000 in Ecosphere 2014). Considering presence of potentially suitable habitat, the absence of any historic records for this species within the project area and the absence of CLF observations by Ecosphere during baseline studies, an analysis of the potential for species from known populations to disperse to the study area was conducted using USFWS dispersal rules. Most of the historic populations of CLF within 5 miles of the project area have been extirpated; based upon the analysis conducted by Ecosphere there is extremely low probability for CLF to naturally disperse to potentially suitable habitat within the project area (Ecosphere 2014).

Mexican gartersnake is listed as threatened with proposed Critical Habitat by the USFWS and is also a BLM Sensitive and State endangered species. Mexican gartersnake is an aquatic species that is known to occur in Grant County from the lower Gila River and from along Duck and Mule creeks. Ecosphere identified moderate quality habitat for this species along Buckhorn Gulch and Hanover Creek, however they determined that the potential for this species to occur within the project area is low as the project area occurs outside of the historic range of the species in Grant County.

Table 3.13-1 Probability for Special Status Species to occur within project area and presence of proposed or designated critical habitat in the project area

Species	Common Name	ESA Status	Proposed or Designated Critical Habitat in Project Area	Probability to Occur
<i>Cyprinella formosa</i>	Beautiful shiner	T	No	N
<i>Gila intermedia</i>	Gila chub	E	No	N
<i>Gila nigra</i>	Headwater chub	C	--	N
<i>Gila nigrescens</i>	Chihuahua chub	T	No	N
<i>Gila robusta</i>	Roundtail chub	C	--	N
<i>Meda fulgida</i>	Spikedace	E	No	N
<i>Oncorhynchus gilae</i>	Gila trout	T	--	N
<i>Poeciliopsis occidentalis occidentalis</i>	Gila topminnow	E	--	N
<i>Tiaroga cobitis</i>	Loach minnow	E	No	N
<i>Rana chiricahuensis</i>	Chiricahua leopard frog	T	No	U
<i>Thamnophis eques megalops</i>	Mexican gartersnake	T	No	U
<i>Thamnophis rufipunctatus</i>	Narrow-headed gartersnake	T	No	N
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed cuckoo	PT	No	N
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	E	No	N
<i>Falco femoralis septentrionalis</i>	Northern aplomado falcon	X	--	N
<i>Strix occidentalis lucida</i>	Mexican spotted owl	T	No	U
<i>Canis lupus baileyi</i>	Mexican gray wolf	X	--	U
<i>Mustela nigripes</i>	Black-footed ferret	X	--	N

Species Status: E=Federal Endangered, PE=Proposed Endangered, T=Federal Threatened, PT=Proposed Threatened, C=Candidate, and X=Experimental Non-Essential population. Probability to Occur: N=No Potential to Occur, U=Unlikely to Occur, M=May Occur, K=Known to Occur, "--" =No Proposed or Designated Critical Habitat for species.

Table 3.13-2 lists the BLM Sensitive, State Listed, and Federal Species of Concern that may occur or are known to be present in the project area (Ecosphere 2014).

Table 3.13-2 List of BLM Sensitive, State Listed, and Federal Species of Concern that may occur or are known to be present in the project area

Common Name	Status	Habitat	Probability of Occurrence
Mammals			
Townsend's big-eared bat	SOC BLM	Semi-desert grasslands to open montane forest, uses abandoned mine features	P
Small-footed western myotis	BLM	Semiarid areas, uses abandoned mine features	P
Occult little brown bat	BLM	Riparian areas, forests and mountainous habitats	P
Fringed myotis	BLM	Grasslands to ponderosa pine forest, mine features	P
Cave myotis	BLM	Widespread, uses mine features	M
Long-legged myotis	BLM	Pinyon-Juniper to ponderosa pine forest	M
Yuma myotis	BLM	Near water in forested areas, may roost in mines	M
Birds			
Northern goshawk	SOC	Ponderosa pine forests and canyon bottoms, widespread in winter	M
American peregrine falcon	SOC NMT	Cliffs and wooded/forested habitats	P
Common black hawk	SOC NMT	Cottonwood riparian areas	P
Pinyon jay	BLM	Pinyon-Juniper or ponderosa pine woodlands	P
Loggerhead shrike	BLM	Desert grasslands, shrublands, and savannas	M

Status Abbreviations: SOC = Federal species of concern; BLM = BLM sensitive species; NMT = State of New Mexico threatened. Probability abbreviations: P = present based on site specific surveys and incidental observations; M = may occur, reasonable probability of limited or seasonal presence (Source: Ecosphere 2014).

No BLM sensitive plant species were identified within the project area (Ecosphere 2014). The five BLM sensitive animal species known to occur within or near the project area include Townsend's big-eared bat, small-footed western myotis, occult little brown bat, fringed myotis, and pinyon jay (Ecosphere 2014). All of these BLM sensitive animal species have been observed during field observations (Ecosphere 2014).

The northern goshawk has not been documented within or in the vicinity of the project area, and no individual goshawks or goshawk nests were observed during baseline field studies conducted for this EA. The nearest known active goshawk territory, which was documented in 2011, is located approximately 2.5 miles northeast of Hanover Mountain (Ecosphere 2014). Based upon vegetation conditions within the project area, Ecosphere characterized 12 acres on the northern slope of Hanover Mountain as "good quality" habitat for the northern goshawk and an additional 157 acres of "moderate to low quality" habitat east of the proposed Haul Road corridor within Ecosphere's survey area. Goshawk may also use other portions of the general project area for hunting and foraging.

No state-listed plant species were identified as known or likely to occur. Two state-listed bird species, the American peregrine falcon (also a Federal species of concern) and the common black hawk, are known to occur within or near the project area and were observed during field investigations conducted by Ecosphere (2014).

Four species of bats, Townsend's big eared bat, occult little brown bat, small footed myotis, and fringed myotis, have been documented in the Hanover Valley area. Townsend's big-eared bat is a BLM sensitive

species and a USFWS Species of Concern. The occult little brown bat, small-footed western myotis, and the fringed myotis are BLM sensitive species. Bats often use historic shafts and adits as roost sites, maternity sites, and/or hibernacula. All four species may also use abandoned buildings, caves, and crevices on rock cliffs for day roosts. These species have been found in the Snowflake, Hanover Mountain, Copper Queen, and Jim Fair historic mine working complex located along the proposed Haul Road alignment.

Cobre has commissioned studies since 2008 to identify bat populations and locate suitable bat habitat associated with abandoned mine features within and adjacent to Hanover Valley (Ecosphere 2014). Cobre is currently closing, safeguarding, and reclaiming historic abandoned mine features on their Continental Mine properties under DP-1403 (Conditions 29 and 63c) with the New Mexico Environment Department (NMED). As part of these closure actions, Cobre has developed a bat mitigation and monitoring program in consultation with the State of New Mexico, who has approved the plan as part of NMED closure actions. Under this program, bat safe closure techniques are used on all features containing bat populations or suitable bat habitat that are identified as historical mines owned by Cobre or located on BLM claims that are controlled by Cobre. Closure of mine features using bat compatible closure techniques is ongoing throughout Cobre properties. Over the past 8 years, Cobre has used bat safe closure techniques on over 400 mine features. In 2014, bat compatible closures are scheduled on private lands along the proposed Haul Road, Hanover Mountain, and in other areas on Cobre properties. Thirty-six bat gates have been installed and an additional 13 bat gates are planned for mine features that exhibit the highest quality bat roosting habitat on Cobre properties. This is almost 50 percent of the mine features that have had some evidence of bat use or otherwise appear suitable as bat roosts. Bats that are excluded from planned mine feature closures are expected to utilize suitable habitat in other bat gated sites located on other lands owned by Cobre that are currently being under used (Ecosphere 2014).

Migratory non-game birds are protected under the MBTA, and most birds within the project area are protected under the MBTA, though certain species have been determined by the New Mexico Partners in Flight (NMPIF) and the USFWS as being high priority species (NMPIF 2007). The NMPIF's bird "Watch List" and the USFWS Division of Migratory Bird Management's Birds of Conservation Concern list identify those high priority bird species by physiographic region (USFWS 2008). Ecosphere 2014 provides a complete list of these species and their potential to occur in the project area based on USFWS' Bird Conservation Regions 34 and 35. Four NMPIF high priority species identified for physiographic regions 56 and 84 were observed in the project area during biological surveys completed in 2012; black-chinned sparrow, juniper titmouse, pinyon jay, and common black hawk (*Appendix C*).

3.13.2 Environmental Consequences: Direct & Indirect Effects

3.13.2.1 Alternative 1 – No Action

No adverse effects are anticipated to occur to the four Federally listed species identified as having some potential to occur within the project area by implementation of the No Action Alternative. A summary of the rationale for this determination is provided in *Table 13.3-3*.

Table 3.13-3 Effects determinations for Federally listed species with some potential to occur under the No Action Alternative and for proposed and designated critical habitat for those species

Species	Effects Determination
<p>Chiricahua leopard frog (<i>Rana chiricahuensis</i>)</p> <p>Federally listed as Threatened with critical habitat.</p>	<p>Individuals of Species – No Effect: The No Action Alternative will not affect Chiricahua leopard frogs (CLF). CLF have not been documented in the project area and most of the nearest known historical localities are considered extirpated (Ecosphere 2014 citing R.D. Jennings et al. reports). One locality, Bolton Spring, supports an extremely small population (n ≤ 3 adults) observed from 2010 to 2012 with limited to no observations of recruitment (Jennings and Christman 2011 as cited in Ecosphere 2014). Bolton Spring is approximately 8 miles (straight-line) from the closest potential habitat in the project area (Buckhorn Spring and Gulch). High levels of total dissolved solids (TDS) likely preclude the long-term use of these aquatic habitats by CLF (Ecosphere 2014).</p> <p>Although suitable vegetation and flow are present at Buckhorn Gulch and Springs, water quality analyses and water chemistry identified high levels of total dissolved solids which are likely to preclude the long-term use of these aquatic habitats by CLF (Ecosphere 2014). Additionally, the potential for CLF to occur is not expected due to the absence of historic or recent records for this species within the project area, the apparent extirpation of most historic populations within 5 miles of the project area, and an analysis using the USFWS “1-3-5” rule of the potential for immigration (dispersal) from the single, extremely small population (Bolton Spring); As a result, adverse direct or indirect impacts to CLF would not occur.</p> <p>Critical Habitat – No Effect: Critical Habitat at Bolton Spring is located approximately 8 miles south of Buckhorn Gulch. The No Action Alternative will not directly or indirectly impact any designated critical habitat for CLF.</p>
<p>Northern Mexican gartersnake (<i>Thamnophis eques megalops</i>)</p> <p>Federally listed as Threatened with proposed critical habitat</p>	<p>Individuals of Species – No Effect: USFWS (see USFWS 2014: <i>Appendix A</i>) notes two historical records of northern Mexican gartersnakes (NMGS) from the Mimbres River Sub-basin, the drainage basin in which the project area occurs. USFWS considers these records to be from the early 1900s, and concludes that the species is likely extirpated from this sub-basin (USFWS 2014). No NMGS localities in southeast Grant County in the vicinity of the project area have been mapped (Degenhardt et al. 1996). The nearest known recent (i.e., 2013) observation of NMGS occurs approximately 30 miles to the west-northwest along the Gila River in the vicinity of Cliff, NM (USFWS 2014 citing Hotle 2013). The No Action Alternative project area does not occur within the currently recognized range of NMGS.</p> <p>NMGS are often found where native fish and amphibian species are abundant (Degenhardt et al. 1996) and no fish or leopard frogs (primary prey items of NMGS) were observed during field surveys in potential habitat; however, canyon treefrog (<i>Hyla arenicolor</i>) tadpoles were observed in Buckhorn Gulch (Ecosphere 2014).</p> <p>Based on the currently recognized range of NMGS, the marginal quality of aquatic habitat in the project area, and the absence of abundant suitable prey species, NMGS is unlikely to occur in the project area; the No Action Alternative is not expected to result in direct or indirect impacts to any NMGS.</p> <p>Critical Habitat – No Effect: Proposed critical habitat for NMGS is approximately 20 miles northwest of Buckhorn Gulch (USFWS 2013a). The No Action Alternative is not expected to directly or indirectly impact any areas proposed for designation of critical habitat for NMGS and would not adversely modify proposed critical habitat for NMGS.</p>

Table 3.13-3 Effects determinations for Federally listed species with some potential to occur under the No Action Alternative and for proposed and designated critical habitat for those species

Species	Effects Determination
<p>Mexican spotted owl (<i>Strix occidentalis lucida</i>)</p> <p>Federally listed as Threatened with critical habitat.</p>	<p>Individuals of Species – No Effect: No Mexican spotted owls (MSO) or nests have been documented from the project area. MSOs are most common in mixed-conifer forests dominated by Douglas-fir and or white fir and canyons with varying degrees of forest cover (Ecosphere 2014). They also occur in ponderosa pine-Gambel oak habitats, typically where the understory vegetation is well developed; nesting and roosting habitat is typically within closed canopy forest or rocky canyons. Habitat that is similar in structure and composition to habitats known to support nesting MSO is limited within the area evaluated by Ecosphere (2014) to the north side of Hanover Mountain. MSOs have been observed in the Piños Altos Range 10 miles north of Hanover Mountain, and it is possible that individuals could occur within limited portions of the project area during the winter months.</p> <p>There are no known records of MSO from the project area and the potential for the species to occur is unlikely and would be limited to winter months. No direct or indirect adverse impacts to MSO are expected from development of the No Action Alternative.</p> <p>Critical Habitat – No Effect: Designated critical habitat for the MSO is located approximately 3 miles north of the project area and the No Action Alternative is not expected to have any direct or indirect impacts to MSO.</p>
<p>Mexican Gray Wolf (<i>Canis lupus baileyi</i>)</p> <p>Federally listed as an Experimental Non-Essential Population without critical habitat</p>	<p>Individuals of Species – No Effect: Mexican gray wolf has been reintroduced into the Apache and Gila National Forests in Arizona and New Mexico as an experimental, non-essential population. Wolves have been observed approximately 12 miles north of the project area (USFWS 2010), but no wolves have been documented within the area evaluated by Ecosphere (2014). Habitat is considered marginal; use by wolves is expected to be limited due to existing disturbance in the area, high level of human activity (such as the proximity of State Highway 152), and limited prey base. Although not specifically identified as a limiting factor for wolves, the lack of perennial water sources in the area may also affect the potential presence of wolves in the area. Dispersing wolves could potentially use this area as a travel corridor. For an experimental non-essential population, the BLM is not obligated to consult with USFWS in accordance with the provisions of Section 7(a)2 of the ESA even if we determine that the action being evaluated may affect the species. Regardless, we have determined here that the No Action Alternative will not affect Mexican gray wolf.</p> <p>Critical Habitat – No Effect: There is no designated or proposed critical habitat for the Mexican gray wolf.</p>

Seven historic mine features within the privately owned portions of Hanover Mountain have been identified as suitable bat habitat (Ecosphere 2014). Planned mining activities will not adversely impact any known occupied or potentially suitable roost habitat on Hanover Mountain as all known or potentially suitable roost sites will have been closed as part of ongoing closure actions prior to the implementation of mining in accordance with the No Action Alternative. Potential foraging and dispersal habitat for special status bat species may be affected by implementation of the No Action Alternative, however, in the context of the overall range of these species and considering the availability of suitable foraging and dispersal habitat, these effects are not expected to result in or cause a trend towards Federal listing.

Approximately 12 acres of habitat characterized as good nesting habitat for northern goshawk would be lost as a result of the implementation of the No Action Alternative. The northern goshawk were not observed during the Ecosphere study. The loss of this relatively small area of habitat for this species

would not be expected to result in impacts to individuals or in population-level effects that would result in a trend toward Federal listing of northern goshawk as threatened or endangered.

A common black hawk was observed flying over Hanover Creek near the Jim Fair area during field studies. In the southwestern United States, this raptor is generally found in riparian habitats, particularly in cottonwood woodlands along perennial lowland streams (BISON-M 2013). No cottonwood dominated riparian habitat would be lost as a result of the implementation of the No Action Alternative, although approximately 2.1 acres of riparian habitat would be lost along the Poison Spring Drainage within the proposed expansion and construction of the Fierro Leach Pad. The loss of this small patch of marginal habitat for this species would not be expected to result in adverse impacts to individuals or in population-level effects that would result in a trend toward Federal listing as threatened or endangered.

Pinyon jays were observed in Hanover Valley near areas proposed under the No Action Alternative including the proposed administration office area and on Hanover Mountain. These jays are mainly found in Pinyon-Juniper Woodlands, but they may also occur in other communities in the non-breeding season. However, even in preferred habitats, their occurrence may be unpredictable and seasonally sporadic (BISON-M 2013). The loss of habitats supporting pinyon pines for this species would result in a reduction of suitable foraging habitat for pinyon jays, but this reduction would not be expected to result in population-level impacts that would result in a trend toward Federal listing as threatened or endangered.

3.13.2.2 *Alternative 2 – Proposed Action*

Implementation of the Proposed Action Alternative would not impact any plant or animal species listed as threatened or endangered by the USFWS, nor would the project affect any designated or proposed critical habitat. The rationale for this determination for each species is described in **Table 3.13-4**. No special status plant species are known or suspected to occur within the Proposed Action Alternative activity area (Ecosphere 2014).

Table 3.13-4 Effects determinations for Federally listed species with some potential to occur under the Proposed Action Alternative and for proposed and designated critical habitat for those species

Species	Effects Determination
Chiricahua leopard frog (<i>Rana chiricahuensis</i>) Federally listed as Threatened with critical habitat.	Individuals of Species – No Effect: The effects determination is based on the same finding as found in the determinations for the No Action Alternative. Please refer to Table 3.13-3 for that discussion. Critical Habitat – No Effect: The Proposed Action Alternative is not located near any designated critical habitat for CLF and will not directly or indirectly impact any designated critical habitat for CLF.
Northern Mexican gartersnake (<i>Thamnophis eques megalops</i>) Federally listed as Threatened with proposed critical habitat	Individuals of Species – No Effect: The effects determination is based on the same finding as found in the determinations for the No Action Alternative. Please refer to Table 3.13-3 for that discussion. Critical Habitat – No Effect: The nearest proposed critical habitat for NMGS is approximately 20 miles northwest of Buckhorn Gulch (USFWS 2013b). The Proposed Action Alternative is not expected to directly or indirectly impact any areas proposed for designation of critical habitat for NMGS and would not adversely modify proposed critical habitat for NMGS.

Table 3.13-4 Effects determinations for Federally listed species with some potential to occur under the Proposed Action Alternative and for proposed and designated critical habitat for those species

Species	Effects Determination
Mexican spotted owl <i>(Strix occidentalis lucida)</i> Federally listed as Threatened with critical habitat.	<p>Individuals of Species – No Effect: The effects determination is based on the same finding as found in the determinations for the No Action Alternative. Please refer to Table 3.13-3 for that discussion.</p> <p>Critical Habitat – No Effect: Designated critical habitat for the MSO is located approximately 3 miles north of the project area and the Proposed Action Alternative is not expected to have any direct or indirect impacts to MSO.</p>
Mexican Gray Wolf <i>(Canis lupus baileyi)</i> Federally listed as an Experimental Non-Essential Population without critical habitat	<p>Individuals of Species – No Effect: The effects determination is based on the same finding as found in the determinations for the No Action Alternative. Please refer to Table 3.13-3 for that discussion.</p> <p>Critical Habitat – No Effect: There is no designated or proposed critical habitat for the Mexican gray wolf.</p>

As part of the Cobre’s ongoing abandoned mine feature closure program, the six mine features located on Cobre lands along the proposed Haul Road will be closed in the fall of 2014 using methods approved under the NMED closure plan (Ecosphere 2014). There are no abandoned mine features on BLM-administered land within the proposed Haul Road alignment or on the BLM-administered slivers on Hanover Mountain. Planned mining activities will not adversely impact any known occupied or potentially suitable roost habitat on Hanover Mountain or within the proposed Haul Road alignment as all known or potentially suitable roost sites in these areas will have been closed as part of ongoing closure actions prior to the implementation of mining.

During their survey of the proposed Haul Road alignment, Ecosphere (2014) identified 20 additional roost sites within their survey area but outside of the disturbance footprint of the proposed Haul Road. All of the known roost sites with portals that would not be directly affected by construction are located east of the proposed Haul Road alignment, some immediately adjacent to the mapped limits of construction and others up to approximately 400 feet from the mapped limits of construction. Eleven of these sites have bat gates. During the life of mine operations, mine traffic on the proposed Haul Road may indirectly affect use of some of these features.

There are no known roost sites within the footprint of the proposed SWRDF expansion on BLM-administered land. There are a total of four known roost sites along or in the vicinity of the proposed Utility Corridor and the existing Bullfrog Pipeline corridor. Two of these sites are fitted with bat gates.

Potential foraging and dispersal habitat for Townsend’s big-eared bat, small-footed western myotis, occult little brown bat, and fringed myotis would be affected by implementation of the Proposed Action Alternative, but the acreage of impact associated with the Proposed Action Alternative is relatively small compared to the overall geographic range of the special status bat species observed in the project area and to the availability of suitable foraging habitat within that range; nor will the project prevent dispersal of these species. The effects of the Proposed Action Alternative are not expected to result in or cause a trend

towards Federal listing of these species. Impacts to habitat that is potentially suitable for northern goshawk on the northern slope of Hanover Mountain would be similar to the impacts identified in the No Action Alternative. The loss of this habitat would not be expected to result in individual or population-level effects that would result in a trend toward Federal listing for northern goshawk as threatened or endangered.

There are no known common black hawk nests within the Project Footprint and none would be impacted. Impacts to riparian habitat from development of the Proposed Action Alternative are minimal (less than 1 acre). Considering the fragmented distribution of riparian habitat in the vicinity of the proposed activities, and the general lack of extensive well developed stands of cottonwood-dominated habitat, the loss of this habitat would not be expected to result in any measureable direct adverse impacts to individual black hawks, nor would it be expected to result in population-level effects that would lead toward Federal listing or endangerment of this species.

Pinyon jays were observed in Hanover Valley near the Proposed Action Alternative Footprint. These jays are mainly found in Pinyon-Juniper Woodlands, but they may also occur in other communities in the non-breeding season. However, even in preferred habitats, their occurrence may be unpredictable and seasonally sporadic (BISON-M 2013). The loss of habitats supporting pinyon pines for this species would result in a reduction of suitable foraging habitat for this species, but this reduction would not be expected to result in population-level effects that would cause or lead to a trend toward Federal listing as threatened or endangered.

Loggerhead shrike has potential to occur in Madrean Juniper Savanna communities within the project area, particularly along the proposed Haul Road near Kearney Mesa. However, this species was not observed in earlier avian studies in this vicinity, and it was not observed during field studies for this project. Based on the lack of observations of this species and the limited extent of potential habitat for this species that would be affected, the loss of Madrean Juniper Savanna communities from construction of the proposed Haul Road would not be expected to adversely impact any individual loggerhead shrike, and it is not expected to result in population-level effects that would result in a trend toward Federal listing as threatened or endangered.

3.14 NOXIOUS WEEDS

3.14.1 Affected Environment

Noxious weeds are plant species that are non-native to New Mexico and have negative impacts to the economy or environment. The New Mexico Noxious Weed Management Act (NWMA) requires that the director of the New Mexico Department of Agriculture (NMDA) select weed species to be targeted as noxious weeds for control or eradication. The NWMA also requires that the director identify methods to be used in controlling noxious weeds. Pursuant to this act, a list of noxious weeds was compiled and published by the NMDA in 2009. Species included in this list are targeted for management or control because they have been declared by the State of New Mexico to be harmful to natural and economic resources or to possess noxious characteristics (NMDA 2009).

The New Mexico Noxious Weed List separates noxious weeds into the following categories:

- Class A. Currently not present in New Mexico, or have limited distribution. Preventing new infestations of these species and eradicating existing infestations are the highest priority.
- Class B. Limited to portions of the state. In areas with severe infestations, management should be designed to contain the infestation and stop any further spread.
- Class C. Widespread in the state. Management decisions for these species should be determined at the local level, based on feasibility of control and level of infestation.
- Watch-List Species. Species of concern in the state. These species have the potential to become problematic. More data are needed to determine if these species should be listed.

Species in Classes A, B, and C known to be present in the project vicinity or believed to have a possibility of occurrence in this vicinity are included in *Appendix D*. Ecosphere (2014) identified five noxious weed species within the project vicinity. These species include: one Class A species (camelthorn, *Alhagi pseudalhagi*); one Class B species, (tree of heaven, *Ailanthus altissima*); and three Class C species (cheatgrass, *Bromus tectorum*; tamarisk, *Tamarix* spp.; and Siberian elm, *Ulmus pumila*). In addition, one Watch List species, giant cane (*Arundo donax*), was identified in the project vicinity.

Past and existing activities in Hanover Valley have resulted in disturbed areas that can influence the spread of noxious weeds. These activities include historic and current mining activities and livestock grazing (BLM 1998). Within the general vicinity of Cobre, noxious weed populations were identified along Hanover Creek: Siberian elm, tamarisk (both Class C species), and tree of heaven (a Class B species). Most of these noxious species populations were found in proximity to residences located along the Hanover Creek drainage. The only noxious species “populations of note” identified during the field studies were a small population of cheatgrass (a Class C species) located on the southern extent of the proposed Haul Road, scattered tamarisk located in the riparian areas on Poison Spring Drainage and Buckhorn Gulch, and a small population (less than 20 individuals) of giant cane (a Watch List species) and tree of heaven located in the area for the proposed administrative buildings (Ecosphere 2014). Tamarisk (or saltcedar) is prevalent along drainages throughout the region. Three individual camelthorn plants (a Class A species) were identified near existing mine structures and were eradicated by direct hand removal, a mechanical approach recommended in guidelines published by NMDOT (2003).

3.14.2 Environmental Consequences: Direct & Indirect Effects

Noxious weeds are generally able to colonize disturbed areas and often out-compete native species. These plants are typically able to spread along linear transportation corridors, Utility Corridors, and waterways and, from these, vector into adjacent landscapes. Traditional ecological boundaries like ridge tops and rivers usually do not deter the spread of noxious weeds. Weed seed can be inadvertently introduced into corridors during construction by transport on equipment and through the use of mulch, imported soil or gravel, and sod. If imported materials are required, the materials would be screened and only approved native materials would be used. Construction, certain mining activities, and livestock grazing can also contribute to the spread of noxious weeds. Implementation of a weed management plan, as described in *Chapter 2* of this EA and in Cobre’s MPO Amendment No. 5, would utilize BMPs designed to reduce the

potential spread of noxious weeds that might result from the proposed activities under the No Action and Proposed Action Alternatives.

3.14.2.1 Alternative 1 – No Action

Mining activities would result in disturbance to the native plant community in the vicinity of Hanover Mountain, and the resulting disturbed surfaces can provide opportunities for the spread of noxious weeds and non-native species. However, no noxious weeds are currently known in the vicinity of Hanover Mountain (Ecosphere 2014).

The proposed site for the Solution Extraction/Electro-winning facility is located along the east side of Hanover Creek. There were no noxious weeds located along this section of the creek.

The development of the Fierro Leach Pad would expand onto private lands and affect a portion of Poison Spring Drainage that supports riparian habitat. Tamarisk is present within this riparian habitat and would be removed as a result of this expansion. Populations of tamarisk, tree of heaven, and giant cane are located within the eastern portion of the proposed site for the Fierro Leach Pad, east of Hanover Creek. Removal and disposal of these plants should be conducted in a manner that would prevent the potential spread of these species along the drainages, as outlined in the No Action alternative in *Chapter 2*.

Surveys were not conducted within the area of the proposed Humbolt Leach Pad. Existing disturbance is limited, and there are no drainages through the area that could support noxious weeds or facilitate the spread of such species.

The proposed Utility Corridor is located between the existing mine and Fierro Road. Populations of tamarisk and Siberian elm occur along Hanover Creek on the east side of Fierro Road and could be affected by installation of the new 69-kV line. Tamarisk is present within the riparian habitat where the proposed Utility Corridor crosses Buckhorn Gulch along the south side of the SWRDF.

3.14.2.2 Alternative 2 – Proposed Action

Proposed mining activities would result in disturbance to the local native plant communities, and the resulting disturbed surfaces could provide opportunities for the spread of noxious weeds and non-native species. No noxious weeds were identified in the area of Hanover Mountain or the North Overburden Stockpile; therefore, activities in these areas are unlikely to contribute to the spread of noxious weeds.

Construction of the proposed Haul Road would create a linear corridor that could provide an avenue where mine-related traffic could facilitate the spread of noxious weed seed to adjacent areas. Cheatgrass was identified at the south end of the alignment on the west side in association with a stock tank. This area is not within the proposed area of disturbance; therefore, construction and use of the proposed Haul Road is unlikely to contribute to the spread of cheatgrass in the area.

The proposed Utility Corridor intersects with riparian communities associated with the Poison Spring Drainage at the north and Buckhorn Gulch along the south side of the SWRDF. Both of these drainages support populations of tamarisk. This newly disturbed corridor could provide a pathway for the spread of

noxious weed seed to other adjacent areas. Weed management activities outlined in the MPO (Cobre 2012:4-3) include preconstruction surveys, evaluation of borrow material, and development of a weed management plan in any areas with Class A or B weeds. Implementation of these measures would limit and in some cases prevent the spread of noxious weeds associated with the implementation of the Proposed Action Alternative.

3.15 CULTURAL RESOURCES

3.15.1 Affected Environment

During the last 25 years, archaeological research required by Federal and state legislation has provided extensive information on the past use of southwestern New Mexico, from the Paleoindian period through the present Euroamerican era. Numerous archaeological survey and excavation projects, many on BLM-administered land, have provided a picture of the prehistoric and historical occupation. Extensive areas of private land on the Mimbres and Gila drainages have also been the subject of academic study, much of which is summarized in archaeological overviews (LeBlanc and Whalen 1980; Lekson 1992; Stuart and Gauthier 1996).

The affected environment contains evidence of both prehistoric Native American and historic Euroamerican use and occupation of the region. Historical period use of the area is dominated by sites relating to mining activities. Prehistoric use of the area is represented by short-term habitation sites.

Archaeological resources in the Hanover Mountain activity area consist entirely of historical features distributed over 16 claims, with no prehistoric sites present. All or parts of each historic mine claim or group of claims have been designated as archaeological sites, such that 11 archaeological sites are present within the Hanover Mountain activity area (Ackerly 2012a). These sites, along with their NRHP eligibility and management recommendations, are summarized in *Table 3.15-1*.

Table 3.15-1 Archaeological sites identified within the Hanover Mountain activity area

Site Number/Name	Land Management Status	Age, Cultural Affiliation, Function	NRHP Eligibility	Management Recommendation
LA173561/Hanover Copper Claim	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173560/Hanover Annex Claim	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173562/Emma Claim	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173563/Hanover No. 2 Group –Hanover No. 2, King Solomon, Virginia and Blue Bell Lodes	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173564/Nora Claim	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173565/Independence Group-Independence and Copper Bell Lodes	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173566/Ontario Claim	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173567/Mayflower Claim	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173568/Quartzite Group-Quartzite, K & K, and Southern Cross	Private and BLM	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173569/Tidal Wave-Taff Group	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary
LA173570/Dewey-Schley Group	Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended for portions of the claim lying within the MPO boundary

The Western Cultural Resource Management, Inc. (WCRM) surveys in the area of the Humbolt Leach Pad identified eight archaeological sites (Brown 1995, 1996). These sites, along with their NRHP eligibility and management recommendations (Brown 1995, 1996), are summarized in **Table 3.15-2**. One of the sites was recommended NRHP-eligible, and one was recommended potentially eligible.

Table 3.15-2 Archaeological sites identified within the Humbolt Leach Pad activity area

Site Number/Name	Land Management Status	Age, Cultural Affiliation, Site Type	NRHP Eligibility	Management Recommendation
LA111397/Lone Star Mine	Private	Historic, Euroamerican, mine and associated features	Not Eligible	None; archaeological clearance recommended
LA111398	Private	Historic, Euroamerican, limited base camp	Not Eligible	None; archaeological clearance recommended
LA111404	Private	Historic, Euroamerican, mine and associated features	Not Eligible	None; archaeological clearance recommended
LA111405	Private	Historic, Euroamerican, mine and associated features	Potentially Eligible	Avoidance
LA111406	Private	Prehistoric, Native American, limited habitation	Eligible (criterion d)	Avoidance
LA111407	Private	Historic, Euroamerican, metal and glass scatter	Not Eligible	None; archaeological clearance recommended
LA114080/North Star Mine	Private	Historic, Euroamerican, mine and associated features	Not Eligible	None; archaeological clearance recommended
LA114081	Private	Historic, Euroamerican, mine and associated features	Not Eligible	None; archaeological clearance recommended

While no known cultural resources have been identified within the privately owned lands within the proposed area for construction and expansion of the Fierro Leach Pad or the Solution Extraction/Electro-winning facility, should this circumstance change, Cobre will comply with applicable state and Federal requirements and standards.

An area encompassing the North Overburden Stockpile, including the associated haul road to Hanover Mountain, was surveyed for cultural resources by WCRM in 1994 (Brown and Randolph 1995) as part of a larger survey to assist plans for future mine expansion. This area is on BLM-administered land. An additional cultural resources inventory adjacent to and south of the proposed location for the North Overburden Stockpile was conducted by WCRM in 1996 (Brown and Van Dyke 1996) in support of the expansion of the existing tailings pond. In late 2011, subsequent to the development of the Cobre MPO Amendment No. 5, the BLM requested that Freeport-McMoRan reinventory several historical mines and one prehistoric site that had been previously recorded during the WCRM inventories within and near the proposed location for the North Overburden Stockpile to verify the character of the sites and the original WCRM NRHP eligibility evaluations. This reinventory was conducted by Ackerly (2011) and included historical mines on Sentinel (LA113048), Schoyerlafe (LA113049), and Super Cobre (LA105619) claims, and prehistoric site LA107552. However, LA113048 lies outside and to the south of the proposed location for the North Overburden Stockpile.

Ackerly's (2011) reinventory includes three archaeological sites that lie within the North Overburden Stockpile activity area: these include historical mines on Schoyerlafe (LA113049) and Super Cobre (LA105619) claims, as well as prehistoric site LA107552. The prehistoric site is the only site that has been recommended eligible for the NRHP. These sites, along with their NRHP eligibility and management recommendations, are summarized in *Table 3.15-3*.

Table 3.15-3 Archaeological sites identified within the proposed location for the North Overburden Stockpile

Site Number/Name	Land Management Status	Age, Cultural Affiliation, Function	NRHP Eligibility	Management Recommendation
LA105619/Super Cobre Claim	BLM	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended
LA113049/Schoyerlafe Claim	BLM and Private	Historic, Euroamerican, mine claim and features	Not Eligible	None; archaeological clearance recommended
LA107552	BLM	Prehistoric, Native American, lithic scatter	Eligible (criterion d)	Avoidance and implementation of avoidance strategies; archaeological clearance recommended assuming avoidance

Source: Ackerly 2011

A complete Class III cultural resources survey of the proposed Haul Road corridor was conducted by Dos Rios Consultants, Inc. (DRC) in 2012 (Ackerly 2012a, 2013). Ackerly (2012a) notes that portions of the proposed Haul Road alignment were also previously examined as part of abandoned mine remediation efforts by Cobre. Eight archaeological sites were identified by Ackerly (2012a) within the inventoried proposed Haul Road corridor: seven historical sites and one prehistoric site. The prehistoric site is the only site in the corridor that has been recommended eligible for the NRHP. These sites, along with their NRHP eligibility and management recommendations, are summarized in *Table 3.15-4*.

Table 3.15-4 Archaeological sites identified within the proposed Haul Road corridor

Site Number/Name	Land Management Status	Age, Cultural Affiliation, Function	NRHP Eligibility	Management Recommendation
LA167304/Housing Area Addendum to the Peru-Pewabic Mine	Private	Historic, Euroamerican, townsite east of Peru-Pewabic Mine	Not Eligible	None; archaeological clearance recommended
LA168165/Addendum to El Paso Iron Mine	Private	Historic, Euroamerican, housing area and refuse scatter northeast of now remediated El Paso Iron Mine	Not Eligible	None; archaeological clearance recommended
LA173555	BLM	Prehistoric, Mimbres, habitation (fieldhouse)	Eligible (criterion d)	Avoidance and implementation of avoidance strategies; archaeological clearance recommended assuming avoidance
LA173556/Vega Ranch	BLM and Private	Historic, Euroamerican, ranch complex	Not Eligible	None; archaeological clearance recommended
LA173557/Snowflake Mine	Private	Historic, Euroamerican, mine complex	Not Eligible	None; archaeological clearance recommended
LA169572/Jim Fair-Jim Thayer Mine	Private	Historic, Euroamerican, mine complex	Not Eligible	None; archaeological clearance recommended
LA173558/Humbolt Lode Claim	Private	Historic, Euroamerican, mine workings	Not Eligible	None; archaeological clearance recommended
LA173560/Hanover Annex Housing Area	Private	Historic, Euroamerican, housing area and refuse scatter on Hanover Annex claim	Not Eligible	None; archaeological clearance recommended

The SWRDF expansion areas, including 6.3 acres on BLM-administered land and 23 acres on privately owned land, were surveyed by WCRM in 1997. In 2012, Ackerly (2012b) wrote a memorandum for Freeport-McMoRan discussing cultural resources within the SWRDF. In this memorandum, Ackerly notes that WCRM documented 14 sites within the 1997 SWRDF footprint, 6 of which were recommended eligible for the NRHP, and 8 of which were deemed not eligible. In 1998, WCRM conducted data recovery at 5 of the 6 eligible sites, leaving one eligible site (LA114088) not mitigated. This site was recommended for mitigation in the 1997 EA approved by the BLM.

Because human remains were found at LA111395 during WCRM's excavations, WCRM recommended, and BLM concurred, that LA111395 would be sequestered and avoided in any subsequent development of the SWRDF (Ackerly 2012b). Subsequent to Freeport-McMoRan's acquisition of Cobre, two additional NRHP-eligible sites (LA129201 and LA129202) were located along the extreme eastern edge of the SWRDF footprint (Ackerly 2012b).

The proposed location of the substation at the northern end of the proposed Utility Corridor has been previously disturbed and contains no evidence of any archeological sites (Ackerly 2014). Ackerly (2014) further notes that the corridor traverses an area previously surveyed by WCRM in 1996 to 1997, and does not intersect any previously recorded prehistoric or historical archeological sites. No cultural resources have been identified in the proposed Utility Corridor under the Proposed Action Alternative.

3.15.2 Environmental Consequences: Direct & Indirect Effects

3.15.2.1 Alternative 1 – No Action

Effects on cultural resources are discussed below for those activity areas comprising previously undisturbed private lands to be disturbed by the No Action Alternative. All other activities on BLM-administered lands were previously permitted, and cultural clearance for those activities would have been granted at that time. For those areas that were not surveyed on private land under this MPO Cobre will comply with applicable state and federal requirements and standards.

No NRHP-eligible properties were identified at Hanover Mountain, and archaeological clearance was recommended for those portions of the sites lying within the MPO boundary (Ackerly 2012a). The No Action Alternative of mining on privately owned lands within the privately owned portions of Hanover Mountain would, therefore, have no adverse effects on cultural resources.

No known cultural resources have been identified within the privately owned lands within the proposed area for construction and expansion of the Fierro Leach Pad or the Solution Extraction/Electro-winning facility. Within the proposed area for construction and expansion of the Humbolt Leach Pad on privately owned land, one prehistoric site has been recommended NRHP eligible (LA111406) and one historical site has been recommended potentially eligible (LA111405). Construction of the Humbolt Leach Pad would adversely affect these two sites. The SWRDF footprint has been reconfigured to avoid direct impacts to identified cultural resources (Ackerly 2012b). A locked chain-link fence was also placed around Site LA111395 to ensure avoidance. The SWRDF expansion is not expected to have adverse effects on cultural resources. If the No Action Alternative were selected, Cobre would comply with applicable state and Federal requirements and standards applicable to managing cultural resources.

3.15.2.2 Alternative 2 – Proposed Action

No NRHP-eligible properties were identified on BLM-administered lands at Hanover Mountain. Mining the BLM-administered lands within the Hanover Mountain Deposit would have no adverse effects on cultural resources.

