4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental consequences and direct and indirect effects of implementing the Proposed Action or alternatives described in Chapter 2. This chapter describes the potential for significant impact of the disposal of mineral materials on the human environment. The BLM Las Vegas Field Office manages public land within its jurisdiction under the general guidelines in the RMP. As described in the RMP, it is the responsibility of BLM to ensure that mineral development occurs in a manner that minimizes environmental damage. The resources are detailed based on the environmental setting specific to the described resource (Chapter 3) as they are potentially impacted. Environmental consequences are discussed in the order of the presentation of the resources described in Chapter 3. Short-term and long-term effects, direct and indirect effects, and the potential for each alternative to affect the resources are included in each section. Interpretation of impacts in terms of their duration, intensity (or magnitude), and context (local, regional, or national effects) are provided where possible.

Types of Impacts

Impacts can be direct, indirect, or cumulative. A direct impact is caused by the action and occurs at the same time and place. An indirect impact occurs later in time. It is a natural environmental, human health, or natural resource impact whereby the original loadings or resource uses may act indirectly through other types of impacts or components of the natural environment. Cumulative impacts result from the incremental impacts from a particular activity when added to other past, present, or future activities. Cumulative impacts may be individually insignificant, but collectively, the individually insignificant activities may become significant.

An impact is defined as either adverse or beneficial. An impact is considered adverse when the outcome of the action results in undesirable effects. A beneficial impact can result if the current condition is improved or if an existing undesirable effect is lessened. This analysis focuses on adverse impacts to determine whether the effects were significant or insignificant. The criteria used to differentiate between significant and insignificant are introduced in each section.

Determination of Significance

The concept of significance encompasses several factors, including the magnitude of change from existing conditions and the likelihood of the change to occur. NEPA requires consideration of significance of effect in both context and intensity. Context means the significance of the action must be analyzed looking at society as a whole, the affected region, specific interests, and the locality.

In evaluating context of the impact, the area or quantity of an affected resource relative to the available area or quantity of that resource is considered. The potential for change in growth and reproductive

success of a species, maintenance of a population at pre-project levels, and the period of recovery after disturbance are other factors considered.

Intensity refers to the severity of impact to each resource. The intensity of an impact is dependent on the potential for violation of laws or regulations; degree of uncertainty and controversy; degree of adverse effect to specific concerns, such as public health and safety, unique resources, or threatened and endangered species; and the resilience of the resource. Impacts may be both beneficial and adverse. Intensity is measured by the degree to which the proposed actions affect each specific resource. A significant effect may exist even if the federal agency believes that the effect would be beneficial. Federal, state, and local laws are also considered in evaluating the level of intensity an effect may have on specific resources.

Determining significance is complex. The significance of a resource or impact is dynamic and may change over time. Significance can be "real" and supportable by fact, or "perceived" and perhaps not fully supportable even with rigorous study. For this analysis, the approach for establishing significance criteria is based on legal issues, public perception, and professional judgment. Significance criteria are introduced in the specific resource sections.

Definitions

Terms referring to impact intensity, context, and duration are used in the effects analysis. Unless otherwise stated, the standard definitions for these terms are as follows:

- **Negligible.** The impact is at the lower level of detection; there would be no measurable change.
- **Minor.** The impact is slight but detectable; there would be a small change.
- **Moderate.** The impact is readily apparent; there would be a measurable change that could result in a small but permanent change.
- **Major.** The impact is severe; there would be a highly noticeable, permanent, measurable change.
- **Localized Impact.** The impact occurs in a specific site or area. When comparing changes to existing conditions, the impacts are detectable only in the localized area.
- **Short-Term Effect.** The effect occurs only during or immediately after implementation of the alternative.
- **Long-Term Effect.** The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more and could be beneficial or adverse.

Impact thresholds are provided at the beginning of each resource discussion. These thresholds are provided to help the reader and decision maker (BLM) understand the magnitude and intensity of impacts.

Mitigation

Mitigation measures are used to lessen adverse environmental impacts. Adverse impacts can be mitigated through avoidance, minimization, restoration, reduction, or compensation. Specific actions that may be considered when determining mitigation measures include:

- Avoiding the impact altogether by not taking a certain action or parts of an action
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation
- Correcting the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action
- Compensating for the impact by replacing or providing substitute resources or environments

Impacts may be reduced to less than significant levels if mitigation guidelines and standard practices are implemented. Mitigation measures may be imposed by regulation or through BLM policies and may be applied broadly or site-specifically.

Each alternative represents a different possible impact to individual resources; therefore, the level of proposed mitigation measures differs with each resource. Although mitigation measures are typically implemented to minimize or eliminate significant impacts, actions that would minimize or eliminate insignificant impacts are also described.

4.1 AIR QUALITY

This air quality evaluation was prepared in accordance with the requirements of NEPA to determine criteria pollutant emissions that would be generated by each alternative for the proposed project. The air quality analysis for this EIS was also prepared in accordance with the methodologies provided by the DAQEM. Regional impacts for both construction and operation were assessed using the EPA AP-42 emission factors.

Detailed information about the analysis, which is summarized in this section, is in the report *Assumptions and Air Quality Modeling Results for the Sloan Hills Competitive Mineral Material Sales Environmental Impact Statement* (PBS&J, 2010a). Emissions of criteria pollutants in terms of exhaust and fugitive emissions were determined using EPA emission factors as provided by DAQEM and compared to *de minimis* conformity threshold values for area criteria pollutants with non-attainment or maintenance

status and Prevention of Significant Deterioration thresholds for criteria pollutants that are unclassified or classified as in attainment. URBEMIS modeling output is in the *Assumptions and Air Quality Modeling Results* report (PBS&J, 2010a).

Simple dispersion modeling using SCREEN3 was conducted to determine whether construction emissions would cause a local exceedance of NAAQS thresholds. Assumptions for the SCREEN3 modeling and modeling output are in the *Assumptions and Air Quality Modeling Results* report (PBS&J, 2010a). The model was used to determine the maximum 1-hour concentration for each criteria pollutant. The SCREEN3 model incorporates conservative assumptions, resulting in a worst-case emissions scenario for each alternative. Pollutant concentrations were determined at the edge of the construction area and at distances of 2,286, 2,469, 3,261, 3,352, 4,298, 5,181, 6,248, and 7,131 meters. These distances were chosen to show emission concentrations at the closest residential developments to the Proposed Action area. Once the 1-hour maximum concentrations were determined, they were converted to reflect averaging times for the ambient air quality standards (AAQS). The factors provided by the EPA (0.7 to convert a 1-hour concentration to an 8-hour concentration, 0.4 for 24-hour, and 0.08 for annual averaging times) were used. The DAQEM stated that AERMOD was a more accurate model for determining impacts from construction. However, after a conversation with the DAQEM, it was determined that if the worst-case scenario from SCREEN3 was modeled in AERMOD and returned a less than significant result, the remaining three alternatives could be considered less than significant. Modeling output for AERMOD for construction impacts is in the *Assumptions and Air Quality Modeling Results* report (PBS&J, 2010a).

AERMOD was used to model the local impacts of the operational activities for the project for all alternatives, which were then compared NAAQS thresholds to determine the potential for local exceedances. Assumptions for the AERMOD modeling and modeling output are in Appendices E1 and E4. The operational activities will be concentrated over different areas throughout the life of the project. However, for each alternative, modeling was conducted such that the average daily disturbance area was situated within the site borders to demonstrate worst-case impacts at the closest receptors. In addition to the areas directly adjacent to the project border, emissions at nearby existing and proposed residential communities were evaluated. Residential developments are located at approximately 2,286, 2,469, 3,261, 3,352, 4,298, 5,181, 6,248, and 7,131 meters from the border of the Proposed Action area. Discrete receptors were placed at the distances listed above and located at specific coordinates that would yield the highest potential concentration of pollutants for the given distance from the site border to provide a worst-case impact potential.

Dispersion modeling was conducted for carbon monoxide, nitrogen dioxide, PM_{10}, and $PM_{2.5}$ using the averaging times shown in Table 3.1-4. The modeling was performed for oxides of nitrogen rather than nitrogen dioxide, the pollutant for which the standards have been adopted. Because oxides of nitrogen consist of nitrogen dioxide and all other forms of oxides of nitrogen, the assessment using oxides of

nitrogen results in a conservative assessment and tends to over-estimate ambient concentrations of nitrogen dioxide resulting from construction and operational activities.

Hazardous air pollutants were not analyzed in detail in this section because no AAQS were set for these pollutants. Hazardous air pollutants potentially emitted from the site activities and equipment can also be classified as PM or volatile organic compounds (VOC), both of which have been analyzed for the project alternatives.

Three existing and one planned residential development are within 3.5 miles of the Proposed Action area. The closest existing receptor is the town of Sloan, which has its closest residences approximately 1.5 miles northwest of the Proposed Action area. Other existing residential communities are the Inspirada development (approximately 2.5 miles northeast) and the Anthem community (approximately 3.5 miles from the edge of the project site to the closest residence). The Inspirada development has plans to expand westward toward the Proposed Action area, with the planned development ending approximately 1.2 miles northeast of the Proposed Action area. Although sensitive receptors are not currently located there, the planned Inspirada development expansion has been included in the impact analysis.

4.1.1 Thresholds of Significance

To determine whether a proposed project would cause a significant effect on the environment, the impact of the project must be determined by examining the types and levels of emissions generated and their impacts on factors that affect air quality. To accomplish this determination of significance, the DAQEM has established air pollution thresholds against which a proposed project can be evaluated and assist lead agencies in determining whether the proposed project is significant. The Proposed Action area is located in Hydrographic Area 212, which is a non-attainment management area for carbon monoxide, PM_{10}, and ozone, and as such is subject to more restrictive thresholds under the CAA General Conformity Rule. The significance thresholds for air quality (Table 4.1-1) have been established on a tons-per-year basis for construction and operations emissions.

Table 4.1-1
***De Minimis* Levels for Non-attainment Areas (Significance Thresholds)**

Air Pollutant	*De Minimis* Levels for Non-attainment Areas (tons/year)
PM_{10} 70	
$PM_{2.5}$	100
Carbon monoxide	100
VOC	100
Nitrogen dioxide	100

In addition to the annual *de minimis* threshold values shown in Table 4.1-1, the AAQS shown in Table 3.1-4 are used to compare emissions levels at sensitive receptors (i.e., residential areas and wilderness areas) to determine whether a project has the potential to contribute to a localized exceedance of the state or federal AAQS in the immediate vicinity of the site during short-term construction or long-term site operation. To determine whether an exceedance will occur, the concentration of criteria pollutants associated with project-specific emissions is added to the background concentrations for each criteria pollutant. If the combined concentration of the ambient and project-specific emissions is below the state and federal AAQS, then the action is considered less than significant with respect to that criteria pollutant.

Clark County is in a non-attainment area for PM_{10}. The background levels for this criteria pollutant currently exceed the most restrictive air quality thresholds for the 24-hour averaging time of 150 $\mu g/m^3$; therefore, by using the above method to determine project exceedances, all projects would be significant with respect to PM_{10}. The EPA, however, defines a project as having a significant contribution if it increases the ambient background concentrations by a significant amount (Clark County, 2001).

By definition, a project can be determined to be regionally significant if it represents 10 percent or more of a non-attainment area's emissions inventory for that pollutant. For pollutants where the ambient background concentrations are greater than the AAQS, this 10 percent rule will be applied. Because the annual background concentrations for PM_{10} and $PM_{2.5}$ are below the state and federal annual average standards (PM_{10}: 50 $\mu g/m^3$ and $PM_{2.5}$: 15 $\mu g/m^3$) but the 24-hour average background concentrations are above the state and federal 24-hour average standards (PM_{10}: 150 $\mu g/m^3$ and $PM_{2.5}$: 65 $\mu g/m^3$), only the 24-hour averaged emissions are compared to the 10 percent rule, or 49.6 $\mu g/m^3$ for PM_{10} and 17.6 for $PM_{2.5}$[4].

Revisions to Section 12 of the Clark County Air Quality Regulations became effective July 1, 2010, and require that a New Source Review Permit be obtained before the construction of any stationary source that emits or has the potential to emit a regulated pollutant into the atmosphere above stated thresholds. The DAQEM considers mining operations a stationary source; therefore, the Proposed Action would be required to obtain a permit under this regulation if emissions exceed the following thresholds:

- PM_{10}: 5 tons per year
- Carbon monoxide: 25 tons per year
- VOC: 5 tons per year
- Nitrogen oxides: 5 tons per year
- Sulfur dioxide: 25 tons per year
- Lead: 0.3 ton per year
- Hydrogen sulfide: 1 ton per year

[4] Average daily emissions for PM_{10} are 20.66 $\mu g/m^3$ over the 3-year period; therefore, on any given day that 495.999 $\mu g/m^3$ is emitted, 10 percent of the daily emissions of PM_{10} is 49.6. Average daily emissions for $PM_{2.5}$ are 7.333 $\mu g/m^3$ over the 3-year period; therefore, on any given day that 175.999 $\mu g/m^3$ is emitted, 10 percent of the daily emissions of PM_{10} is 17.6.

There are no specific thresholds of significance to assess a project's potential to create Valley fever impacts. Project factors—such as its location in the southwestern U.S.; the disturbance of topsoil of undeveloped land up to 1 foot; virgin, undisturbed, non-urban locations; windy areas; archaeological resources probable or known to exist in the area; those areas used for special events (fairs or concerts) and motorized activities (all-terrain vehicle usage); and workers that are not native to the area—are all factors that will increase the risk of Valley fever impacts from projects in endemic regions. The likelihood that Valley fever impacts will affect the site or nearby receptors increases with the number of the above factors that are attributable to an action either during construction or operation activities.

4.1.2 Assumptions

Construction and operational activities would be similar for all of the action alternatives. Operational activities would begin after the construction phase is completed, with no overlap between the two phases. With the No Action Alternative, no construction or operational activities are expected. The sections below describe the construction and operational activities expected for the alternatives. Fugitive dust emissions would be generated during both the construction and operation of the alternatives. The DAQEM has classified county soils by their potential to produce fugitive dust emissions when disturbed. The soils in the vicinity of the Proposed Action area are classified as high for their potential to produce fugitive dust emissions.

4.1.2.1 Construction Phase

Major construction phases would consist of site preparation, grading, and facility construction. Air pollutant emissions would vary with each construction phase, depending on the activity and the associated equipment. Site preparation would require the use of combustion-engine-powered earth-moving equipment that would include backhoes, scrapers, dump trucks, graders, and front-end loaders. Vehicle-engine exhaust and activities that result in the movement of rock, debris, and soil would dominate pollutant emissions during site preparation. Construction activities are anticipated to last for 10 months between March 2011 and December 2011. Although it is unknown whether both sites for Alternative 1 would be constructed such that grading activities would overlap, it was modeled with that assumption as a worst-case scenario. Table 4.1-2 summarizes the major construction assumptions for each alternative. Round-trip distances were determined from the onsite administrative site area to Las Vegas Boulevard. Regardless of the opening of this mine location, the materials would be obtained from somewhere else; therefore, the project-related transportation emissions were determined to be only those emissions from the site to the nearest major roadway (Las Vegas Boulevard).

Table 4.1-2
Major Construction Assumptions

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Total Site Acreage	640	320	320	640	0
Ancillary Facility Sites	2	1	1	1	0
Ancillary Facility Acreage	90	45	45	45	0
Ancillary Building (sq ft)	80,630	40,315	40,315	40,315	0

To bring fugitive dust emissions within attainment standards, Clark County has developed strict regulations for construction activities. Implementation of these standards will reduce the formation and transportation of fugitive dust from the onsite construction and operational activities.

Emissions associated with the construction of Alternatives 1 through 4 would result from vehicle engine exhaust and the movement of rock, debris, and soil for the preparation and construction of the ancillary facility locations within each site. All construction activities in Clark County must comply with the standards set forth in the Construction Activities Dust Control Handbook (Clark County DAQEM, 2003). The impacts from all alternatives were modeled with mitigation incorporated to show the reductions anticipated from these measures. Although several discrete locations were modeled for each residential area, only the highest reported emission levels for each residential area are included in the discussion below. Mitigation measures are discussed in Section 4.1.9.

4.1.2.2 Operation Phase

The dolomite and limestone materials on the proposed project site would be developed using traditional aboveground quarrying techniques including stripping, drilling, blasting, loading, and hauling of both production and waste mineral products. Blasting, excavating, processing, and transporting the dolomite and limestone materials would result in air pollution emissions. The larger site area (Alternative 1) is anticipated to produce up to 10 million tons of aggregate per year with an equal split between the North Site and the South Site. Alternative 4 is anticipated to produce up to 7 million tons of aggregate per year and is assumed to have an equal production split between the North Site and South Site. Alternatives 2 and 3 are anticipated to produce up to 5 million tons of aggregate per year. The average operating lifespan of each alternative is approximately 30 years. The dispersion of emissions from the site will vary with respect to where the activities are concentrated. To demonstrate a worst-case scenario, each scenario was modeled with the emissions at the pit edge and processing area edges closest to the residential locations. Details of the modeling assumptions are in the *Assumptions and Air Quality Modeling Results* report (PBS&J, 2010a).

Similar to the construction phase, the project operation would use combustion-engine-powered equipment, and mining, excavating, and blasting techniques. These long-term operational air impacts are

expected to exceed emissions thresholds for PM_{10} and nitrogen dioxide without mitigation. Because operational activities for mining are similar to construction activities, it is anticipated that the proposed mining sites would have to follow the same dust control measures as those mandated for construction activities.

