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Bureau of Land Management

Environmental Assessment DOI-BLM-NV-B010-2016-0026-EA

DATE: September 8, 2016

Environmental Assessment

Barrick Gold Exploration, Inc.
Amendment to the Horse Canyon/Cortez Unified Exploration Project Plan of Operations (NVN-066621 [16-1A]) and Reclamation Permit No. 0159
Twin Declines for Underground Exploration

File Number: NVN-066621 (16-1A)

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BLM Mission Statement

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times.

Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific, and cultural values.

Abbreviations and Acronyms

2015 HC/CUEP EA	DOI-BLM-NV-B010-2015-0005-EA
%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
mScm	milliSiemens per centimeter
µg/m^3	micrograms per cubic meter
µhos/cm	micromhos per centimeter
µS/cm	microSiemens per centimeter
AAQS	Ambient Air Quality Standards
ACEC	Areas of Critical Environmental Concern
AERMOD	American Meteorological Society / EPA Regulatory Model
amsl	above mean sea level
APE	Area of Potential Effects
ARMPA	Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment
AUMs	animal unit months
BAPC	Bureau of Air Pollution Control
Barrick	Barrick Gold Exploration, Inc.
BCC	Birds of Conservation Concern
BCI	Barrick Cortez, Inc.
BEA	Bank Enabling Agreement
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
bhp	horsepower per hour
BMD	Battle Mountain District
BMPs	Best Management Practices

BLM	Bureau of Land Management
CAA	Clean Air Act
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	cumulative effects study area
CFR	Code of Federal Regulations
CGM	Cortez Gold Mine
Ch	Cambian Hamburg Dolomite
CO	carbon monoxide
CO_{2e}	greenhouse gases
COT	conservation objectives team
CWA	Clean Water Act
Dhc	Devonian Horse Canyon Siltstone
District	Cortez Mining District
DR	Decision Record
Dw	Devonian Wenban Limestone
E	East
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
EPMs	environmental protection measures
ESA	Endangered Species Act
ESDs	ecological site descriptions
ESCO	ESCO Associates, Inc.
FEIS	Final Environmental Impact Statement

FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
FONSI	Finding of No Significant Impact
GBBDC	Game Birds Below Desired Condition
General Mining Law	General Mining Law of May 10, 1872
GHGs	greenhouse gases
GHMA	General Habitat Management Areas
GIS	Geographic Information System
gpm	gallons per minute
GRSG	greater sage-grouse
HAP	hazardous air pollutant
HC/CUEP	Horse Canyon/Cortez Unified Exploration Project
HDPE	high-density polyethylene
HFRA	Healthy Forest Restoration Act
IM	Instruction Memorandum
InSAR	interferometric synthetic aperture radar
IPAC	Information, Planning, and Conservation System
IWM Plan	Integrated Weed Management Plan
Jqm	Jurassic quartz monzonite
K	hydraulic conductivity
LHD	Load-Haul-Dump
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MLRAs	Major Land Resource Areas
MR	Mineral Resources
MSHA	Mine Health and Safety Administration
MTPY	million tons per year

mV	millivolts
N	North
NAC	Nevada Administrative Code
NAD	North American Datum 1983
NAIP	National Agriculture Imagery Program
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NNHP	Nevada Natural Heritage Program
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
Oe	Ordovian Eureka Quartzite
Ohc	Ordovician Hanson Creek Formation
OHVs	off-highway vehicles
Ovi	Ordovician Vinini Formation
PAG	potential acid-generating
Pb	lead
PCRI	Properties of Cultural and Religious Importance
PCS	petroleum-contaminated soils
PFYC	Potential Fossil Yield Classification

PHMA	Priority Habitat Management Areas
Plan	Plan of Operations NVN-066621 and Reclamation Permit No. 0159
Plan Amendment	2016 Amendment to Plan of Operations NVN-066621 and Reclamation Permit No. 0159
PM	particulate matter
ppb	parts per billion
ppm	parts per million
PRPA	Paleontological Resources Preservation Act
Qa	Tertiary-Quaternary alluviums
R	Range
RDPCs	reclaimed desired plant communities
REA	Rapid Ecoregional Assessment
RFFAs	reasonably foreseeable future actions
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
SAD	surface area disturbance
SE	state endangered species
SHPO	State Historic Preservation Office
SIP	State Institutional Plan
SMCRA	Surface Mining Control and Reclamation Act of 1977
SO_2	sulfur dioxide
SP	state protected
Srm	Silurian Roberts Mountains Formation
SS	state sensitive
SSS	special status species
SSURGO	Soil Survey Geographic Database

ST	state threatened
s.u.	standard units
SWPPP	Stormwater Pollution Prevention Plan
T	Township
Tb	Tertiary basalt
TDS	total dissolved solids
Tg	Tertiary gravels
TMDL	Total Maximum Daily Load
Ttf	Tertiary tuffs
U.S.	United States
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transmercator
VOC	volatile organic compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WAD	weak acid dissociable
WAP	Wildlife Action Plan
WSAs	Wilderness Study Areas

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1.0 Introduction

Barrick Gold Exploration, Inc. (Barrick) is the operator of the Horse Canyon/Cortez Unified Exploration Project (HC/CUEP). Exploration activities are conducted under Plan of Operations NVN-066621 and Reclamation Permit No. 0159 (Plan) (Barrick 2015). The United States (U.S.) Department of the Interior Bureau of Land Management (BLM) has authorized Barrick to conduct mineral surface exploration activities disturbing up to 549 acres within the boundaries of the HC/CUEP (BLM 2015a).

Barrick submitted a Plan Amendment to the BLM on February 29, 2016 for the construction of twin declines, exploration drifts, and associated infrastructure to support underground exploration activities. In July 2016, Barrick submitted a revised amendment to the Plan in response to BLM and Nevada Division of Environmental Protection (NDEP) comments (Plan Amendment) (File Number: NVN-066621 (16-1A)) (Barrick 2016a). As of March 2016, there were approximately 420 acres of surface exploration disturbance within the HC/CUEP Plan area. Under the Proposed Action, of the remaining 129 acres of authorized disturbance, 12 acres would be re-allocated from surface exploration to underground exploration.

The HC/CUEP Plan boundary includes approximately 22,307 acres (**Figure 1-1**). It is located approximately 70 miles southwest of Elko, Nevada, and is accessed via Nevada State Route 306 or Nevada State Route 278. The area covered by the approved HC/CUEP Plan is located in Lander and Eureka counties, Nevada within portions of Township (T) 26 North (N), Range (R) 47 East (E) (sections 1, 2, 3, 11, and 12); T26N, R48E (sections 1-17, 20-29, and 32-36); and T27N, R48E (sections 14, 15, 20, 22, 23, 26-29, and 32-36), Mount Diablo Base & Meridian, Nevada.

The 12 acres of surface disturbance for the portal pad would be in Section 8, T. 26 N., R. 48 E., Mount Diablo Base & Meridian, Nevada. The power line and water supply line (along the existing disturbance associated with the Horse Canyon Haul Road) would be in Sections 6, 7 and 8, T. 26 N., R. 48 E., Mount Diablo Base & Meridian, Nevada.

This Environmental Assessment (EA) discloses the current environmental conditions of the HC/CUEP area and analyzes effects associated with the proposed underground exploration activities.

1.1 Background

The HC/CUEP currently operates under the Plan that was analyzed in EA DOI-BLM-NV-B010-2015-0005-EA (BLM 2015b) (2015 HC/CUEP EA); and authorized in March and June 2015 (BLM 2015c; BLM 2015a). Surface exploration activities are authorized to occur within the HC/CUEP Plan boundary and Barrick may disturb up to 549 acres. The Plan includes applicant-committed environmental protection measures (EPMs).

Existing and authorized activities at the Cortez Hills Mine are found in *Barrick Cortez Inc. (NVN-067575) [(14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application* (SRK 2015). Barrick Cortez, Inc. (BCI) submitted an amendment to the Plan of Operations (NVN-

067575) on May 2, 2016 (SRK 2016) to accommodate waste rock disposal, water supply, and power supply associated with the proposed HC/CUEP Plan Amendment.

The HC/CUEP Plan boundary (**Figure 1-1**) includes approximately 22,307 acres. Private land (1,228 acres) consists of portions of patented mine claims, the Horse Ranch, and the Dean Ranch (Willow Spring) owned by Barrick. Approximately 1,241 lode claims controlled by Barrick exist on public lands. Public lands (21,079 acres) are administered in part by the BLM Battle Mountain District (BMD), Mount Lewis Field Office and in part by the BLM Elko District, Tuscarora Field Office. The BLM has designated the Mount Lewis Field Office as the agency decision-maker for the HC/CUEP Plan Amendment EA.

This EA was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and in compliance with applicable regulations and laws passed subsequently, including the President's Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations (CFR) 1500-1508), U.S. Department of the Interior requirements, and guidelines listed in the BLM NEPA Handbook H-1790-1 (BLM 2008a).

1.2 Other Relevant NEPA Decisions

The General Mining Law of May 10, 1872 (General Mining Law), as amended (30 U.S. Code (U.S.C.) §§ 22-54 and §§ 611-615) allows citizens of the U.S. the opportunity to explore for, discover, claim, and produce certain valuable mineral deposits on those federal lands that are open for mining claim location (open to mineral entry).

Cortez Gold Mines began active exploration in the area in the early 1960s. Mineral exploration activities in the 1980s and early 1990s included 18 exploration plan amendments and notices for exploration drilling throughout the area now defined as the HC/CUEP. In November 1999, BLM approved 50 acres of phased disturbance within the Horse Canyon Exploration Plan of Operations project area. The permitting history of the HC/CUEP Plan of Operations is shown in **Table 1-1**.

Table 1-1 HC/CUEP Plan of Operations Permit History

Date	Title/NEPA Reference	File Number	Proposed Action	Citation
Approved August 2001	HC/CUEP EA and Decision Record (DR)/Finding of No Significant Impact (FONSI) (NV063-EA00-35); Plan of Operations No. N64-87-010P (97-1A)	NVN-066621	Amendment 1 combined two previously approved exploration areas. Approval created HC/CUEP and allowed exploration on up to 50 acres.	BLM 2001
Approved September 2004;	HC/CUEP II EA; DR/FONSI (NV063-EA04-61)	NVN-066621	Exploration on up to 250 acres within HC/CUEP Plan boundary.	BLM 2004a; BLM 2004b

Date	Title/NEPA Reference	File Number	Proposed Action	Citation
October 2004				
Approved April 2005	HC/CUEP Decision	NVN-066621	Amendment 2 Decision affirmed up to 250 acres allowed as modified with revised stipulations.	BLM 2005
Approved November 2008	Cortez Hills Expansion Project Record of Decision (ROD) and Plan of Operations Amendment Approval	NVN-067575	ROD modified the HC/CUEP Plan boundary to consolidate and remove overlapping mine plan and exploration plan boundaries.	BLM 2008b
Approved November 2010; May 2011	Addendum to the HC/CUEP II EA (NV063-EA04-61); DR/FONSI	NVN-066621 EA Addendum	Replaced/superseded the 2004 EA, as modified by 2005 DR; supplemented the analysis of cumulative effects; 250 acres of surface disturbance.	BLM 2010; BLM 2011a
Approved August 2012	HC/CUEP Decision	NVN-066621 (11-1A)	Addendum to EA removed 50-acre disturbance limit on up to 250 acres.	BLM 2012
Approved January 2013	HC/CUEP Decision	NVN-066621	Authorized HC/CUEP Plan boundary change (reduction of 35 acres).	BLM 2013
Approved March 2015	HC/CUEP Addendum to Plan Modification EA	NVN-066621 (13-1A, 14-1A)	Authorization of an additional 159 acres of surface disturbance, for a total of 409 acres.	BLM 2015c
Approved June 2015	HC/CUEP Plan Amendment EA	NVN-066621 (13-1A, 14-1A, 14-2A)	Authorization of additional 140 acres of surface disturbance, for a total of 549 acres.	BLM 2015a
Proposed February 2016 Revised May 2016	HC/CUEP Declines Plan Amendment	NVN-066621 (16-1A)	Proposes reallocation of 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities and the construction of twin declines.	Barrick 2016a

1.3 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. 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. In order to use public lands managed by the BLM for locatable mineral exploration and development, persons must comply with the Federal Land Policy and

Management Act of 1976 (FLPMA) and BLM's Surface Management Regulations, State of Nevada laws and regulations applicable to mine reclamation, and other applicable statutes, and regulations. Under the FLPMA and the implementing regulations at 43 CFR 3809, the BLM is authorized to approve exploration plans of operations on public lands.

The proponent, Barrick, is proposing modifications as described in the HC/CUEP Plan Amendment which reallocates a portion of previously-authorized surface disturbance to support underground exploration activities.

The purpose of this federal action and the associated EA is to analyze the environmental effects associated with the proponent's Proposed Action. The NEPA mandates that the BLM evaluate the effects of the Proposed Action and develop alternatives and mitigation, when necessary, to lessen any effects to environmental resources.

The need for the federal action is established by the BLM's responsibilities under FLPMA to respond to an applicant's request for approval of a Plan of Operations for the applicant to exercise their rights under the General Mining Law. Additional aspects of the need of the federal action are:

1) to further the "Minerals" objective of the applicable BLM Resource Management Plan (RMP), which is to "…provide opportunity for exploration and development of locatable minerals, such as gold, silver, copper, lead, molybdenum, etc., consistent with the preservation of fragile and unique resources in areas identified as open to the operations of the mining laws."; 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, including preventing unnecessary or undue degradation of public lands, FLPMA, State of Nevada laws and regulations applicable to mine reclamation, and other applicable laws and regulations".

1.4 Decisions to be Made

The BLM decision regarding the HC/CUEP Plan Amendment includes the following options:

- Approve the HC/CUEP Plan Amendment with no modifications;
- Approve the HC/CUEP Plan Amendment with additional mitigation needed to prevent unnecessary or undue degradation of public lands; or
- Do not approve the HC/CUEP Plan Amendment.

1.5 BLM Responsibilities and Relationship to BLM and Non-BLM Policies, Plans, and Programs and Land Use Plan Conformance

The BLM has the responsibility and authority to manage the surface resources on public lands and has designated lands within the HC/CUEP as open for mineral exploration. In the BLM BMD Record of Decision (ROD) for the Shoshone-Eureka RMP (BLM 1986a), the BLM states in objectives 1 and 2 under Minerals that the BLM will:

- "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," and
- "Assure that mineral exploration, development, and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands."

The management decisions applicable to these objectives are as follows (BLM 1986a):

- Locatable minerals: "All public lands in the planning areas will be open for mining and prospecting unless withdrawn or restricted from mineral entry."
- Current mineral production areas: "Recognize these areas as having a highest and best use for mineral production and encourage mining with minimum environmental disturbance. Make thorough examinations of all sites proposed for other Bureau programs in these areas."

The BLM Elko District ROD for the Elko RMP (BLM 1987) states in Objective 1 under Minerals that the BLM will:

- "Maintain public lands open for exploration, development, and production of mineral resources while mitigating conflicts with wildlife, wild horses, recreation, and wilderness resources."

The short and long-term management action applicable to this objective is as follows (BLM 1987):

- "Designate the resource area open to mineral entry for locatable minerals, except for the district's 11-acre administrative site."

The management decisions and actions in the BLM BMD, Shoshone-Eureka RMP (BLM 1986a) and the BLM Elko District, Elko RMP (BLM 1987) have been reviewed. The HC/CUEP Plan Amendment is in conformance with these RMPs.

The project is also in conformance with the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA) (BLM 2015d). The following Management Decisions (MDs) for Mineral Resources (MR) under Locatable Minerals are applicable to the Proposed Action:

- MD MR 15: Review Objectives SSS (Special Status Species) 4, and to the extent allowed by law, apply MDs SSS 1 through 4 when reviewing and analyzing projects and activities proposed in Greater Sage-Grouse (GRSG) habitat
- MD MR 18: Subject to valid and existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operations and apply mitigation and best management practices that minimize the loss of Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas (GHMAs) or that enhance GRSG habitat by applying the "avoid, minimize and compensatory mitigation" process through

an applicable mitigation system, such as the Nevada Conservation Credit System and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (BEA) (March 2015) (DOI et al. 2015)

Lander County's Policy 13-8 states that the Secretary of the Interior should use all means to encourage the exploration and development of the mineral resource (Lander County 2005).

The Eureka County Master Plan (Eureka County 2010) goal for minerals is to "facilitate environmentally responsible exploration, development, and reclamation of oil, gas, geothermal, locatable minerals, aggregate and similar resources on federal lands."

1.6 Scoping

Internal scoping included two interdisciplinary team meetings held at the BLM BMD Office on February 11, 2016 and March 31, 2016. Resource specialists discussed the HC/CUEP Plan Amendment. Environmental issues and the environmental baseline resources were identified.

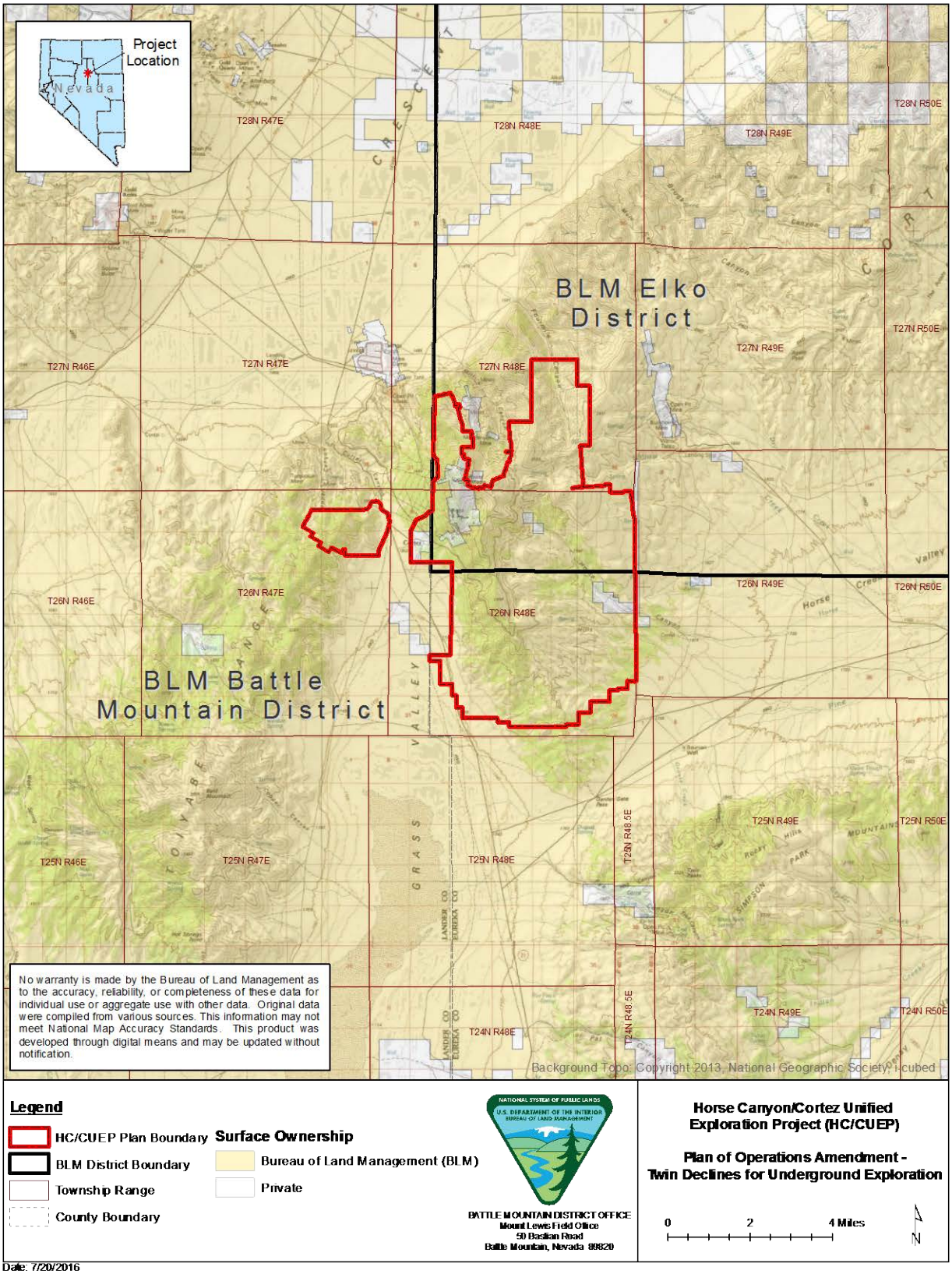
1.6.1 Issues

The internal interdisciplinary team determined that the following resource issues may occur and therefore are analyzed in this EA:

- Cultural Resources – effects on unanticipated discoveries
- Native American Cultural Concerns – effects on properties of cultural and religious importance
- Paleontology – effects on resources encountered during underground exploration
- Visual Resources – effects on scenic quality
- Recreation – changes to current uses or user groups
- Social and Economic Values – change in employment, infrastructure demand
- Air Quality – fugitive dust, equipment emissions
- Soils – potential degradation or loss (erosion)
- Vegetation – change in community composition, reclamation
- Noxious Weeds, Invasive, and Non-native Species – establishment and/or spread, preventative and control measures
- Grazing Management – change/loss of animal unit months (AUMs)
- Forestry and Woodland Resources – commercial and personal firewood collection, pine nut collection
- Water Quality, Surface Water, and Groundwater – sedimentation, flow, use, potential for contamination
- Wetlands/Riparian Zones – potential change/loss and mitigation
- Wildlife – disturbance (noise/human presence), habitat loss/change
- Special Status Species (Plants and Animals) – potential mortality, disturbance, habitat loss/change
- Migratory Birds – disturbance, habitat loss/change
- Wastes, Hazardous or Solid – handling and disposal

- Geology (Minerals) – changes to geologic structure, generation of waste rock, potential to encounter acid-generating rock
- Lands and Reality – changes in right-of-ways (ROWs)

Figure 1-1 Project Vicinity



2.0 Alternatives Analyzed

This chapter describes the alternatives analyzed in this EA. The Proposed Action is the HC/CUEP Plan Amendment, as described by Barrick in the *Horse Canyon/Cortez Unified Exploration Project Plan of Operations Amendment NVN-066621 and Reclamation Permit No. 0159* (May 2016) (Barrick 2016a).

This chapter also presents the No Action Alternative (Section 2.3) and a discussion of past, present, and reasonably foreseeable future actions (RFFAs) (Section 2.4).

The BLM has reviewed the Proposed Action to determine what effects, if any, would occur, and if modifications are needed to mitigate potential effects. The No Action Alternative was considered and analyzed to provide a baseline for comparison of the effects of the Proposed Action. One alternative was identified, the construction of a waste rock disposal facility within the HC/CUEP Plan boundary (Section 2.2).

This EA discloses the current environmental conditions of the HC/CUEP area and analyzes effects associated with proposed underground exploration activities. The HC/CUEP Plan was approved in 2015 (BLM 2015a). The analysis of the currently authorized HC/CUEP Plan was completed in the 2015 HC/CUEP EA (BLM 2015b) and the authorizations were documented in the 2015 decision records (DRs) (BLM 2015c, BLM 2015a), which are incorporated by reference. Up to 549 acres of surface disturbance associated with overland access, new road construction, geophysical analysis, trenching, test wells, monitoring wells, drill pads and sumps, drill holes, and reclamation are authorized. The surface disturbance is authorized to occur within the HC/CUEP Plan boundary. As of March 2016, the HC/CUEP surface disturbance totals 420 acres. In 2016, Barrick submitted to the BLM two work plans for 14.4 acres of disturbance under the currently authorized HC/CUEP Plan for surface exploration. This amount is within the currently authorized total of 549 acres.

HC/CUEP components subject to approval under 43 CFR Subpart 3715 Use and Occupancy include those that involve full or part-time residence on BLM administered lands in support of the development of locatable mineral deposits. Use or occupancy is limited to that which is reasonably incident to mining. Structures associated with the proposed underground exploration activities including the portals and infrastructure on the portal pad, the transmission line and surface water supply line, and the waste rock facility have been identified as subject to Subpart 3715 approval.

2.1 Proposed Action – Plan of Operations Amendment

Barrick submitted a Plan of Operations Amendment to the BLM in February 2016, which proposes to reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Approval of the HC/CUEP Plan Amendment would not change the current authorization of up to 549 acres of surface disturbance or change the currently authorized HC/CUEP Plan boundary. The approval would reallocate 12 acres of surface disturbance to specifically support the construction of twin declines, exploration drifts, and associated surface

infrastructure (**Figure 2-1**). The components of the proposed underground exploration activities are described in Section 2.1.2.1. A summary of proposed components and activities specific to the Proposed Action includes:

- A 12-acre portal pad and infrastructure, two portals, and construction of twin declines
- A 1.7-mile power line within the Horse Canyon Haul Road
- A 1.7-mile water supply line within the Horse Canyon Haul Road
- Use of the Horse Canyon Haul Road to access the portal pad and transport waste rock.

Barrick is also proposing minor changes in surface exploration activities, described in Section 2.1.3.

2.1.1 Proposed Action Applicant-Committed Environmental Protection Measures

All requirements of the March and June 2015 DRs (BLM 2015c, BLM 2015a) including applicant-committed EPMs, as the Conditions of Approval, would remain in place. The applicant-committed EPMs, as they were written in the Conditions of Approval, are included in **Appendix A**.

The applicant-committed EPMs for the Proposed Action include the following:

Air Quality

- Barrick would implement the HC/CUEP fugitive dust control plan to minimize dust emissions. The Horse Canyon Haul Road and the portal pad would be watered, graveled, or chemically treated to reduce fugitive dust emissions, based upon weather and road conditions.
- Speed limits would be posted and vehicle speeds reduced on the Horse Canyon Haul Road to minimize the potential for fugitive dust emissions. Speed limits would be enforced.
- Project vehicles would be maintained regularly to ensure they are operating in a manner to minimize vehicle emissions.

Water Quality

- Barrick would adhere to the HC/CUEP Stormwater Pollution Prevention Plan (SWPPP), included in the Plan Amendment as Appendix B.
- Stormwater best management practices (BMPs) (NDEP et al. 1994, NDEP et al. 2008) would be used to minimize erosion.
- Barrick would follow the spill contingency plan, as included in the Plan Amendment SWPPP.
- Erosion and runoff control measures would be implemented.
- BMPs would be utilized to control erosion and sedimentation (**Appendix A**).

- After underground exploration is completed, the portal pad would be recontoured, growth medium would be placed, and the area reseeded with a BLM-approved seed mixture to establish ground cover and minimize erosion.

Water and Riparian Resources

- There are no riparian or wetland areas within the 12 acres of proposed surface disturbance for the portal pad. Diversion would be placed above the portal pad to route the surface flow around the portal pad.
- Culverts would be used to route diverted surface flow underneath the Horse Canyon Haul Road. The culvert outlet elevation(s) would be designed at or near the existing ground elevations to minimize the hydraulic jump and reduce the potential for erosion as the stormwater flows from the culvert(s) onto natural ground.
- Temporary straw bales would be utilized to protect drainages during construction.

Solid and Hazardous Waste

- Diesel, gasoline, oil, and lubricants would be transported on the Horse Canyon Haul Road for use at the portal pad, underground declines and exploration drifts. There would be no bulk storage of diesel or gasoline at the portal pad. If regulated materials (petroleum products) are spilled, measures would be taken under Barrick spill response guidelines to control the extent of the spill, and the appropriate agencies would be notified in accordance with the applicable federal and state regulations.
- Solid waste would be collected at the portal pad and transported offsite periodically for disposal at an approved solid waste facility.

Wildlife, Sensitive, and Special Status Species

- If construction of the portal pad occurs during the nesting season, defined by the BLM as March 1 through July 31, Barrick would conduct pre-disturbance migratory bird nest surveys and establish exclusion zones around any active nests found. Clearance surveys would be conducted following BLM Wildlife Protocols (BLM 2014a). If active nests are located, or if other evidence of nesting is observed (e.g., mating pairs, territorial defense, carrying nesting material, transporting food) at the portal pad, Barrick's biologist would recommend to the BLM an avoidance buffer around the nest which the BLM, in coordination with the Nevada Department of Wildlife (NDOW) and the U.S. Fish and Wildlife Service (USFWS), will review and approve prior to surface disturbance. Barrick's biologist would inform Barrick when the birds have left the nest. Barrick would not conduct any surface disturbing activities within the exclusion zone until the biologist determines that the birds are no longer nesting.
- Barrick would not construct the portal pad within a 0.5-mile radius of any active raptor nests during the nesting season (March 1 to July 31). Upon identifying an active raptor nest, Barrick would immediately notify the BLM.
- Speed limits of not more than 35 mph would be posted on the Horse Canyon Haul Road. Speed limits would be enforced.

- The Proposed Action has been designed in compliance with the ARMPA (BLM 2015d) and the Barrick Nevada Sage-Grouse BEA (DOI et al. 2015). The components of the Proposed Action (the portal pad, the power line, and the water supply line) are within the area covered by the BEA. Barrick has complied with the ARMPA and the BEA by designing the project to be within non-habitat for the greater sage-grouse and more than 4 miles from the nearest lek.
- Barrick would not construct the portal pad within 50 feet of existing adits, shaft openings, or caves to prevent any impacts to bat species potentially residing in or near these structures. If a BLM-qualified biologist surveys the site and determines that bats are not residing in or near the structure, the aforementioned exclusion zone would not apply.
- The portal pad has been designed to not be located in habitat identified as suitable to support pygmy rabbit.
- The portal pad has been designed to not be located in habitat identified as suitable to support the pale or dark kangaroo mouse.
- No other special status plant or wildlife species or habitat have been identified within the area proposed for the portal pad.

Cultural and Paleontological Resources

- The components of the Proposed Action (the portal pad, the power line, and the water supply line) have been designed to avoid cultural and paleontological resources.
- If Barrick discovers previously unknown cultural resources while constructing the Proposed Action, Barrick would immediately cease any surface disturbing activity within 100 meters/330 feet of the discovery and notify the BLM. If the BLM determines, in consultation with the Nevada State Historic Preservation Office (SHPO), that the site is or may be eligible for the National Register of Historic Places (NRHP), a BLM archaeologist would determine an exclusion zone adequate to protect the resource. Barrick would not conduct any surface disturbing activities within this exclusion zone without further authorization from the BLM, which may require further environmental and/or cultural analyses. If the site is determined not to be eligible, Barrick may resume surface disturbing activities upon notification by the BLM.
- Barrick's employees and contractors would receive training on the potential for cultural resources and the procedures required by Barrick to avoid disturbing, altering, or destroying any remains or any historical or archaeological site, structure, building or object on federal land. If construction activities uncover human remains, Barrick would immediately cease all earth disturbing activities within 100 meters/330 feet of the discovery and notify the BLM and county law enforcement so that the BLM and/or law enforcement can ensure compliance with all applicable laws regarding such discovery.
- If Barrick discovers a vertebrate fossil deposit during construction activities, Barrick would immediately cease further activities that may affect the deposit and notify the BLM so that the BLM may evaluate the discovery and establish an exclusion zone. Barrick would not undertake any further surface disturbance within the exclusion zone.

- The components of the Proposed Action (the portal pad, the power line, and the water supply line) have been designed to avoid Properties of Cultural and Religious Importance (PCRIs).

Survey Monuments

- Survey monuments, witness corners, and/or reference monuments would be protected to the extent economically and technically feasible. Should moving such a feature be required, Barrick would ensure that a licensed Professional Land Surveyor oversee and execute the relocation in a manner consistent with applicable laws. The BLM would be notified in writing prior to the moving of any such survey monument.

Invasive Non-Native Species

- Barrick would be responsible for controlling all noxious weeds at the portal pad until the reclamation activities have been determined to be successful and released by the BLM authorized officer.
- Barrick would implement the Noxious Weed Management Plan (**Appendix A**).

Vegetation/Forestry and Woodland Resources

- Reseeding would be consistent with all BLM recommendations for seed mix constituents, application rate, and seeding methods.
- Pinyon pine and juniper that has been removed from the area of the portal pad would be made available to the public.

Public Safety and Access

- Public safety would be maintained throughout the life of the Proposed Action. All equipment and other facilities would be maintained in a safe and orderly manner.
- Speed limits of not more than 35 mph would be posted on the Horse Canyon Haul Road to maintain operational safety. Speed limits would continue to be enforced.

Wildland Fire Protection

- All applicable state and federal fire laws and regulations would be complied with and all reasonable measures would be taken to prevent and suppress fires in the area of the Proposed Action.
- In the event the proposed activities start or cause a wildfire, Barrick would be responsible for all the costs associated with the suppression.
- Barrick would comply with all applicable state and federal fire laws and regulations and all reasonable measures (i.e. extinguisher, water supply at the portal pad, welding controls) would be taken to prevent and suppress fires in the area of the Proposed Action.
- Vehicles would carry fire extinguishers.

- Adequate fire-fighting equipment would be kept at the portal pad.
- Vehicle catalytic converters would be inspected often and cleaned of all brush and grass debris.
- Wildland fires would immediately be reported to the BLM Central Nevada Interagency Dispatch Center at (775) 623-3444. Information reported would include the location (latitude and longitude if possible), fuels involved, time started, who or what is near the fire, and the direction of fire spread.

Livestock and Range Allotments

- Speed limits of not more than 35 mph would be posted on the Horse Canyon Haul Road to protect livestock. Speed limits would be enforced.

2.1.2 HC/CUEP Plan Amendment Surface Disturbance Reallocation

The surface disturbance by type as currently authorized and the proposed 12 acre reallocation is shown in **Table 2-1** The proposed modifications would result in no new acres of surface disturbance; only a reallocation of use of 12 acres currently authorized within the HCCUEP Plan boundary. The proposed modifications would occur on BLM-administered lands located within the currently authorized HC/CUEP Plan boundary (NVN-066621). The location for the 12 acres of surface disturbance for the Proposed Action (the portal pad) is in the NW1/4 SE1/4, Section 8, T 26 N., R. 48 E., Mount Diablo Base & Meridian, Nevada, Under the Proposed Action, the total disturbance area for exploration would remain the same as currently authorized at 549 acres.

Table 2-1 Summary of Authorized and Proposed Surface Disturbance (Acres)

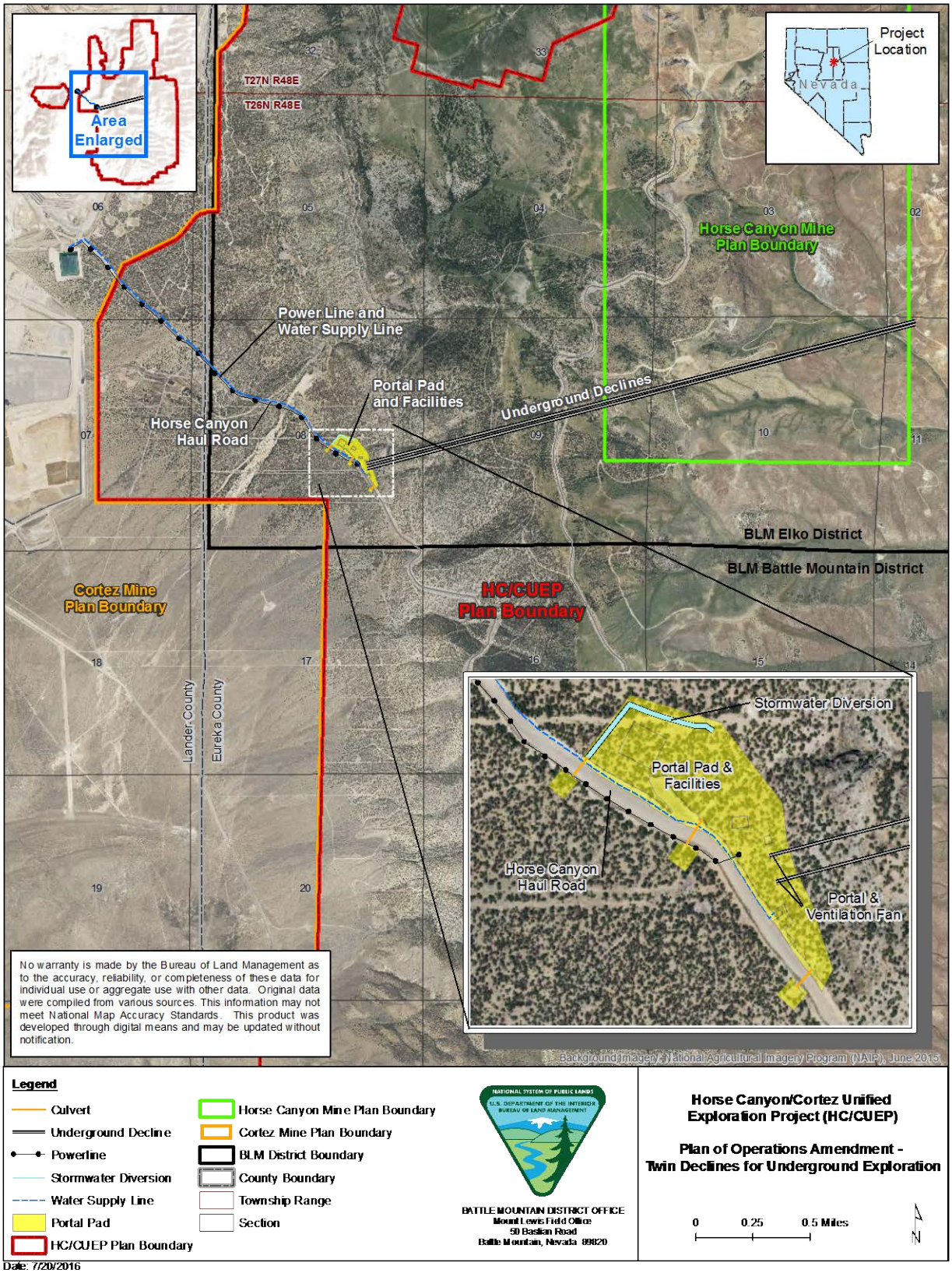
Disturbance Type	Authorized Private	Authorized Public	Authorized Total	Proposed Private	Proposed Public	Proposed Total	Total Private	Total Public	Total Acres
Drill Roads < 30% Underlying Slope	15	64	79	-	-3	-3	15	61	76
Drill Roads > 30% Underlying Slope	3	52	55	-	-	-	3	52	55
Drill Pads and Sumps < 30% Underlying Slope[1]	15	72	87	-	-9	-9	15	63	78
Drill Pads and Sumps > 30% Underlying Slope[1]	1	66	67	-	-	-	1	66	67
Trenches	-	2	2	-	-	-	-	2	2
Communications Sites < 30% Underlying Slope[2]	0.1	0.8	0.9	-	-	-	0.1	0.8	0.9
Sediment/Erosion Control < 30% Underlying Slope	-	5	5	-	2	2	-	7	7
Geophysical Activities < 30% Underlying Slope	-	3	3	-	-	-	-	3	3
Ancillary[3]	-	-	-	-	10	10	-	10	10
Surface Disturbance Recontoured/Seeded < 30% Underlying Slope[1]	18.6	141.8	160.4	-	-	-	18.6	141.8	160.4
Surface Disturbance Recontoured/Seeded > 30% Underlying Slope	17.8	71.3	89.1	-	-	-	17.8	71.3	89.1
Subtotal	71	478	549	0	0	0	71	478	549

Source: Barrick 2016a [1] Includes the drill pads and independent sumps as listed in the Reclamation Cost Estimate.

[2] Tenabo communications site was recontoured in 2014, but not released.

[3] Includes the portal pad, buildings, the ore/PAG transfer pad, power pole/guy wires.

Figure 2-1 Proposed Action



2.1.2.1 Underground Exploration Declines

The proposed HC/CUEP declines would be accessed from portals adjacent to the existing Horse Canyon Haul Road. The portal entrances would be constructed squarely into a solid rock face and would be approximately 50 feet deep. The portal entrances would have rock bolts, mesh, and shotcrete installed to maintain the integrity of the portal openings. Portal arch sets would also be used to provide initial ground support for the portal openings. Each portal would initially be excavated to approximately 18 feet wide by 20 feet tall for the first 50-foot section. Then the opening would be reduced to 15 feet wide by 16 feet high. Construction of the initial decline would be driven at a slightly positive gradient (sloping up) followed by the declining gradient to ensure that surface water would not enter the decline.

The twin exploration declines (tunnels) would be excavated towards the northeast. The alignment may be modified as needed based on geology, rock quality, and other relevant development factors.

The engineering design for the twin declines would accommodate the mining equipment, piping, and ventilation ducting. The twin declines and exploration drifts would be developed using underground drilling and blasting techniques to fracture the rock, Load-Haul-Dump (LHD) equipment to excavate the rock, and LHDs or underground haul trucks to haul the material to the portals. Waste rock would be hauled to existing waste rock facilities at the Cortez Hills Mine operations. The twin declines and exploration drifts would have cross cuts and associated miscellaneous infrastructure, such as explosives magazines and sumps. The exploration drifts would have drill stations.

2.1.2.2 Ore/Potential Acid-Generating (PAG) Transfer Pad

If PAG material is encountered, it would be excavated and placed on the lined ore/PAG transfer pad on the portal pad for relocation to the Cortez Hills Mine Canyon Waste Rock Facility, in accordance with the approved waste rock management plan. This would not result in an increase in surface disturbance or height of the currently authorized Cortez Hills Mine Canyon Waste Rock Facility.

If ore-grade material is encountered, it would be excavated and placed on the lined ore/PAG transfer pad that satisfies the requirements of Nevada Administrative Code (NAC) 445A.438 for later shipment to an off-site processing facility (any ore-grade material would likely be shipped to the Barrick Goldstrike Mine for processing). The ore-grade material would not increase currently authorized off-site haulage amounts established in *Barrick Cortez Inc. (NVN-067575 [14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application* (SRK 2015). Precipitation on the transfer pad would be captured in a tank within containment designed to contain runoff from the 25-year, 24-hour storm event. Contact water from the lined ore/PAG transfer pad would be collected and trucked to the lined Mill #1 water storage reservoirs and then conveyed to the Pipeline Mill, as needed for make-up water.

2.1.2.3 Waste Rock Disposal

Approximately 1.75 million tons of waste rock would be excavated from the twin declines and exploration drifts. During the excavation of the portal pad and development of the underground exploration declines, approximately 1,050,000 tons of non-acid generating waste rock would be excavated. Non-PAG waste rock would be placed in one of the authorized existing waste rock facilities at the Cortez Hills Mine according to the currently authorized configuration. Approximately 700,000 tons of mixed non-acid generating and PAG waste rock would be generated. Distinct waste rock units would be sampled quarterly and subjected to meteoric water mobility procedure and acid base accounting tests. Based on the results, any localized areas of acid-generating waste rock would be placed internal to the waste rock disposal facility and encapsulated or blended with acid-neutralizing waste rock prior to placement (BLM 2008c).

Reclamation of the waste rock facilities at Cortez Hills Mine would be completed per the *Barrick Cortez Inc. (NVN-067575 [14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application* (SRK 2015).

2.1.2.4 General Infrastructure

The following facilities would be located at the portal pad to provide support for the underground exploration:

- Modular trailer for administrative and safety/security office
- Sanitary facilities (blue rooms)
- Ventilation fans
- Petroleum-contaminated soils (PCS) bin
- Solid waste bin
- Portable shotcrete plant and shotcrete storage area (batch plant)
- 10,000-gallon water storage tank
- 10,000-gallon contact water tank
- Compressor
- Generators (three)
- Lined Ore/PAG transfer pad
- Stormwater controls
- Electrical motor control center
- Ready lines

Explosives would be stored in an authorized explosives storage area at the Cortez Hills Mine in accordance with Mine Safety and Health Administration (MSHA) and Bureau of Alcohol, Tobacco, Firearms, and Explosives regulations.

During initial construction, power for the twin declines would come from a series of portable generators. The three generators would be fueled via a mobile maintenance truck. Eventually, the existing Cortez Hills Mine open pit substation would supply power for the portal area via an overhead single pole power line, to be constructed within the existing surface disturbance footprint

of the Horse Canyon Haul Road. There would be minimal disturbance outside the footprint to establish guy wires as needed. After the power line is installed, at least one generator would remain as emergency backup. As the twin declines proceed further underground, electrical power would be provided by cables suspended from the back of the twin declines. Small underground substations would provide distribution of power within the underground workings.

Water for drilling, dust control, and other uses would be supplied from the Cortez Hills Mine fresh water pond to the portal area in two 4-inch pipelines inside a 12-inch pipeline. The water supply line would be on the ground surface within the existing surface disturbance footprint of the Horse Canyon Haul Road. Water would recirculate within the two 4-inch pipelines to keep them from freezing. Drill water would be supplemented by incidental inflow water captured in underground sumps. Barrick has filed water rights applications to allow 100 gallons per minute (gpm) of water from well GVPW-01 (in Lander County) to be used within the declines (in Eureka County) for drilling, dust control, and other uses. There would be an inter-basin transfer of water from Grass Valley to Pine Valley. Barrick has also filed water rights applications to allow up to 50 gpm of passive groundwater inflow within the declines (in Eureka County) to be used for drilling, dust control, and other uses.

Underground mining equipment would include, but not be limited to, LHD machines, haul trucks, development drills, and rock bolters. Ground support of the underground workings would consist of rock bolts, mesh, shotcrete, cemented rock fill, or other appropriate ground control methods typical of Nevada underground exploration. Ground conditions may change as development of the twin declines progresses; the ground control plan would change accordingly.

Once the declines have been established, miscellaneous excavations would be constructed. These excavations would include underground drill stations, access drifts, stopes, load centers, pump stations for incidental water inflow to the twin declines, sumps, explosives, fuel and material storage areas, refuge stations, connector drifts, muck bays, and laydown areas.

Excavations would also be developed to house facilities for underground equipment maintenance, fueling, warehousing, shotcrete plants, drill stations, muck bays, sumps, and refuge chambers.

A portable shotcrete batch plant would be erected on the portal pad to supply shotcrete for underground development. This plant would include 200-ton storage silos for dry mix shotcrete/cement and aggregate stockpiles. The plasticizer and accelerator tanks would be contained within a heated 10 by 20 foot connex container. The plasticizer is linked to the mixer as it goes into the truck.

Underground ventilation would be provided by a fan system. Initially, development fans would be installed next to the decline portals until the declines have become established enough to move the main fan system underground. Fresh air would be forced into development headings and exhausted out through the adjacent decline.

2.1.2.5 Access Road

The twin declines portal area would be accessed from the existing Horse Canyon Haul Road as shown on **Figure 2-1**. The Horse Canyon Haul Road was previously authorized under the Horse Canyon Mine Plan (NVN-066879). The Horse Canyon Haul Road and surface exploration access roads would continue to be maintained by blading, surfaced with gravel where necessary to provide a durable running surface and provide traction, and watered as necessary for dust control. No new access roads are required.

2.1.2.6 Communications

Crews working at the HC/CUEP underground exploration project would use the existing Cortez Hills Mine communications systems.

2.1.2.7 Fuel and Reagent Storage Use

The Cortez Hills Mine existing and authorized facilities would be used to supply gasoline, diesel fuel, antifreeze, petroleum oils, and solvents to the HC/CUEP underground exploration activities. Currently in-place procedures for materials transportation, storage, waste management, and spill prevention and emergency response programs would continue to be implemented.

2.1.2.8 Petroleum Contaminated Soils

PCS generated as a result of a spill would be disposed of within a closed bin and transported off-site for proper disposal.

2.1.2.9 Water Management

During development, passive inflow water is expected to seep into the twin declines. Water would be managed by sump collection systems within the declines and used underground for dust suppression and drilling make-up water.

Stormwater

The portal area initially would be graded to facilitate drainage of the surface runoff away from each portal. Ditches and berms would be constructed above the portal area to divert upgradient storm runoff around the site and conveyed via a culvert placed under the Horse Canyon Haul Road. Two additional culverts would be placed under the Horse Canyon Haul Road to support stormwater control, as shown in **Figure 2-1**. Stormwater from the portal pad area would be managed according to the BMPs in the SWPPP (Barrick 2016b).

Contact water from the lined ore/PAG transfer pad would be collected and trucked to the lined Mill #1 water storage reservoirs and then conveyed to the Pipeline Mill, as needed for make-up water. Post-exploration water management structures have been included in the disturbance for completeness.

2.1.2.10 Growth Media Stockpile

Growth media salvaged from the portal pad would be stockpiled at the Cortez Hills Mine growth media stockpile near the Area 34 heap leach facility.

2.1.2.11 Workforce

Development of the twin declines and exploration drifts would proceed 24 hours per day, 365 days per year. Barrick estimates that the development and drilling program for the underground exploration project would require up to 124 workers for Year 1 through Year 4; this number includes both Barrick and contract underground workers and support staff on the surface. The number of workers would increase up to 188 in Year 5. This workforce would be in addition to the existing personnel employed for surface exploration at the HC/CUEP.

2.1.2.12 Schedule

Barrick anticipates beginning development upon authorization by the BLM and NDEP. Development of the twin declines and exploration drifts would begin in Year 1 and continue through Year 5. Reclamation would begin in Year 6 for most of the facilities. Recontouring and seeding activities would end in Year 7 and would be followed by 3 years of reclamation monitoring.

If underground exploration delineates a mineral resource sufficient for development, reclamation would be deferred should the facilities be needed for future mining.

2.1.3 Compliance with the ARMPA and the Barrick Nevada Sage-Grouse BEA

The Proposed Action has been designed in compliance with the ARMPA (BLM 2015d) and the Barrick Nevada Sage-Grouse BEA (DOI et al. 2015). The ARMPA for the Nevada and Northeastern California Sub-Region includes Management Decision (Mineral Resources) 18: which notes “Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance greater sage-grouse habitat by applying the “avoid, minimize and compensatory mitigation” process through an applicable mitigation system, such as the Nevada Conservation Credit System and exemplified in the Barrick Nevada Sage-Grouse BEA (DOI et al. 2015).”

The 12 acres proposed for reallocation from surface exploration to underground exploration are within the area covered by the BEA. The BEA notes that, to the extent practicable, Barrick would propose measures to avoid or minimize effects to greater sage-grouse (DOI et al. 2015). Barrick has complied with the ARMPA and the BEA by designing the portal pad to be within non-habitat for the greater sage-grouse and more than 4 miles from the nearest lek.

2.1.4 Surface Exploration

Barrick is also proposing the following minor changes to surface exploration activities:

- Increase the maximum drill hole depths to 5,000 feet below ground surface (bgs) with an average depth of 3,000 feet bgs; and
- If discharge ports are constructed in fill rather than native ground, erosion control measures would be put in place to prevent inadvertent sump failure.

No change in the currently authorized amount of total surface disturbance acreage is proposed.

2.1.5 Quality Assurance Plan

No changes to the currently authorized quality assurance plan are proposed. Barrick would continue to conduct site inspections of exploration operations and road construction on a daily basis. This includes on-site inspections of the operation as well as cell phone or radio contact with the drilling and construction crews to respond to field conditions and to address unexpected conditions or problems that may be encountered. Sites are examined to ensure that cultural sites, wetlands, springs, seeps, and drainages are avoided. In addition, any stipulations imposed by the BLM, such as seasonal restrictions, are strictly enforced by Barrick.

Barrick would monitor drill hole abandonment to verify compliance with NAC 534.

Barrick maintains an internal disturbance permitting system that ensures the protection of cultural, biological, and water resources.

2.1.6 Monitoring and Reporting

Under the current authorization, Barrick has the following three reporting obligations. These reporting obligations would continue. Barrick would continue to: (1) submit an annual work plan to the BLM by March 1 of each year, which documents work to be completed in the upcoming year including locations for drill roads, drill pads and reclamation, and includes a map of the proposed construction; (2) submit an annual summary report to the BLM and NDEP by April 15, which documents actual work completed during the previous year and lists which drill holes were left open and the reason for this action; and (3) submit a short letter report to the BLM each quarter with the disturbance data collected for the previous 3 months.

2.1.7 Reclamation

Reclamation of disturbed areas resulting from activities outlined in the HC/CUEP Plan would be completed in accordance with BLM and NDEP regulations and requirements, as currently authorized.

Surface disturbance associated with the decline development and underground exploration activities that are accessible by equipment would be recontoured to a stable post-mining configuration and revegetated. The cut area for the portal locations would be constructed to a stable configuration and would not be recontoured. Underground facilities would be closed in phases starting at the lowest points of the underground workings up to the surface. The closure procedures are summarized below.

In general, removal and cleanup of water management equipment would consist of backfilling or grouting of sumps; and removal and salvage or disposal in an approved off-site waste disposal facility of piping, pumps, and pumping equipment. Piping that cannot be salvaged for reuse would be dismantled as required for backfill placement and left underground.

Fans, motors, pumps, compressors, power supply and distribution equipment, ventilation curtains and ducts, and other equipment would be removed and salvaged for use at another Barrick facility, if possible, or disposed in an approved waste disposal facility. Alternately, non-reactive equipment (e.g., high-density polyethylene (HDPE) pipe) may be left underground.

Remaining fuels, lubricants, and explosives would be removed from the underground workings and properly disposed.

To prevent access to underground workings, a cemented backfill plug a minimum of 50 feet in length would be placed in each of the declines. Subsequently, shotcrete, approximately four inches thick would be sprayed over the fill and adjacent area to connect the fill to the native rock wall and provide a continuous barrier.

Reclamation of the underground workings and surface facilities would have to be recommissioned or rebuilt if post-reclamation mining were to occur.

2.1.7.1 Reclamation Schedule

The anticipated time frame for the HC/CUEP exploration activities is 10 years. Underground reclamation would begin in Year 6 for most of the facilities. Recontouring and seeding activities would end in Year 7 and would be followed by 3 years of reclamation monitoring. Reclamation may be deferred if the facilities are used in future mining. Exploration activities are anticipated to continue regardless of weather conditions.

Following the end of underground exploration activities, berm and sign maintenance, site inspections, and other necessary monitoring for the period of reclamation responsibility would be conducted.

2.1.7.2 Post-exploration Land Uses

When the underground exploration program is completed, the post-exploration land use would revert back to the original land uses. Major existing land uses in the HC/CUEP area include livestock grazing, wildlife habitat, mineral exploration, and recreation.

2.1.7.3 Growth Media Stockpiling and Use

Material salvaged from the disturbed areas would be replaced. Where available (i.e., not in areas covered with rock), soils capable of serving as growth media would be salvaged and stockpiled as part of the fill. In addition to the soils, as much of the soil organic matter as possible would be salvaged to minimize compaction and promote aeration. Currently authorized seed mixes and seeding techniques would not change.

2.1.7.4 Noxious Weed Management

Weed management would follow steps described in the applicant-committed EPMs. The weed management plan has been revised for consistency with the currently authorized Cortez Hills Mine Weed Management Plan and is included in **Appendix A**.

2.1.7.5 Disposition of Structures, Equipment, and Materials

Temporary facilities, such as portable toilets or storage trailers, would be removed from the site during reclamation activities.

The lined ore/PAG transfer pad would be reclaimed by excavating the remaining above-liner materials and liner and hauling these materials to one of the Cortez Hills Mine approved existing waste rock facilities for burial in an appropriate location.

2.1.7.6 Road, Drill Pad, and Sump Reclamation

No changes are proposed to reclamation of roads, drill pads, and sumps. These features that are no longer needed for exploration activities would be reclaimed as currently authorized.

2.1.7.7 Drill Hole Plugging and Water Well Abandonment

No changes are proposed to currently authorized drill hole plugging and water well abandonment methods and procedures. Mineral exploration, development, and condemnation drill holes as well as monitoring and production wells subject to Nevada Division of Water Resources (NDWR) regulations would be abandoned in accordance with applicable rules and regulations (NAC 534.420 through NAC 534.427). Boreholes would be sealed to prevent cross contamination between aquifers, and the required shallow seal would be placed to prevent contamination by surface access.

2.1.7.8 Post-reclamation Monitoring and Maintenance

No changes to currently authorized methods and procedures for post-reclamation monitoring and maintenance are proposed. Following the end of exploration activities, berm and sign maintenance, site inspections, and other necessary monitoring for the period of reclamation responsibility would be conducted. Monitoring of revegetation success would be conducted annually until the revegetation standards have been met, as determined by the BLM and the NDEP. Revegetation monitoring would occur based on seasonal growth patterns, nearby reference area vegetation patterns, precipitation, and weather conditions. Noxious weed monitoring would be undertaken in conjunction with revegetation monitoring.

2.1.7.9 Measures to be taken during Extended Periods of Non-Operation

No changes to currently authorized measures are proposed. The standard operating schedules at the HC/CUEP would be up to 24 hours a day, 365 days a year. No temporary or interim closures of the exploration program are planned. However, due to weather conditions, mechanical or technical difficulties, unfavorable economic conditions, litigation, severe seismic events, or other unforeseen events, activities may have to be temporarily ceased.

In the event that continuous operation is interrupted due to economic considerations or unforeseen circumstances, care and maintenance may be initiated as outlined below:

- Roads: The major roads would receive maintenance, as necessary.
- Erosion Control Measures: All erosion control measures and BMPs would be regularly inspected and maintained.

Per NAC 519A.320(2), Barrick would notify the BLM and the NDEP Bureau of Mining Regulation and Reclamation in writing within 90 days after any project suspension that is anticipated to last longer than 120 days. Barrick would identify the nature and reason for the suspension, the duration of the suspension, and the events expected to result in either resumption of exploration or the abandonment of the exploration project.

2.2 Waste Rock Facility Alternative

Waste rock excavated from the twin declines and exploration drifts would be placed in a new waste rock facility developed adjacent to the Horse Canyon Haul Road (**Figure 2-2**). The Waste Rock Facility Alternative would include the portal pad, an extension of the stormwater diversion around the portal pad, a waste rock facility, and a lined contact collection pond for collection of stormwater from the lined PAG containment area on the waste rock facility. The location for the 40 acres of surface disturbance for the Waste Rock Facility Alternative (the portal pad and waste rock facility) is in the NW1/4 SE1/4, SW1/4 SE1/4, and NE1/4 SW1/4, Section 8, T 26 N., R 48 E., Mount Diablo Base & Meridian, Nevada.

The Waste Rock Facility Alternative would require the reallocation of 40 acres of previously authorized surface disturbance (Table 2-2). Haul truck traffic to and from the Cortez Hills Mine would not occur. Applicant-committed EPMs listed in Section 2.1.1 are included under the Waste Rock Facility Alternative.

The HC/CUEP waste rock disposal facility has been designed to store approximately 1.75 million tons of waste rock along the west side of the Horse Canyon Haul Road within the authorized HC/CUEP Plan boundary. The Waste Rock Facility Alternative has been designed in compliance with the ARMPA (BLM 2015d) and the Barrick Nevada Sage-Grouse BEA (DOI et al. 2015). The 40 acres proposed for the Waste Rock Facility Alternative are within the area covered by the BEA. Barrick has complied with the ARMPA and the BEA by designing the Waste Rock Facility Alternative to be within non-habitat for the greater sage-grouse and more than four miles from the nearest lek.

During the excavation of the portal pad and development of the underground exploration declines, approximately 1,050,000 tons of non-acid generating waste rock would be placed as the base of the HC/CUEP waste rock facility. As the underground exploration targets are reached, an estimated 700,000 tons of mixed non-acid generating and PAG waste rock would be placed on top of the non-acid generating waste rock. Both the non-acid generating and PAG sections of the HC/CUEP waste rock facility would be constructed to final reclaimed slopes no steeper than 2.5H:1V.

The interface between the non-acid generating and PAG portions of the HC/CUEP waste rock facility would be lined with an impervious geomembrane liner to capture precipitation that comes in contact with the PAG waste. This captured precipitation (contact water) would be channeled to a lined collection pond designed to contain runoff from the 25-year, 24-hour storm event. Contact water from the PAG waste rock would be collected and trucked to the lined Mill #1 water storage reservoirs and then conveyed to the Pipeline Mill, as needed for make-up water.

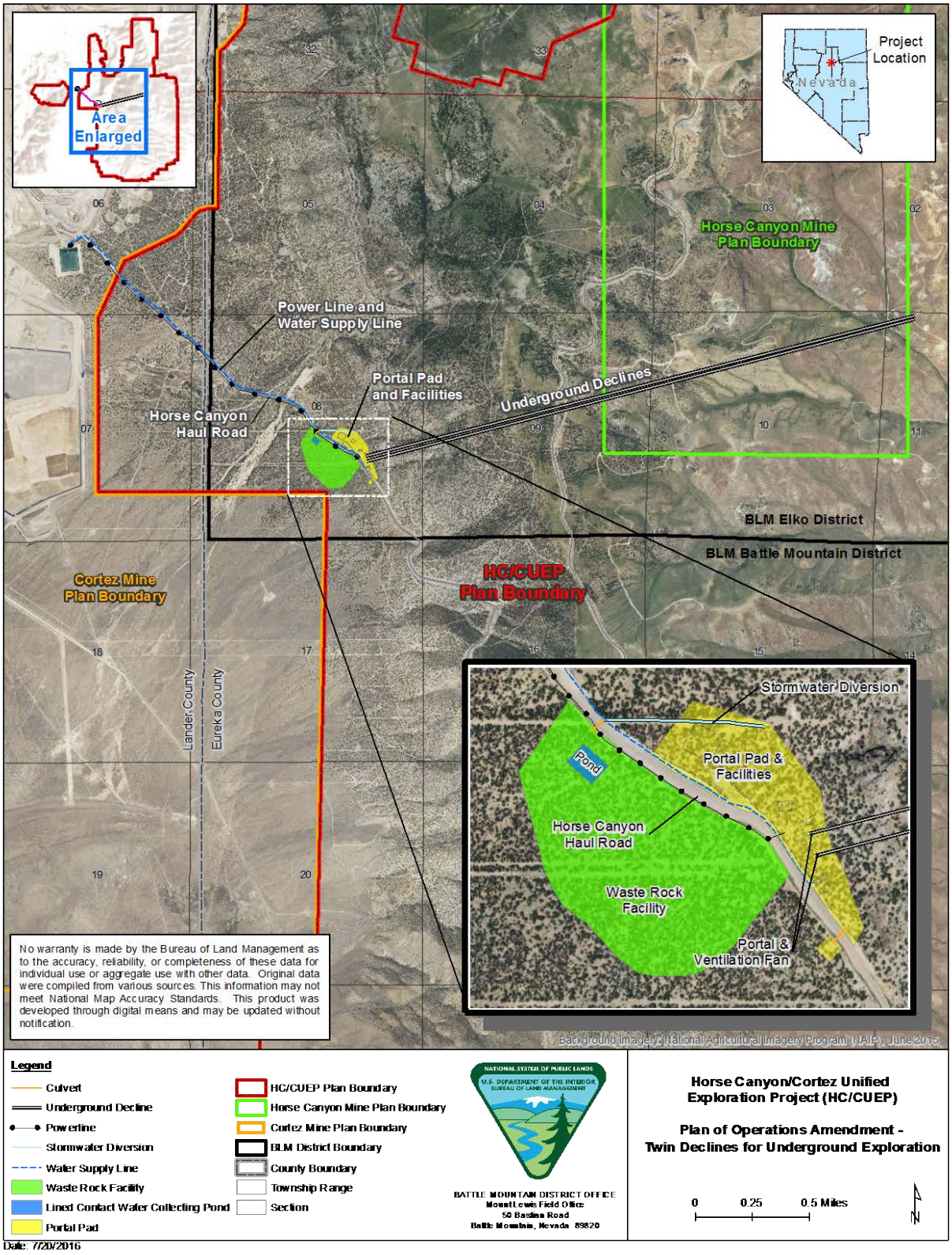
If ore-grade material is encountered, it would be excavated and placed on the lined ore/PAG transfer pad at the portal pad designed to satisfy the requirements of NAC 445A.438 for later shipment to an off-site processing facility. The ore-grade material would not increase currently authorized off-site haulage amounts established in *Barrick Cortez Inc. (NVN-067575 [14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application* (SRK 2015).

Table 2-2 Summary of Authorized and Proposed Surface Disturbance (Acres) – Waste Rock Facility Alternative

Disturbance Type	Authorized Disturbance Private	Authorized Disturbance Public	Authorized Disturbance Total	Waste Rock Facility Private	Waste Rock Facility Public	Waste Rock Facility Total	Total Acres Private	Total Acres Public	Total Acres
Drill Roads < 30% Underlying Slope	15	64	79	-	-13	-13	15	49	76
Drill Pads and Sumps < 30% Underlying Slope	15	72	87	-	-27	-27	15	45	60
Ancillary[1]	-	-	-	-	40	40	-	40	40

[1] Includes the portal pad, buildings, the ore/potential acid-generating (PAG) transfer pad, stormwater controls, power pole/guy wires, and waste rock facility.

Figure 2-2 Waste Rock Facility Alternative



2.3 No Action Alternative

Under the No Action Alternative, the BLM would not grant approval of the HC/CUEP Plan Amendment. Surface exploration and reclamation activities would continue as currently authorized. Underground exploration declines and associated supporting infrastructure would not be developed.

The No Action Alternative incorporates the applicant-committed EPMs identified in the 2015 HC/CUEP EA (BLM 2015b), which are also the Conditions of Approval in the BLM HC/CUEP Plan DRs (BLM 2015c, BLM 2015a).

2.4 Cumulative Effects: Past, Present, and Reasonably Foreseeable Future Actions

Cumulative effects are defined as "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 (RFFAs) regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Projects and actions considered in the cumulative effects analysis are defined for this EA as those past, present, and RFFAs that could interact with the Proposed Action in a manner that would result in cumulative effects. The past and present actions and RFFAs were described in detail in the Cortez Hills Expansion Project Final Environmental Impact Statement (FEIS) (BLM 2008c) and are updated for this EA analysis. These projects and actions are identified in Table 2-3.

The cumulative effects study area (CESA) may vary by resource. At a minimum, the CESA for all resources includes the HC/CUEP Plan boundary. Additional details for resource specific CESAs are described in resource sections of Chapter 3.0, as applicable. The period of potential cumulative impact is defined as 10 years, which includes the period of time the Proposed Action of underground exploration activities would occur, plus reclamation. The cumulative effects analysis in this EA tiers off of the analyses in the Cortez Hills FEIS (BLM 2008c) and the 2015 HC/CUEP EA (BLM 2015b).

