BLM
Mount Lewis Field Office, Nevada

ENVIRONMENTAL ASSESSMENT

DOI-BLM-NV-B010-2015-0016-EA

North Optional Use Area Pit and Philadelphia Canyon Waste Rock Facility Expansion Project

March 2015

U.S. Bureau of Land Management
Mount Lewis Field Office
Battle Mountain District
50 Bastian Road
Battle Mountain, Nevada 89820-2332

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DOI-BLM-NV-B010-2015-0016-EA

NEWMONT MINING CORPORATION
NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT
LANDER COUNTY, NEVADA

Environmental Assessment

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NEWMONT MINING CORPORATION
PHOENIX MINE
NORTH OPTIONAL USE AREA PIT AND
PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT
ENVIRONMENTAL ASSESSMENT

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LIST OF ACRONYMS AND ABBREVIATIONS

2002 Final EIS	Phoenix Project Final Environmental Impact Statement
2011 Draft EIS	Draft Environmental Impact Statement for the Phoenix Copper Leach Project
2012 Final EIS	Final Environmental Impact Statement for the Phoenix Copper Leach Project
ABA	acid base accounting
AMEC	AMEC Earth and Environmental, Inc.
amsl	above mean sea level
ANP	acid neutralization potential
approved 2003 Plan	Phoenix Project Plan of Operations
approved 2012 Plan	Plan of Operations #NVN-067930 (07-3A) and Permit for Reclamation #0223, Phoenix Copper Leach Project Proposed Amendment
ARD/ML	acid rock drainage/metal leaching
AUM	animal unit month
BAPC	Bureau of Air Pollution Control
BLM	Bureau of Land Management
BMRR	Bureau of Mining Regulation and Reclamation
$CaCO_3$	calcium carbonate
CESA	cumulative effects study area
CFR	Code of Federal Regulations
CO	carbon monoxide
EA	Environmental Assessment
EO	Executive Order
EPM	Environmental Protection Measure
ESA	Endangered Species Act of 1973, as amended
FLPMA	Federal Land Policy and Management Act of 1976
GHG	greenhouse gas
H	Horizontal
H_2SO_4/t	sulfate per ton
HCT	humidity cell test
HFRA	Healthy Forests Restoration Act of 2003
HPTP	Historic Properties Treatment Plan
IM	Instruction Memorandum
kg	kilograms
ktons	kilo tons
LR2000	Land and Mineral Legacy Rehost 2000 System
lwc	lands with wilderness characteristics
MDB&M	Mount Diablo Base and Meridian
mg/L	milligrams per liter
Mining Law	General Mining Law of 1872, as amended
MLFO	Mount Lewis Field Office
MMPA	Mining and Mineral Policy Act of 1970
MWMP	meteoric water mobility procedure
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAG	net acid generation

NDEP	Nevada Division of Environmental Protection
NDOA	Nevada Department of Agriculture
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act of 1969
Newmont	Newmont Mining Corporation
NNHP	Nevada Natural Heritage Program
NOUA	North Optional Use Area
NPAG	non-potentially acid generating
NPR	neutralization potential ratio
NRCS	Natural Resource Conservation Service
NSAAQS	Nevada State Ambient Air Quality Standards
PAG	potentially acid generating
pH	potential of hydrogen
Plan Amendment	North Optional Use Area Pit and Philadelphia Canyon Waste Rock Facility Expansion Project Update to Phoenix Mine Plan of Operations Amendment
$PM_{2.5}$	particulate matter of aerodynamic diameter less than 2.5 microns
PM_{10}	particulate matter of aerodynamic diameter less than ten microns
Project	North Optional Use Area Pit and Philadelphia Canyon Waste Rock Facility Expansion Project
PSD	Prevention of Significant Deterioration
REA	Rapid Ecoregional Assessment
RFFAs	reasonably foreseeable future actions
RMP	Resource Management Plan
ROW	right-of-way
SB	Senate Bill
SIP	State Implementation Plan
SO_2	sulfur dioxide
SR	State Route
TDS	total dissolved solids
U.S.	United States
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
V	Vertical
VRM	visual resource management
WRF	Waste Rock Facility
WRMaP	Waste Rock Management Plan

1 INTRODUCTION / PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

Newmont Mining Corporation (Newmont) proposes a modification to their approved Phoenix Project named the North Optional Use Area Pit and Philadelphia Canyon Expansion Facility Project (Project), located in north-central Nevada approximately 12 miles southwest of Battle Mountain, Nevada, in Lander County. The Project is located on public lands administered by the Bureau of Land Management (BLM) Mount Lewis Field Office (MLFO), and private lands. Access to the Project is by traveling south from Battle Mountain approximately 12 miles on Nevada State Route (SR) 305, then west on Buffalo Valley Road, then turning north onto Project Access Road.

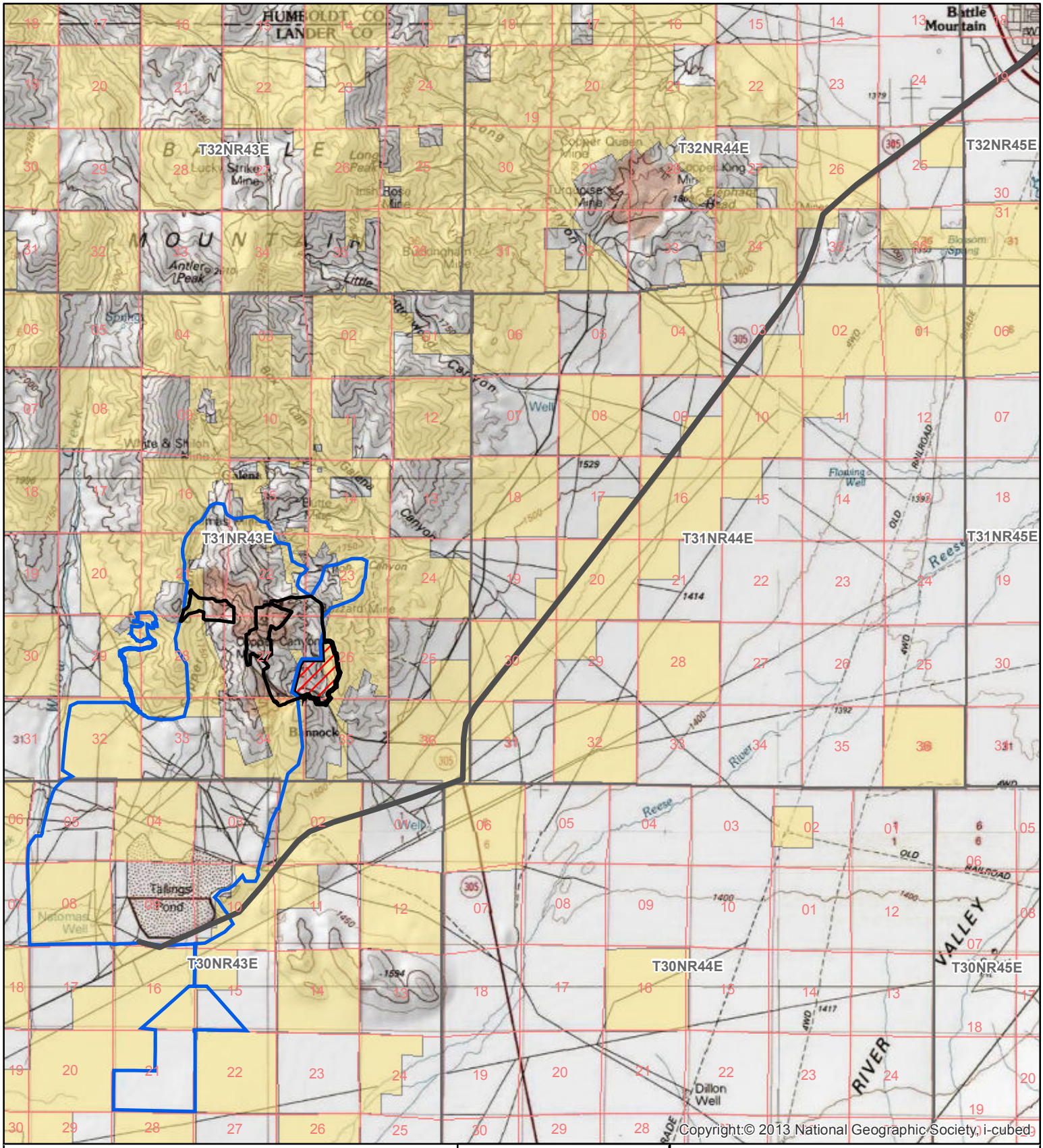
The Project is located in all or parts of Sections 21 through 23, 26 through 28, 34, and 35, Township 31 North, Range 34 East, (T31N, R43E), Mount Diablo Base and Meridian (MDB&M) (Project Area). The proposed expansion area encompasses approximately 186 acres. Figure 1.1.1 shows the Project location, access, and land status.

Newmont originally submitted a Plan of Operations/Nevada Reclamation Permit Application for the Project to the BLM with a final approval on November 28, 2003 (NVN-067930) (approved 2003 Plan). Newmont then submitted an amendment to the 2003 Plan for the Project to the BLM in May 2007, otherwise called the Phoenix Copper Leach Project. Revisions were subsequently submitted in January 2008, September 2010, October 2010, September 2011, and February 2012 (approved 2012 Plan) (Newmont 2012a) as required under the regulations. The approved 2012 Plan is on file and available for review during normal business hours at the BLM MLFO. The Amendment to the Plan of Operations/Nevada Reclamation Permit Application (Plan Amendment) was submitted to the BLM and the Nevada Division of Environmental Protection (NDEP) Bureau of Mining Regulation and Reclamation (BMRR) on July 29, 2014, in accordance with BLM Surface Management Regulations 43 Code of Federal Regulations (CFR) 3809, as amended, and Nevada reclamation regulations at Nevada Administrative Code (NAC) 519A (Newmont 2014a). The purpose of this Plan Amendment is to expand the Project Area boundary as well as add and modify the surface disturbance associated with mining activities in support of the originally approved copper and gold mining and processing operation.

1.2 Purpose of and Need for Action

The BLM is responsible for administering mineral rights access on certain federal lands as authorized by the General Mining Law of 1872, as amended (Mining Law). Under the law, qualified prospectors are entitled to reasonable access to mineral deposits on public domain lands, which have not been withdrawn from mineral entry.

The purpose of the Project is to profitably extract copper and gold from public lands where Newmont holds mining claims to the optimal extent possible. The Project need is to meet the prevailing market demand for gold. The prevailing market demand is regularly adjusted at market exchanges throughout the world. This adjustment results from buyers and sellers agreeing



Explanation

- Approved 2012 Plan Boundary
- Proposed Project Area
- Philadelphia Canyon WRF Expansion
- Access Roads

Land Status

- Bureau of Indian Affairs
- Bureau of Land Management
- Private

0 0.5 1 Miles

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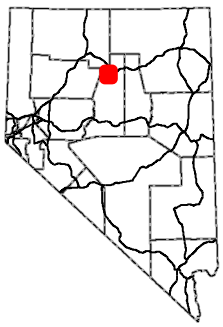

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NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

Project Location, Access, and Land Status

Figure 1.1.1

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on a specific transaction price, which reflects the current supply and demand for the commodity and other factors.

The purpose and need for the federal action is multifold. One aspect of the purpose and need is established by the BLM's responsibilities under the Federal Land Policy and Management Act of 1976 (FLPMA) to respond to a request for a Plan of Operations for the applicant to exercise their rights under the Mining Law. Other aspects of the purpose and need of the federal action are: (1) to further the "Minerals" objective of the applicable resource management plan, which is to "[m]ake available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals" (BLM 1986a); and (2) to provide for mining and reclamation of the Project Area in a manner that is environmentally responsible and in compliance with federal mining laws, the FLPMA, Nevada Mine Reclamation Law, and other applicable laws and regulations.

1.2.1 Decision to be Made

The decision the BLM would make, based on the National Environmental Policy Act of 1969 (NEPA), includes the following options: 1) approve the Plan with no modifications; 2) approve the Plan with additional mitigation measures that are needed to prevent unnecessary or undue degradation of public lands and reduce or eliminate the effects of the proposed action or alternatives; or 3) deny the approval of the Plan as currently written and not authorize the Project if it is found that the Proposed Action does not comply with the 3809 regulations and the FLPMA mandate to prevent unnecessary or undue degradation.

1.3 Existing Activities and Facilities

The existing Phoenix Mine is a gold and copper mining and processing operation. The gold operation involves developing the Phoenix and Reona open pits and expanding the existing Midas and Iron Canyon open pits. The mining of the ore deposits is coupled with excavating and processing low-grade gold ore stockpiles associated with previous mining operations. Heap leach-grade ore is processed at the existing and expanded Reona heap leach facility. Mill-grade ore is processed at the facility milling operation. Tailings are deposited in a tailings storage facility. The copper operations involve copper leaching/beneficiation of copper oxide rock material that was previously permitted for disposal on currently permitted waste rock facilities. Active mining and processing for the Phoenix Mine would last approximately 24 years; overall closure and reclamation activities are anticipated to extend a minimum of 13 years beyond the operational phase. A minimum of 13 years of revegetation and reclamation monitoring are required following mine closure. Additionally, greater than 600 years of post-closure monitoring would follow final reclamation. The Phoenix Mine would mine approximately 158 million tons of copper ore for processing, resulting in approximately 245 million pounds of recoverable copper during the ore processing timeframe. The authorized surface disturbance totals 8,112 acres on both public and private lands. The approved Project layout is shown on Figure 1.3.1.

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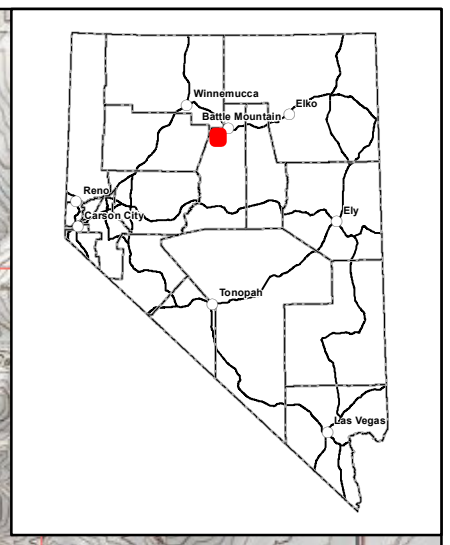

T31NR43E

T31NR44E

T30NR43E

T30NR44E

Explanation

Approved 2012 Plan Boundary

Approved Disturbance

- Active Tailings (Tailings Area 1 & 2)
- Ancillary Facilities
- Ancillary Facilities (Cu Canyon)
- Borrow Area adj Tailings excl stockpile
- Box Canyon
- Butte Canyon WRF
- Clay Borrow Area
- Copper Canyon Evaporation Pond (Cu Canyon)
- East Iron Canyon WRF
- Fortitude Ore Stockpile
- Haul Roads Area E (Cu Canyon)
- Iron Canyon Pit and Backfill
- Iron Launder Plant (Cu Canyon)
- Midas Pit and Backfill
- Minnie Pit and Backfill
- NOUA
- Natomas
- New Phoenix Mill Area & Ancillary Facilities
- North Fortitude WRF
- North Iron Canyon WRF
- Office Area
- Office Area (Cu Canyon)
- Ore Stockpile
- Philidelphia Canyon WRF
- Phoenix HLF
- Phoenix Pit and Backfill
- Reona HLF (Gold)
- Reona Pit and Backfill
- Reona Process Facilities (Cu Canyon)
- SOUA
- Section 10 Growth Media Stockpile
- Section 15 Borrow Area
- Section 16 Borrow Area
- Section 28 Growth Media Stockpile
- Section 4 Growth Media Stockpile
- Section 5 Landfill
- Section 5 Optional Use area
- Solid Waste Disposal Area (Cu Canyon)
- South Canyon Waste (Cu Canyon)
- South Iron Canyon WRF
- Sunshine Pit (Cu Canyon)
- Sunshine WRF (Cu Canyon)
- Tailings Area #3 - Historic Tailings
- Tailings Pipeline and Ditch (Cu Canyon)
- Utility Corridor
- Utility and Haul Road Corridor

0 2,000 4,000 6,000 8,000 Feet

N

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NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

Phoenix Mine Authorized Disturbance

Figure 1.3.1

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1.4 BLM Responsibilities and Relationship to Planning

The BLM has the responsibility and authority to manage the surface and subsurface resources on public lands located within the jurisdiction of the MLFO. The public lands within the Project Area are designated as open for mineral exploration and development. The BLM is responsible for the preparation of this environmental assessment (EA), which was prepared in conformance with NEPA, applicable laws and regulations passed subsequently, including the President's Council on Environmental Quality regulations implementing the NEPA (40 CFR 1500-1508), United States (U.S.) Department of the Interior requirements, and the policy guidance provided in the BLM NEPA Handbook (BLM Handbook H-1790-1) (BLM 2008a). Under 43 CFR 3809.415, the operator of a plan of operations must prevent unnecessary or undue degradation to the public lands.

This EA specifically utilizes and is tiered off the analysis in the Draft Environmental Impact Statement for the Phoenix Copper Leach Project (2011 Draft EIS), dated October 2011 (DOI-BLM-NV-B010-2011-0037-EIS) (BLM 2011), the Final Environmental Impact Statement for the Phoenix Copper Leach Project (2012 Final EIS) (BLM 2012), as well as the Phoenix Project Final EIS, dated January 2002 (NV063-EIS00-28) (2002 Final EIS) (BLM 2002).

1.4.1 Resource Management Plan

The Proposed Action conforms to the BLM's Shoshone-Eureka Resource Management Plan (RMP), as amended, dated March 1986 (BLM 1986a). Specifically, on page 29 in the RMP Record of Decision, under the heading "Minerals" subtitled "Objectives" number 1:

> "Make available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals."

Under "Management Decisions," "Locatable Materials," page 29, number 1:

> "All public lands in the planning areas will be open for mining and prospecting unless withdrawn or restricted from mineral entry."

Under "Management Decisions," "Current Mineral Production Areas," number 5:

> "Recognize these areas as having a highest and best use for mineral production and encourage mining with minimum environmental disturbance..."

1.4.2 Surface Management Authorizations and Relevant Plans

BLM regulations for surface management of public lands under the Mining Law (43 CFR 3809), recognize the statutory right of mineral claim holders, such as Newmont, to explore for and develop federal mineral resources and encourage such development. These federal regulations require the BLM to review proposed operations to ensure that the following items are included: a) adequate provisions to prevent unnecessary or undue degradation of public lands; b) measures to provide for reclamation; and c) operations that comply with other applicable federal, state, and local laws and regulations.

The Mining Law allows individuals to locate and patent mining claims, such as lode claims. Since 1994, Congress has maintained a moratorium on BLM processing of mineral patent applications. Under the mill site provision, 30 U.S. Code (U.S.C.) 42, no location of a claim on non-mineral lands, called mill sites, may exceed five acres each. Under 43 CFR Section 3832.32, the maximum size of an individual mill site is five acres; however, more than one mill site per mining claim can be located if each site is used for at least one of the purposes described in 43 CFR Section 3832.34. The amount of located mill site acreage is that which is reasonably required for use or occupation for efficient and reasonably compact mining or milling operations.

1.4.3 Site Reclamation Requirements

The Mining and Mineral Policy Act of 1970 (MMPA) mandates federal agencies to ensure that closure and reclamation of mine operations are completed in an environmentally responsible manner. The MMPA states that the federal government should promote the following:

> "...development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined lands, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining or mineral activities."

The BLM's long-term reclamation goals are to shape, stabilize, revegetate, or otherwise treat disturbed areas in order to provide a self-sustaining, safe, and stable condition providing productive use of the land, which conforms to the approved land use plan for the area. The BLM's long-term goals also include management of any discharges from process components. The short-term reclamation goals are to stabilize disturbed areas and to protect both disturbed and adjacent undisturbed areas from unnecessary or undue degradation. Relevant BLM policy and standards for reclamation are set forth in the BLM Solid Minerals Reclamation Handbook (BLM Manual Handbook H-3042-1), which provides consistent reclamation guidelines for all solid non-coal mineral activities conducted under the authority of the BLM Minerals Regulations in Title 43 CFR 3809 (BLM 1992a). The BLM has reviewed the site reclamation portions of the Plan to ensure that the Project would meet BLM reclamation standards and goals. The Project would also be required to obtain a reclamation permit from, and meet the reclamation standards of, the State of Nevada Department of Conservation and Natural Resources NDEP BMRR.

