BLM MOUNT LEWIS FIELD OFFICE

Final

Deep South Expansion Project Supplemental Environmental Report – Air Quality

Prepared in Support of:
File Number: NVN-067575 (16-1A)
DOI-BLM-NV-B010-2016-0052 EIS

Bureau of Land Management
Battle Mountain District Office
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, NV 89820

2019

COOPERATING AGENCIES:
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Nevada Department of Wildlife
Lander County and Eureka County

BLM Mission Statement

The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

Prepared in Support of: DOI-BLM-NV-B010-2016-0052 EIS

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Acronyms and Abbreviations

$\mu g/m^3$	micrograms per cubic meter
AAQS	ambient air quality standards
amsl	above mean sea level
BCI	Barrick Cortez Inc.
BEA	Bank Enabling Agreement
BLM	Bureau of Land Management
CESA	cumulative effects study area
CFR	Code of Federal Regulations
CGM	Cortez Gold Mines
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
EIS	environmental impact statement
GHG	greenhouse gases
HAP	hazardous air pollutant
HC/CUEP	Horse Canyon/Cortez Unified Exploration Project
IPCC	Intergovernmental Panel on Climate Change
km	kilometer
MACT	***Maximum Achievable Control Technology***
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NSR	New Source Review
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less

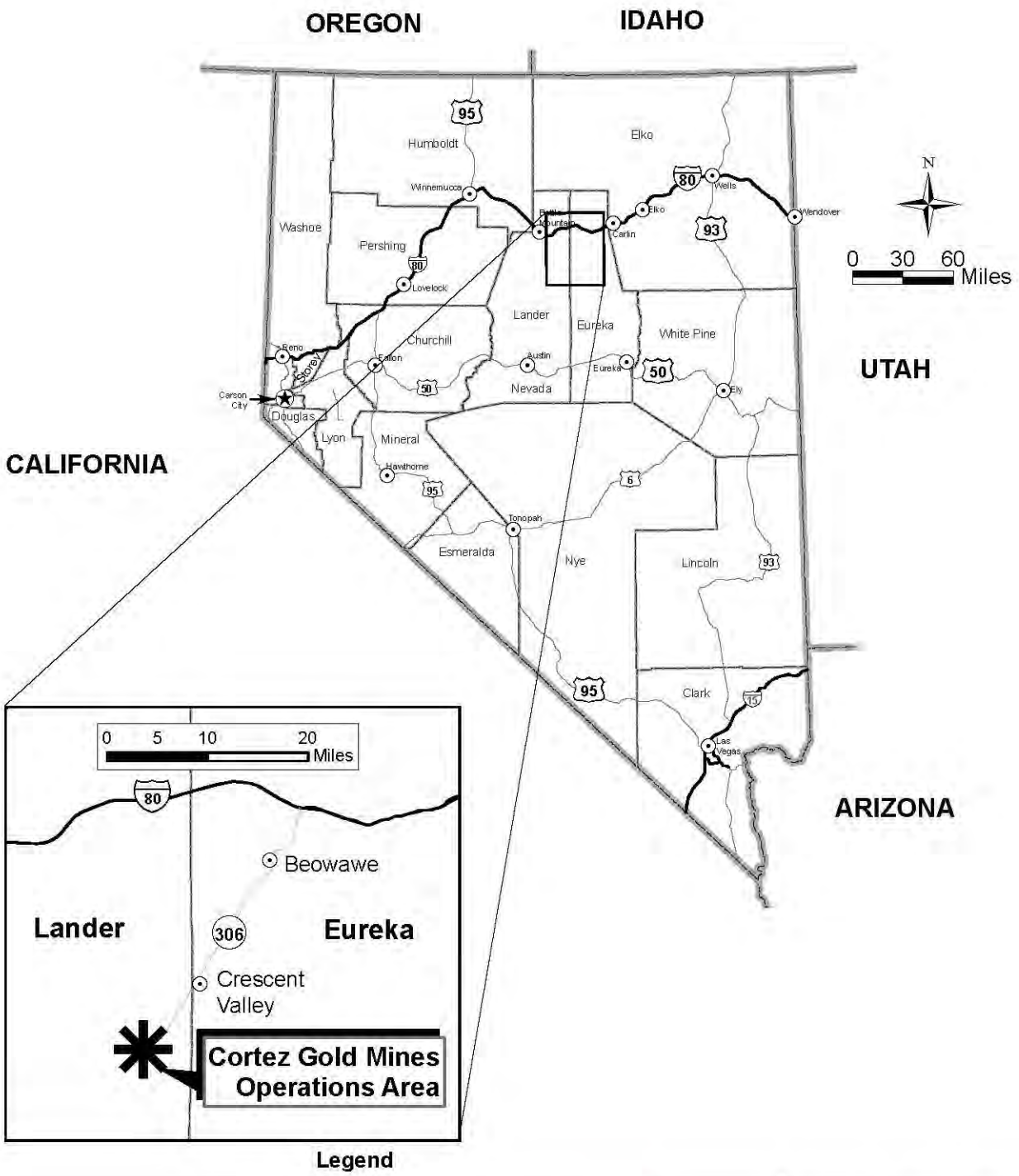
ppm	parts per million
PSD	Prevention of Significant Deterioration
REA	Rapid Ecoregional Assessment
RFFA	reasonably foreseeable future action
RIB	rapid infiltration basin
ROW	right-of-way
SO_2	sulfur dioxide
SRK	SRK Consulting, (U.S.) Inc.
tpd	tons per day
tpy	tons per year
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WRCC	Western Regional Climate Center

1.0 Introduction

Barrick Cortez Inc. (BCI), as manager of the Cortez Joint Venture, proposes modifications to BCI's existing gold mining and processing operations within the Cortez Gold Mines (CGM) Operations Area, which is located approximately 24 miles south of Beowawe in Lander and Eureka counties, Nevada (**Figure 1-1**). On March 30, 2016, BCI submitted the Barrick Cortez Inc. (NVN-067575 (16-1A)) Deep South Expansion Project Amendment to Plan of Operations and Reclamation Permit Application #0093, which describes the proposed modifications, to the Bureau of Land Management (BLM) Battle Mountain District, Mount Lewis Field Office in compliance with 43 Code of Federal Regulations (CFR) Subpart 3809 and 3715. A revised plan amendment was submitted October 6, 2016 (BCI 2016).

The proposed modifications would result in new surface disturbance on private land owned by BCI and public lands administered by the BLM. The proposed mining activities on public and private lands are subject to review and approval by the BLM pursuant to the Federal Land Policy and Management Act of 1976 as amended, and the BLM's surface management regulations (43 CFR Subpart 3809). The BLM's review and approval of a mine plan of operations under the surface management regulations constitute a federal action that is subject to the National Environmental Policy Act of 1969 (NEPA). The BLM has determined that the project constitutes a major federal action and has determined that an environmental impact statement (EIS) must be prepared to fulfill NEPA requirements. The BLM is serving as the lead agency for preparing the Deep South Expansion Project EIS in compliance with all applicable regulations and guidance. The U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service, Nevada Department of Wildlife, and Lander and Eureka counties are serving as cooperating agencies for preparation and review of the EIS.

The EIS development is supported by supplemental environmental reports. This supplemental environmental report describes the potentially affected environment and the environmental consequences (direct, indirect, and cumulative) of implementing the Proposed Action or the alternatives, identifies monitoring and mitigation measures, as needed, and identifies the residual adverse effects for air quality.



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Deep South Expansion Project EIS

Figure 1-1

Project Vicinity

2.0 Alternatives Including the Proposed Action

2.1 Introduction

This chapter summarizes the elements of the Proposed Action and other alternatives (including the No Action Alternative), and the past and present actions, as well as reasonably foreseeable future actions (RFFAs), considered in the cumulative impact analysis.

2.2 Existing Facilities

Existing BCI mining and processing facilities are located in four mine complexes (Pipeline, Gold Acres, Cortez, and Cortez Hills) within the current CGM Operations Area boundary (**Figure 2-1**). The majority of the existing facilities would be used in support of the Proposed Action. Changes to existing facilities are summarized below.

2.3 Proposed Action

2.3.1 Project Overview

BCI's proposed Deep South Expansion Project (Proposed Action) would include modifications to existing facilities in the four existing mine complexes, construction of new facilities, modifications to overall operations, and expansion of the CGM Operations Area boundary (**Figures 2-2** and **2-3**). The proposed modifications and expansions are summarized below.

Pipeline Complex:

- Deepen the existing Crossroads Pit (southeast portion of the Pipeline Pit Complex) by 200 feet and layback portions of the current Pipeline, Crossroads, and Gap pit walls.
- Reconfigure the currently authorized backfill in the Pipeline and Gap pit portions of the Pipeline Pit Complex per one of three proposed backfill scenarios (**Figures 2-4**, **2-5**, and **2-6**), depending on the economic conditions at the time of mining.
- Modify the existing Pipeline/South Pipeline Waste Rock Facility.
- Expand the existing oxide ore stockpile.

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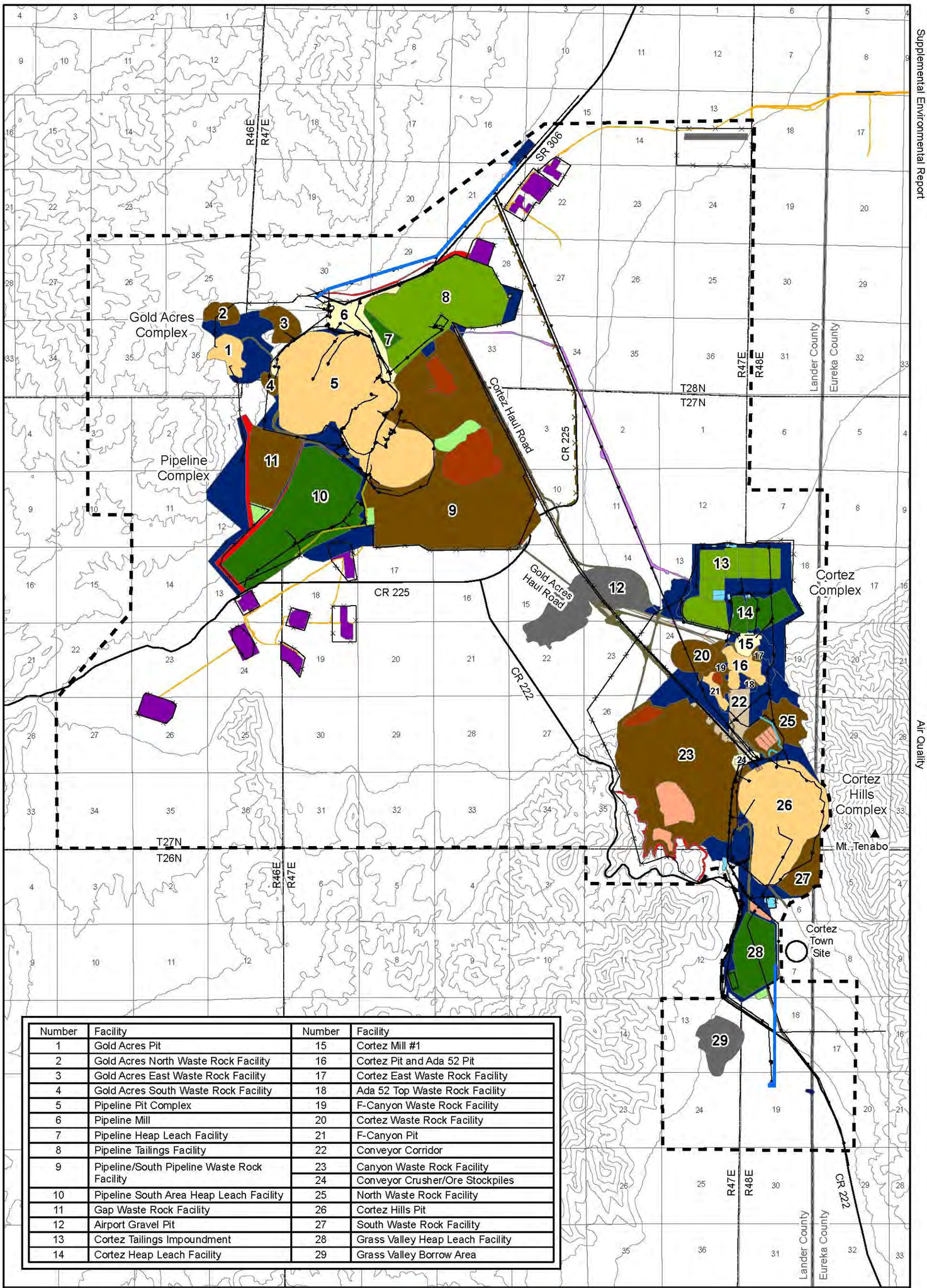

Number	Facility	Number	Facility
1	Gold Acres Pit	15	Cortez Mill #1
2	Gold Acres North Waste Rock Facility	16	Cortez Pit and Ada 52 Pit
3	Gold Acres East Waste Rock Facility	17	Cortez East Waste Rock Facility
4	Gold Acres South Waste Rock Facility	18	Ada 52 Top Waste Rock Facility
5	Pipeline Pit Complex	19	F-Canyon Waste Rock Facility
6	Pipeline Mill	20	Cortez Waste Rock Facility
7	Pipeline Heap Leach Facility	21	F-Canyon Pit
8	Pipeline Tailings Facility	22	Conveyor Corridor
9	Pipeline/South Pipeline Waste Rock Facility	23	Canyon Waste Rock Facility
		24	Conveyor Crusher/Ore Stockpiles
10	Pipeline South Area Heap Leach Facility	25	North Waste Rock Facility
11	Gap Waste Rock Facility	26	Cortez Hills Pit
12	Airport Gravel Pit	27	South Waste Rock Facility
13	Cortez Tailings Impoundment	28	Grass Valley Heap Leach Facility
14	Cortez Heap Leach Facility	29	Grass Valley Borrow Area

CGM Operations Area Boundary
Diversion Channel
Fence
Fissure Ditch
Powerline
Water Pipeline
Rangeland Fence

Ancillary Facility
Borrow Pit/Gravel Pit
Conveyor Corridor
Diversion Channel
Growth Media Stockpile
Haul Road
Heap Leach Facility
Rapid Infiltration Basin

Open Pit
Processing Facility
Pond
Oxide Ore Stockpile
Refactory Ore Stockpile
Tailings Facility
Utilities
Waste Rock Facility

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Note: Existing Crescent Valley RIBs are located northeast of the CGM Operations Area boundary as shown in **Figure 2-3**.

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Figure 2-1
Existing Mine Facilities

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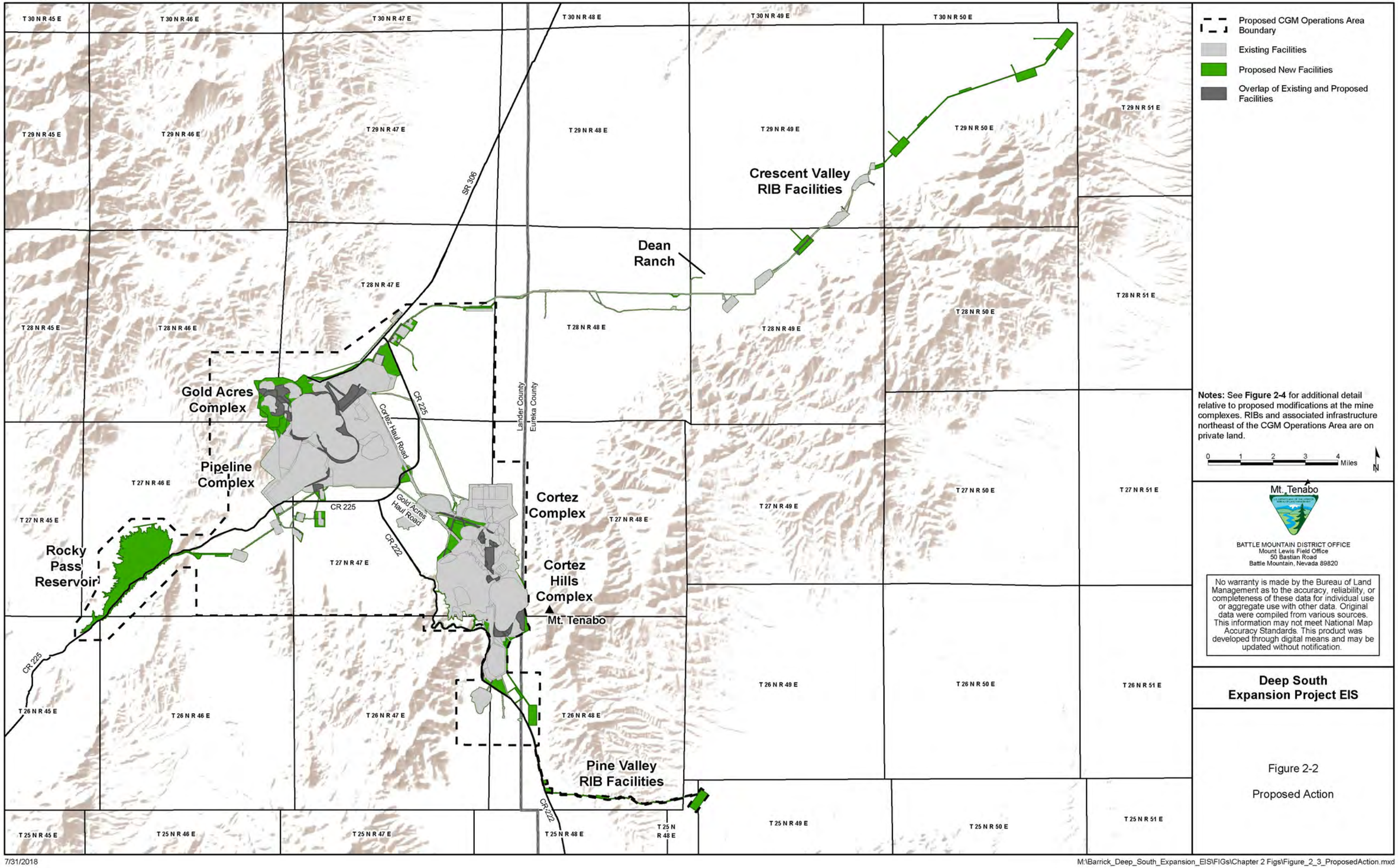
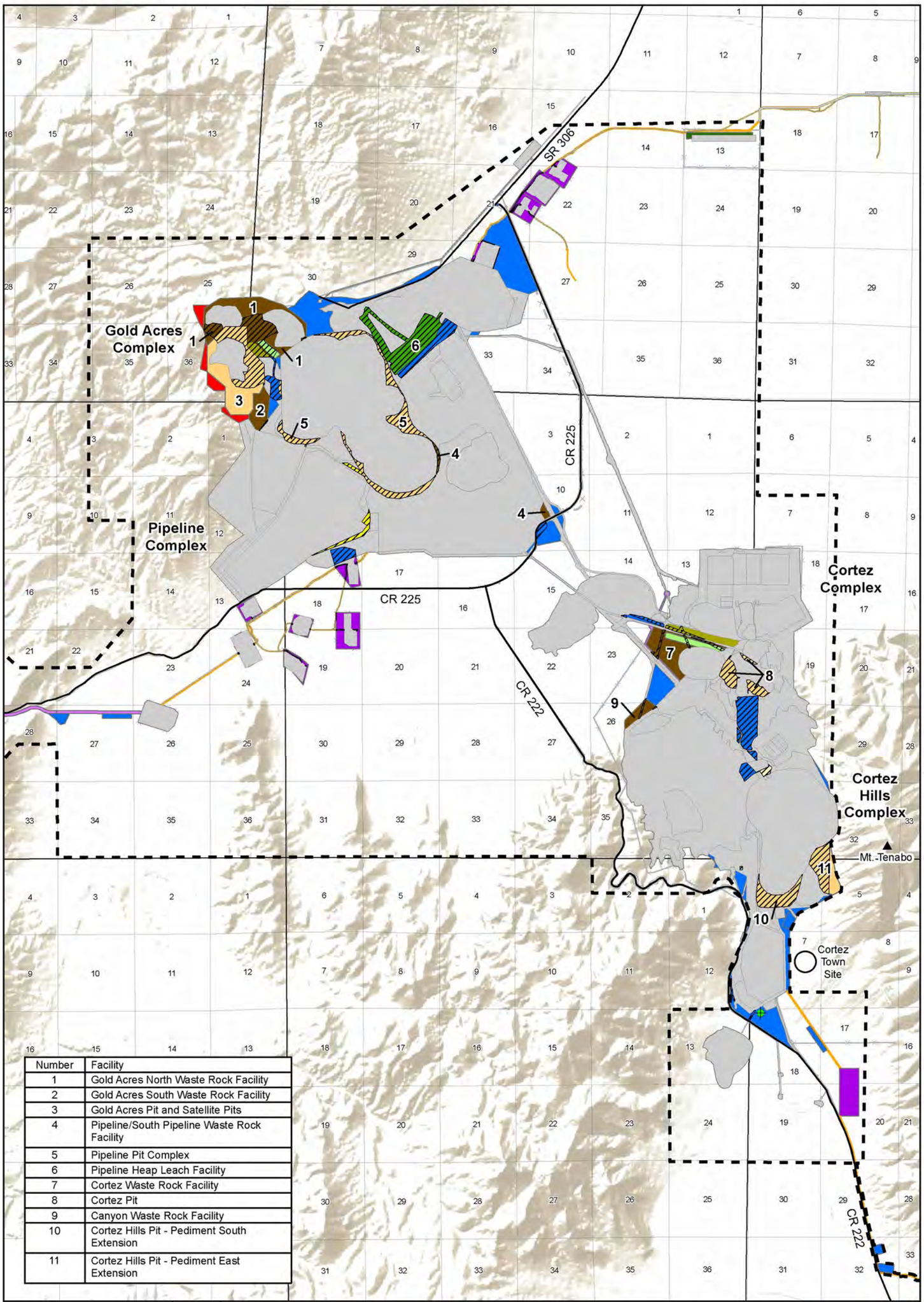


Figure 2-2

Proposed Action



Number	Facility
1	Gold Acres North Waste Rock Facility
2	Gold Acres South Waste Rock Facility
3	Gold Acres Pit and Satellite Pits
4	Pipeline/South Pipeline Waste Rock Facility
5	Pipeline Pit Complex
6	Pipeline Heap Leach Facility
7	Cortez Waste Rock Facility
8	Cortez Pit
9	Canyon Waste Rock Facility
10	Cortez Hills Pit - Pediment South Extension
11	Cortez Hills Pit - Pediment East Extension

Figure 2-3
Proposed Action
Mine Complexes

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- Proposed CGM Operations Area Boundary
- Existing Facilities
- Overlap of Existing and Proposed Facilities
- Powerline
- Fence
- Proposed Infiltration Distribution Pipeline
- Proposed Water Treatment Plant
- Proposed Post-mining Stormwater Control
- Proposed Ancillary Facilities
- Proposed Borrow Pit/Gravel Pit
- Proposed Growth Media Stockpile
- Proposed Haul Road
- Proposed Heap Leach Facility Modification
- Proposed Infiltration Basin
- Proposed Open Pit Modification
- Proposed Stormwater Retention Pond
- Proposed Conveyor Crusher/Ore Stockpile Modification
- Proposed Refactory Ore Stockpile
- Proposed RIBs and Modifications
- Proposed Waste Rock Facility Modification

Note: Ore stockpiles and growth media stockpiles would be placed in existing or proposed ancillary facilities areas or on top of existing or proposed waste rock facilities per existing operations.