Because of the types of operations and the numbers of trucks and equipment traversing the site daily, there is the potential to impact sensitive receptors near the site. The exact locations of potential future receptors is unknown; therefore, discrete receptors were placed at specific locations that would yield the maximum concentration of all potential receptor locations to provide a worst-case impact as described in the methodology section above.

4.1.3 Alternative 1 (Two Independent Mineral Material Sales)

4.1.3.1 Construction Phase

Table 4.1-3 shows the total construction emissions in tons per year; it also shows the localized concentration of emissions from Alternative 1 construction activities from the SCREEN3 analysis on the closest sensitive receptors. As shown, mitigated PM_{10} emissions at 50 meters from the project site are below the 49.6-$\mu g/m^3$ threshold. Because the closest receptor (the town of Sloan) is more than 2,000 meters away from the project site, the emissions of PM_{10} at these receptors from construction activities are well below them. Impacts related to all other criteria pollutants are less than significant for Alternative 1.

Table 4.1-3
SCREEN3 Localized Construction Impacts for Alternative 1 (μg/m^3)

	CO 1-hr[1]	CO 8-hr[2]	NO_2 1-hr[3]	NO_2 Annual	PM_{10} 24-hr[4]	PM_{10} Annual[5]	$PM_{2.5}$ 24-hr[4]	$PM_{2.5}$ Annual[6]
Peak emissions (tons/yr)	5.31 10.18				4.46		1.28	
SCREEN3 Results (μg/m^3)								
At 50 meters	4,623.81	3,236.67 1	31.5 4	7.66	3.15 22	63	0.42	8.08
Town of Sloan	4,607.85	3,225.49	173.61	13.89 0.00	22	00	0.00	8.00
Planned Inspirada	4,606.14	3,224.30	171.13	13.69 0.00	22	00	0.00	8.00
Existing Edge	4,595.90	3,217.13	165.52	13.24 0.00	22	00	0.00	8.00
Anthem 4,590.1	9	3,213.13 1	55.3 8	12.43	0.00	22.00 0.00		8.00
AAQS	40,000	40,000	188	100	49.6 50	17.6	15	
Exceed AAQS?	No	No No		No No		No No		No

1 SCREEN3 results include a background concentration of 4,574.93 μg/m^3.
2 SCREEN3 results include a background concentration of 3,202.54 μg/m^3.
3 SCREEN3 results include a background concentration of 125.87 μg/m^3.
4 Because the 24-hour ambient concentrations are above the AAQS thresholds, concentrations were compared to 10% of the average daily concentration of 49.6 and 17.6 for PM_{10} and $PM_{2.5}$, respectively.
5 SCREEN3 results include a background concentration of 22μg/m^3.
6 SCREEN3 results include a background concentration of 8 μg/m^3.

Table 4.1-4
AERMOD Localized Construction Impacts for Alternative 1 (μg/m3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (μg/m^3)	Maximum Incremental Project-Related Impact (μg/m^3)	Total Impact (Background + Project) (μg/m^3)	Most Restrictive Air Quality Standard (μg/m^3)	Significant Impact?
CO 1-hr	Maximum at fence line	4,582.413	3.538 06	4,585.951	40,000	No
	Area around Sloan	4,582.413	0.28756	4,582.7 01	40,000	No
	Area around existing Inspirada	4,582.413	0.130 59	4,582.544	40,00 0	No
	Area around planned Inspirada	4,582.413	0.208 81	4,582.622	40,00 0	No
	Area around Anthem	4,582.413	0.10259	4,582.5 16	40,000	No
CO 8-hr	Maximum at fence line	3,207.689	2.125 78	3,209.815	10,000	No
	Area around Sloan	3,207.689	0.09084	3,207.7 80	10,000	No
	Area around existing Inspirada	3,207.689	0.056 89	3,207.746	10,00 0	No
	Area around planned Inspirada	3,207.689	0.083 00	3,207.772	10,00 0	No
	Area around Anthem	3,207.689	0.03854	3,207.7 28	10,000	No
NO_2 1-hr	Maximum at fence line	125.875	0.4365	126.311	188.00	No
	Area around Sloan	125.875	0.60251	126.477	188.00	No

Table 4.1-4
AERMOD Localized Construction Impacts for Alternative 1 (µg/m3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
	Area around existing Inspirada	125.875	0.3004	126.179	188.00	No
	Area around planned Inspirada	125.875	0.4375	126.312	188.00	No
	Area around Anthem	125.875	0.2388	126.114	188.00	No
NO_2 Annual	Maximum at fence line	35.696	0.0149460	35.711	100.00	No
	Area around Sloan	35.696	0.0076050	35.703	100.00	No
	Area around existing Inspirada	35.696	0.0046400	35.700	100.00	No
	Area around planned Inspirada	35.696	0.0083610	35.704	100.00	No
	Area around Anthem	35.696	0.0030000	35.699	100.00	No
PM_{10} 24-hr	Maximum at fence line	—	153.8430	—	49.60	Yes
	Area around Sloan	—	3.0524	—	49.60	No
	Area around existing Inspirada	—	2.3579	—	49.60	No
	Area around planned Inspirada	—	3.5190	—	49.60	No
	Area around Anthem	—	1.7017	—	49.60	No
PM_{10} Annual	Maximum at fence line	22	9.1723	31.1723	50	No
	Area around Sloan	22	0.17011	22.17011	50	No
	Area around existing Inspirada	22	0.21626	22.21626	50	No
	Area around planned Inspirada	22	0.4299	22.4299	50	No
	Area around Anthem	22	0.14137	22.14137	50	No
$PM_{2.5}$ 24-hr	Maximum at fence line	—	6.5458	—	17.60	No
	Area around Sloan	—	0.24954	—	17.60	No
	Area around existing Inspirada	—	0.24238	—	17.60	No
	Area around planned Inspirada	—	0.42478	—	17.60	No
	Area around Anthem	—	0.16063	—	17.60	No
$PM_{2.5}$ Annual	Maximum at fence line	8	1.98239	9.98239	15	No
	Area around Sloan	8	0.03682	8.03682	15	No
	Area around existing Inspirada	8	0.0468	8.0468	15	No
	Area around planned Inspirada	8	0.09302	8.09302	15	No

Table 4.1-4
AERMOD Localized Construction Impacts for Alternative 1 (µg/m3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
	Area around Anthem	8	0.03059	8.03059	15	No

4.1.3.2 Operational Phase

Table 4.1-5 shows the anticipated tons per year of criteria pollutants for Alternative 1, assuming a 9-hour workday for unmitigated and mitigated with exporting a maximum of 7 million tons per year. As shown, without the incorporation of mitigation measures AQ1 through AQ10 (Section 4.1.9.1), this alternative would be above the conformity threshold for oxides of nitrogen, $PM_{2.5}$, and PM_{10}. Table 4.1-6 shows the maximum localized concentration of emissions from mitigated operational activities for Alternative 1, assuming a 9-hour workday. As shown with mitigation measures AQ1 through AQ10, this alternative would be below the thresholds for all criteria pollutants; therefore, the impacts are anticipated to be minor and localized at the project site border and existing and planned residential communities.

VOC emissions, while not required under a Conformity analysis, are reported here because they (and oxides of nitrogen) are precursors to ozone emissions. As shown in Table 4.1-5, combined oxides of nitrogen and VOC emissions are below the individual threshold of 100 tons per year, as indicated separately for each pollutant. Given the reaction to ozone is not a total conversion of pollutants, and the combined emissions are below the conformity threshold set independently for oxides of nitrogen and VOC emissions, the proposed project is anticipated to have a minor impact on ozone levels.

Table 4.1-5
Annual Emissions for Alternative 1 (tons per year)

	CO	NO_X Unmit	NO_X Mit	PM_{10} Unmit	PM_{10} Mit	$PM_{2.5}$ Unmit	$PM_{2.5}$ Mit	VOC
Emissions 73.2		146.0	54.74	1,076.4 67.44		229.8	21.86	17.9
Conformity Threshold	100	100	100	70	70	100	100	100
Exceed Threshold?	No	Yes	No Yes		No	Yes	No	No

Unmit = Unmitigated
Mit = Mitigated

Table 4.1-6
Localized Operational Impacts for Alternative 1 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
CO 1-hr	Maximum at fence line	4,582.413	17.21000	4,599.623	40,000	No
	Area around Sloan	4,582.413	0.49528	4,582.908	40,000	No
	Area around existing Inspirada	4,582.413	0.17072	4,582.584	40,000	No
	Area around planned Inspirada	4,582.413	0.30031	4,582.713	40,000	No
	Area around Anthem	4,582.413	0.13855	4,582.552	40,000	No
CO 8-hr	Maximum at fence line	3,207.689	3.69000	3,211.379	10,000	No
	Area around Sloan	3,207.689	0.06192	3,207.751	10,000	No
	Area around existing Inspirada	3,207.689	0.07860	3,207.768	10,000	No
	Area around planned Inspirada	3,207.689	0.11988	3,207.809	10,000	No
	Area around Anthem	3,207.689	0.05208	3,207.741	10,000	No
NO_2 1-hr	Maximum at fence line	125.875	0.1065	125.891	188.00	No
	Area around Sloan	125.875	0.0524	125.927	188.00	No
	Area around existing Inspirada	125.875	0.0202	125.895	188.00	No
	Area around planned Inspirada	125.875	0.0320	125.907	188.00	No
	Area around Anthem	125.875	0.0164	125.981	188.00	No
NO_2 Annual	Maximum at fence line	35.696	0.0013780	35.697	100.00	No
	Area around Sloan	35.696	0.0001080	35.696	100.00	No
	Area around existing Inspirada	35.696	0.0003200	35.696	100.00	No
	Area around planned Inspirada	35.696	0.0006300	35.696	100.00	No
	Area around Sun City Anthem	35.696	0.0002000	35.696	100.00	No
PM_{10} 24-hr	Maximum at fence line	—	44.8	—	49.60	No
	Area around Sloan	—	2.43498	—	49.60	No
	Area around existing Inspirada	—	2.63338	—	49.60	No
	Area around planned Inspirada	—	4.67232	—	49.60	No
	Area around Anthem	—	1.74871	—	49.60	No

Table 4.1-6
Localized Operational Impacts for Alternative 1 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
PM_{10} Annual	Maximum at fence line	22	11.399	33.399	50	No
	Area around Sloan	22	0.15543	22.155	50	No
	Area around existing Inspirada	22 0.234	44	22.234	50	No
	Area around planned Inspirada	22 0.512	88	22.513	50	No
	Area around Anthem	22	0.15077	22.108	50	No
$PM_{2.5}$ 24-hr	Maximum at fence line	—	5.89	—	17.60	No
	Area around Sloan	—	0.24787	—	17.60	No
	Area around existing Inspirada	—	0.27302	—	17.60	No
	Area around planned Inspirada	—	0.47165	—	17.60	No
	Area around Anthem	—	0.16865	—	17.60	No
$PM_{2.5}$ Annual	Maximum at fence line	8	3.02	11.02	15	No
	Area around Sloan	8	0.03289	8.0329	15	No
	Area around existing Inspirada	8	0.04974	8.0497	15	No
	Area around planned Inspirada	8	0.10865	8.1087	15	No
	Area around Anthem	8	0.03199	8.0320	15	No

4.1.3.3 24-Hour Operations

The demand for dolomite and limestone can fluctuate. To meet demand, there may be periods when 24-hour daily operations are needed. These brief but high levels of activities need to be evaluated. The modeling for the 24-hour daily operations assumes the same maximum annual removal of material from the mine as under the typical daily modeling presented above. The analysis of 24-hour operations focuses on Alternative 1 because this alternative has the highest level of activities occurring closest to the potential sensitive receptors. Emissions for carbon monoxide and oxides of nitrogen were evaluated using an operational level of 10 million tons per year as a worst-case estimate. Table 4.1-7 shows the anticipated maximum daily emissions from mitigated operational activities where operational activities occur continuously over a 24-hour period. As shown in Table 4.1-7, and because the 24-hour operations would not be continual throughout the year, the daily impacts anticipated for the local receptors from a continual 24-hour operation for Alternative 1 is moderate, temporary, and localized for PM_{10} because it exceeds the 49.6 µg/m^3 threshold for the 24-hour standard and would extend up to 1,536 feet north of the

site border. The impacts, however, are anticipated to be minor at the existing and planned residential communities and for all other criteria pollutants. Because the other alternatives have less intense levels of activities near the sensitive receptors and produce less emissions, Alternatives 2, 3, and 4 are considered to be minor with a 24-hour operation for carbon monoxide, oxides of nitrogen, and $PM_{2.5}$. PM_{10} impacts for a 24-hour operation of Alternatives 2, 3, and 4 are discussed independently under each alternative.

Table 4.1-7
Maximum Daily Localized Operational Impacts for Alternative 1 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
CO 1-hr	Maximum at fence line	4,582.413	86.34900	4,668.762	40,000	No
	Area around Sloan	4,582.413	2.42315	4,584.8	40,000	No
	Area around existing Inspirada	4,582.413	0.85308	4,583.266	40,000	No
	Area around planned Inspirada	4,582.413	1.51102	4,583.924	40,000	No
	Area around Anthem	4,582.413	0.67853	4,583.092	40,000	No
CO 8-hr	Maximum at fence line	3,207.689	27.72200	3,253.411	10,000	No
	Area around Sloan	3,207.689	0.30979	3,207.689	10,000	No
	Area around existing Inspirada	3,207.689	0.38709	3,208.076	10,000	No
	Area around planned Inspirada	3,207.689	0.57977	3,208.269	10,000	No
	Area around Anthem	3,207.689	0.25315	3,207.942	10,000	No
NO_2 1-hr	Maximum at fence line	125.875	0.5393	126.4139	188.00	No
	Area around Sloan	125.875	0.2572	126.1319	188.00	No
	Area around existing Inspirada	125.875	0.10071	125.975	188.00	No
	Area around planned Inspirada	125.875	0.1605	126.035	188.00	No
	Area around Anthem	125.875	0.08580	125.964	188.00	No
NO_2 Annual	Maximum at fence line	35.696	0.0058300	35.702	100.00	No
	Area around Sloan	35.696	0.0005220	35.696	100.00	No
	Area around existing Inspirada	35.696	0.0015700	35.697	100.00	No
	Area around planned Inspirada	35.696	0.0030600	35.699	100.00	No
	Area around Anthem	35.696	0.0001000	35.699	100.00	No
PM_{10} 24-hr	Maximum at fence line	—	53.32100	—	49.60	Yes
	Area around Sloan	—	5.87441	—	49.60	No
	Area around existing Inspirada	—	6.29330	—	49.60	No

Table 4.1-7
Maximum Daily Localized Operational Impacts for Alternative 1 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
	Area around planned Inspirada	—	11.17114	—	49.60	No
	Area around Anthem	—	4.18280	—	49.60	No
PM_{10} Annual	Maximum at fence line	22	27.83200	49.832	50	No
	Area around Sloan	22	0.37333	22.377	50	No
	Area around existing Inspirada	22 0.560	75	22.568	50	No
	Area around planned Inspirada	22 1.225	88	22.227	50	No
	Area around Anthem	22	0.36076	22.361	50	No
$PM_{2.5}$ 24-hr	Maximum at fence line	—	11.70900	—	17.60	No
	Area around Sloan	—	0.58761	—	17.60	No
	Area around existing Inspirada	—	0.64469	—	17.60	No
	Area around planned Inspirada	—	1.17012	—	17.60	No
	Area around Anthem	—	0.40064	—	17.60	No
$PM_{2.5}$ Annual	Maximum at fence line	8	5.69700	13.697	15	No
	Area around Sloan	8	0.07790	8.078	15	No
	Area around existing Inspirada	8	0.11700	8.117	15	No
	Area around planned Inspirada	8	0.25595	8.256	15	No
	Area around Anthem	8	0.07527	8.075	15	No

4.1.4 Alternative 2 (Sale of North Site Only)

4.1.4.1 Construction Phase

Table 4.1-8 shows the impacts from Alternative 2 construction activities on the closest sensitive receptors as determined from a SCREEN3 analysis. As with Alternative 1, Alternative 2 construction activities would be subject to the terms and conditions of the Clark County Dust Control regulations; therefore, mitigation was applied to the modeling to show a reduction in impacts from dust-generating activities. Comments received from the DAQEM elicited revisions to the emissions for construction activities, which were recalculated using AP-42 emission factors for construction equipment. The DAQEM also requested that the modeling be conducted in AERMOD because its determination of offsite emissions are more accurate than those from SCREEN3. Because construction under Alternative 1 would be more

intensive than under Alternatives 2, 3, or 4, it was determined that for impacts that were minor under Alternative 1 (carbon monoxide, oxides of nitrogen, and $PM_{2.5}$), impacts under the less intensive Alternative 2 could also be concluded to result in a minor determination. Because impacts from PM_{10} were determined to be moderate, localized, and short-term under Alternative 1, an evaluation of PM_{10} emissions from the construction of Alternatives 2, 3, or 4 was completed. PM_{10} emissions concentrations would be similar for the three alternatives because they have relatively the same construction schedule and intensity. Table 4.1-9 shows that the PM_{10} impacts from the construction of Alternative 2 are also moderate, localized, and short-term at the fence line and to 485 feet north of the site; however, impacts are minor near the existing and planned residential development areas.

