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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Coeur Rochester, Inc. (CRI), the operator of the Rochester and Packard mines, herein referred to as the CRI Mine, is a wholly owned subsidiary of Coeur Mining Incorporated. In June 2014, CRI submitted a Plan of Operations and Reclamation Plan #NVN-064629 Amendment (POA 10) to the United States Department of the Interior, Bureau of Land Management (BLM), Winnemucca District.

The CRI Mine is in Pershing County, approximately 18 miles northeast of Lovelock, Nevada. It is in the Humboldt Mountain Range, at 4,960 to 7,300 feet above mean sea level (amsl). A paved county road provides year-round access to the mine. POA 10 would allow the expansion of existing mining operations reclamation and ultimate closure of the CRI Mine. The proposed expansion would extend the life of the project for approximately five to seven years, depending on market conditions and the price of silver. The site would be closed and reclaimed approximately five years after each mining and processing facility is closed.

The proposed POA 10 area (the project area) encompasses, either partially or completely, Sections 2, 3, 9, 10, 11, 15, 16, 21, 22, 27, 28, 29, 32, and 33, Township 28 North (T28N), Range 34 East (R34E), Mount Diablo Base and Meridian (see **Figure 1-1**, Project Area). The project area encompasses approximately 4,339 acres, 4,122 acres of which are on BLM-administered lands and 217 acres are on private lands owned or controlled by CRI.

CRI proposes to expand the project area by 499 acres (371 acres on BLM-administered lands and 128 acres on private land). The proposed project area would include the authorized project area and portions of Sections 8 and 17, T28N, R34E, Mount Diablo Base and Meridian. The authorized and proposed plan boundaries are shown on **Figure 1-2**, Proposed Plan Boundary.