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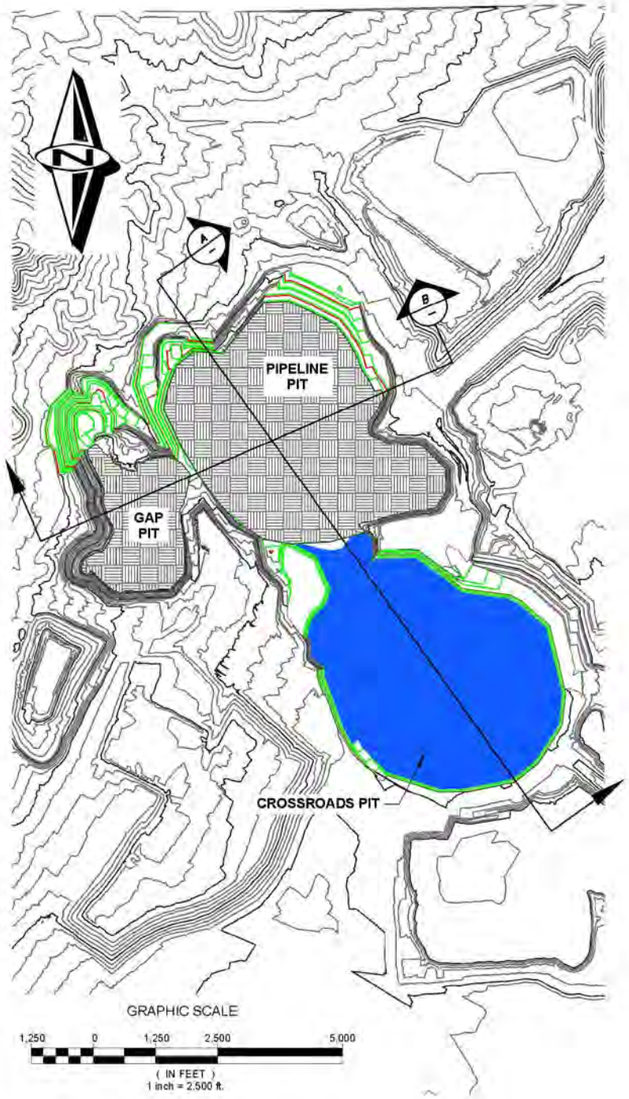

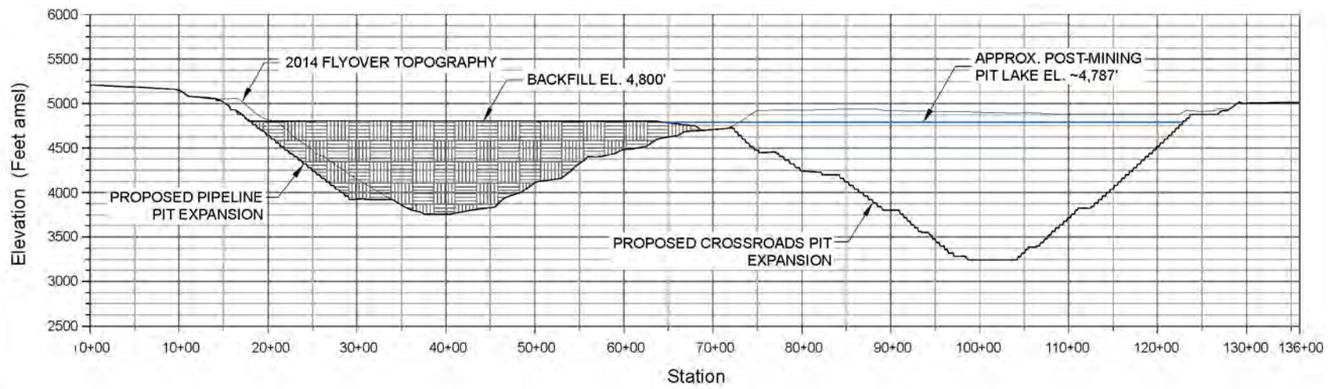

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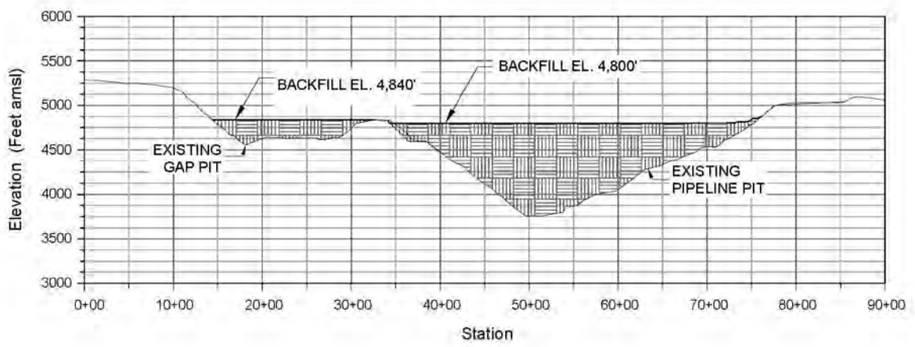

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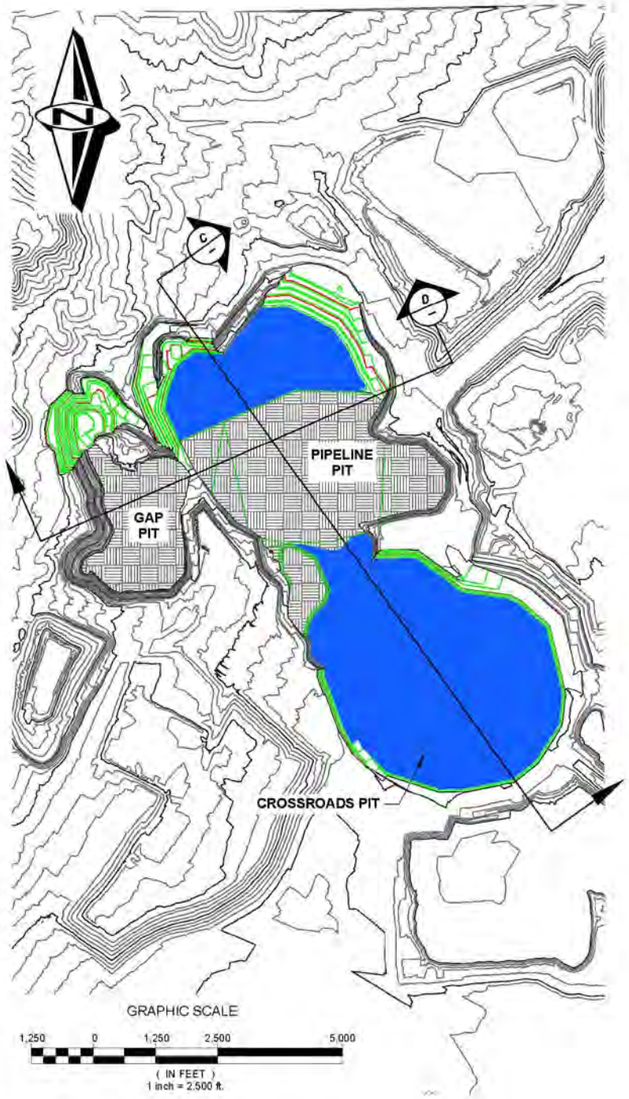
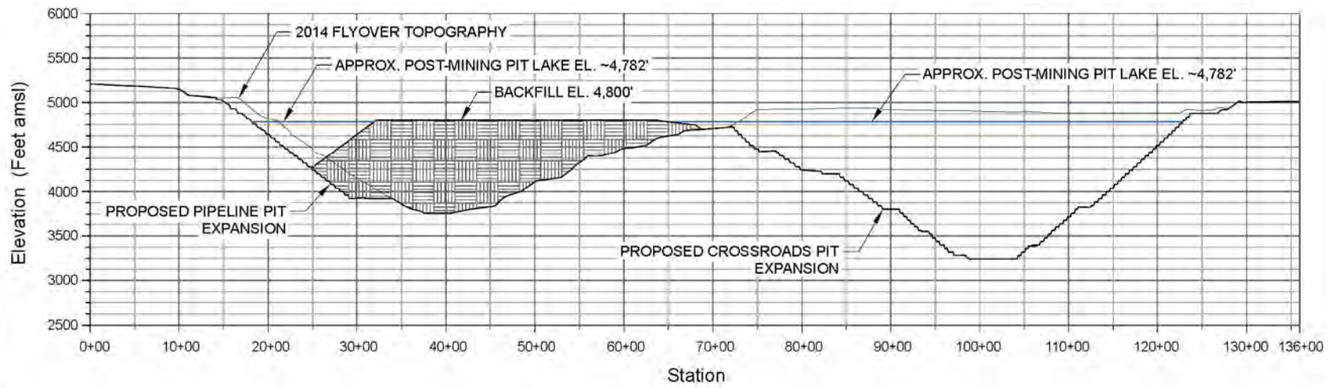
Figure 2-4

Pipeline Pit Complex
Backfill Scenario 1





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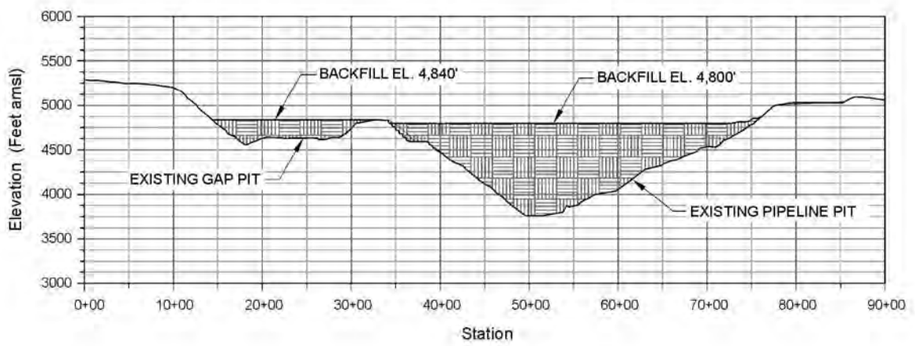

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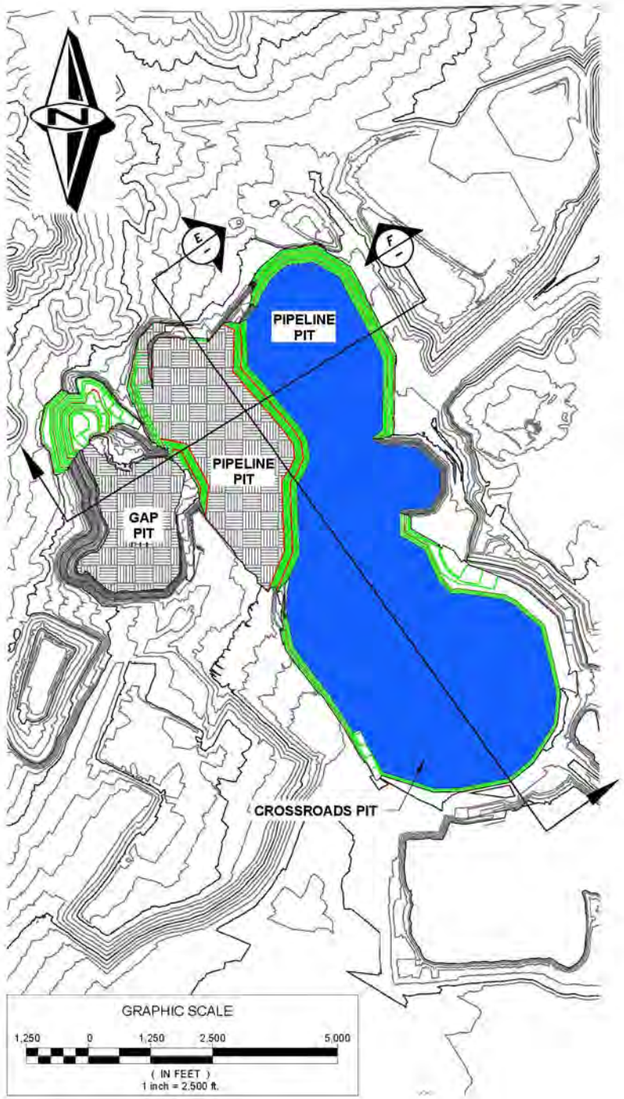
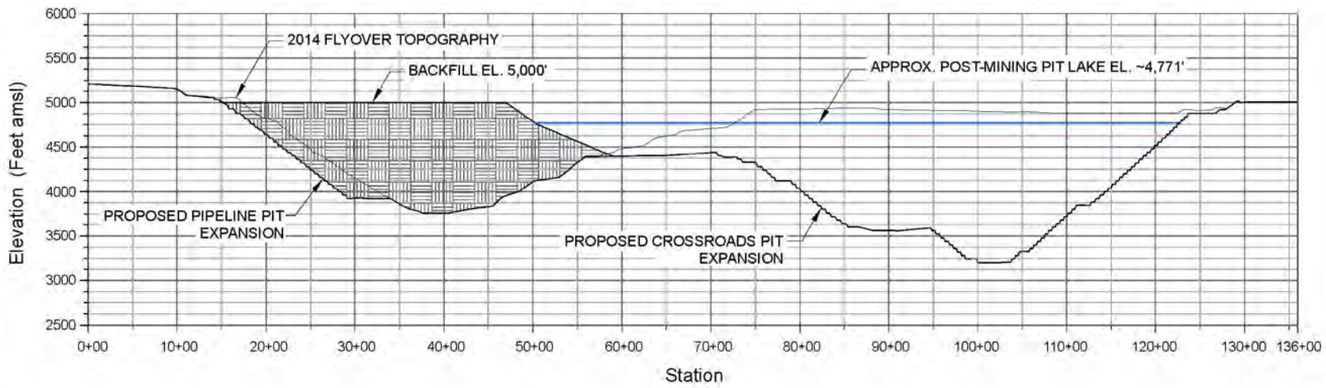
Figure 2-5

Pipeline Pit Complex
Backfill Scenario 2





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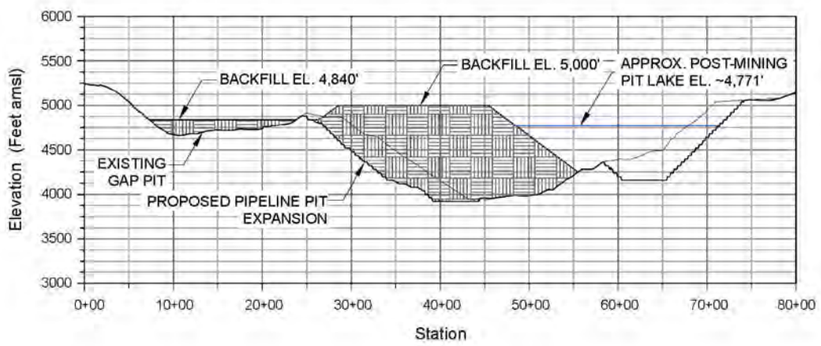

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Figure 2-6

Pipeline Pit Complex
Backfill Scenario 3

Gold Acres Complex:

- Expand and deepen the existing Gold Acres Pit and develop three satellite pits (Alta, Bellweather, and Pasture) (**Figure 2-7**).
- Expand the existing Gold Acres South Waste Rock Facility and combine the existing Gold Acres North and Gold Acres East waste rock facilities into one facility (Gold Acres North Waste Rock Facility).
- Construct a new Class III-waivered landfill and close the existing landfill.
- Construct a new refractory ore stockpile and a new growth media stockpile.
- Construct or install additional ancillary support facilities (e.g., mine operations office, septic system, fuel skid, water pipeline, power infrastructure).

Cortez Hills Complex:

- Expand existing underground operations by increasing the depth of mining by 1,300 feet and construct additional surface support facilities for underground operations.
- Extend the Pediment portion (southern portion) of the existing Cortez Hills Pit to create the Pediment East and Pediment South extensions.
- Potentially backfill the Cortez Hills Pit with approximately 63 million tons of waste rock (**Figure 2-8**).
- Modify the existing Canyon Waste Rock Facility.
- Construct a new water treatment plant and associated facilities.
- Construct a new refractory ore/oxide ore stockpile and a new growth media stockpile.

Cortez Complex:

- Expand and deepen the existing Cortez Pit by approximately 200 feet.
- Backfill the northern portion of the Cortez Pit and the existing Ada 52 Pit with approximately 3 million tons of waste rock (**Figure 2-9**).
- Expand the existing Cortez Waste Rock Facility and re-route the power infrastructure.
- Construct or install additional ancillary support facilities (e.g., mine operations office, septic system, fuel skids, water pipeline, power infrastructure).

Water Management:

- Continue dewatering to accommodate mining to lower elevations in the Pipeline and Cortez Hills complexes, with the maximum dewatering rate remaining below the currently authorized rate of 36,100 gallons per minute.
- Construct additional rapid infiltration basins (RIBs) and associated infrastructure in Grass Valley, Pine Valley, and on private land outside of the CGM Operations Area in Crescent Valley.
- Convert the two existing Grass Valley production wells to injection wells, and construct up to four additional injection wells in Grass Valley, to re-inject treated dewatering water into the aquifer.

- Construct the proposed Rocky Pass Reservoir and associated infrastructure, if needed, and realign a segment of County Road 225 to provide public access around the reservoir.
- Construct stormwater controls, as necessary.

General Site-wide Changes:

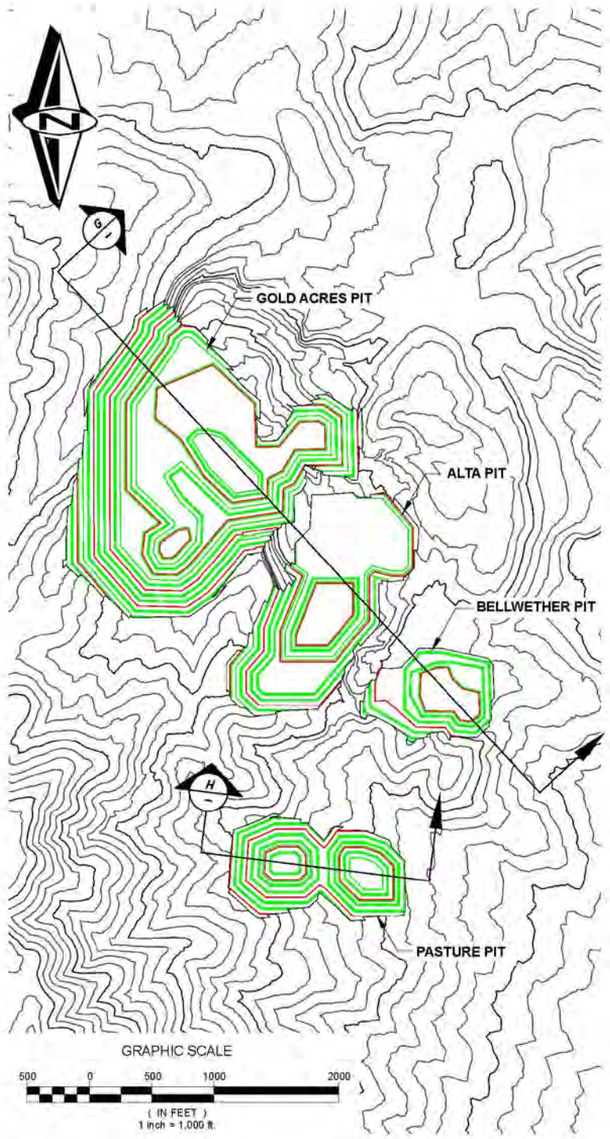
- Expand the CGM Operations Area boundary from the current 58,093 acres to 62,372 acres to include the proposed Pediment East extension of the Cortez Hills Pit, the Pine Valley RIBs and associated infrastructure, and the Rocky Pass Reservoir and associated infrastructure.
- Increase the off-site refractory ore shipment to the existing Goldstrike Mill (**Figure 2-10**) for processing from the currently authorized rate of 1.2 million tons per year (tpy) to 2.5 million tpy. The additional ore would extend processing at the Goldstrike Mill by approximately 3 years.
- Increase the backhaul of oxide ore from the Arturo Mine through the Goldstrike Mine to the Pipeline Complex (**Figure 2-10**) for processing at the existing Pipeline Mill or heap leach facility from the currently authorized rate of 600,000 tpy to 2.5 million tpy. No associated change in the current mill throughput rate, increase in the existing Pipeline Tailings Impoundment, or expansion of the existing Pipeline South Area Heap Leach Facility would be required to accommodate the processing of Arturo Mine oxide ore.
- Modify the site-wide surface mining rate from the currently authorized 580,000 tons per day (tpd) to a maximum of 600,000 tpd.

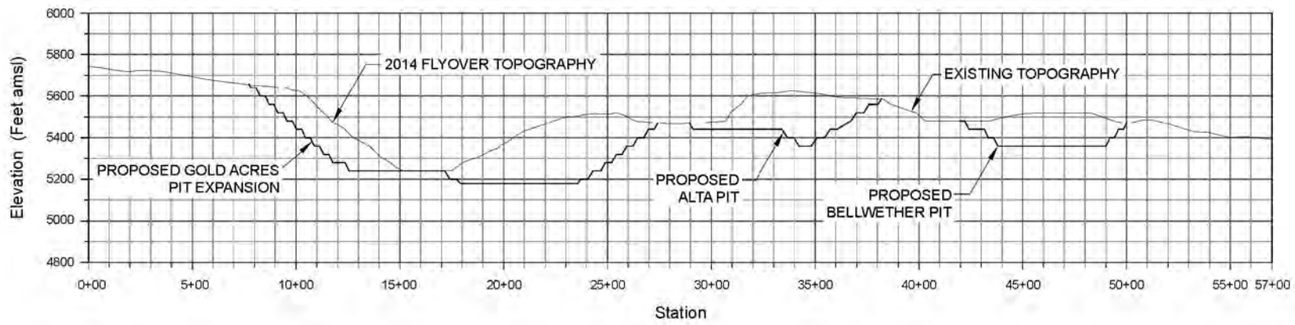
In addition to incorporation of the modifications outlined above, BCI proposes to modify the plan boundaries for BCI's two existing exploration projects (Horse Canyon/Cortez Unified Exploration Project [HC/CUEP] [NVN-66621] and West Pine Valley Exploration Project [NVN-077213]) to eliminate overlap with portions of the expanded CGM Operations Area boundary.

