3.14 Air Quality

The study area for air quality includes the proposed NOA and SOA plan boundaries. The CESA for air quality encompasses the proposed NOA and SOA projects and its corresponding local airshed defined by the Huntington Valley, Newark Valley, Long Valley, and Ruby Valley hydrographic basins. **Figure 3.3-1** illustrates the study area and CESA for air quality. The cumulative impact analysis also includes a discussion of potential visibility impacts to Class I areas located within 200 km of the proposed NOA and SOA projects.

3.14.1 Affected Environment

3.14.1.1 Regulatory Framework

Clean Air Act

The Clean Air Act (CAA), and the subsequent Federal Clean Air Act Amendments of 1990 (CAAA), require the USEPA to identify NAAQS to protect public health and welfare. The CAA and the CAAA established NAAQS for pollutants known as “criteria” pollutants. The ambient standards set for these pollutants satisfy “criteria” specified in the CAA. A list of the criteria pollutants regulated under the CAA and their currently applicable NAAQS set by the USEPA, as revised in 2013, are listed in **Table 3.14-1**.

Air quality is defined by the concentration of various pollutants and their interactions in the atmosphere. Pollution effects on receptors have been used to establish a definition of air quality. Measurement of pollutants in the atmosphere is expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Both long-term climatic factors and short-term weather fluctuations are considered part of the air quality resource because they control dispersion and affect concentrations. Physical effects of air quality depend on the characteristics of the receptors (i.e., location, elevation, and impacts of aerodynamic disturbances), and the type, amount, and duration of exposure. Air quality standards specify acceptable upper limits of pollutant concentrations, averaged over specified intervals. Air pollutant concentrations within the standards generally are not considered to be detrimental to public health and welfare.

The relative importance of pollutant concentrations can be determined by comparison with appropriate NAAQS and state Ambient Air Quality Standards (AAQS) (**Table 3.14-1**). An area is designated by the USEPA as being in attainment for a pollutant if ambient concentrations of that pollutant are below the NAAQS. An area is not in attainment if violations of NAAQS for that pollutant occur. Areas where insufficient data are available to make an attainment status designation are listed as unclassifiable and are treated as being in attainment for regulatory purposes.

Table 3.14-1 National and Nevada Ambient Air Quality Standards

Nevada Standards			National Standards	
Pollutant	**Averaging Time**	**Concentration[1]**	**Primary[1]**	**Secondary[1]**
Ozone (O_3)	8-Hour	0.075 ppm	0.075 ppm	0.075 ppm
Carbon Monoxide (CO)	1-Hour	40,000	40,000	40,000
CO less than 5,000 feet amsl	8-Hour	10,500	10,000	10,000
CO at or greater than 5,000 feet amsl	8-Hour	7,000		

Table 3.14-1 National and Nevada Ambient Air Quality Standards

Nevada Standards			National Standards	
Pollutant	**Averaging Time**	**Concentration[1]**	**Primary[1]**	**Secondary[1]**
Sulfur Dioxide (SO_2)	1-Hour	N/A	197	N/A
	3-Hour	1300	N/A	1,300
	24-Hour	365	N/A	N/A
	Annual Average	80	N/A	N/A
Nitrogen Dioxide (NO_2)	1-Hour[2]	N/A	188	N/A
	Annual Average	100	100	100
Particulate matter with aerodynamic diameter of 10 microns or less (PM_{10})	24-Hour	150	150	150
	Annual Average	50	N/A	N/A
Particulate matter with aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$)	24-Hour	35	35	35
	Annual Average	15	12	15

[1] $\mu g/m^3$ unless otherwise noted.

[2] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.

Source: NDEP 2012a; USEPA 2012a.

Model Selection and Options

According to the Guideline on Air Quality Models (as revised) (40 CFR 51), the AERMOD Model is the preferred model for use in estimating ambient air pollutant concentrations resulting from the emissions of sources such as those within the proposed NOA and SOA projects and with terrain similar to that found within and adjacent to the study area (USEPA 2003). The AERMOD model used in this analysis (version 12345) includes the Plume Rise Model Enhancement downwash algorithms that are used to calculate plume downwash from stack emissions caused by wind flowing over and around nearby buildings.

U.S. Environmental Protection Agency's $PM_{2.5}$ Screening Level Guidance

In March, 2010, the USEPA issued a guidance memorandum (USEPA Guidance) on "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS" (USEPA 2010a). The USEPA Guidance provides recommendations on two aspects of $PM_{2.5}$ modeling procedures. First, it addresses the demonstration that must be made in order for a source or a permitting authority to rely on the USEPA's policy that allows for a PM_{10} air quality analysis to serve as a surrogate for a $PM_{2.5}$ air quality analysis. The second part of the USEPA Guidance provides additional information on modeling procedures to demonstrate compliance with $PM_{2.5}$ NAAQS without relying on the PM_{10} surrogate policy by creating a conservative "screening level analysis" for evaluating compliance with the $PM_{2.5}$ NAAQS. The USEPA Guidance explains that the rationale for the coarse screening level analysis is premised primarily on the assumption that a modeling analysis would be performed for only direct $PM_{2.5}$ emissions and would not include air quality impacts associated with $PM_{2.5}$ precursors (oxides of nitrogen [NO_X] and SO_2) which may result in secondary $PM_{2.5}$ impacts. Certain assumptions are made in the screening level analysis, presumably to offset the lack of an explicit calculation or modeling of secondary $PM_{2.5}$ emissions.

Annual $PM_{2.5}$ National Ambient Air Quality Standards

The screening level analysis described in the USEPA Guidance for evaluating compliance with the annual $PM_{2.5}$ NAAQS recommends that the "annual design value" accounting for background concentration should be added to the highest modeled annual average concentration. The "annual design value" is determined from a 3-year average of the annual average $PM_{2.5}$ concentrations based on monitored data. The screening level analysis used the annual background value of 2.4 $\mu g/m^3$.

24-hour $PM_{2.5}$ National Ambient Air Quality Standards

The screening level analysis described in the USEPA Guidance for evaluating compliance with the 24-hour $PM_{2.5}$ NAAQS recommends that the monitored 24-hour design value should be added to the maximum modeled 24-hour average concentration. In other words, the USEPA Guidance recommends use of the highest modeled value or 1st high, rather than the 8th highest value which is normally selected for compliance modeling when AERMOD is used.

The USEPA Guidance recommends that the modeled concentration be added to the monitored "design value." The 24-hour design value is defined as the 3-year average of the 98th percentile 24-hour average $PM_{2.5}$ concentration. This screening level analysis for 24-hour impacts used a background value of 7 $\mu g/m^3$.

Air Quality Related Values

Federal Land Managers (FLMs) responsible for managing Class I areas, such as wilderness areas and national parks, are concerned with potential impacts from nearby activities on air quality related values (AQRVs) such as, visibility impairment, ozone effects on vegetation, and effects of pollutant deposition on soils and surface waters. For each of these areas of concern, FLMs' air quality guidance recommends that a screening test be applied for proposed sources greater than 50 km from a Class I area to determine whether or not any further analysis is necessary. No Class I areas are located less than 50 km from the proposed NOA and SOA projects. The screening test considers a source located greater than 50 km from a Class I area to have negligible impacts with respect to Class I AQRVs if its total SO_2, NO_X, PM_{10}, and sulfuric acid (H_2SO_4) annual emissions (in tpy, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I area (Q/D) is 10 or less. Based on their guidance, FLMs would not request any further Class I AQRV impact analyses from such sources as impacts are anticipated to be negligible (USFS 2010).

Applicable Regulations for Mercury

Mercury is included on the federal list of HAPs, which has been adopted by reference in the Nevada air quality regulations. Nevada air quality regulations (NAC 445B.349) prohibit the "discharge into the atmosphere from any stationary source of any hazardous air pollutant or toxic regulated air pollutant that threatens the health and safety of the general public, as determined by the director." Mercury emissions associated with precious metals operations are regulated and controlled pursuant to the Nevada Mercury Control Program (NAC 445B.3611-3689 Nevada Mercury Control Program).The USEPA has issued a final rule on National Emissions Standard for HAPs (NESHAPs) for gold mines and gold processing facilities (40 CFR 63 Subpart EEEEEEE). The rule establishes NESHAPs for mercury emissions from gold ore processing facilities.

Mercury is a hazardous air pollutant but is not considered a criteria pollutant, and no NAAQS have been established under the CAA for mercury. Hazardous air pollutants are controlled through emissions limits at the source rather than ambient air concentrations.

3.14.1.2 Air Quality in the Study Area

Nevada is characterized by a series of mountain ranges separated by broad valleys. The eastern part of the state has an average elevation ranging from 5,000 and 6,000 feet amsl. Nevada has several mountain ranges; most of them are 50 to 100 miles long, running generally north-south. Nevada has

great climatic diversity, ranging from scorching lowland desert in the south to cool mountain forests in the north. Its varied and rugged topography, mountain ranges, and narrow valleys range in elevation from approximately 1,500 to more than 10,000 feet amsl. Large local variations of temperature and rainfall are common. The principal climatic features are bright sunshine; low annual precipitation (averaging less than 9 inches in the valleys and deserts); heavy snowfall in the higher mountains; clean, dry air; and exceptionally large daily ranges of temperature.

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

The existing air quality of the study area is typical of the largely undeveloped regions of the western U.S. For the purposes of statewide regulatory planning, this area has been designated as in attainment for all pollutants that have an AAQS (ambient concentrations of criteria pollutant are below the AAQS).

No areas in Nevada are currently designated as nonattainment of the $PM_{2.5}$ standard. There is a lack of sufficient data to develop a comprehensive emissions inventory for $PM_{2.5}$ from mine sources; nevertheless, an acceptable approach for assessing primary $PM_{2.5}$ emissions from fugitive dust sources is to use a percentage of the PM_{10} emissions.

A recent study conducted by the Midwest Research Institute for the USEPA recommends that the $PM_{2.5}/PM_{10}$ ratios for fugitive dust should be in the range of 0.1 to 0.15 (Midwest Research Institute 2006). It is recommended that the results of this study be used to revise the AP-42 $PM_{2.5}$ emission factors for the following four fugitive dust source categories: paved roads, unpaved roads (public and industrial), aggregate handling and storage piles, and industrial wind erosion. Emission estimates for other fugitive dust producing activities, such as construction and demolition, also would be affected since they are based on these four source categories.

3.14.1.3 Background Values for Criteria Pollutants

As shown in **Table 3.14-2**, there is no on-site monitoring within the study area; therefore, the background concentrations are adopted from other USEPA/NDEP monitoring stations in the vicinity. Under a previous AECOM monitoring project, an ambient air monitoring tower was installed near Valmy, Nevada. This is the best, closest data available, and will be the source of background concentrations in the vicinity. For PM_{10} and $PM_{2.5}$ background concentrations, data were obtained from the National Park Interagency Monitoring of Protected Visual Environments (IMPROVE) Great Basin National Park monitoring station.

3.14.1.4 General Climate and Meteorology

Three important meteorological factors influence the dispersion of pollutants in the atmosphere: mixing height, wind (speed and direction), and stability. Mixing height is the height above ground within which rising warm air from the surface would mix by convection and turbulence. Local atmospheric conditions, terrain configuration, and source location determine dilution of pollutants in this mixed layer. Mixing heights vary diurnally, with the passage of weather systems, and with season. For the study area, the mean annual morning mixing height is estimated to be approximately 1,000 feet above ground level (AGL); however, during the winter months the mean morning mixing height is approximately 80 feet AGL (Holzworth 1972). The mean annual afternoon mixing height exceeds 7,400 feet AGL.

Table 3.14-2 Background Concentrations

Pollutant	Averaging Period	Highest Measurement ($\mu g/m^3$)	Available Data	Monitoring Site	Reference
CO	1-Hour 8-Hour	1,265 1,150	2009	New Valmy, Humboldt County, Nevada	New Valmy
NO_2	Annual	51	2009	New Valmy, Humboldt County, Nevada	New Valmy
$PM_{2.5}$	24-Hour Annual[1]	34 3	2008 - 2010	Great Basin National Park, White Pine County, Nevada	IMPROVE Data
PM_{10}	24-Hour[2] Annual	60 6	2008 - 2010	Great Basin National Park, White Pine County, Nevada	IMPROVE Data
SO_2	3-Hour 24-Hour Annual	18.0 8.0 3.5	2009	New Valmy, Humboldt County, Nevada	New Valmy

[1] 3-year average of the weighted annual mean measurements.

[2] 2nd high 24-hour measurement.

Source: IMPROVE 2014.

Because of the typically dry atmosphere, bright sunny days and clear nights frequently occur in the study area. This in turn allows rapid heating of the ground surface during daylight hours and rapid cooling at night. Since heated air rises, and cooled air sinks, winds tend to blow uphill during the daytime and down slope at night. This upslope and down slope cycle generally occurs in all the geographical features, including mountain range slopes and river courses. The volume of air affected is dependent on the area of the feature; the larger the horizontal extent of the feature, the greater the volume of air that moves in the cycle. The complexity of terrain features cause complex movements in the cyclic air patterns, with thin layers of moving air embedded within the larger scale motions. The lower level, thermally driven winds also are embedded within larger scale upper wind systems (i.e., synoptic winds). Synoptic winds in the region are predominantly west to east, characterized by daily weather variations that enhance or diminish the boundary layer winds, and significantly channeled by regional and local topography.

Wind speed has an important effect on area ventilation and the dilution of pollutant concentrations from individual sources. Light winds, in conjunction with large source emissions, may lead to an accumulation of pollutants that can stagnate or move slowly to downwind areas. During stable conditions, downwind usually means down valley or toward lower elevations. Climate data from Elko indicate that the potential for air pollution episodes to last 5 or more days is nearly zero (Holzworth 1972). A potential air pollution episode is defined as a period of time with wind speeds less than 4 miles per hour and mixing heights less than 3,300 feet.

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

The precipitation climate in the vicinity of the study area is classified as arid with elevations below 6,500 feet receiving the least amount of precipitation, 5 to 9 inches per year is common, while the mountainous areas are significantly wetter, receiving 11 to over 16 inches of precipitation annually. An arid climate is characterized by low rainfall, low humidity, clear skies, and relatively large annual and diurnal temperature ranges.

3.14.1.5 Class I Area Visibility Study

The boundary of Jarbidge Wilderness, a Class I area, is approximately 180 km to the north of the proposed NOA and SOA projects. Class I areas are protected by FLMs who manage AQRVs such as visibility and atmospheric deposition. Though not a regulatory program under Prevention of Significant Deterioration (PSD), FLMs review the issuance of a PSD permit for any impacts that exceed guideline thresholds for these parameters. In addition to analysis of the visibility and atmospheric deposition, the change in the acid neutralizing capacity of sensitive lakes is assessed by FLMs. The FLMs consider a source located greater than 50 km from a Class I area to have negligible impacts with respect to Class I AQRVs if its total SO_2, NO_X, PM_{10}, and H_2SO_4 annual emissions (in tpy, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I area (Q/D) is 10 or less. The agencies would not request any further Class I AQRV impact analyses from such sources. In general, the Federal Land Managers' Air Quality Related Values Work Group (FLAG) recommends that an applicant apply the Q/D test (FLAG 2010) for proposed sources greater than 50 km from a Class I area to determine whether or not any further visibility analysis is necessary. Visibility impacts are assessed as part of the environmental consequences analysis, determining the overall impact of future emissions on air, water, and land environments.

3.14.1.6 Climatology Data

Average temperatures at the both the Elko ASOS station and the Alligator Ridge Remote Automatic Weather Station range from about 25°F in January to the 80s (°F) in July and August. **Table 3.14-3** shows the maximum, average, and minimum temperatures at the stations during the period of record (please see note #1 below tables). Summers are typically hot and dry except in the higher mountain ranges. The average annual precipitation is approximately 9.9 inches at the Elko site, and 5.5 inches at the Alligator Ridge site. Average relative humidity ranges from a low of 35 percent in the summer to a high of 69 percent in spring (NOAA 2012). Net evaporation exceeds precipitation in the study area.

Table 3.14-3 Monthly Climate Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Monthly Climate Summary – Elko, Nevada[1]													
Average Max. Temperature[2]	36.3	41.4	51.6	59.4	69.2	80.0	90.3	88.5	78.5	64.5	48.2	37.2	62.2
Average Min. Temperature[2]	13.9	18.4	26.2	31.0	37.6	44.4	50.1	47.9	39.1	28.7	21.2	14.7	31.2
Average Temperature[2]	25.1	29.9	38.9	45.2	53.4	62.2	70.2	68.2	58.8	46.6	34.7	26.0	46.7
Average Total Precipitation[3]	1.12	0.84	1.00	0.97	0.96	0.65	0.37	0.37	0.57	0.75	1.11	1.20	9.91
Average Total Snow Fall[3]	7.8	4.6	3.8	1.8	0.5	0.0	0.0	0.0	0.0	0.5	3.2	6.4	28.7
Average Snow Depth[3]	2	1	0	0	0	0	0	0	0	0	0	1	0

Table 3.14-3 Monthly Climate Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Monthly Climate Summary – Alligator Ridge, Nevada[1]													
Average Max. Temperature[2]	39.2	41.2	48.9	54.6	64.9	75.8	86.1	84.0	75.1	61.6	47.7	38.5	60.0
Average Min. Temperature[2]	20.9	22.2	27.6	32.4	40.6	49.5	58.3	56.3	47.8	37.2	26.8	19.8	36.5
Average Temperature[2]	29.2	30.9	37.8	43.3	53.0	63.2	72.6	70. 5	61.2	48.6	36.2	28.2	47.8
Average Total Precipitation[3]	0.33	0.39	0.50	0.67	0.79	0.60	0.44	0.39	0.38	0.64	0.29	0.22	5.66
Average Total Snow Fall[3]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average Snow Depth[3]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1] Meteorological data recorded from January 1, 1981 to December 31, 2010.

[2] °F.

[3] Inches.

Source: WRCC 2012b.

3.14.1.7 Evaporation

Climate studies measure evaporation from an exposed water surface contained in a large pan. No pan evaporation data have been collected in the proposed NOA and SOA projects. In order to estimate evaporation, WRCC pan-evaporation data from other sites across Nevada were used and interpreted to estimate pan evaporation. The WRCC has pan-evaporation values available for 11 stations in Nevada. The pan evaporation rates range from a low 51.2 inches per year at the Beowawe University of Nevada Ranch Station to a high of 116 inches per year at the Boulder City site (WRCC 2008).

Five pan-evaporation stations with climatic characteristics similar to the study area are listed in **Table 3.14-4**. The Ruby Lake Station, which lies about 10 miles north northeast of the study area, was considered to be the most directly comparable setting to the Bald Mountain mining areas. Accordingly, the Ruby Lake site pan-evaporation value of about 51.5 inches per year has been used for the study area.

To determine actual shallow-pool evaporation, the pan-evaporation is multiplied by a factor of 0.70. This results in an estimated open-water evaporation rate of about 46.5 inches per year.

Table 3.14-4 Comparison of Pan-evaporation Rates at Selected Nevada Sites

Station	Mean Annual Temperature[1]	Elevation[2]	Pan Evaporation[3]
Ruby Lake	46.7	6,010	51.5
Beowawe University of Nevada Ranch	46.7	5,750	51.2
Fallon Experiment	51.2	3,970	62.5
Rye Patch Dam	50.7	4,160	59.4
CNFL	45.2	5,960	66.4

[1] °F.

[2] feet amsl.

[3] inches per year.

Source: WRCC 2012b.

3.14.2 Environmental Consequences

This section discusses project related impacts to air quality resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to air quality include the exceedence of NAAQS within the local or regional area impacted by total project pollutant emissions.

3.14.2.1 Proposed Action

Potential Sources of Air Pollutants

The subsequent air quality analysis includes the following categories of potential sources of air pollutants within the NOA and SOA projects:

- Process emission sources (i.e., lime silos, refining, emergency generators, etc.);
- Insignificant sources (i.e., prill silos, boiler, building heaters, storage tanks, etc.); and
- Other particulate and gaseous emission sources (e.g., point, mobile and area sources) and windblown fugitive and reentrained dust resulting from vehicular traffic (i.e., drilling; blasting; material loading, unloading, and hauling; dozing; grading; wind erosion of exposed surfaces such as open pits, rock disposal areas, overburden storage, tailings, borrow pits, and GMSs and mobile and stationary internal combustion engine exhausts; etc.).

Open Pit Mining and Hauling

The mining process would use standard open pit mining techniques of drilling, blasting, loading, and hauling of ore and waste. Waste rock would be removed from the open pit by blasting with ammonium nitrate and fuel oil explosive (ANFO), loaded by front-end loaders or shovels into haul trucks, and hauled to a nearby RDA. Leach material would then be mined by similar methods: the ore would be drilled, blasted with ANFO, loaded into haul trucks, and hauled to a nearby HLF.

Leaching and Carbon Adsorption

Prior to placement on the heap leach pad, lime would be added to the ore to adjust the pH for leaching. Lime would be stored in silos near each leach pad area. Emissions from silo loading would be controlled by vent filters, and silo discharge to the dosing hoppers would be controlled by enclosures. The transfer of lime from the hoppers to the ore trucks would be controlled by best operating practices.

Carbon Stripping and Electrowinning

Heat for the strip solution would be provided by a propane-fired boiler that has emissions of criteria pollutants and HAPs. From the pressure strip vessel, the pregnant strip solution would be sent to the Electrowinning (EW) cells with potential emissions of mercury. Mercury emissions from the EW cells and barren tank would be controlled by a carbon adsorption filter.

Retorting and Melting

The precious–metal-bearing material from the EW cells would first be retorted to remove mercury and then refined in the furnace. The propane-fired retort would remove mercury by heating the material until the mercury vaporizes. The mercury vapor would be cooled, condensed, and collected as a liquid. The gases exiting the retort condenser would be passed through a carbon filter to remove residual mercury before being released to the atmosphere.

After retorting, the precious-metal-bearing material would be transferred to the propane-fired furnace, where it would be heated with flux that separates impurities from the gold to produce doré bars. Emissions from the furnace would pass through a baghouse and carbon adsorption filter prior to release to the atmosphere.

Carbon Reactivation

After repeated use, the carbon used in the gold recovery process loses efficiency and requires reactivation. To reactivate the carbon, it would be heated in a propane-fired reactivation kiln to remove impurities. The air emissions from the kiln would be controlled by an off-gas cooler and carbon adsorption filter.

Reagent Storage and Ancillary Equipment

A fuel bay would be located near each truck shop, and diesel tanks would be located near the main process areas. Ammonium nitrate prill would be stored onsite in storage silos. Barrick also would maintain emergency generators at the process plants, HLFs, and other essential areas; and operate several propane-fired building heaters.

Air Pollutants

The subsequent air quality analysis includes modeled potential emissions from the Proposed Action for the following air pollutants and the averaging periods for the corresponding NAAQS:

- CO: 8-hour and 1-hour averaging periods;
- NO_2: annual and 1-hour averaging periods;
- $PM_{2.5}$: annual and 24-hour averaging periods;
- PM_{10}: 24-hour averaging period; and
- SO_2: 3-hour and 1-hour averaging periods.

Emissions and Source Characterization

For the pollutants included in the air quality dispersion modeling analysis, the estimated facility-wide potential annual emissions (tpy) are presented in **Table 3.14-5**.

Table 3.14-5 Facility-wide Potential Emissions from the Proposed Action by Source Category

Source Category	$PM_{2.5}$ (tpy)	PM_{10} (tpy)	CO (tpy)	NO_X (tpy)	SO_2 (tpy)	VOC* (tpy)
Process	5.64	10.06	34.07	49.27	0.42	10.22
Insignificant	2.58	2.58	8.35	14.47	1.77	4.78
Fugitive	154.64	764.61	3,284.14	1,816.11	1.70	280.99
Facility Total	162.86	777.26	3,326.56	1,879.85	3.89	295.99

* = volatile organic compound.

Source: Air Sciences 2013a.

Air Quality Dispersion Modeling Analysis

AAQS are maximum concentrations of pollutants in ambient air that are considered protective of the public health. These standards are established by environmental regulatory authorities for air pollutants with known human health effects or that would adversely impact the environment. The estimated total ambient concentrations (modeled concentrations plus applicable background concentrations) from this analysis were compared with the NAAQS for compliance demonstration.

Modeling Assumptions

The dispersion model calculates ambient concentrations for each hour of the modeled time period, and thus appropriate hourly emission rates must be calculated for each modeled source for each modeled time period. The dispersion modeling assumed an operational and facility configuration that simulated a realistic operational maximum scenario. Assumptions include:

- Full production for the maximum production year;
- Heap leach pads and waste rock dumps to be built to one-half of their full proposed heights;
- Open pits to be at their full depth, which results in the maximum potential emissions from the haul trucks;
- The modeled short-term emission rates for the process and insignificant sources were derived from the maximum design hourly process rates;
- The long-term emission rates were derived using the maximum hourly process rates and estimated annual utilization factors; and
- The modeled emission rates for the fugitive sources were determined using annual activity rates for the maximum production year (Air Sciences 2013a).

Unlike process sources, emissions from fugitive sources (e.g., drilling, blasting, material loading, unloading, hauling, dozing, grading, wind erosion of exposed surfaces, and mobile machinery tailpipes) are represented by appropriate activity locations to account for the spatial nature of these activities.

The modeled maximum concentrations and the estimated total ambient concentrations (modeled concentrations plus background concentrations) and their comparison with the applicable NAAQS are presented in **Table 3.14-6**. Highest concentrations are generally found at or near the site boundary.

Table 3.14-6 Highest Modeled Air Pollutant Concentrations from the Proposed Action

Pollutant and Averaging Time	Dispersion Modeling Results ($\mu g/m^3$)	Background ($\mu g/m^3$)	Dispersion Modeling Results with Background ($\mu g/m^3$)	Ambient Standard ($\mu g/m^3$)
CO 8-Hour	168.9	0	168.9	10,000
CO 1-Hour	964.0	0	964.0	40,000
NO_2 1-Hour	79.1	0	79.1	188
NO_2 Annual	4.2	0	4.2	100
PM_{10} 24-Hour	9.9	10.2	20.1	150
$PM_{2.5}$ 24-Hour	9.7	7.0	16.7	35
$PM_{2.5}$ Annual	0.6	2.4	3.0	12
SO_2 3-Hour	1.4	0	1.4	1,300
SO_2 1-Hour	2.2	0	2.2	196

Source: Air Sciences 2013a.

The estimated maximum predicted total ambient concentrations resulting from implementation of the Proposed Action are all below the applicable NAAQS for all the pollutants and averaging periods. Please note that for $PM_{2.5}$, the impact analysis followed the recommendations in the USEPA Guidance which yields a screening level analysis that indicates that the Proposed Action is not expected to cause or contribute to a violation of the 24-hour and annual averaging period $PM_{2.5}$ NAAQS.

Hazardous Air Pollutant Emissions

HAP emissions are primarily created from the combustion of fuel, storage of process chemicals, as constituents of the fugitive dust generated by mining processes, and as fugitive emissions from open pits, HLFs, and RDAs. The air pollution sources at the existing/authorized NOA and SOA have an estimated facility-wide potential to emit 10.39 tpy of all HAPs combined. The highest single HAP is hydrogen cyanide at 6.44 tpy.

Process and fugitive mercury emissions were estimated for the Proposed Action as a part of the HAP emission analysis. Mercury emissions from the refinery sources were estimated using the general industry Nevada Maximum Achievable Control Technology emission limits and the exhaust flow rate for each source. Mercury emissions from fugitive dust were calculated using the average mercury concentration in the ore and waste and the total particulate emissions generated from mining processes.

Fugitive mercury emissions caused by the naturally occurring mercury in the ore and waste volatilizing after extraction were calculated using mercury flux data collected by the University of Nevada, Reno, from the Cortez-Pipeline Mine (Eckley et al. 2010). The mercury flux measurements from the Cortez-Pipeline Mine were taken from low-grade ores containing an average of 0.87 ppm of mercury, and waste containing an average of 0.56 ppm of mercury (Eckley et al. 2010). The whole rock analysis conducted for the Waste Rock Management Plan showed that the average mercury concentration in the ore and waste at the existing BMM is 0.51 ppm. Therefore, the flux rates measured from the Cortez-Pipeline waste rock dump, leach pads, and pit, were used to estimate fugitive mercury emissions from the existing BMM. The rate of mercury emissions were then used to extrapolate total emissions from the existing BMM to calculate emissions from the Proposed Action. Based on the total surface area of the proposed RDAs, active and inactive HLFs, and open pits, the Proposed Action has a potential to emit 80.73 pounds of fugitive mercury emissions annually from volatilization from rock disposal areas, active

and inactive heap leach pads, and pits annually, and 3.64 pounds of mercury emissions annually from process sources (total 84.37 lb/yr or 0.042 tpy).

Air Sciences, Inc. prepared a Technical Memorandum for Barrick Gold North America (Air Sciences 2015) regarding Bald Mountain Mine Mercury Deposition, from which the following was taken:

The USEPA conducted computer simulation modeling using the Regional Modeling System for Aerosols and Deposition (REMSAD), to quantify the contributions from specific sources and source categories to mercury deposition in each of the lower 48 states. The latest version of this modeling was conducted in 2008 and was discussed in USEPA's report titled "Model-Based Analysis and Tracking of Airborne Mercury Emissions to Assist in Watershed Planning" (USEPA 2008). This deposition rate was based on a modeled mercury emission rate of 204.30 pounds per year (lb/yr), which was taken from the 2006 calendar year mercury emissions reported to the NDEP.

USEPA's REMSAD modeling analysis estimated a mercury deposition rate from the Bald Mountain Mine of 0.775 grams per square kilometer per year (g/km^2-yr) in the neighboring South Fork Humboldt hydrographic area. The process and fugitive mercury emissions from the proposed expansion project are 84.37 lb/yr. The mercury deposition rates associated with this lower emission rate can be estimated based on a simple scaling of the 2008 REMSAD modeling as follows:

$$0.775 \text{ g/km}^2\text{-hr}) * (84.37 \text{ lb/yr} / 204.30 \text{ lb/yr}) = 0.320 \text{ g/km}^2\text{-hr}$$

The resultant value represents 2.1 percent of the global background mercury deposition for the area; (e.g., deposition of mercury emissions within the project area from sources outside the U.S., Canada, and Mexico).The corresponding deposition rates for the Long-Ruby Valleys and the Little Smoky-Newark hydrographic areas were similarly estimated at 0.279 g/km^2-hr (1.7 percent of background) and 0.035 g/km^2-hr (0.2 percent of background), respectively. The contribution of mercury emissions from the Bald Mountain Mine to watersheds more distant from the mine than these three areas would be 0.2 percent of background, or less.

Air Quality Related Values

The annual emissions of SO_2, NO_X, H_2SO_4, and PM_{10} are used to derive the potential AQRV impacts as a result of the Proposed Action as shown in **Table 3.14-7**. This approach provides a conservative analysis of potential impacts to Class I areas since it includes the pollutants of interest to the FLM, and is calculated using the highest 24-hour emission rates as if those highest emissions occurred every hour of the day for a full year.

Table 3.14-7 Facility-wide Potential Emissions by Pollutant

Pollutant	Operations (tpy)[1]
SO_2	3.89
NO_X	1,816.11
H_2SO_4	0
PM	777.26
Total	**2,597.26**

[1] Annual emissions (tpy) are based on the potential to emit at the highest hourly rates and conservatively assumes 8,760 hours per year.

Jarbidge Wilderness, a Class I area, is located approximately 180 km north of the mine site. A source located greater than 50 km from a Class I area is deemed to have negligible impacts with respect to Class I AQRVs if its total SO_2, NO_X, PM_{10}, and H_2SO_4 annual emissions (in tpy, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I area (Q/D) is 10 or less.

The Q/D test is calculated based on 2,597.26 tpy total emissions divided by 180 km resulting in a ratio of 14.4. Since this indicates there is a small potential that emissions from the Proposed Action would have impacts on visibility or other air quality related values at a Class I area, an additional air dispersion modeling analysis was conducted to assess air quality concentrations from the Proposed Action at Jarbidge (Air Sciences 2013b). This analysis used the same inputs and approaches described above for the criteria modeling analysis. AERMOD was run with three receptors at the southern boundary of the Jarbidge Wilderness, the closest portion of the Class I area relative to the BMM. Each of the receptors had the same coordinate location, but a different elevation. These receptors represent the elevation profile of the entire Jarbidge Wilderness Class I area (lowest, average, and highest elevations). The resultant maximum concentrations were shown to be less than the Class I significant impact levels (SILs). The SILs are concentrations below which impacts are deemed to be *de minimis*.

Air emissions, including point and fugitive sources, would be controlled in accordance with the air quality operating permits for the proposed NOA and SOA projects and with present BMPs. BMPs include use of dust abatement techniques on unpaved, unvegetated surfaces to minimize airborne dust; maintenance of equipment to ensure proper function; post and enforce speed limits; use of dust abatement techniques before and during surface clearing, excavation, or blasting activities; and compliance with NDEP air permit.

3.14.2.2 North and South Operations Area Facilities Reconfiguration Alternative

The Reconfiguration Alternative, as described in detail in Chapter 2.0, Section 2.5.1, is limited to those aspects of the alternative that differ from the previously described Proposed Action. Additionally, all applicant-committed measures described for the Proposed Action would, as applicable, be required for the Reconfiguration Alternative.

Under the Reconfiguration Alternative, the total estimated surface disturbance for the NOA and SOA projects would be approximately 5,668acres. With consideration of the 1,934 acres of existing authorized disturbance that would not be constructed under the Reconfiguration Alternative, implementation of this alternative would result in a reduction of 3,352 acres (47 percent) of surface disturbance in comparison to the Proposed Action.

Under the Reconfiguration Alternative, operation levels would be similar to the Proposed Action, but with a reduced life of mine of 10 years compared with 20 years for the Proposed Action. Emissions during the period of operation would be similar to the Proposed Action. Accordingly, potential impacts to air quality during operation would be the same as described for the Proposed Action.

3.14.2.3 Western Redbird Modification Alternative

The WRM Alternative, as described in detail in Chapter 2.0, Section 2.5.2, is limited to those aspects of the alternative that differ from the previously described Reconfiguration Alternative. Additionally, all applicant-committed measures described for the Reconfiguration Alternative would, as applicable, be required for the WRM Alternative.

Under the WRM Alternative, the total estimated surface disturbance for the NOA and SOA projects would be approximately 5,266 acres. With consideration of the 2,169 acres of existing authorized disturbance that would not be constructed under the WRM Alternative, implementation of this alternative would result in a reduction of 636 acres of surface disturbance in comparison to the Reconfiguration Alternative.

Under the WRM Alternative, operation levels would be similar to the Reconfiguration Alternative, but with reduced disturbances in the Redbird Pit area and Numbers Complex Pit area. Emissions during the period of operation would be similar to the Reconfiguration Alternative. Accordingly, potential impacts to air quality during operation would be the same as described for the Reconfiguration Alternative.

3.14.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to air quality would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. Under the No Action Alternative, construction of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized.

3.14.2.5 Cumulative Impacts

The 2,070,999-acre CESA for air quality consists of the Huntington Valley, Newark Valley, Long Valley, and Ruby Valley hydrographic basins (**Figure 3.3-1**). Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

Past and present actions have resulted, or would result, in approximately 30,372 acres of total surface disturbance within the air quality CESA. The total quantifiable surface disturbances are related to mining, oil and gas development, wind energy development, exploration, land, road, and utility corridor development, agriculture, livestock grazing; residential developments, and other county and government actions. RFFAs proposed within the air quality CESA include, but are not limited to, the following: mining-related actions (totaling 2,549 acres), oil and gas lease sales within the Long, Ruby, and Huntington valleys (acreage unknown), vegetation treatments (totaling 56,572 acres), and implementation of the USFWS Ruby Mountain NWR CCP.

The types and quantities of mobile equipment used in the Proposed Action would be similar to the existing mine operations, resulting in similar emissions of criteria air pollutants from internal combustion engines. For particulates, the Proposed Action would increase disturbance by an additional 7,097 acres and remove 11 acres of existing authorized disturbance from the 30,372 acres of past and present disturbance resulting in a total cumulative disturbance of approximately 96,939 acres (5 percent of the total air quality CESA). The Reconfiguration Alternative incrementally would increase disturbance by an additional 5,668 acres and remove 1,934 acres of existing authorized disturbance from resulting in a total cumulative disturbance of approximately 93,587 acres (5 percent of the total air quality CESA). The WRM Alternative incrementally would increase disturbance by an additional 5,266 acres and remove 2,169 acres of existing authorized disturbance from past and present disturbance resulting in a total cumulative disturbance of approximately 92,950 acres (4 percent of the total air quality CESA). Under the No Action Alternative, cumulative impacts to air quality would be the same as those described in the *Final Environmental Impact Statement for the Bald Mountain Mine North Operations Area Project* (BLM 2009a) and *Environmental Assessment for the Mooney Heap and Little Bald Mountain Expansion Project* (BLM 2011a).

Cumulative impacts to air quality would include impacts from the proposed project emission sources in combination with impacts from nearby emission sources that are accounted for in the background levels added to the modeled impacts. Increases in surface disturbance affect the emissions and impacts of particulates ($PM_{2.5}$ and PM_{10}).

<u>Mercury and Mercury Emissions</u>

Mercury emissions to the atmosphere come from both background and man-made or anthropogenic sources. Background sources of mercury include natural sources such as naturally enriched soils and volcanoes. There are both global and local anthropogenic sources of mercury. When bound in mineral

forms that typically appear in ore (e.g., cinnabar), mercury is a stable compound that remains in solid form. Ore processing has the potential to liberate mercury from these stable minerals by dissolving it in process solutions. Because it has a boiling point of 675°F, mercury has the potential to volatilize into a gaseous form when subjected to thermal processes in a recovery and refining circuit.