One NRHP-eligible property (LA107552) was identified on BLM-administered lands within the proposed location for the North Overburden Stockpile. A small portion of this site intersects the footprint of the haul road to Hanover Mountain. Ackerly (2011) identified avoidance strategies to implement during construction activities associated with the haul road to avoid any adverse impacts to the site. Avoidance strategies would include berms to prevent vehicular traffic and barricade fencing or other combinations of restrictive-access measures to avoid any adverse impacts to the site. Cobre installed a fence around the site in 2013 to ensure avoidance. The Proposed Action Alternative within the North Overburden Stockpile would therefore have no adverse effects on cultural resources.

One of the eight identified archaeological sites within the inventoried proposed Haul Road corridor is eligible for the NRHP. Prehistoric site LA173555, located on BLM-administered land, is a Mimbres fieldhouse with an associated artifact scatter. A permanent fence along the margins of the existing dirt road would be constructed to prevent accidental ingress into the site (Ackerly personal communication, 11/01/13). The construction of the proposed Haul Road would have no adverse effects on cultural resources.

No NRHP-eligible properties were identified in the proposed Utility Corridor, and archaeological clearance was recommended (Ackerly 2014). Construction, operation, and maintenance of the 69-kV powerline within the proposed Utility Corridor would therefore have no adverse effects on cultural resources.

No adverse effects to historic properties are expected from mine reclamation and closure activities.

3.16 PALEONTOLOGICAL RESOURCES

3.16.1 Affected Environment

Paleontological resources or fossils are the physical remains, impressions, or traces of plants or animals from past geologic ages. Paleontological resources are important mainly for their potential to provide scientific dating information, information on the evolutionary history of plants and animals, and information on paleoenvironments and paleoclimates. Vertebrate fossils are generally considered to be the most significant; however, rare occurrences of invertebrates, plants, and other diagnostic fossils can also provide valuable information (BLM 2000).

Fossil-bearing formations are known to occur in the vicinity of the proposed activities (BLM 2000). Although no project-specific surveys have been performed, previous surveys have been performed in the area of the proposed activities, and no paleontological resources were identified. Fossils frequently found in the fossil bearing formations presented in *Table 3.16-1* (in areas outside of the project footprint) consist of invertebrate fossils, such as brachiopods, corals, cephalopods, gastropods, sponges, trilobites, bryozoa,

ammonites, pelecypods, fusulinids, and crinoids. Some fish scales and teeth have been found in the Percha Shale (Jones et al. 1967). All of these fossils are prolific worldwide, and are thus not unique to this area. The Potential Fossil Yield Classification (PFYC) system is used by the BLM to assess the potential for discovery of significant paleontological resources or the impact of surface-disturbing activities to these resources. The PFYC system uses rock types to broadly categorize the probability of fossil occurrence into five classes that range from Class I (Very Low Potential) through Class 5 (Very High Potential). The majority of area encompassed by the No Action and Proposed Action Alternatives occurs in rock types that are classified with very low or low potential for fossil occurrence. The PFYC for the project area is described below.

3.16.2 Environmental Consequences: Direct & Indirect Effects

Although invertebrate and paleobotanical fossils occur in geologic formations found within the vicinity of the project, previous studies conducted within the Hanover Valley area resulted in no findings of paleontological resources of critical scientific or educational value (Reser 1996). No vertebrate fossil localities have been previously identified in the area of Cobre’s Continental Mine (Reser 1996). The construction and operation of activities proposed under the No Action and Proposed Action Alternatives are not expected to result in the long-term loss of paleontological resources, although fossil-bearing geologic formations could be covered as a result of some of the activities.

3.16.2.1 Alternative 1 – No Action

Fossil-bearing geologic formations found within the disturbance footprints for activities proposed under the No Action Alternative are presented in **Table 3.16-1**. These activities are located primarily in areas of very low and low potential for fossils. Small areas of rock types with slightly higher probability are present, but no fossils have been found during previous surveys.

Table 3.16-1 No Action Alternative: Activities within geological formations associated with fossils

Proposed Activity	Geological Formations Known to Contain Fossils								
	Colorado Formation	Percha Shale Formation	Fusselman and Montoya Dolomite	The Syrena Formation	The Bliss Formation	Lake Valley Limestone	Abo Formation	Oswaldo Formation	Hanover-Fierro Stock ¹
Hanover Mountain	X					X			X
Fierro Leach Pad		X	X						X
Humbolt Leach Pad				X		X	X	X	
SWRDF expansion					X				X
Solution Extraction/ Electro-winning facility									X
Proposed Utility Corridor	X			X		X		X	X

¹ Hanover-Fierro Stock consists of an igneous pluton, it is unlikely that fossils are present within the stock itself. However, perched limestone and shale present above the pluton that has not been metasomatized has the potential to contain fossils.

3.16.2.2 Alternative 2 – Proposed Action

Fossil-bearing geologic formations found within the disturbance footprints for activities that would occur under the Proposed Action Alternative are presented in **Table 3.16-2**. These activities are located primarily in areas of very low and low potential for fossils. Small areas of rock types with slightly higher probability are present, but no fossils have been found during previous surveys.

Table 3.16-2 Proposed Action Alternative: Activities within geological formations associated with fossils

Proposed Activity	Geological Formations Known to Contain Fossils							
	Colorado Formation	Percha Shale Formation	Fusselman and Montoya Dolomite	El Paso Limestone	The Bliss Formation	Lake Valley Limestone	Oswaldo Formation	Hanover-Fierro Stock ¹
Hanover Mountain	X					X		X
North Overburden Stockpile	X							
Proposed Haul Road		X	X	X		X	X	X
SWRDF Expansion								
Proposed Utility Corridor		X				X	X	X

¹ Hanover-Fierro Stock consists of an igneous pluton, it is unlikely that fossils are present within the stock itself. However, perched limestone and shale present above the pluton that has not been metasomatized has the potential to contain fossils.

3.17 LANDS AND REALTY

3.17.1 Affected Environment

3.17.1.1 Bullfrog Pipeline

The Bullfrog Pipeline is part of the existing water supply distribution system that will continue to operate in its current capacity of conveying stormwater and seep water from Cobre's Continental Mine to Chino for use as make-up and road water. Over time, portions of the Bullfrog Pipeline have been replaced and rerouted between Chino and Cobre and around the SWRDF to allow ongoing and expanded mining operations at Cobre's Continental Mine (**Figure 3.17-1**). Portions of the pipeline that are under current mine facilities, such as the SWRDF, will remain in place and will be reclaimed at closure. For the portions of the existing Bullfrog Pipeline that cross BLM-administered land, Cobre has been granted a right-of-way (No. NMNM000555) from BLM that is renewed every 5 years.

3.17.1.2 SWRDF Dam 2

In the late 1990s, an administrative order on consent between the EPA and Cobre included the requirement to capture stormwater from the SWRDF. In response to this action, Cobre constructed SWRDF Dams 1, 2, and 3 to meet the requirements of the order. Stormwater captured in these dams is pumped to SWRDF Dam 3 for incorporation into Cobre's water management system. SWRDF Dam 2

was placed on an unpatented load claim held by Cobre (*Figure 2-4*) and is currently an inadvertent encroachment on BLM-administered land.

3.17.2 Environmental Consequences: Direct & Indirect Effects

3.17.2.1 Alternative 1 – No Action

Under the No Action Alternative, the Bullfrog Pipeline would continue to be authorized under the current right-of-way granted by the BLM, which would have to be maintained and updated as required by BLM.

Under the No Action Alternative, authorization for occupancy of BLM-administered land would not be granted, and SWRDF Dam 2 would continue to be considered an inadvertent encroachment. Cobre would coordinate with BLM to obtain authorization for this facility.

3.17.2.2 Alternative 2 – Proposed Action

Under the Proposed Action Alternative, the current right-of-way for the Bullfrog Pipeline would be relinquished and areas of BLM-administered land crossed by the Bullfrog Pipeline would be authorized as part of this MPO Amendment No. 5 under BLM's 43 CFR 3809.

Under the Proposed Action Alternative, SWDRF Dam 2 would be authorized as part of this MPO Amendment No. 5 under BLM's 43 CFR 3809.

3.18 ENVIRONMENTAL JUSTICE

This section presents an environmental justice evaluation for the Hanover community (represented using the U.S. Census Bureau's Hanover CDP) and Grant County relative to the State of New Mexico. This environmental justice analysis has been conducted in accordance with CEQ guidance. Executive Order (EO) 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." State of New Mexico EO 2005-056 addresses similar concerns and requirements.

In accordance with Federal EO 12898 and State of New Mexico EO 2005-056, this document presents the findings of an environmental justice analysis based on the guidance provided by the CEQ. This analysis has been performed in three steps:

- Step 1. Identify minority and/or low-income populations in the vicinity
- Step 2. Identify the anticipated impacts from development of the No Action and Proposed Action Alternatives
- Step 3. Determine if the anticipated activity impacts would disproportionately impact the minority and/or low-income populations

3.18.1 Affected Environment

The Affected Environment for environmental justice is the same as that described in *Section 3.6*. Most of the information presented below is for New Mexico as a whole, and for Grant County. Additional information is provided, where available, for the Hanover CDP. As previously described, the Hanover CDP is a 2-square-mile area that encompasses the community of Hanover and the immediate environs; it does not include the community of Fierro. This small area has been surveyed, both in the decennial Census, and in the 5-year ACS surveys, as reported in *Section 3.6*. Census data for the CDP is included here as the best available local data.

3.18.1.1 Existing Race and Ethnicity Composition and Poverty Levels

In 1997 the Office of Management and Budget (OMB) published a set of standards that defines race and ethnicity (origin) as two separate entities (OMB 1997). Race, as defined by the U.S. Census Bureau, includes the following five categories at a minimum: "American Indian or Alaska Native," "Asian," "Black or African American," "Native Hawaiian or Other Pacific Islander," and "White." The U.S. Census Bureau states the following based on ethnicity, "Persons who report themselves as Hispanic can be of any race and are identified as such in our data..." The OMB standards define a minimum of two categories based on ethnicity, "Hispanic or Latino" and "Not Hispanic or Latino" (OMB 1997). The CEQ guidance defines a minority population as being of any of the five listed race categories with the exception of "White"; the CEQ also defines those of Hispanic or Latino ethnicity as being a minority population (CEQ 1997). This report follows the CEQ guidance for the definition of minority and low-income populations. Based on the data collection methods implemented by the U.S. Census Bureau, race and ethnicity are considered separately.

The population of Grant County is less racially diverse than the U.S., which is typical for a rural county (*Table 3.18-1*). Within New Mexico, 68.4 percent of the population identifies as white, while 84.9 percent of the population in Grant County and 80.8 percent of the population in Hanover CDP identifies as white (U.S. Department of Commerce 2014). The 2010 Census data indicates that 167 people were living in the Hanover CDP. Racially, the population of the CDP was made up almost entirely of the following categories: White (80.8 percent), Some Other Race (11.4 percent) and American Indian and Alaska Native (3.0 percent).

Table 3.18-1 Race composition by CDP, county, and state

Race	Hanover CDP	Grant County	New Mexico
Total Population	167	29,514	2,059,179
White ¹	80.8%	84.9%	68.4%
Black or African American	0.0%	0.9%	2.1%
American Indian or Alaska Native	3.0%	1.4%	9.4%
Asian	0.0%	0.4%	1.4%
Native Hawaiian & Other Pacific Islander	0.0%	0.1%	0.1%
Some other race	11.4%	9.6%	15.0%
Two or more races	4.8%	2.8%	3.7%

Source: U.S. Department of Commerce 2014

¹ In this category, White includes those self-identifying Hispanic/Latino

People of Hispanic origin or ethnicity can be of any race, and this issue is therefore considered separately from race (Headwaters Economics 2013). Hanover CDP’s percentage of Hispanic population, the fastest growing population in the U.S., is 25 percentage points higher than New Mexico, and 23 percentage points higher than Grant County (**Table 3.18-2**; U.S. Department of Commerce 2014). New Mexico is a majority minority state, with more residents self-identifying as Hispanic than as anything else (U.S. Department of Commerce 2014). Totals for the 2010 Census indicate that 71.9 percent of individuals within the Hanover CDP were self-identified as Hispanic or Latino residents compared to 48.3 percent and 46.3 percent in Grant County and New Mexico respectively (U.S. Department of Commerce 2014).

The identification of a community with potential environmental justice populations is defined by EPA as one that has a greater percentage of minority or low-income populations than an identified reference community. The standard for identifying minority populations is either: 1) the minority population of the affected area exceeds 50 percent; or 2) the minority population percentage of the affected area is “meaningfully greater” than the minority population percentage in the general population or other appropriate unit of geographic analysis, such as a reference community (CEQ 1997). The EPA has not specified what percentage of the population can be characterized as “meaningfully greater.” For the purposes of this analysis, it is assumed that if the affected area’s minority and/or poverty status population is 50 percent or 50 percent greater than the reference community, there is likely an environmental justice population of concern. The area identified for evaluation is Grant County and the reference community selected is the State of New Mexico.

There are no racial demographic categories, as defined by the U.S. Census Bureau, within the analysis community (Grant County) that currently are above the defined 50-percent threshold. There are also no racial demographic categories in the analysis area greater than the reference community of the State of New Mexico (**Table 3.18-1**). The overall percentage of individuals that are of a minority race or mixed minority race within Grant County is 15.2 percent, which is below 50 percent and less than the 31.6 percent present in the State of New Mexico. With regards to ethnicity, Grant County has a population where 48.3 percent of residents identify as Hispanic or Latino (below 50 percent of the County population) and only slightly more (less than 50 percent greater) than the 46.3 percent present within the State of New Mexico. Hispanics or Latinos make up 71.9 percent of the Hanover CDP and are an ethnic minority population requiring consideration under EO 12898 (**Table 3.18-2**).

Table 3.18-2 Hispanic or Latino population demographics

	Hanover CDP	Grant County	New Mexico
Total Population	167	29,514	2,059,179
Hispanic or Latino	120	14,252	953,403
Percentage Hispanic or Latino	71.9	48.3	46.3

Source: U.S. Department of Commerce 2014

Based on the relatively small sample sizes available, poverty data that was reviewed from the Hanover CDP did not meet the defined minimum criteria for data quality. Therefore, for the purposes of income-based assessments in this section, county- and state-level data were used (Headwaters Economics 2013; **Table 3.18-3**).

Poverty is an important indicator of economic well-being. Following the OMB's Directive 14, the Census uses a set of income thresholds that vary by family size and composition to define the thresholds for "poor." If the total income for a family or an unrelated individual falls below the relevant poverty threshold, then the family or an unrelated individual is classified as being in poverty. Poverty thresholds are derived by: 1) multiplying the cost of a 1963 minimum diet by three; 2) adjusting the figure for current prices; and 3) adjusting the figure for family size and composition. For example, the 2012 poverty threshold for a family of two adults and two children is \$22,283 (U.S. Department of Commerce 2012a and b). Poverty data for the county and state levels are presented in **Table 3.18-3**.

Table 3.18-3 Poverty levels in Grant County and New Mexico

Population Category	Grant County	New Mexico
People (number)	28,873	2,013,777
Families (number)	7,764	500,987
People below poverty	5,315	393,139
Families below poverty	1,061	74,552
Percent Below Poverty Level		
People	18.4%	19.5%
Families	13.7%	14.9%

Source: Headwaters Economics 2013

For the purposes of this analysis, a population is considered an environmental justice population if the total number of individuals living below poverty level, as defined by the U.S. Census Bureau, is 50 percent or more of a geographically defined area of analysis or 50 percent greater than the reference population percentage. The percentage of people living in poverty within the reference population (State of New Mexico) is 19.5 percent. The percentage of people living in poverty within the area of analysis (Grant County) is 18.4 percent, which is below the defined 50 percent threshold and also below the percentage of people living in poverty within the State of New Mexico (**Table 3.18-3**). Therefore, there are no populations subject to environmental justice considerations in the analysis area based on poverty levels.

3.18.2 Environmental Consequences: Direct & Indirect Effects

Step 1 of this analysis is to identify minority populations in the affected and reference areas. Based on the analysis conducted and described in the previous section, with regards to race and income level there were no identified populations within either Hanover CDP or Grant County that are defined as minority. Hanover CDP contains a higher proportion of individuals of Hispanic or Latino origin than both Grant County and New Mexico and is identified as a population requiring consideration under environmental justice concerns.

Step 2 is to identify anticipated adverse effects of the No Action and Proposed Action Alternatives. As described in the EA, impacts associated with No Action and Proposed Action Alternatives would occur during construction and operation of the facilities through the life of the mine. There would be increased activity associated with the start-up of mining activities at Cobre's Continental Mine under both the No Action and the Proposed Action Alternatives. Most of the impacts are related to the increase in vehicle traffic (**Section 3.5**) along Fierro Road near the unincorporated communities of Hanover and Fierro. As proposed, all mine-related traffic would utilize Fierro Road under the No Action Alternative; while the

majority of the traffic would be shifted to the proposed Haul Road under the Proposed Action Alternative. Impacts evaluated included noise (*Section 3.2*), vibration (*Section 3.3*), air quality (*Section 3.1*), and visual resources (*Section 3.4*) within Hanover Valley for activities proposed under the No Action and the Proposed Action Alternatives.

Step 3 is to identify any disproportionately high and adverse effects to identified minority/environmental justice populations as a result of the No Action or the Proposed Action Alternative. The percentage of Hispanic or Latino individuals living within Hanover CDP (71.9 percent) is above 50 percent higher than the reference population. The analysis must take into consideration the fact that all reasonable and practicable alternatives to the project that meet the purpose and need can only be conducted within and adjacent to Cobre's Continental Mine, and that the proposed activities are compatible with existing land uses. Potentially high and adverse environmental impacts to residents and the identified ethnic minority environmental justice population within the Hanover CDP are estimated to be greater under the No Action Alternative than the Proposed Action Alternative. After analysis, the BLM finds that there are no disproportionately high and adverse effects to the identified ethnic minority population in the Hanover CDP resulting from implementation of the Proposed Action Alternative.

3.19 CUMULATIVE EFFECTS

This cumulative effects analysis was undertaken following the requirements of NEPA and BLM regulations and policy. The CEQ regulations for implementing NEPA define cumulative impacts as follows:

...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. (40 CFR 1500-1508)

The objective of this analysis is to place the consequences of the Project into the context of other past, present, and reasonably foreseeable actions. Five steps were taken to conduct this analysis:

1. Identify cumulative effects issues
2. Identify the temporal and spatial extent of the study area
3. Identify Past, Present, and Reasonably Foreseeable Future Actions relevant to each issue
4. Establish the baseline/trend for each resource considered
5. Analyze cumulative effects

The analysis of cumulative impacts in this EA is limited to important issues of national, regional, or local significance pursuant to CEQ guidance (CEQ 1997). Considering this guidance and the direct and indirect impacts of the Proposed Action and No Action Alternatives, the following resources were identified for cumulative effects analysis: Air Quality, Surface Water, Groundwater, Vegetation, Wildlife, and Special Status Species.

By their nature, steps two and three of the cumulative effects analysis are interrelated and the completion of steps two, three, and four provides the framework and the context for consideration of cumulative effects. **Table 3.19-1** provides the list of past present and reasonably foreseeable future actions considered in this cumulative effects analysis.

Table 3.19-1 Past, present, and reasonably foreseeable future actions

The identified activity and a brief description of the activity and its effects are provided in the first column. The second column is a summary of the cumulative effects context that includes the distance by zone, a temporal context, and the resource categories with potential cumulative effects. Environmental resources listed in the cumulative effects context summary in bold print indicate that potential or realized effects are considered beneficial to that resource. Resources listed in bold print and in normal print, indicate that both beneficial and adverse effects may have occurred.

Spatial Zones: Zone A encompasses areas within 1 mile of Project Footprint. Zone B is greater than 1 mile and less than or equal to 5 miles. Zone C is greater than 5 miles and less than or equal to 10 miles Zone D is greater than 10 miles

Resource Categories Considered In Cumulative Assessment: AQ = Air Quality, Veg = Vegetation; W = Wildlife; SSS = Special Status Species; SW = Surface Water; GW = Groundwater

Activity	Cumulative Effects Summary
1. Past mining activities at the Cobre Continental Mine. Includes the existing SWRDF area, Tailings Impoundment; The Continental Mine Pit, drilling on Hanover Mountain	<i>Spatial:</i> A <i>Temporal Context:</i> Past <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW, GW
2. Expansion of SWRDF on private lands (about 18 acres)	<i>Spatial Context:</i> A <i>Temporal:</i> Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW
3. Chino Mine operations	<i>Spatial Context:</i> A - C <i>Temporal Context:</i> Past, Present, and Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW
4. Reclamation activities at Chino Mine	<i>Spatial Context:</i> B-D <i>Temporal Context:</i> Past, Present, and Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW
5. Mining and reclamation of Pearson-Barnes Mine area. [It is located within the footprint of the area to be merged as the SWRDF.]	<i>Spatial Context:</i> A <i>Temporal Context:</i> Past <i>Potential Cumulative Effects:</i> AQ, Veg, W, SW, GW
6. Voluntary closure of underground mines in the Snowflake, 86-Humbolt, Pewabic/Philadelphia, Republic, Hanover, Bullfrog, Princess, and Kearney areas with bat gates on selected features	<i>Spatial Context:</i> A <i>Temporal Context:</i> Past <i>Potential Cumulative Effects:</i> AQ, Veg, W, SW, GW
7. Empire Hill reclamation	<i>Spatial Context:</i> A <i>Temporal Context:</i> Past <i>Potential Cumulative Effects:</i> AQ, Veg, W, SW, GW
8. Bullfrog Stockpile reclamation	<i>Spatial Context:</i> B <i>Temporal Context:</i> Past <i>Potential Cumulative Effects:</i> AQ, Veg, W, SW, GW
9. Livestock grazing on BLM and Forest Service allotments	<i>Spatial Context:</i> A <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effects:</i> Veg, W, SSS, SW
10. Tyrone/Little Rock Mine operations	<i>Spatial Context:</i> D <i>Temporal Context:</i> Past, Present, and Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW
11. Reclamation Activities at Tyrone Mine	<i>Spatial Context:</i> C, D <i>Temporal Context:</i> Past, Present, and Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW
12. Closure and reclamation of Hurley Smelter	<i>Spatial Context:</i> D <i>Temporal Context:</i> Past <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW
13. Closure and reclamation of Hidalgo Smelter and town site	<i>Spatial Context:</i> D <i>Temporal Context:</i> Past <i>Potential Cumulative Effect:</i> AQ, Veg, W, SW, GW

Activity	Cumulative Effects Summary
14. Public Service Company of New Mexico (PNM) Lordsburg Generating Station	<i>Spatial Context:</i> D <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effect:</i> AQ
15. Luna Energy Facility located northwest of Deming	<i>Spatial Context:</i> D <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effect:</i> AQ
16. Natural fugitive dust emissions (North and South Alkali Flats – Hidalgo County)	<i>Spatial Context:</i> A - D <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effect:</i> AQ
17. 45,100 acres of agricultural development in the Mimbres Watershed	<i>Spatial Context:</i> D <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SSS, SW, GW
18. Recreational uses of dirt roads on public lands	<i>Spatial Context:</i> A - D <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SSS, W, SW
19. 28,700 acres of land development for residential, commercial, industrial, and transportation infrastructure	<i>Spatial Context:</i> A - D <i>Temporal Context:</i> Past, Present, Future <i>Potential Cumulative Effect:</i> AQ, Veg, W, SSS, SW, GW
20. NMED groundwater abatement process	<i>Spatial Context:</i> A, B <i>Temporal Context:</i> Future <i>Potential Cumulative Effect:</i> GW, SW

3.19.1 Air Resources

Cobre’s Continental Mine is located in an area that currently meets the NAAQS, commonly referred to as an Attainment Area. The Clean Air Act (CAA) PSD program is intended to protect air quality from significantly deteriorating in areas where the air quality is in compliance with NAAQS. As described in **Section 3.1**, both the Proposed Action and the No Action Alternatives comply with the PSD program requirements of the CAA. Similarly air permits issued for the Chino Mine, Tyrone Mine, and Little Rock Mine meet PSD requirements established in the CAA.

In 1978, the EPA designated Air Quality Control Region 012: Grant County, New Mexico as a nonattainment area for exceeding the NAAQS primary and secondary for SO₂ within a 3.5-mile radius of the Hurley Smelter. This designation was based on emissions from the Hurley Smelter, located south of Chino. The Hurley Smelter supported regional mining operations, but was removed from operations and demolished in 2002. Closure and reclamation of the Hurley Smelter eliminated a source of significant air emissions in the region. On February 21, 2003 NMED submitted a request to EPA to modify the New Mexico State Implementation Plan (SIP) to re-designate the 3.5-mile radius around the previous location of the Hurley Smelter as Attainment for SO₂ NAAQS. The Hidalgo Smelter, located near the town of Playas in Hidalgo County, was closed in 1999. Other trends in the region that will contribute to reductions in air emissions include the current population trend (down 4.6 percent since 2000; <http://www.usa.com/grant-county-nm.htm>) in Grant County and the associated reductions in vehicle and other air pollutant emissions.

Wind-blown dust emissions from both natural and anthropogenic sources often dominate the total PM₁₀ and PM_{2.5} measured in the region (Dubois and Ward 2012). Wind-blown dust is primarily a function of soil and vegetation characteristics that influence the erodibility of the soil surface and wind intensity. These natural conditions can be exacerbated by anthropogenic activities such as agriculture, vehicle use of dirt roads, construction activities, etc. The majority of areas to the north, east, and west of the project

area are public lands within the Gila National Forest. Road access to Forest Service land is relatively limited and recreational use in this area of the Gila National Forest is primarily dispersed camping and hiking. Much of the larger region to the south of the project is desert (approximately 77 percent of the Mimbres Watershed is composed of desert or desert grassland habitat types [USDA National Resource and Conservation Service (NRCS) 2012]) with substantial sources of natural windblown dust. The North and South Alkali Flats, located in Hidalgo County, generate blowing dust that at times can be problematic for drivers on Interstate-10 west of Lordsburg when winds become high (Dubois and Ward 2012). Recent reclamation efforts at other mine facilities in the region reduced potential sources of dust emissions. The No Action Alternative and the Proposed Action Alternative will not exceed PSD increment for PM₁₀ and PM_{2.5} emissions, and are therefore not expected to trigger any change in the current Attainment Area status for the region.

In the context of other past, present, and reasonably foreseeable future actions considered here, air emissions from the No Action Alternative and the Proposed Action Alternative are not expected to exceed established PSD increments or result in a change in the regional air shed to non-attainment status, and therefore, neither is expected to result in significant adverse cumulative effects.

Total Net CO_{2e} emissions for New Mexico in 2020 are estimated to be 81.5 million metric tons. This is approximately a 31 percent increase over 2000 emissions (CCS 2006). The production of electricity and fossil fuels accounted for two-thirds of New Mexico's gross GHG emissions in the year 2000 and is anticipated to be the dominant source of GHG emissions in 2020 (CCS 2006). The No Action and Proposed Action Alternatives are a relatively insignificant fraction of this net 2020 CO_{2e} emissions estimate for the entire state of New Mexico. The Proposed Action Alternative will result in approximately 29 percent less annual CO_{2e} emissions than the No Action Alternative, and is not expected to result in significant adverse cumulative effects.

3.19.2 Vegetation, Wildlife, Special Status Species

Within the Mimbres Watershed, native landscapes/cover types constitute approximately 97 percent of the land surface (*Table 3.19-2*). Lands that have been modified for agricultural, urban, industrial, transportation, and mining purposes constitute approximately 3 percent of the land surface within the watershed, with mining taking up approximately 0.5 percent of the watershed (*Table 3.19-2*). Approximately 64 percent of the watershed is publicly owned, with the BLM being the single largest public land management agency. The State of New Mexico is the second largest land manager in the Mimbres Watershed. The incremental increase in disturbed natural vegetation communities from development of the No Action Alternative and the Proposed Action Alternative is 348 and 265 acres, respectively. This represents an increase in the total disturbed area in the Mimbres Watershed of 0.02 and less than 0.01 percent, respectively.

Table 3.19-2 Mimbres Watershed land cover types

Land Cover Class	Acres	Percent of Watershed
Agricultural Lands	45,100	1.5%
Developed Lands (low density and high density)	28,700	1.0%
Mining and Quarry	13,800	0.5%
Native Habitats	2,857,700	97.0%
Grand Total	2,945,300	100.0%

Data Compiled from Natural Resources and Conservation Service (NRCS) Rapid Watershed Assessment for the Mimbres Watershed (HUC8 13030202). Land cover classification based on Southwest Regional Gap Analysis Project (SWReGAP n.d.) <http://earth.gis.usu.edu/swgap/> as reported in NRCS 2012. Acreages in the source material were rounded to the nearest hundred acres. Percentages rounded to the nearest 0.5 percent.

Note: HUC = Hydrologic Unit Code

The acreage of vegetation lost from past and present agricultural, development, and mining activities within the Mimbres Watershed comprises less than 3 percent of the total land area. Approximately 24 acres of vegetation impacts associated with the SWRDF expansion onto privately owned lands would result from activities related to the No Action or Proposed Action Alternatives that were not considered connected actions for purposes of this EA. Direct, indirect, cumulative impacts to vegetation communities from implementation of the No Action Alternative would result in approximately 229 acres of impact to woodland communities, 116 acres of impact to forested habitats, and 2.1 acres of impact to riparian habitat. This represents 0.06 percent, 0.07 percent, and 0.02 percent of the woodland, forested, and riparian habitats in the Mimbres Watershed.

Direct, indirect, and cumulative impacts to vegetation communities from implementation of the Proposed Action Alternative would result in approximately 231 acres of impact to woodland communities, 30 acres of impact to forested habitats, 3 acres of semi-desert grassland habitats, and less than 0.5 acres of impact to riparian habitat. This represents 0.06 percent, 0.02 percent, 0.0002 percent, and 0.005 percent of the woodland, forested, semi-desert grasslands, and riparian habitats in the Mimbres Watershed.

The determination that alternatives considered in this EA are not expected to result in significant adverse cumulative impacts is based on several factors. None of the upland habitats affected by the Proposed Action and the No Action Alternatives are rare or unique. Although the riparian habitats impacted by the No Action Alternative are dominated by exotic, non-native species, these areas do provide habitat. The loss of this vegetation represents a small, incremental decrease in the overall area of riparian habitats within the Mimbres Watershed that would result from direct and indirect impacts of the No Action and Proposed Action Alternatives. The acreage of woodland and forested habitats being affected would result in only minor incremental reductions in the acreage of those habitats in the Mimbres Watershed and these habitat types become even more common and widespread on public lands north of the Mimbres Watershed.

Similar to the cumulative effects to vegetation described above, the loss of wildlife habitat associated with the No Action and the Proposed Action Alternatives, in the context of the past, present, and reasonably foreseeable future actions considered here is not anticipated to result in any significant adverse cumulative effect. The No Action Alternative has the potential to cause greater levels of road-related wildlife mortality than the Proposed Action; however, road use under either alternative is not expected to

have significant levels of wildlife mortality associated with project-related vehicle activities, nor is it expected to result in significant adverse cumulative effects.

The No Action and Proposed Action Alternatives are not expected to result in any adverse impacts to Federally listed threatened or endangered species, nor would these projects adversely impact any proposed or designated critical habitat. Considering the nature of these alternatives, their direct and indirect impacts, land ownership within the Mimbres Watershed, and the high percentage of native cover types within the watershed, no adverse cumulative effects to listed species or proposed or designated critical habitat are expected.

Bat roost habitat in the area is commonly associated with historic underground mine workings. In 2004, Cobre, as part of an environmental and mine safety project initiated closure and reclamation activities at many of the historic mine workings on Cobre property. Cobre commissioned surveys of these mine openings to determine which openings are occupied by bats (Ecosphere 2014). Cobre installed bat gates over historic mine openings that are not within the footprint of the No Action and the Proposed Action Alternatives. These gate structures allow bats to enter and use the mine features while protecting the public from the dangers associated with unauthorized entry. Bat roosts within the footprint of the proposed Haul Road under the Proposed Action Alternative and the Hanover Mountain Deposit under the No Action Alternative would be closed under Cobre's ongoing closure efforts and would not be available for use by bats upon implementation of the No Action or the Proposed Action Alternatives. Many bat roosts would remain undisturbed by these actions, and many of those have been protected by the installation of bat gates. No significant adverse cumulative effect is expected from implementation of the No Action or the Proposed Action Alternatives.

3.19.3 Surface Water Resources

The Mimbres Watershed is approximately 2.94 million acres in size and is located within portions of Dona Ana (408,360 acres, 13.9 percent of Hydrologic Unit Code [HUC]), Grant (743,024 acres, 25.3 percent of HUC), Luna (1,720,088 acres, 58.4 percent of HUC) and Sierra (72,058 acres, 2.4 percent of HUC) Counties in New Mexico. This watershed is a closed system and precipitation that falls within the Mimbres Watershed does not leave the watershed as surface flow. Land ownership within the watershed is primarily publicly owned with 33 percent managed by the BLM, 24 percent managed by the State of New Mexico, 7 percent managed by the USFS, <1 percent owned by the Department of Defense, and <1 percent within a state Park. Privately owned land totals approximately 36 percent of the total Mimbres Watershed (NRCS 2012).

As outlined in *Section 3.9*, the No Action and Proposed Action Alternatives would be implemented in full compliance with applicable state and Federal permits with regard to surface water quality. None of the surface waters downstream from the project area are listed as impaired on the state's Clean Water Act 303(d)/305(b) report, and no project activities are expected to change that status. Under the No Action Alternative, water from a small perennial reach of Poison Spring would be collected from under the Fierro Leach Pad liner and released downstream resulting in no loss of water. During planned operations at the Cobre's Continental Mine, surface water management activities would temporarily reduce total contributing watershed runoff within the Mimbres Watershed by 0.02 percent. Following successful

closure, reclaimed portions of the mine would once again discharge to the Mimbres Watershed. Under either alternative, Cobre holds water rights issued by the State Engineer, both for the use of these waters and for any respective impacts to recharge. Considered in the context of other past, present, and reasonably foreseeable future actions, the No Action and the Proposed Action Alternatives are not expected to result in significant adverse cumulative effects to surface water resources.

3.19.4 Groundwater Resources

The majority of the No Action Alternative and much of the Proposed Action Alternative occur within the groundwater capture zone of the Continental Mine Pit. All elements of these alternatives would be managed in accordance with the requirements of applicable state and Federal regulations. The Cobre Continental Mine occurs within an extensive historical mining district dating from the 1800s, and has experienced groundwater quality impacts associated with these historical mining activities and naturally occurring mineralization. Addressing these past adverse impacts to groundwater quality is being comprehensively addressed through NMED's groundwater abatement process (Telesto 2011).

As demonstrated in *Section 3.10*, no significant adverse effects to groundwater quality are anticipated from the implementation of the No Action or the Proposed Action Alternatives, because continued mining would not add any new constituents or increase the concentration of existing constituents in the groundwater system within the area influenced by the mine as supported by geochemical reports presented in Golder (2009), and Shepard-Miller (1999), and as approved by the NMED.

The Cobre CCP includes a site-wide reclamation plan to address mine related impacts that was approved by the MMD and NMED. The first stage of the NMED groundwater abatement process (Stage 1) (20.6.2.4106 NMAC), is to produce a site-wide groundwater characterization report, which is near completion (W. Niccoli pers. comm.). By regulation, the second stage of this process (Stage 2) (20.6.2.4106 NMAC) is to select and design, if necessary, a groundwater abatement approach that may be in addition to the CCP, and which would result in achieving applicable groundwater standards at the mine as needed. Per the rule, Stage 2 would be submitted after Stage 1 is approved by the NMED. This phase would establish applicable groundwater standards to be obtained and would identify engineering and monitoring measures to meet those standards. Considering the localized nature of groundwater impacts in the vicinity of the Cobre's Continental Mine, the implementation of either the No Action or Proposed Action Alternatives is not expected to add any new constituents or increase concentrations of existing constituents in the groundwater system and the regulatory outcomes of the groundwater abatement process currently underway in accordance with applicable state regulations. Therefore, no significant adverse cumulative effects to groundwater quality are anticipated from implementation of the No Action Alternative or the Proposed Action Alternative.

Water consumption increases over existing conditions are expected under the Proposed Action and No Action Alternatives. Under the Proposed Action Alternative, the majority of water use would be for dust control on the proposed Haul Road. Under the No Action Alternative, milling and leaching operations at Cobre's Continental Mine would account for the majority of the water consumption. Under the Proposed Action Alternative, milling and leaching operations at the Chino Mine would continue at their current rates using the ore that is mined at Cobre's Continental Mine with no increase expected in regional water

consumption for mining. The No Action Alternative would require approximately twice the volume of water as the Proposed Action (Cobre 2014f). Under either alternative, Cobre holds water rights issued by the State Engineer, both for the use of these waters and for any respective impacts to recharge. There would be no increase of water use beyond those allocated amounts permitted by the state.

Regionally, the consumptive use for the No Action and Proposed Action Alternatives would be approximately 2 and 1 percent, respectively, of the groundwater consumption for the Mimbres Basin (Cobre 2014f). Thus, considering that the No Action Alternative would not increase consumptive use of water beyond what is currently authorized by applicable state and Federal permits, and that the Proposed Action Alternative would result in a reduction in consumptive water use over what is currently authorized, neither alternative is expected to cause significant adverse cumulative effects to groundwater quantity.

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Chapter 4

4. CONSULTANT AND COORDINATION

4.1 PERSONS, GROUPS, AND AGENCIES CONSULTED

The list of persons, groups and agencies contacted during the scoping period was compiled using a mailing list maintained by the BLM Las Cruces District Office and supplemented with additional individuals who had expressed interest to Cobre about this project. The full mailing list is provided in the administrative record and included 198 individuals, agencies, and groups.

List of Agencies and Organizations Notified:

Chino Mines Division
Coalition of Arizona / New Mexico Counties
Cobre Consolidated School District
Freeport-McMoRan, Inc.
Gila National Forest
Gila Resources Information Project
Grant County Republican Party
Grant County Soil & Water Conservation District
Hanover MDWCA
Hanover Mutual Domestic Water Association
Interstate Stream Commission
Mining Remedial Recovery Company
Mountain Gold Corporation
New Mexico Department of Game and Fish
New Mexico Department of Transportation
New Mexico Energy, Minerals, & Natural Resources Department
New Mexico Environment Department
New Mexico Environmental Law Center
New Mexico Gas Company
New Mexico Mining Association
New Mexico State Land Office
Phelps Dodge Corporation
Southwest Council of Governments
T & M Dairy
The Center for Biological Diversity
The F R Delk Family Trust
The Foy Partnership
The Nature Conservancy of New Mexico
The New Mexico Wilderness Alliance
The Wilderness Society
US Army Corps of Engineers
USDA Natural Resources Conservation Service
Western New Mexico University
Western Precious Metals Inc.
Wild Earth Guardians

4.2 SUMMARY OF PUBLIC PARTICIPATION

The public scoping period was initiated on February 1, 2013 with publication of the notice in the Silver City Sun News, the Deming Headlight, and the Silver City-Daily Press. Scoping announcements were also posted at the following post office locations: Fierro/Hanover, Bayard, and Hurley. Detailed information on how to provide comments electronically or via regular mail using a pre-addressed comment form was included in the announcements. The public scoping period closed on March 8, 2013. Seventeen comment letters were received during the public scoping period. Comments received are provided in *Appendix A* of this EA as well as responses to each comment.

The BLM Las Cruces District Office issued Cobre's MPO Amendment No. 5 Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for public comment on December 19, 2014. The availability of the documents for review was posted on the BLM website; placed in three area newspapers, the Deming Headlight, the Silver City-Daily Press, and the Silver City Sun News; and, about 200 mailings were sent out to interested individuals, agencies, and non-governmental organizations (NGOs). The original comment period ended January 17, 2015. Based on comments received, the comment period was extended through January 31, 2015. The announcement of the extended comment period was posted on the BLM website and placed in the same three area newspapers. Additionally, copies of the documents were placed in the Bayard and Silver City public libraries for public review.

The BLM Las Cruces District Office received ten comment letters, including emails and comment forms, on Cobre's MPO Amendment No. 5 EA and FONSI. BLM resource specialists reviewed the comments to determine if any new resource information was provided or if any additional impact analysis would be required before publishing the Decision Document. Several letters offered opinions either in favor or in opposition of the proposed action. Others expressed concerns regarding resource impacts that the BLM believes have been adequately covered in the EA.