Table 4.1-8
SCREEN3 Localized Construction Impacts for Alternative 2 (μg/m^3)

	CO 1-hr[1]	CO 8-hr[2]	NO_2 1-hr[3]	NO_2 Annual	PM_{10} 24-hr[4]	PM_{10} Annual[5]	$PM_{2.5}$ 24-hr[4]	$PM_{2.5}$ Annual[6]
Peak emissions (tons/yr)	3.98		7.74	2.48	0.78			
SCREEN3 Results (μg/m^3)								
At 50 meters	4,629.47	3,240.63	125.87	10.57	2.61	22.52	0.37	8.07
Town of Sloan	4,607.95	3,225.56	174.32	13.95	0.00	22.00	0.00	8.00
Planned Inspirada	4,606.04	3,224.23	171.52	13.72	0.00	22.00	0.00	8.00
Existing Edge	4,599.72	3,218.81	170.52	13.64	0.00	22.00	0.00	8.00
Anthem 4,599.17		3,219.42	169.53	13.65	0.00	22.00	0.00	8.00
AAQS	40,000	40,000	188	100	49.6	50	17.6	15
Exceed AAQS?	No	No	No	No	No	No	No	No

1 Carbon monoxide, nitrogen dioxide , PM_{10}, and $PM_{2.5}$ are in μg/m^3.
2 Includes background concentration of 4,574.93 μg/m^3.
3 Includes background concentration of 3,202.45 μg/m^3.
4 Includes background concentration of 7.21 μg/m^3.
5 Includes background concentration of 24.00 μg/m^3.
6 Includes background concentration of 8.00 μg/m^3.

Table 4.1-9
AERMOD Localized Construction Impacts for Alternative 2 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
PM_{10} 24-hr	Maximum at fence line	—	55.37500	—	49.60	Yes
	Area around Sloan	—	2.43400	—	49.60	No
	Area around existing Inspirada	—	2.11365	—	49.60	No
	Area around planned Inspirada	—	3.70138	—	49.60	No
	Area around Anthem	—	1.29013	—	49.60	No
PM_{10} Annual	Maximum at fence line	22	10.62400	31.1723	50	No
	Area around Sloan	22	0.11439	22.17011	50	No
	Area around existing Inspirada	22 0.147	77	22.21626	50	No
	Area around planned Inspirada	22 0.323	99	22.4299	50	No
	Area around Anthem	22	0.09756	22.14137	50	No

4.1.4.2 Operational Phase

Table 4.1-10 shows the anticipated tons per year of criteria pollutants for Alternative 2, assuming a 9-hour workday for unmitigated and mitigated with exporting a maximum of 5 million tons per year. As shown, without the incorporation of mitigation measures AQ2 through AQ10 (Section 4.1.9.1), this alternative is above the conformity threshold for $PM_{2.5}$ and PM_{10}. Table 4.1-11 shows the maximum localized emissions from mitigated operational activities for Alternative 2, assuming a 9-hour workday. As can be seen with mitigation measures AQ2 through AQ10, this alternative is below the thresholds for carbon monoxide, oxides of nitrogen, $PM_{2.5}$, and PM_{10}. Therefore, the impacts are anticipated to be minor and localized at the site border and existing and planned residential communities.

VOC emissions, while not required under a Conformity analysis, are reported here because they (and oxides of nitrogen) are precursors to ozone emissions. As shown in Table 4.1-10, combined oxides of nitrogen and VOC emissions are below the individual threshold of 100 tons per year as indicated separately for each pollutant. Given the reaction to ozone is not a total conversion of pollutants, and the combined emissions are below the conformity threshold set independently for oxides of nitrogen and VOC emission, the proposed project is anticipated to have a minor impact on ozone levels.

Table 4.1-10
Annual Emissions for Alternative 1 (tons per year)

	CO	NO_X Unmit	NO_X Mit	PM_{10} Unmit	PM_{10} Mit	$PM_{2.5}$ Unmit	$PM_{2.5}$ Mit	VOC
Emissions 36.32		72.8	27.17	538.5 47.51		114.9 10.91		8.9
Conformity Threshold	100	100	100 70		70 100		100	100
Exceed Threshold?	No	No	No Yes		No Yes		No	No

Unmit = Unmitigated
Mit = Mitigated

Table 4.1-11
Localized Operational Impacts for Alternative 2 ($\mu g/m^3$)

Pollutant and Averaging Time	Receptor Location	Background Air Quality ($\mu g/m^3$)	Maximum Incremental Project-Related Impact ($\mu g/m^3$)	Total Impact (Background + Project) ($\mu g/m^3$)	Most Restrictive Air Quality Standard ($\mu g/m^3$)	Significant Impact?
CO 1-hr	Maximum at fence line	4,582.413 17.11	300	4,599.526	40,000	No
	Area around Sloan	4,582.413	0.36543 4,582.7	79	40,000	No
	Area around existing Inspirada	4,582.413 0.156	26	4,582.569 40,00	0	No
	Area around planned Inspirada	4,582.413 0.299	55	4,582.713 40,00	0	No
	Area around Anthem	4,582.413	0.10800 4,582.5	21	40,000	No
CO 8-hr	Maximum at fence line	3,207.689 4.586	00	3,212.275	10,000	No
	Area around Sloan	3,207.689	0.05992 3,207.7	49	10,000	No
	Area around existing Inspirada	3,207.689 0.053	40	3,207.743 10,00	0	No
	Area around planned Inspirada	3,207.689 0.102	95	3,207.792 10,00	0	No
	Area around Anthem	3,207.689	0.02889 3,207.7	18	10,000	No
NO_2 1-hr	Maximum at fence line	125.875	0.1063	125.981	188.00	No
	Area around Sloan	125.875	0.0388	125.913	188.00	No
	Area around existing Inspirada	125.875 0.018	4	125.893	188.00	No
	Area around planned Inspirada	125.875 0.031	8	125.907	188.00	No
	Area around Anthem	125.875	0.01275 125.8	87	188.00	No
NO_2 Annual	Maximum at fence line	35.696	0.0009010	35.697	100.00	No
	Area around Sloan	35.696	0.0000630	35.696	100.00	No
	Area around existing Inspirada	35.696 0.000	1600	35.696	100.00	No
	Area around planned Inspirada	35.696 0.000	3240	35.696	100.00	No
	Area around Anthem	35.696	0.0001000 35.69	6	100.00	No

Table 4.1-11
Localized Operational Impacts for Alternative 2 (μg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (μg/m^3)	Maximum Incremental Project-Related Impact (μg/m^3)	Total Impact (Background + Project) (μg/m^3)	Most Restrictive Air Quality Standard (μg/m^3)	Significant Impact?
PM_{10} 24-hr	Maximum at fence line	—	40.2	—	49.60	No
	Area around Sloan	—	1.83965	—	49.60	No
	Area around existing Inspirada	—	2.31311	—	49.60	No
	Area around planned Inspirada	—	3.92562	—	49.60	No
	Area around Anthem	—	1.49845	—	49.60	No
PM_{10} Annual	Maximum at fence line	22	9.26372	31.264	50	No
	Area around Sloan	22	0.11651	22.117	50	No
	Area around existing Inspirada	22 0.175	69	22.176	50	No
	Area around planned Inspirada	22 0.396	86	22.367	50	No
	Area around Anthem	22	0.11296	22.113	50	No
$PM_{2.5}$ 24-hr	Maximum at fence line	—	5.59021	—	17.60	No
	Area around Sloan	—	0.19790	—	17.60	No
	Area around existing Inspirada	—	0.21135	—	17.60	No
	Area around planned Inspirada	—	0.40769	—	17.60	No
	Area around Anthem	—	0.13515	—	17.60	No
$PM_{2.5}$ Annual	Maximum at fence line	8	1.93429	9.934	15	No
	Area around Sloan	8	0.02433	8.024	15	No
	Area around existing Inspirada	8	0.03670	8.037	15	No
	Area around planned Inspirada	8	0.08291	8.083	15	No
	Area around Anthem	8	0.02360	8.024	15	No

4.1.4.3 24-Hour Operations

Section 4.1.3.3 indicates that Alternative 1 would result in more intensive operational emissions than Alternatives 2, 3, and 4 and is considered to be minor with a 24-hour operation for carbon monoxide, oxides of nitrogen, and $PM_{2.5}$. Therefore, the 24-hour operation of Alternative 2 would also be minor for these pollutants. Although Table 4.1-11 shows that PM_{10} impacts from a 9-hour operating day are minor and localized, impacts just inside the site border are 40.2 μg/m^3, just under the 49.6 μg/m^3 threshold. Expanding operations to 24 hours would increase emissions and increase the anticipated impact. This

anticipated impact would exceed the threshold, resulting in a moderate localized impact adjacent to the site border; however, it is not anticipated to exceed thresholds at the existing or planned residences.

4.1.5 Alternative 3 (Sale of South Site Only)

4.1.5.1 Construction Phase

Table 4.1-12 shows the impacts from Alternative 3 construction activities on the closest sensitive receptors. Tables 4.1-8 through 4.1-12 show minor differences in emissions levels in carbon monoxide and oxides of nitrogen and no differences with PM_{10} and $PM_{2.5}$. This is because the size of the area to be built, the square footage of buildings to be erected, and the timeframe and equipment used for the construction would all be identical. The differences are due to the minor changes in trip distance for haul trucks accessing the site. As discussed in Section 4.1.4.1, impacts that were minor under Alternative 1 (carbon monoxide, oxides of nitrogen, and $PM_{2.5}$) could also be concluded to result in a minor determination under the less intensive construction activities. Because impacts from PM_{10} were determined to be moderate, localized, and short-term under Alternative 1, an evaluation of PM_{10} emissions from the construction of Alternatives 2, 3, or 4 was completed. Table 4.1-9 shows that the PM_{10} impacts from the construction of these alternatives are also moderate, localized, and short-term at the fence line; however, impacts are minor near the existing and planned residential development areas.

Table 4.1-12
SCREEN3 Localized Construction Impacts for Alternative 3 (μg/m³)

	CO 1-hr[1]	CO 8-hr[2]	NO_2 1-hr[3]	NO_2 Annual	PM_{10} 24-hr[4]	PM_{10} Annual[5]	$PM_{2.5}$ 24-hr[4]	$PM_{2.5}$ Annual[6]
Peak emissions (tons/yr)	3.98		7.74	2.48	0.78			
SCREEN3 Results (μg/m³)								
At 50 meters	4,629.47	3,240.63	125.8 7	10.57	2.61	22.52	0.37	8.07
Town of Sloan	4,607.95	3,225.56	174.32	13.95	0.00	22.00	0.00	8.00
Planned Inspirada	4,606.04	3,224.23	171.52	13.72	0.00	22.00	0.00	8.00
Existing Edge	4,599.72	3,218.81	170.52	13.64	0.00	22.00	0.00	8.00
Anthem 4,599.1	7	3,219.42	169.5 3	13.65	0.00	22.00	0.00	8.00
AAQS	40,000	40,000	188	100	49.6 50	17.6	15	
Exceed AAQS?	No	No No		No No		No No		No

1 Carbon monoxide , nitrogen dioxide , PM_{10}, and $PM_{2.5}$ are in μg/m³.
2 Includes background concentration of 4,574.93 μg/m³.
3 Includes background concentration of 3,202.45 μg/m³.
4 Includes background concentration of 7.21 μg/m³.
5 Includes background concentration of 24.00 μg/m³.
6 Includes background concentration of 8.00 μg/m³.

4.1.5.2 Operational Phase

Table 4.1-13 shows the anticipated tons per year of criteria pollutants for Alternative 3, assuming a 9-hour workday for unmitigated and mitigated with exporting a maximum of 5 million tons per year. As shown, without the incorporation of mitigation measures AQ2 through AQ10 (Section 4.1.9.1), this alternative would be above the conformity threshold for $PM_{2.5}$ and PM_{10}. Table 4.1-14 shows the maximum emissions from mitigated operational activities for Alternative 3, assuming a 9-hour workday. As can be seen with mitigation measures AQ2 through AQ10, this alternative would be below the thresholds for carbon monoxide and oxides of nitrogen. PM_{10} and $PM_{2.5}$ impacts would be moderate, long term, and localized because it exceeds the respective standards for PM_{10} (24-hour and annual) and $PM_{2.5}$ (annual) and would extend up to 624 feet north and west of the site border. Impacts, however, are anticipated to be minor at the existing and planned residential communities.

VOC emissions, while not required under a Conformity analysis, are reported here because they (and oxides of nitrogen) are precursors to ozone emissions. As shown in Table 4.1-13, combined oxides of nitrogen and VOC emissions would be below the individual threshold of 100 tons per year as indicated separately for each pollutant. Because the reaction to ozone is not a total conversion of pollutants, and the combined emissions are below the conformity threshold set independently for oxides of nitrogen and VOC emissions, the proposed project is anticipated to have a minor impact on ozone levels.

Table 4.1-13
Annual Emissions for Alternative 3 (tons per year)

	CO	NO_X Unmit	NO_X Mit	PM_{10} Unmit	PM_{10} Mit	$PM_{2.5}$ Unmit	$PM_{2.5}$ Mit	VOC
Emissions 36.2		73.2	27.57	538.2 47	56	114.9 11	00	9.0
Conformity Threshold	100	100	100 70		70 100		100	100
Exceed Threshold?	No	No	No Yes		No Yes		No	No

Unmit = Unmitigated
Mit = Mitigated

Table 4.1-14
Localized Operational Impacts for Alternative 3 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
CO 1-hr	Maximum at fence line	4,582.413	10.29800	4,592.711	40,000	No
	Area around Sloan	4,582.413	0.27616	4,582.689	40,000	No
	Area around existing Inspirada	4,582.413	0.141 42	4,582.555	40,000	No
	Area around planned Inspirada	4,582.413	0.274 90	4,582.688	40,000	No
	Area around Anthem	4,582.413	0.10206	4,582.516	40,000	No
CO 8-hr	Maximum at fence line	3,207.689	2.44200	3,210.131	10,000	No
	Area around Sloan	3,207.689	0.04603	3,207.735	10,000	No
	Area around existing Inspirada	3,207.689	0.054 04	3,207.743	10,000	No
	Area around planned Inspirada	3,207.689	0.099 16	3,207.788	10,000	No
	Area around Anthem	3,207.689	0.03312	3,207.722	10,000	No
NO_2 1-hr	Maximum at fence line	125.875	0.0638	125.938	188.00	No
	Area around Sloan	125.875	0.0292	125.904	188.00	No
	Area around existing Inspirada	125.875	0.016 33	125.891	188.00	No
	Area around planned Inspirada	125.875	0.029 1	125.904	188.00	No
	Area around Anthem	125.875	0.012 0	125.887	188.00	No
NO_2 Annual	Maximum at fence line	35.696	0.0005830	35.696	100.00	No
	Area around Sloan	35.696	0.0000450	35.696	100.00	No
	Area around existing Inspirada	35.696	0.000 1600	35.696	100.00	No
	Area around planned Inspirada	35.696	0.000 3150	35.696	100.00	No
	Area around Anthem	35.696	0.0001000	35.696	100.00	No
PM_{10} 24-hr	Maximum at fence line	—	113.75	—	49.60	Yes
	Area around Sloan	—	1.79483	—	49.60	No
	Area around existing Inspirada	—	2.12815	—	49.60	No
	Area around planned Inspirada	—	4.00458	—	49.60	No
	Area around Anthem	—	1.62557	—	49.60	No

Table 4.1-14
Localized Operational Impacts for Alternative 3 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
PM_{10} Annual	Maximum at fence line	22	42.3	64.3	50	Yes
	Area around Sloan	22	0.09826	22.098	50	No
	Area around existing Inspirada	22 0.164	85	22.165	50	No
	Area around planned Inspirada	22 0.330	49	22.330	50	No
	Area around Anthem	22	0.10528	22.105	50	No
$PM_{2.5}$ 24-hr	Maximum at fence line	—	17.45	—	17.60	No
	Area around Sloan	—	0.14846	—	17.60	No
	Area around existing Inspirada	—	0.2048	—	17.60	No
	Area around planned Inspirada	—	0.36986	—	17.60	No
	Area around Anthem	—	0.13891	—	17.60	No
$PM_{2.5}$ Annual	Maximum at fence line	8	8.85	16.85	15	Yes
	Area around Sloan	8	0.02051	8.020	15	No
	Area around existing Inspirada	8	0.03441	8.034	15	No
	Area around planned Inspirada	8	0.06898	8.069	15	No
	Area around Anthem	8	0.02202	8.022	15	No

4.1.5.3 24-Hour Operations

Section 4.1.3.3 indicates that Alternative 1 would result in more intensive operational emissions than Alternatives 2, 3, or 4 and is considered to be minor with a 24-hour operation for carbon monoxide, oxides of nitrogen, and $PM_{2.5}$. Therefore, the 24-hour operation of Alternative 3 would also be minor for these pollutants. Because PM_{10} impacts for a 24-hour operation of Alternative 1 were determined to be moderate, temporary, and localized, impacts from a 24-hour operation of Alternative 3 are analyzed here with respect to PM_{10}. Table 4.1-14 shows that PM_{10} impacts from a 9-hour operating day are moderate, long term, and localized; therefore, expanding operations to 24 hours would increase emissions and increase the anticipated impact, also resulting in a moderate localized impact.