Mercury is not considered a criteria pollutant, and no NAAQS have been established under the Clean Air Act Amendments for mercury. Mercury is included on the federal list of HAPs, which has been adopted by reference in the Nevada air quality regulations. Nevada air quality regulations (NAC 445B.349) prohibit the "discharge into the atmosphere from any stationary source of any hazardous air pollutant or toxic regulated air pollutant that threatens the health and safety of the general public, as determined by the director." The USEPA has issued a final rule on National Emissions Standard for HAPs (NESHAPs) for gold mines and gold processing facilities (40 CFR 63 Subpart EEEEEEE). The rule establishes NESHAPs for mercury emissions from gold ore processing facilities. HAPs are controlled through emissions limits at the source rather than ambient air concentrations. Mercury emissions associated with precious metals operations are also regulated and controlled pursuant to the Nevada Mercury Control Program (NAC 445B.3611-3689 Nevada Mercury Control Program).

Climate Change

Scientific research has identified the potential impacts of anthropogenic GHG emissions and changes in biological carbon sequestration due to land management activities on global climate. More recent reporting of trends in global mean surface temperatures by Hansen et al. (2010) and studies of climate change, such as the Berkeley Earth Surface Temperature Study (Berkeley 2012) and The Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (Intergovernmental Panel on Climate Change [IPCC] 2011), provide further evidence that the earth is getting warmer and further describe the potential impacts of climate change. Section 3.23, Energy Requirements and Greenhouse Gas Emissions, contains an evaluation of GHG emissions and climate change impacts.

3.14.2.6 Monitoring and Mitigation Measures

No mitigation measures are recommended or necessary in view of the demonstrated absence of adverse impacts to air quality. Air quality emission sources at the proposed NOA and SOA projects would be subject to requirements of federal and Nevada air quality regulations. NDEP Bureau of Air Quality would determine whether air quality construction and operating permits would be required for the Proposed Action. The air quality permitting process could require Barrick to submit a permit application, including a complete inventory of potential criteria air pollutant emissions and control measures from the Proposed Action.

3.14.2.7 Residual Impacts

Emissions of criteria pollutants would occur as a result of the proposed NOA and SOA projects (**Table 3.14-6**). However these impacts would not cause exceedences of NAAQS. Residual impacts associated with particulate matter (PM_{10} and $PM_{2.5}$) would be reduced through soil stabilization and subsequent reclamation. As vegetation becomes re-established on disturbed areas, particulate levels should return to typical conditions of a dry desert environment. Once the disturbance ceases and wind-erodible surfaces are reclaimed, the resource would return to approximately its pre-mining condition.

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3.15 Land Use and Access

The study area for land use is defined as the proposed NOA and SOA plan boundaries. The study area for access includes the proposed NOA and SOA plan boundaries as well as the primary access roads such as Ruby Valley County Road 1 (Ruby Valley Road), White Pine County Road 3 (Long Valley Road), and U.S. Highway 50. The CESA for land use and access includes the proposed NOA and SOA plan boundaries (including the TUC) as well as the roads: 1) from Elko via State Highway 228 south (73 miles); 2) from Ely via U.S. Highway 50 to White Pine County Road 3 (Long Valley Road) (56 miles); and 3) from Eureka via U.S. Highway 50 to State Highway 892 (Strawberry Road) (45 miles). **Figure 3.15-1** illustrates the study area and CESA for land use and access.

3.15.1 Affected Environment

3.15.1.1 Land Use

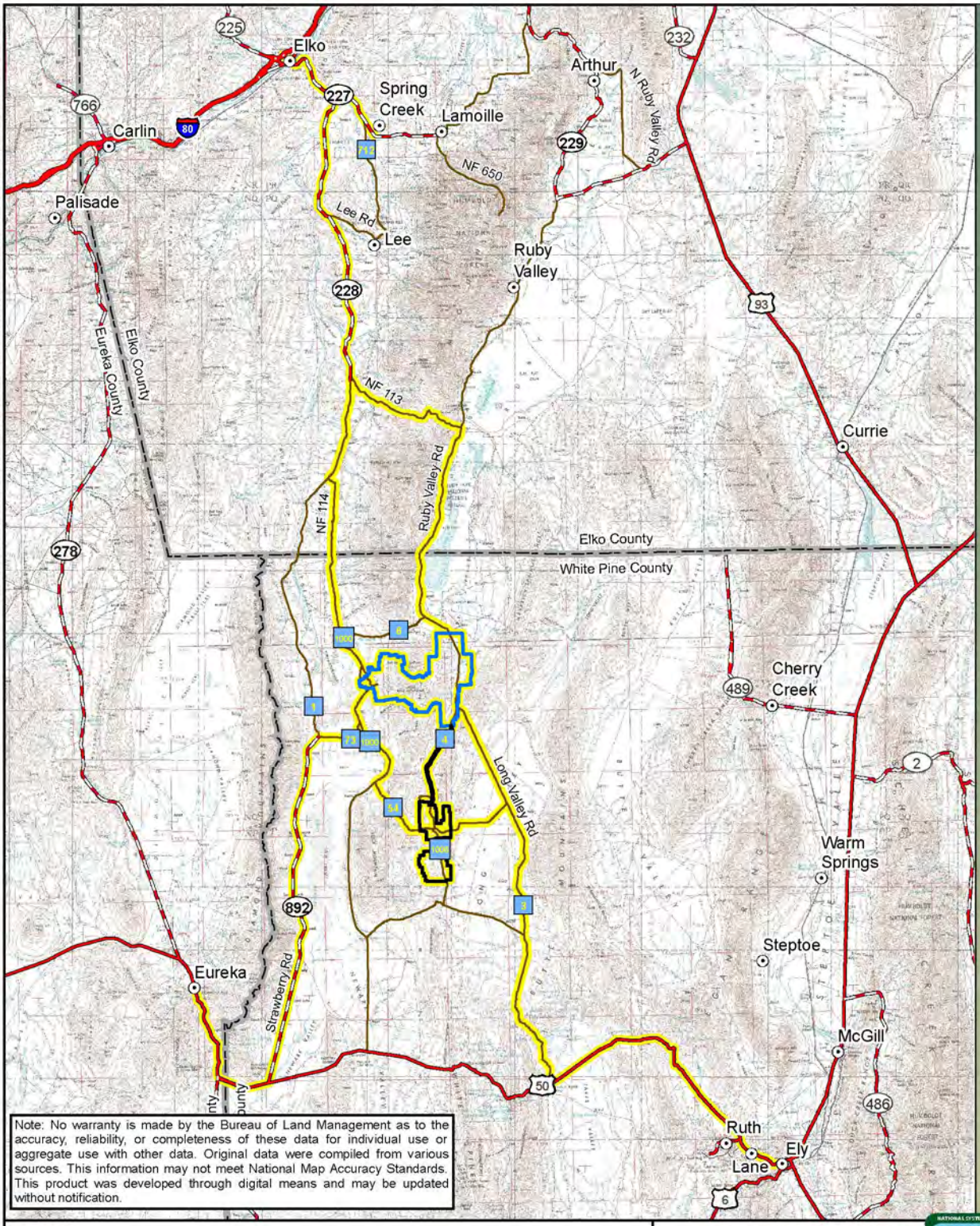
The majority of the study area is administered by the BLM, followed to a much lesser extent by private ownership. Within the study area, the proposed NOA would total 31,085 acres; the proposed SOA would total 10,865 acres. A summary of land management and ownership within the study area is shown in **Table 3.15-1**.

Table 3.15-1 Land Management or Ownership within the Study Area

Management or Ownership	NOA Federal (BLM)		NOA Private	
	Acres	Percent	Acres	Percent
Ownership (Acres/%)	30,843	99.2	242	0.8
Management or Ownership	**SOA Federal (BLM)**		**SOA Private**	
	Acres	**Percent**	**Acres**	**Percent**
Ownership (Acres/%)	10,865	100	0	0
Project Area Total	**41,708**	**99.4**	**242**	**0.6**

The study area is within the historic Bald Mountain Mining District. Mining began here in the late 1800s and historically produced gold, silver, copper, antimony, and tungsten ores. Historical accounts indicate wood was plentiful with good timber southwest of the study area; however, water was scarce. The Bald Mountain Mining District was enlarged in 1976 to include Alligator Ridge and the northeastern portion of Buck Mountain (Kautz et al. 2004).

The study area is located within the administrative boundaries of the BLM Egan Field Office and is currently managed according to the Ely District ROD and Approved RMP (BLM 2008b). USFS lands adjacent to the study area are currently managed according to the Toiyabe National Forest Land and Resource Management Plan (USFS 1986). A forest plan revision was initiated, but activity on the revision has been suspended as of May 2009 (USFS 2009).



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Land Use and Access Cumulative Effects Study Area

Source: Barrick 2012a,b; BLM 2012a.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.15-1

Land Use and Access Study Area and Cumulative Effects Study Area

0 5 10 20 Miles

BLM

Ely District Office

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12/22/2015

Of particular relevance to the land use discussion, the RMP's objective for "lands and realty" states:

> "To respond to public, local, state, and federal agency needs for land for community development, utility and other associated rights-of-way, communication sites, and other allowed uses on BLM-administered lands." (BLM 2008b)

To that end, no public lands within the study area have been identified as disposal areas, indicating their availability for sale or trade to private entities.

The RMP objective for locatable minerals states:

> "Allow development of solid leasable and locatable minerals in a manner to prevent unnecessary or undue degradation." (BLM 2008b)

All of the BLM-administered public lands within the study area are open to development of locatable minerals.

White Pine County zoning in the study area is 05, which is the least restrictive zoning category and allows for mining (White Pine County 2012). There are regulations governing procedures for subdividing land throughout the county, but uses are not controlled in most of the county including the Long and Ruby valleys. White Pine County adopted a Policy for Public Lands addressing the county's priorities for management of federal lands within its boundaries (White Pine County PLUAC 2007). The general statement of the county's objective for public lands states:

> "Support the concept of Multiple Use Management as an overriding philosophy for management of the public lands based on multiple use and sustainable yield concepts, and in a way that will conserve natural resources." (White Pine County PLUAC 2007)

The Policy for Public Lands emphasizes the county's support for, and dependence on, mineral resources development. Specifically, the mineral resources objective states:

> "Encourage the careful development and production of White Pine County's mineral resources while recognizing the need to conserve other environmental resources." (White Pine County PLUAC 2007)

Existing land use in the study area includes open space, grazing, mining, dispersed recreation (particularly in the adjacent Humboldt-Toiyabe National Forest). The existing mining operations are a dominant contributor to the local economy.

Ely, Nevada and Eureka, Nevada are the primary residential communities within the study area. Ely, located approximately 65 miles southeast of the study area, had a 2010 population of 4,255. Ely is a full service town with lodging, gas stations, restaurants, and recreational facilities. The unincorporated township of Eureka, located approximately 25 miles southwest of the study area, had a 2010 population of 610. Eureka offers significantly less services than Ely (U.S. Census Bureau 2010a).

There is no prime or unique farmland in the vicinity of the study area. In addition, there are no irrigated hay fields located within or near the study area.

The nearest special designation to the study area is the Sunshine Locality National Register District, located approximately 3,700 feet southeast of the study area. This special designation contains more than 90 archaeological sites and is located within a 35,000-acre area. It is closed to mineral materials and has a No Surface Occupancy for fluid minerals, but it is currently open to locatable minerals. Additionally, the Pony Express National Historic Trail is located approximately 9,400 feet north of the study area.

There are no Indian Reservations within the study area.

3.15.1.2 Access

The study area is served by a sparse network of roadways typical of rural Nevada. U.S. Highway 50, "The Loneliest Road In America," is the primary east-west traffic artery across central Nevada, connecting with Reno, Nevada, to the west and Ely, Nevada, to the east, going on to join up with I-70 in central Utah. U.S. Highway 50 is approximately 25 miles south of the study area. State Highway 93, approximately 35 miles to the east of the study area running north-south, connects Ely, Nevada, to the south with Wells, Nevada to the north. I-80 runs east-west, connecting Reno, Nevada, to the west with Salt Lake City, Utah, to the east. I-80 is approximately 60 miles north of the study area.

The main access point on the western portion of the study area is State Highway 892 (Strawberry Road) originating at U.S. Highway 50 and running north along the western boundary of the study area through Newark Valley. State Highway 892 is a paved, two-lane highway. The main access point on the eastern portion of the study area is White Pine County Road 3 (Long Valley Road), a county road originating at U.S. Highway 50 and running north along the eastern boundary of the project area. White Pine County Road 3 (Long Valley Road) has approximately 30 miles of paved road beginning at U.S Highway 50. The remaining miles to the main access point on the eastern portion of the study area is a graveled road maintained by White Pine County. County Road 4 runs north-south-west through the study area, connecting White Pine County Road 3 (Long Valley Road) and Ruby Valley County Road 1 (Ruby Valley Road). The study area transportation network is depicted in **Figure 2.4-6**.

Existing traffic conditions on White Pine County Road 3 (Long Valley Road) near the study area at level of service (LOS) "A." LOS will be defined in the following section. As detailed in **Table 3.15-2**, traffic volume from 2001 to 2010 as a percent on U.S. Highway 50 east of State Highway 892 (Strawberry Road), increased only marginally. Traffic volume on White Pine County Road 3 (Long Valley Road) during this same time period was unchanged, and traffic volume on State Highway 892 (Strawberry Road) increased by over 28 percent, although the change in absolute values was minor. According to NDOT, both U.S. Highway 50 and White Pine County Road 3 (Long Valley Road) recorded peak volumes in 2005 and 2006 before settling down to current levels. Peak traffic volumes on State Highway 892 (Strawberry Road) were recorded in 2003 and 2006.

Table 3.15-2 Traffic within the Study Area (Average Annual Daily Traffic)

Location	2001	2005	2010	Percent Change 2005-2010	Percent Change 2001-2010
U.S. Highway 50 (1.2 miles east of Fish Creek Road to Duckwater)	550	590	570	-3.4	3.6
White Pine County Road 3 (Long Valley Road) (100 feet north of U.S. Highway 50, near MP 36)	40	50	40	-20	0
State Highway 892 (Strawberry Road) (.1 mile north of U.S. Highway 50)	70	80	90	12.5	28.6

Source: NDOT 2011.

There is a network of lesser roads throughout the valley varying from well-maintained gravel roads to primitive two-track roads. These roads provide local access to both public and private lands, including access points to the adjacent Humboldt-Toiyabe National Forest. Access roads that would be used for mine access include White Pine County Roads 73, 54 (Alligator Ridge/Buck Pass), and 1000. White Pine

County Road 73 and 1000 are gravel roads; White Pine County Road 54 is a partially paved, partially graveled road.

3.15.2 Environmental Consequences

This section discusses project related impacts to land use and access resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to land use and access include direct and indirect impacts associated with the termination or modification of existing land uses or ROWs and alteration of land use patterns including stimulated or encouraged development of land uses not presently anticipated, or conversely, precluded other planned or proposed uses.

3.15.2.1 Proposed Action

Land Use

Under the Proposed Action, the proposed NOA and SOA plan boundaries would encompass 41,950 acres resulting in a net increase of 18,138 acres compared to the existing plan boundaries. Implementation of surface disturbance activities as a result of proposed development and expansion would remove approximately 4,357 acres within the proposed NOA; and approximately 2,740 acres within the proposed SOA.

The Proposed Action is consistent with BLM plans and policies that designate land use within the proposed NOA and SOA projects as open for mineral exploration and development, as described in the RMP (BLM 2008b). Although White Pine County does not have jurisdiction to regulate land use on federal lands, the proposed NOA and SOA projects would be consistent with the county's preference for "multiple use" management and retention of existing mining areas as expressed in the Policy for Public Lands (White Pine County PLUAC 2007). The proposed NOA and SOA projects would not occur on USFS land; therefore, no impacts are anticipated. In summary, the Proposed Action would comply with adopted plans and policies of potentially affected governmental entities.

The proposed NOA and SOA projects currently experience minimal public use, moderate levels of livestock grazing, and a modest amount of dispersed recreation use, which primarily consists of crossing the area to access the adjacent Humboldt-Toiyabe National Forest, as well as hunters accessing Hunt Units within Management Area 10. Recreational use by hunters rises considerably between August 1 and January 1. The largest numbers of public users are most likely people coming and going to the Ruby Lake NWR to the north.

Under the Proposed Action, surface disturbance (7,097 acres) would reduce the amount of land available for livestock grazing and dispersed recreation, although the loss would be very small relative to the overall area, particularly considering the limited current use levels. The specifics of the loss of livestock grazing and recreation access to public lands are addressed in Section 3.9, Livestock Grazing, and Section 3.16, Recreation, respectively. None of the proposed surface disturbance would occur on currently irrigated cropland; therefore, a loss of crop production would not occur as a result of the Proposed Action.

Under the Proposed Action, ROW N-89754 (LBM Communication Site) and N-90053 (Country Access Road) would be authorized under the amended PoO and the ROW would be relinquished.

The proposed NOA and SOA projects would require the development of six transmission lines (totaling approximately 22 miles) and the construction and/or upgrade of three substations. The transmission lines would utilize single pole structures and would range from 24.9 kV to 69 kV. Mount Wheeler Power supplies aforementioned electrical power to the existing transmission lines and associated substations and transformers, and would continue to provide proposed electrical power needs to the proposed NOA

and SOA projects. Barrick would obtain necessary permits from, and coordinate construction and operation specifications (including engineering design considerations) with Mount Wheeler Power.

With the exception of open pits and pit backfill areas, all project components would be reclaimed. Post-reclamation land use in all areas except for open pits and pit backfill areas (863 acres within the proposed NOA; and 347 acres within the proposed SOA) would be returned to open space, grazing, dispersed recreation, and wildlife habitat. These uses would be consistent with local and BLM land use plans and guidelines.

Access

Three categories of traffic would be generated by the proposed NOA and SOA projects: 1) worker commuting traffic, 2) general company and contractor traffic, and 3) material deliveries. Worker commuting would be predominantly a minor addition to bus or passenger van traffic, which is the primary mode of transportation to the existing Bald Mountain Mine. Workers not using employee transportation would typically utilize automobiles and pickup trucks. Material deliveries would employ mainly heavy trucks and tractor-trailer rigs.

The Proposed Action would require approximately 660 mine and contractor workers during the 2015 to 2023 timeframe, decreasing to approximately 240 mine and contractor workers during the 2026 to 2030 timeframe. Mine and contractor workers are expected to peak in 2017 at approximately 780 workers. It is assumed these workers would mostly commute to the proposed NOA and SOA by bus plus a small number of light vehicles (Barrick 2012a,b). Because of the influencing variables associated with the mine plan, it is estimated that for the Proposed Action, haul road traffic may increase by 20 percent, but no more than 30 percent at various points within the life of mine plan. These various points do not have an associated duration or timeframe. Of course, based on the fact that economics influence the mine plan, there may not be any increase to haul road traffic, which would represent a zero percent increase in comparison to the No Action Alternative.

Highway traffic effects as a result of the Proposed Action were analyzed using techniques promulgated in the Highway Capacity Manual (Transportation Research Board [TRB] 2000). The standard measure of traffic flow from the Highway Capacity Manual is LOS for a given segment of roadway. LOS is a method of qualitatively measuring the operational conditions of traffic flows on roadways, and the perception of those conditions by motorists and passengers (TRB 2000). LOS are rated “A” through “F,” “A” generally represents free-flowing traffic conditions with few restrictions and “F” represents a “forced or breakdown” flow with queues forming and traffic volumes exceeding theoretical capacity of the roadway (TRB 2000). Generally, level “E” represents traffic volumes at the capacity of the roadway. Based on these traffic assumptions, the proposed NOA and SOA projects would have minimal effects on existing traffic levels in the project vicinity. On affected roadways, the LOS would remain at “A” throughout the life of the project (TRB 2000).

Transportation safety concerns related to highway traffic generated by the Proposed Action are anticipated to be minimal in light of the current road network capacity and the anticipated increase in roundtrips. Development of the proposed NOA and SOA projects would have no effect on the physical characteristics of the major intersections or the geometrics of State Highway 892. Lines of sight at intersections are unobstructed and sight distances are ample. The increase in traffic is anticipated to be modest, remaining well within the capacity of the roadway. The mix of heavy vehicles in the traffic stream would not change substantively. As such, any increase in the risk of traffic accidents would be minor and proportional to the overall increase in traffic.

Approximately 26,045 feet of existing roads and two-tracks would be re-routed around the proposed Vantage facilities. This re-route would be constructed in accordance with White Pine County road standards. Alternate routes for public access would be available during construction and signage would be put in place to advice the public of road closures and alternative routes. Additionally, the proposed construction of the TUC between the proposed NOA and SOA projects as well as proposed upgrades

between the Yankee and Vantage facilities would consist of upgrading and maintaining existing sections of county roads to facilitate heavy mine equipment and construction equipment traffic. During construction, flaggers would be utilized to stop and direct traffic and signage would be used to notify travelers of construction activity. Signage and barriers would be erected to deter public access once modification and construction of the county roads and TUC would be completed. Three mine road/public access road intersections are present within the proposed NOA and SOA project (Winrock, Vantage, and Yankee HLF). During construction of these intersections, flaggers would be present to stop and direct signage, and appropriate construction signage would be erected. Signage and barriers would be erected to deter public access once construction of the intersections would be completed. Although traffic levels on local public roads remain very low and standard traffic controls (e.g., signage) would be in place at the intersections, there would be an increase in risk of accidents at the intersection and a minor increase in travel times at public intersections compared with existing conditions.

Based on the preceding analysis, development of the proposed NOA and SOA projects would not adversely affect highway traffic in the project vicinity. Development of the proposed NOA and SOA projects would modify mine road and public road intersections; however, appropriate measures would be implemented to reduce the safety risk and the flow of traffic. As stated previously, increases in traffic, including heavy vehicles, would be minimal. As such, any increase in the risk of traffic accidents would be minor and proportional to the overall increase in traffic. Roadway safety conditions would be slightly degraded; the degree would depend partially on the level of traffic through the mine and public road intersections.

A Traffic Management Plan has been developed to provide standard construction, operation, and maintenance practices for light vehicles and mine equipment traffic using public access routes and locations where mine roads intersect public roads (Barrick 2012a,b). As part of the Traffic Management Plan, Barrick would execute a road maintenance agreement with White Pine County. Furthermore, all other BLM roads with the NOA and SOA boundaries that are impacted by mine operations would be maintained by Barrick. Design features and ACEPMs applicable to land use and access are summarized in Section 2.4.3, Design Features and Applicant-committed Environmental Protection Measures, for the Proposed NOA and SOA projects.

Based on this analysis, the effects of the Proposed Action on land use and access in the project vicinity would be considered minor.

3.15.2.2 North and South Operations Area Facilities Reconfiguration Alternative

Under the Reconfiguration Alternative, implementation of surface disturbance activities as a result of proposed development and expansion would remove approximately 3,254 acres within the proposed NOA; and approximately 2,414 acres within the proposed SOA. With the exception of open pits and pit backfill areas, all project components would be reclaimed, representing a permanent loss of 564 acres within the proposed NOA; and a permanent loss of 321 acres within the proposed SOA as open space for grazing, dispersed recreation, and wildlife habitat. With consideration of the 1,934 acres of existing authorized disturbance that would not be constructed under the Reconfiguration Alternative, implementation of this alternative would result in a decrease of 3,352 acres of surface disturbance in comparison to the Proposed Action. Effects of the Reconfiguration Alternative on access would be similar to those described for the Proposed Action.

3.15.2.3 North and South Operations Area Western Redbird Modification Alternative

The WRM Alternative would be the same as the Reconfiguration Alternative, except that the Redbird Pit and RDA footprints have been reduced and there are proposed changes to haul roads, reclamation, and snow routes that would benefit mule deer (for a total of 2,852 acres of proposed disturbance in the NOA). With consideration of both proposed disturbance and previously authorized acreages that would not be constructed under this alternative, the WRM Alternative would have 637 fewer acres of proposed development and expansion in the NOA than the Reconfiguration Alternative. Effects of the WRM

Alternative on access would be similar to those described for the Reconfiguration Alternative, except some haul roads would have restrictions on truck traffic to benefit mule deer.

3.15.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to land use and access would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. ROW N-89754 (LBM Communication Site) and N-90053 (Country Access Road) would remain. Under the No Action Alternative, construction of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized. The area released for public use after completion of reclamation activities would be a minor incremental increase in available land. Traffic demand would decline on local county and state roads after closure as a result of the loss of jobs and subsequent reduction in vehicle traffic.

3.15.2.5 Cumulative Impacts

The CESA for land use and access includes the proposed NOA and SOA plan boundaries (including the TUC) as well as the roads: 1) from Elko via State Highway 228 south (73 miles); 2) from Ely via U.S. Highway 50 to County Road 3 (Long Valley Road) (56 miles); and 3) from Eureka via U.S. Highway 50 to State Highway 892 (Strawberry Road) (45 miles) (**Figure 3.15-1**) for a total of 41,950 acres. Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

Past and present actions have resulted, or would result, in approximately 15,412 acres of total surface disturbance within the land use and access CESA. The total quantifiable surface disturbances are related to mining, oil and gas development, wind energy development, exploration, land, road, and utility corridor development, agriculture, livestock grazing; residential developments, and other county and government actions. RFFAs proposed within the land use and access CESA include, but are not limited to oil and gas lease sales within the Long, Ruby, and Huntington valleys (acreage unknown). The CESA also includes proposed fuels reduction and vegetation treatments totaling 10,300 acres. Mineral leasing and vegetation treatment are consistent with BLM and White Pine County plans and policies. The Proposed Action incrementally would remove 11 acres of authorized disturbance and increase surface disturbance from past and present actions by an additional 7,097 acres resulting in a total cumulative disturbance of approximately 22,498 acres (54 percent of the total land use and access CESA). The Reconfiguration Alternative would remove 1,934 acres of authorized disturbance from the 15,412 acres of past and present actions and incrementally increase surface disturbance by an additional 5,668 acres resulting in a total cumulative disturbance of approximately 19,146 acres (46 percent of the total land use and access CESA). The WRM Alternative would remove 235 acres of previously authorized disturbance and 402 acres of the proposed surface disturbance that would occur under the Reconfiguration Alternative for a total cumulative disturbance of approximately 18,509 acres (44 percent of the total cultural resource CESA). Fuels reduction and vegetation treatment RFFAs are not considered in these calculations as they would not result in changes to designated land use.

Under the No Action Alternative, cumulative impacts to land use and access would be the same as those described in the *Final Environmental Impact Statement for the Bald Mountain Mine North Operations Area Project* (BLM 2009a) and *Environmental Assessment for the Mooney Heap and Little Bald Mountain Expansion Project* (BLM 2011a).

Although the cumulative surface disturbance would be greater than the surface disturbance associated with the Proposed Action, Reconfiguration Alternative, or WRM Alternative, it still would be a small increment of the acreage of public lands in the area (less than 1 percent of BLM administered lands within the Egan Field Office), and would have minimal effect on land uses displaced by past and present actions and RFFAs within the land use and access CESA. The cumulative unreclaimed surface

disturbance area that would remain after completion of the interrelated actions, including the open pit areas of the Proposed Action, Reconfiguration Alternative, and WRM Alternative would be a small percentage of the total land area in the land use and access CESA. As such, cumulatively impacts would have a negligible effect on land uses.

There would be few, if any, cumulative effects on access or traffic conditions from the Proposed Action, Reconfiguration Alternative, or WRM Alternative, in conjunction with other past and present actions and RFFAs because they are all relatively small traffic generators and most of their access points are widely distributed throughout the land use and access CESA.

3.15.2.6 Monitoring and Mitigation Measures

No additional monitoring and mitigation measures are recommended.

3.15.2.7 Residual Impacts

Assuming successful reclamation of all project components, residual impacts would include the permanent alteration of land uses on approximately 1,210 acres, and 885 acres, and 780 acres for the Proposed Action, Reconfiguration Alternative, and WRM Alternative, respectively. These residual impacts would be associated with open pit and pit backfill areas, which would not be reclaimed. Additionally, minor increases in traffic delays and potential for increased accident risk would occur.

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3.16 Recreation

The study area for recreation is defined as the proposed NOA and SOA plan boundaries. The CESA for recreation encompasses the proposed NOA and SOA plan boundaries plus a 4-mile buffer, as well as the southern Ruby Mountains and portions of Huntington Valley, Newark Valley, and Long Valley north of U.S. Highway 50. **Figure 3.16-1** illustrates the study area and CESA for recreation.

3.16.1 Affected Environment

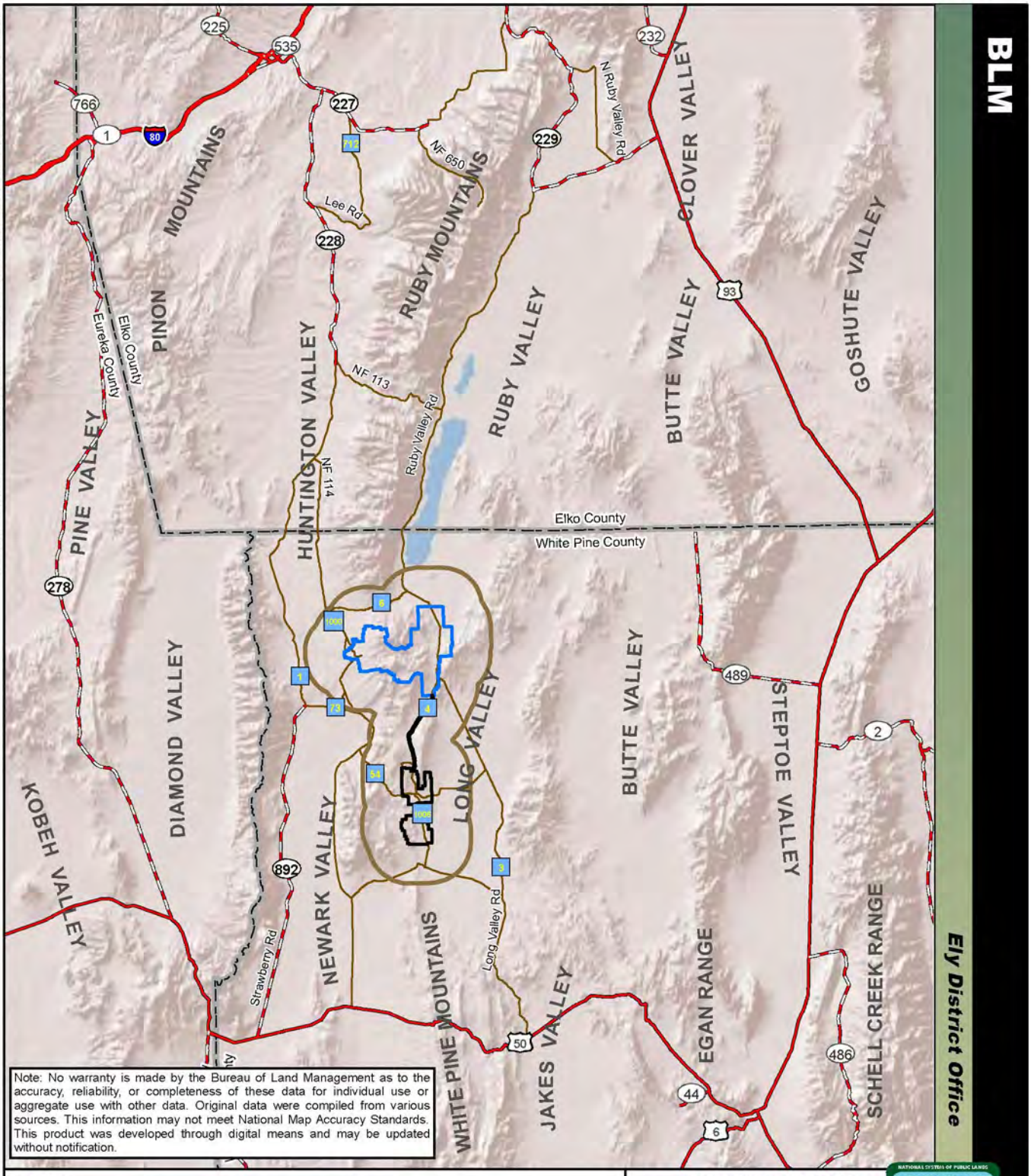
Recreation sites near the study area are categorized into developed, primitive, or dispersed. Developed recreation sites are sites that provide facilities such as picnic tables, toilets, and informational signs and are easy to access. Primitive recreation sites are indicated on maps but do not have developed facilities. Dispersed recreation sites do not have any developed facilities, are not indicated on maps. Access to dispersed recreation sites can vary from easy to difficult. Dispersed recreational opportunities are commonly associated with solitude and a primitive experience (BLM 2008a).

Recreational activities within and adjacent to the study area include casual and dispersed activities, such as OHV use, hunting, fishing, camping, cross-country skiing, horseback riding, caving, geocaching, rock climbing, mountain biking, and heritage tourism (BLM 2008a).

Recreation within the jurisdiction of the BLM Ely District Office is managed through the designation of special recreation management areas (SRMAs) and extensive recreation management areas (ERMAs). An SRMA is defined as an area where more intensive recreation management is needed and where recreation is a principal management objective. There are no SRMAs within the study area. The nearest SRMA, the Loneliest Highway Special Recreation Management Area, is located approximately 10 miles south of the study area. ERMAs are areas where visitors are expected to rely on their own skill, knowledge, and equipment when participating in recreational activities. Management actions are primarily limited to providing basic information and access to the public (BLM 2008a).

No developed recreation areas are present within the study area. The nearest developed recreation facility to the study area is associated with the Ruby Lake NWR, approximately 4 miles north of the study area. The Ruby Lake NWR received its designation in 1938 as a breeding ground for migratory birds and other wildlife. Recreational activities include waterfowl hunting, fishing, boating, and bird watching. Facilities are modest, with only a few restrooms on the refuge and at the refuge headquarters. Access from the south to the Ruby Lake NWR is permitted via White Pine County Road 3 (Long Valley Road) (USFWS 2011). The Illipah Recreation Area, managed by the BLM, provides developed recreational facilities and is located approximately 20 miles south of the study area. Recreational activities include fishing, camping, and picnicking.

Dispersed recreation may occur on BLM-administered lands as well as on the Humboldt-Toiyabe National Forest. Cold Creek Reservoir, located 5 miles west of the study area, offers fishing opportunities for rainbow trout, bowcutt trout, and largemouth bass. There are no developed recreational facilities. Cold Creek Reservoir can be accessed from State Highway 892 (Strawberry Road). The nearest developed campground is the South Ruby Campground approximately 10 miles north of the study area in the Humboldt-Toiyabe National Forest, just west of the Ruby Lake NWR. Recreational activities within the Humboldt-Toiyabe National Forest include hiking, horseback riding, cross-country skiing, photography, camping, hunting, fishing, snowmobiling, mountain biking, and 4-wheeling. The boundaries of local recreational areas are depicted in **Figure 3.16-2.**



Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Recreation Cumulative Effects Study Area

Source: Barrick 2012a,b; BLM 2012a..