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

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Mining Projects			
Black Rock Canyon Mine	117	0	117
Buckhorn Mine	820	0	820

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Clipper Mine	400	0	400
BCI Cortez Gold Mine (CGM) Operations Area	16,700	3,700	20,400
BCI Horse Canyon	698	0	698
BCI Robertson Mine	285	0	285
BCI Satellite Mine Southeast of Cortez Hills (1)	0	1,500	1,500
BCI Satellite Mine North - Northwest of Pipeline/South Pipeline (2)	0	1,500	1,500
Cortez Silver Mining District[1]	92	0	92
Elder Creek Mine	143	0	143
Fox Mine	4	0	4
Greystone Mine	242	0	242
Grey Eagle Project	5	0	5
Hot Springs Sulfur Mine	5	0	5
Klondex Fire Creek Mine	335	0	335
May Mine	1	0	1
Mill Canyon	18	0	18
Mud Spring Gulch	10	0	10
South Silicified Project	31	0	31
Utah Mine and Camp	6	0	6
Other Mining Projects[2]	87		87
Subtotal	19,999	6,700	26,699
Exploration			
Notices BLM-BMD Office: 118 expired, 8 pending, and 30 authorized[3]	265	0	265
Plans (7) BLM-BMD Office[3]	306	0	306
Notices (10) BLM-Ely Field Office[3]	50	0	50
BCI CGM Operations Area	391	0	391

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
BCI Cortez Underground Exploration Project	5	0	5
BCI HC/CUEP	549	0	549
BCI West Pine Valley	150	0	150
BCI West Side	0	200	200
CGM Operations Area	0	600	600
BCI Hilltop Exploration/Mine	92	0	92
BCI Pipeline/South Pipeline/Gold Acres Exploration Project	50	0	50
BCI Robertson Project	12	0	12
Coral Resources Robertson Mine Exploration	22	0	22
Dean Mine	67	0	67
Fire Creek Exploration/Underground Project	50	0	50
Mud Springs	0	10	10
Robertson Exploration Project	194	0	194
South Roberts	0	3	3
Toiyabe Project	20	0	20
Uhalde Lease	100	0	100
Mill Canyon Exploration	250	0	250
Other Mining Exploration[4]	25	1,620	1,645
Subtotal	2,598	2,433	5,031
Utilities/Community			
State Route 306 (100 feet wide)	327	0	327
Gravel Roads in Crescent Valley (50 feet wide)	1,370	0	1,370
Dirt Roads in Crescent Valley (30 feet wide)	644	64	708
Power lines in Crescent Valley (60 feet wide)	364	0	364

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
BCI Fiber Optic Cable (20 feet wide)[5]	53	0	53
BCI Jeremy's Knob Communications Tower and right-of-way (ROW)[6]	0.9	0	0.9
Towns of Crescent Valley and Beowawe[7]	900	0	900
Subtotal	3,658.9	64	3,722.9
Other Development and Actions			
BLM Fuels Reduction Projects[8]	6,541	0	6,541
Wildfires[9]	90,099	0	90,099
Recreation[10]	0	0	0
Livestock[11]	10	53	63
Agriculture Development[12]	9,750	0	9,750
BCI Additional Irrigation Pivots at Dean Ranch	0	640	640
Lodge at Pine Valley[13]	30	0	30
Crescent Valley Water Supply	2	0	2
BCI Cottonwood Infiltration Basins	104	0	104
Subtotal	106,536	693	107,229
Total	**132,792**	**9,890**	**142,682**

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

[2] Includes projects by McEwen Gold and Pyramid Lake/Rye Patch Gold.

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

[4] Barrick Cortez Exploration, Nu Legacy Gold, and 777 Minerals, Inc.

[5] ROW from the Lodge at Pine Valley to BCI Control #3. ROW length is approximately 24 miles.

[6] BCI facility located in T28N, R47E, just north of the CGM Operations Area; ROW N-092170

[7] Surface disturbance associated with the towns of Crescent Valley and Beowawe is 640 and 160 acres, respectively, with approximately 100 acres of private developed land on the periphery.

[8] Inclusive of acreage associated with the Crescent Valley Wildland Urban Interface Fire Defense System, Tonkin Hazardous Fuels Reduction Project, Red Hills Hazardous Fuels Reduction Project, and the Greater sage-grouse applicant-committed EPM. Of the total acreage, planned prescribed burns would affect up to 2,537 acres of pinyon-juniper woodland, and 800 acres of pinyon-juniper woodland would be thinned. The HC/CUEP Greater sage-grouse applicant-committed EPM accounts for future treatment of 900 acres of encroaching pinyon-juniper.

[9] Reflects acreage of vegetation affected by wildland fires from 1998 through 2006. The acreage is inclusive of approximately 22,918 acres of fire-affected pinyon-juniper woodland.

[10] Surface disturbance associated with recreation activities have not been quantified.
[11] Surface disturbance associated with proposed livestock water use is assumed to be twenty water rights at 0.5 acre per water right (20 X 0.5 = 10 acres) and 43 acres for fencing and cattle guards. The 4,313 acres previously included as proposed livestock activities (BLM 2008c; BLM 2015b) inadvertently included surface occupancy instead of actual surface disturbance.
[12] Surface disturbance associated with agricultural development is based on the acreage under irrigation and assumes that a change in vegetation and habitat equates to surface disturbance. Acreage values were based on a February 15, 1998, special hydrographic abstract for Hydrographic Basin No. 054 from the NDWR. These values are based on permitted or authorized use of water and may not reflect actual use in a given year.
[13] This facility is located on the JD Ranch Road approximately 4 miles west of State Route 278 at the BCI-owned JD Ranch. The facility provides accommodations for up to 300 workers.
Source: BLM 2008c, BLM 2015b.

3.0 Affected Environment and Environmental Consequences

This chapter describes the environment affected by the Proposed Action and alternatives, the anticipated direct and indirect effects of the Proposed Action and alternatives, as well as potential cumulative effects. The analysis of potential effects of the Proposed Action and the Waste Rock Facility Alternative incorporates implementation of the applicant-committed EPMs from the June 2015 HC/CUEP EA DR (BLM 2015a) (**Appendix A**), plus additional measures identified in this EA. The analysis of potential effects of the No Action Alternative also incorporates the applicant-committed EPMs. Protection measures identified for individual resources in response to anticipated effects of the Proposed Action and the Waste Rock Facility Alternative are discussed within each resource section, as applicable.

For resources where direct or indirect effects are identified, the Proposed Action is considered with other past and present actions and RFFAs to assess the potential for cumulative effects. The area considered in the cumulative effects analyses may differ by resource. At a minimum, the cumulative analysis includes past and present surface disturbance within the HC/CUEP Plan boundary. Past, present, and reasonably foreseeable future exploration and mining projects within a 30-mile radius (including all or portions of Crescent Valley, Grass Valley, and Pine Valley) are also included. A list of past, present, and RFFAs is included as Table 2-3. The period of potential cumulative impact is defined as approximately 10 years, plus two additional years for final reclamation.

As defined in 40 CFR 1508.8, direct effects are those that are caused by the action and occur at the same time and place. Indirect effects are caused by the action, but are removed in time and place. The context of effects is defined by the action and the scope of the analysis. Effects may be short term (also referred to as temporary) or long term in duration, and may be localized or regional in extent. Short-term effects generally occur for a short period at a specific place. Long-term effects may be defined as lasting the life of a project or beyond. Effects are also described by level of intensity – and definitions of levels of effect are provided by resource. An impact is considered to be major if it would result in a substantial change to the environment. An impact is considered moderate or minor if it would not result in a substantial environmental change, but could still have some effect. The determination of intensity varies for each resource and the context of the specific action. In contrast to no impact, a negligible impact is one that would occur, but at the lowest limits of detection. When available, the analysis applies quantitative thresholds to determine the level of intensity. Other issues have been analyzed qualitatively.

3.1 General Setting

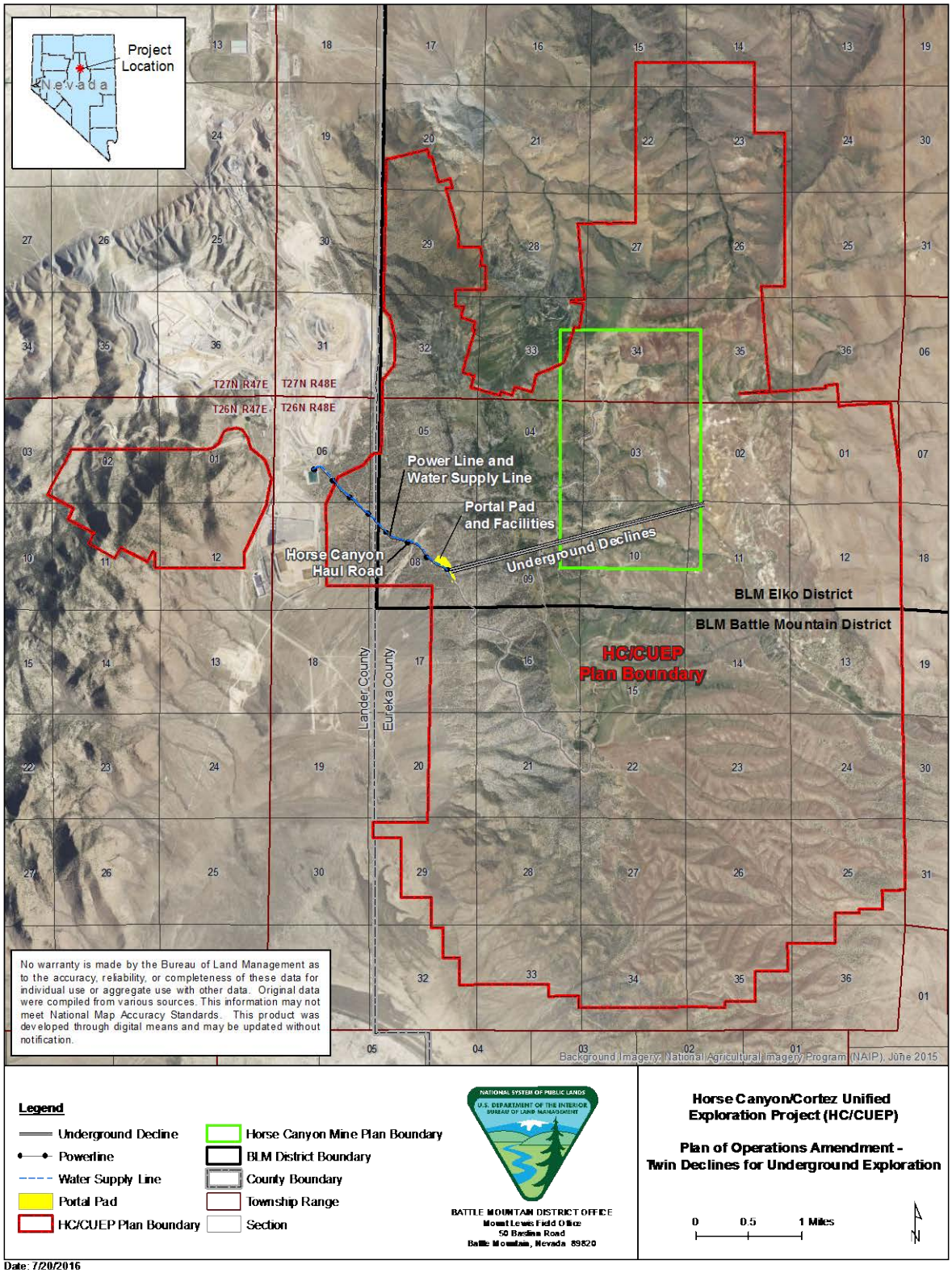
The HC/CUEP area principally lies along the east side of the Cortez Mountains in Eureka and Lander counties, Nevada. A small portion of the HC/CUEP area extends to the western flank of the Cortez Mountains. Current exploration activities within the HC/CUEP Plan boundary have been centralized in the Horse Canyon area. Understanding the exploration history is important when considering surface disturbance associated with HC/CUEP activities. Pre-1981 roads

created in the HC/CUEP area are not part of the existing 420 acres (as of March 2016) of HC/CUEP surface exploration disturbance.

The Cortez Hills Mine is to the northwest of the HC/CUEP Plan boundary, separated by the lower and middle flanks of Mount Tenabo. The Horse Canyon Haul Road, which connects the Cortez Mill #1 area to the former Horse Canyon Mine, is authorized under the Cortez Mine Plan (NVN-067575) and the Horse Canyon Mine Plan (NVN-066879). Additional surface disturbance authorized by the Horse Canyon Mine Plan includes open pits, a waste rock disposal facility, and supporting roads. **Figure 3-1** shows the Proposed Action area within the HC/CUEP Plan boundary, and relative to the Horse Canyon Mine Plan boundary, overlaid on National Agriculture Imagery Program (NAIP) imagery dated June 23, 2015.

The Proposed Action would result in the reallocation of 12 acres of surface disturbance currently authorized within the HC/CUEP Plan boundary to support the underground exploration project. The trace of the declines would cross underneath the boundary of the Horse Canyon Mine Plan of Operations which is also overlain by the HC/CUEP Plan boundary. Because there would be no surface disturbance associated with the underground excavation of the declines and exploration drifts and the declines are within the HC/CUEP Plan boundary, there would be no need to modify the Horse Canyon Mine Plan of Operations. Therefore, the Proposed Action is consistent with BLM's Surface Management Regulations found at 43 CFR 3809.

Figure 3-1 General Setting



3.2 Supplemental Authorities/Resources Considered for Analysis

The BLM's NEPA Handbook H-1790-1 (BLM 2008a) and Nevada Instruction Memorandum (IM) 2009-030, Change 1, require that NEPA documents address specific elements of the environment that are subject to requirements specified in statute, regulation, or Executive Order (EO) (i.e., supplemental authorities). **Table 3-1** lists the supplemental authorities that must be addressed in all environmental analyses.

Table 3-2 includes other resources deemed appropriate for evaluation by the BLM. These tables indicate whether an element or resource was analyzed in the EA, and the location in this chapter where the element or resource is addressed. The elements and resources that do not occur in the HC/CUEP area or would not be affected based on BLM internal scoping are not discussed further in this EA. The elimination of non-relevant elements complies with the CEQ policy.

Table 3-1 Supplemental Authorities to be Considered

Resource	Supplemental Authority	Not Present	Present/Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Air Quality Resources	Clean Air Act (CAA), as amended (42 USC 7401 et seq.); Section 176(c) CAA – General Conformity			x	3.14
Areas of Critical Environmental Concern (ACEC)	FLPMA (43 USC 1701 et seq.)	x			Would not be affected. No ACECs occur in the HC/CUEP vicinity.
Cultural Resources	National Historic Preservation Act, as amended (16 USC 470)			x	3.12
Environmental Justice	EO 12898 "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations" (2/11/1994)	x			Based on a review of existing baseline data, no minority or low-income groups would be disproportionately affected by health or environmental effects as a result of implementation of the Proposed Action. This element is not present within the project area or

Table 3-1 Supplemental Authorities to be Considered

Resource	Supplemental Authority	Not Present	Present/Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
					vicinity and is not further analyzed in this EA.
Farm Lands (prime or unique)	Surface Mining Control and Reclamation Act of 1977 (SMCRA) (30 USC 1201 et. seq.); Farmland Protection Policy Act (7 USC 4202 et. seq.)	x			Would not be affected. No prime or unique farm lands occur in the HC/CUEP vicinity.
Floodplains	EO 11988, as amended "Floodplain Management" 5/24/77	x			Would not be affected. Proposed activities would not alter natural floodplains; project area occurs within Zone C (low risk).
Forests and Rangelands (Healthy Forest Restoration Act [HFRA] only)	Healthy Forests Restoration Act of 2003 (P.L. 108-14B)	x			Would not be affected. HC/CUEP does not meet the requirements to qualify as a HFRA project.
Human Health and Safety (Herbicide Projects)	EO 13045 "Protection of Children from Environmental Health Risks and Safety Risks"		x		The project may use herbicides in accordance with Barrick's authorized noxious weed management plan (**Appendix A**); however, EO 13045 would not apply as pesticides and herbicides would not be used in locations where children would be exposed.
Migratory Birds	EO 13186 "Migratory Birds," Migratory Bird Treaty Act (16 USC 703-711)			x	3.10
Native American Traditional Cultural Resources	American Indian Religious Freedom Act of			x	3.13

Table 3-1 Supplemental Authorities to be Considered

Resource	Supplemental Authority	Not Present	Present/Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
	1978 (42 USC 1996)				
Noxious Weeds, Invasive, and Non-native Species	EO 13112, Invasive Species, 2/3/99			x	3.6
Threatened and Endangered Species (Plants and Animals)	Endangered Species Act of 1973, as amended (16 USC 1531)	x			No federally listed species or habitat occur in HC/CUEP Plan boundary.
Wastes, Hazardous, or Solid	SMCRA; Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended (42 USC 9615)			x	3.15
Water Quality, Surface/Groundwater	Safe Drinking Water Act, as amended (42 USC 300f et. seq.); Clean Water Act of 1977 (33 USC 1251 et seq.)			x	3.5
Wetlands/Riparian Zones	EO 11990 “Protection of Wetlands” 5/24/77		x		Authorized applicant-committed EPMs provide that Barrick would not conduct new surface disturbing activities within riparian or wetland areas without authorization from the BLM.
Wild and Scenic Rivers	Wild and Scenic Rivers Act, as amended (16 USC 1271)	x			Would not be affected. No wild and scenic rivers occur within the HC/CUEP Plan boundary or in the vicinity.
Wilderness/Wilderness Study Areas (WSAs)/lands of	FLPMA (43 USC 1701 et seq.);	x			Would not be affected. Wilderness or WSAs are not present within the

Table 3-1 Supplemental Authorities to be Considered

Resource	Supplemental Authority	Not Present	Present/Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
wilderness characteristics	Wilderness Act of 1964 (16 USC 1131 et. seq.)				project area or vicinity. The BLM conducted a lands with wilderness characteristics inventory of the project area on September 10, 2014, and determined there are no lands with wilderness characteristics in the project area. These elements are not further analyzed in this EA.

Table 3-2 Other Resources of the Human Environment

Other Resources	Not Present	Present/Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Fish and Wildlife			x	3.9
Grazing Management			x	3.11
Land Use Authorization		x		Would not be affected. No new ROWs are proposed.
Geology			x	3.3
Noise		x		Analysis in 2015 HC/CUEP EA was completed due to proximity of active leks. Proposed Action occurs outside the 4-mile buffer from leks; additional baseline or analysis is not warranted. No issues or regulations related to noise for underground activities. Noise is not carried forward for further analysis in this EA.
Paleontological Resources			x	3.4
Recreation			x	3.17
Social and Economic Values			x	3.18
Soils			x	3.8
Special Status Plant Species		x		No habitat for special status plants would be affected by proposed project activities.

Other Resources	Not Present	Present/Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Special Status Fish and Wildlife Species			x	3.10
Vegetation			x	3.6
Forestry and Woodland Resources			x	3.7
Visual Resources			x	3.16
Wild Horses and Burros	x			Would not be affected. HC/CUEP is outside the boundaries of designated herd management areas.

3.3 Geology

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to geologic resources. The assessment area for direct and indirect effects on geologic resources includes the HC/CUEP Plan boundary. The CESA was defined in the Cortez Hills EIS (BLM 2008c) as including a 30-mile radius – it is incorporated by reference. Cumulative effects in this EA are considered relative to the list of past, present, and RFFAs shown in Table 2-3.

3.3.1 Affected Environment Geology

The regional geology of the HC/CUEP area and a geologic cross-section of the declines are shown in **Figure 3-2**. The geology in the HC/CUEP area includes a relatively complex sedimentary sequence of Paleozoic-aged rocks. Paleozoic sedimentary rocks are the dominant geologic formations throughout the area and have undergone a history of sedimentation and deformation. During the early Paleozoic Era, clastic and carbonate rocks were deposited in a shallow marine environment on the western continental margin of North America. These marine clastic rocks (referred to as the Western Assemblage) were deposited in the deep water to the west, while carbonate rocks (referred to as the Eastern Assemblage) were deposited in the shallow water to the east (Stewart 1980). The formations associated with the Western Assemblage are predominantly siliceous with very little carbonate, while formations associated with the Eastern Assemblage are predominantly carbonate (Gilluly and Masursky 1965).

During the Late Devonian and Early Mississippian geologic periods, sedimentary deposition was interrupted, and the Paleozoic sediments were uplifted, folded, and faulted during a tectonic event referred to as the Antler Orogeny. The Roberts Mountain Thrust, a system of low-angle thrust faults which created major deformation of the Paleozoic rocks, is the main structural expression of the Antler Orogeny. Movement along the Roberts Mountain Thrust resulted in the displacement of the Western Assemblage up to 90 miles eastward over the Eastern Assemblage (Stewart 1980). As a result, the Western Assemblage occurs in the upper plate of the thrust, while the Eastern Assemblage occurs in the lower plate of the thrust (Gilluly and Masursky 1965).

Within the Eastern Assemblage (lower plate), the Ordovician-age dolomites and limestones of the Hanson Creek Formation are the deepest-lying units of interest, overlain by Silurian-age calcareous siltstones and dolostones of the Roberts Mountains Formation. The Devonian-age Wenban Formation, composed of impure carbonate rocks, overlies the Roberts Mountains Formation. The Devonian-age Horse Canyon Formation overlies the Wenban Formation, and comprises siliclastic and calcareous clastic rocks.

The Ordovician-age Vinini Formation, the stratigraphically lowest member of the Western Assemblage (upper plate), unconformably overlies the Horse Canyon Formation.

The structural architecture created by the Antler Orogeny accommodated the emplacement of the Jurassic-aged Mill Canyon stock: a composite stock predominantly of quartz monzonite composition. The Mill Canyon stock intrudes the lower plate carbonate sedimentary rocks providing additional ground preparation and a local heat source for later mineralizing fluids. Gilluly and Masursky (1965) describe two parts of the stock: (1) a discordant, rectangular shape along the western lobe and (2) a laccolithic or bysmalithic eastern lobe.

Tertiary basalt flows, up to 200 feet thick, occur in the Cortez Mountains. During the late Tertiary and Quaternary periods, continual uplift and erosion of the mountains have partially filled the basins with unconsolidated to poorly consolidated silt, sand, gravel, and boulders. The boundary between the mountains and the valley margins generally is covered by coalescing alluvial fan deposits, whereas the centers of the valleys are dominated by finer-grained alluvium deposited by ephemeral streams and in playas (Stewart 1980). Alluvial sediments filling the valleys in north-central Nevada typically are thousands of feet thick. The alluvial sediments in Pine Valley are expected to be similar in thickness (BLM 2011b). The generalized stratigraphic sequence of the HC/CUEP area is summarized below.

Strategraphic Sequence

Tertiary-Quaternary alluviums (Qa) – Alluvial, colluvial, terrace, pediment, and landslide deposits (Wells and Elliott 1971, Gilluly and Masursky 1965).

Tertiary basalt (Tb) – Tertiary extrusive basaltic andesite overlying Tertiary gravels and forming a cuesta dipping gently to the southeast. The basaltic andesite is intruded and overlain by Tertiary rhyolite porphyry in some locations (Wells and Elliott 1971, Gilluly and Masursky 1965).

Tertiary tuffs and gravels (Ttf and Tg) – Gravels of dominantly upper-plate lithology having variable percentages of clay-altered volcanics, with interbedded, variably clay-altered tuffs that underlie the Tertiary basalt. Occasionally present at or near the surface where the basalt is absent.

Jurassic quartz monzonite (Jqm) – The Mill Canyon stock is a composite stock with an older porphyritic quartz phase, a magnetite-bearing phase, and a phaneritic (coarse-grained) phase. Mineral composition consists of biotite, feldspars, and quartz with minor magnetite. The composition of the Mill Canyon stock ranges from quartz monzonite to granodiorite.

Ordovician Vinini Formation (Ovi) – Upper-plate unit with sequences of siltstone and shale interbedded with fine-grained chert, sandstone, and quartzite that are generally extensively sheared, carbonaceous siliciclastics (Gilluly and Masursky 1965).

Devonian Horse Canyon Siltstones (Dhc) – A lower-plate unit consisting of largely calcareous siltstones, which are readily silicified to the extent that they appear similar to siliciclastics of the upper plate. Dhc is a principal host of gold in the project area and in other mines in the district, including the Horse Canyon and Cortez Hills mines. Four sub-units are noted, of which Unit 3 is the most commonly observed and is a primary gold host. Unit 3 is a weakly calcareous, thinly planar-laminated siltstone between 50 and 400 feet thick, the lower portion of which commonly contains thin interbeds of siliceous siltstone. The Horse Canyon/Wenban contact is interpreted to be structural based on outcrop observations and drill intercepts, likely representing a major movement plane during the Antler Orogeny and subsequent Mesozoic deformation.

Devonian Wenban Limestone (Dw) – The Wenban Limestone is a dark-grey, thick-bedded, bioclastic limestone that is interbedded with thin-bedded argillaceous weathering slabby limestone (Gilluly and Masursky 1965). Dw is another primary host of gold in the project area. Eight sub-units of the Wenban Limestone have been characterized. Of these, the most important gold-host horizon is Unit 5, a sequence of thinly laminated silty limestone interspersed with turbidites/debris flows. Evidence for mineralized zones deeper in the Wenban section (Units 4 and 3) is observed in scattered drilling but available data at those depths are limited.

Silurian Roberts Mountains Formation (Srm) – The Roberts Mountains Formation is a homogeneous, black, pyritic, laminated, silty, graptolitic limestone composed of approximately 80 percent calcite, 15 percent quartz, 5 percent potassium feldspar, and less than 1 percent muscovite (Gilluly and Masursky 1965). It lies conformably below the Wenban Limestone (Gilluly and Masursky 1965).

Ordovician Hanson Creek Formation (Ohc) – Comprised of an upper and lower fine-grained dolomite member with a middle member of siliceous limestone; lower dolomite is dark gray to black, the middle limestone is massive and light gray, and the upper dolomite is massive and light gray with fossils in the upper-most beds (Gilluly and Masursky 1965).

Ordovician Eureka Quartzite (Oe) – The Eureka Quartzite is a light gray to white, medium to thick bedded quartzite with lenses of dolomite sandstone. (Gilluly and Masursky 1965).

Cambrian Hamburg Dolomite (Ch) – The Cambrian Hamburg Dolomite is a thick uniform sequence of light to dark gray, thin to medium parallel-bedded dolomite sandstones. This unit lies unconformably below the Eureka Quartzite (Gilluly and Masursky 1965).

3.3.1.1 Alteration and Mineralization

The two major types of alteration are silicification and argillization. Alteration in the Dw Unit 5 is dominated by a thick stratiform silica-sulfide breccia (50 to 150 feet). The breccia shows features typical of collapse brecciation (angular clasts, graded cavity fill, etc.) and commonly contains clasts of mafic dike material. Decarbonitization occurs in large parts of the middle Dw, resulting in

solution collapse and subsequent strong silicification. Carbonate units frequently show strong decarbonitization and argillization above and below the breccia horizon, with remobilized carbon and fine-grained sulfides replacing carbonate minerals with little or no replacement silica present.

The mineralization is typical Carlin-style. The breccia horizon in the Dw Unit 5 is variably sulfidized; sulfide enrichment appears to be directly correlatable to gold grade. The replacement-style alteration can locally host high grade gold (>0.25 ounce/ton), particularly at the Horse Canyon/Wenban contact and in the middle Dw.

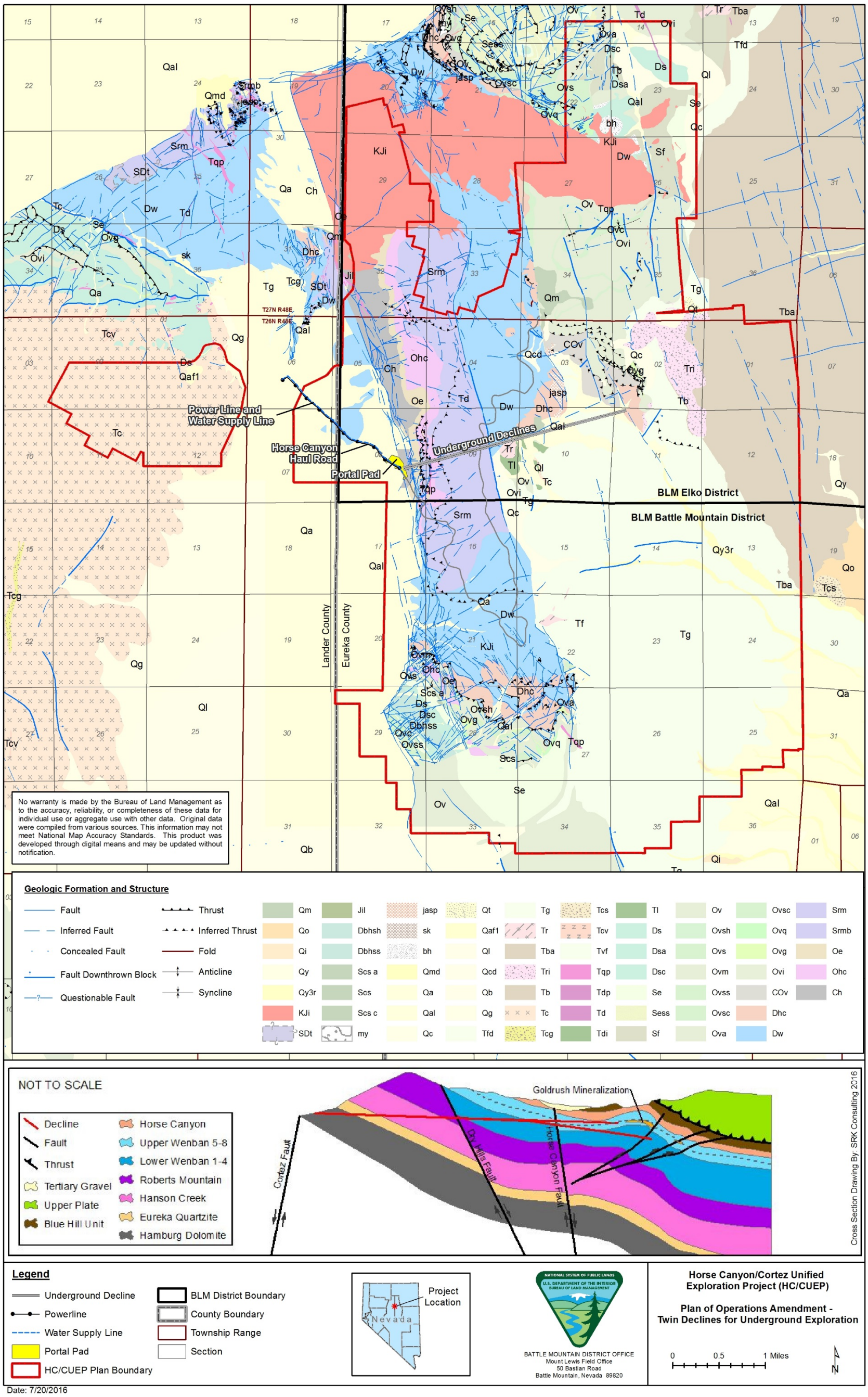
The mineral resources within the HC/CUEP area and the adjacent West Pine Valley Plan of Operations (NVN-077213) area are collectively referred to as the Barrick Goldrush Project.

Based on surface exploration conducted to date, Barrick has defined the following mineral resources for the Barrick Goldrush Project, based on a gold price of $1,300 per ounce, as reported in the Barrick 2015 Annual Report:

Measured and Indicated	8.557 million ounces
Inferred	1.647 million ounces

The underground exploration is designed to allow further definition of the mineral resource.

Figure 3-2 Geology and Cross-section of Declines



3.3.1.2 Waste Rock Characterization

Geochemical characterization of waste rock that would be generated from the proposed construction of exploration declines was completed. Testing was conducted on samples of relevant materials following BLM and NDEP guidance for rock characterization (ITASCA 2016a). Geologic strata encountered by construction would include the Cambrian Hamburg Dolomite (12 percent), Ordovician Eureka Quartzite (8 percent), Ordovician Hanson Creek dolomite (22 percent), Silurian Roberts Mountain Limestone (8 percent), and Devonian Wenban limestone (50 percent). Additional exploration activities proposed to occur in the vicinity of the terminus of the declines would produce waste rock of primarily the Devonian Wenban limestone, but may also include some intrusive rock (ITASCA 2016a). Supporting technical information is included in two technical memoranda prepared by ITASCA, which are included in the project record available at the BLM BMD office.

A supplemental drilling program is planned to confirm site-specific characterization data from three lithologic units: the Cambrian Hamburg dolomite (Ch), the Ordovician Eureka Quartzite (Oe), and the Ordovician Hanson Creek Dolomite (Ohc) (ITASCA 2016b). These strata are anticipated to comprise the westernmost portion (12 percent Ch, 8 percent Oe and 22 percent Ohc, respectively) of the declines.

3.3.2 Environmental Consequences Geology

Information regarding geologic resources was compiled from available geologic maps and regional literature, and geotechnical analyses. Field testing and laboratory testing was conducted to aid in the classification of geologic types and properties. Predictions about effects to geologic resources were based on previous experience of projects of similar scope and characteristics. Analysis of the intensity of effects to geologic resources were derived from the available information, best professional judgment, and previous project investigations.

Effects Context for Geology

Localized: Effects would be limited to the project area.

Regional: Effects would extend beyond the project boundary.

Duration: Because geologic resources are essentially non-renewable, effects would be permanent.

Intensity of Effects Definitions for Geology

Negligible: A change to geologic resources would occur, but the change would be so slight as to not be detectable.

Minor: A change to geologic resources would occur, but the change would be small and limited to resources within the project boundary.

Moderate: A change to geologic resources would occur and would be readily detectable. Additional mitigation measures would likely be needed to offset adverse effects, but would likely be successful.

Major: A change to geologic resources would occur that would have substantial consequences. Extensive mitigation measures would be needed to offset any adverse effects, and the success would not be guaranteed.

3.3.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Construction of the twin declines would affect geologic resources by removing approximately 1.75 million tons of waste rock, which would alter components of the current geologic structure. The declines would begin at approximately 6,625 feet in elevation and extend approximately 17,430 feet to a final elevation of 5,940 feet.

Waste rock removed from the twin declines would be transferred to the existing Cortez Hills Mine Canyon Waste Rock Facility. Use of this waste rock facility by HC/CUEP activities would be authorized by an amendment to the current BCI (NVN-067575 [14-1A]) Plan of Operations and Reclamation Permit #0093 (SRK 2016). Approximately 1,050,000 tons of non-acid generating waste rock would be excavated. Non-PAG waste rock would be placed in the Cortez Hills Mine Canyon Waste Rock Facility.

If any PAG material is encountered, it would be excavated and placed on a lined ore/PAG transfer pad at the portal pad for relocation to the Cortez Hills Mine Canyon Waste Rock Facility. The lined transfer pad would meet the requirements of NAC 445A.438. The lined transfer pad would be reclaimed by excavating the remaining above-liner materials and liner and hauling these materials to the Cortez Hills Mine Canyon Waste Rock Facility for burial in an appropriate location. Approximately 700,000 tons of mixed non-acid generating and PAG waste rock would be generated. The Cortez Hills Mine Canyon Waste Rock Facility is permitted to contain 1.2 billion tons of waste rock and would be comprised primarily of limestone from the Cortez Hills open pit (83.5 percent) (Geomega 2014). There would be adequate capacity to buffer any PAG material from the HC/CUEP underground exploration project.

Distinct waste rock units would be sampled quarterly and subjected to meteoric water mobility procedure and acid base accounting tests. Based on the results, any localized areas of acid-generating waste rock would be placed internal to the Cortez Hills Mine Canyon Waste Rock Facility and encapsulated or blended with acid-neutralizing waste rock prior to placement (BLM 2008c).

The analysis for the Cortez Hills Mine Canyon Waste Rock Facility was completed in the Cortez Hills FEIS (BLM 2008c) and is incorporated by reference. Reclamation of the Cortez Hills Canyon

Waste Rock Facility would be completed according to the *Barrick Cortez Inc. (NVN-067575 [14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application* (SRK 2015).

Construction of the twin declines and exploration drifts would result in 1.75 million tons of waste rock. The change would be localized, permanent, and minor, in that it represents a relatively small portion of the geologic strata.

3.3.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

The same amount of waste rock removed under the Proposed Action would be removed in this alternative, 1.75 million tons. The waste rock would be placed at a waste rock disposal facility adjacent to the Horse Canyon Haul Road, thus not requiring the use of the Cortez Hills Mine Canyon Waste Rock Facility. Quarterly sampling of distinct waste rock units as described for the Proposed Action would occur under the Waste Rock Facility Alternative. An amendment to the BCI (NVN-067575 [14-1A]) Plan of Operations and Reclamation Permit #0093 (SRK 2016) would not be required.

Construction of the twin declines and exploration drifts would result in 1.75 million tons of waste rock. The change would be localized, permanent, and minor, in that it represents a relatively small portion of the geologic strata.

3.3.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue to occur as currently authorized. Geologic resources in the HC/CUEP Plan boundary would not be affected.

3.3.2.4 Cumulative Effects

The CESA boundary for geology was defined in the Cortez Hills FEIS (BLM 2008c) and is incorporated by reference. It considers the list of projects in Table 2-3.

Proposed Action

Effects to geologic resources from construction of the twin declines would be localized. Cumulative effects would be moderate and permanent. Effects to geologic resources from other past, present, and RFFAs would be subject to applicant-committed EPMs, mitigation measures, and reclamation requirements from site-specific decisions.

Waste Rock Facility Alternative

Effects to geologic resources from construction of the twin declines and waste rock facility would be localized. Cumulative effects would be moderate and permanent. Effects to geologic resources from other past, present, and RFFAs would be subject to applicant-committed EPMs, mitigation measures, and reclamation requirements from site-specific decisions.

No Action

There would be no direct or indirect effects to geologic resources under the No Action Alternative. Therefore, cumulative effects would not occur.

3.4 Paleontological Resources

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to paleontological resources. The analysis of direct and indirect effects includes the HC/CUEP Plan boundary. The CESA was defined in the Cortez Hills Expansion Project FEIS (BLM 2008c); it includes the past, present, and RFFAs included in Table 2-3.

3.4.1 Affected Environment Paleontological Resources

Paleontological resources identified on public lands are considered by the BLM as a fragile and nonrenewable scientific record of the history of life on earth and, therefore, are considered to represent an important and critical component of America's natural history. Once damaged, destroyed, or improperly collected, their scientific and educational value may be reduced or lost forever. In addition to their scientific, educational, and recreational values, paleontological resources can be used to inform land managers about interrelationships between biological and geological components of ecosystems over long periods of time (BLM 2015e).

BLM Manual H-8270 directs the management of paleontological resources on lands administered by the BLM. To be considered significant, a paleontological resource must retain integrity and satisfy at least one of the following criteria:

- Effects to unique or site-specific invertebrate, vertebrate, or paleobotanical fossils.
- Effects to scientifically significant or critical fossil resources requiring protection under FLPMA and BLM Manual H-8270.

The Paleontological Resources Preservation Act (PRPA), which was signed into law on March 30, 2009, authorizes the BLM to manage and provide protection to paleontological resources using scientific principles and expertise. The PRPA defines paleontological resources as "any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth."

The BLM has adopted the Potential Fossil Yield Classification (PFYC) system to identify and classify fossil resources on federal lands (BLM 2007). Paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability of

finding paleontological resources can be broadly predicted from the geologic units present. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

The PFYC system provides for classification of geologic units based on the relative abundance of vertebrate fossils or scientifically important fossils (plants, vertebrates, and invertebrates) and their sensitivity to adverse effects. A higher class number indicates higher potential. The PFYC system is not intended to be applied to specific paleontological localities or small areas within units. Although important localities occasionally may occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; rather, the relative abundance of significant localities is intended to be the major determination for the class assignment. The PFYC system provides baseline guidance for predicting, assessing, and mitigating paleontological resources. Descriptions of the potential fossil yield classes are summarized below.

Class 1 – Igneous and metamorphic geologic units (excluding tuffs) that are not likely to contain recognizable fossil remains.

Class 2 – Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically important non-vertebrate fossils.

Class 3 – Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence.

Class 4 – Geologic units are Class 5 units that have lower risks of human-caused adverse effects or lower risk of natural degradation. Proposed ground disturbing activities would require assessment to determine whether significant paleontological resources occur in an area of proposed disturbance.

Class 5 – Highly fossiliferous geologic units that regularly and predictably produce vertebrate fossils or scientifically important non-vertebrate fossils and are at high risk of natural degradation or human-caused adverse effects.

3.4.2 Environmental Consequences Paleontological Resources

Information on paleontological resources was compiled from BLM documentation and other relevant literature, and resource experts. The potential for effects on paleontological resources was inferred based on geologic strata present and the effects to each strata.

Adverse effects to paleontological resources would occur if excavation activities encounter fossils, resulting in mechanical breakdown and/or loss of the material for scientific purposes.

Effects Context for Paleontological Resources

Localized: Effects would be limited to the project area.

Regional: Effects would extend beyond the project boundary.

Duration: Because geologic and paleontological resources (rock formations, fossil-bearing strata, fossils, and subsurface materials) are essentially non-renewable, effects would be permanent.

Intensity of Effects Definitions for Paleontological Resources

Negligible: Effects on paleontological resources would be small and not of perceptible consequence. Geologic strata yielding little information on paleontological potential would be encountered. None to few fossils would likely be encountered by the proposed activities.

Minor: Effects would occur to geologic strata considered to possibly yield information on paleontological potential, yet effects to fossils would be minimized with applicant-committed EPMs. There would be a low probability of effects to fossils due to ground-disturbing activities; none to few fossils would likely be encountered by the proposed activities.

Moderate: Effects on paleontological resources would occur, and may occur over a relatively large area. Effects to fossils due to ground-disturbing activities would be predicted; several to many fossils may be impacted.

Major: Effects on paleontological resources would occur, and would substantially change the geologic characteristics over a large area. There is a high probability of intercepting fossils during ground-disturbing activity; many fossils would likely be lost.

3.4.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Reallocating 12 acres of previously authorized surface disturbance to support underground exploration activities is not likely to affect significant paleontological resources. The Tertiary-age alluvial gravel and sand deposits and Quaternary deposits of valley alluvium, alluvial fans flanking the mountains, playa, talus, and landslide deposits are considered unlikely to produce vertebrate or invertebrate fossils.

Geologic strata affected by construction of the declines would include the Cambrian Hamburg Dolomite, Ordovician Eureka Quartzite, Ordovician Hanson Creek Dolomite, Silurian Roberts Mountain Limestone, and Devonian Wenban Limestone (ITASCA 2016a). Additional exploration activities proposed to occur in the vicinity of the terminus of the declines would produce waste rock of primarily the Devonian Wenban Limestone, but may also include some intrusive rock.

Both the Cambrian Hamburg dolomite and the Ordovician Hanson Creek Dolomite would likely rate as Class 2 in the PFYC system because of the diagenetic alteration they have undergone in changing from limestone to dolomite. With the exception of corals, fossils are extremely rare in

the metamorphic Ordovician Eureka Quartzite (Duncan 1956), likely giving it a rating of Class 2. Silurian Roberts Mountain Limestone (Merrian and McKee 1976) and Devonian Wenban Limestone (Gilluly and Masursky 1965) likely contain a more diverse collection of invertebrate fossils than the quartzite, however the potential for preservation in the HC/CUEP area is low because of the deformation to which the strata have been subjected. These limestone deposits would likely rate as Class 2 in the PFYC system.

The development of the twin declines and exploration drifts could result in direct effects to paleontological resources, however, the geologic strata affected have little potential for vertebrate fossils to occur. According to the Cortez Hills FEIS (BLM 2008c), no vertebrate fossil localities were confirmed through literature searches, BLM paleontological inventories, or queries to other paleontologists; the potential for the occurrence of vertebrate fossils in the study area was considered low (BLM 2008c). The cumulative assessment study area for Cortez Hills considered a 30-mile radius, which incorporates the HC/CUEP Plan boundary.

The currently authorized paleontological applicant-committed EPM would continue to be implemented, which states, if Barrick discovers a vertebrate fossil deposit during surface disturbing activities, Barrick would immediately cease further activities that may affect the deposit and notify the BLM so that the BLM may evaluate the discovery and establish an exclusion zone. Barrick would not undertake any further surface disturbance within the exclusion zone.

Adverse effects may occur if unanticipated fossils are encountered during excavation activities. However, due to the low probability of encountering fossils in the geologic strata disturbed by underground exploration and with implementation of the paleontological applicant-committed EPM, effects on paleontological resources would be localized, and negligible to minor. Any effects would be permanent.

3.4.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Placement of the waste rock facility adjacent to the Horse Canyon Haul Road would not affect paleontological resources. Adverse effects may occur if unanticipated fossils are encountered during excavation activities. However, due to the low probability of encountering fossils in the geologic strata disturbed by underground exploration and with implementation of the paleontological applicant-committed EPM, effects on paleontological resources would be localized, and negligible to minor. Any effects would be permanent.

3.4.2.3 No Action

Surface exploration and reclamation activities would continue to occur as currently authorized, including implementation of the applicant-committed EPM to protect paleontological resources. Effects to paleontological resources are not anticipated under this alternative.

3.4.2.4 Cumulative Effects

The CESA for paleontological resources defined in the Cortez Hills FEIS (BLM 2008c) is incorporated by reference. It considered a 30-mile radius that included the HC/CUEP Plan boundary.

Proposed Action

The potential for the occurrence of vertebrate fossils in HC/CUEP is low. The cumulative analysis conducted in the Cortez Hills FEIS (BLM 2008c) found that the potential for invertebrate fossils to occur in the region is low. Cumulative effects as a result of the Proposed Action would be localized, and negligible to minor. Any effects would be permanent.

Waste Rock Facility Alternative

The potential for effects to paleontological resources is the same as for the Proposed Action. Cumulative effects would be localized, and negligible to minor. Any effects would be permanent.

No Action

Direct or indirect effects to paleontological resources are not anticipated under the No Action Alternative. There would be no cumulative effects.

3.5 Water Resources

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to water resources, including surface water resources (streams, seeps/springs, and wetlands) and groundwater resources. The analysis of potential direct, indirect, and cumulative effects to surface water resources includes the evaluation of water quality and quantity for surface water features found within the HC/CUEP Plan boundary. For groundwater, the direct and indirect analysis area includes two principal hydrogeologic units: the basin fill unit and the carbonate bedrock lower-plate unit. The CESA for groundwater incorporates the hydrologic study area used for a conceptual groundwater flow model, which includes Carico Lake Valley, Crescent Valley, Grass Valley, and Pine Valley hydrographic areas, and includes the Pipeline Complex Mine and the Cortez Hills Complex Mine (ITASCA 2016c).

3.5.1 Affected Environment Water Resources

The HC/CUEP Plan boundary encompasses portions of the Crescent Valley Hydrographic Area (number 54), the Pine Valley Hydrographic Area (number 53), and the Grass Valley Hydrographic Area (number 138) as defined by the NDWR (**Figure 3-3** HC/CUEP Hydrographic Areas, Weather Stations, and Stream Flow Monitoring Stations).

Mount Tenabo marks the intersection of these three hydrographic areas, separating Crescent Valley to the north, Grass Valley to the southwest, and Pine Valley to the east. Both the Crescent Valley and Pine Valley hydrographic areas are part of the Humboldt River Region (Hydrographic Region 4). Grass Valley is part of the Central Region (Hydrographic Region 10) (NDWP 1999).

As is typical in the Basin and Range Province, the HC/CUEP area is dominated by mountain block watersheds that drain onto broad alluvial fans and valley fills. Drainages in HC/CUEP are described below, and are shown on **Figure 3-3** HC/CUEP Hydrographic Areas, Weather Stations, and Stream Flow Monitoring Stations.

The northern portion of the HC/CUEP area drains into Crescent Valley. Canyons in this area include Fourmile Canyon, Mill Canyon, Cortez Canyon, and Copper Canyon. Crescent Valley is bordered by the Shoshone Range on the west, the Cortez Mountains and Dry Hills on the east and northeast, and the Toiyabe Range on the south. The northwestern portion of the valley opens up to the floodplain of the Humboldt River (Zones 1961). Unconsolidated sediments have accumulated in Crescent Valley as a result of erosion and transportation of sediment from mountain streams. Flow volumes from mountain streams diminish rapidly due to percolation of water into the alluvium. This results in few streams reaching the valley playas except during high levels of runoff (Zones 1961). Runoff in Crescent Valley does not drain into the Humboldt River except during unusually high precipitation events. Underflow from Crescent Valley to the Humboldt River is believed to be small and limited to the extreme northern portion of the valley (Zones 1961).

The eastern slopes of the HC/CUEP area drain into Pine Valley, with the primary drainages being Horse Creek, Willow Creek, and their tributaries. Pine Valley is a semi-enclosed basin that is bounded on the west by the Cortez Mountains, on the east by the Sulfur Springs and Pinion ranges, and on the south by the Simpson Park and Roberts mountains. Runoff into Pine Valley is low and most of Pine Creek is maintained by groundwater discharge from springs (Eakin 1961). Pine Creek flows north and drains into the Humboldt River (Eakin 1961).

The western and southern slopes of the HC/CUEP area drain into Grass Valley. Grass Valley is a closed basin, both topographically and hydrologically (Everett and Rush 1966). The Toiyabe Range forms its western boundary and the Cortez Mountains forms its northern boundary. As with Pine Valley and Crescent Valley, much of the streamflow into Grass Valley is absorbed by the alluvium. No streams from the Cortez Mountains reach the playa in the valley bottom (Everett and Rush 1966).

The quantity of surface water in the HC/CUEP area is relatively limited due to the low annual precipitation and the dry climate that promotes evaporation. Within the Pine Valley Hydrographic Area, the Horse Creek weather station recorded a total of 15.02 inches of precipitation in the Horse Canyon area in 2015 (IML Air Science 2015a). Within the Grass Valley Hydrographic Area, the Cortez Hills weather station recorded a total of 14.79 inches of precipitation in the Cortez area in 2015 (IML Air Science 2015b). At both stations, most of the precipitation occurred from March to June/July and September to December, with August and mid-winter being drier seasons.

Station locations are shown on **Figure 3-3** HC/CUEP Hydrographic Areas, Weather Stations, and Stream Flow Monitoring Stations.

Nevada 303(d) List

The NDEP implements the Clean Water Act (CWA) in Nevada, with oversight from the Environmental Protection Agency (EPA). Every 2 years, Nevada conducts a comprehensive analysis of water quality data associated with Nevada's surface waters to determine whether state surface water quality standards are being met and designated uses are being supported. The analysis lists waters requiring a Total Maximum Daily Load (TMDL) for various parameters which may adversely affect the health of the waterbody. The results of the latest analysis are compiled in the Nevada 2014 Water Quality Integrated Report (NDEP 2015), which was prepared in accordance with the requirements of sections 303(d)/305(b)/314 of the CWA. The report covers an assessment period of October 1, 2007 through September 30, 2012. Classified waterbody segments in or near HC/CUEP are described below.

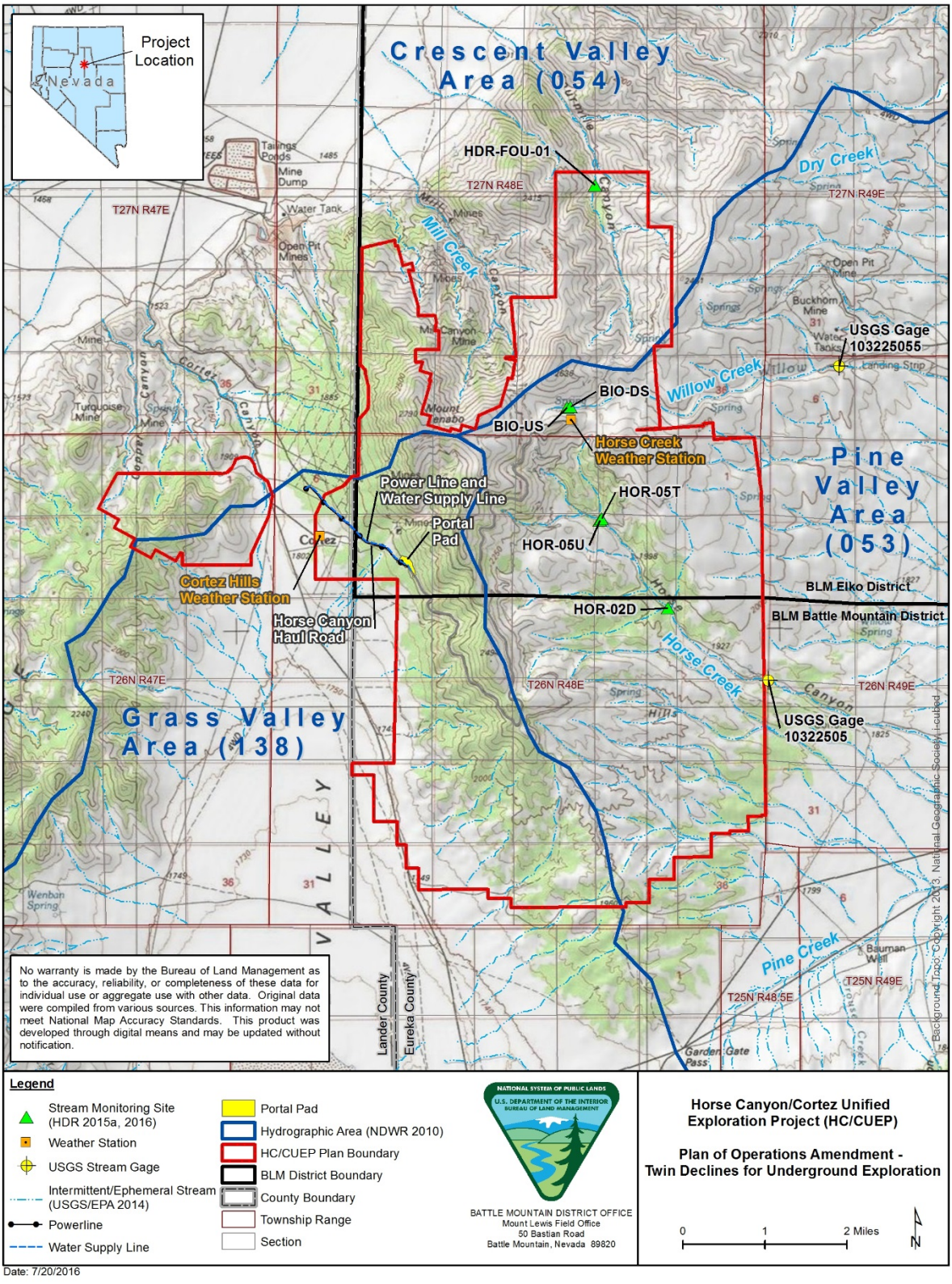
Willow Creek is classified as Category 5 for 15 miles from its origin to Pine Creek, below the Buckhorn Mine (Waterbody ID NV04-HR-83_00) (NDEP 2015). A portion of this segment, where the stream originates, is located in the HC/CUEP area. A Category 5 designation means that available data indicate that at least one designated use is not being supported and a TMDL is needed. Specifically, use for municipal or domestic supply is impaired for this segment of Willow Creek due to total dissolved solids (TDS) levels. There is an assessment sampling station (WC1-BUCK), for which Barrick is listed as the sampling agency.

Pine Creek is classified as Category 3 for a 32.5-mile segment from its origin to the confluence with Dry Creek (Waterbody ID NV04-HR-55_00) (NDEP 2015). The headwaters of this segment are located to the southeast of the HC/CUEP area. Horse Creek flows out of the HC/CUEP area and into this segment of Pine Creek. (Note that this is the “Dry Creek” that is located in the Sulphur Springs Range, and is not the “Dry Creek” near the HC/CUEP area to the north of the Willow Creek drainage.) A Category 3 designation means that there is insufficient information or data are lacking to make a determination as to whether the waterbody supports any of the beneficial uses.

Floodplains

The Federal Emergency Management Agency (FEMA) mapped the entire site as being within a non-shaded Zone C. This zone is described as “areas of minimal flooding” (SRK 2013).

Figure 3-3 HC/CUEP Hydrographic Areas, Weather Stations, and Stream Flow Monitoring Stations



3.5.1.1 Surface Waters

Surface water features within the HC/CUEP Plan boundary have been inventoried and monitored, and a monitoring and sampling program has been developed. An initial comprehensive baseline study report entitled *Horse Canyon/Cortez Unified Exploration Project 2013 Surface Water Baseline Study* (HDR 2014) documented the following study components: stream monitoring and sampling, a seep/spring reconnaissance survey, seep/spring monitoring and sampling, and wetland delineations. Subsequent annual monitoring and sampling events were completed in 2014 and 2015 (HDR 2015a, HDR 2016). Information presented below is summarized from the 3 years of reports. The complete reports are included in the project record.

Streams

There are no perennial streams within the HC/CUEP area. Three drainages of HC/CUEP include segments that exhibit seasonal (intermittent) flow from isolated springs, and short-term seasonal runoff from snowmelt or winter storms: Horse Creek and Willow Creek, both in the Pine Valley Hydrographic Area; and Fourmile Canyon, which occurs in the Crescent Valley Hydrographic Area (HDR 2014). Within the Grass Valley Hydrographic Area on the west side of HC/CUEP, there are short ephemeral drainages that convey flow from infrequent, intense storm events.

Barrick Stream Monitoring Stations

Barrick maintains six stream monitoring stations within the HC/CUEP Plan boundary. Streams and station locations are shown in **Table 3-3** (HDR 2014, HDR 2015a, HDR 2016) and are displayed on **Figure 3-3** HC/CUEP Hydrographic Areas, Weather Stations, and Stream Flow Monitoring Stations.

Surface water monitoring and sampling activities at each stream monitoring station within the HC/CUEP Plan boundary included the following (HDR 2014, HDR 2015a, HDR 2016):

- Stream flow measurements
- In-situ field water quality parameters
- Grab sample for laboratory analysis
- Site photographs
- Documentation of notable conditions or significant disturbance to the area

The following in-situ field/physical parameters were collected (HDR 2014, HDR 2015a, HDR 2016):

- Temperature (degrees Celsius [°C])
- Dissolved oxygen (milligrams per liter [mg/L])
- pH (standard units [s.u.])
- Conductivity (micromhos per centimeter [µhos/cm]/microSiemens per centimeter [µS/cm] (HDR 2014); milliSiemens per centimeter [mS/cm] (HDR 2015a, HDR 2016))
- Salinity (%)

- Oxidative reduction potential (millivolts [mV])
- TDS (mg/L)

Table 3-3 HC/CUEP Plan Boundary Stream Monitoring Stations

Site ID	Group/Drainage	Northing/Easting[1] UTM, NAD83, Zone 11	Location Description
HOR-02D	Horse Canyon	4442123 / 540350	Mouth of Horse Canyon Creek
HOR-05T	Horse Canyon	4443817 / 539102	Upstream of confluence with Horse Canyon Creek, downstream of road crossing
HOR-05U	Horse Canyon	4443836 / 539017	Upstream of the confluence with Horse Canyon Creek tributary
BIO-US	Willow Creek	4446048 / 538369	Upstream of Willow Creek bioreactor
BIO-DS	Willow Creek	4446065 / 538438	Downstream of Willow Creek bioreactor
HDR-FOU-01	Fourmile Canyon	4450408 / 538921	Near midpoint along Fourmile Canyon Creek and immediately upstream of the second large tributary

[1] UTM = Universal Transmercator; NAD83 = North American Datum 1983

In 2013, measurements of turbidity, stream velocity, channel dimension, and depth-to-water measurements (for volume measurements as cubic feet) were also collected, which allows for flow calculations (HDR 2014). In 2014 and 2015, the average turbidity was recorded and flow was calculated, if possible (HDR 2015a, HDR 2016). Stream flows recorded at HC/CUEP from 2013 through 2015 are shown in **Appendix B** for each drainage group.

During the 2013 monitoring, HOR-05U was the only location that exhibited flow during every monitoring event. Water was present and samples were collected at BIO-US and BIO-DS for most of the monitoring events in 2013. These sites were not monitored during December since they were not accessible. HDR-FOU-01 was established after the July 2013 monitoring event. The HDR-FOU-01 site did not have water present during the 2013 monitoring events (HDR 2014).

During the 2014 monitoring, HOR-05U was the only location that exhibited flow during every monitoring event. HOR-02D was dry except in January, February, May and June and HOR-05T was dry except in January through May. Water was present and samples were collected at BIO-US and BIO-DS for most of the monitoring events in 2014, but these sites were not monitored in January through April because they were not accessible. Water flow at both BIO-US and BIO-DS never exceeded 1 gpm; only a trickle was present for a majority of the 2014 monitoring events.

Water was present at HDR-FOU-01 in April and May. Water flow at HDR-FOU-01 was highest in April and measured 6 gpm (HDR 2015a).

Water was present at HOR-05U January through May; HOR-05T was dry except in January, February, and December; and no flow was observed at HOR-02D during the 2015 monitoring events. Water flow at HOR-05U and HOR-05T was too low to measure during each of the 2015 monitoring events when water was present. A visible trickle was observed and water flow was recorded to be 0.45 gpm (0.001 cubic feet per second). Water was present and samples were collected at BIO-US and BIO-DS March and May through October, but BIO-US and BIO-DS were not monitored in January, February, April, November, or December because they were not accessible due to snowpack. Water flow at both BIO-US and BIO-DS never exceeded 1 gpm; only a trickle of flow was present for a majority of the 2015 monitoring events. No water was available for sampling at HDR-FOU-01 in 2015 (HDR 2016).

Tabular results from the stream water quality sampling effort are included in the study reports available in the project record. Samples collected during the events from May to August 2013 were analyzed for NDEP Profile I constituents, not including total phosphorus. Samples collected during the events from September to December 2013 were analyzed for NDEP Profile II constituents, including total phosphorus and total recoverable metals. None of the 2013 samples were analyzed for weak acid dissociable (WAD) cyanide with the exception of the BIO-US and BIO-DS monitoring sites, which were analyzed for WAD cyanide for the May through August 2013 sampling events. Analysis for WAD cyanide was discontinued for the future 2013 monitoring events (HDR 2014). Samples collected during the 2014 and 2015 monitoring events were analyzed for NDEP Profile II constituents, including total phosphorus and total recoverable metals (HDR 2015a, HDR 2016).

The surface water monitoring events did not detect water quality physical parameters or laboratory analytical results that consistently exceeded reference values. Some exceptions were recorded, but these values were determined as either similar to historic background levels, or as slight deviations from secondary standards and are not considered a threat to human health or the environment. The annual results by drainage group are summarized below.

Horse Creek Group

2013

All physical parameters measured for the samples collected from the Horse Canyon sites were within the NDEP reference values, with the exceptions of pH levels in HOR-02D, HOR-05U, and HOR-05T. However, the lab and field pH readings were never both out of range (either below or above the range) for the same sampling period (HDR 2014).

All major ions, nutrients, and non-metals concentrations in samples collected from the Horse Canyon monitoring stations were reported within NDEP reference values. The concentrations of dissolved arsenic were reported above the NDEP reference values for samples collected from HOR-02D, HOR-05U, and HOR-05T, but this is consistent with what has been historically

reported for these locations and represents naturally occurring background levels. All other constituents of dissolved metals were reported within NDEP reference values (HDR 2014).

In September and December 2013, the samples collected from HOR-05U had reported total recoverable aluminum concentrations of 4.81 and 0.52 mg/L, respectively, which are above the EPA secondary standard for drinking water of 0.20 mg/L. The samples collected from HOR-05U had reported total recoverable iron concentrations of 6.85 and 0.61 mg/L, respectively, which are above the EPA secondary standard for drinking water of 0.30 mg/L. The samples collected from HOR-05U had reported total recoverable manganese concentrations of 0.28 and 0.09 mg/L, respectively, which are above the EPA secondary standard for drinking water of 0.05 mg/L. All other constituents of total recoverable metals were reported below the EPA secondary standards. Total recoverable metals have not been historically analyzed at the Horse Canyon monitoring stations (HDR 2014).

2014

All physical parameters measured for the samples collected from Horse Canyon sites were within NDEP reference values, with the exceptions of pH levels at HOR-02D, HOR-05T, and HOR-05U. At these sites, either the laboratory and or field pH reading was out of range, either below or above the range, but both readings were never out of range for the same sampling period (HDR 2015a).

All major ions, nutrients, and non-metals concentrations in samples collected from the Horse Canyon sites were reported within NDEP reference values. Dissolved arsenic was reported above the NDEP reference value for samples collected from HOR-02D, HOR-05U, and HOR-05T, but this is consistent with what has been historically reported for these locations and represents naturally occurring background levels. In January at HOR-02D, dissolved antimony was reported at 0.032 mg/L, which exceeds the NDEP reference value. In February 2014 at HOR-05U, dissolved aluminum and dissolved iron were reported exceeding reference values at 2.27 mg/L and 1.05 mg/L, respectively. All other constituents of dissolved metals were reported within NDEP reference values (HDR 2015a).

The only total recoverable metals that exceeded EPA secondary standards at these locations in 2014 were total recoverable aluminum, total recoverable iron, and total recoverable manganese. The only major anomaly of the concentrations of metals was at HOR-05U in February. The concentration of total recoverable aluminum, total recoverable iron, and total recoverable manganese were reported at 26.4 mg/L, 29.1 mg/L, and 1.02 mg/L, respectively. These concentrations are notably higher than what was reported at HOR-05U during previous events and at other Horse Canyon monitoring sites (HDR 2015a).

2015

All physical parameters measured for the samples collected from the Horse Canyon sites were within NDEP reference values, with the exceptions of pH levels at HOR-05U and HOR-05T. At

these sites during some months, the field pH reading was above the NDEP reference value range (HDR 2016).

In 2015, all major ions, nutrients, and non-metals concentrations in samples collected from the Horse Canyon monitoring sites were reported within NDEP reference values. The concentrations of dissolved arsenic were reported above the NDEP reference value for samples collected from HOR-05U and HOR-05T, but this is consistent with what has been historically reported for these locations and represents naturally occurring background levels (HDR 2016).