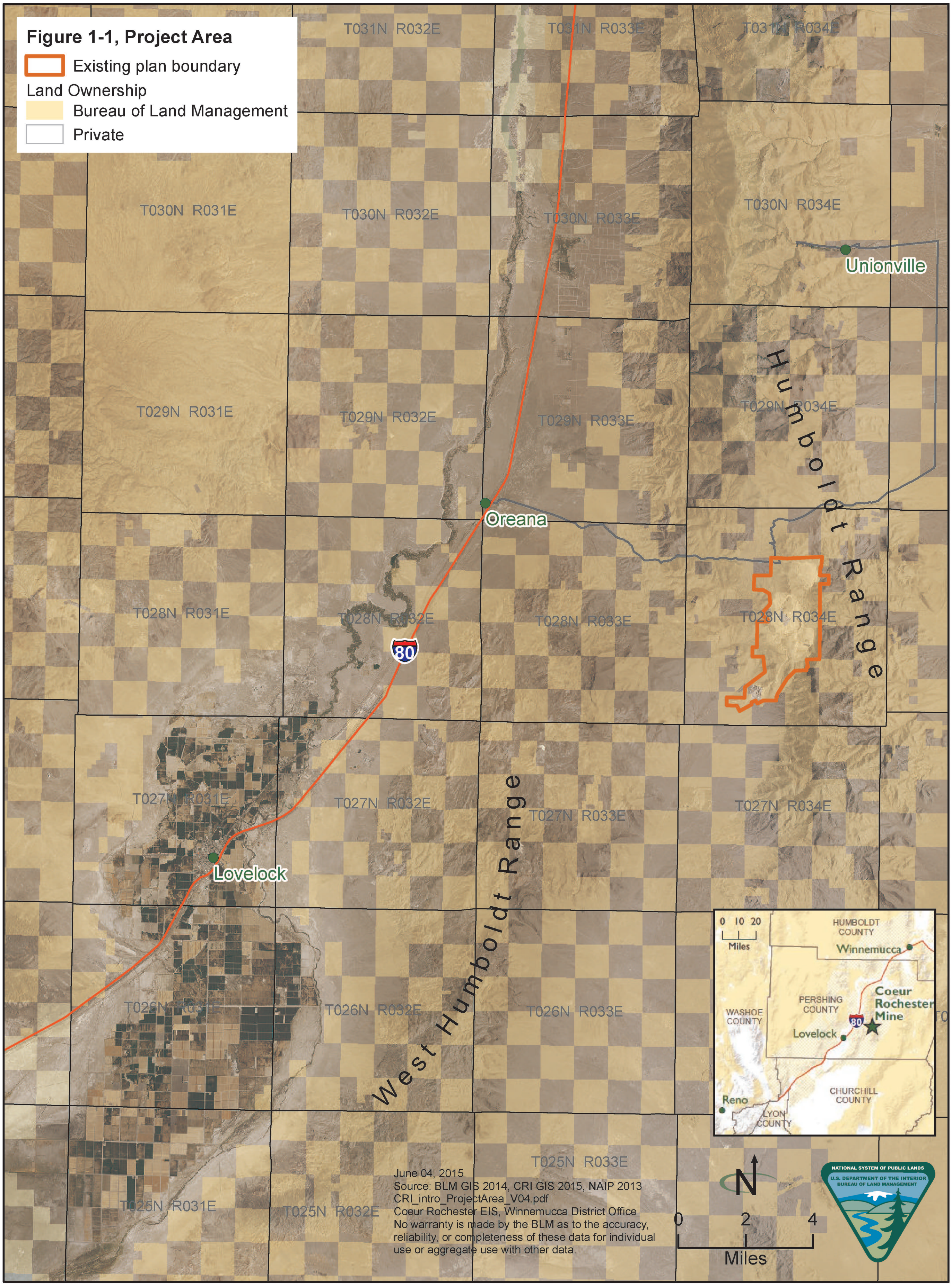


Figure 1-1, Project Area

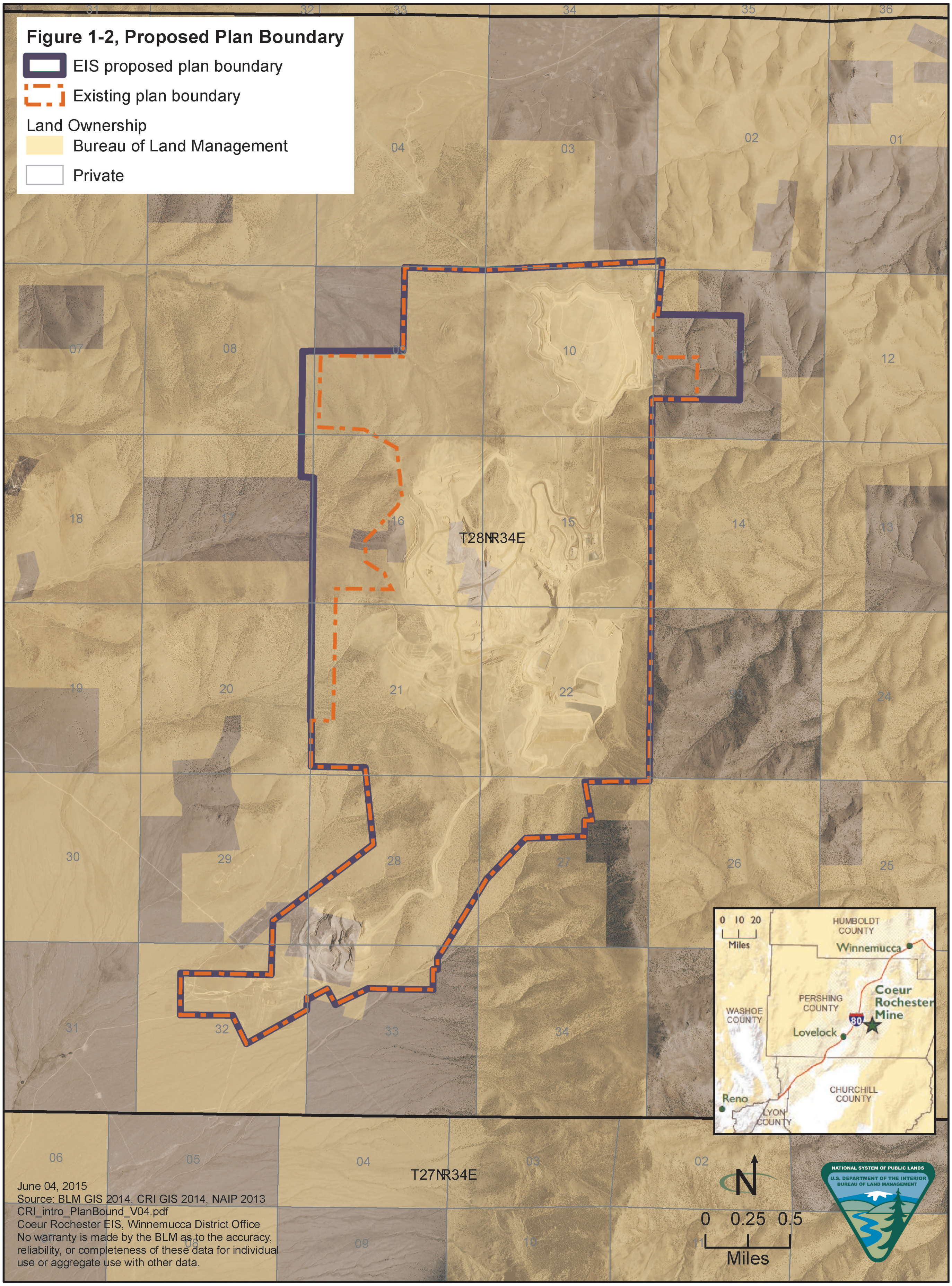


Figure 1-2, Proposed Plan Boundary

Because proposed mining activities are on BLM-administered lands, the BLM's review and approval is required. This is in accordance with the Federal Land Policy and Management Act (FLPMA), the surface management regulations at 43 Code of Federal Regulations (CFR), Part 3809, and requirements of the National Environmental Policy Act (NEPA). Based on a review of the Proposed Action, the BLM has determined that an environmental impact statement (EIS) must be prepared in order to comply with requirements of NEPA, Council on Environmental Quality (CEQ) regulations, and BLM policy and guidance.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of the Proposed Action and alternatives is to allow CRI to expand operations to continue extracting economically recoverable silver and gold reserves and to provide reclamation and closure management of the site following mining. The need for the action is established by the BLM's responsibility under its 2008 Energy and Mineral Policy, the FLPMA, and BLM Surface Management Regulations at 43 CFR, Part 3809. Specifically, it is to respond to a plan of operations and to take any action necessary to prevent unnecessary or undue degradation of the lands.

1.3 LAND USE PLAN CONFORMANCE

The Proposed Action is in conformance with the Record of Decision and Resource Management Plan for the Winnemucca District Planning Area, approved May 21, 2015. This is in accordance with the locatable mineral objective MR9, which states, in part, "manage locatable mineral operations to provide for the mineral needs of the nation while assuring compatibility with and protection of other resources and uses."

1.4 BLM AND NON-BLM POLICIES, PLANS, AND PROGRAMS

The CRI Mine is on BLM-administered lands and private lands owned or controlled by CRI. Mining operations on BLM-administered lands are conducted in accordance with the following:

- General Mining Law of 1872, as revised
- The FLPMA
- The BLM's Surface Management regulations at 43 CFR, Part 3809
- The Mining and Mineral Policy Act of 1970
- 2008 Energy and Mineral Policy

Mining is regulated in Nevada on both federal and private lands through the Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation (BMRR). The BMRR is composed of the regulation, reclamation, and closure branches. The regulation and closure branches regulate mining under the authority of the Nevada Revised Statutes (NRS) 445A.300-445A.730 and the Nevada Administrative Code (NAC) 445A.350-445A.447 (water quality regulations). The BMRR reclamation branch administers land reclamation in accordance with NRS 519A.010-519A.290 and NAC 519.010-519A.415. A financial guarantee and long-term trust (LTT) is in place for CRI's plan of operations. The reclamation cost estimates and LTT estimates are a financial backup if the operator fails to comply with the reclamation requirements. Those estimates are not part of the environmental impact analysis. CRI also maintains other permits as required by applicable federal, state, and local laws and regulations (see **Table 1-1**).

Table 1-1
Permits and Approvals

Agency	Permit or Approval
US Department of the Interior Bureau of Land Management, Winnemucca District Office, in Winnemucca, Nevada	• Rochester Mine Plan of Operations Casefile – #NVN-064629 • Reclamation Bond #NVN-064629 • ROW—Microwave Communication Site #NVN-050235 • ROW—Access Road #NVN-042727 • Notice—Mystic Springs Exploration #NVN-089745 • Notice—Buena Vista Playa Exploration #NVN-089944 • Programmatic Agreement (BLM et al. 1992)
Nevada Department of Environmental Protection (NDEP) Bureau of Air Pollution Control	• Class II Air Permit #AP1044-0063 • Mercury Control Program #AP1044-2242
NDEP Bureau of Air Quality Planning	• Open Burn Variances
NDEP Bureau of Mining Regulation and Reclamation	• Reclamation Permit #0087 • Water Pollution Control Permit #NEV0050037
NDEP Bureau of Safe Drinking Water	• Public Water System #PE-3076-12NTNC • Fe and Mn Removal System, Permit # PE-3076-TP02-12NTNC
NDEP Bureau of Waste Management	• Hazardous Waste ID #NVD-986767572 • Solid Waste Class III Landfill Waiver #SWMI-14-30
NDEP Bureau of Water Pollution Control	• General Stormwater Permit #NVR300000-MSW166 • General Septic Permit #GNEVOSDS09-L0028
Nevada Department of Wildlife	• Industrial Artificial Pond Permit #S37974
Nevada Division of Water Resources	• Water Right #48785 (Well PW-2A)—Proven • Water Right #81864 (Well PW-4A) • Water Right #49613 (Well PW-3A) • Water Right #49614 (C-4 Corridor) • Water Right #58449 (SAC) • Water Right #58450 (CBC) • Water Right #61762 (Well PW-1A)—Proven • Water Right #81235 (Packard Well)
State of Nevada Liquefied Petroleum Gas	• Class 5 License #5-3875-01
Nevada State Fire Marshall	• Hazardous Materials Permit #FDID 14000
Nevada State Business License	• Business License #NV19851018129
Pershing County Business License	• Business License #5270

Table 1-1
Permits and Approvals

Agency	Permit or Approval
US Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE)	• Explosives Permit #9-NV-027-33-3E-92862
US Department of Transportation	• Hazardous Materials Transportation General Permit—HM Company ID #051785
US Environmental Protection Agency	• Toxic Release Inventory #89419CRRCH180EX—Form R • Toxic Substances Control Act—Form U • RCRA #NVD-986767572—Biennial Report
US Federal Communications Commission	• Radio Station Authorization—Call sign #WNFH594 • Radio Station Authorization—Call sign #KB77195

Proposed and new rights-of-way (ROWs) for American Canyon Road, including relocating established ROWs, would be subject to the FLPMA and associated ROWs regulation under 43 CFR, Part 2800. Pershing County has zoned the area where the CRI Mine is located as agricultural-mining-recreation (AMR). The activities proposed for POA 10 are consistent with the Pershing County Regional Master Plan.

The Proposed Action includes an amendment to the BLM plan of operations and an amendment to the NDEP Water Pollution Control Permit and the Final Proposed Closure Plan (FPCP) for closing and stabilizing the heap leach pads (HLPs) and impoundments.

Figure 1-3 presents a flow diagram of the BLM and NDEP permitting processes for closing and stabilizing HLPs, as required for plans of operation and water pollution control permits. Included in the flow chart is information on the decision/permit issuance process, permit requirements, compliance monitoring, and closure monitoring. Also included are steps identifying the bond adjudication, bond release, and long-term trust processes.