4.1.6 Alternative 4 (Single Sale of North Site and South Site)

4.1.6.1 Construction Phase

Table 4.1-15 shows the impacts from mitigated Alternative 4 construction activities on the closest sensitive receptors. As discussed in Section 4.1.4.1, impacts that were minor under Alternative 1 (carbon monoxide, oxides of nitrogen, and $PM_{2.5}$) would also result in a minor determination under the less intensive construction activities. Because impacts from PM_{10} were determined to be moderate, localized, and short-term under Alternative 1, an evaluation of PM_{10} emissions from the construction of Alternatives 2 through 4 was completed. Table 4.1-9 shows that the PM_{10} impacts from the construction of these alternatives are also moderate, localized, and short-term at the fence line and to 485 feet north of the site; however, impacts are minor near the existing and planned residential development areas.

Table 4.1-15
Localized Construction Impacts for Alternative 4 (µg/m³)

	CO 1-hr[1]	CO 8-hr[2]	NO_2 1-hr[3]	NO_2 Annual	PM_{10} 24-hr[4]	PM_{10} Annual[5]	$PM_{2.5}$ 24-hr[4]	$PM_{2.5}$ Annual[6]
Peak emissions (tons/yr)	3.98		7.74 2.48		0.78			
SCREEN3 Results (µg/m³)								
At 50 meters	4,629.47	3,240.63 1	25.8 7	10.57	2.61 22.52		0.37	8.07
Town of Sloan	4,607.95	3,225.56	174.32	13.95 0.00		22.00 0.00		8.00
Planned Inspirada	4,606.04	3,224.23	171.52	13.72 0.00		22.00 0.00		8.00
Existing Edge	4,599.72	3,218.81	170.52	13.64 0.00		22.00 0.00		8.00
Anthem 4,599.1	7	3,219.42 1	69.5 3	13.65	0.00	22.00 0.00		8.00
AAQS	40,000	40,000	188	100	49.6 50		17.6 15	
Exceed AAQS?	No	No No	No	No	No	No	No	

1 Carbon monoxide, nitrogen dioxide , PM_{10}, and $PM_{2.5}$ are in µg/m³.
2 Includes background concentration of 4,574.93 µg/m³.
3 Includes background concentration of 3,202.45 µg/m³.
4 Includes background concentration of 7.21 µg/m³.
5 Includes background concentration of 24.00 µg/m³.
6 Includes background concentration of 8.00 µg/m³.

4.1.6.2 Operational Phase

Table 4.1-16 shows the anticipated tons per year of criteria pollutants for Alternative 3, assuming a 9-hour workday for unmitigated and mitigated with exporting a maximum of 7 million tons per year. As shown, without the incorporation of mitigation measures AQ2 through AQ9 (Section 4.1.9.1), this alternative is above the conformity threshold for $PM_{2.5}$ and PM_{10}. Table 4.1-17 shows the maximum emissions from mitigated operational activities for Alternative 4, assuming a 9-hour workday. As can be seen with mitigation measures MM2 through MM10, this alternative is below the thresholds for carbon monoxide,

oxides of nitrogen, PM_{10}, and $PM_{2.5}$. Therefore, the impacts are anticipated to be minor and localized for all receptors, including the existing and planned residential communities.

VOC emissions, while not required under a Conformity analysis, are reported here as they (and oxides of nitrogen) are precursors to ozone emissions. As shown in Table 4.1-16, combined oxides of nitrogen and VOC emissions are below the individual threshold of 100 tons per year as indicated separately for each pollutant. Given the reaction to ozone is not a total conversion of pollutants, and the combined emissions are below the conformity threshold set independently for oxides of nitrogen and VOC emission, the proposed project is anticipated to have a minor impact on ozone levels.

Table 4.1-16
Annual Emissions for Alternative 4 (tons per year)

	CO	NO_X Unmit	NO_X Mit	PM_{10} Unmit	PM_{10} Mit	$PM_{2.5}$ Unmit	$PM_{2.5}$ Mit	VOC
Emissions	38.7	74.9	29.29	753.4	66.89	160.3	15.40	9.4
Conformity Threshold	100	100	100	70	70	100	100	100
Exceed Threshold?	No	No	No	Yes	No	Yes	No	No

Unmit = Unmitigated
Mit = Mitigated

Table 4.1-17
Localized Operational Impacts for Alternative 4 ($\mu g/m^3$)

Pollutant and Averaging Time	Receptor Location	Background Air Quality ($\mu g/m^3$)	Maximum Incremental Project-Related Impact ($\mu g/m^3$)	Total Impact (Background + Project) ($\mu g/m^3$)	Most Restrictive Air Quality Standard ($\mu g/m^3$)	Significant Impact?
CO 1-hr	Maximum at fence line	4,582.413	174.29700	4,756.701	40,000	No
	Area around Sloan	4,582.413	2.84844	4,585.262	40,000	No
	Area around existing Inspirada	4,582.413	1.21274	4,583.626	40,000	No
	Area around planned Inspirada	4,582.413	2.32542	4,584.739	40,000	No
	Area around Anthem	4,582.413	0.08375	4,582.497	40,000	No
CO 8-hr	Maximum at fence line	3,207.689	42.36900	3,250.058	10,000	No
	Area around Sloan	3,207.689	0.46705	3,208.156	10,000	No
	Area around existing Inspirada	3,207.689	0.41410	3,208.103	10,000	No
	Area around planned Inspirada	3,207.689	0.80123	3,208.490	10,000	No
	Area around Anthem	3,207.689	0.22421	3,207.913	10,000	No
NO_2 1-hr	Maximum at fence line	125.875	.0831	126.706	188.00	No
	Area around Sloan	125.875	0.3074	126.182	188.00	No

Table 4.1-17
Localized Operational Impacts for Alternative 4 (µg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (µg/m^3)	Maximum Incremental Project-Related Impact (µg/m^3)	Total Impact (Background + Project) (µg/m^3)	Most Restrictive Air Quality Standard (µg/m^3)	Significant Impact?
	Area around existing Inspirada	125.875	0.1454	126.020	188.00	No
	Area around planned Inspirada	125.875	0.2510	126.126	188.00	No
	Area around Anthem	125.875	0.1004	125.975	188.00	No
NO_2 Annual	Maximum at fence line	35.696	0.0098	35.706	100.00	No
	Area around Sloan	35.696	0.0005	35.696	100.00	No
	Area around existing Inspirada	35.696	0.0013	35.697	100.00	No
	Area around planned Inspirada	35.696	0.0027	35.699	100.00	No
	Area around Anthem	35.696	0.0008	35.699	100.00	No
PM_{10} 24-hr	Maximum at fence line	—	49.533	—	49.60	No
	Area around Sloan	—	2.14498	—	49.60	No
	Area around existing Inspirada	—	2.69978	—	49.60	No
	Area around planned Inspirada	—	4.5823	—	49.60	No
	Area around Anthem	—	1.74877	—	49.60	No
PM_{10} Annual	Maximum at fence line	22	10.79288	32.793	50	No
	Area around Sloan	22	0.13587	22.136	50	No
	Area around existing Inspirada	22	0.20506	22.205	50	No
	Area around planned Inspirada	22	0.46323	22.463	50	No
	Area around Anthem	22	0.13183	22.132	50	No
$PM_{2.5}$ 24-hr	Maximum at fence line	—	6.47363	—	17.60	No
	Area around Sloan	—	0.22955	—	17.60	No
	Area around existing Inspirada	—	0.24512	—	17.60	No
	Area around planned Inspirada	—	0.47293	—	17.60	No
	Area around Anthem	—	0.15674	—	17.60	No

Table 4.1-17
Localized Operational Impacts for Alternative 4 (μg/m^3)

Pollutant and Averaging Time	Receptor Location	Background Air Quality (μg/m^3)	Maximum Incremental Project-Related Impact (μg/m^3)	Total Impact (Background + Project) (μg/m^3)	Most Restrictive Air Quality Standard (μg/m^3)	Significant Impact?
$PM_{2.5}$ Annual	Maximum at fence line	8	2.24008	10.240	15	No
	Area around Sloan	8	0.0282	8.028	15	No
	Area around existing Inspirada	8	0.04257	8.043	15	No
	Area around planned Inspirada	8	0.09616	8.096	15	No
	Area around Anthem	8	0.02737	8.027	15	No

4.1.6.3 24-Hour Operations

Section 4.1.3.3 indicates that Alternative 1 would result in more intensive operational emissions than Alternatives 2, 3, or 4 and is considered to be minor with a 24-hour operation for carbon monoxide, oxides of nitrogen, and $PM_{2.5}$. Therefore, the 24-hour operation of Alternative 4 would also be minor for these pollutants. Although Table 4.1-17 shows that PM_{10} impacts from a 9-hour operating day would be minor and localized, impacts just inside the site border are 49.533 μg/m^3, just under the 49.6 μg/m^3 threshold. Expanding operations to 24 hours would increase emissions and increase the anticipated impact. This anticipated impact would exceed the threshold, resulting in a moderate localized impact adjacent to the site border; however, it is not anticipated to exceed thresholds at the existing or planned residences.

4.1.7 Alternative 5 (No Action Alternative)

Under the No Action Alternative, the BLM sale of mineral material would not occur in the Sloan Hills area. Mining operations in the Proposed Action area would not be authorized. No surface disturbance would occur, and no impacts to the existing physical or biological environment would take place. Approximately 120 million tons of construction aggregate would not be produced at this location. However, a continuing demand for construction aggregate in the Las Vegas Valley would necessitate alternative mining locations. Because no production would occur at the site, under Alternative 5 no construction would be required; therefore, no impacts to air quality would be realized.

4.1.8 Valley Fever

The area around Las Vegas, including the Proposed Action area, is in an area suspected of being endemic for Valley fever. Because ambient airborne *Coccidioides immitis* spores have the potential to be present anywhere in the endemic areas, the absolute prevention of infection is virtually impossible; however, dust

control mitigation measures are the main path to prevention. With the incorporation of mitigation measures AQ11 through AQ20 (Section 4.1.9.2), the risk of infection to workers or the established communities in the area will be limited to the greatest extent feasible for Alternatives 1 through 4. Because the spores are viable only within the first foot of undisturbed soils, the mitigation measures addressed in Section 4.1.9.2 should be applied to the construction phases and at any point during operations when the first foot of soil is being removed from the mine pit. With the incorporation of mitigation measures, impacts from Valley fever are unlikely to occur.

The Proposed Action area is located in an area suspected to contain the fungal spores that cause Valley fever; however, soil testing of the site has not been conducted to confirm the presence or absence of fungal spores. These spores generally occur only in the upper 1 foot of desert soils. Disturbance of soils by natural means (e.g., animal activity or wind gusts) can result in the spread of spores to nearby communities; therefore, under the No Action Alternative, nearby communities would continue to be at risk for exposure to Valley fever from natural causes of soil disturbance.

4.1.9 Mitigation Measures

4.1.9.1 Construction and Operational Mitigation Measures

The following mitigation measures are included to reduce air quality impacts from the proposed project. Although in the majority of instances the project itself is below regulatory thresholds, the region itself is in exceedence of several criteria pollutants. This project is located in Clark County and is therefore subject to Clark County air quality regulations. These regulations require construction contractors to reduce emissions of criteria pollutants during construction activities. Because the nature of mining is similar to construction with the amount of disturbance of earth required, the Clark County regulations for construction are assumed to be carried over to the operational activities of the project as well. Although mitigation measures AQ3 through AQ8 may repeat aspects of AQ2, they are called out as individual measures because they have been incorporated into the modeling for the construction and operational activities of Alternatives 1 through 4 or because they have a high potential to reduce particulate emissions from the project and are required, but cannot be quantified, to show potential reductions. AQ1 applies to the operational activities for Alternative 1 only.

AQ1 If Alternative 1 is selected, the Operations Manager will ensure that when two separate mines are being operated, operations at the South Site are limited to 7 million tons per year.

AQ2 The Construction Contractor and Operations Manager will ensure that onsite activities adhere to the dust control BMPs included in the Clark County DAQEM Construction Activities Dust Control Handbook.

AQ3 The Construction Contractor and Operations Manager will ensure that all exposed surfaces, including haul roads, access roads, and gravel paved areas, are watered four times per day. All

high-traffic areas will maintain a level of saturation such that no dust plumes are visible. Where feasible, access and haul roads will be paved. Project proponents will investigate the feasibility of paving roads with concrete as opposed to asphalt to eliminate the associated impact to air quality and wildlife.

AQ4 The Construction Contractor and Operations Manager will ensure that soil stabilizers are applied to all inactive areas within 4 days of stopping work in that area.

AQ5 The Construction Contractor and Operations Manager will ensure that speeds on unpaved roads are reduced to 15 mph or less. Signs will be posted at the entrances to all main haul and access routes.

AQ6 The Construction Contractor and Operations Manager will ensure that all materials being loaded or unloaded on site maintain a saturation level such that no dust plumes are visible during material loading or unloading.

AQ7 The Construction Contractor and Operations Manager will ensure that all unnecessary disturbance of soils is avoided.

AQ8 The Construction Contractor and Operations Manager will ensure that soil-disturbing activities during excessively windy conditions (over 15 mph) are limited to those absolutely necessary, and that when wind gusts exceed 25 mph, all soil disturbing activities are ceased.

AQ9 The Construction Contractor and Operations Manager will ensure that idling is restricted to 5 minutes or less for all equipment that is not actively involved in construction or operational activities. This mitigation measure will not apply when excessive starting or stopping of said equipment can be demonstrated to be damaging to the equipment. Signs will be posted at all entrances and at typical staging and queuing areas to inform drivers and operators of the requirement. Drivers that do not comply with the mitigation will be subjected to penalties that may include monetary fines or suspension or revocation of contracts.

AQ10 The Operations Manager will ensure that all onsite diesel equipment and vehicles are rated as EPA Tier 4. All vehicles and emissions control equipment will be maintained and operated as per the manufacturer's instructions and required federal law. The project proponent will research the feasibility of installing equipment that can measure vehicle emissions as they pass through gates or other stationary points.

4.1.9.2 Valley Fever Mitigation Measures

The area around Las Vegas, including the project site, is considered to be in an area suspected of being endemic for Valley fever. Because ambient airborne *Coccidioides immitis* spores have the potential to be present anywhere in the endemic areas, the absolute prevention of infection is virtually impossible;

however, dust control mitigation measures are the main path to prevention. With the incorporation of the following mitigation measures, the risk of infection to workers or the established communities in the area will be limited to the greatest extent feasible for Alternatives 1 through 4. Because the spores are viable only within the first foot of undisturbed soils, these mitigation measures (AQ11 through AQ20: USGS, 2000) should be applied to the construction phases and at any point during operational activities when the first foot of soil is being removed from the pit.

AQ11 The Construction Contractor and Site Manager will provide educational information to all workers prior to the initiation of soil-disturbing activities. Education will consist of the potential risk of infections, mode of infection, symptoms of the infection, and the following mitigation measures designed to minimize worker and community risk.

AQ12 The Construction Contractor and Site Manager will ensure that Coccidioidin skin tests, or other diagnostic test as appropriate, are made available to all workers prior to beginning work so that workers can properly assess their level of risk.

AQ13 The Construction Contractor and Site Manager will ensure that, when feasible, machinery with enclosed cabs with air conditioning are used.

AQ14 The Construction Contractor and Site Manager will ensure that all soils to be disturbed are saturated before beginning digging or blasting activities. Further, they will ensure that a significant level of saturation is maintained during all mining activities so as to avoid dust plumes.

AQ15 The Construction Contractor and Site Manager will ensure that all field vehicles are washed and interiors are cleaned using water (vacuuming or sweeping interiors will create dust and potentially mobilize spores). All field vehicles will be thoroughly cleaned (inside and out) prior to exiting the site.

AQ16 The Construction Contractor and Site Manager will provide adequate facilities such that workers can remove dusty work clothes before leaving the site. Policies will be enforced such that work clothes are removed prior to leaving the site. Dusty work clothes should be stored in closed plastic bags until washed.

AQ17 Where feasible, all roads and work areas will be paved as soon as possible.

AQ18 If feasible, the Site Manager will ensure that when working with the upper foot of soil, fungicides are employed during screening and crushing activities to kill any spores.

AQ19 If feasible, the Site Manager will ensure that when working with the upper foot of soil, the soil is sterilized by heating to 60°C for 30 minutes to kill the fungus. For example, the project could

employ the use of an in situ heating system (such as the GEE Hellfire), which has the ability to heat the soil up to 100°C using electrical resistance heating.

AQ20 If feasible, the Construction Contractor will ensure that either AQ17 or AQ18, or a combination thereof, is employed for all disturbed soils from within the upper foot.

4.2 EARTH RESOURCES

This section describes the potential environmental impacts involving earth resources that may result from implementation of the proposed alternatives. Mitigation measures are provided for any significant impacts. An impact would be considered significant if it would:

- Expose people or property to hazards involving seismic events, landslides, or subsidence
- Result in substantial soil erosion or loss of topsoil
- Substantially alter the topography or ground surface relief beyond that resulting from natural erosion and deposition
- Result in the loss of availability of a known mineral resource

4.2.1 Alternative 1 (Two Independent Mineral Material Sales)

4.2.1.1 Geology

Geology is collectively defined as the topography, stratigraphy, and geologic hazards in the project area.