4.3 LIST OF PREPARERS

Preparers included individuals from BLM and WestLand Resources, Inc.

BLM Interdisciplinary Team Members:

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Jack Barnitz, Biologist, Vegetation/Wildlife/T&E

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Jennifer Montoya, Planning and Environmental Coordinator, NEPA

Leighandra Keeven, Geologist

Vanessa Duncan, Hazardous Materials

Joe Sanchez, Natural Resource Specialist, Recreation Specialist

Kendrah Penn, Lands and Realty Specialist

Leticia Lister, Rangeland Management Specialist, Noxious Weeds

Oswaldo Gomez, Visual Resources Specialist

Michael Johnson, Socioeconomic Resources and Environmental Justice

Joe Navarro, Minerals Specialist

Mohammad Nash, Soils Scientist, Noise Resources

Bill Auby, Geologist, Geology and Soils

Corey Durr, Hydrologist, Water Resources

Tom Holcomb, Archaeologist

WestLand Resources, Inc. – Third Party Consultant:

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Chapter 5

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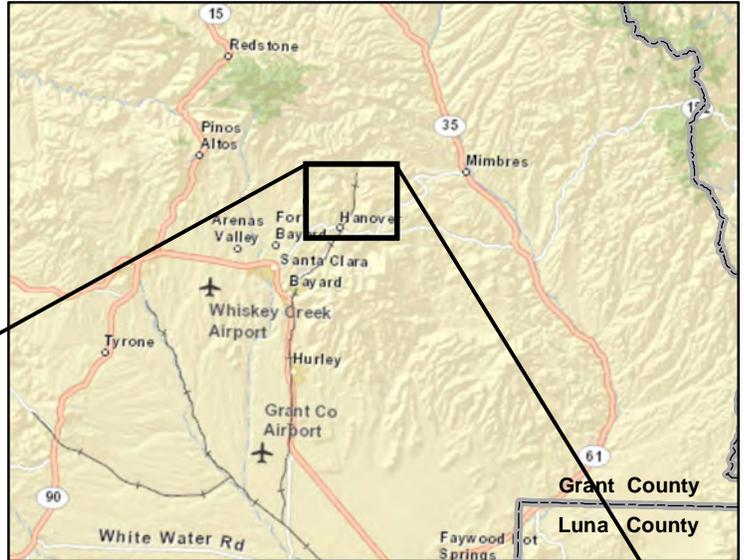
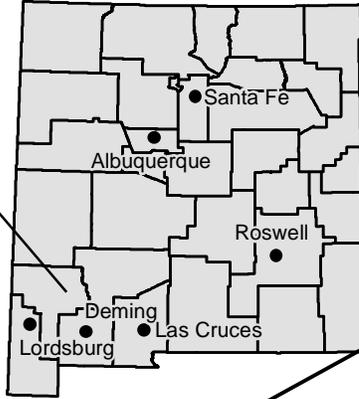
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FIGURES

PORCION OF GRANT COUNTY

NEW MEXICO

PROJECT LOCATION



Approximate Scale 1 Inch = 10 Miles

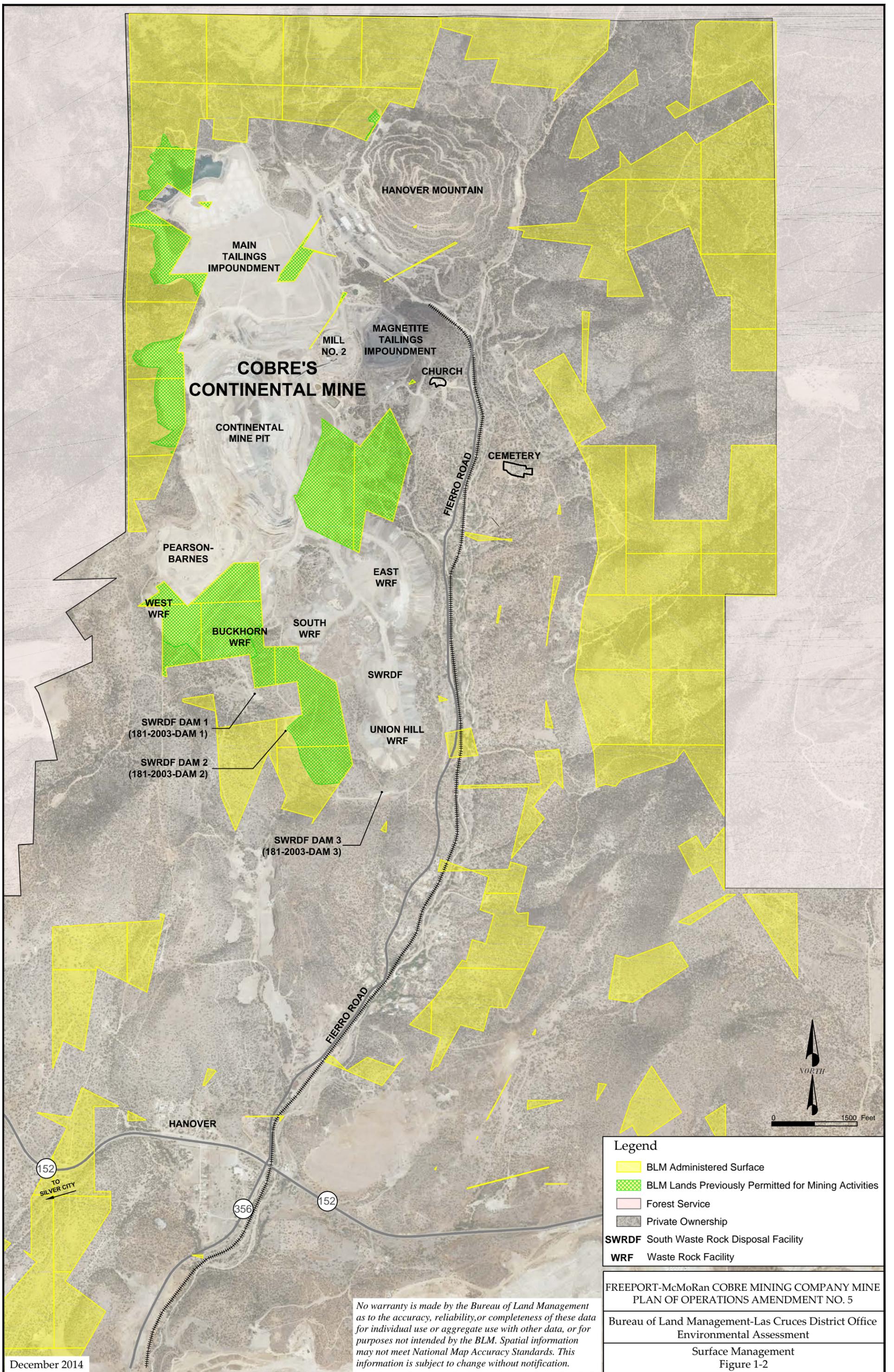


Grant County, New Mexico
Santa Rita Mine USGS 7.5' Quadrangle



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FREEMPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Vicinity Map Figure 1-1



COBRE'S CONTINENTAL MINE

Legend

- BLM Administered Surface
- BLM Lands Previously Permitted for Mining Activities
- Forest Service
- Private Ownership

SWRDF South Waste Rock Disposal Facility
WRF Waste Rock Facility

FREEMONT-McMoRan COBRE MINING COMPANY MINE
 PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
 Environmental Assessment

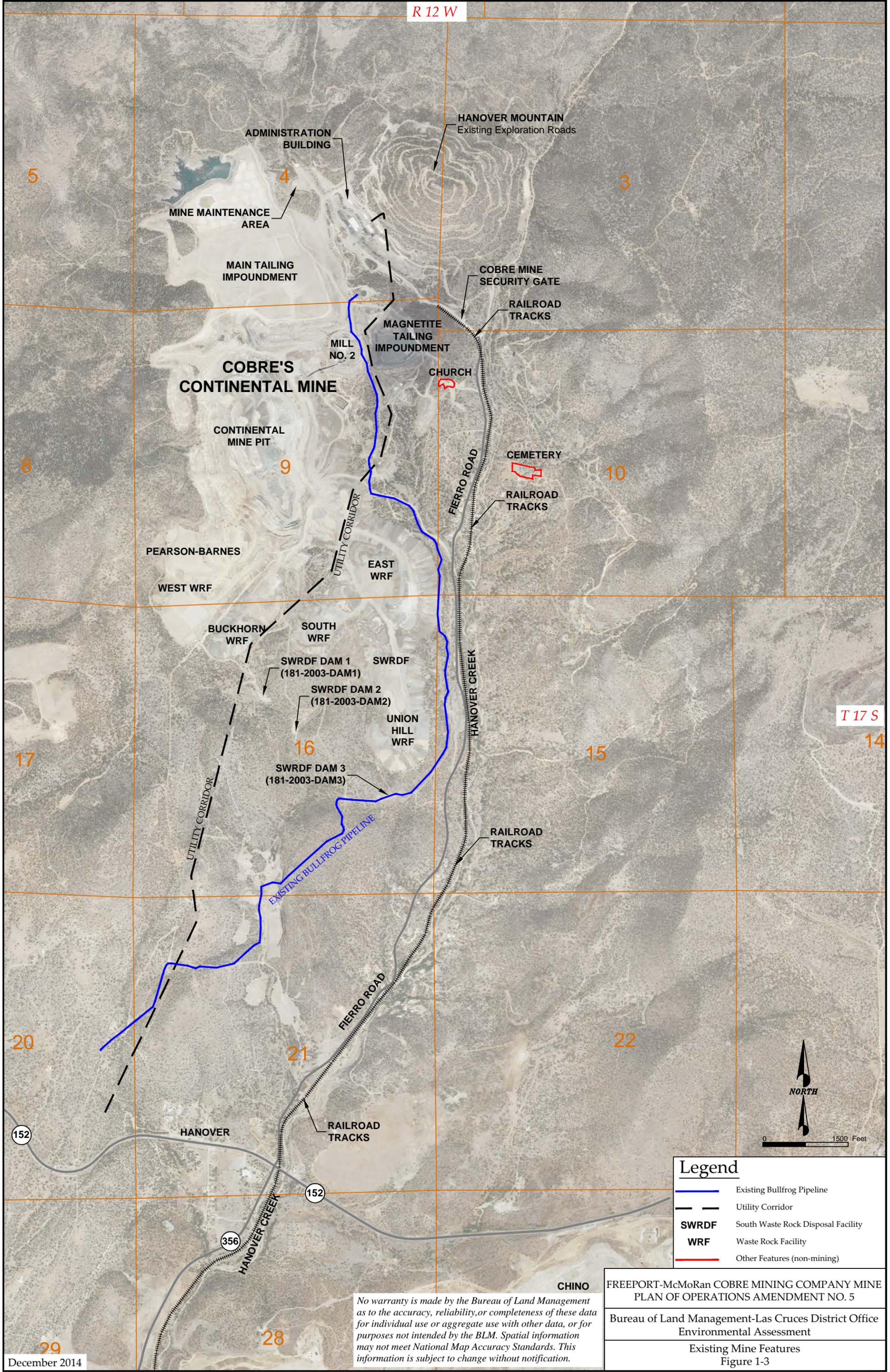
Surface Management
 Figure 1-2

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by the BLM. Spatial information may not meet National Map Accuracy Standards. This information is subject to change without notification.

R 12 W

T 17 S

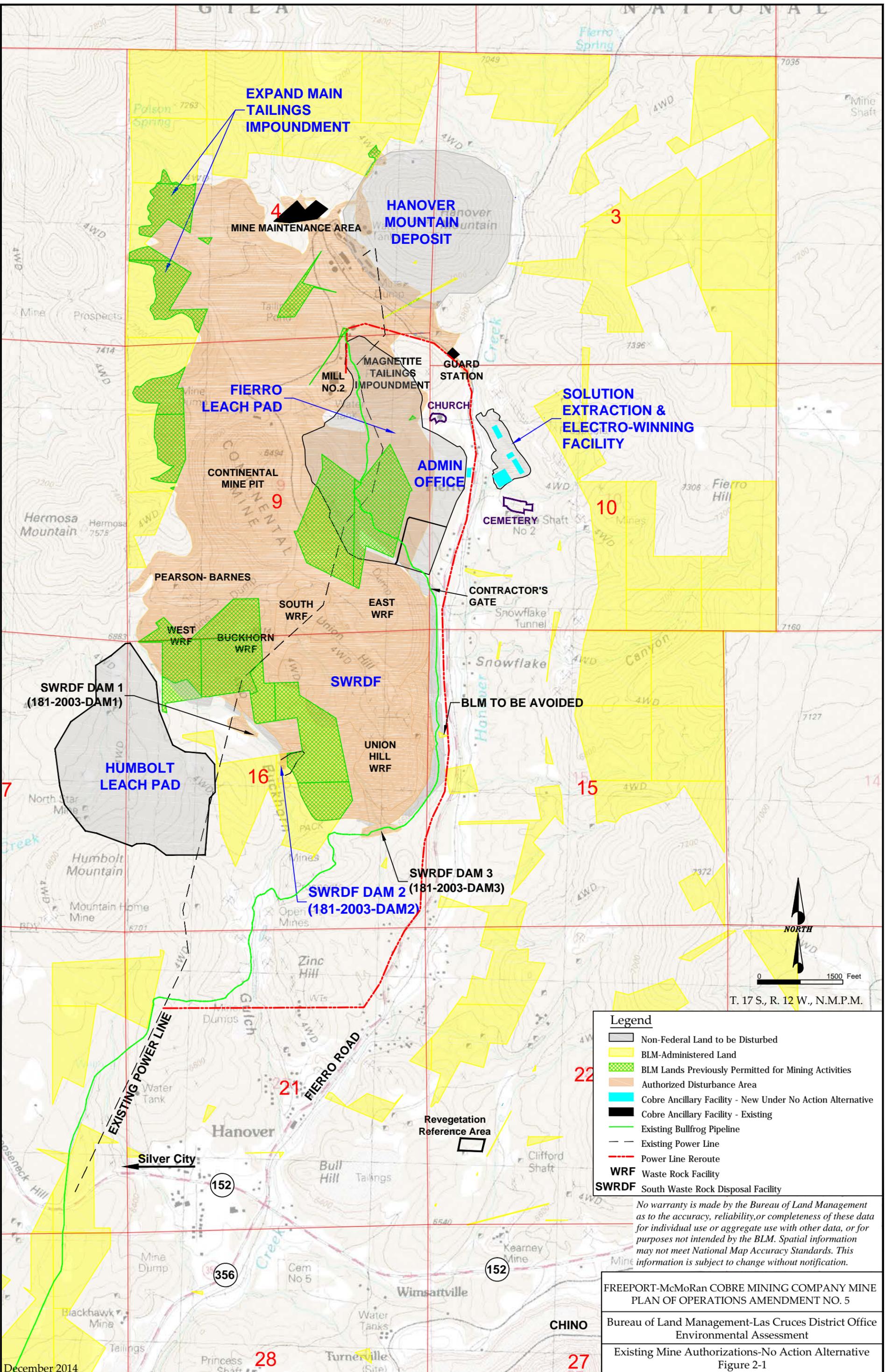
COBRE'S CONTINENTAL MINE



Legend	
	Existing Bullfrog Pipeline
	Utility Corridor
SWRDF	South Waste Rock Disposal Facility
WRF	Waste Rock Facility
	Other Features (non-mining)

CHINO
 FREEPORT-McMoRan COBRE MINING COMPANY MINE
 PLAN OF OPERATIONS AMENDMENT NO. 5
 Bureau of Land Management-Las Cruces District Office
 Environmental Assessment
 Existing Mine Features
 Figure 1-3

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by the BLM. Spatial information may not meet National Map Accuracy Standards. This information is subject to change without notification.



EXPAND MAIN TAILINGS IMPOUNDMENT

4
MINE MAINTENANCE AREA

HANOVER MOUNTAIN DEPOSIT

3

FIERRO LEACH PAD

MILL NO.2
MAGNETITE TAILINGS IMPOUNDMENT

SOLUTION EXTRACTION & ELECTRO-WINNING FACILITY

CONTINENTAL MINE PIT
9

ADMIN OFFICE

10

PEARSON-BARNES

SOUTH WRF

EAST WRF

CONTRACTOR'S GATE

SWRDF

BLM TO BE AVOIDED

15

SWRDF DAM 1 (181-2003-DAM1)

HUMBOLT LEACH PAD

16

SWRDF DAM 2 (181-2003-DAM2)
SWRDF DAM 3 (181-2003-DAM3)

15

14

NORTH

0 1500 Feet

T. 17 S., R. 12 W., N.M.P.M.

Legend

- Non-Federal Land to be Disturbed
- BLM-Administered Land
- BLM Lands Previously Permitted for Mining Activities
- Authorized Disturbance Area
- Cobre Ancillary Facility - New Under No Action Alternative
- Cobre Ancillary Facility - Existing
- Existing Bullfrog Pipeline
- Existing Power Line
- Power Line Reroute
- WRF** Waste Rock Facility
- SWRDF** South Waste Rock Disposal Facility

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FREEMPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office Environmental Assessment

Existing Mine Authorizations-No Action Alternative

Figure 2-1

28

27

7

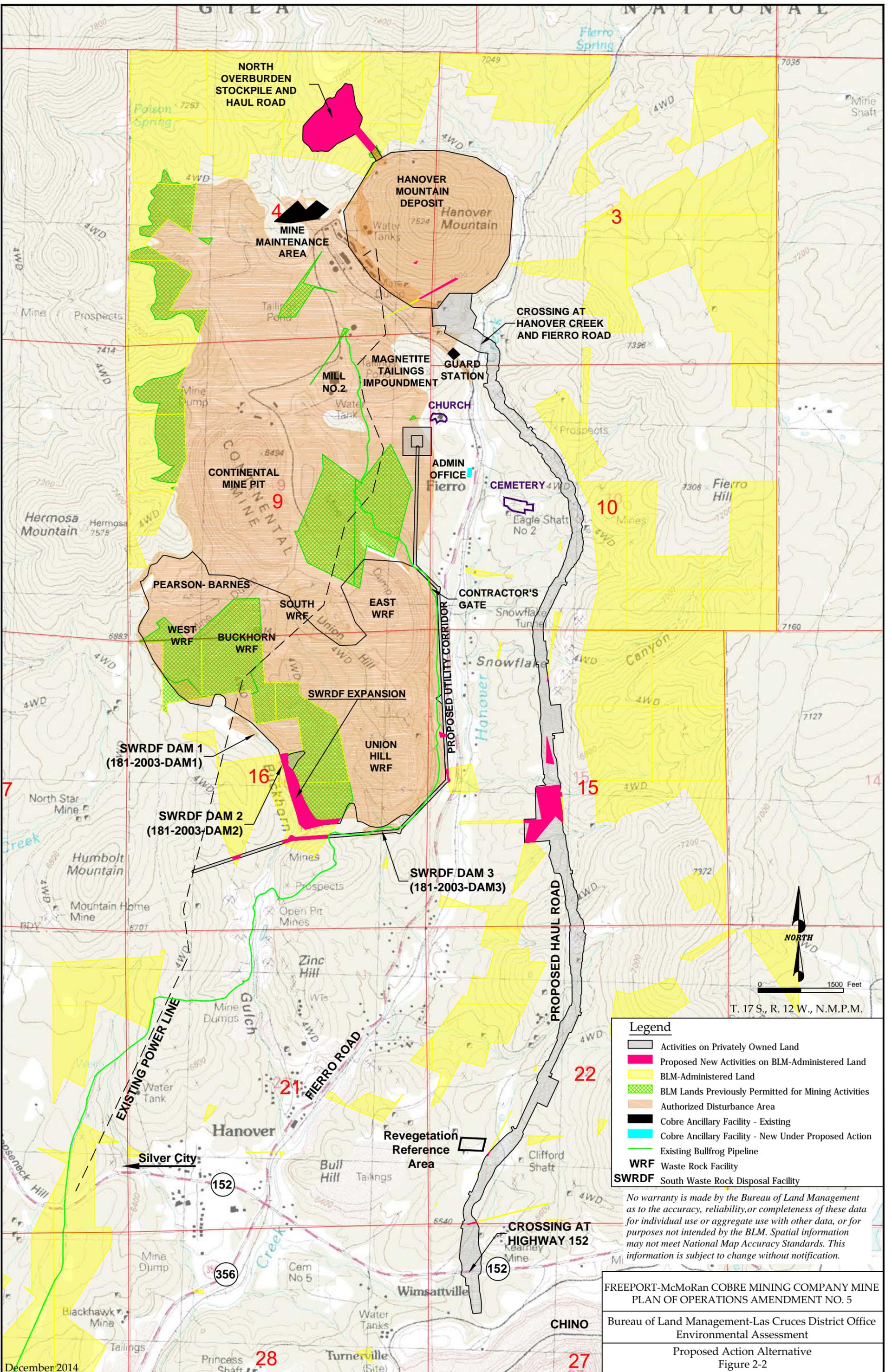
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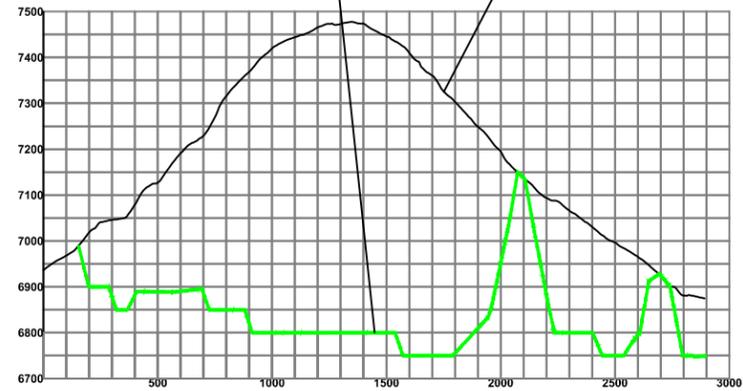
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152

356



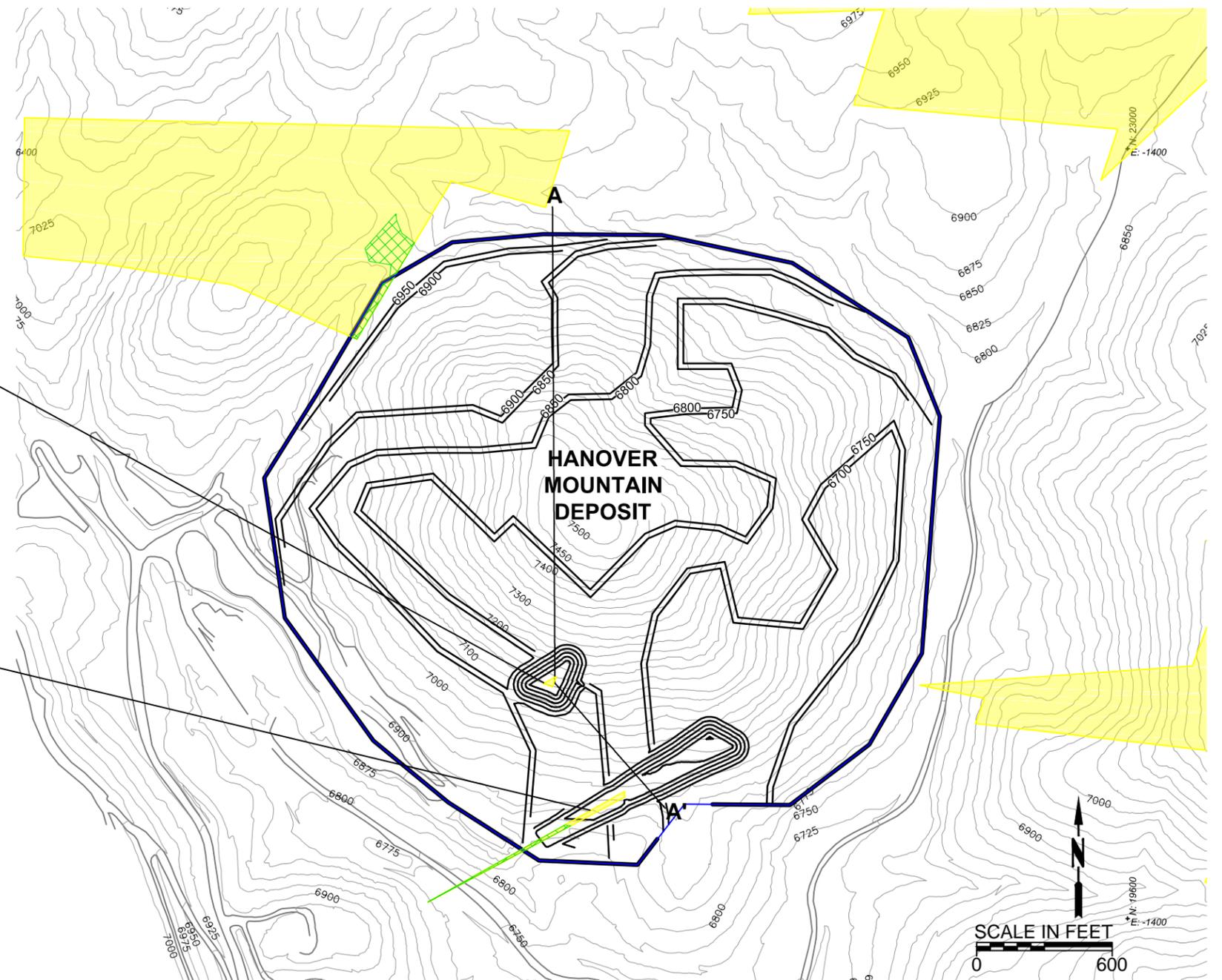
NO ACTION MINE SURFACE **EXISTING SURFACE**



SECTION A - A'

**BLM LOT 13 OF SECTION 4, TOWNSHIP 17 SOUTH,
RANGE 12 WEST, NEW MEXICO PRINCIPLE MERIDIAN,
NEW MEXICO, CONTAINING 0.02 ACRES OF LAND**

**BLM LOT 33 OF SECTION 3, TOWNSHIP 17 SOUTH,
RANGE 12 WEST, NEW MEXICO PRINCIPLE MERIDIAN,
NEW MEXICO, CONTAINING 0.27 ACRES OF LAND**



LEGEND

-  **CONTOURS REPRESENTING EXISTING LAND SURFACE ELEVATION**
-  **CONTOURS REPRESENTING NO ACTION LAND SURFACE ELEVATION**
-  **SHADING INDICATES BLM PARCEL LOCATION**
-  **HATCHING INDICATES BLM LAND PREVIOUSLY PERMITTED FOR MINE ACTIVITIES**

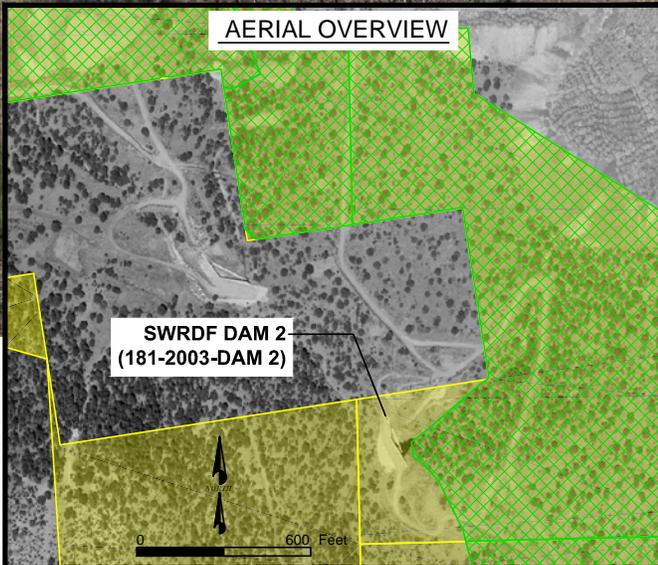
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**FREEPORT-McMoRan COBRE MINING COMPANY MINE
PLAN OF OPERATIONS AMENDMENT NO. 5**

**Bureau of Land Management-Las Cruces District Office
Environmental Assessment**

No Action Alternative Conceptual Layout of the
Hanover Mountain Deposit
Figure 2-3

SWRDF-DAM 2 LOOKING SOUTHEAST



SOUTH WASTE ROCK DISPOSAL FACILITY-DAM 2

Legend

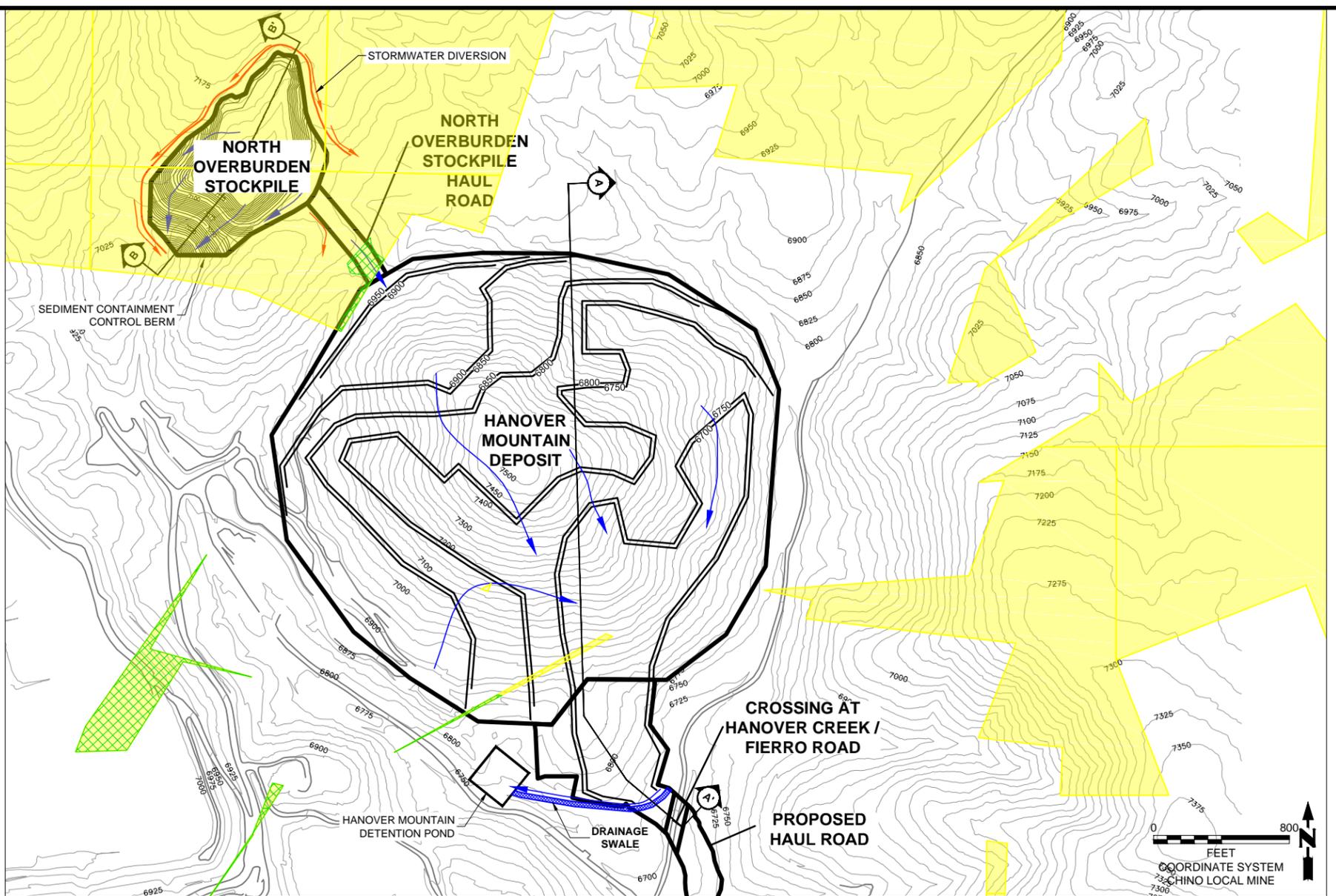
- BLM Administered Land
- BLM Administered Land Previously Permitted for Mine Activities

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FREEMPORT-McMoRan COBRE MINING COMPANY MINE
PLAN OF OPERATIONS AMENDMENT NO. 5

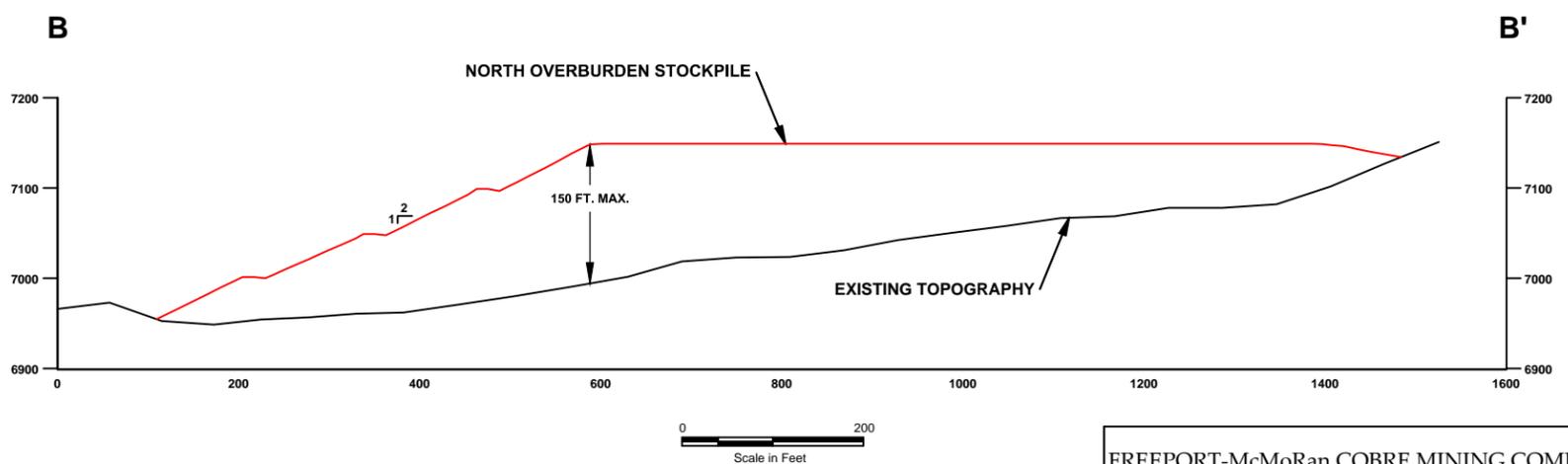
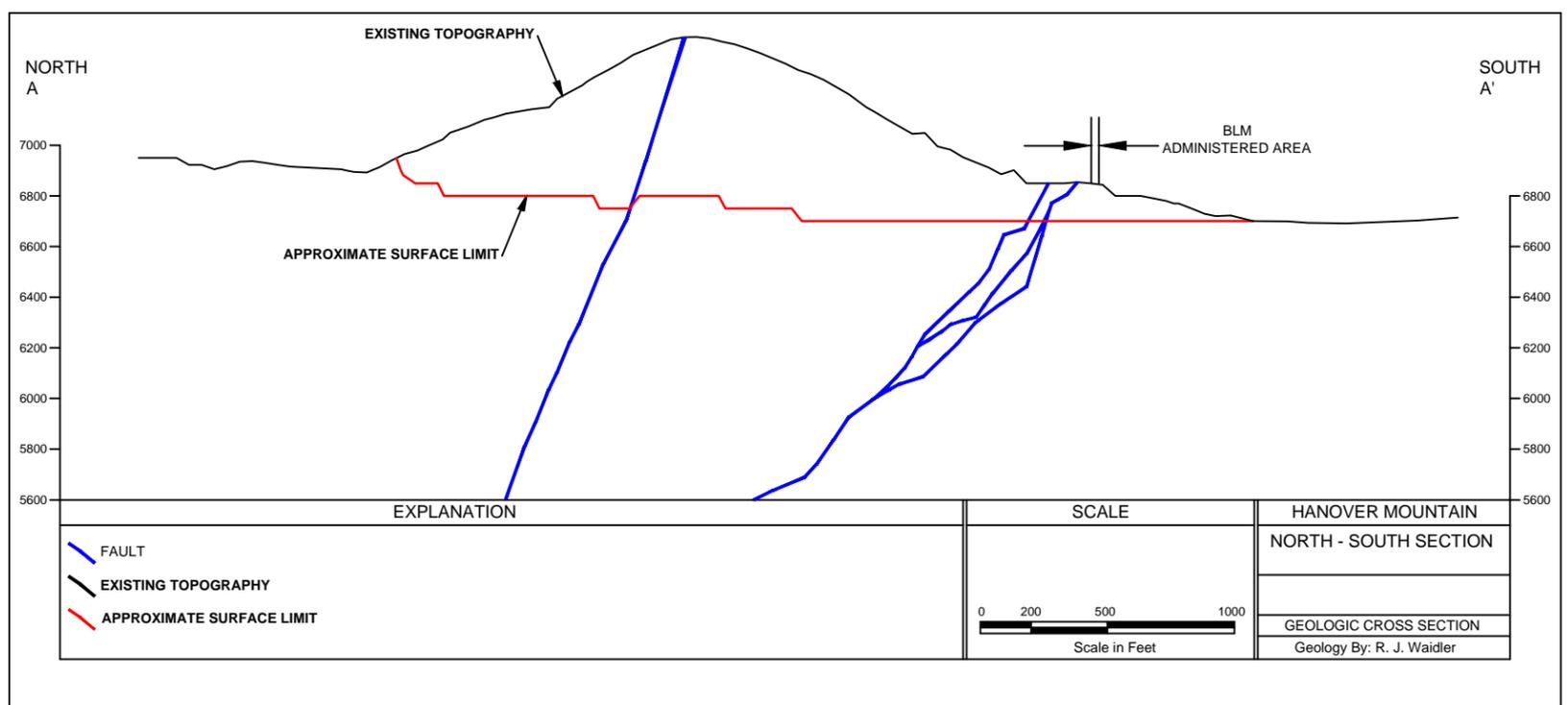
Bureau of Land Management-Las Cruces District Office
Environmental Assessment

South Waste Rock Disposal Facility-Dam 2
Figure 2-4



- BLM Administered Surface
- BLM Lands Previously Permitted for Mining Activities
- Stormwater Flow Direction
- Stormwater Diversion

A - A'

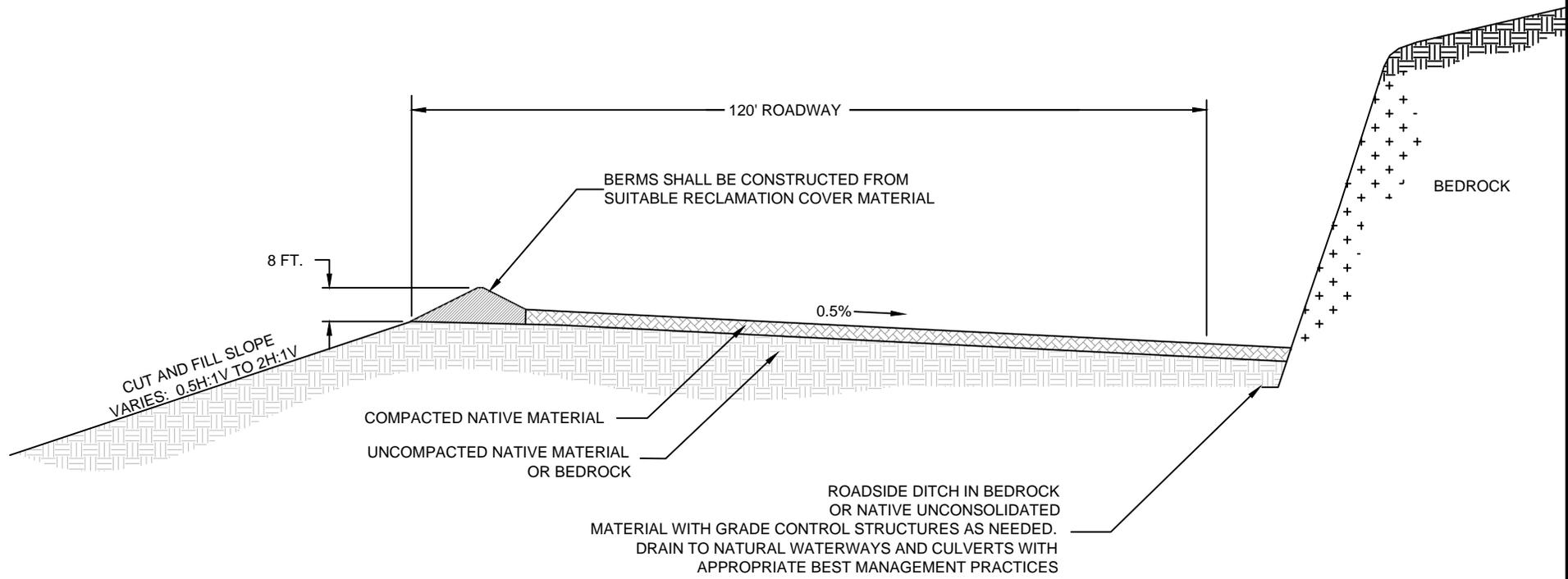


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FREEPORT-McMoRan COBRE MINING COMPANY MINE
PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
Environmental Assessment