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.16-1

Recreation Study Area and Cumulative Effects Study Area

0 2.5 5 10 Miles

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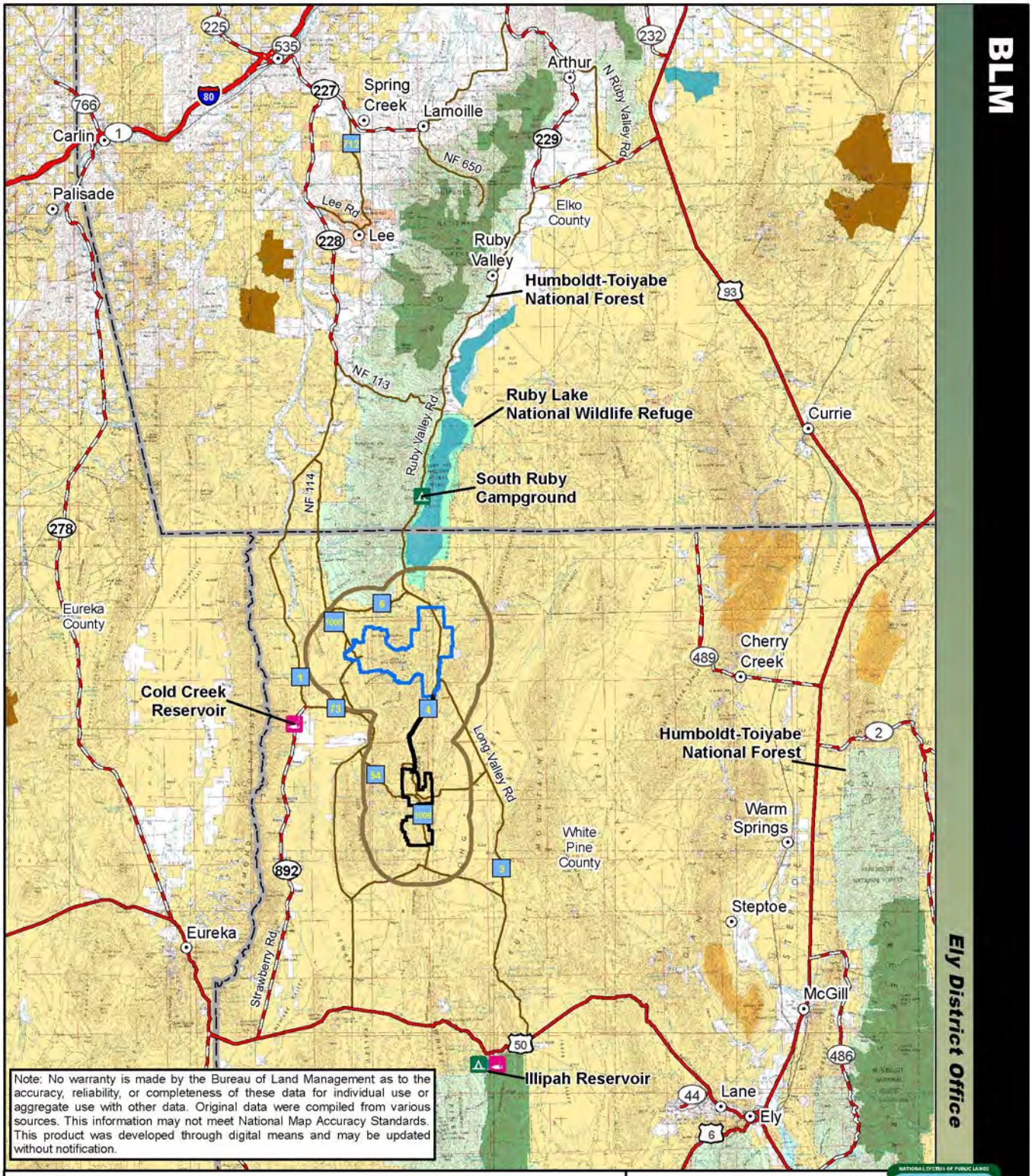

Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Recreation Cumulative Effects Study Area
- U.S. Forest Service Wilderness Land
- BLM Wilderness Area
- BLM Wilderness Study Area
- Campground
- Fishing Access

Land Status

- Bureau of Indian Affairs
- Bureau of Land Management
- Department of Defense
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- State
- Private

Source: BLM 2014d, 2012a, SRK 2012.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.16-2

Recreation Areas Adjacent to the Study Area

0 2.5 5 10 Miles

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The proposed NOA and SOA project boundaries are located within NDOW Big Game Management Area 10. Management Area 10 is composed of Hunt Units 101 through 108; portions of Hunt Units 104 and 108 are within the study area (**Figure 3.7-1**). Hunt Units 104 and 108 overlap approximately 9 percent and 91 percent, respectively, of the study area and 18 percent and 78 percent, respectively within the recreation CESA. Very small portions of Hunt Units 103 and 144 also fall within the recreation CESA, but are not analyzed due to their limited overlap of the study area. Hunting (deer, elk, and pronghorn), fishing, horseback riding, hiking, picnicking, camping, and off-road vehicle use are popular activities within the Management Area. There also is some predator hunting, primarily for coyotes and mountain lions.

Hunting makes up one of the primary recreational activities within and adjacent to the study area; as discussed in Section 3.17, Socioeconomics, the numbers of tags vary from year-to-year, but over the past decade, Management Area 10 has accounted for between 22.9 and 33.81 percent of the statewide total. In 2011, 3,694 deer tags were issued for Hunt Area 10. NDOW data does not indicate how many of these tags were for Hunt Units 104 and 108, and it is important to note that the number of deer tags issued for Management Area 10 (or Hunt Units 101 through 108) would be based on population and others factors related to the entire Management Area 10 mule deer herd. Within the study area, hunting pressure is believed to be limited by difficult access and limited wildlife values. In 2010, mule harvest totals within Hunt Unit 108 were as follows: mule deer (67 individuals), pronghorn (12 individuals), and elk (2 individuals). Harvest totals within Hunt Unit 104 were as follows: mule deer (87 individuals), pronghorn (21 individuals), and elk (4 individuals) (NDOW 2011c). Within Management Area 10 as a whole and with consideration of all hunts and weapon classes, NDOW reported a 39 percent success rate of harvesting a four-point or better mule deer (NDOW 2011c). As noted in Section 3.17, the State of Nevada depends on income derived from hunting and fishing opportunities to underwrite the costs of wildlife management in Nevada.

The Pony Express National Historic Trail, which offers opportunities for historical tourism, is located approximately 2 miles north of the proposed NOA. A detailed description of the Pony Express National Historic Trail is located in Section 3.12.1.3, Prehistoric and Historic Overview.

OHV use on all BLM-administered land in the study area is limited to existing roads and trails.

3.16.2 Environmental Consequences

This section discusses project related impacts to recreation resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to recreation include the potential to displace dispersed recreational use from areas for which there are no reasonable substitutes as a result of decreases in game population, reduced quality of the aesthetic experience, and loss of access.

3.16.2.1 Proposed Action

Under the Proposed Action, implementation of surface disturbance activities as a result of proposed development and expansion would remove approximately 4,357 acres within the proposed NOA; and approximately 2,740 acres within the proposed SOA. The majority (99 percent) of the surface disturbance would occur on BLM-administered public lands.

Public access for recreational purposes would be prohibited within the proposed NOA and SOA per MSHA requirements. The proposed NOA and SOA boundaries would increase by a total of 18,138 to 41,950 acres. Public access would be controlled with fences and locked gates or other physical methods, therefore restricting recreational access within these areas. However, most of this restricted area receives low to moderate recreational use at the present time because of minimal recreational opportunities or limited resource access resulting from development activities. Also, there is extensive public land in the immediately surrounding area that could accommodate migration of dispersed recreation activity from the proposed NOA and SOA, although some recreationists who have utilized a

specific area that would no longer be accessible may not be accommodated by a shift to alternative nearby recreational options.

The Proposed Action may deter access to Humboldt-Toiyabe National Forest and Ruby Lake NWR to some degree due to increased traffic from construction personnel and construction-related equipment deliveries. However, main public access roads to these areas, such as White Pine County Road 3 (Long Valley Road) and State Highway 892 (Strawberry Road) are lightly utilized and it is anticipated that any project related increase in traffic would not preclude access to recreational destinations in a meaningful way (see Section 3.15.2.1). Access to Humboldt-Toiyabe National Forest and Ruby Lake NWR also would be available from the north via State Highway 226 and Ruby Valley County Road 1 (Ruby Valley Road). The Pony Express Trail is expected to be available to visitors; however, as detailed in Section 3.12.2, visitors would potentially experience visual impacts from the proposed project when visiting the trail. Mule deer hunting and viewing opportunities near the study may decrease incrementally in the long term as a result of a gradual reduction in the amount of available mule deer habitat, although some of the risk to mule deer under the Proposed Action would be alleviated by the mule deer design features described in Section 2.4.3.1. Impacts to mule deer are discussed in more detail within Section 3.7.2.1.

A modest increase of 283 individuals in regional population may occur as a result of the Proposed Action (Section 3.17, Social and Economic Values). This new population would result in a population increase within the study area of less than 0.5 percent of the existing population within the study area. The new residents would increase the demand for recreation resources and opportunities in the region, but the increase would be very small in the context of the existing population base. Ample public land is available in the region to accommodate dispersed recreation needs of the increased population. Minor effects to parks and other developed recreation facilities may occur in the communities where the increase in population would reside, primarily Ely, Eureka, and, to a small extent, Elko, Nevada.

All project components would be reclaimed in accordance with the Reclamation Plan (Barrick 2012a,b), and would be available for dispersed recreation use. There would be a permanent loss of open pits and pit backfill area for dispersed recreation use (863 acres within the proposed NOA; and 347 acres within the proposed SOA). Overall, recreational opportunities and resources would likely remain minimal.

Design features and ACEPMs applicable to recreation are summarized in Section 2.4.3, Design Features and Applicant-committed Environmental Protection Measures for the Proposed North and South Operations Area Projects. Based on the implementation of these measures, the ample supply of alternative land for dispersed recreation activities, the effects of the Proposed Action on recreation within and adjacent to the proposed NOA and SOA projects would be considered minor.

3.16.2.2 North and South Operations Area Facilities Reconfiguration Alternative

Under the Reconfiguration Alternative, implementation of surface disturbance activities as a result of proposed development and expansion would remove approximately 3,254 acres within the proposed NOA; and approximately 2,414 acres within the proposed SOA. With the exception of open pits and pit backfill areas, all project components would be reclaimed, representing a permanent loss of 564 acres within the proposed NOA; and a permanent loss of 321 acres within the proposed SOA. With consideration of the 1,934 acres of existing authorized disturbance that would not be constructed under the Reconfiguration Alternative, implementation of this alternative would result in a decrease of 3,352 acres of surface disturbance in comparison to the Proposed Action. The life of the mine would be reduced from 20 to 10 years.

Effects of the Reconfiguration Alternative on recreation would be similar to those described for the Proposed Action, except that that the duration of impacts would be reduced, and mule deer hunting and viewing opportunities near the study area would be impacted less as a result of the maintenance of mule deer migration corridors. Refer to Section 3.7.2.2 of Wildlife and Fisheries Resources, for additional discussions on impacts to mule deer under the Reconfiguration Alternative.

Design features and ACEPMs applicable to recreation are summarized in Section 2.4.3, Design Features and Applicant-committed Environmental Protection Measures for the Proposed North and South Operations Area Projects. Based on the implementation of these measures, the ample supply of alternative land for dispersed recreation activities and the lack of unique recreation resources, the effects of the Reconfiguration Alternative on recreation within and adjacent to the proposed NOA and SOA projects would be considered minor.

3.16.2.3 North and South Operations Area Western Redbird Modification Alternative

The WRM Alternative would be the same as the Reconfiguration Alternative, except for a reduction in the Redbird Pit and RDA footprints, additional reductions in mining durations in the Red Bird Pit and the west side of the North Operations Area, and changes to haul roads, reclamation, and snow routes to benefit mule deer.

Effects of the WRM Alternative on recreation would be similar to those described for the Reconfiguration Alternative, except that there would be 636 fewer acres of surface disturbance. Impacts to mule deer hunting and viewing opportunities near the study area may be further reduced from the Reconfiguration Alternative as a result of wider deer migration corridors resulting from reduced footprints and concurrent reclamation, traffic restrictions to reduce disturbance and potential for collisions with deer, and the snow management route through the west side of the NOA.

3.16.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to recreation would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. Under the No Action Alternative, construction of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized. A continuation of existing recreation conditions would occur for the duration of authorized activities.

3.16.2.5 Cumulative Impacts

The CESA for recreation encompasses the proposed NOA and SOA plan boundaries plus a 4-mile buffer, as well as the southern Ruby Mountains and portions of Huntington Valley, Newark Valley, and Long Valley north of U.S. Highway 50 (**Figure 3.16-1**) for a total of 259,553 acres. Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

Past and present actions have resulted, or would result, in approximately 17,466 acres of total surface disturbance within the recreation CESA. The total quantifiable surface disturbances are related to mining, oil and gas development, wind energy development, exploration, land, road, and utility corridor development, agriculture, livestock grazing; residential developments, and other county and government actions. RFFAs proposed within the recreation CESA include, but are not limited to, the following: oil and gas lease sales within the Long, Ruby, and Huntington valleys (acreage unknown), vegetation treatments (totaling 34,672 acres), and implementation of the USFWS Ruby Lake NWR CCP. Past and present actions within the recreation CESA would not directly affect access to parks, concentrated recreational use areas, designated wilderness or Wilderness Study Areas, or other protected areas in the recreation CESA. Fuels reduction and vegetation treatment RFFAs would result in increased noise, dust, and treatment traffic from vegetation activities as the proposed treatments are implemented and may result in a short-term shift of dispersed recreational use to other non-affected areas. Long-term impacts may include a change from denser vegetation to more open vistas as treatments are completed, and improvements to wildlife habitat that may provide more opportunity for wildlife viewing and hunting opportunities (BLM 2013a).

The Proposed Action, Reconfiguration Alternative, and WRM Alternative would result in additional surface disturbance would limit access to dispersed recreational opportunities. The Proposed Action would remove 11 acres of authorized disturbance from the 17,466 acres of past and present actions and incrementally increase surface disturbance by an additional 7,097 acres resulting in a total cumulative disturbance of approximately 59,224 acres (23 percent of the total recreation CESA, over half of which would be short-term disturbance due to vegetation treatments). The Reconfiguration Alternative would remove 1,934 acres of authorized disturbance and incrementally increase surface disturbance by an additional 5,668 acres resulting in a total cumulative disturbance of approximately 55,872 acres (22 percent of the total recreation CESA). The WRM Alternative would remove 235 acres of the previously authorized disturbance and 402 acres of the proposed surface disturbance that would occur under the Reconfiguration Alternative for a total cumulative disturbance of approximately 55,235 acres (21 percent of the total cultural resource CESA). Under the No Action Alternative, cumulative impacts to recreation would be limited to impacts from previously authorized activities. Impaired access to recreational activities would be the most prominent impact. Further detail of cumulative impacts to recreation under the No Action Alternative would be the same as those described in the *Final Environmental Impact Statement for the Bald Mountain Mine North Operations Area Project* (BLM 2009a) and *Environmental Assessment for the Mooney Heap and Little Bald Mountain Expansion Project* (BLM 2011a).

Although the cumulative surface disturbance would be considerably greater than the surface disturbance associated with the Proposed Action, Reconfiguration Alternative, or WRM Alternative, the existing acreage of public lands (approximately 11.5 million acres of BLM-administered land within the Ely District Office) would continue to accommodate dispersed recreation activities displaced by past and present actions and RFFAs within the recreation CESA. Potential changes to mule deer populations within NDOW Management Area 10 both inside and outside the CESA boundary may affect recreational activities within the CESA and may reduce the number of tags sold and/or harvest success, should the Ruby Mule Deer Herd decline. This would decrease the recreational experience in the areas, as well as potentially resulting in socioeconomic impacts within the CESA. Estimating potential declines in the herd is impossible as it is heavily influenced by several factors unrelated to the proposed project or RFFAs; factors such as winter severity, drought, and disease. However, cumulative disturbance to habitat for this herd would impact the population's resistance to these factors. Sections 3.7 and 3.17 contain addition discussions on cumulative impacts to mule deer.

Cumulative recreational impacts would still be considered low to moderate during operations as a result of restricted access to previously accessible dispersed recreational opportunities such as hunting. The cumulative surface disturbance that would remain after completion of the interrelated actions and reclamation, including the open pits associated with the Proposed Action, Reconfiguration Alternative, or WRM Alternative would be a small percentage of the total land area available for dispersed recreation in the recreation CESA. As such, cumulative impacts would have a negligible effect on recreation resources and opportunities upon completion of reclamation activities.

3.16.2.6 Monitoring and Mitigation Measures

No additional monitoring and mitigation measures are recommended.

3.16.2.7 Residual Impacts

Assuming successful reclamation of all project components, residual impacts to recreation opportunities would include the permanent loss for dispersed recreation use of approximately 1,210 acres, 885 acres, and 780 acres for the Proposed Action, Reconfiguration Alternative, and WRM Alternative, respectively. These residual impacts would be associated with open pits, which would not be reclaimed.

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3.17 Social and Economic Values

The study area and CESA for social and economic values includes Elko, Eureka, and White Pine counties; with particular focus on the communities of Elko, Carlin, Spring Creek, Eureka, and Ely, Nevada. **Figure 3.17-1** illustrates the study area and CESA for social and economic values. The rationale for the study area and CESA is that the mine would be located in White Pine County, but near the Eureka County and Elko County lines. The mine would generate public revenue directly for White Pine County and indirectly for Elko and Eureka counties. It is anticipated that a substantial majority of the workers would live in Elko County because of a combination of proximity, housing availability, and availability of a broad range of public and private services.

3.17.1 Affected Environment

3.17.1.1 Population and Demography

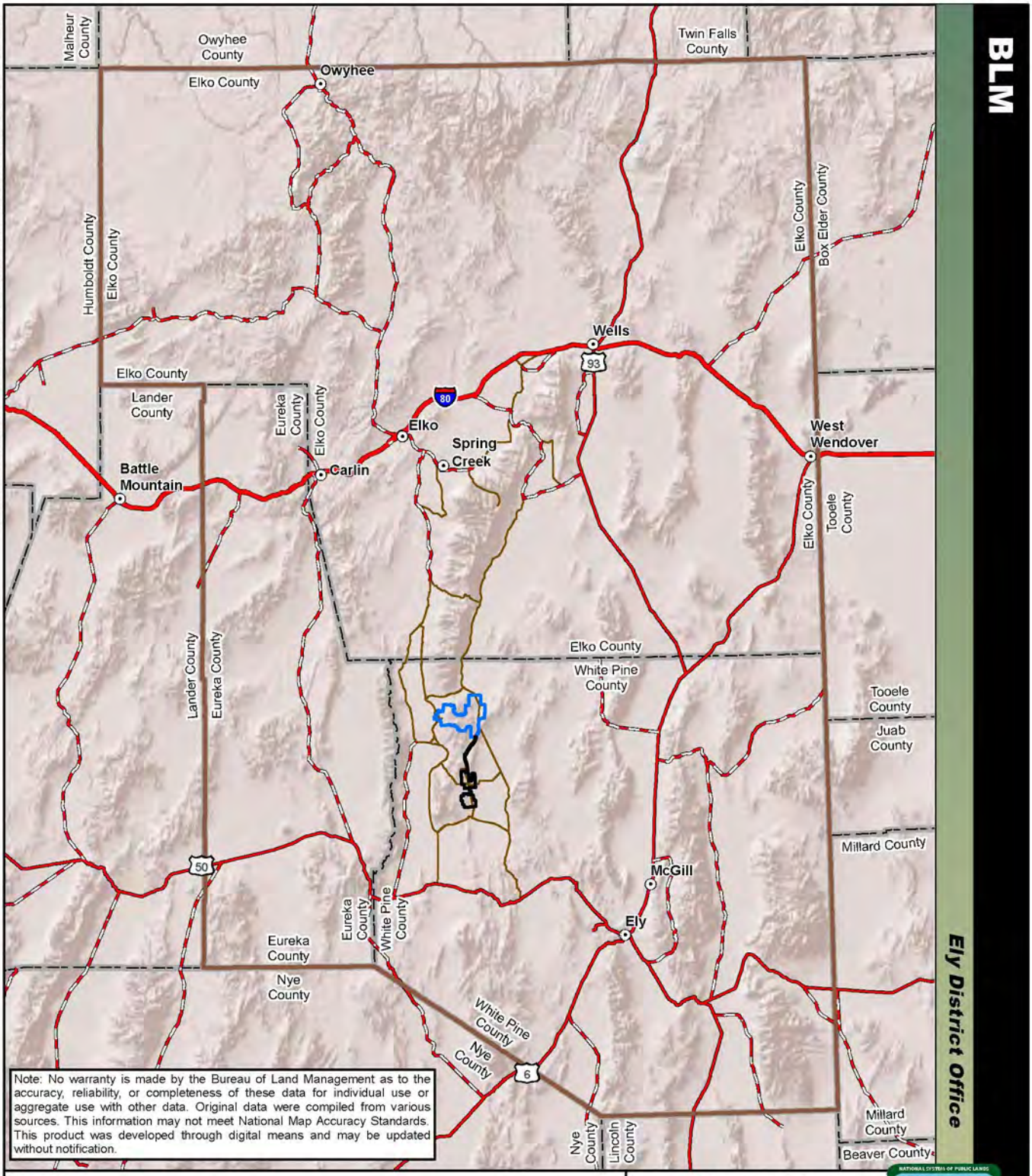
Elko County is the sixth largest, by population, in Nevada, with 48,818 people in 2010 (**Table 3.17-1**). White Pine and Eureka counties, in contrast, are notably smaller, ranked 10th and 16th largest among Nevada's 17 counties, respectively. Nevada has been one of the country's fastest growing states for much of the past three decades, but it was one of the hardest hit by the recent recession. Consequently, the state demographer estimates the state lost population between 2008 and 2009. During the expansion, the bulk of the growth occurred in urbanized areas, particularly southern Nevada. Elko County experienced rapid growth in the 1980s, which continued at a lesser pace into the 1990s; however, the rate has tapered off in recent years (**Table 3.17-1**). White Pine and Eureka counties have trailed the statewide growth rate by a substantial margin for nearly three decades. White Pine County lost population in the 1990s, but has made a modest recovery since. The most dramatic growth in the area has occurred in unincorporated Spring Creek, which is more than six times larger than it was in 1980.

Table 3.17-1 Population Characteristics

Area	1980	1990	2000	2010	Average Annual Change 1980-1990 (%)	Average Annual Change 1990-2000 (%)	Average Annual Change 2000-2010 (%)
Elko City	8,771	14,736	16,708	18,297	5.3	1.3	0.9
Spring Creek CDP[1]	2,002	5,866	10,548	12,361	11.3	6.0	1.6
Carlin	1,233	2,220	2,161	2,368	6.1	(0.3)	0.9
Elko Co.	**17,269**	**33,530**	**45,291**	**48,818**	**6.9**	**3.1**	**0.8**
Eureka Co.	**1,198**	**1,550**	**1,651**	**1,987**	**2.6**	**0.6**	**1.9**
Ely City	4,882	4,756	4,041	4,255	(0.3)	(1.6)	0.5
White Pine Co.	**8,167**	**9,264**	**9,181**	**10,030**	**1.3**	**(0.1)**	**0.9**
Nevada	**800,493**	**1,201,833**	**1,998,257**	**2,700,551**	**4.1**	**5.2**	**3.1**

[1] CDP – Census Designated Place.

Sources: Nevada State Demographer 2009; U.S. Census Bureau 2010b.



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Social and Economic Values and Environmental Justice Study Area and Cumulative Effects Study Area
- City or Town

Source: Barrick 2012a,b; BLM 2012a.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.17-1

Social and Economic Values and Environmental Justice Study Area and Cumulative Effects Study Area

0 7.5 15 30 Miles

N

BLM

Ely District Office

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Workers typically choose a residence location based on some combination of job proximity, housing availability, and access to public and private services. Currently, much of the mining work force in northeast Nevada mines resides in the Elko vicinity because it is the most accessible community with a broad selection of services and housing. Over 80 percent of the population of the three-county study area lives in Elko County.

Table 3.17-2 summarizes race and ethnicity by county. A detailed discussion on race and ethnicity is presented in Section 3.18.1.1, Minority Population.

Table 3.17-2 Race and Ethnicity by County

Race and Ethnicity	Elko County (%)	Eureka County (%)	White Pine County (%)	State of Nevada (%)
White Not of Hispanic Origin	69.1	83.6	76.3	54.1
Black Not of Hispanic Origin	0.7	0.1	3.9	7.7
American Indian, Eskimo or Aluet	4.7	2.1	3.8	0.9
Asian or Pacific Islander Non-Hispanic	1.0	0.9	1.1	7.7
Other and Two or More (Mixed) Races	1.7	1.3	1.8	3.1
Hispanic Origin of Any Race	22.9	12.0	13.2	26.5

Source: U.S. Census Bureau 2010b.

3.17.1.2 Income

Average mining wages and salaries are the highest for any industry in Nevada, averaging $77,321 in 2011, more than 79 percent higher than the all industries average of $43,105 (Nevada Department of Employment, Training & Rehabilitation [NDETR] 2013). The differential holds true for counties within the study area, with average natural resources and mining wages reported at $82,140 in Elko County, $87,970 in Eureka County, and $132,833 in White Pine County. All-industry average wages were reported at $46,119 in Elko County, $85,950 in Eureka County, and $46,225 in White Pine County, although the Eureka County figure is heavily skewed because 94 percent of all employment in the county is mining-related (NDETR 2013). No other industry sector comes within $14,000 of matching mining industry wages.

As noted the Final EIS for the Bald Mountain Mine North Operations (BLM 2009a), in 2007, the average cost with benefits per employee at the Bald Mountain Mine was $107,000, well above the median household income and per capita income in the three counties.

Although mining wages and salaries are typically higher than average, per capita personal income (PCPI) in the study area lagged slightly behind the state level for many years; however, current data indicate that PCPI within the counties in the study area now exceed the state average. Data from 2000 indicated a state average of $30,977. Average PCPI for counties within the study area in 2000 was $25,419 (82.1 percent of the state level) in Elko County, $23,684 (76.5 percent of the state level) in Eureka County, and $25,577 (82.6 percent of the state level) in White Pine County (Bureau of Economic Analysis [BEA] 2013). By 2011, the state PCPI had risen to $36,964, an increase of 19 percent. The average PCPI for counties within the study area was $40,150 for Elko County, $38,071 for Eureka County, and $39,955 for White Pine County. PCPI now exceeds the state average in each of the three counties within the study area (BEA 2013).

In concert with PCPI, estimated median household incomes in all three counties within the study area were above the statewide household income level in 2011. The median household income for the state

in 2011 was estimated at $49,099, compared with $62,937 for Elko County (28.2 percent above the state level), $58,985 for Eureka County (20.1 percent above the state level), and $52,014 for White Pine County (5.9 percent above the state level (NDETR 2013).

According to the U.S. Department of Commerce, an estimated 10.7 percent of Elko County's population was living below the poverty threshold in 2011, an increase from 7.5 percent in 2008. For Eureka County, an estimated 9.6 percent of the population was living below the poverty threshold in 2011, down slightly from 10.0 percent in 2008. For White Pine County, an estimated 14.1 percent of the population was living below the poverty threshold in 2011, up from 13.5 percent in 2008. All of these percentages were lower than the Nevada statewide rates of 15.2 percent in 2011. Only White Pine County exceeded the statewide rate (11.2 percent) in 2008. Poverty rates for children and youth under 18 followed a similar pattern. Rates increased in all three counties between 2008 and 2011, but remained below the statewide average rate with the exception of White Pine County in 2008 (U.S. Census Bureau 2013).

3.17.1.3 Economy and Employment

The study area is a major contributor to Nevada's mining industry. In 2007, the University Center for Economic Development (UCED) at the University of Nevada, Reno conducted an Analysis of the Economic Impact of the Hard Rock Mining Sector on the Elko Micropolitan Statistical Area[1] (Price and Harris 2007). The study noted that in 2004, the counties of Elko and Eureka, which collectively comprise the Elko Micropolitan Statistical Area (SA), recorded a value of output of $1.58 billion for the gold, silver, and other metal ore mining sector. This was approximately 44 percent of total Elko Micropolitan SA value of output and the #1 output value ranking of all of the SA's 146 economic sectors (Price and Harris 2007). In the first quarter 2007, the gold, silver, and other metal ore mining sector had an estimated value of production level of $2.03 billion (Price and Harris 2007). Using information from the first quarter of 2007 and IMPLAN microcomputer input-output software, the study concluded that given the economic inter-linkage and multiplier effect, total output impacts to the Elko Micropolitan SA economy from activities by the gold, silver, and other metal ore mining sector was $2.63 billion. While the Elko Micropolitan SA only includes two of the three counties within in the Socioeconomics study area, it does serve to illustrate the relative contribution of the gold, silver, and other metal ore mining sector to the economy within the study area.

Table 3.17-3 illustrates a comparison of the three counties' employment by major industry with statewide employment by the same sectors. As listed in **Table 3.17-3**, the combined natural resources and mining sector employment in the three counties make up more than half of the total state employment in that economic sector; a large majority of the sector statewide is devoted to metal mining. All of the counties within the study area are substantially more dependent on mining than is the state as a whole. The employment numbers are based on place of work, not place of residence, which explains why Eureka County has more employees in the natural resources and mining sector than it has residents. Several major mines on the Carlin Trend are located in Eureka County, but most of those workers live in Elko County, as noted above. Elko County is notably more economically diverse than the other two counties with a larger and broader selection of services, particularly in the City of Elko, the largest community in the study area. Elko has a substantial casino and hospitality industry and offers a variety of other services, which notably broadens its employment base. White Pine County, with the City of Ely, also is more diverse in its employment than Eureka County, but with a smaller base of employment and, consequently, a less extensive complement of available services.

[1] In 2003, the U.S. Bureau of Census defined a new classification of counties which are designated as "Micropolitan Statistical Areas." To be classified as a Micropolitan Statistical Area (SA), a group of counties must have a community of at least 10,000 to 49,999 people, be distant from a large city, and have proportionately few residents commuting outside the area. The counties of Elko and Eureka comply with these requirements and have been designated as the Elko Micropolitan SA (Price and Harris 2007).

Table 3.17-3 Non-agricultural Wage and Salary Employment by Sector in 2012[1]

Sector	State of Nevada		Elko County		Eureka County		White Pine County	
	No.	%	No.	%	No.	%	No.	%
Goods Producing - Private	**101,500**	**8.1**	**4,910**	**23.0**	**4,150**	**93.3**	**1,370**	**18.0**
Natural Resources and Mining	15,667	1.3	3,060	14.3	4,150	93.3	1,090	14.3
Construction	48,500	3.9	1,600	7.5	*	0.0	250	3.3
Manufacturing	37,333	3.0	250	1.2	*	0.0	30	0.4
Service Providing - Private	**877,717**	**70.1**	**13,890**	**65.0**	**210**	**4.7**	**1,540**	**20.3**
Trade, Transp. & Utilities	211,567	16.9	4,060	19.0	160	3.6	510	6.7
Information	12,950	1.0	150	0.7	*	0.0	20	0.3
Financial Activities	50,850	4.1	450	2.1	*	0.0	80	1.1
Prof. & Business Services	140,550	11.2	1,500	7.0	10	0.2	140	1.8
Educational and Health Services	104,883	8.4	1,360	6.4	*	0.0	170	2.2
Leisure and Hospitality	322,967	25.8	5,750	26.9	40	0.9	540	7.1
Other Services	33,950	2.7	620	2.9	*	0.0	80	1.1
Unclassified[2]	**0**	**0.0**	**10**	**0.0**	**80**	**1.8**	**0**	**0.0**
Subtotal - Private	**979,217**	**78.2**	**18,810**	**88.0**	**4,440**	**99.8**	**2,910**	**38.3**
Service Providing - Public	**147,917**	**11.8**	**3,760**	**17.6**	**230**	**5.2**	**1,360**	**17.9**
Government	147,917	11.8	3,760	17.6	230	5.2	1,360	17.9
Subtotal - Public	**147,917**	**11.8**	**3,760**	**17.6**	**230**	**5.2**	**1,360**	**17.9**
TOTAL	**1,127,134**	**90.0**	**22,570**	**105.6**	**4,670**	**104.9**	**4,270**	**56.2**

[1] 2012 6-month averages.

[2] County unclassified numbers include aggregated data not released by industry for reasons of confidentiality.

* Confidential data.

Source: NDETR 2013.

The combined labor force in the three counties is currently estimated at 37,541; approximately 35,188 of whom are employed. The remaining 2,353 unemployed individuals represent a 6.3 percent unemployment rate. This level is notably lower than both the 11.6 percent statewide unemployment rate and the 8.1 percent national rate (NDETR 2013). Unemployment rates for all three counties have declined from their recent highs, but have not yet reached their pre-recession levels. A potentially important consequence of the current unemployment rates is the availability of up to 2,300 workers for any available jobs related to the proposed NOA and SOA projects.

As reported in the Analysis of the Economic Impact of the Hard Rock Mining Sector on the Elko Micropolitan Statistical Area (Price and Harris 2007), the gold, silver, and other metal ore mining sector in the Elko Micropolitan SA had labor income of $346.2 million. This was approximately 31 percent of

total Elko Micropolitan SA labor income and the #1 labor income ranking of 146 economic sectors (Price and Harris 2007). In the first quarter 2007, the gold, silver, and other metal ore mining sector had an estimated paid labor income of $452.8 million (Price and Harris 2007). The study concluded that given the economic inter-linkage and multiplier effect, the total labor income impacts was $624.9 million.

As noted the Final EIS for the Bald Mountain Mine North Operations (BLM 2009a), in 2007, the Bald Mountain Mine payroll was approximately $23.1 million. Of this total, an estimated $14,784,000 was paid to residents of Elko County, $5,082,000 was paid to residents of White Pine County, and $3,234,000 was paid to residents of Eureka County. Purchases of materials and services for mine operations in 2007 totaled approximately $23,000. A portion of this total would generate sales tax revenue for the state and counties, depending on the actual location of the sales (BLM 2009a). The IMPLAN analysis used in the Final EIS estimated that at maximum capacity, the value of direct, indirect, and induced annual labor income from the Proposed Action was $9.9 million in 2006 dollars.

A specific area of economic concern for the proposed project is the potential for affecting the economic activity generated by big game hunting in Nevada. Statewide, it is estimated that hunters spent $204 million in Nevada in 2011, including approximately $87 million of trip-related expenditures and approximately $117 million for equipment and “other” expenses (U.S. Department of the Interior et al. 2013). It is further estimated that big game hunting accounted for approximately 70 percent of the total hunting expenditures, which would be approximately $143 million (U.S. Department of the Interior et al. 2013). While the survey did not differentiate expenditures among species being hunted, deer typically account for the largest number of licenses among the big game species in Nevada at approximately two-thirds of the total. There were 14,862 deer tags issued statewide in 2011; 3,694 (24.9 percent) of these were issued in Management Area 10, which includes the project study area. The numbers of tags vary from year-to-year, but over the past decade, Management Area 10 has ranged from 22.9 percent to 33.81 percent of the statewide total, averaging 26.5 percent (NDOW 2014b). The State of Nevada depends on income derived from hunting and fishing opportunities to underwrite the costs of wildlife management in Nevada. The Nevada State Legislature’s contribution to NDOW’s management program is minimal. If it assumed that the dollars approximately follow the tag counts, two-thirds of the big game tally would be approximately $95 million for deer; 26.5 percent of which would indicate Management Area 10 accounts for approximately $25 million of hunting expenditures per year (or about $6,750 per deer tag). Over a 20-year life of project, Management Area 10 would account for approximately $500 million of hunting expenditures. NDOW (2011d) estimates local and state tax revenues from hunting-related retail sales at approximately 8.1 percent, which would produce up to $7.7 million from deer hunting statewide and up to $2.0 million per year in revenue from Management Area 10 deer hunting.

These numbers are based on broad, general assumptions, but they provide a general sense of the annual economic activity generated by deer hunting in Management Area 10. The survey data do not provide sufficient information to discern how much of the expenditures would occur in or near the study area as, for example, hunters may purchase firearms, ammunition, off-road vehicles, and other equipment elsewhere for use in local hunting. The survey data also do not indicate whether there are additional benefits from indirect and induced economic activity related to hunting, although it is assumed that the reported expenditures only include direct expenditure dollars.

3.17.1.4 Housing

The 2010 census found 25,140 housing units within the 3 counties in the study area: 19,566 units (approximately 78 percent) were in Elko County; 1,076 units were in Eureka County; and 4,498 units were in White Pine County (**Table 3.17-4**). At the time of the census, 21,985 of the housing units were occupied, leaving 3,155 (12.5 percent) vacant. In Elko County, for example, 17,442 units, were occupied in 2010 and 2,124 (10.9 percent) were vacant. However, the overall vacancy rate can be misleading; however, as some portion of the vacant units were for seasonal, recreational or occasional use and not readily available for people seeking housing.

Vacancy rates were at an extremely low 1.3 percent in homeowner units, but a notably higher 10.2 percent in rental units (U.S. Census Bureau 2010b). Vacancy rates varied geographically as well as by type. The Spring Creek area had a 95.7 percent occupancy rate, while Elko was at 93.4 percent and Carlin was at 84.6 percent. The vacancy rates for just homeowner units ranged from a very tight 0.9 percent in Elko to 3.3 percent in Eureka County; the overall rate was just 1.4 percent for the 3 counties in the study area. Vacancy rates for rental units ranged from 4.6 percent in the Spring Creek area to 21.3 percent in Carlin, with a three-county rate of 9.9 percent.

Short-term housing opportunities in the study area are amply available. Elko is home to 31 motels, hotels, and casinos hosting over 2,000 rooms. There are several mobile home parks and six recreational vehicle (RV) parks in the city with approximately 500 spaces. There are several campgrounds in the surrounding area, several of which are on BLM-administered lands. Carlin has a 61-room Comfort Inn and two small, older motels plus limited opportunities for weekly rentals. There are 19 hotels, motels, and bed and breakfasts in Ely and four more in nearby communities of Baker and Preston. There also are 11 RV parks and campgrounds in the vicinity. There are 4 hotels in Eureka as well as a number of RV spaces.

Table 3.17-4 Housing Vacancy Rates in 2010

Geographic Area	Housing Units				Vacancy Rate by Type (%)	
	Total	Occupied	Vacant	Vacancy Rate (%)	Homeowner Units	Rental Units
City of Elko	7,221	6,743	478	6.6	0.9	6.9
Spring Creek CDP[1]	4,394	4,204	190	4.3	1.2	4.6
City of Carlin	1,043	882	161	15.4	1.0	21.3
Elko County	19,566	17,442	2,124	10.9	1.3	10.2
Eureka CCD	699	552	147	21.0	2.6	8.6
Eureka County	1,076	836	240	22.3	3.3	11.9
City of Ely	2,185	1,856	329	15.1	3.2	9.3
White Pine County	4,498	3,707	791	17.6	2.5	8.9

[1] CCD = Census County Division; CDP = Census Designated Place.

Source: U.S. Census Bureau 2010b.

3.17.1.5 Community Facilities and Services

Public Utilities

Water

The City of Elko obtains municipal water from 18 deep-water wells, and has 25 million gallons of storage capacity. The system has a maximum production capacity of 14.5 million gallons per day (mgd) with current usage ranging from 3 mgd to a peak of 13 mgd. Spring Creek residents are served by nine public wells. Carlin obtains water from one deep-water well and several natural springs, water is stored in a 2-million-gallon tank. Peak production capacity is 1.4 mgd; averaging approximately 1 mgd.