The Proposed Action would result in a total proposed new surface disturbance of 4,380 acres, including 3,846 acres within the CGM Operations Area and 534 acres outside of the CGM Operations Area on private land owned by BCI. Approximately 2,779 acres of the total proposed new disturbance would be on BLM-administered public lands. The currently authorized and proposed new surface disturbance, as well as reallocation of use of currently authorized disturbance, at the site is summarized in **Table 2-1**.

No increase in BCI's current work force (1,250 workers) would be required for the Proposed Action. It is anticipated that a contractor work force of approximately 350 workers also would be on site throughout the life of the project for construction of facilities and for other site preparation activities. Approximately 155 workers would be required for the final 3 years of ongoing ore processing, closure, and reclamation. The total BCI operations work force payroll/benefits is estimated to be approximately $628.8 million. The average annual contractor costs would be approximately $13.5 million.

If approved, the Deep South Expansion Project would extend the life of the mine by approximately 12 years, followed by approximately 3 years for site closure and final reclamation.





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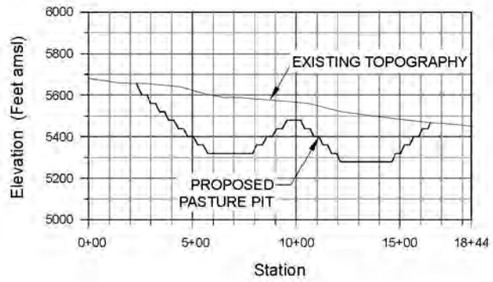

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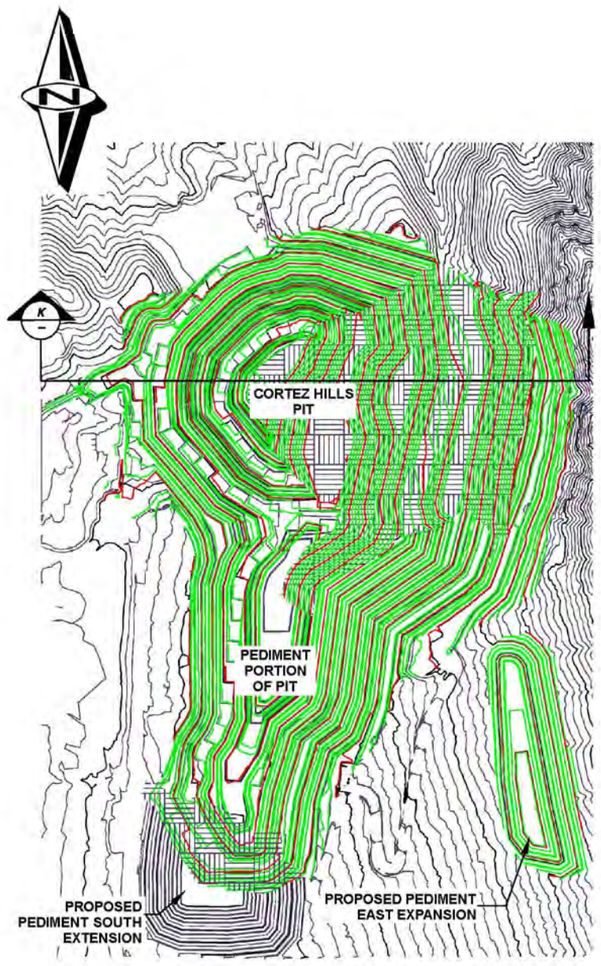
Figure 2-7

Gold Acres Pit and Satellite Pits



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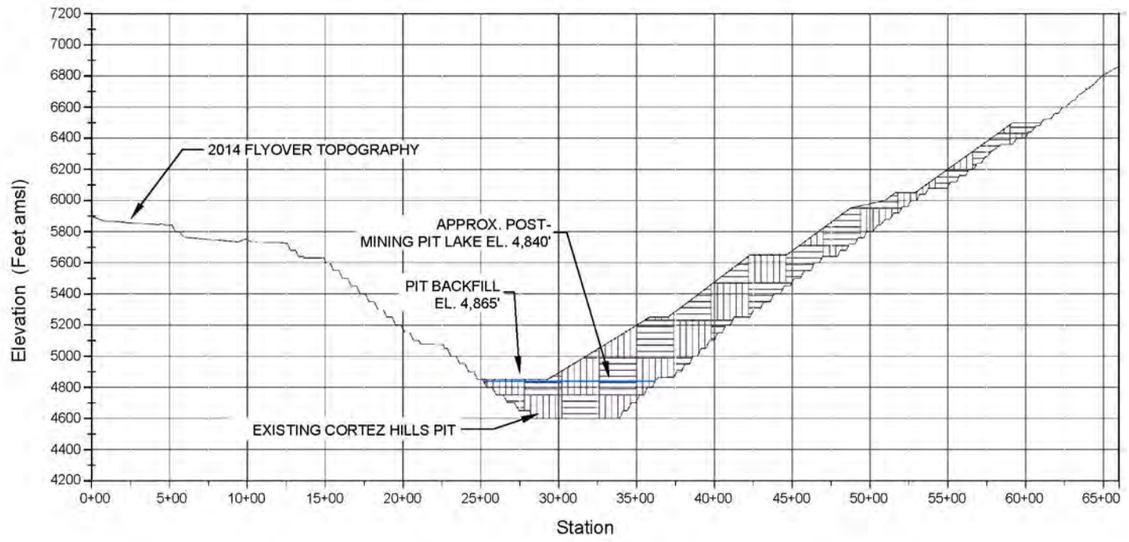

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Note: Waste rock temporarily may be stored in the Pediment South extension and if not utilized for Cortez Hill Pit backfill would be reclaimed in place.

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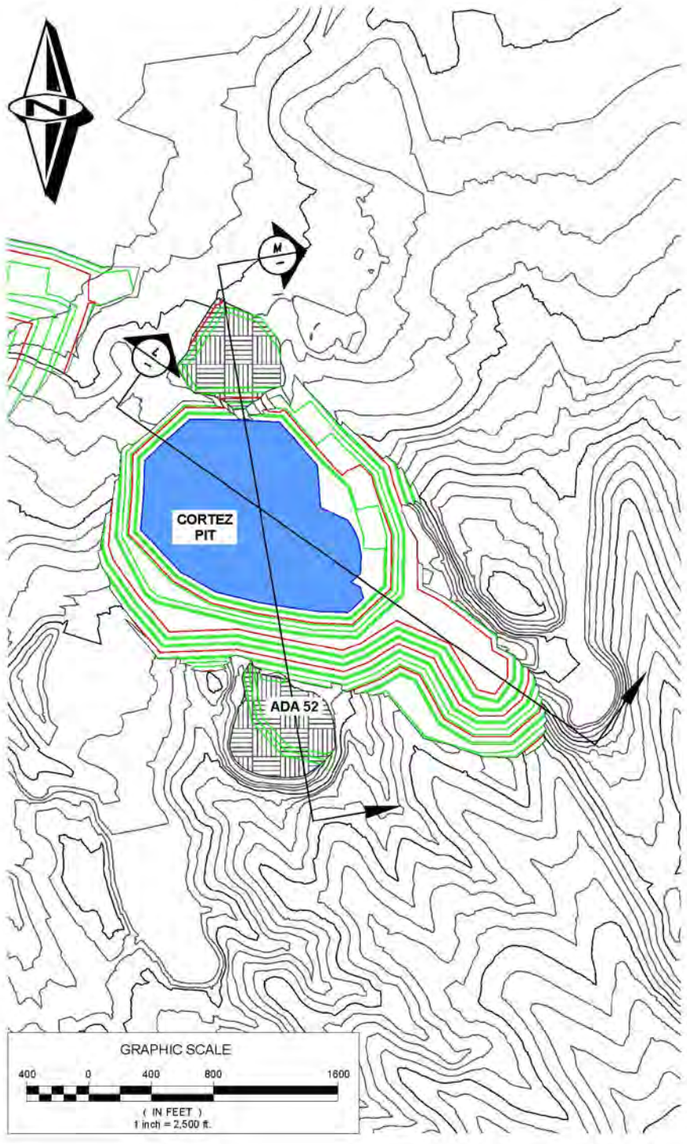
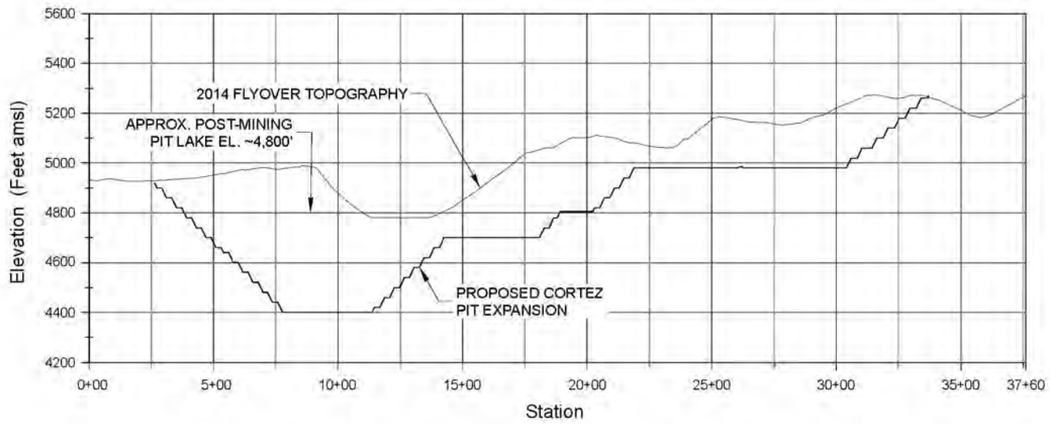
Figure 2-8

Cortez Hills Pit Backfill





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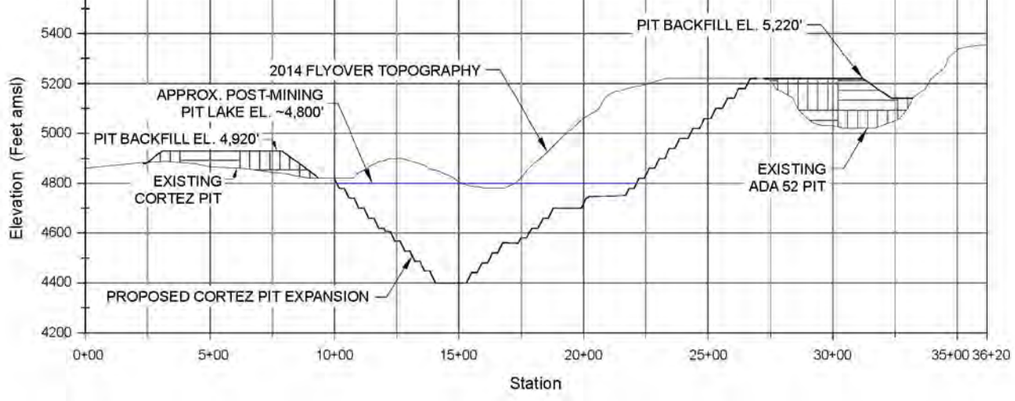

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Figure 2-9

Cortez Pit and
Ada 52 Pit Backfill

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Proposed CGM Operations Area Boundary
Goldstrike Mine Operations Boundary
Arturo Mine Operations Boundary
Ore Transportation Route

Note: No change in the currently authorized ore transportation route is proposed.

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Figure 2-10

Ore Transportation Route

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Table 2-1 Currently Authorized Disturbance and Proposed New Disturbance under the Proposed Action

Mine Complex	Facility	No Action Alternative Total Authorized Disturbance by Facility (acres)	Proposed Action		
			Proposed Total Disturbance by Facility (acres)	Proposed Reallocation of Use of Currently Authorized Disturbance (sum total acres)	Proposed New Surface Disturbance by Facility (acres)
Open Pits		2,752	3,411	474	185
Underground Operations		0[1]	0[1]	0[1]	0[1]
Waste Rock Facilities		5,393	5,685	-105	397
Heap Leach Facilities and Process Areas		1,933	2,049	116	0
Tailings Impoundments		1,416	1,208	-208	0
Ancillary Support Facilities		4,111	4,696	-336	921
Water Management Facilities		704	3,057	10	2,343
Exploration		391	391	0	0
Total Acres within CGM Operations Area[2]		**16,700**	**20,498**	**-48[3]**	**3,846**
Proposed New Disturbance Outside CGM Operations Area[4]					**534**
Total Proposed New Disturbance					**4,380**

[1] Disturbance associated with surface infrastructure for underground mining is accounted for in other currently authorized or proposed disturbance footprints.

[2] Differences are due to rounding.

[3] Reflects reallocation of undisturbed land that previously was authorized for disturbance.

[4] Reflects surface disturbance associated with proposed RIBs and associated infrastructure northeast of the CGM Operations Area in Crescent Valley.

2.3.2 Dewatering and Water Management

Dewatering currently is and would continue at the Pipeline and Cortez Hills complexes. No additional dewatering would be required to facilitate mining of the Cortez Pit. No dewatering would be required for the proposed expansion of the Gold Acres Pit or development of the Gold Acres satellite pits. The dewatering rate for the Deep South Expansion Project would remain below the currently authorized maximum rate of 36,100 gallons per minute. Prior to disposal through infiltration in the RIBs, irrigation use, or temporary storage in the reservoir, the dewatering water would be treated in the existing Pipeline water treatment facility or proposed Cortez Hills water treatment facility to reduce naturally occurring arsenic concentrations to meet Nevada Profile I reference values (Nevada Administrative Code [NAC] 445A).

2.3.3 Applicant-committed Environmental Protection Measures

BCI's committed environmental protection measures for operations in the CGM Operations Area are identified in the Barrick Cortez Inc. (NVN-067575 (16-1A)) Deep South Expansion Project Amendment to Plan of Operations and Reclamation Permit Application #0093 (BCI 2016). These measures currently are, and would continue to be, implemented as standard operating procedures to mitigate potential impacts to environmental and human resources. The measures specific to air quality are presented below.

2.3.3.1 Air Quality

- Fugitive dust controls, including water application on haul roads and other disturbed areas, chemical dust suppressant application (e.g., magnesium chloride), where appropriate, and application of other best management practices as approved by the Nevada Division of Environmental Protection (NDEP)-Bureau of Air Pollution Control, currently are, and would continue to be, implemented. Current operating permits include: Class I (Title V) Air Quality Operating Permit (Permit No. AP1041-2141) and Mercury Operating Permit to Construct: Phase 2 (Permit No. AP1041-2220). The permits would be modified for the Proposed Action, as needed.
- BCI would seed temporary disturbance areas (e.g., growth media stockpiles, cut and fill embankments, etc.) with a BLM-approved interim seed mix, and concurrent reclamation would be implemented on completed portions of the waste rock facilities when safe and practical to do so, thereby minimizing fugitive dust emissions.
- To reduce the generation of fugitive dust from the overland conveyor, the conveyor has been partially covered on the south side, which is the predominant wind direction in the CGM Operations Area. If needed, a water line and water sprays would be installed on the conveyor to further reduce fugitive dust generation.
- To control combustion emissions, all manufacturer installed pollution control equipment would be operated and maintained in good working order.

2.3.4 Reclamation

The proposed Reclamation Plan for the Deep South Expansion Project is summarized below.

2.3.4.1 Reclamation Overview

With the exception of pit highwalls, ramps, and floors; post-reclamation stormwater control features; rerouted county roads (e.g., County Road 225); and roads selected by BLM for post-mining use, all of the surface disturbance associated with the mine components would be reclaimed. Concurrent reclamation would be conducted to the extent practical to accelerate revegetation of disturbance areas. All sediment and erosion control measures and revegetated areas would be inspected periodically to ensure long-term erosion control and successful reclamation.

2.3.4.2 Growth Media

Growth media replacement depths for the existing heap leach pads and tailings impoundments would be at least 18 inches and 12 inches, respectively. All other mine facilities (with the exception of the open pits) would be covered to a depth of at least 6 inches. Approximately 1.2 million cubic yards of growth media would be required to reclaim Proposed Action facilities. Approximately 1.6 million cubic yards of suitable growth media would be salvage, with up to approximately 190 million tons of alluvium/colluvium also available for reclamation use. The proposed growth media placement depths would be reviewed in coordination with the BLM and the NDEP for specification in the final closure plan for the project.

2.3.4.3 Seeding, Planting, and Noxious Weed Control

Seeding would be conducted using the seed mixes that originally were developed by the BLM (BLM 2008a,b), as presented in the Barrick Cortez Inc. (NVN-067575 (16-1A)) Deep South Expansion Project Amendment to Plan of Operations and Reclamation Permit Application #0093 (BCI 2016 – Tables 3-2 and 3-3). The seed mixes were based on the species' effectiveness in providing erosion protection, the ability to grow within the constraints of the low annual precipitation experienced in the region, species suitability for site aspect, and the site

elevation and soil type (BLM 2008a). In addition to seeding the waste rock facilities, BCI would evaluate planting of singleleaf pinyon seedlings in suitable areas as part of the reclamation program.

BCI's Noxious Weed Control Plan (SRK Consulting, (U.S.) Inc. [SRK] 2014) would continue to be implemented at the site as a property-wide program.

2.3.4.4 Facility Reclamation

Facility reclamation is discussed in detail in the Barrick Cortez Inc. (NVN-067575 (16-1A)) Deep South Expansion Project Amendment to Plan of Operations and Reclamation Permit Application #0093 (BCI 2016) and summarized below.

- Open Pits: Post-mining safety barriers (e.g., berms, fencing, or other appropriate barriers) would be installed peripherally to the crest of each pit, with pit ramps barricaded in a similar manner to prevent entrance. Pit lakes would form in the bottom of some pits after dewatering activities cease (i.e., portions of the Pipeline Pit Complex and Cortez Pit). Other pits would be completely or partially backfilled with waste rock material.
- Underground Mine: Closure procedures would include: 1) construction of water-tight dams in select portions of the declines to re-establish pre-mining hydrologic conditions; 2) removal and salvage or disposal in an approved waste disposal facility of underground and surface piping, pumps, and equipment; 3) abandonment of surface dewatering wells and boreholes in accordance with applicable rules and regulations; 4) disposal of remaining fuels, lubricants, and explosives at a licensed off-site facility; and 5) installation of and earthen plug (minimum 30 feet long) in each decline to prevent access.
- Waste Rock Facilities: Concurrent reclamation would be conducted to the extent possible using an interim reclamation seed mix (Barrick Cortez Inc. (NVN-067575 (16-1A)) Deep South Expansion Project Amendment to Plan of Operations and Reclamation Permit Application #0093 [BCI 2016] – Table 3-1). Lifts would be regraded to an overall average 2.5H:1V slope, growth media distributed to a depth of approximately 6 inches, areas reseeded, and erosion controls and storm diversions installed. Portions of pit backfill areas that would be above the projected groundwater table would be reclaimed in a manner similar to out-of-pit waste rock facilities.
- Existing Heap Leach Facilities: A Final Plan for Permanent Closure detailing proposed closure technology (e.g., evaporation cells or evapotranspiration cells), management requirements for long-term effluent discharge, and closure would be developed 2 years prior to project closure pursuant to the requirements of the NDEP (NAC 445A.430 through 445.447) at the time of closure. An ecological risk assessment evaluating potential sodium (and other constituent) accumulation in the soils of the evaporation and evapotranspiration cells would be included.
- Existing Tailings Impoundment: A Final Plan for Permanent Closure would be developed 2 years prior to project closure for submittal to BLM and NDEP. The plan would include tailings closure specifications, including draindown management, which would be similar to that for the heap leach facilities.
- RIBs: The RIBs would be backfilled to grade and revegetated at closure. A detailed closure plan would be prepared at least 2 years prior to the anticipated closure date (NAC 445A.447) for submittal to BLM and NDEP. The closure plan would conform to the water pollution control regulations in effect at the time of closure.

- Rocky Pass Reservoir: Water remaining in the reservoir would be pumped back to the Pipeline Pit. The material from the earthen embankment would be removed and placed in the impoundment footprint from where it was borrowed during construction. The pipelines and other equipment would be removed and properly disposed or reused at another Barrick site. The entire reservoir footprint would be scarified and seeded.
- Roads: Some access roads would be maintained to provide access to monitoring sites following the completion of mining. As determined by BLM, any roads on public lands determined to be suitable for public access or which continue to provide public access consistent with pre-mining conditions would not be reclaimed. County roads also would be retained. Roads that potentially would support alternate land uses, as would be determined in coordination with agencies, local governments, and tribes, also may be retained. All other haul, access, and exploration roads would be recontoured and reclaimed.
- Buildings and Ancillary Facilities: Disposition of buildings and ancillary facilities would be conducted as described in the Final EIS (BLM 2019). BCI would work with agencies, local governments, and tribes to evaluate alternative land uses that could provide long-term socioeconomic benefits from the mine infrastructure.
- Drill Holes and Water Wells: All drill holes and water wells subject to Nevada Division of Water Resources (NDWR) regulations would be abandoned in accordance with applicable rules and regulations (NAC 534.425 through 534.428). Boreholes would be sealed to prevent cross contamination between aquifers, and the required shallow seal would be placed to prevent contamination by surface access.
- Monitoring Wells: Monitoring wells around the heap leach facilities would be maintained until BCI is released from post-mining groundwater monitoring requirements by the NDEP. These wells then would be plugged and abandoned according to the requirements of the Nevada State Engineer.

2.3.4.5 Post-reclamation Monitoring and Maintenance

Following mine closure, BCI would conduct maintenance, site inspections, and any other necessary monitoring for the period of reclamation responsibility. Post-mining groundwater quality would be monitored according to the requirements established by NDEP, with the goal of demonstrating non-degradation to waters of the state. Monitoring of revegetation success would be conducted annually for a minimum of 3 years or until the revegetation standards have been met, as determined by the jurisdictional agencies. In addition, noxious weed monitoring and control would be implemented for a period of 5 years. Post-mining monitoring and maintenance is provided for in BCI's long-term contingency fund (BCI 2016).

2.4 Alternatives to the Proposed Action

Two alternatives to the Proposed Action were carried forward for analysis of impacts and are summarized below.

2.4.1 Gold Acres Pit Partial Backfill Alternative

Project development, operation, and reclamation under the Gold Acres Pit Partial Backfill Alternative would be the same as under the Proposed Action, with the following exceptions.

- Expansion of the existing Gold Acres Pit would be completed prior to development of the proposed satellite pits (Alta, Bellwether, and Pasture), with the waste rock from the satellite pits (30 million tons) placed as backfill in the Gold Acres Pit (**Figures 2-11** and **2-12**).
- Placement of backfill in the Gold Acres Pit would result in a 72-acre reduction in the proposed new disturbance for the Gold Acres North Waste Rock Facility (**Table 2-2**).