Total aluminum and total iron were reported exceeding EPA secondary standards at HOR-05T. Total aluminum, total iron, and total manganese were reported exceeding EPA secondary standards at HOR-05U (HDR 2016).

Willow Creek Group

2013

The levels of TDS reported at BIO-US and BIO-DS exceeded the NDEP reference value of 1,000 mg/L for the majority of the monitoring events in 2013. This is consistent with what was reported for each of these locations in 2012. The highest levels of TDS were reported in November 2013 with BIO-US at 2,330 mg/L and BIO-DS at 2,280 mg/L. All other physical parameters measured in 2013 were within NDEP reference values (HDR 2014).

Conductivity and TDS measured at the BIO-US and BIO-DS monitoring stations were higher than what was recorded at other monitoring stations. The highest conductivity readings were measured in November 2013 with BIO-US at 2,805 µhos/cm and BIO-DS at 2,756 µhos/cm. The remaining parameters were consistent with what was measured at other stations during the 2013 monitoring program (HDR 2014).

Stream flow at BIO-US was 13.46 gpm in June 2013. Flows at BIO-US and BIO-DS were not measurable for the remaining 2013 events, but enough water was present to sample these locations when the sites were accessible (HDR 2014).

Magnesium levels reported for all monitoring events in 2013 at BIO-US and BIO-DS were slightly above the NDEP reference level of 150 mg/L. Sulfate levels reported for all monitoring events in 2013 at BIO-US and BIO-DS were above the NDEP reference level of 500 mg/L but are consistent with historic levels (HDR 2014).

The BIO-US and BIO-DS stations were also monitored for WAD cyanide during the June, July, and August 2013 monitoring events. The level of WAD cyanide reported did not exceed NDEP Profile I reference values (HDR 2014).

The concentrations of dissolved arsenic were reported above the NDEP reference values for samples collected from BIO-DS in August and September 2013, but this is consistent with what has been historically reported for this location and represents naturally occurring background

levels. All other constituents of dissolved metals were reported within NDEP reference values. Concentrations of total recoverable aluminum were reported at 0.43 mg/L in the sample collected from BIO-US in September 2013, above the EPA secondary standard for drinking water of 0.20 mg/L. Total recoverable iron concentrations in samples collected from BIO-US were reported at 0.96 mg/L and 0.35 mg/L in September and October 2013, above the EPA secondary standard for drinking water of 0.30 mg/L. Total recoverable manganese concentrations were slightly above the EPA secondary standards in samples collected from BIO-US and BIO-DS in September, October, and November 2013. All other constituents of total recoverable metals were reported below the EPA secondary standards. Total recoverable metals have not been historically analyzed at the Willow Creek monitoring stations (HDR 2014).

The 2013 monitoring event did not detect water quality physical parameters or laboratory analytical results that consistently exceeded reference values. Some exceptions were recorded, but these values were determined as either similar to historic background levels, or as slight deviations from secondary standards and are not considered a threat to human health or the environment (HDR 2014).

2014

The levels of TDS reported at BIO-US and BIO-DS exceeded the NDEP reference value of 1,000 mg/L for all monitoring events in 2014, which is consistent with what was reported for each of these locations in 2012 and 2013. The highest levels of TDS measured for BIO-US was in December 2014 when field TDS was measured at 1,720 mg/L. The highest level of TDS measured for BIO-DS was in November 2014 when field TDS was measured at 1,719 mg/L. All other physical parameters were within NDEP reference values (HDR 2015a).

Magnesium and sulfate levels reported for all monitoring events at BIO-US and BIO-DS were above the NDEP reference value of 150 mg/L and 500 mg/L, respectively, but are consistent with historic levels. The concentration of dissolved arsenic for samples collected at BIO-US in September were reported at 0.011 mg/L, which is above the NDEP reference value. The concentration of dissolved arsenic at BIO-DS was reported exceeding the NDEP reference value for the samples collected in June, August, September, October, and November. Dissolved aluminum at BIO-DS was reported exceeding the NDEP reference value in the sample collected in June. All other constituents of dissolved metals were reported within NDEP reference values (HDR 2015a).

Total recoverable aluminum, total recoverable iron, and total recoverable manganese were reported exceeding EPA secondary standards collected from samples during various months in 2014 from BIO-US and BIO-DS (HDR 2015a).

2015

The levels of TDS reported at BIO-US and BIO-DS exceeded the NDEP reference value of 1,000 mg/L for all monitoring events in 2015. This is consistent with what was reported for each of these locations in 2012, 2013, and 2014. The highest level of TDS measured for BIO-US was in

October 2015 when field TDS was measured at 1,672 mg/L. The highest level of TDS measured for BIO-DS was in September 2015 when field TDS was measured at 1,648 mg/L. All other physical parameters were within NDEP reference values (HDR 2016).

In 2015, magnesium and sulfate levels reported for all monitoring events in 2015 at BIO-US and BIO-DS were above the NDEP reference values of 150 mg/L and 500 mg/L, respectively. The sulfate levels are consistent with historic levels. In March 2015, the nitrogen level at BIO-DS was reported at 15.5 mg/L, which is above the NDEP reference value of 10.0 mg/L. The concentration of dissolved arsenic was reported above the NDEP reference value in October at BIO-US. The concentration of dissolved arsenic at BIO-DS was reported exceeding the NDEP reference value for the samples collected in June, July, August, September, and October. All other constituents of dissolved metals were reported within NDEP reference values (HDR 2016).

Total aluminum, total iron, and total manganese were reported exceeding the EPA secondary standards collected from samples during the various months in 2015 from BIO-US and BIO-DS (HDR 2016).

Fourmile Canyon

As stated above, water was not present during the 2013 and 2015 monitoring events; therefore, no samples were collected (HDR 2014, HDR 2016). During the 2014 monitoring event, all physical parameters measured and all major ions, nutrients, and non-metals concentrations in samples collected from HDR-FOU-01 were reported within NDEP reference values. The concentrations of dissolved arsenic were reported above the NDEP reference values for all samples collected from HDR-FOU-01, but this is consistent with naturally occurring background levels and other sampling locations in the Fourmile Canyon area that are outside the HC/CUEP Plan boundary. All other concentrations of dissolved metals were reported within NDEP reference values (HDR 2015a).

Total recoverable aluminum and total recoverable iron were the only constituents of recoverable metals that exceeded EPA secondary standards. In May 2014, for HDR-FOU-01, both total recoverable aluminum and total recoverable iron exceeded secondary standards (HDR 2015a).

U.S. Geological Survey (USGS) Stream Monitoring Stations

USGS stream gauges were installed in April 2014 on Willow Creek and Horse Creek. They are identified as USGS Site Number 103225055 (Willow Creek at Allison Ranch), and USGS Site Number 10322505 (Horse Creek at Horse Canyon) (USGS 2014). Measurements from the USGS stream gauges include gage height and discharge (cubic feet per second), and are recorded continuously. Data are available to the public at the USGS website.

Seeps, Springs, and Wetlands

Wetlands are areas where saturation by water is the dominant factor controlling soil development and the vegetation growing at the site (Cowardin et al. 1979). Seep/spring features were

evaluated for the three criteria that define a wetland (soils, vegetation, and hydrology), as regulated by the CWA. Seeps and springs that met the wetland criteria were added to the seep/spring annual monitoring and sampling program (HDR 2014).

A total of 112 seep/spring features were monitored in 2013 to determine wetland status. Of these, a total of 65 seep/spring features were identified as wetlands and the remaining 47 were determined to not be wetlands. The 47 non-wetland seep/spring features were therefore not included in the sampling program (HDR 2014). In 2014, eight of the 65 seep/spring features were reassessed for wetland characteristics where previously a wetland was documented. These eight seep/spring features were evaluated in accordance with wetland delineation procedures. Of these eight seep/spring features, three were determined to be wetlands (HDR 2015b). Prior to the 2015 monitoring event, seven seep/spring features were removed due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events (HDR 2015c).

The seep/spring features have been organized into the following groups based on watersheds and geographic features: Dry Hills, Fourmile Canyon, Horse Creek, Mill Canyon, North Toiyabe Range West, Willow Creek, and Willow Springs. The 2013, 2014, and 2015 seep/spring monitoring sites are listed in **Appendix B**.

In 2013, 2014, and 2015 the seep/spring features within the HC/CUEP Plan boundary were monitored and sampled. When sufficient water was present, the following data were collected:

- Spring flow measurements (if water was present)
- In-situ field water quality parameters (described below, if water was present)
- Grab sample for laboratory analysis (if water was present)
- Site photographs
- Documentation of dominant vegetation, the presence of noxious and invasive plant species, and any notable conditions or significant disturbance to the area

The following in-situ field/physical parameters were collected (HDR 2014):

- Temperature (°C)
- Dissolved oxygen (mg/L)
- pH (s.u.)
- Conductivity (µhos/cm and µS/cm (HDR 2014, HDR 2015b), µhos/cm and mS/cm (HDR 2015b, HDR 2015c))
- Salinity (%)
- Oxidative reduction potential (mV)
- TDS (mg/L)
- NDEP Profile II

In 2013, turbidity, spring velocity, channel dimension, and depth-to-water measurements (for volume measurements as cubic feet) were also collected, which allowed for flow calculations (HDR 2014). In 2014 and 2015, the average turbidity was recorded and flow, if possible, was calculated (HDR 2015b, HDR 2015c).

Samples collected during the monitoring event were analyzed for NDEP Profile II constituents, including total phosphorus and total recoverable metals. None of the samples were analyzed for WAD cyanide (HDR 2014, HDR 2015b, HDR 2015c).

The 2013, 2014, and 2015 seep/spring monitoring sites and results are listed in **Appendix B**. Seep/spring monitoring sites and the number of sites sampled per year are shown in **Table 3-4**.

Table 3-4 Seep/Spring Monitoring Sites and Number of Sites Sampled per Year (2013, 2014, and 2015)

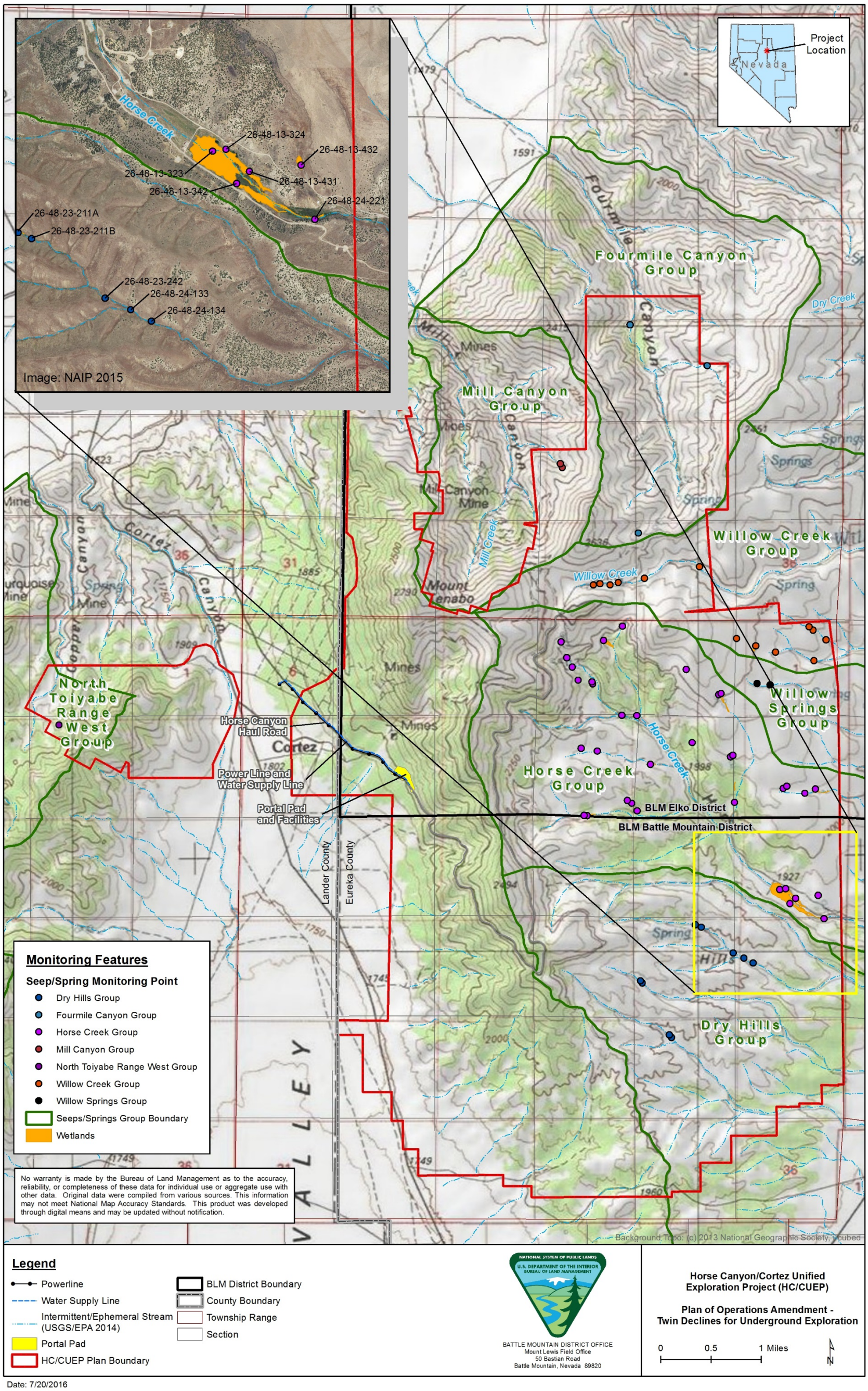
Site ID	Monitoring Sites/ Number Sampled* 2013	Monitoring Sites/ Number Sampled* 2014	Monitoring Sites/ Number Sampled* 2015
Dry Hills	9/0	9/0	9/0
Fourmile Canyon	3/2	3/3	3/2
Horse Creek	35/13	35/13	32/10
North Toiyabe Range West	1/0	1/0	0/0
Mill Canyon	2/2	2/2	2/1
Willow Creek	13/3	13/3	10/2
Willow Springs	2/0	2/0	2/0
Total	65/20	65/21	58/15

*Only sites that had water present were sampled for field/physical parameters.

Wetland areas associated with seep/spring features may include multiple seeps/springs that are accounted for individually in the sampling program. **Appendix B** presents a table of the wetland areas (associated with the seep/spring features) identified in the HC/CUEP area and associated acreages (HDR 2014, HDR 2015b, HDR 2015c). Wetlands that include more than one seep/spring location are indicated in **Appendix B** by including multiple site identification numbers within a wetland feature.

Figure 3-4 displays the seep/spring features and the wetland areas delineated in the HC/CUEP Plan boundary.

Figure 3-4 HC/CUEP Seep and Spring Features and Delineated Wetland Areas



Date: 7/20/2016

3.5.1.2 Groundwater

Precipitation in the mountain ranges and pediments that does not immediately evaporate either infiltrates directly into bedrock, primarily through fractures, or is conveyed by streams to lower elevations where the water percolates into the alluvial fans. Basin-wide groundwater recharge rates for Crescent Valley are estimated to average approximately 0.55 inches/year (Geomega 2007). For the southern portion of Pine Valley included in the Mount Hope Study Area, groundwater recharge rates are estimated to average approximately 0.90 inches/year (BLM 2011b). In western Pine Valley, groundwater in the mountain and alluvial fan areas generally flows to the east-southeast and then eventually turns northward following the Pine Creek drainage toward the Humboldt River.

Pine Valley and Crescent Valley are designated groundwater water basins (also referred to as Administered Groundwater Basins) according to the State Engineer. In these basins, permitted water use is equal to or exceeds the estimated average annual recharge or otherwise requires additional administration.

There are two principal hydrogeologic units in the HC/CUEP area: the basin fill unit and the carbonate bedrock lower-plate unit. The basin fill hydrogeologic unit is comprised of the alluvial, colluvial, terrace, pediment, and landslide deposits which comprise the Tertiary-Quaternary alluviums (Qa), the Tertiary basalt (Tb), the gravels of dominantly upper-plate lithology having variable percentages of clay-altered volcanics (Tertiary gravels) (Tg), and the interbedded, variably clay-altered tuffs (Ttf).

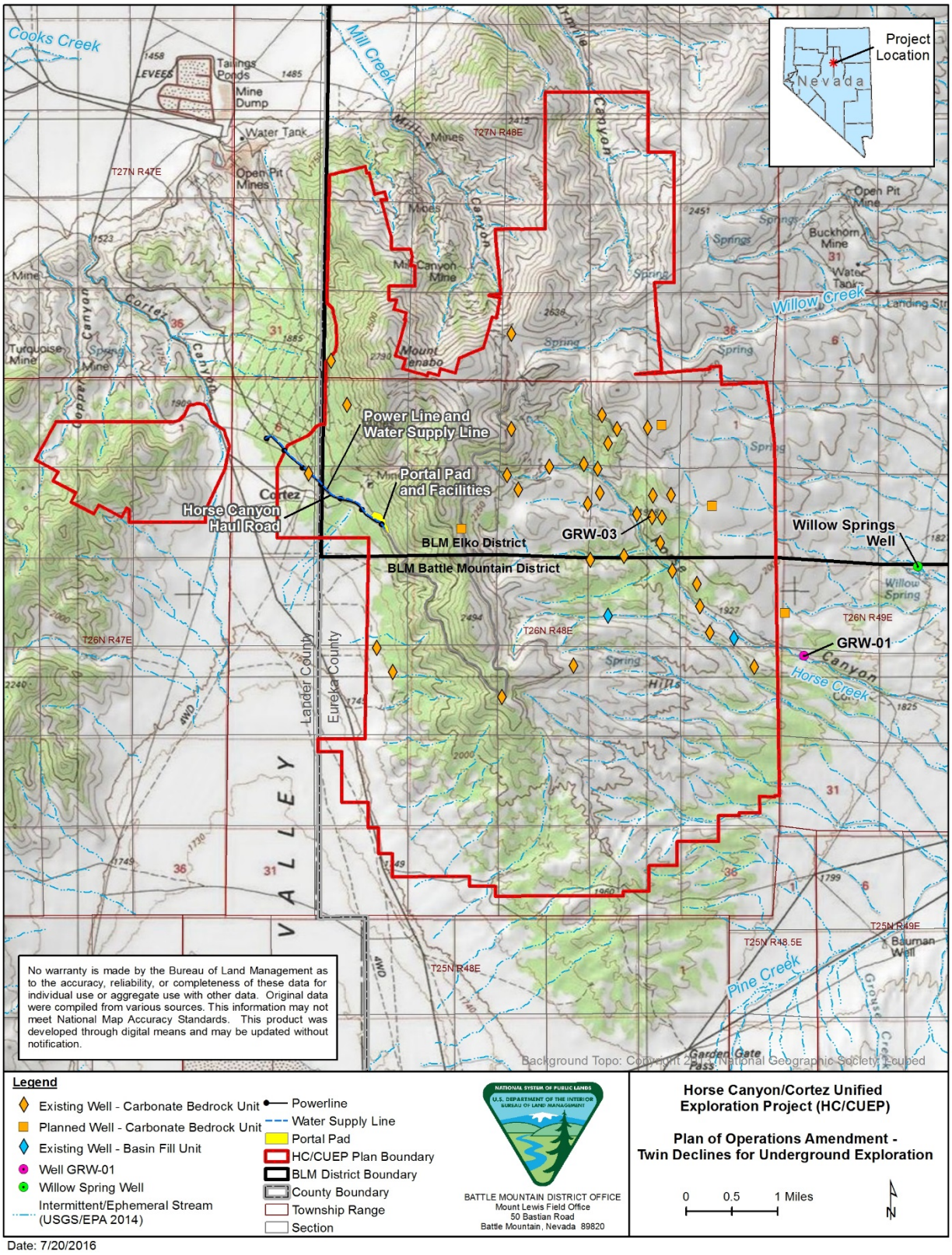
The carbonate bedrock lower-plate hydrogeologic unit is comprised of the Devonian Horse Canyon Siltstone (Dhc) which consists of largely calcareous siltstones, the Devonian Wenban Limestone (Dw) which is a dark-grey, thick-bedded, bioclastic limestone that is interbedded with thin-bedded argillaceous weathering slabby limestone, the Silurian Roberts Mountains Formation (Srm) which is a homogeneous, black, pyritic, laminated, silty, graptolitic limestone, and the Ordovician Hanson Creek Formation (Ohc) which is fine-grained massive dolomite with siliceous limestone.

There is also a siliceous bedrock upper-plate hydrogeologic unit in the HC/CUEP area comprised of the Ordovician Vinini Formation (Ovi) which contains sequences of siltstone and shale interbedded with fine-grained chert, sandstone, and quartzite that are generally extensively sheared, carbonaceous siliciclastics.

Groundwater Monitoring

Groundwater monitoring wells and piezometers within the HC/CUEP area are shown on **Figure 3-5**.

Figure 3-5 Groundwater Monitoring Wells and Piezometers



Within the HC/CUEP area, there are 40 groundwater monitoring wells/piezometers. Two are in the basin fill unit. In this unit, there is a gradient from the higher elevations towards the alluvial fan to the southeast. The water levels vary from 6,450 to 6,250 feet, with a hydraulic gradient of approximately 0.1 foot:1 foot.

In the carbonate bedrock lower-plate unit, there are 34 existing groundwater monitoring wells/piezometers; an additional four are planned. There is a relatively flat phreatic surface within the carbonate unit. The groundwater elevation (as of March 2016) is at approximately 6,050 feet. There has been a head reduction in the carbonate bedrock unit which has corresponded to water level declines measured in the monitoring wells and piezometers; the current declines in the HC/CUEP area range from 10 to 50 feet/year. The head reduction is most likely a result of groundwater pumping at the Pipeline and Cortez Hills mining operations in Crescent Valley. There has been no corresponding head reduction in the overlying basin fill unit. Barrick's current monitoring programs based on interferometric synthetic aperture radar (InSAR) data do not show any subsidence in Pine Valley. Predictive land subsidence modeling completed by SRK using the MODFLOW IBS package and hydraulic heads indicates two areas of predicted land subsidence will occur in the basin fill deposits within the western part of Pine Valley and the northern part of Grass Valley due to the gradual propagation of reduced pore pressures from the underlying carbonate and volcanic bedrock (SRK 2016).

Earlier monitoring included four groundwater monitoring wells/piezometers in the siliceous bedrock upper-plate unit. There is a gradient towards the southeast, in which the water levels vary from 6,390 to 6,270 feet, with a hydraulic gradient of approximately 0.05 foot:1 foot.

Results from groundwater monitoring wells and piezometers show limited connectivity in the HC/CUEP area between the two primary hydrogeologic units, the basin fill unit and the carbonate bedrock lower-plate unit. Barrick conducted a 45-day hydrologic stress test on the GRW-03 well which was completed in the Dw formation. The location of this well is shown on **Figure 3-5.** During the 45-day pumping test, only one of the water-level monitoring locations in a formation other than Dw recorded drawdown. Other monitoring wells and piezometers in the non-carbonate formations did not see any drawdown due to the pumping test. The test results are consistent with the concept of limited hydraulic connection between the Dw and most of the other non-carbonate units in the Horse Canyon area (ITASCA 2014). HC/CUEP exploration activities have not been shown to affect groundwater levels.

Hydraulic Conductivity

The hydraulic conductivity (K) of the basin fill materials is partly dependent on the geology of the eroded source material of which it is composed, as well as the proportion of fines, degree of sorting, cementation, and consolidation. Barrick conducted short-term hydrologic stress tests on two artesian wells completed in the basin fill deposits in the adjacent West Pine Valley Plan of Operations (NVN-077213) area. The first test was an 8-hour flow-and-shut-in test performed on the Willow Springs well, which is located about 2,300 feet from the eastern edge of the HC/CUEP Plan boundary. The second test was a 5-day pumping test of well GRW-01, which is located near

the eastern edge of the HC/CUEP Plan boundary. The locations of these two wells are shown on **Figure 3-5**.

A K-value of 108 feet/day was calculated for the Willow Springs test (ITASCA 2013). Hydraulic conductivity values of this order of magnitude have been reported for permeable basalt and for gravel, as well as for karstic and fractured limestone (Domenico and Schwartz 1990, Spitz and Moreno 1996).

A K-value of only 1.2 to 2.2 feet/day was calculated for the GRW-01 well test (ITASCA 2013). These estimated K-values are two orders-of-magnitude less than the estimated K-value derived from the Willow Springs well test, but they are within the reported ranges for permeable basalt (0.1 to 104 feet/day) and for sand and silty sand (0.01 to 102 feet/day) (Spitz and Moreno 1996).

The difference in K-values is possibly due to the shallower completion interval of the Willow Springs well, which presumably does not penetrate into the deeper zone of Tertiary gravel dominated by a strong clay/volcanoclastic matrix. In this case, the higher K-value of 108 feet/day appears to be associated with the shallower (upper 200 feet) overburden material, which has a weak clay component, whereas K-values on the order of 1 foot/day are representative of the slightly deeper (below 200 feet) overburden material, which has a strong clay/volcanoclastic component (ITASCA 2013).

In the carbonate bedrock lower plate unit, recharge, storage, flow, and discharge of groundwater are primarily controlled by the secondary features (fractured zones, faults, and solution cavities) that have enhanced the overall porosity and permeability of the rock (BLM 2011b). As a result of the 45-day hydrologic stress test on GRW-03 well, K-values that range from 0.7 to 4.2 feet/day were calculated, with a geometric mean of 1.0 feet/day (ITASCA 2014).

Only one of the water-level monitoring locations in formations other than Dw (GRGT-006 P2 in the Dhc) recorded drawdown due to the 45-day pumping test. Other monitoring wells and piezometers in the non-carbonate formations, including some locations in relatively close proximity to the pumping well (e.g., RHPZ-08 P1 and P2, and GRPZ-13 P3), did not see any drawdown due to the pumping test (ITASCA 2014).

Groundwater Modeling

The Barrick four-basin groundwater flow model was used to simulate the passive inflows to the declines and exploration drifts during the 5 years of development (ITASCA 2016c). The model results indicate that average annual inflow rates would be less than 20 gpm for the first 2 years of development, and then would fluctuate between approximately 30 gpm and 50 gpm during the final 3 years of the development period. The inflow water would be managed by sump collection systems within the declines and used underground for dust suppression and drilling make-up water.

3.5.2 Environmental Consequences Water Resources

The 2015 HC/CUEP EA analyzed the effects of up to 549 acres of surface disturbance associated with surface exploration on water resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

Information regarding water resources was compiled from publicly available data and regional literature, HC/CUEP baseline assessments and annual monitoring, and groundwater modelling. Field verification and laboratory testing was conducted to aid in the documentation of surface water and groundwater characteristics. The analysis of water resources was based on anticipated effects of proposed surface disturbance, underground exploration, and reclamation activities. Predictions about short-term and long-term effects to water resources were based on the baseline and monitoring data, groundwater modelling, and previous experience from projects of similar scope and characteristics. Analyses of the potential intensity of effects to water resources were derived from the available information, best professional judgment, and previous project investigations.

Effects Context for Water Resources

Localized: Internal to the HC/CUEP Plan boundary.

Regional: Effects would occur outside of the HC/CUEP Plan boundary.

Short-term: Surface water and Groundwater – for the duration of exploration activities including reclamation.

Long-term: Lasting beyond exploration and reclamation.

Intensity of Effects Definitions for Water Resources

Negligible: Hydrology of the area would not be measurably affected. Effects on the hydrologic regime would be slight or not detectable. Water quality would not be adversely affected, or effects would not be measureable and would not affect beneficial uses of receiving waters. Groundwater levels would not be reduced.

Minor: Effects on hydrology, such as an increase or decrease in surface or groundwater flow, may occur. Effects on water quality may occur and would be detectable, but beneficial uses of receiving waters would not be affected. Effects would be offset with implementation of BMPs and applicant-committed EPMs. Groundwater levels may be reduced.

Moderate: Effects to surface water hydrology would occur and mitigation would be necessary to offset adverse effects. Effects on water quality would occur and would affect beneficial uses of receiving waters. Implementation of BMPs and applicant-committed EPMs would minimize the intensity, but effects may remain for the long-term or require additional mitigation. Groundwater levels would likely be reduced.

Major: Effects to surface water hydrology would occur and would substantially change the hydrologic regime. Effects to water quality would occur and would substantially change beneficial uses of surface or groundwater. Mitigation in addition to BMPs and applicant-committed EPMs would be necessary to offset adverse effects. Long-term monitoring may be required to track mitigation success. Groundwater levels would be reduced.

3.5.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Surface Water Features

The surface facilities for the Proposed Action are within the Grass Valley Hydrographic Area (number 138). The underground exploration declines and exploration drifts would extend into the Pine Valley Hydrographic Area (number 53) (**Figure 3-3** HC/CUEP Hydrographic Areas, Weather Stations, and Stream Flow Monitoring Stations). As described in Section 3.5.1 and documented in HC/CUEP baseline reports (HDR 2014, HDR 2015a, HDR 2016), precipitation inputs and water flow from seeps and springs is relatively low in the HC/CUEP area, which reduces the energy available to carry sediment downstream. The surface disturbance components of the Proposed Action would occur on the western and southern slopes of the HC/CUEP Plan boundary, which drain into Grass Valley. Grass Valley has a closed basin geomorphology; it lacks perennial or intermittent streams, and much of the storm runoff into Grass Valley is absorbed by the alluvium. Seeps, springs, and wetlands were not documented on the western and southern slopes during the HC/CUEP baseline inventory (HDR 2014). Furthermore, seeps/springs and other wetland areas would be avoided through continued adherence to the applicant-committed EPMs. Reclamation would occur as soon as practicable following completion of the twin declines to stabilize soils. For these reasons, under the Proposed Action, adverse effects to surface water features or water quality caused by increased sedimentation would be localized, short-term, and negligible to minor.

The proposed underground declines would trend eastward, thus incorporating hydrologic features within Pine Valley. The stream monitoring stations would continue to be monitored. Due to the depth at which the decline excavations would occur, there would be no adverse effects on surface water features from underground activities.

In order to remain compliant with the current General Stormwater Permit NVR300000 issued by the NDEP (NDEP 2013), Barrick revised the current SWPPP (Barrick 2016b) for the HC/CUEP in accordance with the National Pollutant Discharge Elimination System (NPDES) regulation. The objective of the SWPPP is to minimize the discharges of sediment or contaminants as either direct or indirect discharges to wetlands or other waters through the appropriate use of the current BMPs. Barrick has also developed a spill contingency plan for compliance with CWA regulations that require established procedures to prevent the discharge of oil into waters of the U.S.

The proposed development of infrastructure to support underground exploration activities would be conducted in accordance with the applicant-committed EPMs and BMPs listed in **Appendix A**. These permits, measures, and practices have been and would continue to be implemented under the Proposed Action. Specific to effects on surface waters due to ground disturbing activities, the applicant-committed EPMs and BMPs include: the spill contingency plan; soil erosion prevention and control practices; distance set-backs, design standards, and dust control measures.

Road construction and drainage operations are governed by the State of Nevada General Stormwater Permit NVR300000 (NDEP 2013). BMPs for road construction and maintenance are described in Section 2.1 and **Appendix A**. Stormwater would be routed around the portal pad and would be conveyed to the natural drainage through the installation of culverts under the Horse Canyon Haul Road. Culverting and BMPs would minimize the potential for erosion.

Contact water from the lined ore/PAG transfer pad would be collected and trucked to the lined Mill #1 water storage reservoirs and then conveyed to the Pipeline Mill, as needed for make-up water. With the proposed design features, and implementation of applicant-committed EPMs and BMPs, adverse effects on water quality associated with proposed activities at the portal pad would be localized, short-term, and negligible to minor.

Groundwater

For the Proposed Action, there would be passive inflow to the declines and exploration drifts. The Barrick four-basin groundwater flow model indicates that average annual inflow rates would be less than 20 gpm for the first 2 years of development, and then would fluctuate between approximately 30 gpm and 50 gpm during the final 3 years of the development period. **Appendix B** includes the technical memorandum (ITASCA 2016c) presenting modeling results used to determine the groundwater inflow rate. The inflow water would be managed by sump collection systems within the declines and used underground for dust suppression and drilling make-up water. Dewatering measures would not be required. Effects of underground exploration activities on groundwater would be localized within the affected bedrock unit, long-term as the passive inflow fills the void created by the declines and exploration drifts, and negligible to minor.

3.5.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Surface Water Features

Construction of the waste rock disposal facility adjacent to the Horse Canyon Haul Road would require a larger disturbance footprint. However, due to the lack of seeps, springs, and flowing water on the western and southern slopes, adverse effects to surface water would be localized,

short-term, and negligible to minor. Stormwater would be routed around the portal pad and would be conveyed to the natural drainage through the installation of a culvert in the Horse Canyon Haul Road. Two additional culverts would be placed under the Horse Canyon Haul Road as stormwater controls. Culverting and BMPs would minimize the potential for erosion. Contact water from the ore/PAG transfer pad would be collected and trucked to the lined Mill #1 water storage reservoirs and then conveyed to the Pipeline Mill, as needed for make-up water.

To minimize the potential for effects on water quality due to storage of PAG material at the waste rock disposal facility, the interface between the non-acid generating and PAG portions would be lined with an impervious geomembrane liner to capture precipitation that comes in contact with the PAG waste. This captured precipitation (contact water) would be channeled to a lined collection pond designed to contain runoff from the 25-year, 24-hour storm event.

With the proposed design features, and implementation of applicant-committed EPMs and BMPs, adverse effects on water quality with the Waste Rock Facility Alternative would be localized, short-term, and negligible to minor.

Groundwater

Effects on groundwater would be the same as those described for the Proposed Action. There would be passive inflow to the declines and exploration drifts. As outlined in ITASCA 2016c, the groundwater inflow rates are relatively low, ranging from 20 to 50 gpm, and would not require dewatering. This inflow water would be used underground. Effects of underground exploration activities on groundwater would be localized within the affected bedrock unit, long-term as the passive inflow fills the void created by the declines and exploration drifts, and negligible to minor.

3.5.2.3 No Action

Under the No Action Alternative, surface exploration as currently authorized would continue. Surface exploration, development, and condemnation drill holes as well as monitoring and production wells subject to NDWR regulations would be abandoned in accordance with applicable rules and regulations (NAC 534.420 through NAC 534.427). Boreholes would be sealed to prevent cross contamination between aquifers, and the required shallow seal would be placed to prevent contamination by surface access. The potential for contamination by drilling fluids is minimized by adherence to BMPs and drill hole abandonment procedures. Because connectivity between the hydrologic units is shown to be limited, adverse effects are not anticipated.

Surface Water

Water quality would continue to be monitored at the established stream and seep/spring sites. The applicant-committed EPMs, BMPs, and reclamation practices, would continue to be implemented. Minor amounts of sediment may enter surface waters due to disturbance activities and driving on dirt roads, however, erosion and dust control measures would continue to maintain the effects at negligible levels. Reclamation practices described in Section 2.1.7 would further minimize the potential for effects to surface waters by eliminating bare ground and the chance for erosion and subsequent sedimentation to occur. Effects to surface waters under the No Action

Alternative may include small amounts of sedimentation over a short-term duration, but effects would be minor due to the prevention measures and existing baseline conditions. Effects to surface water features, including streams, seeps/springs, and other wetlands and riparian zones would not occur.

Groundwater

The groundwater monitoring program would continue under the No Action Alternative. Studies conducted for the HC/CUEP have shown that there is limited connectivity between the primary hydrogeologic units. Effects to groundwater are not anticipated.

3.5.2.4 Cumulative Effects

The analysis of cumulative effects to surface water resources includes the evaluation of water quality and quantity for surface water features found within the HC/CUEP Plan boundary. The CESA for groundwater incorporates the hydrologic study area used for a conceptual groundwater flow model, which includes Carico Lake Valley, Crescent Valley, Grass Valley, and Pine Valley hydrographic areas, and includes the Pipeline Complex Mine and the Cortez Hills Complex Mine (ITASCA 2016c). The CESA includes the past, present, and RFFAs included in Table 2-3.

Proposed Action

HC/CUEP surface exploration activities have not resulted in measurable adverse effects to surface waters, or wetlands and riparian zones. Implementation of applicant-committed EPMs and BMPs would continue to minimize effects. Negligible to minor amounts of sedimentation from the Proposed Action may occur, but is not anticipated to result in cumulative effects when combined with currently authorized surface exploration activities within HC/CUEP or with other past, present, and RFFAs. Cumulative effects on surface water would be localized, short-term, and negligible to minor.

The lowering of the water levels in the carbonate bedrock unit in the central part of the hydrographic study area is being influenced by mine-dewatering activities in Crescent Valley. Other influences included agricultural irrigation and non-mining consumptive uses. Continued mine dewatering is expected to contribute to further lowering of the water levels in the carbonate bedrock unit (ITASCA 2016c). Effects on groundwater levels in the carbonate bedrock unit from currently authorized mine-dewatering activities, agricultural irrigation and non-mining consumptive uses are regional, long-term and moderate to major. The effects on groundwater levels from the Proposed Action are not expected to measurably contribute to the further lowering of the water levels in the carbonate bedrock unit. As such, the cumulative effects would continue to be regional, long-term, and moderate to major.

Waste Rock Facility Alternative

Negligible to minor amounts of sedimentation may occur from placing the waste rock disposal facility adjacent to the Horse Canyon Haul Road, but would not be anticipated to result in cumulative effects when combined with currently authorized surface exploration activities within

HC/CUEP, or with other past, present, and RFFAs. Implementation of applicant-committed EPMs and BMPs would continue. This alternative would not cause a change or loss of wetlands and riparian zones.

HC/CUEP surface exploration activities have not resulted in measurable adverse effects to surface waters, or wetlands and riparian zones. Implementation of applicant-committed EPMs and BMPs would continue to minimize effects. Negligible to minor amounts of sedimentation from the Waste Rock Facility Alternative may occur, but is not anticipated to result in cumulative effects when combined with currently authorized surface exploration activities within HC/CUEP, or with other past, present, and RFFAs. Cumulative effects on surface water would be localized, short-term, and negligible to minor.

The lowering of the water levels in the carbonate bedrock unit in the central part of the hydrographic study area is being influenced by mine-dewatering activities in Crescent Valley. Other influences included agricultural irrigation and non-mining consumptive uses. Continued mine dewatering is expected to contribute to further lowering of the water levels in the carbonate bedrock unit (ITASCA 2016c). Effects on groundwater levels in the carbonate bedrock unit from currently authorized mine-dewatering activities, agricultural irrigation and non-mining consumptive uses are regional, long-term, and moderate to major. The effects on groundwater levels from the Waste Rock Facility Alternative are not expected to measurably contribute to the further lowering of the water levels in the carbonate bedrock unit. As such, the cumulative effects would continue to be regional, long-term, and moderate to major.

No Action

Effects on surface waters with continuation of surface exploration would be minimized with implementation of applicant-committed EPMs and BMPs, as such, cumulative effects from other past, present, and RFFAs are not anticipated. Direct or indirect effects to seeps/springs and other wetlands, and groundwater would not occur, therefore, cumulative effects on these features would not occur.

The lowering of the water levels in the carbonate bedrock unit in the central part of the hydrographic study area is being influenced by mine-dewatering activities in Crescent Valley. Other influences included agricultural irrigation and non-mining consumptive uses. Continued mine dewatering is expected to contribute to further lowering of the water levels in the carbonate bedrock unit (ITASCA 2016c). Under the No Action Alternative, effects on groundwater levels in the carbonate bedrock unit from currently authorized mine-dewatering activities, agricultural irrigation and non-mining consumptive uses would continue to be regional, long-term and moderate to major.

3.6 Vegetation Resources

This section describes the general vegetation found in the HC/CUEP Plan boundary. The analysis of potential direct and indirect effects includes general vegetation, noxious weeds, and invasive and non-native plants within the HC/CUEP Plan boundary. The CESA was defined in the Cortez Hills Expansion Project FEIS (BLM 2008c). The cumulative effects analysis considers past, present, and RFFAs included in **Table 2-3** that have involved disturbance to vegetation within a geographic area encompassing the southwestern portion of Pine Valley, the southern portion of Crescent Valley, and the northern portion of Grass Valley.

3.6.1 Affected Environment Vegetation Resources

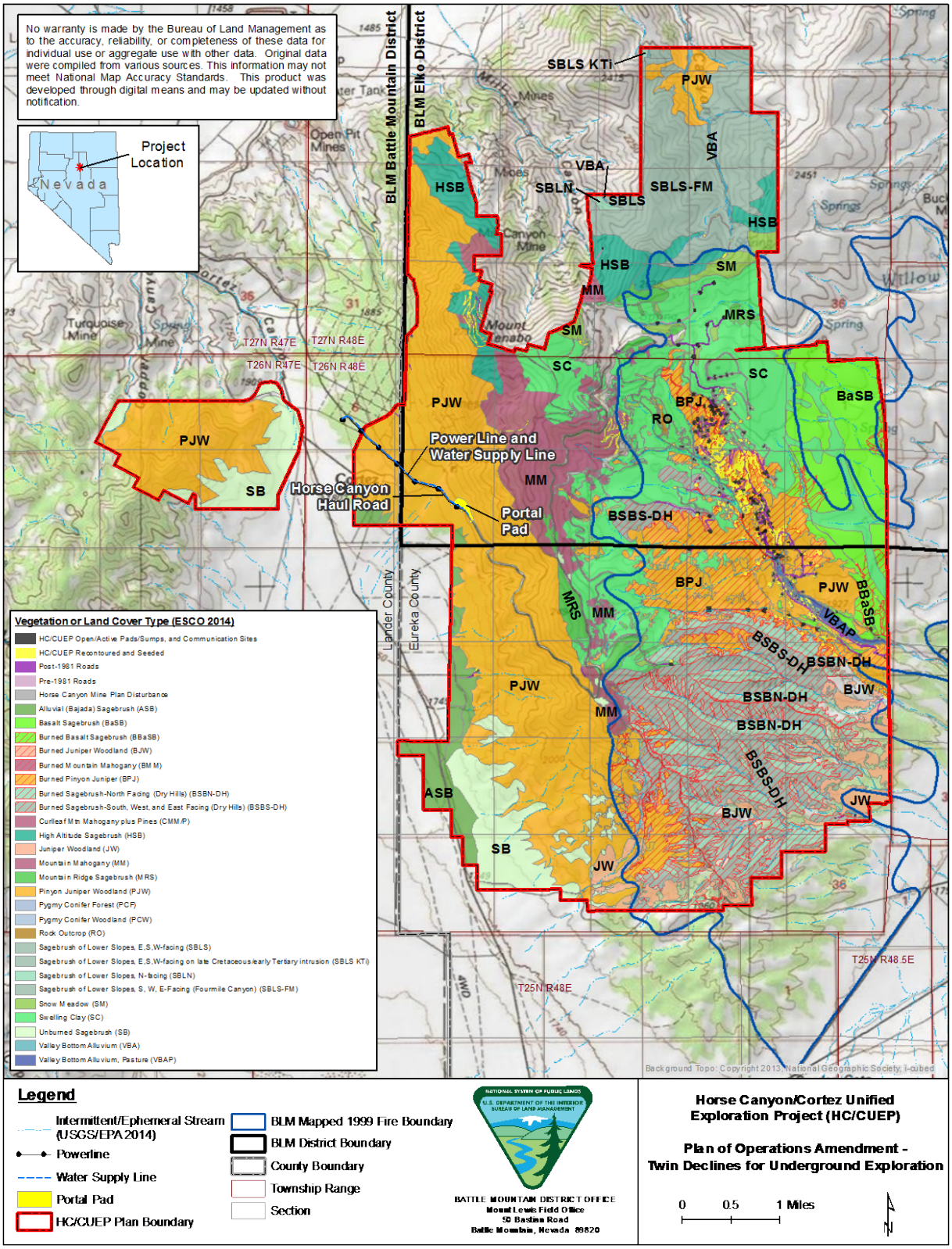
Vegetation inventories of the HC/CUEP area have been conducted since 2009 to document existing conditions and account for alterations in vegetation communities due to disturbance from wildfire, altered fire regimes, as well as HC/CUEP exploration and reclamation activities. Twenty-nine vegetation and land cover types have been identified in the HC/CUEP area (ESCO 2014). Results of the inventory are shown in **Table 3-5** and **Figure 3-6**.

Table 3-5 HC/CUEP Mapped Vegetation and Land Cover Types

Vegetation and Land Cover Type	Acres	Percent of HC/CUEP Area
Pinyon-Juniper Woodland (PJW)	6,049	27.1
Swelling Clay (SC)	2,959	13.3
Burned Sagebrush-South, West, and East Facing (Dry Hills) (BSBS-DH)	1,898	8.5
Burned Pinyon-Juniper (BPJ)	1,507	6.8
Sagebrush of Lower Slopes, S, W, E-Facing (Fourmile Canyon) (SBLS-FM)	1,446	6.5
Burned Sagebrush-North Facing (Dry Hills) (BSBN-DH)	1,205	5.4
Mountain Mahogany (MM)	1,114	5.0
Unburned Sagebrush (SB)	1,104	4.9
Basalt Sagebrush (BaSB)	1,033	4.6
High Altitude Sagebrush (HSB)	819	3.7
Juniper Woodland (JW)	498	2.2
Alluvial (Bajada) Sagebrush (ASB)	477	2.1
Burned Juniper Woodland (BJW)	446	2.0
Horse Canyon Mine Plan Disturbance (Dist)	425	1.9
HC/CUEP Disturbance (March 2016)	420	1.8
Mountain Ridge Sagebrush (MRS)	250	1.1

Vegetation and Land Cover Type	Acres	Percent of HC/CUEP Area
Snow Meadow (SM)	217	1.0
Burned Basalt Sagebrush (BBaSB)	149	0.7
Sagebrush of Lower Slopes, E,S,W-facing (SBLS)	77	0.3
Pre-1981 Roads	68	0.3
Valley Bottom Alluvium, Pasture (VBAP)	58	0.3
Valley Bottom Alluvium (VBA)	37	0.2
Sagebrush of Lower Slopes, N-facing (SBLN)	32	0.1
Sagebrush of Lower Slopes, E, S, W-facing on late Cretaceous or early Tertiary intrusion (SBLS KTi)	13	0.1
Burned Mountain Mahogany (BMM)	12	0.1
Rock Outcrop (RO)	7	<0.1
Pygmy Conifer Woodland (PCW)	1	<0.1
Curl-leaf Mountain Mahogany plus Pines (CMM/P)	0.2	<0.1
Pygmy Conifer Forest (PCF)	0.2	<0.1

Figure 3-6 Vegetation and Land Cover Types



Descriptions are given below for the most common vegetation and land cover types within the HC/CUEP Plan boundary, which account for 90 percent of the HC/CUEP area. All descriptions are derived from ESCO (2014).

Pinyon-Juniper Woodland and Juniper Woodland

Pinyon-Juniper Woodland and Juniper Woodland land cover types are the most common vegetation communities in the HC/CUEP area. Together they account for approximately 30 percent of the land cover within HC/CUEP.

The majority of the intact (i.e., unburned) pinyon-juniper communities are concentrated in the western portion of the HC/CUEP area, on the west slope of the Cortez Mountains. The dominant trees within the existing woodlands are singleleaf pinyon pine (*Pinus monophylla*) and/or Utah juniper (*Juniperus osteosperma*).

Juniper woodlands occur in small areas on the southern and southeastern slopes of the HC/CUEP area. This vegetation type, which lacks the pinyon component, was identified as a separate type from the Pinyon-Juniper Woodland to account for the different wildlife habitat provided by each and the cultural importance represented by the pinyon pine component of the Pinyon-Juniper Woodland. The herbaceous understory of native perennial grasses and forbs averages less than 3 percent cover in both the Pinyon-Juniper Woodland and Juniper Woodland land cover types (ESCO 2014).

Low Elevation Sagebrush

The Low Elevation Sagebrush land cover type that was mapped in HC/CUEP includes sagebrush of lower slopes, unburned sagebrush, basalt sagebrush, and alluvial sagebrush (ESCO 2014). Together they comprise approximately 23 percent of the HC/CUEP area. These sagebrush communities are generally found in the HC/CUEP area below 7,200 feet elevation on variable terrain and soil parent material. Basalt sagebrush is located on the eastern edge of HC/CUEP and alluvial sagebrush is located on the western edge of HC/CUEP near Grass Valley. Unburned sagebrush is also located on the western edge of the HC/CUEP Plan boundary, as well as on the western-most HC/CUEP parcel in the Toiyabe Range. Other low elevation sagebrush is on the lower slopes of Fourmile Canyon.

Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) is the dominant sage species, but basin big sagebrush (*A. tridentata tridentata*) occurs at lower geomorphic positions. Some black sagebrush (*A. nova*) and low sagebrush (*A. arbuscula*) occur on shallow, rocky sites. The lower elevation sagebrush averages about 15 percent shrub cover, and is typically dominated by sagebrush and cheatgrass (*Bromus tectorum*) with varying amounts of native bunchgrasses and other native grasses. There are limited native perennial forbs at these lower elevation sagebrush communities. The 1999 fire altered large expanses of lower elevation sagebrush in the Horse Canyon area.

Sagebrush communities of the northern portion of the HC/CUEP area (e.g. Fourmile Canyon) have generally much steeper slopes and differing soil parent material. The presence of ravine fescue (*Festuca sororia*) and Nevada needlegrass (*Achnatherum nevadense*) are among the compositional differences. Cheatgrass is much more abundant on north-facing slopes compared to other aspects in the Fourmile Canyon area.

Burned Sagebrush

Burned Sagebrush land cover type is located on all aspects of the Dry Hills area (i.e., burned sagebrush-south, west, and east facing (Dry Hills); and burned sagebrush-north facing (Dry Hills)). This cover type comprises approximately 14 percent of the HC/CUEP area.

The Dry Hills are located within the southern portion of the HC/CUEP area. There has been limited recovery of sagebrush in areas that burned in the 1999 fire, with sagebrush cover averaging between 0.1 and 0.2 percent. Characteristics of burned sagebrush on northern aspects differ from burned sagebrush on other aspects. The main shrub is Douglas rabbitbrush (*Chrysothamnus viscidiflorus*); with a total shrub cover of 10 percent on north-facing slopes, and about 5 percent on other aspects. The burned sagebrush areas have more bluebunch wheatgrass (*Pseudoroegneria spicata*) and Thurber needlegrass (*Achnatherum thurberianum*) compared to unburned sagebrush areas. The north-facing burned sagebrush has approximately twice as much grass cover. The native perennial forb cover average in burned sagebrush is about 15 percent on the north-facing areas and 5 percent on other exposures compared to the less than 1 percent for the unburned sagebrush areas. Cheatgrass cover on the burned sagebrush north-facing areas is nearly 30 percent and about 20 percent on the other exposures compared to less than 2 percent in unburned sagebrush.

Swelling Clay

The Swelling Clay land cover type accounts for approximately 13 percent of the HC/CUEP area. It occurs on the middle to upper slopes in the northeastern and central portions of the HC/CUEP area. This type is characterized by claypan soils. Shrub cover is typically moderate, consisting of big sagebrush and Douglas rabbitbrush. The forb cover is generally much higher than at other sagebrush sites. Large numbers of tap-rooted perennials often co-occur. Some sites are located on high elevation, wind-swept sites with concave topography. This topography collects wind-blown snow, which in conjunction with high soil surface permeability, provides moisture to deep-rooted species in the spring and early summer.

Burned Pinyon-Juniper and Burned Juniper Woodland

The Burned Pinyon-Juniper and Burned Juniper Woodland land cover types account for approximately 9 percent of the HC/CUEP area. These types occur in the eastern and southern portions of the HC/CUEP area, including within Horse Canyon. The burned juniper woodlands are found at lower elevations than the burned pinyon-juniper woodlands. Tree cover is non-existent and average perennial herbaceous cover is relatively high (greater than 30 percent). Cheatgrass

cover in these burned woodlands has been estimated to be relatively low, approximately 8 percent.

Mountain Mahogany

The Mountain Mahogany land cover type accounts for approximately 5 percent of the HC/CUEP area. It occurs at the high elevations on the east slope of the Cortez Mountains, in the central portion of the HC/CUEP area. This vegetation type consists of about 16 percent cover of curlleaf mountain mahogany (*Cercocarpus ledifolius*) with varying amounts of singleleaf pinyon pine. Limber pine (*Pinus flexilis*) occurs sporadically. Other woody plants that are present include serviceberry (*Amelanchier alnifolia*), desert gooseberry (*Ribes velutinum*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and desert snowberry (*Symphoricarpos longiflorus*). Cover by native perennial grasses averages less than 2 percent and cover by native perennial forbs averages about 20 percent. Cheatgrass is very limited, averaging 0.3 percent cover. Native annual and biennial plants are diverse, even though they average less than 2 percent cover.

High Altitude Sagebrush

The High Altitude Sagebrush land cover type comprises approximately 4 percent of the HC/CUEP area. It occurs at higher elevations in the northern portion of the HC/CUEP area, north of Mount Tenabo. This sagebrush shrubland is dominated by a mix of mountain big sagebrush and varying amounts of other shrub species. The diversity of grasses, shrubs and native perennial forbs is higher than the lower elevation sagebrush sites.

Horse Canyon Mine Plan Disturbance and Pre-1981 Roads

The Horse Canyon Mine Plan disturbance and pre-1981 roads together encompass approximately 2 percent of the HC/CUEP area. This category includes only those disturbance features that were created by actions external to HC/CUEP exploration (e.g., pits associated with the Horse Canyon Mine; the Horse Canyon Haul Road) or pre-1981 roads. It does not include the disturbance from HC/CUEP exploration activities.

HC/CUEP Disturbance

This category accounts for surface disturbance related to HC/CUEP exploration activities (i.e., pads and sumps, post-1981 roads, communication sites, and recontoured and seeded areas). The existing HC/CUEP exploration disturbance of 420 acres (as of March 2016) is 1.9 percent of the total HC/CUEP area of 22,307 acres. Up to 549 acres of the surface disturbance associated with surface exploration activities are currently authorized to occur within the HC/CUEP Plan boundary. The total acreage disturbed includes 250 acres that has been recontoured and seeded.

The majority of surface disturbance in the HC/CUEP Plan boundary has occurred in areas mapped as Burned Pinyon-Juniper, Swelling Clay, sagebrush, and burned sagebrush

communities. Reclamation has improved the condition of vegetation in areas that burned in the 1999 fire events.

3.6.1.1 Noxious Weeds, Invasive, and Non-native Plant Species

Noxious weeds, invasive, and non-native plant species are species that are highly competitive, highly aggressive, and spread easily. 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" (BLM 2014b). 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 Federal Noxious Weed Act of 1974 (as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990) authorizes cooperation among federal and state agencies in the control of weeds.

The BLM BMD recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture (NDA) statute, found in NAC 555.010. The current Nevada noxious weed list was obtained from the State of Nevada Department of Agriculture website (http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weeds_Home/). As of March 2016 there are 47 species of noxious weeds in Nevada (NDA 2016).

The BLM's policy relating to the management and coordination of noxious weeds and invasive plant species activities is set forth in the BLM Manual 9015 – Integrated Weed Management (BLM 1992). Management guidance on the BLM BMD is also provided by the Integrated Weed Management Plan (IWM Plan) (BLM 2008d), which aims to reduce hazardous fuels, restore fire-damaged lands, and improve ecosystem health by controlling weeds. Additional potential resource protection measures were identified in the EA that analyzed implementation of the IWM Plan (BLM 2009). The BLM's primary focus is providing adequate capability to detect and treat smaller weed infestations in high-risk areas before they have a chance to spread. Noxious weed control is based on a program of prevention, early detection, and rapid response.

Noxious weed surveys have been conducted in the HC/CUEP area (ESCO 2013). Six noxious weed species are known to occur within the HC/CUEP area. The most extensive of these noxious weeds is hoary cress (*Cardaria draba*), followed by musk thistle (*Carduus nutans*), and Scotch thistle (*Onopordon acanthium*). Canada thistle (*Cirsium arvense*), poison hemlock (*Conium maculatum*), and Klamath weed, or spotted St. Johnswort, (*Hypericum perforatum*) occur to a limited degree. Barrick has taken weed control actions to address the hoary cress and musk thistle in the Horse Canyon area (ESCO 2013).

The most common invasive plant species found within the HC/CUEP area is cheatgrass. Much like its distribution throughout Nevada, the species is found throughout the HC/CUEP area in varying densities depending on localized disturbance history, including fire.

The HC/CUEP Weed Management Plan (**Appendix A**) outlines proper herbicide application and handling techniques, worker safety, and describes how to handle spills. Applicant-committed EPMs related to weed control are also incorporated into the Proposed Action (**Appendix A**).

3.6.1.2 Reclamation

Reclamation activities that are incorporated into the Proposed Action are summarized in Section 2.1.6.

3.6.2 Environmental Consequences Vegetation Resources

The 2015 HC/CUEP EA analyzed effects on vegetation resources for up to 549 acres of surface disturbance for surface exploration within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

The vegetation resources analysis was based on a quantitative assessment of field-verified vegetation mapping and anticipated effects of proposed surface disturbance, underground exploration, and reclamation activities. Adverse effects are evidenced as changes in natural vegetation communities and changes in the biological value of plant communities.

Effects Context for Vegetation Resources

Localized: Internal to the HC/CUEP Plan boundary.

Regional: Effects would occur outside of the HC/CUEP Plan boundary.

Short-term: Effects would last for up to 1 year or for the typical regeneration time frame of the native vegetation community.

Long-term: Effects would last for longer than the typical regeneration time frame of the native vegetation community.

Intensity of Effects Definitions for Vegetation Resources

Negligible: Natural vegetation communities would not be extensively altered. Adverse effects on native vegetation would not be measurable. Reclamation would have a high probability of success. There would be no effect on the biological value of the plant community.

Minor: Effects on native vegetation may occur, as localized alterations to the natural vegetation communities. There would be no effect on the overall biological value of the plant community or plant community assemblages. Applicant-committed EPMs, BMPs, and reclamation would minimize the adverse effects, would be relatively simple to implement, and would have a high probability of success.

Moderate: Adverse effects on native vegetation would occur and may change the biological value of the plant community affected. Restoration would be necessary to reduce or rectify adverse effects and would most likely be successful.

Major: Effects on native vegetation would occur and would substantially change the biological value of the native plant community in the context of the region. Repeated restoration efforts would likely be necessary to reduce or rectify adverse effects.

3.6.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The surface disturbance associated with the Proposed Action would remove 12 acres of Pinyon-Juniper Woodland vegetation type. This equates to 0.2 percent of the Pinyon-Juniper Woodland type within the HC/CUEP Plan boundary. This change in the natural vegetation community is localized, long-term, and minor. The change in natural vegetation would not affect the biological values of the plant community at the landscape level.

Reclamation would be completed in accordance with BLM and NDEP regulations and requirements to minimize effects over the long-term. The reclamation plan specifies seed mixes to be used and standards that must be met to qualify areas as reclaimed desired plant communities (RDPCs). Implementation of the weed management plan would also minimize the adverse effect to natural plant communities. Additional details on reclamation practices of the HC/CUEP Plan are included in Section 2.1.7.

Noxious Weeds, Invasive, and Non-native Plant Species

Surface disturbance activities and vehicular travel could result in establishment or spread of undesirable weed species. Weed populations have not been identified as a major threat to vegetation communities in the HC/CUEP area. Existing control measures, the current noxious weed management plan, and reclamation activities have been effective at minimizing new infestations and the spread of existing weeds at HC/CUEP.

Noxious and invasive weed control measures have been and would continue to be implemented under the Proposed Action. The HC/CUEP noxious weed management plan would be followed and annual vegetation inventory efforts would continue, which include monitoring existing weed populations and identifying new populations. Weed control measures include preventative actions to reduce the chance of spreading seeds from vehicle traffic. This would include avoiding known areas of noxious weeds, invasive, and non-native plant species during periods when they could be spread by vehicles. Compliance with the revised noxious weed management plan would ensure implementation of proper BLM protocol regarding invasive, non-native weed management.

Ongoing HC/CUEP reclamation activities would include applying site-specific seed mixes to the disturbed areas to reduce the establishment of weed infestations and to increase competition against weeds.

3.6.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line, and water supply line would be the same as described for the Proposed Action.

Forty acres of Pinyon-Juniper Woodland vegetation type would be removed, which equates to 0.7 percent of the total amount of Pinyon-Juniper vegetation type in the HC/CUEP Plan boundary. The effect would be localized, long-term, and minor. Adverse effects would be minimized through weed management practices and as reclamation is completed. The change in natural vegetation would not affect the biological values of the plant community at the regional level.

Noxious Weeds, Invasive, and Non-native Plant Species

Surface disturbance activities and vehicular travel could result in establishment or spread of undesirable weed species. Noxious and invasive weed control measures have been and would continue to be implemented under the Waste Rock Facility Alternative. Ongoing HC/CUEP reclamation activities would include applying site-specific seed mixes to the disturbed areas to reduce the establishment of weed infestations and to increase competition against weeds.

3.6.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue as currently authorized under the terms and conditions of current permits and approvals. Adverse effects would be localized, long-term, and minor. Effects would be minimized with continued implementation of the current applicant-committed EPMs, including weed management and reclamation.

3.6.2.4 Cumulative Effects

The CESA for vegetation resources includes the geographic area encompassing the southwestern portion of Pine Valley, the southern portion of Crescent Valley, and the northern portion of Grass Valley. The cumulative assessment considers vegetation affected by the 1999 fires, which impacted an estimated 90,000 acres of the CESA. Total surface disturbance estimated from these other past, present, and RFFAs equals 142,682 acres. This total does not account for acres reclaimed.

Proposed Action

Effects on vegetation resources from currently authorized surface disturbing activities and fire are regional, long-term, and moderate. The Proposed Action for the reallocation of 12 acres of surface disturbance to underground exploration activities is approximately 0.008 percent of the disturbance approved or projected within the CESA. The Proposed Action for HC/CUEP includes reclamation and weed control measures, which would minimize long-term, residual effects. The

12 acres is a reallocation of currently authorized acres of surface disturbance. The effects on vegetation resources from the Proposed Action are not expected to measurably increase the cumulative effects on vegetation resources. As such, the cumulative effects would continue to be regional, long-term, and moderate.

Waste Rock Facility Alternative

Effects on vegetation resources from currently authorized surface disturbing activities and fire are regional, long-term, and moderate. The Waste Rock Facility Alternative for the reallocation of 40 acres of surface disturbance to underground exploration activities is approximately 0.03 percent of the disturbance approved or projected within the CESA. The Waste Rock Facility Alternative for HC/CUEP includes reclamation and weed control measures, which would minimize long-term, residual effects. The 40 acres is a reallocation of currently authorized acres of surface disturbance. The effects on vegetation resources from the Proposed Action are not expected to measurably increase the cumulative effects on vegetation resources. As such, the cumulative effects would continue to be regional, long-term, and moderate.

No Action

Surface exploration activities would continue as currently authorized under the No Action Alternative. The applicant-committed EPMs, BMPs, and reclamation would continue to be implemented. Cumulative effects to vegetation are not anticipated; however, effects on vegetation resources from currently authorized surface disturbing activities and fire would remain as regional, long-term, and moderate.

3.7 Forestry and Woodland Resources

This section describes the forestry and woodland resources found within the HC/CUEP Plan boundary and analyses effects of the Proposed Action and alternatives. Direct and indirect effects consider the resource within the HC/CUEP Plan boundary. The cumulative effects analysis considers past, present, and RFFAs included in **Table 2-3** that have involved disturbance to woodland resources within a geographic area encompassing the southwestern portion of Pine Valley, the southern portion of Crescent Valley, and the northern portion of Grass Valley.

3.7.1 Affected Environment Forestry and Woodland Resources

Forestry and woodland resources found within the HC/CUEP Plan boundary include commercial and personal firewood and pine nut collection. Vegetation communities included in these activities are: Pinyon-Juniper Woodland, Burned Pinyon-Juniper, Mountain Mahogany, Burned Mountain Mahogany, Juniper Woodland, Burned Juniper Woodland, Pygmy Conifer Woodland, Curl-leaf Mountain Mahogany plus Pines, and Pygmy Conifer Forest. Pinyon-Juniper Woodland is the most extensive of these communities, covering approximately 6,049 acres (27.1 percent) of the HC/CUEP area.

Exploration activities have disturbed 420 acres (as of March 2016), or 1.9 percent, of the HC/CUEP area. A portion of this disturbance includes the vegetation communities that support

forestry and woodland resources. Of the types considered as supporting forestry and woodland resources, the Burned Pinyon-Juniper type has experienced the majority of disturbance. This type is extensive in the HC/CUEP area, mapped as covering 1,507 acres, and may support commercial and personnel firewood collection activities. Other dominant types include Pinyon-Juniper Woodland and Juniper Woodland, which combined total 6,547 acres. Exploration activities have not restricted public access for the continuation of forestry and woodland uses. As stated in the currently authorized applicant-committed EPMs, Barrick has minimized where possible any injury or removal of pinyon pine, juniper, aspen, limber pine, or mountain mahogany during activities associated with drill pad and road construction. Pinyon pine and juniper that has been removed due to exploration activities is made available to the public.

3.7.2 Environmental Consequences Forestry and Woodland Resources

The 2015 HC/CUEP EA analyzed effects on forestry and woodland resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

The forestry and woodland resources analysis was based on an assessment of field-verified, vegetation mapping and anticipated effects of proposed surface disturbance relative to the resource uses.

Effects Context for Forestry and Woodland Resources

Localized: Internal to the HC/CUEP Plan boundary.

Regional: Effects would occur outside of the HC/CUEP Plan boundary.

Short-term: Effects would last for up to 1 year or for the typical regeneration time frame of the native vegetation community, and may affect forestry and woodland uses for the project duration.

Long-term: Effects would last for longer than the typical regeneration time frame of the native vegetation community and may affect forestry and woodland uses for longer than the project duration.

Intensity of Effects Definitions for Forestry and Woodland Resources

Negligible: Effects on forestry and woodland resources would not be detectable; use of and access to woodland products would continue to be provided.