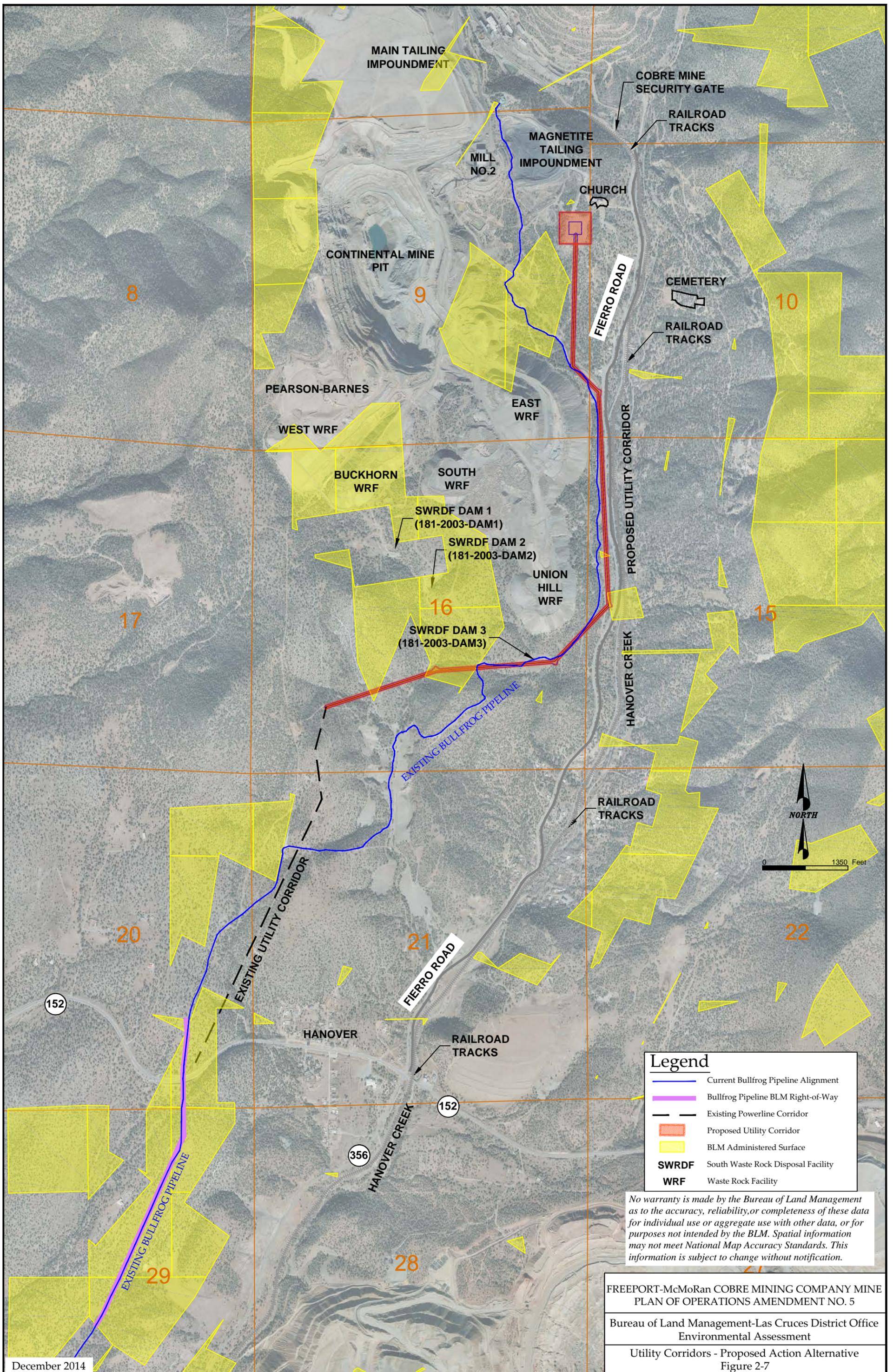
Hanover Mountain Deposit and North Overburden Stockpile
Stormwater BMPs and Conceptual Cross Section
Figure 2-5

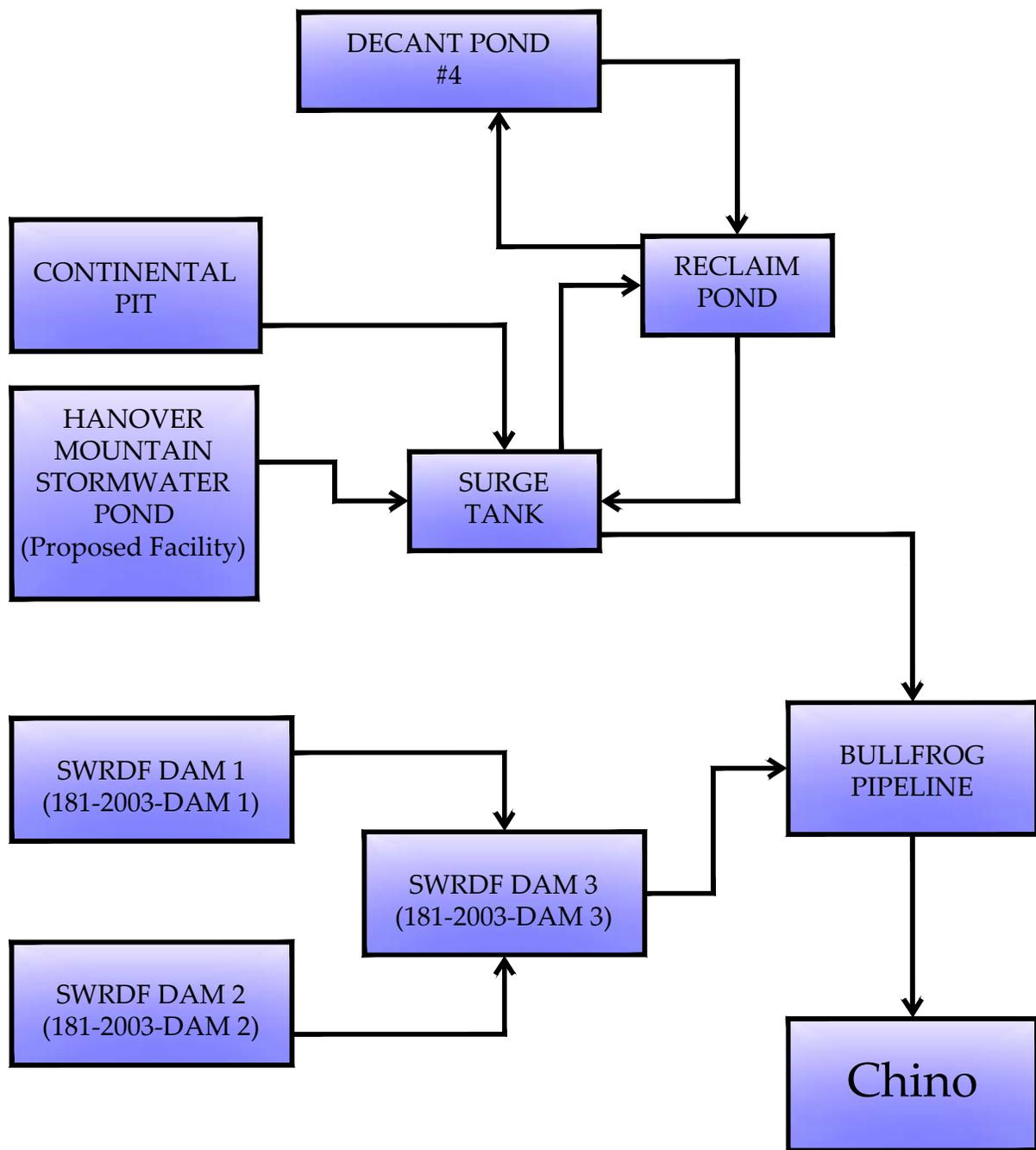


NOT TO SCALE

FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Proposed Haul Road - Conceptual Cross Section Figure 2-6

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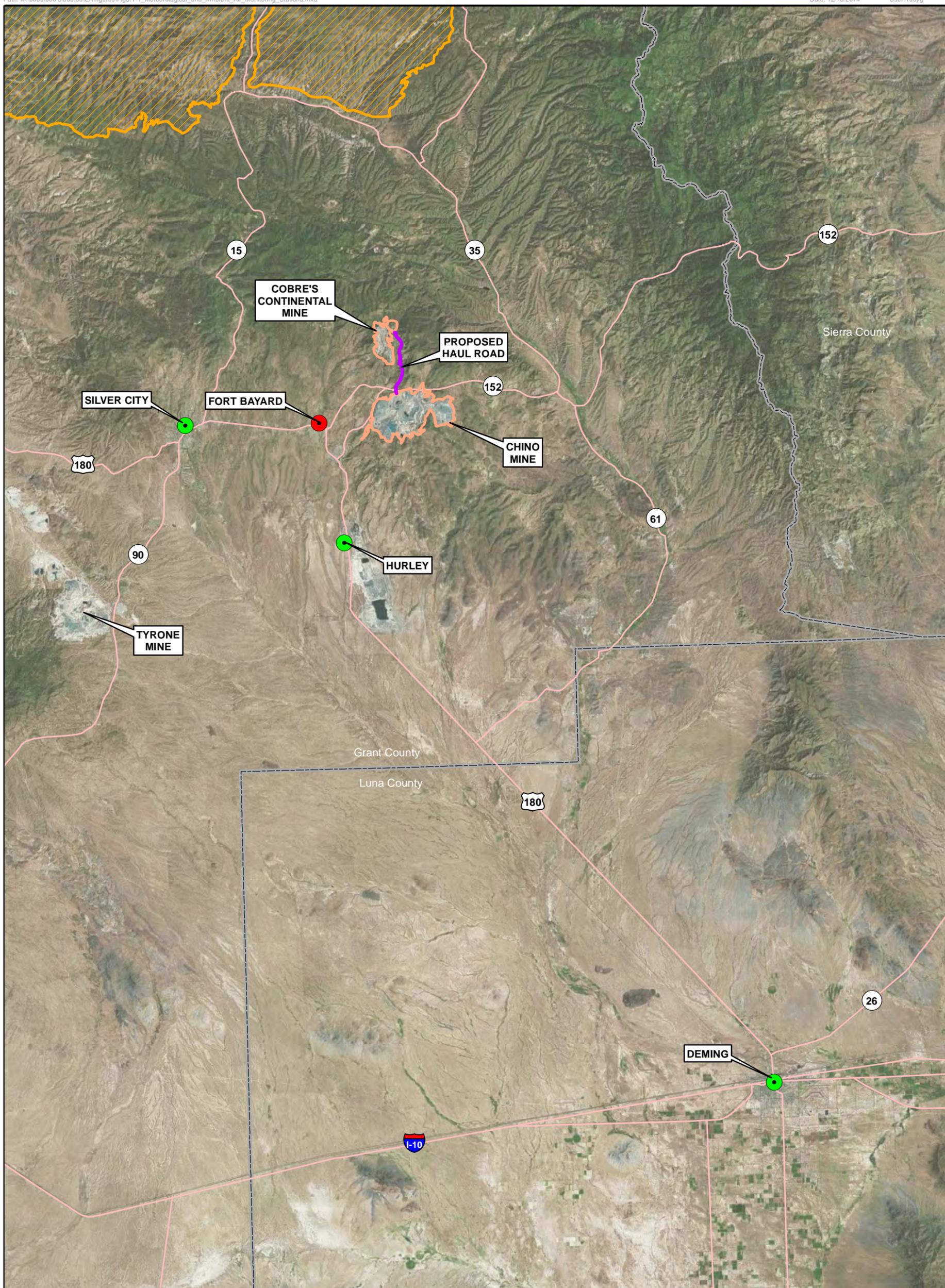


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FREEPORT-McMoRan COBRE MINING COMPANY MINE
PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
Environmental Assessment

Conceptual Drawing of Proposed
Cobre Water Management System
Figure 2-8



Grant County, New Mexico,
 Data Source: Ambient Air Monitoring Stations provided and acquired from http://www.epa.gov/airdata/ad_maps.html on September 9, 2013, Meteorological Station provided and acquired from www.wrcc.dri.edu, Gila Wilderness Area acquired and provided by U.S. Forest Service May 22, 2010
 Image Source: National Agriculture Imagery Program, 2011

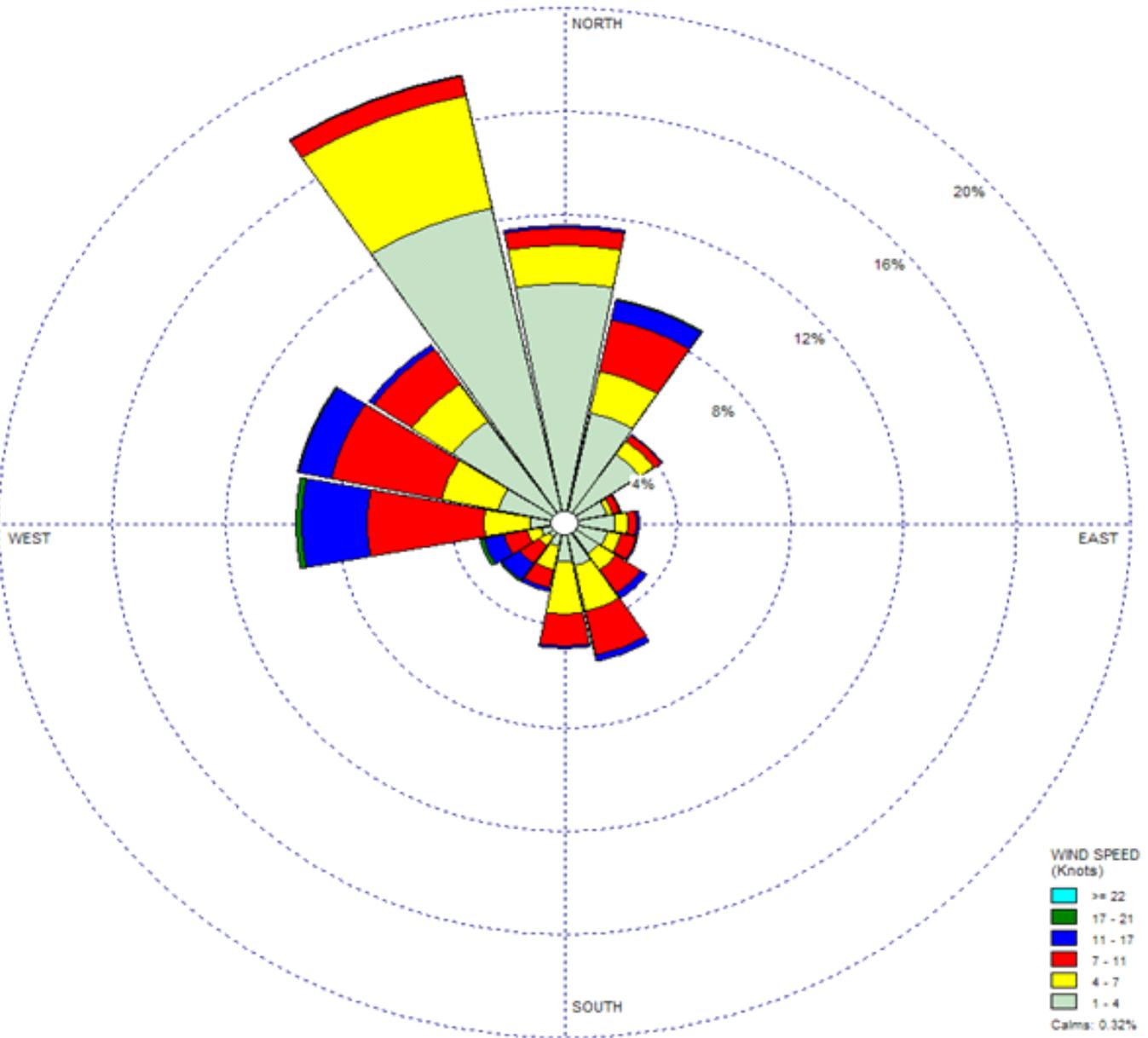
Legend

- Ambient Air Monitoring Station
- Meteorological Station
- Gila Wilderness Area



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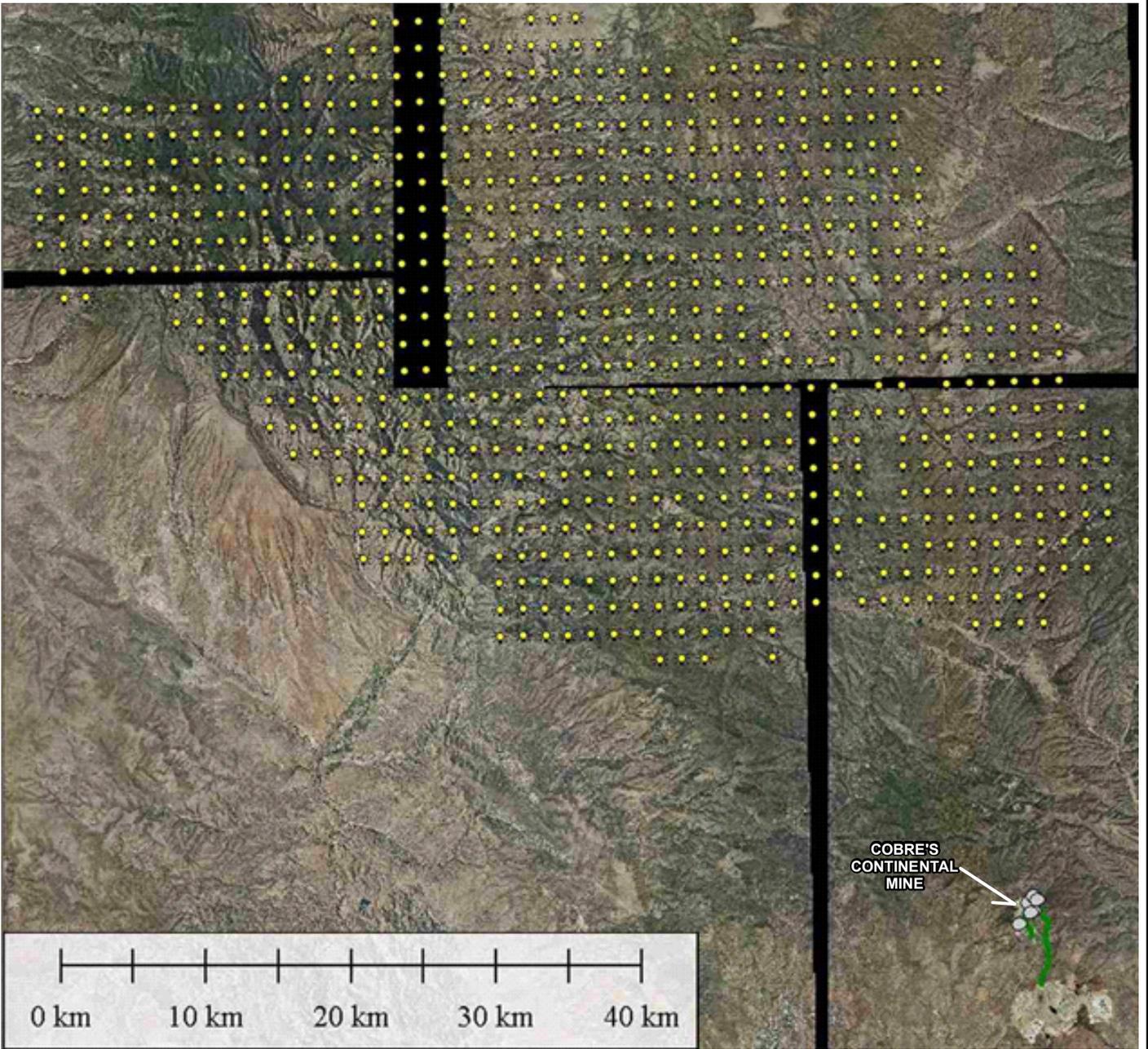
FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Ambient Air and Meteorological Monitoring Stations Figure 3.1.1



Grant County, New Mexico
 Source: Ryan 2014a

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FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Hurley, NM Station: Annual Wind Rose (direction blowing from) for Year 2009 Figure 3.1-2



● Ambient Air Receptor (795)

● Air Emission Individual Source

— Unpaved Haul Road

Grant County, New Mexico

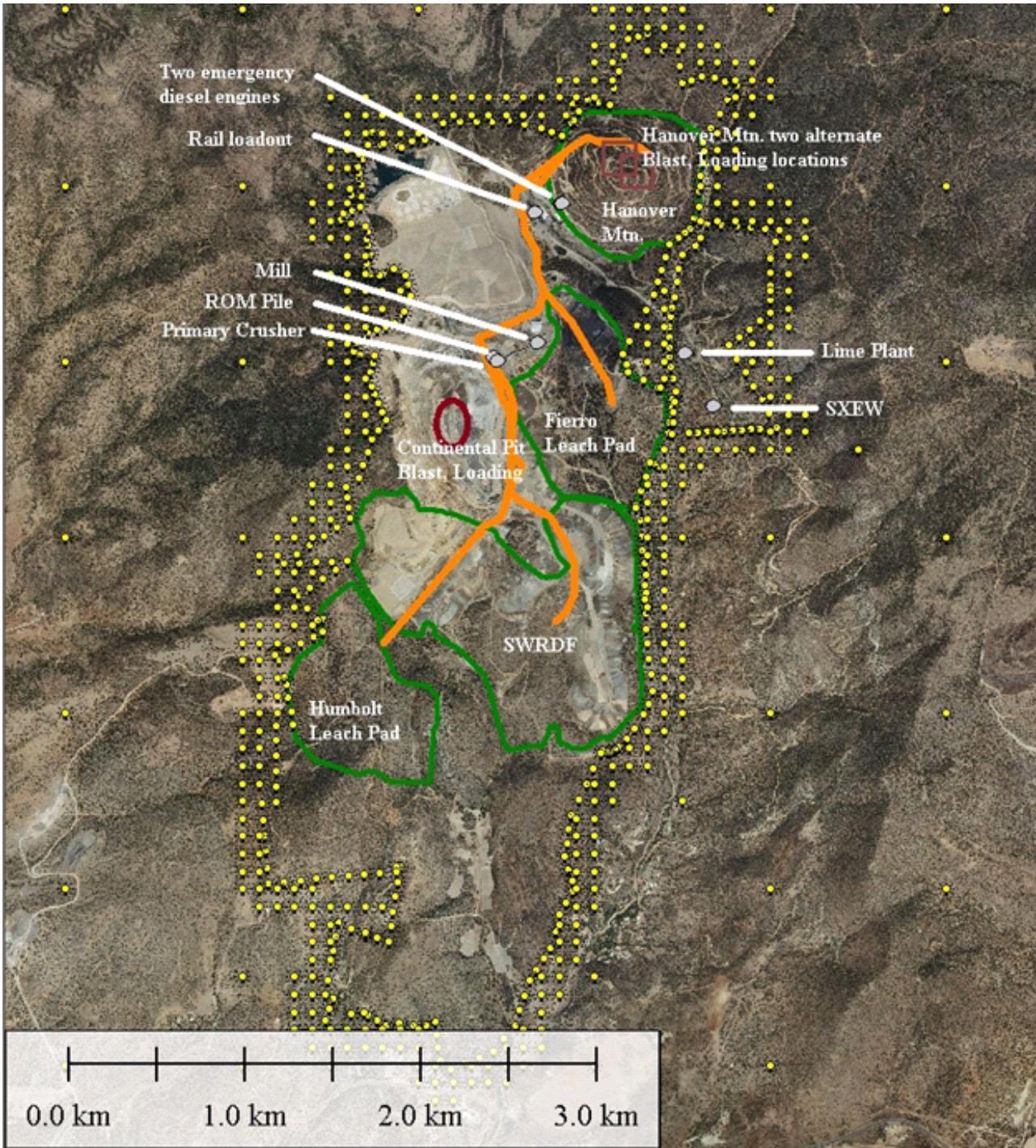
Source: Ryan 2014a

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MINE PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
Environmental Assessment

Class I Gila Wilderness
Area Receptor Locations
Figure 3.1-3



● Ambient Air Receptor (699)

● Air Emission Individual Source

— Unpaved Haul Road

Acronyms Used On This Map

ROM - Run of Mine

SXEW - Solution Extraction Electro-winning Facility

SWRDF - South Waste Rock Disposal Facility

Grant County, New Mexico

Source: Ryan 2014a

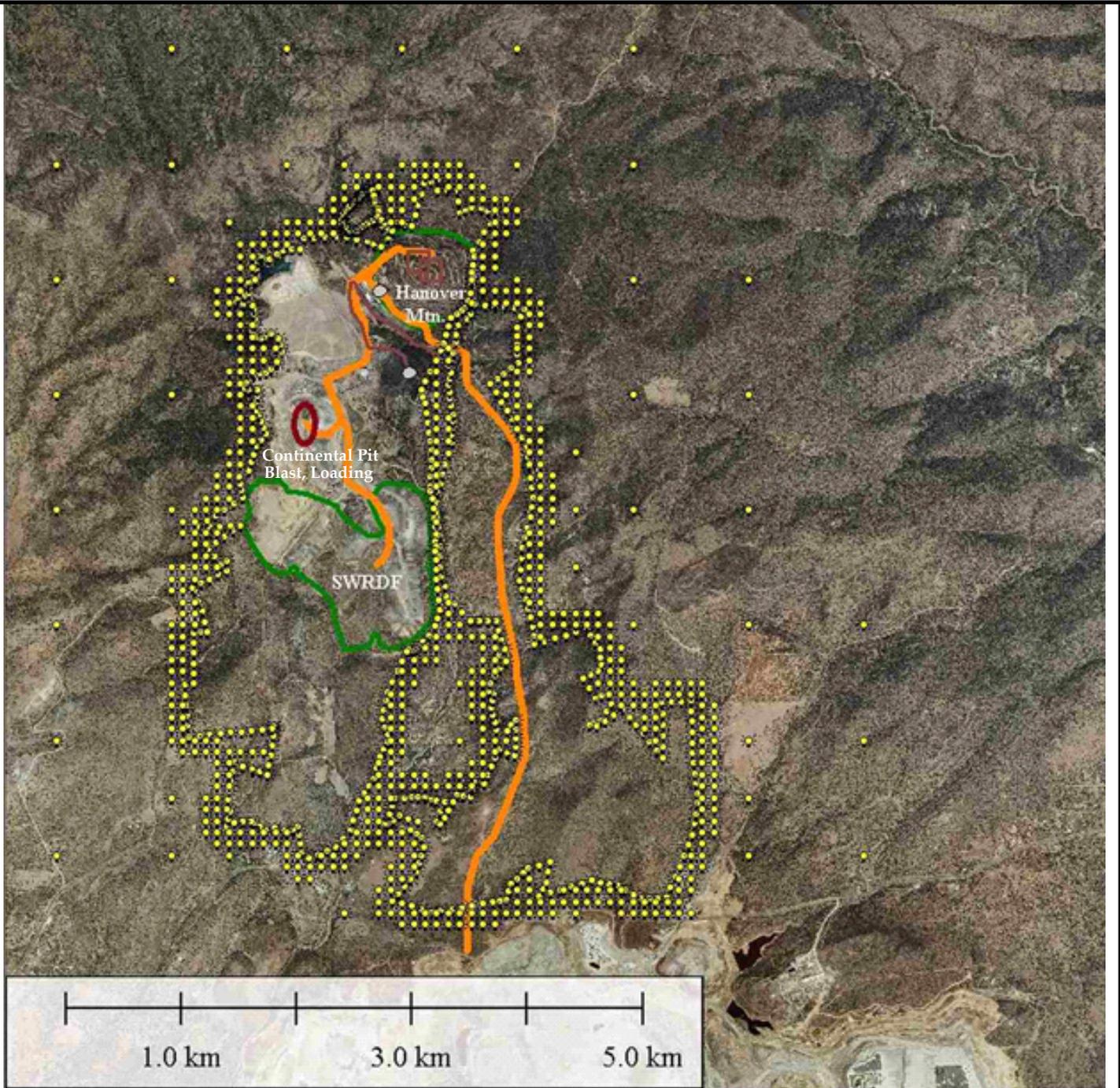
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FREEPORT-McMoRan COBRE MINING COMPANY
MINE PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
Environmental Assessment

No Action Alternative
Receptor Locations

Figure 3.1-4



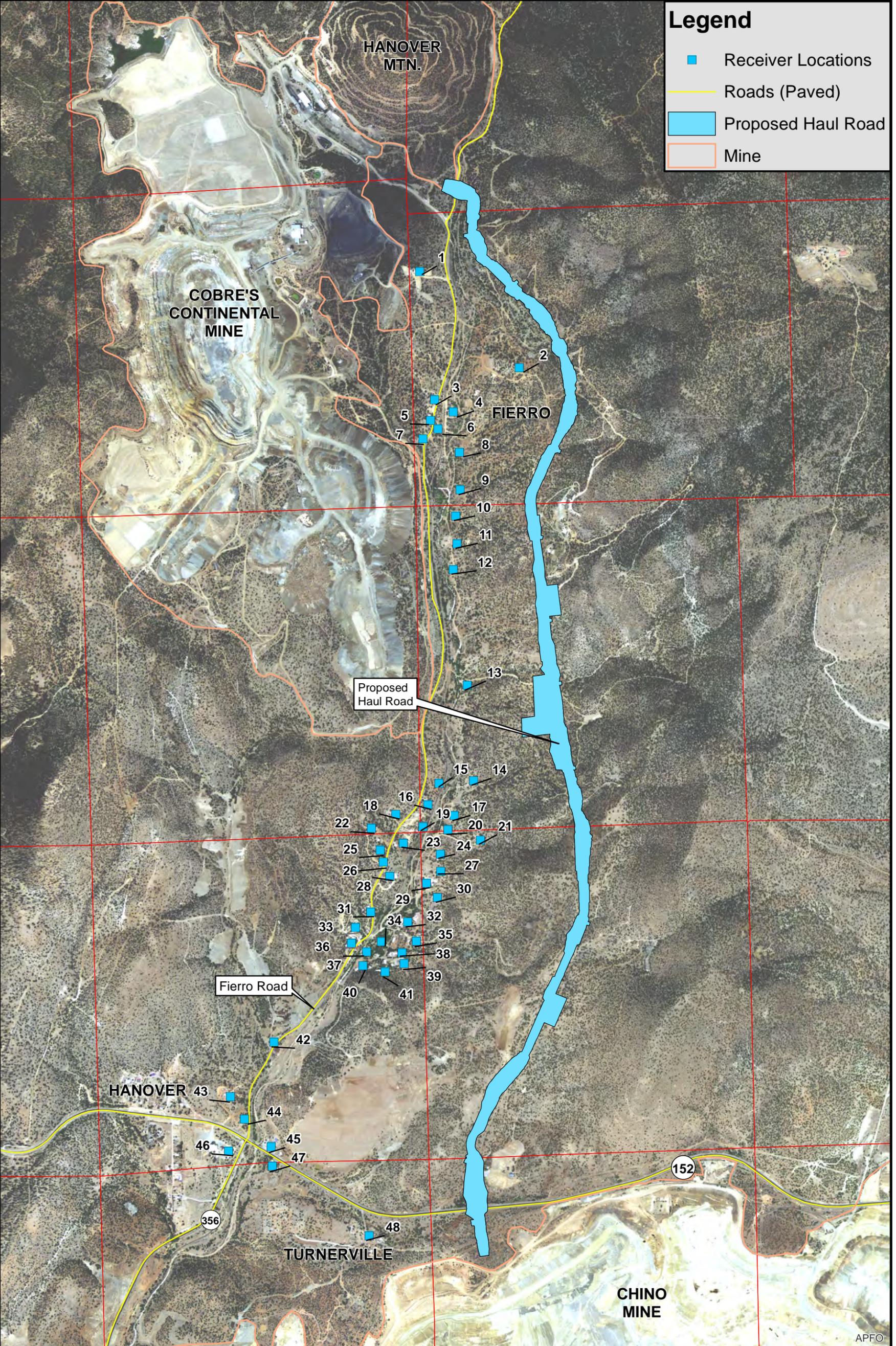
- Ambient Air Receptor (1170)
- Air Emission Individual Source
- Unpaved Haul Road

Acronym Used On This Map
 SWRDF - South Waste Rock Disposal Facility

Grant County, New Mexico
 Source: Ryan 2014b

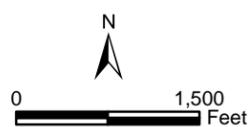
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FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Proposed Action Alternative Receptor Locations Figure 3.1-5



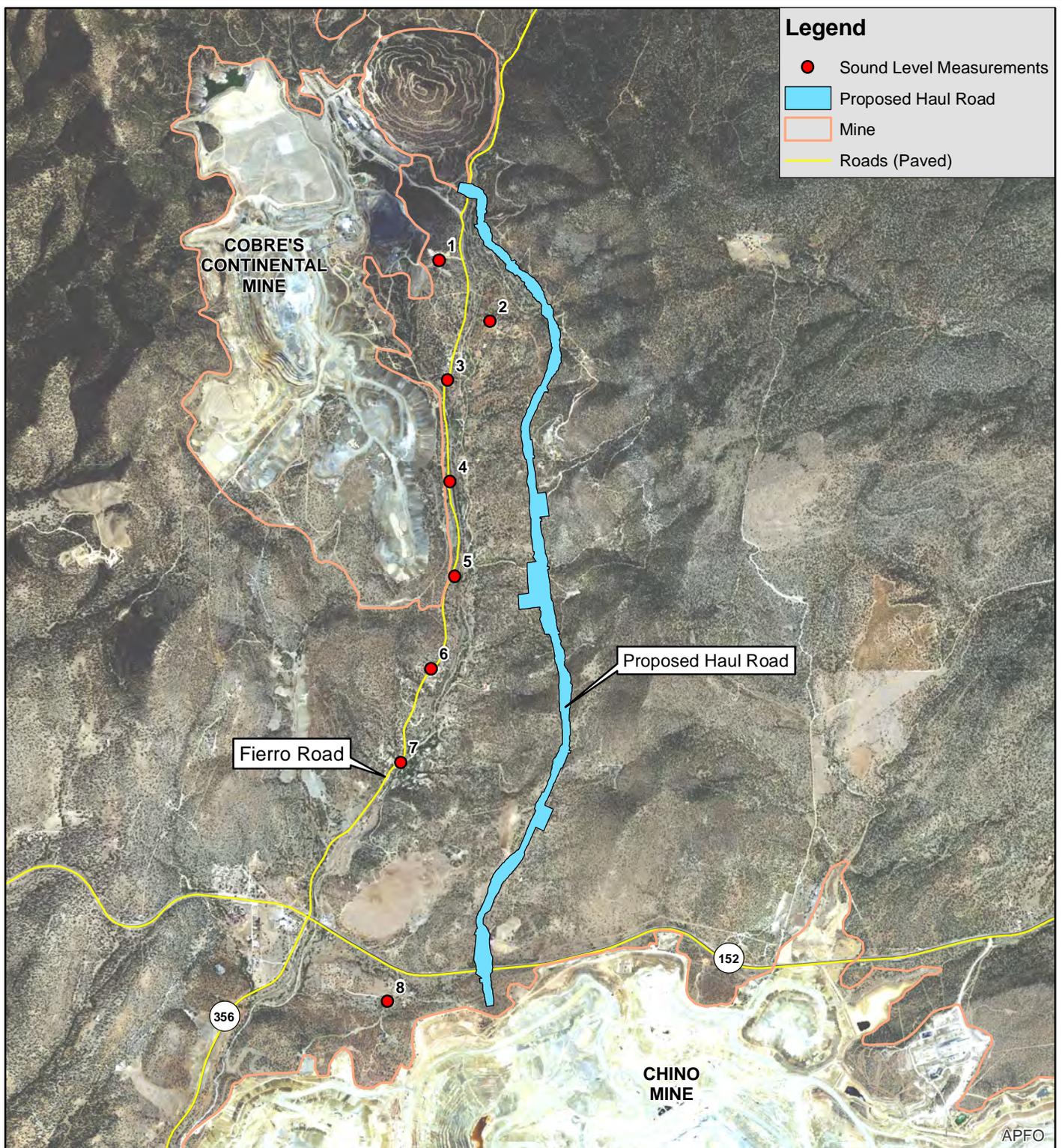
Grant County, New Mexico,
Photo Source: National Agriculture Imagery Program, 2011

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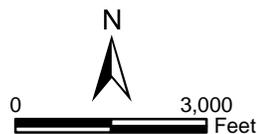


FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Noise Model Receiver Locations Figure 3.2.1

APFO

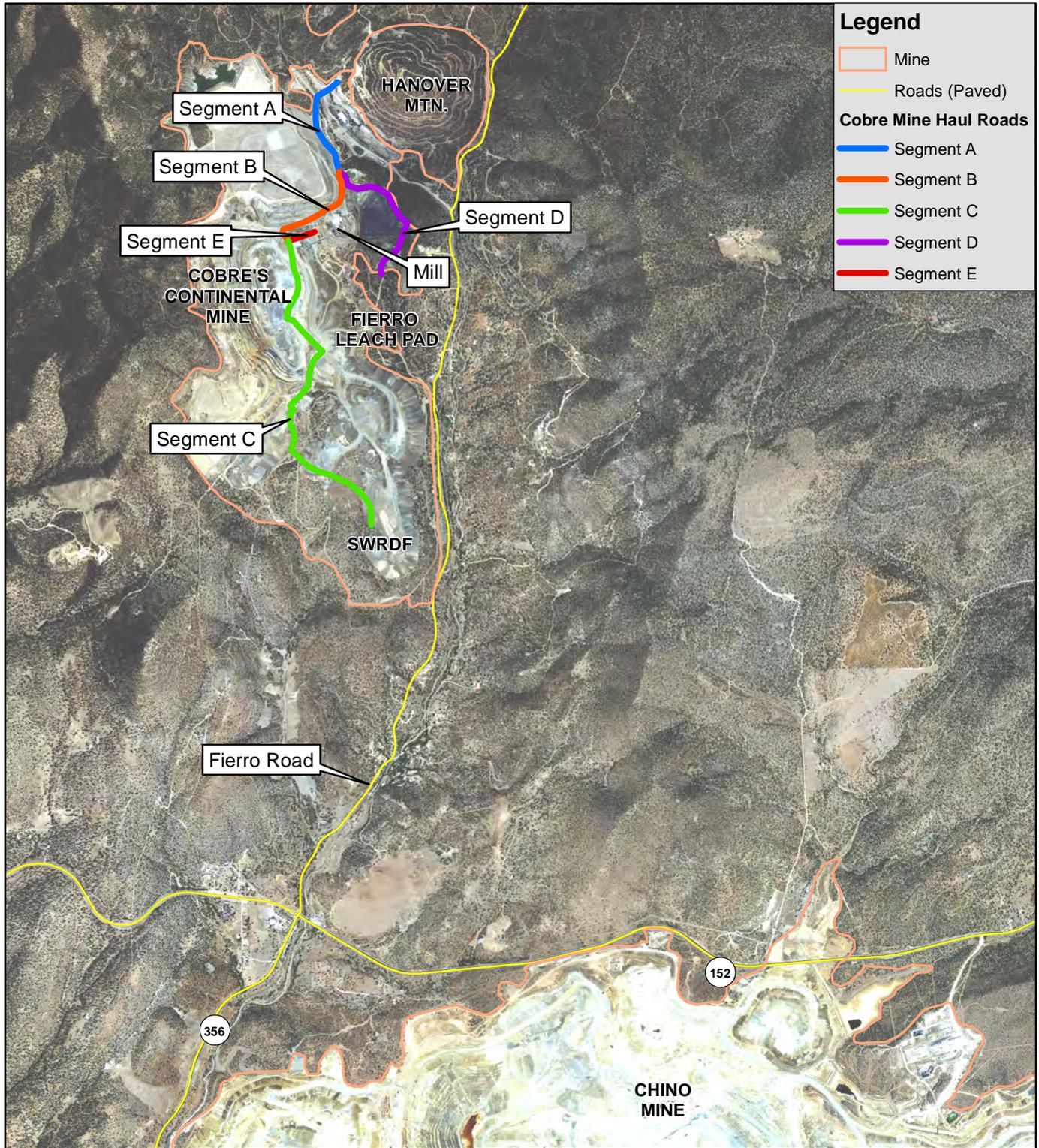


Grant County, New Mexico,
 Photo Source: National Agriculture
 Imagery Program, 2011