1.4.4 Local Land Use Planning and Policy

The Lander County Master Plan, updated in 2010, contains a description of land uses, restrictions on development, and recommendations for future land use planning. A Conservation and Natural Resources Element was developed and included into the Master Plan. This Element reaffirms the Lander County Policy Plan for Federally Administered Lands (Policy Plan), adopted in 2005, which was developed in response to Nevada Senate Bill (SB) 40 passed by the Legislature in 1983. SB40 directs counties to develop plans and strategies for resources that occur within lands managed by federal and state agencies. The Policy Plan policy 13-1 states: "Retain existing mining areas and promote the expansion of mining operations and areas." In addition, policy 13-4 states, "Federal land management agencies should continue to enforce existing reclamation standards to ensure there is no undue degradation of the federally administered lands." Finally, policy 13-6 states, "Mine site and exploration reclamation standards should be consistent with the best possible post mine use for each specific area.

Specific reclamation standards should be developed for each property rather than using broad based universal standards. Private properties (i.e., patented claims) should be reclaimed to the standard and degree desired by their respective owners, following state law and regulations" (Lander County 2005). Policies and Action Programs within the Lander County Master Plan promote the development of mining operations/areas. The elements of the Proposed Action may be in conformance with Lander County plans. The BLM acknowledges that Newmont would have to comply with any applicable Lander County codes.

1.5 Scoping and Issues

1.5.1 Scoping

The Project was scoped internally by the BLM interdisciplinary team at a meeting held on September 16, 2014, at the BLM office in Battle Mountain.

1.5.2 Issues

During this meeting, BLM resource specialists identified the elements associated with supplemental authorities, and other resources and uses to be addressed in this document as outlined in Chapter 3 of this EA. Issues and impacts related to specific resources associated with the Proposed Action were identified:

Air Quality
Cultural Resources
Geology and Minerals
Lands and Realty
Migratory Birds
Native American Religious Concerns
Noxious Weeds, Invasive and Non-native Species
Rangeland Management
Recreation
Social Values and Economics
Soils
Special Status Species
Vegetation Resources
Visual Resources
Wastes, Hazardous or Solid
Water Quality, Surface and Ground
Wildlife Resources

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Plan Amendment would result in an expansion of the Project Area boundary and the addition and modification of surface disturbance and associated mining activities in support of the originally approved copper and gold mining and processing operation (Proposed Action). The Project Area would expand from 21,517 acres to 21,703 acres (186 acres). The expansion of the Project Area is primarily attributable to the expansion of the Philadelphia Canyon Waste Rock Facility (WRF). The North Optional Use Area (NOUA) and the western portion of the Philadelphia Canyon WRF would become part of the Phoenix Open Pit, and the Philadelphia Canyon WRF would expand to the east into the expanded portion of the Project Area. Activities associated with the Proposed Action would be located in portions of Sections 21 through 23, 26 through 28, 34, and 35, T31N, R43E, MDB&M. Other modifications are detailed below and would not result in any new disturbance:

a) approximately 78 acres from the NOUA, 92 acres from the Philadelphia Canyon WRF, 24 acres from the Ore Stockpile, 15 acres from the Ancillary Facilities, and four acres of the Utility Corridor disturbance would be transferred to Phoenix open pit disturbance; and

b) approximately 32 acres of the Minnie open pit disturbance, 15 acres of the Office Area disturbance, 39 acres of the Utility Corridor disturbance, and 186 acres of new disturbance would be transferred to the expansion of the Philadelphia Canyon WRF.

In addition to the proposed activities and modifications listed above, Newmont would conduct construction, mining, and milling operations, and reclamation and closure at the Project in accordance with the approved 2012 Plan, which is described in the 2011 Draft EIS in pages 2-8 through 2-54 (BLM 2011), modifications and corrections identified in the 2012 Final EIS in Table 2.1 (BLM 2012, pages 2-3 through 2-10), as well as the 2002 Final EIS in pages 2-1 through 2-49 (BLM 2002).

Under the Proposed Action, the authorized surface disturbance of 8,112 acres within the expanded Project Area would increase by 186 acres to 8,298 acres. The majority of the proposed facilities would occur in areas that have been previously approved for surface disturbance. Table 2.1-1 summarizes and Figure 2.1.1 illustrates the proposed surface disturbance changes to the Project facilities.

2.1.1 Phoenix Open Pit

Similar to approved existing activities, mining would be conducted using conventional bench mining techniques. The rock would be drilled first on 14- to 18-foot centers with a rotary or hammer percussion drill rig; ammonium nitrate and fuel oil explosives would be used to blast the material. Wheeled front-end loaders, hydraulic excavators, and haul trucks would be used to excavate and haul the ore and waste rock. Ore and waste rock would be transported along haul roads to the proper storage, disposal, or processing areas. Dozers, water trucks, and assorted support vehicles would also be used in the mining operations.

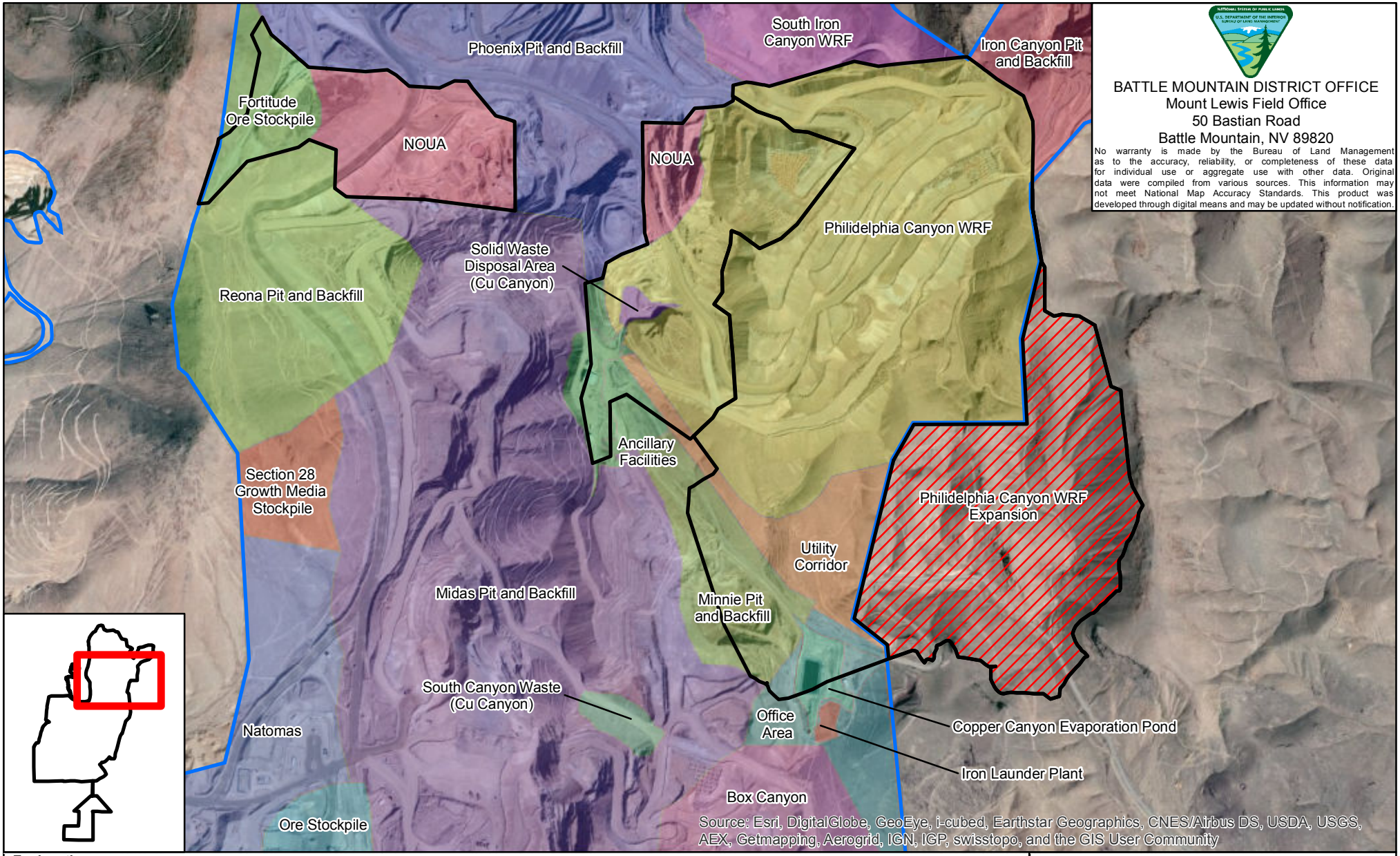
The proposed pit expansions into the NOUA would not extend below an elevation of 6,060 feet above mean sea level (amsl), to maintain the required 40-foot buffer above the predicted post-mining ground water recovery elevation in that area.

Approximately 63 million tons of material would be mined from the proposed expansion, of which approximately 34 million tons would be ore and 29 million tons would be waste material.

Table 2.1-1: Authorized and Proposed Project Surface Disturbance

Project Components	Authorized Surface Disturbance (acres)	Proposed Surface Disturbance (acres)	Total Surface Disturbance (acres)
Open Pits[1]	1,446	181	1,627
Waste Rock Facilities	2,013[2]	180	2,193
Reona Heap Leach Facility	471[3]	0	471
Tailings Facility	1,396	0	1,396
Mill and Processing Area	31	0	31
Ore Stockpiles	62	-24	38
Growth Media/Cover Stockpiles	67	0	67
Clay Borrow Area	469	0	469
Borrow Area	228	0	228
North Optional Use Area	78	-78	0
South Optional Use Area	437[4]	0	437
Phoenix Heap Leach Facility	405	0	405
Haul Roads and Utility Corridors	147	0	147
Utility Corridor	55	-43	12
Office Area	52	-15	37
Ancillary Facilities	21	-15	6
Exploration	50	0	50
Section 5 Optional Use Area	398[5]	0	398
Section 15 Borrow Area	126	0	126
Section 16 Borrow Area	128	0	128
Subtotal[6]	**8,080**	**186**	**8,266**
Willow Creek Road Reroute	27	0	27
Buffalo Valley Power Line	3	0	3
Philadelphia Canyon Power Line	2	0	2
Subtotal[7]	**32**	**0**	**32**
Total	**8,112**	**186**	**8,298**

[1] Pit disturbance includes post-reclamation highwalls and pit backfill facilities.
[2] The SX-EW Beneficiation Facility and a portion of the proposed haul road and utility corridor would be located within the area permitted for the Natomas WRF.
[3] The proposed Reona HLF (approximately 58 acres) would be developed in the permitted Reona HLF (Gold). Up to approximately 12 additional acres would be utilized for the development of evaporation ponds (E-ponds) during closure of the Reona Copper HLF.
[4] Phase 1 of the Phoenix HLF would be developed in the permitted South OUA. Up to approximately 75 additional acres would be utilized for the development of E-ponds during closure of the Phoenix Copper HLF.
[5] New surface disturbance would occur from the development of Proposed Action facilities.
[6] Acres of disturbance within the proposed Phoenix Mine Plan of Operations boundary.
[7] Acres of disturbance associated with ROWs outside the proposed Phoenix Mine Plan of Operations boundary.



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Explanation

- Approved 2012 Plan Boundary
- Proposed Project Area
- Philadelphia Canyon WRF Expansion
- Map Extent

Approved Facilities

- Ancillary Facilities
- Box Canyon
- Copper Canyon Evaporation Pond (Cu Canyon)
- East Iron Canyon WRF
- Fortitude Ore Stockpile
- Iron Canyon Pit and Backfill
- Iron Launder Plant (Cu Canyon)
- Midas Pit and Backfill
- Minnie Pit and Backfill
- NOUA
- Natomas
- Office Area
- Ore Stockpile
- Philidelphia Canyon WRF
- Phoenix Pit and Backfill
- Reona Pit and Backfill
- Section 28 Growth Media Stockpile
- Solid Waste Disposal Area (Cu Canyon)
- South Canyon Waste (Cu Canyon)
- South Iron Canyon WRF
- Utility Corridor

0 500 1,000 1,500 2,000 Feet

N

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NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

Proposed Facility Layout

Figure 2.1.1

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Table 2.1-2 presents the various pit elevations, waste rock, and alluvial capping volumes.

Table 2.1-2: Approximate Final Pit Floor Elevations

Pit Name	Final Pit Floor Elevation (amsl)	Predicted Groundwater Elevation	Backfill Elevation	Waste Rock to be Placed (ktons)	Alluvial Capping Material Needed (ktons)
Phoenix	4,990	6,020	6,060	120,151	2,024
Minnie	5,560	5,530	5,750 – 5,900	8,091	717

ktons = kilotons

The approximately 32-acre portion of the Phoenix/Minnie Open Pit would be covered with the expanded Philadelphia Canyon WRF after it is backfilled, as outlined in the 2011 Draft EIS (BLM 2011).

2.1.2 Philadelphia Canyon Waste Rock Facility

There are eight surface WRFs within the Phoenix Mine area (excluding the NOUA): North Fortitude, Iron Canyon North, Iron Canyon South, Iron Canyon East, Butte Canyon, Box Canyon, Philadelphia Canyon, and Natomas. These facilities would be graded, capped, and vegetated. The expected post-reclamation side slope angles range between 2 Horizontal (H):1 Vertical (V) (2H:1V) and 3H:1V, as described in the approved October 2003 Reclamation Plan. Table 2.1-3 outlines the approved footprint, waste rock and alluvial tonnages, and the operational and reclaimed slopes.

Table 2.1-3: Approved Waste Rock Facility Data

Facility Name	Footprint (acres)	Waste Rock to be Placed (ktons)	Alluvial capping Material Needed (ktons)	Operational Slope	Reclaim Slope (H:V)
Philadelphia Canyon	390	44,445	5,026	1.83	2.3:1

ktons = kilotons

The Philadelphia Canyon WRF would increase in size to approximately 569 acres, primarily through the 186-acre expansion of the Project Area. The total amount of waste rock placed in the WRF would increase to approximately 332.5 million tons, and the amount of alluvial capping material needed would increase to approximately 13.3 million tons.

2.1.3 Waste Rock Management

There are no proposed changes to WRF management associated with this plan. The WRF construction and management activities would comply with the Phoenix Mine WRMaP (Newmont 2014b) as approved by BLM and NDEP. The facility would be constructed in lifts that may vary from 20 to 200 feet and constructed at the angle of repose for the material dumped. After each lift is filled to its maximum design capacity, the slopes of the WRFs would be graded to a slope between 2H:1V and 3H:1V.

AMEC Earth and Environmental, Inc. (AMEC) (2009, 2010) and Vector (2007) conducted cover material studies. The studies included sampling and geotechnical analysis, as well as geochemical analysis of alluvial samples from the Phoenix Mine site. The purpose of each study was to evaluate potential sources of alluvial cover for use as waste rock and heap leach pad cover material during reclamation. The 2010 AMEC study also provides an estimate of available material for use as cover. The AMEC report estimates that the available borrow material from Sections 4, 5, and 8, T30N, R43E, and Sections 32 and 33, T31N, R43E is approximately 14 million cubic yards.

The WRMaP describes characterization, management, and closure of waste rock and associated facilities (Newmont 2014b). The BLM and NDEP BMRR approved the revised WRMaP, dated April 2014.

2.1.4 North Optional Use Area

The NOUA is located on former precious metal processing facilities (Sections 21, 22, 27, and 28, T31N, R43E) and is authorized for use as a WRF, haul road corridor, or for construction of ancillary facilities, and covers 70 acres of private land and eight acres of public land. This area would become part of the Phoenix Open Pit.

2.1.5 Reclamation

Reclamation of disturbed areas resulting from activities outlined in this Reclamation Plan would be completed in accordance with BLM and NDEP regulations. The purpose of Subpart 43 CFR 3809 – Surface Management is to prevent unnecessary or undue degradation of public lands by operations authorized by the Mining Law. Anyone intending to develop mineral resources on public lands must prevent unnecessary or undue degradation of the land and reclaim disturbed areas. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility and provide for the maximum possible coordination with appropriate state agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation of public lands by operations authorized by the Mining Law. The State of Nevada requires that a reclamation plan be developed for any new mining projects and for expansions of existing operations (NAC 519A).

Newmont would reclaim and revegetate surface mine components, with the exception of a portion of the open pits.

The approved mining and milling operations would be active for approximately 24 years, which is consistent with Section 2.3.2 of the 2012 FEIS. No changes to the reclamation schedule are proposed under this Plan Amendment.

2.1.6 Applicant-Committed Environmental Protection Measures

Newmont would continue to commit to the practices described in the approved 2012 Plan (Newmont 2012a) and the existing Programmatic Agreement that would prevent undue or unnecessary degradation during the life of the Project. No changes to these committed practices are proposed in this Plan Amendment. However, a new cultural resources applicant-committed

environmental protection measure (EPM) has been added to this Project, as well as measures to mitigate the loss of Greater sage-grouse Moderate habitat.

- Newmont shall develop, and submit to the BLM for approval, a Historic Properties Treatment Plan (HPTP) to address the potential impacts to the unevaluated rockshelter site and the four contributing elements to the Battle Mountain Mining District that may be adversely affected by the Project. Newmont shall implement the HPTP prior to any surface disturbance of the rockshelter or the contributing district elements.

- In order to reduce impacts from disturbance which occurs within Greater sage-grouse Moderate Habitat, the following applicant committed EPM's could be implemented. The obligation for restoration and enhancement of Greater sage-grouse habitat would be calculated at a 2:1 ratio (two acres of restoration/enhancement for every one acre of disturbance) for disturbance in Moderate Habitat.

    - Since PJ thinning within the Project Area is not a viable option, off-site PJ thinning to benefit Greater sage-grouse habitat would be considered. There are four wildlife habitat enhancement project EAs prepared by the BLM that have analyzed the effects of PJ thinning throughout various locations in Lander County. A BLM biologist, in coordination with an NDOW biologist, would choose a PJ thinning area analyzed in any of the following EAs for potential off-site mitigation: *Bald Mountain Wildlife Habitat Enhancement Project* (BLM 2010, NV062-EA08-083), *Eagle Butte Wildlife Habitat Enhancement Project* (BLM 2011, DOI-BLM-NV-B010-2011-0021-EA), *Toiyabe West Wildlife Enhancement Project* (BLM 2013, DOI-BLM-NV-B010-2013-0020-EA), and *Mount Lewis North Wildlife Habitat Enhancement Project* (BLM 2015, Draft EA). These four EAs identified and assessed crucial Greater sage-grouse habitat where PJ thinning projects would be beneficial due to PJ encroachment into sagebrush communities. BLM and NDOW would preferably choose PJ thinning projects located within the nearest Greater sage-grouse Population Management Unit (PMU) to the Project Area and analyzed in one of the four EAs. Any off-site mitigation plan would be subject to BLM approval .Impacts associated with the off-site mitigation areas were addressed in the corresponding EAs; therefore, no additional NEPA analysis would be required for this mitigation option.

    - Outlined in the Memorandum of Understanding (MOU) *Regarding the Establishment of a Partnership for the Conservation and Protection of the Greater sage-grouse and Greater sage-grouse Habitat,* payment may be made into a Greater sage-grouse mitigation bank account. The Nevada Standardized Reclamation Cost Estimator (SRCE) model would provide the basis for negotiating costs for public lands.

2.2 No Action Alternative

In accordance with BLM NEPA guidelines H-1790-1, Chapter V (BLM 2008), this EA evaluates the No Action Alternative. The objective of the No Action Alternative is to describe the

environmental consequences that would result if the Proposed Action was not implemented. The No Action Alternative forms the baseline for which the impacts of all other alternatives can be measured.

Under the No Action Alternative, Newmont would not conduct additional surface disturbance activities, add new facilities, or expand their Project boundary from the approved 2012 Plan. Newmont would continue construction and operation activities under the approved 2012 Plan.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

There were no other alternatives considered since this Project is a modification of the surface disturbance associated with the approved facilities or is a modification of the facilities for an approved Mine.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

The purpose of this section of the EA is to describe the existing environment of the Project Area, as well as environmental consequences from implementation of the Proposed Action.

Newmont is currently authorized to conduct 8,112 acres of surface disturbance within the Project Area under the approved 2012 Plan. This Project proposes an additional 186 acres of surface disturbance, bringing the total of authorized and proposed disturbance to 8,298 acres. In addition, Newmont proposes to modify the configuration of some authorized facilities within the approved disturbance footprint. This description, as well as the analysis in the 2002 Final EIS, the 2011 Draft EIS, and revisions and modifications in the 2012 Final EIS, form the existing baseline condition of the Project Area and serve as the basis for the analysis of the Proposed Action and alternatives.