Minor: Effects on forestry and woodland resources would occur, however applicant-committed EPMs and BMPs would offset adverse effects and allow for continued use of and access to woodland products. Reclamation would restore the woodland communities in time.

Moderate: Effects on forest and woodland resources would be readily apparent and may alter the resource use. Additional mitigation would be necessary to reduce adverse effects.

Major: Effects on forest and woodland resources would occur and would substantially change the resource use. Additional mitigation would be necessary to reduce adverse effects, and its success could not be guaranteed.

3.7.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Surface disturbance under the Proposed Action would occur within the Pinyon-Juniper Woodland vegetation type. Direct effects to forestry and woodland resources would occur, as 12 acres of the Pinyon-Juniper Woodland vegetation type would be removed. Indirect effects on product users would be mitigated by providing harvested wood products to local communities. Barrick would continue to implement the forestry and woodland resources applicant-committed EPM. The HC/CUEP area would not be restricted from permissible uses such as firewood collection and pine nut collection. Effects would be localized, long-term, and minor.

3.7.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Surface disturbance would occur within the Pinyon-Juniper Woodland vegetation type. Direct effects to forestry and woodland resources would occur, as 40 acres of the Pinyon-Juniper Woodland vegetation type would be removed. Indirect effects on product users would be mitigated by providing harvested wood products to local communities. Barrick would continue to implement the forestry and woodland resources applicant-committed EPM. The HC/CUEP area would not be restricted from permissible uses such as firewood collection and pine nut collection. Effects would be localized, long-term, and minor.

3.7.2.3 No Action

Under the No Action Alternative surface exploration as currently authorized would continue. Direct effects to forestry and woodland resources may occur under the currently authorized disturbance on up to 549 acres, as vegetation types that provide these resources may be removed. Indirect effects on product users would be mitigated by continuing to allow public access to harvest these resources or use harvested wood products. Effects would be negligible.

3.7.2.4 Cumulative Effects

The CESA for forestry and woodland resources includes the geographic area encompassing the southwestern portion of Pine Valley, the southern portion of Crescent Valley, and the northern portion of Grass Valley. The cumulative assessment considers other past, present, and RFFAs listed in Table 2-3, including vegetation affected by the 1999 fires.

Proposed Action

Other past, present, and RFFAs listed in Table 2-3 have resulted in removal of forestry and woodland resources. The 1999 fires impacted an estimated 90,000 acres of the CESA. Total surface disturbance estimated from these other past, present, and RFFAs equals 142,682 acres. This total does not account for acres by vegetation types, nor does it account for acres reclaimed. The authorized surface disturbance of up to 549 acres is approximately 0.4 percent of the disturbance approved or projected within the CESA.

Pinyon-juniper trees harvested within the 12 acres of surface disturbance for the Proposed Action would be made available to the public. Additionally, pinyon-juniper areas surrounding the 12 acres of surface disturbance would be available not only for personal harvest and pine nut collection, but also for commercial use under a commercial deadwood permit. With continued implementation of these applicant-committed EPMs, cumulative effects to forestry and woodland resources would be localized, long-term, and minor.

Waste Rock Facility Alternative

Pinyon-juniper trees harvested within the 40 acres of surface disturbance for the Waste Rock Facility Alternative would be made available to the public. Additionally, pinyon-juniper areas surrounding the 40 acres of surface disturbance would be available not only for personal harvest and pine nut collection, but also for commercial use under a commercial deadwood permit. These applicable applicant-committed EPMs would be implemented. Cumulative effects to forestry and woodland resources would be localized, long-term, and minor.

No Action

Under the currently authorized HC/CUEP Plan, a portion of available woodland resources may be affected by surface disturbance – this proportion would not change. Access to and availability of forestry and woodland products would not be prevented. Cumulative effects would be negligible.

3.8 Soils

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to soils. The direct and indirect analysis includes soil resources found within the HC/CUEP Plan boundary. The CESA includes a geographic area encompassing the southwestern portion of Pine Valley, the southern portion of Crescent Valley, and the northern portion of Grass Valley. Past, present, and RFFAs are listed in Table 2-3.

3.8.1 Affected Environment Soils

Soils in the HC/CUEP area have been mapped and described by the Natural Resources Conservation Service (NRCS) in the soil surveys of Eureka (NRCS 2013a) and Lander (NRCS 2013b) counties, Nevada. There are 29 soil map unit associations in the HC/CUEP Plan boundary (**Figure 3-7**). Acreages for these units and a brief summary of map unit characteristics are shown in **Table 3-6**. Full descriptions of the individual soil map units are available online as Soil Survey Geographic Database (SSURGO) reports.

A field investigation of soils in HC/CUEP was completed in 2014 (SMITH 2014). The locations of soil test pits are shown on **Figure 3-7**. The objectives of the investigation were to evaluate the ground conditions identified in the NRCS soil map units and verify the vegetation communities occurring across the different soils. Results are presented below in **Table 3-6**. The complete field report entitled *Soils Investigation of the Horse Canyon-Cortez Unified Exploration Project Plan of Operations Area in Eureka County and Lander County, Nevada* (SMITH 2014) is available in the project record.

The HC/CUEP area is largely comprised of soils derived from tuffaceous sandstone and limestone and igneous rocks, occurring as residuum and colluvium deposits that occupy moderate to steep hillslopes at higher elevations. In general, these soils are coarse and well drained; a shallow restrictive layer is common. Organic material in these soils is low (less than 5 percent). Soil associations may contain minor loess and volcanic ash deposits in addition to residuum and colluvium. Alluvial deposits occupy a minor component of the HC/CUEP area, occurring in valley bottoms and lower elevations. These soils tend to be deep, moderately permeable, and well-drained.

3.8.1.1 Major Land Resource Areas and Ecological Sites

Major Land Resource Areas (MLRAs) are geographically associated land resource units used in statewide and regional planning (NRCS 2014). The HC/CUEP area contains portions of three MLRAs: MLRA 24 – Humboldt Area, MLRA 25 – Owyhee High Plateau, and MLRA 28B – Central Nevada Basin and Range. The Proposed Action and Waste Rock Facility Alternative are within MLRA 25 – Owyhee High Plateau. Within each MLRA there are numerous ecological sites. Ecological sites provide a consistent framework for describing and classifying rangeland and forestland soils and vegetation associations. Ecological site descriptions (ESDs) are written for the individual ecological sites which comprise the larger MLRA units. The ESDs provide information to evaluate the land as to whether it is suitable for various land-uses, capable of responding to different management activities or disturbance processes, and whether it is able to sustain productivity over the long term (NRCS 2014). Ecological sites are subdivisions of natural landscapes that are differentiated in terms of the historic climax plant community (original or natural potential) they are capable of supporting. An ecological site is the product of all of the environmental factors responsible for its development including soils, topography, climate, and fire (UNR 2014).

ESDs for the HC/CUEP area are under revision, but not all are yet final or approved by the NRCS, and are therefore unavailable for public distribution at this time (NRCS 2016). As of June 2016,

there are 10 “provisional” ESDs for HC/CUEP. Provisional ESDs have undergone both quality control and quality assurance protocols. It is expected that the provisional ESDs will continue to be refined towards an approved status (NRCS 2016). The best available information on ecological sites was obtained from the NRCS website and from SSURGO reports. Ecological sites are listed for each soil map unit in **Table 3-7**.

A provisional ESD contains a grouping of soil units that respond similarly to ecological processes. A provisional ESD contains 1) enough information to distinguish it from similar and associated ecological sites and 2) a draft state and transition model (STM) capturing the ecological processes and vegetative states and community phases as they are currently conceptualized.

STMs are a component of an ESD and describe the dynamic pathways through which the plant community may be modified as a result of plant interactions (phase changes), or as plant communities transition to altered states (by crossing thresholds). STMs describe the kinds and amount of vegetation or the site’s ability to respond to management or natural disturbance. These models also include rehabilitation pathways that describe how altered states can return to the reference state (i.e., the ESD), if possible or known. Phase changes are easily reversible versus transitions to altered states, which are impossible or uneconomical to reverse (NRCS 2016).

The Proposed Action and Waste Rock Facility Alternative are within soil map unit 1233, Perwick-Puett-Tulase association, eroded. The soil map unit is described as residuum derived from lacustrine deposits and siltstone, and residuum and colluvium derived from sedimentary rocks and tuff; depth to a root restrictive layer, bedrock, paralithic, is 10-20; 20 to 39 inches; well- drained; shrink-swell potential is low. The ecological sites listed for this map unit are *F025XY059NV Juniperus osteosperma/ Artemisia tridentata ssp. wyomingensis /Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* and *R025XY019NV Loamy 8-10 P.z*.

3.8.1.2 Soils Field Inventory

Soil test pits were dug by hand at 26 locations within the HC/CUEP boundary. The locations were pre-determined based on ESCO Associates, Inc. (ESCO) vegetation data and NRCS soil map units. Soil profile sampling locations are shown on **Figure 3-7** (SMITH 2014). Soils were classified to the series level. Samples were obtained from each horizon for purposes of characterizing the horizon and to determine suitability of the soil for plant growth.

Table 3-7 lists the soil profile sample (pit) number, soil series mapped in the field, and NRCS soil association. The differences between NRCS soils data and field verification data were determined to be relatively minor, and explainable due to the fact that NRCS-mapped associations are derived from remotely-sensed data and landscape-scale interpretations of geology and topography.

Figure 3-7 NRCS Soil Associations and Soil Pit Locations

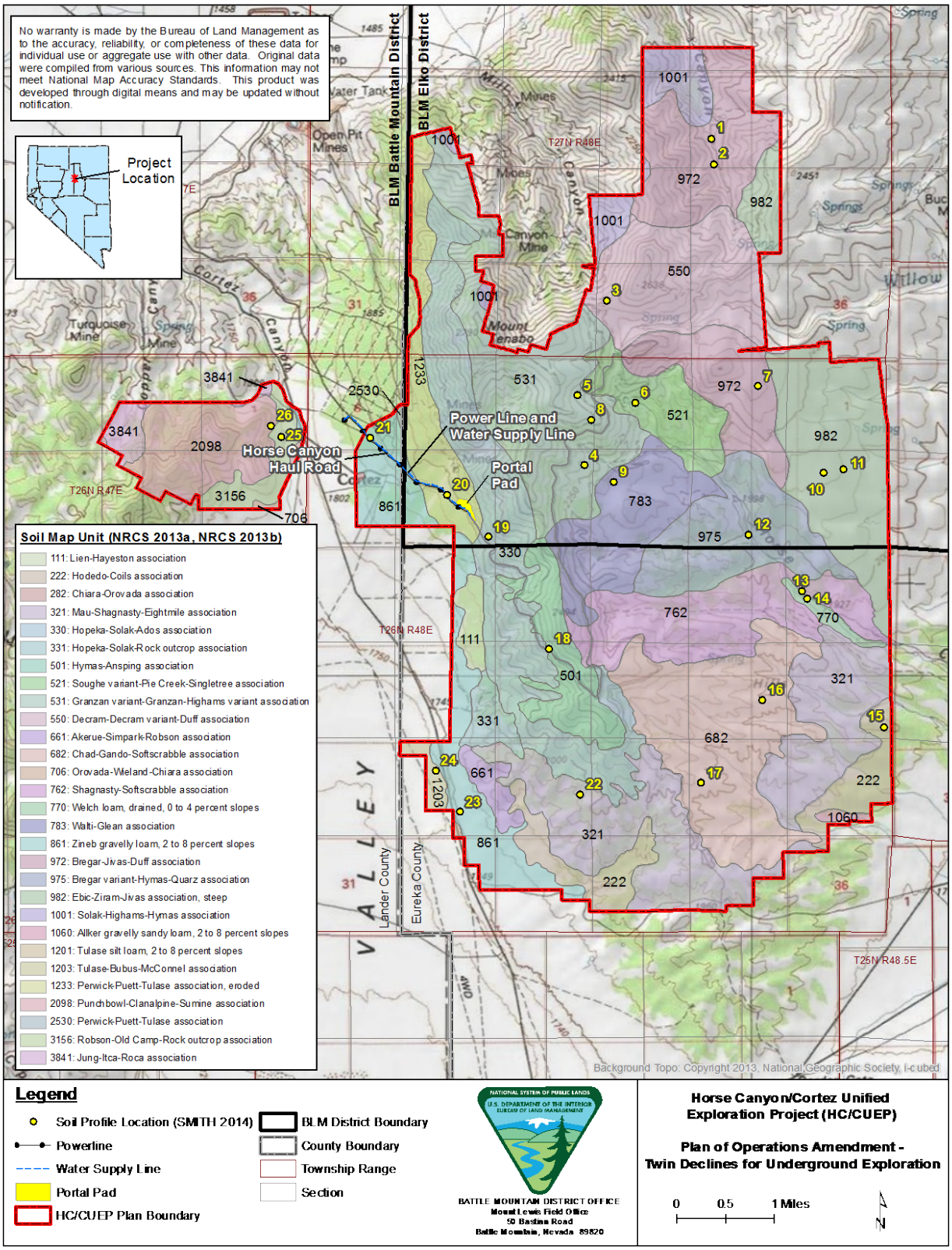


Table 3-6 NRCS Soil Associations and ESDs of the HC/CUEP Area

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Mau-Shagnasty-Eightmile association (321) Mau (45 percent (%)) *R028BY007NV Loamy 10-12 P.z*. ecological site Shagnasty (30%) and Eightmile (15%) *F024XY049NV Pinus monophylla-Juniperus osteosperma/Artemisia tridentata ssp. vaseyana / Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site	Residuum and coluvium derived from volcanic rocks (igneous and metamorphic); depth to a root restrictive layer, bedrock, lithic, is 20 to 39 inches; well-drained; shrink-swell potential is low to moderate. Includes small areas of open and active, recontoured/seeded.	2,323.8	10.4
Hopeka-Solak-Ados association (330) Hopeka (45%) and Ados (15%) *F024XY051NV Pinus monophylla-Juniperus osteosperma / Artemisia nova /Achnatherum thurberianum Pseudoroegneria spicata ssp. spicata* ecological site Solak (25%) *R028BY016NV Shallow Calcareous Slope 8-10 P.z.* ecological site	Colluvium, alluvium and residuum derived from limestone and dolomite; depth to a root restrictive layer, lithic, is 4 to 10 inches (Hopeka), 10 to 20 inches (Solak), petrocalcic, is 20 to 34 inches (Ados); well-drained; shrink swell potential is low.	1,970.5	8.8
Chad-Gando-Softscrabble association (682) Chad (45%) *R028BY027NV Shallow Calcareous Slope 14+ P.z*. ecological site Gando (20%) *R028BY034NV Mountain Ridge 12-14 P.z.* ecological site Softscrabble t (20%) *R028BY030NV Loamy 12-16 P.z.* ecological site	Residuum derived from mixed rocks, loess and volcanic ash; depth to a root restrictive layer, bedrock, paralithic, is 39 to 59 inches; well –drained; shrink-swell potential is low (Gando and Softscrabble) to high (Chad component only).	1,898.0	8.5
Granzan variant-Granzan-Highams variant association (531) Granzan variant (40%) *R028BY042NV Mahogany Thicket* ecological site Granzan (35%) *R025XY009NV South Slope 12-14 P.z.* ecological site	Residuum and colluvium derived from limestone and calcareous shale; depth to a root restrictive layer, bedrock, paralithic, is 25 to 39 inches, lithic, is 39 to 59 inches; well-drained; shrink-swell potential is low.	1,875.7	8.4

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Highams (15%) *R025XY024NV Mountain Ridge* ecological site	Includes recontoured/seeded roads.		
Bregar-Jivas-Duff association (972) Bregar (55%) *R025XY024NV Mountain Ridge* ecological site Jivas (20%) *R025XY009NV South Slope 12- 14 P.z.* ecological site Duff (15%) *R025XY012NV Loamy Slope 12-16 P.z.* ecological site	Residuum and colluvium derived from volcanic rocks and quartzite; depth to a root restrictive layer, bedrock, lithic, is 5 to 12 inches (Bregar), 39 to 59 inches (Jivas); well-drained; shrink-swell potential is low to moderate (Duff). Includes open and active, recontoured/seeded areas.	1,834.5	8.2
Ebic-Ziram-Jivas association, steep (982) Ebic (35%) and Ziram (35%) *R025XY017NV Claypan 12-16 P.z.* ecological site Jivas (15%) *R025XY009NV South Slope 12-14 P.z.* ecological site	Residuum and colluvium derived from volcanic rocks; depth to a root restrictive layer, bedrock, lithic, is 20 to 30 inches, 39-59 (Ziram); well-drained; shrink-swell potential is moderate to low (Jivas).	1,711.9	7.7
Decram-Decram variant-Duff association (550) Decram (50%) and Decram variant (20%) *R025XY024NV Mountain Ridge* ecological site Duff (20%) *R025XY012NV Loamy Slope 12-16 P.z*. ecological site	Residuum derived from quartzite, chert and volcanic rocks; depth to a root restrictive layer, bedrock, lithic, is 20 to 39 inches, 39 to 59 inches (Duff); well-drained; shrink-swell potential is low to moderate (Duff).	1,238.4	5.6
Shagnasty-Softscrabble association (762) Shagnasty (60%) *F024XY049NV Pinus monophylla-Juniperus osteosperma/ Artemisia tridentata ssp. vaseyana/ Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site Softscrabble (25%) *R028BY030NV Loamy 12-16 P.z.* ecological site	Residuum and colluvium derived from igneous and metamorphic rocks; depth to a root restrictive layer, bedrock, paralithic, is 50 to 59 inches, greater than 60 inches (Softscrabble); well-drained; shrink-swell potential is low to moderate. Includes open and active area.	1,217.5	5.5
Zineb gravelly loam, 2 to 8 percent slopes (861)	Alluvium derived from mixed rocks and volcanic ash; depth to a root restrictive	1,122.0	5.0

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Zineb (100%) *R025XY019NV Loamy 8-10 P.z.* ecological site	layer is greater than 60 inches; well-drained; shrink-swell potential is low.		
Bregar variant-Hymas-Quarz association (975) Bregar variant (50%) and Hymas (20%) *F024XY049NV Pinus monophylla-Juniperus osteosperma/Artemisia tridentata ssp. vaseyana/Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site Quarz (20%) *R025XY009NV South Slope 12-14 P.z.* ecological site	Resdiuum and colluvium derived from mixed rocks (Bregar variant and Quarz) and limestone (Hymas); depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches (Bregar variant and Hymas), 20 to 30 inches (Quarz); somewhat excessively drained (Bregar variant) and well-drained (Hymas and Quarz); shrink-swell potential is low (Bregar variant and Hymas) and moderate (Quarz). Includes open and active, recontoured/seeded areas	1,084.8	4.9
Walti-Glean association (783) Walti (70%) *R028BY037NV Claypan 12-14 P.z.* ecological site Glean (15%) *R028BY030NV Loamy 12-16 P.z.* ecological site	Colluvium and residuum derived from volcanic rocks; depth to a root restrictive layer, bedrock, lithic, is 20 to 30 inches, 39 to 59 inches (Glean); well-drained; shrink-swell potential is high (Walti) to low (Glean). Includes small areas of open and active, recontoured/seeded	946.3	4.2
Punchbowl-Clanalpine-Sumine association (2098) Punchbowl (40%) *R024XY030NV Shallow Calcareous Loam 8-10 P.z.* ecological site Clanalpine (30%) *F024XY054NV Pinus monophylla/Artemisia tridentata ssp. vaseyana/Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site	Residuum weathered from mixed (Punchbowl and Sumine), colluvium derived from volcanic rock and/or residuum weathered from volcanic rock (Clanalpine), and colluvium derived from mixed (Sumine); depth to a root restrictive layer, bedrock, lithic, is 8 to 14 inches (Punchbowl) and 20 to 39 inches (Sumine), paralithic, is 20 to 39 inches (Clanalpine); well-drained; shrink-swell potential is low (Punchbowl and Sumine) and moderate (Clanalpine).	797.7	3.6

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Sumine (15%) *R024XY029NV South Slope 12-16 P.z.* ecological site			
Perwick-Puett-Tulase association, eroded (1233) Perwick (40%) and Puett (35%) *F025XY059NV Juniperus osteosperma/ Artemisia tridentata ssp. wyomingensis /Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site Tulase (15%) *R025XY019NV Loamy 8-10 P.z.* ecological site	Residuum derived from lacustrine deposits and siltstone, and residuum and colluvium derived from sedimentary rocks and tuff; depth to a root restrictive layer, bedrock, paralithic, is 10-20; 20 to 39 inches; well-drained; shrink-swell potential is low.	709.3	3.2
Hodedo-Coils association (222) Hodedo (60%) *F024XY049NV Pinus monophylla-Juniperus osteosperma /Artemisia tridentata ssp. vaseyana / Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site Coils (25%) *R028BY007NV Loamy 10-12 P.z.* ecological site	Alluvium derived from mixed rocks (volcanic and sedimentary); depth to a root restrictive layer, duripan, is 20 to 26 inches; well-drained; shrink-swell potential is high.	730.1	3.3
Hymas-Ansping association (501) Hymas (55%) and Ansping (30%) *F024XY049NV Pinus monophylla-Juniperus osteosperma/ Artemisia tridentata ssp. vaseyana/ Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site	Residuum and colluvium derived from limestone, depth to restrictive layer, bedrock, lithic is 10 to 20 inches; and alluvium and colluvium derived from limestone, sedimentary and volcanic rocks, depth to a root restrictive layer, duripan, is 39 to 55 inches; well-drained; shrink-swell potential is low.	615.8	2.8
Soughe variant-Pie Creek-Singletree association (521) Soughe variant (50%) *F024XY049NV Pinus monophylla-Juniperus osteosperma/Artemisia tridentata ssp. vaseyana/Pseudoroegneria spicata ssp. spicata-*	Residuum derived from mixed rocks (Soughe variant) and tuff (Pie Creek) and residuum and colluvium derived from igneous rocks, loess, and volcanic ash (Singletree); depth to a root restrictive layer, bedrock, paralithic, is 12 to 20 inches	599.4	2.7

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Achnatherum thurberianum ecological site Pie Creek (20%) *R025XY018NV Claypan 10-12 P.z.* ecological site Singletree (20%) *R025XY012NV Loamy Slope 12-16 P.z.* ecological site	(Soughe variant), 39 to 59 inches (Singletree), lithic, is 23 to 39 inches (Pie Creek); well-drained; shrink-swell potential is high (Soughe variant and Pie Creek) and low (Singletree). Includes open and active, recontoured/seeded areas.		
Solak-Highams-Hymas association (1001) Solak (40%) *R028BY016NV Shallow Calcareous Slope 8-10 P.z.* ecological site Highams (25%) *F024XY051NV Pinus monophylla-Juniperus osteosperma/Artemisia nova/Achnatherum thurberianum Pseudoroegneria spicata ssp. spicata* ecological site Hymas (25%) *F024XY049NV Pinus monophylla-Juniperus osteosperma/Artemisia tridentata ssp. vaseyana/Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site	Residuum and colluvium derived from mixed rocks (Solak) and limestone (Hymas) and residuum derived from limestone and dolomite (Highams); depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches; somewhat excessively drained (Solak) and well-drained (Highams and Hymas); shrink-swell potential is low (Solak and Hymas) and moderate (Highams).	472.0	2.1
Robson-Old Camp-Rock outcrop association (3156) Robson (50%) *R024XY018NV Claypan 10-12 P.z.* ecological site Old camp (20%) *R024XY005NV Loamy 8-10 P.z.* ecological site Rock outcrop (15%)[1]	Residuum weathered from igneous rock (Robson) and colluvium derived from volcanic rock and/or residuum weathered from volcanic rock (Old camp); depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches; well-drained; shrink-swell potential is moderate (Robson) and low (Old Camp).	260.7	1.2
Hopeka-Solak-Rock outcrop association (331) Hopeka (40%) *F024XY051NV Pinus monophylla-Juniperus osteosperma/Artemisia nova/Achnatherum thurberianum Pseudoroegneria*	Residuum and colluvium derived from limestone and dolomite (Hopeka) and mixed rocks (Solak); depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches (Hopeka) and 10 to	181.6	0.8

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
spicata ssp. spicata ecological site Solak (35%) *R028BY016NV Shallow Calcareous Slope 8-10 P.z.* ecological site Rock outcrop (10%)[1]	20 inches (Solak); well-drained (Hopeka) and somewhat excessively drained (Solak); shrink-swell potential is low.		
Akerue-Simpark-Robson association (661) Akerue (40%) and Simpark (35%) *R028BY016NV Shallow Calcareous Slope 8-10 P.z.* ecological site Robsin (10%) *R028BY037NV Claypan 12-14 P.z*. ecological site	Residuum derived from volcanic rocks and quartzite; depth to a root restrictive layer, duripan, is 14 to 20 inches; well-drained; shrink-swell potential is low to moderate.	161.9	0.7
Jung-Itca-Roca association (3841) Jung (35%) *R028BY016NV Shallow Calcareous Slope 8-10 P.z.* ecological site Itca (25%) *F024XY054NV Pinus monophylla/Artemisia tridentata ssp. vaseyana/Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site Roca (25%) *R024XY028NV South Slope 8-12 P.z.* ecological site	Colluvium derived from volcanic and sedimentary rock and/or residuum weathered from volcanic and sedimentary rock; depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches (Itca and Jung), 20 to 39 inches (Roca); well-drained; shrink-swell potential is moderate.	146.5	0.7
Lien-Hayeston association (111) Lien (40%) *F024XY051NV Pinus monophylla-Juniperus osteosperma /Artemisia nova /Achnatherum thurberianum Pseudoroegneria spicata ssp. spicata* ecological site Lien (30%) *R028BY011NV Shallow Calcareous Loam 8-10 P.z.* ecological site Hayeston (15%) *R028BY010NV Loamy 8-10 P.z.* ecological site	Alluvium derived from mixed rocks, loess and volcanic ash; depth to a root restrictive layer, duripan, is 6 to 14 inches; well-drained; shrink-swell potential is low.	142.6	0.6
Tulase-Bubus-McConnel association (1203)	Alluvium derived from mixed rocks, loess and volcanic ash; depth to a root restrictive layer is greater	92.2	0.4

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Tulase (40%) and McConnel (15%) *R024XY005NV Loamy 8-10 P.z.* ecological site Bubus (30%) *R024XY002NV Loamy 5-8 P.z.* ecological site	than 60 inches; well-drained; shrink-swell potential is low.		
Welch loam, drained, 0 to 4 percent slopes (770) Welch (95%) is in the *R028BY024NV Loamy Bottom 14+ P.z*. ecological site	Alluvium derived from volcanic rocks; depth to a root restrictive layer is greater than 60 inches; moderately well-drained; shrink-swell potential is moderate. Includes small areas of open and active, recontoured/seeded.	87.3	0.4
Allker gravelly sandy loam, 2 to 8 percent slopes (1060) Allker (85%) R024XY005NV Loamy 8-10 P.z. ecological site	Alluvium derived from mixed rocks and loess; depth to a root restrictive layer is greater than 60 inches; well-drained; shrink-swell potential is low.	35.8	0.2
Chiara-Orovada association (282) Chiara (50%) and Orovada (40%) *R024XY005NV Loamy 8-10 P.z.* ecological site	Alluvium derived from mixed (Chiara) and loess over alluvium derived from mixed (Orovada); depth to a root restrictive layer is greater than 60 inches (Orovada), duripan, is 10 to 20 inches (Chiara); well-drained; shrink-swell potential is low.	18.7	0.1
Orovada-Wieland-Chiara association (706) Orovada (45%), Wieland (25%), and Chiara (15%) *R024XY005NV Loamy 8-10 P.z.* ecological site	Loess over alluvium derived from mixed (Orovada), volcanic ash and/or alluvium derived from mixed and/or loess (Wieland), and alluvium derived from mixed (Chiara); depth to a root restrictive layer is greater than 60 inches (Orovada and Wieland), duripan, is 10 to 20 inches (Chiara); well-drained; shrink-swell potential is low (Orovado and Chiara) and moderate (Wieland).	12.4	0.1
Perwick-Puett-Tulase association (2530)	Residuum weathered from sedimentary rock and/or tuff	10.8	<0.1

Association (map units) and Ecological Sites	Characteristics	Acres	Percent Total
Perwick (40*%)* and Puett (30%) *F025XY059NV Juniperus osteosperma/Artemisia tridentata ssp. wyomingensis/Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum* ecological site Tulase (15%) *R024XY005NV Loamy 8-10 P.z.* ecological site	(Perwick and Puett), colluvium derived from tuff and/or sedimentary rock (Puett), volcanic ash and/or alluvium derived from mixed and/or loess (Tulase); depth to a root restrictive layer is greater than 60 inches (Tulase), bedrock, paralithic, is 20 to 39 inches (Perwick), 10 to 20 inches (Puett); well-drained; shrink-swell potential is low.		
Tulase silt loam, 2 to 8 percent slopes (1201) *R025XY019NV Loamy 8-10 P.z.* ecological site.	Alluvium derived from mixed rocks, loess and volcanic ash; depth to a root restrictive layer is greater than 60 inches; well-drained; shrink-swell potential is low.	8.7	<0.1
TOTAL		**22,307**	**100**

Table 3-7 Field Investigation Soil Profile – Soil Map Unit Relationships

Soil Profile	Soil Series	Classification to Family
1	Badhap	Bregar-Jivas-Duff Association (Map Unit 972)
2	Badhap	Bregar-Jivas-Duff Association (Map Unit 972)
3	Fairydell	Decram-Decram Variant-Duff Association (Map Unit 550) (Different series, but not deeper family; deeper to bedrock.)
4	Madeline	Granzan Variant-Granzan-Highams Variant Association (Map Unit 531) (Similar to Higrams Variant but layer of hard bedrock at less than 20 inches versus layer of soft bedrock; different family.)
5	Badhap	Granzan Variant-Granzan-Highams Variant Association (Map Unit 531) (Temperature regime found with the Badhap is cryic rather than frigid, which is consistent with topographic location of soil pit.)
6	Glean	Soughe Variant-Pie Creek-Singletree Association (Map Unit 521) (Not consistent with any series in the NRCS map unit; soil plot in landform (drainage swale) not consistent with surrounding landscape.)
7	Jivas	Bregar-Jivas-Duff Association (Map Unit 972)
8	Baldridge	Granzan Variant-Granzan-Highams Variant Association (Map Unit 531) (Similar to Granzan Series, but lacks a calcic horizon; soil pit is in landform typical of map unit.)
9	Lone	Walti-Glean Association (Map Unit 783) (Not like any series in NRCS map unit; landform is typical; differs by including a duripan at 29 inches instead of bedrock.)
10	Ebic	Ebic-Ziram-Jivas Association steep (Map Unit 982)

Soil Profile	Soil Series	Classification to Family
11	Ebic	Ebic-Ziram-Jivas Association steep (Map Unit 982)
12	Pie Creek	Bregar Variant-Hymas-Quarz Association (Map Unit 975) (Similar to Quarz, but differs due to percent of rock fragments is less in Pie Creek)
13	Shagnasty	Shagnasty-Softscramble Association (Map Unit 762)
14	Welch	Welch Loam, 0-4% slopes (Map Unit 770)
15	Hodedo	Bregar-Jivas-Duff Association (Map Unit 972) (Similar to Jivas Series, but differs due to lower percentage of rock fragments, presence of duripan, and greater than 35% clay in argillic horizon; therefore, Great Group differs.)
16	Softscrabble	Chad-Gando-Softscrabble Association (Map Unit 682)
17	Chad	Chad-Gando-Softscrabble Association (Map Unit 682)
18	Hopeka	Hymas-Ansping Association (Map Unit 501) (Similar to Hymas, but differs due to lack of mollic epipedon, which changes the Order)
19	Hopeka	Hopeka-Solak-Ados Association (Map Unit 330)
20	Crookston Variant	Perwick-Puett-Tulase Association, Eroded (Map Unit 1233) (Unlike components of NRCS map unit; more similar to Tulase Series, but still differs by particle size class, presence of duripan and mollic epipedon; therefore Order is different than Tulase; landform is typical of map unit.)
21	Bannion	Zineb gravelly loam, 2-8% slopes (Map Unit 861) (Similar to Zineb, except for presence of duripan rather than only duric material, which changes suborder)
22	Lone	Mau-Shagnasty-Eightmile Association (Map Unit 321) (Similar to Mau, except for presence of duripan rather than only duric material; less clay and lack of argillic horizon; therefore, suborder changes.)
23	Cewat	Zineb gravelly loam, 2-8% slopes (Map Unit 861) (Similar to Zineb, except for lack of duric material, which changes subgroup.)
24	Turpin	Tulase-Bubus-McConnel Association (Map Unit 1203)
25	Robson	Robson-Old Camp-Rock Outcrop Association (Map Unit 3156)
26	Sumine	Punchbowl-Clanalpine-Sumine Association (Map Unit 2098)

3.8.2 Environmental Consequences Soils

The 2015 HC/CUEP EA analyzed effects on soils within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

The soils analysis in this EA used publicly available data of soil mapping units and ecological site descriptions from the NRCS. Soil mapping units were field-verified. Soil types were qualitatively assessed relative to anticipated effects of proposed surface disturbance, underground exploration, and reclamation activities. Adverse effects would include soil removal, soil loss due to erosion, profile mixing, compaction, contamination, and loss of productivity.

Effects Context for Soils

Localized: Internal to the HC/CUEP Plan boundary.

Regional: Effects would occur outside of the HC/CUEP Plan boundary.

Short-term: Effects would not permanently alter the soil properties, or effects would last for up to 1 year.

Long-term: Effects would alter soil properties, possibly permanently, and/or last for longer than 1 year.

Intensity of Effects Definitions for Soils

Negligible: Effects to soils would be so slight as to not be measurable.

Minor: Effects to soils may occur, such as removal of topsoil, but would be offset with implementation of applicant-committed EPMs, BMPs, and reclamation.

Moderate: Adverse effects on soils would occur and would be measurable, even with implementation of applicant-committed EPMs, BMPs, and reclamation. Additional mitigation may be necessary to offset adverse effects.

Major: Adverse effects on soils would occur, even with implementation of applicant-committed EPMs, BMPs, and reclamation. Additional mitigation would be necessary to offset adverse effects, but effects would likely substantially change soil properties, and its success could not be guaranteed.

3.8.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The portal pad would occur in the Perwick-Puett-Tulase association, eroded (1233) soil map unit. Soil test pit 20 (Crookston Variant soil series) coincides with the area where the portal pad would occur. Near surface growth media would be salvaged from the portal pad area and would be stockpiled at the Cortez Hills Mine growth media stockpile.

The proposed power line and water supply line would be located within existing disturbance on the Horse Canyon Haul Road. This portion of the existing Horse Canyon Haul Road is within the soil map unit called Zineb gravelly loam, 2 to 8 percent slopes (861). Soil test pit 21 (Bannion soil series) coincides with this area.

Soils overlying the underground components of the Proposed Action would not be affected and are not discussed further in this EA.

The current surface disturbance within the HC/CUEP Plan boundary is 420 acres (as of March 2016). The amount of disturbance under the Proposed Action would remain within the currently authorized amount of 549 acres.

Surface exploration activities disturb the soil surface, increasing the potential for erosion from wind and water. Compaction of soils may reduce nutrient uptake and aeration, and cause reduced infiltration rates and increased runoff. Currently authorized applicant-committed EPMs to prevent adverse effects to soils, such as soil loss and compaction, are included in the Proposed Action. Erosion and runoff control measures, such as water bars, ditching, and other water control structures are used in areas of surface disturbance. Erosion prevention BMPs and general exploration BMPs are outlined in the HC/CUEP Plan and included as part of the Proposed Action (**Appendix A**).

Reclamation activities, outlined in Section 2.1.7, also offset soil loss and compaction. After the underground exploration activities are completed, the areas subject to surface disturbance would be re-graded, contoured, and available topsoil/growth medium would be replaced. Seeding would be completed using the site-appropriate mix and amounts (Section 2.1.7). Revegetation activities are commenced at the earliest feasible time following exploration activities.

Effects on soils from the Proposed Action would be localized, long-term, and minor. Effects would be minimized with implementation of the applicant-committed EPMs, BMPs, and reclamation practices. Long-term effects would be rectified once exploration is complete, growth medium is returned and seeded, and vegetation is reestablished.

3.8.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Under the Waste Rock Facility Alternative, 40 acres of surface disturbance would occur. Soil map units affected would be the same as those described for the Proposed Action. Effects on soils from the Waste Rock Facility Alternative would be localized, long-term, and minor. Effects would be minimized with implementation of the applicant-committed EPMs, BMPs, and reclamation practices. Reclamation specific to the waste rock disposal facility would include recontouring, placement of growth media, and seeding. Long-term effects would be rectified once exploration is complete, growth medium is returned and seeded, and vegetation is reestablished.

3.8.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue as currently authorized under the terms and conditions of current permits and approvals. Effects to soils would be localized, long-term, and negligible to minor. Reclamation practices would

commence as surface exploration activities are completed. The applicant-committed EPMs and BMPs for erosion control would continue to be implemented and reclamation would continue under the current reclamation permit to minimize long-term effects.

3.8.2.4 Cumulative Effects

The CESA for soils includes past, present, and RFFAs listed in Table 2-3 that have involved disturbance to soils within a geographic area encompassing the southwestern portion of Pine Valley, the southern portion of Crescent Valley, and the northern portion of Grass Valley.

Proposed Action

Total surface disturbance estimated from other past, present, and RFFAs equals 142,682 acres. This total does not account for acres reclaimed.

Cumulative effects on soils from currently authorized surface disturbing activities are regional, long-term, and moderate. The Proposed Action for the reallocation of 12 acres of surface disturbance to underground exploration activities is approximately 0.008 percent of the disturbance approved or projected within the CESA. The Proposed Action includes the continued implementation of the applicant-committed EPMs, BMPs, and reclamation currently authorized to prevent and minimize effects to soils. The effects from the Proposed Action are not expected to measurably increase the cumulative effects on soils. As such, the cumulative effects would continue to be regional, long-term, and moderate.

Waste Rock Facility Alternative

Cumulative effects on soils from currently authorized surface disturbing activities are regional, long-term, and moderate. The reallocation of 40 acres of surface disturbance for the Waste Rock Facility Alternative to underground exploration activities is approximately 0.03 percent of the disturbance approved or projected within the CESA. The Waste Rock Facility Alternative includes the continued implementation of the applicant-committed EPMs, BMPs, and reclamation currently authorized to prevent and minimize effects to soils. The effects from the Waste Rock Facility Alternative are not expected to measurably increase the cumulative effects on soils. As such, the cumulative effects would continue to be regional, long-term, and moderate.

No Action

The HC/CUEP Plan for surface exploration would continue and the applicant-committed EPMs, BMPs, and reclamation to prevent or minimize effects to soils would be implemented. The cumulative effects on soils would continue to be regional, long-term, and moderate.

3.9 Wildlife Resources

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to general wildlife resources. The analysis of direct and indirect effects considered wildlife resources within the HC/CUEP Plan boundary. The CESA considered the list

of past, present, and RFFAs included in Table 2-3. Special status species are discussed in Section 3.10.

A separate Wildlife Report was prepared to support the 2015 HC/CUEP EA (Tetra Tech 2015); it is incorporated by reference and is available in the project record. The report includes agency coordination, and describes key habitats in the HC/CUEP Plan boundary, methods and results from baseline field surveys, and provides detailed natural history information for wildlife species that are expected or known to occur within the HC/CUEP area. Updates to baseline inventories that have been completed since the 2015 HC/CUEP EA are included below.

3.9.1 Affected Environment Wildlife Resources

HC/CUEP exploration activities have resulted in 420 acres (as of March 2016) of surface disturbance, which equates to 1.9 percent of the land surface within the HC/CUEP Plan boundary. The majority of surface disturbance has occurred in the Horse Canyon area in the sagebrush, burned sagebrush, lower montane woodlands/chaparral, and burned lower montane woodlands/chaparral land cover types. Activities have been conducted in accordance with currently authorized applicant-committed EPMs and BMPs, which were developed to minimize potential effects on wildlife and provide for avoidance of seeps/springs and wetland habitat. In previously burned areas, reclamation of HC/CUEP disturbed areas has improved wildlife habitat from burned conditions.

Up to 549 acres of surface disturbance associated with surface exploration activities are currently authorized to occur within the HC/CUEP Plan boundary (BLM 2015a). Activities are authorized to occur incrementally over a 10-year period. Disturbance is localized, consisting of relatively small polygon features.

3.9.1.1 Habitat Types

The BLM IM 2006-114 uses the 2012 Nevada Wildlife Action Plan (WAP) (WAPT 2012) to identify wildlife species assemblages and key habitats for land use planning. Key habitats were identified in the HC/CUEP area by reclassifying the vegetation types mapped by ESCO (ESCO 2014) to fit into the WAP categories (see Wildlife Report for more information).

3.9.1.2 General Wildlife

The Wildlife Report describes big game, furbearers, upland game, and non-game species that may inhabit the HC/CUEP area (Tetra Tech 2015). The northern half of the HC/CUEP area is mapped as year-round mule deer (*Odocoileus hemionus*) range and the southern half is mapped as crucial winter range (NDOW 2014). There are small areas in the southeastern, southwestern, and western portions of the HC/CUEP area that are mapped as year-round pronghorn antelope (*Antilocapra americana*) habitat (NDOW 2010). In addition, pronghorn winter range is located approximately 0.5 mile south and east of the HC/CUEP area (NDOW 2010).

The majority of surface disturbance has occurred in Horse Canyon, in the sagebrush, burned sagebrush, lower montane woodlands/chaparral, and burned lower montane woodlands/chaparral land cover types; resulting in a loss of these habitats for wildlife use. The existing surface

disturbance consists of linear or relatively small polygon features, including access roads, drill pads, and recontoured/seeded areas. Exploration activities are conducted according to the applicant-committed EPMs, detailed in **Appendix A**, and the reclamation activities authorized by current permits and approvals (BLM 2015a). Applicant-committed EPMs provide for avoidance of seeps/springs and wetland habitat; thus, this habitat type has not been impacted. In previously burned areas, reclamation of HC/CUEP disturbed areas has improved wildlife habitat from burned conditions.

3.9.1.3 Fisheries

There are no perennial streams and; therefore, no fisheries occur in the HC/CUEP area. The fisheries resource is not discussed further in this EA.

3.9.2 Environmental Consequences Wildlife Resources

The 2015 HC/CUEP EA analyzed the effects of up to 549 acres of disturbance for surface exploration on wildlife resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b). The wildlife analysis in this EA used publicly available data of species' distributions and habitat types to qualitatively assess whether effects would be caused by proposed surface disturbance, underground exploration, and reclamation activities. Adverse effects would include direct effects to individuals (i.e. mortality caused by vehicle collisions), changes to habitat quality or loss of habitat, habitat fragmentation, and habitat avoidance or behavior modification due to human presence or disturbance.

Effects Context for Wildlife Resources

Localized: Effects would be limited to one site or habitat, or one part of a population.

Regional: Effects would occur across a landscape and would affect habitats important to supporting a population.

Short-term: One year or less for individual or habitat; 5 years or less for a population.

Long-term: Greater than 1 year for individual or habitat; greater than 5 years for a population.

Intensity of Effects Definitions for Wildlife Resources

Negligible: Effects on wildlife would be slight and would not result in a loss of individuals or habitat.

Minor: Effects to individuals or habitat may occur, but adverse effects would be minimized with implementation of applicant-committed EPMs, BMPs, and reclamation. Overall population viability would not be affected.

Moderate: Adverse effects on individuals and/or habitat would be likely, and may cause a change in the population (e.g. abundance, distribution) at a local level. Even with implementation of

applicant-committed EPMs, BMPs, and reclamation, effects would be measureable and additional mitigation may be necessary to further reduce or reverse adverse effects.

Major: Adverse effects on individuals and/or habitat would occur. The effects would be highly noticeable and may be permanent. Additional mitigation would be necessary to further offset adverse effects. Overall population viability may be affected.

3.9.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Effects on wildlife that would occur as a result of the Proposed Action include habitat alteration, fragmentation, and loss as a result of removing vegetation, disturbing soil, and increasing the potential for weed invasions. The Proposed Action would occur in the Lower Montane Woodlands and Chaparral habitat type, as mapped by the WAP. The reallocation of 12 acres represents a small incremental habitat loss, 0.05 percent of land cover in the HC/CUEP Plan boundary. Adverse effects on wildlife due to habitat alteration, fragmentation, and loss would be localized, long-term, and minor.

Wildlife may also be affected by human presence and associated traffic and noise, resulting in short or long-term avoidance of localized areas where activities are proposed. Traffic and increased human presence would be limited to along the existing Horse Canyon Haul Road and at the portal pad for the 5 years during underground exploration and the additional 2 years for reclamation. The adverse effect from human activity would be localized, long-term, and minor.

It is expected that incremental reduction of Lower Montane Woodlands and Chaparral habitat type in localized areas of the HC/CUEP Plan boundary as a result of the Proposed Action may affect wildlife use of immediately surrounding habitat and may result in habitat fragmentation. The effect of potential habitat fragmentation caused by the Proposed Action is likely to be localized, long-term, and minor due to the nature of the proposed disturbance, which is small in terms of total acreage, would occur over a 7-year period, and would be reclaimed.

Surface disturbance and vehicular traffic may cause the introduction or spread of undesirable weed species. Existing control measures, the noxious weed management plan, and the reclamation plan would minimize adverse effects of weed invasions on wildlife habitat. Implementation of the reclamation plan would result in conversion of HC/CUEP disturbed areas to herbaceous and grass communities until shrubs become re-established and reach maturity.

Other procedures to minimize effects to specific wildlife species and/or particular wildlife habitat features are included in the applicant-committed EPMs (**Appendix A**). These measures are discussed in more detail below.

Big Game

The proposed portal pad would be located within both year-round and crucial winter range for mule deer. Approximately 2.4 percent of the mule deer habitat within HC/CUEP may be altered under the currently authorized 549 acres of surface disturbance. There would be no change to this proportion of potential disturbance as a result of the Proposed Action.

Noise and human presence may limit mule deer use in the vicinity of the Proposed Action. However, given the proximity to existing disturbance (Horse Canyon Haul Road), availability of suitable habitat in other areas of the Cortez Mountains, and the ability of the species to move relatively large distances, direct and indirect effects to the mule deer herd as a result of proposed disturbance or habitat alteration would be negligible to minor. Reclamation following completion of exploration activities would rectify long-term effects.

The increase in vehicular traffic on Horse Canyon Haul Road as a result of the Proposed Action may result in mule deer mortality due to motor vehicle collisions. However, vehicle collisions are likely to be few, and would not have a measurable impact on the overall Cortez Mountain mule deer population. Speed limits are posted and vehicle speeds reduced in areas of disturbance to minimize the potential for vehicle collisions. The effects on mule deer from the Proposed Action would be localized, long-term, and minor.

The Proposed Action would not affect year-round pronghorn habitat; as the majority of habitat for this species is located in adjacent valleys (Crescent Valley, Grass Valley, and Pine Valley). Effects on pronghorn behavior caused by noise and human presence would likely not occur, given that the primary habitat is in the valley basins. Pronghorn are typically found in the valley shrublands and are unlikely to use the woodland habitat around the Horse Canyon Haul Road. Effects on pronghorn from the Proposed Action would be negligible.

Small Game/Non-game Species

Small mammals and other small non-game species (such as reptiles) may experience direct mortality from vehicle collisions since it may be more difficult for these species to avoid large moving equipment. However, small species populations tend to recover more quickly from perturbations due to higher reproductive rates. Therefore, mortalities that may occur are unlikely to have long-term effects on populations. Habitat affected would be a small portion of available habitat and would occur at a local level, and would not have measurable, long-term effects on these species following reclamation. Effects on small game/non-game species would be localized, long-term, and minor.

3.9.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. Waste rock would not be trucked to the Cortez Hills Mine. Haul truck traffic along the Horse Canyon Haul Road would be less than under the Proposed Action. The

stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Placement of the waste rock disposal facility adjacent to the Horse Canyon Haul Road would occur in the same habitat as the Proposed Action - in the Lower Montane Woodlands and Chaparral habitat type, as mapped by the WAP. Effects on wildlife that would occur as a result of the Waste Rock Facility Alternative include habitat alteration, fragmentation, and loss as a result of removing vegetation, disturbing soil, and increasing the potential for weed invasions. The reallocation of 40 acres represents a small incremental habitat loss, 0.18 percent of land cover in the HC/CUEP Plan boundary. Adverse effects on wildlife due to habitat alteration, fragmentation, and loss would be localized, long-term, and minor.

Wildlife may also be affected by human presence and associated traffic and noise, resulting in short or long-term avoidance of localized areas where activities are proposed. Traffic and increased human presence would be limited to along the existing Horse Canyon Haul Road and at the portal pad for the 5 years during underground exploration and the additional 2 years for reclamation. Vehicle collisions would be less likely to occur under the Waste Rock Facility Alternative; waste rock would not be hauled to Cortez Hills, and would not have a measurable impact on wildlife. Speed limits are posted and vehicle speeds reduced in areas of disturbance to minimize the potential for vehicle collisions. The adverse effect from human activity would be localized, long-term, and minor.

It is expected that incremental reduction of Lower Montane Woodlands and Chaparral habitat type in localized areas of the HC/CUEP Plan boundary as a result of the Waste Rock Facility Alternative may affect wildlife use of immediately surrounding habitat and may result in habitat fragmentation in that area. The effect of potential habitat fragmentation caused by the Waste Rock Facility Alternative is likely to be localized, long-term, and negligible to minor due to the nature of the proposed disturbance, which is small in terms of total acreage, would occur over a 7-year period, and would be reclaimed.

Surface disturbance and vehicular traffic may cause the introduction or spread of undesirable weed species. Existing control measures, the noxious weed management plan, and the reclamation plan would minimize adverse effects of weed invasions on wildlife habitat. Implementation of the reclamation plan would result in conversion of HC/CUEP disturbed areas to herbaceous and grass communities until shrubs become re-established and reach maturity.

Other procedures to minimize effects to specific wildlife species and/or particular wildlife habitat features are included in the applicant-committed EPMs for previously authorized disturbance (**Appendix A**). These measures are discussed in more detail below.

Big Game

The proposed portal pad and waste rock facility would be located within both year-round and crucial winter range for mule deer. Approximately 2.4 percent of the mule deer habitat within the HC/CUEP Plan boundary may be altered at any one time under the currently authorized 549

acres of surface disturbance. There would be no change to this authorized proportion of potential disturbance as a result of the Waste Rock Facility Alternative.

Noise and human presence may limit mule deer use in the vicinity of the Waste Rock Facility Alternative. However, given the proximity to existing disturbance (Horse Canyon Haul Road), availability of suitable habitat in other areas of the Cortez Mountains, and ability of the species to move relatively large distances, direct and indirect effects to the mule deer herd would be negligible to minor. Reclamation following completion of exploration activities would rectify long-term effects.

Vehicle collisions would be less likely to occur under the Waste Rock Facility Alternative, since waste rock would not be hauled to the Cortez Hills Mine and therefore would not have a measurable impact on the overall Cortez Mountain mule deer population. Speed limits are posted and vehicle speeds reduced in areas of disturbance to minimize the potential for vehicle collisions.

The Waste Rock Facility Alternative would not affect year-round pronghorn habitat; as the majority of habitat for this species is located in adjacent valleys (Crescent Valley, Grass Valley, and Pine Valley). Effects on pronghorn behavior caused by noise and human presence would likely not occur, given that the primary habitat is in the valley basins. Pronghorn are typically found in the valley shrublands and are unlikely to use the woodland habitat around the Horse Canyon Haul Road. Effects on pronghorn from the Waste Rock Facility Alternative would be negligible.

Small Game/Non-game Species

Small mammals and other small non-game species (such as reptiles) may experience direct mortality from vehicle collisions since it may be more difficult for these species to avoid large moving equipment. However, the likelihood is reduced since waste rock would not be hauled to the Cortez Hills Mine. Mortalities that may occur are unlikely to have long-term effects on populations, since small species populations tend to recover more quickly due to higher reproductive rates. Habitat affected would be a small portion of available habitat and would occur at a local level; there would not be measurable, long-term effects on these species following reclamation. Effects on small game/non-game species under the Waste Rock Facility Alternative would be minor.

3.9.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue as currently authorized under the terms and conditions of current permits and approvals. The Proposed Action would not be approved. There would be no additional direct or indirect effects. Effects on wildlife and wildlife habitat would be localized, long-term, and minor.

3.9.2.4 Cumulative Effects

The CESA for wildlife resources includes the HC/CUEP Plan boundary and the area within which the list of past, present, and RFFAs occur (Table 2-3). For mule deer, the CESA is herd

management units 14 and 15. For pronghorn, the CESA is herd management unit 141, 143, 152, 154, and 155.

Proposed Action

The authorization of 549 acres of surface disturbance represents 2.5 percent of land within the HC/CUEP Plan boundary. This total percentage would not change with the reallocation of 12 acres. The Proposed Action identifies a specific location where 12 acres of currently authorized surface disturbance would occur, but does not increase the total authorized or change the incremental total. Exploration activities that have occurred under the currently authorized HC/CUEP Plan have been conducted according to applicant-committed EPMs in order to not result in measurable effects to wildlife resources. The applicant-committed EPMs would continue to be implemented under the Proposed Action. Implementation of applicant-committed EPMs and ongoing reclamation further minimize the potential for cumulative effects. Noise and human presence under the currently authorized HC/CUEP Plan is localized at active drill sites and reclamation areas, and is spaced over time. Truck traffic on the Horse Canyon Haul Road and activity at the portal pad would also be localized.

Other past, present, and RFFAs have likely caused or would cause habitat alteration and changes in wildlife behavior. Wildlife would likely continue to avoid localized areas of disturbance. Cumulative effects of these activities on wildlife are regional, long-term, and minor. The Proposed Action is not anticipated to increase the potential for cumulative effects due to the localized nature of proposed activities, the ability of wildlife to mobilize to other areas, and the continued implementation of currently authorized applicant-committed EPMs. Species that are mobile and able to live in a variety of habitats could adapt. The timeframe within which habitat alteration and the increase in human presence and noise would occur is as currently authorized. Once exploration is complete, and areas are reclaimed, habitats would be restored and species would likely return. Cumulative effects to wildlife species would continue to be regional, long-term, and minor.

Waste Rock Facility Alternative

The Waste Rock Facility Alternative identifies a specific location where 40 acres of currently authorized surface disturbance would occur, but does not increase the total authorized or change the incremental total. Surface exploration activities that have occurred under the currently authorized HC/CUEP Plan have been conducted according to applicant-committed EPMs in order to not result in measurable effects to wildlife resources. The applicant-committed EPMs would continue to be implemented under the Waste Rock Facility Alternative. Implementation of applicant-committed EPMs and ongoing reclamation further minimize the potential for cumulative effects. Noise and human presence under the currently authorized HC/CUEP Plan is localized at active drill sites and reclamation areas, and is spaced over time. Truck traffic on the Horse Canyon Haul Road and activity at the portal pad would also be localized; however, waste rock would not be hauled to the Cortez Hills Mine.

Other past, present, and RFFAs have likely caused or would continue to cause habitat alteration and changes in wildlife behavior. Wildlife would likely continue to avoid localized areas of disturbance. Cumulative effects of these activities on wildlife are regional, long-term, and minor. The Waste Rock Facility Alternative is not anticipated to increase the potential for cumulative effects due to the localized nature of proposed activities, the ability of wildlife to mobilize to other areas, and the continued implementation of currently authorized applicant-committed EPMs. Species that are mobile and able to live in a variety of habitats could adapt. The timeframe within which habitat alteration and the increase in human presence and noise would occur is as currently authorized. Once exploration is complete, and areas are reclaimed, habitats would be restored and species would likely return. Cumulative effects to wildlife species would continue to be regional, long-term, and minor.

No Action

Under the No Action Alternative, surface exploration and reclamation would continue under current terms and conditions of permits and approvals. Cumulative effects on wildlife and wildlife habitat would continue to be localized, long-term, and minor.

3.10 Special Status Species

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to special status species. Analyses of the direct and indirect effects includes special status species or habitats found within the HC/CUEP Plan boundary. The CESA for special status species includes the area defined by activities listed in **Table 2-3**. Species-specific analysis areas are identified for those particular species, as applicable.

BLM Manual 6840 defines special status species as: (1) species that are listed or proposed for listing under the Endangered Species Act (ESA), (2) species listed by a state in a threatened or endangered category implying potential endangerment or extinction, and (3) BLM sensitive species as designated by the State Director. BLM sensitive species are species that are given special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. The State of Nevada classifies wildlife species under NAC 503 as endangered, protected, sensitive, or threatened.

The ESA (Section 7) requires federal agencies to ensure that any activities they authorize, fund, or carryout, do not jeopardize the continued existence of any species federally listed, or proposed for listing, as threatened or endangered. An official ESA species list for HC/CUEP (Eureka and Lander counties) was obtained for the project through the USFWS Information, Planning, and Conservation System (IPAC) website.

A separate Wildlife Report was prepared to support the 2015 HC/CUEP EA (Tetra Tech 2015). It is incorporated by reference and available in the project record. The Wildlife Report includes agency coordination, and describes key habitats in the HC/CUEP area, methods and results from baseline field surveys, and provides detailed natural history information for special status species that are expected or known to occur within HC/CUEP.

3.10.1 Affected Environment Special Status Animal Species

The Wildlife Report provides a list of species considered for analysis in this EA and the rationale for inclusion or exclusion (Tetra Tech 2015). Species were excluded based on the absence of suitable habitat, or because the HC/CUEP area was not within the species' geographic range.

3.10.1.1 Threatened, Endangered, and Candidate Species

The USFWS currently lists one species under the ESA for Eureka and Lander counties (USFWS 2016). The Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*) is a threatened species. This species does not occur in the HC/CUEP area since there are no perennial streams within the HC/CUEP area (Tetra Tech 2015). There is no critical habitat designated within the HC/CUEP area (USFWS 2016).

3.10.1.2 BLM Sensitive and State-listed Species

Species are listed as BLM sensitive if there is evidence of a downward trend in population numbers, such that viability or a distinct population segment of the species is at risk across all or a significant portion of its range. A species may also be listed if it has a restricted geographic range, or requires specialized or unique habitat that occurs on BLM-administered land, and there is evidence that such areas are threatened such that the species' viability may be at risk. All Nevada state-listed species are also designated as BLM sensitive species.

BLM sensitive and state-listed species that occur or may occur in the HC/CUEP area along with their seasonal use, and associated WAP key habitats that occur within the HC/CUEP area, are shown in **Table 3-8**. Surveys for greater sage-grouse, pygmy rabbit (*Brachylagus idahoensis*), raptors, burrowing owl (*Athene cunicullariaa hypugaea*), and bat species have been completed. Natural history information for the remaining BLM sensitive and state-listed species is described in the Wildlife Report (Tetra Tech 2015).

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
Amphibians				
Northern Leopard Frog (*Rana pipiens*)	SP	Year-round	Intermountain Rivers and Streams, Springs and Springbrooks (WAPT 2012)	Historically occurred throughout most of Nevada but now occurs in patchy, isolated areas (Rogers and Peacock 2012). Potential habitat may be present in springs, along drainages, and associated upland areas in HC/CUEP.
Birds				
Bald Eagle (*Haliaeetus leucocephalus*)	S, SE, BCC	Winter	Sagebrush, Intermountain Cold Desert Shrub,	Winter resident in northern Nevada (Floyd et al. 2007).

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
			Intermountain Rivers and Streams (WAPT 2012)	Could forage in the HC/CUEP area.
Black Rosy-finch (*Leucosticte atrata*)	S, BCC	Migration and/or Winter	Lower Montane Woodlands and Chaparral; Grasslands and Meadows; Cliffs and Canyons; Caves and Mines; Sagebrush (Neel 1999, WAPT 2012)	Communal night roosts in winter consist mainly of abandoned mine shafts and adits, and natural caves (GBBO 2010). Suitable habitat exists within the HC/CUEP area.
Brewer's Sparrow (*Spizella breweri*)	S, SS, BCC	Spring - Summer	Sagebrush (WAPT 2012)	One of the most common birds in Nevada's shrublands (Floyd et al. 2007). Suitable habitat exists within the HC/CUEP area.
Ferruginous Hawk (*Buteo regalis*)	S, BCC	Spring, Summer, Fall	Sagebrush, Lower Montane Woodlands and Chaparral, Grasslands and Meadows, Cliffs and Canyons, Intermountain Cold Desert Shrub, Barren Lands (i.e., mine high walls) (WAPT 2012, Neel 1999)	Most commonly found where sagebrush is interspersed with occasional junipers (Floyd et al. 2007). Suitable habitat exists within or near the HC/CUEP area.
Golden Eagle (*Aquila chrysaetos*)	S, BCC	Year-round	Cliffs and Canyons, Barren Lands (i.e., mine high walls) (WAPT 2012)	Widespread in the rugged canyons, sagebrush foothills, and high mountains of Nevada (Floyd et al. 2007). Known to nest in the HC/CUEP area (GBE 2014, GBE 2015).
Greater Sage-grouse (*Centrocercus urophasianus*)	S, BCC	Year-round	Sagebrush; Intermountain Rivers and Streams (WAPT 2012, Neel 1999)	The sagebrush habitat along the southern foothills of the Cortez range in northern Grass Valley provides habitat for greater sage-grouse (BLM 2004a). Known to occur within the

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
				HC/CUEP area (NDOW 2014).
Loggerhead Shrike (*Lanius ludovicianus*)	S, SS, BCC	Year-round	Sagebrush, Lower Montane Woodlands and Chaparral (WAPT 2012)	Widespread in the shrublands of Nevada (Floyd et al. 2007). Suitable habitat exists within the HC/CUEP area.
Northern goshawk (*Accipiter gentilis*)	S	Year-round	Lower Montane Woodlands and Chaparral (GBBO 2010)	Nesting unlikely due to lack of mature forest, but may forage in the HC/CUEP area.
Pinyon Jay (*Gymnorhinus cyanocephalus*)	S, BCC	Year-round	Lower Montane Woodlands and Chaparral (WAPT 2012)	Wide ranging in Nevada and closely tied to pinyon pine trees (Neel 1999). Suitable habitat exists within the HC/CUEP area.
Sage Thrasher (*Oreoscoptes montanus*)	S, SS, BCC	Spring - Summer	Sagebrush (WAPT 2012)	Favors large expanses of undisturbed, tall sagebrush (Floyd et al. 2007). Suitable habitat exists within the HC/CUEP area.
Swainson's Hawk (*Buteo swainsoni*)	S	Spring, Summer, Early Fall	Sagebrush; Sagebrush, Grasslands and Meadows; Lower Montane Woodlands and Chaparral (Neel 1999)	Known to occur in valleys surrounding the HC/CUEP area, suitable foraging habitat exists within HC/CUEP area (Floyd et al. 2007).
Western Burrowing Owl (*Athene cunicularia hypugaea*)	S	Spring, Summer	Sagebrush, Grasslands and Meadows, Barren Lands, Intermountain Rivers and Streams (WAPT 2012, Neel 1999)	Found in a wide variety of arid and semi-arid environments, with well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground (Klute et al. 2003). Suitable habitat exists within the HC/CUEP area. Surveys conducted in 2014; burrowing owls were not detected (ARCADIS 2014a).
Mammals				
Big Brown Bat (*Eptesicus fuscus*)	S	Year-round	Lower Montane Woodlands and Chaparral;	In Nevada occurs from 300 to 3,000 meters (NBWG 2006). Suitable habitat

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
			Sagebrush; and Barren Lands (NBWG 2006).	exists within the HC/CUEP area. Identified in 2014 survey (ARCADIS 2014b).
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)	S, SP	Summer	Lower Montane Woodlands and Chaparral; Sagebrush; Grassland and Meadows (NBWG 2006).	In Nevada occurs from 210 to 2,550 meters (NBWG 2006). Suitable habitat exists within the HC/CUEP area. Not identified in 2014 survey (ARCADIS 2014b), but identified in 2015 survey (ERM 2016a).
California Myotis (*Myotis californicus*)	S	Year-round	Lower Montane Woodlands and Chaparral; Sagebrush; Grassland and Meadows (foraging), Caves and Mines (roosting) (NBWG 2006).	In Nevada occurs from 210 to 2,730 meters (NBWG 2006). Suitable habitat exists within the HC/CUEP area. Identified in 2014 survey (ARCADIS 2014b).
Canyon Bat (*Parastrellus hesperus*)	S	Year-round	Intermountain Cold Desert Shrub, Mojave Warm Desert Scrub, Sagebrush, Lower Montane Woodlands and Chaparral (foraging); Cliffs and Canyon, Caves and Mines (roosting) (NBWG 2006)	Not identified in 2014 survey (ARCADIS 2014b), but identified in 2015 survey (ERM 2016a).
Dark Kangaroo Mouse (*Microdipodops megacephalus*)	S, SP	Year-round	Sagebrush; Grasslands and Meadows (WAPT 2012)	Suitable habitat exists within the HC/CUEP area. Suitable habitat is not present within the area of the Proposed Action or the Waste Rock Facility Alternative.
Fringed Myotis (*Myotis thysanodes*)	S, SP	Year-round	Lower Montane Woodlands and Chaparral (foraging), Caves	In Nevada occurs from 420 to 2,160 meters (NBWG 2006). Suitable habitat

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
			and Mines (roosting) (WAPT 2012)	exists within the HC/CUEP area. Identified in 2014 survey (ARCADIS 2014b).
Hoary Bat (*Lasiurus cinereus*)	S	Year-round	Lower Montane Woodlands and Chaparral (foraging), Caves and Mines (roosting) (WAPT 2012)	Tree-associated species found primarily in forested uplands in Nevada; has also been recorded in juniper stands (NBWG 2006). Juniper woodlands occur in the HC/CUEP area. Not identified in 2014 survey (ARCADIS 2014b), but identified in 2015 survey (ERM 2016a).
Little Brown Myotis (*Myotis lucifugus*)	SS	Year-round	Intermountain Rivers and Streams (foraging); Lower Montane Woodlands and Chaparral (foraging and roosting); Cliffs and Canyons (roosting); Caves and Mines (roosting) (NBWG 2006)	Typically associated with coniferous forest and woodlands near water. May be found in human buildings/structures. Identified in 2014 survey (ARCADIS 2014b).
Long-eared Myotis (*Myotis evotis*)	S	Year-round	Lower Montane Woodlands and Chaparral, Sagebrush (foraging); Caves and Mines (roosting) (WAPT 2012)	In Nevada occurs from 690 to 3,090 meters (NBWG 2006). Suitable habitat exists within the HC/CUEP area. Identified in 2014 survey (ARCADIS 2014b).
Long-legged Myotis (*Myotis volans*)	S	Year-round	Lower Montane Woodlands and Chaparral; Sagebrush (NBWG 2006).	In Nevada occurs from 930 to 3,420 meters (NBWG 2006). Suitable habitat exists within the HC/CUEP area. Identified in 2014 survey (ARCADIS 2014b).
Pale Kangaroo Mouse (*Microdipodops pallidus*)	S	Year-round	Sagebrush; Grasslands and Meadows (WAPT 2012)	Suitable habitat exists within the HC/CUEP area. Suitable habitat is not present within the area of the Proposed Action or the

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
				Waste Rock Facility Alternative.
Pallid Bat (*Antrozous pallidus*)	S, SP	Year-round	Lower Montane Woodlands and Chaparral; Sagebrush (NBWG 2006).	In Nevada occurs from 420 to 2,580 meters (NBWG 2006). Known to occur within four miles of HC/CUEP (NDOW 2014). Habitat exists within the HC/CUEP area. Not identified in 2014 survey (ARCADIS 2014b), but identified in 2015 survey (ERM 2016a).
Pika (*Ochotona princeps)*	S, SP	Year-round	Cliffs and Canyons (i.e., rock outcrops), Grasslands	In Nevada and California, occurs from 6,000 to 12,750 feet (Millar and Westfall 2010). May occur in talus areas at high elevations in HC/CUEP area, especially where talus and grasslands are adjacent.
Pygmy Rabbit (*Brachylagus idahoensis*)	S	Year-round	Sagebrush (Green and Flinders 1980, WAPT 2012)	Occupied habitat and active burrows are present in the southwestern portion of the HC/CUEP Plan boundary (ARCADIS 2014c). Suitable habitat is not present within the area of the Proposed Action or the Waste Rock Facility Alternative.
Silver-haired Bat (*Lasionycteris noctivagans*)	S	Year-round	Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands, Aspen Woodland, Warm Desert Riparian (foraging and roosting). May hibernates in Cliffs and Canyons and Caves and Mines (NBWG 2006)	Not identified in 2014 survey (ARCADIS 2014b), but identified in 2015 survey (ERM 2016a).
Spotted Bat (*Euderma maculatum*)	S, ST	Year-round	Lower Montane Woodlands and Chaparral, Barren	Not known to occur in central Nevada, however, widely distributed throughout

Table 3-8 BLM Sensitive and State-listed Species

Species	Status[1]	Seasonal Use	WAP Key Habitat (in HC/CUEP Area)	Rationale for Consideration
			Lands (foraging); Cliffs and Canyons (roosting) (WAPT 2012)	the rest of the state, and suitable habitat exists within HC/CUEP area. Occurs from 540 to 2,130 meters (NBWG 2006). Not identified in 2014 survey (ARCADIS 2014b).
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	S, SS	Year-round	Lower Montane Woodlands and Chaparral (foraging); Caves and Mines (roosting) (WAPT 2012)	In Nevada occurs between 210 to 2,500 meters (NBWG 2006). This bat has been observed within four miles of the HC/CUEP area (NDOW 2014). Identified in 2014 survey (ARCADIS 2014b).
Western Pipistrelle (*Pipistrellus Hesperus*)	S	Year-round	Sagebrush; Lower Montane Woodlands and Chaparral (NBWG 2006).	In Nevada occurs from 210 to 2,550 meters (NBWG 2006). Suitable habitat exists within the HC/CUEP area.
Western Red Bat (*Lasiurus blossevillii*)	S, SS	Year-round	Warm Desert Riparian (WAPT 2012)	Not identified in 2014 survey (ARCADIS 2014b), but identified in 2015 survey (ERM 2016a).
Western Small-footed Myotis (*Myotis ciliolabrum*)	S	Year-round	Lower Montane Woodlands and Chaparral (foraging); Caves and Mines (roosting) (WAPT 2012)	In central Nevada commonly found in valley bottoms from 1,050 to 1,800 meters in a variety of habitats (NBWG 2006). Suitable habitat is possible in lower elevation portions of the HC/CUEP area. Identified in 2014 survey (ARCADIS 2014b).