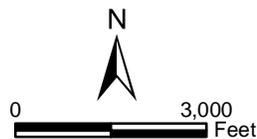


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FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Sound Level Measurement Locations Figure 3.2-2



Grant County, New Mexico,
 Photo Source: National Agriculture
 Imagery Program, 2011



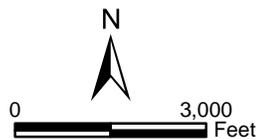
Acronym Used On This Map
 SWRDF - South Waste Rock Disposal Facility

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FREEMPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Noise Sources: No Action Alternative Figure 3.2-3



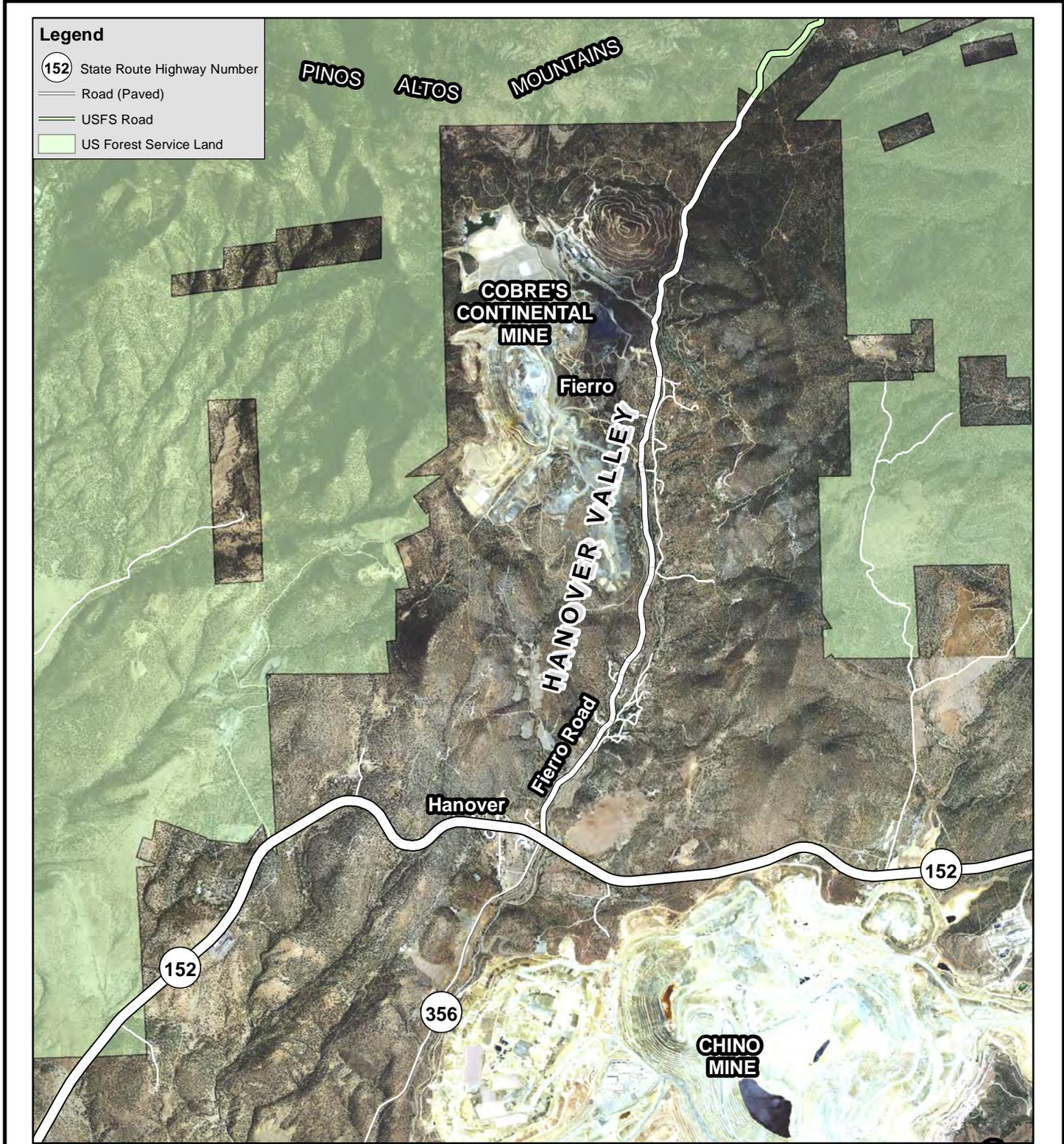
Grant County, New Mexico,
 Photo Source: National Agriculture
 Imagery Program, 2011



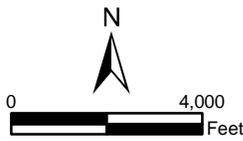
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Acronym Used On This Map
 SWRDF - South Waste Rock Disposal Facility

<p>FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5</p>
<p>Bureau of Land Management-Las Cruces District Office Environmental Assessment</p>
<p>Noise Sources: Proposed Action Alternative Figure 3.2-4</p>



Grant County, New Mexico,
 Photo Source: National Agriculture
 Imagery Program, 2011

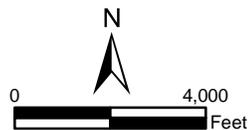


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FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Visual Analysis Area: General Vicinity of Hanover Valley Figure 3.4-1



Grant County, New Mexico,
 Photo Source: National Agriculture
 Imagery Program, 2011

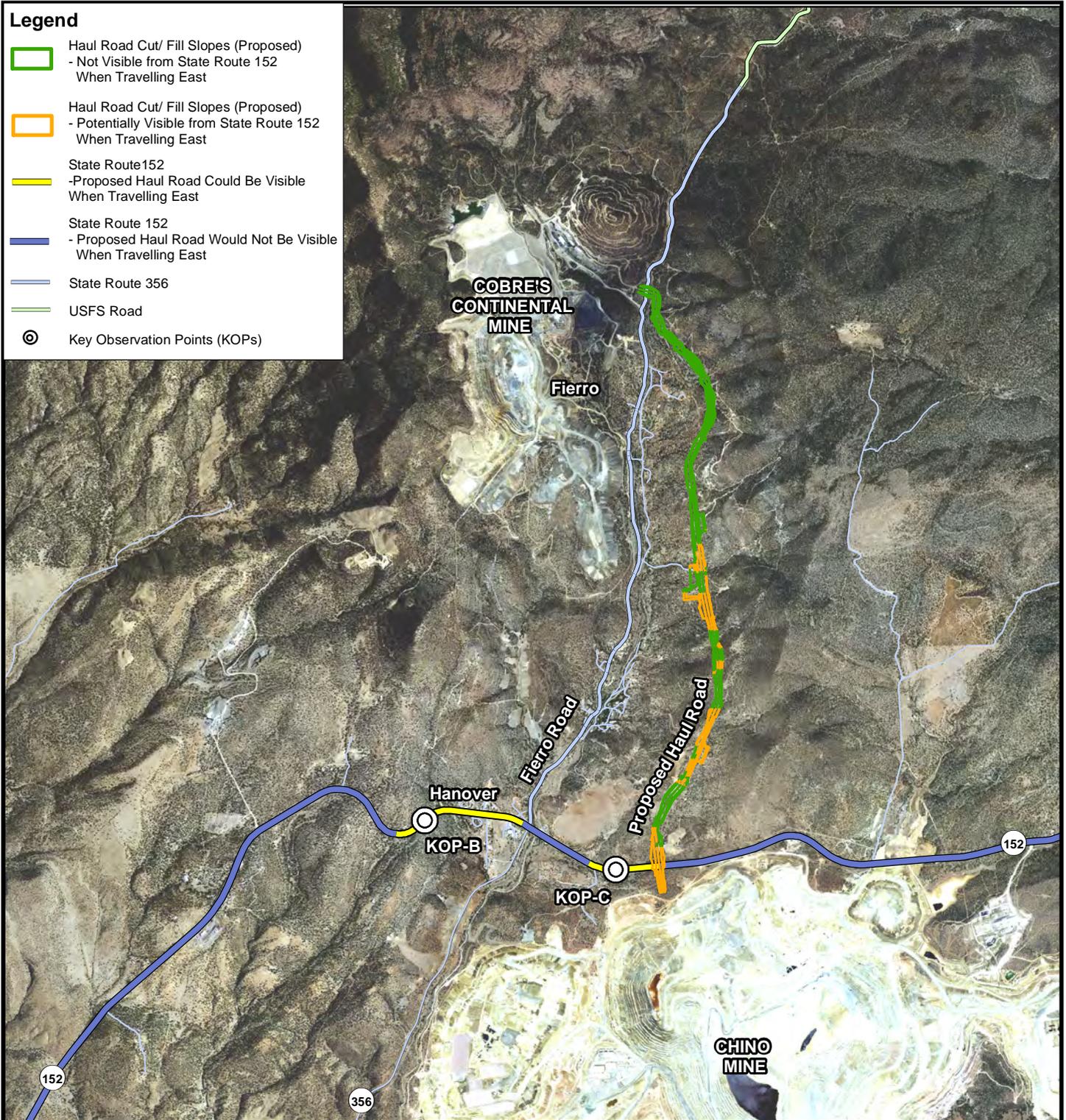


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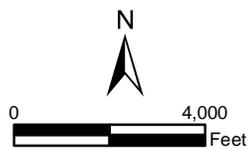
FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Locations of Key Observation Points (KOPs) Figure 3.4-2

Legend

- Haul Road Cut/ Fill Slopes (Proposed)
- Not Visible from State Route 152
When Travelling East
- Haul Road Cut/ Fill Slopes (Proposed)
- Potentially Visible from State Route 152
When Travelling East
- State Route 152
- Proposed Haul Road Could Be Visible
When Travelling East
- State Route 152
- Proposed Haul Road Would Not Be Visible
When Travelling East
- State Route 356
- USFS Road
- ⊙ Key Observation Points (KOPs)



Grant County, New Mexico,
Photo Source: National Agriculture
Imagery Program, 2011

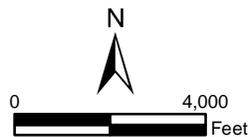


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FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Linear Visibility Analysis: KOPs B and C for State Route 152 Figure 3.4-3



Grant County, New Mexico,
 Photo Source: National Agriculture
 Imagery Program, 2011

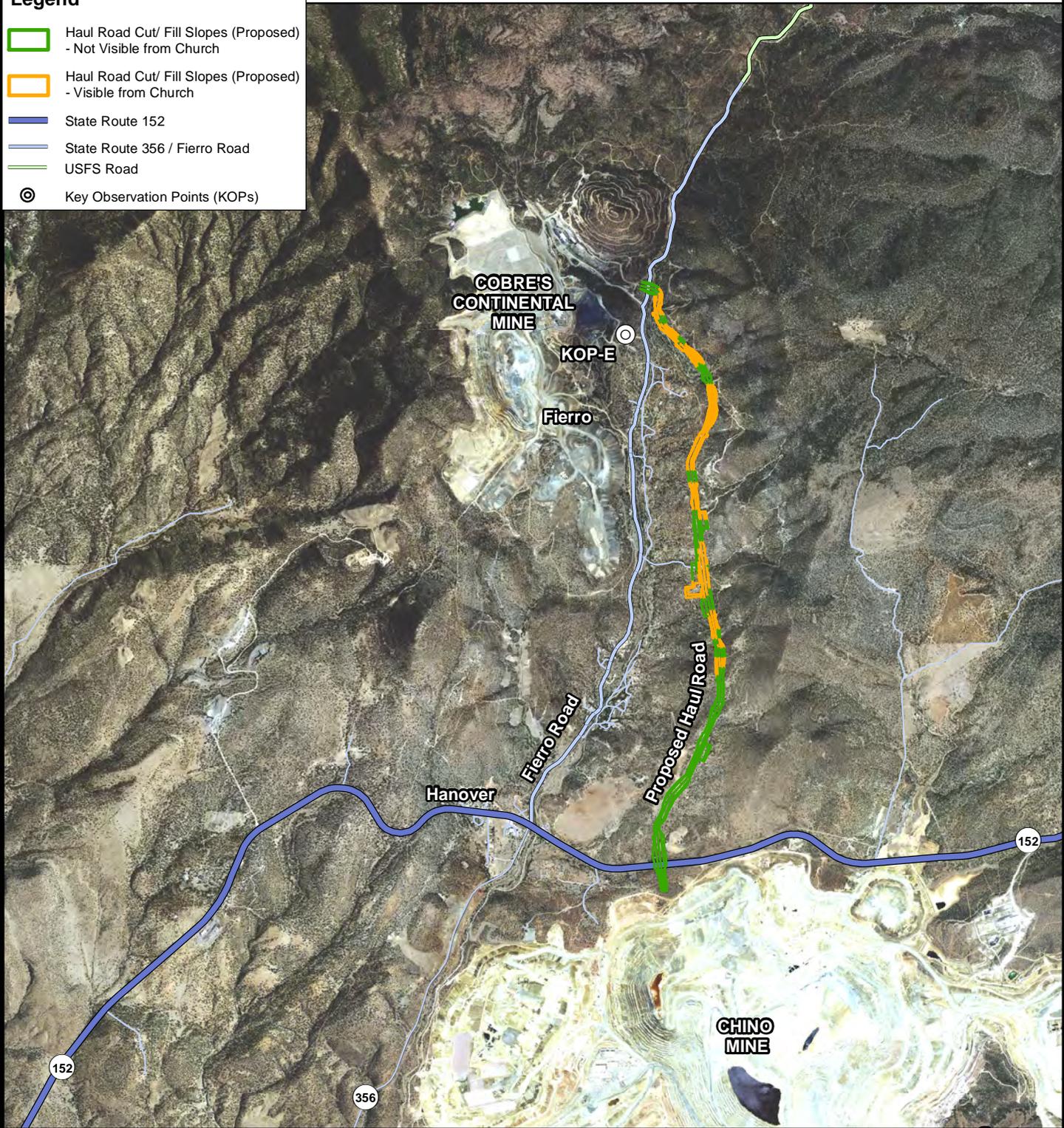


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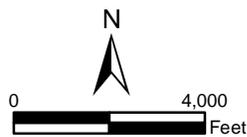
FREEMPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Linear Visibility Analysis: KOP D for State Route 152 Figure 3.4-4

Legend

- Haul Road Cut/ Fill Slopes (Proposed)
- Not Visible from Church
- Haul Road Cut/ Fill Slopes (Proposed)
- Visible from Church
- State Route 152
- State Route 356 / Fierro Road
- USFS Road
- ⊙ Key Observation Points (KOPs)

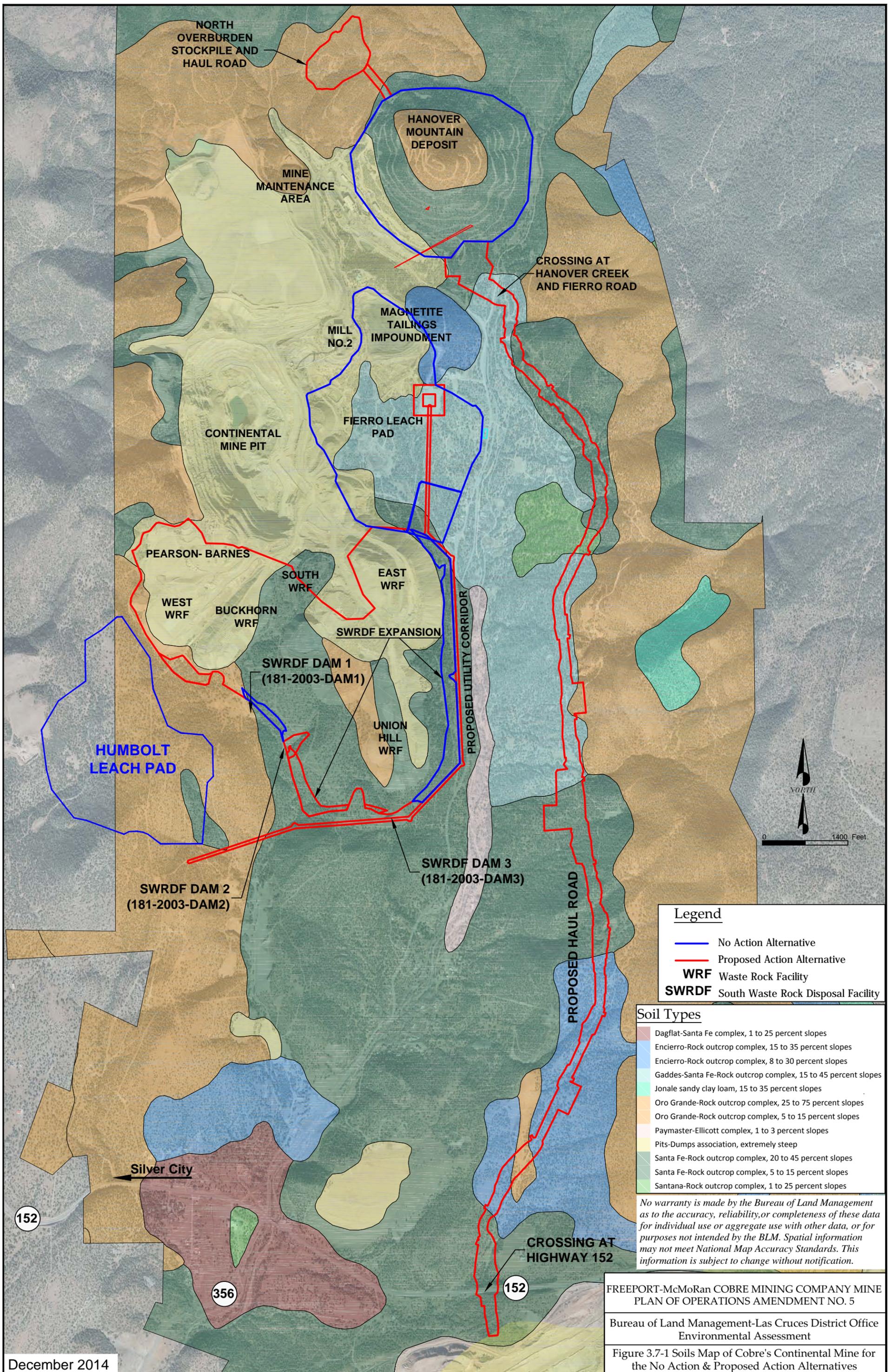


Grant County, New Mexico,
Photo Source: National Agriculture
Imagery Program, 2011



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FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
Bureau of Land Management-Las Cruces District Office Environmental Assessment
Fixed Visibility Analysis: KOP E Saint Anthony's Church Figure 3.4-5



FREEPORT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
 Bureau of Land Management-Las Cruces District Office
 Environmental Assessment
 Figure 3.7-1 Soils Map of Cobre's Continental Mine for the No Action & Proposed Action Alternatives

GEOLOGIC FORMATIONS KEY

(Figure 3.8-1)

	QUARTERNARY ALLUVIUM
	BASALTIC ANDESITE FLOWS
	CLAST-RICH CONTINENTAL BRECCIA PIPE
	MATRIX-RICH CONTINENTAL BRECCIA PIPE
	GRAVEL AND BOULDER DEPOSITS

CRETACEOUS & TERTIARY INTRUSIVE ROCKS

	RYOLITE TUFF
	MAFIC DIKES
	HANOVER-FIERRO STOCK
	GRANODIORITE PORPHYRY
	SYENODIORITE PORPHYRY
	HORNBLLENDE QUARTZ DIORITE

PALEOZOIC & MESOZOIC SEDIMENTARY ROCKS

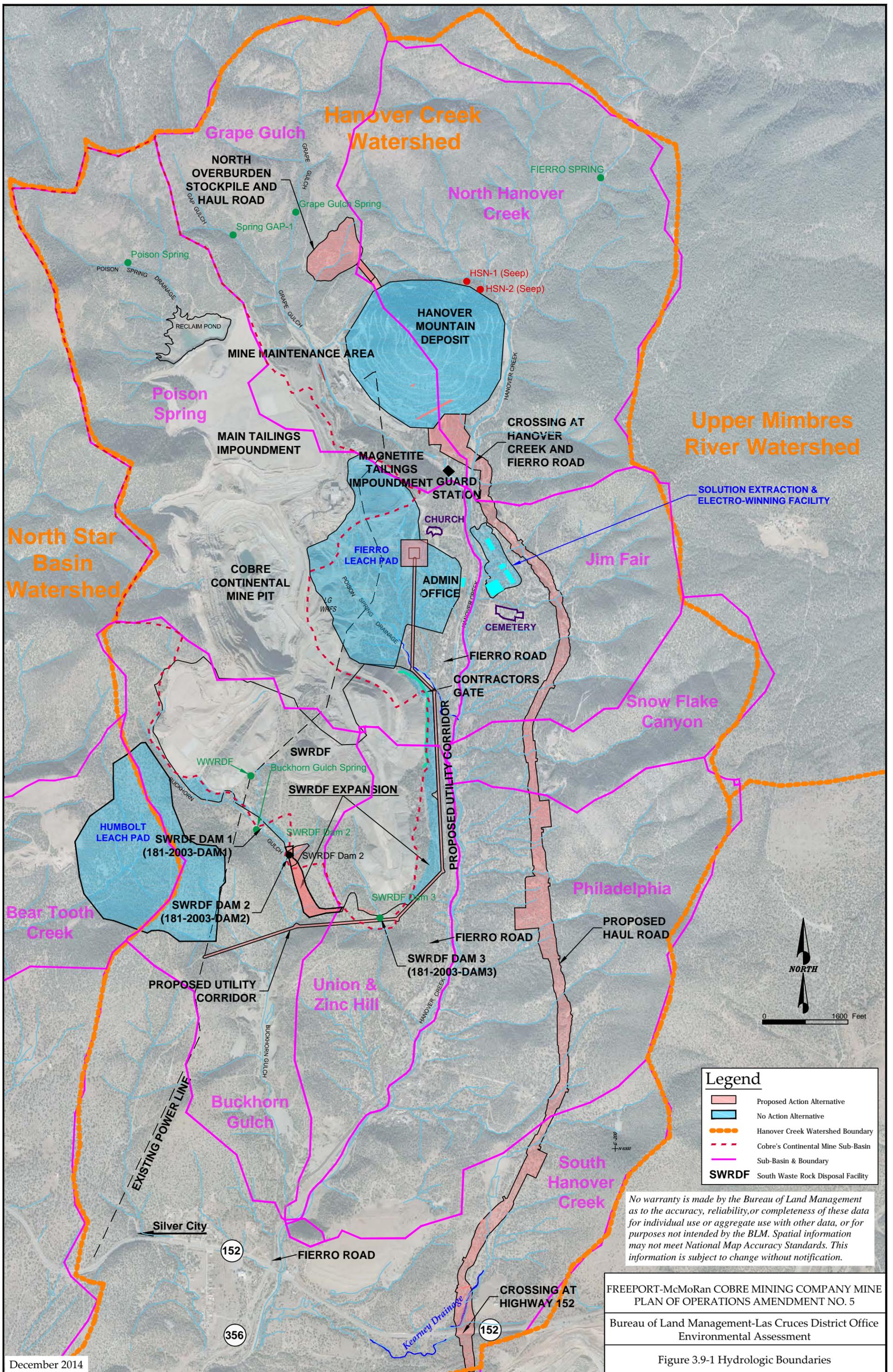
	COLORADO FORMATION		LAKE VALLEY LIMESTONE
	COLORADO FORMATION, SHALE MEMBER		PERCHA SHALE
	BEARTOOTH QUARTZITE		FUSSELMAN AND MONTOYA DOLOMITES
	ABO FORMATION		EL PASO LIMESTONE
	SYRENA FORMATION		BLISS FORMATION
	OSWALDO FORMATION		FAULTS

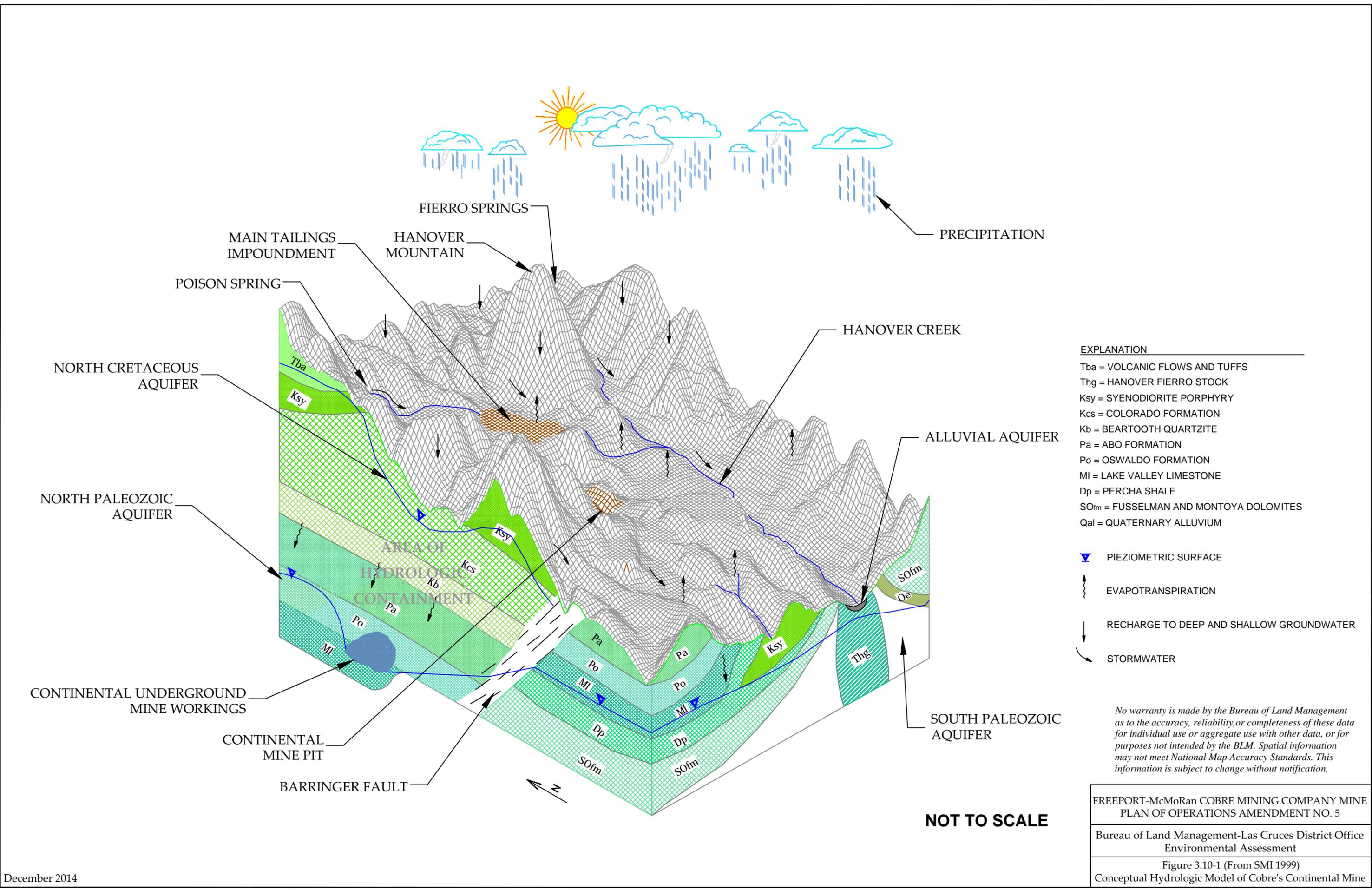
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FREEPORT-McMoRan COBRE MINING COMPANY MINE
PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
Environmental Assessment

Figure 3.8-2
Geology Formations Key





- EXPLANATION**
- Tba = VOLCANIC FLOWS AND TUFFS
 - Thg = HANOVER FIERRO STOCK
 - Ksy = SYENODIORITE PORPHYRY
 - Kcs = COLORADO FORMATION
 - Kb = BEARTOOTH QUARTZITE
 - Pa = ABO FORMATION
 - Po = OSWALDO FORMATION
 - MI = LAKE VALLEY LIMESTONE
 - Dp = PERCHA SHALE
 - SOfm = FUSSELMAN AND MONTOYA DOLOMITES
 - Qal = QUATERNARY ALLUVIUM
- PIEZOMETRIC SURFACE
 - EVAPOTRANSPIRATION
 - RECHARGE TO DEEP AND SHALLOW GROUNDWATER
 - STORMWATER

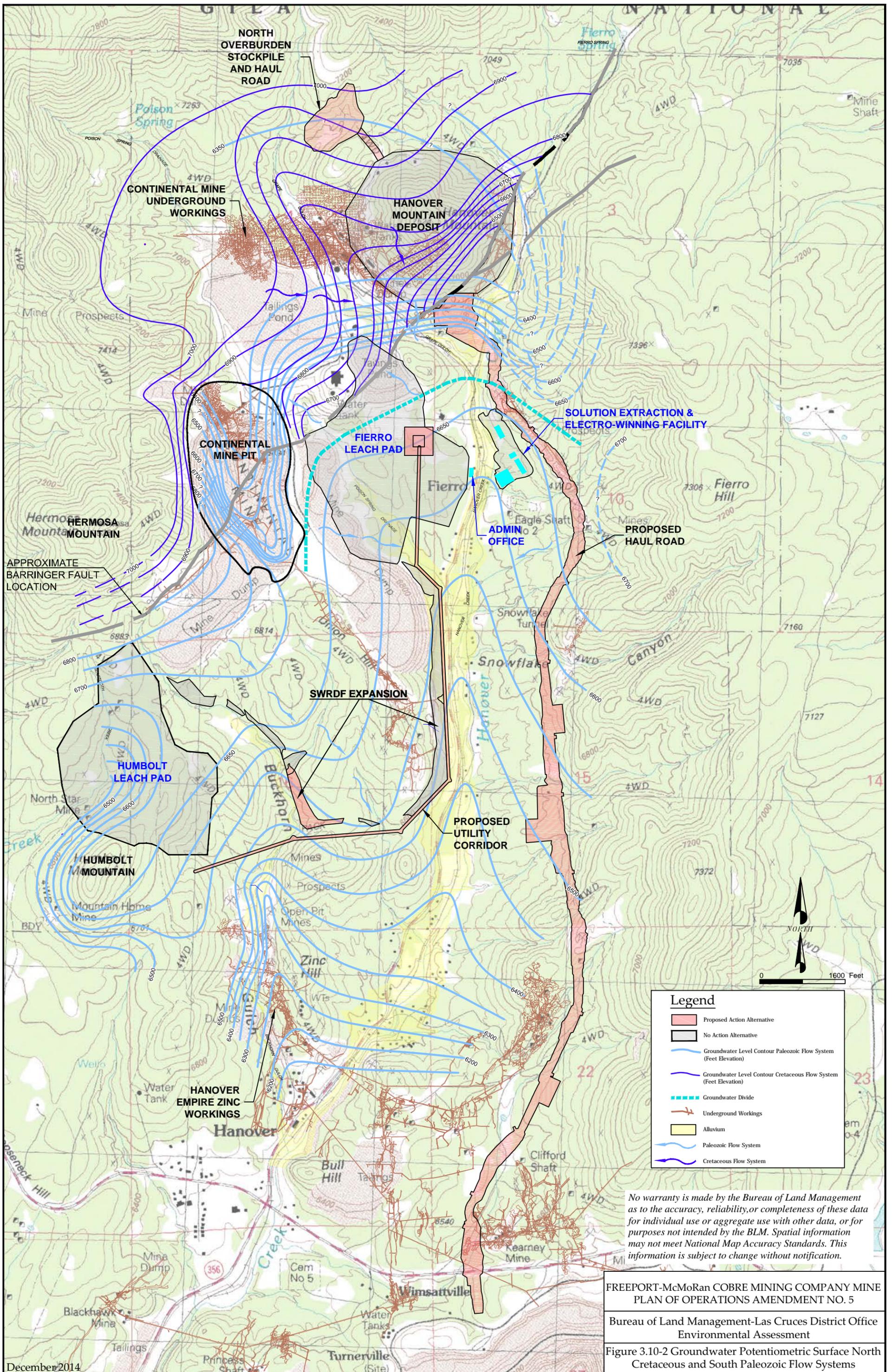
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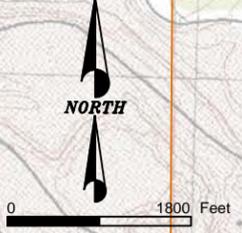
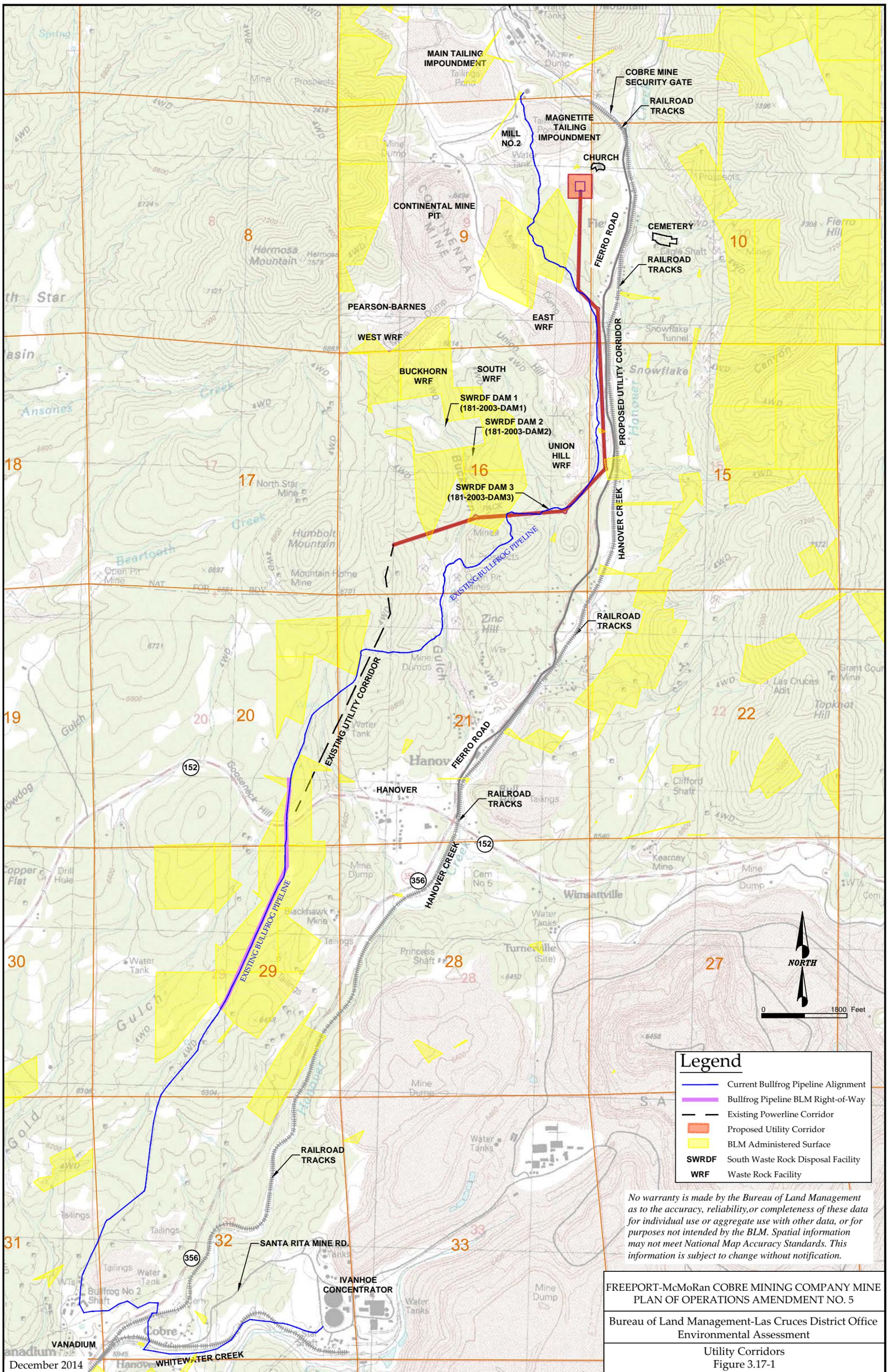
FREEPORT-McMoRan COBRE MINING COMPANY MINE
 PLAN OF OPERATIONS AMENDMENT NO. 5

Bureau of Land Management-Las Cruces District Office
 Environmental Assessment

Figure 3.10-1 (From SMI 1999)
 Conceptual Hydrologic Model of Cobre's Continental Mine

NOT TO SCALE





Legend	
—	Current Bullfrog Pipeline Alignment
—	Bullfrog Pipeline BLM Right-of-Way
- - -	Existing Powerline Corridor
■	Proposed Utility Corridor
■	BLM Administered Surface
SWRDF	South Waste Rock Disposal Facility
WRF	Waste Rock Facility

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FREEMONT-McMoRan COBRE MINING COMPANY MINE PLAN OF OPERATIONS AMENDMENT NO. 5
 Bureau of Land Management-Las Cruces District Office
 Environmental Assessment
 Utility Corridors
 Figure 3.17-1

APPENDIX A

Responses to Public Scoping Comments

Appendix A. Responses to Public Scoping Comments

This appendix provides our responses to the public comments received during our public scoping process. These comments were used by the U.S. Department of the Interior Bureau of Land Management (BLM) to identify issues of concern and help the BLM interdisciplinary (ID) team formulate alternatives to the proposed action and mitigation and monitoring measures.

Table A-1: Alphabetical list of commenters, the organization they represent, date letter was received, and their letter number

Commenters	Organization	Date Received	Letter Number
Steve & Felipe Becerra	Private citizens, Hanover, NM	2/21/2013	2
Kim K. Godfrey	Private citizen, Hanover, NM	3/7/2013	10
James Hollen, Permit Lead, Permit GR002 Continental Mine	Mining & Minerals Division New Mexico Energy, Minerals & Natural Resources Department	3/7/2013	14
Father Paulus Kao Pastor	Our Lady of Fatima Church, Holy Family Mission, Bayard, NM	2/14/2013	4
Father Paulus Kao Pastor	Our Lady of Fatima Church, Holy Family Mission, Bayard NM	3/7/2013	9
Harold A. Love, P. E. Assistant District Engineer	Engineering Support New Mexico Department of Transportation (NMDOT) District 1	3/24/2013	13
Robert R. Lucero	Private citizen, Hanover, NM	3/2/2013	12
Morgan R. Nelson Environmental Impact Review Coordinator	New Mexico Environment Department	4/11/2013	17
Keith Pankonin	Private citizen, Hanover, NM	3/6/2013	11
Justin Riggs	U. S. Army Corps of Engineers	2/12/2013	1
Kelly M. Russell Forest Supervisor	USDA Forest Service Gila National Forest	2/13/2013	7
Rosalina Sedellos	Private citizen, Hanover, NM	3/7/2013	16
Sally Smith Director of Responsible Mining	Gila Resources Information Project	3/8/2013	3
Weldon & Carol Smith	Private citizens, Silver City, NM	2/4/2013	6
Kurt Volbrecht Geologist	New Mexico Environmental Department Ground Water Quality Bureau Mining Environmental Compliance Section (MECS)	3/14/2013	5
Marvin & Judy Ward	Private citizens	2/14/2013	8
Matthew Wunder, Chief Conservation Services Division	State of New Mexico Department of Game & Fish	3/5/2013	15

Responses to Public Scoping Comments. Comments are *verbatim* as provided by the commenter. Each comment letter was reviewed and responses are provided for each comment in each letter. Please refer to Section 1.8 for a description of BLM criteria applied to each comment to identify key issues for consideration in the EA.