3.1.1 Supplemental Authorities

Supplemental authorities subject to requirements specified by statute or Executive Order (EO) must be considered in all BLM environmental documents. The elements associated with the supplemental authorities identified in the NEPA Handbook (BLM 2008, Appendix 1) and in the Nevada Instruction Memorandum (IM) 2009-030, Change 1, are listed in Table 3.1-1. The table lists the elements and the determination whether the element is present in the Project Area and whether the Proposed Action would affect the element.

Table 3.1-1: Elements Associated with Supplemental Authorities and Rationale for Detailed Analysis for the Proposed Action

Supplemental Authority Element	Not Present	Present/ Not Affected	Present/May be Affected	Rationale/Reference Section
Air Quality			X	See Section 3.2.1.
Areas of Critical Environmental Concern (ACEC)	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Cultural Resources			X	See Section 3.2.2.
Environmental Justice	X			No minority or low-income groups would be disproportionately affected by health or environmental effects as a result of the implementation of the Proposed Action. This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Farm Lands (Prime or Unique)	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Fish Habitat	X			Native fish habitat is not present within the Project Area or vicinity and is not further analyzed in this EA.

Supplemental Authority Element	Not Present	Present/ Not Affected	Present/May be Affected	Rationale/Reference Section
Floodplains	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Forests and Rangelands (Healthy Forests Restoration Act [HFRA] projects only)	X			This Project does not meet the requirements to qualify as an HFRA project and is not further analyzed in this EA.
Historic Trails	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Human Health and Safety (Herbicide Projects)	X			The Project may use herbicides to eradicate noxious weeds; however, EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks", would not apply to this Project as there would be no children on the site During application of herbicides. This element is not further analyzed in this EA.
Migratory Birds			X	See Section 3.2.7.
Native American Religious Concerns			X	See Section 3.2.4.
Noxious Weeds, Invasive and Non-native Species			X	See Section 3.2.5.
Threatened or Endangered Species	X			Threatened or endangered species are not present in or near the Project Area. This element is not further analyzed in this EA.
Wastes – Hazardous/Solid		X		The Proposed Action would not affect hazardous or solid wastes. See summary below.
Water Quality, surface and ground			X	See Section 3.2.11.
Wetlands and Riparian Zones	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Wild and Scenic Rivers	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Wilderness/Wilderness Study Areas (WSAs)/lands with wilderness characteristics	X			Wilderness or WSAs are not present within the Project Area or vicinity. The BLM conducted a lands with wilderness characteristics inventory of the Project Area, and determined there are no lands with wilderness characteristics in the Project Area. These elements are not further analyzed in this EA.

Those elements listed under the supplemental authorities not occurring in the Project Area and not affected, are not discussed further in this EA based on the rationale provided in Table 3.1-1. Elements present are analyzed in Section 3.2, and include justification for the resources present

and determined to be affected by the Proposed Action. The resources that are present but determined not to be affected by the Proposed Action are summarized below.

Wastes, Hazardous or Solid

Activities associated with the Proposed Action would not require the use, storage, or transport of hazardous materials beyond what was analyzed in the 2002 Final EIS (BLM 2002, pages 3.15-1 through 3.15-7) and the 2011 Draft EIS (BLM 2011, pages 3.16-5 through 3.16-9). Newmont would continue to comply with federal, state, and local regulations regarding hazardous materials, as well as with the Phoenix Mine Solid and Hazardous Waste Management Plan (JBR 2010) and the Spill Prevention, Control and Countermeasure Plan – Phoenix Mine (Newmont 2012b). No further analysis for this element is included in this EA.

3.1.2 Additional Affected Resources

In addition to the elements listed under supplemental authorities, the BLM considers other resources and uses occurring on public lands and the issues that may result from the implementation of the Proposed Action. Other resources or uses of the human environment considered for this EA are listed in Table 3.1-2 below.

Table 3.1-2: Resources or Uses Not Associated with Supplemental Authorities

Other Resources or Uses	Not Present	Present/ Not Affected	Present/May Be Affected	Rationale/Reference Section
Geology and Mineral Resources			X	See Section 3.2.3.
Land Use Authorization		X		Land use authorization would not be affected by the Proposed Action. See summary below.
Paleontological Resources	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Rangeland Management			X	See Section 3.2.6.
Recreation			X	See Section 3.2.7.
Social Values and Economics		X		Social values and economics would not be affected by the Proposed Action. See summary below.
Soils			X	See Section 3.2.8.
Special Status Species (Plants and Wildlife)			X	See Sections 3.2.9 and 3.2.11.
Vegetation			X	See Section 3.2.9.
Visual Resources			X	See Section 3.2.10.
Wild Horses and Burros	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Wildlife			X	See Section 3.2.12.

Those other resources listed that do not occur in the Project Area and would not be affected, are not discussed further in this EA based on the rationale provided in Table 3.1-2. Resources or uses present in the Project Area are discussed and analyzed in Section 3.2, and include justification for the resources present and determined to be affected by the Proposed Action. The resources that are present but determined not to be affected by the Proposed Action are summarized below. The potential effects of the No Action Alternative on both supplemental authorities and other resources or uses are discussed in Section 3.3.

Land Use Authorization

No new land use authorizations are located in the proposed expansion area, and the proposed expansion area would not result in any land use, access, or right-of way conflicts. No further analysis for this element is included in this EA.

Social Values and Economics

The Proposed Action would not result in changes to the life of the approved 2012 Project, would not change the construction and operation schedule, and would not add individuals to the work force described in the approved 2012 Plan. Therefore, no further analysis for this element is included in this EA.

3.2 Effects of the Proposed Action

3.2.1 Air Quality

3.2.1.1 Affected Environment

The Federal Clean Air Act is the primary controlling legislation over air quality. Ambient air quality and the emission of air pollutants are regulated under both federal and state laws and regulations. Regulatory air standards potentially applicable to the Project include the following: National Ambient Air Quality Standards (NAAQS) and the Nevada State Ambient Air Quality Standards (NSAAQS).

The Bureau of Air Pollution Control (BAPC) is the agency in the State of Nevada delegated with the responsibility for implementing a State Implementation Plan (SIP) (excluding Washoe and Clark Counties, which have their own SIP). Included in a SIP are the State of Nevada air quality permit programs (NAC 445B.001 through 445B.3791, inclusive). Also part of a SIP is the NSAAQS. The NSAAQS are generally identical to the NAAQS with the exception of the following: a) an additional standard for carbon monoxide (CO) in areas with an elevation in excess of 5,000 feet amsl; b) a hydrogen sulfide standard; c) the revised NAAQS for particulate matter of aerodynamic diameter less than 2.5 microns ($PM_{2.5}$); d) the revised NAAQS for particulate matter of aerodynamic diameter less than ten microns (PM_{10}); e) the revised NAAQS for sulfur dioxide (SO_2) and nitrogen dioxide; f) ozone (Nevada has yet to adopt the new and revised federal standards); and g) a violation of state standards occurring with the first annual exceedance of an ambient standard, while federal standards are generally not violated until the second annual exceedance. In addition to establishing the NSAAQS, the BAPC is responsible for the Prevention of Significant Deterioration (PSD) program, enforcing the New Source

Performance Standards, and implementing the Federal Operating Permit Program (Title V) throughout the State of Nevada.

The attainment status relative to the NSAAQS within the Project Area is determined by monitoring ambient levels of criteria pollutants. An attainment or unclassified designation means that no violations of NSAAQS or NAAQS have been documented in the region. The Project Area is located in the Buffalo Valley hydrographic basin, which is considered in attainment relative to the NAAQS and is not a PSD-triggered basin for any pollutant. The existing air quality is typical of largely undeveloped regions of the western United States (US) with limited sources of pollutants.

Climate and Meteorology

The Project Area is located southeast of Antler Peak. The elevations within the Project Area range from approximately 5,286 feet amsl to 6,611 feet amsl. According to the Western Regional Climate Center (WRCC), the average maximum temperature at Battle Mountain 4 SE, located approximately 16 miles northeast of the Project Area, peaks at approximately 94.1 degrees (°) Fahrenheit (F) in July, and the average minimum temperature peaks at approximately 16.1 °F in January. The average annual precipitation is approximately 5.6 inches and tends to peak in December in the form of snow (WRCC 2013).

Current Conditions

The BLM published the final Rapid Ecoregional Assessment (REA) for the Central Basin and Range in June 2013 (Comer et al. 2013). 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 regime. 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 piñon-juniper encroachment as well as downy brome (cheatgrass).

Greenhouse Gas Emissions

Greenhouse gases (GHGs) are those that allow short-wave solar radiation to enter the earth's atmosphere but absorb long-wave infrared radiation reemitted from the earth's surface. GHGs can affect climate patterns, which in turn can affect resource management.

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide, methane, and nitrous oxide are examples of greenhouse gases that have both natural and man-made sources, while other GHGs, such as chlorofluorocarbons, are exclusively man-made.

Sources of GHG emissions in the vicinity of the Project Area are wildfires, vehicles (including off-highway vehicles), construction and operation activities in support of mineral development, and livestock grazing.

Climate Change

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 water bodies and their currents.

Warmer and more arid conditions, coupled with a shorter snow season, have led to limited water supplies and severe drought in parts of the state. By 2100, the average temperature in Nevada is predicted to increase by 3 °F to 4 °F in the spring and fall and by 5 °F to 6 °F in the summer and winter. El Niño events are predicted to increase in frequency and duration as a result of global climate change. These temperature changes would affect evaporation and precipitation in the state, likely resulting in the decreased availability of water (National Conference of State Legislatures 2008).

In the 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. 2013). However, models show significant 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. 2013). Model forecasts for minimum temperatures show a considerable change in both rate and magnitude over most of the 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 significant forecasted trends in precipitation for any other months in either the near-term (2020s) or midcentury (2050s) projections (Comer et al. 2013).

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. 2013). However, the potential effects of the Project on climate change are beyond the scope of this EA and are not further analyzed in this EA.

3.2.1.2 Environmental Consequences

The Proposed Action would add approximately 186 acres of surface disturbance to the acreage included in the approved 2012 Plan. The air quality impacts from the activities associated with this additional acreage would result in the following: fugitive emissions from blasting, including dust and other pollutants (in the form of PM_{10} and $PM_{2.5}$); fugitive dust emissions from vehicle travel and the dumping of material onto the WRF (in the form of PM_{10} and $PM_{2.5}$); and tailpipe emissions (in the form of SO_2, nitrogen oxide, CO, and volatile organic compounds). The air quality impacts associated with the Phoenix Mine operate under an NDEP Bureau of Air Pollution Control Class II Air Quality Permit to Operate (AP 1041-0220.03). Fugitive dust emissions are also controlled by the procedures outlined in the Phoenix Mine Fugitive Dust Control Plan (Newmont 2010). There would be no appreciable impacts to air quality as a result of the activities associated with the Proposed Action because impacts would be temporal, and there is no increase in equipment or operating hours beyond what was analyzed in the 2003 Final EIS and the 2011 Draft EIS. Therefore, this resource element is not carried forward for additional analysis.

3.2.2 Cultural Resources

3.2.2.1 Affected Environment

A Class III cultural resources inventory was completed and included the proposed expansion area. Cultural resources identified during the inventory within the proposed expansion area include a prehistoric rock shelter and four historic mining features.

3.2.2.2 Environmental Consequences

Cultural resource inventories identified a total of five historic or potentially historic properties within the proposed expansion area. One resource, a prehistoric rockshelter, has been recommended as unevaluated for listing in the National Register of Historic Places (NRHP), and would therefore be treated as eligible. Four other resources are recommended as contributing elements to the overall eligibility of the Battle Mountain Mining District. These four elements consist of three road segments associated with Philadelphia Canyon (recommended as contributing elements under Criterion A) and one mining camp (recommended as a contributing element under Criteria A and D). None of these elements have been recommended as individually eligible for the NRHP.

Newmont has identified that avoidance of the unevaluated rockshelter site and the four contributing elements to the Battle Mountain Mining District is not possible for this Project. The applicant-committed EPM outlined in Section 2.1.6 would be followed to mitigate any adverse effects to these five properties, including the preparation and implementation of a HPTP. In addition, Newmont would follow the applicant-committed EPMs identified in the 2011 Draft EIS (BLM 2011, page 2-56). Through implementation of these EPMs and existing Programmatic Agreement, no appreciable impact to cultural resources is expected.

3.2.3 Geology and Mineral Resources

3.2.3.1 Affected Environment

Regional and local geology, as well as seismicity and mineralogy, were discussed in the 2011 Draft EIS (BLM 2011; pages 3.1-1 through 3.1-8) for the approved 2012 Project. The geology, seismicity, and mineralogy conditions would be relevant for the proposed expansion area.

3.2.3.1.1 General Geology

In Copper Canyon, the Paleozoic formations were intruded by a Tertiary granodiorite, causing alteration to the sedimentary sequence near the intrusion. Important local structures include the Copper Canyon fault, Virgin fault, Golconda thrust, and Plumas fault (Figure 3.2.3). The Copper Canyon fault is highly brecciated with 600 feet of displacement and exhibits post-mineralization movement. The Virgin fault dips 65° to the west with 400 feet of displacement in the north end and 1,000 feet of displacement near the south end of the fault. Erosion along the Virgin fault has resulted in exposure of the Golconda thrust. The Golconda thrust moved the Pumpernickel Formation over the Antler Sequence during the Sonoma orogeny (BLM 2002, page 3.1-2).

3.2.3.2 Environmental Consequences

Impacts to geology, seismicity, and mineralogy associated with surface disturbance and mining activities approved in the 2003 Plan were analyzed in the 2002 Final EIS (BLM 2002, pages 3.1-19 through 3.1-25), and in the 2012 Plan analyzed in the 2011 Draft EIS (BLM 2011, pages 3.1-9 and 3.1-10), and modifications and corrections identified in Table 2-1 in the 2012 Final EIS (BLM 2012). Impacts to the geology, seismicity, and mineralogy conditions would be relevant for the proposed expansion area.

3.2.3.2.1 General Geology

Direct impacts of the Proposed Action on geology and mineral resources would include the removal of approximately 63 million tons of material, of which approximately 34 million tons would be ore and 29 million tons would be waste material.

3.2.4 Native American Cultural Concerns

3.2.4.1 Affected Environment

Located within the traditional territory of the Western Shoshone, the MLFO administrative boundary contains spiritual, traditional, and cultural resources, and sites to engage in social practices that aid in maintaining and strengthening the social, cultural, and spiritual integrity of the Tribes. The BLM began conducting Native American consultation on January 23, 2015, by contacting the Te-Moak Tribe of the Western Shoshone (the Battle Mountain Band, the Elko Band, and the South Fork Band) and the Duckwater Shoshone Tribe.

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

Antler sequence

Harmony Formation

Pumpernickel Formation

Harmony Formation

Crane Canyon sequence of Means

Alluvial fan deposits

Explanation

- Approved 2012 Plan Boundary
- Proposed Project Area
- Philadelphia Canyon WRF Expansion
- Qya - Younger alluvium
- QToa - Older alluvium and alluvial fan deposits (Pleistocene and Pliocene)
- QTb - Basalt flows (Holocene to Pliocene)
- Tfi - Felsic phaneritic intrusive rocks (Miocene to Eocene)
- PlPacl - Conglomerate, sandstone, and limestone (Permian to Middle Pennsylvanian)
- DCs - Shale, chert, quartzite, greenstone, and limestone (Devonian to Upper Cambrian)
- GC - Golconda terrane - Basinal, volcanogenic, terrigenous clastic, and minor carbonate rocks (Permian to Upper Devonian)
- DF - Dutch Flat terrane - Feldspathic sandstone, shale, and turbiditic limestone (Upper Devonian)

0 0.3 0.6 0.9 1.2 Miles

N

BUREAU OF LAND MANAGEMENT

NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

Geologic Formations

Figure 3.2.3

3/25/2015

Social activities of Native Americans continue to define places of cultural importance across lands currently administered by the BLM. Some Western Shoshone maintain cultural, spiritual, and traditional activities, visit their sacred sites, hunt game, and gather available medicinal and edible plants. Through oral history (the practice of handing down knowledge from the elders to the younger generations), some Western Shoshone continue to maintain a world view similar to that of their ancestors.

Cultural, traditional, and spiritual sites and activities of importance to Tribes include, but are not limited to the following:

- Existing animal traps;
- Certain mountain tops used for vision questing and prayer;
- Medicinal and edible plant gathering locations;
- Prehistoric and historic village sites and gravesites;
- Sites associated with creation stories;
- Hot and cold springs;
- Collection of materials used for basketry and cradle board making;
- Locations of stone tools such as points and grinding stones (mano and matate);
- Chert and obsidian quarries;
- Hunting sites;
- Sweat lodge locations;
- Locations of pine nut ceremonies, traditional gathering, and camping;
- Rock collecting for use in offerings and medicine gathering;
- Tribally identified Traditional Cultural Properties (TCPs);
- TCPs found eligible to the NRHP;
- Rock shelters;
- Rock art locations;
- Lands or resources that are near, within, or bordering current reservation boundaries; and
- Actions that conflict with tribal land acquisition efforts.

In accordance with the National Historic Preservation Act of 1966 (P.L. 89-665), the NEPA, the FLPMA (P.L. 94-579), the American Indian Religious Freedom Act of 1978 (P.L. 95-341), the NAGPRA (P.L. 101-601) and EO 13007, the BLM must provide affected Tribes an opportunity to comment and consult on the proposed Project. The BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities, and resources.

3.2.4.2 Environmental Consequences

Various Tribes and bands of the Western Shoshone have stated that federal projects and land actions can have widespread effects to their culture and religion as they consider the landscape as sacred and as a provider. Various locations throughout the BLM MLFO Battle Mountain administrative area host certain traditional, spiritual, and cultural use activities today, as in the past. TCPs, designated by the Tribes, are not known to exist within the vicinity of the Project Area. The BLM continues to solicit input from local tribal entities.

For this Proposed Action, Newmont would develop, and submit to the BLM for approval, a HPTP to address the potential impacts to the unevaluated rockshelter site and the three contributing elements to the Battle Mountain Mining District that may be adversely affected by the Project. The measures identified in the HPTP may limit, reduce, or possibly eliminate impacts to Tribal resources, sites, and/or associated activities.

The BLM continues to coordinate with the Tribes to identify any other sites or artifacts, or cultural, traditional, and spiritual use resources and activities that might experience an impact.

If any TCPs, tribal resources, sacred sites, etc. are identified within or in close proximity to the Project boundary, a protective "buffer zone" may be acceptable, if doing so satisfies the needs of the BLM, the proponent, and affected Tribe. The size of any "buffer zone" would be determined through coordination and communication between all participating entities.

The designated BLM representative, accompanied by designated tribal observers, may periodically visit identified cultural resources sites within or near the mining activity boundary. Native American Consultation and monitoring by the BLM and Tribal Cultural Resource Specialists may occur throughout the life of a project to ensure that any identified TCPs are not deteriorating.

If a subsequent development plan or amendment to the Plan is submitted to the BLM, as a result of an approval of this specific mining proposal, the BLM would again initiate consultation with the local Tribes and utilize any data collected during this mining proposal.

During the Project's activities, if any cultural properties, items, or artifacts (i.e., stone tools, projectile points, etc.) are encountered, it must be stressed to those involved in the proposed Project activities that such items are not to be collected. The applicant-committed EPMs in the approved 2012 Plan (Newmont 2012a) state that all activities would be halted immediately in the event of a discovery of a cultural resource. Cultural and archaeological resources are protected under the Archaeological Resources Protection Act (16 US Code 470ii) and the FLPMA.

Though the possibility of disturbing Native American gravesites within most project areas is extremely low, inadvertent discovery procedures must be noted. Under the NAGPRA, section (3)(d)(1), the discovering individual must notify the authorized officer in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

At this time, no impacts related to Native American Cultural Concerns have been identified and are not anticipated from the Proposed Action. Tribal relations and coordination does not terminate with the land use decision itself, but rather continues to engage Tribes regarding treatments, mitigation, reclamation, and disposition of artifacts and deports.