Table 2-2 Currently Authorized Disturbance and Proposed New Disturbance under the Acres Pit Partial Backfill Alternative

Mine Complex	Facility	No Action Alternative Total Authorized Disturbance by Facility (acres)	Gold Acres Pit Partial Backfill Alternative		
			Proposed Total Disturbance by Facility (acres)	Proposed Reallocation of Use of Currently Authorized Disturbance (sum total acres)	Proposed New Surface Disturbance by Facility (acres)
Open Pits		2,752	3,411	474	185
Underground Operations		0[1]	0[1]	0[1]	0[1]
Waste Rock Facilities		5,393	5,597	-121	325
Heap Leach Facilities		1,933	2,049	116	0
Tailings Impoundment		1,416	1,208	-208	0
Ancillary Support Facilities		4,111	4,696	-336	921
Water Management Facilities					
Water Management Facilities		704	3,057	10	2,343
Exploration		391	391	0	0
Total Acres within CGM Operations Area[2]		**16,700**	**20,410**	**-64[3]**	**3,774**
Proposed New Disturbance Outside CGM Operations Area[4]					**534**
Total Proposed New Disturbance					**4,308**

[1] Disturbance associated with surface infrastructure for underground mining is accounted for in other currently authorized or proposed disturbance footprints.

[2] Differences are due to rounding.

[3] Reflects reallocation of undisturbed land that previously was authorized for disturbance.

[4] Reflects surface disturbance associated with proposed RIBs and associated infrastructure northeast of the CGM Operations Area in Crescent Valley.

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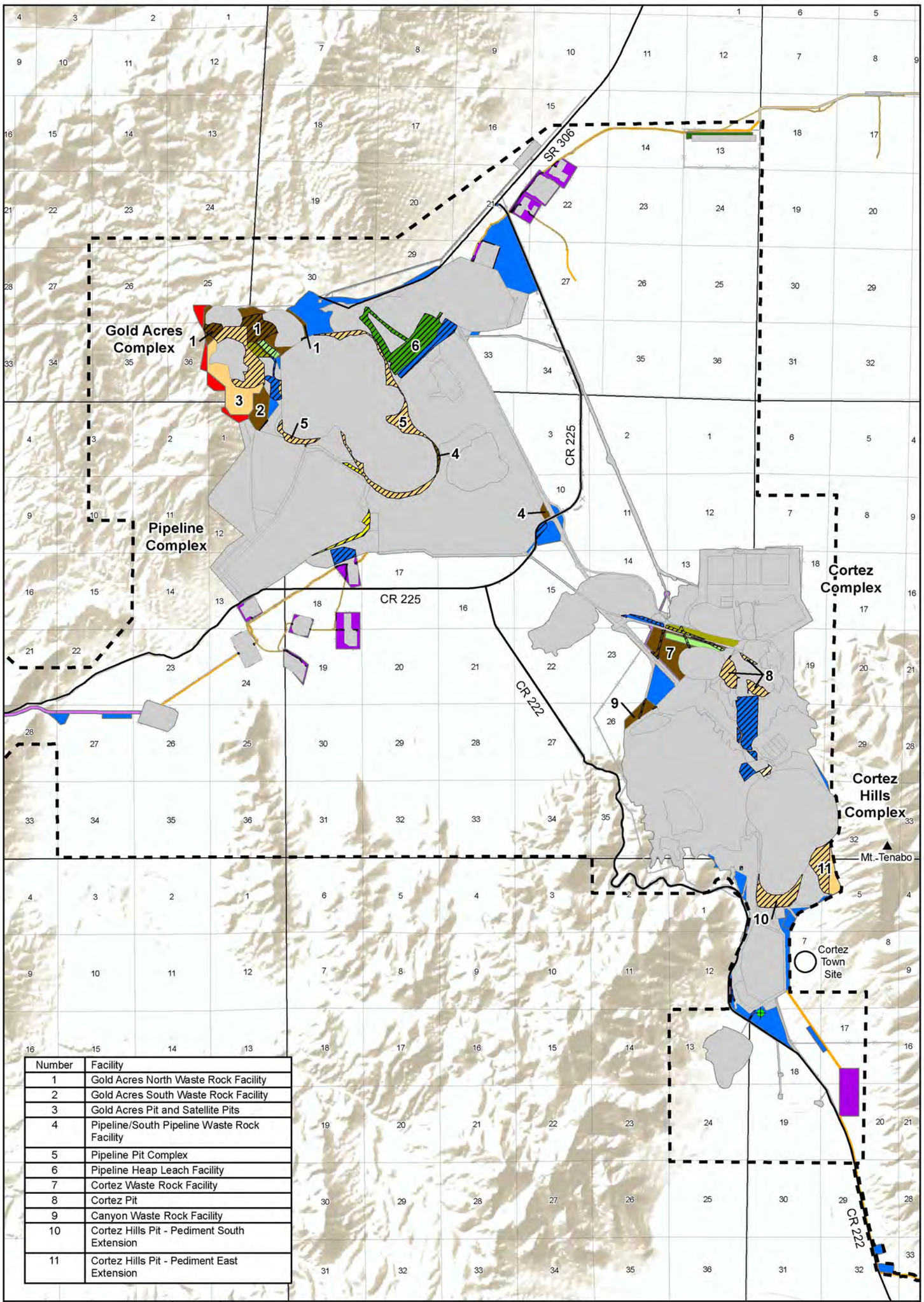

Number	Facility
1	Gold Acres North Waste Rock Facility
2	Gold Acres South Waste Rock Facility
3	Gold Acres Pit and Satellite Pits
4	Pipeline/South Pipeline Waste Rock Facility
5	Pipeline Pit Complex
6	Pipeline Heap Leach Facility
7	Cortez Waste Rock Facility
8	Cortez Pit
9	Canyon Waste Rock Facility
10	Cortez Hills Pit - Pediment South Extension
11	Cortez Hills Pit - Pediment East Extension

Figure 2-11
Gold Acres Pit
Partial Backfill Alternative -
Mine Complexes

Deep South Expansion Project EIS

- Proposed CGM Operations Area Boundary
- Existing Facilities
- Overlap of Existing and Proposed Facilities
- Powerline
- Fence
- Proposed Infiltration Distribution Pipeline
- Proposed Water Treatment Plant
- Proposed Post-mining Stormwater Control
- Proposed Ancillary Facilities
- Proposed Borrow Pit/Gravel Pit
- Proposed Growth Media Stockpile
- Proposed Haul Road
- Proposed Heap Leach Facility Modification
- Proposed Infiltration Basin
- Proposed Open Pit Modification
- Proposed Stormwater Retention Pond
- Proposed Conveyor Crusher/Ore Stockpile Modification
- Proposed Refactory Ore Stockpile
- Proposed RIBs and Modifications
- Proposed Waste Rock Facility Modification

Note: Ore stockpiles and growth media stockpiles would be placed in existing or proposed ancillary facilities areas or on top of existing or proposed waste rock facilities per existing operations. New surface disturbance would be the same as under the Proposed Action except for a 72-acre reduction in new disturbance at the Gold Acres Waste Rock Facility (facility number 1 in this figure).

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Battle Mountain, Nevada 89820

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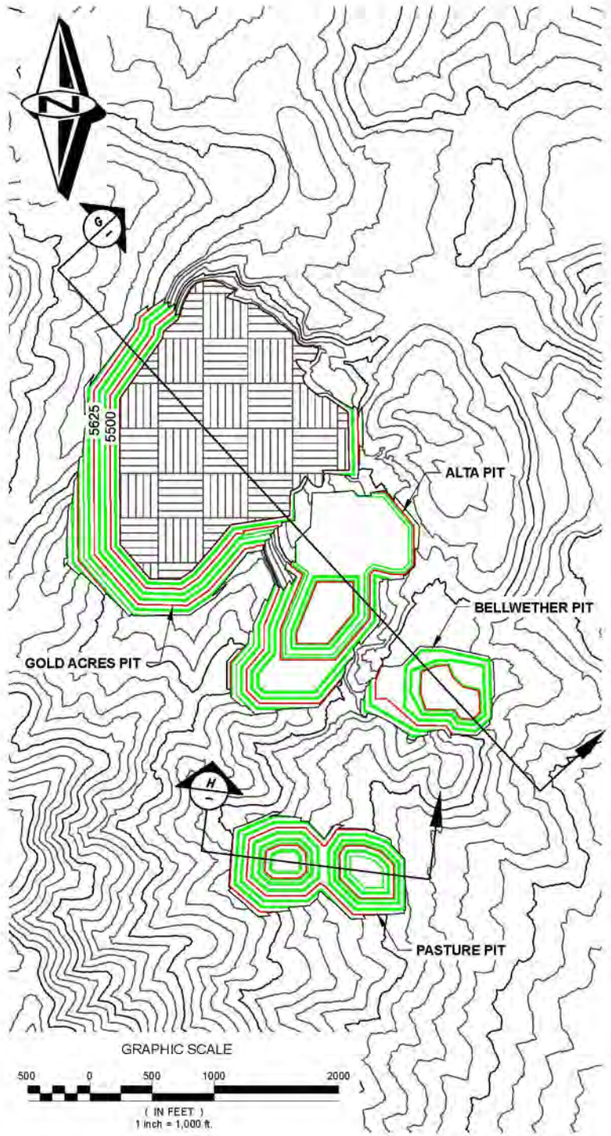

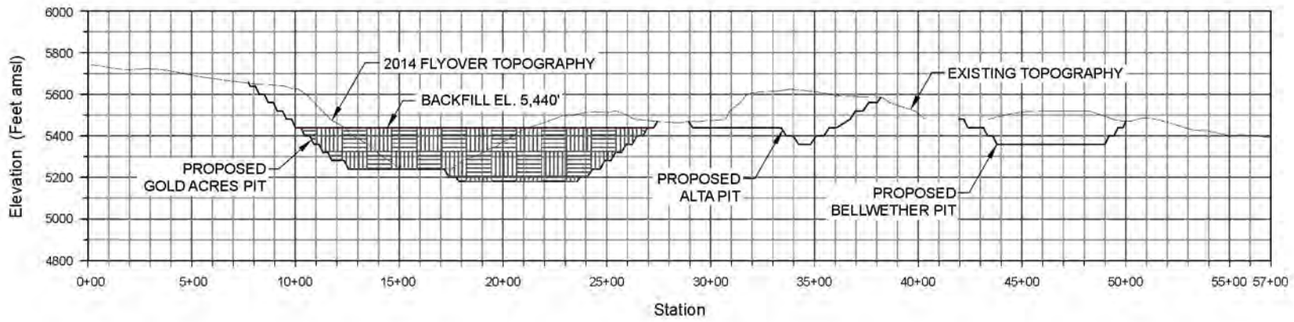

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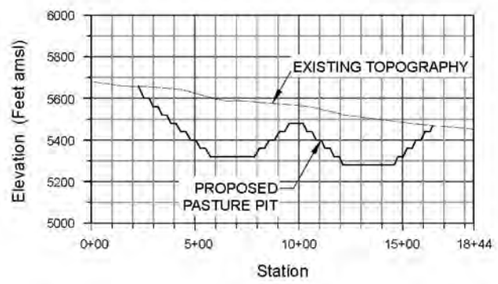

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Figure 2-12

Gold Acres Pit
Partial Backfill

2.4.2 No Action Alternative

Under the No Action Alternative, the existing mining and processing operations in the CGM Operations Area, the current off-site transport of refractory ore to the Goldstrike Mill for processing, the backhaul of Arturo Mine oxide ore to the Pipeline Complex for processing, and site reclamation would continue under the terms of current permits and approvals as authorized by the BLM and State of Nevada. Existing facilities in the four mine complexes in the CGM Operations Area and the authorized disturbance are shown in **Figure 2-1** and presented in **Table 2-1**. The facilities and ongoing operations are summarized below.

Mine Facilities:

- Open pit mining at the Pipeline Pit Complex and the Cortez Hills and Cortez pits would continue. Any additional mining at the Gold Acres Pit would be conducted in accordance with existing permit criteria.
- Underground mining at the Cortez Hills Complex would continue, with mining conducted to the 3,800-foot elevation.
- The following out-of-pit waste rock facilities would continue to be used: Pipeline/South Pipeline Waste Rock Facility, Gap Waste Rock Facility, Canyon Waste Rock Facility, North Waste Rock Facility, South Waste Rock Facility, and Cortez Waste Rock Facility.
- Waste rock mined in the Pipeline Pit Complex alternately may be placed in the currently authorized backfill areas in the northeast and northwest portions of the pit complex (i.e., Pipeline Pit and Gap Pit, respectively).
- The following heap leach facilities would continue to be used: Pipeline South Area Heap Leach Facility, the heap leach portion of the Pipeline Heap Leach/Tailings Facility, and the Grass Valley Heap Leach Facility.
- The Pipeline Mill would continue to be used, and tailings would continue to be deposited at the tailings portion of the Pipeline Heap Leach/Tailings Facility.
- Existing ancillary facilities would continue to be used.

Water Management:

- Mine dewatering and disposal would continue through the completion of mining (early 2023). Dewatering water would be consumed, piped to the existing RIBs in Crescent Valley for infiltration, or piped to the Dean Ranch for seasonal irrigation purposes as currently authorized. Dewatering water would be treated at the Pipeline water treatment plant prior to disposal.

General Site-wide Operations:

- Refractory ore would continue to be trucked off-site at a rate of up to 1.2 million tpy for processing at the Goldstrike Mill, with shipments and processing continuing through 2023.
- Arturo Mine oxide ore would continue to be backhauled at a rate up to 600,000 tpy to the Pipeline Complex for mill and heap leach processing through 2023.

Approximately 1,250 workers currently are employed by BCI for open-pit and underground mining, heap leach and mill processing, and reclamation activities in the CGM Operations Area, with an on-site contractor work force of approximately 350 workers. Operations are anticipated to continue through approximately 2023. Approximately 155 workers would be required for the final 3 years (through 2026) of ongoing ore processing, decommissioning, and

final reclamation. The average annual operations work force payroll for the remainder of the currently authorized project would be approximately $406 million.

2.4.2.1 Environmental Protection Measures

BCI's committed environmental protection measures for operations in the CGM Operations Area, as well as additional BLM-stipulated mitigation measures, were identified in the associated NEPA documents (BLM 2015a, 2014a, 2011a, 2008a) and decision documents (BLM 2015b, 2014b, 2011b, 2008b). These measures would continue to be implemented as standard operating procedures to mitigate potential impacts to environmental and human resources.

2.4.2.2 Reclamation

Existing facilities would be closed and reclaimed in accordance with the currently approved reclamation plan, current permits, and applicable federal and state site closure and reclamation requirements. Final closure and reclamation of the mine site are discussed in previous NEPA documents (BLM 2015a, 2014a, 2008a) and generally would follow the procedures in Section 2.3.4, Reclamation. Post-mining pit lakes would develop in the Crossroads Pit and southern portion of the Gap Pit portions of the Pipeline Pit Complex, the Cortez Hills Pit, and the Cortez Pit as discussed in the Cortez Hills Expansion Project Final EIS (BLM 2008a).

2.4.2.3 Monitoring

Under the No Action Alternative, monitoring would continue as described in the approved plans and the comprehensive Cortez Integrated Monitoring Plan (BLM 2011a, 2008a).

2.5 Past, Present, and Reasonably Foreseeable Future Actions

The past and present actions, as well as the RFFAs, for the cumulative impact analysis are summarized below in **Table 2-3**, and the distribution of the primary surface-disturbing actions shown in **Figure 2-13**.

Table 2-3 Surface Disturbance Associated with Past and Present Actions and RFFAs

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Mining Projects			
Black Rock Canyon Mine	117	0	117
Clipper Mine	400	0	400
BCI Buckhorn Mine	820	0	820
BCI CGM Operations Area	16,700	0	16,700
BCI Goldrush Project[1]	0	***1,102***	***1,102***
BCI Horse Canyon Mine	***425***	0	***425***
BCI Mill Canyon	18	0	18
Cortez Silver Mining District[2]	92	0	92
Elder Creek Mine	143	0	143
Fire Creek Mine	285	5	290
Fox Mine	4	0	4
Greystone Mine	242	0	242
Grey Eagle Project	5	0	5
Hot Springs Sulfur Mine	5	0	5
May Mine	1	0	1
Mud Spring Gulch	10	0	10
South Silicified Project	31	0	31
Utah Mine and Camp	6	0	6
Other Mining Projects[3]	97	210	307
Subtotal	**19,*401***	**1,*317***	**20,*718***
Exploration			
Notices BLM-Battle Mountain District Office: 118 expired, 8 pending, and 30 authorized[4]	265	0	265
Plans (7) BLM-Battle Mountain District Office[4]	306	0	306
Notices (10) BLM-Ely Field Office[4]	50	0	50
BCI HC/CUEP[5]	549	0	549
BCI West Pine Valley	150	0	150
BCI Hilltop Exploration/Mine	92	0	92
BCI Pipeline/South Pipeline/Gold Acres Exploration Project	50	0	50
BCI Robertson Project	12	0	12
BCI Robertson Exploration Project[6]	294	0	294
Dean Mine	67	0	67
Mud Springs	0	10	10
Mill Canyon Exploration	250	0	250
South Roberts	0	3	3

Table 2-3 Surface Disturbance Associated with Past and Present Actions and RFFAs

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Toiyabe Project	40	0	40
Uhalde Lease	100	0	100
Other Mining Exploration[7]	32	1,564	1,596
Subtotal	**2,257**	**1,577**	**3,834**
Utilities/Community			
State Route 306 and Roads in Northern Crescent Valley (100 feet wide)	422	0	422
Gravel Roads in Crescent Valley and Northern Carico Lake Valley (50 feet wide)	1,558	0	1,558
Dirt Roads in Crescent Valley and Northern Carico Lake Valley (30 feet wide)	776	0	776
Power lines in Crescent Valley (60 feet wide)	364	0	364
Wells Rural Electric Cooperative power line for potential future Goldrush Project	0	1***50***	1***50***
BCI Fiber Optic Cable (20 feet wide)[8]	53	0	53
BCI Jeremy's Knob Communications Tower and Right-of-Way (ROW)[9]	0.5	0	0.5
Towns of Crescent Valley and Beowawe[10]	900	0	900
Other ROWs (Roads, Mining)	27	161	188
Other Utilities (Electric, Communications, Federal Aviation Administration)	1,176	2	1,178
Subtotal	**5,276**	**3*14***	**5,*590***
Other Development and Actions			
BLM Fuels Reduction Projects[11]	5,641	900	6,541
Wildfires[12]	351,220	0	351,220
Recreation[13]	0	0	0
Livestock[14]	10	53	63
Wildlife	0	0	0
Agriculture Development[15]	9,750	0	9,750
BCI Additional Irrigation Pivots at Dean Ranch[16]	0	640	640
Lodge at Pine Valley[17]	30	0	30

Table 2-3 Surface Disturbance Associated with Past and Present Actions and RFFAs

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Crescent Valley Water Supply	2	0	2
BCI Cottonwood Infiltration Basins[16]	104	0	104
BCI Bank Enabling Agreement (BEA) Project Plans[18]	0	46,929	46,929
Subtotal	**366,757**	**48,522**	**415,279**
Total	**393,*691***	**51,*730***	**445,*421***

[1] ***Disturbance acreage from BCI's Goldrush Mine Plan of Operations, Table 4-1 (BCI 2018); total disturbance of 1,724 acres less existing disturbance of 622 acres equals new disturbance of 1,102 acres. Existing disturbance is included in the disturbance for BCI's HC/CUEP and West Pine Valley exploration projects.***

[2] Historic mining- and exploration-related disturbance first began in 1862, prior to the promulgation of surface land management laws and regulations governing mining activities on public lands (e.g., Federal Land Policy and Management Act of 1976 and 40 CFR 3809). Since there were no laws or regulatory programs in place at that time, there were no regulatory or administrative approvals granted. Therefore, the identified disturbance acreage does not include all historic mining-related disturbance in the area.

[3] Includes gold and barium/barite mines.

[4] Plans and notices outside of the general Crescent Valley area have not been quantified.

[5] The approved plan provides for surface exploration activities and development of twin declines for underground exploration (BLM 2016b).

[6] BCI's Robertson Exploration Project boundary is located immediately north of, and partially within, the CGM Operations Area as shown in **Figure 2-13**.

[7] Includes projects by Barrick Cortez Exploration, Nu Legacy Gold, and 777 Minerals Inc.

[8] Right-of-way (ROW) runs from the Lodge at Pine Valley to the southeast boundary of the CGM Operations Area.

[9] BCI facility located in T28N, R47E, Section 18 SESE just north of the CGM Operations Area; ROW N-092170.

[10] Surface disturbance associated with the towns of Crescent Valley and Beowawe is assumed to be 640 and 160 acres, respectively, with approximately 100 acres of private developed land peripheral to the towns.

[11] Inclusive of acreage associated with the Crescent Valley Wildland Urban Interface Fire Defense System, Tonkin Hazardous Fuels Reduction Project, and Red Hills Hazardous Fuels Reduction Project. Of the total acreage, planned prescribed burns would affect up to 2,537 acres of pinyon-juniper woodland, and 800 acres of pinyon-juniper woodland would be thinned. Also includes future treatment of 900 acres of encroaching pinyon-juniper woodland for enhancement of greater sage-grouse habitat in the approved HC/CUEP Plan of Operations (BLM 2016a,b).

[12] Reflects acreage of vegetation affected by wildland fires from 1998 through 2017 within the vegetation cumulative effects study area (CESA). The acreage is inclusive of approximately 19,681 acres of fire-affected pinyon-juniper woodland.

[13] Surface disturbance associated with recreation activities has occurred; however, the acreages have not been quantified.

[14] Existing livestock-related surface disturbance is associated with water developments. The surface disturbance associated with the livestock RFFAs is based on 0.5 acre per water development activity and 43 acres for fencing and cattle guards. The 4,313 acres previously identified for RFFA activities (BLM 2015a) inadvertently included acreage of surface occupancy. Livestock-related activities outside of the Carico Lake Allotment have not been quantified.

[15] Surface disturbance associated with agricultural development is based on the acreage under irrigation and assumes that a change in vegetation and habitat equates to surface disturbance. Acreage values were based on a February 15, 1998, special hydrographic abstract for Hydrographic Basin No. 054 from the NDWR. These values are based on permitted or authorized use of water and may not reflect actual use in a given year.

[16] Surface disturbance located on private (Barrick-owned) land outside of the CGM Operations Area.

[17] This facility is located on the JD Ranch Road approximately 4 miles west of State Route 278 at the BCI-owned JD Ranch.

[18] Includes 37,006 acres for the BEA Public Lands Project Plan and 9,929 acres for the BEA Private Lands Project Plan. Conservation actions that would be implemented to restore and enhance greater sage-grouse habitat would include tree removal, seeding and planting, establishment of fuel breaks, and improving wet meadows (Barrick 2018).

Source: ***BCI 2018;*** BLM 2017a,b, 2015a, 2008a; ESRI World Imagery 2017; U.S. Census Bureau 2017.