LETTER: 1 COMMENTER - JUSTIN RIGGS, U. S. ARMY CORPS OF ENGINEERS

Comment: 1-1 “The Corps is familiar with this project; we have already had a pre-application meeting with Freeport-McMoRan's consultant. In regards to the Corp's authority under section 404 of the Clean Water Act, this project will require a Department of the Army permit. When PCN is complete and submitted for application, the Corps will then determine if compensatory mitigation will be required, and if this project meets the criteria for a nation wide permit.”

Response: Thank you for your comment. Cobre is responsible for working with the Army Corps of Engineers to ensure all Clean Water Act Section 404 permitting obligations are met.

LETTER: 2 COMMENTER - STEVE & FELIPE BECERRA, PRIVATE CITIZENS

Comment: 2-1 “Our concerns – Noise, Dust, and not having access to the forest rd” “Also Dust & Noise at the Cemetery. We visit site on a monthly basis. Have fam & friends buried there. And we enjoy the quiet time there.”

Response: Thank you for your participation and response to the public notice. Please refer to Section 3.2 for our analysis of noise impacts, including sensitive receptors such as the cemetery and Section 3.1 for our analysis of air impacts. Public access to the Gila National Forest via National Forest System Road 778 would not be altered.

Comment: 2-2 “We have complained even on trucks with excess use of the "Jake Brake" noise in town site in Hanover. Have talked to Mr. Rivera at mine gate about it. Had a Grant County Sheriff's Officer up here to talk to Drivers. Post Office also complained about trucks speeding. Will get a Petition in Hanover community to take to Grant County commission to see if they can put a ordinance on "Jake Brake" noise in effect in the town site. Hanover & Turnerville town sites have all complained on excess use of "Jake Brake" noise. I have talked to the State Highway and D O T and State Police about this matter. Will get all signatures in Petition to take to the Grant County Commission. Whatever it takes to stop such nuisance. We need a ordinance at the town site. Thank you.”

Response: The development of an ordinance regarding traffic restrictions and use of a county road is outside the scope of this EA. An analysis of potential noise effects along Fierro Road was conducted for the No Action and Proposed Action Alternatives

analyzed in this EA (Section 3.2). This analysis used FHWA noise models that model average truck noise over specified time durations and does not consider instantaneous noise events such as the noise from the use of jake brakes.

LETTER: 3 COMMENTER - SALLY SMITH, DIRECTOR OF RESPONSIBLE MINING, GILA RESOURCES INFORMATION PROJECT

Comment: 3-1 On behalf of the Gila Resources Information Project (GRIP), I am submitting comments related to scoping of the Environmental Assessment for the Freeport-McMoRan Mine Plan of Operation for the Cobre Mine. I serve as board president and Director of Responsible Mining for GRIP, located in Silver City, NM. Founded in 1998, our mission is to promote healthy communities in Southwest New Mexico by protecting our environment.

I have been actively involved in the process of mine permitting since the inception of the New Mexico Mining Act (NMMA) in 1992, and specifically involved in operational and Closure/Closeout plans and permitting for Phelps Dodge (now Freeport- McMoRan) mines in Grant County for the past 20 years. In 2012, I served as a member of the Copper Regulation Advisory Board, part of a legislatively mandated process whereby the New Mexico Environment Department/Ground Water Quality Bureau (NMED GWQB), Mining Environmental Compliance Section (MECS) developed draft water quality regulations specifically for copper mining in New Mexico.

Over the last 20 years I have followed the Plans of Operation for Cobre Continental Mine and associated NEPA EIS and EA processes for the various scenarios presented by the mine companies in ownership. I have outlined below a number of issues that should be addressed by the BLM in its Environmental Assessment of the Cobre MPO.

Response: Thank you for your comments and participation and response to the public notice.

Comment: 3-2 “Grant County has several large open pit copper mines, which preceded the NMMA and have considerable impact to regional groundwater aquifers and many other impacts associated with large-scale mining operations. GRIP believes mining companies must assure the public and the agencies that they can afford and will rise to the technical challenges of protecting the environment and cultural and natural resources in construction, expansion, operation and post closure. We believe that adequate and secure bonding must be calculated and posted in the event that corporations fail in these obligations and the state and BLM would be responsible for the daunting task of managing pumping, potential treatment and all containment that would need immediate attention and ample funds. We do not believe that Parent Company Guarantees, self bonding, property and other less than readily available bonding mechanism should be admissible. Adequate bonding for all contingencies and all reclamation work needed to stabilize and prevent acid mine drainage with detailed and conservative cost estimations is imperative in event of the owner /operator default.”

Response: We will conform to our BLM requirements with regard to reclamation and closure bond requirements. It will be Cobre’s responsibility to work with the state with regard to their obligations for state programs. To the extent that the state requirements meet or exceed our requirements, we will work with Cobre to ensure that adequate bonding requirements are provided and to also ensure that they do not have to bond twice for necessary closure work.

Comment: 3-3 “The EIS should evaluate requirement of liners for any potential acid generating materials. The North Overburden Stockpile, almost entirely on BLM managed lands, should be placed on a BMP designed liner with a BMP catchment drainage system and have a detailed characterization/sampling plan.”

Response: Overburden materials from Hanover Mountain that will be placed at the North Overburden Stockpile will consist of native, inert materials that will be used as cover material at closure. The materials are not acid generating and do not require that a liner system will be placed at the North Overburden Stockpile. This is discussed in Section 3.10.2.2.

Comment: 3-4 “In 1996 and 1997 I joined and assisted the Fierro Preservation Association in acquiring some protection, additional property and certain amenities for the historic St Anthony Church and cemetery both of which are shown on the Proposed Action MPO map in close proximity to proposed mining, mine administration building, and haul road. In 1996 the Office of Cultural Affairs, (OCA) had written some letters of concern about Cobre Mining Company permit deficiencies and outstanding issues regarding the operations and expansion of the Continental Mine and potential damage to the church and cemetery. Especially in light of the sanctity and special

significance Hanover Mountain has held and still holds for people who are or who were once members of the Fierro community, the potential for damage should prompt special measures for the protection and sanctity of the church, shrine and cemetery sites.”

Response: The Fierro Preservation Agreement applies to activities described under the No Action Alternative. Please see Section 3.6 for a discussion of the status of the Agreement.

Comment: 3-5 “All cultural resources should be protected by having adequate surveys of all areas of disturbance with particular attention paid to the potential of subsidence in areas riddled by underground workings.”

Response: Cultural resources surveys were conducted throughout the project area. Please see Section 3.15 for a more detailed discussion.

Comment: 3-6 “Protection of surface and groundwater, including springs, especially in a time of predicted drought and uncertainty regarding climate predictability, are also imperative and essential to the community’s dependence on the potential affected aquifer and other water sources.”

Response: Please see Sections 3.9 and 3.10, for detailed discussions on surface water and groundwater, respectively.

Comment: 3-7 “Past impacts from mining at Continental have already occurred including two slurry spills in 1996 from Mill No. 2, one of which contributed an estimated 50,000 gallons of crushed ore and water were reported to extend at least 3,000 feet off permit boundary into Hanover creek. Also, a dam overtopping which took tailings material down Hanover Creek well beyond Highway 152, resulted in a significant cleanup process and fines.”

“The state Office of Natural Resources Trustee (ONRT) Final Groundwater Restoration Plan documented the areal extent of groundwater damages associated with Cobre Continental Mine at 528 acres. ONRT considered all groundwater affected by mining activities with sulfate concentrations exceeding 250 milligrams of sulfate to be injured because they exceed federal SDWA standards. ONRT identified groundwater plumes in alluvial and regional aquifers at Cobre Mine include: Continental Pit Regional, West Waste Rock Regional, Buckhorn Waste Rock Regional, East Waste Rock Regional, South Waste Rock Regional, Union Hill Waste Rock Regional, and Hanover Creek Alluvial. ONRT samples tested by SPLP test showed that the hazardous substances, arsenic, cadmium, copper, lead and manganese had leached into the groundwater from source material at concentrations in excess of State of New Mexico standards for human health and domestic water

supply. The SPLP test also contained detectable concentrations of the hazardous substances cobalt and zinc (Daniel B. Stephens & Associates, 1997b).”

“ONRT investigation resulted in \$13 million in groundwater damages and \$5.5 million in wildlife damage claims against Phelps Dodge, now FMI.”

Response: Thank you for your comment.

Comment: 3-8 “Make sure that characterization and modeling of existing contamination in soils, surface and groundwater is well documented. And assure that characterization of areas to be disturbed have well documented characterization before and during disturbance. And assure that reliable background data is established.”

Response: Please see Sections 3.7, 3.9, and 3.10 for more detailed discussions on soils, surface water, and groundwater resources, respectively.

Comment: 3-9 “Although the MPO says, the newly proposed construction activities are expected to have a significant short-term impact, FMI estimated over the long-term ten years of expected mining, on-average 100-125 and potentially up to 200 trucks per day, 24/7, will be crossing the ridge above the community at least partially in sight. This will undoubtedly be disruptive to the estimated 75-80 inhabitants, many elderly, and in the short-term will cause congestion and delays involved with construction of the overpasses and additional long term traffic to the mine site.”

Response: We have reviewed the MPO Amendment No. 5 and do not find any reference to the short term significant effects referenced in the comment. The EA provides an analysis of the visual effects of the proposed Haul Road and other actions contemplated in the MPO and traffic impacts of the existing authorized activities (No Action Alternative) and the Proposed Action Alternative. The commenter is referred to Sections 3.4 and 3.5 of the EA for additional information visual resources and traffic.

Comment: 3-10 “There should be a detailed study of transportation/traffic, safety and road impacts on any highways used for haulage and/or employee and contractor traffic. The study should include Highway 152, 356 and 180 and the Fierro Road and Forest Service access road. Residents complain now about the traffic and worn condition of the Fierro Road, which should be evaluated for the additional traffic of construction and operation.”

Response: Please refer to Section 3.5 for a discussion of anticipated impacts associated with changes to traffic levels and patterns. The traffic impact analysis identified anticipated truck traffic on State Highways 356 and 180. Under current conditions, the bulk of mine related traffic that reports to Chino utilizes these roads. This will not change under the Proposed Action Alternative. To contrast the Proposed Action and

No Action Alternatives, the traffic analysis focused anticipated changes in traffic patterns on State Highway 152 and Fierro Road.

Comment: 3-11 “Wind velocities and prevailing directions should be sampled and recorded to determine potential for blowing dust and deposition of mine waste, road closures, and/or dangerous driving conditions and assure that potential dangers and the feasibility of mitigation alternatives are considered and to assure that Class II air quality regulations will be attainable and that blowing dust from construction and operations and reclamation will be adequately suppressed.”

Response: The commenter is referred to Section 3.1 for discussions of air impacts and air emission dispersion modeling.

Comment: 3-12 “Residents, residences and the churches and cemetery and Post Office and any other habitations should be insulated as much as possible from operational and construction operation dust, noise and vibration including blasting. An effort to contain blasting to a daytime and weekday schedule should be included in permitting.”

Response: The commenter is referred to Section 3.1 (air), Section 3.2 (noise), and Section 3.3 (vibration) for more detailed discussions.

Comment: 3-13 “Evaluation of the visual impacts should be conducted and areas planned should be staked in critical areas so that the path of the haul road and overpasses, office facilities and utility corridor is demarcated and understood by the residents. The project area is located in a BLM Class II Visual area, meaning that the level of changes to the existing landscape should be low. Limiting the visibility of the haul road from residences should be a priority.”

Response: A visual analysis was conducted for the proposed Haul Road. Please refer to Section 3.4 for a more detailed discussion.

Comment: 3-14 “Comprehensive wildlife assessment, protection, and monitoring should be assured now, and throughout mining, reclamation and post mining.”

Response: The commenter is referred to Section 3.12 for a more detailed discussion on wildlife. The MPO indicates that wildlife monitoring will be conducted in accordance with state permit requirements (MPO Section 4.1).

Comment: 3-15 “Efforts should be made to work in full cooperation with state of New Mexico and other permitting agencies and scheduling and timing of permitting should be coordinated.”

Response: Cobre is responsible for coordination with state agencies with regulatory authority over operations at their mine facilities. Should state permitting decisions result in changes in proposed mine plans, we will evaluate whether additional NEPA review by our office is necessary. To the extent those processes can be coordinated it will reduce uncertainty in their permitting and start-up schedules.

Comment: 3-16 “The wellbeing and safety of the residents, the wildlife and natural resources of the Fierro /Hanover area should be considered throughout the current NEPA process and in the subsequent years of mining and reclamation.”

Response: The commenter is referred to Sections 3.7 (soils), 3.11 (vegetation), 3.12 (wildlife), 3.13 (special status species), 3.14 (noxious weeds), and 3.18 (environmental justice).

LETTER: 4 COMMENTER - FATHER PAULUS KAO, PASTOR

Comment: 4-1 “Please respect the church building, the property surrounding it, & the access road to the church.”

Response: Thank you for your comment. Access to the church will not be affected by the proposed activities. For further discussion please refer to Section 3.6.

Comment: 4-2 “Please respect the cemetery, and the road to access it.”

Response: Access to the cemetery would not be affected by activities under the No Action or the Proposed Action Alternatives. Potential impacts to the cemetery are addressed in various sections of this EA including Sections 3.1 (air), 3.2 (noise), 3.3 (vibration), and 3.4 (visual resources).

LETTER: 5 COMMENTER - KURT VOLBRECHT, NMED – MECS, NEW MEXICO ENVIRONMENT DEPARTMENT GROUND WATER QUALITY BUREAU MINING ENVIRONMENTAL COMPLIANCE SECTION (MECS)

Comment: 5-1 The New Mexico Environment Department (NMED) has received the request for Scoping Comments on the proposed Amendment No. 5 to Cobre’s amended Mine Plan of Operations (MPO) received by the Ground Water Quality Bureau on February 4, 2013. NMED offers these comments to assist the BLM in understanding relevant issues and concerns that NMED has regarding the proposed change in activity and use of BLM land within the Continental Mine site as presented on the map that accompanied your request.

Cobre is currently permitted to under three separate discharge permits; DP-181 which regulates the existing operational facilities; DP-1056 which regulates all unconstructed facilities including the North Overburden Stockpile and the Hanover Mountain Mine; and DP-1403 which covers closure activities for the Continental Mine. Cobre has made timely application to renew their operational discharge permit,

DP-181, and NMED it is currently reviewing this application. NMED is anticipating that during the process of renewing and modifying DP-181, operational requirements concerning the North Overburden Stockpile and the Hanover Mountain Mine will be included.

The activities identified in the MPO including the North Overburden Stockpile, Connecting Haul Road, South Waste Rock Disposal Facility, and SWRDF Dam 2 will be included under DP-181 upon renewal. The closure permit, DP-1403 will also be modified upon renewal to include any proposed changes to the mine plan. NMED will work with BLM to insure that operational and closure requirements included the renewed permits are not in conflict with the proposed MPO.

Please contact me at 505-827-0195 or by email at kurt.vollbrecht@state.nm.us if you have any questions.

Response: Thank you for your comment. Cobre will continue to work with NMED to ensure all required permits are current for the proposed activities.

LETTER: 6 COMMENTER - WELDON & CAROL SMITH, PRIVATE CITIZENS

Comment: 6-1 I certainly have no objections to Freeport-McMoRan Cobre Mining Co. and their future plans. Also I appreciate being able to use BLM as long as possible. Thank you.

Response: Thank you for your participation and response to the public notice. Concerns expressed by members of the public are one of the many factors considered by the BLM when making decisions. The BLM thanks all who took the time and effort to participate in the NEPA process and hopes they continue to provide input to further our efforts to manage important public resources.

LETTER: 7 COMMENTER - KELLY M. RUSSELL, FOREST SUPERVISOR, USDA FOREST SERVICE GILA NATIONAL FOREST

Comment: 7-1 “Thank you for the opportunity to comment on the Environmental Assessment of the Mining Plan of Operations (MPO) Amendment No. 5 for the Continental Mine Project. This specific plan amendment would authorize Cobre Mine to impact approximately 39 acres of Bureau of Land Management (BLM) land as part of the proposed mining operation. The BLM-administered land affected by this proposed modification to the existing MPO are associated with mining Hanover Mountain, development of the North Overburden Stockpile, construction of a 3.25-mile long connection Haul Road to transport ore to the Chino Mine facility for processing, expansion of the South Waste Rock Disposal Facility (SWRDF), authorization of the SWRDF Dam No. 2, and relocation of a utility corridor. These proposed projects are located adjacent the Gila National Forest near the Cobre Mine, and the proposed Little Rock Mine.”

“Much of our public land can only be accessed via National Forest or BLM roads. If these roads are restricted or blocked, access to public land could become severely restricted. Therefore, the Gila National Forest supports the BLM's plan amendment proposal, with the provision that access by the public on County Road 3-5 (National Forest System road 778) is allowed to continue. This road crosses BLM property in section 3, T17S, R12W. I don't believe Grant County has an easement on this section of road. Therefore, we would like to insure that the public's access on this road is protected. Thank you for the opportunity to comment on this proposed Mining Plan of Operations amendment. If you have any questions, please contact Russell Ward, District Ranger at 575-388- 8430.”

Response: Thank you for your participation and response to the public notice. Public access to the Gila National Forest via National Forest System Road 778 would not be altered. Short term impacts to access may occur during construction of the haul road overpass proposed as part of the Proposed Action Alternative; however, long term access to National Forest System Road 778 will not be adversely affected by either the Proposed Action or the No Action Alternative.

LETTER: 8 COMMENTER - MARVIN & JUDY WARD, PRIVATE CITIZENS

Comment: 8-1 “It looks like the only thing this land could be used for is mining in visiting the area it is very rough land. It also looks like you can't even access these isolated pieces of land without trespassing on Cobres property. I think we should let them use the land and create the jobs, that would be a good use for the land (JOBS!)”

Response: Thank you for your comment.

LETTER: 9 COMMENTER - FATHER PAULUS KAO, PASTOR

Comment: 9-1 “I am the Pastor of O. L. Fatima Church in Bayard, Holy Family Mission in Hanover, and St. Anthony Mission in Fierro. We are concerned about the dust vibration and noise which could cause structural damage to the mission church and shrine in Fierro, and problems to the Fierro cemetery.”

Response: Thank you for your comment. Please refer to Sections 3.1, 3.2, and 3.3 for discussion of air, noise, and vibration effects to St. Anthony's Church and to Fierro Cemetery. Access would be maintained to these places under both the No Action and Proposed Action Alternatives.

LETTER: 10 COMMENTER - KIM K. GODFREY, PRIVATE CITIZEN

Comment: 10-1 “My physical address is 107 Fierro Rd., Hanover, NM 88043- My concern about the haul road would be dust, air quality, blasting and the noise.”

Response: Thank you for your comment. Please refer to Sections 3.1, 3.2, and 3.3 for more detailed discussions of potential effects to air, noise, and vibration, respectively.

Comment: 10-2 “The road would be ugly, and spoil the view. It would ruin the peaceful setting of Hanover / Fierro Area.”

Response: Thank you for comment. Please refer to Section 3.4. for a discussion of the visual impacts of the No Action and Proposed Action Alternatives. The commenter is also referred to Sections 3.1, 3.2, 3.3 for discussions of air, noise and vibration effects of the No Action and Proposed Action Alternatives.

Comment: 10-3 “I hope the Mine will please consider different options to this plan, such as hauling with the existing rail road, or else re-routing the road further east and completely outside of the residential areas. Thank you for your consideration of this very important issue.”

Response: The commenter is referred to Section 2.2.3 for a discussion of alternatives, including use of the rail line, identified but not carried forward for detail analysis in this EA. Technical and logistical constraints associated with the rail system operation resulted in the determination that it would not meet the purpose and need for the project. Placement of the proposed Haul Road further east was not considered.

LETTER: 11 COMMENTER - KEITH PANKONIN, PRIVATE CITIZEN

Comment: 11-1 “Put it on the train. Don't make bridge or road.”

Response: The commenter is referred to Section 2.2.3 for a discussion of alternatives, including use of the rail line, identified but not carried forward for detail analysis in this EA. Technical and logistical constraints associated with the rail system operation resulted in the determination that it would not meet the purpose and need for the project.

LETTER: 12 COMMENTER - ROBERT R. LUCERO, PRIVATE CITIZEN

Comment: 12-1 “First of all you just put in a new rail road that you can use to haul your matirials no why do you have to rape more of our land. Noise palution. Dust from haul road”

Response: Thank you for your comments. The commenter is referred to Section 2.2.3 for a discussion of alternatives, including use of the rail line, identified but not carried forward for detail analysis in this EA. Technical and logistical constraints associated with the rail system operation resulted in the determination that it would not meet the purpose and need for the project.

The commenter is referred to Sections 3.1 and 3.2 for discussion of potential air and noise impacts from the Proposed Action and No Action Alternatives.

Comment: 12-2 “Hasard to wild life”

Response: Thank you for your comment. Please refer to Section 3.12 for a more detailed discussion on wildlife resources.

Comment: 12-3 “Defacing- of the earth for selfish financial reasons”

Response: Thank you for your participation and response to the public notice. Concerns expressed by members of the public are one of the many factors considered by the BLM when making decisions. The BLM thanks all who took the time and effort to participate in the NEPA process and hopes they continue to provide input to further our efforts to manage important public resources.

Comment: 12-4 “Would you like 200.350 ton trucks through your yard-“

Response: Thank you for your comment. Please see Sections 3.1, 3.2, 3.3, 3.4, and 3.5 of this EA for analysis of potential effects of implementation of the Proposed Action and No Action Alternatives to air quality, noise, vibration, visual effects, and traffic impacts, respectively.

Comment: 12-5 “Well I was born hear in Hanova 57 years ago- sad to say I was part of those who raped the earth H worked a the Fiero Mine frome 1975-1981 all the way from the underground to the open pit so I also will have answer for my part. El Roberto Lucero”

Response: Your comment is noted.

**LETTER: 13 COMMENTER - HAROLD A. LOVE, P. E., ASSISTANT DISTRICT ENGINEER
ENGINEERING SUPPORT, NEW MEXICO DEPARTMENT OF TRANSPORTATION
(NMDOT) DISTRICT 1**

Comment: 13-1 “NMDOT has reviewed the scoping report for the subject project and offers the following comments:

Proposed crossing at NM 152 will need to be permitted by our office. Depending on the size and frequency of haul trucks, the crossing my require special enhancements to include special signing, traffic control devices and /or a concrete pavement section.

Please contact me as soon as possible so that we may begin the permit process. You may contact me with any questions/concerns regarding this project.”

Response: Thank you for your comment. We understand that Cobre is currently coordinating with New Mexico Department of Transportation to meet all design standards for construction of the proposed Haul Road overpass of SR 152. Final design plans and the required detour during construction will be submitted to NMDOT for review and approval.

LETTER: 14 COMMENTER - JAMES HOLLEN, PERMIT LEAD, PERMIT GR002RE, CONTINENTAL MINE SR. MINE RECLAMATION SPECIALIST/GEOLOGIST/ARCHAEOLOGIST MINING & MINERALS DIVISION NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPT.

Comment: 14-1 “The NM Mining and Minerals Division ("MMD") withholds making any formal comments on Freeport-McMoRan Cobre Mining Company’s ("Cobre") revised Mine Plan of Operations Amendment No. 5 ("MPO") and reserves the right to comment at a later date during review of the forthcoming Draft Environmental Assessment or after this information regarding certain proposed revisions to the existing Mine Plan of Operations are included within a revised Closeout Plan and Financial Assurance Estimate and submitted by Cobre to MMD for approval.”

Response: Thank you for your comment. Cobre will be coordinating with the New Mexico Mining and Minerals Division throughout the permitting process. We look forward to your continued participation in the NEPA process.

Comment: 14-2 “As currently proposed within the MPO, the Hanover Mine, connecting Haul Road, the expanded South Waste Rock Disposal Facility, Ancillary Facilities and Utility Corridor and the reclamation of these proposed facilities are either absent or inconsistent with the MMD approved Permit GR002RE Rev. 01-1, the existing Closeout Plan or Financial Assurance estimates. No surface disturbing activities relating to any of these proposed facilities can be initiated or approved until after MMD has approved a Closeout Plan and received acceptable Financial Assurance that includes these proposed facilities.”

Response: Thank you for your comment. Please see response to comment 14-1.

Comment: 14-3 “I wish to be included within any mailing lists to receive future information from the BLM regarding proposed additions to the Continental Mine; my contact information is included below:

James Hollen, Permit Lead, Permit GR002RE, Continental Mine
1220 S. St Francis Dr.
Santa Fe, NM 87505
505-476-3436
james.hollen@state.nm.us”

Response: Thank you for your participation and response to the public notice. The BLM thanks all who took the time and effort to participate in the NEPA process and hopes they continue to provide input to further our efforts to manage important public resources. Your name will be added to our mailing list for future correspondence regarding this project.

**LETTER: 15 COMMENTER - MATTHEW WUNDER, CHIEF, CONSERVATION SERVICES DIVISION,
STATE OF NEW MEXICO DEPARTMENT OF GAME & FISH**

Comment: 15-1 “In response to your letter dated 1 February 2013, the New Mexico Department of Game and Fish (Department) has reviewed the April 2012 proposed modifications to the Mine Plan of Operations (MPO) for the Cobre Mine. Freeport-McMoRan Cobre Mining Company (Cobre) proposes activities associated with future mining operations. Proposed new activities include: constructing the Hanover Mountain Mine, the North Overburden Stockpile, and the Connecting Haul Road; establishing a new utility corridor; and expanding the Southwest Waste Rock Disposal Facility. Ore from Hanover Mountain would be hauled to the Chino Mine to be processed at existing facilities. The Cobre Mine is located in Grant County approximately 12 miles northeast of Silver City. Total new disturbance would be approximately 311 acres, of which 272 are privately owned and 39 are managed by the U.S. Bureau of Land Management (BLM).”

Response: Thank you for your participation and response to the public notice.

Comment: 15-2 “Throughout the MPO, Cobre asserts that the State has approved all permits for the proposed future mining operations. It is accurate to state that the current New Mexico Mining Act standby status approval for Permit Number GR002RE included expansion of the permit area to encompass all proposed new facilities except the haul road. The Mining and Minerals Division (MMD) is currently processing Cobre's request for the renewal of standby status, the term of the initial standby period having expired in 2012. Cobre has not applied to MMD for a return to active mining. MMD has indicated in their February 27, 2013 letter to Cobre that there are outstanding issues that must be resolved before Permit GR002RE can be renewed. Among these is the failure of the revegetation Test Plot Program and consequent uncertainty over the availability of enough suitable cover material for reclamation. Renewing the standby permit, or resuming active mining, will require submitting an updated closeout plan and revised financial assurance, in addition to permitting of the haul road corridor.”

Response: Cobre will continue to coordinate with state agencies to meet all permit obligations. The Hanover Mountain Deposit, SWRDF, and North Overburden Stockpile are currently permitted under DP-1056 and under Cobre's NMMA permit GR002RE. In 2005, the modified NMMA boundary included the area for the proposed Haul Road; however, an alignment had not been selected at that time. The permits and closure cost estimates will be altered to include all facilities proposed in the MPO Amendment No. 5.

Comment: 15-3 “On page 2-12 in section 2.4 the MPO states that, under the terms of NM Environment Department Discharge Permit 181, an updated waste rock handling plan is required before mining can resume. Table 4, on page 1-9, shows that Discharge Permit 181, which includes the waste rock facilities, was scheduled to expire as of March 2012. Section 2.5, on page 2-12, refers to a new water diversion permit that is required from the Office of the State Engineer, prior to construction of the Hanover Mountain Mine. We recommend that the BLM confer with all three of the aforementioned state agencies to clarify state permit status to be considered during the Environmental Assessment (EA) process.”

Response: Cobre is responsible for coordination and scheduling of their state permits required to implement work that may be authorized by BLM following completion of our review of the proposed MPO in accordance with our obligations under NEPA. If activities ultimately authorized by these agencies differ materially from what is authorized by the BLM in accordance with our obligations, we will have to determine if additional NEPA review of a modified plan is required.

Comment: 15-8 “The MPO (page 8-3) states the haul road will be removed at the end of mine life but the crossing will remain. The BLM should evaluate whether the impacts of a permanent crossing structure might constitute unnecessary and undue degradation. We recommend that reclamation should include removal of the haul road crossing and restoration of natural stream geomorphology.”

Response: Current reclamation plans call for the bridge to remain in place upon closure. We, the BLM, will determine in our decision document, if leaving the bridge in place would constitute unnecessary and undue degradation of resources. If it is determined to constitute unnecessary and undue degradation, we will identify appropriate mitigation and monitoring measures to ensure that unnecessary and undue degradation does not occur.

Comment: 15-9 “Section 3.2.2.1, on page 3-2 describes hibernation use and a potential maternity colony of Townsend's big-eared bats (NM sensitive, Federal Species of Concern) in the historic Snowflake Mine, near the proposed haul road. Bat gates are being installed to protect this colony. The noise and vibration associated with the haul trucks is likely to displace the bats, whether or not there are bat gates.

Additional bat surveys are being conducted at other historic mines located within the haul road corridor. If possible, the haul road corridor should be realigned to avoid the Snowflake Mine, and any other historic mine where significant bat habitat is discovered by the surveys. If displacement from important habitat is unavoidable, it may be possible to provide compensatory mitigation.”

Response: Please refer to Section 3.13.2.2 for a detailed discussion.

Comment:15-10 “All sumps, ponds, tanks and other impoundments which will occur on-site during operations or after reclamation should be inventoried and evaluated for chemical or physical hazards to wildlife. Impoundments containing contaminants at potentially harmful levels should be covered or netted to exclude flying and terrestrial animals. Impoundments containing only clean stormwater and which are not covered or netted should be provided with ramps to allow escape of trapped wildlife. Above- ground tanks should also be covered, netted or provided with a means of escape. Standard barbed-wire fencing does not keep out wildlife. Department staff is available for consultation regarding netting or escape ramp options for any specific size and type of impoundment.”

Response: Please refer to Section 3.12 for a discussion of impacts to wildlife associated with the Proposed Action and the No Action Alternatives.

Comment: 15-11 “Fencing alignment and purpose of each fence should be specified. Fences must be at least eight feet high to exclude big game. To exclude smaller animals, wrap the fence at the bottom with smaller mesh material. Fences intended to mark boundaries or exclude livestock while allowing passage of wildlife should be constructed according to the Department’s Fencing Guideline, available online at wildlife.state.nm.us/conservation/habitat_handbook/index.htm. Department staff is available for consultation regarding fencing options for any specific location and purpose of fence.”

Response: The proposed MPO Amendment No. 5 identifies fence to be used without reference to specific types or whether it is suitable for wildlife exclusions or is wildlife friendly. Our analysis presented in the EA assumes that fencing will be four-strand barbed wire unless otherwise noted.

Comment: 15-12 “The most recent biological survey of the project area for special status species was apparently conducted in 1997. More recent surveys have been limited to bats in the historic mine closure areas. New biological surveys should be conducted for this EA, in locations proposed for new surface disturbance: namely, Hanover Mountain Mine, the North Overburden Stockpile, and the haul road corridor. For your information, we have enclosed a list of sensitive, threatened and endangered species that occur in Grant County. Included below are sources of additional information:

1. For Biota Information System of New Mexico (BISON-M) species accounts, searches, and county lists go to bison-m.org.
2. For the Department's Habitat Handbook Project guidelines go to wildlife.state.nm.us/conservation/habitat_handbook/index.htm.
3. For custom, site-specific database searches on plants and wildlife go to nhnm.unm.edu, then go to Data, Free On-Line Data, and follow the directions.

4. For state-listed plants contact the New Mexico State Forestry Division at (505) 476-3334) or nmrareplants.unm.edu/index.html.
5. For the most current listing of federally listed species always check the U.S. Fish and Wildlife Service at (505) 346-2525 or fws.gov/southwest/es/NewMexico/SBC.cfm.”

Response: A Baseline Biology Report was done which documents the results of past and recent surveys conducted in the area (Ecosphere 2014). For a more detailed discussion on vegetation, wildlife, and special status species, please refer to this report and to Sections 3.11, 3.12, and 3.13, as well as Appendix B.

Comment: 15-13 “The reclamation plan should specify the number, placement and general description of wildlife habitat features that will be constructed.”

Response: Detailed discussion regarding the number, placement, and general description of wildlife habitat features are not provided in the proposed MPO Amendment No. 5. The plan refers to monitoring procedures outlined in MMD permit number GR009RE for their Chino Facility.

Comment: 15-14 “The noxious weed plan should include periodic surveillance and timely reporting of weed infestations on the project area.”

Response: A noxious weed survey was conducted. Please refer to Sections 2.1.2.11 and 3.14.

Comment: 15-15 “Thank you for the opportunity to comment on this EA and MPO. If there are any questions, please contact Rachel Jankowitz, Mining Habitat Specialist at 505-476-8159 or rjankowitz@state.nm.us.”

Response: Thank you for your participation and response to the public notice.

Comment: 15-16 “New Mexico Department of Game and Fish attached the list of New Mexico Wildlife of Concern for Grant County”

Response: Thank you for providing this list. A detailed Biological Baseline Report was completed by Ecosphere (2014) and included an analysis of state listed species. This report is included in the administrative record for this project and is summarized in Section 3.13 of this draft EA.

LETTER: 16 COMMENTER - ROSALINA SEDELLOS, PRIVATE CITIZEN

Comment: 16-1 “Dust and noise is unacceptable.”

Response: Thank you for your comment. The commenter is referred to Sections 3.1 and 3.2 of this draft EA for a more detailed discussion on air and noise impacts.

Comment: 16-2 “Distraction of traffic, although unavoidable is not tolerable.”

Response: Traffic levels were evaluated for Fierro Road. Please refer to Section 3.5 for a more detailed discussion.

**LETTER: 17 COMMENTER - MORGAN R. NELSON, ENVIRONMENTAL IMPACT REVIEW
COORDINATOR, NEW MEXICO ENVIRONMENT DEPARTMENT**

Comment: 17-1 “Your letter regarding the above named project was received by the New Mexico Environment Department (NMED) and was sent to various bureaus for review and comment. Comments were provided from the Surface Water Quality Bureaus, and are as follows. Surface Water Quality Bureau The USEPA requires NPDES permit coverage for storm water discharges from construction projects (common plans of development) that will result in the disturbance (or re-disturbance) of one or more acres (as of March 10, 2003), including expansions, of total land area. The NPDES Storm Water permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during construction and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.) and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters. You should also be aware that EPA requires all “operators” (see Federal Register/Vol. 63, No. 128/Monday, July 6, 1998 pg 36509) obtain NPDES permit coverage for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications (probably the city of Lovington in this case), and the general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the storm water pollution plan and other permit conditions, and possibly other “operators” will require appropriate NPDES permit coverage for this project. If construction activity or disturbances were to take place in a river, including the river banks and wetlands a 404 dredge and fill permit issued by the US Army Corps of Engineers would be required. Additionally a state Water Quality Certification would be required under Section 401 for activities regulated under Section 404 of the Federal Clean Water Act by the U.S. Army Corps of Engineers (USACE). The NMED has issued conditional certification to use Nationwide Permits in ephemeral surface water (<http://www.nmenv.state.nm.us/swqb/WPS/NMEDSection401WQCEphemeralBlank etNWP2007.pdf>). A project-specific Section 401 Water Quality Certification is required for activities regulated under an

Individual Section 404 permit, or for discharges regulated by Nationwide Permits to intermittent and perennial surface water, or wetlands defined in 20.6.4.7 NMAC; and Outstanding National Resource Waters (ONRW) designated in 20.6.4.9 NMAC. I hope you find this information helpful.”

Response: Thank you for your comment. Cobre is responsible for obtaining necessary permits from state agencies, including the Surface Water Bureau of NMED. Similarly they will be responsible for the implementation of all applicable BMP's in accordance with an approved Storm Water Pollution Prevention Plan required under the USEPA NPDES program.

APPENDIX B

**Responses to
Public Comments
on the EA
and FONSI**

APPENDIX B. RESPONSES TO COMMENTS

The BLM Las Cruces District Office issued Cobre’s MPO Amendment No. 5 Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for public comment on December 19, 2014. The availability of the documents for review was posted on the BLM website; placed in three area newspapers, the Deming Headlight, the Silver City-Daily Press, and the Silver City Sun News; and, about 200 mailings were sent out to interested individuals, agencies, and non-governmental organizations (NGOs). The original comment period ended January 17, 2015. Based on comments received, the comment period was extended through January 31, 2015. The announcement of the extended comment period was posted on the BLM website and placed in the same three area newspapers. Additionally, copies of the documents were placed in the Bayard and Silver City public libraries for public review.

The BLM Las Cruces District Office received ten comment letters, including emails and comment forms, on Cobre’s MPO Amendment No. 5 EA and FONSI. BLM resource specialists reviewed the comments to determine if any new resource information was provided or if any additional impact analysis would be required before publishing the Decision Document. Several letters offered opinions either in favor or in opposition of the proposed action. Others expressed concerns regarding resource impacts that the BLM believes have been adequately covered in the EA. *Table B-1* provides a list of the commenters.

Table B-1. List of Commenters

Letter Number	Date	Name	Organization	Affiliation	Type
1	1/22/2015	Marjorie Fish		Private	Email
2	1/15/2015	James Lee		Private	Email
3	1/29/2015	Carol Martin		Private	Email
4	1/12/2015	Daren and Megan Albrecht		Private	Comment Form
5	1/16/2015	Village of Santa Clara		Private	Comment Form
6	1/12/2015	Kurt Vollbrecht	New Mexico Environment Department	Public	Letter
7	1/16/2015	Allyson Siwik	Gila Resources Information Project	NGO	Letter
8	1/31/2015	Allyson Siwik	Gila Resources Information Project	NGO	Letter
9	1/28/2015	J.E. Arguello		Private	Letter

BLM appreciates the time and effort individuals, agencies, and NGOs take to submit comments and concerns on the proposed project. Disclosure of impacts and opportunities for public review and comment are key elements of the NEPA process. BLM’s responses to each of the comments are provided below. The language has not been revised or edited from the original comments.

LETTER: 1 COMMENTER - MARJORIE FISH

Comment: 1 I am writing to oppose Cobre's plans to restart mining operations that would affect 36 acres of BLM land. The use of haul trucks and the construction of a 3.6 mile-long road from Hanover Mountain to Chino that will cross Fierro Road and Hanover Creek will create an environmental problem affecting air quality and an increase in traffic on Fierro Road. Residents in the area will be negatively affected during ingress and egress onto Fierro Road and at key intersections. Particulate matter exposure may also present health problems for residents adjacent to the mine and the road. For these reasons, I oppose the plan to restart mining operations at Cobre.

Thank you for extending the period for receiving comments.

Response: Thank you for your comment and participating in the process. As described in *Chapter 2* of this EA, mining operations will restart under the No Action and the Proposed Action scenarios. Resource impacts for each alternative are addressed in the EA. Please see *Section 3.1* for Air Quality and *Section 3.5* for Traffic.

LETTER: 2 COMMENTER - JAMES LEE

Comment: 2 Comment concerning Freeport-McMoRan Cobre Mining Company Plan of operations (MPO) Amendment No#5.

Comment:

This proposal is another attempt by F-MC to add to the un-necessary utilization of BLM (Public) land.

There is an existing railroad between Cobre and Chino that is capable of handling the material. It was utilized until this proposal. They then removed a short section of track rendering it useless but capable of repair in less than one day.

This haultruck road and associated mining operation will further degrade the land in the area of Fierro and Hanover, and use public lands without any attempt to ensure the recovery of these lands in the future.

This proposal will not increase the employment in the area, and all benefits of this operation will be to the shareholders and management of Freeport-McMoRan. It will block travel by local persons in the National Forest via Hanover Creek/Fierro Road north to the forest. This roadway is utilized for hunting and recreation extensively and has historic significance probably an RS-2477 roadway.

This is in addition to the 24 hour traffic of haultrucks through this peaceful valley.