[1] S = BLM sensitive species for Battle Mountain District or Statewide (BLM 2011c), SE = state endangered species; ST= state threatened, SP = state protected; SS = state sensitive species (NAC 503), BCC = Bird of Conservation Concern (USFWS 2008).

Greater Sage-grouse

In Nevada, greater sage-grouse are distributed throughout the northern two-thirds of the state, and along the state border with California. Although this species' historic range has been reduced, it is still found in relatively large populations in Elko, northern Humboldt, northern Washoe, Eureka, Lander, and White Pine counties (NDOW 2004).

Greater sage-grouse is a sagebrush-obligate species, meaning that it is restricted to sagebrush ecosystems and cannot survive in areas lacking this habitat. Sagebrush shrubs are used for forage and for nesting, brood-rearing, and fall/winter cover. Greater sage-grouse congregate at lekking grounds each spring (March 1 to May 15), where the males display breeding plumage to attract hens for mating. Nesting and early brood-rearing occurs from April through June (NDOW 2004). Nests are within 1.1 to 6.2 kilometers (0.7 to 3.9 miles) of the lek site on average (Connelly et al. 2000). Detail on greater sage-grouse seasonal habitat requirements are discussed in the Wildlife Report (Tetra Tech 2015).

The Nevada and Northeastern California Greater Sage-Grouse ARMPA implements the BLM's National Greater Sage-Grouse Conservation Strategy by incorporating greater sage-grouse conservation measures into land use plans (BLM 2015d). The ARMPA guides land and resource management on BLM-administered land to benefit greater sage-grouse and addresses threats identified in the 2013 USFWS Conservation Objectives Team (COT) report (USFWS 2013). Habitat management direction in the ARMPA includes avoiding and minimizing disturbance, or mitigating unavoidable disturbance in greater sage-grouse habitat to result in a net conservation gain to the species. Land use decisions are based on published habitat maps. The ARMPA direction eliminates surface disturbance in the highest value habitat (Sagebrush Focal Areas), avoids or limits new disturbance in PHMA, and minimizes disturbance in GHMA.

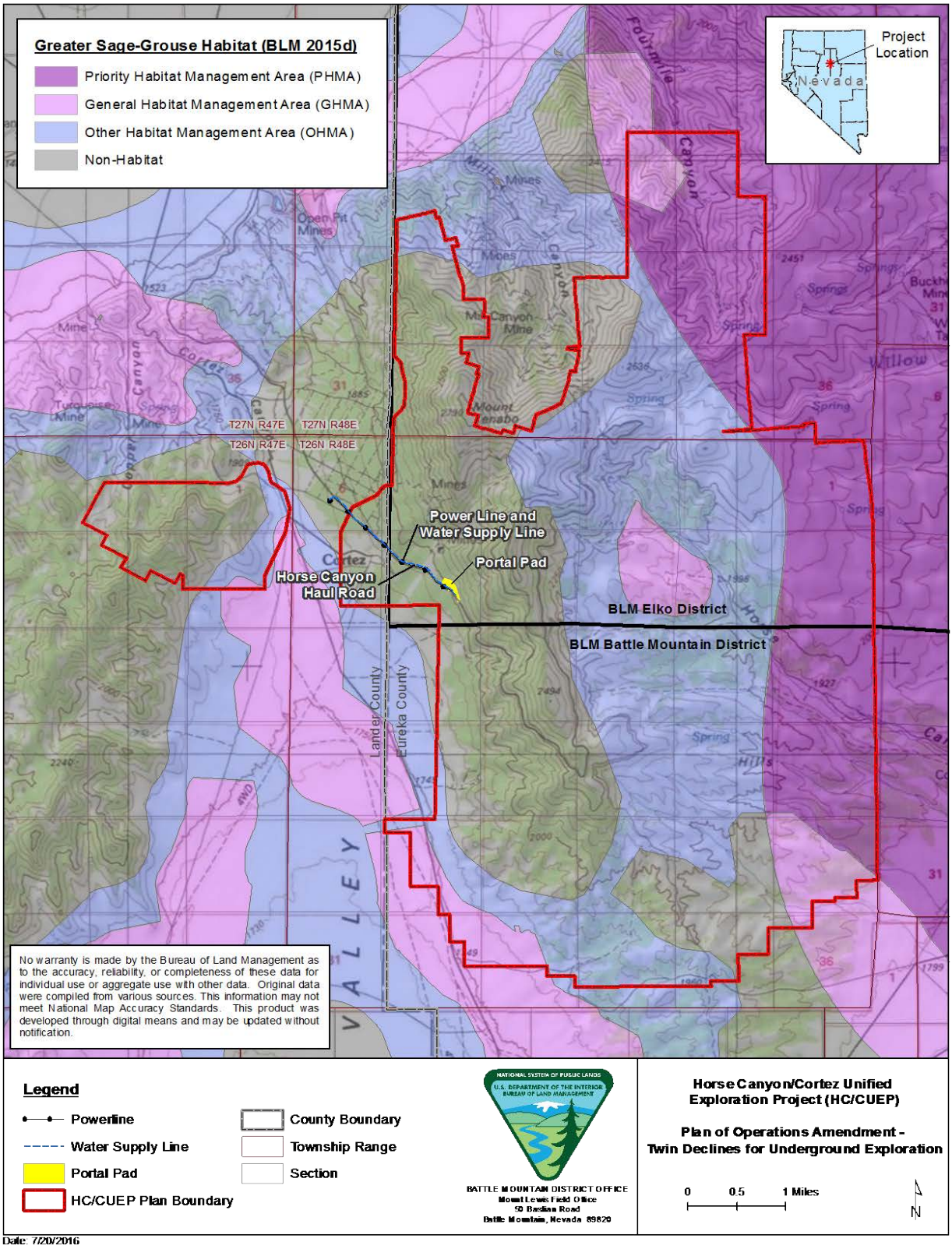
The greater sage-grouse habitat (BLM 2015d) mapped for the HC/CUEP area is shown in **Figure 3-8**. The Proposed Action is indicated as occurring within Non-habitat.

Greater Sage-grouse Leks

Greater sage-grouse lek activity surveys were conducted in the spring of 2014 in order to document a baseline status of known leks within 4 miles of the HC/CUEP Plan boundary (ARCADIS 2014d). Detail on the survey methodology is included in the Wildlife Report (Tetra Tech 2015). Within 4 miles of the HC/CUEP Plan boundary, five known leks were identified in the 2014 NDOW database, including one inactive lek (Horse Creek 02), two active leks (Horse Creek 01 and New Brock Canyon), and two leks where the status was unknown (Cortez-Grass Valley and Fye Canyon) (NDOW 2014). "Active" status is defined as two male greater sage-grouse sighted at least two times in the last 5 years (BLM 2014a).

The 2014 field surveys confirmed that Horse Creek 01 and New Brock Canyon leks were active in 2014 (ARCADIS 2014d). A new lek was also documented within 4 miles of the HC/CUEP Plan boundary, and is referred to herein as the "New Cortez-Grass Valley Lek" (ARCADIS 2014d). Cortez-Grass Valley, Fye Canyon, and Horse Creek 02 leks were inactive during the 2014 field surveys. The NDOW database request indicated that the Horse Creek 02 lek was inactive in 2015 (NDOW 2016). There are no greater sage-grouse leks located within 4 miles of the Proposed Action.

Figure 3-8 Greater Sage-Grouse Habitat (BLM 2015d)



Pygmy Rabbit

The pygmy rabbit is a sagebrush-obligate species. It is endemic to the Great Basin, where its range is centered on Nevada. Its distribution within this range is patchy (Keinath and McGee 2004). It is found on big sagebrush plains and alluvial fans, particularly in clumps of sagebrush that are tall and dense relative to the surrounding sagebrush (Green and Flinders 1980, Larrucea and Brussard 2008). Pygmy rabbits require deep, friable soils (such as loam) for excavating burrows. Its winter diet is almost exclusively sagebrush. In summer, about half of its diet is composed of sagebrush and also grasses (Green and Flinders 1980). It is slow-moving and susceptible to predation, and therefore dependent on cover for protection (NNHP 2014). Pygmy rabbit populations are at risk from loss and fragmentation of sagebrush habitat, particularly since they are not able to cross large barriers (e.g. playas, mountains) when dispersing (Keinath and McGee 2004).

A pygmy rabbit habitat suitability analysis was conducted in 2014. Ground surveys were also conducted in 2014 in habitat identified as suitable within the HC/CUEP boundary (ARCADIS 2014c). Pygmy rabbit individuals and active burrow systems were observed in five locations in the survey area, in or near the valley floor in the southwest portion of the HC/CUEP boundary. Occupied sites were located in or near dense stands of tall shrubs where soils were deep and friable and slopes were gentle. Some burrow systems contained multiple burrow entrances (10 or more burrows in a 50-foot radius). Areas where no pygmy rabbits were detected were characterized by short and low density shrubs. No suitable habitat was identified in the portion of HC/CUEP for the locations of the Proposed Action and Waste Rock Facility Alternative.

Migratory Birds

This section discusses migratory birds that occur or are expected to occur in the HC/CUEP area, with an emphasis on BLM priority birds. In order to focus management efforts, BLM has defined priority birds (BLM 2014a) as including USFWS Birds of Conservation Concern (BCC) (USFWS 2008) and USFWS Game Birds Below Desired Condition (GBBDC) (USFWS 2004). Some BLM priority birds are also listed as BLM sensitive species.

Over 500 bird species may be found inhabiting Nevada for all or portions of the year (NNHP 2014). For an overview list of birds observed or expected to occur in HC/CUEP, see the Wildlife Report (Tetra Tech 2015). The majority of birds that occur in the HC/CUEP area are protected under the Migratory Bird Treaty Act (MBTA), which prohibits take of a migratory bird or parts, nests, or eggs of such birds. Protected birds are those that annually migrate from summer breeding grounds to a different winter range. Species that are typically encountered in the HC/CUEP area include generalist species and species associated with sagebrush, grassland, pinyon-juniper, and mountain mahogany habitat types. Streamside habitat that would support riparian specialists is limited, and is restricted to patches along a 1.25-mile section of Fourmile Creek, and along Horse Creek in areas mapped as alluvial valley bottom. Cliff and rocky outcrop habitat is also present and supports nesting raptors, and likely other birds associated with rocky habitat.

Based on geographic range and habitat requirements, USFWS BCC that occur or are expected to occur in the HC/CUEP area in the spring/summer breeding season include: Calliope hummingbird (*Selasphorus calliope*), green-tailed towhee (*Pipilo chlorurus*), long-billed curlew (*Numenius americanus*), sage sparrow (*Artemisiospiza belli*), and Virginia's warbler (*Oreothlypis virginiae*). Mourning dove (*Zenaida macroura*) is a GBBDC that would occur in the HC/CUEP area year-round.

In addition, 20 species of raptors typically associated with open country and woodland habitat are known or expected to occur in the HC/CUEP area. See the Wildlife Report for a list of raptor species that may use the HC/CUEP area. Golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*) are BLM sensitive species, and they also receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA). Golden eagles are known to nest in and around HC/CUEP, and bald eagles may forage in the HC/CUEP area in winter months.

Aerial raptor nest surveys have been conducted annually within the HC/CUEP Plan boundary and a surrounding 10-mile area since 2012. In 2015, within the HC/CUEP Plan boundary there were four active raptor nests: one golden eagle nest located on a highwall, one red-tailed hawk (*Buteo jamaicensis*) nest located in a dead pinyon tree, and two great horned owl (*Bubo virginianus*) nests located in a juniper tree and a willow tree. None of the four active nests are located within the Proposed Action surface disturbance area (12 acres).

Within a 1-mile buffer of the HC/CUEP Plan boundary there were five active raptor nests: three golden eagle nests, one ferruginous hawk (*Buteo regalis*) nest, and one red-tailed hawk (*Buteo jamaicensis*) nest. Considering a 10-mile area from the HC/CUEP Plan boundary for golden eagles, there are an additional 11 active golden eagle nests (GBE 2015). See the 2015 Wildlife Report for more detail on raptor nests in the HC/CUEP Plan boundary (Tetra Tech 2015).

Burrowing Owl

Following a desktop assessment to determine areas of suitable habitat, field surveys were conducted to determine if burrowing owls are presently using the HC/CUEP area. A pedestrian survey for visual assessment combined with a broadcast-call survey was conducted in HC/CUEP between July 20 and August 11, 2014 (ARCADIS 2014a). No burrowing owls were detected and no occupied burrows were found in HC/CUEP (ARCADIS 2014a). See the Wildlife Report for more detail on the burrowing owl survey conducted at HC/CUEP.

Bats

Field surveys were conducted to identify species of bats using the HC/CUEP area (ARCADIS 2014b). Following a desktop assessment to determine where potential bat foraging and roosting habitat could exist in the HC/CUEP area, two acoustical bat monitoring stations were established. Site A was near a historical adit and perennial water sources within sagebrush. Site B was near a pit wall with rocky outcrops and cliffs nearby in pinyon-juniper vegetation; historical adits and shafts were also identified as occurring in the vicinity.

Data was collected from dusk to dawn for two consecutive days during three monitoring events (July, August, and October). Eight species were positively identified based on bat call analysis. Relative percent of total passes was also recorded. Additional bat species group determinations were made of those results that could not be identified to the species level. The species groups were based on call frequencies.

Results by species are as follows:

- Big brown bat (*Eptesicus fuscus*) 3%
- Townsend's big-eared bat (*Corynorhinus townsendii*) 1.5%
- California myotis (*Myotis californicus*) 1.5%
- Western small-footed myotis (*Myotis ciliolabrum*) 16%
- Long-eared myotis (*Myotis evotis*) 16%
- Little brown myotis (*Myotis lucifugus*) 28.5%
- Fringed myotis (*Myotis thysanodes*) 5%
- Long-legged myotis (*Myotis volans*) 3%

Site A yielded higher results than Site B, which was concluded to be due to Site A's proximity to water. See the Wildlife Report for more detail on the 2014 bat survey conducted at HC/CUEP.

An acoustic survey by ERM in 2015 identified potential calls from the Brazilian free-tailed bat (*Tadarida brasiliensis*), hoary bat (*Lasiurus cinereus*), canyon bat (*Parastrellus hesperus*), pallid bat (*Antrozous pallidus*), silver-haired bat (*Lasionycteris noctivagans*), and the western red bat (*Lasiurus blossevillii*) within the HC/CUEP Plan boundary (ERM 2016a, ERM 2016b).

3.10.2 Affected Environment Special Status Plant Species

There are no plant species federally listed or proposed for listing for Eureka and Lander counties. The Nevada Natural Heritage Program (NNHP) was contacted to obtain the species data maintained in their database for Nevada's at-risk, rare, endangered, and threatened species. A response was received on March 18, 2014. Based on the Geographic Information System (GIS) data received, there was one special status plant species occurrence in the HC/CUEP area: Beatley buckwheat (*Eriogonum beatleyae*). This is a BLM sensitive species for the BMD (BLM 2011c) and has been documented in upper Horse Canyon.

The BLM lists 27 sensitive plant species for the BMD and 19 for the Elko District (BLM 2011c). Of these, six species have been considered for occurrence in recent surveys of HC/CUEP. Only the Beatley buckwheat has been found (Buckner 2014).

Beatley buckwheat has been found in native and reclaimed areas as recently as 2013 (Buckner 2014). It is known to occur in rocky areas of shrubland and chaparral habitats (Natureserve 2014). Several similar species of *Eriogonum* have also been documented. Beatley buckwheat has been encountered at scattered locations throughout HC/CUEP while conducting general vegetation inventories. It appears to do well in disturbed areas (including the extensive burned

areas within HC/CUEP), which is typical of many other buckwheat species. It has been encountered elsewhere in the Cortez Mountains in Eureka County (Buckner 2014).

3.10.3 Environmental Consequences Special Status Species

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on special status species within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b). The June 2015 Decision Record authorizing the HC/CUEP Plan included specific measures for addressing potential effects to special status species, including greater sage-grouse. These measures continue to apply to all disturbance under the approved HC/CUEP Plan.

The special status species analysis in this EA used publicly available data of species' distributions and habitat types to qualitatively assess whether effects would occur due to proposed surface disturbance, underground exploration, and reclamation activities. Adverse effects would include direct effects to individuals (i.e. mortality caused by vehicle collisions), changes to habitat quality or loss of habitat, habitat fragmentation, and habitat avoidance or behavior modification due to human presence or disturbance.

Effects Context for Special Status Species

Localized: Effects would be limited to one site or habitat, or one part of a population.

Regional: Effects would occur across a landscape and would affect habitats important to supporting a population.

Short-term: One year or less for individual or habitat; 5 years or less for a population.

Long-term: Greater than 1 year for individual or habitat; greater than 5 years for a population.

Intensity of Effects Definitions for Special Status Species

Negligible: Effects on special status species would be slight and would not result in a loss of individuals or habitat.

Minor: Effects to individuals or habitat may occur, but adverse effects would be minimized with implementation of applicant-committed EPMs, BMPs, and reclamation. Overall population viability would not be affected.

Moderate: Adverse effects on individuals and/or habitat would be likely, and may cause a change in the population (e.g. abundance, distribution) at a local level. Even with implementation of applicant-committed EPMs, BMPs, and reclamation, effects would be measureable and additional mitigation may be necessary to further reduce or reverse adverse effects.

Major: Adverse effects on individuals and/or habitat would occur. The effects would be highly noticeable and may be permanent. Additional mitigation would be necessary to further offset adverse effects. Overall population viability may be affected.

3.10.3.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

General effects to wildlife that may occur as a result of the Proposed Action are described in Section 3.9.2.1. No threatened or endangered species occur in the HC/CUEP area; therefore, there would be no effects to these species.

Procedures to minimize effects to specific species and/or particular habitat are included in the applicant-committed EPMs as part of the Proposed Action (**Appendix A**). These include annual activity surveys. These also include seasonal and/or spatial restrictions around active migratory bird nests, active raptor nests, greater sage-grouse leks, and springs. There are spatial restrictions for bats near mine adits, shafts, and caves. These measures are discussed in more detail below by species. In addition, noxious and invasive weed control measures would continue to be implemented to prevent habitat degradation.

Migratory Birds

A total of 420 acres have been disturbed (as of March 2016). The surface disturbance has resulted in a reduction of migratory bird nesting and foraging habitat. The Proposed Action would disturb 12 acres of potential migratory bird nesting and foraging habitat and result in increases in noise and human activity at the portal pad and along the Horse Canyon Haul Road until reclamation is completed.

To minimize disturbance effects to breeding birds, Barrick has committed to conducting pre-disturbance migratory bird nest surveys in the spring and establishing exclusion zones around active nests as part of the applicant-committed EPMs. Additionally, surface disturbance clearance surveys would be conducted following BLM Wildlife Protocols (BLM 2014a) when a proposed activity would involve ground disturbance during the nesting season, defined by BLM as March 1 through July 31. Based on the localized and incremental nature of the Proposed Action, the ability of birds to move to other areas of HC/CUEP, the overall availability of suitable nesting and foraging habitat in other portions of the Cortez Mountains, and implementation of applicant-committed EPMs, the habitat reductions, noise, or human presence resulting from the Proposed Action would have a localized, long-term, and minor effect on migratory bird populations in the area.

Raptors

The primary impact to raptor species in HC/CUEP has been and would be from disturbance of nest sites and loss of foraging habitat. Seasonal and spatial restrictions on drilling and surface disturbing activities around active raptor nests are included in the applicant-committed EPMs to minimize noise and human presence around nests. Loss of foraging habitat would be temporary, as activities of the Proposed Action would occur for 7 years and disturbed areas would be

reclaimed. For the reasons stated above, effects of the Proposed Action on raptor populations would be localized, long-term, and negligible to minor.

Greater Sage-grouse

As previously noted in Section 2.1.2, the Proposed Action was designed to avoid effects to greater sage-grouse. Surface facilities associated with the Proposed Action are in greater sage-grouse Non-Habitat as mapped by BLM (BLM 2015d) in accordance with the ARMPA and the BEA.

There are no leks within a 4-mile radius of the surface facilities of the Proposed Action. The design of the portal pad considered the distance to the nearest lek to avoid effects associated with noise. The nearest lek, Horse Canyon 02, is more than 4 miles from the Proposed Action and is inactive. Construction of the underground declines would not affect surface resources in any of the greater sage-grouse habitat categories. Effects on greater sage-grouse from noise and human presence associated with the Proposed Action are not anticipated. There would be no direct or indirect effects on greater sage-grouse as a result of the Proposed Action. No long-term population-level effects or lek abandonment is expected as a result of the Proposed Action.

Pygmy Rabbit

The existing 420 acres of surface disturbance have not impacted pygmy rabbits. The Proposed Action would not affect suitable pygmy rabbit habitat. There would be no effect on pygmy rabbits as a result of the Proposed Action.

Pale and Dark Kangaroo Mouse

The Proposed Action would not occur in suitable habitat for the pale or dark kangaroo mouse. The 12 acres of surface disturbance for the Proposed Action would occur in Pinyon-Juniper Woodland land cover type, which is not pale or dark kangaroo mouse habitat. The soil pit near the location of the 12 acres indicated that the soil is well drained, fine loamy alluvium, with a duripan and mollic epipedon, which are soil characteristics not preferred by the pale or dark kangaroo mouse. The Proposed Action would not affect the pale or dark kangaroo mouse.

Burrowing Owl

The Proposed Action would not occur in suitable burrowing owl nesting habitat. This species was not detected during baseline surveys for the 2015 HC/CUEP EA. The Proposed Action would not affect burrowing owls.

Bats

Applicant-committed EPMs include avoiding drilling within 50 feet of adits, shaft openings, or caves and avoidance of seeps/springs and wetlands. No direct effects have occurred or would occur to roosting habitat and seep/spring/wetland foraging habitat, and indirect effects caused by noise and human presence would be minimized by the 50-foot set-back. Incremental loss in woodland habitat associated with underground exploration disturbance would occur. Lighting

occurring during nighttime operations may temporarily attract insects, and thus foraging bats, but lighting systems are relatively small and localized. Since roosting sites have been avoided, it is unlikely that night lighting has impacted roosting sites or interfered with circadian rhythms.

The bat surveys completed in 2014 and 2015 found that several bat species are using the HC/CUEP area during current levels of exploration activity. Of the two bat survey locations in the 2014 survey, the detector closest to a water source yielded the most bat use. The Proposed Action would not occur in close proximity to known water sources. The portals would be plugged upon completion of underground excavation activities. Given the widespread availability of suitable foraging habitat, applicant-committed EPMs, and proposed reclamation of the portals, the Proposed Action would have a localized, long-term, and negligible to minor effect on bat species.

Special Status Plant Species

Of the Nevada listed and BLM sensitive species, Beatley buckwheat has been found in HC/CUEP. It is reported as occurring in several locations, including native and reclaimed areas. The Proposed Action would not disturb known occurrences or suitable habitat for the Beatley buckwheat (rocky areas of shrubland and chaparral habitats). Given its seeming tolerance of disturbance and apparent affinity for low competition sites associated with disturbance (including reclamation) (Buckner 2014), the Proposed Action is not anticipated to result in a negative impact on the Beatley buckwheat. The Proposed Action would have no effect on special status plants.

3.10.3.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. Waste rock would not be hauled to the Cortez Hills Mine. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Migratory Birds

Applicant-committed EPMs would be implemented under the Waste Rock Facility Alternative. There would be a localized, long-term, and negligible to minor effect on migratory birds.

Raptors

Applicant-committed EPMs would be implemented under the Waste Rock Facility Alternative. Effects of the Waste Rock Facility Alternative on raptors would be localized, long-term, and negligible to minor.

Greater Sage-grouse

As previously noted in Section 2.2., the Waste Rock Facility Alternative was located and designed to avoid effects to greater sage-grouse. Surface facilities associated with the Waste Rock Facility

Alternative are in greater sage-grouse Non-Habitat as mapped by the BLM (BLM 2015d) in accordance with the ARMPA and the BEA.

There are no leks within a 4-mile radius of the surface facilities of the Waste Rock Facility Alternative. The design of the portal pad and waste rock disposal facility considered the distance to the nearest lek to avoid effects associated with noise. The nearest lek, Horse Canyon 02, is more than 4 miles from the Waste Rock Facility Alternative and is inactive. Construction of the underground declines would not affect surface resources in any of the greater sage-grouse habitat categories. Effects on greater sage-grouse from noise and human presence associated with the Waste Rock Facility Alternative are not anticipated. There would be no direct or indirect effects on greater sage-grouse as a result of the Waste Rock Facility Alternative. No long-term population-level effects or lek abandonment is expected as a result of the Waste Rock Facility Alternative.

Pygmy Rabbit

The existing 420 acres of surface disturbance have not impacted pygmy rabbits. The Proposed Action would not affect suitable pygmy rabbit habitat. There would be no effect on pygmy rabbits as a result of the Waste Rock Facility Alternative.

Pale and Dark Kangaroo Mouse

The Waste Rock Facility Alternative would not occur in suitable habitat for the pale or dark kangaroo mouse. The 40 acres of surface disturbance for the Waste Rock Facility Alternative would occur in Pinyon-Juniper Woodland land cover type, which is not pale or dark kangaroo mouse habitat. The soil pit near the location of the 40 acres indicated that the soil is well drained, fine loamy alluvium, with a duripan and mollic epipedon, which are soil characteristics not preferred by the pale or dark kangaroo mouse. The Waste Rock Facility Alternative would not affect the pale or dark kangaroo mouse.

Burrowing Owl

The Waste Rock Facility Alternative would not occur in suitable burrowing owl nesting habitat. This species was not detected during baseline surveys for the 2015 HC/CUEP EA. The Waste Rock Facility Alternative would not affect burrowing owls.

Bats

Applicant-committed EPMs would be implemented. No direct effects have occurred or would occur to roosting habitat and seep/spring/wetland foraging habitat, and indirect effects caused by noise and human presence would be minimized by the 50-foot set-back. The Waste Rock Facility Alternative would not occur in close proximity to known water sources. The portals would be plugged upon completion of underground excavation activities. Given the widespread availability of suitable foraging habitat, applicant-committed EPMs, and proposed reclamation of the portals, the Waste Rock Facility Alternative would have a localized, long-term, and negligible to minor effect on bat species.

Special Status Plant Species

The Waste Rock Facility Alternative would not disturb known occurrences or suitable habitat for the Beatley buckwheat (rocky areas of shrubland and chaparral habitats). Given its seeming tolerance of disturbance and apparent affinity for low competition sites associated with disturbance (including reclamation) (Buckner 2014), the Waste Rock Facility Alternative is not anticipated to result in a negative impact on the Beatley buckwheat. The Waste Rock Facility Alternative would have no effect on special status plants.

3.10.3.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue as currently authorized. Up to 549 acres of surface disturbance would be allowed to occur within the HC/CUEP Plan boundary. There would be no increase in haul truck traffic on the Horse Canyon Haul Road, thus eliminating the potential for effects associated with traffic in this localized area. The previously approved applicant-committed EPMs for special status species would continue to be implemented, which would minimize the effects from noise and human disturbance. Reclamation would continue, which would replace habitat affected by past exploration activities, and improve areas where habitat was lost due to past fire events.

Noxious and invasive weed control measures would continue to be implemented to prevent habitat loss. The No Action Alternative would continue to have localized, long-term, negligible to minor effects on some special status species.

3.10.3.4 Cumulative Effects

The CESA for special status species includes the HC/CUEP Plan boundary and the area defined by activities listed in Table 2-3.

Proposed Action

Special status species would likely avoid localized areas within HC/CUEP during exploration activities. Other past, present, and RFFAs have likely caused or would cause the same behavioral effect. Species that are mobile and able to live in a variety of habitats could adapt and population-level effects or long-term effects would not occur. Habitat alteration, fragmentation, and human presence and noise in the HC/CUEP area would occur for 10 years, plus an additional 2 years for reclamation; however, effects would be localized. Once surface exploration is complete, and areas are reclaimed, habitats would be restored and species would likely return. Cumulative effects to special status species would be localized, long-term, and negligible to minor.

Incremental effects to special status wildlife species and their habitat as a result of the Proposed Action, when combined with the effects from the past and present actions and RFFAs, and with the implementation of the BMPs and applicant-committed EPMs, would be negligible to minor. Cumulative effects to special status wildlife species from the Proposed Action would continue to be localized, long-term and negligible to minor.

The Proposed Action is not anticipated to affect special status plant species. Cumulative effects to special status plants would not occur.

Waste Rock Facility Alternative

Special status species would likely avoid localized areas within the HC/CUEP boundary during exploration activities. Other past, present, and RFFAs have likely caused or would cause the same behavioral effect. Species that are mobile and able to live in a variety of habitats could adapt and population-level effects or long-term effects would not occur. Habitat alteration, fragmentation, and human presence and noise in the HC/CUEP area would occur for 10 years, plus an additional 2 years for reclamation; however, effects would be localized. Once surface exploration is complete, and areas are reclaimed, habitats would be restored and species would likely return. Cumulative effects to special status species would be localized, long-term, and negligible to minor.

Incremental effects to special status wildlife species and their habitat as a result of the Waste Rock Facility Alternative, when combined with the effects from the past and present actions and RFFAs, and with the implementation of the BMPs and applicant-committed EPMs, would be negligible. Cumulative effects to special status wildlife species from the Waste Rock Facility Alternative would continue to be localized, long-term, and negligible to minor.

The Waste Rock Facility Alternative is not anticipated to affect special status plant species. Cumulative effects to special status plants would not occur.

No Action

Under the No Action Alternative, surface exploration activities would continue to contribute to disturbance, habitat alteration, and habitat fragmentation. Species are mobile and able to disperse to available habitats, and reclamation would gradually restore habitats as exploration is completed. Noise and human presence may cause wildlife to disperse into other areas, but this effect would diminish as exploration is terminated. Cumulative effects to special status species would continue to be localized, long-term, and negligible to minor.

The No Action Alternative is not anticipated to affect special status plant species. Cumulative effects to special status plants would not occur.

3.11 Grazing Management

This section presents resources related to grazing management, which include allotments and associated acreages found in HC/CUEP, and the permitted (active) AUMs associated with each allotment. The analysis area for direct, indirect, and cumulative effects to rangeland resources includes the allotments and associated AUMs that occur within the HC/CUEP Plan boundary.

3.11.1 Affected Environment Grazing Management

BLM livestock management objectives for the HC/CUEP area provide direction for maintenance or improvement of the condition of the public rangelands to enhance productivity for all rangeland values (BLM 1987). The HC/CUEP area includes three grazing allotments; the allotment boundaries extend beyond the HC/CUEP Plan boundary (**Figure 3-9**). Allotment details are shown in **Table 3-9**.

There are 1,487 total AUMs available within the HC/CUEP Plan boundary. Surface disturbance of up to 549 acres, currently authorized (BLM 2015a), would reduce surface grazing capacity of up to 37 AUMs, using the standard of 15 acres per AUM (BLM 2004a); this would be a capacity reduction of 2.5 percent Authorization of this amount of surface disturbance has not required issuance of grazing waivers by the BLM (BLM 2015a). No changes to current grazing management or livestock improvements have been required. The authorized AUMs for the permittees have not been reduced. The applicant-committed EPMs for livestock and range allotments (**Appendix A**) have been followed. Permittees have voluntarily not released livestock into reclaimed areas in Horse Canyon to allow for the establishment of vegetation.

The 2015 HC/CUEP EA analyzed the effects of up to 549 acres of disturbance for surface exploration on grazing management within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

Figure 3-9 Grazing Allotments

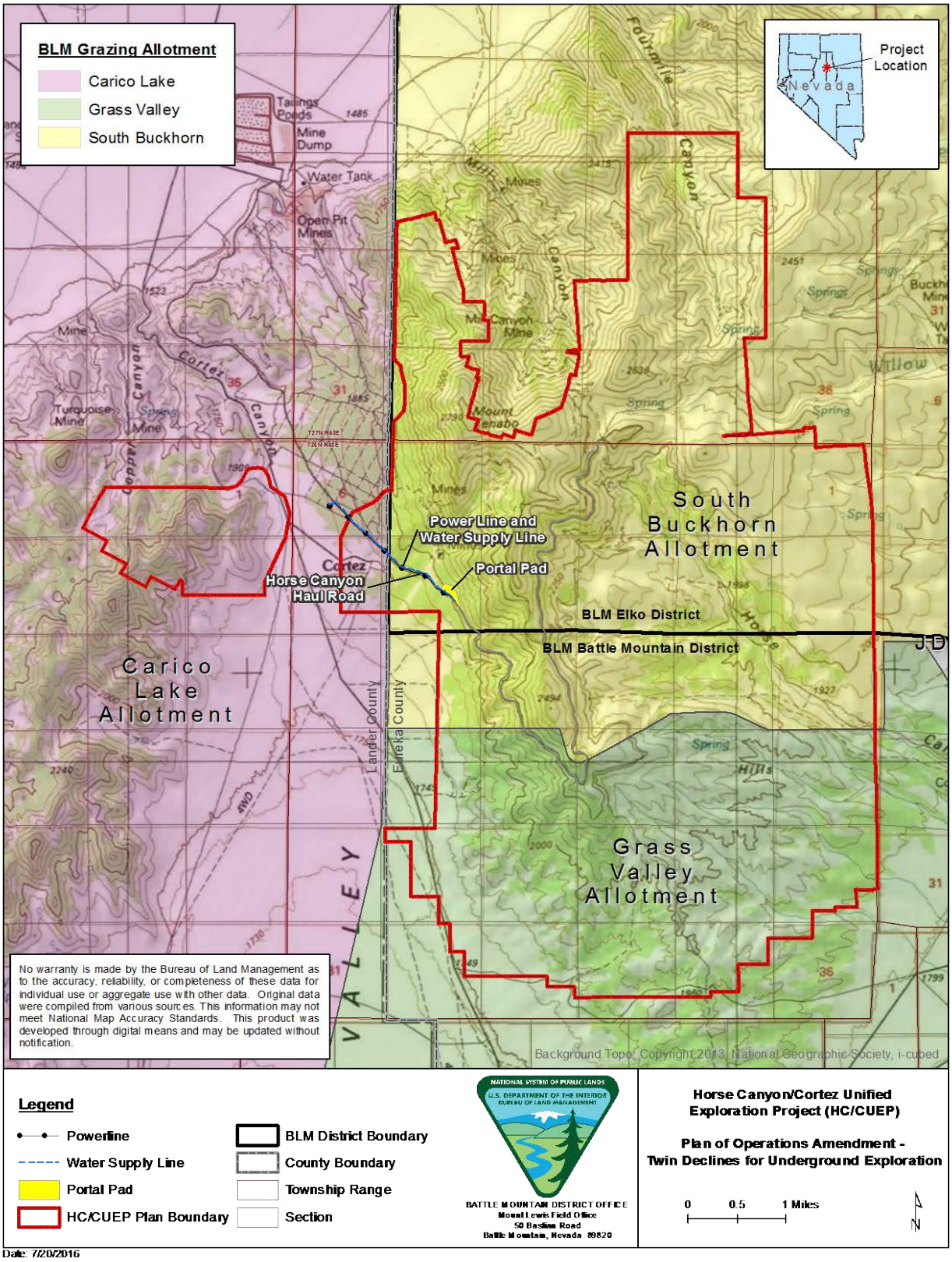


Table 3-9 Grazing Allotments

Allotment (BLM Management District)	Total Acres (Public and Private) / Total Permitted animal unit months (AUMs)	Allotment Acres within HC/CUEP/ Permitted AUMs within HC/CUEP[1]	Percent of Allotment in HC/CUEP
Grass Valley (Battle Mountain BLM)	296,304 (282,854 public land and 13,450 private land) / 17,701 AUMs (public land)	7,241 acres / 482.7 AUMs	2.4
Carico Lake (Battle Mountain BLM)	599,304 (562,352 public land and 36,952 private land)/ 24,954 AUMs (public land)	1,586 acres / 105.7 AUMs	0.3
South Buckhorn (Elko BLM)	296,313 (222,822 public land and 73,491 private land)/ 19,689 AUMs (public land)	13,481 acres / 898.7 AUMs	4.6
Total	**1,191,921** (1,068,028 public land and 123,893 private land)/ **62,344 AUMs**	**22,308/ 1,487 AUMs**	**7.3**

[1]Permitted (Active) AUMs within HC/CUEP calculated as 15 acres per AUM (BLM 2004a). The permitted (Active) AUMs within this table are representative of the total project area (HC/CUEP).

3.11.2 Environmental Consequences Grazing Management

The analysis of grazing management in this EA used publicly available information on grazing allotments (i.e. acres, AUMs) to quantitatively assess anticipated effects of proposed surface disturbance, underground exploration, and reclamation activities. Adverse effects would include losses of AUMs that would require changes in current grazing management.

Effects Context for Grazing Management

Localized: Effects would be limited to one site or a portion of one allotment.

Regional: Effects would occur throughout one or more allotments; multiple permittees may be affected.

Short-term: Effects would not substantially alter the natural vegetation community, or would last for the duration of the project.

Long-term: Effects would alter the natural vegetation community and would last for longer than the project duration.

Intensity of Effects Definitions for Grazing Management

Negligible: Effects to livestock grazing would be slight and no reductions to AUMs or change in livestock management would be required.

Minor: Effects to livestock grazing would alter the availability of resources that livestock grazing depends on. Small reductions to AUMs may be necessitated. No adjustments to grazing management should be required.

Moderate: Effects to livestock grazing directly affect livestock access to limiting resources. Reductions to AUMs are necessary and adjustments to livestock grazing should be considered. Adverse effects would be minimized with implementation of applicant-committed EPMs, BMPs, but reclamation would require long-term monitoring and maintenance.

Major: Effects to livestock grazing affect management on a pasture or allotment level. Reductions in AUMs and a significant change in authorized use would be required. Adverse effects could be minimized with implementation of applicant-committed EPMs and BMPs, but reclamation would require long-term monitoring and maintenance.

3.11.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The reallocated 12 acres would occur in the South Buckhorn Allotment. Approximately 4.6 percent of the South Buckhorn Allotment and 898.7 AUMs of the allotment occur within the HC/CUEP Plan boundary. The 12 acres would reduce capacity by less than one AUM. The 12 acres of surface disturbance is within the current authorized amount of 549 acres and would not require issuance of waivers or require changes to current grazing management practices or livestock improvements. Reclamation would return disturbed areas to the pre-development land uses, which include livestock grazing. The Proposed Action would last for 5 years, with an additional 2 years for reclamation. The Proposed Action would result in negligible, localized, long-term effects. Following reclamation, resource conditions would be restored to pre-project conditions and no effects should persist.

3.11.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure

at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

The 40 acres would reduce capacity by less than 3 AUMs. The 40 acres of surface disturbance is within the currently authorized amount of 549 acres and would not require issuance of waivers or require changes to current grazing management practices or livestock improvements. Reclamation would return disturbed areas to the pre-development land uses, which include livestock grazing. The Waste Rock Facility Alternative would last for 5 years, with an additional 2 years for reclamation. The Waste Rock Facility Alternative would result in negligible, localized, long-term effects. Following reclamation, resource conditions would be restored to pre-project conditions and no effects should persist.

3.11.2.3 No Action

Surface exploration activities would continue as currently authorized. Up to 549 acres of surface disturbance may occur, but would not require changes to current grazing management or livestock improvements, or require a grazing waver. As exploration activities are completed, reclamation would return disturbed areas to pre-development land uses, which include livestock grazing. Because the No Action Alternative would not require a reduction in permitted AUMs, there would be no effect on grazing management.

3.11.2.4 Cumulative Effects

The CESA for grazing management includes the allotments and associated AUMs that occur within the HC/CUEP Plan boundary. The CESA includes the Grass Valley, Carico Lake, and South Buckhorn allotments.

Proposed Action

There would be no effect to grazing management from the Proposed Action. Cumulative effects would not occur.

Waste Rock Facility Alternative

There would be no effect to grazing management from the Waste Rock Facility Alternative. Cumulative effects would not occur.

No Action

There would be no effect to grazing management under the No Action Alternative. Cumulative effects would not occur.

3.12 Cultural Resources

This section presents the cultural resources of the HC/CUEP area, including the archaeological and ethnographic history. The analysis area for direct, indirect, and cumulative effects includes the HC/CUEP Plan boundary.

3.12.1 Affected Environment Cultural Resources

Seventy-one cultural resource inventories have been completed from 1981-2014, resulting in 84 percent coverage of the HCCUEP area. These inventories have documented 439 cultural resources, of which 144 resources are eligible, pending eligible, or unevaluated for NRHP. Applicant-committed EPMs including pre-disturbance cultural inventories are implemented with HC/CUEP exploration activities to protect significant cultural resources.

Eligible cultural resources span the entire history of human occupation in the area. Native American sites indicate occupation of the area up to 9,000 years ago. Archaeological sites in the HC/CUEP area show the transition from large, dart sized projectile points to the bow and arrow, and the introduction of milling stone implements and brownware ceramics. Basketry and pinyon pine nut harvesting are attested to in both the archaeological and ethnographic record. Native Americans were living in the area when silver was discovered in 1863.

Historic archaeological sites are largely associated with creation of the Cortez Mining District (District) in 1863. The HC/CUEP area contains what were historically the District's most productive mines, including the Garrison, St. Louis, and Arctic, as well as the ruins of two of the District's mills and the ghost town of Cortez. The hills surrounding the mines have evidence of charcoal production, woodcutting, prospecting, and lime production. Work in the District was performed by various ethnic groups including Chinese, Mexican, and Italian. The historic mining landscape contains 150 years of mining adaptation. Horse Canyon derives from Horse Ranch, a property in the canyon that captured and bred horses for out-of-state markets in the 1880s.

The District has been proposed as a Historic District for the NRHP. The District is eligible for inclusion under criterion (a): its association with events that have made a significant contribution to broad patterns of U.S. history, including settlement and ethnic heritage; criterion (b): its association with people that have made a significant contribution to broad patterns of history, specifically Simeon Wenban (Wenban was one of the original prospectors and played the most important role in developing the mines of the District); criterion (c): it is representative of a significant and distinguishable entity whose components may lack individual distinction; and criterion (d): it has yielded or is likely to yield information important to U.S. history. The District has several mills representing a nearly complete record of the evolution of precious metal milling technology in the west, and contains archaeological sites that can address topics of landscape transformation, migration and diaspora, and industrial capitalism. The BLM and Nevada SHPO consider the District eligible under all four criteria (BLM 2008c).

3.12.1.1 Properties of Cultural or Religious Importance

In 1992, the National Historic Preservation Act (NHPA) was amended to allow for properties of traditional religious and cultural importance to an Indian tribe to be determined as eligible for inclusion on the NRHP. Coordination between BLM and local Indian tribes has resulted in the identification of two PCRIs in the HC/CUEP area: Mount Tenabo/White Cliffs and Horse Canyon (BLM 2004c).

Mount Tenabo is eligible for inclusion under criterion (a): its association with events that have made a significant contribution to broad patterns of Western Shoshone and U.S. history; and criterion (c): it is representative of a significant and distinguishable entity whose components may lack individual distinction (BLM 2004c). There had been roads, drill pads, and communications sites established within the area defined as the Mount Tenabo/White Cliffs PCRI prior to the BLM's determination of eligibility for the NRHP.

Horse Canyon is eligible for inclusion under criterion (b): association with people that have made a significant contribution to broad patterns of U.S. history; and criterion (c): it is representative of a significant and distinguishable entity whose components may lack individual distinction (BLM 2004c). There had been roads and drill pads established within the area defined as the Horse Canyon PCRI prior to the inclusion of the site on the NRHP in 2004. A small portion of the open pit and waste rock disposal facility for the South Silicified Pit (permitted under the Horse Canyon Mine Plan of Operations NVN 66896) were constructed within the area defined as the Horse Canyon PCRI prior to the inclusion of the site on the NRHP in 2004.

3.12.2 Environmental Consequences Cultural Resources

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on cultural resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

The cultural resources analysis in this EA reviewed results of previously conducted resource inventories to assess whether eligible or potentially eligible historic properties or archaeological sites would be impacted. Adverse effects result when an action would diminish the characteristics that make a historic property eligible for the NRHP, or that would physically destroy or damage an archaeological site.

It should be noted that the proposed portal pad, proposed waste rock facility, and other locations of proposed surface disturbance were designed to avoid eligible or potentially eligible cultural resources. As such, the following would apply:

Effects Context for Cultural Resources

Localized: Effects would be limited to eligible sites within the HC/CUEP Plan boundary.

Regional: Effects would occur to eligible sites outside of the HC/CUEP Plan boundary.

Short-term: Effects would last for the project duration.

Long-term: Effects would last beyond the project duration.

Intensity of Effects Definitions for Cultural Resources

No Historic Properties Affected: A “no historic properties affected” determination indicates that no historic properties are in the Area of Potential Effects (APE), or that there are historic

properties in the APE, but the undertaking would not alter the characteristics that qualify it for inclusion in or eligibility for the National Register.

No Adverse Effect: A "no adverse effect" determination indicates that there would be an effect on the historic property by the undertaking, but the effect does not meet the criteria of adverse effect in 36 CFR 800.5(a)(1) and would not alter any of the characteristics that make it eligible for listing in the National Register in a manner that would diminish the integrity of the historic property.

Adverse Effect: An adverse effect indicates that the undertaking would alter, directly or indirectly, any of the characteristics that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property.

3.12.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. The APE for the Proposed Action is the 12 acres of surface disturbance. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The location of the portal pad was selected to avoid potentially eligible cultural sites and ineligible cultural sites without concurrence. The reallocation of 12 acres to support underground exploration activities would not result in direct or indirect effects to cultural resources. The Proposed Action would be conducted under adherence to the previously approved applicant-committed EPMs detailed in **Appendix A**. By incorporating these measures, there would be no historic properties affected.

The Proposed Action would not occur within either of the PCRIs identified within the HC/CUEP Plan boundary.

3.12.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. The APE for the Waste Rock Facility Alternative is the 40 acres of surface disturbance. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

The location of the waste rock disposal facility adjacent to the Horse Canyon Haul Road was selected to avoid potentially eligible cultural sites and ineligible cultural sites without concurrence. Reallocation of 40 acres of previously authorized surface disturbance acreage to support underground exploration activities would not result in direct or indirect effects to cultural resources. The Waste Rock Facility Alternative would be conducted under adherence to the previously

approved applicant-committed EPMs detailed in **Appendix A**. By incorporating these measures, there would be no historic properties affected.

The Waste Rock Facility Alternative would not occur within either of the PCRIs identified within the HC/CUEP Plan boundary.

3.12.2.3 No Action

Under the No Action Alternative, exploration and reclamation activities would continue to occur as currently authorized. By incorporating the previously approved applicant-committed EPMs detailed in **Appendix A**, there would be no effects to cultural resources.

3.12.2.4 Cumulative Effects

There would be no effects to cultural resources from the Proposed Action, the Waste Rock Facility Alternative, or the No Action Alternative; therefore, there would be no cumulative effects on cultural resources.

3.13 Native American Traditional Cultural Resources

Federal law and agency guidance require BLM to consult with Native American tribes concerning the identification of cultural values and traditional practices of Native American people that may be affected by actions on BLM-administered lands. This consultation includes the identification of places (i.e., physical locations) of traditional cultural importance to Native American tribes. Places that may be of traditional cultural importance to Native American people include, but are not limited to, locations associated with the traditional beliefs concerning tribal origins, cultural history, or the nature of the world; locations where religious practitioners go, either in the past or the present, to perform ceremonial activities based on traditional cultural rules or practice; ancestral habitation sites; trails; burial sites; and places from which plants, animals, minerals, and waters possessing healing powers or used for other subsistence purposes, may be taken. Some of these locations may be considered sacred to particular Native American individuals or tribes.

BLM has been engaged in Native American consultation regarding exploration activities in the HC/CUEP area since the initial HC/CUEP Plan was proposed in 2000; consultation remains ongoing. In compliance with the NHPA, as amended, the BLM initiated NHPA and government-to-government consultation for this EA in April of 2016. Letters were sent to the following tribal groups: Battle Mountain Band of the Te-Moak Tribe of Western Shoshone, Duckwater Shoshone Tribe, Elko Band and South Fork Band of the Te-Moak Tribe of Western Shoshone, Te-Moak Tribe of Western Shoshone, and Yomba Shoshone Tribe. The consultation for this EA is ongoing.

3.13.1 Affected Environment Native American Traditional Cultural Resources

The potential effects from mining and exploration in the Cortez Mountains have been extensively analyzed in the Cortez Hills FEIS (BLM 2008c). The Native American traditional values regional cumulative effects study area analyzed in the Cortez Hills FEIS included the HC/CUEP Plan area; that analysis is incorporated by reference (BLM 2008c).

3.13.2 Environmental Consequences Native American Traditional Cultural Resources

The 2015 HC/CUEP EA analyzed effects on Native American Traditional Cultural Resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

The Native American Traditional Cultural Resources analysis in this EA reviewed results of previously conducted and ongoing tribal consultation, previous ethnographic studies, and locations of PCRIs relative to proposed activities to assess whether effects may occur. Adverse effects would result if an action would diminish the characteristics used to define a site or object(s) of cultural importance, access to the site or object(s) is limited or eliminated, or traditional uses of the site or object(s) are affected.

It should be noted that the proposed portal pad, proposed waste rock facility, and other locations of proposed surface disturbance were designed to avoid known resources of Native American cultural importance.

Effects Context for Native American Traditional Cultural Resources

Localized: Effects would be limited to within the HC/CUEP Plan boundary.

Regional: Effects would occur outside of the HC/CUEP Plan boundary.

Short-term: Effects would last for the project duration.

Long-term: Effects would last beyond the project duration.

Intensity of Effects Definitions for Native American Traditional Cultural Resources

Negligible: Effects to the resources may be perceived, but access to these areas for Native American cultural purposes would not be restricted.

Minor: Effects may be perceived, but are limited to a specific area or group of resources, and would not alter traditional uses of the resource.

Moderate: Effects would occur, either to the resources or by altering traditional uses. Mitigation would be necessary to offset effects.

Major: Effects are substantial, noticeable, and permanent.

3.13.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The Proposed Action does not propose activities within the Mount Tenabo/White Cliffs PCRI or the Horse Canyon PCRI.

The Proposed Action proposes to truck approximately 500 tons of waste rock per day from the declines to existing waste rock disposal facilities at the Cortez Hills Mine. If 85-ton capacity haul trucks are used, approximately six haul truck trips per day would occur on the segment of Horse Canyon Haul Road between the portal pad and the Cortez Hills Mine waste rock disposal facility. A 1.7-mile transmission line and a 1.7-mile surface water line would be placed along the Horse Canyon Haul Road within the existing disturbance footprint. The increase in truck traffic and added infrastructure would be apparent in the current landscape setting, but these components would cease/be removed when the declines are completed. The area has been used historically for exploration and mining; the current viewshed includes historic adits and other evidence of previous and current human activity (such as the Horse Canyon Haul Road). The proposed additional activities and features would change the current landscape, but the change in appearance would be limited once the portal pad is reclaimed. The applicant-committed EPMs (**Appendix A**) would remain in effect under the Proposed Action. Access to these areas for Native American cultural purposes would not be restricted. Effects of the Proposed Action would be localized, long-term, and negligible.

3.13.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad would be the same as described for the Proposed Action. A 1.7-mile transmission line and a 1.7-mile surface water line would be placed along the Horse Canyon Haul Road within the existing disturbance footprint. The Cortez Hills Mine waste rock disposal facilities would not be used, which would lessen truck traffic compared to the Proposed Action.

The Waste Rock Facility Alternative would not occur within the Mount Tenabo/White Cliffs PCRI or the Horse Canyon PCRI.

The added infrastructure and human activity would be apparent in the current landscape setting, but these components would cease/be removed when the declines are completed. The area has been used historically for mining and exploration; the current viewshed includes historic adits and other evidence of previous and current human activity (such as the Horse Canyon Haul Road). The proposed additional activities and features would change the current landscape, but the change in appearance would be limited once the portal pad and waste rock disposal facility are reclaimed. The applicant-committed EPMs (**Appendix A**) would continue to be implemented. Access to these areas for Native American cultural purposes would not be restricted. Effects under the Waste Rock Facility Alternative would be localized, long-term, and minor.

3.13.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue to occur under the current conditions of approval. There would be no underground exploration or associated surface activities or infrastructure. The current applicant-committed EPMs would remain in effect under the No Action Alternative. By incorporating these measures, effects to the elements that contribute to the cultural characteristics of the Mount Tenabo/White Cliffs PCRI and the Horse Canyon PCRI would be minimized. Access to these areas for Native American cultural purposes would not be restricted under the No Action Alternative. Effects under the No Action Alternative would be localized, short-term, and negligible.

3.13.2.4 Cumulative Effects

The Native American traditional values regional cumulative effects study area analyzed in the Cortez Hills FEIS included the HC/CUEP Plan area; that analysis is incorporated by reference (BLM 2008c). Within the regional cumulative effects study area, cumulative effects have occurred within Western Shoshone aboriginal lands that have provided, and continue to provide, sustenance, as well as spiritual and religious renewal, for the indigenous people. Native Americans believe the power that emanates from the land, water, plants, and animals fuels their cultural identity and heritage. Mining-related activities, cattle grazing, construction of transmission lines, wildfires, transportation corridors, and other actions in the regional cumulative effects study area cumulatively have affected, or would affect, these resources and Western Shoshone culture, tradition, and lifeways. Direct effects to prehistoric and ethnohistoric sites and burials as a result of activities associated with past, present, and RFFAs have been, or would be, mitigated in compliance with federal and state laws. However, some Western Shoshone believe that areas once affected by development cannot be satisfactorily mitigated. These actions have cumulatively impacted, and would continue to impact, their heritage and lifeways (BLM 2008c).

Roads, transmission lines, mines and mine-related facilities, agriculture, infrastructure, and human settlement have created cumulative visual effects in a landscape that has been part of the Western Shoshone aboriginal lands for centuries. Some of the landmarks traditionally used by Native Americans have been, or would be, visually impacted by development-related activities. As a result, Native Americans view their original use and sacredness as having been devalued (BLM 2008c).

Direct effects to Native American traditional cultural resources would be avoided with implementation of the applicant-committed EPMs. Following reclamation, the area would be returned to a pre-disturbance land use condition (BLM 2015b).

In summary, the Western Shoshone aboriginal lands in the regional cumulative effects study area, and the resources within, have been, or would be, cumulatively affected by past, present, and reasonably foreseeable development (BLM 2008c).

3.14 Air Quality Resources

This section describes the air resources analysis area and effects to air quality. The analysis tiers off of the analysis completed in the 2015 HC/CUEP EA, which considered direct and indirect effects on air quality resources for up to 549 acres of surface disturbance (BLM 2015b). The analysis area for potential direct and indirect effects to air quality resources in this EA includes a ¼-mile radius from the portal pad and along the transportation corridor to the Cortez Hills Mine. The CESA includes the airshed associated with HC/CUEP hydrographic areas: Crescent Valley, Grass Valley, and Pine Valley, and incorporates the cumulative effects analysis completed for Cortez Hills Mine by reference (BLM 2008c).

Comparisons between ambient air quality and national and state Ambient Air Quality Standards (AAQS) are used to assess air quality. National and Nevada AAQS are shown in Table 3-10.

FLPMA provides BLM's basic authority as a multiple use land management agency. FLPMA also places the responsibility on the BLM to provide for compliance with applicable state and federal pollution control laws (air, water, noise, and other pollution standards) under BLM land use plans, and to take actions necessary to prevent unecessary or undue degradation of the public lands.

The BLM Manual 7300 provides direction for air resource management under the BLM administration. The current Shoshone-Eureka RMP (BLM 1986a) does not provide further management guidance on air quality.

The NDEP Bureau of Air Pollution Control (BAPC) issues the air quality permits and provides the oversight for compliance with the permit as prescribed in the NAC 445B regulations. The State of Nevada uses the federal hazardous air pollutant (HAP) list for emission standards.

Table 3-10 National and Nevada AAQS

Pollutant	Primary/ Secondary	Averaging Time	National Level	National Form	Nevada Level	Nevada Form
Carbon Monoxide (CO)	primary	8 hours	9 ppm	Not to be exceeded more than once per year	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm		35 ppm	
Lead (Pb)	primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)	primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	100 ppb	98th percentile, averaged over 3 years
	primary and secondary	1 year (annual)	53 ppb(2)	Annual mean	53 ppb(2)	Annual mean
Ozone (O_3)	primary and secondary	8 hours	0.070 ppm(3)	Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years	0.075 ppm(3)	Annual fourth-highest daily maximum 8- hour concentration, averaged over 3 years
Particle Pollution ($PM_{2.5}$) (PM)	primary	1 year	12 µg/m^3	Annual mean, averaged over 3 years	12 µg/m^3	Annual mean, averaged over 3 years
	secondary	1 year	15 µg/m^3	Annual mean, averaged over 3 years	15 µg/m^3	Annual mean, averaged over 3 years

Pollutant		Primary/ Secondary	Averaging Time	National Level	National Form	Nevada Level	Nevada Form
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb [(4)]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	75 ppb [(4)]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year	0.5 ppm	Not to be exceeded more than once per year

ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter

[(1)]In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

[(2)]The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

[(3)]Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

[(4)]The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirments of a State Implemtation Plan (SIP) call under the previous SO_2 standards (40 CFR 40.4(3)), a SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required Nevada AAQS.

Sources: NDEP 2014a, USEPA 2016.

3.14.1 Affected Environment Air Quality Resources

The NDEP BAPC does not currently monitor ambient air quality in the HC/CUEP area; the area is therefore considered unclassified for all pollutants having an air quality standard (40 CFR 81.329). However, the air quality in the HC/CUEP region is considered typical for undeveloped regions of the western U.S. For regulatory and planning purposes, HC/CUEP is considered to be in an attainment/unclassified area, meaning it meets air quality standards.

Barrick currently operates the authorized HC/CUEP Plan activities under a Class II Air Quality Operating Permit (AP1041-3336) (NDEP 2014b). The Class II permit is for facilities that emit less than 100 tons per year for any one regulated pollutant and emit less than 25 tons per year total HAP, and emit less than 10 tons per year of any one HAP. Under the Class II Air Permit, Barrick submits yearly reports to the NDEP BAPC to document all emissions units/systems specified.

3.14.1.1 Fugitive Dust Management

All exploration activities with surface disturbance exceeding 20 acres are required to obtain a surface area disturbance (SAD) permit from the NDEP BAPC. Barrick has instituted fugutive dust control measures as per the HC/CUEP fugitive dust control plan in the SAD under NAC 445B.22037. The HC/CUEP fugitive dust control plan is implemented under the Class II Air Quality Operating Permit. BMPs to prevent particulate matter (PM) from becoming airborne include: speed limits posted and vehicle speeds reduced in areas of disturbance to minimize the potential for fugitive dust emissions, protect wildlife and livestock, and maintain operational safety; speed limits enforced; access and drill roads maintained and watered; wet drilling methods are used. Barrick requires that vehicles are maintained regularly to ensure they are operating in a manner to minimize vehicle emissions (NDEP 2014b).

3.14.1.2 Climate and Meteorology

The HC/CUEP area is located at the southern end of the Cortez Mountains. The elevations within the HC/CUEP area range from 5,700 feet above mean sea level (amsl) to 9,150 feet amsl. The average maximum temperature at the Beowawe University of Nevada Ranch, located approximately 12 miles south of the HC/CUEP area, is approximately 88 degrees Fahrenheit (°F) in July, and the average minimum temperature is approximately 13°F in January. The average annual precipitation is approximately 10 inches and tends to peak in May (WRCC 2013).

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 pinyon-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 GHGs 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 HC/CUEP area are wildfires and prescribed burns; vehicles (including off-highway vehicles (OHVs)); construction and operation for mineral and energy development; and livestock grazing, wild horses, and burros. To the extent that these activities increase, GHG emissions are also likely to increase.

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 Nevada. By 2100, the average temperature in Nevada is predicted to increase by 3 to 4 °F in the spring and fall and by 5 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 Nevada, 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. 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 Proposed Action on climate change are beyond the scope of this EA and are not further analyzed in this EA.

3.14.2 Environmental Consequences Air Quality Resources

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on air resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b). This EA focuses the analysis on a ¼-mile buffer around the location of proposed activities and facilities to identify potential effects specific to the Proposed Action of reallocating 12 acres to support underground exploration activities. Proposed activities that would result in air emissions include surface disturbance of the portal pad and construction of the exploration declines, vehicle and equipment travel, reclamation work, and use of diesel-powered equipment. There would be three generators and a shotcrete plant located at the portal pad.

Sources of air emissions associated with these exploration activities include diesel exhaust, and ground disturbance activities, including road maintenance and vehicle traffic (fugitive dust).

Comparisons between predicted ambient air quality and national and state Ambient Air Quality Standards (AAQS) were used to assess air quality effects. Potential to emit values and modelling results were obtained from Barrick's application to revise the Class II air permit.

Effects Context for Air Quality Resources

Localized: Changes are perceived at the location of the activity, but dissipate within a specified extent.

Regional: Changes are perceived throughout the airshed.

Short-term: Changes in ambient air quality occur at a site associated with a specific activity, for the duration of that activity.

Long-term: Changes in ambient air quality would remain following the end of a specific activity.

Intensity of Effects Definitions for Air Quality Resources

Negligible: Air emissions of proposed activities would be so small as to not be detectable. Emissions would not result in a perceptible change in ambient conditions.

Minor: Air emissions of proposed activities would show an increase in ambient concentrations, but would be well below the national and state AAQS. Applicant-committed EPMs and BMPs would offset effects.

Moderate: Air emissions of proposed activities would show a larger increase in ambient concentrations, but would still be below the national and state AAQS. Applicant-committed EPMs and BMPs would offset effects.