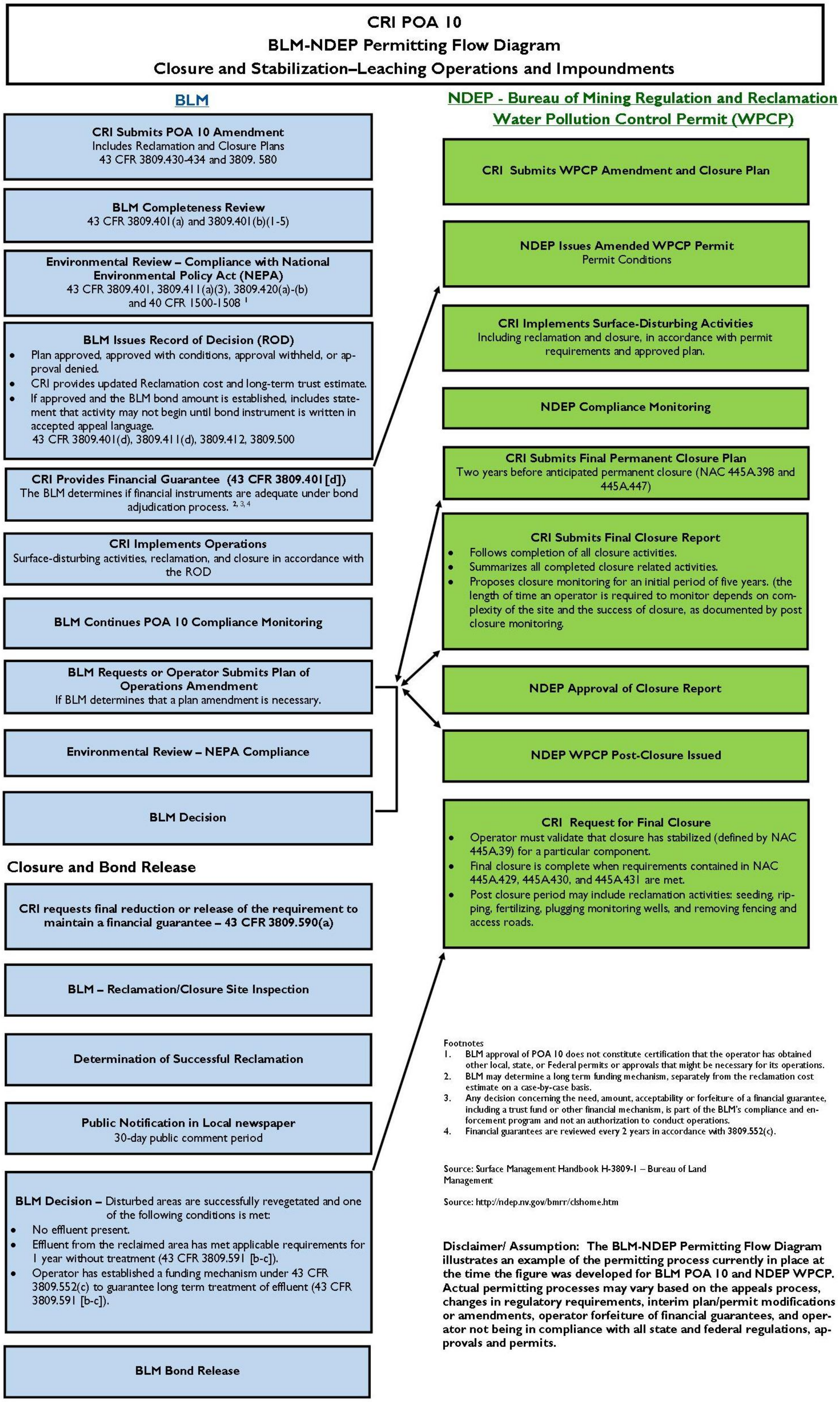
1.5 Authorizing Actions

CRI has the permits and approvals to conduct mining operations at the CRI Mine (**Table 1-1**). Implementing the Proposed Action or alternatives would require amending some of the existing permits.

1.6 Scoping

The project scoping summary report summarizes the public scoping process and identifies the issues and concerns brought forward during the scoping process (EMPSi 2014). Based on key issues identified by the public, the BLM determines the scope and the significant issues to be analyzed in depth (40 CFR, Part 1501.7 [a][2]) in the EIS. Before it began the scoping process, the BLM published a notice of intent (NOI) to prepare this EIS in the *Federal Register* on Friday, June 27, 2014. The NOI invited public participation and scoping comments for a 30-day scoping period ending on July 27, 2014.

Figure 1-3 CRI POA 10 BLM-NDEP Permitting Flow Diagram



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The BLM initiated the following additional steps as part of the scoping process:

- Sent letters to federal, state, and local agencies, affected tribal governments, and other interested parties informing the public and inviting participation and comments related to the Proposed Action
- Issued news releases to local news sources
- Updated the Winnemucca District website to inform the public of the project and to invite comments
- Held public scoping meetings on July 9, 2014, at the Lovelock Community Center in Lovelock, Nevada, and on July 10, 2014, at the Winnemucca Convention Center

1.7 Issues

The BLM received a total of 11 public scoping letters, containing 144 individual comments. Commenters ranged from individuals to state and federal agencies and environmental groups. Comments relating to the Proposed Action were identified and have been consolidated into the following issues:

- What are the potential impacts on air quality from mine emissions, including mercury and carbon emissions?
- What are the potential impacts on water quality and quantity, including any impacts on groundwater and surface waters?
- What are the social costs of the CRI Mine expansion for emitting greenhouse gases (GHGs), in particular carbon dioxide?
- What is the contribution to climate change from the CRI Mine expansion from emitting GHGs, in particular carbon dioxide?
- What are the potential geochemical mining impacts from chemical leaching at mine facilities, including waste disposal sites, open pits, and heap leach pads?
- What are potential impacts on wild horses and burros?
- What are the potential impacts on wildlife and special status species?
- What are the potential impacts on vegetation and riparian resources?
- What are the potential impacts on cultural resources?
- What are the potential impacts on visual resources?
- What are the indirect impacts on dispersed recreation?
- Will the process be consistent with NEPA, in particular development of baseline data and alternatives, monitoring, and cumulative impacts assessment?

Additional information concerning scoping comments is provided in the Scoping Report (EMPSi 2014).

1.8 PUBLIC INVOLVEMENT AND REVIEW OF THE DRAFT EIS

The Coeur Rochester Mine Plan of Operations Amendment 10 and Closure Plan Draft EIS was made available for public comment on August 21, 2015. The comment period lasted 45 days, ending on October 5, 2015. Individuals, public agencies, and nonprofit organizations submitted 142 letters with comments on the Draft EIS. The comments and responses to them are in **Appendix A**.

One commenter requested the preparation of a supplemental EIS. Requirements for preparing a supplemental EIS are found in the CEQ regulations at 40 CFR, Subpart 1502.9(C)(1), which states, in part, "Agencies: Shall prepare supplements to either the draft or final environmental impact statement (EIS) if, i) The agency makes substantial changes in the Proposed Action that are relevant to environment concerns; ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts."

EPA's comments on the Draft EIS focused on heap leach closure and post closure financial assurance, additional long-term monitoring and maintenance activities and costs, summary of geochemical characterization, and climate change.

The BLM has prepared the final EIS adding information that clarifies and improves the EIS analysis, based on EPA's comments (40 CFR, Subpart 1503.4), as follows:

- Regulatory requirements relating to reclamation bonding
- Additional information and clarification of post-closure heap leach monitoring of HLPs and proposed e-cells
- Clarification of proposed e-cell maintenance activities
- Additional geochemistry characterization data supporting the existing geochemical information in the Draft EIS
- Additional information relating to climate change, including proposed mitigation measures

Based on EPA and other public comments received on the Draft EIS and taking into consideration CEQ guidance with respect to supplemental EIS documents, the BLM has determined that a supplemental EIS is not necessary. This is because there were no substantial changes in the Proposed Action that are relevant to environmental concerns presented in the Draft EIS. Moreover, there were no significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or impacts.

1.9 MINE HISTORY AND EXISTING AND APPROVED FACILITIES

1.9.1 Mine History

Mining in the historic Rochester Mining District (Rochester District) began in the 1860s and continued into the late 1920s. After 1929, mining was limited until 1942. By 1951, the area was almost completely deserted. Beginning in the 1980s, new mining priorities and technologies led to renewed interest in mining the area. In 1986, CRI began operations at the CRI Mine. Today the open Rochester and Packard pits are being mined.

Typical open pit mining techniques are used, and the procedures are as follows:

- Ore and waste rock are drilled and then blasted, loaded, and hauled to either the crusher facility or directly to the HLPs or rock disposal site (RDS), also known as non-ore rock dumps.
- Ore from the open pits is hauled either directly to HLPs or to the ore crusher facilities depending on the consistency of the blasted material.
- Following crushing, lime is added to ensure proper alkalinity (approximately pH 10) for cyanide processing and safety considerations.
- A series of overland conveyors delivers the ore to the load out area stockpile.
- The ore is then loaded onto 100-ton haul trucks for delivery to the HLPs.
- Any "run of mine" ore (ore that is not crushed) is hauled directly to the HLPs, bypassing the crushing process.