I am calling on our elected representatives to please look into this issue and possible work within the system to block this obvious injustice in the making.

Signed electronically
James (Jim) Lee
Hanover, New Mexico

Response: Thank you for your comment and participation in the NEPA process. As described in *Section 2.2.3* of this EA, use of the railway is not a viable option and BLM determined it would not be analyzed in this EA. Please refer to the EA for specific resource concerns including Socioeconomic (*Section 3.6*) and Traffic (*Section 3.5*).

LETTER: 3 COMMENTER - CAROL MARTIN

Comment: 3 I know mining is important to the economy. My hope is that ALL ponds are lined. All environmental guidelines are followed. Train tracks are maintained to proper guidelines to prevent more deaths or chemical spills. Noise levels are kept within promised decibel levels. Fresh drinking water is provided to Hurley community. Salt Cedar and Tree of Life and Tumbleweeds are removed. The reclamation for this area is addressed ahead of time instead of being an afterthought.

Response: Thank you for your comment. The Proposed Action is described in *Section 2.1.2* of the EA. The railway was determined to not be a viable option and will not be used for this project (*Section 2.2.3*). Reclamation and closure activities are described in *Sections 2.2.2.11 and 2.1.2.12*.

LETTER: 4 COMMENTER - DAREN AND MEGAN ALBRECHT

Comment: 4 We are a local ranching family that understands the importance of utilizing both public land and private land in a responsible manner. We have private land, a BLM grazing lease, and state land leases along the Mimbres River. We also live just down gradient of the White Water Creek and Lampbright Draw adjacent to the San Vicente. After reviewing the Environmental Assessment Cobre Mine Plan of Operations Amendment No. 5 dated December 2014, and comparing Alternative #1 vs. Alternative #2 it appears to us that the Proposed Action or Alternative #2 would be the best option for the environment as well as the most practical use of the land. We would encourage the district manager/BLM to approve this project as proposed.

Response: Thank you for your comment and participation in the process.

LETTER: 5 COMMENTER - VILLAGE OF SANTA CLARA

Comment: 5 The village is in favor of this Haul Rd due the fact that this will reduce traffic on Hwy152. When Cobra mine was open as a separate mine the traffic on Hwy152 was very busy. If A Haul Rd was put in the traffic would stay the same except for a few Cobra employees.

Response: Thank you for your comment and participation in the process.

LETTER: 6 COMMENTER - KURT VOLLBRECHT, PROGRAM MANAGER, MINING ENVIRONMENTAL COMPLIANCE SECTION GROUND WATER QUALITY BUREAU

Comment: 6-1 The New Mexico Environment Department (NMED) received an invitation to review Freeport-McMoRan Cobre Mining Company's (Cobre) Mine Plan of Operations (MPO) Environmental Assessment (EA) for the Continental Mine Facility on December 23, 2014. The MPO EA addresses impacts to Bureau of Land Management (BLM) land as part of the proposed mining operation. The proposed modification to the MPO includes mining Hanover Mountain, development of the North Overburden Stockpile, construction of an approximately 3.6-mile long Haul Road to transport ore from Cobre to the Chino Mine facility for processing, expansion of the South Waste Rock Disposal Facility (SWRDF), authorization of the SWRDF Dam No. 2, and relocation of a utility corridor.

Response: Thank you for your participation in the NEPA process.

Comment: 6-2 General Comments

The following are general comments pertaining to the MPO EA.

1. As of December 1, 2013, the Continental Mine is regulated under Section 20.6.7 NMAC (<http://www.nmenv.state.nm.us/gwb/documents/2067NMACfinal.pdf>), otherwise known as the Copper Rule, in addition to Section 20.6.2 NMAC. It is important to point this out because the regulations governing the Continental Mine have changed since the MPO Amendment No. 5 was submitted in December of 2012. Any current and/or proposed mining activities must be done in accordance with the Copper Rule and regulated facilities must be designated and operated to ensure compliance with the Water Quality Act.

Response: The BLM understands the Copper Rule is a state regulation that will be overseen by NMED.

Comment: 6-3 2. In Section 3.9.2.2, Cobre states that any potentially acid generating materials exposed during construction that will impact surface water will be removed or suitable cover material will be installed. NMED has informed Cobre that the proposed Haul Road may be considered a non-discharging unit, and therefore, would

be conditionally exempt from 20.6.7 NMAC regulations. This is based on NMED's understanding that the Haul Road will not be constructed with acid generating material or material that has the potential to generate contaminated leachate. Cobre states in Permit No. GR002RE-Revision 14-1, Errata and Revision to Permit GR002RE-Permit & Design Limit Boundaries that if acid generating material is encountered during construction of the Haul Road, it will be encapsulated with three feet of non-acid generating material. NMED will require the same treatment for any material used in the haul road construction that has the potential to generate contaminated leachate.

Response: The BLM understands NMED will oversee compliance with the CCP approved for the mine.

Comment: 6-4 3. In Section 3.19.4, Cobre states that the "majority of the No Action Alternative and much of the Proposed Action Alternative occur within the groundwater capture zone of the Continental Mine." The aforementioned Copper Rule has varying operational and closure requirements depending on the location of facilities relative to an "open pit surface drainage area" (defined at 20.6.7.7B(42) NMAC) that includes not only the ground water capture zone (defined at 20.6.7.7B(5) NMAC), but superimposed on the area of open pit hydrologic containment a surface water capture zone where surface water runoff drains into the open pit by gravity. A determination of the open pit surface drainage area has not yet been made by NMED pursuant to the Copper Rule.

Response: The BLM understands the Copper Rule is a state regulation that will be overseen by NMED.

Comment: 6-5 4. In Section 3.19.4, ground water abatement is discussed. The ground water abatement process is intended to address current discharges from the Continental Mine as well as ground water quality impacts from historical mining activities. NMED is working with Cobre to finalize the site-wide ground water characterization report, which is the first stage of the ground water abatement process.

Response: Thank you for your comment.

LETTER: 7 COMMENTER - ALLYSON SIWIK, EXECUTIVE DIRECTOR, GILA RESOURCES PROJECT

Comment: 7-1 On behalf of the Gila Resources Information Project (GRIP), I am submitting comments on the Cobre Mine Plan of Operations (MPO) Amendment No. 5 Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).

Response: Thank you for your participation in the NEPA process.

Comment: 7-2 1. We are very concerned that the Bureau of Land Management (BLM) did not facilitate public participation in review of this action. GRIP received a letter from BLM electronically of the availability of the EA late December 19, 2014. This was a Friday just before the Christmas holiday. People weren't getting back to work until the first week of January. The letter to interested parties did not indicate that the FONSI was also available for review, did not provide the URL's for the documents, and did not mention where on the BLM site the documents were available for review (the Las Cruces District Office page). If one used the search function on the blm.gov site, the FONSI does not show up. The general public would not have known where to go to get access to these documents.

Additionally, the majority of people who live adjacent to the mine site are elderly. They do not have access to computers or the Internet. BLM was responsive to GRIP's request and did put hard copies of the document in the Silver City Public Library and Bayard Public Library. However, they were not available to the public until a few days ago and moreover, BLM did not send out a notice to interested parties notifying them of the availability of these documents at the library. We have received one complaint from a Hanover resident that they did not receive a letter from BLM notifying them of the availability of the EA. Similarly, a notice was not posted at the Hanover Post Office when GRIP visited on 1/15/15. Taken together, all of these lapses in basic outreach to interested parties made it very difficult to review and comment on the EA and FONSI by today's comment deadline. To be fair to the public and residents who will be impacted by Cobre's MPO amendment and to provide adequate time for public comment, BLM should extend the comment deadline for an additional 30 days.

Response: The BLM Las Cruces District Office issued Cobre's MPO Amendment No. 5 Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) for public comment on December 19, 2014. The availability of the documents for review was posted on the BLM website; placed in three area newspapers, the Deming Headlight, the Silver City-Daily Press, and the Silver City Sun News; and, about 200 mailings were sent out to interested individuals, agencies, and non-governmental organizations (NGOs). The original comment period ended January 17, 2015. Based on comments received, the comment period was extended through January 31, 2015. The announcement of the extended comment period was posted on the BLM website and placed in the same three area newspapers. Additionally, copies of the documents were placed in the Bayard and Silver City public libraries for public review.

Comment: 7-3 2. Air Quality Impacts Not Fully Addressed - Air quality modeling conducted for the EA predicts concentrations of particulate matter (dust) less than or equal to 80% of federal health-based National Ambient Air Quality Standards. Given uncertainties in

modeling, local topography, and localized weather conditions, GRIP is concerned about the potential for exposures above the particulate matter air quality standards. Cobre has indicated that water will be used to suppress dust. GRIP believes that the installation of local air quality monitors would be appropriate to ensure the effectiveness of dust suppression efforts and to demonstrate to residents living adjacent to the mine and haul road are not exposed to high concentrations of particulate matter. Existing air monitors are too distant to adequately measure PM exposure of residents living close to the mine site and haul road.

Response: Please see responses to more detailed comments on air quality provided by GRIP (Letter 8).

Comment: 7-4 3. Traffic The EA predicts an increase in traffic on Fierro Road during the construction phase and a smaller increase in traffic once the haul road is complete. The increased traffic volumes on Fierro Road during construction are not reported. There is no discussion in the EA of the necessary measures that will be taken by Cobre to address this increase in traffic during haul road construction. Cobre needs to ensure the safety of residents during ingress/egress from residences onto Fierro Road and at key intersections.

Response: Under the No Action Alternative, all construction traffic would use Fierro Road as it is the only access route to Cobre's Continental Mine. Cobre estimates that the number of employees and contractors required would be over 1,000 for construction of the SX/EW plant and approximately 1,200 contract laborers to rehabilitate the mill. These employees would have a contractor parking lot near the Chino Mine on Hwy 152 and would be transported to Cobre via buses. Approximately 200 construction management, supervisors, suppliers and vendors per day would use Fierro Road in personal vehicles and delivery trucks to access the site. The duration for construction would be approximately 24 months.

Under the Proposed Action, construction traffic along Fierro Road would consist of a blasting crew of 4, a culvert crew of 8, and a structure crew of 15 for duration of 1 to 3.5 months. Construction of the proposed Haul Road would be from south to north, so construction traffic would utilize the roadway as it is being built, limiting traffic volumes on Fierro Road.

Table B-1 summarizes the anticipated traffic use on Fierro Road under the Proposed Action and No Action alternatives during construction.

Table B-1. Summary of Construction Traffic for the Proposed Action and No Action Alternatives (Albrecht 2015).

CHR Manpower on Fierro Rd. for the Proposed Action Plan						2/13/2015
# of Employees	Construction Activity	Duration	Shifts per day	Days per week	Access Point	Trucks/Equipment
4	Blasting Crew	1 months	1	7	Fierro Road	2 Work Trucks
8	Culvert Crew	1 month	1	7	Fierro Road	6 personal vehicles 2 work trucks & Culvert deliveries
15	Structure Crew	3.5 months	1	7	Fierro Road	Personal Vehicles Multiple deliveries and Concrete trucks

Note: Construction will begin from the south to the north so the majority of all vehicles will utilize the haul road from the Chino property or HWY 152 for the majority of the construction process which would reduce traffic on Fierro Rd. significantly.

CHR Manpower on Fierro Rd. for the No Action Plan						2/13/2015
# of Employees	Construction Activity	Duration	Shifts per day	Days per week	Access Point	Trucks/Equipment
1,000	SX/EW & facilities	24 months	1	7	Fierro Road	Personal vehicles, buses, vendors, and delivery trucks
1,200	Mill Renovation	24 months	1	7	Fierro Road	Personal vehicles, buses, vendors, and delivery trucks

Note: Accessing Fierro Rd. from Hwy 152 would be the only access for this construction project.

Comment: 7-5 The use of the haul road for Freeport traffic other than haul trucks could be very dangerous. We question whether the assumption that Freeport employees using vehicles other than haul trucks would not use the Fierro Road; therefore the traffic volumes on Fierro Road for the proposed alternative are underestimated in our opinion.

Response: As described in the EA, mine-related traffic will use the Proposed Haul Road which is standard practice.

Comment: 7-6 We are very concerned about the poor condition of Fierro Road and the impacts to it during construction, continued magnetite hauling, and use by Freeport staff. There have been on-going complaints about the impacts Freeport trucks have caused to local roadways and the fact that local residents (who are taxpayers too) are having to bear the consequences of Freeport's mining operations on public roadways. This should be addressed in the EA and is not.

Response: The Road Manager for Grant County, Earl Moore, was contacted with regards to concerns about the condition of Fierro Road and the potential increased cost of road maintenance. He noted that Fierro Road is a county road that is maintained by the Roads Department of Grant County. When the Continental Mine (Cobre) was previously in operation, there may have been some additional road maintenance required though no specific concerns were identified (Pers. Com., Earl Moore, Road Manager, Grant County to Kimberly Otero, WestLand Resources, Feb, 11, 2015). Fierro Road has been chip-sealed within the last two years and no complaints from local residents have been filed with the Grant County Roads Department regarding the condition of the road or traffic volumes on the road (Pers. Com., Earl Moore,

Road Manager, Grant County to Kimberly Otero, WestLand Resources, February 11, 2015). There would be less traffic on Fierro Road under the Proposed Action Alternative as a majority of the mine traffic would access Cobre via the Proposed Haul Road (See *Section 3.5* of the EA).

Comment: 7-7 4. New Groundwater Quality Rules for Copper Mining - We are unclear if this EA was prepared consistent with the new Copper Rule. The new Closure/Closeout Plan for Cobre was just made publicly available on the Mining and Minerals Division website after January 2, 2015. We have not seen any drafts of the new discharge permit for Cobre from NMED. There may be changes needed in the EA relative to new requirements under the Copper Rule.

Response: Please refer to the response to Comment 6-2 regarding Copper Rules. The EA was prepared in compliance with NEPA and BLM's 3809 regulations. Any changes to the MPO within BLM's scope of review must be submitted to the BLM for evaluation under our 3809 regulations.

Comment: 7-8 In conclusion, GRIP is concerned that the public health and quality of life of those living in proximity to the haul road will be impacted for at least ten years from traffic, noise, dust, vibration, and lights on 24/7 basis. In particular, we believe that air quality and traffic impacts could be significant and that Cobre should be required to monitor and mitigate those impacts as necessary.

Thank you for consideration of our comments.

Sincerely,

Allyson Siwik

Executive Director

Response: Thank you for your comment. The BLM feels that impacts to the environment resulting from construction and operation of the proposed Haul Road have been adequately addressed in the EA (*Chapter 3*) and that these impacts are not anticipated to be significant.

LETTER: 8 COMMENTER - ALLYSON SIWIK, EXECUTIVE DIRECTOR, GILA RESOURCES PROJECT

Comment: 8-1 On behalf of Gila Resources Information Project (GRIP), I am submitting additional comments and questions on the Cobre Mine Plan of Operations (MPO) Amendment No. 5 Environmental Assessment (EA) and Finding of No Significant Impacts (FONSI). We appreciate additional time to submit comments to you on this proposed project.

Response: Thank you for your comment and your participation in the NEPA process.

Comment: 8-2 Air Quality Impacts

The air quality analysis did not conduct on-site monitoring of PM₁₀ and PM_{2.5} concentrations to establish background concentrations. The Chino-Cobre mining complex generates considerable amounts of dust that impair visibility and impact community health. Because there is no existing air quality monitoring network in the vicinity of mining operations and within the adjacent communities of Hanover, Fierro, and Bayard, it is unknown if additional fugitive dust emissions from the Cobre proposed action will contribute to existing elevated levels of PM in the mine area and impact the health of local residents. The attached photos demonstrate that high dust concentrations already impact this area.

Response: Within the vicinity of Cobre, the State of New Mexico conducts on-site monitoring of the PM₁₀ concentration just west of the Chino Mines Company complex and the PM_{2.5} concentration in Silver City. The New Mexico Air Quality Bureau has established these PM_{2.5} and PM₁₀ monitoring sites to provide background particulate matter concentrations for Grant County. Current operations at the Cobre Mining Company are subject to the New Mexico Air Quality Control Act and its associated regulations, and holds the necessary permits for operation. The State of New Mexico monitors mine operations for compliance with these permits. The modeling reports prepared for Cobre for this project (Ryan 2104a and 2014b) demonstrate that proposed operations will not cause or contribute to a violate any federal or state ambient air quality standards. This information is summarized in *Section 3.1* of the EA. The photos provided depict areas near Chino Mine. While not within the scope of analysis for this EA, operations at Chino are addressed under cumulative effects (*Section 3.19*).

Comment: 8-3 Modeled impacts of the no action alternative and proposed action on ambient concentrations of PM₁₀ relative to the PM₁₀ 24-hour National Ambient Air Quality Standard (NAAQS) are not reported in the tables on pages 43 and 45 of the EA.

Response: The air modeling reports for the No Action and Proposed Action alternatives provide detailed information on the methods and results of modeling. In *Section 7* of each of the reports, Ryan (2014 a and b) notes that Grant County facility air emissions must comply with the standards set by the "Prevention of Significant Deterioration" (PSD) standards for PM₁₀. The PSD standards are identified for three categories depending on the location. Lands adjacent to Cobre are Class 1 (includes national parks and wilderness areas) or Class 2 (areas intended to accommodate "moderate" growth); therefore, Cobre facility compliance with standards for Class 1 and Class 2 areas are evaluated. These PSD standards are more stringent than NAAQS or NMAAQs. The results of the model for PM₁₀ compared to PSD standards for PSD Class 1 and Class 2 areas are provided in the following tables:

No Action Alternative (Ryan 2014a). Class I.

Table 7-8. Maximum AERMOD predicted PSD Class I area PM₁₀ increment consuming air concentrations that result from Cobre facility PSD increment consuming PM₁₀ source emissions.

Averaging Time	Highest Predicted PM ₁₀ Concentration (µg/m ³)	PSD Class I PM ₁₀ Standards (µg/m ³)	% of PSD
24-hour	0.18	8	2%
Annual	0.012	4	1%

No Action Alternative (Ryan 2014b). Class II.

Table 7-9. Maximum AERMOD predicted PSD Class II area PM₁₀ increment consuming air concentrations that result from Cobre facility PSD increment consuming PM₁₀ source emissions.

Averaging Time	Highest Predicted PM ₁₀ Concentration (µg/m ³)	PSD Class II PM ₁₀ Standards (µg/m ³)	% of PSD
24-hour	29.6	30	99%
Annual	6.9	17	41%

Proposed Action Alternative (Ryan 2014b). Class I.

Table 7-8. Maximum AERMOD predicted PSD Class I area PM₁₀ increment consuming air concentrations that result from Cobre facility PSD increment consuming PM₁₀ source emissions.

Averaging Time	Highest Predicted PM ₁₀ Concentration (µg/m ³)	PSD Class I PM ₁₀ Standards (µg/m ³)	% of PSD
24-hour	0.27	8	3%
Annual	0.022	4	1%

Proposed Action Alternative (Ryan 2014b). Class II.

Table 7-9. Maximum AERMOD predicted PSD Class II area PM₁₀ increment consuming air concentrations that result from Cobre facility PSD increment consuming PM₁₀ source emissions.

Averaging Time	Highest Predicted PM ₁₀ Concentration (µg/m ³)	PSD Class II PM ₁₀ Standards (µg/m ³)	% of PSD
24-hour	29.7	30	99%
Annual	10.0	17	59%

Comment: 8-4 Modeled impacts of the no action alternative and proposed action on ambient concentrations of PM_{2.5} relative to the PM_{2.5} NAAQS presented in the tables on pages 43 and 45 of the EA do not distinguish between the 24-hour and annual NAAQS.

Response: The information is provided in the Ambient Air Quality Reports (Ryan 2104a and 2014 b). The PM_{2.5} potential 24-hour and annual emissions compared to NAAQS for the No Action and Proposed Action alternatives are provided below:

No Action Alternative (Ryan 2014a)

Table 7-10. Maximum total predicted PM_{2.5} concentrations resulting from Cobre facility sources potential emissions added to New Mexico designed PM_{2.5} background.

Averaging Time	Predicted PM _{2.5} Concentration (µg/m ³)	Background PM _{2.5} (µg/m ³)	Total PM _{2.5} Concentration (µg/m ³)	NAAQS PM _{2.5} Standard (µg/m ³)	% of PM _{2.5} NAAQS (µg/m ³)
24-hour	13.5	10.1	23.6	35	67%
annual	2.9	5.1	8.0	12	67%

Proposed Action Alternative (Ryan 2014b)

Table 7-10. Maximum total predicted PM_{2.5} concentrations resulting from Cobre facility sources potential emissions added to New Mexico designed PM_{2.5} background.

Averaging Time	Predicted PM _{2.5} Concentration (µg/m ³)	Background PM _{2.5} (µg/m ³)	Total PM _{2.5} Concentration (µg/m ³)	NAAQS PM _{2.5} Standard (µg/m ³)	% of PM _{2.5} NAAQS (µg/m ³)
24-hour	16.6	10.1	26.7	35	76%
annual	3.8	5.1	8.9	12	74%

Comment: 8-5 It is not evident from the EA if the AERMAP pre-processor was used to model impacts of the no action alternative and proposed action for elevated terrain. The Cobre Mine area is located in complex terrain with the haul road elevated above residences. The discussion of modeling methodology does not indicate if this was accounted for.

Response: Cobre Mining Company conducted air quality modeling using AERMAP, a model that takes into account complex terrain, land cover, local meteorological data, and background concentrations. Land cover and terrain are covered in *Section 5.3* and *Section 6*, respectively, of the Ambient Air Quality Reports completed by Ryan for the No Action and Proposed Action alternatives (2014a and 2014b).

Comment: 8-6 Precipitation and soil moisture assumptions are critical elements of air dispersion modeling of fugitive dust emissions from unpaved roads. What are the impacts of long-term drought on dust emissions for the haul road? Also, do the predicted ambient concentrations of PM₁₀ and PM_{2.5} for the proposed action include the impacts of dust suppression? The EA mentions that watering will be used, but there is no discussion of the impacts of watering on fugitive emissions.

Response: The Ambient Air Quality Reports completed for the No Action and Proposed Action alternatives (Ryan 2014a and 2014b) used accepted values for unpaved road dust emissions; however, this did not include reduced emissions due to precipitation. The predicted ambient concentrations of PM₁₀ and PM_{2.5} did incorporate a reduction in PM₁₀ and PM_{2.5} dust emissions from the use of dust suppression as approved by NMED AQB.

Comment: 8-7 Air quality modeling conducted for the EA predicts concentrations of PM_{2.5} less than or equal to 80% of federal health-based National Ambient Air Quality Standards. Given uncertainties in modeling, complex terrain, localized weather conditions, and possible elevated background concentrations of dust due to existing mining and materials handling at the Chino-Cobre complex, GRIP is concerned about the potential for exposures above the particulate matter air quality standards. GRIP believes that the installation of local air quality monitors would be appropriate to ensure the effectiveness of dust suppression efforts and to demonstrate that residents living adjacent to the mine and haul road are not exposed to high concentrations of particulate matter. Existing air quality monitors are too distant (12 miles away) to adequately measure PM exposure of residents living close to the mine site and haul road.

Response: Surface meteorological data used in the AERMOD modeling was obtained from the Hurley station, located 12 miles south of Cobre, and the Silver City Station, located 12 miles southwest of Cobre. The evaluation conducted by Ryan (2014a, 2014b) for the suitability of using this data determined that the Hurley data offers a representative meteorological data set for the Cobre facility area. The State of New Mexico AQB has the responsibility for monitoring air quality throughout the state and ensuring that facility operations do not exceed NMAAQs, NAAQS, or PSD standards. Establishing and maintaining an air quality monitoring station will not be a requirement of Cobre's MPO for Cobre's Continental Mine. BLM will defer to the state's expertise to ensure air quality permit conditions are met.

Comment: 8-8 In conclusion, GRIP reiterates its concern that the public health and quality of life of those living in proximity to the haul road will be impacted for at least ten years from traffic, noise, dust, vibration, and lights on a 24/7 basis. In particular, we believe that air quality impacts could be significant for residents of Fierro and Hanover. Cobre should be required to monitor PM₁₀ and PM_{2.5} concentrations and mitigate air quality impacts as necessary.

Thank you for consideration of our comments.

Sincerely,

Allyson Siwik

Executive Director

Response: Thank you for your comment. As noted above, air quality impacts associated with the No Action and Proposed Action alternatives have been adequately addressed in *Section 3.1* of the EA.

LETTER: 9 COMMENTER - J.E. ARGUELLO

Comment: 9-1 Comment form dated 1/28/2015:

Additional Information To Prior Submitted materials ON January 16, 2015. This 6 page comments updated submission will replace the Prior Submitted comments. Except for the prior submitted Photos and Information.

Attached Letter:

Local citizens, who live in close proximity to Chino Mines, have major concerns about the existing plan of mining operation:

1.A. The haulage truck traffic on the proposed 3.6 mile haul road will greatly increase pollution of noise, dust, and diesel smoke, which will affect the health and well-being of local residents.

Response: The EA addresses resource impacts associated with the proposed Haul Road: Air (*Section 3.1*) and Noise (*Section 3.2*).

Comment: 9-2 1 B. Present Chino operations produce a toxic cloud of diesel smoke and dust that can be seen every morning hanging over the mine and concentrator during low wind conditions. This pollution settles over the town of Bayard and extends southward (see 6 attached photos).

Response: The scope of this analysis as described in *Section 1.6* of the EA includes activities on BLM administered land and connected actions on privately -owned lands including the proposed Haul Road, two parcels on BLM administered land at Hanover Mountain, the North Overburden Stockpile, expansion of the SWRDF, authorization of SWRDF Dam 2, and the upgrade and relocation of the utility corridor. The photos provided depict areas near the town and Bayard and the Chino operations. While Chino operations are not part of the scope of this EA, in accordance with NEPA, impacts of Chino were considered in the cumulative effects analysis (*Section 3.19*).

Comment: 9-3 2.A. The act of transporting Cobre's Hanover Mountain's 131 acres and North Overburdened Stockpiles to the Chino mine will produce even higher and more widespread leach piles, which are already causing harm to surrounding property values. The alarming massive growth and height of these piles, especially since Freeport-McMoRan assumed ownership, are not only producing an eyesore, but are obstructing the view of the much beloved Kneeling Nun and the adjacent mountain. Many property owners purchased land and built their homes specifically to overlook their spiritual icon (See attached photo dated 4/15/2014).

Response: Refer to Comment 9-2. Chino Mine will continue to operate under the existing approved Plan of Operations, which specifies the maximum height of the stockpiles.

Comment: 9-4 2 B. This type of massive stockpiles, especially when soaked with leach water, has a history of sliding down, causing major spills and pollution (See U.S. Copper Porphyry Mines Report July 2012). Similar examples include:

1. A previous Cobre Mine Dam spilled into Hanover Creek that resulted in a massive cleanup.
2. Phelps Dodge Tyrone's # 3 Tailings Dam in 1980 spilled 2.6 million cubic yards of tailings into the Mangus Valley.
3. Bingham Canyon Mine landslide on April 10, 2013 with 165 million tons that slid into the pit and piled up 300 feet deep, the largest landslide in North American mining history.
4. Imperial Metals - Mount Polley mine disaster in BC, Canada August 4, 2014 caused environmental disaster when 25 million cubic meters of chemically toxic and heavy metal laden tailings and water slid into Polley Lake, down Hazeltine Creek, into Quesnel Lake, formerly the cleanest deep water lake in the world, and then into the Quesnel River and Cariboo Creek.

Response: The mine will be built under the No Action and Proposed Action alternatives. As described in *Chapter 2.1*, the No Action Alternative would require construction of new leach facilities and expansion of the Cobre tailings impoundment. As described in *Chapter 2.2*, the Proposed Action Alternative would use existing facilities at the Chino Mine and would not expand the footprint of those permitted facilities. The SWRDF expansion within the scope of this EA is relatively small in extent totaling approximately 6.3 acres.

Comment: 9-5 3. A. According to a Silver City Daily Press release in mid-2014, approximately 43 loads of sulfuric acid were being delivered to the mine on a daily basis:

$$\begin{aligned} &43 \text{ loads daily} \times 30 \text{ days} = 1290 \text{ loads monthly} \\ &1290 \text{ loads monthly} \times 12 \text{ mo} = 15,480 \text{ loads yearly} \\ &15,480 \text{ loads yearly} \times 3,000 \text{ gallons per load} = 46,440,000 \text{ gallons per yr.} \end{aligned}$$

This presents an unsafe hazard to the entire community on the two main roads traveling through the towns to the mine. Truck congestion alongside smaller local traffic has increased greatly, which poses a higher accident risk to the citizenry and repair to the roads and bridges has not kept up with the extra wear and tear on surface roads. Small sulfuric acid spills have already occurred on the Silver City area roads. As the risk of accident and road failure increase, so does the potential for air and ground water pollution.

Response: Under the Proposed Action Alternative, there would be no ore processing occurring at Cobre Mine; therefore, there would be no transport of sulfuric acid along local roads.

Comment: 9-6 B. Acidic mist is likely being carried by wind from the mine's south leach dumps to the nearby Bayard town site. A recent newspaper report cited an incident when workers were overcome by fumes on one of these dumps; they had to be evacuated and received medical care.

Response: See response to Comment 9-2.

Comment: 9-7 C. The leach fields are not contained by rubber liners. With millions of gallons of sulfuric acid added to those leach fields, the resulting disintegration of the bedrock base will eventually allow the acid solution to migrate to the fresh ground water springs under the mine. Some of this spring ground water currently has to be pumped out daily from the bottom of the Chino mine pit to keep the mine from flooding. Add to this the enormous amount of sulfuric acid being introduced into the Chino leach fields, the acid solution and heavy metals can further migrate into hundreds of miles of underground adjacent mine tunnels surrounding the Chino Mine.

Response: See response to Comment 9-2.

Comment: 9-8 D. Two of these problem areas are the Ground Hog Mine and the Oswaldo 2. Both these mine shafts, next to the Chino Mine, have needed spring water to be pumped out regularly. The seepage into the bottom of the Chino Mine pit is part of this natural groundwater spring system that connects to the local mine tunnels. The Ground Hog Mine has about 30 miles of train rail drifts and about 50 more miles of other tunnels. ASARCO Mine information indicates that the Ground Hog 1600 Level Tunnel was mining under the Chino Mine Pit. Asarco stopped mining this material when Chino asked for more royalties.

The Oswaldo # 2 Mine connects underground to the Oswaldo 1, The Princess Mine and also the Hanover Mine. Fresh clean springwater used to run along the sides of track tunnels in all these mines, which had to be dewatered to keep the mines operating free of flooding.

This system presents a huge problem that exists in that polluting the underground spring system will contaminate the whole county and elsewhere.

Response: See response to Comment 9-2.

Comment: 9-9 E. Some questions beg to be answered and need to be answered about another leach field in the Chino Mine, The Lampbright leach fields. How many gallons of sulfuric leach water solution being applied to the Lampbright leach fields are not being recovered back into the system loop and where are they going? Evaporation accounts for some losses, but not the major amount of loss. To where is this acidic solution migrating? How much more will the addition of the proposed Cobre Mine leach material affect our ground water through loss of more sulfuric acid and heavy metal solution? How many more millions of sulfuric acid will be added to the leach fields if all the leach materials is transported from Cobre to Chino?

Response: See response to Comment 9-2.

Comment: 9-10 What also needs to be considered; is that Ground Faults exist on Grant County's mining District on the Ground Hog Mine. Previously owned and mined by ASARCO Mining Company, now part of Chino Mines.

Miners on the Ground Hog's 1600 level encountered a massive ground fault. It runs west to east, 1600 Ft. underground. Approximately, right under the Vanadium Posts Office and goes East under the Chino Mines south leach dumps. They miners could not mine through the fault, because it produced 180-degree water and steam, at great pressure, in combination with clean gravel, which shot out of drill holes. Mining was ceased on that drift; because the fault posed a grave danger, it was broken through and would have allowed the mine drift to be flooded. With great effort, the miners were able to quick-cement valves on the drill holes to stop the flooding.

Records show that several faults exist throughout the mining area. The very possibility of contaminating our ground water, with copper leaching solutions through ground faults and the many springs under the mine leaching process, exists. Protecting our Ground water resources is very essential for ensuring that the future wellbeing of our children and communities is preserved. Responsible Mining is essential to keep our drinking ground water safe.

Response: See response to Comment 9-2.

Comment: 9-11 Also, the fact that on most mornings, a diesel smoke and dust cloud hangs over the mine, extending to Bayard and towards Hurley, calls for the necessity of installing pollution monitors along this corridor. The north town site of Bayard, just below the Chino Mines south leaching dumps will also need to have noise, dust and smoke monitors to protect the Fierro and Hanover resident's health. The extra activity on this haulage road will also produce more pollution along the Hanover Creek corridor, including Vanadium, Bayard and south towards Hurley. Pollution monitors are essential along all of the Hanover Creek corridor, to protect all the residents health.

Response: Air quality impacts associated with traffic on the Proposed Haul Road are considered in the EA (*Section 3.1*) and in the Ambient Air Quality Reports prepared for Cobre for the No Action and Proposed Action Alternatives (Ryan 2014 a and 2014b).

Comment: 9-12 MINING OUR NATURAL RESOURCES IS ESSENTIAL. MINING WHILE PROTECTING LOCAL COMMUNITIES AND KEEPING OUR GROUNDWATER CLEAN AND SAFE FOR FUTURE GENERATIONS IS ESSENTIAL AND SHOULD BE OUR FIRST PRIORITY.

THE HEALTH AND WELFARE OF OUR CHILDREN AND GRANDCHILDREN WHO WILL STILL BE HERE AFTER THE MINES ARE CLOSED ARE DEPENDENT ON ALL OF US WORKING TOGETHER TO SAFEGUARD A CLEAN ENVIRONMENT AND MOST IMPORTANTLY OUR MOST PRECIOUS, GOD GIVEN NATURAL RESOURCE SAFE CLEAN DRINKING WATER

Response: Thank you for your comment.

APPENDIX C
Biological
Tables

APPENDIX C1

**Project-Specific
Special Status
Species List for
Amended Mine
Plan of Operations
Expansion Project,
Grant County,
New Mexico
(Table B-2a)**

Table B-2a. Project-Specific Special Status Species List for Amended Mine Plan of Operations Expansion Project, Grant County, New Mexico.

SPECIES	COMMON NAME	Federal Status ¹	BLM Status ¹	State Status ¹	Critical Habitat/ Recovery Unit in Project Area? ²	Typical Habitats ³	Expected Potential for Occurrence						
							Project Area Habitat Overview	Project Area	Study Area ⁴				
									Hanover Mountain and North Overburden Stockpile	Haul Road	Utilities Corridor, Bullfrog Pipeline, Switch	South Waste Rock Disposal Facility Expansion Area and Dam 2	Ancillary Facilities
MOLLUSCS													
<i>Pyrgulopsis gilae</i>	Gila Springsnail	--	--	T	No/No	Occupies cool to warm water (14-27 degrees C) spring habitats ranging from highly degraded to relatively undisturbed. Known in Grant County from a series of springs along the East fork, Middle fork, and mainstem of the Gila River in the Gila National Forest. May co-occur with <i>Pyrgulopsis thermalis</i> (NatureServe).	Potentially suitable habitat occurs along Buckhorn Gulch from Buckhorn Spring approximately 1,000 feet downstream and portions of Hanover Creek. Additional limited habitat found along Poison Gulch.	Unlikely to Occur	Does Not Occur	Does Not Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Pyrgulopsis thermalis</i>	New Mexico Hot Springsnail	--	--	T	No/No	Found in cooler portions of minor hot springs flows; can tolerate water as hot as 35 degrees C. Abundant on algae-covered stones and vertical rock faces, with and without dense grasses. Endemic to New Mexico; range is restricted to two thermal springs in the Gila Wilderness (NatureServe).	No suitable hot spring aquatic habitat in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
FISH													
<i>Agosia chrysogaster</i>	Longfin Dace	--	Sens	--	No/No	Small- or medium-sized perennial streams.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Catostomus clarki</i>	Desert Sucker	SOC	Sens	--	No/No	Small to medium perennial rivers.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Catostomus insignis</i>	Sonora Sucker	SOC	Sens		No/No	Perennial creeks and small to medium rivers.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Cyprinella formosa</i>	Beautiful Shiner	T	--	--	No/No	Perennial drainages. The USFWS lists this species as extirpated in Grant County.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Gila intermedia</i>	Gila Chub	E	Sens	E	No/No	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Gila nigra</i>	Headwater Chub	C	--	E	--	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Gila nigrescens</i>	Chihuahua Chub	T	--	E	No/No	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Gila robusta</i>	Roundtail Chub	C	Sens	E	--	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Meda fulgida</i>	Spikedace	E	Sens	E	No/No	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur

Table B-2a. Project-Specific Special Status Species List for Amended Mine Plan of Operations Expansion Project, Grant County, New Mexico.

SPECIES	COMMON NAME	Federal Status ¹	BLM Status ¹	State Status ¹	Critical Habitat/ Recovery Unit in Project Area? ²	Typical Habitats ³	Expected Potential for Occurrence						
							Project Area Habitat Overview	Project Area	Study Area ⁴				
									Hanover Mountain and North Overburden Stockpile	Haul Road	Utilities Corridor, Bullfrog Pipeline, Switch	South Waste Rock Disposal Facility Expansion Area and Dam 2	Ancillary Facilities
<i>Oncorhynchus gilae</i>	Gila Trout	T	--	T	No/No	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Poeciliopsis occidentalis occidentalis</i>	Gila Topminnow	E	Sens	T	No/No	Perennial drainages. The USFWS lists this species as extirpated in Grant County.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Rhinichthys osculus</i>	Speckled Dace	--	Sens	--	--	Headwaters, perennial creeks, and small to medium rivers; rarely in lakes.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Tiaroga cobitis</i>	Loach Minnow	E	Sens	E	No/No	Perennial drainages.	No perennial waters located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
AMPHIBIANS													
<i>Anaxyrus (Bufo) microscaphus</i>	Southwestern Toad	--	Sens	--	--	Occurs along rocky stream courses in pine-oak zone or along irrigation ditches/flooded fields/ streams bordered by willows/cottonwoods. Irrigated cropland and reservoirs often used. Needs perennial or semi-permanent streams or shallow ponds for egg laying (NatureServe).	Suitable perennial or semi-perennial water sources are located in the vicinity of the Project Area at Buckhorn Spring and along Hanover Creek near the confluence with Poison Gulch; however, high alkalinity and Total Dissolved Solids (TDS) levels at these locations likely preclude use of the areas by this species. No suitable water sources are located within the Project Area footprint.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Lithobates (Rana) yavapaiensis</i>	Lowland Leopard Frog	SOC	Sens	E	--	Found in perennial to semi-perennial springs and wet meadows, pools, beaver ponds, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet. Occasionally found in livestock drinkers, irrigation sloughs and acequias, wells, abandoned swimming pools, back yard ponds, and mine adits (USFWS 2008).	Requires perennial water sources. Two perennial water sources are located in the vicinity of the Project Area; Buckhorn Spring and a reach along Hanover Creek near the confluence with Poison Gulch. The high alkalinity and TDS levels at these locations should preclude use by this species.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Rana chiricahuensis</i>	Chiricahua Leopard Frog	T	--	--	No/Yes: Unit 8	Found in perennial to semi-perennial springs and wet meadows, pools, beaver ponds, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet. Occasionally found in livestock drinkers, irrigation sloughs and acequias, wells, abandoned swimming pools, back yard ponds, and mine adits (USFWS 2008).	Requires perennial water sources. Two perennial water sources are located in the vicinity of the Project Area; Buckhorn Spring and a reach along Hanover Creek near the confluence with Poison Gulch. Known populations in the region are not located within dispersal distance to the Project Area (Figure A-15). The high alkalinity and TDS levels at these locations should preclude use by this species.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur

Table B-2a. Project-Specific Special Status Species List for Amended Mine Plan of Operations Expansion Project, Grant County, New Mexico.