The dolomite and limestone materials on the proposed North Site would be developed using traditional aboveground quarrying techniques, including stripping, drilling, blasting, loading, and hauling of both production and waste mineral products. Direct impacts of Alternative 1 on geologic and mineral resources would include the generation of approximately 200 million tons of aggregate and approximately 20 million tons of waste rock. The open pit mines under Alternative 1 would result in the permanent alteration of the landscape and disturbance of approximately 205 acres. This disturbance includes unreclaimed areas disturbed by the open pit and reclaimed waste rock stockpile areas.

4.2.1.1.1 Ancillary Facilities

The construction of ancillary facilities, such as access roads, water pipelines, and utility corridors, would disturb approximately 135 acres. Trenching for utilities and water pipelines would temporarily alter the topography; however, the topography and natural ground surface would be restored to its preconstruction condition after installation of the facilities. Therefore, no impacts to topography would occur from construction and operation of ancillary facilities.

4.2.1.1.2 Aggregate Material Mining

Alternative 1 consists of two proposed competitive mineral material sales that would result in two open pit dolomite/limestone quarries and associated facilities. The boundary between the two pits would be taken down as the mine pits progress. This would be accomplished by establishing a surveyed boundary between the two properties. As the pits progress, excavated rock along the surveyed boundary would be monitored to determine who has the extractive rights to the rock (Figure 2.1-5). The two mining companies would then coordinate the extraction rates to ensure the process was safe and does not impede the other operator when extracting along the common boundary. Eventually, the two open pits would merge into one open pit.

The completion of the North Site and South Site pit mines independently and collectively would result in a noticeable topographic change in the immediate area of the project. The current elevation of the mine sites range from 2,680 feet above mean sea level on the valley floor to 3,375 feet above mean sea level at the highest point. The elevation of approximately 205 acres at the mine sites would decrease each year, resulting in an elevation of 2,500 feet above mean sea level after 30 years of mining operations (see Section 4.8 for visual simulations of the mining operations). Alternative 1 would substantially alter the topography beyond that resulting from natural erosion and deposition. Therefore, the impact to topography would be significant. Although reclamation of the mining sites would be conducted in accordance with BLM guidelines (see below), the natural topography of the land would be significantly altered.

The USGS ground motion hazard maps indicate that there is a low probability that ground motion presents a hazard at the site. There are no identified geologic conditions that would be intensified by project activities resulting in geologic hazards. The pit walls and waste rock stockpiles would be constructed to conform to regulatory standards to minimize instability. During the progression of the mine pit, benches approximately 45 feet in height would be constructed in the quarry with a production width of approximately 25 feet to safely accommodate loaders and haul trucks. This would result in a slope of approximately 60 degrees from horizontal, which would provide an adequate factor of safety (CEMEX/ SRP, 2008). The mine configuration will be subject to geotechnical review. If local rock instability is discovered during mining operations, a pit slope of 1 to 1 would be used in that area. The design of the open pit would take into account the mining companies' knowledge of the rock materials, geotechnical tests, and Mine Safety and Health Administration design standards. As mining occurs, design parameters and assumptions would be tested against actual conditions. Monitoring of the conditions would be accomplished through geological and geotechnical evaluation involving geologic structure mapping and slope stability monitoring and analysis.

4.2.1.2 Mining Resources

Approximately 200 million tons of aggregate would be generated and transported off site for use. The depth of the mine bottom is set by reserve requirements at the 2,500-foot elevation, but additional

resources are present below the 2,500-foot elevation (TerraMins, 2009). Reclamation, which would consist of slope stabilizing and revegetation, would not reduce the availability or access to additional resources below 2,500 feet. Therefore, the impact to mining resources would not be significant.

4.2.1.3 Soils

Alternative 1 would impact the soil resources in the project area. Approximately 341 acres would be disturbed by mining operations, access roads, ancillary facilities, and other miscellaneous project components and activities. The potential for soil erosion would be highest immediately after disturbance and on steeper slopes but would decrease gradually over the life of the operation.

Generally, the soils in the areas that would be affected by the facilities have low to moderate potential for water erosion and moderate to high potential for wind erosion. Disturbances to these soils during mining would create the potential for inducing soil erosion from storm runoff and wind.

Unusable rock (rock that does not meet mine material specifications) would be removed to allow access to the defined zones of aggregate deposits. Unusable rock from the North Pit would be stockpiled in a 17-acre site located in the southeast 1/4 of Section 29. An erosion control fence approximately 2,100feet long would be installed around the east and south boundaries of the unusable rock stockpile area (Figure 2.1-1). Unusable rock from the South Pit would be stockpiled in an 8-acre site located in the northwest quarter of Section 32 within the 44-acre staging area (Figure 2.1-3). Maximum stockpile heights will be dictated by the conveyor equipment feeding them and could be up to 80 feet high. Other stockpiles will have their height determined by plant site requirements but will typically be less than 40 feet high. The unusable rock would be used to soften slopes and block access to the property during reclamation or would be sold for fill, decorative rock, or other low-end construction applications.

Soils impacts would also be reduced through implementation of mandatory environmental controls and reclamation. As stated in Section 2.6, the successful applicant(s) would be responsible for developing a site-specific reclamation plan in cooperation with the BLM once a mineral material sales contract is awarded. Reclamation will be part of the mining process; as soon as a portion of the mine is completed, reclamation will begin. The site-specific reclamation plan developed for Sloan Hills would be required to contain the following components that would reduce erosion impacts.

Any surface area that is disturbed by mining will be reclaimed as soon as is practicable. The pit slopes will be stabilized using appropriate reshaping and earthwork measures, including proper placement of soils and other materials. Soil conservation measures, including surface manipulation, reduction in slope angle, revegetation, and water management techniques, will be used. Sediment retention structures or devices will be located as close to the source of sediment-generating activities as possible.

When the final landform is achieved, the surface will be stabilized by vegetation or other means as soon as practicable to reduce further soil erosion by wind or water, and to provide forage and cover.

Revegetation will approximate the surrounding undisturbed vegetation. Where revegetation is impractical or inconsistent with the surrounding undisturbed areas, other forms of surface stabilization, such as rock pavement, will be used. Reclamation efforts will be monitored for success for a designated period of time.

Soil erosion impacts would be further reduced substantially through implementation of BMPs that would be required as part of compliance with local dust control ordinances, Clark County air quality permit requirements, and NPDES stormwater pollution prevention plans.

4.2.2 Alternative 2 (Sale of North Site Only)

4.2.2.1 Geology

Direct impacts of Alternative 2 on geologic and mineral resources would include the generation of approximately 126 million tons of aggregate and approximately 6.2 million tons of waste rock. The North Site pit mine under Alternative 2 would result in the permanent alteration of the landscape and disturbance of approximately 143 acres. This disturbance includes unreclaimed areas disturbed by the open pit and reclaimed waste rock disposal areas.

The construction of ancillary facilities, such as access roads, water pipelines, and utility corridors, would disturb approximately 78 acres. The types of impacts resulting from construction and operation of the ancillary facilities would be the same as those described for Alternative 1 in Section 4.2.1.1.

The natural topographic and geomorphic features in the open pit mine area would be permanently changed. The completion of the North Site pit mine would result in a noticeable topographic change in the immediate area of the project. The elevation of the mine site would decrease from 3,375 feet above mean sea level to 2,500 feet above mean sea level after 30 years of mining operations. Alternative 2 would substantially alter the topography beyond that resulting from natural erosion and deposition. Therefore, the impact to topography would be significant. Although reclamation of the mining sites would be conducted in accordance with BLM guidelines, the natural topography of the land would be significantly altered.

The types of impacts from geologic hazards resulting from Alternative 2 would be the same as those described for Alternative 1 in Section 4.2.1.1.

4.2.2.2 Mining Resources

Approximately 126 million tons of aggregate would be generated and transported off site for use. For the reasons noted for Alternative 1, access to other mineral resources would be precluded. Therefore, the impact to mining resources would not be significant.

4.2.2.3 Soils

Alternative 2 would impact the soil resources in the project area. Approximately 221 acres would be disturbed by mining operations, access roads, ancillary facilities, and other miscellaneous project components and activities. The types of impacts to soils under Alternative 2 would be the same as those described for Alternative 1 in Section 4.2.1.3.

4.2.3 Alternative 3 (Sale of South Site Only)

4.2.3.1 Geology

Direct impacts of Alternative 3 on geologic and mineral resources would include the generation of approximately 74 million tons of aggregate and approximately 7.4 million tons of waste rock. The South Site pit mine under Alternative 3 would result in the permanent alteration of the landscape and disturbance of approximately 63 acres. This disturbance includes unreclaimed areas disturbed by the open pit and reclaimed waste rock disposal areas.

The construction of ancillary facilities such as access roads, water pipelines, and utility corridors would disturb approximately 64 acres. The types of impacts resulting from construction and operation of the ancillary facilities would be the same as those described for Alternative 1 in Section 4.2.1.1.

The natural topographic and geomorphic features in the open pit mine area would be permanently changed. The completion of the South Site pit mine would result in a noticeable topographic change in the immediate area of the project. The elevation of the mine site would decrease from 3,214 feet above mean sea level to 2,500 feet above mean sea level after 20 years of mining operations. Alternative 3 would substantially alter the topography beyond that resulting from natural erosion and deposition. Therefore, the impact to topography would be significant. Although reclamation of the mining site would be conducted in accordance with BLM guidelines, the natural topography of the land would be significantly altered.

The types of impacts from geologic hazards resulting from Alternative 3 would be the same as those described for Alternative 1 in Section 4.2.1.1.

4.2.3.2 Mining Resources

Approximately 19 million tons of aggregate would be generated and transported off site for use. The proposed project would not affect access to other mineral resources. Therefore, the impact to mining resources would not be significant.

4.2.3.3 Soils

Alternative 3 would impact the soil resources in the project area. Approximately 127 acres would be disturbed by mining operations, access roads, ancillary facilities, and other miscellaneous project

components and activities. The types of impacts to soils under Alternative 3 would be the same as those described for Alternative 1 in Section 4.2.1.3.

4.2.4 Alternative 4 (Single Sale of North Site and South Site)

4.2.4.1 Geology

The impacts to topography and geologic hazards resulting from Alternative 4 would be the same as those described for Alternative 1 in Section 4.2.1.1.

4.2.4.2 Mining Resources

The impacts to mining resources resulting from Alternative 4 would be the same as those described for Alternative 1 in Section 4.2.1.1.

4.2.4.3 Soils

The impacts to soils resulting from Alternative 4 would be the same as those described for Alternative 1 in Section 4.2.1.1.

4.2.5 Alternative 5 (No Action Alternative)

4.2.5.1 Geology

Under the No Action Alternative, the open pit mine(s) would not be developed, and the potential impacts to topography and geologic hazards from mining operations would not occur. The topography would be unchanged. However, aggregate materials needed to sustain growth and development in the region would not be provided from this mining source.

4.2.5.2 Mining Resources

Under the No Action Alternative, the open pit mine(s) would not be developed, and the mineral resources available at the site would not be extracted and made available for public use. The aggregate materials needed to sustain growth and development in the region would not be provided from this mining source, but there would be no loss of availability that would preclude future extraction. There would be no impact.

4.2.5.3 Soils

Under the No Action Alternative, the open pit mine(s) and ancillary facilities would not be developed. Therefore, no impacts to soils would occur.

4.2.6 Mitigation Measures

ER 1 To minimize or avoid potential hazards from earthquakes and other geologic events, the successful applicant(s) will have inspections performed by a BLM-approved appropriate professional (e.g., geologist, geophysicist, geologic engineer, or structural engineer) following geologic events in the vicinity of the Proposed Action area. The appropriate professional will perform the inspection and make recommendations to ensure that hazards are minimized for the next event. The successful applicant(s) will implement the recommended corrective actions.

ER2 The successful applicant(s) shall acquire the appropriate insurance coverage to address potential offsite damage to structures or injury to people from blasting activities or by facility structures that are moved off site by a geologic event such as an earthquake or flash flood.

4.3 BIOLOGICAL RESOURCES

This section describes the potential impacts from the construction, operation, and maintenance of the Proposed Action and alternatives related to vegetation, wildlife, federal and state protected species, and invasive species.

NEPA provides guidance regarding the significance of actions that would adversely affect an endangered or threatened species or its critical habitat (40 CFR 1508.27(b)(9), or that would threaten a violation of federal law imposed for the protection of the environment (40 CFR 1508.27(b)(10). The significance of impacts associated with implementation of an alternative is based on the extent to which such impacts would:

- Create loss of habitat, resulting in exceeding carrying capacities of wildlife populations, resulting in negative impacts to habitats
- Result in loss of special or unique wildlife habitat
- Jeopardize the continued existence of a species or result in destruction or adverse modification of critical habitat (40 CFR 1508.27(b)(9), ESA-16 USC 1531, et seq.)
- Result in a potential violation of federal law imposed for the protection of the environment (40 CFR 1508.27(b)(10)

The region identified for determining direct and indirect impacts to biological resources is Clark County. Although it consists of a variety of vegetation community types, Clark County was selected for the analysis to adequately address wildlife corridors and habitat connectivity.

4.3.1 Alternative 1 (Two Independent Mineral Material Sales)

Under Alternative 1, BLM would sell the mineral material rights of the North Site and South Site to two separate mining companies. The sales would total 640 acres over 10 years, with options for renewal at 10-year intervals.

4.3.1.1 Vegetation

Plant Communities

Mining activities would affect vegetation communities, and impacts would include the loss of or damage to individual plants and the seed bank, grading and compacting native soil, and permanent loss of habitat. Approximately 341 acres of vegetation would be directly impacted by mining activities and associated facilities. Of the 341 acres of vegetation that would be impacted, approximately 136 acres would be restored and revegetated during the reclamation phase of the mine. Approximately 205 acres of vegetation within the open pit mines would be permanently lost.

The majority of the vegetation that would be cleared is Mojave Creosote Scrub habitat. Although Mojave Creosote Scrub habitats continue to undergo adverse impacts of conversion, loss, fragmentation, and quality, this habitat type remains relatively abundant in the region of influence; therefore, the impact to this vegetation type from Alternative 1 would be considered minor. Desert Wash Scrub habitat would not be cleared under Alternative 1.

Indirect impacts on vegetation at and adjacent to the proposed mine sites and ancillary facilities include increased human presence that could lead to unauthorized vehicle use off-road, potential illegal dumping, and illegal collection of plants.

During initial site preparation, topsoil and subsoil would be removed within the mineral extraction boundary and stockpiled for use in reclamation. Removal of the soil would impact the native seed bank within the area. Once mining activities cease, topsoil would be replaced; however, it is unlikely that the seed bank would remain viable after 20 to 30 years of mine operation.

Alternative 1 would result in long-term, localized but moderate impacts to vegetation in the Proposed Action area.

Cacti, Yucca, and Evergreen Trees

Alternative 1 would disturb a large number of cacti and yuccas. Nevada State Law (NRS 527.060–.120) protects evergreen trees, any species in the Cactaceae family, and members of the genus *Yucca*. Clearing and grading of the site during initial site preparation would impact cacti and yucca species that occur in the Proposed Action area. Approximately 6,000 cacti and yucca plants would be removed or destroyed under this alternative. Cacti and yucca are considered government property and are regulated under the

Nevada BLM forestry program (43 CFR 5400). The successful applicant would be required to develop a restoration plan as part of the construction, operation, and maintenance plan that includes the salvage and use of cacti and yucca impacted by this project. As mitigation for impacts to cacti and yucca, the successful applicant will be required to coordinate with the BLM botanist to:

- Salvage, replant, and maintain cacti and yucca off site in an area designated by BLM;
- Salvage, transport, and maintain cactus and yucca at a BLM designated stockpile; or
- Provide funding for BLM to hold a public sale that will remove cactus and yucca from the project area.

Implementation of Alternative 1 would have a moderate, localized, long-term impact on cacti and yucca species. No evergreen trees occur in the Proposed Action area; therefore, there would be no impacts to these species from implementation of Alternative 1.

Noxious Weeds

Implementation of Alternative 1 would include the clearing of lands capable of supporting vegetation native to the project area. Land that has been graded and cleared is vulnerable to noxious weed establishment and spread. Approximately 30 acres within the northeastern portion of the Proposed Action area is already disturbed and currently contains ruderal vegetation. This disturbed land could present a potential source for noxious weed establishment and spread. Native vegetation left alone can usually compete with noxious weeds. However, vehicles that may transport seeds of noxious weeds to the Proposed Action area can give these weeds a competitive edge over native vegetation by depositing seeds where they would not naturally occur. Seeds can be easily introduced into these areas via construction vehicles that have been in other areas where noxious weeds are present.

Indirect impacts on vegetation may occur after project construction and implementation of the vegetation reclamation plan through natural processes and by increased human access and use of the area. The construction and operation activities associated with this alternative could introduce noxious weeds into the surrounding vegetation communities. Adverse impacts that could occur from the introduction and spread of noxious weeds include:

- Decrease in biological diversity of native ecosystems
- Reduction in water quality and availability for native wildlife species
- Decrease in the quality of habitats for native wildlife
- Alterations in habitats needed by threatened and endangered species
- Increased direct and indirect competition with native species

- Health hazards, because some species are poisonous to humans, wildlife, and livestock
- Increased potential for wildfires and spread of wildfires

Implementation of mitigation measures can substantially reduce the likelihood of noxious weed introductions (Section 4.3.6). Therefore, with the implementation of these mitigation measures, the above-mentioned impacts associated with noxious weeds are not likely to occur.