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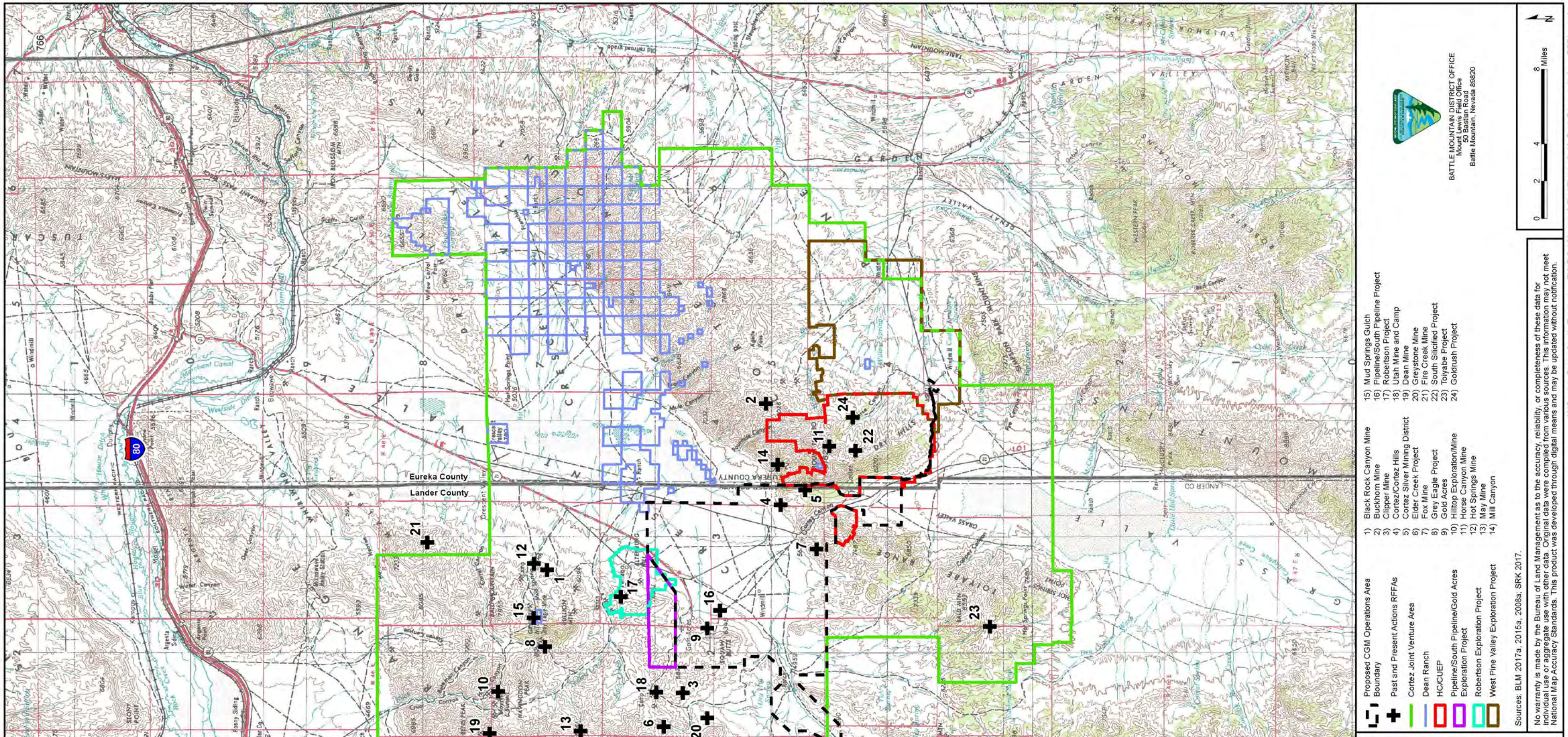

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Deep South Expansion Project EIS

Figure 2-13

Past and Present Actions and RFFAs

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3.0 Air Quality

The project study area for air quality encompasses the proposed facilities modifications, the area within 10 kilometers (km) (6.2 miles) of the CGM Operations Area, the transportation route for both the proposed additional off-site shipment of refractory ore to the Goldstrike Mine and proposed additional backhaul of Arturo Mine oxide ore through the Goldstrike Mine to the Pipeline Complex, and the Goldstrike Mill (relative to emissions associated with the proposed modification to refractory ore shipments). The CESA encompasses the Crescent Valley, Grass Valley, Marys Creek, and Maggie Creek hydrographic basins as defined by the NDWR (2012).

3.1 Climate

Nevada lies within the Basin and Range Physiographic Province, which is characterized by a series of north-south trending mountain ranges and intervening basins. This varied and rugged topography (including mountain ranges and narrow valleys) ranges in elevation from approximately 1,500 to more than 10,000 feet above mean sea level (amsl). Nevada has climatic diversity ranging from hot lowland desert in the south to cool mountain forests in the north. Large local variations of temperature and rainfall are common. The principal climatic features are bright sunshine, low annual precipitation (averaging 9 inches per year in the valleys and deserts), heavy snowfall in the higher mountains, clean dry air, and exceptionally large daily ranges of temperature.

The CGM Operations Area is located near the east-central portion of the Great Basin. The surrounding terrain consists of alternating mountain ranges and sagebrush-covered valleys. The proposed project lies on the western slopes of the Cortez Mountains. The higher elevations in the Cortez Mountains lie north of the CGM Operations Area with the highest peaks reaching elevations over 9,000 feet amsl. Elevations in the study area primarily range from approximately 4,500 to 7,500 feet amsl.

3.1.1 Regional Climate

Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that influences the climate of the state. One of the greatest contrasts in precipitation found within a short distance in the U.S. occurs between the western slopes of the Sierra Nevada Mountains in California and the valleys just to the east of this range. The prevailing winds are from the west. As the warm moist air from the Pacific Ocean ascends the western slopes of the Sierra Range, the air cools, condensation takes place, and most of the moisture falls as precipitation. Descending the eastern slope, the air is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the western portions of Nevada, but throughout the state, with the result that the lowlands are largely desert or steppes.

The climate in the project region is classified as arid. An arid climate is characterized by low rainfall, low humidity, clear skies, and relatively large annual and diurnal temperature ranges. Elevations below 6,500 feet amsl typically receive the least amount of precipitation (5 to 9 inches per year) while the mountainous areas greater than 6,500 feet amsl are substantially wetter and may receive 11 to 16 plus inches of precipitation annually (Western Regional Climate Center [WRCC] 2017a).

Three important meteorological factors influence the dispersion of pollutants in the atmosphere: mixing height, wind (speed and direction), and atmospheric stability. Mixing height is the height above ground within which rising warm air from the surface will mix by convection

and turbulence. Local atmospheric conditions, terrain configuration, and source location determine dilution of pollutants in this mixed layer. Mixing heights vary diurnally, with the passage of weather systems and with the season.

Wind speed has an important effect on area ventilation and the dilution of pollutant concentrations from individual sources. Light winds in conjunction with large source emissions may lead to an accumulation of pollutants that can stagnate or move slowly to downwind areas. Wind direction can indicate the typical directions of pollutant transport.

Morning atmospheric conditions tend to be stable due to the rapid cooling of the layers of air nearest the ground. Afternoon conditions, especially during the warmer months, tend to be neutral to unstable because of the rapid heating of the surface under clear skies. During the winter, periods of stable afternoon conditions may persist for several days in the absence of synoptic (continental scale) storm systems to generate higher winds with more turbulence and mixing. A high frequency of inversions at lower elevations during the winter can be attributed to the nighttime cooling and sinking air flowing from higher elevations to the low lying areas in the basins. Although winter inversions generally are quite shallow, they tend to be more stable due to reduced surface heating. Periods with stable conditions tend to result in higher pollutant concentrations than unstable periods.

While the terrain relief in the vicinity of the CGM Operations Area is diverse, two relatively nearby meteorological stations provide insight into the climate of the area. The Elko, Nevada, station is located approximately 60 miles northeast of the CGM Operations Area. The Beowawe University of Nevada Ranch observation site is located approximately 15 miles south-southeast of the CGM Operations Area.

3.1.2 Current Climate and Trends

Table 3-1 shows the average maximum, mean, and average minimum temperatures recorded at the Beowawe and Elko stations over a 30-year period (1980 through 2010). Both stations show a seasonal weather pattern with warm summers, cold winters, and transitional seasons. Although precipitation is spread throughout the year, most of the annual precipitation falls as snow during the winter months. The average annual precipitation is approximately 10 inches at both the Elko and Beowawe stations. As both these stations are similar in elevation to most of the project area, it can be considered representative of the CGM Operations Area. However, high elevation areas surrounding the CGM Operations Area likely experience cooler temperatures and higher precipitation.

No wind data are available from the Beowawe station; however, multi-decade wind data from the Elko station were obtained through the Iowa Environmental Mesonet (2017) data portal. As shown in **Figure 3-1**, the Elko wind rose indicates that winds are predominantly from the west, with a secondary maximum of wind occurrences from the south. It should be noted that winds in the Elko region are likely highly influenced by local terrain. Therefore, it is difficult to confidently say this would be representative of the CGM Operations Area. In comparison, **Figure 3-2** shows a wind rose generated from 1 year of data collected at the Cortez Hills meteorological station located in the CGM Operations Area. Unlike the Elko wind rose, the Cortez Hills wind rose shows winds predominantly from the north-northwest and south-southeast. While this weather station has not collected enough data to contain a detailed climatological record, it does show that winds in the area are diverse and likely influenced by local terrain. It should be noted that the Elko station and Cortez Hills station monitors serve different purposes, and the data collection specifications between the stations are different. Therefore, comparison of the data from the two stations should be done with caution. These

wind roses do indicate that there are likely terrain induced flows in the vicinity, and wind flows in the vicinity of the CGM Operations Area are likely variable.

Table 3-1 Monthly Climate Summary

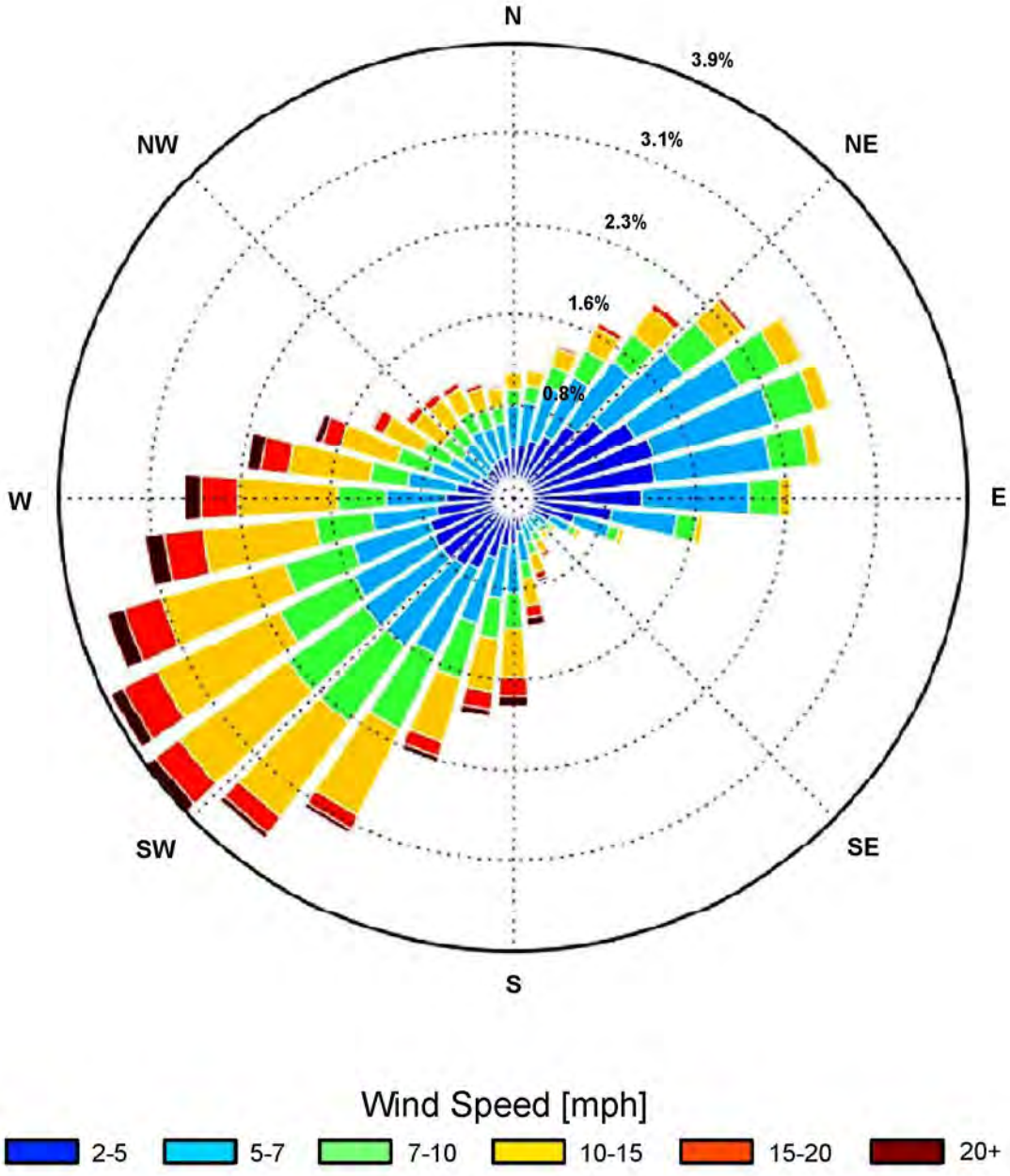
Parameter	Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Maximum Temperature (°F)	Beowawe[1]	40.7	45.2	52.2	58.7	67.8	77.9	87.5	86.3	77.7	66.0	51.8	41.6	62.9
	Elko[2]	36.3	41.4	51.6	59.4	69.2	80.0	90.3	88.5	78.5	64.5	48.2	37.2	62.2
Mean Temperature (°F)	Beowawe[1]	26.5	31.4	38.4	43.9	52.1	60.7	68.7	66.8	58.0	47.0	35.9	27.3	46.5
	Elko[2]	25.1	29.9	38.9	45.2	53.4	62.2	70.2	68.2	58.8	46.6	34.7	26.0	46.7
Average Minimum Temperature (°F)	Beowawe[1]	12.4	17.5	24.6	29.1	36.3	43.6	49.8	47.4	38.3	27.9	19.9	13.0	30.1
	Elko[2]	13.9	18.4	26.2	31.0	37.6	44.4	50.1	47.9	39.1	28.7	21.2	14.7	31.2
Average Total Precipitation (inches)	Beowawe[3]	0.9	0.7	1.1	1.0	1.3	0.8	0.5	0.5	0.6	0.8	0.9	0.9	9.9
	Elko[4]	1.1	0.8	1.0	1.0	1.0	0.7	0.4	0.4	0.6	0.8	1.1	1.2	9.9
Average Total Snowfall (inches)	Beowawe[3]	6.8	4.2	5.1	3.3	1.4	0.0	0.0	0.0	0.0	0.5	2.1	5.4	28.7
	Elko[4]	7.8	4.6	3.9	1.8	0.5	0.0	0.0	0.0	0.0	0.5	3.2	6.4	28.7
Average Snow Depth (inches)	Beowawe[3]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Elko[4]	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0

[1] 1981 – 2010 monthly climate normals at Beowawe, Nevada (WRCC 2017b).

[2] 1981 – 2010 monthly climate normals at Elko Regional Airport, Nevada (WRCC 2017c).

[3] 1972 – 2016 Beowawe, Nevada, period of record monthly climate summary (88.1 percent of possible observations for period of record for snowfall and 74.4 percent for snow depth were utilized in this statistic) (WRCC 2017d).

[4] 1888 – 2016 Elko Regional Airport, Nevada, period of record monthly climate summary (95.5 percent of possible observations for period of record for snowfall and 90.2 percent for snow depth were utilized in this statistic) (WRCC 2017e).



BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

Deep South Expansion Project EIS

Figure 3-1

Wind Rose
for Elko
January 1970
through July 2016

Source: Iowa Environmental Mesonet 2017.

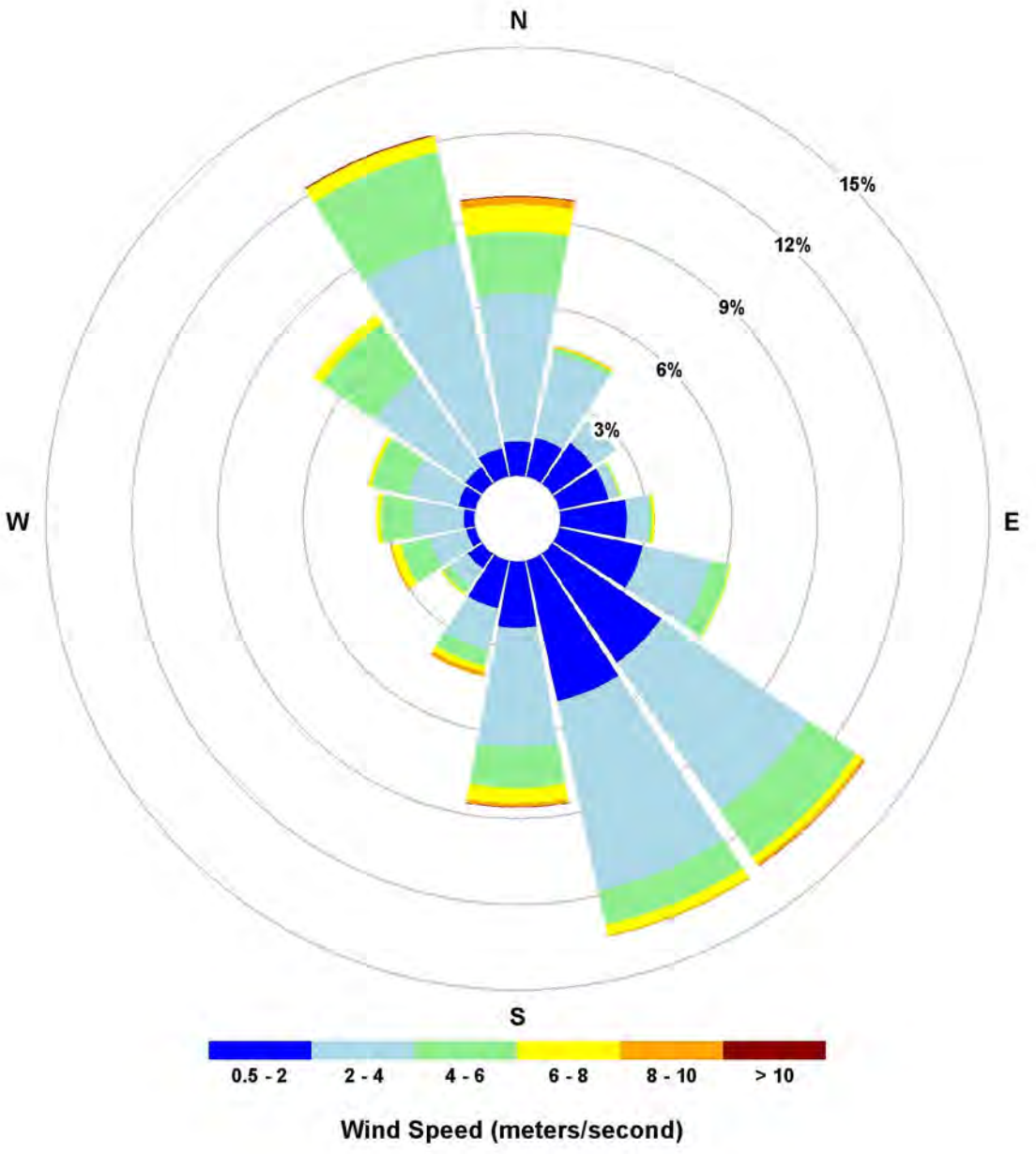


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Figure 3-2

Wind Rose for Cortez Hills Station for Year 2011

Source: Air Sciences 2016a.

3.2 Air Quality

Air quality is defined by the concentration of various pollutants and their interactions in the atmosphere. The relative importance of pollutant concentrations can be determined by comparison with appropriate national and/or state ambient air quality standards (AAQS). Air pollutant concentrations that are lower than the standards generally are not considered to be detrimental to public health and welfare.

3.2.1 Regional Air Quality and Regulatory Framework

Pollution effects on receptors have been used to establish a definition of air quality. Both long-term climatic factors and short-term weather fluctuations are considered part of the air quality resource because they control dispersion and affect concentrations. Physical effects of air quality depend on the characteristics of the receptors and the type, amount, and duration of exposure. Air quality standards specify acceptable upper limits of pollutant concentrations and duration of exposure***, including a margin of safety for sensitive populations***.

The existing air quality near the project study area is typical of the largely undeveloped regions of the western U.S. Current sources of air pollutants in the region include several precious metals mines that are sources for ***particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) and particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$)***. BCI has operated PM_{10} monitors at the CGM Operations Area in the past, and results of this monitoring program are discussed in Section 3.2.

An area is designated by the USEPA as being in attainment for a pollutant if ambient concentrations of that pollutant are below the National Ambient Air Quality Standards (NAAQS). An area is not in attainment if violations of NAAQS for that pollutant occur. Areas where insufficient data are available to make an attainment status designation are listed as unclassifiable and are treated as being in attainment for regulatory purposes. National and state AAQS are presented in **Table 3-2**.

The project area has been designated as in attainment for all pollutants that have an AAQS. The closest non-attainment area (for PM_{10}) is Washoe County, Nevada, which is approximately 150 miles west of the CGM Operations Area. In addition, the city of Reno, Nevada, located approximately 170 miles west of the CGM Operations Area, is in non-attainment for carbon monoxide (CO).

3.2.1.1 New Source Review

Established in the Clean Air Act, New Source Review (NSR) (NAC Chapter 445B) refers to the permitting process which new stationary sources of pollution must undergo before construction. Under NSR, a source may have one or more of the following permitting requirements:

- Prevention of Significant Deterioration (PSD) permits, which are required for new major sources or major sources making a major modification in an attainment area.
- Non-attainment NSR permits, which are required for new major sources or major sources making a major modification in a non-attainment area.
- Minor source permits.

NSR is pollutant-specific; therefore, a single stationary source may have requirements under all three programs for different pollutants. The proposed Deep South Expansion Project is not expected to trigger major source permitting requirements under the PSD or non-attainment NSR programs for any pollutant based on the expected types of equipment, projected

emissions levels for that equipment, and current attainment status for the project study area. Therefore, PSD is not anticipated to be applicable for the project and has been eliminated from further analysis in this EIS.

Table 3-2 National and State of Nevada Ambient Air Quality Standards

Pollutant	Averaging Time	Nevada Standards[1] ($\mu g/m^3$)	National Standards[2] ($\mu g/m^3$)	
Ozone	8-hour	137[3]	137[3]	Same as Primary
CO	1-hour	40,500	40,000	--
	8-hour CO less than 5,000 feet amsl	10,500	10,000	--
	8-hour CO at or greater than 5,000 feet amsl	7,000		
SO_2 (sulfur dioxide)	1-hour	196[3]	196[3]	--
	3-hour	1,300	--	1309[3]
	24-hour	365	--	--
	Annual average	80	--	--
Nitrogen dioxide (NO_2)	1-hour	188[3]	188[3]	--
	Annual average	100	100[3]	Same as Primary
PM_{10}	24-hour	150	150	Same as Primary
	Annual average	--	--	--
$PM_{2.5}$	24-hour	35	35	Same as Primary
	Annual average	12	12	15
Lead	Rolling 3-month average	0.15	0.15	Same as Primary
Hydrogen sulfide	1-hour	112	--	--

[1] Obtained from NAC 445B.22097 Standards of Quality for Ambient Air (NRS 445B.210) and R145-17 (State Environmental Commission 2018) for ozone.