The City of Ely provides water and sewer service within city boundaries and supplies water to some areas adjacent to the city. Ely's water system relies on groundwater sources, including two dewatering wells associated with the Robinson open pit mine and five additional wells. Water quality is generally good. The water system includes 5 storage tanks with a total capacity of 8 million gallons. Supply capacity is sufficient for the needs of the system. If the Robinson Mine source should lost, there might be a need to limit summer irrigation to alternate days, although tests in recent years have indicated supply from the other five wells should be sufficient (Municipal Water Department 2013).

The water systems in Eureka and nearby Devil's Gate Districts #1 and #2 are managed by the county Public Works Department. The Eureka system produces water from 2 wells, pumping it to 3 storage tanks with a total capacity of 2,350,000 gallons. A recent spring rehabilitation project above the town has augmented Eureka's supply from numerous springs. The Devil's Gate system consists of 2 wells, pumps, a 250,000-gallon storage tank, and distribution system.

Wastewater

Elko and Carlin have wastewater treatment facilities. The "fixed film" biological treatment plant averaging 3.5 mgd is located in Elko. Approximately 60 percent of treated water is reused for irrigation. Carlin employs two lagoons with rapid infiltration basins. Wastewater treatment in Spring Creek utilizes private septic systems.

Ely treats wastewater with an activated sludge treatment plant primarily to reduce nitrogen from the wastewater stream. Effluent achieves very good compliance with water quality standards (Municipal Water Department 2013). The wastewater system has capacity for current needs plus potential growth; it currently operates at approximately 60 percent of capacity.

The Eureka Waste Water Treatment Facility, managed by Eureka County's Public Works Department, treats waste water for the Town of Eureka. The facility is permitted to discharge up to 100,000 gpd and has only a modest amount of unused discharge capacity currently.

Solid Waste

The City of Elko operates a regional solid waste landfill. At current use rates, it has capacity to last until at least 2092.

The City of Ely operates a regional solid waste landfill on the northwest edge of the city, which is permitted for both municipal waste and construction waste. The available capacity is being used faster than expected, but the current estimated closure date is in 2050, and an alternative site will be needed to accommodate future demand.

Eureka County Public Works operates a landfill west of town. Current capacity is expected to be sufficient until approximately 2035 under current conditions, and the county is exploring additional capacity via acquisition of additional land from the BLM or vertical expansion of the current landfill through a permit modification through NDEP.

Energy

Electricity is provided to residents in the City of Elko and some surrounding portions of the study area in Elko County by Nevada Power; natural gas is provided by Southwest Gas Corporation.

Mount Wheeler Power, a rural electric cooperative, serves all of White Pine County, southeastern Eureka County and portions of southern Elko County. The service area includes the City of Ely and the Town of Eureka. There is no natural gas service in Eureka County or White Pine County; propane is supplied by private companies. White Pine County also has private heating oil and coal suppliers.

Public Safety

Law Enforcement

Law enforcement, detention and emergency dispatch services for unincorporated Elko County are provided by the County Sheriff. Elko and Carlin police departments provide law enforcement for their respective incorporated jurisdictions. The Bureau of Indian Affairs Police are responsible for the 193-acre Elko Band Colony. The Eureka County Sheriff provides law enforcement, detention and emergency dispatch services for all of Eureka County. The White Pine County Sheriff is responsible for law enforcement, detention and emergency dispatch services in rural White Pine County. The sheriff also serves as the chief of police for the City of Ely under a cooperative agreement; Ely's police department provides law enforcement within the city. The Duckwater Reservation has its own small police department. The Nevada Highway Patrol provides law enforcement on the state highway system and provides support to other law enforcement agencies.

Fire Protection

Fire protection services are provided by numerous agencies throughout the study area. The Elko City Fire Department, Carlin City Volunteer Fire Department, BLM, USFS, and Northeastern Fire Protection Department of the Nevada Division of Forestry provide fire protection in Elko County. These departments are all involved in mutual aid cooperative agreements. The Elko City Department is the largest of the agencies with 3 staff positions and 15 career firefighters supported by 34 volunteer positions. The department has 10 major pieces of equipment, including 7 regular engines, 2 smaller specialty trucks, and 1 specialized airport engine. The department also houses four pieces of Nevada Department of Forestry firefighting equipment. The Carlin Volunteer Fire Department primarily serves the city and surrounding area with fire protection and ambulance services with a volunteer crew of 33.

White Pine County fire protection services are provided by the City of Ely Fire Department and a county-wide fire district with volunteer units in several smaller communities in the county. The Ely Fire Department is operated by a combination of 5 full-time, paid firefighters and approximately 31 volunteer firefighters providing protection for the City of Ely. A majority of the private lands in White Pine County are included in the Nevada Division of Forestry White Pine County Fire Protection District. The District is managed by a Battalion Chief; volunteer departments in smaller communities in the county are operated under the auspices of the district.

Eureka County does not have a county fire department, but it provides funding, a full time battalion chief, facilities, equipment, training and supplies for four volunteer departments in communities throughout the county. The Eureka Volunteer Fire Service (VFS) provides fire protection services in the town and surrounding area. The VFS is staffed entirely by approximately 25 volunteers with a fleet of 8 vehicles: 2 structure engines, a 3,800-gallon water tender, 3 brush fire trucks, a rescue/extraction truck, and a pumper truck for use in the town.

In addition to the local fire departments, the BLM, USFS, and Northeastern Fire Protection Department of the Nevada Division of Forestry provide fire protection, primarily in outlying areas where they are primarily responsible for fighting wildland fires. The Nevada Division of Forestry received legislative approval in 2013 for an enhanced Wildland Fire Protection Program, which "allows the State to provide

financial assistance with wildland fire costs, increased suppression resources and coordination, incident management assistance, and technical expertise to participating counties during a wildfire" (Nevada Division of Forestry 2014). Local, state, and federal agencies are all involved in mutual aid/cooperative agreements, supporting each other as appropriate and as needed, depending on the circumstances of each fire.

Emergency Medical Services

The Elko County Ambulance Service provides ambulance service throughout the county with ambulance units located in Elko, Wells and Jackpot. The certified service operates 24 hours per day with a staff of paramedics, Emergency Medical Technicians, and volunteers. In addition to ground ambulances, there are fixed wing and helicopter air ambulance stationed at the Elko airport.

White Pine County emergency medical service ambulances are based at the Emergency Response Complex in Ely. Staffing is provided by volunteer Emergency Medical Technicians with back-up from fire department first responders.

The Eureka County Emergency Medical Service provides emergency services throughout the county. Ambulances are based in three locations, including in the Town of Eureka. Staffing in the Eureka area includes 2 paid, full-time employees, including an Emergency Medical Service coordinator and approximately 14 volunteers.

Health Care

The Northeast Nevada Regional Hospital in Elko is the principal health care facility for all of northeastern Nevada. It provides 24-hour emergency care and has 75 acute care rooms. The hospital has a full service laboratory, an intensive care unit, both magnetic resonance imaging and computerized axial tomography scan capabilities, and provides most major medical specialty services (Northeast Nevada Regional Hospital 2013). The hospital also provides services to the Elko Band Colony Health Center under an Indian Health Service contract.

The Carlin Community Health Center is one of a series of federally supported clinics providing health care to medically underserved areas operated by Nevada Health Centers, a private, non-profit organization. The Carlin clinic is staffed by physicians, physician assistants and nurse practitioners. The center provides service in family medicine, preventative health, women's health, children's health and immunizations, health education, prenatal and newborn care, and pharmacy services.

The William Bee Ririe Hospital in Ely is an accredited critical access hospital providing a full range of health care for the Ely/White Pine County area. The hospital provides both intensive care and general care services ranging from state of the art diagnostic services to emergency care, surgery, and recuperative therapies. The hospital also operates a rural health clinic in Ely.

Eureka County supports two diagnostic and treatment centers through contracts with Nevada Rural Health Services. It also funds ambulance/emergency medical technician services in coordination with the volunteer fire departments. There is no hospital in Eureka County; persons needing hospital or medical services beyond the capabilities of the diagnostic centers are transported to Elko or Ely or other regional facilities by air ambulance.

3.17.1.6 Education

Elementary and secondary schools in the study area are operated by the Elko, Eureka and White Pine county school districts.

Elko County School District. With administrative offices in Elko, the Elko County School District is by far the largest of the three with over 9,500 students in the 2010-2011 school year and more than 10,000 in the 2012-2013 school year (**Table 3.17-5**).

Table 3.17-5 Public Schools Enrollment History

School District/ Year	Enrollment by Grade Level[1]						Gain/ Loss Over Prior Year (%)
	Pre-Kindergarten[2]	Kindergarten	Elementary (1-6)	Secondary (7-12)	Ungraded[3]	Total	
Elko County School District							
2008-2009	65	676	4,441	4,470	17	9,669	-1.4
2009-2010	78	754	4,225	4,407	10	9,474	-2.0
2010-2011	75	780	4,245	4,446	10	9,556	0.9
2011-2012	63	823	4559	4517	10	9,972	4.4
2012-2013	128	874	4564	4492	14	10,072	1.0
5-Year Net Change							4.2
Eureka County School District							
2008-2009	0	14	100	125	3	242	2.5
2009-2010	13	16	106	125	0	260	7.4
2010-2011	10	19	92	118	0	239	-8.1
2011-2012	21	14	102	115	1	253	5.9
2012-2013	20	26	106	119	0	271	7.1
5-Year Net Change							12.0
White Pine County School District							
2008-2009	34	101	617	680	0	1,432	-0.8
2009-2010	31	99	627	685	0	1,442	0.7
2010-2011	42	97	599	686	1	1,425	-1.2
2011-2012	40	116	603	641	1	1,401	-1.7
2012-2013	13	123	632	651	1	1,420	1.4
5-Year Net Change							-0.8

[1] Enrollments at the end of the first school month.

[2] Pre-Kindergarten refers to 3 and 4 year olds receiving special education (NAC 388.490).

[3] Ungraded refers to a student enrolled in a non-graded class in a school for special education or a student who cannot be assigned to a particular grade because of the nature of his or her condition (NAC 387.111).

Source: Nevada Department of Education 2013.

Eleven of the district's schools are located in the Elko-Spring Creek-Carlin area. Elko has four elementary schools, one junior high, and one high school. Spring Creek has two elementary schools, one middle school, and one high school. Carlin has a combined school for elementary through high school. The district had an overall ratio of 17.2 students per teacher in the 2010-2011 school year.

Students from the Elko Band Colony attend Elko District schools. There also is a Head Start Program at the Colony for children from 3 to 5 years old.

The White Pine County School District, headquartered in Ely, had approximately 1,425 students in the 2010-2011 school year, dropping only slightly to 1,420 in the 2012-2013 school year. White Pine had 16.5 students per teacher in the 2010-2011school year. The White Pine district has three elementary schools, one middle school, two high schools and one K-12 school located in Lund.

Eureka County School District is the smallest of the three districts with fewer than 300 students. The student population has grown by 13.3 percent from 2010-2011 to 2012-2013. The district had just 9.3 students per certified teacher in 2010-2011. The district has one elementary school in Crescent Valley and one elementary school and one high school in Eureka. High School students from the Duckwater Indian Reservation in the northeast corner of Nye County are transported to Eureka for high school, although the reservation has its own elementary-middle school under the jurisdiction of the Nye County School District.

As **Table 3.17-5** illustrates, the Elko County School District has experienced substantial enrollment growth in the last 3 years, reaching its highest enrollment level since the national recession began. The Eureka County School District also has seen notable growth, albeit from a much smaller base. Enrollment in the White Pine County School District has fluctuated, but remained in a narrow range.

The primary provider of higher education opportunities to residents in the study area is Great Basin College (GBC). The college, a pioneer in distance learning techniques, serves nearly 4,000 students in six of Nevada's largest rural counties (GBC 2008). Its main campus, and only residential facility, is located in Elko. GBC also has a branch center with extensive course offerings in Ely and satellite centers with limited offerings in Eureka, Carlin and more than 20 other communities throughout Nevada.

In addition to Great Basin College, the University of Nevada, Reno Fire Science Academy (FSA) is located at Carlin. The FSA is purported to be "one of the finest emergency response programs and training facilities in the world" (FSA 2008). It offers highly specialized training in emergency response and emergency management.

3.17.1.7 Public Finance

There are six main general governmental entities influencing the study area: Elko, Eureka, and White Pine counties, and the cities of Elko, Carlin, and Ely. The Town of Eureka is an unincorporated community overseen by the Eureka County Commissioners. Elko County has a professional county manager and a five-member Board of Commissioners, who oversee the operations of the county, including administration, law enforcement, courts and public works. Eureka County operates with a three member Board of Commissioners, who function as both policy makers and administrators, with department heads and supervisors taking direction from the Commissioners as the main county administrators. White Pine County has a 5-member Board of Commissioners, providing both policy and administration. Both the City of Elko and the City of Carlin employ council-manager governmental structures with professional city managers and policy making City Councils, each made up of a directly elected Mayor and four Council Members. The City of Ely has a similar Council-Manager form of government, but with five council members plus the mayor. The Town of Eureka does not have a separate governing board; it is under the jurisdiction of the county board.

Local government finance in Nevada is a complex admixture of locally derived and state shared revenues. Local revenues are primarily *ad valorem* property taxes on real and personal property and the net proceeds of mines in the jurisdiction. They also collect revenues from fines, licenses and permits, and fees for services. State shared revenues, designated as intergovernmental resources in **Tables 3.17-6** and **3.17-7**, include sales, motor vehicle, fuel and gaming taxes. State revenue sharing addresses significant economic disparities between the relatively wealthy urban centers of Reno and Las Vegas and the often less affluent rural agricultural and mining communities (Nevada Department of Taxation 2013).

Elko, Eureka and White Pine counties have approved deficit operating budgets for fiscal year (FY) 2012-2013, showing anticipated annual revenues potentially falling short of anticipated annual expenditures. In the event these shortfalls would occur, the counties would tap reserves to balance their budgets, as required by statute (**Table 3.17-6**). Elko County anticipated revenues of $41.2 million against planned expenditures of $59.7 million, resulting in an expected deficit of $18.4 million. Eureka County anticipated

revenues of $15.2 million and expenditures of $35.6 million. White Pine County expects revenues of $19.7 million and expenditures of $23.8 million.

Two of the three study area cities and the Town of Eureka have similarly constructed budgets for the FY 2012-2013 with shortfalls in anticipated revenues compared with expenditures (**Table 3.17-7**). The City of Elko's FY 2012-2013 budget anticipates revenues of $22.7 million and expenditures of $26.5 million, producing a $3.9 million deficit. The much smaller City of Carlin planned revenues of $2.6 million and expenditures of $3.0 million, leaving a $0.4 million deficit. The Town of Eureka budget, prepared by the County Board, anticipates revenue of $108,173 and expenditures of $118,400, resulting in a $10,227 deficit. The City of Ely is the only entity that has budgeted for a surplus in FY 2012-2013. Ely expects revenue of $2.58 million against expenditures of $2.57 million, which would produce a small surplus of $14,103.

Table 3.17-6 County Budgets for Fiscal Year 2012-2013

Governmental Fund Types and Expendable Trust Funds ($)	Elko County	Eureka County	White Pine County
Revenues			
Property Taxes	12,545,451	5,109,733	4,323,270
Other Taxes	14,000	164,047	5,560,604
Licenses and Permits	855,000	8,750	189,290
Intergovernmental Resources	21,913,833	8,049,750	7,439,439
Charges for Services	3,242,520	1,284,470	822,150
Fines and Forfeits	1,380,200	86,900	414,400
Miscellaneous	1,274,800	465,455	970,400
Total Revenues	41,225,804	15,169,105	19,719,553
Expenditures			
General Government	12,309,445	11,978,230	4,617,523
Judicial	11,209,806	1,759,850	4,792,082
Public Safety	14,633,563	3494064	2,614,530
Public Works	9,157,378	8,647,500	3,599,743
Sanitation[1]	--	327,500	--
Health[1]	342,200	1,340,849	114,140
Welfare	3,145,218	57,500	700,126
Culture and Recreation	2,132,795	1,860,193	5,490,356
Community Support	2,528,829	1,435,663	749,549
Intergovernmental Expenditures	3,433,612	4,279,000	888,740
Capital Projects	--	--	--
Contingencies	450,000	400,000	250,000
Utility Enterprises	--	--	--
Hospitals	--	--	--
Transit Systems	--	--	--
Airports	--	--	--
Other Enterprises	--	--	--
Debt Service - Principal	302,916	--	--

Table 3.17-6 County Budgets for Fiscal Year 2012-2013

Governmental Fund Types and Expendable Trust Funds ($)	Elko County	Eureka County	White Pine County
Interest Cost	11,592	--	--
Total Expenditures	59,657,354	35,580,349	23,879,204
Excess Revenues Over (Under) Expenditures	(18,431,550)	(20,411,244)	(4,097,236)

[1] White Pine County combines Health and Sanitation into one line item; Elko County doesn't identify a Sanitation budget.

Sources: Nevada Department of Taxation 2013 (Schedules S-1 from local government entities' FY 2012 to 2013 budgets).

Table 3.17-7 City and Town Budgets for Fiscal Year 2012-2013

Governmental Fund Types and Expendable Trust Funds ($)	City of Elko	City of Carlin	Town of Eureka	City of Ely
Revenues				
Property Taxes	3,676,885	312,789	21,173	--
Other Taxes	3,279,818	100,000	--	76,000
Licenses & Permits[1]	1,780,260	70,000	1,500	307,000
Intergovernmental Resources	12,544,743	1,816,577	83,500	1,915,263
Charges for Services	1,047,275	130,000	--	123,500
Fines and Forfeits	203,250	77,800	--	112,600
Miscellaneous	120,864	92,775	2,000	49,710
Total Revenues	22,653,095	2,599,941	108,173	2,584,073
Expenditures				
General Government	3,011,515	641,292	--	202,276
Judicial	508,032	83,125	--	244,616
Public Safety[2]	9,687,225	1,118,550	45,400	1,096,617
Public Works	7,227,066	392,133	70,500	514,540
Sanitation	--	--	--	--
Health[3]	659,495	99,596	--	229,190
Welfare[3]	--	--	--	--
Culture and Recreation	4,242,366	522,175	--	125,916
Community Support	30,000	56,828	--	--
Intergovernmental Expenditures	--	--	--	--
Capital Projects[4]	--	--	--	64,400
Contingencies	265,218	20,000	2,500	30,000
Utility Enterprises	--	--	--	--
Hospitals	--	--	--	--
Transit Systems	--	--	--	--
Airports	--	--	--	--
Other Enterprises	--	--	--	--

Table 3.17-7 City and Town Budgets for Fiscal Year 2012-2013

Governmental Fund Types and Expendable Trust Funds ($)	City of Elko	City of Carlin	Town of Eureka	City of Ely
Debt Service - Principal	480,000	48,000	--	32,673
Interest Cost	411,324	15,000	--	29,742
Total Expenditures	26,522,241	2,996,699	118,400	2,569,970
Excess Revenues Over (Under) Expenditures	(3,869,146)	(396,758)	(10,227)	14,103

[1] Includes electrical franchise fee for Ely.

[2] Includes Fire Protection line item for Ely.

[3] Elko combines Health and Welfare into a single line item.

[4] Includes Street Improvements line item for Ely.

Sources: Nevada Department of Taxation 2013 (Schedules S-1 from local government entities' FY 2012 to 2013 budgets).

In all of the deficit budget jurisdictions, unreserved fund balances are available that would be sufficient to cover the budgeted shortfalls, although, in some cases, the reserve funds would be substantially reduced if the budgeted shortfalls should actually occur. Elko County, as an example, chooses to budget conservatively by underestimating revenue for the forthcoming year and appropriating "every dime" for expenditures (Elko County 2008). The county's experience with this approach has been that, at the end of a FY, actual revenue has exceeded their projections and expenditures for most funds rarely reach the appropriated levels (Elko County 2008). The result has been that the county's ending fund balance has held firm or only declined modestly in recent years (Elko County 2008). If the year's revenue and expenditure streams should play out close to the budgeted amounts, Elko County's unreserved fund balance would drop from over $21 million to under $3 million, although indications are that the actual decline would be substantially smaller. After covering budgeted deficits, Eureka County would still have an unreserved fund balance of over $25 million and White Pine County would have an unreserved fund balance of over $29 million.

The largest revenue sources for the county governments are projected to be property taxes and intergovernmental transfers, and in the case of White Pine County, "other" taxes. Intergovernmental transfers are by far the largest source of revenues for the cities and the Town of Eureka. Expenditure emphases vary notably among jurisdictions as illustrated in **Tables 3.17-6** and **3.17-7**.

Eureka County has experienced substantial increases in its property tax base from FY 2011 to FY 2013, due entirely to a near doubling of net proceeds of mines. Total assessed valuations for Elko County and White Pine County have grown only slightly over the same period. All three counties benefit from taxes on net proceeds of mines, but Eureka County's budget benefits to a much greater degree than either of the other two. Net proceeds of all mines constitute over 70 percent of the total assessed valuation in Eureka County, but slightly less than 19 percent of Elko County's assessed valuation and slightly over 23 percent of White Pine County's assessed valuation.

Ad valorem tax rates vary substantially amongst the counties within the study area. Elko County's *ad valorem* tax rate was $0.8386 per $100 of assessed value for FY 2012-2013; Eureka County's rate was a similar $0.8458 per $100 of assessed value. White Pine County's rate was more than double those rates at $1.951 per $100 of assessed value.

Sales tax rates in Nevada counties held constant at 6.5 percent in most rural counties for several years, but increased after the Legislature raised the local school support tax from 2.25 percent to 2.60 percent in 2009. Both Elko and Eureka counties now collect sales and use taxes at a 6.85 percent rate; and White Pine County collects sales and use taxes at a 7.725 percent rate. The proposed NOA and SOA projects would likely purchase materials and services in both Elko County and White Pine County,

generating sales and use tax payments to both. Of the total sales and use tax payments, a portion (2 percent of the 6.85 percent collected) goes to the state general fund and 2.6 percent goes to school districts. The county where the tax is generated receives 0.5 percent, and the remaining 1.75 percent is distributed to all counties under a statutory formula (Nevada Department of Taxation 2010).

3.17.1.8 Social Conditions

Elko, Spring Creek, and Carlin, in western Elko County, grew very rapidly in the 1980s, due to a boom in mining and related support activities, but stabilized in subsequent years when they experienced years of modest population growth and decline through about 2003. Growth resumed in recent years, but at moderated rates. The passage of time and the community's ability to weather not only the booms, but subsequent downturns have allowed for development of a relatively stable social setting that now exists in Elko County. Many residents have lived in the area for a number of years, social ties have become established, and residents take pride in their communities. Many of the people place a high priority on maintaining informal lifestyles and small town traditions. Eureka County and White Pine County didn't experience the boom that occurred in Elko County from 1980 to 1990 (**Table 3.17-1**). Growth in those two counties has been more moderate over the last three decades with a softening in the 1990 to 2000 period followed by modest increases in the growth rates subsequent to 2000. The City of Ely lost nearly 20 percent of its population from 1980 to 2000, but has rebounded slightly since 2000.

Gold prices continue to be a significant factor driving the growth or decline of the communities. When prices dropped in the late 1990s, workers were laid off, some mines announced early closures, and expansion plans were shelved, at least temporarily. As prices rose more recently, the reverse was true. Mines with available reserves implemented growth plans to take advantage of the opportunities. Subsequent price declines have shown early indications of reducing growth pressures once again. Although Elko County, in particular, is more diversified than it was two decades ago, the mining industry is still an important sector, affecting both the economy and the psychology of area communities. The historical dependency on natural resource extraction and production, relatively low population, distances separating communities, structure of local governance in rural Nevada, and issues associated with management of federal lands all influence social conditions, organization, and values in the planning area (BLM 2007b).

The study area has at least two population segments: long-term residents connected to the agricultural base or attracted to the quality of life, and a generally more mobile segment that reacts to job opportunities, particularly in the mining industry (BLM 2007b). With the relative stability in the mining economy in recent years, however, the distinction between long-term and more mobile populations has been less pronounced. One indicator of greater stability is the fact that violent crime rates throughout the three-county study area are notably lower than for Nevada as a whole with rates for all three counties at least 40 percent lower than the state rate.

3.17.2 Environmental Consequences

This section discusses project related impacts to social and economic values resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to social and economic values include: 1) effects associated with potential changes in long-term local population, employment, or earnings associated with construction or operation of the proposed NOA and SOA projects; 2) potential project-related demands for housing and public services or infrastructure that would exceed capacities in these systems; 3) potential project-related effects on public sector fiscal conditions regarding demand for services compared to revenue generated; and 4) potential effects of the No Action Alternative relative to local work force and employment conditions.

As indicated in Chapter 2.0, the calendar years cited in the following discussion are approximate and could vary, depending on completion of permitting.

3.17.2.1 Proposed Action

Under the Proposed Action, construction of the proposed NOA project is anticipated to begin in 2016; construction of the proposed SOA project is anticipated to begin in 2017 (**Table 3.17-8**). Construction activities would occur in the proposed NOA for approximately 8 years beginning in mine year 1; construction activities would occur in the proposed SOA for approximately 5 years beginning in mine year 2. Construction employment would be inconsistent throughout the construction periods. The contractor work force would increase to approximately 120 contract workers for a 2-year period at the proposed NOA, overlapping the second year with the first year of 120 additional contractor workers employed at the proposed SOA (**Table 3.17-8**). At completion of initial construction phases, operations would begin with modest increases from current levels at the proposed NOA and an increase to a total of approximately 200 workers (including 10 contractors) at the proposed SOA. The total employment level would grow to a peak of approximately 782 in 2018, and would average approximately 664 from 2016 through 2024. Staff at the proposed NOA would be fairly consistently in the range of 400 to 450 workers – approximately 100 above current levels – for much of that time. Staff levels would be in the range of 160 to 190 workers at the proposed SOA until 2024 when proposed SOA employment would taper off. Contractor employment would typically include 20 workers at the proposed NOA and 10 workers at the proposed SOA, except for temporary spikes to 120 workers at the proposed NOA in both 2022 and 2024 (**Table 3.17-8**). After 2026, most operations would taper off at the proposed SOA, and mining would end at the proposed NOA, although leaching, reclamation and closure activities would continue at proposed NOA, with operations winding down after 2036. It is expected that the project would effectively terminate at the end of 2036, except for reclamation and closure activities, which would continue through 2061. Long-term monitoring and fluid management activities would continue beyond that time as long as necessary.

Total employment would be at or above current levels through approximately 2026, dropping below current levels by over 200 workers from 2027 through 2032, before tapering down to a small monitoring staff by 2034.

Employment is one of the key driving forces in determining the social and economic effects of a proposed mine. In this case, with an existing mine in operation at the existing NOA, and several other Barrick operations in northeast Nevada, it is uncertain how many of the additional workers needed for the proposed NOA and SOA projects would be new hires and how many would be transfers from other operations. It may be that the needed workers would be all, or nearly all, new hires. At the opposite extreme many, or even most, of the workers may be transferred from current positions at other Barrick operations. The actual scenario would probably lie somewhere in between the extremes. In general, the effects would be similar, except that the timing might differ. The total employment and payroll would likely be the same as any transfers would likely be “surplus” workers who might otherwise be laid off from their current projects. Under the circumstances, this analysis assumed all of the permanent workers would be new hires to determine whether there could be substantial gaps in local facility and service capabilities should the maximum scenario occur.

<u>Income and Employment</u>

The Proposed Action would continue to employ the existing 450 workers, all of whom are committed to the proposed NOA. Approximately 410 of the 450 are BMM employees and 40 are contractors.

Table 3.17-8 Employment Estimates

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Existing																							
Salaried	65	65	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly	345	345	345	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	410	410	410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contractors	40	40	40		0	0																	
Subtotal w/Contr.	450	450	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proposed Action - North Operations Area																							
Salaried	0	0	0	70	70	70	70	70	69	68	68	67	68	68	48	47	46	46	42	35	19	3	3
Hourly	0	0	0	404	403	381	373	364	355	337	343	335	346	351	180	178	176	171	174	151	79	21	21
Subtotal	0	0	0	474	473	451	443	434	424	405	411	402	414	419	228	225	222	217	216	186	98	24	24
Contractors	0	0	0	120	120	20	20	20	20	120	20	120	20	20	20	20	20	20	20	20	20	0	0
NOA Subtotal w/Contr.	450	450	450	594	593	471	463	454	444	525	431	522	434	439	248	245	242	237	236	206	118	24	24
Proposed Action - South Operations Area																							
Salaried	0	0	0	0	4	21	21	20	20	17	18	12	1	1	0	0	0	0	0	0	0	0	0
Hourly	0	0	0	0	1	170	168	166	163	163	141	72	11	11	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	5	191	189	186	183	180	159	84	12	12	0	0	0	0	0	0	0	0	0
Contractors	0	0	0	0	120	120	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0
SOA Subtotal w/Contr.	0	0	0	0	125	311	199	196	193	190	169	94	12	12	0	0	0	0	0	0	0	0	0
Proposed Action North Operations Area and South Operations Area Projects Combined																							
Salaried	65	65	65	70	74	91	91	90	89	85	86	79	69	69	48	47	46	46	42	35	19	3	3
Hourly	345	345	345	404	404	551	541	530	518	500	484	407	357	362	180	178	176	171	174	151	79	21	21
Subtotal	410	410	410	474	478	642	632	620	607	585	570	486	426	431	228	225	222	217	216	186	98	24	24
Contractors	40	40	40	120	240	140	30	30	30	130	30	130	20	20	20	20	20	20	20	20	20	0	0
Total	450	450	450	594	718	782	662	650	637	715	600	616	446	451	248	245	242	237	236	206	118	24	24

Construction

Construction would require work force increases of up to 2 years, including approximately 64 BMM staff and 80 contractors for the proposed NOA, plus up to 120 additional contractors for the proposed SOA. Considering the relatively short time period of construction employment spikes and that three-quarters of the increases would be contract workers, many of whom would likely be currently located in the three-county study area, it is likely that the indirect and induced employment generated by the construction activity would be 24 indirect and 36 induced jobs. Considering the relatively small number of workers needed, the short duration of high-activity construction periods, and the over 2,300 unemployed workers in the study area, local labor is expected to provide 55 percent of the direct project workers and all of the indirect and induced workers during construction, leaving a need for very few workers from outside the local area. The 55 percent figure is equivalent to current local versus non-local employment at the mine. The assumption that indirect and induced employment from construction activities would all be local derives from the short-term (2 years or less) construction employment spikes, which are considered to be too brief to attract significant numbers of non-local job seekers for most secondary job opportunities. The employment impact during construction represents less than 0.3 percent of total employment in the three-county study area. It would lower the unemployment rate in the study area from 6.3 percent to 5.9 percent.

Employment Operations and Total

Total employment at the proposed NOA would ramp up from the current level to 594 workers (including contractors) in 2016 and would peak at 782 in 2018, with the addition of construction and operations personnel at the proposed SOA. At peak, the total would include 332 additional workers over current levels, including 100 additional contractors. After the end of a construction spike at the proposed SOA in 2018, total employment would drop by over 100 and continue at approximately that level, with some variability, through 2024 (**Tables 3.17-8**). The annual average employment from 2016 through 2024 would include 566 BMM staff and 98 contractors. Relative to current direct employment, this would be equivalent to 156 additional BMM employees and 58 additional contractors for a total of 214 additional workers (**Table 3.17-8**). For purposes of this analysis, it is assumed that all of these individuals would be new workers.

Table 3.17-9 illustrates the indirect and induced employment that would result from the average increase in direct employment from 2016 through 2024. As previously noted, it is uncertain how many of the project employees would be new hires – which would theoretically generate indirect and induced jobs based on a multiplier effect – as opposed to transferees from other local projects. If some or all of the jobs were filled by transferees, the indirect and induced employment they would support would already be embedded in the local economy and the effect would be one of sustaining existing economic activity rather than generating new activity. The peak employment effects noted in **Table 3.17-10** also are considered to be maximums because direct project employment above approximately 660 workers would last for just 4 years (2017, 2018, 2019, and 2022). It is likely that indirect and induced employment changes may be somewhat lower than indicated in the table as these secondary and tertiary effects would not respond as quickly as direct employment, although much of the economic activity generated by worker expenditures would still occur.

Table 3.17-9 Proposed Action New Project-related Employment, Households, and Population Projections (2015-2024 Average)

New Project-related Employment								
Direct[1]			Indirect and Induced[2]			Total		
Local	Non-local	Total	Local	Non-local	Total	Local	Non-local	Total
118	96	214	120	40	161	238	136	375

New Project-related Households			
	Direct[3]	Indirect & Induced[4]	Total New Households
New Non-local Workers	96	40	
Single	24	10	34
Married - 1 Worker	65	15	80
Married - 2 Workers	4	8	12
New Households	**93**	**33**	**126**

New Project-related Population					
		Population[5]			
			Children[6]		
	Households	Adults	School-Age	Other	Total
Single Households	34	34	0	0	34
Married Households	92	184	52	13	247
Total	**126**	**218**	**52**	**13**	**283**

1 Work force was assumed to be 55 percent local, 45 percent non-local.

2 Indirect employment was calculated using an employment multiplier of 0.30; induced employment was calculated using a multiplier of 0.45 (Dobra 1989); the indirect and induced work force was assumed to be 75 percent local and 25 percent non-local.

3 Non-local direct work force was assumed to be 25 percent single or married without families present; 10 percent of married worker households were assume to be two-worker families.

4 Non-local indirect and induced work force was assumed to be 25 percent single or married without families present; half of married worker households were assume to be two-worker families.

5 Population estimates were based on one person per single family household and 2.71 persons per married household.

6 Eighty percent of children were assumed to be of school age.

Table 3.17-10 Proposed Action – New Project-related Employment, Households, and Population Projections (2015-2024 Peak)

New Project-related Employment								
Direct[1]			Indirect and Induced[2]			Total		
Local	Non-local	Total	Local	Non-local	Total	Local	Non-local	Total
183	149	332	187	62	249	369	212	581

New Project-related Households			
	Direct[3]	Indirect & Induced[4]	Total New Households
New Non-local Workers	149	62	
Single	37	16	53
Married - 1 Worker	101	23	124
Married - 2 Worker	6	12	17
New Households	**144**	**50**	**194**

New Project-related Population					
		Population[5]			
			Children[6]		
	Households	Adults	School-Age	Other	Total
Single Households	53	53	0	0	53
Married Households	141	282	80	20	382
Total	**194**	**335**	**80**	**20**	**435**

1 Work force was assumed to be 55 percent local, 45 percent non-local.

2 Indirect employment was calculated using an employment multiplier of 0.30; induced employment was calculated using a multiplier of 0.45 (Dobra 1989); the indirect and induced work force was assumed to be 75 percent local and 25 percent non-local.

3 Non-local direct work force was assumed to be 25 percent single or married without families present; 10 percent of married worker households were assume to be two-worker families.

4 Non-local indirect and induced work force was assumed to be 25 percent single or married without families present; half of married worker households were assume to be two-worker families.

5 Population estimates were based on one person per single family household and 2.71 persons per married household.

6 Eighty percent of children were assumed to be of school age.

Because there are approximately 2,350 unemployed workers within the three-county study area, it is assumed that many of the workers needed for the proposed NOA and SOA projects would be available locally. The calculations in **Tables 3.17-9** and **3.17-10** assume local workers would fill approximately 55 percent of direct project jobs and 75 percent of the indirect jobs during development and operation of the proposed NOA and SOA projects. An estimated 149 direct and 62 indirect and induced workers from outside the local area would be needed in the peak year (2018). The total of 581 additional jobs in the 2018 peak year would represent a 1.7 percent increase over total 2012 employment in the three-county study area. It would reduce the unemployment rate from the 2012 level of 6.3 percent to approximately 4.7 percent for a 1- to 2-year period, if all of the jobs were filled by new hires from the local area. If the stated assumptions about local versus non-local hires were accurate, the unemployment rate would be reduced to 5.3 percent as a result of the 369 local hires.

In comparison, the average new total project-generated employment over the 9-year period from 2016 through 2024 would be 375 new direct, indirect and induced jobs, an estimated 238 of which would be filled by local workers. At this level, the existing unemployment level in the three-county area would be reduced from 6.3 percent to 5.6 percent.

The employment effects would be proportionally less than those described during later years of the proposed NOA and SOA projects. As **Table 3.17-8** illustrates, employment would revert to approximately current levels in 2025 and 2026, and would drop below current levels from 2027 through the end of the project.

The estimated average annual wage, including benefits, for salaried and hourly workers would be approximately $111,000. Consequently, the direct payroll would range over the life of the mine from $52.6 million (2016) to $71.2 million (at peak year of 2018), declining to $53.9 million in 2024), and then declining further with the reduction in work force after 2024. If it is assumed that contractors would earn approximately the same as BMM employees, they would add $13.3 million in 2016, $15.5 million in 2018, and $14.4 million in 2024, resulting in a total of $65.9 million in 2016, $86.8 million in 2018, and $68.3 million in 2024. Each $1.00 in direct earnings would indirectly generate $0.37 in earnings to other workers in the local economy (BEA 1992; Dobra 1989; Price and Harris 2007). Consequently, the annual indirect earnings effect would be $24.3 million in 2016, $ 32.1 million in 2018, and $25.3 million in 2024. The increase in income earnings would be a substantial economic benefit accruing to the local economy of the three-county study area.