Threatened, Endangered, and Other Sensitive Plant Species

Implementation of Alternative 1 would result in direct and indirect impacts on special status plant species. Direct impacts would include the temporary loss of approximately 2 acres of potential rosy two-tone beardtongue habitat as a result of the mining activities. Loss of potential habitat for special status plant species considered in this section is shown in Table 4.3-1.

Table 4.3-1
Loss of Potential Habitat for Special Status Plant Species (Alternative 1)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Las Vegas bearpoppy (*Actomecon californica*)	0	0	0
Rosy two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor*)	2	0	2

Indirect impacts on special status plant species at and adjacent to the Proposed Action area include increased human presence that could lead to unauthorized vehicle use off-road, potential illegal dumping, and illegal collection of plants. Increased dust from mining activities could also impact special status plant species by covering leaves and reducing the plants' ability to respire, photosynthesize, and transpire. This could lead to stunted plant growth in the immediate vicinity of the Proposed Action area where dust concentrations would be highest, or potentially cause some plants to die.

Implementation of Alternative 1 would result in moderate, localized, long-term impacts to potential rosy two-tone beardtongue habitat.

4.3.1.2 Wildlife

Mining activities associated with Alternative 1 would cause long-term disturbance to wildlife and wildlife habitat in the Proposed Action area. During initial site preparation, clearing and grading activities would result in some level of injury, mortality, and adverse consequences of displacement to wildlife, particularly small mammals and reptiles that are not mobile enough to evade construction operations, and destruction of habitat. Larger, more mobile wildlife species would avoid the initial clearing activity and subsequently use adjacent areas on a temporary or short-term basis. Individuals of certain species would

disperse outside the Proposed Action area. Displacement would result in a slight population increase adjacent to the Proposed Action area, which may result in increased competition for resources between individuals until a stable carrying capacity is eventually established.

Wildlife habitat in the footprint of the mine would be permanently removed (approximately 205 acres). An additional 136 acres of wildlife habitat would be disturbed during construction and operation of the mines for access roads, utilities, and ancillary facilities. The Proposed Action area would be enclosed with a fence to prevent entry of unauthorized persons and to protect animals from wandering into harm's way. This would result in fragmentation of approximately 640 acres of wildlife habitat from adjacent areas. For most species resident to the Proposed Action area, unavailability of the 640 acres would result in inter-specific and intra-specific competition for nearby resources. For example, displaced individuals of smaller species are forced into adjacent habitats already occupied by their neighbors. The result is competition for limited resources, which may affect an individual's survival and reproductive contribution to the local population. Mortality and birth rates may fluctuate until populations of the various species attain new levels reflective of what habitat adjacent to the mines can support. The resultant population size and distribution of wildlife species in adjacent habitat would be expected to decline or remain somewhat static compared to the preconstruction environment. Wildlife species requiring landscape-level environments may respond differently, especially if the large areas required to meet a species' needs are no longer met because of other habitat availability pressures acting concurrently elsewhere within the affected species range. Impacts to wildlife habitat and population levels from the implementation of Alternative 1 would be minor and long term.

Increased noise, dust levels, and human activity during mining operations would potentially disrupt normal foraging and breeding behavior of wildlife species adjacent to the construction area. However, these impacts would be localized and would last only for the duration of the mining operations. Existing sources of noise in the Proposed Action area include recreational activities (such as OHV use and target shooting), automobile traffic, operation of heavy machinery, and other activities associated with nearby sand and gravel operations. Project-related noise would substantially differ from the existing conditions only when blasting is implemented. Outside of blasting, wildlife residing outside of the project boundary fence would not be subject to significant increases in noise and vibration. Therefore, noise impacts to wildlife would be minor, localized, and short-term.

Migratory Birds

Construction and operation of the mine sites would have direct and indirect impacts on migratory bird populations. Due to the highly mobile nature of migratory birds, mortality of migratory birds is not likely to occur as a result of Alternative 1. The successful mining applicants would be required to comply with the Migratory Bird Treaty Act of 1918, which prohibits the destruction of migratory birds, their nests, eggs, or young. Therefore, impacts to migratory birds during the breeding season would not be permitted and there would be no direct impacts to migratory bird young or eggs from implementation of

Alternative 1. However, construction of new overhead electrical lines would result in an increased risk of migratory bird mortality from collisions with overhead electrical lines. Implementation of Alternative 1 would also result in the direct loss of potential nesting and foraging habitat. Migratory birds would be forced to seek out suitable nesting and foraging sites in nearby areas. Approximately 205 acres of potential habitat would be permanently lost, and an additional 136 acres would be temporarily lost for the 10- to 30-year life of the mines. The direct loss of habitat from the development of the mines would be moderate, localized, and long-term. Alternative 1 would not have significant impacts on migratory bird populations.

Indirect impacts would include increased human use and recreation of areas adjacent to the Proposed Action area due to the increase in accessibility provided by a new access road. Indirect impacts would be minor and long-term and would not have a significant effect on migratory bird populations.

Bald and Golden Eagle

Implementation of Alternative 1 would have direct and indirect impacts on bald and golden eagles. Direct impacts would include the permanent loss of 205 acres of potential foraging habitat and the temporary loss of 136 acres of potential foraging habitat.

Indirect impacts would include increased human use and recreation of areas adjacent to the Proposed Action area due to increased accessibility.

Alternative 1 would have negligible, localized, long-term impacts to bald and golden eagles in the Proposed Action area.

Threatened, Endangered, and Other Sensitive Wildlife Species

Threatened, endangered, and other sensitive wildlife species would be directly and indirectly impacted from the implementation of Alternative 1. Direct impacts would include the permanent and temporary loss of suitable habitat as a result of mining activities. Loss of potential habitat for each special status species considered in this section is shown in Table 4.3-2.

Table 4.3-2
Loss of Potential Habitat for Special Status Wildlife Species (Alternative 1)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Desert tortoise (*Gopherus agassizii*)	443	205	648
Western burrowing owl (*Athene cunicularia hypugea*)	136	205	341
Peregrine falcon (*Falco peregrinus*)	136	205	341
Banded Gila monster (*Heloderma suspectum cinctum*)	136	205	341
Chuckwalla (*Sauromalus obesus*)	136	205	341
Desert bighorn sheep (*Ovis canadensis nelsoni*)	443	205	648

Desert Tortoise. The Proposed Action area is estimated to contain a moderate to high density of desert tortoises. Desert tortoises may be harassed by removal or displacement from the Proposed Action area. Direct impacts on the desert tortoise resulting from mining would include removal of habitat and loss or displacement of habitat features, such as cover and forage. Because desert tortoises are slow-moving animals, some individuals would be unable to move from the path of construction/mining equipment or employee vehicles. Therefore, additional direct impacts may include the crushing and/or loss of individual animals. Alternative 1 would result in the permanent loss of 205 acres of desert tortoise habitat and the temporary loss of 443 acres through conversion of habitat or fragmentation (due to the installation of the project boundary fence). An unknown number of desert tortoises may be injured or killed as a result of Alternative 1; however, mitigation measures are proposed (Section 4.3.6) that would require the successful mining applicants to conduct a desert tortoise clearance prior to the start of any ground-disturbing activities. This will reduce the likelihood that individuals will be injured or killed to less than significant levels. Desert tortoise would not be able to reoccupy undisturbed areas in the Proposed Action area until mining concluded and the boundary fence was removed. After closure of the mines and reclamation, desert tortoises would likely be able to reoccupy the temporary disturbance areas.

Desert tortoises that are removed from the Proposed Action area during clearance surveys would be relocated to nearby suitable habitat, as approved by the USFWS. Indirect impacts from implementation of Alternative 1 would occur at the relocation site from increased competition for resources. Additional indirect impacts could occur in areas adjacent to the Proposed Action area from productivity degradation attributable to various human activities, potential introduction of non-native plant species, increased noise, and increased visitation.

The proposed project would require formal consultation with the USFWS under Section 7 of the ESA. The BLM has prepared and submitted a Biological Assessment for Alternative 1 to initiate this formal consultation process. As a result of this consultation, the USFWS may issue a Biological Opinion that would authorize the take of desert tortoise and/or their habitat and would also specify reasonable and prudent measures and conservation recommendations that would minimize impacts to the desert tortoise. Reasonable and prudent measures would include, at a minimum, a requirement that the successful applicant(s) conduct desert tortoise clearance surveys prior to the initiation of ground-disturbing activities. As part of the conservation recommendations, remuneration fees would also be required for impacts on desert tortoise habitat. Currently, remuneration fees for the desert tortoise are $774 per acre, adjusted annually for inflation. Alternatively, if the USFWS determines that the potential impacts to desert tortoise exceed acceptable levels, they may issue a finding of jeopardy, and the successful applicant(s) would not be authorized to take desert tortoise or their habitat.

With the implementation of the USFWS's reasonable and prudent measures and conservation recommendations, impacts on the desert tortoise would not be significant. Implementation of Alternative 1 would result in moderate, long-term impacts on desert tortoise.

Western Burrowing Owl. The construction and operation of the proposed mines would have direct and indirect impacts on the western burrowing owl. Direct impacts would include loss of habitat during the clearing and grading phase and from construction of access roads, water pipelines, and ancillary facilities. Implementation of Alternative 1 would result in the permanent loss of approximately 205 acres of potential habitat and the temporary loss of approximately 136 acres. Burrowing owls are fairly tolerant of human disturbance and will often breed around the fringes of agricultural, urban, and other developed areas (Neel, 1999). As a result, burrowing owls may continue to occupy areas adjacent to the Proposed Action area at levels commensurate with the current environment. The direct loss of habitat from the implementation of Alternative 1 would represent only a small fraction of the total habitat available in Clark County.

Indirect impacts on western burrowing owls would include increased human use of adjacent areas due to the increase in accessibility provided by new access roads, and changes in the vegetation community. Changes in vegetation may indirectly affect mortality rates and/or reproductive success, or changes in prey distribution and abundance.

Alternative 1 would have moderate, localized, long-term impacts to western burrowing owls in the Proposed Action area.

Peregrine Falcon. Direct impacts that would occur to peregrine falcons as a result of the implementation of Alternative 1 would include the loss of potential foraging habitat. The Proposed Action area does not contain suitable nesting habitat. Peregrine falcons are a very mobile species and would be able to move from the path of construction/mining equipment and employee vehicles prior to being crushed.

Indirect impacts would include increased human use and recreation of areas adjacent to the Proposed Action area due to the increase in accessibility provided by new access roads. Proposed mining operations could also impact prey abundance in the vicinity.

Alternative 1 would have negligible, localized, long-term impacts to peregrine falcons in the Proposed Action area.

Banded Gila Monsters and Chuckwallas. Implementation of Alternative 1 would result in direct and indirect impacts to Gila monsters and chuckwallas in the Proposed Action area. Because Gila monsters and chuckwallas are relatively small animals, slow-moving, and spend a large portion of their lives underground or in shelters, they can be very difficult to detect in their habitat. Gila monsters and chuckwallas are less mobile than larger species of wildlife or birds that can move/fly out of harm's way. Accordingly, implementation of Alternative 1 would result in injury and/or mortality of an unknown number of Gila monsters and chuckwallas. Individuals that are not able to quickly move would be crushed by equipment or employee vehicles. Additionally, there would be a direct loss of habitat resulting from construction of the mines and associated facilities. Implementation of Alternative 1 would result in the permanent loss of approximately 205 acres of potential habitat and the temporary loss of approximately 140 acres. Approximately 295 acres of suitable habitat would be fragmented from adjacent habitat due to the installation of a project boundary fence. Individuals that are not relocated outside of the fence during clearance surveys would be at greater risk for injury or mortality during mining operations.

Indirect impacts on Gila monsters and chuckwallas would include increased human use of the surrounding habitat and potential changes in the vegetation community and predator/prey abundance.

Alternative 1 would have moderate, localized, long-term impacts to Gila monsters and chuckwallas populations in the Proposed Action area. The construction and operation of the mines is not expected to significantly impact populations of either species.

Desert Bighorn Sheep. Implementation of Alternative 1 would have direct and indirect long-term impacts to desert bighorn sheep in the Proposed Action area. Alternative 1 would cause the permanent loss of approximately 205 acres of habitat in rugged terrain. Steep, rocky, and rugged terrain are preferred by desert bighorn sheep because they provide security from predation and protection from human disturbance. This type of escape terrain cannot be reclaimed once the mines have reached the end of their operational life. Alternative 1 would also cause the temporary loss of approximately 443 acres (in addition to the 205 acres that would be permanently lost) of suitable habitat due to the installation of a project boundary fence, which would prohibit movement of bighorn sheep through the Proposed Action area.

The Proposed Action area is within the historical principal movement corridor between the North McCullough Range and the Bird Spring Range. While movement between these two ranges has already been impacted by the construction of I-15, recent data indicate that bighorn sheep have begun to use the

Proposed Action area year-round (Hardenbrook, 2010). Implementation of Alternative 1 would further fragment movement between the two ranges and encroach into existing habitat. Additionally, with the removal of 648 acres of potential habitat, bighorn sheep populations currently using the Proposed Action area would either be forced to use a smaller area or migrate to avoid the impacted habitat. This could result in increased competition with neighboring herds or a reduction in the carrying capacity of the area.

No permanent water sources (e.g., springs or guzzlers) would be destroyed as a result of Alternative 1. Water sources are available in nearby adjacent areas containing escape terrain.

Implementation of Alternative 1 would have moderate, long-term impacts to bighorn sheep populations in the Proposed Action area.

4.3.2 Alternative 2 (Sale of North Site Only)

The impacts on biological resources under Alternative 2 would be similar in nature, but smaller in scale, to those that would occur under Alternative 1.

4.3.2.1 Vegetation

Under Alternative 2, approximately 221 acres of vegetation would be directly impacted by the mine and facilities. Other direct and indirect impacts on vegetation communities would be the same as those described in Section 4.3.1.1.

Approximately 3,900 cacti and yucca plants would be removed or destroyed under this alternative. No evergreen trees occur in the area that would be impacted by Alternative 2; therefore, there would be no impacts to these species.

Direct and indirect impacts on special status plant species would be the same as those described in Section 4.3.1.1. Loss of potential habitat for each special status plant species considered in this section is shown in Table 4.3-3.

Table 4.3-3
Loss of Potential Habitat for Special Status Plant Species (Alternative 2)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Las Vegas bearpoppy (*Actomecon californica*)	0	0	0
Rosy two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor*)	2	0	2

Implementation of Alternative 2 would have a moderate, localized, long-term impact on vegetation.

4.3.2.2 Wildlife

Under Alternative 2, approximately 143 acres of wildlife habitat would be permanently impacted from the construction of the open pit mine. An additional 78 acres of wildlife habitat would be temporarily impacted from construction of the water pipeline, access road and utility corridor, stockpile area, and ancillary facilities. Other direct and indirect impacts on wildlife would be the same as those described in Section 4.3.1.2.

Threatened, endangered, and other sensitive wildlife species would also be directly and indirectly impacted from the implementation of Alternative 2. Direct impacts would include the permanent and temporary loss of suitable habitat as a result of mining activities. Loss of potential habitat for each special status species considered in this section is shown in Table 4.3-4. Other direct and indirect impacts to special status wildlife species would be the same as those described in Section 4.3.1.2.

Table 4.3-4
Loss of Potential Habitat for Special Status Wildlife Species (Alternative 2)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Desert tortoise (*Gopherus agassizii*)	183 143		326
Western burrowing owl (*Athene cunicularia hypugea*)	78 143		221
Peregrine falcon (*Falco peregrinus*)	78 143		221
Banded Gila monster (*Heloderma suspectum cinctum*)	78 143		221
Chuckwalla (*Sauromalus obesus*)	78 143		221
Desert bighorn sheep (*Ovis canadensis nelsoni*)	183 143		326

4.3.3 Alternative 3 (Sale of South Site Only)

The impacts on biological resources under Alternative 3 would be similar in nature, but smaller in scale, to those that would occur under Alternative 1 due to the decreased area that would be mined.

4.3.3.1 Vegetation

Under Alternative 3, approximately 127 acres of vegetation would be directly impacted by the mine and facilities. Other direct and indirect impacts on vegetation communities would be the same as those described in Section 4.3.1.1.

Approximately 2,250 cacti and yucca plants would be removed or destroyed under this alternative. No evergreen trees occur in the area that would be impacted by Alternative 3; therefore, there would be no impacts to those species.

Implementation of Alternative 3 would not result in direct impacts to special status plant species. Indirect impacts on special status plant species would be the same as those described in Section 4.3.1.1.

4.3.3.2 Wildlife

Under Alternative 3, approximately 63 acres of wildlife habitat would be permanently impacted from the construction of the open pit mine. An additional 64 acres of wildlife habitat would be temporarily impacted from construction of the water pipeline, access road and utility corridor, stockpile area, and ancillary facilities. Other direct and indirect impacts on wildlife would be the same as those described in Section 4.3.1.2.

Threatened, endangered, and other sensitive wildlife species would also be directly and indirectly impacted from the implementation of Alternative 3. Direct impacts would include the permanent and temporary loss of suitable habitat as a result of mining activities. Loss of potential habitat for each special status species considered in this section is shown in Table 4.3-5. Other direct and indirect impacts to special status wildlife species would be the same as those described in Section 4.3.1.2.