In 2007, mining was placed on hold, but heap leaching continued. Mining restarted in 2011 at the Rochester pit. Mining ceased at the Packard pit in 2007, and it and the RDS associated with that pit are in various stages of reclamation. The existing or authorized disturbance at the Rochester Mine is 1,939 acres within the POA 10 boundary; the mine has produced about 125 million ounces of silver and 1.4 million ounces of gold.

1.9.2 Existing and Approved Facilities and Employment

Previously permitted operations included open pit mining and the use of cyanide heap leach facilities to produce approximately 5 million ounces of silver and 40,000 ounces of gold annually during full production. To date, CRI is authorized to disturb 1,939 acres on both BLM-administered and private lands within the mine plan boundary. Existing and approved facilities are as follows:

- Two open pits (Rochester and Packard)
- Three haul roads

- Ancillary roads
- Contingency ponds/closure evaporation cells (e-cells)
- Four HLPs
- Six rock disposal sites
- Drainage control
- Processing facilities, including the plant
- Exploration roads and pads

Figure 1-4 depicts currently authorized facilities, and **Figure 1-5** depicts them in greater detail. **Table 1-2** identifies existing approved facilities disturbance. The permitting history for facility authorizations is provided in **Table 1-3**.

Table 1-2
Existing Authorized Disturbance

Mine Facilities	**Existing/Authorized Acres**	
	Private	**Public**
Exploration Evaluations		
Rochester and Packard areas	0.7	78.5
Total acres	**0.7**	**78.5**
Roads		
Ancillary service	0	18.2
North w/Stage IV haul road	2.6	11.5
Packard haul road	0	31.8
Southwest Stage II haul corridor	0	36.7
Total acres	**2.6**	**98.2**
Open Pits/Berms		
Rochester	45.3	272.5
Packard	68.6	33
Total acres	**113.9**	**305.5**
Contingency Pond/E-Cells		
Stage I plant area pond(s) E	0	3.1
Stage II concept closure pond D	0	8.3
Stage III existing-concept pond A	0	6.5
Stage IV conceptual closure pond[2]	3.8	6
Conceptual closure pond B	0	3.3
Conceptual closure pond C	0	2
Conceptual closure pond F	0	4
Evaporation test pond	0	0.5
Total acres	**3.8**	**33.7**
Heap Leach		
Stage I	0	85
Stage II	0	107.3
Stage III	0	161.8
Stage IV	0	215.4
Total acres	**0**	**569.5**

Table 1-2
Existing Authorized Disturbance

Mine Facilities	Existing/Authorized Acres	
	Private	Public
Waste Rock Disposal Sites		
North RDS	2.7	94
South RDS	0	207.1
Charlie RDS	0	50.7
East RDS	0	46.1
West RDS	19.2	89.2
Packard RDS	7.2	3
Low-grade stockpile	0	37.2
Total acres	**29.1**	**527.3**
Foundations and Buildings		
Foundation and buildings	0	2.4
Total acres	**0**	**2.4**
Yards-Storage		
Plant in-fill area	0	91.9
Growth medium stockpiles	0	19.4
Ancillary miscellaneous disturbance	36.5	10.3
Total acres	**36.5**	**121.6**
Sediment and Drainage Control		
American Canyon closure diversion	0	8.7
S. American Canyon closure diversion	0	4.1
Packard conceptual channels	0	2.8
Total acres	**0**	**15.6**
Grand total acres	**186.6**	**1,752.3**

Source: CRI 2015

Table 1-3
Permitting History and Approval Dates

Plan of Operation/Amendment	Mine Facilities	Approval Date
Original Mine Plan	Rochester pit, RDS, two HLPs	February 1986
Amendment 1	Proposed development and construction of the South RDS	September 1988
Amendment 2	Modification to facilities based on identified additional ore reserves	1990
Amendment 3	Approval of the Coeur Rochester Amended Plan of Operations to construct the Stage IV HLP and to expand the South and West RDSs	January 1993
Amendment 4	Approval of the expansion of the West RDS, expansion of the in-pit backfill of the Rochester pit, and the expansion of the Stage II heap leach pad	June 2000
Amendment 5	Incorporation of the Nevada Packard Project	February 2002
Amendment 6	Expansion of the Rochester pit and a modification to the footprint for the Nevada Packard Project, expansion of the Stage IV HLP, and a minor adjustment to the North and South RDSs	August 2003
Amendment 6.5	Expansion of the Stage IV HLP, three borrow sites for use in expanding the Stage IV heap leach pad, and identification of an equipment staging area in an existing disturbed area	April 2004
Amendment 7	A plan for reclamation and closing the Rochester and Nevada Packard sites, as stipulated in the Decision Record for Plan Amendment No. 6; a proposed height increase for the Stage II heap leach facility and development and construction of the proposed Stage III heap leach facility (The BLM began preparing an EIS for POA 7 in February 2004. In July 2008, it withdrew POA 7, and the NEPA process ended because of the need for further baseline information to fully evaluate the alternatives as they pertained to closure.)	N/A
Amendment 8	Additional mining and partial backfilling of portions of the Rochester pit to a minimum elevation of 6,175 feet amsl; construction, operation, and closure of the Stage III HLP; construction of a conveyor and pipeline corridor from the tertiary crusher to the new Stage III HLP; construction of a buttress along the southeast pit wall for stabilization associated with the construction of the conveyor/pipeline corridor.	October 2010
Amendment 9	POA 9 was withdrawn and not completed.	POA 9 was withdrawn.