Major: Air emissions of proposed activities would be detectable at a regional scale. Air emissions of proposed activities would show a very large increase in ambient concentrations, and controls would be required to achieve the national and state AAQS. The source may meet the Significant Emission Rates (i.e., 40 tons per year of NO_X) as defined by regulation.

3.14.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Barrick would submit an application to revise the Class II air permit to include components of the Proposed Action. Barrick conducted an emissions inventory for the Class II Air Quality Operating Permit update (Air Sciences Inc. 2016). The Class II air permit includes equipment in both the HC/CUEP and West Pine Valley Plan of Operations (and therefore exceeds the potential effects of the Proposed Action).

The equipment requirements within the HC/CUEP Plan (including the Proposed Action) are one diesel generator [779 brake horsepower per hour (bhp)], two diesel generators (3,627 bhp each), a shotcrete plant (including a storage silo and a polyfiber feed system). The shotcrete plant would have a baghouse for dust control.

The equipment requirements within the West Pine Valley Plan includes two diesel generators (324 bhp each), a gasoline storage tank, and two diesel storage tanks.

The stationary source potential to emit values for the Class II permit revision (which includes equipment within both the HC/CUEP and West Pine Valley Plan of Operations) are shown in **Table 3-11**.

Table 3-11 Activity Emissions Summary

Pollutants	Pounds/ Hour	Tons/Year
PM	1.73	2.47
PM_{10}	1.20	2.37
$PM_{2.5}$	0.65	2.27
Nitrogen oxides (NOx)	3.66	8.53
SO_2	0.34	1.48
CO	3.87	16.96
Volatile organic compound (VOC)	4.08	17.87
Greenhouse Gases (CO_{2e})	N/A	53,590
HAPs	Not Applicable (N/A)	5.4E-01
Benzene	N/A	2.6E-01
Toluene	N/A	9.3E-02
Xylene	N/A	6.4E-02
Formaldehyde	N/A	3.8E-02
Acetaldehyde	N/A	1.6E-02
Acrolein	N/A	3.3E-03
Total PAH (including Naphthalene)	N/A	6.9E-02

Source: Air Sciences Inc. 2016

Barrick conducted an AERMOD (American Meteorological Society / EPA Regulatory Model) air dispersion modelling analysis to determine air quality effects of exploration activities for the Class II permit revision (which includes equipment within both the HC/CUEP and West Pine Valley Plan of Operations) (see Appendix 7 in Air Sciences Inc. 2016). Air pollutants and averaging periods modelled and modelling results are shown in **Table 3-12**.

Table 3-12 Air Emissions Modelling Results (Air Sciences Inc. 2016)

Pollutant	Averaging Period	Maximum Impact ($\mu g/m^3$)	Background Concentration	Total Impact	Nevada AAQs ($\mu g/m^3$)	Compliance
CO	8-hr	4.4	0	4.4	7,000	Yes
CO	1-hr	29.6	0	29.6	40,500	Yes
NO_2	Annual	0.7	0	0.7	100	Yes
NO_2	1-hr	27.0	0	27.0	188	Yes
$PM_{2.5}$	Annual	0.1	2.3	2.4	15	Yes
$PM_{2.5}$	24-hr	1.4	8.0	9.4	35	Yes

Pollutant	Averaging Period	Maximum Impact (µg/m^3)	Background Concentration	Total Impact	Nevada AAQs (µg/m^3)	Compliance
PM_{10}	Annual	0.1	9.0	9.1	50	Yes
PM_{10}	24-hr	15.5	10.2	25.7	150	Yes
SO_2	Annual	0.01	0	0.01	80	Yes
SO_2	24-hr	0.1	0	0.1	365	Yes
SO_2	3-hr	0.5	0	0.5	1,300	Yes
SO_2	1-hr	0.6	0	0.6	196	Yes

Barrick would continue to implement the fugitive dust control plan to minimize dust emissions. Speed limits would continue to be posted and enforced to reduce fugitive dust from vehicular traffic. Haul truck traffic trips are anticipated to be approximately six per day, averaged over the 5-year period of underground exploration; the Horse Canyon Haul Road would be watered. Emissions would be localized and anticipated to dissipate to undetectable levels within a ¼-mile from proposed activities. With implementation of applicant-committed EPMs and adherence to the requirements in the Class II Air Permit, effects to air quality under the Proposed Action would be localized, short-term, and minor.

Haul truck traffic on the Horse Canyon Haul Road and operation of equipment for the underground exploration would not be expected to contribute to climate change.

If any ore-grade material is encountered during underground exploration, it would be placed on the lined PAG/ore transfer pad for transportation to an ore-processing facility. Hauling ore of up to 1.2 million tons per year (MTPY) was analyzed under the EA for the *Barrick Cortez Inc. (NVN-067575 [14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application* (BLM 2015e), and authorized under the September 2015 decision, which are incorporated by reference. The Proposed Action does not include an increase in the level of ore hauling and would not result in an increase in the currently authorized ore-haul truck traffic to and from the Cortez Hills Mine.

3.14.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Waste rock would not be hauled to the Cortez Hills Mine. Air emissions from haul truck traffic would not increase. Effects would be localized and expected to dissipate within ¼-mile of proposed activities. The applicant-committed EPMs and the fugitive dust control plan and

associated BMPs would remain in place to minimize airborne particulates. Emissions from the Waste Rock Facility Alternative would be localized, short-term, and minor.

3.14.2.3 No Action

Under the No Action Alternative, underground exploration activities would not occur. Surface exploration would continue under current permits and approvals. During this time, there would be emissions from diesel equipment and surface disturbance. Emissions would be reported and tracked as per the Class II Air Permit. The applicant-committed EPMs and the fugitive dust control plan and associated BMPs would remain in place to minimize airborne particulates. Barrick would continue the reclamation program to recontour and seed disturbed areas reducing the potential for windblown dust from exposed surfaces. Effects to air quality would be localized, short-term, and minor.

3.14.2.4 Cumulative Effects

The cumulative effects analysis for air quality includes past, present, and RFFAs occurring within the airshed associated with hydrographic areas: Crescent Valley, Grass Valley, and Pine Valley. The projects that have contributed to air emissions in these areas, primarily from surface disturbance activities and associated equipment use, are shown in Table 2-3. This is a largely undeveloped region characterized by wide-open basins.

The air emissions from the Proposed Action or the Waste Rock Facility Alternative would be regulated under the existing Class II Air Permit (as modified), and are minimized with implementation of a dust control plan, BMPs, and reclamation of disturbed areas to reduce the potential for windblown dust. Emissions from the Proposed Action or the Waste Rock Facility Alternative and continued surface exploration at HC/CUEP would occur, but emissions would dissipate and likely would not combine with those from other actions. Cumulative effects would be localized, short-term, and minor.

3.15 Waste

This section considers potential direct, indirect, and cumulative effects associated with handling and disposal of waste, including hazardous wastes. The analysis area includes the HC/CUEP Plan boundary and transportation routes used to transport solid waste.

According to the EPA, a material must first be classified as solid waste as defined in 40 CFR Part 261.2 to be considered a hazardous waste. It is a solid waste that is dangerous or potentially harmful to our health or the environment. The EPA further defines a solid waste as any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and community activities (USEPA 2014).

3.15.1 Affected Environment Waste

The affected environment includes people and the natural resources who may come in contact with or which may be harmed by wastes generated by the Proposed Action. Natural resources include: water, air, soils, and biological resources. The Proposed Action would not generate hazardous waste. Petroleum products would be used on-site. The HC/CUEP spill contingency plan provides standard operating procedures to minimize the potential for harmful materials to impact vulnerable natural resources. Solid waste (garbage, human) has been and would be generated from HC/CUEP activities, with the solid waste transported to off-site disposal facilities.

3.15.2 Environmental Consequences Waste

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on wastes within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b). The analysis in this EA considered types of waste to be produced from proposed activities and whether the types produced have potential to harm people or natural resources.

Effects Context for Waste

Localized: Generation of waste (solid or hazardous) would only occur during distinct activities at a specific location.

Regional: Generation of waste (solid or hazardous) would require the use of or have an effect on regional resources.

Short-term: Generation of waste (solid or hazardous) would occur during the project.

Long-term: Generation of waste (solid or hazardous) would occur beyond the project duration.

Intensity of Effects Definitions for Waste

Negligible: No harmful or hazardous waste would be generated by proposed activities. A relatively small amount of solid, non-hazardous waste (i.e. garbage, human waste) would be generated, and petroleum products would be used. Applicant-committed EPMs and BMPs would minimize the potential for adverse effects on humans or natural resources.

Minor: Harmful or hazardous waste would be generated during project activities, in addition to generation of solid, non-hazardous waste, and use of petroleum products. Applicant-committed EPMs and BMPs would minimize the potential for adverse effects on humans or natural resources.

Moderate: Harmful or hazardous waste would be generated during project activities. Solid, non-hazardous waste would be generated, and petroleum products used. Applicant-committed EPMs and BMPs would minimize the potential for adverse effects on humans or natural resources, but the exposure risk or quantities used/generated would increase the potential for harmful effects.

Major: Harmful or hazardous waste would be generated during project activities. Applicant-committed EPMs and BMPs would minimize the potential for adverse effects on humans or natural resources, but the risk for adverse effects would be high.

3.15.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The Proposed Action would not generate hazardous waste. Solid, non-hazardous waste, including garbage and human waste, would be transported to off-site authorized disposal facilities. The potential for spills to occur would be minimized through prevention measures outlined in the HC/CUEP spill contingency plan. Effects from waste would be localized, short-term, and negligible.

3.15.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Hazardous waste would not be generated under the Waste Rock Facility Alternative. Solid, non-hazardous waste, including garbage and human wastes, would be transported to off-site authorized disposal facilities. The potential for spills to occur would be minimized through prevention measures outlined in the HC/CUEP spill contingency plan. Effects from waste would be localized, short-term, and negligible.

3.15.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue as currently authorized. There would be no change in current waste management and spill prevention practices. The spill contingency plan would remain in place. Effects from waste would be localized, short-term, and negligible.

3.15.2.4 Cumulative Effects

Potential direct and indirect effects associated with waste would be minimized with applicant-committed EPMs and BMPs. Cumulative effects from waste would continue to be localized, short-term, and negligible.

3.16 Visual Resources

This section defines the visual resources of the HC/CUEP and analyzes potential direct, indirect, and cumulative effects to visual resources from proposed activities. The analysis considers the potential for effects based on BLM Visual Resource Management (VRM) classes. Direct and indirect effects consider the viewshed of the HC/CUEP Plan boundary area. The CESA includes the general viewshed of the HC/CUEP Plan boundary within the Cortez Mountains. Past, present, and RFFAs are included in Table 2-3.

The BLM VRM system provides a way to identify and evaluate visual values in order to determine appropriate levels of management. VRM classes are assigned to areas during resource management planning. The VRM system also provides a way to analyze the potential visual effects and apply visual design techniques to ensure that surface-disturbing activities or developments are in harmony with their surroundings. A visual resource inventory (VRI) was most recently completed for the BLM BMD in 2011.

3.16.1 Affected Environment Visual Resources

The HC/CUEP area is within VRM Class III and IV, as described in the Shoshone-Eureka RMP (BLM 1986a).

The management objectives for VRM Class III and IV are as follows (BLM 1986b):

> VRM Class III Objective: "…is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape."
>
> VRM Class IV Objective: "… 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. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements."

The HC/CUEP area is located in the northern Great Basin section of the Basin and Range Physiographic Province (BLM 2004a). The Great Basin is characterized by a rhythmic pattern of isolated mountain ranges and broad sweeping basins. Clear skies and broad open vistas characterize this landscape (BLM 2001). The HC/CUEP area includes rolling to angular hills and ridges with steep side slopes. The area is covered with a pattern of sagebrush and grasses at lower elevations and juniper and mixed shrubs at higher elevations. Evidence of past fire events appears as a change in texture and color to the otherwise homogenous vegetation patterns on the landscape. Soil colors range from beige to a chalky off-white which, when exposed, contrast highly with the surrounding vegetation. Rock colors vary from light to dark brown to burnt orange (BLM 2004a).

Man-made features are mostly linear; predominately consisting of roads, fences, and power lines. Drill pads, reclamation areas, communication sites, and the exploration office are also visual features of the landscape. The features create weak to moderate contrasts with the gentle sloping lines of the Cortez Mountains. Existing disturbance from authorized exploration activities has altered the elements of line and color in the HC/CUEP Plan boundary, particularly in Horse Canyon. As reclamation has been completed and contrasts in line reduced, the overall visual effect has diminished. However, effects to line and color continue.

3.16.2 Environmental Consequences Visual Resources

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on visual resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

This analysis considered whether proposed activities would be consistent with the BLM VRM classes.

Effects Context for Visual Resources

Localized: Activities would affect the viewshed at a specific location.

Regional: Activities would affect the viewshed on a landscape-level or affect visual qualities of the region.

Short-term: Effects would be temporary and removable following proposed activities.

Long-term: Effects would be permanent.

Intensity of Effects Definitions for Visual Resources

Negligible: Effects would not result in any perceptible changes to existing viewsheds. Visual effects would be consistent with VRM class objectives.

Minor: Effects would result in changes to a viewshed or to a small area, or would introduce a compatible human-made feature to an existing developed area. Visual effects would be consistent with VRM class objectives.

Moderate: Effects would be readily apparent and would change the character of visual resources in an area. Visual effects may not be consistent with VRM class objectives.

Major: Effects would be highly noticeable or would change the character of visual resources by adding human-made features into a mostly undeveloped area, or by removing most human-made features from a developed area. Visual effects would not be consistent with VRM class objectives.

3.16.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

Surface components of the Proposed Action would result in effects to line and color. The portal pad would change the current appearance of the western slopes of the Cortez Mountains. It would be located in the background, and the foothills and canyons of the Cortez Mountains would hide complete views from any one vantage point. The power line and water supply line would be located within the existing disturbance corridor of the Horse Canyon Haul Road, which would minimize the visual effect of adding this infrastructure to the landscape. Haul trucks and other support vehicles would use Horse Canyon Haul Road, adding to current levels of human activity on the landscape. The resulting view during underground exploration would be a blending of the individual disturbance features within the natural landscape and would be viewed within the context of existing mining facilities in the area. Underground exploration activities would cease in Year 5, followed by 2 years of reclamation. Surface infrastructure at the portal pad, and the power line and surface water supply line would be removed. Surface disturbance associated with the decline development and underground exploration activities that are accessible by equipment would be recontoured to a stable post-mining configuration and revegetated. The cut area for the portal locations would be constructed to a stable configuration and would not be recontoured.

Public visitation to the area is low and the disturbance activities are not within view of large population centers. The visual effects of mining and exploration activities in this area are consistent with the VRM class objectives. Visual resources have been and would continue to be affected by exploration activities. Reclamation would reduce effects to line and color over time.

To minimize effects from lighting, Barrick would utilize hooded stationary lights and light plants. Lighting would be directed onto the pertinent site only and away from adjacent areas not in use with safety and proper lighting of the active work areas being the primary goal. Lighting fixtures would be hooded and shielded as appropriate. Barrick would utilize lighting designed to reduce the effects to night skies.

The Proposed Action would be consistent with VRM class objectives. Infrastructure would be removed and disturbed areas reclaimed following completion of underground exploration activities. Evidence of the reclaimed portal pad would remain for the long-term. Effects on visuals resources from the Proposed Action would be localized, long-term, and minor.

3.16.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure

at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

Surface components may be more visible due to the larger disturbance footprint. The 40 acres of disturbance would include a waste rock disposal facility. Effects of the transmission line and water supply line along Horse Canyon Haul Road would be the same as described for the Proposed Action. Truck traffic on the haul road would be reduced, as waste rock would not be trucked to the Cortez Hills Mine. Visual effects of the Waste Rock Facility Alternative would be consistent with VRM class objectives. Infrastructure would be removed and disturbed areas reclaimed following completion of underground exploration activities. Evidence of the reclaimed portal pad and the waste rock disposal facility would remain for the long-term. Effects on visual resources from the Waste Rock Facility Alternative would be localized, long-term, and minor.

3.16.2.3 No Action

Under the No Action Alternative, exploration and reclamation activities would continue as currently authorized. Reclamation would reduce the changes in line and color, minimizing effects over time. Effects to visual resources from currently authorized HC/CUEP activities would be minimized over time. Visual effects of the No Action Alternative would be consistent with VRM class objectives. Effects to visual resources would be localized, short-term, and negligible.

3.16.2.4 Cumulative Effects

The CESA includes the general viewshed of the HC/CUEP Plan boundary within the Cortez Mountains. Past, present, and RFFAs are included in Table 2-3.

Proposed Action

With successful reclamation and revegetation of the surface disturbance areas, long-term visual effects would be minimized. Although the portal locations and evidence of surface disturbance would remain to varying degrees, the VRM objectives would be met. The area has been used historically for mining; the current viewshed includes historic adits and other evidence of previous mining activity. The Proposed Action would not significantly change the current landscape. Cumulative effects from the Proposed Action would be localized, long-term, and minor.

Waste Rock Facility Alternative

With successful reclamation and revegetation of the surface disturbance areas, long-term visual effects would be minimized. Although the portal locations, the waste rock disposal facility, and evidence of surface disturbance would remain permanently, the VRM objectives would be met. The area has been used historically for mining; the current viewshed includes historic adits and other evidence of previous mining activity. The Waste Rock Facility Alternative would not substantially change the current landscape. Cumulative effects from the Waste Rock Facility Alternative would be localized, long-term, and minor.

No Action

Cumulative effects of continued surface exploration within HC/CUEP are not anticipated with successful reclamation and revegetation. The No Action Alternative and other past, present, and RFFAs are consistent with VRM objectives.

3.17 Recreational Resources

This section presents recreational opportunities of the HC/CUEP area. The analysis for potential direct and indirect effects to recreational resources includes effects to those opportunities identified as occurring within the HC/CUEP Plan boundary. The CESA includes recreational opportunities of the surrounding Cortez Mountains. Past, present, and RFFAs are included in Table 2-3.

3.17.1 Affected Environment Recreational Resources

The HC/CUEP area is isolated and undeveloped. There are no recreational facilities within the HC/CUEP Plan boundary or vicinity; and in this part of Nevada, developed recreational opportunities are relatively sparse. The Elko RMP ROD designated a portion of the HC/CUEP area as “open” to off-road vehicle use (BLM 1987). The HC/CUEP area in Eureka County lies in the NDOW Management Unit 144 (MU 144). There are 17 commercial outfitter guides permitted to operate in the BLM BMD, of which MU 144 is a part. In the HC/CUEP Plan boundary and vicinity, opportunities for public recreation primarily include OHV use, hunting, and camping. Mountain biking, horseback riding, sightseeing, outdoor photography, nature study, wildlife viewing, bird watching, and rock collecting may also occur. The HC/CUEP area is not known as a popular destination for public use and no annual commercial or competitive permitted events occur in the area. The surface exploration activities that are currently authorized have reduced recreation opportunities, particularly in Horse Canyon. OHV users, hunters, and campers are likely the most affected groups.

3.17.2 Environmental Consequences Recreational Resources

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on recreational resources within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

This EA considered recreational activities of the area and analyzed whether proposed activities would alter public access to these opportunities. The analysis was based on BLM staff knowledge of the recreational resources available and levels of use in the project area.

Effects Context for Recreational Resources

Localized: Proposed activities would affect recreationists or opportunities within the HC/CUEP Plan boundary.

Regional: Proposed activities would affect recreationists or opportunities on a landscape-level or outside of the HC/CUEP Plan boundary.

Short-term: Effects would last for 1 year or less.

Long-term: Effects would last more than 1 year.

Intensity of Effects Definitions for Recreational Resources

Negligible: Recreationists may notice changes to the recreational setting, but proposed activities would not affect their experience.

Minor: Recreationists may notice changes in recreational opportunities and the changes may affect aspects of their experience, but overall access to opportunities would not be affected.

Moderate: Recreationists would be aware of the proposed activities and effects would be evidenced as reduced opportunities and quality of experience. Some recreationists might feel displaced and need to pursue their desired recreation in another area. Mitigation measures may be necessary to offset adverse effects and would likely be successful.

Major: Recreationists would be aware of the proposed activities and effects would be evidenced as reduced opportunities and quality of experience. Recreationists would be displaced and need to pursue their desired recreation in another area. Mitigation measures may be necessary to offset adverse effects, but the success may not be guaranteed.

3.17.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The Proposed Action would not change existing access to public lands within the HC/CUEP Plan boundary for recreational uses. The area is not known as a popular destination for public use and no annual commercial or competitive permitted events occur in the area. Under the Proposed Action, recreationists would notice the proposed activities for an estimated 5 to 7 years. The effects to recreational resources would be localized, long-term, and negligible.

3.17.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line and water supply line would be the same as described for the Proposed Action.

The Waste Rock Facility Alternative would not change existing access to public lands within the HC/CUEP Plan boundary for recreational uses. The area is not known as a popular destination for public use and no annual commercial or competitive permitted events occur in the area.

Under the Waste Rock Facility Alternative, recreationists would notice proposed activities for an estimated 5 to 7 years. The effects to recreational resources would be localized, long-term, and negligible.

3.17.2.3 No Action

Under the No Action Alternative surface exploration and reclamation activities would continue as currently authorized. Recreation opportunities would continue to be reduced until reclamation is complete. Surface exploration activities are currently authorized to continue for 10 years. The area is not known as a popular destination for public use and no annual commercial or competitive permitted events occur in the area. The effects to recreational resources would be localized, long--term, and negligible.

3.17.2.4 Cumulative Effects

The CESA includes recreational opportunities of the surrounding Cortez Mountains. Past, present, and RFFAs are included in Table 2-3. Other past, present, and RFFA mining and exploration projects in the Cortez Mountains have reduced recreational opportunities by changing the natural characteristics of the landscape, thus potentially reducing hunting opportunities. Wildfires have reduced recreational opportunities by altering wildlife habitats.

Proposed Action

The Proposed Action would occur for 5 years with an additional 2 years for reclamation; this is within the currently authorized schedule for HC/CUEP exploration. While exploration activities associated with HC/CUEP would result in a short-term, temporary reduction of recreation opportunities, areas near the HC/CUEP area offer similar recreational opportunities. In the long-term reclamation would return the acreage to recreational uses. The effects to recreational resources would be localized, long-term, and minor.

Waste Rock Facility Alternative

The Waste Rock Facility Alternative would occur for 5 years with an additional 2 years for reclamation; this is within the currently authorized schedule for HC/CUEP exploration. Effects would be similar to those under the Proposed Action. Areas near the HC/CUEP area offer similar recreational opportunities and reclamation would return the acreage to recreational uses. Cumulative effects to recreational resources under the Waste Rock Facility Alternative would be localized, long-term, and minor.

No Action

Recreation opportunities would continue to be reduced until reclamation is complete. Surface exploration activities are currently authorized to continue for 10 years. Cumulative effects under the No Action Alternative would be localized, long-term, and minor.

3.18 Social and Economic Values

HC/CUEP is located in Eureka and Lander counties approximately 70 miles southwest of Elko, Nevada, and is accessed via Nevada State Route 306 or Nevada State Route 278. Eureka and Lander counties are located in north central Nevada and encompass approximately 4,180 square miles and 5,519 square miles, respectively. The study area for direct, indirect, and cumulative effects for social and economic values includes Elko, Eureka, and Lander counties. The rationale for including Elko County is that the majority of the workers employed by Barrick for the exploration activities at HC/CUEP live in the city of Elko. Elko County is located in northeastern Nevada and encompasses approximately 17,203 square miles.

3.18.1 Affected Environment Social and Economic Values

Elko County is the largest of the three counties in the analysis area. Lander County is the second largest. Population levels and growth rates are shown in **Table 3-13**. Data includes the entire State of Nevada, Elko, Eureka and Lander counties, and the largest communities or Census Designated Places (CDPs) within each of these three counties from 1980 through 2010.

Table 3-13 Population Characteristics

State/County/ Major Community	1980	1990	2000	2010	Annual Percent Growth Rate for 1980-1990	Annual Percent Growth Rate for 1990-2000	Annual Percent Growth Rate for 2000-2010
Nevada	800,508	1,201,833	1,998,257	2,700,551	4.1	5.2	3.1
Elko County	17,269	33,530	45,291	48,818	6.9	3.1	0.8
Elko City	8,758	14,736	16,708	18,297	5.3	1.3	0.9
Spring Creek CDP[1]	NA	5,866	10,548	12,361	NA	6.0	1.6
Carlin City	1,232	2,220	2,161	2,368	6.1	-0.3	0.9
Eureka County	1,198	1,547	1,651	1,987	2.6	0.7	1.9
Eureka CDP[1]	NA	NA	NA	610	NA	NA	NA
Lander County	4,076	6,266	5,794	5,775	4.4	-0.8	0.0
Battle Mountain CDP[1]	2,749	3,542	2,871	3,635	2.6	-2.1	2.4

[1]CDP – Census Designated Place

Source: U.S. Census Bureau 2010, 2000a, 2000b, 1990a, 1990b, and 1981

Employment and Income

Unemployment rates in Elko, Eureka, and Lander counties were lower than the statewide average in 2013 and 2015. The average annual unemployment rates for 2015 for Elko, Eureka, and Lander counties were 5.2, 6.0, and 6.6, respectively, compared to 6.8 percent for the entire State of Nevada. The unemployment rate in the study area averaged 5.9 percent, which is lower than the statewide average of 6.8 percent (NDETR 2015a). However, the average workforce numbers have decreased since 2013. The 2013 and 2015 averages for labor force, employment, and unemployment numbers, and unemployment rates for the State of Nevada compared to counties in the study area are shown in **Table 3-14**.

Table 3-14 Average Annual Labor Force, Average Employment and Unemployment, and Average Unemployment Rates by County for 2013 and 2015

Location	Average Labor Force	Average Employment	Average Unemployment	Average Unemployment Rate (percent)
2013[1]				
Nevada	1,369,800	1,240,600	129,200	9.4
Elko County	30,550	28,850	1,700	5.6
Eureka County	1,120	1,050	70	5.9
Lander County	4,940	4,690	250	5.0
2015[2]				
Nevada	1,420,300	1,323,100	97,200	6.8
Elko County	27,546	26,125	1,421	5.2
Eureka County	1,051	988	63	6.0
Lander County	3,403	3,178	225	6.6

Source: [1]NDETR 2013; [2]NDETR 2015a

In Elko County, more than 50 percent of the people work in the following industries: Leisure and Hospitality; Trade, Transportation, and Utilities; Government; and Natural Resources and Mining (NDETR 2015b). The majority of people within Eureka County work in the Natural Resources and Mining Industry (NDETR 2015b). In Lander County, more than 50 percent of the people work in the Natural Resources and Mining Industry (NDETR 2015b).

The median household income from the 2012 and 2015 U.S. Census Bureau data for the State of Nevada, Elko, Eureka, and Lander counties, Elko City, and Spring Creek CDP are shown in **Table 3-15**. The median household income for Elko, Eureka, and Lander counties, Elko City, and Spring Creek CDP is higher than the State of Nevada's median household income for both census periods. Median household income decreased between census periods for Nevada, Elko County, and Spring Creek CDP.

Table 3-15 Median Household Income

Location[1]	2008-2012	2009-2013
Nevada	$54,083	$52,800
Elko County	$70,411	$70,238
Elko City	$71,297	$72,565
Spring Creek CDP	$90,900	$90,158
Eureka County	$61,311	$64,632
Lander County	$70,341	$72,742

Sources: U.S. Census Bureau 2012 and 2015

[1]Median household income not available for Carlin City, Eureka CDP, or Battle Mountain CDP.

3.18.2 Environmental Consequences Social and Economic Values

The 2015 HC/CUEP EA analyzed effects of up to 549 acres of disturbance for surface exploration on social and economic values within the HC/CUEP Plan boundary; it is incorporated by reference (BLM 2015b).

This EA considered the most recent publicly available social and economic data. The analysis incorporated a qualitative review of past and current data to detect trends, and a comparison of trends relative to proposed activities. Effects may be beneficial or adverse.

Effects Context for Social and Economic Values

Localized: Effects of proposed activities would occur at a small scale, such as within one community or would be specific to the proposed project location.

Regional: Effects of proposed activities would occur across several communities.

Short-term: Effects would occur for the duration of the project.

Long-term: Effects would occur beyond the duration of the project.

Intensity of Effects Definitions for Social and Economic Values

Negligible: There would be a very small effect—less than 1 percent—on the local and regional economy. The consequences of the action would have no measurable effect on the socioeconomic environment.

Minor: There would be a minor change—1 to 10 percent—adverse or beneficial to the local economy. The action would affect only a small sector of the economy, and would require a significant effort to measure. The consequences of the action would not be readily apparent.

Moderate: There would be a measurable impact on a relatively small sector of the socioeconomic environment—by 11 to 15 percent—or the action would alter the relationship between sectors of the economy. Adverse impacts would not prove significant enough to threaten any economic sector, and beneficial impacts would not result in major structural shifts.

Major: There would be a major impact—over 15 percent—to the regional and local economy that would become readily apparent in the form of beneficial or adverse shifts in the socioeconomic structure. In certain cases, entirely new economic sectors would be created, or established sectors eliminated. Major impacts would reverberate throughout the socioeconomic environment, significantly altering existing conditions, in beneficial or adverse ways.

3.18.2.1 Proposed Action

The Proposed Action would reallocate 12 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Proposed Action, a portal pad and infrastructure, and two underground declines would be constructed. The power line and water supply line would be placed within the existing Horse Canyon Haul Road.

The Proposed Action would require an increase in the HC/CUEP workforce for a 5-year period. The development of the twin declines and exploration drifts would require a workforce for 24 hours per day, 365 days per year. An estimated 124 workers would be required for years 1 through 4. The number of workers would increase up to 188 in Year 5. The Proposed Action may result in changes to social infrastructure such as housing demand, public facilities and services, emergency health care services, and public education. However, it is likely that the workforce would be supplied from the surrounding communities where social infrastructure is already in place and the increase would be absorbed by underutilized infrastructure. The employment sector data demonstrates that exploration and mining related projects are crucial for maintaining the trends of lower than statewide average unemployment rates and higher than statewide average median household income rates for all three counties. The currently authorized surface exploration activities at HC/CUEP have used the local workforces of Elko, Eureka, and Lander counties, and have supported the local economy, resulting in a beneficial economic effect.

The Proposed Action of 12 acres of surface disturbance would result in a grazing capacity reduction of less than 1 AUM; this would result in a direct impact of $29.40/year and an indirect impact of $24.00/year (Resource Concepts, Inc. 2001).

Anticipated effects on social and economic resources under the Proposed Action would be regional, short-term, and negligible.

3.18.2.2 Waste Rock Facility Alternative

The Waste Rock Facility Alternative would reallocate a total of 40 acres of the authorized 549 acres of surface disturbance to support underground exploration activities. Under the Waste Rock Facility Alternative, a waste rock disposal facility would be constructed adjacent to the Horse Canyon Haul Road. The stormwater diversion at the portal pad would be extended. Infrastructure at the portal pad, the power line, and the water supply line would be the same as described for the Proposed Action. The timeframe for the Waste Rock Facility Alternative would be the same as described for the Proposed Action.

Effects would be similar to those described for the Proposed Action. A slightly smaller workforce relative to the Proposed Action would be required due to the decrease in demand for haul truck drivers. The workforce for the Waste Rock Facility Alternative would be approximately four persons less than the Proposed Action. This difference would be negligible.

The Waste Rock Facility Alternative of 40 acres of surface disturbance would result in a grazing capacity reduction of less than 3 AUMs; this would result in a direct impact of $88.20/year and an indirect impact of $72.00/year (Resource Concepts, Inc. 2001).

Effects on social and economic resources under the Waste Rock Facility Alternative would be regional, short-term, and negligible.

3.18.2.3 No Action

Under the No Action Alternative, surface exploration and reclamation activities would continue to have a regional, short-term, and negligible beneficial social and economic effect on the communities in Elko, Eureka, and Lander counties. The benefit would be less than under the Proposed Action.

3.18.2.4 Cumulative Effects

The CESA for social and economic values includes Elko, Eureka, and Lander counties. The past, present, and RFFAs are included in Table 2-3.

Proposed Action

Exploration activities at HC/CUEP have added to the current demand on the workforce, which has and would continue to support other mining and exploration projects in the affected counties of Elko, Eureka, and Lander. The Proposed Action does not induce substantial growth or concentration of population, displace a large number of people, cause a substantial reduction in employment, reduce wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services. It is expected that the cumulative socioeconomic effects of the Proposed Action would be regional, short-term, and negligible.

Waste Rock Facility Alternative

Cumulative effects would be nearly the same as those described for the Proposed Action. It is expected that the cumulative socioeconomic effects of the Waste Rock Facility Alternative would be regional, short-term, and negligible.

No Action

Surface exploration activities at HC/CUEP would continue to add to the current demand on the workforce, which is also used to support other present and future foreseeable mining and exploration projects in the affected counties of Elko, Eureka, and Lander. Under the No Action Alternative, the cumulative effects would be regional, short-term, and negligible. Effects would be less beneficial than under the Proposed Action.

4.0 Consultation and Coordination

This EA was prepared at the direction of the BLM Mount Lewis Field Office, BMD by Tetra Tech, Inc. under a contract with Barrick. Following is a list of persons, groups, organizations, and agencies consulted, as well as a list of individuals responsible for the preparation/review of this EA. BLM responses to comments received on the draft EA are included in **Appendix C**.

4.1 Persons, Groups, Organizations, and Agencies Consulted

State Agencies:
Lindsey Lesmeister NDOW Mining Biologist
Bonnie Weller NDOW GIS Specialist/Biologist

Native Americans:
Battle Mountain Band of the Te-Moak Tribe of Western Shoshone
Duckwater Shoshone Tribe
Elko Band and South Fork Bank of the Te-Moak Tribe of Western Shoshone
Te-Moak Tribe of Western Shoshone
Yomba Shoshone Tribe

County Governments:
Eureka County

4.2 List of Preparers/Reviewers

Table 4-1 List of Preparers/Reviewers

Preparer/Reviewer	Discipline/Role
Bureau of Land Management – Battle Mountain District, Mount Lewis Field Office	
Christine Gabriel	Project Manager, Planning and Environmental Coordinator, NEPA Compliance
Andrea Dolbear	Planning and Environmental Coordinator - District Lead, NEPA Compliance
Joe Moskiewicz	Assistant Field Manager, Minerals
Gant Massey	Geology, Water Resources
Juan Martinez	Native American Traditional Cultural Resources
Justin Demaio Steve Highland	Cultural and Paleontological Resources
Sam Ault Stephanie Herbert	Rangeland Specialist, Grazing Management, Vegetation and Soils, Noxious Weeds, Invasive, and Non-native Species, Wetlands/Riparian Zones
Todd Erdody	Forestry and Woodland Products

Table 4-1 List of Preparers/Reviewers

Preparer/Reviewer	Discipline/Role
Stephaney Cox	Wildlife, Migratory Birds, Threatened and Endangered Species (Plants and Animals)
Brandon Anderson	Recreation and Visual Resources
Craig Nicholls	Air Quality
Cheryl LaRoque	Waste - Hazardous and Solid
Julie Suhr Pierce	Socioeconomics
John Ames	Mining Engineering
Kathy Graham	GIS Compliance
Kyle Hendrix	Public Outreach
Victoria Sanderson	NEPA Coordination, Project Record
Tetra Tech, Inc.	
Michele Weidner	Project Manager, NEPA Compliance
Jill Reid	General Resource Specialist, Project Record, Document Preparation
Wendy Rieth	Wildlife Biologist, GIS Analyst
Barrick	
Bob Ingersoll	Senior Manager
Kimberley Wolf	Permitting Specialist

5.0 References

Air Sciences Inc. 2016. Application to Revise Class II Air Quality Operating Permit AP1041 3336. Prepared for Barrick Gold Exploration, Inc. April 2016.

ARCADIS U.S., Inc. (ARCADIS). 2014a. HCCUEP Burrowing Owl Survey Report. Prepared for Barrick. September 2014. 3 p. plus appendices.

_____. 2014b. HC/CUEP - Bat Survey Report. October. 2014. 5 p. plus appendices.

_____. 2014c. HCCUEP – Pygmy Rabbit Survey Report. Prepared for Barrick. June 2014 5 p. plus appendices.

_____. 2014d. HCCUEP – Greater Sage-grouse Monitoring Report. Prepared for Barrick. May 2014. 4 p. plus appendices.

Barrick Gold Exploration, Inc. (Barrick). 2015. Horse Canyon/Cortez Unified Exploration Project Plan of Operations Amendment NVN-066621 and Reclamation Permit No. 0159. Submitted to BLM, Mount Lewis Field Office, Battle Mountain District, Nevada. Revised May 2015.

_____. 2016a. Horse Canyon/Cortez Unified Exploration Project Plan of Operations Amendment NVN-066621 and Reclamation Permit No. 0159. Submitted to BLM, Mount Lewis Field Office, Battle Mountain District, Nevada. Revised July 20, 2016.

_____. 2016b. Revised Stormwater Pollution Prevention Plan Horse Canyon Mine, Horse Canyon Cortez Unified Exploration Project, and West Pine Valley Exploration Project. Barrick Gold Exploration, Inc. Revised: May 2016.

Buckner, D. 2014. Personal communication via email re: special status plants.

Bureau of Land Management (BLM). 1986a. Record of Decision for Shoshone-Eureka Resource Management Plan. Battle Mountain District, Shoshone-Eureka Resource Area, Battle Mountain, Nevada. February 1986.

_____. 1986b. Manual H-8410-1 – Visual Resource Inventory. January 17, 1986. Accessed: April 16, 2014. Available at: http://www.blm.gov/wo/st/en/prog/Recreation/recrecreationnational/RMS/2.html.

_____. 1987. Elko Resource Management Plan Record of Decision. U.S. Department of the Interior, Bureau of Land Management, Elko District Office, Elko, Nevada. March 1987.

_____. 1992. BLM Manual 9015 - Integrated Weed Management. Accessed: Sept. 15, 2014. Available at: http://www.blm.gov/ca/st/en/prog/weeds/9015.print.html.

_____. 2001. Decision Record and Finding of No Significant Impact for Cortez Gold Mines Horse Canyon/Cortez Unified Exploration Project Environmental Assessment No.

NV063-EA00-35 and Plan of Operations No. N64-87-010P (97-1A) NVN 066621, August 2001.

_____. 2004a. Horse Canyon/Cortez Unified Exploration Project II Environmental Assessment NV063-EA04-61. Cortez Gold Mines. Elko Field Office and Battle Mountain Field Office, Nevada. Case File #NVN066621. September 2004.

_____. 2004b. Decision Record, Finding of No Significant Impact, and Plan of Operations Approval for Cortez Gold Mines Horse Canyon/Cortez Unified Exploration Project Amendment Environmental Assessment No. NV063-EA04-61 and Plan of Operations No. NVN 066621. Elko Field Office and Battle Mountain Field Office, Nevada. October 2004.

_____. 2004c. Mount Tenabo Properties of Cultural and Religious Importance Determinations of Eligibility to the National Register of Historic Places. BLM 6-2352- 1. Prepared by G.Dixon and R. McGonagle, BLM Elko and Battle Mountain Field Offices. April 19.

_____. 2005. Decision for Horse Canyon/Cortez Unified Exploration Project Amendment. Case File Number: N-66621, EA NV063-EA-04-61. Nevada State Office. April 4, 2005.

_____. 2007. Potential Fossil Yield Classification (PYFC) System for Paleontological Resources on Public Lands. Instruction Memorandum No. 2008-009. October 15, 2007.

_____. 2008a. BLM National Environmental Policy Act Handbook H-1790-1. Bureau of Land Management, National Environmental Policy Act Program, Office of the Assistant Director, Renewable Resources and Planning (WO-200), Washington, DC. January 2008.

_____. 2008b. Record of Decision and Plan of Operations Amendment Approval for the Cortez Hills Expansion Project Final Environmental Impact Statement NVN-067575. Battle Mountain District, Battle Mountain, Nevada. November 2008.

_____. 2008c. Cortez Hills Expansion Project Final Environmental Impact Statement, NVN-0677575. Battle Mountain Field Office, Battle Mountain, Nevada. September 2008.

_____. 2008d. Integrated Weed Management Plan. Mt. Lewis Field Office and Tonopah Field Office, Battle Mountain District, Nevada. July 2008.

_____. 2009. Integrated Weed Management Plan Environmental Assessment. Mt. Lewis Field Office and Tonopah Field Office, Battle Mountain District, Nevada. January 2009.

_____. 2010. Addendum to the Horse Canyon/Cortez Unified Exploration Project II Environmental Assessment NV063-EA04-61. File Number: NVN-066621. Battle Mountain District Office, Battle Mountain, Nevada. November 2010.

_____. 2011a. Decision Record, Finding of No Significant Impact, and Plan of Operations

Approval for Cortez Gold Mines Horse Canyon/Cortez Unified Exploration Project Amendment Environmental Assessment No. NV063-EAO4-61 Addendum to Environmental Assessment and Plan of Operations No. NVN 066621. Battle Mountain District Office, Battle Mountain, Nevada. May 2011.

_____. 2011b. Mount Hope Project Draft Environmental Impact Statement: U.S. Bureau of Land Management, NVN-082096 and NVN-084632, December 2011. Available at: http://www.blm.gov/nv/st/en/fo/battle_mountain_field/blm_information/

_____. 2011c. BLM Final Sensitive Species List. IM-NV-2011-059-A01.

_____. 2012. Decision for Barrick Cortez, Inc. Amendment to Horse Canyon/Cortez Unified Exploration Project Revision to the Plan of Operations (NVN-066621 (11-1A) and Reclamation Permit No. 159). Mount Lewis Field Office, Nevada. August 23, 2012.

_____. 2013. Decision for Barrick Cortez, Inc. Amendment to Horse Canyon/Cortez Unified Exploration Project Plan of Operations Boundary Change (NVN-066621 and Reclamation Permit No. 159). Mount Lewis Field Office, Nevada. January 3, 2013.

_____. 2014a. Statewide Wildlife Survey Protocols (DRAFT), BLM, Nevada. 2014. 30 p.

_____. 2014b. Noxious Weeds and Invasive Species. BLM Nevada's War Against Weeds. Accessed on: May 8, 2014. Available at: http://www.blm.gov/nv/st/en/prog/more programs/invasive species.html.

_____. 2015a. Decision for Barrick Gold Exploration Horse Canyon/Cortez Unified Exploration Project Plan of Operations Amendment NVN-066621 and Reclamation Permit No. 0159. Mount Lewis Field Office, Nevada. June 19, 2015.

_____. 2015b. Environmental Assessment for the Barrick Gold Exploration, Inc. Horse Canyon/Cortez Unified Exploration Project Plan of Operations (NVN-066621 [13-1A]) and Reclamation Permit No. 0159 Plan Modification, Addendum, and Amendment. File Number: NVN-066621 (13-1A, 14-1A, 14-2A). Battle Mountain District Office, Mount Lewis Field Office, Battle Mountain, Nevada. March 2015.

_____. 2015c. Decision for Barrick Gold Exploration Inc. Horse Canyon/Cortez Unified Exploration Project Modification to the Plan of Operations and Addendum to the Plan of Operations. Mount Lewis Field Office, Battle Mountain, Nevada. March 5, 2015.

_____. 2015d. Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment. Attachment 2 from the USDOI 2015 Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region including the Greater Sage-Grouse Sub-Regions of: Idaho and Southwestern Montana, Nevada, and Northeastern California, Oregon, and Utah. Prepared by USDOI BLM Nevada State Office. September 2015.

_____. 2015e. Environmental Assessment for Barrick Cortez Inc. (NVN-067575 [14-1]) Amendment 3 to Plan of Operations and Reclamation Permit Application. EA DOI-BLM-NV-B010-2015-055-EA. File Number: NVN-067575. Battle Mountain District Office, Mount Lewis Field Office, Battle Mountain, Nevada. July 2015.

Comer, P., P. Crist, M. Reid, J. Hak, H. Hamilton, D. Braun, G. Kittel, I. Varley, B. Unnasch, S. Auer, M. Creutzburg, D. Theobald, and L. Kutner. 2013. *Central Basin and Range Rapid Ecoregional Assessment Report*. Prepared for the U.S. Department of the Interior, Bureau of Land Management. 168 pp + Appendices.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Journal of Wildlife Management 28(4): 967 985.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC.

Department of the Interior, Bureau of Land Management, U.S. Fish and Wildlife Service, and Barrick Gold of North America. 2015. Barrick Nevada Sage-grouse Bank Enabling Agreement. March 25, 2015.

Domenico, P.A. and F.W. Schwartz. 1990. Physical and Chemical Hydrogeology, John Wiley & Sons, New York, 824 p.

Duncan, Helen, 1956. Ordovician and Silurian coral faunas of western United States: USGS Bulletin. 1021-F, p. 209-236.

Eakin, T.E. 1961. Ground-water Appraisal of Pine Valley, Eureka and Elko Counties, Nevada. Ground-water Resources Reconnaissance Series, Report 2. Nevada Department of Conservation and Natural Resources, Carson City, Nevada. 41 p.

ERM 2016a. Technical Memorandum to Kim Wolf re: Bat Monitoring for NDOW. February 17, 2016.

ERM 2016b. Personal communication (email) to NDOW re: Bat Files. February 26, 2016.

ESCO Associates, Inc. (ESCO). 2013. Noxious Weed Management Plan, HC/CUEP Project Area, Eureka County, Nevada. Prepared for: Barrick Gold of North America, P.O. Box 29, Elko, Nevada 89803. Prepared by: ESCO Associates, Inc. April 2013.

_____. 2014. Draft Vegetation Types of the HCCUEP Area (in support of mapping). Eureka and Lander counties, Nevada. ESCO Associates, Inc. Boulder, CO. March 2014.

Eureka County. 2010. Eureka County Master Plan. March 23, 2010.

Everett, D.E. and F.E. Rush. 1966. A Brief Appraisal of the Water Resources of Grass and Carico Lake Valleys, Lander and Eureka Counties, Nevada. Water Resources Reconnaissance Series Report 37. Nevada Department of Conservation and Natural Resources, Carson City, Nevada. 27 p.

Floyd, T., C. S. Elphick, G. Chisholm, K. Mack, R. G. Elston, E. M. Ammon, and J. D. Boone. 2007. Atlas of the Breeding Birds of Nevada. University of Nevada Press, Reno and Las Vegas, Nevada. 581 p.

Geomega. 2007. Groundwater flow modeling report for the Cortez Hills expansion project: prepared for Cortez Gold Mines by Geomega, Inc. August 15 2007.

Geomega. 2014. Cortez Range From Decline Waste Rock Analysis. Technical Memorandum. March 1, 2014.

Gilluly, J. and H. Masursky. 1965. Geology of the Cortez Quadrangle, Nevada. U.S. Geological Survey Bulletin 1175. 1965.

Great Basin Bird Observatory (GBBO). 2010. Nevada Comprehensive Bird Conservation Plan, ver. 1.0. Great Basin Bird Observatory, Reno, NV. Available online at: www.gbbo.org/bird_conservation_plan.html.

Great Basin Ecology (GBE). 2014. Cortez Mine 2014 Raptor Survey. Report prepared for Barrick Cortez Mine. May 2014. 10 p.

_____. 2015. Cortez Mine 2015 Raptor Survey. Report prepared for Barrick Cortez Mine. August 2015. 57 p.

Green, J. S. and J. T. Flinders. 1980. *Brachylagus idahoensis*. Mammalian Species 125:1-4.

HDR Engineering, Inc. (HDR). 2014. Horse Canyon/Cortez Unified Exploration Project – 2013 Surface Water Baseline Study. March 2014. Reno, Nevada.

_____. 2015a. Goldrush Surface Water Monitoring Annual Report 2014. Prepared for Barrick Gold of North America. March 26, 2015. Reno, Nevada.

_____. 2015b. Goldrush Seep and Spring Monitoring Report – 2014. Prepared for Barrick of North America. April 8, 2015. Reno, Nevada.

_____. 2015c. DRAFT Goldrush Seep and Spring Monitoring Annual Report – 2015. Prepared for Barrick of North American. December 9, 2015. Reno, Nevada.

_____. 2016. Goldrush Surface Water Monitoring Report 2015. Prepared for Barrick of North America. February 15, 2016. Reno, Nevada.

IML Air Science. 2015a. Horse Creek 2015 Monthly Meteorological Summary. Accessed February 17, 2016. Available at http://www.imlairscience.com/Cortez/Summary.aspx?id=3.

_____. 2015b. Cortez Hills 2015 Monthly Meteorological Summary. Accessed March 15, 2016. Available at http://www.imlairscience.com/Cortez/Summary.aspx?id=2.

ITASCA. 2013. Hydrologic Stress Tests of GRW-01 and Willow Springs Wells – Data Summary, Analysis, and Discussion. August 1, 2013.

_____. 2014. GRW-03 Pumping Test, Data Analyses, and Summary of Findings. May 21, 2014.

_____. 2016a. Summary of Geochemical Characterization of Waste Rock Samples for the Proposed HCCUEP Exploration Declines Technical Memorandum. March 24, 2016.

_____. 2016b. Supplemental Waste Rock Characterization Data for the Proposed HCCUEP Exploration Declines. Technical Memorandum. May 2, 2016.

_____. 2016c. Estimation of Groundwater Inflow Rates and Water Table for Horse Canyon/Cortez Unified Exploration Project Declines Technical Memorandum. May 19, 2016.

Keinath, D.A. and M. McGee. 2004. Species Assessment for Pygmy Rabbit (*Brachylagus idahoensis*) in Wyoming. Prepared for Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming. March 2004. 82 p.

Klute, D. S., L.W. Ayers, M. T. Green, W. H. Howe, S. J. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

Lander County. 2005. Lander County 2005 Policy Plan for Federally Administered Lands. 2005.

Larrucea, E.S. and P.F. Brussard. 2008. Habitat selection and current distribution of the pygmy rabbit in Nevada and California, USA. Journal of Mammalogy 89(3): 691-699.

Merriam, C.W. and E.H. McKee. 1976. The Roberts Mountains Formation, a Regional Stratigraphic Study With Emphasis on Rugose Coral Distribution. USGS Professional Paper 973.

Millar, C., I. and R. D. Westfall. 2010. Distribution and Climatic Relationships of the American Pika (*Ochotona princeps*) in the Sierra Nevada and Western Great Basin, .S.A.; Periglacial Landforms as Refugia in Warming Climates. Artic, Antarctic, and Alpine Research, Vol. 42, No. 1, 2010, pp. 76-88. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, 800 Buchanan Street, Western Annex Building, Albany, California 94710, U.S.A.

National Conference of State Legislatures. 2008. *Nevada: Assessing the Costs of Climate Change*. http://cier.umd.edu/climateadaptation/Climate%20change--NEVADA.pdf.

_____. 2013a. Soil Survey Geographic (SSURGO) database for Eureka County Area, Nevada (NV775), Survey Area Version 8, 11/27/2013 (GIS data dated 9/10/2012). Natural

Resources Conservation Service, United States Department of Agriculture, Fort Worth, Texas. Available at: http://websoilsurvey.nrcs.gov

_____. 2013b. Soil Survey Geographic (SSURGO) database for Lander County, Nevada, North Part (NV776), Survey Area Version 6, 12/3/2013 (GIS data dated 11/27/2013), Natural Resources Conservation Service, United States Department of Agriculture, Fort Worth, Texas. Available at: http://websoilsurvey.nrcs.gov

_____. 2014. Ecological Site Descriptions. Natural Resources Conservation Service. Accessed May 2, 2014. Available at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/

_____. 2016. NRCS Ecological Site Description website. Accessed June 2016. Available at https://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx

Natureserve. 2014. Accessed November 2014. Available at http://explorer.natureserve.org/servlet/NatureServe?searchName=Eriogonum+beatleyae

Neel, L. A. 1999. Nevada Bird Conservation Plan. Reno: Nevada Partners in Flight. 260 p.

Nevada Bat Working Group (NBWG). 2006. The Revised Nevada Bat Conservation Plan. 254 p.

Nevada Department of Agriculture (NDA). 2016. Nevada Noxious Weed List. Nevada Department of Agriculture. Accessed March 16, 2016. Available at: http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weed_List/.

Nevada Department of Employment, Training, and Rehabilitation (NDETR). 2013. Nevada Workforce Informer. Local Area Unemployment Statistics. 2013 Nevada Labor Force Report. Accessed April 17, 2014. Available at: http://www.nevadaworkforce.com/

_____. 2015a. 2015 Nevada Labor Force Summary Data.

_____. 2015b. 2015 Nevada Covered Employment. Published December 2015.

Nevada Department of Wildlife (NDOW). 2004. Greater Sage-grouse Conservation Plan for Nevada and Eastern California. First edition. NDOW. June 30, 2004. 108 p.

_____. 2010. GIS vector layer “NDOW_Pronghorn_Distribution_2010”. Acquired February 7, 2014 from Chet Van Dellen, GIS Coordinator, NDOW.

_____. 2014. Letter response from T. Herrick of NDOW to W. Rieth of Tetra Tech Re: Horse Canyon Cortez Exploration. April 8, 2014.

_____. 2016. Greater Sage-grouse 2015 Lek Data within four-mile radius of the Horse Canyon/Cortez Unified Exploration Project Declines Amendment. Received via email March 15, 2016.

Nevada Division of Environmental Protection and Nevada Division of Conservation. 1994. *Best Management Practices Handbook*, 1994.

Nevada Division of Environmental Protection (NDEP), Truckee Meadows Stormwater Coordinating Committee, Washoe Regional Planning Commission, and Clark County Regional flood control District. 2008. *Nevada Contractors Field Guide for Construction Site Best Management Practices (BMPs)*, 2008.

_____. 2013. General Stormwater Permit, NVR300000.

_____. 2014a. Bureau of Air Quality Planning. Ambient Air Quality Monitoring Program – Pollutants of Concern. Accessed March 16, 2016. Available at http://ndep.nv.gov/baqp/monitoring/aaqstd.html.

_____. 2014b. Class II Air Quality Operating Permit AP1041-3336. February.

_____. 2015. Nevada 2014 Water Quality Integrated Report, Assessment Period – October 1, 2007 through September 30, 2012. NDEP, Bureau of Water Quality Planning, Carson City, NV. October 2015. 30 p.

Nevada Division of Water Planning (NDWP). 1999. Nevada State Water Plan. NDWP, Department of Conservation and Natural Resources. March 1999. 959 p.

Nevada Natural Heritage Program (NNHP). 2014. Species information (web database). Available: http://heritage.nv.gov/species_info.

Resource Concepts, Inc. 2001. Nevada Grazing Statistics Report and Economic Analysis for Federal Lands in Nevada. March 26, 2001.

Rogers, S. D. and M. M. Peacock. 2012. The disappearing northern leopard frog (*Lithobates pipiens*): conservation genetics and implications for remnant populations in western Nevada. Ecology and Evolution 2012; 2(8): pp. 2040-2056.

Smith Environmental & Engineering (SMITH). 2014. Soils Investigation of the Horse Canyon-Cortez Unified Exploration Project Plan of Operations Area in Eureka County and Lander County, Nevada. p. 38 plus appendices.

Spitz, K. and J. Moreno. 1996. A Practical Guide to Groundwater and Solute Transport Modeling, John Wiley & Sons, New York, 461 p.

SRK Consulting, Inc. (SRK). 2013. Horse Canyon Mine Stormwater Pollution Prevention Plan. April. Elko, Nevada.

_____. 2015. Barrick Cortez Inc. (NVN-067575 [14-1A]) Amendment 3 to Plan of Operations and Reclamation Permit Application. Revised July.

_____. 2016. Barrick Cortez Inc. (NVN-067575) Amendment to Plan of Operations and Reclamation Permit #0093. Submitted to Bureau of Land Management, Mount Lewis Field Office. May 2, 2016; revised July.

_____. 2016. Results of Land Subsidence Predictions in Pipeline and Cortez/Cortez Hills Complexes for the Deep South Expansion Project. Technical Memorandum. August. 8 p. plus figures.

Stewart, J.H. 1980. Geology of Nevada, a discussion to accompany the geologic map of Nevada: Nevada Bureau of Mines and Geology Special Publication 4.

Tetra Tech. 2015. Horse Canyon/Cortez Unified Exploration Project, Wildlife Baseline Report. Prepared for Bureau of Land Management, Battle Mountain District Office, Mount Lewis Field Office. July 2014. 48 p.

United States Census Bureau (U.S. Census Bureau). 1981. 1980. Census of Population Volume 1 Characteristics of the Population Chapter A Number of Inhabitants Part 30 Nevada PC80-1-A-30. U.S. Department of Commerce, Bureau of the Census, Population Division. Table 5. Population of Places: 1960 to 1980. Accessed: June 11, 2014. Available at: http://www.census.gov/prod/www/decennial.html.

_____. 1990a. 1990 Census of Population and Housing. Table 30. Population and Housing Units. Accessed: April 16, 2014. Available at: http://www.census.gov/population/www/censusdata/hiscendata.html.

_____. 1990b. 1990 Census of Population and Housing Public Law 94-171 Data (Official) Age by Race and Hispanic Origin. Accessed: June 11, 2014. Available at: http://censtats.census.gov.

_____. 2000a. Census Explorer. 2000 Census. Total Population by State and County. Accessed: April 15, 2014 and May 30, 2014. Available at: http://www.census.gov/censusexplorer.html.

_____. 2000b. U.S. Census 2000 Demographic Profiles. Table DP-1 Profile of General Demographic Characteristics: 2000. Geographic area: Battle Mountain CDP, Elko City, Spring Creek CDP, and Carlin City, Nevada. Accessed: April 15, 2014. Available at: http://censtats.census.gov.

_____. 2010. 2010 Census Interactive Population Search. Accessed: April 15, 2014 and May 30, 2014. Available at: http://www.census.gov/2010census/popmap/ipmtext.php.

_____. 2012. Nevada QuickFacts from the U.S. Census Bureau. Accessed: June 13, 2014. Available at: http://quickfacts.census.gov/qfd/states/32000.html.

_____. 2015. 2009-2013 Median Household Income for Elko City, Elko County, Eureka

County, Lander County, Spring Creek CDP, and Nevada. Nevada QuickFacts from U.S. Census Bureau. Accessed February 17, 2016. Available at http://quickfacts.census.gov/gfd/states/32000.html.

United States Environmental Protection Agency (USEPA). 2014. Wastes – Hazardous Waste and Non-Hazardous Waste. Accessed on May 6, 2014. Available at: http://www.epa.gov/epawaste/hazard/index.htm and http://www.epa.gov/epawaste/nonhaz/index.htm.

_____. 2016. National Ambient Air Quality Standards (NAAQS) Table. Criteria Air Pollutants. Accessed March 10, 2016. Available at http://www.epa.gov/criteria-air-pollutants/naaqs-table.

United States Fish and Wildlife (USFWS). 2004. Appendix 4 *in* A Blueprint for the Future of Migratory Birds, Migratory Bird Program Strategic Plan 2004-2014. USFWS Migratory Bird Program. 21 p.

_____. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 p.

_____. 2013. Greater Sage-Grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, Colorado. February 2013.

_____. 2016. Letter regarding List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project. Declines EA for Barrick Gold's Horse Canyon/Cortez Unified Exploration Plan, Consultation Code: 08ENVD00-2016-SLI-0223. February 16, 2016.

United States Geological Survey (USGS). 2014, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation). Accessed May 2014. Available at http://waterdata.usgs.gov/nv/nwis/uv.

U.S. Geological Survey (USGS) /Environmental Protection Agency (EPA). 2014. National Hydrography Dataset for Nevada. Vector GIS data. Accessed 01/27/2014. Available: http://datagateway.nrcs.usda.gov.

University of Nevada – Reno (UNR). 2014. MLRA descriptions, received from Devon Snyder (UNR) via Barrick email, April 14, 2014.

Wells and Elliott. 1971. Geochemical Reconnaissance of the Cortez-Buckhorn Area, Southern Cortez Mountains, Nevada, US Geological Survey Bulletin 1312-P.

Wildlife Action Plan Team (WAPT). 2012. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno, Nevada. Submitted September 6, 2012. Approved March 1, 2013.

Western Regional Climate Center (WRCC). 2013. *Beowawe U of N Ranch, Nevada Period of Record Monthly Climate Summary: September 1972 to January 2013*. Reno, Nevada. Available at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nv0800.

Zones, C.P. 1961. Ground-water Potentialities in the Crescent Valley, Eureka and Lander Counties, Nevada. U.S. Geological Survey (USGS) Water Supply Paper 1581, U.S. Government Printing Office, Washington, DC. 48 pp.

Appendix A - Previously Authorized Environmental Protection Measures; BMPs; Weed Plan

Environmental Protection Measures

HORSE CANYON MINE, HORSE CANYON CORTEZ UNIFIED EXPLORATION PROJECT, AND WEST PINE VALLEY EXPLORATION PROJECT

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June 2016

Table of Contents

1. Introduction

Barrick will continue to implement approved applicant-committed environmental protection measures (EPMs) to ensure a safe and environmentally sound exploration project. These measures were updated to include the Conditions of Approvals in the BLM Decision Record dated June 2015 pertaining to the 2015 Plan Amendment.

2. Environmental Protection Measures

2.1 Air Quality

Barrick, in compliance with the NDEP - Bureau of Air Pollution Control Surface Disturbance Permit, will protect air quality by undertaking road maintenance activities to reduce fugitive dust emissions. Roads will continue to be watered using fresh water or drill-produced groundwater consistent with NDEP approval, graveled, or chemically treated to reduce fugitive dust emissions, based upon weather and road conditions. Application of water and/or a dust suppression chemical such as magnesium chloride by water trucks will be done, as needed, in areas of close-spaced drilling and related activity. Barrick will use wet drilling methods to reduce the potential for fugitive dust emissions.

Speed limits are posted and vehicle speeds reduced in areas of disturbance to minimize the potential for fugitive dust emissions, to protect wildlife and livestock, and to maintain operational safety. Speed limits will continue to be enforced. Project vehicle will continue to be maintained regularly to ensure they are operating in a manner to minimize vehicle emissions.

2.2 Water Quality

All drill holes will be plugged in accordance with Nevada Revised Statutes (NRS) 534, Nevada Administrative Code (NAC) 534.4369, and NAC 534.4371, with the exception of drill holes collared with a mud rotary or reverse circulation drill rig and completed with a core rig, which will be plugged prior to the core rig moving from the drill site. Barrick may maintain up to 60 open holes which include both holes which are currently being drilled and other drill holes which have been left open for further exploration work. Barrick must include in the annual summary report which drill holes were left open and the reason for this action.

If any drill hole produces artesian flow, the drill hole will be contained pursuant to NRS 534.060 and NAC 534.378 and will be sealed by the method described in NAC 534.4371. If casings are set in a drill hole, either the drill hole must be completed as a well and plugged pursuant to NAC 534.420, or the casings will be completely removed from the drill hole and then plugged in accordance with NAC 534.4369 and NAC 534.4371.

Barrick will continue to plug all drill holes in accordance with NAC 534.4371 as administered by the NDWR, State Engineer's Office. Barrick will comply with the drill hole abandonment procedures set forth in NAC 534.420 through 534.437 to prevent cross-contamination of aquifers or contamination of ground and surface waters.

Stormwater BMPs (NDEP et.al 1994 *and NDEP et.al. 2008*) will be used at construction sites to minimize stormwater erosion.

Drill cuttings will be contained on site, and fluids managed utilizing appropriate control measures. Sediment traps will be used as necessary and filled at the end of the drill program. Barrick will follow the spill contingency plan

Only nontoxic fluids, such as but not limited to BARAFLOC©, will be used in the drilling process.

2.3 Spill Contingency Plan

Materials and equipment necessary for spill cleanup will be kept at each drill rig. Equipment and materials will include, but not be limited to, shovels, gloves, safety glasses, sorbent materials, sand, sawdust, and plastic/metal trash containers specifically for this purpose.

Well-maintained equipment will be used to perform the work required at the Project. When practicable, equipment maintenance will be performed off-site. In the event of oil, fuel, lubricating grease or other equipment leaks, cleanup will be conducted as soon as possible. If the leak is on compacted soil, an oil-absorbing product, such as Absorb®, may be applied. Once the cleanup product has absorbed the spill material, the product will be removed and placed in the petroleum contaminated soil bin located in the laydown yard, and the material disposed of according to state and federal regulations. Any contaminated soil will be removed, managed, and disposed of at an off-site facility in compliance with state and federal regulations. In the event of oil, fuel, or hydraulic fluid leaks, cleanup will be conducted as soon as possible. In the event of a major spill, the following actions will be taken in addition to any federal, state, and local health and safety regulations:

- Contain the spread or migration of the spill using the on-hand supply of erosion control structures and/or by creating dirt berms, as feasible and necessary.
- Regulated wastes will be removed from the Project area and disposed of in a state, federal, or local designated area.
- If a spill of a petroleum constituent is considered to meet the reportable quantity per the NDEP's guidelines (greater than 25 gallons or greater than 3 cubic yards of impacted material) or a reportable quantity for hazardous waste is released based on the U.S Environmental Protection Agency (EPA) guidelines established under Title III List of Lists (40 CFR Part 302), the BLM and NDEP (775) 687-4670 will be notified within 24 hours and the appropriate remedial actions and confirmation sampling will be conducted under direction of the NDEP.

2.4 Soils and Erosion Prevention and Control

Barrick will conduct exploration operations to minimize soil erosion. Erosion and runoff control measures, such as water bars, ditching, and other water control structures will be implemented in areas of surface disturbance. After the exploration program is completed in an area, the surface disturbance will be graded, re-contoured, and available topsoil/growth medium replaced, and the area will be seeded with an appropriate and BLM-approved seed mixture in order to establish a ground cover and minimize erosion. Revegetation activities will continue to be commenced at the earliest feasible time following reclamation activities. Best Management Practices (BMPs) will be utilized to control erosion and sedimentation. Best management practices utilized to control erosion and sedimentation are detailed in Attachment 1 of this appendix.