Hunting Related Economics

Because it is not possible to accurately quantify changes in the local deer herd population from the proposed project, the resulting specific economic effects are similarly difficult to accurately quantify. However, employing the general deer hunting-related economic assumptions from recent years, noted above, an estimate of a range of socioeconomic impacts can be made based on potential incremental population fluctuations in deer populations. For example, if it is assumed that the Proposed Action would adversely affect the deer herd to the extent that Management Area 10 hunt tags would be reduced by 10 percent, and using the deer tag data and economic contribution calculations provided in Section 3.17.1.3, Economy and Employment, the effect on hunting expenditures would be a reduction of approximately $2.5 million, or 2.7 percent of 2011 statewide big game hunting expenditures. State and local tax revenues would be reduced by approximately $203,000 statewide. For each additional 10 percent increment in tag reduction, hunting-related expenditures and tax revenues would decline proportionally. A reduction in income derived from hunting opportunities would reduce the funding available to NDOW for wildlife management. For additional information on the potential effects of the Proposed Action on the deer herd, see Section 3.7, Wildlife and Fisheries Resources.

Population

Potential average and peak population increases resulting from development of the Proposed Action are presented in **Tables 3.17-9** and **3.17-10**, respectively. The figures include population effects from anticipated indirect and induced employment.

As noted above, it is uncertain how many of the workers needed for the proposed NOA and SOA projects would be new hires and how many would be transferred from other projects. It also is notable that the highest levels of employment for the Proposed Action would only last for approximately 1 to 2 years at a time. Consequently, the actual population effects may well be less than the calculated estimates shown, especially for the peak employment. The estimated number of employees noted in the average (**Table 3.17-9**) addresses a 9-year period during which total employment would be at or above 600, or approximately 150 above current levels. An expectation of a 9-year-long job would be more likely to entice a family to move than a 1- or 2-year job. At the average employment level, the population increase is estimated at approximately 283, which would be approximately 0.5 percent of the 2010 population of the three counties. Should the peak new employment generate the population estimated in **Table 3.17-10**, the total new population would be approximately 435 people, or 0.7 percent of the 2010 population of the study area. In either case, the population effect of the Proposed Action would be expected to be modest.

Slightly over 88 percent of employees at the existing NOA operations reside in the three-county study area: 70 percent in Elko County, 13 percent in White Pine County, and 5 percent in Eureka County. It is likely that new workers would follow a similar pattern. Elko County, and the City of Elko in particular, is a major draw because of the concentration of both public and private sector resources and facilities. Eureka, being much smaller, has more limited resources and is constrained by a limited housing supply (see below). According to this pattern, if the peak population potential should occur, approximately 305 additional people would locate in Elko County, which would add 0.6 percent to the county population; 56 people (0.6 percent of the current population) would locate in White Pine County; and 22 people (1.1 percent of the county population) would locate in Eureka County. Population increases at these levels would not impose significant burdens on any of the three counties, although housing may be the most important limitation.

Housing

Construction

A maximum of 200 contract construction workers is expected to be needed for the proposed project. Assuming most construction workers would be hired from the local labor force, they would not affect the housing market to any substantial degree. If substantial numbers of the anticipated contractor work force were brought in from outside the area; however, there is an ample supply of temporary housing resources available to accommodate them with well over 2,000 motel/hotel rooms, over 500 RV spaces, and several campgrounds in the local area to accommodate them with minimal effects on other local activities. While there could be some competition for temporary housing during high tourism seasons, less than 8 percent of the total temporary housing supply would be needed for project construction workers even if the highly unlikely case should occur that all the contract construction workers were to be non-locals in need of temporary accommodations.

Operations

Operations would generate demand for an estimated maximum of 194 housing units for the peak 2 to 3 years of the project (**Table 3.17-10**) or an average of 126 units over the first 9 years of the proposed NOA and SOA projects. At the time of the 2010 census, there were over 3,000 vacant housing units in the study area (**Table 3.17-4**), which if it has continued to be reasonably accurate, would indicate there would be more than enough housing available to accommodate both the peak and the average demand. The vacancies aren't uniform across the housing stock, however. The owner-occupied housing market was very tight with vacancy rates throughout the study area at or below 3.3 percent. In contrast, there

were moderate to high vacancy rates in the rental housing stock, which should be sufficient to accommodate the expected project-related demand. It is likely; however, that the availability of suitable housing in Eureka County is constrained by the small size of the market and a growing demand from other activities. Assuming this is the case, more of the new project-related households would be likely to locate in Elko County communities, or the Ely vicinity. Approximately 70 percent of the current work force resides in Elko County, 13 percent in White Pine County, and 5 percent in Eureka County. If this pattern were to hold true for the new operations workers, the peak project-related demand would be 136 units in Elko County, 25 units in White Pine County, and 10 units in Eureka County. In contrast, Eureka County has added 50 new rental units and has a new subdivision with plans for up to 122 single family units and 110 multi-family units.

Community Facilities and Services

No significant capacity or service issues have been identified for public facilities or services in the three-county study area. In addition, underlying population growth rates have declined to modest levels in recent years. Consequently, the relatively small number of new people that would be anticipated for construction and operation of the proposed NOA and SOA projects, even under the maximum scenario, would not be expected to adversely affect public services in the area.

Education

School enrollment would increase by between 52 and 80 students under the estimated average and peak population growth scenarios for operations at the proposed NOA and SOA projects. Assuming a population distribution similar to that of current employees at the existing NOA, up to 56 new students would enroll in Elko County schools, 10 new students would enroll in White Pine County schools, and just 3 new students would enroll in Eureka County schools. At these levels of increase, the effects would be minor and should not adversely affect district schools.

Public Finance

The proposed NOA and SOA projects would generate public revenues from sales and use taxes, net proceeds of mines taxes, *ad valorem* property taxes, and from business taxes. The estimates presented in this analysis are based on information provided by Barrick at a point in time prior to project development. As such, they are subject to change as the project proceeds and commodity prices fluctuate. The estimates are believed to be a reasonable assessment of the tax revenues that would flow from the project.

Construction, operation, maintenance, and abandonment of the proposed mine would generate increases in sales and use tax receipts. Purchases of equipment, supplies and construction materials for the Proposed Action would be subject to sales tax as would consumer purchases by the construction work force. Detailed estimates of the taxable purchases made in the affected area by the mine and construction work force cannot be quantified at this time, however, Barrick estimates project-generated sales taxes would be generally in the range of from $5 million to $6 million per year for the life of the project until production ends. Sales taxes would be collected in the jurisdiction where purchases were made and would be distributed among the state, the school district(s), the county, and the counties' revenue sharing pool. School districts – including White Pine County, Eureka County and possibly Elko County – are significant beneficiaries of sales and use taxes, receiving approximately 38 percent of the proceeds. The local county's share of sales taxes is relatively modest at approximately 7 percent of the revenue.

In the event deer hunting is adversely affected by the Proposed Action, the reduction in related expenditures would also result in a reduction in sales tax and lodging tax revenues to the state and local jurisdictions. As noted above, a 10 percent reduction in Management Area 10 deer tags could be expected to reduce state and local tax revenues statewide up to approximately $203,000; a 25 percent reduction in Management Area 10 deer tags could be expected to reduce tax revenues statewide up to approximately $508,000.

Net proceeds taxes and *ad valorem* property taxes would be a more substantial contributor to county coffers and White Pine County would be the primary beneficiary of these revenues. Net proceeds of mines are categorized and taxed similar to real property. Barrick estimates property taxes from the BMM project would be in the range of $3 million to $3.5 million for the productive life of the mine based on anticipated capital investments in plant and equipment.

Barrick estimates net proceeds taxes from the proposed NOA and SOA projects at over $141 million over the life of the mine. In general terms, net proceeds taxes are assessed on the value of production, which would vary with market prices, minus the costs of production, recovery and processing of the ore. Consequently, the annual payments can vary widely. Estimates for the proposed NOA and SOA projects range from zero in a few years to over $25 million near the end of production, after the major expense of mining has ended. For most years, net proceeds taxes are estimated to fall in a range from $5 million to $10 million. As noted in **Table 3.17-6**, the combination of property taxes and net proceeds taxes from the proposed NOA and SOA projects would have a major positive impact on White Pine County taxing entities' revenues.

In short, construction of the mine would have a major, positive, short-term fiscal effect on the entities within the affected area, and operation and maintenance of the mine would have a long-term, major, positive fiscal effect. These effects would cease at the time the proposed NOA and SOA mines were closed and abandoned.

Social Conditions

With only a modest change in permanent employment and a minor increase, at most, in population expected from the proposed NOA and SOA projects, the Proposed Action is not expected to cause adverse changes in the social structure or traditional lifestyles of study area communities. A possible influx of a small number of contract workers from outside the study area, if it should occur, would be of short duration and would have a relatively low temporary effect on the quality of life of people currently living in the area. The possible transfer of some workers to the proposed NOA and SOA projects from other Barrick projects in the region would potentially sustain the jobs of current employees for a few additional years, which would be expected to sustain their individual lifestyles, and modestly enhance the stability and social structure of the community as a whole. Extending the employment of those workers could be beneficial to the long-term sustainability of the community as it would provide additional time for local economic diversification efforts to be realized.

3.17.2.2 North and South Operations Area Facilities Reconfiguration Alternative

Under the Reconfiguration Alternative, social and economic effects would be generally similar to the Proposed Action, but reduced in magnitude because the mine life would be just half as long and the short-term peak total work force would be approximately one-third lower than for the Proposed Action.

Income and Employment

The Reconfiguration Alternative would continue to employ most of the existing 450 workers with the majority being BMM workers. **Table 3.17-11** summarizes the estimated employment by year for the Reconfiguration Alternative. For the North Operations Area project, construction activities would initiate in year 2015 pending permit approvals with an initial work force of approximately 430 workers that increases in 2017 to a peak of 511 workers with the expansion of the contract work force and initiation of operations. Employment would decline to 191 workers in 2019 during operations after initial construction activities were completed, would fall below 100 workers from 2021 to 2024, and be reduced to 41 workers by 2025 at the end of operations in the NOA (**Table 3.17-11**).

Table 3.17-11 Employment Estimates for the North and South Operations Area Facilities Reconfiguration Alternative

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
North Operations Area										
Salaried	67	68	67	47	47	47	47	47	39	13
Hourly	353	323	275	134	84	20	20	20	50	23
Subtotal	420	391	342	181	131	67	67	67	89	36
Contractors	10	120	120	10	10	10	10	10	5	5
NOA Subtotal w/Contractors	430	511	462	191	141	77	77	77	94	41
South Operations Area										
Salaried	0	0	0	20	20	20	20	20	20	
Hourly	0	0	0	134	195	259	259	259	168	20
Subtotal	0	0	0	154	215	279	279	279	188	20
Contractors	0	0	120	60	10	10	10	10	5	5
SOA Subtotal w/ Contractors	0	0	120	214	225	289	289	289	193	25
North Operations Area and South Operations Area Projects Combined										
Salaried	67	68	67	67	67	67	67	67	59	13
Hourly	353	323	275	268	279	279	279	279	218	43
Subtotal	420	391	342	335	346	346	346	346	277	56
Contractors	10	120	240	70	20	20	20	20	10	10
NOA and SOA Subtotal w/ Contractors	430	511	582	405	366	366	366	366	287	66

For the South Operations Area, construction would begin in 2017 and operations in 2018. The number of workers would increase from 120 at startup to a peak of 289 in 2020 through 2022. Employment would decline to approximately 193 workers in 2023 and be reduced to 25 workers by 2025 at the end of operations in the SOA (**Table 3.17-11**).

The total combined employment for the Reconfiguration Alternative would be approximately 430 in 2016 and it would increase to a peak of 582 in 2018 followed by a reduction to 366 in 2020 through 2023 before a further reduction to 66 workers in 2025 at the end of operations. Under this alternative, the average number of workers over the 10-year life of the project would be approximately half the average number of workers for the Proposed Action during the same 10-year timeframe.

Construction

Construction would require contractor work force increases of up to 2 years, including approximately 120 contractors for the NOA in 2016 and 2017, plus up to 120 additional contractors for the SOA in 2017 under this alternative (**Table 3.17-11**). There would be a slight reduction in the existing BMM work force during this timeframe but overall there would be a net increase due to the growth in contract workers. The construction work force impacts under this alternative would be similar to those described for the Proposed Action as there would be a similar number of contract workers under both alternatives during the initial construction phase and considering the relatively short time period of construction employment spikes. Under this alternative, the indirect and induced employment generated by the construction activity would be expected to be similar to the Proposed Action with an estimated 24 indirect and 36 induced jobs. Similarly, local labor is expected to provide 55 percent of the direct project workers and all of the indirect and induced workers during construction, leaving a need for very few workers from outside the local area. The employment impact during construction represents less than 0.3 percent of total employment in the three-county study area.

Employment Operations and Total

Total employment at the NOA would ramp up from the current level to 511 workers (including contractors) in 2017 and would peak at 582 in 2018 with the addition of construction and operations personnel at the SOA (**Table 3.17-11**). At the peak, total employment would include 132 additional workers over current levels, including contractors. After the end of a construction spike at the NOA and SOA in 2018, total employment would decline by approximately 200 workers by 2019 and level off at approximately 366 workers through 2023, drop to 287 employees in 2024, before declining to 66 workers in 2025 when operations end (**Table 3.17-11**). The annual average employment from 2015 through 2024 would include 321 BMM staff and 54 contractors.

The estimated average annual wage, including benefits, for salaried and hourly workers would be approximately $111,000. The direct payroll would range from $46.6 million (2016) to $37.9 million (at peak year 2018), declining to $30.7 million in year 2024), and further declining with the reduction in work force at the end of operations. If it is assumed that contractors would earn approximately the same as BMM employees, they would add $1.1 million to the BMM payroll in 2016, $26.6 million at peak year (2018) and $1.1 million in 2024, for a total payroll of $47.7 million in 2016, $64.6 million in 2018 and $31.8 million in 2024. The direct payroll is estimated to be approximately $38 million per year during the 2019 to 2022 operations timeframe with contractors contributing $3.6 million per year.

Each $1.00 in direct earnings would indirectly generate $0.37 in earnings to other workers in the local economy (BEA 1992; Dobra 1989; Price and Harris 2007). Consequently, the annual indirect earnings effect would range from $17.6 million (2016) to $11.7 million (2024); during the peak year (2018), the annual indirect earnings effect would be $23.9 million. Typical annual indirect earnings effect during the operations phase would be approximately $15.3 million. The increase in income earnings would be a substantial economic benefit accruing to the local economy of the three-county study area.

Hunting Related Economics

A key objective of the Reconfiguration Alternative was to reduce impacts to the Management Area 10 mule deer herd by maintaining three designated undisturbed migration corridors through the NOA. It is anticipated that this alternative would reduce impacts to the Management Area 10 mule deer herd and correspondingly would be expected to have reduced economic effects as a result of potential reductions in Management Area 10 hunt tags allocated annually by NDOW. Because it is not possible to accurately quantify the effect of the Reconfiguration Alternative on the local mule deer herd population, the economic effects are similarly difficult to quantify. Employing the general deer hunting-related economic assumptions from recent years, noted above, and projecting forward, if it is assumed that the Reconfiguration Alternative would adversely affect the deer herd to the extent that Management Area 10 hunt tags would be reduced by 5 percent, the effect on hunting expenditures would be a reduction of up to approximately $1.25 million or 1.35 percent of the 2011 statewide big game hunting expenditures. State and local tax revenues would be reduced by up to approximately $101,500 statewide. For each additional 5 percent increment in tag reduction, hunting-related expenditures and tax revenues would decline proportionally. For additional information on the potential effects of the Reconfiguration Alternative on the deer herd, see Section 3.7, Wildlife and Fisheries Resources.

Population

Population effects from the Reconfiguration Alternative would be less than the impacts described for the Proposed Action as fewer workers would be hired under this alternative. The highest levels of employment would only last for approximately 1 to 2 years in 2016 and 2017 during startup of construction and operations. Total employment would average 375 BMM employees and contractors during the 2015-2024 timeframe, or approximately 75 below current staffing levels of 450. Under the Reconfiguration Alternative, the average employment level is slightly reduced from current employment levels at the mine, and this would have minimal effects on the population of the three counties.

Housing

Construction

Similar to the Proposed Action, a maximum of 200 contract construction workers are expected to be needed under the Reconfiguration Alternative. Assuming most construction workers would be hired from the local labor force, they would not affect the housing market to any substantial degree.

Operations

Operations would not generate any additional demand for housing units because the current work force employed at the mine would fill the demand under the Reconfiguration Alternative.

Community Services and Facilities

The 1- to 2-year increase in a small number of contract workers that would likely reside in the three-county area would not negatively impact public services in the area. No significant capacity or service issues have been identified for public facilities or services in the three-county study area.

Education

School enrollment would not materially change from existing conditions based on the projected employment at the mine for operations under the Reconfiguration Alternative.

Public Finance

The Reconfiguration Alternative would generate public revenues from sales and use taxes, net proceeds of mines taxes, *ad valorem* property taxes, and from business taxes.

Under this alternative, sales and use tax receipts would be generated over the life of mine. Purchases of equipment, supplies and construction materials would be subject to sales tax as would consumer purchases by the construction work force. Barrick estimates project-generated sales taxes would be approximately $5 million per year for the life of the Reconfiguration Alternative until production ends.

It is anticipated that the Reconfiguration Alternative would result in reduced impacts to the Management Area 10 mule deer population and the associated hunting opportunity within the study area. For this alternative there would be less impact in related expenditures that would also result in smaller reductions in sales tax and lodging tax revenues to the state and local jurisdictions in comparison to the Proposed Action. As noted above, a 5 percent reduction in Management Area 10 deer tags would be expected to reduce state and local tax revenues statewide by approximately $101,500.

Barrick estimates net proceeds taxes from the Reconfiguration Alternative at approximately $53 million over the life of the mine that would average about $5 million per year. Barrick estimates that net proceeds taxes would range from $3.2 million to $7.5 million on an annual basis and would peak in 2018 over the life of this alternative, and that property taxes from this alternative would average over $2 million per year for the productive life of the mine based on anticipated capital investments in plant and equipment.

Construction of the mine would have a substantial, positive, short-term fiscal effect on the entities within the affected area, and operation and maintenance of the mine would have a long-term, major, positive fiscal effect. These effects would be shorter in duration under this alternative than the Proposed Action due to the shorter mine life (10 years) compared with 20 years for the Proposed Action. These effects would cease at the time the mines were closed and abandoned.

Social Conditions

With little change in permanent employment and no increase in population expected, the Reconfiguration Alternative is not anticipated to cause adverse changes in the social structure or traditional lifestyles of study area communities.

3.17.2.3 North and South Operations Area Western Redbird Modification Alternative

The WRM Alternative would be the same as the Reconfiguration Alternative, except for a reduction to the Redbird Pit and RDA footprints, changes to haul roads, reclamation, and snow routes to benefit mule deer, and a reduction in the duration of mining on the west side of the NOA.

Effects of the WRM Alternative on employment and income would be similar to those described for the Reconfiguration Alternative, except that for the NOA, there would be a reduction in the maximum number of employees from 511 to 498 (in 2017); minimum employment in the NOA (41 in year 2025) would be the same as under the Reconfiguration Alternative. Employment in the SOA would be the same as the Reconfiguration Alternative.

Impacts to hunting economics would be similar to, but potentially reduced from, the Reconfiguration Alternative because the WRM Alternative represents a reduction in acres impacted and the duration of mining activities on the west side of the NOA, and includes changes to haul roads, reclamation and snow routes to further reduce impacts to the Management Area 10 mule deer herd. It is expected that more positive outcomes for the Management Area 10 deer herd would have a positive effect on the socioeconomics of hunting.

Impacts to housing, community services and facilities, education, public finance, social conditions would be similar to the Reconfiguration Alternative.

3.17.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to social and economic values would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. Under the No Action Alternative, construction of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized. The number of employees would continue at the current level of 410, and there would be 40 full-time contractors. Assuming an average wage of $111, 000, the direct payroll for 410 employees would be $45.5 million. With consideration of 40 contractors, total payroll would be $49.9 million. Barrick estimates project-generated sales taxes would be approximately $100,000-$145,000 per year until production ends. Net proceeds tax payments would range from zero to about $24 million through 2021; in all but three years, net proceeds taxes are estimated to be zero. Property tax would generally be about $1 to $3 million per year through 2021 (Barrick 2015d).

After the end of mining in 2022, employment would taper down to approximately 3 workers for final monitoring. After the end of production, net proceeds tax payments would end and property taxes would decline substantially. Sales tax revenues received by the three counties would be substantially reduced. Demand by mine employees and their families for housing, schools, fire and police protection, and utilities may be reduced if alternative jobs are not available locally when the mine closes, forcing workers to move elsewhere for employment. However, if the current expansion in mining activity in the study area continues until the mine closes, the impact on county employment, income, and infrastructure would be less than would occur under less favorable economic conditions. Many of the current BMM employees would be likely to find work at other mines in the analysis area under that circumstance. Considering the combined labor force in the three counties (37,541) and the current 6.3 percent unemployment rate (2,353 unemployed individuals), if all 410 employees and all 40 contractors were local and could not find work elsewhere, the unemployment rate would increase to 7.5 percent. This rate would be lower than the 11.6 percent statewide unemployment rate and the 8.1 percent national rate identified in Section 3.17.1.3.

3.17.2.5 Cumulative Impacts

The study area and CESA for social and economic values includes Elko, Eureka, and White Pine counties; with particular focus on the communities of Elko, Carlin, Spring Creek, Eureka, and Ely, Nevada (**Figure 3.17-1**). Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

<u>Proposed Action</u>

Employment from mining activity in and near the three-county study area is a major contributor to economic activity in the social and economic values CESA. In comparison, employment and expenditures for other RFFAs would be relatively minor. Consequently, the focus of this discussion is on the three mining projects listed in **Table 2.7-4** and the estimated employment figures included therein. Construction employment for the mines would typically be short-term in nature, lasting 1 to 2 years, at most. Consequently, potential cumulative effects of these construction activities with the Proposed Action would depend on timing. If timing of construction would not coincide with the Proposed Action, the cumulative effects would be minimal. If the schedules would coincide, the cumulative effects would be minor because the anticipated construction work forces would be in the range of 500 to 600 workers, perhaps half of whom would come from the estimated 2,300 unemployed in the social and economic values CESA and the other half from outside the area. Local workers would already be situated in the social and economic values CESA and there are ample temporary housing facilities available to accommodate 300 temporary residents without adversely affecting the communities.

The RFFA operations work forces would be somewhat larger, estimated at up to 900 workers, somewhat less than 20 percent of which would be attributable to the Proposed Action. With approximately half of these workers coming from outside the social and economic values CESA, the main concern would be

housing availability. **Table 3.17-4** indicates there would be sufficient rental housing available, although increased demand for homeowner units could be problematic. The greatest stress point for housing would be in Eureka County, where the Mount Hope Molybdenum Mine Project (the largest of the RFFA mine employers) would be located. With the exception of the concern about housing availability, the remainder of the likely cumulative effects of the Proposed Action would be beneficial, generating income and employment benefits in the social and economic values CESA. As noted above, the Proposed Action could expand employment by a relatively small amount. It could extend employment for workers transferred from other Barrick mines by several years; or there could be a combination of expansion and extension of employment. Regardless of the exact scenario that would transpire, the Proposed Action would represent a relatively small portion (peak of 4 percent, average of 2.6 percent or less) of the total mining-related employment in the area.

There is some concern that the proposed project would adversely affect Eureka County because project workers and their families may locate in the county, but tax revenues from the mine and a majority of other project generated public revenues would accrue to other counties. As noted above, it is likely that most new project workers and families would locate in the Elko County or White Pine County, although there may be a small increment that would locate in Eureka County. This would add a commensurately small increment to the demand for public facilities and services in Eureka County. However, any increase would be offset by the fact that there are existing activities and RFFAs located in Eureka County that would generate revenues to the county, but that have employees choosing to live, and using services and facilities, in Elko County or White Pine County.

In summary, no adverse social or economic effects have been identified for the Proposed Action; therefore, no adverse cumulative social or economic effects are anticipated.

North and South Operations Area Facilities Reconfiguration Alternative

Under the Reconfiguration Alternative, social and economic effects would generally be similar to, but less in magnitude as described under the Proposed Action. The construction employment for the mines work force identified in **Table 3.17-11** would be in the range of approximately 500 workers including the construction work force from the Reconfiguration Alternative. Cumulative effects of construction activities would be considered minimal to minor as discussed above.

The operations work force for RFFAs are estimated at up to 900 workers, with no additional operations work force required for the Reconfiguration Alternative as the existing mine work force will fill this need. The cumulative effects under the Reconfiguration Alternative would be beneficial, generating income and employment benefits in the social and economic values CESA similar to the Proposed Action but at a reduced level.

North and South Operations Area Western Redbird Modification Alternative

The cumulative effects under the WRM Alternative would be similar to, but slightly reduced from, those described for the Reconfiguration Alternative.

No Action Alternative

Under the No Action Alternative, after 2022, most of the current work force of 410 employees and 40 full-time contractors would be dismissed over a period of 2 to 3 years. The effects of this scaling down would depend on the timing in relation to other mining activities in the social and economic values CESA and nearby counties. If other projects are seeking workers at that time, the effects would be minor. If not, the closure associated with the No Action Alternative would reduce natural resources and mining employment by approximately 5.4 percent, which would increase unemployment, reduce economic activity, and reduce tax revenues for local public entities. The post-closure period of care and maintenance to support the long-term land use goals would require a very small work force. This post closure-period would include maintenance of storm water management facilities and long-term water, stability, and vegetation monitoring. Employment and payroll for maintenance and monitoring activities

would be a very minor increment (less than 0.3 percent) of the total mining-related economic activity in the social and economic values CESA and an even smaller increment of the total economic activity in the social and economic values CESA. There would be a small amount of sales tax generated from purchase of material and supplies needed to support the activity. There would be no new net proceeds of mines taxes generated from the proposed NOA and SOA projects. There would be no additional project-related demands for housing, community facilities and services, or education resources. With such a low level of economic activity for post-closure activities, the proposed NOA and SOA projects-related cumulative effects would be virtually undetectable in the economy of the social and economic values CESA.

3.17.2.6 Monitoring and Mitigation Measures

No additional monitoring and mitigation measures are recommended.

3.17.2.7 Residual Impacts

For the most part, social and economic effects from the Proposed Action, Reconfiguration Alternative, and WRM Alternative would end after the project is completed. There would be public and private investment in infrastructure, homes and businesses from revenues generated by the project that would have economic life beyond the life of the project.

3.18 Environmental Justice

The study area and CESA for environmental justice includes Elko, Eureka, and White Pine counties. **Figure 3.17-1** illustrates the study area and CESA for environmental justice. The rationale for the study area and CESA is that the mine would be located in White Pine County, but near the Eureka County and Elko County lines. Approximately two-thirds of the current work force resides in the Elko-Spring Creek area and it is assumed that any new workers would follow a similar pattern because the Elko area provides a combination of proximity, housing availability, and availability of a broad range of public and private services.

3.18.1 Affected Environment

EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was issued February 11, 1994 (59 FR 7629). EO 12898 "is intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority communities and low-income communities access to public information on, and an opportunity for participation in, matters relating to human health and the environment." It requires each federal agency to achieve environmental justice as part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects, including social and economic effects, of its programs, policies, and activities on minority and low-income populations.

Pursuant to EO 12898, the President's CEQ prepared "Environmental Justice: Guidance Under the Environmental Policy Act" (1997) to assist federal agencies with their NEPA procedures "… so that environmental justice concerns are effectively identified and addressed." This analysis was conducted with the assistance of the CEQ "guidance" document.

EO 12898 states that population groups defined as minorities include: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic/Latino origin; or Hispanic/Latino. CEQ guidelines for evaluating potential adverse environmental justice effects indicate minority populations should be identified when either: 1) a minority population exceeds 50 percent of the population of the affected area, or 2) a minority population represents a "meaningfully greater increment" of the affected area population than the population of some appropriate larger geographic unit, as a whole.

Low-income populations are those communities or sets of individuals whose median income is below the current poverty level of the general population. According to the CEQ guidance, low-income populations in an affected area should be identified using the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, federal agencies may consider as a community either a group of individuals living in geographic proximity to one another or a set of individuals (such as migrant workers or Native Americans) where either type of group experiences common conditions of environmental exposure or effect (CEQ 1997).

3.18.1.1 Minority Population

The three counties within the study area are notably less ethnically and racially diverse than the state as a whole (**Table 3.18-1**). Eureka County, in particular, is 84 percent white, non-Hispanic, compared with 76 percent for White Pine County, 69 percent for Elko County and 54 percent for Nevada. All three counties have higher percentages of American Indian, Eskimo, or Aleut population than the state's 0.9 percent (U.S. Census Bureau 2010b). The Te-Moak Tribe of Western Shoshone Indians has its headquarters in Elko. Elko County is home to three of the four colonies of the tribe: Elko Band, South Fork Band, and Wells Band. A portion of the Duck Valley Indian Reservation also is located in northern Elko County on the Idaho-Nevada border. White Pine County hosts two Indian reservations: 1) the Goshute Reservation, approximately 60 miles northeast of Ely, home of the Shoshone-Goship people; and 2) the Ely Shoshone Reservation comprising several land parcels headquartered in and near Ely.

The Duckwater Reservation, home of the Duckwater Shoshone Tribe, is just over the county line in Nye County, approximately 50 miles southwest of Ely. There are no reservation lands in Eureka County.

Table 3.18-1 Race and Ethnicity by County within the Study Area

Race and Ethnicity	Elko County (%)	Eureka County (%)	White Pine County (%)	State of Nevada (%)
White Not of Hispanic Origin	69	84	76	54
Black Not of Hispanic Origin	<1	<1	4	8
American Indian, Eskimo or Aleut	5	2	4	1
Asian or Pacific Islander Non-Hispanic	1	1	1	8
Other and Two or More (Mixed) Races	2	1	2	3
Hispanic Origin of Any Race	23	12	13	27

Source: U.S. Census Bureau 2010b.

In accordance with the CEQ guidance on addressing environmental justice under NEPA, minority populations should be identified when either:

- The minority population of the affected area exceeds 50 percent; or
- The minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

No racial or ethnic group exceeds 50 percent of the population in any county within the study area; however, the population percentages of American Indians in all three counties within the study area could be considered “meaningfully greater” than for the state as a whole, ranging from 2 times greater for Eureka County to over 5 times greater for Elko County. Therefore, for the purpose of identifying environmental justice concerns, a minority population, as defined by the CEQ guidance, exists in the study area. However, the American Indian populations in the study area tend to be concentrated on several reservations throughout the study area, all of which are separated from the proposed NOA and SOA projects by more than 30 miles.

3.18.1.2 Low-Income Populations

Table 3.18-2 summarizes Per Capita Personal Income for the State of Nevada and the three counties within the study area. As shown, PCPI now exceeds the state average in each of the three counties within the study area (BEA 2013). A detailed discussion on income is presented in Section 3.17.1.2, Income. Based on this data, none of the counties within the study area would be considered to have low-income populations under EO 12898.

3.18.2 Environmental Consequences

This section discusses project related impacts to environmental justice resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to environmental justice are guided by EO 12898 that initiated consideration of environmental justice in federal actions. The basic question is whether any potential adverse effects of the Proposed Action, Reconfiguration Alternative, or WRM Alternative would fall disproportionately on minority or low income members of the affected community.

Table 3.18-2 Per Capita Personal Income – Nevada and Counties

Area Name	2000	2011	Percent Change	Percent of Nevada (2000)	Percent of Nevada (2011)
Nevada State Total	$30,977	$36,964	19.3	100.0	100.0
Elko County	$25,419	$40,150	58.0	82.1	108.6
Eureka County	$23,684	$38,071	60.7	76.5	103.0
White Pine County	$25,577	$39,955	56.2	82.6	108.1

Source: BEA 2010; U.S. Census Bureau 2012.

According to the CEQ guidance, "when determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

(a) Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death; and

(b) Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and

(c) Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards." (CEQ 1997)

"When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

(a) Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and

(b) Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and

(c) Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards." (CEQ 1997)

In order to assess the potential for environmental justice impacts, the socioeconomic characteristics of the counties within the study area and communities are first analyzed for the presence of minority and/or low income populations. Second, if minority and/or low-income populations are identified based on the CEQ guidance, the Proposed Action, Reconfiguration Alternative, or WRM Alternative are evaluated for potential effects, which may be expected to disproportionately impact any such populations.

3.18.2.1 Proposed Action

The initial analysis indicates that the potential effects of the Proposed Action would not be expected to disproportionately affect any particular population. The area in the immediate vicinity of the proposed

NOA and SOA projects has no resident population. The nearest residences are a few remote ranches located several miles from the proposed NOA and SOA projects. The residents of the ranches have not been identified as minority or low-income in nature. The nearest residential area is the community of Eureka, approximately 30 air miles to the southwest (and about 60 miles via existing roads). Larger communities are all at greater distances from the proposed NOA and SOA project areas and farther by road. Concentrations of American Indian populations are all located at considerable distances from the proposed NOA and SOA projects. The nearest are the Ely Shoshone Reservation lands, which are approximately 25 miles to the southeast. Considering the distances from the proposed NOA and SOA projects to American Indian populations, the only likely effects would be air quality related and those would affect the entire population equally, without regard to ethnicity or race. The air quality analysis for the proposed NOA and SOA projects is presented in Section 3.14, Air Quality.

An additional provision of the CEQ guidance requires consideration of “impacts that may affect a cultural, historical, or protected resource of value to an Indian tribe or a minority population, even when the population is not concentrated in the vicinity.” The analyses in Section 3.12, Cultural Resources, and Section 3.13, Native American Traditional Values, determined that adverse effects to such resources would not likely occur. If impacts would occur, they would be effectively minimized or mitigated through implementation of the PA and Treatment Plan.

Regarding whether “communities have been sufficiently involved in the decision making process,” the BLM has held public scoping meetings in Ely, Elko, Eureka, and Reno, Nevada and distributed public notices about the proposed NOA and SOA projects through mailings and notices in area newspapers in addition to the formal notice in the Federal Register. There also has been an extensive effort to involve the Native American communities in the process through consultation specific to the proposed NOA and SOA projects. Section 3.13, Native American Traditional Values, outlines the ongoing Native American government-to-government consultation process for the proposed NOA and SOA projects.

Based on these considerations, no disproportionate, adverse environmental justice effects would be anticipated from development of the Proposed Action.

3.18.2.2 North and South Operations Area Facilities Reconfiguration Alternative

The Reconfiguration Alternative differs from the Proposed Action largely in adjustments to facility footprints within the proposed NOA and SOA plan boundaries. Effects beyond the boundaries, where Native American populations reside, would be essentially the same as those anticipated from the Proposed Action. Consequently, no disproportionate, adverse environmental justice effects would be anticipated from development of the Reconfiguration Alternative.

3.18.2.3 North and South Operations Area Western Redbird Modification Alternative

The WRM Alternative is the same as the Reconfiguration Alternative except for the reduction or elimination of some facilities within the proposed NOA plan boundary. The effects beyond the boundaries, where Native American populations reside, would be essentially the same as those anticipated from the Reconfiguration Alternative. No disproportionate, adverse environmental justice effects would be anticipated from development of the WRM Alternative.

3.18.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to environmental justice would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. Under the No Action Alternative, construction of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized. Any potential adverse environmental justice effects were addressed in the permitting process for the existing activities and no additional environmental justice effects would be expected.

3.18.2.5 Cumulative Impacts

The study area and CESA for social and economic values includes Elko, Eureka, and White Pine counties (**Figure 3.17-1**). Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

The environmental justice analysis did not identify any disproportionate effects from the Proposed Action, Reconfiguration Alternative, or WRM Alternative and an extensive effort to involve all communities in the decision-making process was documented. As previously stated, no disproportionate, adverse environmental justice effects would be anticipated from development of the Proposed Action, Reconfiguration Alternative, or WRM Alternative. Consequently, no cumulative environmental justice effects are anticipated as a result of the Proposed Action, Reconfiguration Alternative, or WRM Alternative.

3.18.2.6 Monitoring and Mitigation Measures

No additional monitoring and mitigation measures are recommended.

3.18.2.7 Residual Impacts

There would be no disproportionate adverse environmental justice effects on minority or low-income populations; therefore, no residual impacts to environmental justice are anticipated.

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3.19 Visual Resources

The study area and CESA for visual resources is defined as a 15-mile BLM VRM background distance zone (**Figure 3.19-1**).