Source: CRI 2015

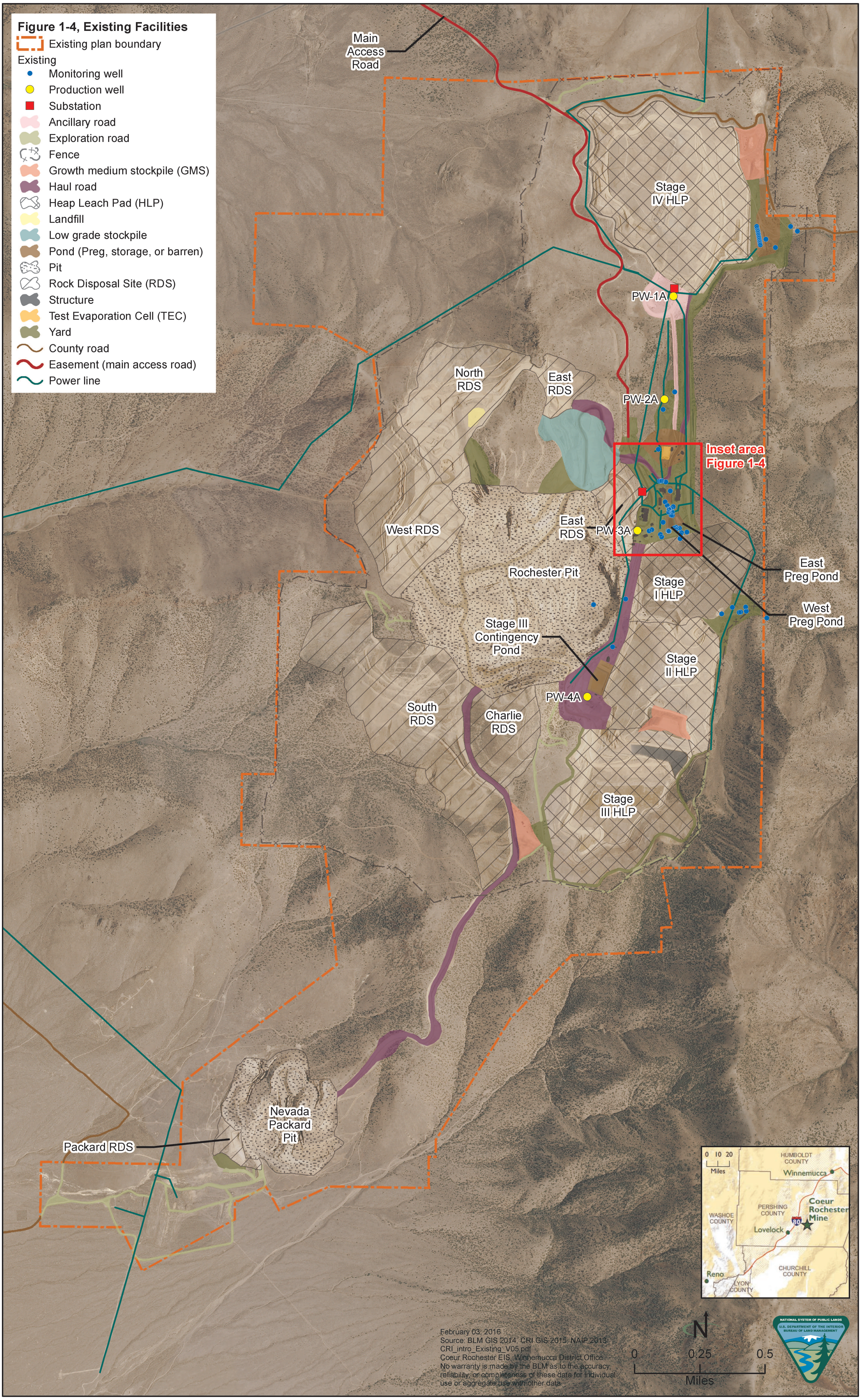

Figure 1-4, Existing Facilities
Existing plan boundary
Existing
Monitoring well
Production well
Substation
Ancillary road
Exploration road
Fence
Growth medium stockpile (GMS)
Haul road
Heap Leach Pad (HLP)
Landfill
Low grade stockpile
Pond (Preg, storage, or barren)
Pit
Rock Disposal Site (RDS)
Structure
Test Evaporation Cell (TEC)
Yard
County road
Easement (main access road)
Power line
Main Access Road
Stage IV HLP
PW-1A
North RDS
East RDS
PW-2A
Inset area Figure 1-4
West RDS
East RDS
PW-3A
Rochester Pit
East Preg Pond
Stage I HLP
West Preg Pond
Stage III Contingency Pond
Stage II HLP
South RDS
Charlie RDS
PW-4A
Stage III HLP
Nevada Packard Pit
Packard RDS
HUMBOLDT COUNTY
Winnemucca
PERSHING COUNTY
WASHOE COUNTY
Coeur Rochester Mine
Lovelock
CHURCHILL COUNTY
Reno
LYON COUNTY
0 10 20
Miles
N
0 0.25 0.5
Miles
February 03, 2016
Source: BLM GIS 2014, CRI GIS 2015, NAIP 2013
CRI_intro_Existing_V05.pdf
Coeur Rochester EIS, Winnemucca District Office
No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

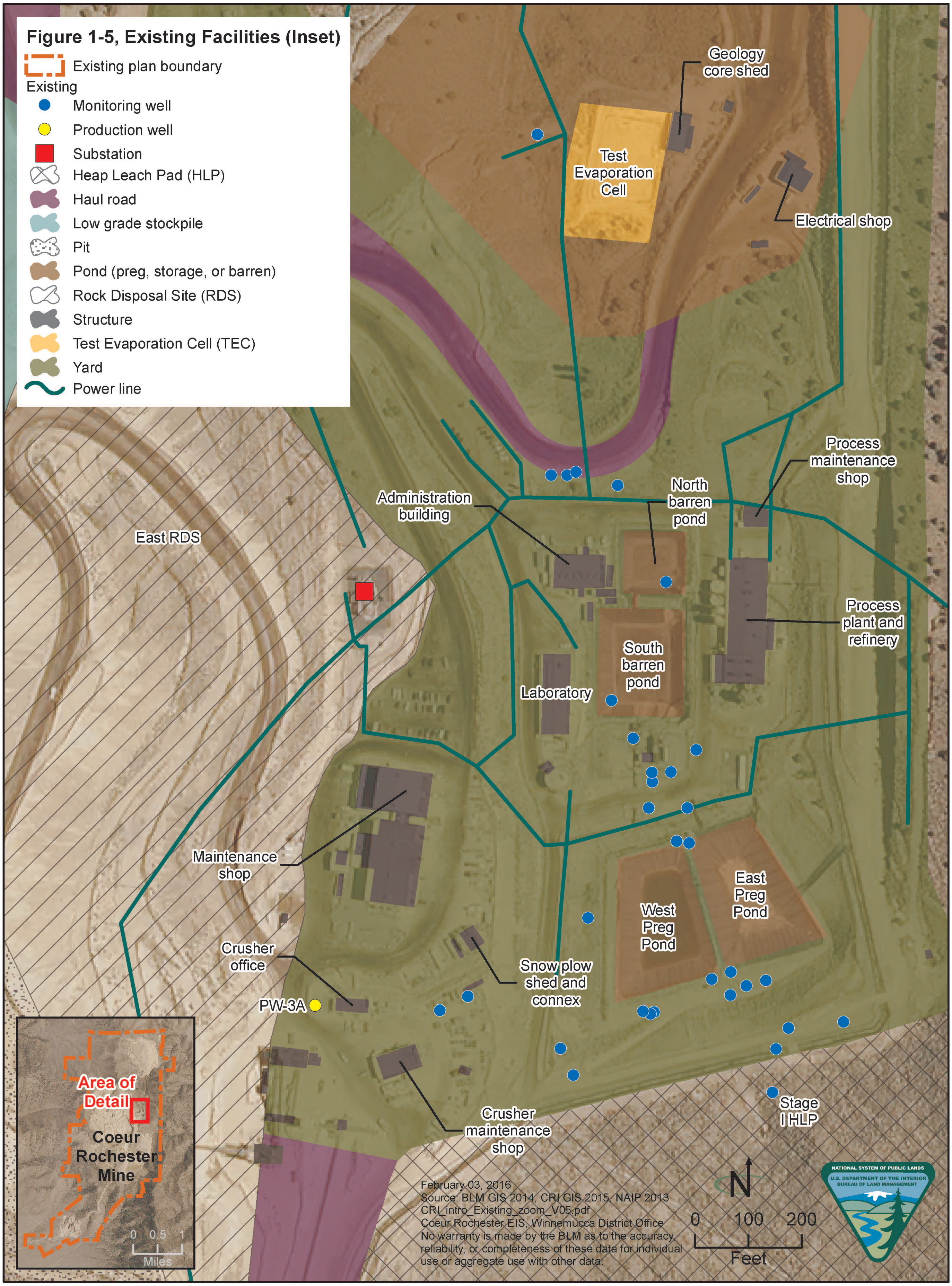
Figure 1-5, Existing Facilities (Inset)
Existing plan boundary
Existing
Monitoring well
Production well
Substation
Heap Leach Pad (HLP)
Haul road
Low grade stockpile
Pit
Pond (preg, storage, or barren)
Rock Disposal Site (RDS)
Structure
Test Evaporation Cell (TEC)
Yard
Power line
Geology core shed
Test Evaporation Cell
Electrical shop
Process maintenance shop
North barren pond
Administration building
East RDS
Process plant and refinery
South barren pond
Laboratory
Maintenance shop
East Preg Pond
West Preg Pond
Crusher office
Snow plow shed and connex
PW-3A
Crusher maintenance shop
Stage I HLP
Area of Detail
Coeur Rochester Mine
0 0.5 1
Miles
N
0 100 200
Feet
February 03, 2016
Source: BLM GIS 2014, CRI GIS 2015, NAIP 2013
CRI_intro_Existing_zoom_V05.pdf
Coeur Rochester EIS, Winnemucca District Office
No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Existing Open Pits

The project area includes the Rochester and Packard pits. Mining at both pits has typical bench designs, consisting of 25-foot mining benches to create 50-foot walls between catch benches. A catch bench is typically 20 feet wide, with a face angle of 70 degrees. The total authorized disturbance for both pits is 419 acres on both BLM-administered and private lands. The Rochester pit is authorized for 317 acres and the Packard pit for 102 acres.