Barrick has begun a program of hand-planting big Wyoming sagebrush and bitterbrush seedlings in reclaimed areas. Similar programs for hand-planting seedlings may occur in the future as deemed necessary to achieve the reclamation objectives.

2.5 Water and Riparian Resources

In general, natural drainage patterns will not be altered; however, a diversion will be placed above the portal pad to route the surface flow around the portal pad. Stormwater from this channel would be routed under the Horse Canyon haul road via culverts and directed into an unnamed drainage.

Culverts will be used as necessary to route diverted surface flow underneath the Horse Canyon haul road. The culvert outlet elevation(s) will be designed at or near the existing ground elevations to minimize the hydraulic jump and reduce the potential for erosion as the stormwater flows from the culvert(s) onto natural ground.

Drill site construction within drainages will be avoided unless prior approval from the BLM and NDEP is obtained. When drainages must be crossed with a road, best management practices, shown in Attachment 1, will be followed to minimize the surface disturbance and erosion potential. Temporary culverts and/or straw bales will be utilized to protect drainages. Smaller drainage patterns that could be affected by trench or pad construction will be restored, and all culverts and pipes will be removed upon completion of the exploration program. The following construction and maintenance practices from the BLM Gold Book, *Surface Operating Standards and Guidelines, Fourth Edition, Revised 2007,* will be implemented:

- All culverts should be laid on natural ground or at the original elevation of any drainage crossed. All future culverts should have a minimum diameter of 18 inches. The outlet of all culverts should extend at least 1 foot beyond the toe of any slope.
- Ditch grades should be no less than 0.5 percent to provide positive drainage and to avoid siltation.
- For “dry bed” or low flow road crossings, which do not require a culvert, the drainage will not be filled so that water can flow across the crossings without being impounded.

Barrick will not conduct new surface disturbing activities within riparian or wetland areas without authorization from the BLM as outlined below. If Barrick determines that new surface disturbance activities within riparian areas are required, Barrick will submit to the BLM the locations of the proposed drill pads and access roads in an acceptable format (i.e. electronic spatial files). Barrick will not conduct the proposed operations unless authorized by the BLM, which may require further environmental analysis, or operating restrictions, or site-specific environmental protection measures. If it is the only practicable alternative, the BLM may authorize surface disturbance within riparian areas if it is determined that the action, as proposed or conditioned, will not impair the long-term function or utility of riparian habitat

If Barrick determines that new surface disturbance is required within wetland areas, Barrick will not conduct the proposed operations unless authorized by the BLM. Any disturbance authorized within wetland areas will be in accordance with Executive Order 11990. Specifically:

> Sec. 2. (a) In furtherance of Section 101 (b)(3) of the National Environmental Policy Act of 1969 (42 U.S.C. 4331 (b)(3)) to improve and coordinate federal plans, functions, programs and resources to the end that the Nation may attain the widest range of beneficial uses of the environment without degradation risk to health or safety, each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.
>
> Sec. 5. In carrying out the activities described in Section 1 of this Order, each agency shall consider factors relevant to a proposal's effect on the survival and quality of the wetlands. Among these factors are:(a) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards, and sediment and erosion;(b) maintenance of natural systems, including conservation and long term productivity of existing flora and

> fauna species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and (c) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses.

Existing exploration and reclamation activities within riparian areas will be allowed to continue provided the BLM conduct on-going evaluations of operations to make any riparian mitigation recommendations.

All exploration activities will continue to be conducted using BMPs such that sediments, cuttings, drilling fluids, or any other material or substance will not enter flowing drainages.

Sumps will be excavated and managed to prevent overtopping and saturating the safety berms. Barrick will monitor sumps regularly for seeps or other evidence of erosion and will direct drill crews to cease activity and notify supervisors if seepage is observed. Barrick will ensure that sump evacuation proceeds for as long as drilling or other water-producing activities continue; if evacuation is not possible, Barrick will cease drilling as soon as water levels approach the sump capacity. No trash will be placed in the sumps.

2.6 Solid and Hazardous Wastes

The Project will not generate, use or dispose of any hazardous waste. Petroleum products will be used on-site. Petroleum products are excluded as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act section 101(14). Diesel, oil, and lubricants will be transported to the site in portable containers (e.g., tanks in the pickup trucks for diesel fuel) but will not be stored on-site. If regulated materials (petroleum products) are spilled, measures will be taken under Barrick spill response guidelines to control the extent of the spill, and the appropriate agencies will be notified in accordance with the applicable federal and state regulations.

Solid waste will be collected at each drill pad and the portal pad and transported offsite periodically for disposal at an approved solid waste facility.

2.7 Wildlife and Sensitive Species

In order to avoid potential impacts to breeding migratory birds, Barrick will have a BLM-approved biologist survey in early spring of each year all areas proposed for drilling or surface disturbance for the presence of active nests. Barrick has committed to conducting pre-disturbance migratory bird nest surveys in the spring and establishing exclusion zones around active nests as part of the applicant committed EPMs. Additionally, surface disturbance clearance surveys will be conducted following BLM Wildlife Protocols (BLM 2014) when a proposed activity involves ground disturbance during the nesting season, defined by the BLM as March 1 through July 31. When active nests are located, or if other evidence of nesting is observed (e.g., mating pairs, territorial defense, carrying nesting material, transporting food), Barrick's biologist will recommend to the BLM an avoidance buffer around the nest which the BLM, in coordination with the Nevada Department of Wildlife (NDOW) and the U.S. Fish and Wildlife Service (USFWS), will review and approve prior to surface disturbance. Barrick's biologist will inform Barrick when the birds have left the nest. Barrick will not conduct any drilling or surface disturbing activities within the exclusion zone until the biologist determines that the birds are no longer nesting.

Each year during the nesting season (March 1 to July 31), Barrick will not conduct drilling or surface disturbing activities within a 0.5-mile radius of any active raptor nests. Upon identifying an active raptor nest, Barrick will immediately notify the BLM.

Speed limits are posted and vehicle speeds reduced in areas of disturbance to minimize the potential for fugitive dust emissions, to protect wildlife and livestock, and lo maintain operational safely. Speed limits will continue to be enforced.

2.8 Greater Sage-grouse (Centrocercus urophasianus)

Barrick will adhere to the environmental protection measures as established by the BLM for Greater sage-grouse lek/strutting grounds and for known nesting and brood rearing areas. Noise generated by exploration activities will not increase ambient levels by 10 A-weighted decibels (dBA) at active leks based upon the BLM stipulations (BLM 2014). The EPMs are applicable to potentially affected active leks within four miles of the Project, which currently include the Horse Creek 01 Lek and the New Cortez-Grass Valley Lek. The New Brock Canyon Lek is excluded from EPMs due to topographical features, which reduce or eliminate noise generated from the Proposed Action. The EPMs are subject to review by a BLM biologist and may be adjusted based on annual surveys of lek activity. Upon identifying any previously unknown Greater sage-grouse lek/strutting ground, nesting or brood rearing area, Barrick will immediately notify the BLM.

To prevent effects at leks from potential increases in noise, Barrick will implement sound reduction measures, which may include sound modelling as per BLM protocol (BLM 2014), placement of a sound barrier at drill rigs, or restriction of drilling operations during seasonal and daily timing periods. If the sound modeling shows no projected increase in noise levels above 10 dBA, no additional measures are needed. If the sound modeling shows an increase in noise levels above 10 dBA or if no modeling is conducted, Barrick will install sound barriers (likely hay bales or similar material) at the drill rig or will adhere to seasonal and time operational restrictions. The restrictions will be in place from March 1 through May 15 from 4:00 a.m. to 10:00 a.m. (BLM 2014).

Barrick will provide a Work Plan for future surface disturbance locations to the BLM. The BLM may conduct field verification of Greater sage-grouse habitat in areas of proposed surface disturbance to further define habitat impacts.

In order to reduce impacts due to disturbance within Greater sage-grouse habitat, Barrick will provide one or more of the following EPMs in coordination with the BLM:

- Pinyon-juniper removal
- Install Greater sage-grouse flight deterrents
- Exclosures surrounding springs, meadows, and riparian areas
- Payment for Greater sage-grouse mitigation (as outlined below)

Barrick will implement the EPMs within two years of the decision for 2015 Plan; an extension of the timeframe for implementing the EPMs may be authorized by the BLM. Greater sage-grouse EPMs completed will be reported in the annual disturbance summary report, which is provided to the BLM and the NDEP by April 15.

Use of hand-thinning methods (i.e. chainsaw, lop and scatter of slash, etc.) to remove pinyon and juniper trees in areas that are determined to be actively encroaching into Greater sage-grouse habitat will be implemented. Pinyon-juniper will be removed from three acres of encroachment areas for every one acre of proposed Project disturbance. Pinyon-juniper treatment will be prioritized to occur within the Project boundary, and focus on Phase I and Phase II pinyon-juniper conditions. Treatment activities will not occur within a four-mile buffer from active leks from March 1 through June 30 to minimize the potential for impacts to breeding and nesting Greater sage-grouse. Surveys for migratory birds will be required between March 1 and July 31.

To minimize potential impacts to cultural resources as a result of these EPMs, several additional actions will be undertaken. As specific treatment sites are identified, a BLM staff archaeologist or

BLM permitted archaeologist will evaluate the potential of the area for cultural resources, and will undertake avoidance measures as needed. To reduce the risk of unauthorized collection, field crews will be instructed by an agency archaeologist or BLM permitted archaeologist regarding the importance of cultural resources and the possible penalties under the Archaeological Resources Protection Act for the destruction of archaeological resources. In order to decrease the risk of inadvertent damage to fragile remains, crews will also be instructed to recognize wood and brush cultural resources.

Greater sage-grouse flight deterrents (fence markers) will be attached to fences within Greater sage-grouse habitat at a BLM-determined ratio of number of deterrents for every acre of disturbance. Preferred locations of flight deterrents include fencing near leks and associated buffer areas.

Exclosures will be constructed surrounding springs, meadows, and riparian areas identified by the BLM as important Greater sage-grouse habitat.

As 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* (BLM et al. 2013) payment may be made into a Greater sage-grouse mitigation bank account or other program in an amount equal to the cost of satisfying the target mitigation ratios. Costs for making such improvements on private lands will be based on the Nevada Standardized Reclamation Cost Estimator (SRCE) model. The Nevada SRCE will also provide the basis for negotiating costs for public lands including cost of NEPA compliance (BLM et al. 2013).

Where reclaimed areas are found to adequately address some or all of the impacts to Greater sage-grouse habitat the required habitat improvement acreage may be reduced or credited on a 1 acre to 1 acre ratio as determined by the BLM (BLM et al. 2013).

In September 2015, the US Department of the Interior Bureau of Land Management Washing, DC published the Record of Decision and Approved Resource Management Plan Amendments (ARMPAs) for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California Oregon, and Utah. The ARMPAs include Greater Sage-Grouse habitat management direction. that avoids and minimizes additional disturbance in Greater Sage-Grouse habitat management areas. The ARMPA for the Nevada and Northeastern California Sub-Region includes Management Decision (Mineral Resources) 18: which notes " Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the "avoid, minimize and compensatory mitigation" process through an applicable mitigation system, such as the Nevada Conservation Credit System and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015)."

The 12 acres proposed for reallocation from surface exploration to underground exploration are within the area covered by the BEA. The BEA notes that, to the extent practicable, Barrick will propose measures to avoid or minimize impacts to Greater Sage-grouse.(Barrick 2015). Barrick has complied with the BEA by designing the portal pad to be within non-habitat for the Greater Sage-grouse. Furthermore, the portal pad is located more than four miles from the nearest lek.

2.9 Bats

Barrick will not conduct surface disturbing activities within 50 feet of existing adits, shaft openings, or caves to prevent any impacts to bat species potentially residing in or near these structures. If a BLM-qualified biologist surveys the site and determines that bats are not residing in or near the

structure, the aforementioned exclusion zone will not apply. Bat surveys are carried out in accordance with the BLM's Statewide Wildlife Protocols (BLM 2014) and in accordance with the BLM-approved wildlife work plan (ARCADIS 2014a).

2.10 Pygmy Rabbit (Brachylagus idahoensis)

Barrick will not conduct surface disturbing activity within habitat identified as suitable to support pygmy rabbit until a pre-disturbance survey has been conducted. Surveys are carried out in accordance with the BLM's Statewide Wildlife Protocols (BLM 2014), the site pygmy rabbit survey work plan (ARCADIS 2014b), and the Interagency Pygmy Rabbit Working Group recommendations (IPRWG 2008). If active burrows are identified, Barrick will notify the BLM to evaluate the potential impact and coordinate with Barrick to devise and implement measures to minimize impacts to the pygmy rabbit and its habitat. These measures may include avoidance.

2.11 Dark and Pale Kangaroo Mice

If dark kangaroo mice (*Microdipodops megacephalus*) and pale kangaroo mice (*Microdipodops pallidus*) habitat have the potential to occur in disturbance areas, habitat surveys will occur prior to ground disturbance activities, and a report will be submitted to the BLM. Both species were eliminated from further analysis in the 2015 HC/CUEP Wildlife Report. The HC/CUEP area is outside of the pale kangaroo mice known range which occurs in the southwestern portion of Nevada. The dark kangaroo mouse was discussed further, but still eliminated from further analysis based on BLM opinion on habitat. The majority of the dark kangaroo mouse's geographic range is in Nevada, but it is also found in small areas of Oregon, Idaho, Utah, and California (O'Farrell and Blaustein 1974). It is a nocturnal species that is found in sandy or fine, gravelly soils, such as dunes, sandy valley bottoms, or alluvial fans, in areas dominated by sagebrush, rabbitbrush (*Chrysothamnus* spp), and horsebrush (*Tetradymia* spp). It is active from March through October. When inactive and during winter hibernation, this mouse is found underground in burrows (NNHP 2014). This species forages primarily on seeds, but also insects (Project review by BLM in 2015 determined suitable habitat for this species was not present in the HC/CUEP area (ARCADIS 2015).

2.12 Other Special Status Species

In the event that other special status plant or wildlife species are identified within the Project, Barrick will not conduct surface disturbing activities within the species' habitat until the BLM can evaluate the potential impact and coordinate with Barrick to devise and implement a plan to avoid the habitat.

All trenches, sumps, and other small excavations that pose a hazard or nuisance to the public, wildlife, or livestock will be adequately fenced to preclude access or constructed with a sloped end for easy egress.

2.13 Cultural and Paleontological Resources

Barrick will continue to conduct exploration activities in accordance with all applicable state and federal regulations and the 2005 Programmatic Agreement among the BLM, State Historic Preservation Office (SHPO), and the Cortez Joint Venture. Before conducting any surface disturbing activities, Barrick will submit to the BLM a 1:24,000 scale map showing the location of proposed activity. For areas that previously have been surveyed at the Class III level, the BLM will then determine which cultural sites need to be monitored and establish an exclusion zone around each site eligible for the National Register of Historic Places (NRHP).

For areas that have not been surveyed at a Class III level, the BLM will determine the Area of

Potential Effect and whether a Class III survey is necessary. If a Class III survey is required, Barrick will retain a BLM-qualified archaeologist to undertake the inventory. Barrick will select a Native American observer from a list of previously used observers to accompany the archaeologist during the inventory to provide information and/or recommendations to the BLM. If selected Native American observer is not available upon 5 days' notice, a different observer may be selected. If none is available within a reasonable period, Barrick will document that a reasonable attempt was made to contact the Tribes and obtain an observer. A revised Programmatic Agreement between Barrick, BLM, SHPO, and Tribal entities is currently under development, which may result in an updated Native American observer process.

The archaeologist will submit a report that adheres to the BLM's Cultural Resource Inventory Guidelines documenting the results of the inventory. All documented sites will be protected from surface disturbing activities by an exclusion zone determined by a BLM archaeologist until the BLM assesses whether the site is eligible for listing on the NRHP. If the BLM determines, in consultation with SHPO, that such site is or may be eligible for the NRHP, Barrick will not conduct any surface disturbing activities within the exclusion zone without further authorization from the BLM, which may require further environmental and/or cultural analyses. If the site is determined not to be eligible, or the BLM determines that existing cultural surveys are sufficient to conclude that no eligible sites exist, Barrick may conduct surface disturbing activities upon notification by the BLM.

If Barrick discovers previously unknown cultural resources while undertaking exploration activities, Barrick will immediately cease any surface disturbing activity within 100 meters/330 feet of the discovery and notify the BLM. If the BLM determines, in consultation with SHPO, that the site is or may be eligible for the NRHP, a BLM archaeologist will determine an exclusion zone adequate to protect the resource. Barrick will not conduct any surface disturbing activities within this exclusion zone without further authorization from the BLM, which may require further environmental and/or cultural analyses. If the site is determined not to be eligible, Barrick many resume surface disturbing activities upon notification by the BLM.

Barrick's employees and contractors will receive training on the potential for cultural resources and the procedures required by Barrick to avoid disturbing, altering, or destroying any remains or any historical or archaeological site, structure, building or object on federal land. If exploration activities uncover human remains, Barrick will immediately cease all earth disturbing activities within 100 meters/330 feet of the discovery and notify the BLM and county law enforcement so that the BLM and/or law enforcement can ensure compliance with all applicable laws regarding such discovery.

If Barrick discovers a vertebrate fossil deposit during surface disturbing activities, Barrick will immediately cease further activities that may affect the deposit and notify the BLM so that the BLM may evaluate the discovery and establish an exclusion zone. Barrick will not undertake any further surface disturbance within the exclusion zone

2.14 Native American Traditional Cultural Resources

After more than ten years of ethnographic work and consultation in the Crescent Valley/Cortez/Grass Valley/Pine Valley areas, which included interviews with knowledgeable individuals and groups, compilations of ethnographic research, field tours, and formal government-to-government consultations with federally recognized Native American tribes in the area, the BLM determined that Mount Tenabo/White Cliffs and portions of Horse Canyon are eligible for listing on the NRHP as Properties of Cultural and Religious Importance (PCRI) (BLM 2004).

Before conducting any activity in the PCRI areas, Barrick will notify the BLM of the proposed activity, so that the BLM may establish exclusion zones as necessary to protect the features identified as

contributing elements in the April 19, 2004 eligibility determinations for the PCRI areas. Barrick will not conduct any activity within such exclusion zones without further authorization from the BLM, which may require further environmental and/or cultural analyses. For any activity conducted inside the PCRI areas, but outside of the exclusion zones, Barrick will arrange for a BLM permitted archaeologist and a Native American observer (as provided above) to be on site during new surface disturbing activity to ensure that contributing elements are not adversely affected by the operations.

2.15 Survey Monuments

Survey monuments, witness corners, and/or reference monuments will be protected to the extent economically and technically feasible. Should moving such a feature be required, Barrick will ensure that a licensed Professional Land Surveyor oversee and execute the relocation in a manner consistent with applicable laws. The BLM will be notified in writing prior to the moving of any such survey monument.

2.16 Fire Prevention and Control

Barrick will comply with all applicable federal and state fire laws and regulations, and will take all reasonable measures to prevent and suppress fires in the area of operations. Barrick and contractors are required to carry fire extinguishers, hand tools, and/or backpack-type water pumps in their vehicles to suppress small fires.

2.17 Invasive Non-Native Species

Barrick will be responsible for controlling all noxious weeds in newly disturbed areas until the reclamation activities have been determined to be successful and released by the BLM authorized officer.

A noxious weed management plan has been prepared for the Project (SRK 2016) and is included in Attachment 2. The purpose of the plan is to prevent, mitigate, and control the spread of noxious weeds during and following exploration. The plan prescribes a control protocol using disturbance categories and best applicable control methods for effectiveness. Disturbance categories are applied to areas of the Project based on frequency of disturbance. The plan also includes a list of five weed control alternative methods, including manual, chemical, and seeding of desirable species methods, which are applied to each disturbance category.

Barrick will follow the noxious weed management plan (SRK 2016) presented in Attachment 2. As part of weed control measures, Barrick will require that the undercarriage of all contractor vehicles be cleaned prior to entering the Project area if the vehicle is coming from an area outside of northeastern Nevada. A list of State of Nevada weeds can be found at the State of Nevada Department of Agriculture website: http://agri.nv.gov/Pi ant/Noxious_Weeds/Noxious_Weed_List.

Only chemicals approved for use on public land will be used for invasive, non-native weed treatment. Barrick will conduct weed eradication programs annually in areas of their activities. Areas of known noxious weeds, invasive and non-native species will be avoided during periods when weeds could be spread by vehicles (i.e. periods of potential seed dispersal).

Re-establishment of vegetation in disturbance areas will be conducted as soon as practical to reduce the potential for wind and water erosion, minimize impacts to soils and vegetation, and help prevent the spread of noxious weeds, invasive and non-native species.

Reclaimed areas will be seeded with BLM -approved recommendations for seed mix, application rates, and seeding methods. The BMPs of actively treating noxious weeds, invasive and non-native species upon discovery will also prevent these weed species from spreading and dominating the

site. Compliance with the noxious weed management plan (SRK 2016) in Attachment 2 will insure exploration activities follow proper BLM protocol regarding noxious weeds, invasive and non-native species.

2.18 Vegetation/Forestry and Woodland Resources

Reseeding will be consistent with all BLM recommendations for seed mix constituents, application rate, and seeding methods.

Barrick will minimize where possible any injury or removal of pinyon pine, juniper, aspen, limber pine, or mountain mahogany during activities associated with drill pad and road construction. However, pinyon pine and juniper that has been removed due to exploration or mitigation activities will be made available to the public.

2.19 Public Safety and Access

Public safety will be maintained throughout the life of the Project. All equipment and other facilities will be maintained in a safe and orderly manner.

Drill sites, sumps, and excavations will be reclaimed as soon as practicable after completion of sampling and logging.

Final reclamation of overland travel routes, sumps, and drill sites will consist of, if required, fully recontouring disturbances to their original grade, and reseeding in the fall season immediately following completion of exploration activities. In the event that any existing roads are damaged as a result of Barrick activities, Barrick will return them to their original condition.

Road construction and drainage operations are governed by the provisions of the Project Plan and the State of Nevada General Stormwater Permit NVR 300000 (MSW-798 approved March 2013). Roads will be designed to the minimum standards needed to accommodate intended safe use and to maintain surface resource protection. Where feasible, exploration roads will be constructed along existing contours. Exploration road construction will be conducted in such a manner as to minimize cuts and fills, including limiting road construction on steep slopes, where possible.

2.20 Wildland Fire Protection

All applicable state and federal fire laws and regulations will be complied with and all reasonable measures will be taken to prevent and suppress fires in the Project area.

In the event the proposed Project activities start or cause a wildfire, Barrick will be responsible for all the costs associated with the suppression.

Barrick will comply with all applicable state and federal fire laws and regulations and all reasonable measures (i.e. vehicle hand tools, extinguisher, contact the BLM concerning fire controls on welding) will be taken to prevent and suppress fires in the Project area.

All Project vehicles will carry fire extinguishers and a minimum of ten gallons of water during the months of May through September.

Adequate fire- fighting equipment, i.e., shovel, Pulaski, extinguisher(s), and a minimum ten gallons of water will be kept at the drill site(s).

Vehicle catalytic converters will be inspected often and cleaned of all brush and grass debris.

Welding operations will be conducted in an area free from or mostly free from vegetation. A minimum of ten gallons of water and a shovel will be on hand to extinguish any fires created from the sparks. Extra personnel will be at the welding site to watch for fires created by welding sparks.

Welding aprons will be used when conditions warrant (i.e., during red flag warnings).

Wildland fires will immediately be reported to the BLM Central Nevada Interagency Dispatch Center at (775) 623 -3444. Information reported will include the location (latitude and longitude if possible), fuels involved, time started, who or what is near the fire, and the direction of fire spread.

When conducting operations during the months of May through September, the BLM Battle Mountain District Office, Division of Fire and Aviation will be contacted at (775) 635-4000 to determine if any fire restrictions are in place for the Project and to provide approximate beginning and ending dates for Project activities.

2.21 Livestock and Range Allotments

Barrick will protect fences, gates, stock ponds, and other range improvements within the Project. Gates will be closed and/or locked as appropriate. Any range monitoring key areas in the Project area will be avoided.

3. References

ARCADIS. 2014a. *HC/CUEP – Bat and Burrowing Owl Survey Work Plan.*

ARCADIS. 2014b. *HC/CUEP – Pygmy Rabbit Survey Work Plan. March 2014.*

BLM. 2015. Instruction Memorandum NV-2015-017 *Revised Direction for Proposed Activities within Greater Sage-Grouse habitat*, February 9, 2015.

BLM. 2015a. Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and northeastern California, Oregon, and Utah. September 2015.

BLM. 2014. *Statewide Wildlife Protocols (DRAFT)*, BLM Nevada, 2014.

BLM, 2007. Gold Book. *Surface Operating Standards and Guidelines, Fourth Edition*. Revised 2007.

BLM. 2004. *Mount Tenabo Properties of Cultural and Religious Importance Determinations of Eligibility to the National Register of Historic Places*, April 19, 2004.

BLM et.al. 2013. *Memorandum of Understanding Among USDI BLM, Nevada State Office, USDA USFS, Humboldt-Toiyabe National Forest, Nevada Department of conservation and Natural Resources and Barrick Gold of North America, Newmont Mining Corporation, and Other Companies Regarding the Establishment of a Partnership for the Conservation and Protection of the Greater Sage-Grouse and Greater Sage-Grouse Habitat,* July 2013.

ESCO Associates, Inc. 2014a. *Draft Vegetation Types of the HCCUEP Area (in support of mapping) Eureka and Lander counties, Nevada.* March 2014.

ESCO Associates, Inc. 2014b. *Greater Sage Grouse Habitat Suitability Ratings for HCCUEP,* November 2014.

IPRWG. 2008. *Surveying for Pygmy Rabbits (Brachylagus idahoensis).* Interagency Pygmy Rabbit Working Group. February 2008.

Nevada Division of Environmental Protection and Nevada Division of Conservation. 1994. *Best Management Practices Handbook*, 1994.

Nevada Division of Environmental Protection, Truckee Meadows Stormwater coordinating committee, Washoe Regional Planning Commission, and Clark county Regional flood control District. 2008. *Nevada Contractors Field Guide for Construction Site Best Management Practices (BMPs)*, 2008.

Nevada Administrative Code 445A. *Mining Facilities* .n.d.

Nevada Administrative Code 534. *Underground Water and Wells*, n.d.

Nevada Division of Environmental Protection. *Stormwater General Permit NVR300000 General Permit for Stormwater Discharges Associated With Industrial Activity From Metal Mining Activities*, March 2013.

Nevada Revised Statute 534, *Underground Water and Wells*, n.d.

SRK. 2016. Horse Canyon/Cortez Unified Exploration Project Noxious Weed Management Plan, June 2016.

SRK. 2008. *Amendment to the Pipeline/South Pipeline Plan of Operations for the Cortez Hills Expansion Project and NDEP Reclamation Permit Application*, July 2008.

Attachment 1: Best Management Practices

Specific Erosion Controls

BMPs for erosion control used at the project area include preservation of existing vegetation, to the extent possible, recontouring, revegetation, riprap, velocity dissipation devices, and ditches. Specific erosion BMPs for the project area include:

- Waste rock piles at the project area have been recontoured and revegetated;
- Roads in the project area are canted toward ditches which run the length of the road;
- Water used for dust control is sprayed over roads and disturbed areas at a rate that moistens the soil but does not cause run-off, preventing wind erosion;
- Velocity dissipation devices (berm cutouts) are used throughout the roads at the project area to divert storm water into natural drainages and minimize exposure to disturbed soil;
- Silt fences, straw bales, ditches, and sediment basins, for all down slope boundaries of construction areas and side slopes as deemed appropriate by individual site conditions are installed and will maximize the amount of sediment that is trapped;
- Storm water is diverted away from material storage areas;
- Concurrent reclamation of drill roads and pads is practiced.
- Reclamation of the Horse Canyon Cortez Unified Exploration Project is performed pursuant to Permit #0159 issued by the Nevada Division of Environmental Protection-Bureau of Mining and Reclamation and the Bureau of Land Management. Reclamation of the West Pine Valley Exploration Plan is performed pursuant to Permit #0229

Elko Exploration Best Management Practices Erosion and Sediment Control

BMP	Description and Use
Slope Terracing and Tracking	Terracing and soil roughening or tracking of slopes reduces erosion by creating stair-steps, furrows across slopes and serrations in the soil. Uneven bare soil surfaces capture raindrops, decrease the velocity of run-off, trap sediments, increase infiltration, and aid in the establishment of vegetation. Terracing and soil roughening or tracking of slopes may be necessary on the 3:1 slopes in the southern portion of the project site.
Wind Erosion and Dust Control	Dust control measures will be provided *as necessary* to prevent or alleviate dust nuisance and comply with regulations. Control may consist of applying water, soil stabilizers, or dust palliatives (SS-5). The application of water via a water truck is a typical dust control measure. Caution must be taken to prevent water applications in excess of soil absorption rates. Otherwise, the excess water could result in sediment-laden run-off.
Riprap	Riprap measures are to be provided at the storm drain outlet for soil stabilization, and to prevent soil erosion in areas of concentrated run-off.
Silt Fence	Silt fences slow and detain sediment laden sheet flow from disturbed areas and allow settlement of sediment prior to discharge off-site. However, silt fences require more maintenance and must be removed upon completion of the project. A silt fence may be installed to protect the existing basin and drainages.
Stockpile Management	Stockpiles must be located 100 feet away from stream inlets and water courses that can convey sediment. Sediment logs should be placed around the perimeter of each and every stockpile to prevent sediment movement from designated areas.
Solid and Demolition Waste	Designate on-site waste collection areas away from stream inlets. Cover dumpsters at all times. Collect construction site litter and debris daily.
Spill Prevention	Discharges of non-hazardous and hazardous materials can be eliminated by preventing and controlling spills. Contractors are responsible for utilizing drip pans or absorbent material under equipment when it is not in use, maintaining a stockpile of spill clean-up materials located where it will be readily accessible, and for immediate clean-up of spills and proper disposal of soils and materials.
Vehicle & Equipment Maintenance & Fueling	Fueling and maintenance areas should be located at least 100 feet from any waterway, protected from any ability of conveyance of pollutants, located on a level grade. Washing, fueling, and any major maintenance should be conducted off site whenever possible.

BMP	Description and Use
Material Delivery and Storage	Within the construction staging area, the contractor will designate a storage area away from a storm water conveyance, for the delivery, handling, and storage of materials. Materials subject to wind erosion and weather will be stored within a covered container.
Paints and Liquid Materials	A specific storage and cleaning area should be designated to minimize or eliminate the transport of paint, adhesives, solvents, and cleaning products to storm drains or watercourses.
Sanitary / Septic Waste Management	All sanitary septic waste facilities (portable restrooms) must be placed at least 100 feet from surface water. The facility must be located in an area, where if tipped over, it will not allow conveyance of septic fluids and waste into the surface water system. The facility should be anchored down to prevent them from overturning during periods of high wind. Fiber rolls should be placed around the facility. The facility should be discharged into a sanitary sewer, not the storm drain system. The facility should be monitored for leaks and good working order at least once a week.
Landscape Management	A specific storage area for plant storage, landscaping topsoil, and chemicals, should be designated to limit the discharge of soils, fertilizers, and chemicals into storm drains and gutters, drainages, and water courses.
Noxious Weed Control	Many invasive plants are listed as noxious weeds in the Nevada Revised Statutes. Consequently, their control or management is mandated by law. Construction practices are a known cause of the spread of invasive weeds. Should the site have invasive weeds, application of herbicide or manually uprooting the infestation is recommended. Great care should be taken to (1) stay out of infested areas with vehicles and (2) make sure vehicles are free of dirt and debris when entering and exiting the site to not carry seeds and plant pieces to or from the construction site.
Sediment Basins	Sediment basins will be utilized to catch sediment leaving the site. Basins are existing structures that will be cleaned out of accumulated sediment and emergency spillways will be constructed for each structure.

Attachment 2: Noxious Weed Management Plan

HORSE CANYON/CORTEZ UNIFIED EXPLORATION PROJECT

NOXIOUS WEED MANAGEMENT PLAN

Report Prepared for

BARRICK GOLD EXPLORATION INC.
293 Spruce Road
Elko, Nevada 89801

Report Prepared by

SRK Consulting (U.S.), Inc.
460100.020
June 2016

HORSE CANYON/CORTEZ UNIFIED EXPLORATION PROJECT

Noxious Weed Management Plan

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SRK Project Number 452300.110

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Appendices

1 Introduction and Scope of Report

Barrick Gold Exploration Inc. (Barrick) is the operator of the Horse Canyon/Cortez Unified Exploration Project (HC/CUEP). Exploration activities are conducted under Plan of Operations NVN-066621 and Reclamation Permit No. 0159 (HC/CUEP Plan). The HC/CUEP Plan boundary includes approximately 22,307 acres consisting of public lands administered by both the Bureau of Land Management (BLM) Battle Mountain District, Mount Lewis Field Office and in part by the BLM Elko District, Tuscarora Field Office. It is located approximately 70 miles southwest of Elko, Nevada and is accessed via Nevada State Route 306 or Nevada State Route 278. The area covered by the approved HC/CUEP Plan is located in Lander and Eureka counties, Nevada within portions of Township (T) 26 North (N), Range (R) 47 East (E) (sections 1, 2, 3, 11, and 12); T26N, R48E (sections 1-17, 20-29, and 32-36); and T27N, R48E (sections 14, 15, 20, 22, 23, 26-29, and 32-36).

Barrick recognizes the economic and environmental impact that can result from the establishment of noxious weeds and has committed to a proactive approach to weed control. This Noxious Weed Management Plan (Plan) is prepared as a site-wide plan to be implemented for ongoing and future projects. This plan contains management strategies, provisions for annual monitoring and treatment evaluation, and provisions for treatment. The results from annual monitoring will be the basis for updating this Plan and developing annual treatment programs.

Noxious weeds have been added as one of the critical elements of the human environment, and as such, these species need to be addressed in all National Environmental Policy Act (NEPA) documents. A proactive approach to addressing this issue is to develop a plan for prevention, detection, and control of noxious weeds that is part of the overall site plan of operations.

The BLM policy relating to the management and coordination of noxious weed activities is set forth in *BLM Manual 9015 - Integrated Weed Management* (BLM 1992). The BLM policy requires that all ground-disturbing projects and any projects that alter plant communities be assessed to determine the risk of introducing noxious or spreading noxious weeds. If the risk is moderate or higher, a positive management program needs to be established. Risk is assessed due to the likelihood that a species will establish as a result of the action, which is based on the presence of noxious weeds in the general area of the project (i.e., within the watershed, or other regional area), and the effect of the action on the vegetation and soil in the area. If noxious weeds are already present in the area, and if the action will create seedbed conditions conducive to these species, then the risk is considered high. Surface disturbing activities that expose bare mineral soil or create mesic conditions (e.g., infiltration ponds) generally result in a high risk rating. The presence of noxious weeds at HC/CUEP, which are currently being treated, adds to the risk.

1.1 Purpose of the Plan

The purpose of this Plan is to provide guidelines for effectively managing designated noxious weeds which represent a threat to the continued economic and environmental value of lands within the HC/CUEP Plan boundary. This Plan implements the mandates of the Nevada Revised Statutes Chapter 555 by detailing integrated management options for designated noxious weeds. Such options include control alternatives, preventative measures, and monitoring. It is this Plan's intent to incorporate those options that are the least environmentally damaging yet practical, timely, and economically feasible.

1.2 Enactment Authority

Chapter 555 of the Nevada Revised Statutes and Nevada Administrative Code requires eradication of noxious weeds by owners or occupants of land. The Nevada Department of Agriculture Plant Industry Division enforces the laws set forth in the Nevada Revised Statutes and Nevada Administrative Code.

1.3 Goals of Plan

The goals of this Plan are to comply with and execute the requirements of Chapter 555 of the Nevada Revised Statutes and Chapter 555 of the Nevada Administrative Code. In addition this Plan aims to implement the BLM's mission to sustain the health, diversity, and productivity of the Nation's public lands for the use and enjoyment of present and future generations.

2 Noxious Weed Management Objectives

The goal of this Plan is to avoid or limit increases in noxious or invasive weed distribution. To achieve this goal; project construction, operation, maintenance, and reclamation activities will be conducted in a manner that will:

- Avoid or minimize the introduction or spread of noxious and invasive weeds into previously un-infested areas or beyond an existing infestation zone. An infestation zone is defined as an area containing a single large infestation or several separate infestations;
- Avoid or minimize substantial increases in noxious and invasive weed population or extent within an existing infestation zone; and
- Avoid or minimize direct or indirect adverse effects on threatened and endangered, and special status plant or wildlife species by invasive and noxious weeds.

3 Noxious Weed Inventory

Vegetation inventories of the HC/CUEP area have been conducted since 2009 to document existing conditions and account for alterations in vegetation communities due to disturbance from wildfire, altered fire regimes, as well as HC/CUEP exploration and reclamation activities. As of 2013, six noxious weed species are known to occur within the HC/CUEP Plan area. The most extensive of these noxious weeds is hoary cress (*Cardaria draba*), followed by musk thistle (*Carduus nutans*), and Scotch thistle (*Onopordon acanthium*). Canada thistle (*Cirsium arvense*), poison hemlock (*Conium maculatum*), and Klamath weed, or spotted St. Johnswort, (*Hypericum perforatum*) occur to a limited degree. Barrick has taken weed control actions to address the hoary cress and musk thistle in the Horse Canyon area (ESCO 2013).

The most common invasive plant species found within the HC/CUEP area is cheatgrass. Much like its distribution throughout Nevada, the species is found throughout the HC/CUEP area in varying densities depending on localized disturbance history, including fire. Cheatgrass creates combustible cover on formerly bare ground and allows fires to carry more often and more extensively than was previously the case. This synergistically tends to encourage further spread of annual/winter opportunistic species (McAdoo et al 2007). Vegetation present in the area consists of pinyon and juniper trees, with few shrubs in the higher elevations and sagebrush, rabbitbrush, and sparse

grasses on the valley floors. A range fire impacted the eastern margin of the Project Area (east side of Horse Canyon) in 1999 (ESCO 2011).

4 Weed Management

4.1 Weed Control Alternatives

For purposes of management it is appropriate to separate areas of disturbance that are to be repeatedly impacted, such as roadsides from other areas where there is a one- time impact to be followed by an indefinitely long interval without further disturbance.

Category A – Re-disturbance annual or more often

In these areas, typified by roadsides, routine operations of maintenance re-establish bare ground via grading, and new development of weedy plants is to be expected on a continuing basis. Efforts to create and maintain desirable perennial vegetation are not practical.

Category B – Re-disturbance likely but two to five years away

In these areas, such as certain drill pads, further exploration activities may eventually develop and cause new disturbance, but annual disruption is unlikely.

Category C – Re-disturbance if any is long-term (five or more years)

In these areas no definite return is anticipated, and establishment and maintenance of a competitive perennial cover of desirable species would be sought.

Alternative methods of weed control are described below, with a guide for appropriate controls based on the disturbance category shown in Table 1. All treatments must be approved for use by the BLM and be conducted in compliance with all federal, state, and local weed control regulations and in consultation with the BLM weed specialist. Treatment windows are species-specific but generally include the spring growing season prior to flower bud formation, and fall for species that either germinate in the fall or as biennial or perennial plants, have an active growth period in the fall following summer dormancy.

Table 1: Application of Weed Control Alternatives

Disturbance Category	Weed Type	Appropriate Actions	Preferred Action(s)
A	Annual/Biennial	1, 2, 3, 4	2
A	Perennial	1	3
B	Annual/Biennial	1, 2, 3, 4, 5	4, 5
B	Perennial	1, 2, 3, 4, 5	3, 5
C	Annual/Biennial	3, 4, 5	5
C	Perennial	1, 2, 3, 5	5

1. Manual Removal

This alternative includes the pulling of weeds as well as mechanized removal via grading or other surficial manipulation during for example roadside maintenance.

2. Manual Prevention of Flowering (e.g. mowing)

This is appropriate for annual/biennial species to avoid allowing them to produce seed.

3. Chemical Application

To date, the use of chemicals has primarily been in the form of ground-based spot spray application of 2,4-D Amine (light trucks and ATV's). It is anticipated that future treatment of weeds will likewise be ground-based from light vehicles or in some cases via backpack apparatus.

4. Development of Desirable Annual Competition

Seeding of fast-growing annual plant species into open sites may in some cases (short term such as Category B) be an effective tool to pre-empt weed invasion. Species to be considered include wheat, triticale, regreen, and annual rye (*Lolium multiflorum*). The latter three have the advantage of being unlikely to produce seed that could spread the plants outside the treatment area. Even were they to spread, there is essentially no chance of them becoming an invasive problem themselves. As grasses, all have the advantage for this purpose of a fine diffuse root system that thoroughly dominates the shallow soil, pre-empting weed development (ESCO 2013).

5. Development of Desirable Perennial Competition

For sites where re-disturbance is only a long-term prospect, if ever, establishment of a perennial cover of grass to exclude weeds is desirable. Seed mixes for high and low elevation sites are included in the Plan of Operations. Reclamation is discussed further in Section 4.3.

4.1.1 Herbicide Application Handling, Spills, and Cleanup

Herbicide Application and Handling

Herbicide application will be conducted according to the Nevada Department of Agriculture requirements. Pesticide application contractors will have valid licensing and permits active before undertaking chemical weed control. Prior to herbicide application Barrick will consult with the BLM weed specialist to determine what herbicide formulations are permitted.

All herbicide applications will follow U.S. Environmental Protection Agency label instructions. Application equipment will be calibrated as to application rates and checked periodically to ensure proper rates of herbicide application. Beyond those constraints, herbicide application in the field would be suspended if any of the following conditions were encountered:

- Wind speeds greater than six miles per hour (mph) if liquids are to be applied;
- Wind speeds greater than 15 mph if granules are to be applied;
- Snow or ice covering the foliage of target weeds; and
- Precipitation occurring or imminent.

Transport of herbicides will have the following constraints:

- Only herbicide amounts needed for each day's work will be brought into the areas to be sprayed;
- Transport of herbicide concentrate will be only in approved containers, and placed within a compartment equipped to allow prevention to container tips and spills. The compartment will be isolated from all other equipment and crew materials such as clothing and food;
- All mixing of concentrate to application rates of dilution will occur greater than 200 feet away from open flowing water, wetlands, or other sensitive resources; and
- All herbicide transport, storage, and application equipment will be inspected daily for leaks.

Weed control contractors must provide Barrick with full documentation of the identity and amount of herbicides used on the project site.

Herbicide Spills and Cleanup

All reasonable precaution will be taken to avoid herbicide spills. Should a spill occur, cleanup will commence immediately. Contractors must have spill kits on hand in vehicles at all times. Kits will include the following:

- Protective clothing and gloves;
- Adsorptive clay or cat litter or other commercial adsorbent;
- Plastic bags and bucket (with lid);
- Shovel;
- Fiber brush;
- Dust pan;
- Caution tape;
- Highway flares (should the incident occur on an established road); and
- Detergent.

Although variable depending on size location and other particulars of the spill, general procedures would be as follows:

- Controlling traffic (if any);
- Clean-up team don protective clothing;
- Stop leak(s);
- Contain spilled material;
- Clean and remove the spilled herbicide and contaminated adsorptive material and soil; and
- Transport contaminated materials to an authorized disposal site.

Worker Safety and Spill Reporting

Herbicide contractors will have readily available copies of the appropriate Safety Data Sheets (SDS) for the herbicides used. Herbicide spills will be reported in accordance with applicable regulations, including reporting to Barrick Gold Exploration environmental department.

4.2 Weed Prevention

4.2.1 Construction Measures

To limit the spread of noxious and invasive weeds from previously infested zones into un-infested areas, the following measures will be implemented during construction:

- **Pre-Cleaning Equipment -** Equipment previously used in undisturbed areas at other sites outside of northeastern Nevada will be power-washed prior to entry into the HC/CUEP Plan area. New equipment or equipment from disturbed areas are presumed to be weed-free and will not need to be power washed prior to entry.
- **Weed-Free Materials -** Certified noxious and invasive weed-free materials (e.g., straw bales, certified weed-free seed) will be used where needed during construction, operation, reclamation, and maintenance.
- **Disposal -** Noxious weeds may be cut and disposed of in designated areas or destroyed in a manner acceptable to the Nevada Department of Agriculture Plant Industry Division and the Nevada Cooperative Extension.
- **Containment -** One, or both, of the following methods will be implemented to minimize the spread of noxious weed seeds and plant materials by equipment and vehicles during construction:

- weed-infested growth media will be excavated, stored on-site, monitored, and treated, if necessary, to limit new infestations and spread, monitored, and treated following construction; and
- layer(s) of mulch, degradable geotextiles, or similar materials will be placed over the infestation area and secured in a manner, so they will not be washed away.

4.2.2 Operation and Maintenance Measures

To avoid or limit the introduction and spread of noxious weeds into un-infested areas during project operation and maintenance activities, Barrick will implement the following measures:

- **Cleaning Equipment and Vehicles** - Equipment previously used in undisturbed areas at other sites outside of northeastern Nevada will be power-washed prior to entry into the Plan Area. New equipment or equipment from disturbed areas presumed to be weed-free and will not need to be power washed prior to entry.
- **Minimize Disturbance to Existing Vegetation** - Vehicles should be confined to existing roadways and not permitted to conduct cross-country travel unless involved in approved activity (i.e., exploration, surveying, etc.). This will reduce the potential for new weed establishment.
- **Avoiding Known Infestation Areas** - Known areas of weed infestations will be avoided during periods when they could be spread by disturbance and vehicle use in the area, such as during seeding.

4.3 Reclamation

Interim Seeding of Long-Term Disturbance

The interim seed mix shown in Table 2 can be used on road berms, sediment basins, growth media stockpiles, and other sites that will have exposed soil. The establishment of vegetation on these sites will reduce the potential for noxious weeds to establish. Seed mixes will be developed in coordination with and approved by the BLM and other cooperating agencies as appropriate. An interim stabilization seed mix is shown in Table 2

Table 2: Interim Stabilization Seed Mix

Common Name	Scientific Name	Application Rate[1] (pounds pure-live-seed per acre)
Alfalfa	*Medicago sativa*	1.0
Crested wheatgrass	*Agropyron crisatum*	1.0
Total Application Rate		2.0

[1] Application rate is for broadcast seeding.

Effective Reclamation

Whenever feasible, earthwork and reclamation seeding should occur within the same year to allow the seeded species to establish before noxious weeds can dominate the reclaimed surfaces. Using species in the seed mix that have been successful in previous reclamation efforts and seed suited for

the site conditions will also reduce the potential for noxious weed establishment by providing a dense perennial plant cover.

4.3.1 Post-Reclamation Surveys and Weed Control Measures

Noxious weed surveys and weed control treatments will be conducted during the growing season, following all reclamation activities. The surveys will be conducted concurrently with reclamation monitoring activities. Controls will be considered successful when the extent and density of the infestations in the construction disturbance areas, by species, are not greater than the baseline conditions measured during surveys prior to project construction.

Weed Surveys and Follow-Up Treatments During Operations and Maintenance

Staff will conduct follow-up noxious weed surveys within the Plan Area following construction, until weed abatement and revegetation criteria are met. Informal visual assessments will be performed in all areas not involving active mining.

Ongoing Weed Abatement and Habitat Maintenance

Staff will reseed areas greater than 0.5 acres areas disturbed during operations activities that are at risk for weed invasion, that are not involved within active mining operations, and are not proposed to be under active mining operations in the future. If necessary, areas exhibiting noxious weeds will be treated with the application of an approved herbicide.

4.4 Weed Management as an Assigned Duty

The implementation of this Plan needs to be included in the assigned duties of an individual in the Environmental Department. This individual will be the repository for noxious weed observations and developing the appropriate action for the eradication of new weed infestations. This individual will also be responsible for the annual monitoring and control efforts, which will be part of the annual weed plan update described below. This individual will also be responsible for notifying contractors that vehicles need to be cleaned before entering the HC/CUEP Plan area.

4.5 Awareness and Education

Identification and eradication of the first noxious weed to establish in an area translates to major cost savings over treatment of large or multiple patches of weeds. The first weed can only be detected if mine personnel can identify it as a noxious weed. While it is not necessary that every employee be able to identify noxious weeds, there are key mine personnel that should have training in noxious weed identification and understand the importance, per legal mandate, of controlling and limiting the spread of noxious and invasive weed infestations, including discussion of management measures required by past BLM decisions. This awareness training will include environmental staff, geologists, equipment operators involved in road maintenance/construction, and anyone else that is frequently traveling around the site or doing other compliance inspections or monitoring. Noxious weed identification training should occur during late winter or early spring, and an annual refresher course should be included. As noxious weeds are detected, these trained individuals should all visit the infestation to reinforce the noxious weed identification training. The training course should include the following:

- Identification of the common, local invasive plants;
- Identification of simple techniques to prevent new infestations, or preventing the spread of

weeds; and
- The necessary information to record relative to weed infestations, treatment, and monitoring.

If treatments are to be conducted by Barrick personnel, then training and certification for restricted use pesticides is recommended.

5 Monitoring

Monitoring has two objectives:

- Identify new infestations; and
- Evaluate effectiveness of the treatment program.

5.1 Monitoring for New Infestations

Monitoring for new infestations will be a combination of formal monitoring and informal observations. The formal monitoring includes annual inspection of exploration disturbance including drill sites, sumps, roads, sediment controls, well and piezometer sites, and laydown areas. While this monitoring can be combined with other permit monitoring, it must be performed in the spring when the noxious weeds have initiated growth but before they bloom. This schedule allows for sufficient time to implement a treatment program before seeds are produced and when the plants are susceptible to treatment options.

New infestations should be identified as to species, GPS or mapped location, approximate size of the infestation, and any constraints for treatment (i.e., adjacent to transformers, adjacent to springs or live waters, etc.). This information will then be included in the annual plan update and treatment plan. The new infestations will be entered into the exploration data base and mapped along with previous infestations to determine if any patterns in spread of the weeds can be determined.

Personnel trained in noxious weed identification will report all observations of noxious weeds that are made during routine activities to the individual responsible for the weed management program. If the locations were not identified with GPS units, the weed manager will visit the site and document the new infestation information listed above and include the new infestations in the annual treatment plan.

5.2 Monitoring Existing Infestations

Infestations treated previously or found after the growing season will be monitored in the spring to determine if the treatment has been effective and to include the sites in the annual treatment plan, as necessary. Seeds of noxious weeds can remain viable in the soil for several years; therefore, treated areas will be monitored to measure the effectiveness and duration of the treatments.

Notes regarding the size of the infestation, vigor of the plants, density of plants, success of establishment of desired species seeded after treatment, and recommendations for follow-up treatment will be entered into the weed management data base. This information provides a record of the noxious weed control that has been conducted and the effectiveness of the treatment program. It also documents whether or not the cultural practice of post-treatment seeding is successful in reducing the potential of re- establishment of noxious weeds.

Following implementation of a weed control alternative, results will be followed through monitoring to assess effectiveness and the need for any further action. Monitoring types are shown in Table 3 by disturbance category.

Table 3: Types of Monitoring

Disturbance Category	Action	Monitoring Type	Monitoring Interval
A	1, 2, 3, 4	Qualitative, Photo	Annual
B	1, 2, 3, 4, 5	Qualitative, Photo	Biennial
C	1, 2, 3, 4, 5	Quantitative, Photo	Triennial

Monitoring of sites treated for noxious weeds may reasonably be treated by qualitative means, noting presence or absence of the subject species and taking photos from established points. Disturbance Category C lands will be monitored quantitatively as part on on-going assessment of revegetation success and as part of that the presence/ absence and abundance of noxious species if any will be determined.

6 Post-Treatment Management

Post-treatment seeding is necessary to establish desirable species in the void left by eradicating or reducing the noxious weed population. Without seeding, the area is a suitable seedbed for weed species and the entire process starts over.

Seeding disturbed areas is just one step in the post-treatment management. The desired species must also be managed to ensure they remain. However, in areas which may not be excluded from grazing, the seeded species will often receive preferential grazing by livestock. Where this is likely to occur, non-native species should be used as they are less palatable and capable of withstanding greater grazing pressure.

Wildlife species can also present a post-treatment management problem if the species seeded following treatment are palatable to deer, pronghorn, rabbits, or other herbivores that have access to the site. Therefore, the choice of post-treatment seed mix should include consideration of the herbivores likely to have access to the treatment area.

Due to the long-term viability of the seed of many noxious weed species, post-treatment management includes continued monitoring of the treated areas for a minimum of five years. This duration can be extended for species like Scotch thistle, the seeds of which can remain viable for seven or more years.

7 Coordination

Barrick will communicate with the BLM and Eureka County Weed Control District to ensure that the appropriate Best Management Practices are implemented to minimize noxious weed introductions and dispersal. Staff will coordinate with the BLM and weed management groups such as, the Nevada Cooperative Extension, Nevada Division of Agriculture, Bureau of Plant Industry, weed management districts, and the Nevada Weed Management Association.

The weed management district for the HC/CUEP area is the Eureka County Weed Control District. Barrick will file with the Eureka County Board of directors to include the HC/CUEP Plan area within the weed control district per NRS 555.217.

8 Annual Review

The annual review is a summary of the annual noxious weed monitoring and the action plan developed as the result of the monitoring data. The review is documentation of the treatments that occurred in the previous year, the inspection of the facilities for new infestations, and documentation of effectiveness of treatment of known infestations. This information is then used to determine what actions are necessary for the current year and the budget requirements for the required actions. The annual review should include a map of the new infestations, existing infestations, treated areas, seeded areas, and areas to be treated in the current year.

The annual review can also specify the treatment for the current year, or that information can be determined by the contractor based on the latest herbicides available and approved for public lands.

9 References

Bureau of Land Management (BLM). 1992. *BLM Manual 9015 - Integrated Weed Management,* December 2, 1992.

ESCO Associates, Inc. (ESCO). 2013. Noxious Weed Management Plan, HC/CUEP Project Area, Eureka County, Nevada. Prepared for: Barrick Gold of North America, P.O. Box 29, Elko, Nevada 89803. Prepared by: ESCO Associates, Inc., P.O. Box 18775, Boulder, CO 80308. April 2013.

Appendix A: NRS 555.010 Designation and Categorization of Noxious Weeds

NRS 555.010 Designation and Categorization of Noxious Weeds

Category A weeds are weeds that are generally not found or that are limited in distribution throughout the State. Such weeds are subject to:

(a) Active exclusion from the State and active eradication wherever found.

(b) Active eradication from the premises of a dealer of nursery stock.

Category B weeds are weeds that are generally established in scattered populations in some counties of the State. Such weeds are subject to:

(a) Active exclusion where possible.

(b) Active eradication from the premises of a dealer of nursery stock.

Category C weeds are weeds that are generally established and generally widespread in many counties of the State. Such weeds are subject to active eradication from the premises of a dealer of nursery stock. The following weeds are designated noxious weeds:

Weed Categories

	Category A Weeds
African rue	(*Peganum harmala*)
Austrian fieldcress	(*Rorippa austriaca*)
Austrian peaweed	(*Sphaerophysa salsula*)
Black henbane	(*Hysocyamus niger*)
Camelthorn	(*Alhagi pseudalhagi*)
Common crupina	(*Crupina vulgaris*)
Dalmatian toadflax	(*Linaria dalmatica*)
Dyer's woad	(*Isatis tinctoria*)
Eurasian watermilfoil	(*Myriophyllum spicatum*)
Giant reed	(*Arundo donax*)
Giant salvinia	(*Salvinia molesta*)
Goats rue	(*Galega officinalis*)
Green fountain grass	(*Pennisetum setaceum*)
Houndstongue	(*Cynoglossum officinale*)
Hydrilla	(*Hydrilla verticillata*)
Iberian starthistle	(*Centaurea iberica*)
Klamath weed	(*Hypericum perforatum*)
Malta starthistle	(*Centaurea melitensis*)
Mayweed chamomile	(*Anthemis cotula*)
Mediterranean sage	(*Salvia aethiopis*)
Purple loosestrife	(*Lythrum salicaria, Lythrum virgatum* and their cultivars)
Purple starthistle	(*Centaurea calcitrapa*)
Rush skeletonweed	(*Chondrilla juncea*)

Sow thistle	(*Sonchus arvensis*)
Spotted knapweed	(*Centaurea maculosa*)
Squarrose knapweed	(*Centaurea virgata*)
Sulfur cinquefoil	(*Potentilla recta*)
Syrian bean caper	(*Zygophyllum fabago*)
Yellow starthistle	(*Centaurea solstitialis*)
Yellow toadflax	(*Linaria vulgaris*)
	Category B Weeds
Carolina horse nettle	(*Solanum carolinense*)
Diffuse knapweed	(*Centaurea diffusa*)
Leafy spurge	(*Euphorbia esula*)
Medusahead	(*Taeniatherum caput-medusae*)
Musk thistle	(*Carduus nutans*)
Russian knapweed	(*Acroptilon repens*)
Sahara mustard	(*Brassica tournefortii*)
Scotch thistle	(*Onopordum acanthium*)
White horse nettle	(*Solanum elaeagnifolium*)
	Category C Weeds
Canada thistle	(*Cirsium arvense*)
Hoary cress	(*Cardaria draba*)
Johnson grass	(*Sorghum halepense*)
Perennial pepperweed	(*Lepidium latifolium*)
Poison Hemlock	(*Conium maculatum*)
Puncture vine	(*Tribulus terrestris*)
Salt cedar (tamarisk)	(*Tamarix* spp.)
Water Hemlock	(*Cicuta maculata*)

Appendix B –
Water Resources Supplemental Information

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TECHNICAL MEMORANDUM

TO:	**Kim Wolf – Barrick Gold of North America** **Bob Hays – Barrick Cortez**	**1965-11**
FROM:	**Dan Stone, Ph.D.** **Alan Jang, Ph.D., P.E.**	
DATE:	**19 May 2016**	
SUBJECT:	**Estimation of Groundwater Inflow Rates and Water Table for Horse Canyon/Cortez Unified Exploration Project Declines**	

INTRODUCTION

Barrick Gold Exploration Inc. (BGEI) operates the Horse Canyon/Cortez Unified Exploration Project (HCCUEP) within Eureka and Lander Counties, Nevada. Under a proposed amendment to the HCCUEP Plan of Operations (PoO), BGEI would develop twin underground declines and associated surface infrastructure within the Project Area. The HCCUEP declines, as they are referred to herein, would provide access to the Goldrush orebody in Horse Canyon from the west. The portals for the declines would be located adjacent to the existing Horse Canyon haul road in the northern part of Grass Valley. The declines would extend to the east beneath the southern ridgeline of Mount Tenabo in the Cortez Mountains and terminate beneath the upper part of Horse Canyon in western Pine Valley (Figure 1).

This technical memorandum describes a numerical groundwater flow model simulation made to estimate the rates of groundwater inflow (seepage) and the local water table elevation during development of the HCCUEP declines. The simulation was performed using the Barrick Cortez Four-Basin groundwater flow model, which encompasses the Carico Lake Valley, Crescent Valley, Grass Valley, and Pine Valley hydrographic areas and includes the Pipeline Complex mine (Pipeline, South Pipeline, and Gap open pits) and the Cortez Hills Complex mine (Cortez Hills and Pediment open pits and underground mining operation). The hydrologic study area (HSA), the hydrogeologic setting for the Four-Basin model, the conceptual groundwater flow model for the HSA, and the construction, calibration, and predictive use of the numerical groundwater flow model are described in the January 2016 report entitled "Barrick Cortez Four-Basin (Carico Lake Valley, Crescent Valley, Grass Valley, and Pine Valley) Groundwater Flow Model Report" (Itasca 2016). For brevity, details of the numerical model are not repeated in this memorandum.

HCCUEP DECLINES MODEL SCENARIO

The groundwater conditions in the central part of the HSA are being influenced by the Pipeline Complex and Cortez Hills Complex mine-dewatering activities in Crescent Valley. Consequently, the model simulation for the analysis of the HCCUEP declines included the background effects of continued dewatering and associated water-management activities (rapid infiltration basins [RIBs] infiltration, irrigation, and mining consumption) for the Pipeline Complex mine and the Cortez Hills Complex mine, which were assumed to continue through December 2023. Pumping withdrawals in the HSA for agricultural irrigation and other non-mining-related consumptive uses were also included in the model simulation.

The portals for the declines will be located at an elevation of approximately 6,595 feet (ft) above mean sea level (amsl) on the west-facing hillside south of Mount Tenabo, and the declines will extend approximately 11,800 ft to the east to a final elevation of approximately 6,150 ft amsl. Figure 1 shows the planned layout of the declines in relation to the Horse Canyon haul road, Mount Tenabo, and the preliminarily-identified geologic structures within Horse Canyon.

Development of the HCCUEP declines was assumed to occur over a period of 2.8 years, beginning in January 2017 and ending in October 2019. The modeled time period simulated the years leading up to the start of the HCCUEP decline's development, along with the approximately 3-year period of development.

During development, groundwater is expected to seep into the declines. The seepage would be collected in sumps and then used as makeup water underground. For modeling purposes, all of the collected seepage was assumed to be consumed and to not reenter the local groundwater system.

"Drain" boundary conditions were specified along the traces of the twin declines to simulate the passive groundwater seepage that will occur during their development. The drain elevations were specified in accordance with the anticipated bottom elevations of the declines and they were progressively activated/lowered according to the planned development schedule. Drain conductances were set to high values—equivalent to roughly two orders of magnitude greater than the horizontal hydraulic conductivity (K_h) values of the surrounding media—so that inflow to the drains was primarily controlled by the K_h values of the hydrogeologic units immediately adjacent to the underground openings.

ESTIMATED GROUNDWATER INFLOW RATES

Predicted passive groundwater inflow rates to the HCCUEP declines are shown in Figure 2. The model results indicate that average annual inflow rates will be less than 20 gallons per minute (gpm) for the three years of development. Following their development, the open declines will

continue to collect groundwater seepage during subsequent exploration phases of the project, but the seepage rates to the declines will gradually diminish over time.

ESTIMATED GROUNDWATER TABLE

The groundwater table in the vicinity of the declines was determined with the model by calculating the elevation of zero pressure head (i.e., atmospheric conditions) in the model grid cells aligned with the trace of the declines. Interpolation between adjacent grid cells was performed to generate the water-table surface.

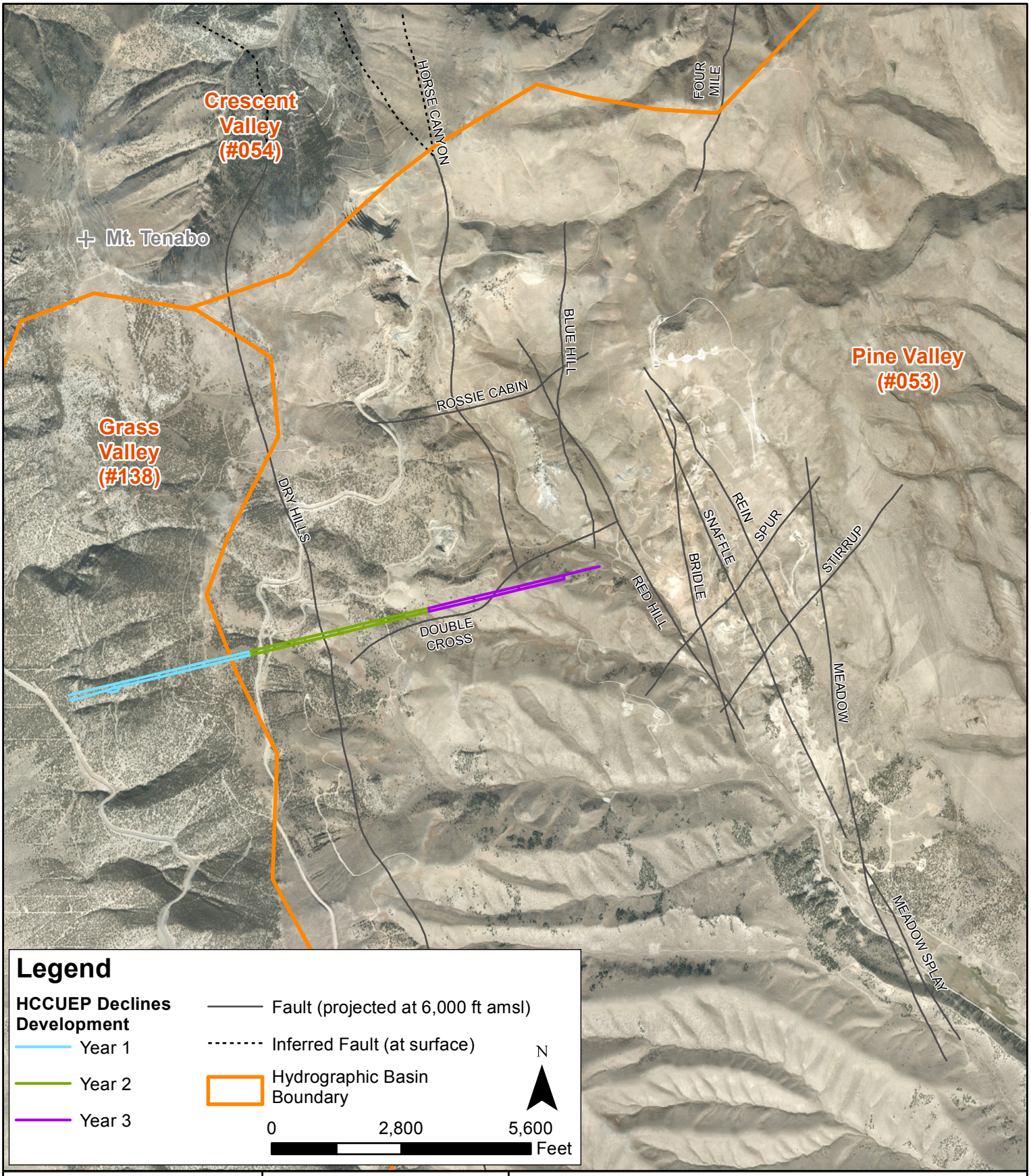
The estimated groundwater table along the trace of the HCCUEP declines is shown in Figure 3 at two different points in time, December 2015 (for reference) and October 2019 (at the end of the decline's development). The general lowering of the water table between December 2015 and October 2019 is a result of the ongoing mine-dewatering activities at the Pipeline Complex and Cortez Hills Complex, in addition to the seepage (passive dewatering) associated with the decline's excavation.