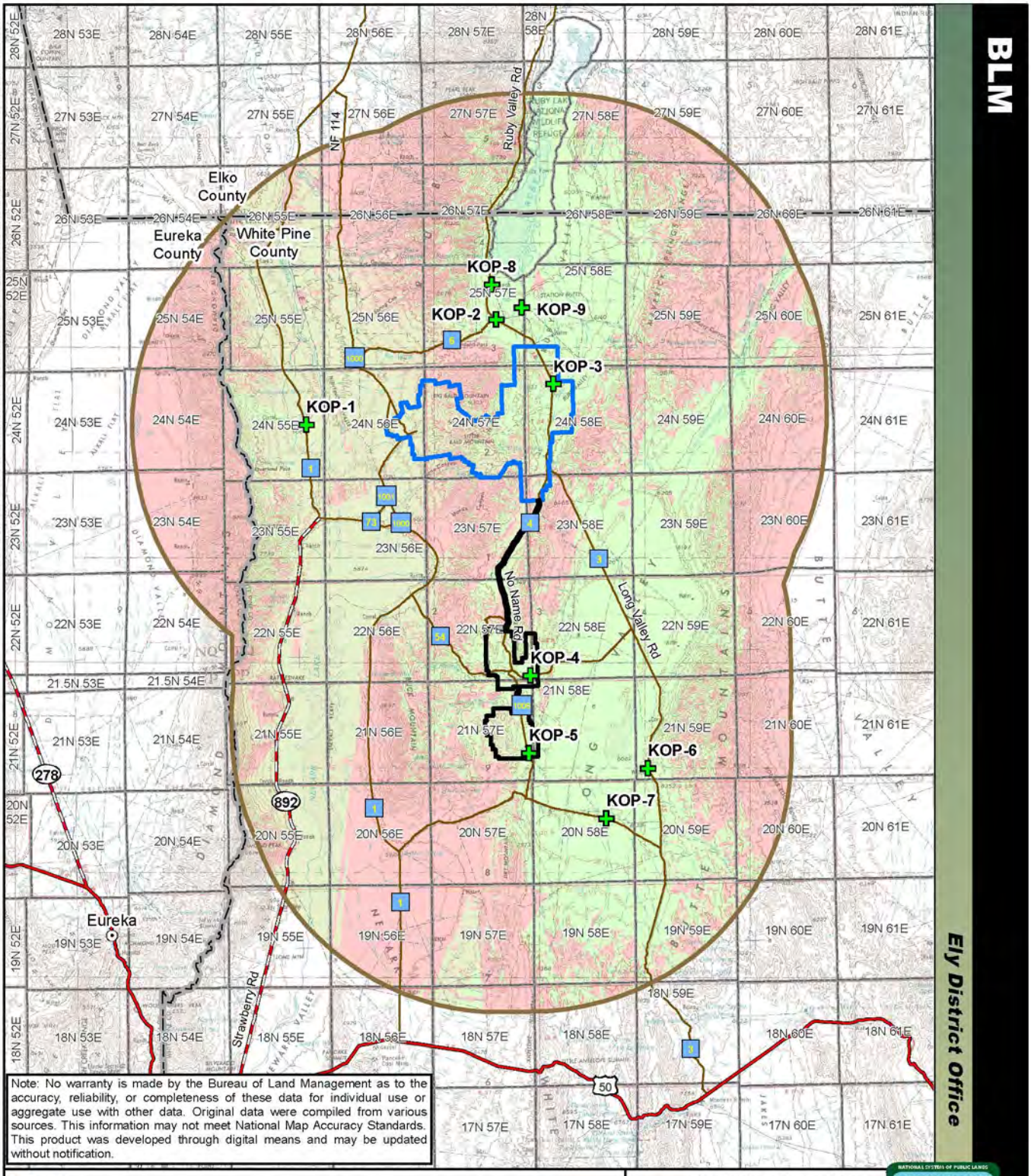
3.19.1 Affected Environment

Scenic quality is the measure of the visual appeal of a unit of land. Section 102(a) of the FLPMA (1976), states that "...the public lands are to be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values." Section 103(c) identifies "scenic values" as one of the resources for which public land should be managed. Section 201(a) states that "the Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including scenic values)..."
Section 505(a) requires that "each ROW shall contain terms and conditions which will...minimize damage to the scenic and esthetic values..."

Section 101(b) of the NEPA requires that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

Under FLPMA, the BLM developed a standard visual assessment methodology, known as the VRM System, to inventory and manage scenic values on lands under its jurisdiction. Guidelines for applying the VRM system on BLM lands are described in BLM Manual 8400 et seq. "Public lands have a variety of visual values. These different values warrant different levels of management. Because it is neither desirable nor practical to provide the same level of management for all visual resources, it is necessary to systematically identify and evaluate these values (Illustration 1) to determine the appropriate level of management. Visual values are identified through the VRM inventory (Manual Section 8410) and are considered with other resource values in the Resource Management Planning process. Visual management objectives are established in RMP's in conformance with the land use allocations made in the plan. These area specific objectives provide the standards for planning, designing, and evaluating future management projects. The contrast rating system (Manual Section 8431) provides a systematic means to evaluate proposed projects and determine whether these projects conform with the approved VRM objectives. It also provides a means to identify mitigating measures that can be taken to minimize adverse visual impacts. The VRM system, therefore, provides a means: to identify visual values; to establish objectives through the RMP process for managing these values; and to provide timely inputs into proposed surface disturbing projects to ensure that these objectives are met. (BLM VRM System, 1986)."

The characteristic landscape of the study area is contained within a variety of landforms of the Basin and Range physiographic province (Fenneman 1931). Visual resources within the study area are influenced by topographic, vegetative, geologic, hydrologic, and land use characteristics. The topography ranges from wide, flat valley floors and low angular hills to steep mountain ranges. Vegetation is comprised of grasses, greasewood, rabbitbrush, and sagebrush at lower elevations to mountain tree and shrub vegetation, including mountain mahogany, pinion pine, and juniper at higher elevations. Vegetation patterns affect color, form, line, and contrast, which shape the basis for analysis of visual resources in the study area. Land use in the study area includes the Pony Express National Historic Trail, a NWR, historic/cultural sites, grazing and dispersed recreation, with infrequent and scattered ranches. There is surface water in the study area, including a marsh, ephemeral streams and seeps and springs. The eastern slopes of the Ruby Mountains are well-known for the springs that flow into the marsh. The excellent air quality in the region promotes expansive views. Recreational activities such as hiking, photography, wildlife viewing, and picnicking depend on the settings and scenic views that VRM is required to manage.



Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Key Observation Point
- Not Visible
- Visible
- Visual Resources Cumulative Effects Study Area

Source: BLM 2012a.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.19-1

Visual Resources Study Area and Cumulative Effects Study Area

0 2.5 5 10 Miles

N

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A Visual Resource Inventory (VRI) was conducted to determine the visual values within the jurisdiction of the BLM Ely District Office (2011g). The components of VRI include scenic quality evaluation, sensitivity level analysis, visibility, distances zones, and visual resource inventory classes.

For the scenic quality evaluation, lands are rated as Class A (19 points or more), Class B (12 to 18 points), or Class C (11 points or less). Lands are rated using seven key factors: landforms, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. **Figure 3.19-2** illustrates the scenic quality evaluation within the study area.

The sensitivity level analysis measures public concern for visual resources. Lands are assigned high, medium, or low sensitivity levels based on consideration of the following factors: types of users, amount of use, public interest, adjacent land uses, special areas, and other factors. **Figure 3.19-3** illustrates the sensitivity levels based on the sensitivity level rating units within the study area.

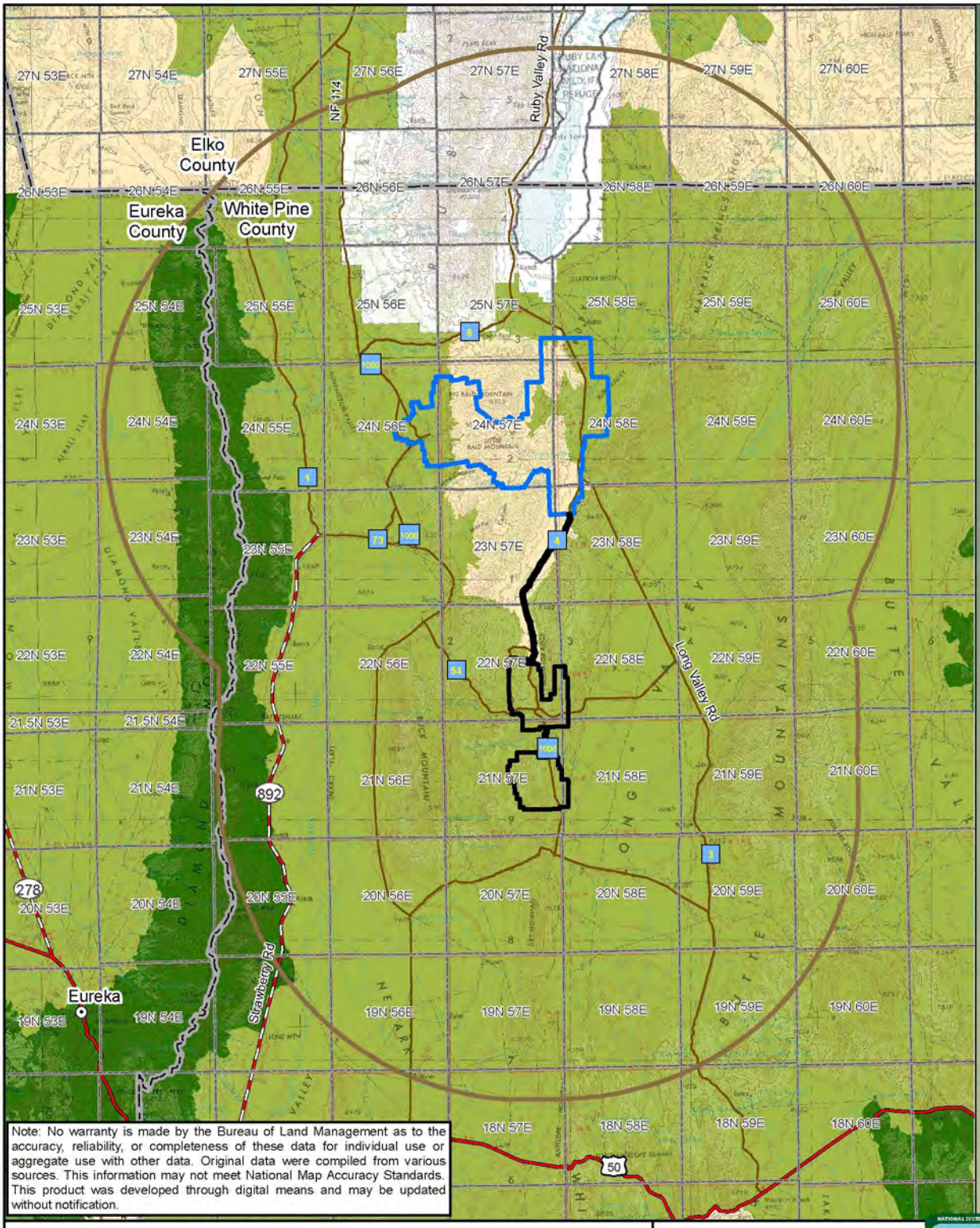
Distance zones are delineated to subdivide the landscape based on relative visibility from travel routes, use areas, or vantage points. The three distance zones (**Figure 3.19-4**) include:

- Foreground-Middleground Zone: This is an area that can be seen from a distance of 3 to 5 miles.
- Background Zone: This is the remaining area which can be seen from approximately 15 miles.
- Seldom Seen Zone: These are areas that are not visible within the foreground-middleground and background zones and areas beyond the background zones.

The scenic quality evaluation, sensitivity level analysis, and delineation of distance zones are combined to develop VRI classes (**Figure 3.19-5**), which represent the relative value of the visual resources. Classes I and II are the most valued, Class III represents a moderate value, and Class IV represents the least value. VRI classes are informational in nature and provide the baseline data for considering visual values in the RMP process. VRI classes do not establish management direction and are not used as a basis for constraining or encouraging surface-disturbing activities. **Table 3.19-1** summarizes the acreages and percent of the study area categorized into each VRI component, the resulting VRI classes, and the VRM classes.

Table 3.19-1 Visual Resource Inventory Summary

Scenic Quality Evaluation	**BLM - Class A**	**BLM - Class B**	**BLM - Class C**	**Total**	--
	91,700 acres – 9 percent	822,056 acres – 83 percent	77,522 acres – 8 percent	991,279 acres – 100 percent	--
Sensitivity Level Analysis	**High**	**Medium**	**Low**	**Total**	--
	284,299 acres – 29 percent	341,023 acres – 34 percent	365,957 acres – 37 percent	991,279 acres – 100 percent	--
Distance Zones	**Foreground-Middleground**	**Background**	**Seldom Seen**	**Total**	--
	516,516 acres – 52 percent	256,326 acres – 26 percent	218,437 acres – 22 percent	991,279 acres – 100 percent	--
VRI Classes	**VRI Class I**	**VRI Class II**	**VRI Class III**	**VRI Class IV**	**Total**
	0 acres – 0 percent	219,518 acres – 22 percent	174,291 acres – 18 percent	597,469 acres – 60 percent	991,279 acres – 100 percent
VRM Classes	**VRM Class I**	**VRM Class II**	**VRM Class III**	**VRM Class IV**	**Total**
	5 acres – 0 percent	79,652 acres – 8 percent	539,181 acres – 51 percent	429,382 acres – 41 percent	1,048,220 acres – 100 percent



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Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Visual Resources Cumulative Effects Study Area

Scenic Quality Rating Code

- A - 18.5 or More Total Score for Scenic Quality
- B - 11.5 to 18 Total Score for Scenic Quality
- C - 11 or Less Total Score for Scenic Quality

Source: BLM 2012a, 2011g.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.19-2

Visual Resource Inventory Scenic Quality Classifications

0 2.5 5 10 Miles

N

BLM

Ely District Office

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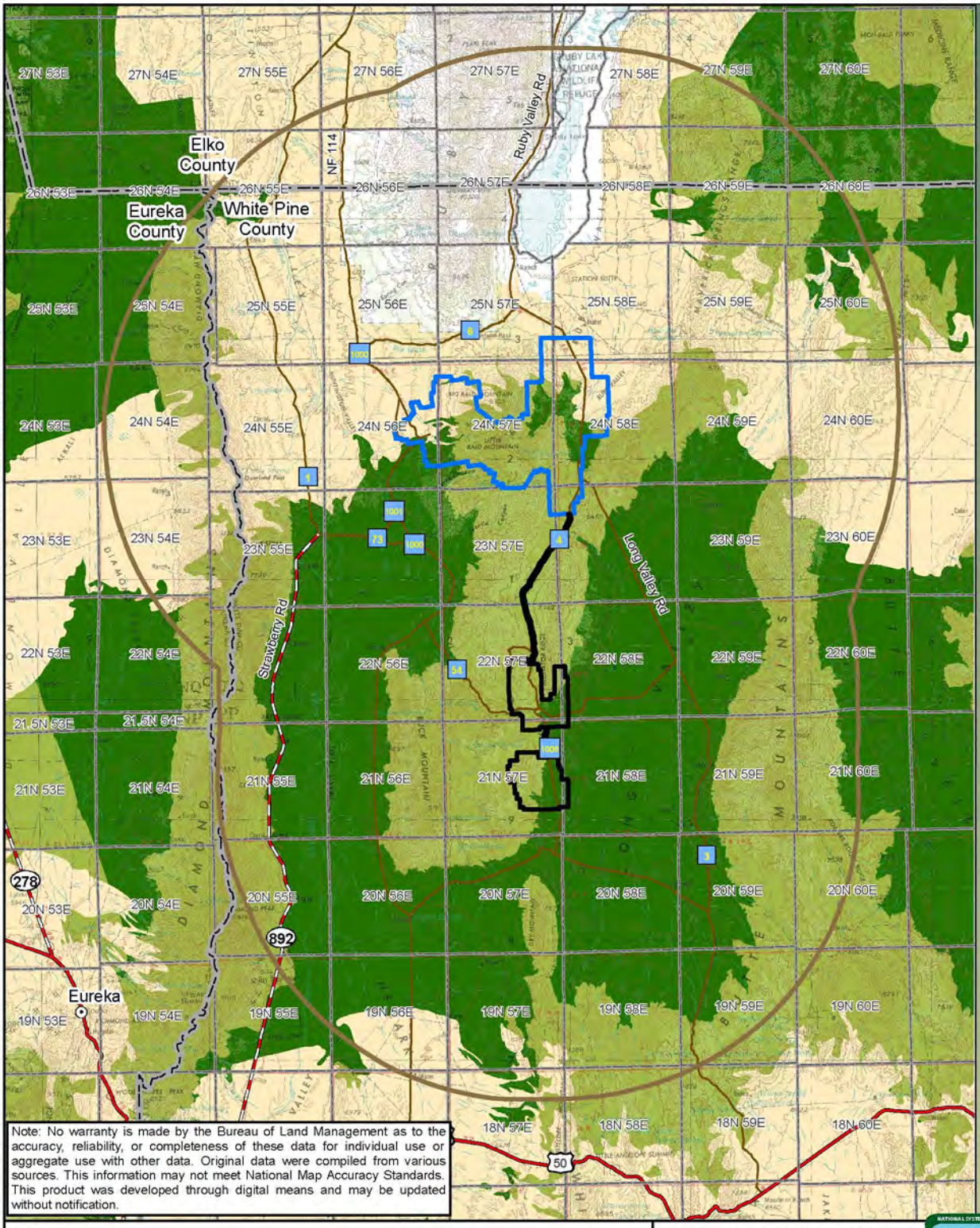

Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Visual Resources Cumulative Effects Study Area

VRI Sensitivity Level Rating

- Maintenance of Visual Quality has Low Value
- Maintenance of Visual Quality has Moderate Value
- Maintenance of Visual Quality has High Value

Source: BLM 2012a, 2011g.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.19-3

Visual Resource Inventory Sensitivity Level Analysis

0 2.5 5 10 Miles

BLM

Ely District Office

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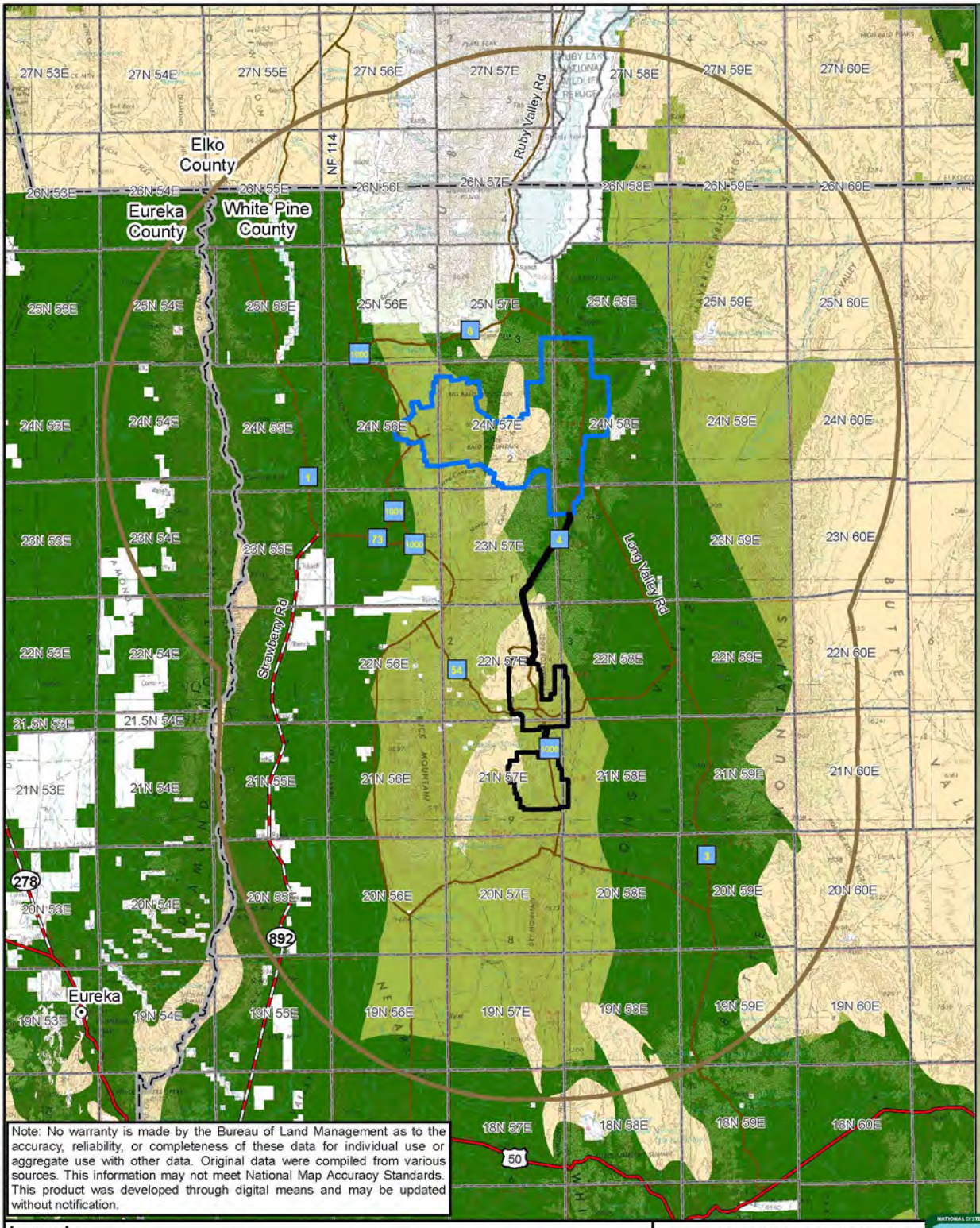

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Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Visual Resources Cumulative Effects Study Area

Visual Distance Zone Code

- Foreground-Middleground. Visibility generally up to 5 miles.
- Background. Visibility generally from 5 to 15 miles.
- Seldom Seen. Hidden from view, or not in foreground/middleground or background visibility zones.

Source: BLM 2012a, 2011g.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.19-4

Visual Resource Inventory Distance Zones

0 2.5 5 10 Miles

N

BLM

Ely District Office

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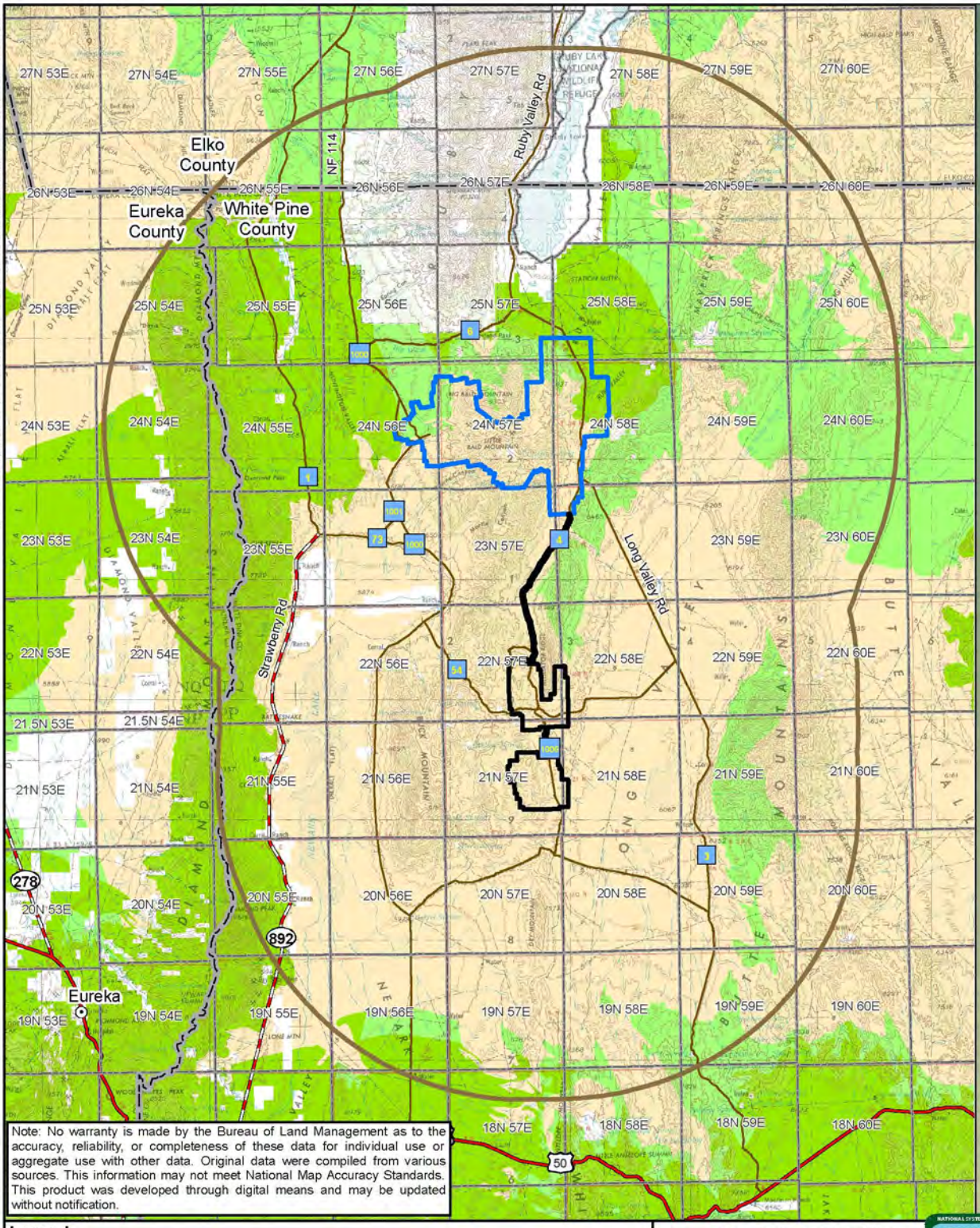

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Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Visual Resources Cumulative Effects Study Area

VRI Class Code

- VRI Class I
- VRI Class II
- VRI Class III
- VRI Class IV

Source: BLM 2012a, 2011g.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.19-5

Visual Resource Inventory Classes

0 2.5 5 10 Miles

N

BLM

Ely District Office

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VRM classes (**Figure 3.19-6**) take into consideration the value of visual resources and management priorities for land uses. During the RMP process, inventory class boundaries can be adjusted as necessary to reflect resource allocation decisions made in the RMP. Management objectives established for each VRM class (BLM Handbook H-8410-1 Visual Resource Inventory) are summarized in **Table 3.19-2**.

Table 3.19-2 BLM Visual Resource Management Class Objectives

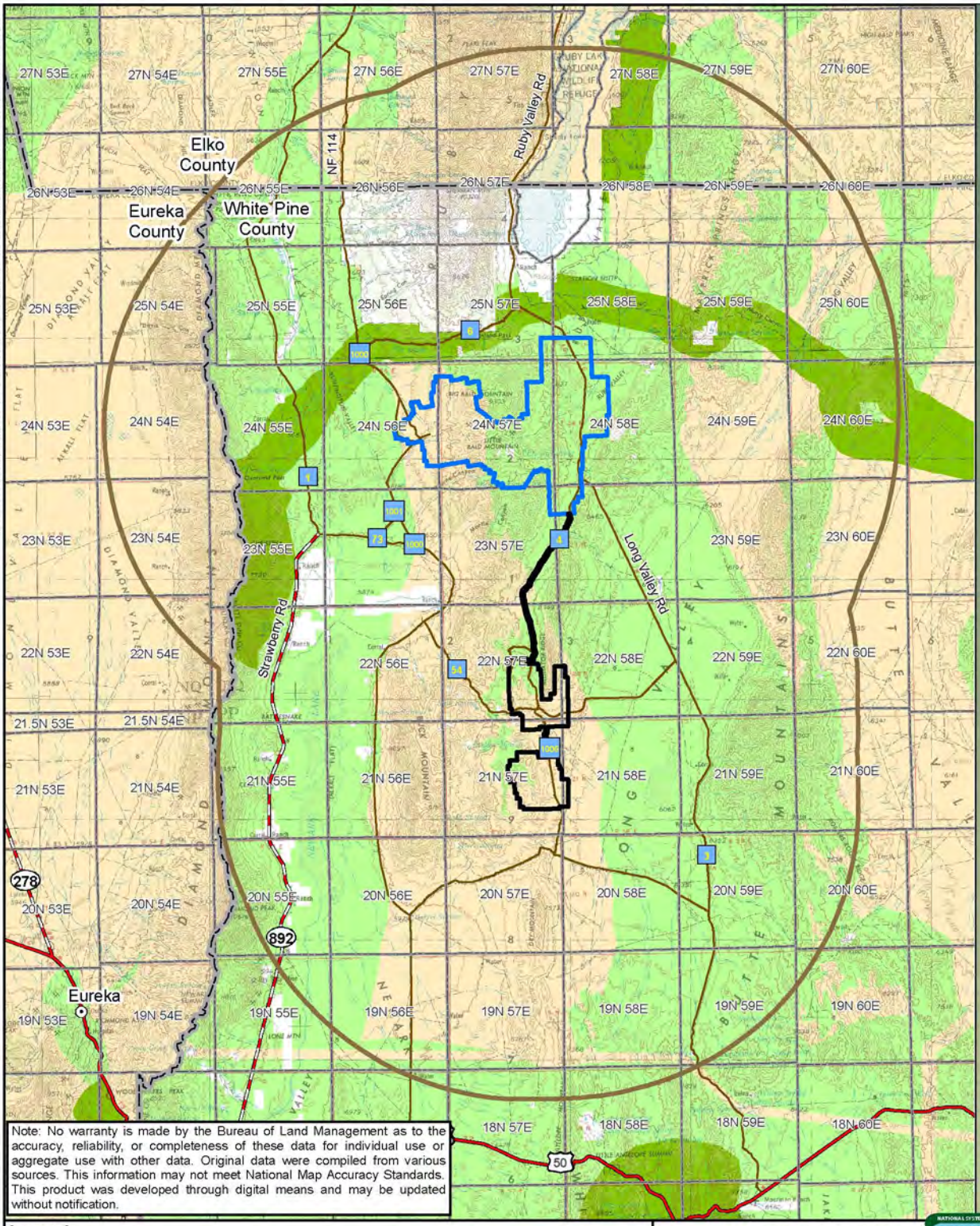
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic (design) elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class 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.
Class IV	The objective of this class is to provide for management activities, which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. 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 (design) elements.

Source: BLM 1986.

The project study area is comprised of three VRM Classes: Class II, along the Pony Express Trail; Class III, in the foreground-middleground distance zone of the higher use roadways and higher sensitivity level areas near the SOA; and Class IV, in all remaining areas. The Ruby Lake NWR, South Marsh National Natural Landmark, and Fort Ruby National Historic Landmark are unclassified due to jurisdiction outside of the BLM.

The visual resources study identified nine KOPs (**Figure 3.19-1**) as the viewpoints for conducting the characteristic landscape, impacts, and VRM compliance analyses. KOP locations are as follows:

- KOP-1 has been selected due to its location on the Pony Express National Historic Trail and, secondarily, the visitor use activity at the intersection of the trail and the Strawberry Road/Nevada State Highway 892, a major visitor use area in the region. KOP-1 is located directly west of the proposed NOA Plan Boundary at the intersection of the Pony Express National Historic Trail and Strawberry Road/Nevada State Highway 892. KOP-1 represents the view of the proposed NOA project from the west.



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Legend

- Proposed NOA Plan Boundary
- Proposed SOA Plan Boundary
- Visual Resources Cumulative Effects Study Area

VRM Class Code

- VRM Class I
- VRM Class II
- VRM Class III
- VRM Class IV

Source: BLM 2012a, 2011g.

Bald Mountain Mine North and South Operations Area Projects EIS

Figure 3.19-6

Visual Resource Management Classes

0 2.5 5 10 Miles

N

BLM

Ely District Office

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- KOP-2 has been selected due to its location on the Pony Express National Historic Trail and, secondarily, the visitor use activity at the intersection of the trail and the White Pine County Road 3. KOP-2 is located north of the proposed NOA Plan Boundary at the intersection of the Pony Express National Historic Trail and White Pine County Road 3. KOP-2 represents the view of the proposed NOA project from the north.
- KOP-3 has been selected due to its location on White Pine County Road 3 in the immediate foreground of the project. KOP-3 is located in the northeastern section of the proposed NOA Plan Boundary along County Road 3. KOP-3 represents the view of the proposed NOA project from the north in the Ruby Valley.
- KOP-4 has been selected due to its location on the recreational access road in the immediate foreground of the northern area of the SOA project. KOP-4 is located within the northern portion of the proposed SOA Plan Boundary along a recreational and mine access road near Alligator Ridge. KOP-4 represents the view approaching the proposed SOA project from the east.
- KOP-5 has been selected due to its location on the recreational access road in the immediate foreground of the southern area of the SOA project. KOP-5 is located within the southern portion of the proposed SOA Plan Boundary along a recreational and mine access road. KOP-5 represents the view approaching the proposed SOA project from the south.
- KOP-6 has been selected due to its location on White Pine County Road 3, the major recreational and residential access road in the valley. KOP-6 is located southeast of the proposed SOA Plan Boundary on White Pine County Road 3. KOP-6 represents the view approaching the proposed SOA project from the east across Long Valley.
- KOP-7 has been selected due to its location at the water well in the Sunshine Locality historic area. KOP-7 is located southeast of the proposed SOA Plan Boundary in the Sunshine Locality historic area on a BLM recreation road. KOP-7 represents the view approaching the proposed SOA from the southeast.
- KOP-8 has been selected due to its location at the Fort Ruby National Historic Landmark visitor use area. KOP-8 is located north of the proposed NOA Plan Boundary in the Fort Ruby National Historic Landmark site on a recreational road. KOP-8 represents the view approaching the proposed NOA project from the north.
- KOP-9 has been selected due to its location at the Ruby Stage Station historic site marker and use area. KOP-9 is located northeast of the proposed NOA Plan Boundary. KOP-9 represents the view approaching the proposed NOA project from the north.

All of the approach routes are lightly to moderately traveled, and are the only routes to and through the area. Most traffic in the area is generated by local mineral development, ranching, recreational activity, and heritage tourism.

3.19.2 Environmental Consequences

This section discusses project related impacts to visual resources resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to visual resources include direct and indirect impacts associated with the degradation of views from KOPs in the vicinity of the project.

3.19.2.1 Proposed Action

Potential visual impacts associated with the proposed NOA and SOA projects were analyzed using the procedures outlined in the BLM Visual Contrast Rating Handbook H-8431-1 (BLM 1986). Impacts to landscape scenery and impacts to viewers were determined by comparing the characteristics and extents of the landforms, vegetation, and structures of the proposed project facilities with the visual resource inventory components of scenic quality, sensitivity levels, and distance zones. Compliance with

agency management objectives were determined by comparing visual contrast ratings for the proposed project facilities with the VRM class objectives (**Table 3.19-1**) for the project vicinity, VRM Class III and VRM Class IV. The process involves comparing the degree of visual contrast from the proposed facilities and project-related activities with the existing landscape character both during active mining and after reclamation is completed. The contrast rating process used nine KOPs (**Figure 3.19-1**) as the viewpoints for conducting the impact and RMP compliance analysis.

The expansion and development of the proposed NOA and SOA projects would increase the amount of visual contrast that currently exists between existing/authorized facilities and the natural character of the landscape. The primary change in visual effects from the currently approved levels would be the addition of the RDAs, HLFs, open pits, process areas, structures, and ancillary facilities, and the electrical transmission line within the TUC. The proposed NOA and SOA projects also would extend visual effects through the increased use of the area and proposed mining activity.

As noted in Section 3.19.1, Affected Environment, prior to completion of reclamation, the existing mine features exhibit strong form and color contrast, especially under bright, clear light conditions. Moderate to strong line and landform contrasts are generated to a large extent by the shapes of the existing RDAs, HLFs, and open pits. Moderate texture contrasts are generated between the bare surfaces of the mine features and the vegetation textures and patterns in the natural landscape. The proposed NOA and SOA projects would expand the visual effects in the vicinity of the existing mine areas and adjacent undeveloped areas, and would be most prominent during active mining. The visual contrast effects gradually would become less noticeable with reclamation.

The proposed NOA and SOA facilities would have visual characteristics during active mining that would be similar to existing facilities, notably geometric forms and exposed earth surfaces. As a result, the proposed NOA and SOA projects would have similar, but expanded, visual effects to those already occurring from the existing facilities, including moderate to strong form and color contrasts, weak to moderate line contrast, and weak texture contrast. The key considerations, therefore, are the degree of expansion of the visual impacts, and the amount of allowable contrast under the VRM Class III and VRM Class IV objectives. The objective for Class III states, "…the level of change to the characteristic landscape should be moderate." The objective for Class IV states, "…the level of change to the characteristic landscape can be high."

Night sky/night lighting of the NOA and SOA operations (processing areas, machinery, vehicles, light towers, conveyors, and roadway intersections) would cause impacts to the characteristic night landscape. There would be an increase in the existing conditions in sky glow in the view from all locations, including the nine KOPs, other locations along the Pony Express National Historic Trail, at the Fort Ruby National Historic Landmark, and within the Ruby Lake NWR and the South Mark National Natural Landmark,. Greater sky glow impacts would be apparent during non-moonlit nights, from reflections on clouds, and during the clearest and darkest nights. Areas of night-time activity, such as star gazing, camping, hiking, dispersed recreation, and driving would receive higher noticeable changes to the characteristic night sky. Buildings, landforms, and vegetation nearest the light sources would be reflected by operations lighting and would have increased visibility to viewers in the surrounding landscape out to and beyond the background distance zone.

Of particular importance to users of the cultural resource is the foreground-middleground view of the NOA project from the Pony Express National Historic Trail, a VRM Class II area. The NOA project is located outside of the VRM Class II area and, thus, would not be expected to conform to VRM Class II objectives. Users of the Pony Express Trail would notice moderate to high contrasts to landform, vegetation, and color in the characteristic landscape. These contrasts would be lessened by the presence of existing mining operations and remnant landscapes from past mining.

Visual contrasts from the proposed NOA and SOA projects would be greatest at KOP-1, KOP-2, KOP-3, KOP-4, and KOP-5, due to their close proximities to substantial changes in the characteristic

landscapes. Lighting used to facilitate around-the-clock mining would increase visual contrasts at night in the view from these KOPs. The North Poker Flats HLF would reach the skyline in the views from KOP-2, KOP-8, and KOP-9. Due to the relative scale of the RDAs, and change in color, line, form, and texture (moderate to strong contrasts) in the immediate foreground from KOP-2, KOP-3, KOP-8, and KOP-9, it is expected that the proposed facility would not achieve the requisite "moderate" level of landscape change in the short term – during active mining – for VRM Class III areas. It would be expected that the visual contrasts from facilities would be reduced after reclamation. However, the long-term visual effects (as seen from KOP-2 and KOP-3) would not be expected to achieve the VRM Class III objective unless the overall planar form of each RDA is reshaped to repeat the angular ridgelines in the background.