3.2.5 Noxious Weeds, Invasive, and Non-Native Species

3.2.5.1 Affected Environment

Noxious weeds, invasive and non-native species are species that are highly competitive, highly aggressive, and spread easily, which typically establish in disturbed sites, roadways, and waterways. Noxious weeds and invasive plant species have been defined as pests by law or regulation. The BLM defines a noxious weed as, "a plant that interferes with management objectives for a given area of land at a given point in time." The BLM Battle Mountain District recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture (NDOA) statute, found in NAC 555.010. Currently the list contains 47 noxious weed species. When considering whether to add a species to the list, the NDOA makes a recommendation after consulting with outside experts and a panel comprising Nevada Weed Action Committee members. Per NAC 555.055, if a species is found probable to be "detrimental or destructive and difficult to control or eradicate," the NDOA, with approval of the Board of Agriculture, designates the species as a noxious weed. The species is then added to the noxious weed list in NAC 555.010. Upon listing, the NDOA would also assign a rating of "A," "B," or "C" to the species. The rating reflects the NDOA's view of the statewide importance of the noxious weed, the likelihood that eradication or control efforts would be successful, and the present distribution of noxious weeds within the state. An "invasive species" is defined as a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO 13112, signed February 3, 1999). The BLM's policy relating to the management and coordination of noxious weed and invasive plant species is set forth in the BLM Manual 9015 – Integrated Weed Management (BLM 1992b). The BLM's primary focus is providing adequate capability to detect and treat smaller weed infestations before they have a chance to spread. Noxious weed control is based on a program of "prevention, early detection, and rapid response" (BLM 2013).

Field surveys were conducted in 2012 and included the proposed expansion area. The noxious weed species hoary cress (*Cardaria draba*) was identified in the proposed expansion area (Table 3.2-1). The invasive, non-native species cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*) were identified throughout the proposed expansion area.

Table 3.2-1: Noxious Weeds Observed in the Proposed Expansion Area

Noxious Weed	NDOA Category	NDOA Category Description	Date Observed in the Project Area
Hoary cress	C	Weeds that are generally established and generally widespread in many counties of the State.	May 2012

3.2.5.2 Environmental Consequences

New surface disturbance of approximately 186 acres could increase the potential for spread and establishment of noxious weeds, invasive and non-native species. Newmont would follow the Applicant-committed Environmental Protection Measure (EPM) identified in the 2011 Draft EIS (BLM 2011, page 2-56), which states that Newmont would also continue to implement the

Phoenix Weed Management Plan (Newmont 2011) for the monitoring and treatment of noxious weeds.

3.2.6 Rangeland Management/Livestock Grazing

3.2.6.1 Affected Environment

The Project Area is located within the Copper Canyon Grazing Allotment. The allotment contains 60,948 acres and the permitted animal unit months (AUMs) are 5,023. The number of acres per AUM is 12. The Project Area contains 186 acres or 0.3 percent of the allotment. The current permittees for the Copper Canyon Allotment include the following: ELLC Grazing Membership LLC; Chiara Ranch; Ellison Ranching Company; and Badger Ranch.

3.2.6.2 Environmental Consequences

The Proposed Action would result in the loss of approximately 186 acres within the Copper Canyon Allotment due to the expansion of the Philadelphia Canyon WRF outside of the approved 2012 Project boundary. The increase of 186 acres of surface disturbance in this allotment would impact approximately 15 AUMs, which is an impact to approximately 0.003 percent of the total active AUMs in the Copper Canyon Allotment. Due to the small amount of disturbed AUMs, combined with the steep topography of the Project Area (which would limit livestock use), the BLM has not issued a grazing reduction waiver at this time.

3.2.7 Recreation

3.2.7.1 Affected Environment

The primary recreation use in the Project Area vicinity includes deer, sage grouse, and chukar hunting, and trout fishing. Dispersed recreation activities include rock-hounding, hiking, horseback riding, all-terrain vehicle use, visiting old mining camp sites, photography, and camping (BLM 2011).

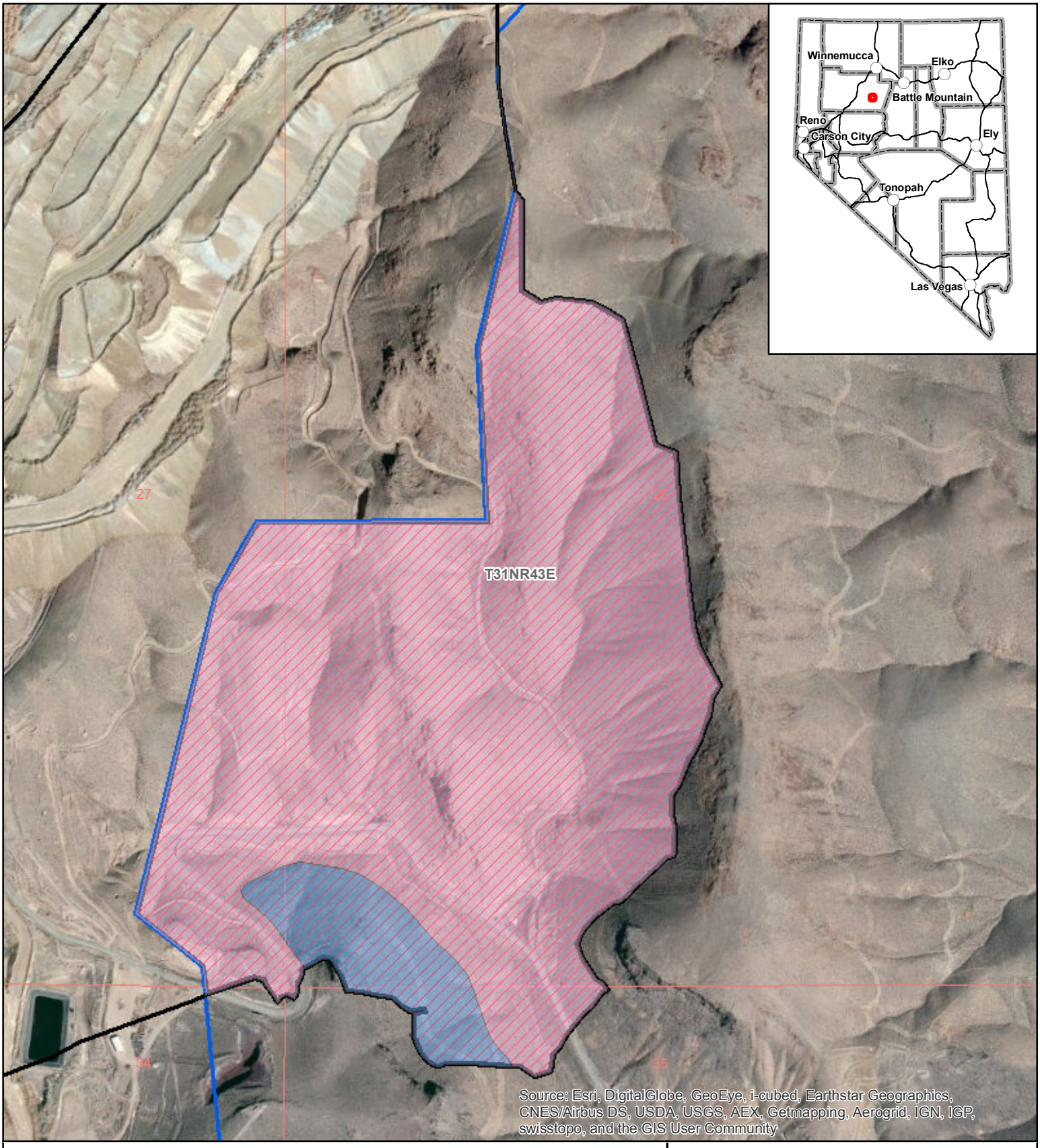
3.2.7.2 Environmental Consequences

The Proposed Action would result in up to 186 acres of surface disturbance, which would reduce opportunities for dispersed recreation within the Project Area. However, no appreciable impacts are anticipated as a result of the Proposed Action, since there is other similar land available to dispersed recreational visitors in the vicinity of the Project Area. Therefore, this resource element is not carried forward in additional analysis.

3.2.8 Soils

3.2.8.1 Affected Environment

The soils within the approved 2012 Project Area have all been previously disturbed. There are two soil types in the proposed expansion area: approximately 171 acres of the Bregar-Roca-Quarz association and approximately 15 acres of the Malpais-Stingdorn association (Figure 3.2.8). The Bregar-Roca-Quarz association consists of very cobbly, very gravelly, and



Explanation

- Proposed Project Area
- Approved 2012 Plan Boundary
- Philadelphia Canyon WRF Expansion

Soil Map Unit/Ecological Site Name

- Bregar-Roca-Quarz association/Mountain Ridge (R024XY016NV) (171 acres)
- Malpais-Stingdorn association/Loamy 5-8 P.Z. (R024XY002NV) (15.4 acres)

0 500 1,000 Feet

N

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

BUREAU OF LAND MANAGEMENT

NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

NRCS Soil Map Units and Ecological Sites

Figure 3.2.8

3/25/2015

extremely gravelly loams and is located on mountains between elevations of 6,200 and 7,600 feet amsl. The Bregar series consists of very shallow and shallow well-drained soils that formed in residuum and colluviums derived from andesite, tuff, and quartzite (Natural Resource Conservation Service [NRCS] 2011a). The Roca series consists of moderately deep, well-drained soils that formed in colluvium and residuum derived from volcanic and sedimentary rocks (NRCS 2012a). The Quarz series consists of moderately deep, well-drained soils that formed in residuum and colluvium derived mainly from sedimentary rocks (NRCS 2011b). The erodibility factors for water are moderate and for wind are slight (NRCS 1992).

The Malpais-Stingdorn association is located on hills between elevations of 5,400 to 6,200 feet amsl. The Malpais series consists of very deep, well-drained soils that formed in alluvium and colluvium derived from mixed rocks (NRCS 2012b). The Stingdorn series consists of very shallow, well-drained soils that formed in residuum derived from rhyolite, andesite, and tuff (NRCS 2011c). The erodibility factors for water are moderate and for wind are slight (NRCS 1992).

3.2.8.2 Environmental Consequences

Surface disturbing activities associated with the Proposed Action would result in the disturbance to approximately 186 additional acres of soils within the proposed expansion area. The areas of proposed activities within the approved 2012 Project Area have been previously disturbed. Direct impacts from the additional disturbance would primarily include potential increases in soil erosion due to wind and storm water runoff.

BMPs would be used to limit erosion and reduce sediment in precipitation runoff from proposed Project facilities and disturbed areas during construction, operations, and initial stages of reclamation. BMPs that would be used during construction and operation to minimize erosion and control sediment runoff would include surface stabilization measures, runoff control and conveyance measures, and sediment traps and barriers.

Revegetation of disturbed areas would reduce the potential for wind and water erosion. Following construction activities, areas such as cut and fill embankments and growth media/cover stockpiles would be seeded as soon as practicable and safe. Concurrent reclamation would be maximized to the extent practicable to accelerate revegetation of disturbed areas. All sediment and erosion control measures would be inspected periodically, and repairs performed as needed.

3.2.9 Vegetation Resources

3.2.9.1 Affected Environment

The vegetation within the approved 2012 Project Area has all been previously disturbed. There are two ecological sites in the proposed expansion area: approximately 171 acres of the Mountain Ridge ecological site (R024XY016NV) and approximately 15 acres of the Loamy 5-8" P.Z. ecological site (R024XY002NV) (Figure 3.2.8). Field surveys were conducted in 2012 by JBR and included the proposed expansion area (JBR 2013a).

Dominant plant species within the Mountain Ridge ecological site (R024XY016NV) consisted of black sagebrush (*Artemisia nova*), low sagebrush (*Artemisia arbuscula*), and Idaho fescue (*Festuca idahoensis*). Other species observed in this ecological site included the following: antelope bitterbrush (*Purshia tridentata*); littleleaf horsebrush (*Tetradymia glabrata*); yellow rabbitbrush (*Chrysothamnus viscidiflorus*); squirreltail (*Elymus elymoides*); Sandberg's bluegrass (*Poa secunda*); and cheatgrass (JBR 2013a). These species were observed within a 2,797-acre area.

Dominant plant species within the Loamy 5-8" P.Z. ecological site (R024XY002NV) consisted of shadscale saltbush (*Atriplex confertifolia*), bud sagebrush (*Picrothamnus desertorum*), and Indian ricegrass (*Achnatherum hymenoides*). Other species observed in this ecological site included the following: Nevada jointfir (*Ephedra nevadensis*); littleleaf horsebrush; spiny hopsage (*Grayia spinosa*); yellow rabbitbrush; Sandberg's bluegrass; squirreltail; and cheatgrass. Also occasionally observed were Wyoming big sagebrush (*Artemesia tridentata* ssp. *wyomingensis*) and black greasewood (*Sarcobatus vermiculatus*). These species were observed within a 9,562-acre area.

3.2.9.1.1 Special Status Plant Species

Field surveys were conducted in 2012 by JBR and included the proposed expansion area. There were no special status plant species identified in the proposed expansion area (JBR 2013a).

3.2.9.2 Environmental Consequences

Surface disturbing activities associated with the Proposed Action would result in the loss of approximately 186 additional acres of vegetation and habitat within the proposed expansion area. The areas of proposed activities within the approved 2012 Project Area have been previously disturbed.

Reclamation and revegetation activities are outlined in Section 2.1.5 of this EA, in Section 2.4.21 in the 2002 Final EIS (BLM 2002, pages 2-36 to 2-40), and in Section 2.4 of the 2011 Draft EIS (BLM 2011, pages 2-34 to 2-54). Reclamation and revegetation activities would be in conformance with the BLM and State of Nevada reclamation regulations. Reclamation and revegetation would minimize the direct impacts to the vegetation communities within the Project Area.

3.2.10 Visual Resources

3.2.10.1 Affected Environment

The Visual Resource Management (VRM) system designates classes for BLM-administered lands in order to identify and evaluate scenic values to determine the appropriate levels of management during land use planning (Table 3.2-2). Each management class portrays the relative value of the visual resources and serves as a tool that describes the visual management objectives (BLM 1986b).

Table 3.2-2: BLM Visual Resource Management Classes

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

Source: BLM 1986b

Lands within the Project Area are classified as VRM Class IV. The activities associated with mining and mining-related activities may require modifying the existing character of the landscape. There has been previous surface disturbance from mining and mining-related activities in the Project Area.

3.2.10.2 Environmental Consequences

The Phoenix Pit is currently visible from Buffalo Valley Road, and the proposed expansion of the Phoenix Open Pit would maintain similar views. The Philadelphia Canyon WRF is currently visible from SR 305 and Buffalo Valley Road and may be a prominent feature to the casual observer. However, the proposed WRF expansion would be contoured similar to existing topography during reclamation. The objective of Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt would be made to minimize the impacts of these activities through careful location, minimal disturbance, and repeating the basic elements (BLM 1986b). The effects of the Proposed Action on visual resources would be consistent with BLM-prescribed Class IV VRM objectives.

3.2.11 Water Quality, Surface and Ground

3.2.11.1 Affected Environment

3.2.11.1.1 Surface Water

There are no perennial drainages, springs, or seeps within the Project Area. Surface water in the Project Area typically derives from precipitation in the form of rain and snow. Typically, the months with the greatest precipitation are March, May, and November. During the winter months, precipitation generally occurs as snow at elevations higher than 5,500 feet amsl.

Ephemeral drainages occur within the Project Area and exhibit flow for short periods of time in direct response to snow melt and/or storm events and typically infiltrate rapidly into the alluvium after exiting the mountain block.

3.2.11.1.2 Ground Water

Quarterly ground water samples have been taken from monitoring locations within the Project Area. Specific samples taken from the proposed expansion area indicate that Profile I standards set by the NDEP have been exceeded in iron, manganese, sulfate, and TDS samples (Newmont 2015). These exceedances may be naturally occurring or attributed to past mining activities such as unreclaimed waste rock or tailings facilities.

3.2.11.1.3 Geochemistry

General Approach

A geochemical characterization was conducted and included the proposed expansion area (Golder Associates 2014). The overall objective of this geochemical characterization program was to provide an evaluation of the environmental stability of waste rock, particularly related to acid rock drainage/metal leaching (ARD/ML) potential. The program followed a phased approach. Phase 1 included an initial static testing program. This was followed by Phase 2, which included long-term kinetic testing and additional static testing. The goal of static testing was to describe the bulk chemical characteristics of a waste material, which provided an initial, screening-level prediction of the acid generating and metal leaching potential. Kinetic testing resolved uncertainties identified during the static testing program and provided further information to evaluate expected field behaviors. These tests accelerated oxidation and weathering reactions to provide a basis for evaluating lag times to acid generation and metals leaching, estimating the time required to deplete neutralization potential and oxidizable sulfur, determining oxidation and metal leaching rates, and establishing the composition of long-term mine discharges.

Existing Geochemical Dataset

This geochemical characterization program was designed as a confirmatory, or supplemental, program and was intended to build upon the existing Phoenix Mine geochemical database to predict the geochemical behavior for subsequent expansion proposals. Previous data collection and assessment efforts by Newmont produced a thorough characterization of the geology and geochemical behavior of the lithologic units within the bounds of the approved 2012 Plan. These previous efforts have resulted in a database containing:

- Geological and assay data from the following: 1) greater than 6,500 boreholes; and 2) greater than 450,000 samples.
- Results from previous geochemical characterization programs that included the following approximate number of tests: 1) 1,200 acid base accounting (ABA); 2) 100 whole rock chemistry; 3) 50 meteoric water mobility procedure (MWMP); and 4) 100 humidity cell tests (HCT).
- Operational water quality monitoring data.

The principal findings of the characterization programs conducted to date show the majority of the lithologic units present at the Phoenix operation are considered PAG and have low acid neutralization potential (ANP). Exceptions are the Pumpernickel and Edna Formations, which contain non-potentially acid generating (NPAG) material as well. The acidic conditions generated by PAG rock may result in the release of sulfate and a number of metals, in particular, aluminum, copper, iron, manganese, and nickel. Metal/metalloid release under circumneutral conditions may include antimony, arsenic, mercury, and zinc.

Phase I Results

Chemical Composition

The trace metal content of the waste rock and ore samples was evaluated to identify parameters of potential environmental concern.

Trace metals with elevated average values in all identified lithologic units (as defined by five times the crustal abundance) include the following: silver, arsenic, bismuth, cadmium, copper, and selenium.
Trace metals with elevated average values in only certain lithologic units include the following:

- Molybdenum – elevated in the Pumpernickel Formation, Harmony Formation, Lower Battle Formation, Upper Battle Formation, Tertiary Intrusive, Virgin Fault Zone, and Alluvium;
- Lead – elevated in the Pumpernickel Formation, Harmony Formation, Lower Battle Formation, Tertiary Intrusive, Antler Formation, Virgin Fault Zone, Alluvium, and Dump;
- Tin – Middle Battle and Antler Formations; and
- Zinc – Tertiary Intrusive and Edna Mountain.

The trace elements found with elevated average values in all of the lithologic units are chalcophile elements (i.e., they occur in association with sulfide minerals and their weathering products). There is a relationship between sulfur and these chalcophilic elements indicating the correlation is the strongest between sulfur and bismuth and between sulfur and selenium. Average concentrations of arsenic, bismuth, cadmium, selenium, and sulfur exceed the crustal abundance concentration by greater than an order of magnitude in virtually all lithologic units tested.

Phase II Results

Net Acid Generation Testing

In general, the NAG acidity and NAG potential of Hydrogen (pH) of the samples follow trends consistent with the ABA data. Samples with higher AGP and lower ANP exhibit higher NAG acidities and lower NAG pH values, and vice versa.

Results for each of the major formations or lithologic units are discussed below.

Pumpernickel Formation

The NAG pH values for the Pumpernickel Formation samples range from 2.5 to 4.5. The NAG acidity for the nine Pumpernickel Formation samples tested ranges from 45 kilograms (kg) sulfate per ton (H_2SO_4/t) to less than detection limits (<1 kg H_2SO_4/t) with an overall average of 17 kg H_2SO_4/t. Samples of the argillic, and quartz-sericitepyrite alteration types and undifferentiated samples exhibited the lowest NAG acidity values, with values of 8 kg H_2SO_4/t, 7 kg H_2SO_4/t, and 7 kg H_2SO_4/t, respectively. The two siliceous hornfels alteration type samples exhibited the widest range of values with acidity concentrations from less than detection (<1 kg H_2SO_4/t) to 40 kg H_2SO_4/t. The biotite hornfels alteration type samples exhibited the highest consistent NAG acidity, with values ranging from 9 kg H_2SO_4/t to 45 kg H_2SO_4/t.

The lowest NAG pH values were observed in one of the siliceous hornfels samples (GrPx-042) and one of the biotite hornfels samples (GrPx-006). The highest NAG pH was observed in the other siliceous hornfels sample (GrPx-044). The remaining samples (including argillic, undifferentiated, quartz-sericite-pyrite, and the remaining biotite hornfels alteration type samples) exhibited little difference in NAG pH.