The Rochester pit excavation began in 1986 on the peak of Nenzel Hill, at an elevation of approximately 7,000 feet amsl. Under present authorizations, the eastern portions of the pit have been permitted to a depth of approximately 5,975 feet amsl. The approved pit design results in an ultimate pit floor elevation ranging from 5,975 to 6,500 feet amsl. Portions of both pits have been permitted to allow backfilling with waste rock. Waste rock is placed in designated areas in the Rochester pit, in accordance with the approved Waste Rock Management Plan (WRMP); this has been revised by the Updated Backfill Management Plan (UBMP).

In 2007, the eastern portion of the Rochester pit intercepted groundwater at 5,975 feet amsl, and a small pit lake developed. Areas between the pre-backfilled pit floor and the 6,250-foot amsl are now referred to as the backfill zone. Waste rock classified as non-potentially acid generating (non-PAG) has been amended with lime and placed as backfill in the eastern portion of the Rochester pit; this was to eliminate the potential for a post-mining pit lake. The authorized depth of the western portion of the Rochester pit is above the backfill zone. In accordance with current authorizations, CRI has backfilled the eastern portion of the Rochester pit to an elevation of 6,175 feet.

Groundwater modeling completed by Schlumberger Water Services (SWS) indicates the backfill elevation of 6,175 feet amsl will allow groundwater, at approximately two gallons per minute (gpm), to flow from the backfill zone to the Black Ridge Fault aquifer without degrading Waters of the State (SWS 2012a). Updated groundwater modeling continues to support the assertion that the Rochester pit backfill elevation of 6,175 feet amsl will not degrade Waters of the State (SWS 2015).

In addition to the backfill zone, non-PAG waste rock has been placed in the pit to buttress the southeast high wall, along with construction of a conveyor corridor.

Backfilling the Rochester pit is essentially complete, and no waste rock has been placed above an elevation of 6,175 feet amsl in the backfill zone (i.e., above 6,175 feet amsl), in accordance with the authorized plan of operations. Waste rock classified as potentially acid generating (PAG) is placed in areas outside the backfill zone and above an elevation of 6,250 feet amsl, in accordance with the approved WRMP and UBMP.

The in-pit PAG disposal sites are covered with at least 50 feet of non-PAG waste rock; waste rock with less than or equal to 0.05 percent pyritic sulfur can be placed without adding lime. If the pyritic sulfur content of the cover material is greater than 0.05 percent, the waste rock is amended with lime to achieve an acid neutralization potential/acid generation potential (ANP/AGP) ratio of greater than or equal to three to one (≥3:1).

The Packard pit elevations range from 6,100 feet amsl at the top or project-level elevation to 5,575 feet amsl at the pit bottom. Approximately 9.4 million tons of oxide waste rock was also backfilled into the Packard pit during mine operations. The Packard pit did not intercept groundwater, and placement of the backfill material into the pit has reduced the size and surface disturbance of the Packard RDS.

SRK Consulting (US), Inc. (SRK) reviewed existing geochemical data to determine its adequacy to meet the requirements for this plan amendment. SRK also made an initial evaluation of potential impacts from the temporary stockpiling of PAG waste rock outside of the pit. It concluded that the initial characterization programs that provided the basis for the WRMP are validated and confirmed by subsequent characterization and monitoring. The waste rock characterization programs confirm the total sulfur is a reliable indicator of the acid generating potential of the waste rock material. Therefore, the current classification system as defined in the approved WRMP is sufficiently sensitive to the indicators of metal leaching and acid generation (SRK 2014).

Rock Disposal Sites

RDSs applicable to the Rochester pit are six surface valley-fill dumps including the north, south, east, low grade, west, and Charlie RDSs (**Figure 1-4**); the Packard mine has one RDS. Rock disposal sites are also authorized in both the Rochester and Packard pits. The total authorized disturbance for RDSs is 556 acres on both BLM-administered and private lands.

Heap Leach Pads

The total authorized disturbance for the four authorized HLPs is 569.5 acres on BLM-administered lands.

The Stage I heap leach facility (which includes the heap leach pad and associated components) was constructed in 1986. Mined ore was stacked on the pad through 1990, after which only leaching continued until 1997. Construction of the facility included installing a primary synthetic liner, composed of 80-mil high density polyethylene (HDPE) and a secondary compacted clay liner.

The Stage I heap leach facility covers an area of about 85 acres, containing approximately 24.7 million tons of ore. Ore was placed in 20-foot lifts and stacked to a height of approximately 200 feet. The under-drain collection systems, catch basin east and catch basin west, were designed to capture seasonal spring flows buried beneath the pad and to convey the flows to the process ponds. Flows in the southeast portion of the heap under-drain system were designed to flow southeast to the South American Canyon sump (east of the Stage I heap leach facility). The sump is presently pumped at a rate of approximately three gpm.

Dikes were constructed at both the northern and southern ends of the HLP to contain pregnant solution (solution containing precious metals). The north dike was constructed with a double-walled pipe that conveyed pregnant solution into the main collection ditch. Pregnant solution collected in a cistern just upstream of the north dike then flowed into solution ponds.

In 1991, a fluid management system was installed in Stage I, and use of the drain and solution ponds was discontinued. The fluid management system directs the flow of process solutions throughout the heap leach facility and process system via a series of pipes. CRI began to decommission the Stage I HLP in March 1997 by discontinuing solution application and using draindown solution as makeup water for the remaining leach pads. High-rate evaporative sprinklers were installed to further remove draindown solution.

By October 1997, over 55 million gallons of process solution were removed from the Stage I heap leach facility. It was fully decommissioned in April 1998, at which time all barren solution was diverted to the Stage II and Stage IV HLPs, while draindown solution from Stage I was recycled to the solution management system.

The Stage I heap leach facility has since been recontoured, covered with 10 inches of salvaged soil, and seeded. Historical impacts on groundwater quality from Stage I have been observed since 1990, and remediation is being addressed through the water pollution control permit (WPCP) process.

Historically, the shallow alluvial water-bearing zone (the shallow sediments) near the Stage I heap leach facility and sediments and bedrock north of the process facilities area have been impacted by seepage from the Stage 1 HLP, process ponds, and pipelines. The use of calcium hypochlorite to detoxify cyanide resulting from accidental releases has also impacted the shallow sediments.

Decommissioning the Stage I heap leach facility was finalized in April 1998, and ongoing remediation, such as pumping back solutions, continues. In 2013, the Stage I HLP additional pump-back wells were installed, in accordance with NDEP requirements. Several corrective action plans have been implemented to remedy the elevated concentrations at HLP I. These are described in detail in **Section 2.2.12**, Reclamation.

Most of the Stage II heap leach facility was constructed in 1988, with a primary and a secondary liner. A sand and pipe drainage system between the liners serves as the leak detection system. The primary liner is composed of 80-mil HDPE, while the secondary liner consists of 12 to 24 inches of clay, compacted to between 1×10^{-5} centimeters per second (cm/sec) and 1×10^{-7} cm/sec permeability. Crushed ore and run of mine ore have been stacked onto the Stage II HLP in 20-foot lifts to an ultimate height of approximately 300 feet; the maximum permitted height for the Stage II HLP is 330 feet.

Stage II uses a fluid management system, which directs the flow of process solutions throughout the heap leach facilities and process system without using the pregnant and barren solution storage ponds; the pregnant solution from Stage II is pumped directly into the process facility. The Stage II HLP covers approximately 105 acres, with a capacity of approximately 55 million tons of ore. The Stage II HLP has been regraded to promote side slope leaching and future reclamation.

The Stage III HLP is designed to ultimately contain approximately 67 million tons of ore, with a maximum height of approximately 400 feet above the ground surface. Construction began in 2011 and underwent phased construction through 2013. The Stage III HLP has been constructed with an 80-mil, double-textured HDPE liner, overlying a secondary geo-synthetic clay liner (GCL). A leak detection system was installed between the two liner systems.

Ore is placed on the HLP in lifts ranging from 15 to 30 feet. Benches, approximately 30 feet wide, separate each lift. The surface of each lift is ripped (bulldozers with steel teeth on the back are used to scarify the surface) to facilitate process solution percolation and burial of the drip tube for wildlife protection. As cyanide solution percolates through the ore, the gold and silver in the ore dissolve into solution. The pregnant solution is collected in the underlying solution collection pipe network. It is routed through the buttress into the pregnant solution tank or directly to the process plant, where it is combined with pregnant solution from the Stage II and Stage IV HLPs. The process plant recovers precious metals, using a Merrill-Crowe recovery process (see *Solution Processing Facility* below). Following precious metal recovery at the plant, the barren solution is recycled to the heap leach facilities for reuse in leaching.