[2] 40 CFR Part 50.

[3] Standards for these pollutants are given only in units of parts per million or parts per billion. These units were converted to micrograms per cubic meter ($\mu g/m^3$) assuming reference conditions as defined in 40 CFR 50.3 (25ºC and 760 millimeters of mercury) and rounded to nearest $\mu g/m^3$.

3.2.1.2 *Nevada State Permits*

The Nevada Division of Environmental Protection – Bureau of Air Pollution Control issues air quality operating permits to stationary and temporary mobile sources that emit regulated pollutants to ensure that these emissions do not harm public health or cause significant deterioration in areas that presently have clean air. Bureau of Air Pollution Control requires that a surface area disturbance permit be submitted to clear, excavate, or level 5 acres or more of land per NAC 445B.22037. A Class I Air Quality Operating permit is for facilities that emit more than 100 tpy for any one regulated pollutant or emit more than 25 tpy total hazardous air pollutants (HAPs) or emit more

than 10 tpy of any one HAP or is a PSD source or major Maximum Achievable Control Technology (M***ACT***) ***source.*** Ambient air monitoring at the CGM Operations Area is not required by the ***current*** Class I Air Quality Operating Permit (NDEP-Bureau of Air Quality 2018).

3.2.2 Mercury and Mercury Emissions

Mercury emissions to the atmosphere come from both background and man-made (known as anthropogenic) sources. There are both global and local anthropogenic sources of mercury. Mercury assumes many forms and can be found naturally in the environment as free metallic mercury, chemically combined with other elements in a number of soil or rock types, and in the form of methylmercury in plants and animals. Background sources of mercury occur naturally in many soils, volcanic rocks, and marine and geothermal water sources. When bound in mineral forms that typically appear in ore (e.g., cinnabar), mercury is a stable compound that remains in solid form. Ore processing has the potential to liberate mercury from these stable minerals by dissolving it in process solutions. Because it has a boiling point of 675°F, mercury has the potential to volatilize into a gaseous form when subjected to thermal processes in a recovery and refining circuit. Mercury is generally present in the atmosphere in one of three chemical forms: gaseous elemental mercury, oxidized or reactive gaseous mercury, and particulate mercury.

Gaseous elemental mercury is a relatively non-reactive chemical form that is not very soluble in water. This form of mercury travels the farthest and can be transported on wind currents for months to years if not oxidized, providing an opportunity for long-range transport and dispersion. Concentrations of mercury in the air are usually low and of little direct concern. However, atmospheric mercury falls to earth through rain or snow and enters lakes, rivers, and estuaries. Once there, it can transform to its most toxic form, methylmercury, and accumulate in fish and animal tissues.

Oxidized or reactive gaseous mercury has an average atmospheric residence time of days to weeks (less in the presence of precipitation or bromine compounds often present in saline waterbodies). It is not easily volatilized and is very water-soluble. It is easily taken up in precipitation or adsorbed on small particles in the atmosphere and falls out as wet or dry deposition. This form of mercury has a higher potential to enter the food chain and result in concerns related to fish and waterfowl consumption. Oxidized or reactive gaseous mercury represents a small portion of the mercury emissions from mining sources.

Particulate mercury has an average atmospheric residence time of hours to days (depending on the presence or absence of precipitation and the particle size). It has low volatility and is easily taken up in precipitation or adsorbed on small particles, falling out relatively close to the emission source in the presence of precipitation, or as dry deposition that may be transported for longer distances if associated with very small particle sizes. Particle-bound mercury is relatively stable and is not easily converted to methylmercury (USEPA 1997).

Mercury is not considered a criteria pollutant, and no NAAQS have been established under the Clean Air Act Amendments for mercury. Mercury is included on the federal list of HAPs, which has been adopted by reference in the Nevada air quality regulations. Nevada air quality regulations (NAC 445B.22013) prohibit the “discharge into the atmosphere from any stationary source of any hazardous air pollutant or toxic regulated air pollutant that threatens the health and safety of the general public, as determined by the director.” The USEPA has issued a final rule on National Emissions Standards for HAPs for gold mines and gold processing facilities (40 CFR 63 Subpart EEEEEEE). The rule establishes National Emissions Standards for HAPs for mercury emissions from gold ore processing facilities. For existing ore pretreatment

processes, the emissions limit is no more than 127 pounds of mercury per million tons of ore processed. HAPs are controlled through emissions limits at the source rather than ambient air concentrations. Mercury emissions associated with precious metals operations are regulated and controlled pursuant to the Nevada Mercury Control Program (NAC 445B.3611-3689 Nevada Mercury Control Program).

3.2.3 Visibility

Class I areas (e.g., wilderness areas) have federal protection to minimize visibility impacts. There are no Class I areas within 100 km of the study area. The nearest Class I area to the project study area is the Jarbidge Wilderness Area, which is located approximately 190 km (118 miles) northeast of the project study area. Given the large distance between the project study area and the nearest Class I area, the low level of anticipated emissions, and that the proposed project is not anticipated to trigger PSD permit requirements, a visibility impact assessment is not warranted for the project.

3.3 Greenhouse Gas Emissions and Climate Trends

Climate represents the long-term statistical characterization of daily, seasonal, and annual weather conditions such as temperature, relative humidity, precipitation, cloud cover, solar radiation, and wind speed and direction. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. A region's climate is affected by latitude, terrain, and altitude, as well as nearby waterbodies and their currents.

3.3.1 Greenhouse Gases

The entrapment of heat in the atmosphere, also known as the greenhouse effect, raises the average surface temperature of the earth (Intergovernmental Panel on Climate Change [IPCC] 2013). Some greenhouse gases (GHGs), such as water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) occur naturally and from anthropogenic activities (i.e., resulting from or produced directly by human activities). Other GHGs, such as hydrofluorocarbons, result only from anthropogenic activities.

Anthropogenic source emissions of GHGs to the atmosphere steadily increased due to land use changes and agriculture until the early 1800s (IPCC 2013). Beginning in the mid-19th Century with the boom of the industrial revolution, the combustion of fossil fuels and the construction of urban cities resulted in the prominent growth of CO_2 concentrations in the atmosphere. As of December 2016, the average atmospheric concentration of CO_2 observed at Mauna Loa Observatory in Hawaii exceeded 400 parts per million (400 ppm) (Tans and Keeling 2017) compared to the pre-industrial revolution average concentration below 300 ppm (IPCC 2013). The noticeable increase in the atmospheric CO_2 concentration has taken form through climate change effects such as increasing regional temperatures due to the greenhouse effect.

Greenhouse gases are chemically stable and persist in the atmosphere, typically becoming well mixed throughout the atmosphere before being removed by physical or chemical processes. These GHGs have varying residence times in the atmosphere, but generally take years to fully breakdown. For example, CO_2 can take anywhere from 10 to 100 years to leave the atmosphere depending on its ability to be absorbed by vegetation or the ocean or react with other molecules in the atmosphere (IPCC 2013). With longer residence times, atmospheric dispersion of GHGs can travel across different regions. Furthermore, GHGs have varying potencies based on their ability to trap radiative energy (i.e., heat), as well as their residence time in the atmosphere. The potency of different GHGs is determined by their

potency relative to CO_2 and is referred to as a global warming potential. Based on the global warming potentials published in the Federal Register, CH_4 is 25 times more potent and N_2O is 298 times more potent than CO_2 (Federal Register 2014).

Sources of GHG emissions in the project study area include wildfires and prescribed burns; vehicles (including off-highway vehicles); construction and operation equipment for mineral, energy, and communications development; and livestock grazing. To the extent that these activities increase, GHGs also are likely to increase and contribute to forecast climate change scenarios which include warmer, more arid conditions across Nevada.

It is difficult to assess the impact on climate due to a particular action with confidence, as downscaled modeling associated with localized climate-changing pollutant emissions and climate change is still in a formative phase. The lack of scientific tools designed to predict climate change on a regional or local scale limits the ability to quantify potential future impacts; therefore, an established methodology does not yet exist to accurately predict the effect of local and regional activities on global climate change.

On October 30, 2009, the USEPA issued the final mandatory reporting rule for major sources of GHG emissions (40 CFR Part 98). The rule requires a wide range of sources and source groups to record and report selected GHG emissions, including CO_2, CH_4, N_2O, and some halogenated compounds. Mandatory reporting of GHG emissions is required if sources emit 25,000 tons of carbon dioxide equivalent (CO_2e) per year.

3.3.1.1 Climate Change Trends

BLM published the final Rapid Ecoregional Assessment (REA) for the Central Basin and Range in June 2013 (Comer et al. 2012). REAs examine climate change and other widespread environmental influences that are affecting western landscapes. REAs look across an ecoregion to more fully understand ecological conditions and trends, natural and human influences, and opportunities for resource conservation, restoration, and development. The REAs provide regional information that can inform local management efforts.

Over the past 100 years, the weather, vegetation cover, and wildfire regimes of the Central Basin and Range ecoregion have changed, suggesting a change in the ecoregion's climate. Changes in temperature and precipitation have resulted in changes to vegetation cover and wildfire regimes. Changes are expressed in species composition, changes in vegetation communities, and increasing quantities of invasive species. Many areas once dominated by sagebrush have pinyon-juniper encroachment as well as cheatgrass.

The effects of temperature rises, and the extent of such effects, will vary by region. The effects will cause changes in both human and natural ecosystems (IPCC 2014a). An average increase in global temperature of 1.0°C (1.8ºF) may threaten some terrestrial and aquatic ecosystems, result in more extreme weather events such as hurricanes and flooding, and cause restrictions in available water resources (IPCC 2014a). Additional warming beyond 1°C will increase the likelihood of these events. IPCC projects that by the end of the 21st Century under a low emissions scenario where steps are actively being taken to reduce GHG emissions, the global mean temperature will increase by approximately 1.0°C (1.8ºF) compared to the baseline global mean temperature from 1986 to 2005. Furthermore, the IPCC models predict an approximately 4.0°C (7.2ºF) increase under a high emissions scenario where population growth continues to increase at a high rate, as well as continued expansion of fossil fuel use (IPCC 2014b).

In the Nevada Central Basin and Range ecoregion, climate models suggest there is no strong trend toward either wetter or drier conditions either in the near future (through the 2020s) or in

the long term (through the 2050s) (Comer et al. 2012). However, models show substantial increases in maximum monthly temperatures by 2020, primarily in the summer months (July, August, and September). The highest maximum temperature increase projected is 6°F. These increases are predicted to occur mostly in the southern and northeastern edges of the ecoregion. Forecasts for 2060 predict substantial increases in maximum temperature for all months. Similar to forecasts for 2020, the greatest increases are predicted during the summer months and along the southern and northeastern edges of the ecoregion (Comer et al. 2012). Model forecasts for minimum temperatures show a considerable change in both rate and magnitude over most of the project study area. July through September showed the greatest degree of change over most of the region.

Data for precipitation suggest no strong trend toward either wetter or drier conditions in any month for the ecoregion. With the exception of a slight increase in summer monsoon rains toward the south and east, there were no substantial forecasted trends in precipitation for any other months in either the near-term (2020s) or midcentury (2050s) projections (Comer et al. 2012).

Potential effects of these forecasts on the landscape could include increased fuel loads in higher elevations, increased frequency and duration of droughts, expansion of invasive species in higher elevations, increased wind erosion, and changes in wildfire regimes (Comer et al. 2012). GHG emissions are estimated and reported as a proxy in this EIS to assess the potential impacts of the proposed project on climate change.

3.4 Environmental Consequences

Issues related to air quality include potential impacts associated with project-generated air emissions.

Environmental impacts to air resources would be significant if the Proposed Action or other action alternatives result in any of the following:

- Exceedance ***or violation*** of national or state AAQS.
- Elevated mercury deposition that contributes to increased mercury levels in waterbodies.
- Exposure of sensitive receptors to substantial pollutant concentrations.

Effects to air quality are discussed in terms of intensity, duration, and context, based on the following definitions.

Intensity

- No Substantial Effects: Air emissions temporarily would increase; however, the effects from the project emission levels would be within applicable air quality standards and would not exceed national or state AAQS.
- Substantial Effects: The effects from the air emissions would increase substantially and would exceed applicable national or state AAQS. Mitigation would be required and would need to be coordinated and planned with applicable state and federal agencies.

Duration

- Short-term: Air quality effects would cease following the completion of mine construction, operations, and reclamation.

- Long-term: Air quality effects would continue following the completion of mine construction, operations, and reclamation.

Context

- Localized: Effects from the project-related emissions would not result in exceedance of the national or state AAQS beyond the CGM Operations Area boundary, the off-site ore transportation route between the CGM Operations Area and the Goldstrike Mine, or the Goldstrike Mine site.
- Regional: Effects from the project-related emissions would result in exceedance of the national or state AAQS beyond the CGM Operations Area boundary, off-site ore transportation route, or Goldstrike Mine site.

3.4.1 Methods

This section presents a brief overview of the air quality analysis methodology, data sets, and modeling techniques used to estimate the changes in ambient air quality and hazardous air pollutant levels that could result from the proposed project air emissions as outlined in the Barrick Cortez - Deep South Expansion Project NEPA Air Quality Impact Analysis Report (Air Sciences Inc. 2016a).

3.4.1.1 Emission Inventory

The emissions inventory for the Proposed Action consists of emissions sources associated with the proposed project activities. The emissions sources that have been quantified for this analysis include construction activities and ore and waste rock handling (fugitive emissions), ongoing processing activities in the CGM Operations Area, off-site refractory ore transport to the Goldstrike Mine and backhaul of Arturo Mine oxide ore to the Pipeline Complex, and processing of CGM Operations Area refractory ore at the Goldstrike Mill. The project emissions were quantified for oxides of nitrogen (NO_X), CO, SO_2, PM_{10}, $PM_{2.5}$, volatile organic compounds (VOCs), 20 HAPs (including mercury), and GHG emissions. Of the 187 HAPs regulated under Section 112 of the Clean Air Act, the following 20 HAPs were analyzed: 1,3-butadiene, acetaldehyde, acrolein, arsenic, benzene, beryllium, cadmium, chromium, cobalt, dichlorobenzene, formaldehyde, hexane, lead, manganese, mercury, nickel, polycylic organic matter, selenium, toluene, and xylene. These HAPs were selected for inclusion in the analysis based on their prevalence for the types of activities that would occur as part of the Proposed Action. GHG emissions estimates were developed for CO_2, CH_4, and N_2O, as well as the global warming potential in CO_2e. GHG emissions were calculated rather than modeled for this analysis, consistent with common practices for NEPA analyses.

3.4.1.2 Criterial Pollutants

Process emission sources at the CGM Operations Area consist of material handling, crushing, conveying, refining, building heaters, emergency generators, and other small emission sources. Fugitive emission sources from the CGM Operations Area and/or off-site ore transport/backhaul and off-site processing include: drilling, blasting, material loading, unloading, and hauling; dozing and grading; wind erosion of exposed surfaces; mobile machinery tailpipes; and driving on unpaved/paved roads (Air Sciences Inc. 2016a). The off-site transportation route is shown in **Figure 2-10**.

Fugitive emissions from drilling and blasting were estimated based on the facility-wide maximum production rate. Wind erosion emissions were calculated for each location (e.g., waste rock facilities, stockpile areas, and haul roads) based on surface area and erosion potential. Material-hauling emissions were calculated based on vehicle miles traveled along

each road type. The fugitive dust emissions from off-site transporting and transferring of refractory ore were estimated based on the USEPA AP-42 emission factors. Emissions associated with off-site refractory ore processing were based on a scaling of total Goldstrike Mill emissions.

3.4.1.3 Modeling

A near-field ambient air quality impact assessment was performed by Air Sciences Inc. (2016a) to quantify the project's criteria pollutants (SO_2, NO_2, CO, PM_{10}, and $PM_{2.5}$) impacts using the USEPA regulatory model AERMOD. The purpose of the near-field modeling analysis was to assess future air quality impacts that potentially would occur in the immediate vicinity of the CGM Operations Area. In order to evaluate the maximum potential emissions from project activities in the CGM Operations Area, two different mining scenarios were modeled:

- Scenario 1 (Mining Year 1) – Maximum production from the Pipeline Pit Complex (Pipeline and Crossroads pits) and Cortez Pit; and
- Scenario 2 (Mining Year 3) – Maximum production from the Gold Acres Pit.

Modeled impacts subsequently were compared to applicable national and state AAQS.

In addition to the assessment of criteria pollutants, previous modeling of mercury deposition for prior NEPA analyses for the CGM Operations Area was used to estimate the proposed project's potential mercury impacts.

3.4.2 Proposed Action

Activities associated with the Proposed Action that would have the potential to impact air quality include the following:

- Expansion of existing open pits and waste rock facilities and development of three new satellite pits, with associated waste rock and ore transport/placement;
- Surface support operations and waste rock and ore transport/placement associated with expansion of underground operations;
- Construction of the proposed Rocky Pass Reservoir embankment and new RIB facilities;
- Ongoing ore processing at the existing Pipeline Mill; and
- Transport of refractory ore from the CGM Operations Area to the Goldstrike Mine for mill processing and backhaul of Arturo Mine oxide ore to the Pipeline Complex.

The currently authorized site-wide mining rate is 580,000 tpd, and the proposed site-wide mining rate is 600,000 tpd. No increase in Pipeline Mill throughput is proposed.

3.4.2.1 Emissions Inventory

The emission inventory for the Proposed Action includes emissions from construction activities, mine operations, and closure and final reclamation activities in the CGM Operations Area, as well as emissions associated with off-site refractory ore transport to the Goldstrike Mine, backhaul of Arturo Mine oxide ore to the Pipeline Complex, and processing of CGM Operations Area refractory ore at the Goldstrike Mill.

Construction-related emissions would be associated with construction of the Rocky Pass Reservoir embankment and new RIB facilities. Based on the emissions inventory spreadsheet

used by Air Sciences Inc. in the modeling effort (BCI 2017), the emissions from the expansion of facilities, additional stockpiles, and other infrastructure expansion activities were included in the quantification of emissions from mine operations. The mine operations emissions were calculated based on the estimated annual mine production throughout the life of the project. The activities were then modeled using the calculated emissions. The emissions from off-site ore transport and backhaul, and the processing of CGM Operations Area refractory ore at the Goldstrike Mill, were assumed to occur at an even rate throughout of the life of the project. After mine operations cease, the ongoing ore processing, decommissioning, and final reclamation is anticipated to continue for approximately 3 years as discussed in Section 2.3.4.

Table 3-3 presents the total annual emissions inventory for the Proposed Action by year, based on the emissions calculated by Air Sciences Inc. (2016a) plus estimated emissions from construction of the Rocky Pass Reservoir embankment and new RIB facilities, reclamation activities, and off-site ore transport/backhaul and processing. PM_{10} and $PM_{2.5}$ emissions primarily would be from fugitive dust related to travel on unpaved mine haul roads, surface disturbance, and blasting. NO_X, CO, VOC, and SO_2 emissions primarily would be from mobile sources and construction equipment.

Table 3-3 Total Emissions Inventory for the Proposed Project

Project Year	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO (tpy)	NO_X (tpy)	SO_2 (tpy)	VOCs (tpy)	Mercury (tpy)	Total HAPs[1] (tpy)	Calculated GHG (tpy CO_2e)
1	1,154.4	260.5	3,134.3	3,202.2	21.3	540.0	0.08	16.1	398,959
2	1,162.6	260.0	3,107.5	3,153.3	21.3	531.4	0.08	16.2	398,959
3	1,226.5	267.5	3,110.5	3,164.5	21.3	532.1	0.08	16.4	398,959
4	1,166.4	260.5	3,111.1	3,166.6	21.3	532.2	0.08	16.2	398,959
5	1,170.6	260.8	3,113.5	3,175.7	21.3	532.8	0.08	16.2	398,959
6	1,001.6	280.8	3,823.4	3,871.8	21.9	651.7	0.09	18.8	463,192
7	984.9	278.8	3,823.4	3,871.7	21.9	651.7	0.09	18.8	463,192
8	984.9	278.8	3,823.4	3,871.7	21.9	651.7	0.09	18.8	463,192
9	984.9	278.8	3,823.4	3,871.7	21.9	651.7	0.09	18.8	463,192
10	194.4	50.9	749.9	752.7	0.8	133.2	0.01	3.0	64,233
11	194.4	50.9	749.9	752.7	0.8	133.2	0.01	3.0	64,233
12	194.4	50.9	749.9	752.7	0.8	133.2	0.01	3.0	64,233

[1] Mercury is included in the total HAPs values.

Source: BCI 2017.

No individual HAP (including mercury) would be emitted in a quantity greater than the major source limit of 10 tpy. Also, the combined HAP emissions would be less than the major source limit of 25 tpy. Therefore, the project would not constitute a major HAP source ***and would not trigger major source permitting requirements based on HAP emissions. The HAP emissions from the Proposed Action are presented in Table 3-4 for the individual HAP for the mine operations and total HAP emissions for the mine operations, ore processing, and the entire Proposed Action.***

The Proposed Action GHG emissions presented in **Table 3-3** encompass all emissions sources associated with the proposed project and include sources of emissions that are not

required to be considered in the reporting rule requirements. As discussed in Section 3.3.1, sources that emit more than 25,000 tons of CO_2e per year are required to report GHG emissions. As discussed in Section 3.2.3, the Proposed Action is not expected to trigger major source permitting requirements under PSD.

The 2016 national annual emissions of GHGs were approximately 6.5 billion tons CO_2e (USEPA 2018). Under the Proposed Action, the maximum annual GHG emissions would be 463,192 tpy CO_2e (see **Table 3-3**), or approximately 0.00007 percent of the national annual emissions.

3.4.2.2 Modeling

Modeling was conducted for five of the criteria air pollutants (PM_{10}, $PM_{2.5}$, CO, NO_2, and SO_2). The NO_X emissions shown in **Table 3-3** were used as input values for the NO_2 modeling. As discussed in the modeling report (Air Sciences Inc. 2016a), the dispersion model converts the NO_X into NO_2. The proposed project would not directly produce ozone, rather ozone would be produced by photo-chemical reactions involving certain VOCs and NO_X. The potential for lead or hydrogen sulfide emissions are considered negligible; therefore, they were not considered in the analysis.

Not all of the emissions shown in **Table 3-3** were reflected in the modeling analysis conducted by Air Sciences Inc. (2016a). The emissions sources selected for inclusion in the modeling analysis to estimate peak impacts were based on those sources that would be the largest emissions sources in the CGM Operations Area that would operate throughout the life of operations. Activities that would result in emissions only during discrete points in time (i.e., construction and reclamation activities) were not included the modeling effort. It is anticipate that the emissions from these construction and reclamation activities would be much lower than the modeled operations sources and, therefore, would likely result in the same or lower impacts than the modeled impacts.