Harmony Formation

The NAG acidities for the five Harmony Formation samples tested range from 5 kg H_2SO_4/t to 87 kg H_2SO_4/t with an overall average of 41 kg H_2SO_4/t. The NAG pH values range from 2.3 to 3.3. For the Harmony Formation the alteration types with the lowest NAG acidities are the biotite hornfels and undifferentiated samples with values of 5 kg H_2SO_4/t to 18 kg H_2SO_4/t and 16 kg H_2SO_4/t, respectively. The siliceous hornfels and argillic alteration types have the highest NAG acidities with concentrations of 81 kg H_2SO_4/t and 87 kg H_2SO_4/t, respectively.

Samples of the argillic and siliceous hornfels alteration types have relatively low NAG pH values (2.3 and 2.5, respectively). The biotite hornfels alteration type samples and undifferentiated samples have acidic NAG pH values, though relatively lower with NAG pH values of 2.7 and 3.3 for biotite hornfels and 2.8 for undifferentiated alteration samples.

Tertiary Altered Granite

The NAG acidity for the five Tertiary Altered Granite samples tested ranges from 62 kg H_2SO_4/t to 8 kg H_2SO_4/t with an overall average of 31 kg H_2SO_4/t. The NAG pH values are all acidic, ranging from 2.4 to 3.1. The argillic and biotite hornfels alteration type samples exhibited similar NAG acidity concentrations of 13 kg H_2SO_4/t and 12 kg H_2SO_4/t, respectively. The one quartz-sericite-pyrite alteration sample exhibited a value of 61 kg H_2SO_4/t. The potassic samples exhibited the widest range of NAG acidities with 8 kg H_2SO_4/t and 62 kg H_2SO_4/t.

One potassic sample (GrPx-069) and the quartz-sericite-pyrite sample exhibited the lowest NAG pH of the different alteration types, both exhibiting values of 2.5. The other potassic sample (GrPx-072) exhibited the highest NAG pH with a value of 3.1, consistent with the wide variation in NAG acidity reported for this alteration. The argillic and biotite hornfels samples exhibited similar NAG pH values of 2.7 and 2.8, respectively.

Other Formations

The NAG acidities for samples from the other formations span a wide range, from less than the detection limit (<1 kg H2SO4/t) to 76 kg H2SO4/t, with an overall average of 26 kg H2SO4/t. The NAG pH values for these formations range from 2.5 to 5.5. Of the other formations, Middle Battle and Virgin Fault Zone exhibited the highest NAG acidities, with concentrations of 76 kg H2SO4/t and 63 kg H2SO4/t, respectively, and the lowest NAG pH values of 2.6 and 2.5, respectively. The Alluvium exhibited the lowest NAG acidity with a concentration below detection limits and the highest NAG pH value of 5.5. The Waste Dump samples exhibited a range of NAG acidities (5 to 43 kg H2SO4/t, but consistent NAG pH values between 2.6 and 3.0.)

Meteoric Water Mobility Procedure

A discussion of the results by major formation and lithologic unit is presented in the following sub-sections, with emphasis on constituents identified as being elevated relative to the average crustal abundance (5x crustal abundance) through elemental analysis: silver, arsenic, bismuth, cadmium, copper, molybdenum, lead, zinc, selenium, and tin.

Pumpernickel Formation

Six samples from the Pumpernickel Formation were submitted for MWMP testing. The following general chemical characteristics are observed for the leachates:

- pH values range from 3.8 to 7.1;
- Total dissolved solids (TDS) concentrations range from 170 milligrams per liter (mg/L) to 560 mg/L;
- Alkalinity concentrations range from below detection limits (<5 mg/L as calcium carbonate ($CaCO_3$)) to 11 mg/L as $CaCO_3$. Only one sample yielded alkalinity above detection limits; and
- Principal major ions are sulfate (73 mg/L to 331 mg/L), bicarbonate (<5 mg/L to 13 mg/L), and calcium (17 mg/L to 67 mg/L).

Of the eight elements identified as being elevated relative to the average crustal abundance in the Pumpernickel Formation, silver, bismuth, and molybdenum were below detection limits in each sample. The other five elements exhibited concentrations in the following ranges:

- Arsenic: 0.006 mg/L to 0.109 mg/L;
- Cadmium: <0.002 to 0.145 mg/L (four samples were below detection limits);
- Copper : <0.01 mg/L to 0.36 mg/L (four samples were below detection limits);
- Lead: <0.002 mg/L to 0.008 mg/L (five samples were below detection limits); and
- Selenium: <0.005 to 0.024 mg/L (one sample was below detection limits).

The biotite hornfels and siliceous hornfels alteration type samples exhibited the highest pH values which were slightly acidic to circumneutral, and the lowest TDS concentrations. The other alteration types exhibited pH values below 5 with argillic alteration type samples yielding the lowest pH of 3.8 and the highest TDS of 560 mg/L. The alkalinity values for the Pumpernickel Formation samples were below detection limits except for the siliceous hornfels alteration type sample (with a concentration of 11 mg/L as $CaCO_3$).

In general, samples of the siliceous hornfels and biotite hornfels alteration types exhibited leachate concentrations of major ions and metals lower than that of samples of the argillic and quartz-sericite-pyrite alteration types and undifferentiated alteration samples. The quartz-sericite-pyrite alteration type sample exhibited the highest leachate concentration of sulfate (331 mg/L), calcium (67 mg/L), arsenic (0.109 mg/L), and selenium (0.024 mg/L). The argillic alteration type sample exhibited the highest leachate concentration of cadmium (0.145 mg/L), copper (0.36 mg/L), and zinc (8.27 mg/L).

Harmony Formation

One biotite hornfels alteration type sample from the Harmony Formation was submitted for short-term leach testing. The following general leachate chemical characteristics were observed:

- pH value of 6.9;
- TDS concentration of 170 mg/L;
- Alkalinity of 8 mg/L as $CaCO_3$; and
- Principal major ions are sulfate (70 mg/L), bicarbonate (10 mg/L), and calcium (12 mg/L).

All eight of the elements identified as being elevated relative to the average crustal abundance in the Harmony Formation in Section 3.1 were below detection limits in the leachate.

Tertiary Altered Granite

Two samples from the Tertiary Altered Granite lithologic unit were submitted for MWMP testing. The following general chemical characteristics were observed:

- pH values range from 4.4 to 7.9;
- TDS concentration ranging from 520 mg/L to 590 mg/L;
- Alkalinity ranging from below detection limits (<5 mg/L as $CaCO_3$) to 146 mg/L as $CaCO_3$; and
- Principal major ions are sulfate (240 mg/L to 253 mg/L), bicarbonate (<5 mg/L to 179 mg/L), and calcium (53 mg/L to 114 mg/L).

Of the nine elements identified as being elevated relative to the average crustal abundance in the Tertiary Altered Granite Formation, silver, bismuth, and molybdenum were below detection limits in both samples. The other six elements exhibited concentrations below detection in GrPx-069, but were measured in leachate at the following concentrations in sample GrPx-082:

- Arsenic: 0.138 mg/L;
- Cadmium: 0.026 mg/L:
- Copper : 0.77 mg/L:
- Lead: 0.153 mg/L;
- Selenium: 0.014 mg/L; and
- Zinc: 5.51 mg/L.

The quartz-sericite-pyrite alteration type sample exhibited the lower leachate pH value (4.4) and highest leachate concentration of each constituent discussed above, except for calcium. The potassic altered sample exhibited the highest leachate pH (7.9), alkalinity (146 mg/L as $CaCO_3$), and bicarbonate (179 mg/L).

Other Formations

Five samples were submitted representing the other formations: one from the Waste Dump, two from the Upper Battle Formation, one from the Middle Battle Formation, and one from the Virgin Fault Zone. These samples collectively exhibited the following general leachate chemical characteristics:

- pH values ranging from 3.7 to 7.8;
- TDS concentration ranging from 230 mg/L to 4,690 mg/L;
- Alkalinity ranging from below detection limits (<5 mg/L as $CaCO_3$) to 236 mg/L as $CaCO_3$. Only one sample yielded alkalinity above detection limits; and
- Principal major ions are sulfate (92 mg/L to 3110 mg/L), bicarbonate (<5 mg/L to 288 mg/L), and calcium (31 mg/L to 587 mg/L).

Of the elements identified as being elevated relative to the average crustal abundance in these formations, silver, bismuth, and tin were below detection limits in each sample. The remaining elements exhibited the following concentrations:

- Arsenic: <0.003 mg/L to 0.548 mg/L (two samples were below detection limits);
- Cadmium: <0.002 to 1.81 mg/L (three samples were below detection limits);
- Copper : <0.01 mg/L to 7.52 mg/L (three samples were below detection limits);
- Lead: <0.002 mg/L to 0.023 mg/L (two samples were below detection limits);
- Molybdenum: 0.03 mg/L (only identified as being elevated in Upper Battle);
- Selenium: <0.005 mg/L to 0.014 mg/L (three samples were below detection limits); and
- Zinc: <0.01 mg/L to 47.8 mg/L (two samples were below detection limits).

The Waste Dump and Virgin Fault Zone samples exhibited the lowest pH values (4.0 and 3.7, respectively) and highest concentrations of major ions and metals. The Middle Battle Formation

exhibited the highest alkalinity (236 mg/L as $CaCO_3$) and bicarbonate (288 mg/L) and tied for highest pH with the Upper Battle Formation biotite hornfels sample (7.8).

Comparison to Water Quality Standards

The following constituents in the MWMP leachates exceed the United States Environmental Protection Agency (EPA) National Primary/Secondary Drinking Water Standards:

- pH (lower standard) for nine samples;
- TDS for eight samples;
- Fluoride for two samples;
- Sulfate (secondary standard) for seven samples;
- Aluminum (0.2 mg/L secondary standard) for eight samples;
- Antimony for five samples;
- Arsenic for nine samples;
- Beryllium for three samples;
- Cadmium for seven samples;
- Chromium for one sample;
- Copper (secondary standard) for two samples;
- Iron (secondary standard) for seven samples;
- Lead for three samples;
- Manganese (secondary standard) for 19 samples;
- Selenium for one sample;
- Thallium for two samples; and
- Zinc for five samples (Golder 2014).

Sixteen samples of nickel only exceeded the State of Nevada Water Quality Standards for Municipal and Domestic water supply.

Additionally, the following constituents in the MWMP leachates exceed both EPA Primary/Secondary Drinking Water Standards and State of Nevada Water Quality Standards for Municipal and Domestic Water Supply:

- Arsenic for six samples;
- Cadmium for seven samples;
- Chromium for one sample;
- Lead for one sample; and
- Selenium for one sample (Golder 2014).

The following constituents in the MWMP leachates exceed ten times the highest maximum concentration level for either the EPA Primary/Secondary Drinking Water Standards or the State of Nevada Water Quality Standard for Municipal and Domestic water supply:

- TDS for one sample;
- Aluminum (secondary standard) for three samples;
- Arsenic for one sample;

- Beryllium for two samples;
- Cadmium for five samples;
- Iron (secondary standard) for six samples;
- Manganese (secondary standard) for ten samples; and
- Nickel for seven samples (Golder 2014).

The Phoenix Mine WRMaP includes methods that address the exceedances of the EPA and State of Nevada standards (Newmont 2014b).

Humidity Cell Testing

Based on the static test results, 38 samples were selected for kinetic testing (30 from the original selection and eight from the ancillary sample set). The samples represent waste rock materials in the general area of the currently permitted pit as well as in the Expansion Area. Samples submitted for kinetic testing were pre-screened using static test characterization to represent a range of ARD generating potentials: PAG (23 samples), uncertain (11 samples), and NPAG (four samples). The HCT samples represent a range of the lithologic formations (Pumpernickel Formation, Waste Dump, Harmony Formation, Tertiary Altered Granite, Upper Battle Formation, Middle Battle Formation, Lower Battle Formation, Antler Peak Formation, Alluvium, and Virgin Fault Zone) as well as a range of alteration types (biotite hornfels, quartz sericite-pyrite, argillic, siliceous hornfels, potassic, calc-silicate hornfels, skarn, and undifferentiated).

Pumpernickel Formation

Thirteen samples from the Pumpernickel Formation were submitted for kinetic testing. The lixiviant pH values for the Pumpernickel Formation samples throughout the entire testing program range from 2.9 to 8.2, with the majority of the leachates falling between pH 3 to 6. In general, the biggest change in pH for both the original and ancillary samples was observed during the first ten to 20 cycles. During this initial period, each sample exhibited a decrease in pH of approximately one to two pH units, with the exception of siliceous hornfels sample GrPx-044 and biotite hornfels sample GrPx-024, which exhibited a slight increase in pH, and biotite hornfels sample GrPx-009 which exhibited a relatively stable pH throughout the testing period. The argillic, quartz-sericite-pyrite, and undifferentiated samples, as well as the biotite hornfels sample GrPx-014, each showed a decrease in pH beyond the initial period.

In general, at the end of the testing duration, the lowest pH values were observed in the argillic, undifferentiated, and quartz-sericite-pyrite samples and the highest pH values were observed in biotite hornfels sample GrPx-024 and siliceous hornfels sample GrPx-044. Each of the ancillary set samples exhibited a higher and more stable pH trend than its alteration equivalent in the "original" sample set, with the ancillary undifferentiated samples exhibiting a circumneutral pH. This trend was observed throughout the entire test.

Alkalinity in the original Pumpernickel Formation samples was below detection limit for all samples throughout the testing duration except for: one measurement in cycle 12 for biotite hornfels sample GrPx-009 (original sample set); undifferentiated sample GrPx-202 (ancillary sample set), which had periodic detections of alkalinity ranging from 6 mg/L as $CaCO_3$ to

14 mg/L as $CaCO_3$; and undifferentiated sample GrPx-201, which had a one-time reported value of 7 mg/L as $CaCO_3$.

Sulfate leachate concentrations for the original Pumpernickel Formation samples ranged in concentration from 1 mg/L to 468 mg/L throughout the duration of testing and from 1 mg/L to 83 mg/L in the ancillary samples. In both samples sets, generally the highest concentrations for each sample were observed during the first week and decreased until approximately week 10, when the concentration of sulfate began to stabilize in most samples. An exception to this trend was observed in the quartz-sericite-pyrite and undifferentiated samples, which both exhibited a gradually increase in sulfate following the rinse. The highest concentrations were observed in the argillic, undifferentiated (GrPx-028), and quartz-sericite-pyrite samples and the lowest was observed in the siliceous hornfels and biotite hornfels samples.

Consistent with the lower leachate pH values, several of the Pumpernickel Formation samples leached metals in varying concentrations. Trends for metals concentrations were observed to either be stable or decreasing at the termination of the humidity cell tests. The exceptions to this metal leaching behavior from the Pumpernickel Formation is summarized below:

- Undifferentiated sample GrPx-028 had increasing leachate concentration trends for beryllium, copper, lithium, manganese, and silicon. Sample GrPx-038 showed increasing trends for aluminum, beryllium, lead, and silicon concentrations. Sample GrPx-014 had increasing concentrations for lead. These increases occurred during the initial phase of the testing, with concentrations decreasing in the final phase.
- For the ancillary samples, sample GrPx-203 had increasing leachate concentrations for: cadmium, copper, iron, nickel, and zinc. These increases occurred during the initial phase of the testing, with concentrations decreasing in the final phase.

Harmony Formation

Five samples from the Harmony Formation were submitted for kinetic testing. No ancillary set samples were submitted from the Harmony Formation.

The leachate pH for the samples ranged from 5.8 to 2.0 over the total duration of testing. The greatest decrease in pH occurred during the first 20 weeks, where samples exhibited deceases in leachate pH values by up to 3. The only sample continuing to show consistent pH decrease after week 20 was biotite hornfels sample GrPx-058. The siliceous hornfels and argillic samples exhibited the lowest stable pH values around 2.5 after approximately 30 weeks while biotite hornfels sample 056 exhibited the highest stable pH value close to 4. Consistent with the measured pH values, leachate alkalinity concentrations for Harmony Formation samples were below detection limits for all samples for the duration of the testing.

Sulfate in the Harmony Formation HCT sample leachates ranged from 18 mg/L to 1,370 mg/L for the duration of testing. However, the different alterations exhibited different trends in their respective sulfate concentrations. The biotite hornfels samples both exhibited peak concentrations during the first ten weeks and then gradually decreased to stable sulfate concentrations between 50 to 70 mg/L. The argillic, siliceous hornfels, and undifferentiated

samples each exhibited a gradual increase in sulfate following the initial cycles, reaching stable concentrations after week 25 between 350 and 1,150 mg/L.

Consistent with the lower leachate pH values, several of the Harmony Formation samples leached metals in varying concentrations. However, each of the metals was observed as stable or decreasing at the termination of the cell. The metal leaching behavior from the Harmony Formation is summarized below:

- The siliceous hornfels (GrPx-060), argillic (GrPx-063), and undifferentiated (GrPx-067) samples exhibited the highest concentrations of leached metals.
- Elevated concentrations of lead, nickel, and zinc were attributed to the initial rinse period with concentrations of each constituent gradually decreasing throughout the remainder of the testing.
- Iron, aluminum, cadmium, chromium, cobalt were all observed to be leaching from these samples during the end of the rinse or afterwards, but stabilized or decreased in concentration thereafter.

Tertiary Altered Granite

The six samples from the Tertiary Altered Granite, one of which is from the ancillary sample set, had HCT leachate pH values ranging from 2.5 to 7.8 for the duration of testing. Consistent with the other lithologic units for the original sample set, the greatest decrease in pH occurred during the first 20 weeks of testing for all samples except the potassic sample GrPx-069, which exhibited a relatively stable pH throughout the testing. At the termination of testing, this same potassic sample had the highest pH value (6.1), while terminal pH for the other original samples ranged from 2.6 to 3.5. The ancillary sample exhibited a higher terminal pH value of 5.4.

Alkalinity in each of the Tertiary Altered Granite samples (original and ancillary sets) was below detection limits for the duration of the testing program, with the exception of potassic sample GrPx-069. This sample exhibited decreased alkalinity until cycle 46 when the concentration declined below the detection limit.

Sulfate in the six Tertiary Altered Granite samples ranged from below detection limit to 1,880 mg/L, with the biotite hornfels and quartz-sericite-pyrite samples exhibiting the highest final sulfate concentrations of 276 mg/L and 668 mg/L, respectively. The sample with the lowest sulfate concentration was undifferentiated sample GrPx-206 from the ancillary set, with a maximum value of 11 mg/L in the second cycle of testing. Each of the Tertiary Altered Granite samples exhibited similar behavior during testing with a peak sulfate concentration during the first 10 weeks followed by a relatively stable concentration afterwards with no significant increases or decreases.

The metal leaching behavior of the Tertiary Altered Granite is summarized below.

- The quartz-sericite-pyrite, biotite hornfels, and argillic alteration types exhibited metals leaching, consistent with the lower pH values.

- The biotite hornfels and the quartz-sericite-pyrite samples had steadily increasing concentrations for aluminum, arsenic, iron, and silicon. The biotite hornfels sample also showed similar behavior for lithium.
- With the exception of the potassic sample GrPx-069 and the undifferentiated ancillary sample (both of which had higher pH values), copper concentrations demonstrated an increasing trend followed by a decreasing trend throughout the testing.
- The biotite hornfels and the quartz-sericite-pyrite samples reported decreasing trends after a peak in concentration for lead. Similar behavior was observed for beryllium and zinc in the argillic and for beryllium in the quartz-sericite-pyrite sample.

Other Formations

Eleven samples were submitted from the other formations (four from Upper Battle, three from Antler Peak, two from Lower Battle, two from Waste Dump, one from Middle Battle, one from Alluvium, and one from the Virgin Fault Zone). In general, most of the samples reported steady trends in pH from the beginning of the test, with the exception of the undifferentiated Waste Dump sample GrPx-047 and Virgin Fault Zone sample VFZ_un_113, which reported decreases in pH until week 10, after which the trends became stable. Lower Battle sample Pbl_sh_093 showed a constant decrease in pH values from the beginning of the test, and Middle Battle sample Pbm_sk_105, that after 30 weeks of constant pH values, reported a decrease until the end of the testing. The Lower Battle siliceous hornfels and Middle Battle skarn both reported the largest decrease in pH and required the most time to stabilize: 45 weeks for Middle Battle and 60 weeks for the Lower Battle siliceous hornfels. The Upper Battle samples, displayed a gradual increase throughout the duration of testing following the initial rinse. The Upper Battle, Lower Battle iotite hornfels, Antler Peak skarn and undifferentiated, and Alluvium samples exhibited the highest pH values of 6.8 to 7.8 for Upper Battle, 7.4 for the Lower Battle biotite hornfels, 7.6 for the Antler Peak skarn, and 7.1 for Alluvium.