Construction and operation of the Stage IV HLP began in 1994. Through a series of expansion phases, it was expanded through 2004 to approximately 222 acres and a permitted height of 330 feet, hosting approximately 113 million tons of ore. The Stage IV HLP and dike sump were constructed with a primary synthetic liner, composed of 80-mil HDPE, and a secondary liner, composed of compacted clay with 1×10^{-6} cm/sec permeability. A leak detection system was installed between the two liner systems.

An under-drain, shallow water collection system was also constructed beneath the secondary liner to drain springs buried by the HLP. Collection structures were placed between the primary and secondary liners (leak detection line [LDL] #1 through LDL #8) and under the secondary liner (under-drain detection line [UDL] #1 through UDL #3). All of these lines report to sumps located east of the Stage IV dike. Portions of the Stage IV HLP have been resloped to accommodate leaching.

Construction included a dike of compacted rock at the Stage IV HLP to contain pregnant solution within the facility. The dike was keyed into bedrock (slot excavated to enhance stability of the facility); it ranges between 50 and 430 feet in base width, with a crest elevation of 5,925 feet amsl. An 80-mil HDPE liner was placed on the upstream side of the dike, facing the heap leach facility. The Stage IV HLP also uses a fluid management system; this directs process solution flows throughout the heap leach facilities and process system without the use of pregnant and barren solution storage ponds. The pregnant solution is either pumped directly into the process facility or is recirculated to the heap leach facility.

Access and Haul Roads

Primary access to the mine is via the Limerick Canyon Road from US Interstate Highway 80 (I-80) at the Oreana-Rochester Exit (Exit 119). Pershing County maintains the County Road from I-80 to the cattle guard at the Limerick Canyon Summit/Spring Valley Pass; CRI maintains and would continue to maintain the road from the cattle guard to the project area throughout the mine's active life and post-mining responsibility period under ROW NVN-042727. The main access road is shown on **Figure 1-4**.

The total authorized disturbance for haul and access roads is 101 acres on both BLM-administered and private lands. The mine contains the north haul road (14 acres) for rock disposal management in the RDS; the southwest haul roads (36 acres) for run-of-mine ore transport access to the Stage II heap leach facility; and the Packard haul road (32 acres), between the Nevada Packard pit and the Rochester site. The mine also has ancillary roads (18 acres) used to access other areas within the mine boundary. Roads are maintained to reduce the potential for water or air erosion and would be reclaimed as part of the closure process.

Ore Crusher

The original ore crushing facilities were installed in 1986. In 1987, a fourth tertiary cone crusher and the scalping screen system were added. In 2003, the crushing circuit was changed to include a new tertiary system, replacing all but the primary and secondary systems. The primary crusher system consists of an apron feeder, a standard grizzly (screen), and a jaw crusher. The secondary crusher system consists of a vibrating grizzly and a cone crusher. The tertiary system consists of two cone crushers. The current maximum permitted throughput is 2,000 tons per hour, averaged over an hour. The crusher is permitted to operate 24 hours per day.

Process Fluid Management

The Stage I HLP is a valley fill design that stores solution in the facility. Originally, draindown solutions reported to the barren solution sump. In 2009, process fluid management was converted to a free draining system. Leaching solutions for the Stage I HLP ceased being applied in 1997. HLP Stages II and IV have valley fill designs that store solutions in each facility.

The Stage III HLP is a valley-fill leach pad constructed without an internal dike system. This facility is designed to be free draining. Because the Stage III HLP will not retain solution behind a dike, it has been designed to include a separate process component, using tanks for primary fluid management, with an external open pond for emergency storage.

Solution Processing Facility

The pregnant solution from the HLPs is clarified one to three times, as necessary, then the oxygen is removed using two de-aerator towers. Zinc dust is added to the solution to precipitate precious metals, which are removed by one of six filter presses.

The metal precipitates are removed from the filter presses, are placed into trays, and then are placed into a retort to remove moisture and extract mercury. Exhaust from the retort is routed through a chiller condenser system where mercury in the vapor phase is condensed into elemental mercury. The elemental mercury is transferred to a designated mercury flask where it is managed and shipped off-site as hazardous waste. Exhaust from the condenser system is transferred to a series of two sulfur impregnated carbon adsorption columns meeting the requirements of the Phase II Mercury Operating Permit to Construct (MOPTC) AP1044-2242.

After the precipitate is dried in the retorts it is mixed with variable concentrations of silica, sodium carbonate, borax, and potassium nitrate before smelting. This precipitate is smelted using a propane-fired reverberatory furnace; slag impurities are skimmed from the top of the molten metal and the final gold and silver doré product is poured from the furnace.

The maximum allowable throughput of CRI's reverberatory furnace is 2.5 tons of precipitate per batch. The furnace may be operated 10 hours per day, not to exceed 3,000 hours per calendar year (in accordance with the Class II Air Quality Operating Permit AP1044-0063.03). In 1994, a wet electrostatic precipitator (WESP) was installed after the existing Venturi scrubber for the reverberatory furnace. The WESP and the existing Venturi scrubber for the reverberatory furnace provide air pollution control for particulate matter ($PM_{2.5}$ and PM_{10}) and mercury of the emissions from the reverberatory furnace. In April 2013, a sulfur-impregnated carbon tray air pollution control device was added to meet the requirements of MOPTC AP1044-2242 for enhanced mercury collection.

Sodium cyanide is transported to the site as solid briquettes. In order for the briquette to be used, barren solution is added, and the dissolved briquette solution is transferred to the storage tank from the delivery trucks.

Liquid cyanide is directly transferred from trucks to the storage tank. Cyanide solution is directly metered into the barren process stream from the storage tank. This system minimizes the exposure potential to both humans and wildlife.

The liquid cyanide is stored west of the process building. Two storage tanks—one with a 10,000-gallon capacity and another with a 21,000-gallon capacity—are on a cement secondary containment area, which drains to the south barren pond. The secondary containment area was designed to drain into the south barren pond should liquid cyanide be released accidentally from the storage tanks. The secondary containment area also houses a storage tank for the dilute cyanide solution. After processing, the dilute cyanide solution, or barren solution, is cycled to the barren tank and is reused in the heap leach process.

Process Solution Ponds

In 1986, CRI built the east and west pregnant ponds, the south barren solution pond, and the north barren solution pond, along with the Stage I heap leach facility. Following installation of the fluid management system in 1991, the east and west pregnant ponds and the south barren pond were no longer needed to contain process solution. They were converted into contingency ponds for emergency solution storage.

In 2011, CRI constructed the Stage III contingency pond/closure e-cell to manage solutions from this facility during emergencies. The capacities of these ponds are as follows:

- East pregnant pond—2.6 million gallons
- West pregnant pond—2.6 million gallons
- South barren pond—2.2 million gallons
- North barren pond—748,000 gallons
- Stage III contingency pond—15.2 million gallons

The east and west pregnant ponds were constructed in 1986 using a synthetic primary liner placed over geonet and geotextile. These ponds were relined in 2011 using 60-mil primary and secondary HDPE liners.

The south barren and north barren ponds were built in 1986 using designs similar to the two pregnant ponds. The north barren pond was rebuilt in 2004 to include an 80-mil HDPE primary liner and geonet over the original synthetic liner. The south barren pond was relined in 2014 with double-synthetic 60-mil HDPE liners. A leak detection system was installed so the ponds could be reintroduced into the heap leach processing circuit and used for closure.

The Stage III pond was constructed using 60-mil HDPE primary and secondary liners; it is used to manage solutions during emergencies. The pond has a separate geonet leak detection system placed between the primary and secondary HDPE liners. As part of the leak detection system, monitoring sumps were installed to detect any solution leakage.

Stormwater and Emergency Management Ponds

Three emergency and stormwater management ponds have been built in the American and South American Canyons and Sage Hen Flats. They provide additional storage capacity during emergencies, such as power outages and extreme storms. The South American Canyon pond was constructed with a compacted clay base, with a permeability of $1x10^{-5}$ cm/sec or less. The Sage Hen Flat pond was divided into two containment areas: north of the process plant area and south of the American Canyon Spring. These ponds also have compacted clay bases with permeability of $1x10^{-5}$ cm/sec or less.