The maximum modeled concentrations from on-site operations, the estimated total concentrations (modeled concentrations plus background concentrations), and their comparison with the applicable AAQS for model scenarios 1 and 2 are presented in **Tables 3-*5*** and **3-*6***, respectively. For completeness, the estimated total concentrations were determined using two potential background concentrations: 1) a background value recommended by NDEP and 2) an alternate background value that is conservatively high based on monitoring stations in other areas of remote Nevada. As shown in **Tables 3-*5*** and **3-*6***, the estimated maximum total ambient concentrations for both scenarios are below the applicable AAQS, regardless of the background value used. The locations of the maximum modeled impacts from either scenario using the NDEP background values are shown in **Figure 3-3**. As shown in the figure, Air Sciences Inc. (2016b) reported that the maximum impacts occur at the CGM Operations Area boundary for all pollutants and averaging periods. Ongoing implementation of fugitive dust controls as discussed in Section 2.3.3, Applicant-committed Environmental Protection Measures, and outlined in BCI's Fugitive Dust Control Plan (BCI 2013), as well as implementation of concurrent reclamation, would help reduce the localized impacts of the PM_{10} and $PM_{2.5}$ emissions. No substantial effects would occur under the Proposed Action, and air quality effects would be short-term.

Table 3-4 *Total HAP Emissions Inventory for the Proposed Project*

Mine Operations HAPs	Year (tpy)												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1,3-Butadiene	3.7E-03	3.7E-03	3.7E-03	3.7E-03	3.7E-03	3.7E-03	3.7E-03	3.7E-03	3.7E-03	3.7E-03	8.8E-04	8.8E-04	8.8E-04
Acetaldehyde	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	2.7E-02	2.7E-02	2.7E-02
Acrolein	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	5.1E-03	5.1E-03	5.1E-03
Antimony	1.0E-01	9.1E-02	9.6E-02	1.1E-01	9.8E-02	1.0E-01	7.7E-02	7.5E-02	7.5E-02	7.5E-02	1.8E-02	1.8E-02	1.8E-02
Arsenic	4.5E-01	4.1E-01	4.5E-01	5.0E-01	4.4E-01	4.4E-01	3.4E-01	3.2E-01	3.2E-01	3.2E-01	7.6E-02	7.6E-02	7.6E-02
Benzene	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00	1.3E+00	3.1E-01	3.1E-01	3.1E-01
Beryllium	2.7E-03	2.4E-03	2.5E-03	2.7E-03	2.6E-03	2.6E-03	2.0E-03	2.0E-03	2.0E-03	2.0E-03	4.6E-04	4.6E-04	4.6E-04
Cadmium	7.2E-03	6.4E-03	6.6E-03	7.3E-03	6.8E-03	7.0E-03	5.4E-03	5.3E-03	5.3E-03	5.3E-03	1.2E-03	1.2E-03	1.2E-03
Chromium	5.8E-02	5.1E-02	5.4E-02	5.9E-02	5.5E-02	5.6E-02	4.4E-02	4.3E-02	4.3E-02	4.3E-02	1.0E-02	1.0E-02	1.0E-02
Cobalt	1.4E-02	1.3E-02	1.3E-02	1.5E-02	1.4E-02	1.4E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	2.5E-03	2.5E-03	2.5E-03
Dichlorobenzene	1.9E-04	1.9E-04	1.9E-04	1.9E-04	1.9E-04	1.9E-04	1.9E-04	1.9E-04	1.9E-04	1.9E-04	4.4E-05	4.4E-05	4.4E-05
Formaldehyde	2.5E-01	2.5E-01	2.5E-01	2.5E-01	2.5E-01	2.5E-01	2.5E-01	2.5E-01	2.5E-01	2.5E-01	5.9E-02	5.9E-02	5.9E-02
Hexane	2.8E-01	2.8E-01	2.8E-01	2.8E-01	2.8E-01	2.8E-01	2.8E-01	2.8E-01	2.8E-01	2.8E-01	6.6E-02	6.6E-02	6.6E-02
Hydrogen Cyanide	8.2E+00	8.2E+00	8.2E+00	8.2E+00	8.2E+00	8.2E+00	8.2E+00	8.2E+00	8.2E+00	8.2E+00	1.9E+00	1.9E+00	1.9E+00
Lead	8.7E-02	7.7E-02	8.0E-02	8.8E-02	8.2E-02	8.4E-02	6.5E-02	6.4E-02	6.4E-02	6.4E-02	1.5E-02	1.5E-02	1.5E-02
Manganese	1.1E+00	9.5E-01	1.0E+00	1.1E+00	1.0E+00	1.0E+00	8.1E-01	7.9E-01	7.9E-01	7.9E-01	1.8E-01	1.8E-01	1.8E-01
Mercury	4.0E-02	4.0E-02	4.0E-02	4.1E-02	4.0E-02	4.0E-02	3.9E-02	3.9E-02	3.9E-02	3.9E-02	9.2E-03	9.2E-03	9.2E-03
Nickel	8.4E-02	7.5E-02	7.8E-02	8.6E-02	8.0E-02	8.2E-02	6.3E-02	6.2E-02	6.2E-02	6.2E-02	1.4E-02	1.4E-02	1.4E-02
POM	3.6E-01	3.6E-01	3.6E-01	3.6E-01	3.6E-01	3.6E-01	3.6E-01	3.6E-01	3.6E-01	3.6E-01	8.4E-02	8.4E-02	8.4E-02
Selenium	6.3E-03	5.6E-03	5.9E-03	6.5E-03	6.0E-03	6.2E-03	4.7E-03	4.6E-03	4.6E-03	4.6E-03	1.1E-03	1.1E-03	1.1E-03
Toluene	4.9E-01	4.9E-01	4.9E-01	4.9E-01	4.9E-01	4.9E-01	4.9E-01	4.9E-01	4.9E-01	4.9E-01	1.2E-01	1.2E-01	1.2E-01
Xylene	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	3.4E-01	7.9E-02	7.9E-02	7.9E-02
Total Mine Operations HAPs	13.31	13.11	13.22	13.40	13.24	13.27	12.85	12.81	12.81	12.81	3.00	3.00	3.00
Total Ore processing HAPs	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97
Total Proposed Action HAPs	16.28	16.08	16.20	16.38	16.21	16.24	15.82	15.78	15.78	15.78	5.98	5.98	5.98

Source: BCI 2017.

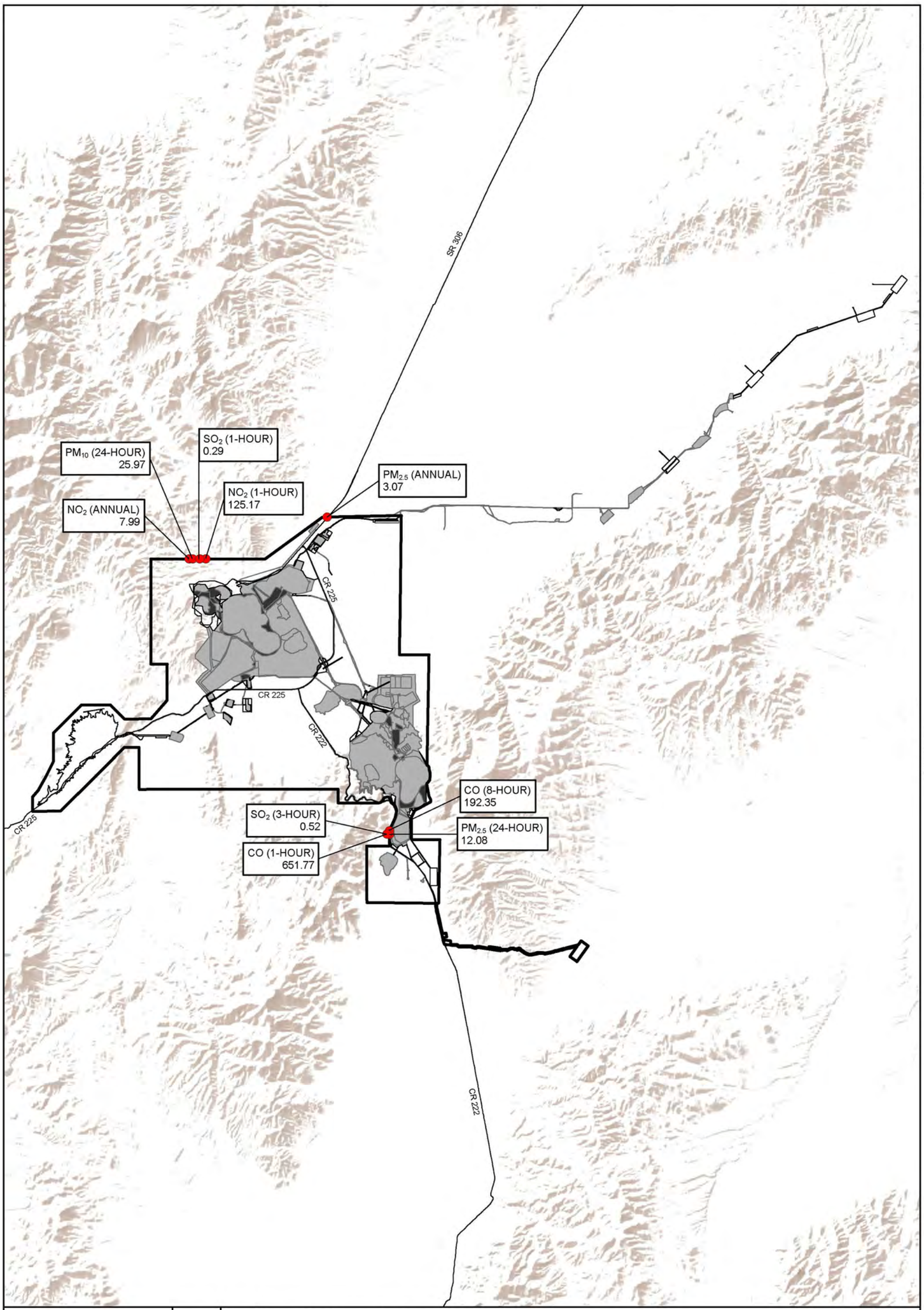

Figure 3-3
Estimated Ambient
Air Quality Impacts

Deep South Expansion Project EIS

- Proposed CGM Operations Area Boundary
- Existing Facilities
- Proposed New Facilities
- Overlap of Existing and Proposed Facilities
- Estimated Ambient Air Quality Impact (µg/m³)

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

Note: Estimated ambient air quality impacts reflect modeled concentrations plus background concentrations.

Source: Air Sciences Inc. 2016.

0 1 2 3 4 5 Miles

N

7/29/2018

M:\Barrick_Deep_South_Expansion_EIS\FIGs\Chapter 3 Figs\Figure_3_10_3_ModeledAmbientAQImpacts.mxd

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Table 3-5 Scenario 1 Model Results and Comparison with AAQS

Pollutant	Averaging Period	Modeled Impact (µg/m^3) [1]	Total Concentrations with NDEP Background Values (µg/m^3)		Total Concentrations with Alternate Background Values (µg/m^3)		Applicable AAQS (µg/m^3)	Compliance with Applicable AAQS
			Background Values [2]	Total Impact	Background Values [2]	Total Impact		
CO	8-hour[3]	192.3	0.0	192.3	801.4	993.7	10,000	Yes
	1-hour[3]	651.8	0.0	651.8	1,030.4	1,682.2	40,000	Yes
NO_2	Annual	5.1	0.0	5.1	1.9	7.0	100	Yes
	1-hour[4]	100.6	0.0	100.6	9.2	109.8	188	Yes
$PM_{2.5}$	Annual	0.5	2.3	2.8	2.3	2.8	12	Yes
	24-hour[5]	4.1	8.0	12.1	8.0	12.1	35	Yes
PM_{10}	24-hour[3]	12.8	10.2	23.0	10.2	23.0	150	Yes
SO_2	3-hour[3]	0.5	0.0	0.5	0.5	1.0	1,300	Yes
	1-hour[6]	0.2	0.0	0.2	0.7	0.9	196	Yes

[1] Based on Air Sciences Inc. modeling data provided by BCI (2017).

[2] Air Sciences Inc. 2017a.

[3] Highest-second-high modeled concentration.

[4] Highest-eighth-high daily maximum 1-hour modeled concentration.

[5] Highest-eighth-high modeled concentration.

[6] Highest-fourth-high modeled concentration.

Table 3-6 Scenario 2 Model Results and Comparison with AAQS

Pollutant	Averaging Period	Modeled Impact (µg/m^3) [1]	Total Concentrations with NDEP Background Values (µg/m^3)		Total Concentrations with Alternate Background Values (µg/m^3)		Applicable AAQS (µg/m^3)	Compliance with Applicable AAQS
			Background Values [2]	Total Impact	Background Values [2]	Total Impact		
CO	8-hour[3]	192.4	0.0	192.4	801.4	993.8	10,000	Yes
	1-hour[3]	651.8	0.0	651.8	1,030.4	1,682.2	40,000	Yes
NO_2	Annual	8.0	0.0	8.0	1.9	9.9	100	Yes
	1-hour[4]	125.2	0.0	125.2	9.2	134.4	188	Yes
$PM_{2.5}$	Annual	0.8	2.3	3.1	2.3	3.1	12	Yes
	24-hour[5]	4.1	8.0	12.1	8.0	12.1	35	Yes
PM_{10}	24-hour[3]	15.8	10.2	26.0	10.2	26.0	150	Yes
SO_2	3-hour[3]	0.5	0.0	0.5	0.5	1.0	1,300	Yes
	1-hour[6]	0.3	0.0	0.3	0.7	1.0	196	Yes

[1] Based on Air Sciences Inc. modeling data provided by BCI (2017).

[2] Air Sciences Inc. 2017a.

[3] Highest-second-high modeled concentration.

[4] Highest-eighth-high daily maximum 1-hour modeled concentration.

[5] Highest-eighth-high modeled concentration.

[6] Highest-fourth-high modeled concentration.

Refractory ore sent to Goldstrike for processing would continue to be processed through either the existing roasters or the autoclaves as currently authorized. Impacts associated with processing CGM Operations Area refractory ore at the Goldstrike Mill were estimated by scaling previous emissions and impacts from Goldstrike Mill operations by the portion of the throughput that would be attributable to CGM Operations Area refractory ore under the Proposed Action. Total Goldstrike Mill emissions and impacts, and the emissions and estimated impacts for the processing of CGM Operations Area refractory ore at the Goldstrike Mill as reported by Air Sciences Inc. (2016a) are shown in **Table 3-*7***. As shown in **Table 3-*7***, the maximum impacts from processing CGM Operations Area refractory ore at Goldstrike would be all well below the applicable AAQS. Because CGM Operations Area refractory ore would displace a portion of the Goldstrike ore in the mill throughput, the Proposed Action impacts shown in **Table 3-*7*** are not additive to the Goldstrike ore processing impacts. However, even adding the Proposed Action impacts to the Goldstrike ore processing impacts as a worst-case assumption would not result in total impacts that would exceed the AAQS.

Table 3-7 Emissions and Impacts from CGM Operations Area Refractory Ore Processing at the Goldstrike Mill

Pollutant	Averaging Period	Total Goldstrike Emissions and Impacts		Proposed Action Emissions and Impacts from Off-site Ore Processing		
		Emissions (tpy)	Modeled Impact ($\mu g/m^3$)	Emissions (tpy)	Estimated Impact ($\mu g/m^3$)	AAQS ($\mu g/m^3$)
CO	8-hour	400	38.25	18.38	1.76	40,000
	1-hour		216.49		9.95	10,000
NO_2	Annual	311	0.83	35.05	0.09	188
	1-hour		10.38[1]		1.17	100
$PM_{2.5}$	Annual	ND[2]	ND[2]	28.03	0.51	35
	24-hour				0.81	12
PM_{10}	Annual	579	10.62	87.35	1.60	NA
	24-hour		16.65		2.51	150
SO_2	3-hour	996	13.03	18.22	0.24	196
	1-hour		14.48[b]		0.26	1,300

[1] Estimated using the SCREEN3 scaling ratios provided in the AERSCREEN User's Guide.

[2] No data. CGM Operations Area refractory ore processing $PM_{2.5}$ impacts were scaled from the Goldstrike PM_{10} data.

Source: Air Sciences Inc. 2016a.

Proposed Action impacts at sensitive receptors were not modeled; however, it is anticipated that impacts at sensitive receptors as a result of proposed modifications in the CGM Operations Area would be lower than previously modeled for the Cortez Hills Expansion Project Final EIS (BLM 2008a). The eight sensitive receptor locations analyzed in the 2008 EIS represented areas frequently visited by the public (e.g., schools), nearby residences, and the Jarbidge Wilderness Area, the nearest Class I area. The 2008 EIS modeling results showed all pollutants were within the AAQS at the sensitive receptor locations. As mine production and processing activities in the CGM Operations Area as analyzed in the 2008 EIS are similar to those under the Proposed Action, and impacts predicted for the Proposed Action (as shown in **Tables 3-*5***, **3-*6***, and **3-*7***) are substantially lower than operational impacts estimated in the 2008 EIS (Table 3-6) and 2011 SEIS (BLM 2011, Tables 3-4, 3-7, and 3-8), the impacts at the sensitive receptor locations under the Proposed Action also are anticipated to be substantially lower. Therefore, it is anticipated that all pollutants would be below the AAQS and PSD Class I

increments at the sensitive receptor locations under the Proposed Action. No substantial adverse effect would occur under the Proposed Action, and air quality effects would be short-term.

The number of truck trips for the off-site transport of CGM Operations Area refractory ore to the Goldstrike Mine and backhaul of Arturo Mine oxide ore to the Pipeline Complex would increase from the current 9 round-trips per hour to 18 round-trips per hour under the Proposed Action. Emissions impacts associated with the currently authorized ore transport previously were analyzed in prior NEPA documents for the CGM Operations Area (BLM 2015b, 2011). Due to the travel distance involved (approximately 70 miles one way), and because the modeled concentrations for operations in the CGM Operations Area as shown in **Tables 3-*5*** and **3-*6*** are well below the national and state AAQS, it would be unlikely that the addition of transport-related fugitive dust emissions from paved and unpaved roads and transport truck tailpipe emissions would result in a violation of the national or state AAQS for CO, NO_2, SO_2, $PM_{2.5}$, or PM_{10}. The additional emissions for all pollutants associated with the ore transport would at most increase by approximately 20 percent. These additional emissions would be spread over many miles; therefore, it is unlikely to notably increase the maximum modeled impacts at the CGM Operations Area. Air pollutant concentrations below the AAQS generally are not considered to be detrimental to public health and welfare.

3.4.2.3 Mercury Impacts

The mercury emissions from CGM Operations Area refractory ore processing at the Goldstrike Mill were estimated by Air Sciences Inc. (2016a) by scaling the Goldstrike Mill total mercury emissions rates for 2014, as reported to NDEP in 2015, by the amount of processed ore that would be attributable to the Proposed Action. The projected mercury emissions from processing CGM Operations Area refractory ore at Goldstrike were estimated based on relative throughputs, independent of the mercury content in the ore, because the roaster and autoclave emission controls at the Goldstrike Mill are designed so that the mercury concentration entering the controls does not affect the mercury emissions (Air Sciences Inc. 2016a). No increase in mill throughput would be required; however, the Proposed Project would extend processing at the Goldstrike Mill by approximately 3 years. The maximum projected mercury emissions attributable to the processing of CGM Operations Area refractory ore at the Goldstrike Mill are 0.04 tpy (80.0 pounds per year) (Air Sciences Inc. 2016a). This represents 14 percent of the total mercury emissions from the Goldstrike Mill operations (588 pounds per year). Assuming a linear relationship, mercury deposition from off-site refractory ore processing at Goldstrike under the Proposed Action would represent approximately 14 percent of the total deposition impact attributed to Goldstrike Mill operations (Air Sciences Inc. 2016a).

REMSAD modeling for mercury deposition rates associated with Goldstike Mill operations previously was conducted in support of a prior NEPA analysis (BLM 2008b) for the Goldstrike Mine site. As shown in **Figure 3-4**, previous REMSAD modeling results showed that mercury deposition rates from Goldstrike Mill operations represent approximately 1 percent of global background deposition at distances between 30 km (18.6 miles) to the southwest and 100 km (62 miles) to the north of the Goldstrike Mine. Therefore, at this 1 percent isopleth, mercury deposition attributable to the processing of CGM Operations Area refractory ore at the Goldstrike Mill would represent approximately 0.14 percent of global background (14 percent of 1 percent) under the Proposed Action.

The previous REMSAD modeling effort also examined nearby waterbodies for mercury deposition caused by mercury emissions from Goldstrike. The REMSAD model results indicated that the Goldstrike Mill's contribution to mercury deposition in the Willow Creek Reservoir region, approximately 32 km (19.9 miles) northwest of Goldstrike, is approximately

10 percent of the global background. The results also indicated that mercury deposition attributable to Goldstrike Mill emissions at the Wildhorse Reservoir area, approximately 90 km (55.9 miles) northeast of Goldstrike, is less than 0.8 percent of the global background (Air Sciences Inc. 2016a). Therefore, it is estimated that off-site refractory ore processing at Goldstrike under the Proposed Action would contribute approximately 1.4 percent of the global background at the Willow Creek Reservoir (14 percent of 10 percent) and 0.11 percent of the global background at the Wildhorse Reservoir (14 percent of 0.8 percent). Because CGM Operations Area refractory ore would displace a portion of the Goldstrike Mill throughput, the Proposed Action impacts would not be additive to the Goldstrike ore processing impacts (Air Sciences Inc. 2016a).

Under the Proposed Action, oxide ore from the Arturo Mine would displace a portion of the currently authorized throughput at the Pipeline Mill. Mercury emissions (particulate, gaseous elemental, and gaseous reactive) and potential impacts associated with mercury deposition as a result of currently authorized operations in the CGM Operations Area previously were analyzed in the Cortez Hills Expansion Project Final EIS (BLM 2008a). As discussed in that document, material handling (primary, secondary, and tertiary crushing; conveying; and stacking) are potential emission sources of particulate mercury. Controls currently are, and would continue to be, applied to each of the processes to reduce overall particulate emissions (including mercury). Thermal sources of mercury emissions (gaseous elemental and gaseous reactive) associated with the refining process at the Pipeline Mill include the refining furnaces, carbon kilns, retort, and electrowinning cells (BLM 2008a). Mercury emissions from thermal sources currently are, and would continue to be, controlled as described in the Cortez Hills Expansion Project Final EIS (BLM 2008a). Arturo oxide ore would be sampled to ensure that only ore suitable for mill or heap leach processing would be backhauled to the Pipeline Complex. In addition, the average mercury content of Arturo oxide ore is approximately 2.3 ppm (BCI 2015), which is lower than the average 14.0 ppm of mercury in the ore processed at the Pipeline Mill (BLM 2015b). Based on ongoing implementation of emission controls at the Pipeline Mill, the sampling of Arturo oxide ore prior to shipment to the site, and the average mercury content of the Arturo oxide ore, mercury emissions and potential impacts associated with mercury deposition as a result of the Proposed Action would not be anticipated to increase.