KOP-4 also would have strong form and color contrasts combined with moderate to strong line and texture contrasts. The mining activities in view from KOP-4 are located in VRM Class IV areas, where high levels of changes are permitted in the characteristic landscape and, as such, are in compliance with VRM objectives.

KOP-1, KOP-6, and KOP-7 would have moderate form and color contrasts combined with weak to moderate line and texture contrasts. The mining activities in view from these KOPs are located in VRM Class IV areas and, as such, are in compliance with VRM objectives.

The assessment of visual contrasts is informed by photographic simulations of the proposed NOA and SOA projects post-mining. The photographs of existing conditions, Proposed Action post-mining, and visual contract rating forms for each KOP are presented in **Appendices H1** (Visual Simulations) and **H2** (Visual Contrast Rating Forms).

Figure H-1 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-1. As shown, the proposed Redbird RDA, and reconfigured Rat West RDA and BMM 2/3 HLF Expansion would be constructed in previously disturbed views in their immediate vicinities. The visual effects of the expanded facilities would be apparent to the casual observer and would be seen as moderate impacts to scenery and viewers, because the facilities would be seen as extensions of the existing/authorized disturbances. The visual contrast rating worksheet for KOP-1 is provided in **Appendix H2**.

Figure H-2 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-2. As shown, the proposed Poker Flats and Duke Areas and Royale Area facilities on the northeastern corner of the proposed NOA would be constructed on partially disturbed land. The visual effects would be moderate because the facility would be seen as extensions of the existing/authorized disturbances. The North Poker Flats HLF would reach the skyline and, as such, would cause moderate to strong contrasts. The expanded facilities would be apparent to the casual observer from KOP-2. Other facilities would be entirely screened by intervening terrain or project landforms. The visual contrast rating worksheet for KOP-2 is provided in **Appendix H2**.

Figure H-3 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-3. As shown, the proposed South Poker Flats HLF; Winrock North, Winrock West, and Winrock East RDAs; and South Poker Flats Process Area and associated process ponds would be constructed immediately adjacent to White Pine County Road 3. As such, the visual effects would be strong, because the facilities would be seen as in the context of minimal existing/authorized disturbances. The expanded facilities would be strongly apparent to the casual observer from KOP-3. Other facilities would be entirely screened by intervening terrain or project landforms. The visual contrast rating worksheet for KOP-3 is provided in **Appendix H2**.

Figure H-4 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-4. As shown, the most prominent visible features would be the Gator HLF (300 feet high) and Gator Process Area, located

0.1 and 0.2 mile from KOP-4, respectively. Other facilities would be entirely screened by the Gator HLF or intervening terrain. The moderate to strong form, line, and color, and texture contrasts of the facility would achieve the Class IV objective during its active life. The degree of visual contrast would be further lessened with completion of reclamation. The visual contrast rating worksheet for KOP-4 is provided in **Appendix H2**.

Figure H-5 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-5. As shown, the most prominent visible features would be (from left to right) the Yankee South RDA (375 feet high), Yankee HLF (275 feet high), Yankee Process Area (0.6 mile), Gator HLF (300 feet high), and Gator South RDA (150 feet high), located 0.7, 0.5, 0.6, 4.7, and 6.0 miles from KOP-5, respectively. Other facilities would be entirely screened by intervening terrain or project landforms. The moderate to strong form, line, color, and texture contrasts of the facility would achieve the Class IV objective during its active life. The degree of visual contrast would be further lessened with completion of reclamation. The visual contrast rating worksheet for KOP-5 is provided in **Appendix H2**.

Figure H-6 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-6. From this perspective, a viewer would be able to experience broad vistas of the landscape between Alligator Ridge and Dry Mountain. The Vantage RDA would be “sky-lined” and would attract a moderate level of attention. Due to the distance (greater than 7 miles) between the observer and the proposed SOA project, the other proposed facilities would not dominate the viewer’s attention and the existing, natural character of the landscape would be “partially retained.” Other facilities would be entirely screened by intervening terrain or project landforms. The moderate form, line, and color contrasts and weak texture contrast of the facility would achieve the Class IV objective during its active life. The degree of visual contrast would be further lessened with completion of reclamation. The visual contrast rating worksheet for KOP-6 is provided in **Appendix H2**.

Figure H-7 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-7. As shown, the most prominent visible features would be (from left to right) the Yankee South RDA (375 feet high – 6.5 miles), Yankee HLF (275 feet high – 6.6 miles), Yankee Process Area (0.6 mile), Gator HLF (300 feet high – 9.8 miles), and Gator South RDA (150 feet high – 10.8 miles). Due to the distance (greater than 6 miles) between the observer and the proposed SOA project, the other proposed facilities would not dominate the viewer’s attention and the existing, natural character of the landscape would be “partially retained.” Other facilities would be entirely screened by intervening terrain or project landforms. The moderate form, line, and color contrasts and weak texture contrast of the facility would achieve the Class IV objective during its active life. The visual contrast rating worksheet for KOP-7 is provided in **Appendix H2**.

Figure H-8 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-8. As shown, the proposed Poker Flats and Duke Areas, Royale Area, and Winrock Area facilities on the northeastern corner of the proposed NOA project would be constructed on partially disturbed land. The visual effects would be moderate, because the facility would be seen as extensions of the existing/authorized disturbances. The North Poker Flats HLF facility would reach the skyline and, as such, would cause moderate to strong contrasts. The expanded facilities would be apparent to the casual observer from KOP-8. Other facilities would be entirely screened by intervening terrain or project landforms. The visual contrast rating worksheet for KOP-8 is provided in **Appendix H2**.

Figure H-9 illustrates the existing condition and a simulation of visual effects as a result of implementation of the Proposed Action (post-mining) as seen from KOP-9. The proposed Poker Flats and Duke Areas, Royale Area, and Winrock Area facilities on the northeastern corner of the proposed NOA project would be constructed on partially disturbed land. The visual effects would be moderate,

because the facility would be seen as extensions of the existing/authorized disturbances. The North Poker Flats HLF facility would reach the skyline and, as such, would cause moderate to strong contrasts. The expanded facilities would be apparent to the casual observer from KOP-9. Other facilities would be entirely screened by intervening terrain or project landforms. The visual contrast rating worksheet for KOP-9 is provided in **Appendix H2**.

Design features and ACEPMs are summarized in Section 2.4.3, Design Features and Applicant-committed Environmental Protection Measures, for the Proposed North and South Operations Area Projects. Design features and ACEPMs specific to visual impacts focus facility design, phased construction, concurrent reclamation, and the use of anti-glare light fixtures. Successful reclamation standards would include the recontouring of disturbed areas to blend with the natural topography, stabilization of erosion, and the establishment of an acceptable vegetative cover in accordance with Nevada Guidelines for Successful Revegetation. Reclamation goals and criteria, concurrent and proposed reclamation timelines, and post-reclamation monitoring standards are described in Section 2.4.4, Reclamation.

3.19.2.2 North and South Operations Area Facilities Reconfiguration Alternative

Under the Reconfiguration Alternative, the impacts to viewers at KOP-2, KOP-8, and KOP-9 would be reduced substantially as compared to the Proposed Action. This is due to the removal in the North Operations Area of the Royale Pit, Royale North RDA, Royale South RDA, North Poker Flats HLF, Winrock HLF, Winrock Process Area, and associated ancillary facilities, which would have been visible from KOP-2, KOP-8, and KOP-9. **Figures H-2, H-8,** and **H-9** illustrate the existing condition and a simulation of visual effects as a result of implementation of the Reconfiguration Alternative (post-mining) as seen from KOP-2, KOP-8, and KOP-9, respectively. In addition, the impacts to viewers at KOP-3 would be lessened as compared to the Proposed Action, due to the removal of the Winrock HLF and Winrock Process Area. **Figure H-3** illustrates the existing condition and a simulation of visual effects as a result of implementation of the Reconfiguration Alternative (post-mining) as seen from KOP-3. Impacts to viewers at KOP-4 would be reduced substantially due to the removal in the South Operations Area of the Gator HLF, Gator Process Area, and associated ancillary facilities, which would have been in the immediate foreground. **Figure H-4** illustrates the existing condition and a simulation of visual effects as a result of implementation of the Reconfiguration Alternative (post-mining) as seen from KOP-4. In addition, the impacts to viewers at KOP-5, KOP-6, and KOP-7 would be lessened as compared to the Proposed Action. **Figures H-5**, **H-6**, and **H-7** illustrate the existing condition and a simulation of visual effects as a result of implementation of the Reconfiguration Alternative (post-mining) as seen from KOP-5, KOP-6, and KOP-7, respectively. All other visual impacts of the Reconfiguration Alternative would be similar to the impacts of the Proposed Action in that visible facilities would be in the same location as for the Proposed Action. The visual contrast rating worksheets for KOP-1, KOP-2, KOP-3, KOP-4, KOP-5, KOP-6, KOP-7, KOP-8, and KOP-9 are provided in **Appendix H2**.

3.19.2.3 Western Redbird Modification Alternative

Under the WRM Alternative, the impacts to viewers at the KOPs would be the same as described for the Reconfiguration Alternative with the following exception. Impacts to viewers at KOP-1 would be reduced in comparison to the Reconfiguration Alternative due to the reduction of the Redbird RDA and Pit footprints, which would have been visible from KOP-1. **Figure H-10** illustrates the existing condition and a simulation of visual effects as a result of implementation of the WRM Alternative (post-mining) as seen from KOP-1. The visual contrast rating worksheets for this alternative for KOP-1 is provided in **Appendix H2**.

3.19.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to visual resources would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. Under the No Action Alternative, construction

of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized.

3.19.2.5 Cumulative Impacts

The CESA for visual resources is shown in **Figure 3.19-1** and consists of a 15-mile BLM VRM background distance zone. Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

Past and present actions have resulted, or would result, in approximately 18,413 acres of total surface disturbance within the visual resources CESA. The total quantifiable surface disturbances are related to mining, oil and gas development, wind energy development, exploration, land, road, and utility corridor development, agriculture, livestock grazing; residential developments, and other county and government actions. RFFAs proposed within the visual resources CESA include, but are not limited to, the following: oil and gas lease sales within the Long, Ruby, and Huntington valleys (acreage unknown), and vegetation treatments (totaling 34,672 acres).

Among these actions, the past and present actions and RFFAs projects associated with mining would be the most likely to introduce visual contrast within the visual resources CESA; however, there is potential for vegetation treatments to result in more vistas of previously hidden natural and man-made features such as rock outcroppings, ridge lines, homes on private land, abandoned mines, pipelines, and roads (BLM 2013a). All of the identified RFFAs would be located in VRM Class III and VRM Class IV areas. It is anticipated that the visual disturbance would meet the standards of the VRM Class IV objective, which provide for major change in the landscape. It is anticipated that the RDAs and HLFs proposed for the Ruby Valley area would not meet the VRM Class III objective, which provide for “moderate change” in the landscape, unless reshaped to repeat the form elements of the background topography. Implementation of the Reclamation Plan and the assumption that standard reclamation requirements would be required for permitting of future projects, the cumulative effects to visual resources would be minimized to the degree possible after completion of future projects.

The Proposed Action incrementally would remove 11 acres of authorized disturbance from the 18,413 acres of past and present actions and incrementally increase disturbance to visual resources by an additional 7,097 acres resulting in a total cumulative disturbance of approximately 60,171 acres (5 percent of the total visual resources CESA). The 7,097 acres of disturbance would result in moderate long-term impacts to scenery for viewers traversing the Pony Express National Historic Trail, viewers at the Fort Ruby National Historic Landmark, South Marsh National Natural Landmark, Ruby Stage Station area and Sunshine Locality historic area, viewers in areas of dispersed recreation, and viewers traveling along roads and trails. Strong contrasts of form, line, and color would not be in compliance with VRM Class III objectives and would be in compliance with Class IV objectives. Short-term contrasts would be greater than long-term contrasts and would lessen with time and the reclamation process.

The Reconfiguration Alternative would remove 1,934 acres of authorized disturbance from the 18,413 acres of past and present actions and incrementally increase surface disturbance by an additional 5,668 acres resulting in a total cumulative disturbance of approximately 56,819 acres (5 percent of the total visual resource CESA). The NOA and SOA project Reconfiguration Alternative would result in lower long-term impacts than the Proposed Action and contrasts would comply with both VRM Class III and Class IV objectives. The WRM Alternative would remove 234 acres of previously authorized disturbance and 402 acres of new disturbance proposed under the Reconfiguration Alternative for a total cumulative disturbance of approximately 56,182 acres (5 percent of the total cultural resource CESA).

Under the No Action Alternative, cumulative impacts to visual resources would be the same as those described in the *Final Environmental Impact Statement for the Bald Mountain Mine North Operations Area Project*, as follows: and “Visual resources in the cumulative effects study area have been affected by past, present, and reasonably foreseeable future actions. Projects that could have impacts visible

from the Pony Express Trail are the most problematic since this is the most visually sensitive area within the cumulative effects study area. The Proposed Action would add cumulatively to the disturbances seen within the long range viewshed of this trail, but would not impact the 1-mile buffer of the Class II management area around the trail. The great majority of cumulative impacts would last until natural vegetation has become established in disturbed areas, which could take many years. Until then, form and color change would be apparent with altered vegetation communities. Open pits and structures associated with some proposed actions would be permanent. Most of the disturbances in the study area, including the Proposed Action, are within Class III and IV VRM areas. Class IV allows for strong contrast, while Class III allows for moderate contrast. Most of the Class III designations are along travel routes most visible to the public. These areas also are subject to periodic developments where the final design and/or reclamation should be such that only moderate visual contrast would occur, thus preserving the overall aesthetic appeal of the region. The Proposed Action would add cumulatively to these disturbances." (BLM 2009a). Also applicable is the *Environmental Assessment for the Mooney Heap and Little Bald Mountain Expansion Project, as follows: "*Sensitive receptors within the CESA include users of the Ruby Mountains and the Ruby Lake NWR. The Pony Express Trail is included within a Class II visual resource management corridor to the north of the Plan area. Past and present land-disturbing projects and activities within the CESA have resulted in visual impacts which can be seen by viewers within the CESA, including portions of the Pony Express Trail. Reasonably foreseeable future actions also would contribute to visual resource impacts through land clearing activities and facility construction. The effects of mining projects would last until successful reclamation is completed; however, visual impacts such as color and texture changes may remain much longer. The Proposed Action includes the development of roads, RDAs, pit expansions, and the installation of three new radio towers. These actions would occur within an area which is already highly disturbed making the addition of these disturbances negligible within the CESA" (BLM 2011a).

Pending completion of successful reclamation on all project components with the exception of open pits and backfill areas, it is anticipated that the Proposed Action, Reconfiguration Alternative, and WRM Alternative would contribute less than 1 percent to the overall cumulative disturbance within the visual resources CESA. Although, successful reclamation would minimize visual impacts to the extent possible, the additional cumulative visual impacts of the project landforms' shapes, lines, and colors would be noticeable to the casual observer in both the short and long term.

3.19.2.6 Monitoring and Mitigation Measures

Issue: Consistency with BLM standards for coloration of exterior facility surfaces.

Mitigation Measure VR-1: For the proposed NOA and SOA projects, to be consistent with disturbed soils within the mine boundary, new facilities and buildings within the mined area would be painted the color Carlsbad Canyon as listed on the BLM Environmental Color Chart. New facilities and buildings outside of the mined area that would be surrounded with vegetation or at the tree line would be painted the color Shadow Gray, as listed on the BLM Environmental Color Chart.

Effectiveness: These two colors, Carlsbad Canyon and Shadow Gray, would reduce color-related contrasts for the casual observer.

3.19.2.7 Residual Impacts

Although successful reclamation would minimize visual impacts to the extent possible, the large-scale forms and lines of the proposed facilities would remain visible for the Proposed Action, Reconfiguration Alternative, and WRM Alternative. These changes would result in residual adverse effects to visual resources.

3.20 Hazardous Materials and Solid Waste and Public Health and Safety

The study area for hazardous materials and solid waste and Public Health and Safety is defined as the proposed NOA and SOA plan boundaries as well as the primary access roads such as State Highway 278 from Carlin, Nevada to Eureka, Nevada; U.S. Highway 50 from Eureka east to State Highway 892 (Strawberry Road); State Highway 892 (Strawberry Road) to the proposed NOA and SOA projects; and U.S. Highway 50 from Ely, Nevada to White Pine County Road 3 (Long Valley Road). These areas and routes were chosen because they are the areas and routes that would be impacted by hazardous materials storage, use, and transportation and disposal of waste in permitted on-site disposal areas.

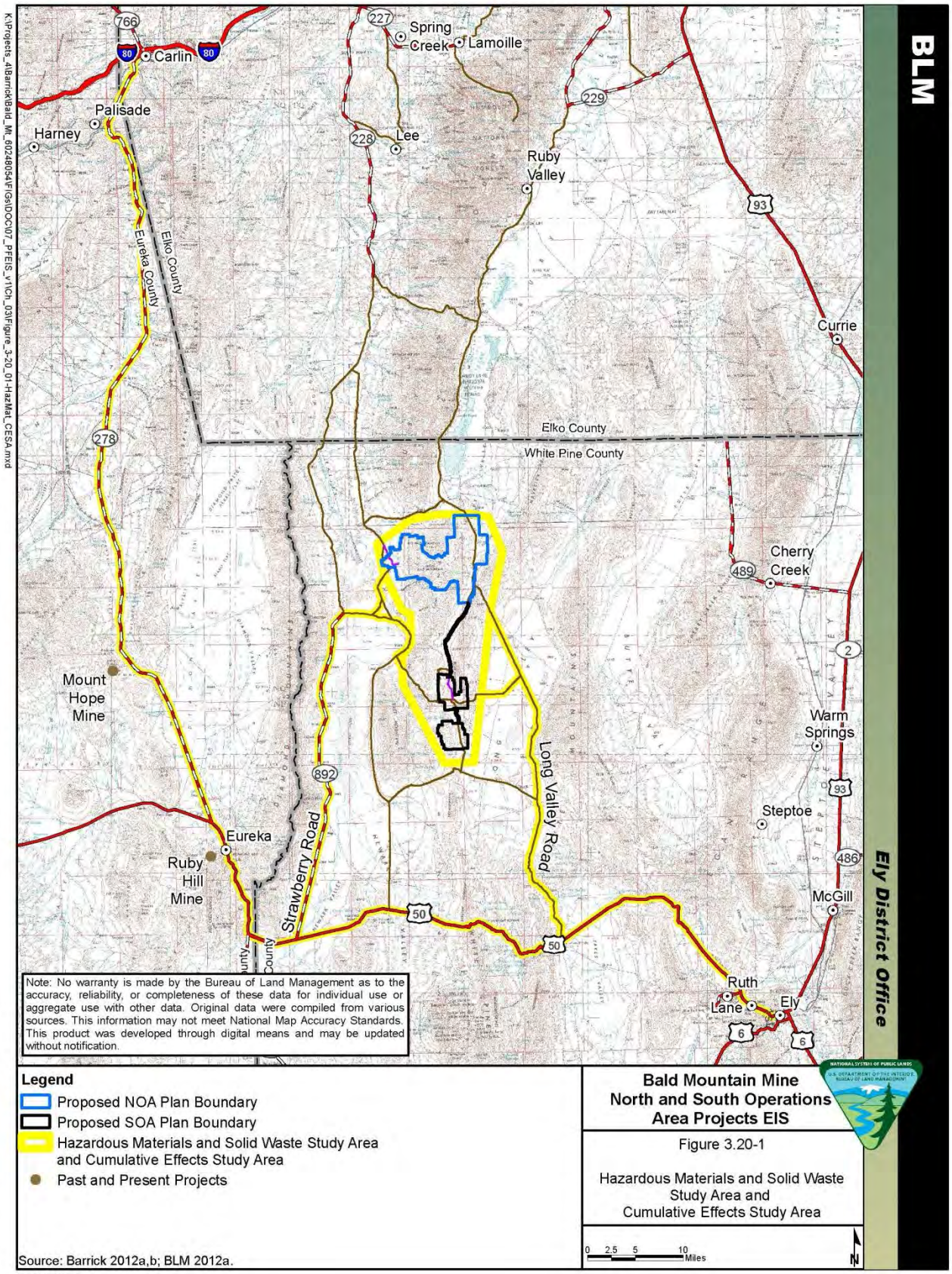
The CESA for hazardous materials and solid waste would include the study area as defined above, the Authorized Regional Exploration Boundary, the Ruby Hill Mine, and Mount Hope Project Area. The CESA was chosen because it includes areas to be impacted by the proposed NOA and SOA projects as well as other mining-related activities that would likely contribute to hazardous materials transportation and use and waste disposal in reasonable proximity to the proposed NOA and SOA projects. **Figure 3.20-1** illustrates the study area and CESA for hazardous materials and solid waste.

3.20.1 Affected Environment

3.20.1.1 Regulatory Framework

Hazardous materials, which are defined in various ways under a number of regulatory programs, can represent potential risks to both human health and the environment when not properly managed. The term hazardous materials include the following materials that may be utilized or disposed of in conjunction with mining operations:

- Substances covered under Occupational Safety and Health Administration and MSHA Hazard Communication Standards (29 CFR 1910.1200 and 30 CFR 42): The types of materials that may be used in mining activities and that would be subject to these regulations would include almost all of the materials identified in **Tables 2.4-38** and **2.4-54**. **Tables 2.4-38** and **2.4-54** summarize the existing average annual usage for chemical consumables necessary to construct and operate the existing/authorized NOA and SOA, respectively.
- Hazardous materials as defined under USDOT regulations 49 CFR, Parts 170-177: The types of materials that may be used in mining activities and that would be subject to these regulations would include sodium cyanide, explosives, cement, fuels, some paints and coatings, and other chemical products.
- Hazardous substances as defined by the CERCLA and listed in 40 CFR Table 302.4: The types of materials that are designated as hazardous substances that are used in mining activities and that would be subject to these requirements would include sodium cyanide; solvents; solvent-containing materials (e.g., paints, coatings, degreasers); acids; and other chemical products.
- Hazardous waste as defined in the RCRA: Procedures in 40 CFR 262 are used to determine whether a waste is a hazardous waste. The types of materials used in mining activities and that may be subject to these requirements could include liquid waste materials with a flash point of less than 140°F, spent solvent containing waste, corrosive liquids, and lab assay waste. Hazardous waste is regulated under Subtitle C of the RCRA. Any hazardous substances and extremely hazardous substances as well as petroleum products such as gasoline, diesel, or propane, are subject to reporting requirements if volumes on hand exceed threshold planning quantities under Sections 311 and 312 of SARA. The types of materials that may be used in mining activities and that would be subject to these requirements would include fuels, coolants, acids, and solvent-containing products such as wet paints and coatings.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Elko County
White Pine County
Cherry Creek
Mount Hope Mine
Warm Springs
Steptoe
Eureka
Ruby Hill Mine
Strawberry Road
Long Valley Road
McGill
Ruth
Lane
Ely
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
Legend
Proposed NOA Plan Boundary
Proposed SOA Plan Boundary
Hazardous Materials and Solid Waste Study Area and Cumulative Effects Study Area
Past and Present Projects
Bald Mountain Mine North and South Operations Area Projects EIS
Figure 3.20-1
Hazardous Materials and Solid Waste Study Area and Cumulative Effects Study Area
0 2.5 5 10 Miles
N
Source: Barrick 2012a,b; BLM 2012a.
12/14/2015

- Petroleum products defined as "oil" in the Oil Pollution Act of 1990: The types of materials used in mining activities and that would be subject to these requirements include fuels, lubricants, hydraulic oil, and transmission fluids.

In conjunction with the definitions noted above, the following lists provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- The SARA Title III List of Lists or the Consolidated List of Chemicals Subject to Emergency Planning and Community Right-to-Know Act and Section 112(r) of the CAA.
- The USDOT listing of hazardous materials in 49 CFR 172.101.

Certain types of materials, while they may contain potentially hazardous constituents, are specifically exempt from regulation as hazardous waste. Used oil, for example, may contain toxic metals, but would not be considered a hazardous waste unless it meets certain criteria. Other waste that might otherwise be classified as hazardous are managed as "universal waste" and are exempted from hazardous waste regulations as long as they are handled in ways specifically defined by regulation. An example of a material that could be managed as a universal waste is lead-acid batteries. As long as lead-acid batteries are recycled appropriately, requirements for hazardous waste do not apply.

Pursuant to regulations promulgated under CERCLA, as amended by SARA, release of a reportable quantity of a hazardous substance to the environment must be reported within 24 hours to the National Response Center (40 CFR Part 302). The NAC (445A.347) also requires immediate reporting of a release of a reportable quantity of a hazardous substance to the Nevada Division of Emergency Management. In addition, under the State of Nevada WPCP program, all releases of a reportable quantity must be reported as soon as possible, but not later than 24 hours after the event, to the NDEP Bureau of Corrective Actions; and a spill report would be provided to NDEP. Nevada regulates the storage and handling of certain defined "highly hazardous substances" under NAC 459.952-459.9542. The Nevada State Fire Marshal requires that storage of hazardous materials above certain specified thresholds obtain a permit under NAC 459.9918 (Nevada State Fire Marshal and State Emergency Response Commission 2008).

3.20.1.2 Regulatory Definition of Solid Waste

Solid waste consists of a broad range of materials that include garbage, refuse, wastewater treatment plant sludge, non-hazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances) resulting from industrial, commercial, mining, agricultural, and community activities (USEPA 2006). Solid waste is regulated under different subtitles of the RCRA and includes hazardous waste (discussed in the previous section) and non-hazardous waste. Non-hazardous waste is regulated under RCRA Subtitle D. In Nevada, solid waste rules are found in the NAC. Disposal of solid waste is regulated under NAC 444.570-444.7499; disposal of hazardous waste is regulated under NAC 444.850-444.8746.

<u>Solid Waste Generated from Current Mining Operations</u>

Solid waste that is currently generated at the existing/authorized NOA includes non-hazardous waste and hazardous waste (Section 2.4.1.17, Hazardous Materials). Non-hazardous waste includes glass, plastics, paper, wood, used tires and non-hazardous laboratory wastes which are disposed of at the currently authorized BMM and Saga Class III-waivered landfills. Another nonhazardous waste stream is PCS and is currently managed in the existing/authorized NOA at on-site treatment units. The volume of PCS generated annually totals approximately 700 cubic yards (Barrick 2012a). When PCS treatment meets requirements as specified in the current BMM PCS Management Plan, it can be disposed in predetermined areas within the mine permit area.

The existing BMM NOA and Mooney Basin areas are classified as a Small Quantity Generator of hazardous waste as defined by the RCRA (USEPA 2006). Most of the hazardous waste would consist of spent solvent and used paint. Other waste consists of universal waste (fluorescent lights, batteries), and used products (used oil and antifreeze).

3.20.1.3 Spills and Contaminated Sites

The SWPPP summarizes a record of spills that have occurred from February 2008 to November 2010. The SWPPP indicated that fuels and petroleum oils were involved in the majority of on-site spills (Barrick 2012a,b). The spilled amounts ranged from 5 to 400 gallons and the impacted media was soil which was excavated and transferred to the PCS treatment facilities. Barren solutions and cyanide solutions were the other materials spilled and spill amounts ranged from 100 to 2,000 gallons. The spills impacted soil which was excavated and placed at the Mooney HLF. Only two incidents at the mine were listed on the NDEP Corrective Actions database: 1) a gasoline spill (reported as a closed site) and 2) a motor oil spill reported as an open site (NDEP 2012b).

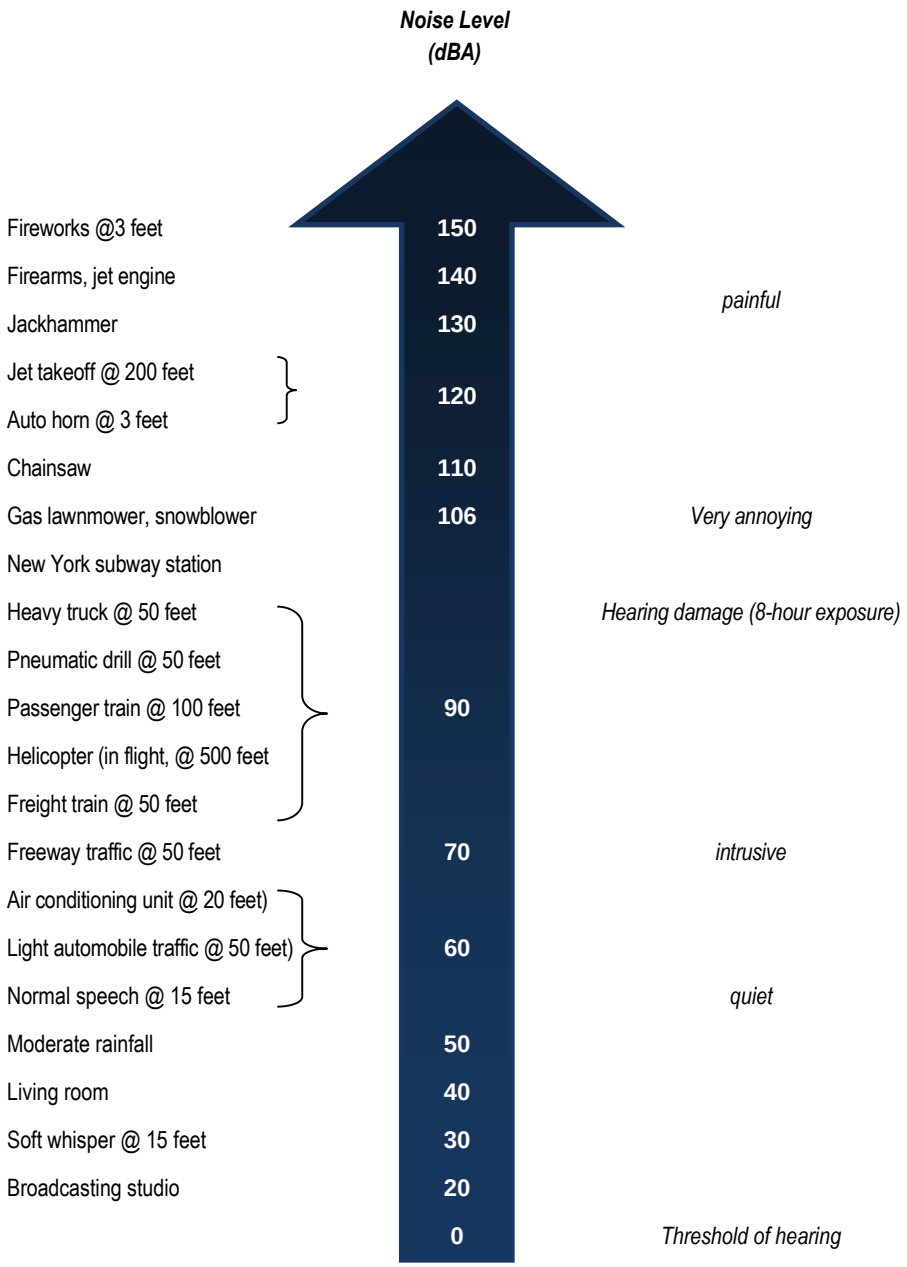
3.20.1.4 Noise

Noise is defined as any sound that is undesired, extraneous or interferes with one's hearing. Noise is considered a human health concern as it can interfere with speech communication and hearing or is otherwise considered annoying. An individual's response to noise is influenced by the type of noise, perceived importance of the noise, appropriateness in the setting, time of day, type of activity during which the noise occurs, and the sensitivity of the individual. Methods have been developed for weighting the sound frequency spectrum to approximate the response of the human ear. The dBA scale is widely used for environmental noise assessments because of its relative convenience and accuracy in correlating with people's judgments of what constitutes noise. Typical A-weighted sound and noise levels associated with common activities or situations are shown in **Figure 3.20-2**.

Ambient noise, or background noise, is defined as the total noise from nearby and distant sources, that is relatively steady and homogeneous, with no particular source identifiable within it (GE Energy 2005; National Wind Coordinating Committee 2002). As noted in the Bald Mountain Mine North Operations Area Project Final EIS (BLM 2009a), the primary sources of noise currently observed are wind and noise from the existing BMM operations. Intermittent blasting can be heard, mostly faintly, at only a few receptors representing human residences or activity. Existing natural noise levels are generally low intensity away from traffic corridors, estimated to average between 30 and 35 dBA. Traffic impacts contribute slightly higher background noise levels (BLM 2009a).

In 2013, noise modeling and monitoring was conducted at selected lek locations in an effort to evaluate impacts to greater sage-grouse breeding activity from future mining activity in the vicinity of the NOA and SOA projects. Baseline ambient noise levels at monitored leks ranged between 16.3 to 19.8 dBA (JBR 2013a; also see Section 3.8). It assumed that these levels are generally representative of baseline conditions further outside of the mining boundary.

There are few receptors within audible range of the existing mine. The closest private property to the Proposed Action is located at NE¼ NE¼ Section 5, T23, R58, Lot #1. This property is currently unoccupied (BLM 2009a). The building on this property is 4,480 feet from the Mooney Deep South HLF.



Source: CEQ 1970.

Figure 3.20-2 Typical A-weighted Sound Levels

3.20.2 Environmental Consequences

This section discusses project related impacts to hazardous materials and solid waste resulting from the Proposed Action, Reconfiguration Alternative, WRM Alternative, and No Action Alternative. Primary issues related to hazardous materials and solid waste include the possibility of an accidental release from on-site storage and use areas, or during transportation to or from the site.

3.20.2.1 Proposed Action

The Proposed Action would utilize the transportation routes as shown in **Figure 2.4-6**. Process chemicals and fuel would continue to be transported by truck along the highways in the region, using the identified routes. Trucks also would continue to transport small quantities of hazardous waste on an infrequent basis. Potential impacts would involve the continuation of the hazardous material and waste management practices currently in use and previously analyzed (BLM 2009a). It is anticipated that the Proposed Action would not result in a change to the current classification of Small Quantity Generator of hazardous waste for the proposed NOA and SOA projects.

For the proposed NOA, the existing Class III-waivered landfills would continue to be used to dispose non-hazardous waste as described in Section 2.4.1.17, Hazardous Materials. For the proposed SOA, an additional landfill would be constructed within the proposed Vantage and Yankee South RDA disturbance areas which would accept non-hazardous waste. For both the proposed NOA and SOA projects, used oil, antifreeze, solvents, and batteries would continue to be recycled at approved off-site facilities. Existing off-site facilities have the capacity for current projected future waste of this type that would result from the Proposed Action (approximately a 20 to 30 percent increase over current). Fuel storage would continue in aboveground tanks with secondary containment structures capable of containing 110 percent of the volume of the largest tank. Engineering controls, which help to reduce exposure to potential hazards through isolation and containment (including leak detection) of fuel and chemicals during storage and use, in addition to actions included in the Spill Contingency Plan and the Emergency Response Plan (Barrick 2012a,b) reduce the risk of an on-site chemical or fuel release. As a result, the risk of chemical or fuel release to the environment would continue to be more likely during transportation operations to and from the proposed NOA and SOA projects under the Proposed Action. The probability of that type of a release is described in detail below.

<u>Probability of a Release</u>

Process chemicals, fuel, and waste materials could be accidentally released during transport to and from the proposed NOA and SOA projects. The Proposed Action would require the continuation of transport of the materials and quantities shown in **Tables 2.4-38** and **2.4-53**. As shown, the Proposed Action would increase the quantities of primary fuels and reagents from those currently utilized.

The probability of a truck accident involving hazardous materials was estimated in the *Final Environmental Impact Statement for the Bald Mountain Mine North Operations Area Project* (BLM 2009a) using accident and release statistics for truck shipments of hazardous materials (Bastelle 2001). The primary emphasis in the previous analysis was placed upon the release of liquid material that could pose an immediate human health hazard or an off-site contaminant hazard. The following analysis would use the same statistical analysis as that used in the *Final Environmental Impact Statement for the Bald Mountain Mine North Operations Area Project*.

A risk analysis of a transportation-related release of liquid sodium cyanide, diesel fuel, and hydrochloric acid was performed using the anticipated volumes of materials to be transported to the proposed NOA and SOA as listed in **Tables 2.4-38** and **2.4-53**. The analysis considers the proposed NOA and SOA projects separately since the operational lives of each area are different. **Tables 3.20-1** and **3.20-2** provide a potential incident analysis of the transportation of hazardous materials to the proposed NOA project and proposed SOA project, respectively. For the analysis, it was assumed that the main transportation route is State Highway 278 from Carlin to Eureka; followed by U.S. Highway 50 from

Eureka east to State Highway 892 (Strawberry Road); then from State Highway 892 (Strawberry Road) to the proposed NOA or SOA projects, a one-way trip of approximately 150 miles.

These results indicate a low probability of an accidental release of hazardous materials to the environment during the estimated life of the Proposed Action. The probability of a release to the environment in a populated area would be many times less than the estimates shown in **Tables 3.20-1** and **3.20-2** since most of the route is located in rural areas. A detailed description of the potential effects of such a release are described in detail below.