The third pond, east and downgradient of the Stage IV HLP in American Canyon, was constructed with an 80-mil HDPE liner overlying a compacted clay base. It has a capacity of 234,000 gallons and a pump-back system.

Growth Medium and Stockpile Volumes

Growth medium (soil) is used for reclamation and closure. Areas scheduled for disturbance are evaluated for suitable growth medium, which is stripped and stockpiled. Growth medium may also be developed from alternative sources to supplement existing stockpiles. There is a total of 903,000 cubic yards of surveyed growth medium presently stockpiled at the project area, as shown on **Figure 1-4**, Existing Facilities.

Water Use and Conveyance

Mine and ore processing operations require an average of 400,000 gallons per day (gpd) of freshwater, which equates to approximately 344 gpm or 550 acre-feet per annum (afa; SWS 2015). CRI currently holds water rights for 1,927.27 afa from the Buena Vista Valley Hydrographic Basin and 161.3 afa from the Carson Desert Valley Hydrographic Basin. Mine and ore processing operations consist of the following:

- Ore crushing
- Nonpotable water use in the administration building, warehouse, and maintenance shop
- Road dust suppression
- Drill rig water
- Water storage for fire suppression
- Additional makeup water for the heap leach process fluid management system and process plant operations

Freshwater for mine and ore processing is obtained from four production wells in the Buena Vista Valley Hydrographic Basin: PW-1A, PW-2A, and PW-4A (see **Figure 1-4**); PW-3A is used for domestic water supply. The combined approved annual use rate for these four wells is 1,927.27 afa. Freshwater needed for previous mine operations at the Packard Mine was obtained from the Packard production well in the Carson Desert Valley Hydrographic Basin. Water from that well is used only for mine-related operations at the Packard mine area. The annual allowable use from this well is 161.3 afa.

Nonpotable freshwater is pumped from Rochester production wells PW-1A, PW-2A, and PW-4A to water tanks TW-1 and TW-2. TW-1 has a capacity of 145,000 gallons and provides water to the crushing facilities, the maintenance shop, the warehouse building, and the process facilities. TW-2 has a capacity of 350,000 gallons and provides water to the crushing facilities, fire suppression system, water trucks for dust suppression on roads, and drill rigs.

Potable water from PW-3A is pumped through a water treatment plant and potable water tank for distribution to buildings. The potable water system is near the maintenance shop, and the septic system is near the test evaporation cell (TEC). Both the potable water system and the septic system are permitted by the NDEP.

Employment

Mining and ore processing operations are currently conducted in two 12-hour shifts, 24 hours a day, seven days a week, 365 days a year. The average number of employees needed are the following:

- 110 for mining and maintenance
- 72 for crushing and maintenance
- 28 for ore processing
- 36 for laboratory, general staff, and administration

In 2011, the CRI Mine supported an estimated 577 jobs. This included direct mining and contract employment and jobs to support or supply the CRI Mine. In 2011, the mine was either directly or indirectly responsible for an estimated $35.1 million in labor income. That year, CRI paid $2.2 million in taxes, and the portion of sales and use, property, and net proceeds taxes from the CRI Mine was an estimated 8 percent of Pershing County's total revenue. In 2012, the mine employed a monthly average of 58 contractors and paid a combined total of more than $2.5 million in ad valorem and sales and use taxes and more than $2.1 million in net proceeds taxes. As in 2011, a substantial portion of those taxes accrued to Pershing County (Blankenship Consulting LLC 2013).

In 2013, the CRI Mine had 289 full-time employees and 56 contract employees. Based on those levels of direct employment, the mine either directly or indirectly supports an estimated 685 jobs in Pershing County and elsewhere in northern Nevada (Blankenship Consulting LLC 2013).

Power Distribution

Power is supplied by NV Energy via a 60-kilovolt (kV) transmission line that runs through Rochester Canyon (ROW NVN-043389). Power is distributed throughout the site under NV Energy ROWs NVN-065285 and NVN-058336. Power is initially received at the Sage Hen substation and terminates at a second substation at American Canyon. Electrical power exits the substations at the 5-kV level. NV Energy maintains these project area transmission lines and substations. Step-down transformers are at the crushing facilities, the maintenance shop and warehouse building, the process building, and several locations along the Stage III HLP overland conveyor. Motor control centers, which are next to these transformers, supply additional electrical requirements. Auxiliary generators throughout the mine area serve as a backup power supply. Generator fuel is stored on the skids with the generators in secondary containment.

Fuels and Reagents

Bulk fuels and reagents are transported to the project area by licensed vendors via Limerick Canyon Road from I-80 as needed. The primary chemicals and fuels used for mine and ore processing are sodium cyanide, diesel fuel, gasoline, propane, petroleum oils, diatomaceous earth (DE), fluxing reagents, zinc dust, emulsion, ammonium nitrate, and lime (see **Table 1-4**, Fuels and Reagents).

There are two fuel storage facilities at the project area. The first is a 6,000-gallon, unleaded gasoline, aboveground tank. The second, located at the ready-line west of the primary crusher, consists of three aboveground diesel fuel storage tanks, with capacities of 8,000, 10,000, and 50,000 gallons. These tanks are located within a concrete secondary containment unit designed to contain at least 110 percent of the volume of the largest tank.

Auxiliary generators are located throughout the area. Generator fuel is stored on the skids with the generators in secondary containment. Reagents for ore processing are stored within a concrete secondary containment area at the process facility. This area is designed to contain 110 percent of the volume of the largest tank in a 100-year 24-hour storm. A 100-year, 24-hour storm occurs when the total 100-year storm rainfall occurs in a 24-hour period.

Blasting agents and explosives are stored and used on-site, in accordance with the federal Mine Safety and Health Administration (MSHA) and BATFE regulations. Blasting agents and explosives are stored in a security-controlled facility specifically designed for these types of materials.

Table 1-4
Fuels and Reagents

Material	Use	Average Annual Rate of Use	Typical Amount Stored	Storage Method	Type of Containment	Waste Management/ Disposal	Use Location	Hazard Characteristic	Amount per Load
Lime (calcium oxide)	Ore process	12,000 tons	60,000 lbs	Silo	Ground	Spent	Crusher and mine	Caustic	20 tons
Diatomaceous earth	Ore Process	120 tons	111,750 lbs	Pallet	Ground	Spent	Process	None	47 tons
Sodium cyanide (solid or liquid)	Ore process	3,900 tons	40,000 lbs	Tank	Secondary Containment	Spent	Process	Toxic	20 tons
Diesel fuel	Equipment operations	2,500,000 gallons	65,000 gallons	Tank	Secondary Containment	Spent	Mine trucks	Combustible	20 tons
Gasoline	Vehicle operations	88,000 gallons	7,050 gallons	Tank	Secondary Containment	Spent	Light vehicles	Flammable	20 tons
Propane	Heating and ore process	80,000 gallons	30,000 gallons	Tank	Not applicable	Spent	Process facility	Flammable	20 tons
Petroleum oils	Equipment operations	51,000 gallons	5,000 gallons	Tank	Secondary Containment	Recycled off-site	Equipment	Combustible	2,000 lbs
Antifreeze	Equipment operations	1,200 gallons	2,000 gallons	Tank	Secondary Containment	Recycled off-site	Equipment	Toxic	2,000 lbs
Ammonium nitrate	Blasting operations	1,500 tons	40,000 lbs	Silo	Secondary Containment	Spent	Mine	Reactive	20 tons
Anti-scalent	Ore process	5,100 gallons	1,700 gallons	Tank	Secondary Containment	Spent	Process facility	Toxic	7.65 tons
Emulsion	Blasting operations	750 tons	40,000 lbs	Silo	Secondary Containment	Spent	Mine	Reactive	20 tons
Zinc	Ore process	502 tons	200,000 lbs	Barrel	Secondary Containment	Spent	Process facility	Toxic	5,000 lbs
Fluxes/reagents	Ore process	50,000 lbs	25,000 lbs	Barrel	Secondary Containment	Spent	Process facility	Various	2,000 lbs