The alkalinity for these samples was mostly below detection limits, with the exception of the following samples: Alluvium (11 mg/L as $CaCO_3$), Upper Battle (7 mg/L as $CaCO_3$ to 26 mg/L as $CaCO_3$), and Antler Peak (13 mg/L as $CaCO_3$ to 21 mg/L as $CaCO_3$).

The other formations also showed varied trends in sulfate concentration. During the initial rinse, the Upper Battle samples had an initial increase in sulfate, but concentrations then started to decrease similar to the other formations. The alluvium sample demonstrated the largest change in sulfate concentration, declining from 2,280 mg/L to 18 mg/L during its testing. The Alluvium (18 mg/L), Upper Battle (24 mg/L to 37 mg/L), and Waste Dump undifferentiated sample GrPx-049 (12 mg/L) exhibited the lowest concentrations of sulfate while Waste Dump sample GrPx-047 (577 mg/L), Antler Peak (377 mg/L), and Virgin Fault Zone (688 mg/L) reported the highest concentrations of sulfate. Of the samples in the ancillary sample set, the Upper Battle undifferentiated exhibited the highest sulfate concentration throughout the duration of testing.

The metals leaching potential of the other formations is summarized below:

- Virgin Fault Zone sample 113 and Waste Dump sample 049 exhibited leaching of iron, aluminum, arsenic, chromium, and silicon; and

- Lower Battle, Waste Dump, Virgin Fault Zone, and Middle Battle exhibited leaching of lead.

The concentrations of each of these metals were observed to be decreasing by the termination of the test.

Evaluation of Acid Generation Potential

For several reasons, no single criteria have universal applicability in terms of predicting acid generation. The actual threshold values for a particular solid are material-specific, and depend on many factors, including the amounts and types of acid generating and neutralizing minerals, their morphology, their grain size, their crystallinity, their chemical composition, their paragenesis, the material's texture, and the site-specific exposure conditions. Below is a discussion of the potential to generate acid based on the ABA, NAG, mineralogy, and humidity cell results. The evaluation presented here is based on the Nevada Modified Sobek methods for ABA; discussions with respect to the NCC method for ABA have been presented previously (Golder Associates 2012).

Pumpernickel Formation

The Pumpernickel Formation material contains variable concentrations of sulfide sulfur (<0.01 to 4.4 percent) and exhibits a wide range of neutralization potential ratio (NPR) values (0.01 to > 5,250). Accordingly, the Pumpernickel Formation samples fall within the PAG, NPAG, and uncertain regions.

Some distinction for the Pumpernickel Formation samples may be made based on the alteration type. Quartz-sericite-pyrite alteration samples all are classified as PAG, while the siliceous hornfels samples are classified as PAG to uncertain and the biotite hornfels are classified as NPAG to uncertain to PAG. These results are generally consistent with the NAG acidity and pH trends. The siliceous hornfels and biotite hornfels alteration types both have samples with high and low NAG acidity values (9 kg H_2SO_4/t to 45 kg H_2SO_4/t for biotite hornfels and <1 kg H_2SO_4/t to 40 kg H_2SO_4/t for the siliceous hornfels).

The range of ABA classifications by alteration type is also generally consistent with the mineralogy results. The quartz-sericite-pyrite samples have the highest pyrite content (three to six percent) or contain jarosite, consistent with the PAG classifications of this material. The siliceous hornfels samples have a greater range of pyrite content (zero to six percent) and the biotite hornfels samples also have a range of pyrite content (1.2 to five percent), matching the range of classifications for these alteration types.

The humidity cell testing confirms the acid generation potential of the argillic and quartz-sericite-pyrite materials, with acidic conditions developing for these materials in the HCTs. The undifferentiated sample from the original sample set also developed acidic conditions (consistent with its ABA classification of PAG), though leachate pH values for two undifferentiated samples from the ancillary sample set remained above 6 (consistent with their ABA classifications as NPAG). The HCTs for biotite hornfels and siliceous hornfels developed a range of conditions through their respective testing durations, from acidic (with pH values less than 5) to near neutral (pH values between 6 and 7). This range is generally consistent with the

range of conditions predicted by the ABA and NAG testing. Those samples classified as uncertain generated acidic or neutral conditions in the case of the biotite hornfels and neutral conditions in the case of the siliceous hornfels.

Based on these results, the sulfide content of the Pumpernickel Formation is expected to control the acid generation behavior. The argillic and quartz-sericite-pyrite alteration types may be generally classified as PAG, while the other alteration types tested are variable, depending on the sulfide content.

Harmony Formation

The acid potential of the Harmony Formation samples is also strongly dependent on the sulfide content. Almost all samples with greater than 0.1 percent sulfide sulfur fall within the classification of PAG material (with the exception of three samples in the uncertain range and one sample classified as NPAG), whereas samples with less than 0.1 percent sulfide sulfur are all classified as NPAG.

With respect to the alteration types, while the ABA data do not provide a consistent indication of acid generation potential, the NAG tests provide further information. The biotite hornfels and undifferentiated samples, classified as PAG or uncertain by ABA testing, each show lower NAG acidity values and higher NAG pH values relative to those of the argillic and siliceous hornfels samples. These results are also consistent with the mineralogical results, as biotite hornfels and undifferentiated samples have lower pyrite contents compared with siliceous hornfels and argillic samples, which have the greatest pyrite contents of the Harmony Formation with eight percent and nine percent, respectively.

For the five Harmony Formation HCTs, all tests developed acidic conditions (end of test pH values ranging from 2.4 to 3.8) regardless of their initial classification as PAG or uncertain.

Based on these results, the sulfide content of the Harmony Formation is expected to control acid generation behavior, regardless of alteration type, and those materials classified as uncertain by ABA methods should be considered PAG.

Tertiary Altered Granite

All samples analyzed from the Tertiary Altered Granite fall within the PAG or uncertain classification based on ABA testing, with the exception of two samples that did not contain sulfide sulfur at detectable limits. The samples with quartz-sericite-pyrite alteration tend to be the most acidic and the samples with argillic alteration fall within the uncertain range. The NAG testing is consistent and presents the quartz-sericite-pyrite samples as having the greatest NAG acidity (61 kg H_2SO_4/t) and lowest NAG pH (2.45). NAG testing also indicates the potassic samples are highly variable, while the argillic and biotite hornfels samples have lower NAG acidity. Mineralogical evidence further supports these results. The quartz-sericite-pyrite and one potassic sample have the most pyrite (six percent and seven percent, respectively), while the other alteration types each exhibited lower or no detectable pyrite.

Six Tertiary Altered Granite samples underwent HCT testing. Five of the samples achieved acidic conditions during testing, regardless of initial ABA classifications as PAG or uncertain.

The undifferentiated sample, which was predicted to be PAG based on ABA testing, achieved a pH of 5.6 during testing. This sample was characterized by low sulfide sulfur (0.12 percent), but very low ANP, resulting in the PAG classification.

Based on the overall results for the Tertiary Altered Granite, the material is classified as PAG.

Other Formations

The sample classification for the other formations and lithologic units/alteration types based on ABA testing. Additional observations are provided below for the other formations:

- Waste Dump materials have variable classification based on ABA testing, dependent on sulfide content. Additionally, the materials have variable NAG acidity values, though consistent low NAG pH values. Samples selected for HCTs were initially classified as PAG and developed acidic conditions. Based on the overall results, in particular the range of ABA results, these materials are considered variable.
- Upper Battle and Lower Battle Formation samples (all alteration types) have a range of classifications based on the ABA testing. NAG testing resulted in neutral NAG pH values for all samples tested. Pyrite contents were relatively low (one to three percent) in samples analyzed, though carbonate content was below detection or present in low amounts (less than one percent). Of the six Upper Battle and Lower Battle Formation HCT samples, only one sample developed acidic conditions (siliceous hornfels sample). Based on these results, these materials are considered uncertain to variable.
- The Antler Peak Formation magnetite skarn has a high NPR value (242), resulting in a NPAG classification for this material. The tested undifferentiated sample was classified as NPAG by ABA testing, had high calcite content, and did not develop acidic conditions in humidity cell testing. The skarn materials presented a range of results, with ABA classifications of PAG and uncertain. Mineralogical evaluation of a skarn sample showed the highest sulfide mineral content in the testing program with 20 percent pyrite and 20 percent pyrrhotite consistent with the PAG classifications and a NAG pH near 3. However, the humidity cell did not develop acidic conditions during the duration of testing (63 cycles).
- Middle Battle skarn samples are consistently classified as PAG based on the ABA testing, low NAG pH values and high NAG acidities (76 kg H_2SO_4/t), elevated pyrite content (nine percent), and acidic conditions achieved in the HCT (terminal pH of 3.7).
- Alluvium materials are considered NAG based on ABA, NAG, mineralogy, and HCT results.
- Virgin Fault Zone materials have a range of classifications based on ABA testing depending on sulfur content. The sample selected for further testing, initially classified as PAG, also resulted in acidic conditions via NAG and HCT testing. Based on the overall results, in particular the range of ABA results, these materials are considered variable.

Major Findings of Geochemical Testing

Based on ABA testing, NAG testing, mineralogical analysis, and humidity cell testing, the ARD potential for various material types are summarized below:

- PAG: Pumpernickel Formation quartz-sericite-pyrite and argillic, Tertiary Altered Granite, Middle Battle Formation skarn, Lower Battle Formation siliceous hornfels
- Uncertain: Antler Peak skarn, Upper Battle Formation, and Lower Battle biotite hornfels
- NPAG: Alluvium, Antler Peak Formation magnetite skarn, Edna Mountain Formation
- Variable: Pumpernickel siliceous hornfels and biotite hornfels, Harmony, Waste Dump, Virgin Fault Zone
- Metals leaching for each formation was generally low and typically associated with the rinsing period where the first flush created a peak concentration. However, several formations appear to exhibit greater metals leaching potential than others. The Harmony Formation siliceous hornfels samples and Tertiary Altered Granite quartz-sericite-pyrite samples exhibited the greatest potential for metals leaching. Additionally, metals with elevated concentrations following the initial rinse (e.g., iron, aluminum, cadmium, and lead) generally decreased or stabilized throughout the remaining duration of testing.
- A sulfide content of 0.1 percent was identified as a potential indicator value to distinguish between PAG from NPAG material.

Of the 29 million tons of waste rock generated under the Proposed Action, 63 percent, or 18 million tons would be rehandled waste rock of undetermined origin. Approximately 26 percent, or eight million tons, would be from the Harmony Formation. The remaining 11 percent, or three million tons, would be a mix of Pumpernickel Formation, Alluvium, and Intrusive. Characterization of the existing WRF was conducted by Exponent (2000a). This characterization work has been used to assess the rehandled waste rock. Geochemical characterization of the as yet unmined materials has been completed by Golder Associates (2014). This characterization work has been used to assess the remaining waste rock materials.

ABA tests and MWMP tests of sulfidic waste rock (Exponent 2000a) indicate the rock has the potential to release acid, sulfate and metals to runoff water during storm events.

3.2.11.2 Environmental Consequences

3.2.11.2.1 Surface Water

The Project may require the alteration or diversion of existing natural surface water drainages or washes. However, no storm water collection channels are being reconfigured, and no new storm water infrastructure is being proposed. There are ephemeral drainages in the Project Area that may be impacted by contact of runoff water from the expanded Philadelphia Canyon WRF with PAG waste rock. Construction of five-foot thick caps, made of oxide, benign, and/or amended waste rock or other suitable material would prevent the contact of storm water with PAG waste rock. The WRF may be exposed for up to 12 months prior to capping, which may result in an increased risk of contamination during that period.

The water quality impact from runoff from the reclaimed WRF is expected to be minimal based on MWMP testing of cover material and capping methodologies identified in the 2002 Final EIS. Under the current plans, surface water quality monitoring would continue through the operational period, and would terminate based on approval from BLM and NDEP BMRR. If the surface water quality monitoring detects that any surface water runoff contains concentrations, which exceed the applicable water quality standards, surface water runoff would be captured and managed in compliance with the Stormwater Pollution Prevention Plan (Newmont 2012c). Contaminated runoff from the WRF following placement of the vegetated caps is expected to be minimal, since the caps would prevent the contact of PAG waste rock with storm water.

In addition, BMPs would be utilized to minimize the amount of pollutants contacting or discharged in site storm water runoff. Measures or procedures that can be utilized within a BMP may include structural and nonstructural controls. Structural controls include ditches, retention basins, sediment basins, pipelines, constructed channels, and culverts. Non-structural BMPs are management practices that prevent or reduce storm water pollution such as employee training, inspections/maintenance of structural controls, and materials management/good housekeeping (Newmont 2012c).

3.2.11.2.2 Ground Water

The proposed pit expansions into the NOUA would not extend below an elevation of 6,060 feet above mean sea level (amsl), to maintain the required 40-foot buffer above the predicted post-mining ground water recovery elevation in that area. Therefore, ground water quality would not be affected based on the proposed pit expansion. However, infiltration into the ground water may occur from precipitation events at the WRFs. Impacts to ground water quality were described in the 2002 Final EIS (BLM 2002, pages 3.2-51 through 3.2-64). Activities associated with the Proposed Action are not anticipated to result in ground water quality impacts beyond those analyzed in the 2002 Final EIS because the spatial domain, proposed action, and affected resources are demonstrably similar.

3.2.11.2.3 Geochemistry

The State of Nevada permit for existing operations requires that runoff water be collected if necessary to prevent degradation of water quality. Construction of five-foot thick caps, made of oxide, benign, and/or amended waste rock or other suitable material, on existing facilities would prevent the contact of storm water with PAG waste rock. The caps would be constructed to provide a favorable environment for plant growth, which would increase the fraction of precipitation that is lost to evapotranspiration and is therefore unavailable for infiltration (BLM 2002, page 3.2-52). Experience associated with the placement of the capping materials has demonstrated that such waste rock placement and fines generation usually provides an adequate seedbed for establishing vegetation (BLM 2002, page 2-35). Monitoring of the caps after placement would be done at different stations and would consist of a Time Domain Reflectometry unit (or equivalent device) measuring moisture content in the upper five to six feet to the WRF at the top of a reclaimed WRF. Specific cap monitoring details are located in Section 6.6.1 of the WRMaP (Newmont 2014b).

The water quality impact from runoff from the reclaimed WRF is expected to be minimal based on MWMP testing. Under the current plans, surface water quality monitoring would continue

through the operational period, and would terminate based on approval from BLM and NDEP BMRR. If the monitoring detects that any surface water runoff contains concentrations, which exceed the applicable water quality standards, runoff would be captured and managed in compliance with the Stormwater Pollution Prevention Plan (Newmont 2012c). Adverse impacts to ground water from infiltrating precipitation through the WRF following placement of the vegetated caps is expected to be minimal, since the caps would prevent the contact of PAG waste rock with storm water. In addition, BMPs that would help prevent contamination of surface and ground water resources include the following: good housekeeping; employee training; erosion and sediment controls; preventative maintenance; visual inspections; material handling and storage practices that minimize the exposure of pollutants to stormwater; spill prevention and response; and stormwater control structures (Newmont 2012c). Therefore, no off-site impacts to surface water quality from the WRF runoff are expected.

3.2.12 Wildlife Resources

3.2.12.1 Affected Environment

Field surveys were conducted in 2012 by JBR and included the proposed expansion area (JBR 2013a). However, the following species were observed within an approximate 18,700-acre survey area, so it is unknown which of these species were specifically identified within the 186-acre proposed expansion area.

3.2.12.1.1 Special Status Species

BLM policy for management of special status species is in the BLM Manual Section 6840. Special status species include the following:

- Federally Threatened or Endangered Species: Any species the United States Fish and Wildlife Service (USFWS) has listed as an endangered or threatened species under the Endangered Species Act of 1973, as amended (ESA) throughout all or a significant portion of its range;
- Proposed Threatened or Endangered Species: Any species the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- Candidate Species: Plant and animal taxa under consideration for possible listing as threatened or endangered under the ESA;
- Delisted Species: Any species in the five years following their delisting;
- BLM Sensitive Species: Native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: 1) there is information that a species has undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or 2) the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008b); and

- State of Nevada Listed Species: State-protected animals that have been determined to meet BLM's Manual 6840 policy definition.

Data was received from the Nevada Natural Heritage Program (NNHP) in February 2013, and the USFWS and the Nevada Department of Wildlife (NDOW) in March 2013. The NNHP identified the pygmy rabbit (*Brachylagus idahoensis*), a BLM sensitive species, and the Pleasant Valley pyrg (*Pyrgulopsis sadai*), a Taxon determined to be Critically Imperiled by the NNHP, as having the potential to occur within the vicinity of the Project. The USFWS identified the Threatened species Lahontan cutthroat trout (LCT) (*Oncorhynchus clarkia* ssp. *henshawi*), and the Candidate species Columbia spotted frog (*Rana luteiventris*) and Greater sage-grouse (*Centrocercus urophasianus*) as having the potential to be impacted by Project activities. The NDOW identified that occupied mule deer and pronghorn antelope distribution exists within portions of the Greater Phoenix Project Area and four-mile buffer area. The NDOW also identified Greater sage-grouse habitat in portions of the Greater Phoenix Project Area, as well as four historic lek sites in the vicinity of the Greater Phoenix Project Area. There is no habitat in the proposed expansion area for the Pleasant Valley pyrg, LCT, or the Columbia spotted frog; therefore, these species would not be impacted by Project activities.

The BLM requested that a spring and seep survey be conducted within the vicinity of the Project, which included a survey for springsnails. There were no seeps, springs, or perennial streams identified in the proposed expansion area; therefore, there were also no springsnails identified in the proposed expansion area (JBR 2014).

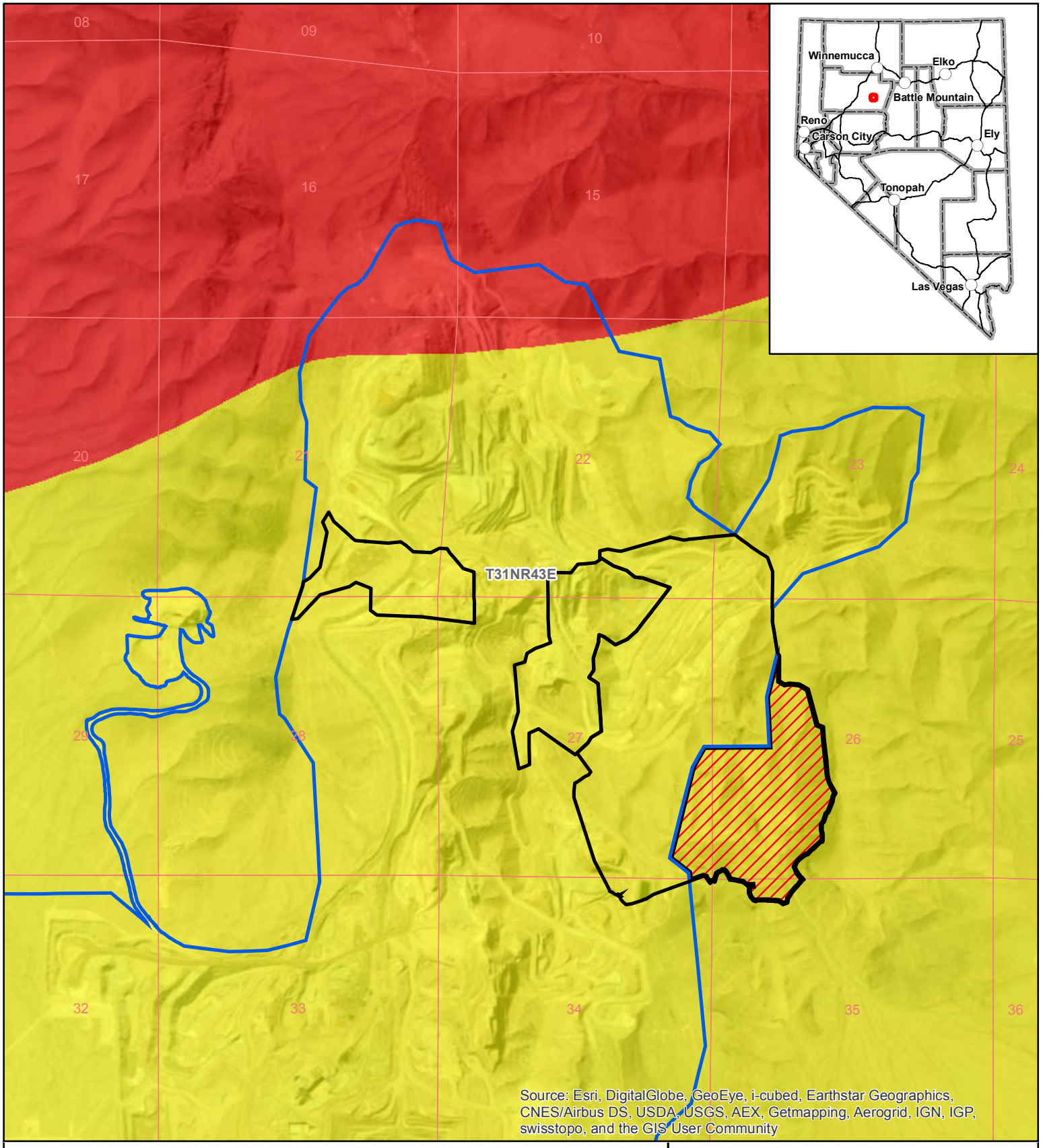
Greater Sage-Grouse

Greater sage-grouse surveys were conducted in 2012 and 2013 and included the proposed expansion area (JBR 2013b). According to the surveys, there were approximately 61 acres of Preliminary Priority Habitat and approximately 40 acres of Preliminary General Habitat in the proposed expansion area. Based on recent Nevada BLM guidance provided in IM NV-2015-017, the BLM has adopted the following new Greater sage-grouse habitat categories: High (equivalent to the previous PPH designation); Moderate (equivalent to the previous PGH designation); Low; and Non-habitat. Based on these new categories, the entire proposed expansion area is designated as Moderate (Figure 3.2.11). In addition, lek surveys were conducted at the four historic leks identified by NDOW and at the one new lek site discovered by JBR; however, all five of these lek sites are located more than four miles away from the proposed expansion area.