3.4.3 Gold Acres Pit Partial Backfill Alternative

Under the Gold Acres Pit Partial Backfill Alternative, potential impacts to air quality would be similar to those described for the Proposed Action since differences between the alternatives are small. Under this alternative there would be a 72-acre reduction of new surface disturbance at the Gold Acres Complex. This difference would result in approximately a 2 percent reduction of new surface disturbance relative to the Proposed Action.

3.4.4 No Action Alternative

Under the No Action Alternative, the proposed Deep South Expansion Project would not be developed and associated impacts to air quality would not occur. As described in Section 2.4.2, No Action Alternative, existing mining and processing operations and reclamation activities within the CGM Operations Area, off-site ore transport/backhaul, and off-site refractory ore processing at the Goldstrike Mill, would continue to operate under the terms of current permits and approvals as authorized by the BLM and State of Nevada.

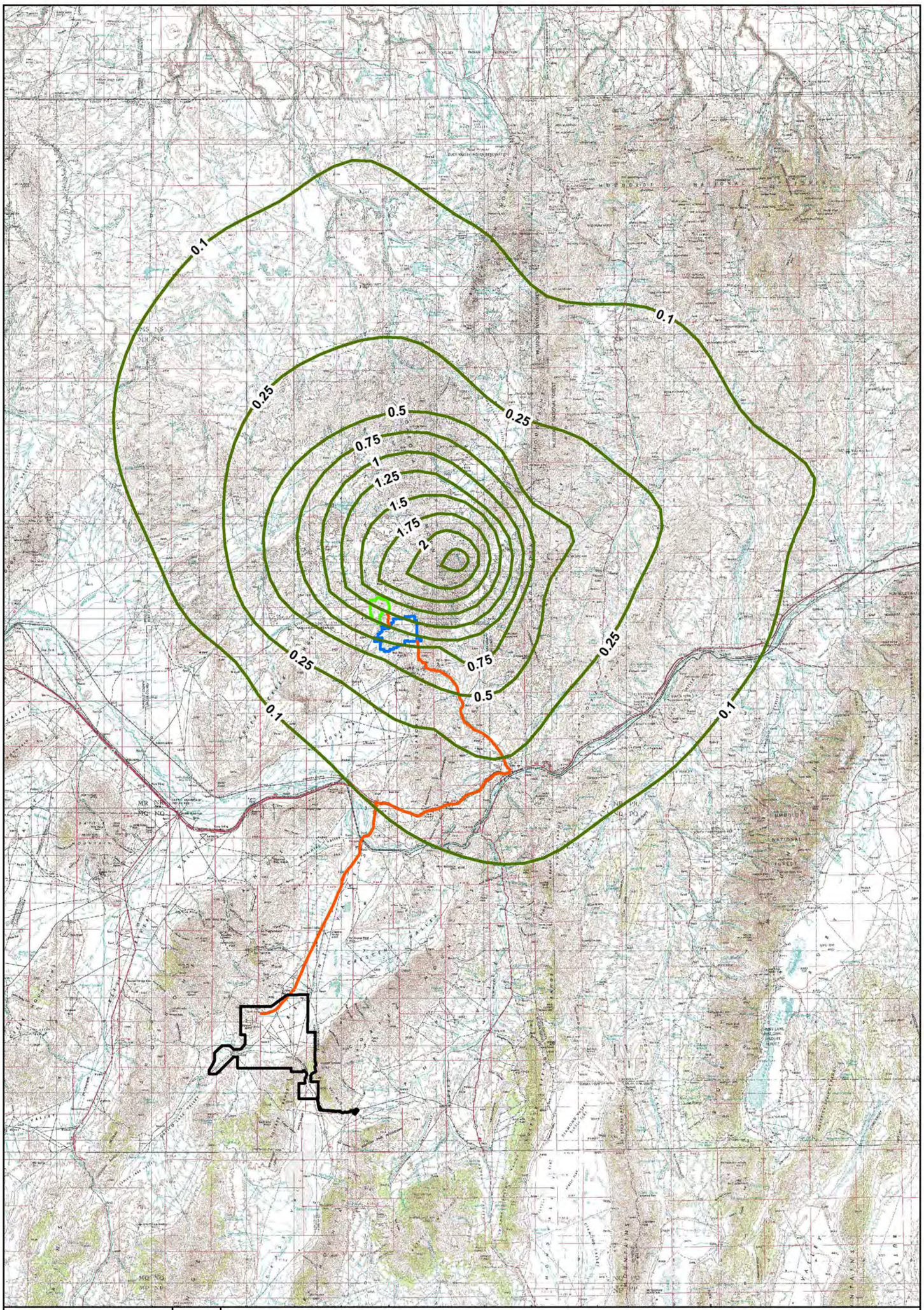

Figure 3-4

Mecury Deposition from Total Goldstrike Mill Emissions

Deep South Expansion Project EIS

Source: Air Sciences Inc. 2016b.

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The emissions inventory for the No Action Alternative was calculated for ongoing open pit mining at the Pipeline Pit Complex and the Cortez Hills and Cortez pits, off-site CGM Operations Area refractory ore transport and backhaul of Arturo Mine oxide ore to the Pipeline Complex, and the processing of CGM Operations Area refractory ore at the Goldstrike Mill. As discussed in Section 2.4.2, No Action Alternative, all existing operations would cease in 2023 (referred to here as Project Year 4), with ongoing ore processing, decommissioning, and final reclamation completed by 2026 (referred to here as Project Year 7).

3.4.4.1 Emission Inventory

The mine operations emissions were calculated based on the currently authorized mining rate, which is a combined rate of 540,000 tpd at the Pipeline Pit Complex and Cortez Hills Pit and 40,000 tpd at the Cortez Pit. For the off-site refractory ore transport and processing, ore would continue to be transported and processed at the Goldstrike Mill at a rate of up to 1.2 million tpy through 2023 (Project Years 1-4). Arturo Mine oxide ore would continue to be backhauled through the Goldstrike Mine to the Pipeline Complex at a rate of up to 600,000 tpy for processing through 2023 (Project Year 4). The off-site ore processing and transport emissions were calculated similar to the approach discussed in Section 3.4.2; however, No Action Alternative rates were used instead of the Propose Action values. The annual total emissions by year for the No Action Alternative are provided in **Table 3-*8***. The emissions are shown to enable a comparison to the Propose Action.

3.4.4.2 Modeling

Activities associated with mine operations and off-site ore transport and processing were not explicitly modeled for the No Action Alternative for this EIS. The activities associated with the No Action Alternative were analyzed in prior NEPA documents for the CGM Operations Area (BLM 2015a, 2011, 2008a, 2004, 2000). The values in the No Action Alternative emission inventory (**Table 3-*8***) are less than those for the Proposed Action (**Table 3-3**) for all years, with operations ceasing sooner than under the Proposed Action. The Proposed Action modeling predicts concentrations of all criteria pollutants to be below the applicable AAQS and minimal levels of mercury deposition. It is anticipated that impacts under the No Action Alternative would be similar to, or less than, impacts under the Proposed Action. No substantial adverse effect would occur under the No Action Alternative, and air quality effects would be short-term.

Table 3-8 Total Emissions Inventory for the No Action Alternative

Project Year	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO (tpy)	NO_X (tpy)	SO_2 (tpy)	VOC (tpy)	Mercury (tpy)	Total HAPs[1] (tpy)	GHG (tpy CO_2e)
1	1,017.2	227.5	3,086.8	3,090.6	11.7	526.4	0.1	14.6	333,508.9
2	1,017.2	227.5	3,086.8	3,090.6	11.7	526.4	0.1	14.6	333,508.9
3	1,017.2	227.5	3,086.8	3,090.6	11.7	526.4	0.1	14.6	333,508.9
4	1,017.2	227.5	3,086.8	3,090.6	11.7	526.4	0.1	14.6	333,508.9
5	163.9	39.1	713.2	708.6	0.7	119.7	0.0	3.0	64,233.0
6	163.9	39.1	713.2	708.6	0.7	119.7	0.0	3.0	64,233.0
7	163.9	39.1	713.2	708.6	0.7	119.7	0.0	3.0	64,233.0

[1] Mercury is included in the total HAPs.

Source: AECOM 2017.

3.5 Cumulative Impacts

The CESA for air quality is shown in **Figure 3-5**. Past and present actions and RFFAs are identified in **Table 2-3** and shown in **Figure 2-13**.

To quantify cumulative air impacts, major sources of air emissions located within the air quality cumulative effect study area were included in the modeling analysis conducted by Air Sciences Inc. (2017b) The major sources of air emissions located within the CESA include the potential future Goldrush Project and the existing Fire Creek Project. Although the Goldrush Project is currently only in the exploration phase, emissions from maximum production were estimated based on the Air Sciences Inc. (2017b) Technical Memorandum describing the Goldrush Project as a RFFA, along with the associated best currently available information. If permitted and developed, the Goldrush Project would consist of an underground mine, with ore and waste rock transported off-site for storage and processing. The Technical Memorandum for the Goldrush Project RFFA describes the use of either rail or trucks for transporting the ore and waste rock to the CGM Operations Area facilities for storage. The refractory ore then would be trucked to an off-site processing facility (Air Sciences Inc. 2017b). The emissions from the off-site processing also are included in the CESA.

3.5.1 Proposed Action

3.5.1.1 Emission Inventory

The emissions for nearby source emissions used for this cumulative impact analysis are provided in **Table 3-*9***. The emissions from the potential future Goldrush Project were estimated assuming only truck transport of ore to provide a conservatively high estimate of potential emissions. The Fire Creek Project emissions were obtained from the Fire Creek Mine Project Environmental Assessment (BLM 2015a).

Table 3-9 Emissions from On-site Operations at Nearby Sources

Nearby Source	$PM_{2.5}$ (tpy)	PM_{10} (tpy)	CO (tpy)	NO_X (tpy)	SO_2 (tpy)
Goldrush Project	24	105.9	239.3	260.9	1.6
Fire Creek Project	2.4	15.2	58.3	12.7	0.75

Source: Air Sciences Inc. 2017b.

The cumulative emissions for the off-site transport and processing of refractory ore would include the ore transport and processing under the Proposed Action, No Action Alternative, and potential future Goldrush Project. In addition to the off-site refractory ore transport and processing discussed for the Proposed Action and No Action Alternative, the potential future Goldrush Project would transport up to 1.8 million tpy of refractory ore to the Goldstrike Mine for processing. The cumulative emissions for these activities are summarized **Table 3-*10***. The emissions were calculated using the same methods as discussed for the Proposed Action.

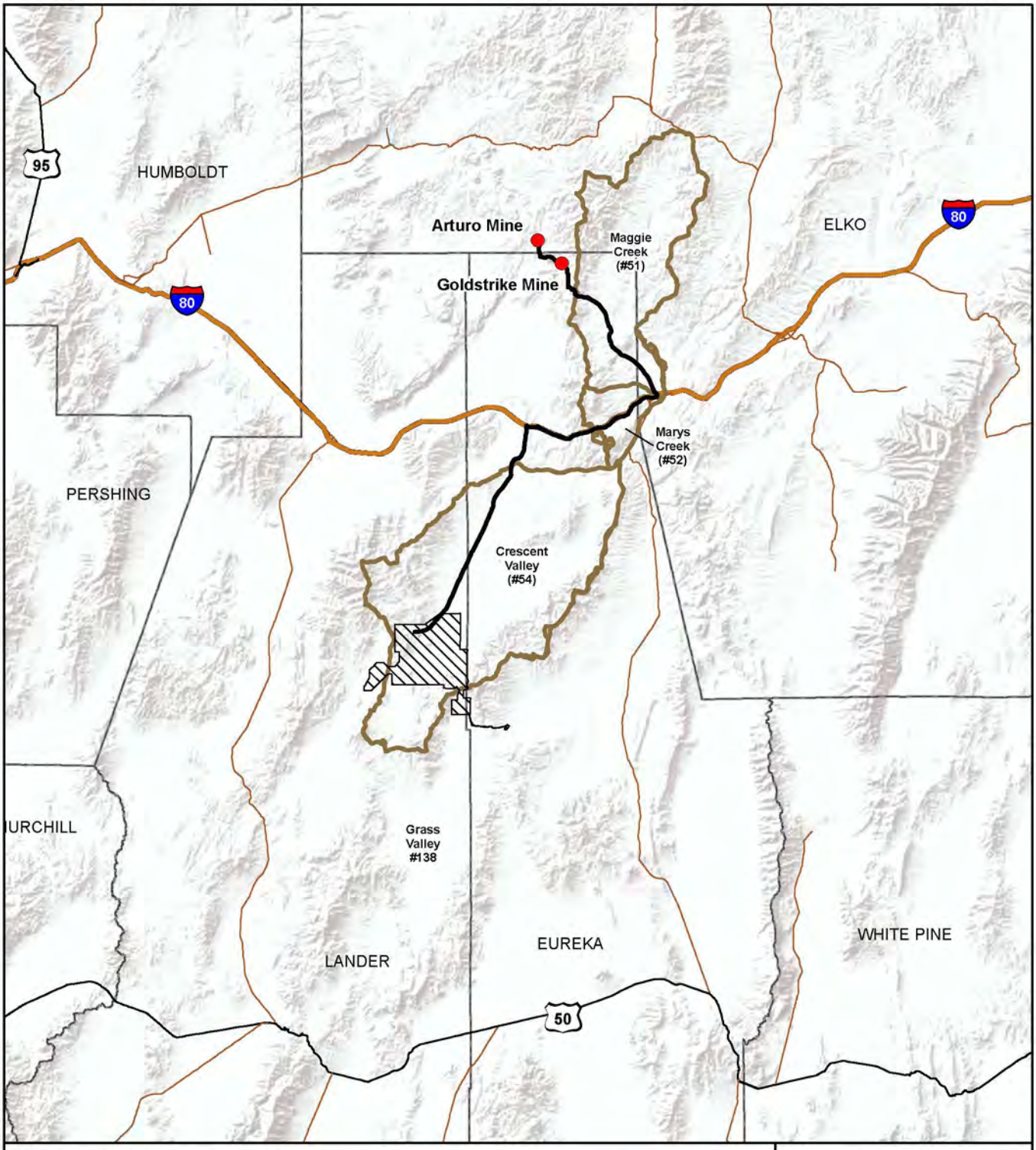
95
HUMBOLDT
Arturo Mine
Maggie Creek (#51)
Goldstrike Mine
ELKO
80
80
Marys Creek (#52)
PERSHING
Crescent Valley (#54)
URCHILL
Grass Valley #138
LANDER
EUREKA
WHITE PINE
50
Proposed CGM Operations Area Boundary
Air Quality CESA (Based on hydrographic basins)
Interstate Highway
U.S. Highway
State Highway
Ore Transportation Route
BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820
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. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
Deep South Expansion Project EIS
Figure 3-5
Air Quality CESA
0 6 12 24 Miles
N
Notes: The CESA for air quality also includes the project study area (i.e., CGM Operations Area, ore transportation route, and Golstrike Mill).

Table 3-10 Emissions from Off-site Ore Transport and Processing

Activity	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO (tpy)	NO_X (tpy)	SO_2 (tpy)	Mercury (tpy)	Total HAPs (tpy)	CO_2e (mtpy)
Off-site ore Transport	262.4	50.9	25.0	102.4	0.27	0.0755	5.1	28,790
Off-site ore Processing	83.6	35.2	25.4	66.1	33.57	--	--	181,823

Source: Air Sciences Inc. 2017b.

3.5.1.2 Modeling

Cumulative modeling was conducted for five of the criteria air pollutants (i.e., PM_{10}, $PM_{2.5}$, CO, NO_2, and SO_2). Results of the cumulative impact analysis for the two modeled Proposed Action operating scenarios 1 and 2 are provided in **Tables 3-*11*** and **3-*12***, respectively. As shown in the tables, the estimated total concentrations (sum of cumulative impact and background concentration) using the NDEP-Bureau of Air Pollution Control recommended background concentrations are less than the applicable AAQS for each pollutant and averaging period for the both modeled scenarios. Similarly, using the alternative background concentrations based on monitoring stations in other areas of remote Nevada show that predicted cumulative impacts are below the applicable AAQS for each modeling scenario (Air Sciences Inc. 2017b).

The same methods as described under the Proposed Action for estimating impacts from processing of CGM Operations Area refractory ore at the Goldstrike Mill were used for the cumulative impacts analysis. As shown in **Table 3-*13***, the impacts from Goldstrike Mill operations are all well below the AAQS. Because refractory ore from the CGM Operations Area and Goldrush Project would displace a portion of the Goldstrike ore throughput, the estimated cumulative impacts shown in **Table 3-*13*** are not additive to the total Goldstrike impacts. The estimated cumulative impacts shown in the table would be well below the AAQS. Additionally, adding estimated cumulative impacts to the total Goldstrike impacts as a worst-case assumption would not result in a total impact that would exceed the AAQS. No substantial adverse effect would occur, and air quality effects would be short-term.

3.5.1.3 Mercury Impacts

Following the same methods as used to estimate the Proposed Action impacts, it is estimated that the mercury deposition from processing refractory ore from both the CGM Operations Area and Goldrush Project at the Goldstrike Mill would account for approximately 26 percent of the total deposition impact attributed to the total mercury emissions modeled for Goldstrike. For example, it is estimated that mercury deposition associated with processing CGM Operations Area and Goldrush Project refractory ore at the Goldstrike Mill would contribute 2.6 percent of the global background at the Willow Creek Reservoir (32 km [19 miles] northwest of Goldstrike) and 0.21 percent of the global background at the Wildhorse Reservoir (90 km [55.9 miles] northeast of Goldstrike). As noted previously, because the CGM Operations Area and Goldrush Project refractory ore would displace a portion of the throughput at the Goldstrike Mill, the cumulative impacts are not additive to the total Goldstrike impacts (Air Sciences Inc. 2017b). No substantial adverse effect would occur, and air quality effects would be short-term.

3.5.2 Gold Acres Pit Partial Backfill Alternative

Under the Gold Acres Pit Partial Backfill Alternative, potential cumulative impacts to air quality would be similar to the Proposed Action.

3.6 Monitoring and Mitigation Measures

It is assumed that BCI would continue implementing the current meteorological monitoring programs at the CGM Operations Area. No additional monitoring or mitigation measures have been identified, as no significant impacts to air quality are predicted as a result of the proposed project.

3.7 Residual Adverse Impacts

There would be no residual adverse impacts to air quality from the proposed project since reclamation and revegetation would stabilize exposed soil and control fugitive dust emissions. As vegetation becomes established, particulate levels should return to what is typical for a dry desert environment. Once the disturbance ceases and wind erodible surfaces are reclaimed, the resource would return to approximately its pre-mining condition.

Table 3-11 Scenario 1 (Mining Year 1) Cumulative Impact Analysis Results

Pollutant	Averaging Period	Modeled Cumulative Impact ($\mu g/m^3$)[1]	Total Concentrations NDEP Background Values ($\mu g/m^3$)		Total Concentrations Alternate Background Values ($\mu g/m^3$)[2]		Applicable AAQS ($\mu g/m^3$)	Compliance with Applicable AAQS
			Background Value[2]	Total Impact	Background Values[2]	Total Impact		
CO	8-hour[3]	194.0	0.0	194.0	801.4	995.4	10,000	Yes
	1-hour[3]	653.8	0.0	653.8	1,030.4	1,684.2	40,000	Yes
NO_2	Annual	11.1	0.0	11.1	1.9	13.0	100	Yes
	1-hour[4]	107.2	0.0	107.2	9.2	116.4	188	Yes
$PM_{2.5}$	Annual	1.2	2.3	3.5	2.3	3.5	12	Yes
	24-hour[5]	4.5	8.0	12.5	8.0	12.5	35	Yes
PM_{10}	24-hour[3]	26.8	10.2	37.0	10.2	37.0	150	Yes
SO_2	3-hour[3]	0.6	0.0	0.6	0.5	1.1	1,300	Yes
	1-hour[6]	0.3	0.0	0.3	0.7	1.0	196	Yes

[1] BCI 2017.

[2] Air Sciences Inc. 2017b.

[3] Highest-second-high modeled concentration.

[4] Highest-eighth-high daily maximum 1-hour modeled concentration.

[5] Highest-eighth-high modeled concentration.

[6] Highest-fourth-high modeled concentration.

Table 3-12 Scenario 2 (Mining Year 3) Cumulative Impact Analysis Results

Pollutant	Averaging Period	Modeled Cumulative Impact (µg/m³)[1]	Total Concentrations with NDEP Background Values (µg/m³)[1]		Total Concentrations with Alternate Background Values (µg/m³)		Applicable AAQS (µg/m³)	Compliance with Applicable AAQS
			Background Values[2]	Total Impact	Background Values[2]	Total Impact		
CO	8-hour[3]	194.0	0.0	194.0	801.4	995.4	10,000	Yes
	1-hour[3]	653.8	0.0	653.8	1,030.4	1,684.2	40,000	Yes
NO_2	Annual	11.0	0.0	11.0	1.9	12.9	100	Yes
	1-hour[4]	125.2	0.0	125.2	9.2	134.4	188	Yes
$PM_{2.5}$	Annual	1.2	2.3	3.5	2.3	3.5	12	Yes
	24-hour[5]	4.5	8.0	12.5	8.0	12.5	35	Yes
PM_{10}	24-hour[3]	26.8	10.2	37.0	10.2	37.0	150	Yes
SO_2	3-hour[3]	0.6	0.0	0.6	0.5	1.1	1,300	Yes
	1-hour[6]	0.3	0.0	0.3	0.7	1.0	196	Yes

[1] BCI 2017.

[2] Air Sciences Inc. 2017b.

[3] Highest-second-high modeled concentration.

[4] Highest-eighth-high daily maximum 1-hour modeled concentration.

[5] Highest-eighth-high modeled concentration.

[6] Highest-fourth-high modeled concentration.

Table 3-13 Emissions and Impacts from Processing Refractory Ore from the CGM Operations Area and Goldrush Project at the Goldstrike Mill

Pollutant	Averaging Period	Total Goldstrike Emissions and Impacts		Cumulative Processing Emissions and Impacts		Applicable AAQS (µg/m³)
		Emissions (tpy)	Modeled Impact (µg/m³)[1]	Emissions (tpy)	Estimated Modeled Impact (µg/m³)[1]	
CO	8-hour	400	38.25	25.37	2.43	40,000
	1-hour		216.49		13.73	10,000
NO_2	Annual	311	0.83	66.11	0.18	188
	1-hour		10.38[2]		2.21	100
$PM_{2.5}$	Annual	ND[3]	ND[3]	35.19	0.65[4]	35
	24-hour[3]				1.01[4]	12
PM_{10}	Annual	579	10.62	83.55	1.53	NA
	24-hour		16.65		2.40	150
SO_2	3-hour	996	13.03	33.57	0.44	196
	1-hour		14.48[2]		0.49	1,300

[1] BLM 2008a.

[2] Estimated using the SCREEN3 scaling ratios provided in the AERSCREEN User's Guide.

[3] No data.

[4] Cumulative ore processing $PM_{2.5}$ impacts are based on the Goldstrike PM_{10} data.

Source: Air Sciences Inc. 2017b

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