At the end of the declines development, the estimated groundwater table is below the elevation of the declines everywhere except at the very end of the declines (near GRPZ-06) and over a distance of approximately 2,200 ft where the declines pass beneath the divide between Grass Valley and Pine Valley, approximately 2,400 to 4,600 ft from the portals (Figure 3). The water table intercepts the end of the declines in October 2016 only because there has been insufficient time for complete drainage (since the development just reached that location at that time). Between approximately 2,400 and 4,600 ft from the portals, during the latter part of development Year 1 and the early part of Year 2, the declines will pass through a very low permeability rock unit (the Eureka Quartzite), so the water table is expected to decrease only very slowly in that area, even with the presence of the open declines. Because the low permeability unit inhibits groundwater flow, the seepage rates into the declines are expected to remain low (see Figure 2) despite the higher water-table elevation in that particular zone. As a result, active dewatering measures will not be required for any part of the declines development.

REFERENCE

Itasca. 2016. Barrick Cortez Four-Basin (Carico Lake Valley, Crescent Valley, Grass Valley, and Pine Valley) groundwater flow modeling report. Prepared for Barrick Gold of North America by Itasca Denver, Inc., January.

Attachments: Figure 1 – Layout of Simulated HCCUEP Declines
Figure 2 – Predicted Passive Groundwater Inflow to HCCUEP Declines
Figure 3 – Vertical Cross Section Along Trace of HCCUEP Declines Showing Modeled Water Table in December 2015 and October 2019



PROJECT NO.	1965-11
BY	AJ
CHECKED	DBS
DRAWN	AEM
DRAWING NAME	GRUG-WestAccessUpd
DRAWING DATE	Oct. 05, 2015
REVISION DATE	May 19, 2016

ITASCA™ Denver, Inc.

Layout of Simulated HCCUEP Declines

CLIENT: Barrick Cortez Inc.

FIGURE NO. 1

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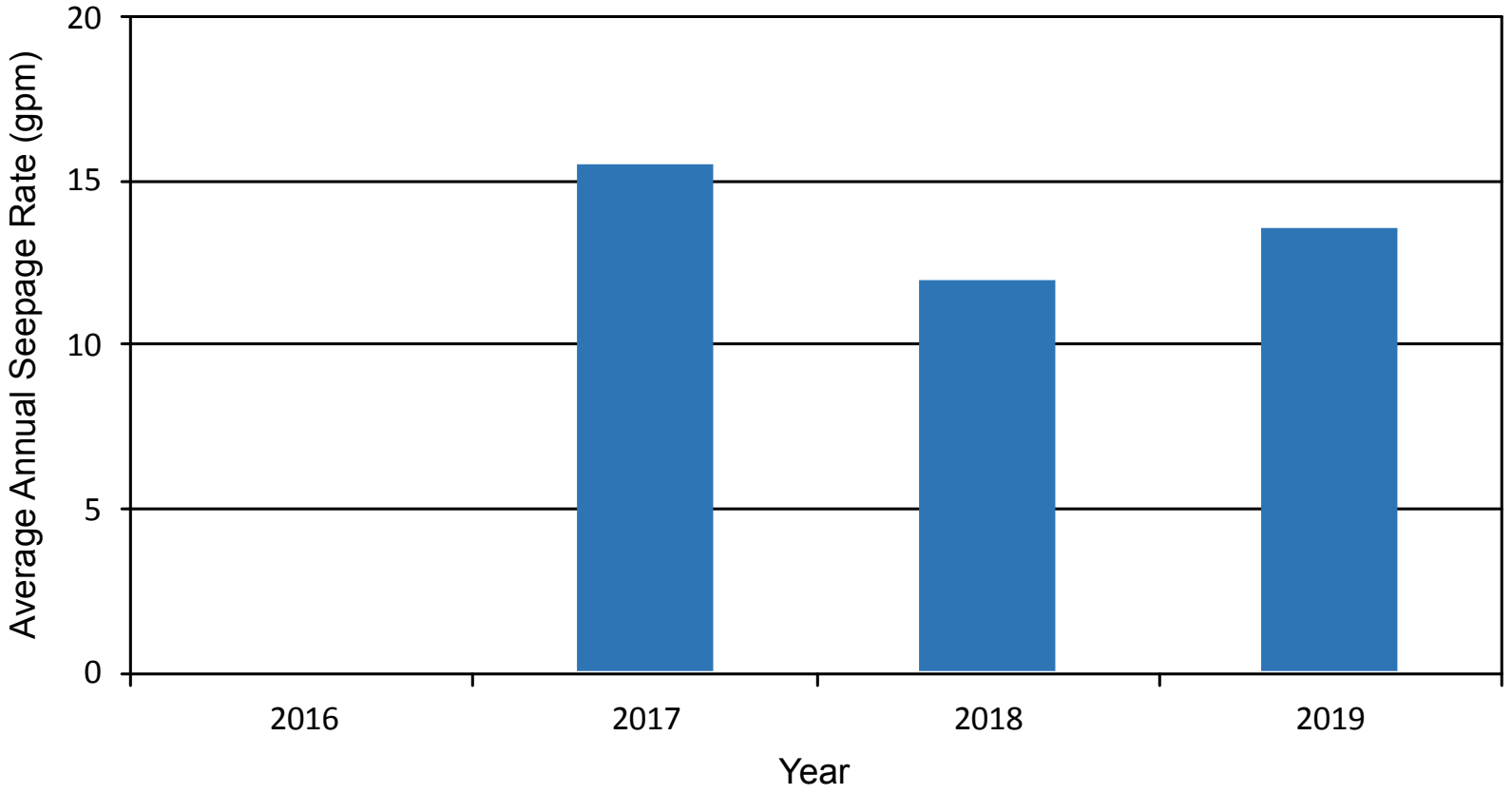


PROJECT NO.	1965-11
BY	AJ
CHECKED	DBS
DRAWN	AEM
DRAWING NAME	HCCUEP_SeepRate
DRAWING DATE	May 19, 2016
REVISION DATE	

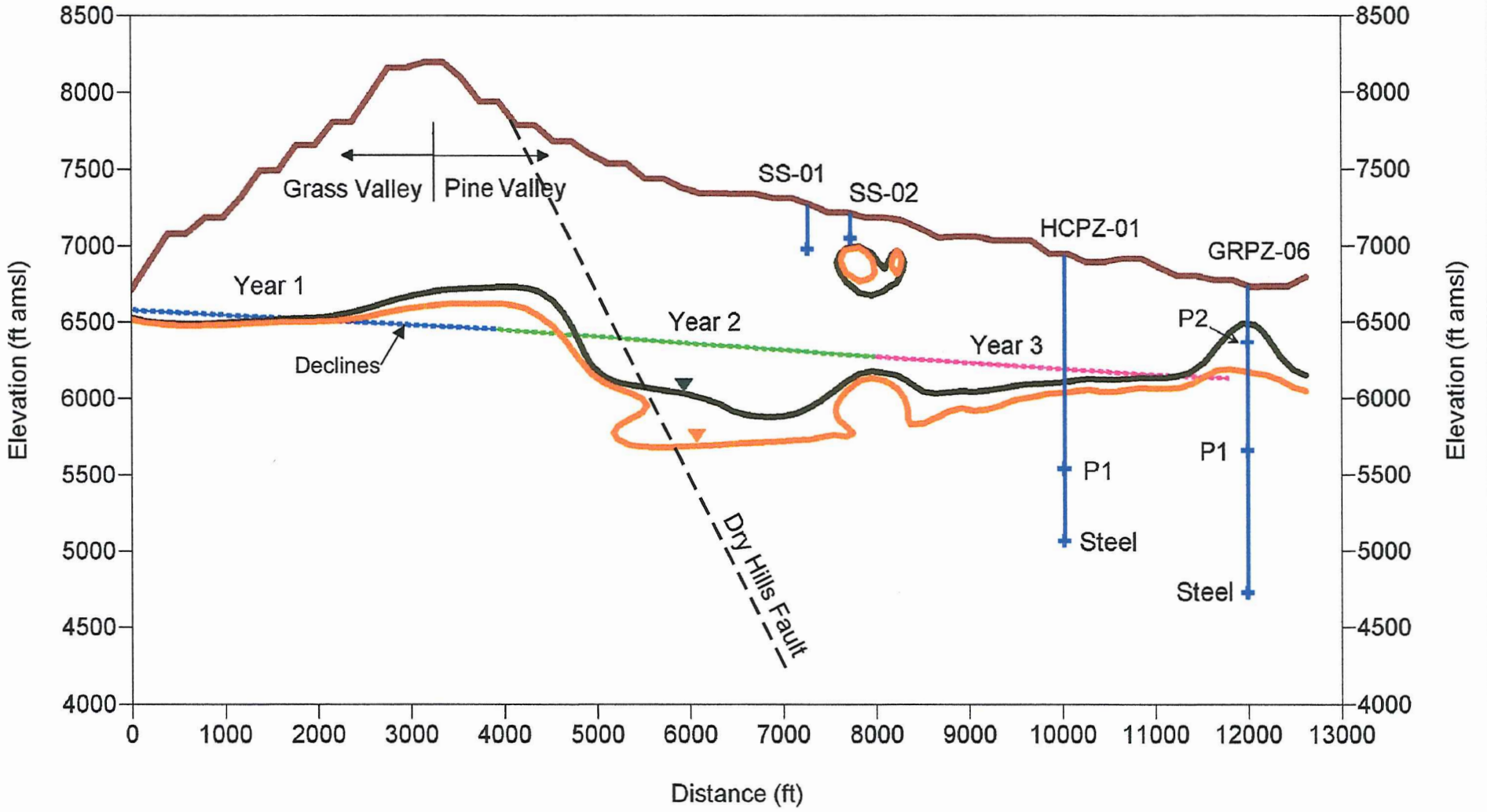
ITASCA™ Denver, Inc.

Predicted Passive Groundwater Inflow to HCCUEP Declines

CLIENT: Barrick Cortez Inc.

FIGURE NO. 2

G:\ARCGIS\Barrick\Reports\1965_SPS-200\HCCUEP_SeepRate.mxd



PROJECT NO.	1965-11
BY	AJ
CHECKED	DBS
DRAWN	AEM
DRAWING NAME	SimGWT_CrossSec
DRAWING DATE	May 19, 2016
REVISION DATE	

ITASCA™ Denver, Inc.

Vertical Cross Section Along Trace of HCCUEP Declines Showing Modeled Water Table in December 2015 and October 2019

CLIENT: Barrick Cortez Inc.

FIGURE NO. 3

G:\ARCGIS\Barrick\Reports\1965_SPS-200\SimGWT_CrossSec.mxd

Figure B-1. 2013 HC/CUEP Annual Stream Monitoring Sites Flow

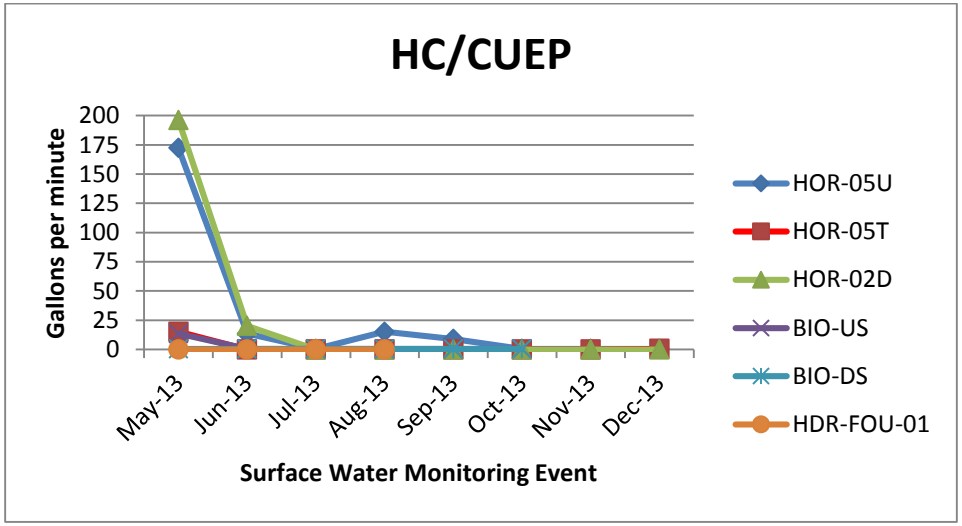


Figure B-2. 2014 HC/CUEP Annual Stream Monitoring Sites Flow

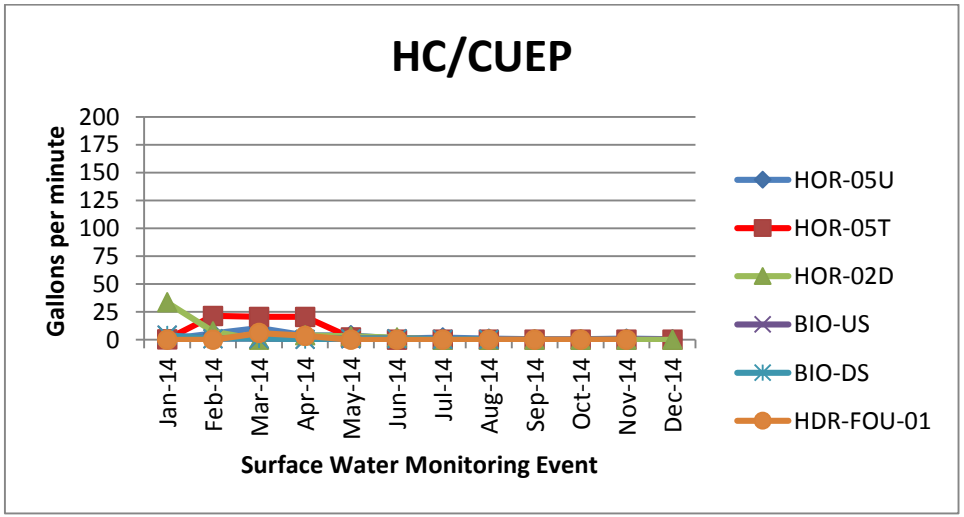


Figure B-3. 2015 HC/CUEP Annual Stream Monitoring Sites Flow

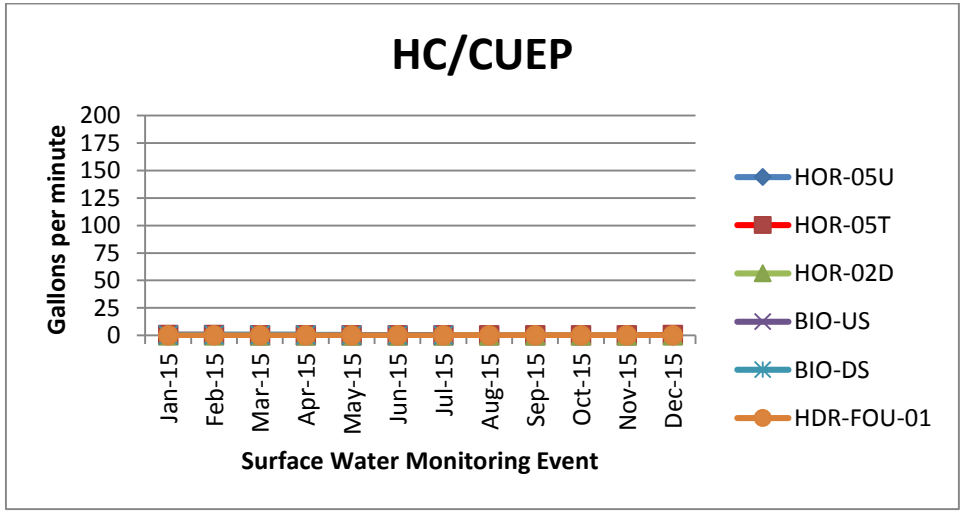


Table B-1. 2013, 2014, and 2015 Seep/Spring Monitoring and Sampling Sites within the HC/CUEP Boundary

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
Dry Hills (2013, 2014, and 2015 - 9 seep/spring sites)				
	26-48-23-211A	539894	4440606	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-23-211B	539988	4440565	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-23-242	540498	4440151	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-23-313A	539016	4439706	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-23-313B	539046	4439673	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-24-133	540675	4440070	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-24-134	540818	4439991	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-26-123A	539518	4438802	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-26-123B	539478	4438843	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
Fourmile Canyon (2013, 2014, and 2015 - 3 seep/spring sites)				
	27-48-22-222A	538848	4450203	• 2013 - Physical parameters measured did not exceed NDEP reference values and were consistent with the physical parameters of other monitoring locations in this area. All concentrations of anions and cations at this location were detected within NDEP reference values.

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				The following dissolved metals exceeded their respective reference limit: dissolved arsenic 0.073 mg/L; dissolved iron 1.10 mg/L. Total recoverable iron 2.66 mg/L; all other total recoverable metals were reported within reference values. • 2014 - Water flow was too low to measure and was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.055 mg/L, but all other constituents of dissolved metals were reported within NDEP reference values. Total recoverable metals were reported within EPA secondary standards with the exception of total recoverable iron 3.84 mg/L. • 2015 - Water flow was not measurable. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. The following dissolved metals exceeded their respective NDEP reference value: dissolved arsenic 0.070 mg/L and dissolved iron 0.80 mg/L. All other constituents of dissolved metals were reported within NDEP reference values. Total metals were reported within EPA secondary standards with the exception of total iron 1.14 mg/L.
	27-48-23-234	540081	4449548	• 2013 - No water present; no sample collected • 2014 - Water flow was a trickle and was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 0.53 mg/L and total recoverable iron 0.59 mg/L. • 2015 - Surface water was mucky and collected from small pools with no visible water flow. Field measured pH was 8.59 s.u., which is above the NDEP reference range, but laboratory reported pH was within the NDEP reference range at 8.3 s.u. All other physical parameters

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following total metals were reported above EPA secondary standards: total aluminum 5.26 mg/L, total iron 6.22 mg/L, and total manganese 0.14 mg/L.
	27-48-35-112	538979	4446871	• 2013 - Water flow was too low to be measured. All concentrations of anions, cations, and dissolved metals were reported within NDEP Profile II reference values. The following constituents of total recoverable metals exceeded reference values: total recoverable aluminum 0.82 mg/L; total recoverable iron 1.46 mg/L; and total recoverable manganese 0.10 mg/L. • 2014 - Water flow was too low to be measured. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following constituents of total recoverable metals were elevated above EPA secondary standards: total recoverable aluminum 2.95 mg/L, total recoverable iron 2.65 mg/L, and total recoverable manganese 0.06 mg/L. • 2015 - Surface water was present on the reclaimed road, however not enough water was present to collect water samples or physical parameters.
	27-48-14-343	539549	4450385	2013 - Not added to monitoring program (not a wetland)
	27-48-23-133	539073	4449556	2013 - Not added to monitoring program (not a wetland)
	27-48-23-143	539463	4449546	2013 - Not added to monitoring program (not a wetland)
	27-48-23-144	539615	4449580	2013 - Not added to monitoring program (not a wetland)
	27-48-23-144A	539553	4449574	2013 - Not added to monitoring program (not a wetland)
	27-48-23-424	540372	4449119	2013 - Not added to monitoring program (not a wetland)
	27-48-23-441	540286	4448984	2013 - Not added to monitoring program (not a wetland)
	27-48-26-143	539482	4448017	2013 - Not added to monitoring program (not a wetland)

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
	27-48-26-312	539238	4447858	2013 - Not added to monitoring program (not a wetland)
	27-48-26-312A	539210	4447810	2013 - Not added to monitoring program (not a wetland)
	27-48-26-314	539223	4447620	2013 - Not added to monitoring program (not a wetland)
	27-48-26-324	539612	4447506	2013 - Not added to monitoring program (not a wetland)
	27-48-26-324A	539624	4447514	2013 - Not added to monitoring program (not a wetland)
	27-48-26-324B	539634	4447553	2013 - Not added to monitoring program (not a wetland)
	27-48-26-324C	539636	4447558	2013 - Not added to monitoring program (not a wetland)
	27-48-26-324D	539631	4447564	2013 - Not added to monitoring program (not a wetland)
	27-48-26-342	539653	4447442	2013 - Not added to monitoring program (not a wetland)
	27-48-26-411	539759	4447740	2013 - Not added to monitoring program (not a wetland)
	27-48-27-423	538741	4447660	2013 - Not added to monitoring program (not a wetland)
	27-48-27-423A	538719	4447629	2013 - Not added to monitoring program (not a wetland)
	27-48-27-424	538835	4447673	2013 - Not added to monitoring program (not a wetland)
	27-48-27-424A	538840	4447651	2013 - Not added to monitoring program (not a wetland)
Horse Creek (2013 and 2014 – 35 seep/spring sites; 2015 - 32 seep/spring sites)				
	26-48-02-322	539752	4444692	• 2013 - No water present; no sample collected • 2014 - Soils were moist, but there was not enough surface water to collect water samples or physical parameters. • 2015 - Soils were moist, but there was not enough surface water to collect water samples or physical parameters.
	26-48-02-423A	540270	4444287	• 2013 - All physical parameters were detected within NDEP reference values. Water flow was measured at 1.79 gpm. All concentrations of anions, cations, dissolved metals, and total recoverable metals were reported within NDEP reference values.

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				• 2014 - Water flow measured about 0.75 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. All concentrations of total recoverable metals were reported within EPA secondary standards. • 2015 - Water flow measured approximately 1.00 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following total metals were reported above EPA secondary standards: total aluminum 0.38 mg/L and total iron 0.32 mg/L.
	26-48-02-423B	540306	4444308	• 2013 - All physical parameters were detected within NDEP reference values. Water flow was measured at 0.45 gpm. All concentrations of anions, cations, dissolved metals, and total recoverable metals were reported within NDEP reference values and were comparable to the concentrations of other constituents in the area. • 2014 - Water flow was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. All concentrations of total recoverable metals were reported within EPA secondary standards. • 2015 - Water flow was not measured, but a trickle was visible, and recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following concentrations of total metals were reported above the EPA secondary standards: total aluminum 0.78 mg/L, total iron 0.66 mg/L, and total manganese 0.10 mg/L.
	26-48-03-114	537749	4445131	• 2013 - Not sampled due to access limitations • 2014 - No water present; no sample collected. Site was evaluated to determine if it was a wetland. It was determined that it is not a wetland.

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				• 2015 - This site is located within a dry upland drainage, and no wetland characteristics were observed at this location. This site was removed from the monitoring program and not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
	26-48-03-134	537836	4444877	• 2013 - No water present; no sample collected • 2014 - Damp soils, but no surface water to collect water samples or physical parameters. • 2015 - Damp soils, but no surface water to collect water samples or physical parameters.
	26-48-03-143	537927	4444726	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - This site is located within a dry drainage, and no wetland characteristics were observed at this location. This site was removed from the monitoring program and not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
	26-48-03-213	538428	4445155	• 2013 - No water present; no sample collected • 2014 - Water flow was about 0.45 gpm. pH measured 4.93 s.u., which is below the NDEP reference value range. All other physical parameters were within NDEP reference values. The concentration of fluoride was reported at 4.5 mg/L, which is above the NDEP reference value. All other anions and cations were reported below NDEP reference values. The following dissolved metals were reported above NDEP reference values: dissolved aluminum 3.67 mg/L, dissolved cadmium 0.69 mg/L, dissolved manganese 1.97 mg/L, and dissolved zinc 12.4 mg/L. The following total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 4.91 mg/L, total recoverable iron 0.66 mg/L, total recoverable manganese 2.35 mg/L, and total recoverable zinc 12.4 mg/L. • 2015 - Water flow was too low to measure and recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported below NDEP reference values. The following dissolved metals were reported above

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				NDEP reference values: dissolved arsenic 0.033 mg/L, dissolved iron 0.61 mg/L, and dissolved manganese 0.38 mg/L. The following total metals were reported above EPA secondary standards: total aluminum 9.85 mg/L, total iron 56.6 mg/L, and total manganese 6.66 mg/L.
	26-48-03-221	538728	4445377	• 2013 - No water present; no sample collected • 2014 - Water flow was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. The following dissolved metals were reported above NDEP reference values: dissolved arsenic 0.038 mg/L, dissolved iron 6.87 mg/L, and dissolved manganese 0.58 mg/L. The following total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 1.27 mg/L, total recoverable iron 9.27 mg/L, and total recoverable manganese 1.69 mg/L. • 2015 - No visible water flow at the time of sampling. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. The following dissolved metals were reported above NDEP reference values: dissolved iron 0.89 mg/L and dissolved manganese 2.13 mg/L. The following total metals were reported above EPA secondary standards: total aluminum 11.1 mg/L, total iron 41.3 mg/L, and total manganese 22.0 mg/L.
	26-48-03-321	538021	4444516	• 2013 - Water flow was measured at 8.96 gpm. All physical parameters were detected within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.011 mg/L, above the reference limit. Concentrations of all other dissolved metals and total recoverable metals were detected within NDEP reference values. • 2014 - Water flow measured about 4 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.014 mg/L, which is above the NDEP

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				reference value. All concentrations of total recoverable metals were reported within EPA secondary standards. • 2015 - Water flow was too low to measure and recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.012 mg/L, which is above the NDEP reference value. All concentrations of total metals were reported within EPA secondary standards.
	26-48-03-413A	538239	4444487	• 2013 - No water present; no sample collected • 2014 - Saturated soils were observed during monitoring, but not enough surface water was present to collect a sample or physical parameters. • 2015 - Some ponded surface water was observed downstream from the spring monitoring point, but not enough surface water was present to collect a sample or physical parameters.
	26-48-03-413B	538254	4444461	• 2013 - No water present; no sample collected • 2014 - Surface water was present in shallow pools, though not enough to obtain water samples or physical parameters. • 2015 - Moist soils were present, but no water was present to obtain water samples or physical parameters.
	26-48-03-443	538718	4443956	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-03-444	538959	4443948	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-10-142	538066	4443427	• 2013 - The level of TDS detected was 780 mg/L, exceeding the NDEP reference limit. All other physical parameters were within reference values. All concentrations of anions, cations, dissolved metals, and total recoverable metals were reported within NDEP reference values. • 2014 - Water flow measured about 0.45 mg/L. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				metals were reported within NDEP reference values. All concentrations of total recoverable metals were reported within EPA secondary standards. • 2015 - Water flow measured approximately 0.38 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. All concentrations of total metals were reported within EPA secondary standards.
	26-48-10-232	538326	4443382	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-10-344	538113	4442357	• 2013 - No sample collected (spring discharge feature not found, removing and replacing with 26-48-10-433) • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-10-433	538163	4442349	• 2013 - There was no significant water flow at the time of monitoring, standing surface water present to collect field parameters and water samples. All physical parameters were detected within NDEP reference values. All concentrations of dissolved metals, total recoverable metals, cations, and anions were reported within NDEP reference values. • 2014 - Water flow measured 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 1.81 mg/L and total recoverable iron 2.50 mg/L. • 2015 - No water present; no sample collected
	26-48-10-441	538806	4442595	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-10-442	538878	4442546	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-10-444	538964	4442428	• 2013 - No water present; no sample collected

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				• 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-11-142	539843	4443518	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-11-144A	540497	4443317	• 2013 - TDS were detected at 510 mg/L, exceeding the NDEP reference limit. No other physical parameters exceeded reference values. All concentrations of anions, cations, and dissolved metals were detected within NDEP Profile II reference values. Dissolved manganese exceeded reference values at 0.28 mg/L. The following constituents of total recoverable metals exceeded reference values: total recoverable aluminum 0.28 mg/L; total recoverable iron 0.35 mg/L; total recoverable manganese 0.25 mg/L. • 2014 - Water flow was too low to measure and was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following constituents of total recoverable metals were elevated above reference values: total recoverable aluminum 0.70 mg/L and total recoverable iron t 0.72 mg/L. • 2015 - No visible water flow and the seep was very mucky. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved manganese was reported at 0.63 mg/L, which is above the NDEP reference value. All other dissolved metals were reported below the NDEP reference values. The following constituents of total metals were reported above EPA secondary standards: total aluminum 0.79 mg/L, total iron 1.18 mg/L, and total manganese 0.53 mg/L.
	26-48-11-144B	540456	4443295	• 2013 - Water flow was too low to be measured; no physical parameters were measured above NDEP reference values. All concentrations of anions, cations, dissolved metals, and total recoverable metals were reported within NDEP Profile II reference values.

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				• 2014 - Water flow was very low and was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions, cations, and dissolved metals were reported within NDEP reference values. The following total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 0.58 mg/L and total recoverable iron 0.60 mg/L. • 2015 - Water was present, but there was no visible flow. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.018 mg/L, which is above the NDEP reference value. The following total metals were reported above EPA secondary standards: total aluminum 2.36 mg/L, total iron 2.92 mg/L, and total manganese 0.13 mg/L.
	26-48-11-312	539176	4443169	• 2013 - No water present; no sample collected • 2014 - Saturated soils were present in the seep area, but surface water was not present to collect physical parameters or water samples. • 2015 - Saturated soils were present in the seep area, but no surface water was present; no sample collected
	26-48-11-422	540521	4442562	• 2013 - No water present; no sample collected • 2014 - No seep or evidence of seeping at this location, and water samples and physical parameters were not collected. • 2015 - This site is located above the Red Hill road in a heavily disturbed area. No wetland characteristics were observed at this location. This site was removed from the monitoring program and not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
	26-48-12-324	541358	4442817	• 2013 - Water flow was measured at 0.45 gpm, and all physical parameters were detected within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. The following dissolved metals exceeded reference values: dissolved aluminum 0.64 mg/L; dissolved iron 2.00 mg/L; dissolved manganese 1.84 mg/L. The

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				following total recoverable metals exceeded reference values: total recoverable aluminum 2.98 mg/L; total recoverable iron 3.95 mg/L; total recoverable manganese 1.98 mg/L. • 2014 – Water flow was measured at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. The following dissolved metals were above the NDEP reference values: dissolved arsenic 0.024 mg/L and dissolved manganese 0.38 mg/L. The following total recoverable metals were above reference values: total recoverable aluminum 1.12 mg/L, total recoverable iron 1.36 mg/L, and total recoverable manganese 0.41 mg/L. • 2015 - No visible water flow present and water was collected from ponded water. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved manganese was reported at 0.61 mg/L, which is above the NDEP reference value. The following total metals were above reference values: total aluminum 0.70 mg/L, total iron 1.08 mg/L, and total manganese 0.60 mg/L.
	26-48-12-341	541303	4442787	• 2013 - Water flow was too low to be measured at this location; all physical parameters were detected within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic exceeded the NDEP reference limit at 0.014 mg/L. All other concentrations of dissolved metals were detected within NDEP reference values. All concentrations of total recoverable metals were detected within NDEP reference values. • 2014 - Water flow was not flowing, and a water sample was collected from water pooling in cattle hoof prints. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.015 mg/L, which is above the NDEP reference value. All other concentrations of dissolved

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				metals were reported within NDEP reference values. The following total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 1.05 mg/L and total recoverable iron 1.28 mg/L. • 2015 - No visible water flow and water was collected from ponded water. Field measured pH was 8.62 s.u., which is above the NDEP reference range, and laboratory reported pH was 8.1 s.u., which is within the NDEP reference range. All other physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.016 mg/L, which is above the NDEP reference value. All other concentrations of dissolved metals were reported within NDEP reference values. All total metals were reported below the EPA secondary standards.
	26-48-12-414	541816	4442778	• 2013 - Water flow was measured at 0.45 gpm. TDS was detected at 760 mg/L, exceeding NDEP reference values. All concentrations of anions and cations were reported within NDEP Profile II reference values. Dissolved manganese exceeded reference values at 0.58 mg/L. The following total recoverable metals exceeded NDEP Profile II reference values: total recoverable aluminum 0.88 mg/L; total recoverable iron 1.73 mg/L; total recoverable manganese 0.70 mg/L. • 2014 - A water sample and physical parameters were collected from the standing water in cow hoof prints. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.011 mg/L, which is above NDEP reference values. The following total recoverable metals were elevated above NDEP reference values: total recoverable aluminum 0.74 mg/L, total recoverable iron 1.31 mg/L, and total recoverable manganese 0.73 mg/L. • 2015 - No water present; no sample collected
	26-48-12-432	541648	4442708	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				• 2015 - No water present; no sample collected
	26-48-13-323	541243	4441171	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-13-324	541337	4441184	• 2013 - Water flow was measured at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. The level of dissolved arsenic reported was 0.031 mg/L and exceeded reference values. All concentrations of total recoverable metals that were reported were within reference values. • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-13-342	541411	4440946	• 2013 - Water flow was measured at 0.04 gpm. TDS exceeded NDEP reference values, measuring 512 mg/L. All other physical parameters were within the reference values. All concentrations of anions, cations, and total recoverable metals were reported within NDEP reference values for these constituents. Dissolved arsenic was reported at 0.026 mg/L, which exceeded the NDEP reference limit. • 2014 - Water flow measured 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values for these constituents. Dissolved arsenic was reported at 0.021 mg/L, which is above the NDEP reference value. All total recoverable metals were reported below EPA secondary standards. • 2015 - No water present; no sample collected
	26-48-13-431	541500	4441030	• 2013 - Water flow was too low to be measured. TDS was measured at 1,050 mg/L, exceeding the NDEP reference limit. All other physical parameters were within reference values. All concentrations of anions, cations, and total recoverable metals were reported within NDEP reference values. The concentration of dissolved arsenic was detected at 0.078 mg/L, exceeding the NDEP reference values. All other constituents of dissolved metals were within reference values.

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				• 2014 - Soil surface was saturated, but not enough surface water was present to collect a water sample or physical parameters. • 2015 - No water present; no sample collected
	26-48-13-432	541858	4441074	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-24-221	541953	4440698	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
Mill Canyon (2013, 2014, and 2015 - 2 seep/spring sites)				
	27-48-27-134	537769	4447920	• 2013 - Water flow was too low to be measured; all other field parameters were detected within NDEP reference values. All concentrations of anions and cations were detected within NDEP Profile II reference values. The concentration of dissolved arsenic exceeded the reference limit at 0.064 mg/L. All other concentrations of dissolved metals were reported within reference values. The following total recoverable metals exceeded reference values: total recoverable aluminum 0.77 mg/L; total recoverable iron 0.82 mg/L. • 2014 - Water flow was too low to be measured and was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.055 mg/L, which is above the reference value. All other concentrations of dissolved metals were reported within NDEP reference values. The following total recoverable metals were above EPA secondary standards: total recoverable aluminum 2.70 mg/L and total recoverable iron 3.21 mg/L. • 2015 - No visible water flow. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.067 mg/L, which is above the reference value. All other concentrations of dissolved metals were reported

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				within NDEP reference values. The following total metals were above EPA secondary standards: total aluminum 1.21 mg/L, total iron 1.95 mg/L, and total manganese 0.07 mg/L.
	27-48-27-134A	537735	4447980	• 2013 - Water flow was too low to be measured. All concentrations of anions and cations were detected within NDEP Profile II reference values. The concentration of dissolved arsenic exceeded the reference limit and was reported at 0.066 mg/L. All other concentrations of dissolved metals were reported within reference values. The following total recoverable metals exceeded reference values: total recoverable aluminum 4.66 mg/L; total recoverable iron 5.23 mg/L; total recoverable manganese 0.11 mg/L. • 2014 - Water flow was a trickle and was recorded at 0.45 gpm. All physical parameters were within NDEP reference values. All concentrations of anions and cations were reported within NDEP reference values. Dissolved arsenic was reported at 0.062 mg/L, which is above the reference value. All other concentrations of dissolved metals were reported within NDEP reference values. The following total recoverable metals were above EPA secondary standards: total recoverable aluminum 0.67 mg/L and total recoverable iron 0.76 mg/L. • 2015 - No water present; no sample collected
	27-48-27-131	537538	4448151	2013 - Not added to monitoring program (not a wetland)
	27-48-27-131A	537568	4448105	2013 - Not added to monitoring program (not a wetland)
North Toiyabe Range West (2013 and 2014 – 1 seep/spring site; 2015 - 0 seep/spring site)				
	26-47-11-121	529709	4443797	• 2013 - No sample collected (site confirmed to not be a water feature) • 2014 - No sample collected; no wetland characteristics (site was visited in 2013 and no wetland characteristics were observed at the time) • 2015 - This site is a dry hole in the ground, and no wetland characteristics were observed at this location. This site was removed from the monitoring program and

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
Willow Creek (2013 and 2014 – 13 seep/spring sites; 2015 – 10 seep/spring sites)				
	26-48-01-131	540859	4445063	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-01-141	541179	4444967	• 2013 - No water present; no sample collected • 2014 - Wet vegetation at this site, but no surface water present to collect a water sample or physical parameters. • 2015 - No water present; no sample collected
	26-48-01-212	541713	4445369	• 2013 - No water present; no sample collected • 2014 - Wet vegetation, but it was below the ordinary high-water mark in the channel. No water present; no sample collected. Determined to be a non-wetland. • 2015 - This site is within a dry, ephemeral drainage, and no wetland indicators were present. This site was removed from the monitoring program and not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
	26-48-01-212B	541782	4445320	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-01-223	541985	4445163	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-01-234	541796	4444829	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	26-48-02-224	540558	4445180	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected
	27-48-34-322A	538263	4446041	• 2013 - TDS exceeded reference values and was detected at 2,250 mg/L, and all other physical parameters were detected within NDEP reference values. Magnesium and sulfate levels were detected above NDEP Profile II reference values, measuring 189 mg/L and 1,370 mg/L, respectively. All other

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				concentrations of anions and cations were detected within reference values. All constituents of dissolved metals were reported within reference values. The following constituents of total recoverable metals were detected above reference values: total recoverable aluminum 0.36 mg/L; total recoverable iron 1.12 mg/L; total recoverable manganese 0.11 mg/L. • 2014 - Water flow measured about 1 gpm in the stream and TDS at this location measured 1,721 mg/L, which exceeded the NDEP reference value. Magnesium was reported at 216 mg/L and sulfate was reported at 1,580 mg/L, which are both above the NDEP reference values. All concentrations of dissolved metals were reported within reference values. The following concentrations of total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 0.34 mg/L and total recoverable iron 0.60 mg/L. Determined to be a non-wetland. • 2015 - Channel was mucky and water flow was not visible. Field measured TDS was 1,484 mg/L and laboratory reported TDS was 2,520 mg/L, which were both above the NDEP reference value. Magnesium was reported at 235 mg/L and sulfate was reported at 1,570 mg/L, which were both above NDEP reference values. All concentrations of dissolved metals were reported within reference values. The following concentrations of total metals were reported above EPA secondary standards: total aluminum 32.0 mg/L, total iron 50.1 mg/L, and total manganese 1.57 mg/L.
	27-48-34-322B	538366	4446058	• 2013 - No water present; no sample collected • 2014 - Water flow was not measureable. The concentration of TDS measured 1,514 mg/L, which exceeded the NDEP reference value. Magnesium was reported at 216 mg/L and sulfate was reported at 1,580 mg/L, which are both above NDEP reference values. All concentrations of dissolved metals were reported within NDEP reference values. The following concentrations of total recoverable metals were reported above EPA secondary standards: total recoverable aluminum 0.29

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
				mg/L and total recoverable iron 0.44 mg/L. Determined to be a wetland. • 2015 - Saturated soil was present, however no surface water was present to sample.
	27-48-34-412	538532	4446043	• 2013 - No water present; no sample collected • 2014 - No wetland characteristics were present at this location, and no surface water was present to collect water or physical parameters. Determined to be a non-wetland. • 2015 - This site is directly adjacent to Willow Creek and did not exhibit any wetland indicators. This site was removed from the monitoring program and not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
	27-48-34-421	538664	4446079	• 2013 - No water present; no sample collected • 2014 - No wetland characteristics were observed at this location, and no surface water was present to collect water sample or physical parameters. Determined to be a non-wetland. • 2015 - This site is within Willow Creek, and no wetland indicators were present. This site was removed from the monitoring program and not monitored in 2015 due to the lack of flow and wetland features in 2013 and 2014.
	27-48-35-234	539960	4446330	• 2013 - Water flow was too low to be measured. TDS exceeded reference values at 1,140 mg/L; all other physical parameters were detected within NDEP reference values. The concentration of sulfate detected at this location exceeded NDEP Profile II reference values at 657 mg/L. All other anion and cation concentrations were detected within reference values. All constituents of dissolved metals and total recoverable metals were detected within reference values. • 2014 - Seep is just outside the ordinary high-water mark of the channel. No surface water was present to collect water sample or physical parameters. Determined to be a wetland. • 2015 - Seep is just outside the ordinary high-water mark of the channel. No surface water was present to collect water sample or physical parameters.

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
	27-48-35-311	539078	4446149	• 2013 - Water flow was recorded at 0.45 gpm. TDS exceeded the reference limit and was detected at 1,950 mg/L, and all other physical parameters were detected within NDEP reference values. The concentration of sulfate detected at this location exceeded NDEP Profile II reference values at 1,240 mg/L. All other anion and cation concentrations were detected within reference values. All constituents of dissolved metals and total recoverable metals were detected within reference values. • 2014 - Water flow measured about 2 gpm. The TDS concentration measured at 1,280 mg/L, which exceeded the NDEP reference value. All other physical parameters were within NDEP reference values. The concentration of sulfate was reported at 1,140 mg/L, which was above the NDEP reference value. All other anion and cation concentrations were reported within NDEP reference values. All constituents of dissolved metals and total recoverable metals were reported within NDEP reference values and EPA secondary standards. Determined to be a wetland. • 2015 - Water flow was too low to be measured and recorded as 0.45 gpm. Field measured TDS was 1,342 mg/L and laboratory reported TDS was 2,040 mg/L, which were both above NDEP reference values. All other physical parameters were within NDEP reference values. The concentration of magnesium was reported at 167 mg/L and the concentration of sulfate was reported at 1,180 mg/L, which were both above the NDEP reference values. All concentrations of dissolved metals were reported within NDEP reference values. Total aluminum was reported at 0.59 mg/L and total iron was reported at 0.81 mg/L, which are both above EPA secondary standards.
Willow Springs (2013, 2014, and 2015 - 2 seep/spring sites)				
	26-48-01-313B	540883	4444464	• 2013 - No water present; no sample collected • 2014 - No water present; no sample collected • 2015 - No water present; no sample collected

Site ID	Site ID	UTM Easting	UTM Northing	Sample Collected in 2013, 2014, and 2015/ 2013, 2014, and 2015 Physical and Analytical Sample Results (HDR 2014, HDR 2015b, and HDR 2015c)
	26-48-01-323	541090	4444442	• 2013 - No water present; no sample collected • 2014 - There were slightly saturated soils, but no surface water present to collect water samples or physical parameters. • 2015 - There were slightly saturated soils, but no surface water present to collect water samples or physical parameters.

Table B-2. HC/CUEP Wetland Areas[1]

Group	Wetland Site ID	Acres	Notes
Dry Hills (2013, 2014, and 2015 - 8 wetland areas confirmed)	26-48-23-211A	0.015	Not Applicable
	26-48-23-211B	0.01	
	26-48-23-242	0.018	
	26-48-23-313A	0.009	
	26-48-23-313B	0.021	
	26-48-24-133	0.006	
	26-48-24-134	0.007	
	26-48-26-123A / 26-48-26-123B	0.02	
Fourmile Canyon (2013, 2014, and 2015 - 3 wetland areas confirmed)	27-48-22-222A	0.063	Not Applicable
	27-48-23-234	0.078	
	27-48-35-112	0.021	
Horse Creek (2013 - 29 wetland areas confirmed; 2014 - 28 wetland areas confirmed; 2015 - 26 wetland areas confirmed)	26-48-02-322	0.014	Not Applicable
	26-48-02-423A	0.61	
	26-48-02-423B	0.314	
	26-48-03-114[#]	ND	Determined in 2014 that this site was a non-wetland. Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.

Group	Wetland Site ID	Acres	Notes
	26-48-03-134	0.009	Not Applicable
	26-48-03-143[#]	ND	Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.
	26-48-03-213	2.173	Not Applicable
	26-48-03-221	0.039	
	26-48-03-321	0.023	
	26-48-03-413A	0.068	
	26-48-03-413B	0.066	
	26-48-03-443	0.272	
	26-48-03-444	0.519	
	26-48-10-142	0.124	
	26-48-10-232	0.033	
	26-48-10-344 / 26-48-10-433	0.535	
	26-48-10-441	0.019	
	26-48-10-442	0.028	
	26-48-10-444	0.016	
	26-48-11-142	0.019	
	26-48-11-144A / 26-48-11-144B	0.385	

Group	Wetland Site ID	Acres	Notes
	26-48-11-312	0.142	
	26-48-11-422	0.215	Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.
	26-48-12-324	0.168	Not Applicable
	26-48-12-341	0.047	
	26-48-12-414	0.726	
	26-48-12-432	0.027	
	26-48-13-323 / 26-48-13-324 / 26-48-13-342 / 26-48-13-431 / 26-48-24-221	20.896	
	26-48-13-432	0.426	
Mill Canyon (2013, 2014, and 2015 - 2 wetland areas confirmed)	27-48-27-134	0.03	Not Applicable
	27-48-27-134A	0.012	
North Toiyabe Range West (2013 and 2014 no confirmed wetland areas)	Not Applicable	Not Applicable	Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.

Group	Wetland Site ID	Acres	Notes
Willow Creek (2013 - 13 confirmed wetland areas; 2014 - 9 confirmed wetland areas; 2015 - 10 confirmed wetland areas)	26-48-01-131	0.75	Not Applicable
	26-48-01-141	0.016	
	26-48-01-212[#]	0.01	Determined in 2014 that this site was a non-wetland. Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.
	26-48-01-212B	0.014	Not Applicable
	26-48-01-223	0.015	
	26-48-01-234	0.01	
	26-48-02-224	0.005	
	27-48-34-322A[#]	0.03	Determined in 2014 that this site was a non-wetland.
	27-48-34-322B[#]	0.02	Reassessed in 2014 and determined to be a wetland.
	27-48-34-412[#]	0.01	Determined in 2014 that this site was a non-wetland. Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.

Group	Wetland Site ID	Acres	Notes
	27-48-34-421[#]	0.01	Determined in 2014 that this site was a non-wetland. Dropped from monitoring program and not monitored in 2015 due to lack of flow and wetland features documented in the 2013 and 2014 monitoring events.
	27-48-35-234[#]	0.16	Reassessed in 2014 and determined to be a wetland.
	27-48-35-311[#]	0.04	Reassessed in 2014 and determined to be a wetland.
Willow Springs (2 wetlands confirmed present in 2013)	26-48-01-313B	0.292	Not Applicable
	26-48-01-323	0.152	

[1] A wetland area may contain more than one seep/spring sampling/monitoring site.
Table shows results from 2013 through 2015 comprehensive HC/CUEP area wetland delineation effort.
[#] GIS polygons of wetland boundaries not available; site too small to delineate.

Appendix C -
BLM Responses to Comments

Comment Number	Comment	Response to Comment
1	 **EUREKA COUNTY BOARD OF COMMISSIONERS** J.J. Goicoechea, Chairman ⌖ Mike Sharkozy, Vice Chair ⌖ Fred Etchegaray, Member *PO Box 694, 10 South Main Street, Eureka, Nevada 89316* *Phone: (775) 237-7211 ⌖ Fax: (775) 237-5212 ⌖ www.co.eureka.nv.us* August 18, 2016 Mr. Jon Sherve, Field Manager Bureau of Land Management – Mount Lewis Field Office 50 Bastian Road Battle Mountain, NV 89820 RE: 3809 (NVB0100); NVN-066621 (16-1A); HCCUEP Twin Declines EA Dear Mr. Sherve: We have reviewed the Environmental Assessment (EA) for the proposed Barrick Horse Canyon/Cortez Unified Exploration Project (HCCUEP) Plan of Operations Amendment for the Twin Declines for Underground Exploration. We are supportive of the amendment and ask BLM to move forward with a Decision Record granting approval as soon as possible. We did provide comments on the previous EA related to this project in January, 2015. When we received the Preliminary EA (PEA) for the Twin Declines, we noted that many of the previous issues carried through and our previous comments were not addressed. However, we are pleased that Barrick was willing to make an independent, concerted effort to meet with us and pursue the changes necessary to address our comments and concerns. We wish all projects to have this positive result. However, as has been the case with this EA, we find that unless project proponents take these independent steps to address our comments and concerns, BLM typically does not. For this project, Eureka County provided comments to BLM on the PEA via email on June 15 and noted: "We have not identified any new issues and have simply reasserted a few previous, unresolved comments on the previous HCCUEP EA. We would like to have an opportunity to get these formally and finally resolved so that any NEPA products moving forward related to this project do not continue to have the issues we have identified." District Manager, Doug Furtado, responded to his staff via email the same day: "After you guys have had a chance to review the County's comments, please either schedule a call or meeting with all parties to communicate how we plan to address and/or properly incorporate them into the final and decision." BLM never responded to us, never scheduled a call, and we had no clarity on how our comments would be addressed. While Barrick met with us to go over our comments but we were not sure what changes would be made without BLM at the table. It left us waiting for the release of the public EA to see how, or if, any changes were made to address our comments. Even with what we consider an inadequate process by BLM to address our comments and concerns, we are pleased that most of our comments that continued to apply to this EA that were not addressed in the previous EA were positively addressed through our coordination with Barrick. Particularly, we are pleased to see: Page **1** of **2**	Shortly after the EA team received comments on the administrative draft of this EA, it was pointed out that the Eureka County comments on the 2015 EA were responded to in an Appendix along with all comments received. The Eureka County resources manager indicated in an email dated May 27th, 2016, that he had not realized Eureka County comments were responded to. Eureka County is indicating that their water resources concerns have been adequately addressed by Barrick. Water resources issues were thoroughly researched and modeled for the Cortez Hills Expansion Final Environmental Impact Statement (FEIS), completed in 2008. This EA tiers and updates the water resources issues relevant to this Amendment and Proposed Action from that FEIS. The BLM hydrologist has thoroughly reviewed the baseline data and analysis of effects and concurs with the findings disclosed in this EA. BLM responds to all substantive comments on all inquiries in all public environmental documents. The comments submitted do not warrant any changes in the Final HC/CUEP EA.

- The State of Nevada Conservation Credit System listed as an option to address impacts to Greater Sage Grouse;
- The County and its Weed District mentioned as partners in addressing future weed treatments;
- Better descriptions on the seed mixes and hand plantings and how they will be adjusted according to ecological conditions other than just elevation;
- Revisions of what constitutes "surface disturbance" for livestock grazing and that many Rangeland Improvement Projects (water developments, cattle guards, fences, etc.) are surface occupancy, not surface disturbance;
- Better descriptions of vegetation resources in the context of Ecological Site Descriptions with their associated State and Transition Models;
- Clarification of field soil mapping minor discrepancies with NRCS soil maps; and
- Language describing the socioeconomic impacts of reduction in grazing AUMs due to the project.

When polled, Eureka County residents ranked a sustainable water supply as one of their highest priorities and even small water usage as that envisioned for this project raises questions from them. Barrick expended a great deal of effort and money to rigorously investigate the groundwater resources of the HICCEUP and surrounding areas. This effort included a study of the interaction between surface water and groundwater and a rigorous assessment of the potential effects the declines might have on water resources. They coordinated their investigation with Eureka County in part to address the residents' concerns. The results of these investigations are documented in the comprehensive 2016 report prepared by Itasca, but the water resources sections EA do not do justice to this effort. Granted, interested persons could read the Itasca report. However, it is by its very nature a technical report and may not be fully understood by the general public. Why not provide a succinct summary in the EA that clearly describes the existing resources and how the project might affect these resources?

The cursory treatment of water resources in the EA has prompted a number of questions from concerned residents that could have been answered through a more comprehensive treatment of the topic. For instance, there are inter-basin water issues related to water piped from Grass Valley to places of use within Pine Valley. Barrick has also filed applications to move water from Buckhorn to the portions of the declines within Pine Valley. The EA provides one paragraph regarding the GW flow model used to estimate passive inflow, but does not mention that the water will originate from Pine Valley and might possibly be used in Grass Valley. We are not advocating for any changes in this EA to address this, but wish to work with BLM and proponents, including Barrick, on future projects to clearly describe water use and management. This is an example of one of the outstanding items that could have been better addressed if BLM had followed through with the commitment to meet with us "to address and/or properly incorporate [our comments] into the final…."

We look forward to coordinating with BLM and Barrick to have this and future projects be successful. Again, we ask BLM to approve the Twin Declines as analyzed under this EA.

Sincerely,

J. J. Goicoechea, DVM, Chairman
Eureka County Board of Commissioners

cc: Bob Ingersoll, Barrick
John Ruhs, NV BLM State Director

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Working with Communities to Protect Their Land Air and Water

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August 20, 2016

Battle Mountain District Office
Mount Lewis Field Office
attn: Christine Gabriel, Planning and Environmental Coordinator
50 Bastian Road
Battle Mountain, NV 89820

Re: Comment on the *Horse Canyon/Cortez Unified Exploration Project Plan of Operations (NVN-066621 [16-1A]) and Reclamation Permit No. 0159 Plan Amendment – Twin Declines for Underground Exploration. (Environmental Assessment DOI-BLM-NV-B010-2016-0026-EA)*

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Dear Ms Gabriel,

Great Basin Resource Watch preference is the no action alternative. Between the Proposed and Waste Rock Alternative, GBRW prefers the Waste Rock Alternative due to the lesser air quality affects of this alternative.

Native American Cultural Concerns

In general we do not support continued mining exploration and operations in the region surrounding mount Tenabo, which destroy Western Shoshone cultural aspects of the Mount Tenabo/Horse Canyon area.

> The Horse Canyon area is and has been a special place for the Shoshone people dating back thousands of years. The laws on mining seem to forget the land and the people who live on it, that also predate Nevada statehood and intruders looking for gold who have been taking all the resources of the Shoshone people. The expanding of Barrick's exploration activities into the Horse Canyon area tells the Shoshone people that the laws that protect tribes has no merit in legal terms. Barrick has known about this area before they purchased it from Placer Dome. I believe they were also doing exploration in Horse Canyon during court case for Cortez. Barrick also is aware that the Horse Canyon area is under the protection of "TCP" (Traditional Cultural Protection). There are things that cannot be bought that are priceless. These things are only to be recognized and talked about on both sides to come to a resolution. The 1872 Mining Law is a violation under International Human Rights Forum on Indigenous Peoples and their lands.
>
> - Larson Bill, Western Shoshone, South fork Reservation

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Thank you for your comments.

Regarding Native American Cultural Concerns
The BLM has consulted with and continues to consult with all Native American tribes with interests in the project area. None of the tribes have expressed concern regarding this project.

The potential impacts of the Proposed Action and the Waste Rock Facility Alternative to Cultural Resources and Native American Traditional Cultural Resources are described in Sections 3.12 and 3.13 of the 2016 HC/CUEP EA. That analysis incorporates by reference the analysis contained in the 2015 HC/CUEP EA and the mitigation measures adopted in the 2015 decision records. Section 3.13 of the 2016 HC/CUEP EA also incorporates by reference the analysis of potential impacts to Native American Traditional Cultural Resources contained in the Cortez Hills Expansion Final Environmental Impact Statement (FEIS). The incorporated analysis is based on cultural resource surveys, which we consider a "loss of sites analysis", ethnographic studies, and consultation with Western Shoshone tribes and individuals, which addresses your concern about interviews with Shoshone people.

An analysis of potential cumulative effects is included in Section 3.12 and 3.13 of the 2016 HC/CUEP EA. It incorporates by reference the extensive cumulative effects analysis from the Cortez Hills FEIS and is supplemented by the cumulative effects analysis in the 2015 HC/CUEP EA.

The effectiveness of mitigation measures adopted in the HC/CUEP Plan are evaluated in the 2015 HC/CUEP EA. With the existing mitigation measures and the incorporation of applicant-committed environmental protection measures, direct impacts to cultural resources, including Native American Traditional Cultural Resources, have been avoided by the Proposed Action, so no further mitigation is required. The EA acknowledges that impacts to Western Shoshone beliefs (contrasted with impacts to physical resources) cannot always be mitigated.

GBRW has worked with Shoshone people to protect the Mount Tenabo cultural region from destructive affects of gold mining. Every expansion of exploration and mining in the area further erodes the cultural value of the land. There is a phrase, "Death by a Thousand Cuts," which we view as appropriate in this case. Over the years with the permission of the US government through BLM private mining and exploration companies have been allowed to destroy the cultural potency of this region, which BLM noted previously,[1] "In summary, the Western Shoshone believe that areas once unaffected by development and encompassing the Puha and spirit of their ancestors have been diminished."

BLM admits that exploration and mining have impacted the cultural area, "Exploration activities associated with the existing 409 acres of surface disturbance have impacted the Mount Tenabo/White Cliffs PCRI.' (reference 1 pg 3-81). However, little mention of how cultural area has been affected is contained in the analysis. BLM needs to assess the extent of the damage done to the cultural area by loss of sites analysis and by interviews with Shoshone people. The analysis of impacts is incomplete without a complete understanding of affect on the cultural area. Furthermore, BLM needs to convey in the analysis how the activities past and present and reasonably foreseeable will affect the value of the Mount Tenabo/Horse Canyon cultural area.

BLM is required under FLMPA to prevent unnecessary and undue degradation including cultural degradation. BLM is already expecting further damage to the cultural area and believes that various measures discussed in the EA will avoid significant impacts. BLM provides no evidence that the mitigation measures will be effective and even admits that they are arguably not effective as stated, "some Western Shoshone believe that areas once affected by development cannot be satisfactorily mitigated. These actions have cumulatively impacted, and would continue to impact, their heritage and lifeways (BLM 2008c)." (EA pg. 3-111) BLM needs to demonstrate effectiveness in the mitigation measures as required by NEPA.

Overall, GBRW does not see that the BLM is properly protecting the Western Shoshone cultural area of Horse Canyon, Mt. Tenabo and the associated White Cliffs. GBRW views BLM continues to violation of FLPMA and NEPA in this proposed action.

Environmental Baseline

The EA incorrectly often relies on recent data to establish a baseline. For example, "Grass Valley has a closed basin geomorphology; it lacks perennial or intermittent streams, and much of the storm runoff into Grass Valley is absorbed by the alluvium. Seeps, springs, and wetlands were not documented on the western and southern slopes during the HC/CUEP baseline inventory (HDR 2014)." (EA pg.3-39). Baseline should be pre-mining and at least prior to modern mining especially where water analysis is concerned. GBRW expects that seeps, springs and wetlands have already been affected by regional mining and exploration activities particularly from the Cortez Hills Mine. This aspect should be included in the cumulative impacts analysis.

It appears to GBRW that BLM assumes that baseline means relative in time to the proposed action. Indeed a comparison to conditions just prior to the action has importance in evaluating how the current proposal will affect changes in the environment. However, this does not address the cumulative impact assessment required by NEPA. Cumulative impacts should always be relative to the pre-disturbed conditions. The EA does not discuss the actual environmental baseline as is needed. The public is not given a complete picture of cumulative impacts in this EA.

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Regarding Environmental Baselines

Consistent with guidance in Section 6.6.2 of the BLM NEPA Handbook, the No Action alternative is to not approve the proposed Plan Amendment and is used in the 2016 HC/CUEP EA to provide the baseline for comparison of environmental effects. The No Action in the 2016 HC/CUEP EA is the continuation of previously authorized surface exploration activities. The 2015 HC/CUEP EA analyzed the effects of up to 549 acres of surface disturbance associated with surface exploration within the HC/CUEP Plan boundary. The current Proposed Action would reallocate a portion of this previously authorized surface disturbance acreage to support underground exploration. The 2015 HC/CUEP EA was incorporated into the 2016 HC/CUEP EA by reference.

The area has a history of exploration and mining activities. As you noted, the current analysis of effects of the Proposed Action on seeps, springs, and wetlands does rely on recently collected baseline information. Consistent with Section 6.7.1 of the BLM NEPA Handbook, the Affected Environment describes the existing conditions (which includes effects from past actions) and trends of the resource. The baseline survey results were used as the basis for evaluating the Proposed Action's effects on seeps, springs, or wetlands. The analysis concludes that there would be no effects on these resources. Also consistent with the BLM NEPA Handbook, Section 6.8.1.2, use of the recent baseline inventory and monitoring reports demonstrates that the BLM took a "hard look" at the potential effects of the Proposed Action.

Surface water features, including seeps, springs, and wetlands, at HC/CUEP are currently monitored (see Section 3.5.1.1 of the 2016 HC/CUEP EA). The monitoring program would continue under the Proposed Action.

The analysis of cumulative effects considered past, present, and reasonably foreseeable actions (RFFAs) as identified in Section 2.4, Table 2-3 of the 2016 HC/CUEP EA. Effects from

Water Quality

The surface water quality section discusses many water quality deficiencies, but does not clarify whether these exceedences of water quality standards are background or due mining related activities. For example, "The levels of TDS reported at BIO-US and BIO-DS exceeded the NDEP reference value of 1,000 mg/L for the majority of the monitoring events in 2013. This is consistent with what was reported for each of these locations in 2012. The highest levels of TDS were reported in November 2013 with BIO-US at 2,330 mg/L and BIO-DS at 2,280 mg/L." (EA pg. 3-28). This need to be clarified.

The EA acknowledges the existence of potentially acid generating (PAG) rock, but does not follow through to analyze potential affects of PAG material. According to the EA, "Approximately 700,000 tons of mixed non-acid generating and PAG waste rock would be generated." (EA, pg. 2-10). Thus, the declines have the potential to have exposed PAG material inside. At the end of exploration water will infiltrate back into the declines and there could be acid-generation in the decline, which would be a degradation of groundwater and violation of state law.

The EA also states that PAG material is to be 'excavated." GBRW is assuming this means that there is an expectation that no PAG material will be exposed, and thus there will be no potential for acid generation after closure of the declines? The EA needs to clarify this. GBRW would not agree with this assumption in general as other mines in Nevada have assumed that acid generation would not occur and it has. There needs to be long-term monitoring of the groundwater in the declines to varify that assumption. In addition there should be a mitigation plan in case acid-generation does occur.

Water Quantity

The EA fails to evaluate in the cumulative impacts analysis whether the various seeps, springs and wetlands have be affected by existing mining activities. The EA needs to include an inventory of pre-mining seeps, springs and wetlands in comparison with current including flow volumes of the seeps and springs. The EA states, "There has been a head reduction in the carbonate bedrock unit which has corresponded to water level declines measured in the monitoring wells and piezometers; the current declines in the HC/CUEP area range from 10 to 50 feet/year. The head reduction is most likely a result of groundwater pumping at the Pipeline and Cortez Hills mining operations in Crescent Valley. (EA pg. 3-36). Thus there is the potential for surface water expressions to be affected. The EA does discuss some analysis that points to a lack of connection between the bedrock aquifer and alluvium. However, there is not clarity that seeps and springs are all derived from the alluvial aquifer. BLM must not make assumptions about how the public is to interpret this data, and there must data to support any conclusion drawn in the EA.

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past actions resulted in the affected environment. The past, present, and RFFAs were described in detail in the Cortez Hills Expansion Project FEIS (BLM 2008c), and were updated for this EA analysis. The cumulative effects analysis in the HC/CUEP EA tiers to the analyses in the Cortez Hills FEIS and the 2015 HC/CUEP EA.

Regarding Water Quality

The exceedances of Total Dissolved Solids (TDS) at BIO-US and BIO-DS in the Willow Creek drainage are indicative of historic mining activities not related to the permitted exploration activities of the HC/CUEP Plan.

Waste rock characterization studies specific to the Proposed Action are included in the project record available at the BLM Battle Mountain District office. Approximately 700,000 tons of mixed non-acid generating and potentially acid generating (PAG) waste rock would be excavated as underground exploration activities reach the mineralized area. Excavation, testing, and handling of the PAG material are described in the 2016 HC/CUEP EA (Section 2.1.2.3; Section 3.3.2.1).

As described in Section 3.5.2.1 of the 2016 HC/CUEP EA, dewatering measures would not be required. Effects of underground exploration activities on groundwater would be negligible to minor, and localized within the affected bedrock unit as the passive inflow fills the void created by the declines and exploration drifts. The groundwater monitoring program would continue under the Proposed Action.

Regarding Water Quantity

Potential effects on seeps, springs, and wetlands have been evaluated by incorporating the surface water monitoring program data, and the data from groundwater monitoring and hydraulic conductivity studies completed in the HC/CUEP area and disclosed in the 2016 HC/CUEP EA (see

		Section 3.5.1.2 of the 2016 HC/CUEP EA). HC/CUEP exploration activities have not been shown to affect groundwater levels. There has been a head reduction detected in the carbonate bedrock unit most likely a result of groundwater pumping at the Pipeline and Cortez Hills mining operations in Crescent Valley. There has been no corresponding head reduction in the overlying basin fill unit. During the 45-day pumping test, only one of the water-level monitoring locations in a formation other than the Devonian Wenban Limestone (Dw) recorded drawdown. Other monitoring wells and piezometers in the non-carbonate formations did not see any drawdown due to the pumping test. The test results are consistent with the concept of limited hydraulic connection (ITASCA 2014). Due to the depth at which the decline excavations would occur, there would be no effects on surface water features from underground exploration activities, and therefore, no cumulative effects (see Section 3.5.2 of the 2016 HC/CUEP EA). Monitoring of seeps, springs, and wetlands in the HC/CUEP area has not detected that these features have been affected by currently authorized exploration activities. Surface water features would continue to be monitored. Groundwater monitoring as described in the HC/CUEP EA, Section 3.5.1.2, would also continue. Based on the responses provided, the comments submitted do not warrant any changes in the Final HC/CUEP EA.

Thank you for the opportunity to submit these comments. Please contact John Hadder if you have any questions, and we look forward to your response.

Sincerely,

John Hadder
Director

[1] U. S. Dept. of Interior, Bureau of Land management, *Horse Canyon/Cortez Unified Exploration Project Plan of Operations (NVN- 066621 [13-1A]) and Reclamation Permit No. 0159 Plan Modification, Addendum, and Amendment,* December 2014, pg. 3-81.

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