Table 4.3-5
Loss of Potential Habitat for Special Status Wildlife Species (Alternative 3)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Desert tortoise (*Gopherus agassizii*)	262 63		324
Western burrowing owl (*Athene cunicularia hypugea*)	64 63		127
Peregrine falcon (*Falco peregrinus*)	64 63		127
Banded Gila monster (*Heloderma suspectum cinctum*)	64 63		127
Chuckwalla (*Sauromalus obesus*)	64 63		127
Desert bighorn sheep (*Ovis canadensis nelsoni*)	262 63		324

4.3.4 Alternative 4 (Single Sale of North Site and South Site)

The impacts on biological resources under Alternative 4 would be similar in nature, but smaller in scale, to those that would occur under Alternative 1 due to the decreased area required for access roads, stockpiles, and ancillary facilities.

4.3.4.1 Vegetation

Under Alternative 4, approximately 286 acres of vegetation and wildlife habitat would be directly impacted by the mine and facilities.

Approximately 5,100 cacti and yucca plants would be removed or destroyed under this alternative. No evergreen trees occur in the area that would be impacted by Alternative 4; therefore, there would be no impacts to these species.

Direct and indirect impacts on special status plant species would be the same as those described in Section 4.3.1.1. Loss of potential habitat for each special status plant species considered in this section is shown in Table 4.3-6.

Table 4.3-6
Loss of Potential Habitat for Special Status Plant Species (Alternative 4)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Las Vegas bearpoppy (*Actomecon californica*)	0	0	0
Rosy two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor*)	2	0	2

4.3.4.2 Wildlife

Under Alternative 4, approximately 205 acres of wildlife habitat would be permanently impacted from the construction of the open pit mine. An additional 81 acres of wildlife habitat would be temporarily impacted from construction of the water pipeline, access road and utility corridor, stockpile area, and ancillary facilities. Other direct and indirect impacts on wildlife would be the same as those described in Section 4.3.1.2.

Threatened, endangered, and other sensitive wildlife species would also be directly and indirectly impacted from the implementation of Alternative 4. Direct impacts would include the permanent and temporary loss of suitable habitat as a result of mining activities. Loss of potential habitat for each special status species considered in this section is shown in Table 4.3-7. Other direct and indirect impacts to special status wildlife species would be the same as those described in Section 4.3.1.2.

Table 4.3-7
Loss of Potential Habitat for Special Status Wildlife Species (Alternative 4)

Species	Temporarily Lost Habitat (acres)	Permanently Lost Habitat (acres)	Total Lost Habitat (acres)
Desert tortoise (*Gopherus agassizii*)	441 205		646
Western burrowing owl (*Athene cunicularia hypugea*)	81 205		286
Peregrine falcon (*Falco peregrinus*)	81 205		286
Banded Gila monster (*Heloderma suspectum cinctum*)	81 205		286
Chuckwalla (*Sauromalus obesus*)	81 205		286
Desert bighorn sheep (*Ovis canadensis nelsoni*)	441 205		646

4.3.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, no mineral material contracts would be awarded for the sale of mineral material in the Proposed Action area. A mine would not be constructed in the Sloan Hills site. Therefore, there would be no impacts on biological resources from the No Action Alternative.

4.3.6 Mitigation Measures

Mitigation measures, including a site-specific reclamation plan, would be incorporated into a mineral material sales contract for the successful applicant(s). The reclamation plan will detail the actions required to restore temporarily disturbed areas to as close to a natural state as is possible and practicable. This plan will outline revegetation, wildlife habitat reclamation, and soil stabilization measures. Due to the regionally arid climate, vegetation recovers slowly over several years. Therefore, implementation, monitoring, and success criteria will be established to ensure the successful reclamation of the project area. Monitoring of the restoration areas will continue until the success criteria are achieved. Additional mitigation measures to reduce potential impacts to vegetation that would be incorporated into a mineral material sales contract are listed below.

BR1 Cacti and yucca plants and topsoil will be salvaged from permanently disturbed sites prior to construction. The disposition of this material (stockpiling areas) will be outlined in the reclamation plan. Implementation of reclamation actions will accelerate the recovery of temporarily disturbed areas and improve habitat.

BR2 Mitigation measures proposed for air quality impacts in Section 4.1.9 would reduce impacts to vegetation and wildlife from increased dust and air pollutants as a result of mining activities.

BR3 Use of mechanical or herbicidal methods to control and remove noxious weeds from all areas to be disturbed prior to construction.

BR4 A weed management plan that will inventory and prioritize weed infestations for treatment within the project footprint. If any weeds spread beyond the project footprint, those weeds will need to be treated as a part of the project.

BR5 Washing the undercarriages of construction vehicles prior to working on the project at designated wash stations located off the Proposed Action area.

BR6 To avoid spreading and establishing new populations of noxious weeds, temporarily disturbed areas should be restored to resemble the previous natural setting, including weed treatment as may be prescribed. The area should be monitored for restoration success and for noxious weeds and exotic plants to ensure that establishment of these species does not occur.

BR7 Training construction workers and equipment operators on the identification of weeds to be avoided.

BR8 Limiting the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform the activity safely and as designed. Avoid creating soil conditions that promote weed germination and establishment.

The following mitigation measures would be incorporated into a mineral material sales contract and would minimize potential impacts to wildlife in the Proposed Action area.

BR9 A pre-construction survey will be conducted for migratory birds during nesting and breeding season to minimize impacts from land-clearing operations. If nesting migratory birds are recorded in the mining areas during the pre-construction survey, a protective buffer will be established around the nest and the site will be avoided until the young have fledged.

BR10 To minimize impacts on Gila monster, the successful mining applicants will be required to comply with NDOW's protocols for encountering Gila monster on project sites. These protocols are in Appendix C.

BR11 A desert tortoise worker education program will be presented to all personnel (such as haul truck drivers and equipment delivery drivers) who will be on site or who will enter the site. Personnel will be notified of the reporting protocols for desert tortoises that are located in the Proposed Action area.

BR12 Permanent desert tortoise exclusionary fencing will be installed around the Proposed Action area boundary. An Authorized Desert Tortoise Biologist will be present during the fence construction to monitor.

BR13 An Authorized Desert Tortoise Biologist(s) will conduct a tortoise clearance survey immediately prior to commencement of construction.

BR14 A litter-control program will be enforced to avoid attracting predators.

BR15 A 20 mph speed limit for construction vehicles will be enforced. For unpaved roads, the enforced speed limit will be 15 mph.

BR16 Post-construction habitat restoration will be conducted.

BR17 Remuneration fees will be paid for each acre of surface disturbance.

BR18 During the desert tortoise clearance surveys, biologists will also be required to search for other special status species. If other special status species are encountered, they will be relocated out of harm's way in accordance with state and federal laws.

4.4 WATER RESOURCES

This section describes the potential impacts on surface water and drainage, groundwater, and water quality that may result from the proposed alternatives. For purposes of this EIS, impacts on water resources would be considered significant if implementation any of the alternatives were to result in the following:

- Exposure of people and property to substantial flooding and/or substantial degradation of water quality
- Substantial erosion, scour, or siltation
- Alteration of existing drainages in a manner that could substantially and negatively affect listed and/or sensitive species or habitat
- Substantial decrease in groundwater quality
- Substantial decrease in groundwater resources available to others

4.4.1 Alternative 1 (Two Independent Mineral Material Sales)

Alternative 1 has the potential to impact surface water and drainage, groundwater, water quality, and water supply. Impacts on these resources are described below.

4.4.1.1 Surface Water and Drainage

Alternative 1 would impact surface drainage patterns in the Proposed Action area. Existing natural drainage patterns and pathways would be lost or modified during mining operations across the 640 acres

required for mining operations. While modification of drainage patterns could potentially impact downstream surface waters, including conditions of ephemeral washes, impacts are expected to be minimal. Development requirements in Clark County require the preparation of drainage plans for projects that could change drainage pathways, result in construction of new drainage pathways or control structures, or change runoff and channel flow in downstream areas. Development and implementation of a drainage plan would minimize the impacts of modifying drainage patterns on downstream surface waters.

The successful applicant(s) would be required to conduct a delineation of potentially jurisdictional waters of the U.S. with a significant nexus test prior to the initiation of construction and mining activities to determine whether a permit pursuant to Section 404 of the CWA is required. If USACE asserts jurisdiction, a Section 404 permit will be required for any project impacts that may result in the placement of dredge or fill material into a water of the U.S. Coordination with the USACE would be necessary to determine the appropriate Section 404 permit required for Alternative 1.

Pittman Natural Wash 2 on the southeast side of the Proposed Action area would not be impacted directly by Alternative 1 because it is outside the mineral extraction boundary and ancillary facilities area. Flows to Pittman Natural Wash 2 may be modified or lost as a result of Alternative 1. Water on the sites from rainfall would be retained on site. Impacts on surface water flows are expected to be minimal, and no listed or sensitive species habitat would be negatively affected by changes to the drainage patterns from Alternative 1.

Alternative 1 would not result in increased potential for flooding or flood-related hazards. The proposed mine sites and access roads are not within the 100-year floodplain of any surface water as determined by FEMA.

4.4.1.2 Surface Water Quality

Disturbance of surface soils by construction and mining activities can increase the potential for erosion and transport of soil (sediment) during rainfall/runoff events where surface water runoff crosses the mining areas. Increased soil disturbance associated with construction and mining activities may increase the potential for erosion and transport of soil (sediment) during rainfall/runoff events and suspended sediment loads in the system. However, these impacts are expected to be minimized by implementing the drainage plan, SWPPP that retains rainfall/runoff on site, and BMPs for controlling sedimentation.

There is the potential for accidental spills of contaminants during construction and mining activities that could be transported off site by surface water flows during precipitation events. The potential sources are associated with leakages of fuel or lubricants from vehicles and other machinery. If contaminants are transported off site, they could adversely affect surface water quality in downstream surface waters. Development and implementation of a drainage plan, Hazardous Materials Control Plan, SWPPP that retains rainfall/runoff on site, and BMPs would minimize the potential for transport of contaminants off site during precipitation events.

It is not anticipated that Alternative 1 would lead to increases in the levels of contaminants or dissolved solids in Pittman Natural Wash 2 or in the downstream waters of Pittman Wash, Duck Creek, and eventually Las Vegas Wash. Duck Creek is listed as a 303(d) impaired water for both dissolved solids and selenium. Alternative 1 is not anticipated to adversely impact water quality in downstream surface waters or to increase contaminants or dissolved solids in any 303(d) impaired water.

4.4.1.3 Groundwater Resources

Alternative 1 could impact groundwater recharge by modifying the land surface. Changes in the permeability of the ground surface could locally reduce groundwater infiltration rates. The total area of ground surface to be modified is a small fraction of the total recharge area for the Las Vegas Valley. Additionally, most of the groundwater recharge for the Las Vegas Valley occurs at elevations above 5,000 feet in the adjacent mountain ranges. Less than 15 percent of the rainfall in the valley contributes to recharge at elevations below 5,000 feet (Dettinger, 1989). Therefore, changes to the permeability of the ground surface associated with Alternative 1 would not significantly impact groundwater recharge in the Las Vegas Valley Groundwater Basin.

4.4.1.4 Groundwater Quality

The temporary handling and storage of potential chemical substances and waste products have a slight potential to affect groundwater quality adversely at the plant location should there be a release of these substances to the environment. The potential for groundwater quality degradation is minimal because the climate is arid, which reduces the potential for infiltration of chemicals into the ground; the depths of the groundwater are at least 100 feet, and depth to water in an existing onsite well was 596 feet below land surface; and a Hazardous Materials Control Plan would be developed and implemented.

Alternative 1 could impact groundwater quality in the long term by increasing runoff and by storage of process water in four water recovery ponds. Short-term impacts could also occur by increasing pollutant loading from construction activities. Because of the considerable depth to groundwater, there is little potential for direct surface water recharge to groundwater that could impact groundwater quality; potential pollutants in percolating water would be filtered and retained in the overlying soil and geologic material. A Hazardous Materials Control Plan would be developed and implemented to minimize the potential for spills that could impact groundwater quality.

Construction and use of septic systems on the North Site and South Site have the potential to impact groundwater quality; however, the septic systems would be designed to the specifications of the Southern Nevada Health District if the system is smaller than 3,000 gallons or NDEP if the system is larger than 3,000 gallons. Due to the depth to groundwater, low levels of water infiltration in the arid climate, and the design requirements, there is little potential for impacts to groundwater quality from use of the septic systems. As for surface water recharge, potential pollutants in percolating water would be filtered and retained in the overlying soil. The potential volume of septic effluent reaching groundwater would be

Table 4.4-1
North Site Mine Estimated Water Use Requirements (Alternative 1)

Year after Mining Commences	Aggregate Mining (tons)	Annual Water Use (100 acre-feet/ million tons of mined material)	Annual Water Use(150 acre-feet/ million tons of mined material)	Recycled Water Savings at 150 acre-feet/million tons (85 percent recycled)	Annual Water Use for Dust Suppression and Other Uses (AFY)	Net Annual Water Use (AFY)
1	750,000	75	112.5	96 580		597
2	1,000,000	100 150	128		2	25
3	2,300,000	230	345	293 2		54
4	2,300,000	230	345	293 2		54
5	2,300,000	230 345	293		2	54
6	2,500,000	250	375	319 2		58
7	2,500,000	250	375	319 2		58
8	3,000,000	300 450	383		2	70
9	4,000,000	400	600	510 2		92
10	5,000,000	500 750	638		2	115
11 5,000,00	0	500	750	638 2		115
12 5,000,00	0	500	750	638 2		115
13	5,000,000	500 750	638		2	115
14 5,000,00	0	500	750	638 2		115
15 5,000,00	0	500	750	638 2		115
16	5,000,000	500 750	638		2	115
17 5,000,00	0	500	750	638 2		115
18 5,000,00	0	500	750	638 2		115
19	5,000,000	500 750	638		2	115
20 5,000,00	0	500	750	638 2		115
21	5,000,000	500 750	638		2	115
22 5,000,00	0	500	750	638 2		115
23 5,000,00	0	500	750	638 2		115

Table 4.4-1
North Site Mine Estimated Water Use Requirements (Alternative 1)

Year after Mining Commences	Aggregate Mining (tons)	Annual Water Use (100 acre-feet/ million tons of mined material)	Annual Water Use(150 acre-feet/ million tons of mined material)	Recycled Water Savings at 150 acre-feet/million tons (85 percent recycled)	Annual Water Use for Dust Suppression and Other Uses (AFY)	Net Annual Water Use (AFY)
24	5,000,000	500 750	638		2	115
25 5,000,00	0	500	750	638 2		115
26 5,000,00	0	500	750	638 2		115
27	5,000,000	500 750	638		2	115
28 5,000,00	0	500	750	638 2		115
29	5,000,000	500 750	638		2	115
30 5,000,00	0	500	750	638 2		115
Total	125,650,000	12,565 18,848	16,021		638	3,465

Table 4.4-2
South Site Mine Estimated Water Use Requirements (Alternative 1)

Year after Mining Commences	Aggregate Mining (tons)	Annual Water Use (100 acre-feet/ million tons of mined material)	Annual Water Use (150 acre-feet/ million tons of mined material)	Recycled Water Savings at 150 acre-feet/million tons (85 percent recycled)	Annual Water Use for Dust Suppression and Other Uses (AFY)	Net Annual Water Use (AFY)
1	250,000	25	37.5	32	580	586
2	500,000	50 75	64		2	13
3	750,000	75	112.5	96	2	19
4	1,000,000	100 150	128		2	25
5	2,000,000	200 300	255		2	47
6	3,000,000	300 450	383		2	70
7	3,500,000	350 525	446		2	81
8	4,000,000	400 600	510		2	92
9	4,000,000	400 600	510		2	92
10	5,000,000	500 750	638		2	115
11	5,000,000	500 750	638		2	115
12	5,000,000	500 750	638		2	115
13	5,000,000	500 750	638		2	115
14	5,000,000	500 750	638		2	115
15	5,000,000	500 750	638		2	115
16	5,000,000	500 750	638		2	115
17	5,000,000	500 750	638		2	115
18	5,000,000	500 750	638		2	115
19	5,000,000	500 750	638		2	115
20	5,000,000	500 750	638		2	115
Total	74,000,000	7,400	11,100 9,435		618 2,283	