Mammals

Pygmy Rabbit

A desktop analysis for determining suitable pygmy rabbit habitat was conducted within the proposed expansion area. According to these surveys, suitable pygmy rabbit habitat did not occur within the proposed expansion area; therefore, walking surveys were not conducted in that area (JBR 2013a).



Explanation

- Approved 2012 Plan Boundary
- Proposed Project Area
- Philadelphia Canyon WRF Expansion

USGS Greater Sage-Grouse Habitat Categories

- High
- Moderate

0 1,750 3,500 Feet

N

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

BUREAU OF LAND MANAGEMENT

NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

Great Sage-Grouse Habitat

Figure 3.2.11

3/25/2015

Bats

Bat surveys were conducted within the Project Area during summer 2012 (JBR 2013a). Potential bat habitat survey areas consisted of old deep mines with potential multiple connections and good airflow. AnaBat II Detectors were placed at these locations, and included three locations, one in an old shaft and two in old adits, adjacent to the proposed expansion area. The recordings identified the following seven bat species adjacent to the proposed expansion area: pallid bat (*Antrozous pallidus*); big brown bat (*Eptesicus fuscus*); hoary bat (*Lasiurus cinereus*); California myotis (*Myotis californicus*); western small-footed myotis (*Myotis ciliolabrum*); little brown myotis (*Myotis lucifugus*); and western pipistrelle (*Pistrellus hesperus*). The closest occurrence to the proposed expansion area was approximately 1,421 feet away (JBR 2013a).

Raptors

A helicopter survey was conducted on May 30, 2012 (JBR 2013c) that included the Project Area. An additional helicopter survey was conducted on May 8, 2013 (JBR 2013d). These surveys encompassed the area within ten miles of the proposed expansion area. Within the ten-mile buffer of the proposed expansion area, the following sensitive species nest types were identified: three occupied and two unoccupied ferruginous hawk nests; six occupied and eight unoccupied golden eagle nests; and one golden eagle nest with an unknown status (JBR 2013c; JBR 2013d). There were no Brewer's sparrow nests identified within the proposed expansion area.

Burrowing Owl

Burrowing owl surveys were conducted along three transects within the vicinity of the Project Area during summer 2012 (JBR 2013a) within suitable burrowing owl habitat, which consists of annual and perennial grasslands and scrublands characterized by low-growing vegetation. Suitable habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface (JBR 2013a, page 19). Each transect was approximately 4.5 miles in length and contained ten calling stations approximately 0.5 mile apart. Route C was the closest route located near the proposed expansion area. The surveys along Route C did not detect any burrowing owls either visually or audibly (JBR 2013a, page 23).

General Wildlife

Mammals

Large mammals observed within the Project Area during field surveys included pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*). Other mammals observed included the following: coyote (*Canis latrans*); American badger (*Taxidea taxus*); black-tailed jackrabbit (*Lepus californicus*); mountain cottontail rabbit (*Sylvilagus nuttallii*); wood rats (*Neotoma* spp.); least chipmunk (*Tamias minimus*); and white-tailed antelope ground squirrel (*Ammospermophilus leucurus*) (JBR 2013a).

Reptiles

The Great Basin collared lizard (*Crotaphytus bicinctores*), desert horned lizard (*Phrynosoma platyrhinos*), western whiptail (*Cnemidophorus tigris*), and leopard lizard (*Gambelia wislizenii*) were observed within the Project Area (JBR 2013a).

Migratory Birds

Migratory birds that were observed within the Project Area during field surveys included the following: western meadowlark (*Sturnella neglecta*); sage sparrow (*Amphispiza belli*); horned lark (*Eremophila alpestris*); barn swallow (*Hirundo rustica*); mountain chickadee (*Poecile gambeli*); Brewer's sparrow (*Spizella breweri*); western tanager (*Piranga ludoviciana*); spotted towhee (*Pipilo maculates*); and osprey (*Pandion haliaetus*). Raptors observed included the following: golden eagle (*Aquila chrysaetos*); red-tailed hawk (*Buteo jamaicensis*); ferruginous hawk (*Buteo regalis*); prairie falcon (*Falco mexicanus*); American kestrel (*Falco sparverius*); and turkey vulture (*Cathartes aura*). Burrowing owl (*Athene cunicularia*) and great horned owl (*Bubo virginianus*) were also observed (JBR 2013a).

A helicopter survey was conducted on May 30, 2012 (JBR 2013c) that included the Project Area. An additional helicopter survey was conducted on May 8, 2013 (JBR 2013d). These surveys encompassed the area within ten miles of the proposed expansion area. Within the ten-mile buffer of the proposed expansion area, the following nest types were identified: 12 occupied common raven nests; one occupied and one unoccupied great horned owl nest; two occupied prairie falcon nests; eight occupied and one unoccupied red-tailed hawk nest; and 17 unoccupied unknown/potential raptor nests (JBR 2013c; JBR 2013d).

3.2.12.2 Environmental Consequences

3.2.12.2.1 Special Status Species

Greater Sage-Grouse

Project activities would remove approximately 186 acres of Moderate habitat. Newmont would be required to mitigate for the loss of Moderate habitat at a ratio of two acres for every one acre of disturbance, which would result in approximately 372 acres of mitigation. Implementation of either of the applicant-committed EPMs identified in Section 2.1.6 would reduce impacts to the loss of Greater sage-grouse habitat. The BLM may elect to conduct field verification, in coordination with NDOW, of Greater sage-grouse habitat based on the recent Nevada BLM guidance provided in IM NV-2015-017 and adjust off-site mitigation obligations accordingly.

Mammals

Bats

Direct impacts to special status bat species, as a result of surface disturbing and mining activities associated with the Proposed Action, include the long-term removal of approximately 186 acres of foraging habitat. However, since there is no roosting habitat within the proposed expansion area, impacts to special status bat species are not anticipated.

Raptors

There were no special status raptor nests or raptors observed within the proposed expansion area during the May 2012 helicopter surveys, July 2012 ground surveys, May 2013 helicopter surveys, or July 2013 ground surveys (JBR 2013b; JBR 2013c). There were occupied and unoccupied ferruginous hawk and golden eagle nests identified within ten miles of the proposed expansion area. Impacts to special status raptor nests and nesting habitat associated with mining activities authorized in the approved 2003 Plan were analyzed in the 2002 Final EIS (BLM 2002, page 3.5-12), and in the approved 2012 Plan analyzed in the 2011 Draft EIS (BLM 2011, pages 3.5-19 and 3.5-20). Mitigation measures in Section 3.5.4 of the 2002 Final EIS (BLM 2002, page 3.5-19) and applicant-committed EPMs in Section 2.5.4 of the 2011 Draft EIS identified that pre-construction nest surveys would be conducted during the avian breeding season if ground disturbing activities could not be avoided during that time period (BLM 2011, page 2-57). If nests are found, a no-disturbance buffer zone would be established, as determined by the USFWS, the NDOW, and the BLM. These EPMs would also be applicable to the Proposed Action and would continue to be implemented, if necessary. Consistent with the analysis in the 2002 Final EIS and 2011 Draft EIS, significant direct and indirect impacts are not anticipated.

3.2.12.2.2 General Wildlife

Construction and operation of the Project would directly affect wildlife habitat through removal of vegetation in areas proposed for new disturbance. Approximately 186 acres of wildlife habitat would be directly removed as part of surface disturbance activities associated with the Proposed Action, primarily within the proposed expansion area, as the other areas proposed for expansion have been previously disturbed. Wildlife may be displaced by these activities, but would likely shift spatially into adjacent available habitat. There is similar habitat within and adjacent to the Project Area where mobile wildlife could relocate. Therefore, no impacts to regional populations are anticipated to result from the loss of habitat within the Project Area.

Indirect impacts could occur due to increased noise and human presence. However, noise within the Project Area would be temporary and associated with construction and operation of mining equipment, and sporadic associated with mining blasts. Human presence would be spread throughout the Project Area.

Applicant-committed EPMs identified in the 2011 Draft EIS that would reduce potential impacts to general wildlife species include the identification of wildlife and collection of mortality information, and the development of a wildlife monitoring plan (BLM 2011, page 2-56).

Migratory Birds and Raptors

There were no migratory bird nests observed within the proposed expansion area during the May 2012 helicopter surveys, July 2012 ground surveys, May 2013 helicopter surveys, or July 2013 ground surveys (JBR 2013b; JBR 2013c). There was one raptor observed flying overhead adjacent to the proposed expansion area. Impacts to migratory bird nests and nesting habitat associated with mining activities authorized in the approved 2003 Plan were analyzed in the 2002 Final EIS (BLM 2002, page 3.5-12), and in the approved 2012 Plan were analyzed in the 2011 Draft EIS (BLM 2011, pages 3.5-13 and 3.5-14). Mitigation measures in Section 3.5.4 of

the 2002 Final EIS (BLM 2002, page 3.5-19) and applicant-committed EPMs in Section 2.5.4 of the 2011 Draft EIS identified that pre-construction nest surveys would be conducted during the avian breeding season if ground disturbing activities could not be avoided during that time period (BLM 2011, page 2-57). These EPMs would also be applicable to the Proposed Action and would continue to be implemented, if necessary. Consistent with the analysis in the 2002 Final EIS and 2011 Draft EIS, significant direct and indirect impacts are not anticipated.

3.3 Effects of the No Action Alternative

Under the No Action Alternative, none of the impacts associated with the Proposed Action would occur. However, Newmont would continue mining activities under the approved 2012 Plan. Impacts analyzed in the 2011 Draft EIS (BLM 2011), and modifications and corrections identified in the 2012 Final EIS (BLM 2012), would continue to occur. The analysis of the No Action Alternative in this EA addresses 8,112 acres of surface disturbance authorized in the approved 2012 Plan. The impact analysis for the No Action Alternative is in large part the same impact analysis discussed in Chapter 3 of the 2002 FEIS (BLM 2002) and Chapter 3 of the 2011 Draft EIS (BLM 2011), which analyzes all the existing mining operations occurring at the Phoenix Mine. The total surface disturbance from the No Action Alternative from mine operations totals 8,112 acres on public and private land. Impacts associated with the No Action Alternative would be similar but proportionally less than impacts associated with the additional 186 acres of proposed surface disturbance under the Proposed Action.

4 CUMULATIVE IMPACT ANALYSIS

4.1 Introduction

For the purpose of this EA, the cumulative impacts are the sum of all past, present, and reasonably foreseeable future actions (RFFAs) resulting primarily from mining, commercial activities and public uses. The purpose of the cumulative analysis in the EA is to evaluate the significance of the Proposed Action's contributions to cumulative impacts. A cumulative impact is defined under federal regulations as follows:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individual minor but collectively significant actions taken place over a period of time" (40 CFR 1508.7).

As required under the NEPA and the regulations implementing the NEPA, this chapter addresses those cumulative effects on the environmental resources in the Cumulative Effects Study Areas (CESAs) that could result from the implementation of the Proposed Action and reasonable alternatives, past actions, present actions, and RFFAs. The extent of the CESAs will vary by each resource, based on the geographic or biological limits of that resource. As a result, the list of projects considered under the cumulative analysis may vary according to the resource being considered. In addition, the length of time for cumulative effects analysis will vary according to the duration of impacts from the Proposed Action on the particular resource.

For the purposes of this analysis and under federal regulations, 'impacts' and 'effects' are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through the following three steps:

Step 1: Identify, describe, and map CESAs for each resource evaluated in this chapter.

Step 2: Define timeframes, scenarios, acreage, and activity estimates for cumulative impact analysis.

Step 3: Identify and quantify the location of possible specific impacts from the Proposed Action and judge the significance of these contributions to the overall impacts.

4.2 Cumulative Effects Study Areas

Environmental consequences of the Proposed Action were previously evaluated in Chapter 3 for the various environmental resources. Discussed in the following sections are the resources that have the potential to be cumulatively impacted by the Proposed Action within the identified CESAs. The discussions are based upon the previous analysis in Chapter 3 for each environmental resource. Based on the preceding analysis, the Proposed Action would not impact the following resources and would therefore not have cumulative impacts: Air Quality; Cultural Resources; Geology and Minerals; Land Use Authorization; Native American Cultural Concerns; Social Values and Economics; Wastes (hazardous and solid); and Water Quality, Ground.

Seven elements or resources have been brought forward for cumulative impact analysis: Noxious Weeds, Invasive, and Non-native Species; Rangeland Management/Livestock Grazing; Soils; Vegetation; Visual Resources; Water Quality, Surface; and Wildlife, including migratory birds and special status animal species. The geographic areas considered for further analysis of cumulative effects vary in size and shape to reflect each evaluated environmental resource and the potential area of impact to each from the Proposed Action as determined through the analysis in Chapter 3. The CESA boundaries for these elements are either the same as the CESA boundaries identified in the 2011 Draft EIS (BLM 2011), or modified based on the needs of the Proposed Action.

The CESA for noxious weeds, invasive, and non-native species, rangeland management/livestock grazing, soils, and vegetation was determined to be the Copper Canyon grazing allotment (Figure 4.2.1).

The CESA for surface water quality follows the western portion of the Elder Creek-Reese River HUC 12 subwatershed, then follows Galena Canyon down to Reese River (Figure 4.2.1).

The CESA for wildlife (including migratory birds and special status animal species) runs northeast approximately five miles from the Town of Battle Mountain, northwest approximately eight miles (along an existing railroad grade), southwest approximately five miles to I-80, northwest along I-80 for approximately five miles, south along Buffalo Valley for approximately 28 miles, east to SR 305, and SR 305 north to the Town of Battle Mountain (BLM 2011, page 3.5-1) (Figure 4.2.1). Table 4.2-1 describes each CESA area by resource.

Table 4.2-1: Cumulative Effects Study Areas

Resources Analyzed	Description of CESA	Size of CESA (acres)
Noxious Weeds, Invasive, and Non-native Species; Rangeland Management/Livestock Grazing; Soils; Vegetation	Copper Canyon Grazing Allotment	106,431
Water Quality, Surface	Western portion of the Elder Creek-Reese River HUC 12 subwatershed, following Galena Canyon west to the Reese River	14,199
Wildlife, including migratory birds and special status animal species	An area that runs northwest approximately eight miles (along an existing railroad grade), southwest approximately five miles to I-80, northwest along I-80 (approximately five miles), south along Buffalo Valley (approximately 28 miles), east to SH 305, and SH 305 north to the Town of Battle Mountain	234,663

T35NR40E T35NR41E T35NR42E T35NR43E T35NR44E T35NR45E T35NR46E

T34NR40E T34NR41E T34NR42E T34NR43E T34NR44E T34NR45E T34NR46E

T33NR40E T33NR41E T33NR42E T33NR43E T33NR44E T33NR45E T33NR46E

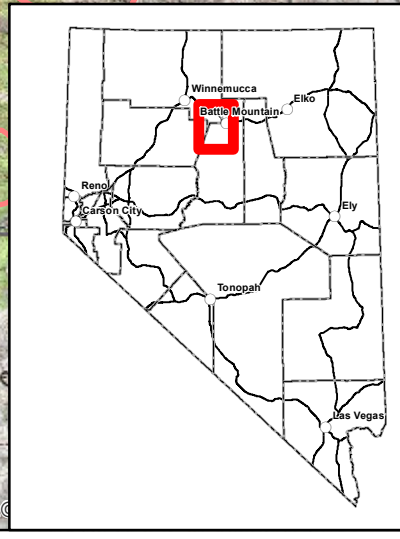
T32NR40E T32NR41E T32NR42E T32NR43E T32NR44E T32NR45E T32NR46E

T31NR40E T31NR41E T31NR42E T31NR43E T31NR44E T31NR45E T31NR46E

T30NR40E T30NR41E T30NR42E T30NR43E T30NR44E T30NR45E T30NR46E

T29NR40E T29NR41E T29NR42E T29NR43E T29NR44E

T28NR40E T28NR41E T28NR42E T28NR43E T28NR44E



Explanation

- Approved 2012 Plan Boundary
- Proposed Project Area
- Philadelphia Canyon WRF Expansion
- Map Extent
- Geology CESA
- Wildlife CESA
- Range CESA
- Surface Water CESA
- Fires (2000-2013)

0 1.5 3 4.5 6 Miles

N

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

BUREAU OF LAND MANAGEMENT

NORTH OPTIONAL USE AREA PIT AND PHILADELPHIA CANYON WASTE ROCK FACILITY EXPANSION PROJECT

Cumulative Effects Study Areas and Fire History

Figure 4.2.1

3/25/2015

4.2.1.1 Past and Present Actions

Past and present actions in the Range CESA include the following: livestock grazing and rangeland improvements; wildland fires; vegetation treatments; wildlife habitat management; ROW construction and maintenance; mineral exploration and mining; and dispersed recreation.

Past and present actions in the Surface Water CESA include the following: livestock grazing and rangeland improvements; wildland fires; wildlife habitat management; ROW construction and maintenance; mineral exploration and mining; and dispersed recreation.

Past and present actions in the Wildlife CESA include the following: livestock grazing and rangeland improvements; wildland fires; wildlife habitat management; ROW construction and maintenance; mineral exploration and mining; and dispersed recreation.

Livestock Grazing and Rangeland Improvements

Portions of six allotments are located in the Wildlife CESA. Portions of two allotments are located in the Surface Water CESA. The Range CESA is the Copper Canyon grazing allotment. The allotments located in each of the CESAs are listed in Table 4.2-2.

Table 4.2-2: Allotments Located Within the CESAs

Grazing Allotment Name	Range CESA	Surface Water CESA	Wildlife CESA
Argenta		X	X
Buffalo Valley			X
Carico Lake			X
Copper Canyon	X	X	X
Goldbanks			
North Buffalo			X
Pleasant Valley			
Pumpernickel			
South Buffalo			
Twenty Five			X

Table 4.2-3 includes the rangeland improvements located within the three CESAs.

Table 4.2-3: Rangeland Improvements Located Within the CESAs

CESA	Rangeland Improvement Type
Range	cattle guards (9), flowing wells (14), guzzler (1), troughs (4), wells (18), windmill (1), allotment fences (75 miles), ownership fences (46 miles), pasture fences (7 miles), protection fences (6 miles), temporary fence (2 miles), other fences (17 miles), water pipeline (55 miles)
Surface Water	cattle guards (2), guzzler (1), allotment fence (19 miles), ownership fence (6 miles), water pipeline (55 miles)

CESA	Rangeland Improvement Type
Wildlife	cattle guards (18), flowing wells (14), guzzler (1), troughs (4), wells (18), windmill (1), allotment fences (33 miles), ownership fences (39 miles), pasture fence (7 miles), protection fences (6 miles), temporary fence (2 miles), other fences (4 miles), water pipeline (19 miles)

Wildland Fires

Although there are no recorded wildland fires within the Project Area, there have been approximately 309 acres of wildland fire disturbance within the Wildlife CESA between 2000 and 2013, and approximately 20 acres within the Surface Water CESA. The wildland fire disturbance is shown on Figure 4.2.1.