SPECIES	COMMON NAME	Federal Status ¹	BLM Status ¹	State Status ¹	Critical Habitat/ Recovery Unit in Project Area? ²	Typical Habitats ³	Expected Potential for Occurrence							
							Project Area Habitat Overview	Project Area	Study Area ⁴					Ancillary Facilities
									Hanover Mountain and North Overburden Stockpile	Haul Road	Utilities Corridor, Bullfrog Pipeline, Switch	South Waste Rock Disposal Facility Expansion Area and Dam 2		
REPTILES														
<i>Heloderma suspectum suspectum</i>	Reticulate Gila Monster	--	Sens	E	--	Inhabits the lower slopes of mountains and nearby outwash plains, especially in canyons and arroyos where water is at least periodically present. In some areas, they also frequent irrigated farmlands that adjoin those habitat types.	Limited poor quality habitat occurs in Project Area, at base of Hanover Mountain & along haul route.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	
<i>Phrynosoma cornutum</i>	Texas Horned Lizard	--	Sens	--	--	Inhabits open arid and semiarid regions with sparse vegetation (deserts, prairies, playa edges, bajadas, dunes, foothills) with grass, cactus, or scattered brush or scrubby trees. Range includes eastern and southern New Mexico, including the Rio Grande valley (NatureServe).	The Project Area lies outside of this species' known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	
<i>Thamnophis eques megalops</i>	Mexican Garter Snake	C	Sens	E	--	Strongly associated with permanent water with vegetation, including stock tanks, ponds, lakes, cienegas, cienega streams, and riparian woods. In New Mexico, this snake is known from the lower Gila River basin, along Duck and Mule creeks in Grant County (NatureServe).	Suitable water habitat is located in Project Area along Buckhorn Gulch drainage & along portions of Hanover Creek. Additional habitat found along Poison Gulch.	Unlikely to Occur	Does Not Occur	Does Not Occur	Unlikely to Occur	Does Not Occur	Does Not Occur	
<i>Thamnophis rufipunctatus rufipunctatus</i>	Narrow-headed Garter Snake	SOC	Sens	T	--	One of the most aquatic of all garter snakes, this species often occurs along well-lit sections of rocky streams with abundant riparian vegetation in areas of piñon-juniper, oak-pine, or ponderosa pine. New Mexico distribution includes the Mimbres, Gila, and San Francisco river drainages in Catron, Grant, and Hidalgo counties, at elevations of 2,296 to 7,874 feet (NatureServe, NMDGF 2007).	Suitable water habitat is located in Project Area along Buckhorn Gulch drainage & along portions of Hanover Creek. Additional habitat found along Poison Gulch.	May Occur	Does Not Occur	Does Not Occur	May Occur	Does Not Occur	Does Not Occur	
BIRDS														
<i>Accipiter gentilis</i>	Northern Goshawk	SOC	--	--	--	Typically nests in drainages, canyon bottoms, or north-facing forested slopes with ponderosa pine composed of large, mature trees and high (60-90 percent) canopy closure. Historic nest location approximately 1 mile northwest of Project Area. This is a USFS sensitive species.	Suitable nesting habitat occurs in Project Area, particularly on the north side of Hanover Mountain. One potentially suitable nest, currently used by a red-tailed hawk, was observed on the eastern perimeter of the proposed haul road survey corridor. Goshawk may use area for hunting.	May Occur	May Occur	Unlikely to Occur	Does Not Occur	Does Not Occur	Does Not Occur	

Table B-2a. Project-Specific Special Status Species List for Amended Mine Plan of Operations Expansion Project, Grant County, New Mexico.

SPECIES	COMMON NAME	Federal Status ¹	BLM Status ¹	State Status ¹	Critical Habitat/ Recovery Unit in Project Area? ²	Typical Habitats ³	Expected Potential for Occurrence							
							Project Area Habitat Overview	Project Area	Study Area ⁴					Ancillary Facilities
									Hanover Mountain and North Overburden Stockpile	Haul Road	Utilities Corridor, Bullfrog Pipeline, Switch	South Waste Rock Disposal Facility Expansion Area and Dam 2		
<i>Ammodramus bairdii</i>	Baird's Sparrow	SOC	Sens	T	--	Winter migrant of New Mexico only; variety of habitats including desert grasslands in the south to prairies in the northeast; range extends into small portions of southern New Mexico. Prefers tall, dense, expansive grasslands. Breeds in the vanishing prairie lands of the northern Great Plains.	No suitable habitat in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	
<i>Athene cunicularia hypugaea</i>	Western Burrowing Owl	SOC	Sens	--	--	Generally associated with prairie dog colonies and open grassland/shrub areas, but have been known to utilize other burrows, such as badger.	Limited habitat in Project Area; no prairie dog colonies in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	
<i>Buteo nitidus maxima</i>	Northern Gray Hawk	SOC	Sens	--		Found in cottonwood woodlands occurring where desert streams provide sufficient moisture for a narrow band of trees and shrubs along the margins (BISON-M).	Limited habitat along Hanover Creek and Poison Gulch. Habitat affected by residences along drainage.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur	
<i>Buteo regalis</i>	Ferruginous Hawk	--	Sens	--		Breeds in open country including prairies, plains, and badlands. Found in Great Basin Shrubsteppe-open to dense stands of shrubs and low trees, including big sagebrush, saltbush, greasewood, or creosote bush; Sonoran Desert Scrub-open to dense stands of shrubs, low trees, and succulents dominated by paloverde, pricklypear, and giant saguaro; Chihuahuan Desert Scrub-open stands of creosote bush and large succulents in southern New Mexico and southwest Texas (BISON-M).	No suitable habitat in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	
<i>Buteogallus anthracinus anthracinus</i>	Common Black-hawk	SOC	--	T	--	An obligate riparian nester, the species favors mature gallery forests dominated by Fremont cottonwood or Arizona sycamore, and is usually associated with perennial streams. Found along the Gila, San Francisco, and Mimbres Rivers in the southwest quadrant of New Mexico (NMPIF).	Two perennial water sources are located in the vicinity of the Project Area; Buckhorn Spring and a reach along Hanover Creek near the confluence with Poison Gulch; however, riparian areas associated with these water sources are limited. May pass through the area as a transient. Observed by Ecosphere along Hanover Creek near Jim Fair open cut in April 2013.	Occurs in Area	Unlikely to Occur	Occurs in Area	May Occur	Unlikely to Occur	May Occur	

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							Project Area Habitat Overview	Project Area	Study Area ⁴				
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<i>Calothorax lucifer</i>	Lucifer Hummingbird	--	--	T	--	Found on slopes and adjacent canyons in arid montane areas, especially where there are flowering species such as agave, ocotillo, and other chaparral-type plants (BISON-M). In New Mexico, a small breeding population is present in the Peloncillo Mountains, and the species has also been recorded in Grant, Luna, and Sierra Counties (NMPIF).	Project Area lies at the edge of this species' range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Calypte costae</i>	Costa's Hummingbird	--	--	T	--	Usually breeds in arid habitats in open to dense vegetation of various shrubs, low trees, and succulents, plus occasionally in adjacent agricultural areas (BISON-M). In New Mexico, Costa's Hummingbird is an uncommon and sporadic breeder in the southwest and south-central mountains. It occurs most regularly in Guadalupe Canyon and in side canyons along the lower Gila River from Cliff south. It may be irregular in other small desert ranges (NMPIF).	The Project Area is located outside of this species' known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Camptostoma imberberidgwayi</i>	Beardless Northern Tyrannulet	--	--	E	--	Found in semi-open brushy woodlands, scrubby riparian thickets, and edges of cottonwood gallery or secondary forest. Prefers patchy forest areas.	Limited habitat along Hanover Creek and Poison Gulch.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Caprimulgus ridgwayi ridgwayi</i>	Buff-collared Nightjar	--	--	E	--	Within New Mexico, the species prefers rocky desert canyons and washes with arid shrublands and woodlands (BISON-M). The northern limit of its range reaches just over the Mexican border to southeasternmost Arizona and southwesternmost New Mexico—the Madrean Sky Islands in the eastern Sonoran Desert mountain region (NatureServe).	The Project Area is located outside of its known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Coccyzus americanus occidentalis</i>	Western Yellow-billed Cuckoo	C	Sens	--	--	Associated with lowland deciduous woodlands, willow and alder thickets, second-growth woods, deserted farmlands, and orchards. Breeds in riparian woodlands with dense, understory vegetation (BISON-M).	No suitable riparian habitat.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur

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<i>Columbina passerina pallescens</i>	Common Ground-dove	--	--	E	--	Prefers desert riparian deciduous woodland, especially cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of trees and shrubs along the margins. Also frequents native shrublands and weedy areas.	Limited suitable riparian habitat along Hanover Creek and Poison Gulch.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Cynanthus latirostris magicus</i>	Broad-billed Hummingbird	--	--	T	--	Found in arid scrub, open deciduous forest, semi-desert and other open landscapes in arid habitats. In New Mexico, breeds regularly only in Guadalupe Canyon in Hidalgo County, and occurs rarely in other canyons in the Peloncillo Mountains (NMPIF).	Project Area located outside species range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Empidonax traillii extimus</i>	Southwestern Willow Flycatcher	E	--	E	No/No	Breeds in dense riparian habitat, with willow, salt cedar, box elder, and cottonwood being the dominant tree species. Breeding elevation ranges from sea level to over 8,200 ft. Nests near slow moving streams, river backwaters, oxbows, or marshy areas (NMPIF).	No suitable dense riparian habitat is present in the Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Falco femoralis septentrionalis</i>	Northern Aplomado Falcon	E/EXPN	--	E	No/No	In New Mexico, the species has a strong association with Chihuahuan desert grasslands, with scattered tall yuccas and mesquite. Larger shrubs or small trees must be widely spaced. Dense, lightly grazed or ungrazed grasslands are preferred (NMPIF).	No suitable grassland savanna habitat in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	SOC	--	T	--	In New Mexico, breeding territories center on cliffs in wooded/forested habitats, with large "gulfs" of air nearby in which these predators can forage (BISON-M). Nests are constructed on ledges on relatively tall cliffs, in remote areas with minimal human disturbance (NMPIF).	Historic nest site lies approximately 2.5 miles SE at Kneeling Nun geologic formation. No suitable breeding or nesting habitat located in Project Area. Birds may use Project Area for hunting.	May Occur	May Occur	May Occur	May Occur	May Occur	May Occur
<i>Falco peregrinus tundrius</i>	Arctic Peregrine Falcon	SOC	--	T	--	Rare winter migrant of New Mexico only; breeds in the Arctic tundra.	May be a seasonal migrant through area. No breeding or nesting habitat present in Project Area.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Gymnorhinus cyanocephalus</i>	Piñon Jay	--	Sens	--	--	Found in piñon-juniper woodland or pine; also occurs in scrub oak and sagebrush in nonbreeding season. Nests in shrubs or trees (e.g., pine, oak, or juniper), about 1.5-9 m above ground (NatureServe).	Suitable habitat located throughout the Project Area.	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area

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<i>Haliaeetus leucocephalus alascanus</i>	Bald Eagle	--	--	T	--	Nest within trees in forested areas, especially mature and old-growth stands, adjacent to large bodies of water. Winter roost in large trees within a few miles of ponds, lakes and rivers. The majority of the populations occurring in New Mexico are found near streams and lakes.	May be a seasonal migrant through areas. No breeding or nesting habitat present in Project Area.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Hylocharis leucotis borealis</i>	White-eared Hummingbird	--	--	T	--	Species' range includes Animas Mountains and southward.	The Project Area lies outside the edge of this species' known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Junco phaeonotus palliatus</i>	Yellow-eyed Junco	--	--	T	--	In New Mexico, this species occupies mixed-coniferous forest and ponderosa pine forest generally found at higher elevations, but may be found at mid-elevations where conifer forest is present in canyons. Known from forests in the Animas Mountains (Hidalgo County) and the Big Burro Mountains (Grant County); records also exist for the Big Hatchet, Piños Altos Mountains, and Peloncillo Mountains (NMPIF).	The Project Area lies outside the edge of this species' known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Lanius ludovicianus</i>	Loggerhead Shrike	--	Sens	--	--	In New Mexico, this species is associated with open country and with short vegetation, including desert grasslands and shrublands and open woodlands or juniper savannas. Breeding territories are often centered around isolated trees or large shrubs and dense, thorny shrubs are preferred nest sites. Forage in open areas, often with short grass, but the presence of shrubs is critical (NMPIF).	Suitable habitat located within southern portions of haul road in juniper savanna.	May Occur	Unlikely to Occur	May Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Melanerpes uropygialis uropygialis</i>	Gila Woodpecker	--	--	T	--	The species is often associated with large saguaro cacti, but its range extends beyond the range of saguaro. Where tall cacti are absent, the species may occur in lowland areas with tall trees suitable for nesting, including riparian woodlands. Species range in New Mexico includes the lower Gila Valley (Hidalgo and Grant counties), Bitter Creek (western Grant County), Guadalupe Canyon, San Simon Cienega, and drainages of the Animas and Peloncillo Mountains (NMPIF).	No suitable cacti habitat located in Project Area; however, riparian habitat is found along Hanover Creek that may be used for nesting. Project Area is located outside of typical range.	Unlikely to Occur	Does Not Occur	Does Not Occur	Unlikely to Occur	Does Not Occur	Does Not Occur

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<i>Melospiza (Pipilo) aberti aberti</i>	Abert's Towhee	--	--	T	--	Occupies dense brush and woodland areas or areas adjacent to dense agricultural edge, but prefers streamside habitat of well-developed cottonwood-willow gallery forest with a dense understory of shrubs. In New Mexico, this species occurs along the edges of mature mixed broadleaf forest along portions of the Gila River from the Arizona border to Mogollon Creek in Grant County, and at the San Simon Cienega in Hidalgo County (NMPIF).	Suitable riparian habitat is limited in the Project Area to small areas along Hanover Creek. Project Area is located outside of this species' known range in Grant County.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Passerina ciris palador</i>	Painted Bunting	--	Sens	--	--	Inhabits riparian and microphyll shrubland and adjacent habitats, and other shrublands at lower (2,800-5,500 ft) and middle (5,000-7,500 ft) elevations (BISON-M). Western U.S. breeding populations use semi-open country with scattered trees and shrubs, riparian areas, abandoned farmland and other early successional stages (NatureServe).	Limited suitable habitat along Hanover Creek and along haul road and utility corridor.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Passerina versicolor versicolor; dickeyae</i>	Varied Bunting	--	--	T	--	Arid thorn brush at riparian edges, thorn forest, scrubby woodland, and overgrown clearings. Absent from human residential areas.	Limited habitat along Hanover Creek and along haul road and utility corridor; may occur as vagrant.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Pelecanus occidentalis carolinensis</i>	Brown Pelican	--	--	E	--	Usually found in marine habitats in warm waters. Rarely found inland. Recorded in large lakes or major rivers in New Mexico.	No suitable open water habitat located in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant	--	--	T	--	Occupies wetlands in fresh, brackish, or salt water, both in coastal and inland areas. Key habitat requirements include deep water for diving and elevated perches in trees, shrubs, and other structures for nesting, and roosting (NMPIF).	No suitable large perennial water sources.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Plegadis chihi</i>	White-faced Ibis	--	Sens	--	--	Occur in wet meadows, marsh edges, and reservoir shorelines at lower elevations (2,800 to 5,500 ft). Occurs at elevations where stream conditions provide sufficient permanent moisture for emergent plants or for a narrow band of deciduous trees and shrubs (BISON-M).	No suitable large perennial water sources.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur

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<i>Strix occidentalis lucida</i>	Mexican Spotted Owl	T	--	--	No/No	Nesting and breeding common in mature to old growth mixed conifer forests. Requires cool summer roosts but may winter in comparatively open habitats at lower elevations.	Limited hunting and potential winter habitat in Project Area. Designated Critical Habitat 3 miles NW of Project Area. Owls have been observed approximately 10-15 miles north of the project near Piños Altos by Ecosphere biologists.	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Toxostoma bendirei</i>	Bendire's Thrasher	--	Sens	--	--	Species summers and migrates in the western region of the state. Occasional visitor in autumn-winter in extreme southwest NM and are rare and very local in shrubland/woodland. In southwest NM, they inhabit microphyll shrubland, lowland (2,800-5,500 ft) and midland (5,000-7,500 ft) shrubland, and juniper woodland (BISON-M). In southern New Mexico and southern Arizona, will breed in degraded desert grassland or desert scrub where there are shrubs but little grass (NatureServe).	Suitable juniper woodland located along southern portion of haul road and utility corridors.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Trogon elegans canescens</i>	Elegant Trogon	--	--	E	--	Associated with sycamore- or high-elevation cottonwood-dominated riparian vegetation in a surrounding matrix of piñon-juniper, pine-oak woodland, or upland forest. In New Mexico, its known range is restricted to the Peloncillo Mountains in southwest Hidalgo County (NMPIF).	Project located outside known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Tyrannus crassirostris</i>	Thick-billed Kingbird	--	--	E	--	Occupies riparian canyons with cottonwood and Arizona sycamore, and often forages on adjacent slopes of desert scrub. Regular breeding range in New Mexico only known from Guadalupe Canyon in southern Hidalgo County (NMPIF).	Limited suitable riparian habitat is located along Hanover Creek. May pass through area as migrant.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Vireo bellii arizonae</i>	Bell's Vireo	SOC	Sens	T	--	In New Mexico, nesting occurs in narrow-leaved riparian shrubs such as willow, seep willow, or hackberry, from late April to August. Forages mostly in the lower 5 meters of vegetation structure. The species is locally distributed across the southern third of the state during the breeding season; the <i>V. bellii arizonae</i> race has known populations in the lower Gila	Suitable riparian habitat or shrub habitat is found along Hanover Creek and Buckhorn Gulch.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur

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						Box, San Simon Cienega and Guadalupe Canyon (NMPIF).								
<i>Vireo vicinior</i>	Gray Vireo	--	--	T	--	Desert scrub, mixed juniper or piñon pine and oak scrub associations, and chaparral, in hot, arid mountains and high plains scrubland. Rare summer residents of Gila National Forest. Found in the Silver City area (BISON, NMPIF).	Suitable habitat occurs within the Project Area, particularly along the proposed haul road.	May Occur	May Occur	May Occur	May Occur	May Occur	May Occur	May Occur
MAMMALS														
<i>Canis lupus baileyi</i>	Mexican Gray Wolf	E/EXPN	--	E	No/No	Occurs in desert, grassland/herbaceous, old fields, shrubland/chaparral, conifer, hardwood, and mixed woodland habitats with no particular habitat preference. Requires areas with low human population and high prey densities. Young are born in a den that may be on a bluff or slope among rocks or in an enlarged badger hole. As of 2000, the wild population was limited to three packs reintroduced to the Apache and Gila National Forests (NatureServe).	Single wolves may pass through the area. Wolves have been observed 10 to 15 miles north of the Project Area. Project Area has limited prey base and moderate presence of humans, which would restrict use.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	SOC	Sens	--	--	Semi-desert shrublands, piñon-juniper woodlands, and open montane forests; caves, mines, and rocky outcrops very important component of habitat.	Species has been found in abandoned mine structures, shafts and adits in project vicinity. Species known to occur in LC-1 Adit and Snowflake claim group near Project Area.	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area	Occurs in Area
<i>Euderma maculatum</i>	Spotted Bat	--	Sens	T	--	Riparian and piñon-juniper woodlands to ponderosa pine and spruce-fir forests usually near bodies of water. Spotted bats may summer in forested areas and migrate through lower elevations at other seasons. Roost in cliffs.	Rare throughout its range. Observed near Lake Roberts in Grant County. Limited suitable habitat in Project Area.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Idionycteris phyllotis</i>	Allen's Lappet-browed (Big-eared) Bat	--	Sens	--	--	Primarily occurs in mountainous wooded areas, including ponderosa pine, piñon-juniper, Mexican woodland, and oakbrush but also cottonwood riparian woodland. Typically found near rocks, cliffs, boulders, etc. and maternity colonies have been found in mine shafts, boulder piles, sandstone crevices, lava beds and beneath bark of ponderosa pine snags.	Rare summer resident in NM. Suitable habitat found throughout Project Area; however, species not previously identified during almost 300 mine feature evaluations.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Lasiurus blossevillii</i>	Western Red Bat	--	Sens	--	--	In New Mexico, a species of primarily deciduous sycamore, cottonwood, oak,	Limited suitable habitat within cottonwood groves along Hanover Creek	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur

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						and willow riparian habitats; rarely found in desert habitats. May occasionally use caves.	and Whitewater Creek.						
<i>Myotis ciliolabrum melanorhinus</i>	Small-footed Western Myotis Bat	--	Sens	--	--	Generally inhabits desert, badland, and semiarid habitats; more mesic habitats in southern part of range. In New Mexico found at elevations of 5,177-7,000 feet. Roosts in summer in rock crevices, caves, tunnels, under boulders, beneath loose bark, or in buildings. Hibernates in caves and mines. Maternity colonies often are in abandoned houses, barns, or similar structures (NatureServe).	Suitable habitat occurs throughout Project Area. This myotis species has been found in abandoned mine features in Project Area.	Occurs in Area	Occurs in Area	Occurs in Area	May Occur	May Occur	May Occur
<i>Myotis evotis evotis</i>	Long-eared Myotis Bat	--	Sens	--	--	Found predominantly in mixed coniferous forests, typically only at higher elevations in New Mexico between 7,000 and 8,500 feet. Typically roost in tree cavities and beneath exfoliating bark in both living trees and dead snags. Sometimes roosts at ground level in rock crevices, fallen logs, and even in the crevices of sawed-off stumps (BCI).	Limited habitat found on north side of Hanover Mountain. Not previously observed in the Project Area.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur	Does Not Occur
<i>Myotis lucifugus occultus</i>	Occult Little Brown Myotis Bat	--	Sens	--	--	Widespread; found mainly in mountainous and riparian areas in a wide variety of forest habitat, from tree-lined xeric-scrub to aspen meadows. Often forms nursery colonies in buildings, attics, and other man-made structures (BCI).	Suitable habitat occurs in Project Area. This myotis species has been found in mine features in Project Area.	Occurs in Area	Occurs in Area	Occurs in Area	May Occur	May Occur	May Occur
<i>Myotis thysanodes thysanodes</i>	Fringed Myotis Bat	--	Sens	--	--	In New Mexico occurs from ponderosa pine forests down into the grassland and from 5,000 to 8,000 feet in elevation. It is a species of the woodlands at moderate elevation in mountains. Night and day roosts include caves, mines, and buildings (typically abandoned). Hibernacula include caves and buildings; not much is known about their winter range (BCI).	Suitable habitat occurs in Project Area. This myotis species has been found in mine features in Project Area.	Occurs in Area	Occurs in Area	Occurs in Area	May Occur	May Occur	May Occur
<i>Myotis velifer</i>	Cave Myotis Bat	--	Sens	--	--	Found through the southern half of New Mexico. Forms nursery colonies, usually numbering in the thousands in caves, mines, barns, buildings, and sometimes under bridges (BCI).	Suitable habitat occurs in Project Area. Myotis species have been found in abandoned buildings and mine features in Project Area.	May Occur	May Occur	May Occur	May Occur	May Occur	May Occur

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<i>Myotis volans interior</i>	Long-legged Myotis Bat	--	Sens	--	--	Widely distributed across US. Especially dependent on wooded habitats from piñon-juniper to coniferous forests, usually at elevations of 4,000 to 9,000 feet. Most nursery colonies live in tree crevices or under exfoliating bark in openings or along forest edges where they receive a large amount of daily sun. Other maternity colonies may be found in rock crevices, cliffs, and buildings. Forages over ponds, streams, water tanks, and in forest clearings (BCI).	Suitable habitat occurs in Project Area. Myotis species have been found in abandoned buildings and mine features in Project Area.	May Occur	May Occur	May Occur	May Occur	May Occur	May Occur
<i>Myotis yumanensis yumanensis</i>	Yuma Myotis Bat	--	Sens	--	--	Most often found in buildings or bridges. Occasionally roosts in mines or caves. Bachelors may roost in abandoned cliff swallow nests. Tree cavities were probably the original sites for most nursery roosts. Typically forages over water in forested areas (BCI).	Suitable habitat occurs in Project Area. Myotis species have been found in abandoned buildings and mine features in Project Area. This species not specifically seen in Project Area.	May Occur	May Occur	May Occur	May Occur	May Occur	May Occur
<i>Mustela nigripes</i>	Black-footed Ferret	E/EXPN	--	--	No/No	Open grasslands with year-round prairie dog colonies.	No prairie dog colonies are located in the Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Nasua narica</i>	White-nosed Coati	--	Sens	--	--	Most records are from the Peloncillo Mountains in Hidalgo County, but there are also reports from as far north as the Gila Valley and Burro Mountains (Grant County). Coatis are usually found in canyons (oak-sycamore-walnut, oak-pine, or shrub-grass dominated), near creeks or some source of water, but can be found in oak and piñon-juniper woodlands. Utilize rock crevices, cavities among tree roots, and caves or mines (BISON-M).	Suitable habitat located throughout Project Area. On NE edge of known range.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Sigmodon ochrognathus</i>	Yellow-nosed Cotton Rat	--	Sens	--	--	Dry rocky slopes in oak-piñon-juniper habitat, montane meadows in ponderosa pine and Douglas-fir forests, rocky slopes of desert mountains with scattered bunches of grass, and grassy montane flats with deep soils, few rocks (in areas where it is the only cotton rat present). Only known in New Mexico from Hidalgo County (NatureServe).	The Project Area lies outside of this species' known range.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur

Table B-2a. Project-Specific Special Status Species List for Amended Mine Plan of Operations Expansion Project, Grant County, New Mexico.

SPECIES	COMMON NAME	Federal Status ¹	BLM Status ¹	State Status ¹	Critical Habitat/ Recovery Unit in Project Area? ²	Typical Habitats ³	Expected Potential for Occurrence						
							Project Area Habitat Overview	Project Area	Study Area ⁴				
									Hanover Mountain and North Overburden Stockpile	Haul Road	Utilities Corridor, Bullfrog Pipeline, Switch	South Waste Rock Disposal Facility Expansion Area and Dam 2	Ancillary Facilities
PLANTS													
<i>Cleome (Peritoma) multicaulis</i>	Slender spiderflower	SOC	--	E		Wet, saline or alkaline soils; often in and around alkali sinks, alkaline meadows, or old lake beds. Not seen in New Mexico since collections in 1851 at Las Playas in Hidalgo County, and at "the mouth of the Mimbres River" (NMRPTC). Flowers August to September.	Potential habitat located around Buckhorn Spring and drainage. No populations found by Ecosphere during survey in 2012 in suitable habitat.	Unlikely to Occur	Does Not Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur
<i>Cypripedium parviflorum var. pubescens</i>	Large Yellow Lady's-slipper	--	--	E	--	Habitat variable. Moist, muddy habitat with dripping water or in moderate shade along streambanks, mountain meadows and mesic places in ponderosa pine, mixed conifer, and aspen forest communities, sometimes up to 100 yards from any water (Coleman 2002).	No suitable habitat in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Peniocereus (Cereus) greggii var. greggii</i>	Cereus, Night-blooming	SOC	Sens	E	--	Found mostly in sandy to silty-gravelly soils in gently broken or level terrain in desert grassland or Chihuahuan desert scrub. Typically found growing up through and supported by shrubs, especially <i>Larrea divaricata</i> and <i>Prosopis glandulosa</i> .	No suitable habitat in Project Area. Previous studies did not locate populations in Project Area.	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur	Does Not Occur
<i>Phemeranthus humilis (Talinum humile)</i>	Piños Altos flame flower	SOC	--	SOC	--	Found on shallow, gravelly, usually clayey soils overlying rhyolite; usually on rock benches in sloping terrain, but also in soil pockets overlying rock in nearly level areas; Madrean grassland, oak woodland, or piñon-juniper woodland, often with <i>Nolina microcarpa</i> and <i>Agave parryii</i> (NMRPTC). Blooms mid-July through August.	Historic populations found within 2.5 miles south of Project Area during surveys on adjacent FMI properties (Kneeling Nun area). Suitable habitat located throughout Project Area. Previous studies did not locate populations in Project Area. No populations found by Ecosphere during survey in 2012 in suitable habitat.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur
<i>Puccinellia parishii</i>	Alkaligrass, Parish's	SOC	Sens	E	--	Alkaline springs, seeps, and seasonally wet areas that occur at the heads of drainages or on gentle slopes at 800-2,200 m (2,600-7,200 ft) range-wide. The species requires continuously damp soils during its late winter to spring growing period (NMRPTC).	Alkaline seeps occur in the vicinity of Buckhorn Spring. Previous studies did not location populations. No populations found by Ecosphere during survey in 2012 in suitable habitat.	Unlikely to Occur	Does Not Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur

Table B-2a. Project-Specific Special Status Species List for Amended Mine Plan of Operations Expansion Project, Grant County, New Mexico.

SPECIES	COMMON NAME	Federal Status ¹	BLM Status ¹	State Status ¹	Critical Habitat/ Recovery Unit in Project Area? ²	Typical Habitats ³	Expected Potential for Occurrence						
							Project Area Habitat Overview	Project Area	Study Area ⁴				
									Hanover Mountain and North Overburden Stockpile	Haul Road	Utilities Corridor, Bullfrog Pipeline, Switch	South Waste Rock Disposal Facility Expansion Area and Dam 2	Ancillary Facilities
<i>Sclerocactus (Toumeyia) papyracanthus</i>	Cactus, Grama Grass	--	Sens	--	--	Grows in piñon-juniper woodlands and in desert grasslands and is almost always associated with grama (<i>Bouteloua spp.</i>), especially blue grama (<i>B. gracilis</i>). It may also be associated with dropseed (<i>Sporobolus spp.</i>) (NMRPTC).	May be extirpated in Grant County (NatureServe). No populations have been identified in Project Area during previous surveys.	Unlikely to Occur	Does Not Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur
<i>Scrophularia macrantha</i>	Figwort, Mimbres	--	Sens	SOC	--	Found on steep, rocky, usually north-facing igneous cliffs and talus slopes, occasionally in canyon bottoms; piñon-juniper woodland and lower montane coniferous forest; 6,500-8,200 feet (NMRPTC). Blooms July to October.	Found 2.5 miles SE of the Project Area near the Kneeling Nun rock formation. Previous studies have not identified populations in the Project Area, and surveys completed by Ecosphere in 2012 did not locate any populations.	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Unlikely to Occur	Does Not Occur

¹ C=Candidate, E=Endangered, E/EXPN = Endangered, experimental non-essential population, T=Threatened, SOC=Species of Concern, Sens=Sensitive

² US Fish and Wildlife Service. Website: <http://criticalhabitat.fws.gov/crithab/>

³ Habitat information identified from:

BCI = Bat Conservation International Species Profiles. Website: <http://www.batcon.org/index.php/all-about-bats/species-profiles.html>

BISON-M = Biota Information System of New Mexico. Species Booklets. Website: <http://www.bison-m.org/simplespeciessearch.aspx>

NatureServe = NatureServe Explorer Species Database. Website: <http://www.natureserve.org/explorer/index.htm>

NMPIF = New Mexico Partners in Flight-Species Accounts. Website: <http://nmpartnersinflight.org/species.html>

NMRPTC = New Mexico Rare Plant Technical Committee. Website: <http://nmrareplants.unm.edu/rarelist.php>

USFWS = US Fish and Wildlife Service, New Mexico Ecological Services Field Office. All Listed and Sensitive Species in New Mexico. Website: http://www.fws.gov/southwest/es/NewMexico/SBC_view_all.cfm

Coleman, Ronald A. 2002. The Wild Orchids of Arizona and New Mexico. Cornell University Press. 248 pp.

⁴ Does Not Occur, Unlikely to Occur, and May Occur derived from USFWS terminology

Sources: US Fish and Wildlife Service species list for Grant County, New Mexico (USFWS 2013), BISON-M 2013, NMDGF 2007, NMRPTC 2012, and Barnitz pers. comm. 2012

APPENDIX C2

**Birds of
Conservation
Concern in
Bird Conservation
Regions 34 and 35
(Table B-8b)**

Table B-8B. Birds of Conservation Concern in Bird Conservation Regions 34 and 35

Common Name			Occurrence in Project Area ²			
	BCR 34 (Sierra Madre Occidental U.S. portion only)	BCR 35 (Chihuahuan Desert U.S. portion only)	Known to Occur	May Occur	Not Likely to Occur	Does Not Occur
American Bittern						X
American Peregrine Falcon	X	X		X		
Arizona Woodpecker	X				X	
Baird's Sparrow	X	X				X
Bald Eagle	X	X			X	
Bell's Vireo	X	X			X	
Bendire's Thrasher	X	X			X	
Black Rosy-Finch						X
Black-chinned Sparrow	X	X	X			
Black-throated Gray Warbler	X			X		
Blue-throated Hummingbird	X				X	
Botteri's Sparrow	X					X
Brewer's Sparrow				X		
Brown-capped Rosy-Finch						X
Buff-breasted Flycatcher	X					X
Burrowing Owl		X				X
Canyon Towhee	X			X		
Cassin's Finch				X		
Cassin's Sparrow		X			X	
Chestnut-collared Longspur	X	X				X
Colima Warbler		X				X
Common Black-Hawk	X	X	X			
Elegant Trogon	X					X
Elf Owl	X	X			X	
Ferruginous Hawk		X				X
Five-striped Sparrow	X					X
Flammulated Owl	X	X		X		
Golden Eagle		X		X		
Grace's Warbler	X	X		X		
Grasshopper Sparrow	X	X				X
Gray Vireo	X			X		

Table B-8B. Birds of Conservation Concern in Bird Conservation Regions 34 and 35

Common Name			Occurrence in Project Area ²			
	BCR 34 (Sierra Madre Occidental U.S. portion only)	BCR 35 (Chihuahuan Desert U.S. portion only)	Known to Occur	May Occur	Not Likely to Occur	Does Not Occur
Gunnison Sage Grouse						X
Juniper Titmouse			X			
Lark Bunting	X	X			X	
Lewis's Woodpecker	X			X		
Loggerhead Shrike		X		X		
Long-billed Curlew		X				X
Lucifer Hummingbird		X				X
Lucy's Warbler	X				X	
McCown's Longspur		X				X
Mountain Plover	X	X				X
Northern Beardless-Tyrannulet	X				X	
Olive Warbler	X			X		
Painted Bunting		X			X	
Phainopepla	X					X
Pinyon Jay	X		X			
Prairie Falcon			X			
Red-faced Warbler	X	X			X	
Rose-throated Becard	X					X
Rufous-winged Sparrow	X					X
Snowy Plover		X				X
Sprague's Pipit	X	X				X
Varied Bunting	X	X			X	
Veery						X
Virginia's Warbler		X		X		
Willow Flycatcher						X
Yellow Warbler (<i>sonorana</i> ssp.)	X	X		X		
Yellow-billed Cuckoo	X	X				X

¹Ecoregions identified here are categories outlined in the *Birds of Conservation Concern* (USFWS 2008).

²BISON-M (2012) was used to identify species habitat requirements.

Source: NABCI 2014, USFWS 2008, NMPIF 2012

APPENDIX D

Noxious Weed Species List for the State of New Mexico

Appendix D. Noxious Weed Species List for the State of New Mexico

Noxious Weeds Known or Likely to Occur within the Project Footprint (NMDA 2012; Ashigh et al. 2010). Those in bold were observed (Ecosphere 2014).

Common Name	Scientific Name	Habitat/Potential to occur within the Project Footprint
<p>Class A species are currently not present in New Mexico or have limited distribution. Preventing new infestations of these species and eradicating existing infestations is the highest priority.</p>		
Camelthorn	<i>Alhagi psuedalhagi</i>	Found in deep, moist soils and dry, rocky, and saline soils. It is abundant along riverbanks, canals, and irrigation ditches but also occurs in roadside drainage areas and cultivated fields. The three populations of camelthorn located along Hanover Creek were destroyed (Ecosphere 2014).
Dalmatian toadflax	<i>Linaria dalmatica</i>	Found in disturbed areas, along roadsides, agricultural areas, riparian areas; potential to occur along roadsides and Hanover Creek.
Hoary cress	<i>Cardaria</i> spp.	Found in moist areas, including irrigated pastures and crops, and disturbed areas such as roadways, railways, and ditches (Ashigh et al. 2010). Hoary cress could be present on moist areas near roads and ditches, and along Hanover Creek and other intermittent or ephemeral springs or drainage channels.
Purple loosestrife	<i>Lythrum salicaria</i>	Limited to very wet areas including, wetlands, rivers, streams, ponds, floodplains, reservoirs, and ditches (Ashigh et al. 2010). This species is unlikely to be present due to the ephemeral nature of most surface waters.
Spotted knapweed	<i>Centaurea biebersteinii</i>	Found in disturbed areas, including roadsides, ditches, fields, semi-arid deserts, and grasslands (Ashigh et al. 2010). This species could be present along roads and at the edges of disturbed areas.
Yellow starthistle	<i>Centaurea solstitialis</i>	Found in conditions similar to spotted knapweed, as well as open woodlands (Ashigh et al. 2010). This species could be present along roadsides and disturbed areas, but it could also be found in lower elevation woodlands.
<p>Class B Species are limited to portions of the state. In areas with severe infestations, management should be designed to contain the infestation and stop any further spread.</p>		
Tree of heaven	<i>Ailanthus altissima</i>	A deciduous tree that can tolerate a variety of soil conditions. It is often found in disturbed areas but may also grow in more natural conditions in riparian areas and woodlands (Ashigh et al. 2010). This tree was observed in disturbed areas at the Continental Mine Pit and around existing buildings associated with mining operations.
African rue	<i>Peganum harmala</i>	Found in disturbed areas along roads, open fields, and ditches, as well as in arid and semi-arid desert areas (Ashigh et al. 2010). African rue could be present near existing roads and on the edges of existing disturbed areas, particularly at lower elevations.
Malta starthistle	<i>Centaurea melitensis</i>	Found in conditions similar to yellow starthistle (Ashigh et al. 2010). This species could be present along roadsides and disturbed areas, but it could also be found in lower elevation woodlands.
Musk thistle	<i>Carduus nutans</i>	Found in disturbed open areas, including roadsides, ditches, waste areas, and stream banks (Ashigh et al. 2010). Musk thistle could be present at lower elevations along roadsides and other disturbed areas.
Poison hemlock	<i>Conium maculatum</i>	Found in riparian areas, ditches, open fields, and pastures (Ashigh et al. 2010). This species could be present, particularly along Hanover Creek, ephemeral springs, or riparian areas.
<p>Class C species are wide-spread in the state. Management decisions for these species should be determined at the local level, based on feasibility of control and level of infestation.</p>		
Cheatgrass	<i>Bromus tectorum</i>	Cheatgrass is annual grass that is common in disturbed areas, open fields, rangeland, grasslands, and deserts (Ashigh et al. 2010). This grass was observed on the southern extent of the proposed Haul Road (Ecosphere 2014).

Common Name	Scientific Name	Habitat/Potential to occur within the Project Footprint
Saltcedar or Tamarisk	<i>Tamarix</i> spp.	A small multi-stemmed tree that is common in riparian areas, along shorelines of rivers, streams, lakes, ponds, and irrigation ditches, and along roadsides (Ashigh et al. 2010). This species is known to be present along Hanover Creek.
Siberian elm	<i>Ulmus pumila</i>	A deciduous tree that invades grasslands, rangelands, semi-arid areas, and riparian areas, and is found in disturbed areas (Ashigh et al. 2010). This species is known to be present along Hanover Creek.
Bull thistle	<i>Cirsium vulgare</i>	Bull thistle is a widespread, biennial forb that is found in disturbed areas, including roadsides, fencelines, ditches, and streams (Ashigh et al. 2010). It is likely to be present in disturbed areas, particularly along roadsides and Hanover Creek.
Jointed goatgrass	<i>Aegilops cylindrica</i>	A winter annual grass that occurs in disturbed areas, agricultural fields, and grasslands (Ashigh et al. 2010). This grass could be present along roadsides and edges of disturbed areas.
Russian olive	<i>Elaeagnus angustifolia</i>	A small, multi-stemmed tree that may grow up to 40 feet tall. This tree is most often found in riparian areas, but also occurs in disturbed areas, grasslands, woodlands, and desert shrublands (Ashigh et al. 2010). This species could be present, particularly at Hanover Creek.
Watch List species are Species of Concern in the state. These species have the potential to become problematic. More data are needed to determine if these species should be listed (NMDA 2012).		
Giant cane	<i>Arundo donax</i>	A perennial grass that grows in thickets up to 20 feet tall along streambanks, floodplains, and drainages. Giant cane was observed in the area of the office (Ecosphere 2014).

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