Table 3.20-1 North Operations Area Project Potential of Hazardous Material Transportation Incidents

Material/ USDOT Hazardous Material Category[1]	Annual Use (gallons)	Approximate Shipment Quantity (gallons)	Number of Shipments Life-of-Mine[2]	Distance (miles)[3]	Incident per Mile[4]	Incident Probability[5]
Diesel Fuel and Gasoline / 3	10,000,000	20,500	9,740	1,461,000	0.0000007	1.02
Sodium Cyanide / 6.1	3,800,000	6,250	12,160	1,824,000	0.0000008	1.46
Hydrochloric Acid / 8	83,300	4,200	400	60,000	0.0000004	0.024

[1] Hazardous Material Category (USDOT Pipeline and Hazardous Material Safety Administration [PHMSA] 2012).

[2] 20-year operational life of mine (number of shipments x 20 years).

[3] 150 miles one-way from I-80 from Carlin, Nevada.

[4] Table 25, page 4-13, Battelle (2001), includes accidents and en-route leaks, but not loading/unloading incidents.

[5] Incident probability = distance X (incident rate).

Table 3.20-2 South Operations Area Project Potential of Hazardous Material Transportation Incidents

Material/USDOT Hazardous Material Category[1]	Annual Use (gallons)	Approximate Shipment Quantity (gallons)	Number of Shipments Life of Mine[2]	Distance (miles)[3]	Incidents Per Mile[4]	Incident Probability[5]
Diesel Fuel / 3	7,500,000	20,500	6,935	1,040,250	0.0000007	0.73
Sodium Cyanide / 6.1	1,600,000	6,250	4,864	729,600	0.0000008	0.58
Hydrochloric Acid / 8	Not applicable, not a primary chemical to be used.					

[1] Hazardous Material Category (USDOT PHMSA 2012).

[2] 19-year operational life of mine (number of shipments x 19 years).

[3] 150 miles one-way from I-80 from Carlin, Nevada.

[4] Table 25, page 4-13, Battelle (2001), includes accidents and en-route leaks, but not loading/unloading incidents.

[5] Incident probability = distance X (incident rate).

Effects of a Release

The environmental effects of a release would depend on the substance, quantity, timing, and location of the release. This analysis considers the potential for off-site release incidents during transportation, but does not indicate a volume or location. The event could range from a minor oil spill on the project site where cleanup equipment would be readily available to a large fuel or chemical spill during transportation. Some of the chemicals could have immediate adverse effects on water quality and aquatic resources if a spill were to enter a flowing stream or a spring or wetland area. However, considering the transportation routes, the probability of a spill entering a wetland or other waterway would be low. Therefore, it is unlikely that spills of these materials would impact waterways. Rapid response to any spills and subsequent cleanup actions would lessen adverse effects to the impacted media.

As stated previously, the primary emphasis in this analysis is placed upon the release of liquid material that could pose an immediate human health hazard or an off-site contaminant hazard (hydrochloric acid, diesel fuel, and sodium cyanide). However, other fuels and reagents including ethylene glycol, methanol, propane, ammonium nitrate, sodium hydroxide, and calcium oxide would continue to be delivered to the proposed NOA and SOA projects and stored on-site (**Tables 2.4-38** and **2.4-54**). The transportation of these materials also represents a potential for an off-site release during transportation and these materials are subject to response, reporting, and cleanup procedures as the chemicals that receive primary emphasis in this analysis.

Hydrochloric acid spills that occur on the ground or in water would have the potential to impact local populations of aquatic and terrestrial life through the oxidizing action that destroys plant and animal cells. An acid spill into a waterway would have the potential to migrate from the initial spill site.

A release of diesel fuel would have the potential to impact soil, water, wildlife, and vegetation resources. A spill into a waterway would cause contamination of water and soil, likely affecting local aquatic populations. A spill to the ground would impact soils and potentially any vegetation in the spill area.

The effect of a sodium cyanide release would be more variable than a release of diesel fuel or hydrochloric acid and would depend on the amount of the release, the location of the release (e.g., dry upland area, wetland area, or flowing stream), the organisms exposed, and the chemical conditions at the release location. The release of sodium cyanide would likely cause the poisoning of aquatic and terrestrial species depending on exposure and concentrations. Environmental effects of a cyanide spill would be short-term and limited in extent due to the fairly rapid natural degradation of cyanide in the environment due to the natural cyanide cycle (Ghosh et al. 2006).

However, the small quantities of hazardous waste that would be generated and transported by the Proposed Action, combined with the very low probability of accidental release (**Tables 3.20-1** and **3.20-2**), would result in a very low risk of the previously described effects on the human and natural environment.

Public Safety

Spills and Fire

Any large-scale release of these chemicals could have implications for public health and safety. The location of the release would again be a primary factor in determining its importance; however, the probability of a release is very low, as is the probability of a release in a populated area. Therefore, it is highly unlikely that a release affecting human health or safety would occur during the life of the proposed NOA and SOA projects.

In the event of a release during transport, the commercial transportation company would be responsible for first response and cleanup. Local and regional law enforcement and fire protection agencies also may

be involved to secure the site and protect public safety. Barrick has the facilities, water trucks, water supply, and equipment to quickly put out a fire in the event that a fire breaks out from mining equipment/operations. In the event of an accident involving hazardous substances, the carrier must notify local emergency response personnel. The release of a reportable quantity of a hazardous substance must be reported to the appropriate state and federal agencies within the specified timeframes. The Emergency Response Plan (Barrick 2012a,b) would include a plan for the response of mine resources to off-site transportation hazardous material releases.

Noise

The Federal Noise Control Act of 1972 established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. The USEPA was given responsibility for implementing programs to assess noise and identify acceptable noise impacts. Neither the State of Nevada nor White Pine County has regulations quantitatively limiting noise generation or impacts from the proposed project during the construction or operational phases. For this analysis, the USEPA guideline recommends that noise levels above 55 dBA day-night sound level at residential land use be used as a guide for assessing impacts at the nearest home, ranch, business, or identified receptor.

Under the Proposed Action, noise would be generated from backhoes and other equipment operation used to develop new processing areas or roads. Noise from project activity during the operational phase would primarily be generated by site equipment, blasting, drilling, and traffic to and from the site. Operational noise would be present for about 20 years. **Table 3.20-3** portrays the noise levels of various types of construction equipment expected at different distances based on the concept of geometric spreading, which identifies a decrease of 6 dBA for every doubling of the distance away from a point source (Truax 1999).

Table 3.20-3 Noise Levels at Various Distances from Typical Construction Equipment

Construction Equipment	Noise Level (dBA) at Distances							
	50 feet	100 feet	200 feet	400 feet	800 feet	1,600 feet	3,200 feet	6,400 feet
Haul Truck	80	74	68	62	56	50	44	38
Pile Driver	95	89	83	77	71	65	59	53
Blasting	94	88	82	76	70	64	58	52
Earth Scraper	90	84	78	72	66	60	54	48
Front-end Loader	80	74	68	62	56	50	44	38
Blast Hole Drill	85	79	73	67	61	55	49	43
Exploration Drill	85	79	73	67	61	55	49	43

Source: Barrick 2012a.

As shown in **Table 3.20-3**, it is estimated that the noisiest piece of equipment (a pile driver) operating at peak load would produce noise levels that would exceed the USEPA guideline for residential noise (55 dBA) at a distance of about 1,600 feet (USEPA 1974), but would attenuate to an acceptable level at about 4,800 feet. This calculation does not consider by air absorption, terrain, and vegetation, which may result in additional noise attenuation.

Analytical assessments of noise were conducted as part of the BLM 2009a Final EIS (which would be represented of current activities at the mine) in the vicinity of the eastern BMM property boundary using conservative assumptions of noise generated and regional and local environmental attenuation. These assessments showed noise impacts from currently permitted on-site BMM operations are estimated to

have a maximum 15-minute average of approximately 51 dBA, and to have an instantaneous peak near 62 dBA when blasting occurred near the eastern mine boundary (BLM 2009a). The Final EIS estimated that noise impacts would have the potential to be three to four A-weighted decibels higher during the construction period, and that higher equipment usage rates would result in a maximum 15-minute average of approximately 58 dBA during the construction phase. The 2012 Final EIS also noted that operations may have an instantaneous peak near 64 dBA if blasting and the construction phase occurred simultaneously (Barrick 2012a).

The overall mine noise generation profile would be minimally changed compared with current activities on site because there is expected to be little change in the activities that generate the most noise, including blasting. The locations of the noise-generating activities would change slightly, but those changes would be expected to be unnoticeable or minor at all off-site receptors.

Within the mine boundary employees use hearing protection per MSHA requirements 30 CFR Part 62 Occupational Noise Exposure. Outside of mining areas, Barrick would restrict public access to the existing roads that cross active mining areas per MSHA requirements. Public access would be controlled with fences and locked gates or other physical methods (see **Figure 2.4-6)**. The closest private property to the Proposed Action is approximately 4,480 feet from the Mooney Deep South HLF. Noise levels from general construction and operation at this area would meet USEPA guidelines. As a result, no adverse health impacts are expected to sensitive receptors in the area. Impacts to wildlife from noise are discussed in Sections 3.7 and 3.8.

3.20.2.2 North and South Operations Area Facilities Reconfiguration Alternative

The Reconfiguration Alternative would use and transport the same amounts and types of hazardous materials and waste on an annual basis as the Proposed Action; however, the mine life is 10 years for this alternative compared with 20 years for the Proposed Action. As a result, the amount of hazardous materials and waste generated for this alternative would be approximately half of the Proposed Action over the life of the mine. The number of hazardous materials shipments, miles traveled, and calculated number of incidents over the mine life would be expected to be reduced by approximately half compared with the Proposed Action (**Tables 3.20-1** and **3.20-2**). There would be a low probability of an accidental release of hazardous materials to the environment over the life of the mine for this alternative.

Construction and operational noise levels would be similar to the Proposed Action, but operations would exist for 10 years instead of 20 years.

3.20.2.3 North and South Operations Area Facilities Western Redbird Modification Alternative

The WRM Alternative would use and transport the same amounts and types of hazardous materials and waste on an annual basis as the Reconfiguration Alternative. Due to the reduction and/or modification of facility footprints under the WRM Alternative, the number of hazardous materials shipments, miles traveled, and calculated number of incidents over the mine life could be reduced in comparison with the Reconfiguration Alternative. There would be a low probability of an accidental release of hazardous materials to the environment over the life of the mine for this alternative. Impacts from noise would be similar to the Reconfigurations Alternative.

3.20.2.4 No Action Alternative

Under the No Action Alternative, the proposed NOA and SOA projects would not be developed and associated impacts to hazardous materials and solid waste would not occur. Barrick would continue its operations, closure, and reclamation activities within the NOA and SOA boundaries under the terms and current permits and approvals as authorized by the BLM and State of Nevada. Under the No Action Alternative, construction of all previously authorized expansion and associated facilities would be implemented and reclaimed as authorized. Hazardous materials currently used would continue to be used in volumes as approved, and no increase of volume of materials would occur. The Spill

Contingency Plan and the Emergency Response Plan (Barrick 2012a,b) would continue to be implemented, reducing the risk of spills and potential contamination. Solid waste would continue to be disposed according to applicable regulations. Construction and operational noise levels would be similar to the Proposed Action, but operations would exist for about 7 years instead of 20 years.

3.20.2.5 Cumulative Impacts

The CESA for hazardous materials and solid waste would include the study area as defined above, the Authorized Regional Exploration Boundary, the Ruby Hill Mine, and Mount Hope Project Area (**Figure 3.20-1**). Past and present actions and RFFAs are discussed in Section 2.7, Past, Present, and Reasonably Foreseeable Future Actions; their locations are illustrated in **Figure 2.7-1**.

Past projects that received chemical shipments on the routes analyzed in this assessment include the existing Bald Mountain Mine, Mooney Basin Operations Area, Little Bald Mountain Mine (collectively the existing BMM NOA), Casino/Winrock Mine, White Pine Mine, Yankee Mine, and Alligator Ridge Mine. These properties were responsible for operating in accordance with applicable regulations, and there are no known current environmental impacts from the delivery of chemicals along the analyzed transportation routes from these operations. The existing NOA currently receives chemical shipments and stores hazardous materials and waste on-site in accordance with applicable local, state, and federal requirements. As described in Section 3.20.1.3, Spills and Contaminated Sites, spills were small and the impacts have been small and isolated. Other present actions which may involve the analyzed transportation routes include mineral exploration activities, exploratory oil and gas wells, and maintenance activities along utility corridors. These activities bring increased vehicle traffic and may involve the transport of small amounts of chemicals to the various sites within the hazardous materials and solid waste CESA. Increased traffic on the access roads also increases the potential for vehicle collision with a supply vehicle.

The RFFAs (all mining-related activities) shown in **Table 2.7-4** could cause an increase in vehicular traffic on the analyzed transportation routes. These routes include U.S. Highway 50, State Highway 93, State Highway 892 (Strawberry Road), and White Pine County Road 3 (Long Valley Road). Data indicates that peak traffic volumes occurred on these highways in 2005 and 2006, after which volumes dropped (see Section 3.15, Land Use and Access, for details). RFFAs that include new mining projects and oil and gas projects would transport material along these same routes.

The Proposed Action, Reconfiguration Alternative, and WRM Alternative would be one of the larger potential contributors to the cumulative hazardous materials and solid waste CESA. The Proposed Action, Reconfiguration Alternative, and WRM Alternative would cause an estimated 20 to 30 percent increase in fleet operational use. This would result in a corresponding increase in hazardous materials transport over the 21-year mine life for the Proposed Action and 10-year mine life for the Reconfiguration Alternative and WRM Alternative. It is impossible to determine how much actual overlap there would be traffic with the Proposed Action or other action alternatives, and other RFFAs. However, these increases, based on previous peak numbers, are unlikely to exceed the safe capacity of these aforementioned roads. For example, White Pine County Road 3 (Long Valley Road) currently operates at a LOS A with all cumulative existing traffic. Cumulatively, traffic numbers and transport of hazardous materials would increase, which in turn, would increase the likelihood of vehicle collisions and material spills on the access roads. However, given the low probability of a hazardous material release due to vehicle accident, it would be expected that the cumulative increase in risk would be low.

With the continued, proper implementation of the Spill Contingency Plan and the Emergency Response Plan (Barrick 2012a,b) for on- and off-site incidents, cumulative impacts associated with storage, use, and transportation of hazardous materials are expected to be small. Proper disposal of solid waste also would limit the risk of potential impacts.

3.20.2.6 Monitoring and Mitigation Measures

The transportation and use of hazardous materials and the generation and disposal of solid wastes are regulated by federal and state regulations and should be sufficient to provide protection to the environment and public health. Therefore, no additional monitoring and mitigation measures are recommended.

3.20.2.7 Residual Impacts

Residual adverse effects from the use of hazardous materials under the Proposed Action, Reconfiguration Alternative, or WRM Alternative would depend on the substance, quantity, timing, location, and response involved in the event of an accidental spill or release. Operational compliance with applicable regulations and in accordance with the Spill Contingency Plan and the Emergency Response Plan (Barrick 2012a,b) as well as the prompt cleanup of spills and releases would minimize the risk of residual adverse effects due to accidental spills or releases of hazardous materials. Sodium cyanide can be acutely toxic, but does not persist in the environment for a long period of time. Regulations governing the transportation, storage, use, and disposal of hazardous materials have greatly reduced the potential for residual effects due spills of hazardous materials. Proper disposal of non-hazardous solid waste in the permitted landfills would minimize residual effects with regard to such materials.

3.21 Relationship between Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-term Productivity

As described in Section 3.1, Introduction, short-term is defined as the 25-year construction and operational life of the Proposed Action, also including the initial phases of reclamation. For the Reconfiguration Alternative and WRM Alternative, short-term is defined as the 15-year construction and operational life including the initial years of the reclamation period. Long-term is defined as the remainder of the reclamation period, followed by closure, reclamation monitoring, and post-closure monitoring (i.e., beyond 25 years for the Proposed Action; beyond 15 years for the Reconfiguration and WRM alternatives). This section identifies the tradeoffs between the short-term uses of environmental resources during construction, operation, and reclamation versus the long-term productivity of environmental resources that would extend beyond the end of reclamation.

The short-term use of resources during the construction, operation, and initial phases of reclamation for the Proposed Action, Reconfiguration Alternative, and WRM Alternative would result in beneficial impacts such as additional local employment and the generation of revenue.

The proposed NOA and SOA projects would result in various short-term uses with adverse impacts involving the temporary loss of soil and vegetation productivity and the associated loss of wildlife habitat; possible wildlife avoidance and displacement; temporary reduction in the livestock grazing area and an associated loss of AUMs; temporary increases in fugitive dust; and temporary reduction in dispersed recreation opportunities. These short-term uses would occur on approximately 5,266 to 7,097 acres (depending on alternative), and are expected to end upon completion of construction, operations, and successful reclamation. Short-term uses would be minimized through implementation of ACEPMs.

Long-term productivity (i.e., including and following project reclamation) would primarily depend on the effectiveness of the proposed reclamation of the disturbance areas. Successful reclamation would provide for post-mining wildlife, wild horses, and livestock grazing by establishing self-sustaining plant communities. Revegetation also is expected to stabilize disturbed surfaces and control erosion. It is estimated that long-term productivity would be lost on approximately 780 to 1,210 acres of area (depending on alternative) that would be permanently disturbed due to creation of open pits and pit backfill areas which would not be backfilled or reclaimed. This would cause a long-term loss in soil and vegetation productivity and associated terrestrial wildlife habitat and livestock forage, associated loss of AUMs, and potential long-term loss to dispersed recreation on public lands. Although some avian species could use un-reclaimed pit walls for nesting habitat once mining operations cease, these areas would not be considered to provide equal habitat suitability in comparison to natural topographic features.

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3.22 Irreversible and Irretrievable Commitment of Resources

The Proposed Action, Reconfiguration Alternative, WRM Alternative could result in the irreversible commitment of resources (e.g., the loss of future options for resource development or management, especially of nonrenewable resources such as minerals or cultural resources) or the irretrievable commitment of resources (e.g., the lost production or use of renewable natural resources during the life of the Proposed Action, Reconfiguration Alternative or WRM Alternative operations). Irreversible and irretrievable impacts as a result of implementation of the Proposed Action, Reconfiguration Alternative and WRM Alternative are summarized for each resource in **Table 3.22-1**.

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
Geology and Minerals	Yes	Yes	Approximately 279 MT of gold ore would be mined during operations. This would result in the irreversible and irretrievable commitment of the minerals extracted from the ore.	Approximately 245 MT of gold ore would be mined during operations.	Approximately 195 MT of gold ore would be mined during operations.
Water Quality and Quantity	No	Yes	Groundwater levels affected by groundwater pumping for water supply and pit dewatering are predicted to recover in the long term. The total estimated volume of groundwater extracted over the mine life is 43,452 acre-feet. This volume of water would be removed from the groundwater system and consumed for operational use. This permanent extraction of groundwater is considered an irretrievable commitment of resources.	Groundwater levels affected by groundwater pumping for water supply and pit dewatering are predicted to recover in the long term. The total estimated volume of groundwater extracted over the mine life is 21,126 acre-feet. This volume of water would be removed from the groundwater system and consumed for operational use. This permanent extraction of groundwater is considered an irretrievable commitment of resources.	Groundwater levels affected by groundwater pumping for water supply and pit dewatering are predicted to recover in the long term. The total estimated volume of groundwater extracted over the mine life is 20,225 acre-feet. This volume of water would be removed from the groundwater system and consumed for operational use. This permanent extraction of groundwater is considered an irretrievable commitment of resources.
Soils and Reclamation	Yes	Yes	Suitable growth media would be salvaged from the proposed disturbance areas for use in reclamation. There would be a temporary loss of soil productivity and irretrievable commitment of this resource on approximately 7,097 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of soil productivity and irreversible commitment of this resource on approximately 1,210 acres associated with open pit and pit backfill areas, which	Suitable growth media would be salvaged from the proposed disturbance areas for use in reclamation. There would be a temporary loss of soil productivity and irretrievable commitment of this resource on approximately 5,668 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of soil productivity and irreversible commitment of this	Suitable growth media would be salvaged from the proposed disturbance areas. There would be a temporary loss of soil productivity and irretrievable commitment of this resource on approximately 5,266 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of soil productivity and irreversible commitment of this resource on approximately 780 acres associated with open pit and pit backfill

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
			would not be reclaimed.	resource on approximately 885 acres associated with open pit and pit backfill areas, which would not be reclaimed.	areas, which would not be reclaimed.
Vegetation	Yes	Yes	There would be a temporary loss of vegetation productivity and irretrievable commitment of this resource on approximately 7,097 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of vegetation productivity and irreversible commitment of this resource on approximately 1,210 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of vegetation productivity and irretrievable commitment of this resource on approximately 5,668 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of vegetation productivity and irreversible commitment of this resource on approximately 885 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of vegetation productivity and irretrievable commitment of this resource on approximately 5,266 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of vegetation productivity and irreversible commitment of this resource on approximately 780 acres associated with open pit and pit backfill areas, which would not be reclaimed.
Wildlife and Fisheries	Yes	Yes	There would be a temporary loss of wildlife habitat and irretrievable commitment of this resource on approximately 7,097 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of wildlife habitat and irreversible commitment of this resource on approximately 1,210 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of wildlife habitat and irretrievable commitment of this resource on approximately 5,668 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of wildlife habitat and irreversible commitment of this resource on approximately 885 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of wildlife habitat and irretrievable commitment of this resource on approximately 5,266 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of wildlife habitat and irreversible commitment of this resource on approximately 780 acres associated with open pit and pit backfill areas, which would not be reclaimed.

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
Special Status Species and Migratory Birds	Yes	Yes	There would be a temporary loss of special status wildlife and migratory bird habitat and irretrievable commitment of this resource on approximately 7,097 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of special status wildlife and migratory bird habitat and irreversible commitment of this resource on approximately 1,210 acres associated with open pit and pit backfill areas, which would not be reclaimed. There would be a permanent loss of approximately 73 acres of greater sage-grouse PHMA, 237 acres of GHMA, and 197 acres of OHMA.	There would be a temporary loss of special status wildlife and migratory bird habitat and irretrievable commitment of this resource on approximately 5,668 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of special status wildlife and migratory bird habitat and irreversible commitment of this resource on approximately 885 acres associated with open pit and pit backfill areas, which would not be reclaimed. There would be a permanent loss of approximately 67 acres of greater sage-grouse PHMA, 186 acres of GHMA, and 197 acres of OHMA.	There would be a temporary loss of special status wildlife and migratory bird habitat and irretrievable commitment of this resource on approximately 5,266 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of special status wildlife and migratory bird habitat and irreversible commitment of this resource on approximately 780 acres associated with open pit and pit backfill areas, which would not be reclaimed. There would be a permanent loss of approximately 67 acres of greater sage-grouse PHMA, 148 acres of GHMA, and 131 acres of OHMA.
Livestock Grazing	Yes	Yes	There would be a temporary loss of livestock grazing opportunity (508 AUMs) and irretrievable commitment of this resource on approximately 7,097 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of livestock grazing opportunity (89 AUMs) and irreversible commitment of this resource on approximately 1,210 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of livestock grazing opportunity (381 AUMs) and irretrievable commitment of this resource on approximately 5,668 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of livestock grazing opportunity (64 AUMs) and irreversible commitment of this resource on approximately 885 acres associated with open pit and pit	There would be a temporary loss of livestock grazing opportunity (350 AUMs) and irretrievable commitment of this resource on approximately 5.266 acres during operation, until reclamation is completed. Additionally, there would be a permanent loss of livestock grazing opportunity (64 AUMs) and irreversible commitment of this resource on approximately 780 acres associated with open pit and pit backfill areas, which would not be reclaimed.

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
				backfill areas, which would not be reclaimed.	
Wild Horses	Yes	Yes	There would be a temporary loss of wild horse habitat and irretrievable commitment of this resource on approximately 7,072 acres within the Triple B HMA during operation, until reclamation is completed. Additionally, there would be a permanent loss of wild horse habitat and irreversible commitment of this resource on approximately 1,210 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of wild horse habitat and irretrievable commitment of this resource on approximately 5,642 acres within the Triple B HMA during operation, until reclamation is completed. Additionally, there would be a permanent loss of wild horse habitat and irreversible commitment of this resource on approximately 885 acres associated with open pit and pit backfill areas, which would not be reclaimed.	There would be a temporary loss of wild horse habitat and irretrievable commitment of this resource on approximately 5,240 acres within the Triple B HMA during operation, until reclamation is completed. Additionally, there would be a permanent loss of wild horse habitat and irreversible commitment of this resource on approximately 780 acres associated with open pit and pit backfill areas, which would not be reclaimed.
Paleontological	No	No	The risk of disturbance to unique or site-specific paleontological resources would be very low.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.
Cultural	Yes	Yes	A total of 596 cultural sites would be affected by the proposed NOA and SOA projects. Of these, 64 are eligible for the NRHP, 429 are not eligible, 3 are unevaluated, 13 could not be relocated, 10 have been mitigated, and 77 have been destroyed by previous disturbance. These impacts would be both irretrievable and irreversible.	A total of 472 sites would be affected. Of these 54 are eligible for the NRHP, 323 are not eligible, 2 are unevaluated, 7 could not be relocated, 9 have been mitigated, and 77 have been destroyed by previous disturbance.	A total of 465 sites would be affected. Of these 54 are eligible for the NRHP, 316 are not eligible, 2 are unevaluated, 7 could not be relocated, 9 have been mitigated, and 77 have been destroyed by previous disturbance.
Native American	No	No	To date, no traditional cultural properties or places of cultural and religious	Irreversible and irretrievable commitments of resources would	Irreversible and irretrievable commitments of resources would be the

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
Traditional Values			importance have been identified by tribal representatives participating in the ongoing Native American consultation process. However, the Yomba Shoshone Tribe did identify concerns regarding potential impacts on groundwater. The irreversible and irretrievable potential impacts to groundwater are disclosed above under the Water Quality and Quantity row.	be the same as that described under the Proposed Action.	same as that described under the Proposed Action.
Air Quality	No	No	Project emissions would not exceed federal or state AAQS. Air quality would return to existing conditions upon completion of the proposed NOA and SOA projects.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.
Land Use and Access	No	No	There would be no irreversible or irretrievable impacts to land use or access; public access patterns would be maintained.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.
Recreation	Yes	Yes	There would be an irretrievable commitment to dispersed recreation on approximately 7,097 acres of public land during operations, until reclamation is achieved. Additionally, there would be an irreversible commitment to dispersed recreation on approximately 1,210 acres of public lands associated with open pit and pit backfill areas, which would not be reclaimed. There would be no irreversible or irretrievable impacts to wilderness.	There would be an irretrievable commitment to dispersed recreation on approximately 5,668 acres of public land during operations, until reclamation is achieved. Additionally, there would be an irreversible commitment to dispersed recreation on approximately 885 acres of public lands associated with open pit and pit backfill areas, which would not be reclaimed. There would be no	There would be an irretrievable commitment to dispersed recreation on approximately 5,266 acres of public land during operations, until reclamation is achieved. Additionally, there would be an irreversible commitment to dispersed recreation on approximately 780 acres of public lands associated with open pit and pit backfill areas, which would not be reclaimed. There would be no irreversible or irretrievable impacts to wilderness.

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
				irreversible or irretrievable impacts to wilderness.	
Social and Economic Values	No	No	There would be increased employment for construction and operation personnel during the life of the proposed NOA and SOA projects. State and local government revenues also would benefit. There would be no irretrievable or irreversible commitment of community resources.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.
Visual Resources	Yes	Yes	Permanent visual changes would result from construction of the open pits, HLFs, and RDAs. Impacts would be reduced through successful reclamation of the heaps and RDAs, but open pits would not be reclaimed. The resulting visual impacts of the project landforms' shapes, lines, and colors would be noticeable to the casual observer over the long-term and would represent an irreversible and irretrievable visual impact.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.
Environmental Justice	No	No	No disproportionate adverse environmental impacts are anticipated to any minority populations.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.

Table 3.22-1 Irreversible and Irretrievable Commitment of Resources by the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Resource	Irreversible Impacts	Irretrievable Impacts	Proposed Action Explanation	Reconfiguration Alternative Explanation	WRM Alternative Explanation
Hazardous Materials and Solid Waste	No	No	No irreversible impacts or irretrievable commitment of resources are anticipated in relation to hazardous materials or solid wastes; however, if a spill were to affect a sensitive resource, an irretrievable impact could occur pending the cleanup of that spill and subsequent recovery of the resource.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.	Irreversible and irretrievable commitments of resources would be the same as that described under the Proposed Action.

3.23 Energy Requirements and Greenhouse Gas Emissions

Ongoing scientific research has identified anthropogenic GHG emissions as potential impacts to the global climate. Through complex interactions on a global scale, GHGs lead to a net warming of the atmosphere. GHGs are gasses that trap heat in the atmosphere by decreasing the amount of heat radiated by the earth back into space. Although there are many GHGs (water vapor, methane, nitrous oxide [N_2O], O_3, fluorine, chlorine, bromine), the most notable is CO_2. Industrialization and the burning of fossil fuels have increased the levels of CO_2 in the atmosphere. Because CO_2 is the most prevalent GHG, the USEPA references all GHG emissions to what they term carbon dioxide equivalent (CO_2e). The Intergovernmental Panel on Climate Change concluded that "both past and future anthropogenic CO_2 emissions would continue to contribute to warming and sea level rise for more than a millennium, due to the time scales required for removal of this gas from the atmosphere" (IPCC 2007a).

According to the USEPA, the atmospheric concentration of CO_2 has increased approximately 39 percent since the beginning of the industrial age primarily as a result of fossil fuels combustion (USEPA 2014). Additionally, the global average temperature has risen by 1.4°F over the past century and is expected to raise another 2°F to 11.5°F over the next century (USEPA 2012b). Increasing the GHG emissions to the atmosphere is expected to accelerate this temperature change.

3.23.1 Regulatory Framework

The USEPA and CEQ have implemented regulations and guidelines regarding evaluation of GHG emissions and climate change, and the manner in which NEPA documents should address these issues. The U.S. Supreme Court on April 2, 2007, ruled that the USEPA had authority to regulate GHGs as pollutants and required the USEPA to determine whether GHGs cause or contribute to global warming (USEPA 2008). In 2008, Congress directed the USEPA to publish a mandatory GHG reporting rule based on USEPA's existing authority under the CAA. On October 30, 2009, the USEPA published a final rule for the mandatory reporting of GHGs (40 CFR Part 98) from large GHG emissions sources in the U.S. Implementation of 40 CFR Part 98 is referred to as the Greenhouse Gas Reporting Program (USEPA 2010b,c).

CEQ guidance requires the consideration of a proposed project's potential GHG emissions and the potential effects of climate change on a project in NEPA reviews of proposed federal actions. On February 8, 2010, the CEQ released a draft guidance memorandum to federal agencies regarding their treatment of GHG emissions and climate change impact issues within the NEPA process (CEQ 2010). The guidance addresses two related issues: 1) the treatment of GHG emissions that directly or indirectly may result from a proposed federal action, such as the permitting of a proposed project; and 2) the analysis of potential climate change impacts on a proposed federal action. Within the CEQ guidance, the threshold of 25,000 metric tpy of CO_2e GHG emissions per year are suggested as a "useful, presumptive, threshold for discussion and disclosure…because it has been used and proposed in rule-makings under the Clean Air Act" (CEQ 2010).

The evaluation of GHG emissions and climate change impacts within this EIS is based on the CEQ draft guidance memorandum regarding the treatment of GHG emissions and climate change impacts within a NEPA document (CEQ 2010). Specifically, the guidance recommends consideration of:

- GHG emissions effects of a proposed action and alternatives; and
- The relationship of climate change effects to a proposed action or alternatives in terms of the proposal design, environmental impacts, mitigation, and adaptation measures.

The CEQ guidance acknowledges that the nature of a proposed action and its relationship to climate change must be considered to determine the level of analysis appropriate to a specific NEPA document.

In addition, the USEPA (USEPA 2013) organizes GHG emission sources into "scopes" according to the type of impact, direct or indirect, of the emissions.

- Scope 1: Direct GHG emissions from sources that are owned or controlled by the project proponent, including emissions from fossil fuels burned on site, emissions from owned or leased vehicles, and other direct sources.
- Scope 2: Indirect GHG emissions from the generation of electricity, heat, or steam generated offsite but purchased by the proponent.
- Scope 3: Indirect GHG emissions from sources not owned or directly controlled by the proponent but related to the proponent's activities, such as vendor supply chains, delivery services, outsourced activities, production of construction materials, and employee travel.

3.23.2 Applicability of Greenhouse Gas Emissions and Climate Change to the Proposed Project

Recent scientific evidence suggests there is a direct correlation between global warming and emissions of GHGs. GHGs include CO_2, methane, nitrogen oxide, and O_3. Although many of these gases occur naturally in the atmosphere, man-made sources substantially have increased the emissions of GHGs over the past several decades. Of the man-made GHGs, the greatest contribution currently comes from carbon dioxide emissions.

Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks (i.e., vegetation) cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused GHG concentrations to increase dramatically, and are a possible contributor to overall global climatic changes (IPCC 2007b). Potential changes to the project area resulting from the effects of climate change forecasted by the Central Basin and Range REA could include higher than normal growing season temperatures, contraction or expansion of some existing vegetation communities, the expansion of existing noxious weed populations, and the introduction of noxious weed species previously undocumented in the ecoregion and project area (Comer et al. 2013). Regarding temperature increases specifically, the Central Basin and Range REA forecasts an average increase in average summer maximum daytime temperatures of approximately 5°F within the BMM project area by 2060 (Comer et al. 2013). These increases in average growing season temperatures are anticipated to result in low elevation basins throughout the Central Basin and Range ecoregion potentially transitioning from the existing cool semi-desert vegetation communities into very warm and sparsely vegetated desert landscapes more typical of the Mojave Basin and Range.

Climate change analyses are comprised of several factors, including GHGs, land use management practices, and the albedo effect. The tools necessary to quantify incremental climatic impacts of specific activities associated with those factors are presently unavailable. As a consequence, impact assessment of effects of specific anthropogenic activities cannot be performed. Additionally, specific levels of significance have not yet been established. Therefore, climate change analysis for the purpose of this document is limited to accounting and disclosing of factors that contribute to climate change and estimated GHG emissions are used as a reasonable proxy for a comparison of climate change impacts by alternative.

3.23.3 Energy Consumption and Greenhouse Gas Emissions for the Proposed Action, Reconfiguration Alternative, and WRM Alternative

Annual emissions of GHGs (CO_2e, which include CO_2, methane, and N_2O) from construction and operations sources are directly related to the consumption of fuels (combustion). Purchased power also contributes to GHG emissions at the power plants that furnish power to the grid supplying power to the

proposed NOA and SOA projects. GHG emissions for the proposed NOA and SOA projects are generated from direct combustion of fossil fuels, dominated by diesel, but also including propane used for process heating and from indirect GHG emissions associated with electrical power consumption.

GHG emissions are primarily created by the combustion of fuel by process sources, insignificant sources, and by mobile mining equipment. Under the Proposed Action, the process and insignificant sources have an estimated facility-wide potential to emit 23,694 tpy of CO_2e. Under the Proposed Action, the mobile mining equipment (i.e., non-road engines) has an estimated facility-wide potential to emit 166,128 tpy of CO_2e (Air Sciences 2013a). **Table 3.23-1** summarizes the GHG (CO_2e) emissions per year under the Proposed Action. The GHG (CO_2e) emissions per year under the Reconfiguration Alternative and WRM Alternative would also be consistent with those values shown in **Table 3.23-1**. Although GHG emissions would be similar on an annual basis, total GHG emissions generated over the 10-year mine life of the Reconfiguration Alternative and WRM Alternative would be approximately half of the total GHG emissions generated for the 20-year mine life of Proposed Action.

Table 3.23-1 Greenhouse Gas Emissions under the Proposed Action

Case	Fuel GHG Emissions (tpy)	Propane Gas-related GHG Emissions (tpy)	Power GHG Emissions (tpy)	Total GHG Emissions (tpy)
Proposed Action (Stationary Sources)	0	23,694	4,207	27,901
Proposed Action (Mobile Sources)	166,128	-	0	166,128
Proposed Action Total	**166,128**	**23,694**	**4,207**	**194,029**

Source: Air Sciences 2013a.

Barrick's current practices include measures to reduce the contribution of the mine to GHG emissions. Solar power is used to run a component of the wireless network system and energy efficiency measures are employed by various departments including: discouraging light vehicle engine idling, in-process conversion to LED lights, new installations are equipped with LED lights, photocells on external buildings, and no heating is used in the main areas of the process plants (space heaters only). In 2015 alone, Bald Mountain Mine spent approximately $15,000 on LED replacements in one plant. The mine also employs waste minimization practices which create opportunities for waste to be broken down and used to produce new materials, thus conserving raw materials. BMM also provides transportation to all employees as a safe and efficient means to arrive to and from work.

3.23.4 Cumulative Impacts

As stated previously, cumulative GHG emissions have been linked with accelerated global climate change (IPCC 2007a; National Research Council 2010). Total GHG emissions from the Proposed Action, Reconfiguration Alternative, and WRM Alternative would be an estimated 194,029 tpy. Total GHG emissions generated over the 10-year life of mine for Reconfiguration Alternative and WRM Alternative would be approximately half of the total GHG emissions generated over the 20-year mine life for the Proposed Action. These emissions would contribute cumulatively to global annual GHG emissions, which total an estimated 41 billion metric tons (Emissions Database for Global Atmospheric Research 2012).

3.23.5 Monitoring and Mitigation Measures

As noted above, Barrick currently promotes a culture of energy efficiency into work activities. No additional mitigation is proposed.

3.23.6 Residual Impacts

Residual GHG would include all estimated emissions totaling 194,029 tpy under the Proposed Action and 97,015 tpy under both the Reconfiguration Alternative and WRM Alternative.