Vegetation Treatments

Vegetation treatments within the Range CESA include approximately 444 acres of drill seeding.

Wildlife Habitat Management/Restoration/Hazardous Fuel Treatment

Research and management of big game and wildlife are undertaken by the NDOW and the BLM and may include modification to existing habitat and rangeland facilities. The Range and Wildlife CESAs include a portion of NDOW Hunt Unit 151. The Surface Water CESA includes portions of NDOW Hunt Units 151 and 152.

Rights-of-Way

The BLM-maintained Land and Mineral Legacy Rehost 2000 System (LR2000) database was queried by Township, Range, and Section to show the past and present ROWs that have been approved within the Range, Surface Water, and Wildlife CESAs. These ROWs include the following: roads and highways; railroads; power transmission; communication sites; telecommunications; irrigation and water facilities; oil and gas pipelines and facilities; wind energy facilities; and other ROWs. The approximate total acreage of existing and approved ROWs within each CESA is listed in Table 4.2-4. The exact acreage of surface disturbance associated with these ROWs cannot be quantified; however, it is assumed that these types of ROWs and the construction and maintenance associated with these facilities would create a level of surface disturbance that would contribute to cumulative impacts to various resources. In addition, certain types of ROWs can fragment habitat or create barriers or hazards for wildlife passage. The LR2000 database was queried on December 3 and 4, 2014, for the Wildlife CESA, December 24, 2014 for the Range CESA, and March 16, 2015, for the Surface Water CESA. Any newly approved ROWs that have been added to the LR2000 database after these dates within the respective CESAs are not included in the analysis.

Table 4.2-4: Past and Present Rights-of-Way Acres in the CESAs

ROW Type	Range CESA (acres)	Surface Water CESA (acres)	Wildlife CESA (acres)
Roads and Highways	1,332	550	1,753
Railroads	--	--	146
Power Transmission	1,649	668	2,097
Communication Sites	37	--	36
Telecommunications	468	416	862
Irrigation/Water Facilities/ Pipelines	71	8	71
Oil and Gas Pipelines/Facilities	282	277	282
Other	87	--	88
Total	**3,926**	**1,919**	**5,335**

Mineral Exploration and Mining

The LR2000 database was queried by Township, Range, and Section to show the past and present mineral exploration or mining activities (i.e., authorized Notices, closed Notices, authorized and closed plans of operation, and mineral material disposal sites) that have been issued within the three CESAs. Past and present mineral exploration and mining activities in the Range, Surface Water, and Wildlife CESAs include historic exploration and mining operations. Table 4.2-5 shows the results of the LR2000 query, in acres, of the exploration and mining activities within each CESA. The LR2000 database was queried on December 3 and 4, 2014, for the Wildlife CESA, December 24, 2014, for the Range CESA, and March 16, 2015, for the Surface Water CESA. Any newly authorized Notices or plans of operation that have been added to the LR2000 database after these respective dates are not included in the analysis. The Independence Mine is located adjacent to the Phoenix Mine.

Table 4.2-5: Past and Present Minerals Disturbance Acres in the CESAs

Disturbance Type	Range CESA (acres)	Surface Water CESA (acres)	Wildlife CESA (acres)
Acknowledged and Closed Notices	258	53	404
Authorized and Closed Plans	15,050	10,966	20,411
Mineral Material Disposal Sites	438	100	1,343
Total	**15,746**	**11,119**	**22,158**

Dispersed Recreation

Dispersed recreation opportunities in the CESAs include sightseeing, pleasure driving, rock collecting, photography, winter sports, off-highway vehicle use, mountain biking, picnicking, camping, fishing, hunting, and hiking. This wide range of opportunities is possible because virtually all of the public lands in the CESAs are accessible and offer a variety of settings suitable for different recreational activities.

4.2.1.1 Reasonably Foreseeable Future Actions

RFFAs in the Range CESA include livestock grazing, wildland fires, vegetation treatments, wildlife habitat management, ROW construction and maintenance, mineral exploration, mining, and dispersed recreation.

RFFAs in the Surface Water CESA include livestock grazing, wildland fires, wildlife habitat management, mineral exploration, and dispersed recreation.

RFFAs in the Wildlife CESA include livestock grazing, wildland fires, wildlife habitat management, ROW construction and maintenance, mineral exploration, mining, and dispersed recreation.

4.3 Evaluation of Potential Cumulative Impacts

4.3.1 Noxious Weeds, Invasive, and Non-native Species

The CESA for noxious weeds, invasive and non-native species is the Range CESA. This CESA encompasses approximately 106,431 acres and is shown on Figure 4.2.1.

Past and Present Actions: Past and present actions with impacts created from noxious weeds, invasive, and non-native species could have included and may currently include livestock grazing, wildland fires, vegetation treatments, wildlife habitat management, ROW construction and maintenance, mineral exploration, mining, and dispersed recreation. These actions could have disturbed vegetation and soils creating an opportunity for the establishment and spread of noxious weeds, invasive, and non-native species. There are no specific data to quantify impacts from noxious weeds, invasive and non-native species that resulted from wildlife habitat management, livestock grazing, or dispersed recreation.

Authorized and closed mineral exploration and mining Notices and plans of operation, as well as mineral material disposal sites, total approximately 15,746 acres (approximately 15 percent of the CESA) of surface disturbance. Approximately 3,926 acres of ROWs were issued within the Range CESA that had the potential to introduce noxious weeds, invasive and non-native species. There were also approximately 444 acres of vegetation treatments that occurred within the Range CESA. The total quantifiable past and present actions have affected approximately 20,116 acres, or approximately 19 percent of the CESA.

RFFAs: Potential impacts from noxious weeds, invasive and non-native species as a result of livestock grazing, wildlife habitat management, dispersed recreation, ROW construction and maintenance, mineral exploration activities, vegetation treatments, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts from noxious weeds, invasive and non-native species as a result of dispersed recreation, livestock grazing, wildlife habitat management, vegetation treatments, or potential wildland fires. There are approximately 1,567 acres of disturbance from pending minerals projects in the Range CESA including the proposed Project and no pending ROW projects.

4.3.1.1 Proposed Action

The Proposed Action (approximately 186 acres) would impact approximately 0.2 percent of the CESA. Quantifiable past and present actions and RFFA disturbance in the Range CESA total approximately 21,683 acres, which results in an incremental impact from the new surface disturbance associated with the Proposed Action of approximately 0.9 percent. Since there are minimal quantifiable data for activities within the CESA, this calculation is a conservative analysis of the potential incremental impact of the Proposed Action. Project-related impacts would be localized and minimized due to implementation of the applicant-committed EPM outlined in the 2011 Draft EIS (BLM 2011, Section 2.5), the Phoenix Weed Management Plan, and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts from noxious weeds, invasive, and non-native species as a result of surface disturbing activities associated with implementation of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minimal.

4.3.2 Rangeland Management/Livestock Grazing

The CESA for rangeland management/livestock grazing is the Range CESA. This CESA totals approximately 106,431 acres and is shown on Figure 4.2.1.

Past and present actions: Past and present actions that could have impacted and may be currently impacting rangeland management include wildland fires, vegetation treatments, wildlife habitat management, ROW construction and maintenance, mineral exploration and mining, and dispersed recreation. There are no specific data to quantify impacts from wildlife habitat management or dispersed recreation. Building of fences or other linear features, or off-road traveling could have destroyed habitat or disrupted the movement of grazing animals.

Authorized and closed mineral exploration and mining Notices and plans of operation, as well as mineral material disposal sites, total approximately 15,746 acres (approximately 15 percent of the CESA) of surface disturbance. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized, or have been naturally revegetated over time. Approximately 3,926 acres of ROWs were issued within the Range CESA that had the potential to affect livestock movement and disturb forage. There are also ongoing revegetation treatments in the Range CESA that total approximately 444 acres. The total quantifiable past and present actions have affected approximately 20,116 acres, or approximately 19 percent of the CESA.

RFFAs: Potential impacts to rangeland management from wildlife habitat management, dispersed recreation, mineral exploration, mining, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts to rangeland management from wildlife habitat management, dispersed recreation, or potential wildland fires within the CESA. There are approximately 1,567 acres of disturbance from pending minerals projects in the Range CESA including the proposed Project and no pending ROW projects.

4.3.2.1 Proposed Action

The Proposed Action (approximately 186 acres) would impact approximately 0.2 percent of the CESA. Quantifiable past and present actions and RFFA disturbance in the Range CESA total approximately 21,683 acres, which results in an incremental impact from the new surface disturbance associated with the Proposed Action of approximately 0.9 percent. Since there are minimal quantifiable data for activities within the CESA, this calculation is a conservative analysis of the potential incremental impact of the Proposed Action. Project-related impacts would be localized and minimized due to implementation of the mitigation measures in the 2002 Final EIS (BLM 2002, Section 3.3.4), applicant-committed EPMs outlined in the 2011 Draft EIS (BLM 2011, Section 2.5), and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to rangeland management/livestock grazing as a result of surface disturbing activities associated with implementation of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minimal.

4.3.3 Soils

The CESA for soils is the Range CESA. This CESA totals approximately 106,431 acres and is shown on Figure 4.2.1.

Past and Present Actions: Past and present actions that could have impacted and may be currently impacting soils include livestock grazing and rangeland improvements, wildland fires, vegetation treatments, wildlife habitat management, ROW construction and maintenance, mineral exploration and mining, and dispersed recreation that disturbed or impacted soils, or that increased erosion or sedimentation. Soil disturbance may also have been associated with wildland fires; however, fire rehabilitation and natural revegetation have potentially occurred, stabilizing soil loss. Impacts from these activities include loss of soils productivity due to changes in soil physical properties, soil fertility, soil movement in response to water and wind erosion, and loss of soil structure due to compaction.

Authorized and closed mineral exploration and mining Notices and plans of operation, as well as mineral material disposal sites, total approximately 15,746 acres (approximately 15 percent of the CESA) of surface disturbance. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized, or have been naturally revegetated over time. Approximately 3,926 acres of ROWs were issued within the CESA that had the potential to create surface disturbance. There are also ongoing revegetation treatments in the Range CESA that total approximately 444 acres. The total quantifiable past and present actions have affected approximately 20,116 acres, or approximately 19 percent of the CESA.

RFFAs: Potential livestock grazing and rangeland improvements, wildland fires, vegetation treatments, wildlife habitat management, ROW construction and maintenance, mineral exploration and mining, dispersed recreation, and soil compaction due to travel by heavy equipment on unpaved roads, are expected to continue. There are no specific data to quantify impacts to soils as a result of dispersed recreation, livestock grazing, wildlife habitat management, vegetation treatments, or potential wildland fires. There are approximately

1,567 acres of disturbance from pending minerals projects in the Range CESA including the proposed Project and no pending ROW projects.

4.3.3.1 Proposed Action

The Proposed Action (approximately 186 acres) would impact approximately 0.2 percent of the CESA. Quantifiable past and present actions and RFFA disturbance in the Range CESA total approximately 21,683 acres, which results in an incremental impact from the new surface disturbance associated with the Proposed Action of approximately 0.9 percent. Since there are minimal quantifiable data for activities within the CESA, this calculation is a conservative analysis of the potential incremental impact of the Proposed Action. Project-related impacts would be localized and minimized due to implementation of the EPMs outlined in the 2011 Draft EIS (BLM 2011, Section 2.5) and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to soils as a result of surface disturbing activities associated with implementation of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minimal.

4.3.4 Vegetation

The CESA for vegetation is the Range CESA. This CESA totals approximately 106,431 acres and is shown on Figure 4.2.1.

Past and Present Actions: Past and present actions that could have impacted and may be currently impacting vegetation include livestock grazing and rangeland improvements, wildland fires, wildlife habitat management, ROW construction and maintenance, mineral exploration, mining, vegetation treatments that altered the structure, composition, and ecology of plant communities, and dispersed recreation. There are no specific data to quantify impacts to vegetation from livestock grazing, wildlife habitat management, or dispersed recreation. Impacts caused by hunting activities and associated off-road vehicle travel include the introduction of noxious weeds, invasive or non-native species and trampled vegetation.

Authorized and closed mineral exploration and mining Notices and plans of operation, as well as mineral material disposal sites, total approximately 15,746 acres (approximately 15 percent of the CESA) of surface disturbance. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized, or have been naturally revegetated over time. Approximately 3,926 acres of ROWs were issued within the CESA that had the potential to create surface disturbance. There are also ongoing revegetation treatments in the Range CESA that total approximately 444 acres. The total quantifiable past and present actions have disturbed approximately 20,116 acres, or approximately 19 percent of the CESA.

RFFAs: Potential livestock grazing and rangeland improvements, wildland fires, wildlife habitat management, ROW construction and maintenance, mineral exploration, vegetation treatments, and dispersed recreation are expected to continue. There are no specific data to quantify impacts to vegetation as a result of dispersed recreation, livestock grazing, wildlife habitat management, vegetation treatments, or potential wildland fires. There are approximately 1,567 acres of disturbance from pending minerals projects in the Range CESA including the proposed Project and no pending ROW projects.

4.3.4.1 Proposed Action

The Proposed Action (approximately 186 acres) would impact approximately 0.2 percent of the CESA. Quantifiable past and present actions and RFFA disturbance in the Range CESA total approximately 21,683 acres, which results in an incremental impact from the new surface disturbance associated with the Proposed Action of approximately 0.9 percent. Since there are minimal quantifiable data for activities within the CESA, this calculation is a conservative analysis of the potential incremental impact of the Proposed Action. Project-related impacts would be localized and minimized due to implementation of the applicant-committed EPMs outlined in the 2011 Draft EIS (BLM 2011, Section 2.5) and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to vegetation as a result of surface disturbing activities associated with implementation of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minimal.

4.3.5 Visual Resources

The majority of the Project Area has been previously disturbed and has obvious existing disturbance that currently affects the line, color, texture, and form of the landscape. The effects of the Proposed Action on visual resources would be consistent with BLM-prescribed Class IV VRM objectives. With the implementation of applicant-committed EPMs, and successful reclamation, the incremental cumulative visual impacts from the Proposed Action, in combination with past and present actions and RFFAs, would be minimal and not significant.

4.3.6 Water Quality, Surface

The CESA for water quality, surface, is the Surface Water CESA. This CESA totals approximately 14,199 acres and is shown on Figure 4.2.1. The CESA was determined by considering the amount of surface disturbance associated with the proposed action, and tailored for the Project using existing topographic features (including surface drainages), and established hydrologic boundaries.

Past and Present Actions: Past and present actions that could have impacted and may be currently impacting surface water quality include livestock grazing, wildland fires that introduced sediment to ephemeral streams or consumed water within the Surface Water CESA, wildlife habitat management, ROW construction, mining, and dispersed recreation. Impacts from these actions could have included increased sedimentation and runoff containing hazardous materials.

Historic fires (2000–2013) have burned approximately 20 acres in this CESA (approximately 0.1 percent of the CESA). Authorized and closed mineral exploration and mining Notices and plans of operation, as well as mineral material disposal sites, total approximately 11,119 acres (approximately 78 percent of the CESA) of surface disturbance. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized, or have been naturally revegetated over time, decreasing the amount of sediment that reaches the waterways. Approximately 1,919 acres of ROWs were issued within the CESA that had the potential to create surface disturbance that could lead to sedimentation of waterways. The total quantifiable past and present actions have disturbed approximately 13,058 acres, or approximately 92 percent of the CESA.

RFFAs: Potential livestock grazing and rangeland improvements, wildland fires, wildlife habitat management, ROW construction, mineral exploration, and dispersed recreation are expected to continue. There are no specific data to quantify on the amount of sedimentation that could result from these activities. There are approximately 16 acres of disturbance from pending minerals projects in the Surface Water CESA.

4.3.6.1 Proposed Action

The Proposed Action (approximately 186 acres) would impact approximately 1.3 percent of the CESA. Quantifiable past and present actions and RFFA disturbance in the Surface Water CESA total approximately 13,074 acres, which results in an incremental impact from the Proposed Action of approximately 1.4 percent. Since there are minimal quantifiable data for activities within the CESA, this calculation is a conservative analysis of the potential incremental impact of the Proposed Action. Project-related impacts would be localized and minimized due to implementation of the Stormwater Pollution Prevention Plan (Newmont 2012c), BMPs outlined in the WRMaP (Newmont 2014b), and concurrent reclamation. Additionally, surface waters are extremely limited, are generally related to short periods of time and occur in response to infrequent storm events, and typically infiltrate quickly into the alluvium after exiting the mountain block. Therefore, based on the above analysis and findings, incremental impacts to water quality, surface, as a result of surface disturbing activities associated with implementation of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minimal.

4.3.7 Wildlife, including Migratory Birds and Special Status Animal Species

The CESA for wildlife, including migratory birds and special status animal species, is the Wildlife CESA. This CESA totals approximately 234,663 acres and is shown on Figure 4.2.1.

Past and Present Actions: Past and present actions that could have impacted and may be currently impacting wildlife, including migratory birds and special status animal species, include livestock grazing and rangeland improvements, wildland fires, wildlife habitat management, ROW construction and maintenance, mineral exploration, mining, and dispersed recreation. Impacts to wildlife, including migratory birds and special status animal species, could have resulted from the following: 1) indirect impacts from the destruction of habitat associated with building roads and clearing vegetation; or 2) indirect impacts from the disruption from human presence or noise from construction equipment, haul trucks, and other vehicles and equipment. A number of these past and present actions, such as roads, fences, and agricultural development, may result in habitat fragmentation and migration route disruption, as well as affecting the success of reproduction. The extent of these impacts vary with the type of activity.

Historic fires (2000–2013) have burned approximately 309 acres in this CESA (approximately 0.1 percent of the CESA). Authorized and closed mineral exploration and mining Notices and plans of operation, as well as mineral material disposal sites, total approximately 22,158 acres (approximately nine percent of the CESA) of surface disturbance. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized, or have been naturally revegetated over time. Approximately 5,335 acres of ROWs were issued within the CESA that had the potential to create surface

disturbance. The total quantifiable past and present actions have disturbed approximately 27,802 acres, or approximately 12 percent of the CESA.

RFFAs: Potential livestock grazing and rangeland improvements, wildland fires, wildlife habitat management, ROW construction and maintenance, mineral exploration, and dispersed recreation are expected to continue. There are no specific data to quantify impacts to wildlife, including migratory birds and special status animal species, as a result of dispersed recreation, livestock grazing, wildlife habitat management, or potential wildland fires. There are approximately 1,568 acres of disturbance from pending minerals projects in the Wildlife CESA including the proposed Project and approximately nine acres of pending ROW projects.

4.3.7.1 Proposed Action

The Proposed Action (approximately 186 acres) would impact approximately 0.08 percent of the CESA. Quantifiable past and present actions and RFFA disturbance in the Wildlife CESA total approximately 29,379 acres, which results in an incremental impact from the new surface disturbance associated with the Proposed Action of approximately 0.6 percent. Since there are minimal quantifiable data for activities within the CESA, this calculation is a conservative analysis of the potential incremental impact of the Proposed Action. Project-related impacts would be localized and minimized due to implementation of the mitigation measures in the 2002 Final EIS (BLM 2002, Section 3.5.4), EPMs outlined in the 2011 Draft EIS (BLM 2011, Section 2.5), and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to wildlife, including migratory birds and special status animal species, as a result of surface disturbing activities associated with implementation of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minimal.

4.3.8 Cumulative Impacts from the No Action Alternative

The cumulative impact analysis for the No Action Alternative is in large the same cumulative impact analysis discussed in Chapter 3 of the 2002 FEIS (BLM 2002) and Chapter 3 of the 2011 Draft EIS (BLM 2011), which analyzes all the existing mining operations occurring at the Phoenix Mine. The total surface disturbance from the No Action Alternative from mine operations totals 8,112 acres on public and private land. The past and present actions and RFFAs used in this analysis for the Proposed Action would have a similar incremental cumulative impact as the No Action Alternative; however, the No Action Alternative would not result in any additional incremental cumulative impacts.

5 CONSULTATION AND COORDINATION

This EA was prepared at the direction of the BLM MLFO, Battle Mountain District, Nevada, by Enviroscientists, Inc., under a contract with Newmont. The following is a list of persons, groups, and agencies consulted, as well as a list of individual responsible for the preparation of this EA.

5.1 Persons, Groups, and Agencies Consulted

Native Americans

The Battle Mountain Band, the Elko Band, and the South Fork Band of the Te-Moak Tribe of the Western Shoshone
Duckwater Shoshone Tribe

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