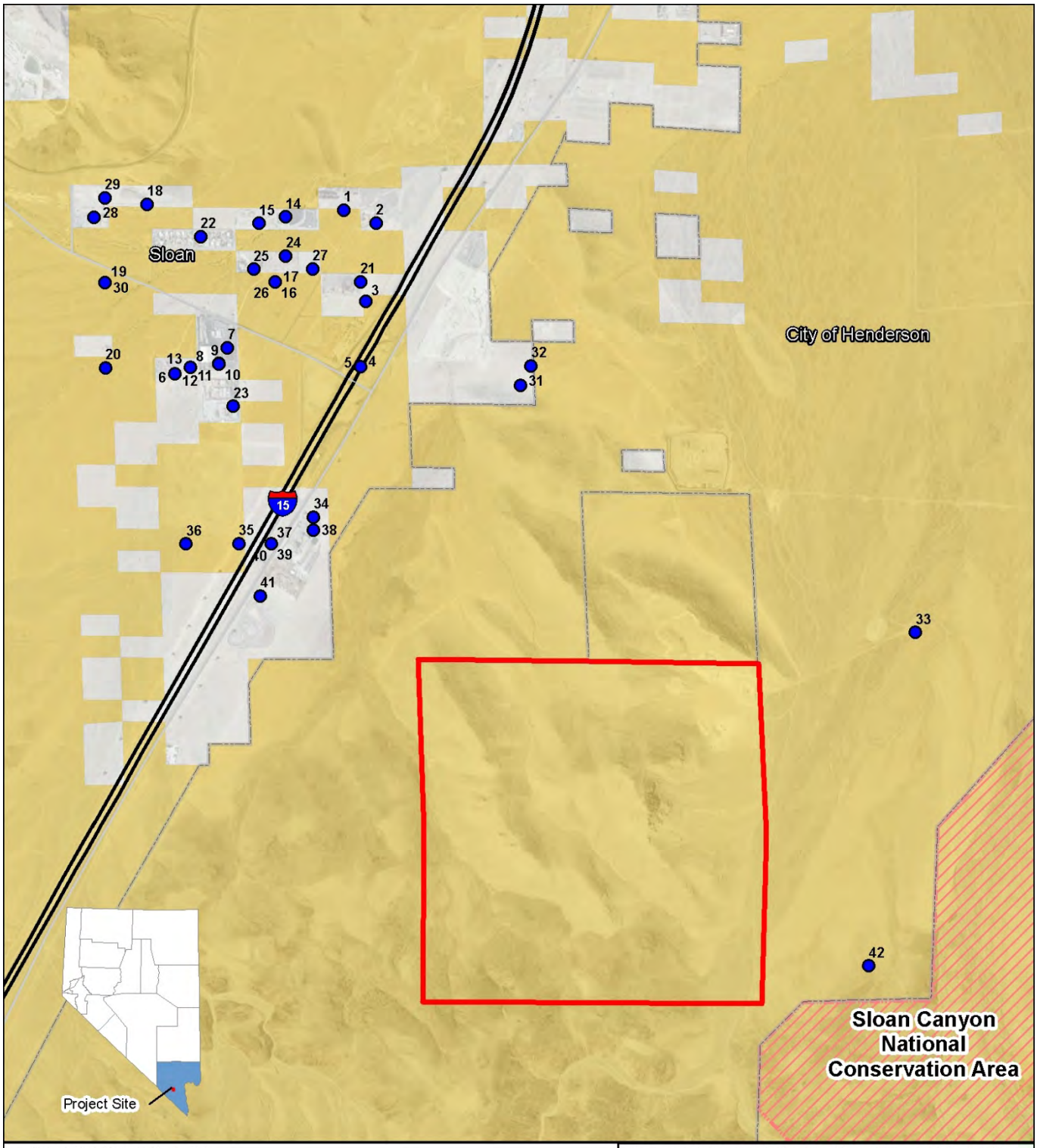
Water for Alternative 1 could be obtained from one of three potential sources: the nearby existing Bernadot well (Nevada Department of Conservation and Natural Resources, Division of Water Resources Log No. 32387 with a water right for industrial use for up to 331.5 AFY [Nevada Department of Conservation and Natural Resources, Division of Water Resources Application No. 47940]), which is approximately 1,500 feet off site to the northeast and has a 331.5 AFY water right; newly constructed onsite water well(s)[5] with permitted point(s) of diversion; or by working with the LVVWD to secure water.

CEMEX currently holds permits from the Nevada Department of Conservation and Natural Resources, Division of Water Resources, to divert approximately 941 AFY of groundwater from the Las Vegas Valley Groundwater Basin and has a Memorandum of Understanding to use the Bernadot well. The Bernadot well water rights are adequate to cover the operational water needs for the North Site, which would be excised if CEMEX is the successful applicant. If CEMEX were not the successful applicant, new wells would need to be drilled on the site and water rights transferred from another point of diversion to the Proposed Action area through a permitted change in the point of diversion or surface water resources; no new water rights are allowed in the Las Vegas Valley Groundwater Basin.

SRP currently holds permits from the Nevada Department of Conservation and Natural Resources, Division of Water Resources, to divert approximately 41 AFY of groundwater from the Las Vegas Valley Groundwater Basin. These are permits that are currently being exercised at another point of diversion and would have to be transferred to this location through a permitted change in the point of diversion. Additional water would be needed to meet the demands of this South Site mine. The successful mining applicant would be required to identify supplemental water sources prior to the start of mining activities.

A review of the well logs indicates that a majority of the wells in the area extract water from limestone, which corresponds to the carbonate aquifer described in Section 3.4.2.1 and are likely within a confined aquifer. Figure 4.4-1 shows the locations of nearby wells for which well log information is available from the Nevada Department of Conservation and Natural Resources, Division of Water Resources and that are located in an area that could be affected by the Proposed Action pumping from a permitted change in the point of diversion. Localized impacts on groundwater levels could occur as a result of Alternative 1. Pumping from wells could lead to a localized increase in the depth to groundwater as a cone of depression develops around the wells. Offsite impacts would vary, depending upon the original point of diversion and where the well(s) are drilled on site.

[5] The onsite well(s) would be located within the ancillary facility site. The actual well location(s) would depend on which mining applicant is selected (which would determine the location of the ancillary facility) and would be based on a geotechnical investigation. For the purposes of analysis, the proposed new well(s) in the South Site were assumed to be in the middle of the South Site.



Proposed Sloan Hills Competitive Mineral Material Sales Environmental Impact Statement

Figure 4.4-1
Nevada Department of Water Resources Well Locations

Prepared by: PBSJ

07/12/2010 | TD | X:\Projects\100011108 Sloan Hills EIS\5.0 Maps_Figures_Drawings\GIS\MXD\Fig-4.4-1_Well_Locations.mxd

Expected Proposed Action process water requirements range from 500 to 750 AFY after the tenth year of operation for both the North Site and South Site, respectively. The lower value (85 percent) of anticipated recycled water use results in a process water demand of 75 to 112.5 AFY.

If CEMEX is the successful applicant for the North Site, the Bernadot well water rights would be used for the Proposed Action and no additional water rights would be needed. Because the point of diversion would not change and there would be no increase in the volume of water being appropriated from the groundwater basin, there would be no groundwater impacts from the Proposed Action in the North Site, beyond what is already permitted. If CEMEX is not the successful applicant, the successful applicant may be allowed to use water from the Bernadot well, but this is not guaranteed. Therefore, a change in point of diversion may be required.

Groundwater used for the South Site would come from new onsite well(s) and a permitted change in point of diversion or the use of surface water. A permitted change in point of diversion or use of surface water would be required regardless of the successful applicant; SRP holds water rights for only 41 AFY of groundwater in the Las Vegas Valley Groundwater Basin.

Changes in point of diversion would result in some localized groundwater effects from the Proposed Action. Additional drawdown in the vicinity of the new well(s) would occur; however, there would also be some groundwater recovery in the vicinity of the old points of diversion. At distance, there would be no groundwater effect because there would be no net increase in the volume of groundwater removed from the Las Vegas Valley Groundwater Basin because no new water rights are allowed in this basin.

The effect of changing the points of diversion to meet Proposed Action demands cannot be accurately assessed because it is unknown where the existing points of diversion are located, and modeling cannot accurately identify the potential effects of changing the point of diversion. Additionally, the surface water resources are not currently available, nor are they guaranteed. Therefore, a worst-case scenario is used for this analysis, which assumes a new water right from a new well located in the center of the North Site (only if CEMEX is not the successful applicant) and a new water right from a new well located in the South Site. The approach of using a new water right to estimate Proposed Action effects provides a worst-case scenario and does not accurately reflect what actual impacts would be, but only serves to provide an estimate of the relative effect associated with the Proposed Action alternatives. If water rights used to meet Proposed Action demands came from one of the wells in the cluster of wells to the northwest of the Proposed Action area, the potential Proposed Action effects on the nearby wells would be offset by reduced pumping from the original point of diversion location (northwest of the Proposed Action area). However, potential effects from changing the point of diversion on the cluster of wells to the northwest of the Proposed Action area would not be greater than the modeled scenario if water rights came from a well located farther away.

To evaluate potential groundwater impacts from the Proposed Action area, an analytical groundwater flow model (AquiferWin32 [Environmental and Water Resource Software, 2004]) was used. A hypothetical new well was assumed to be in the center of the North Site and/or South Site, as applicable. A recycled water system with 85 percent efficiency (75 to 112.5 AFY water supply demand) was used to specify the pumping rate. Thus, the 112.5 AFY needed to support the maximum demands for each site equates to a maximum pumping rate of 70 gallons per minute for each well. Details on the modeling approach and results are in the *Water Resources Technical Support Document for the Sloan Hills Competitive Mineral Material Sales Environmental Impact Statement* (PBS&J, 2010b).

If CEMEX is the successful applicant or if the successful applicant obtains water rights from the Bernadot well, there would be no adverse effect associated with the North Site groundwater use, and modeled drawdown would be 70 feet near the pumped well in the South Site. Predicted drawdown at the existing wells would range from 2 feet at the farthest wells (Figure 4.4-1, Map ID 16-19) to 15 feet at the closest well (Figure 4.4-1, Map ID 42). The changes in available drawdown in the existing wells ranged from 0.4 to 6.7 percent of available drawdown. Because the well locations are not precise, the actual drawdown experienced in each well may vary, but the change would not be substantial and the levels of simulated drawdown are not considered to be adverse because they represent a very small percentage of the available drawdown in the wells. Furthermore, as noted above, the pumped water would be offset by diminished pumping elsewhere, so the actual groundwater drawdown would be much less than the modeling simulation shows, and there would be an increase in groundwater levels in places near the existing points of diversion.

Water required for dust suppression depends upon the Proposed Action phase. During the site clearing and preparation phase, up to 580.5 AF of water would be required for dust suppression (PBS&J 2010b). If groundwater is used for dust suppression, site preparation would require 4.16 times more groundwater than the maximum operational requirement of 112.5 AFY. Because no processing would occur during the site preparation, recycled water would not be available for dust suppression but groundwater would not be required for processing. Groundwater pumping for dust suppression could result in temporary (limited to 1 year of site preparation activities) localized adverse effects on the groundwater table. Similar to operational pumping effects, pumped water for site preparation dust suppression would be offset by diminished pumping elsewhere and, at distance, there would be no groundwater effect because there would be no net increase in the volume of groundwater removed from the Las Vegas Valley Groundwater Basin because no new water rights are allowed in this basin. During operation, about 1.8 AFY would be required for dust suppression. Dust suppression water cannot be recycled; however, recycled water can be used for dust suppression. As such, during operation of Alternative 1, recycled water would be used on site to control dust emissions, and dust suppression water requirements would not adversely affect groundwater levels.

If CEMEX is the successful applicant, sufficient water rights in the Las Vegas Valley Groundwater Basin would exist to fulfill site preparation requirements for dust suppression; however a change in point of

diversion for 282 AFY would be required because the Bernadot well water rights are not sufficient to meet site preparation dust suppression pumping requirements. If CEMEX is not the successful applicant, site preparation dust suppression groundwater requirements would require a change in point of diversion by 282 AFY to 580.5 AFY for 1 year.

4.4.2 Alternative 2 (Sale of North Site Only)

Impacts on water resources from Alternative 2 would be similar to those described for Alternative 1 (Section 4.4.1); however, the scope of the impacts would decrease because only the North Site would be developed and operated.

4.4.2.1 Surface Water and Drainage

Impacts on surface water and drainage for Alternative 2 would be similar in nature to those described for Alternative 1 (Section 4.4.1.1). The scope of impacts would decrease as only 320 acres, rather than 640 acres, would be impacted by mining operations.

4.4.2.2 Surface Water Quality

Impacts on surface water quality would be similar to those described for Alternative 1 (Section 4.4.1.2). The level of impacts would decrease because only 320 acres, rather than 640 acres, would be impacted by mining operations.

4.4.2.3 Groundwater Resources

Impacts on groundwater resources would be similar to those described for Alternative 1 in Section 4.4.1.3. The level of impacts would decrease because only 320 acres, rather than 640 acres, would be impacted by mining operations.

4.4.2.4 Groundwater Quality

Impacts on groundwater quality from Alternative 2 would be similar to those described for Alternative 1 in Section 4.4.1.4. The level of impacts would decrease because only one mine would be in operation and there would be only one set of ancillary facilities.

4.4.2.5 Water Use

Impacts on water supply from Alternative 2 would be similar to those described for Alternative 1 in Section 4.4.1.5. The impacts would be less because water use requirements would decrease. Between 2,523 and 3,465 AFY of water would be needed over the life of the mine under Alternative 2. Water use requirements would be the same as shown in Table 4.4-1.

If CEMEX is the successful applicant, or if the successful applicant uses the Bernadot well to meet water demands, the Proposed Action would have no effect on groundwater supplies and groundwater levels

beyond what is currently permitted; the Bernadot well water right is sufficient to meet all Proposed Action demands. No change in point of diversion would be required, and impacts would be less than for Alternative 1.

Similar to Alternative 1, worst-case groundwater modeling was conducted, but only for a new North Site well pumping, if CEMEX is not the successful applicant, or if the successful applicant does not use the Bernadot well. Groundwater modeling for this scenario indicates that drawdown near the North Site well would be 70 feet (PBS&J 2010b). Predicted drawdown at the existing wells would range from 3 feet at the farthest wells (Figure 4.4-1, Map ID 19) to 15 feet at the closest well (Figure 4.4-1, Map ID 34), which is less than Alternative 1 without the Bernadot well water rights, but is greater than Alternative 1 if CEMEX is the successful applicant. Changes in drawdown in the existing wells ranged from 0.7 to 10 percent of available drawdown. Similar to Alternative 1, because the well locations are not precise, the actual drawdown experienced in each well may vary, and drawdown in the Proposed Action area would be offset by diminished pumping elsewhere. Similar to Alternative 1 with the Bernadot well water rights, there would be no adverse effect on groundwater levels and water supplies because the maximum drawdown in existing offsite wells would be small compared to the available drawdown.

4.4.3 Alternative 3 (Sale of South Site Only)

Impacts on water resources from Alternative 3 would be similar in nature to those described for Alternative 1 in Section 4.4.1; however, the scope of the impacts would decrease due to only the South Site being developed and operated.

4.4.3.1 Surface Water and Drainage

Impacts on surface water and drainage for Alternative 3 would be similar to those described for Alternative 1 (Section 4.4.1.1). The scope of impacts would decrease because only 320 acres, rather than 640 acres, would be used and the projected life of the mine would decrease from 30 years to 20 years.

4.4.3.2 Surface Water Quality

Impacts on surface water quality from Alternative 3 would be similar to those described for Alternative 1 (Section 4.4.1.2). The level of impacts would decrease because only 320 acres, rather than 640 acres, would be used, and the projected life of the mine would decrease from 30 years to 20 years.

4.4.3.3 Groundwater Resources

Impacts on groundwater resources from Alternative 3 would be similar to those described for Alternative 1 (Section 4.4.1.3). The level of impacts would decrease because only 320 acres, rather than 640 acres, would be used, and the projected life of the mine would decrease from 30 years to 20 years.

4.4.3.4 Groundwater Quality

Impacts on groundwater quality from Alternative 3 would be similar to those described for Alternative 1 in Section 4.4.1.4. The level of impacts would decrease because only one mine would be in operation, there would be only one set of ancillary facilities, and the projected life of the mine would decrease from 30 years to 20 years.

4.4.3.5 Water Use

Impacts on water supply from Alternative 3 would be similar to those described for Alternative 1 in Section 4.4.1.5. The impacts would be less because water use requirements would decrease. Between 1,728 to 2,283 AFY of water would be needed over the life of the mine under Alternative 3. Water use requirements would be the same as shown in Table 4.4-2. Impacts to groundwater levels would be the same as Alternative 1 where CEMEX is the successful North Site applicant, or the successful North Site applicant uses groundwater from the Bernadot well.

4.4.4 Alternative 4 (Single Sale of North Site and South Site)

Impacts on water resources from Alternative 4 would be the same as those described for Alternative 1 (Section 4.4.1).

4.4.4.1 Surface Water and Drainage

Impacts on surface water and drainage from Alternative 4 would be the same as those described for Alternative 1 (Section 4.4.1.1).

4.4.4.2 Surface Water Quality

Impacts on surface water quality from Alternative 4 would be the same as those described for Alternative 1 in Section 4.4.1.2.

4.4.4.3 Groundwater Resources

Impacts on groundwater resources from Alternative 4 would be the same as those described for Alternative 1 (Section 4.4.1.3).

4.4.4.4 Groundwater Quality

Impacts on groundwater quality from Alternative 4 would be the same as those described for Alternative 1 (Section 4.4.1.4).

4.4.4.5 Water Use

Impacts on water supply from Alternative 4 would be similar to those described for Alternative 1 in Section 4.4.1.5. The impacts would be less because water use requirements would decrease. Between

3,299 and 4,631 acre-feet of water would be needed over the life of the mine under Alternative 4. Estimated water use for Alternative 4 is shown in Table 4.4-3.

Similar to Alternative 2, if the Bernadot well is used to meet water supply demands, there would be no operational effect of the Proposed Action on groundwater levels and water supplies beyond what is currently permitted. The 331.5 AFY Bernadot well water rights would be sufficient to meet the anticipated maximum Proposed Action water supply demand of 157.5 AFY (assuming an 85 percent recycled water use efficiency) and 1.8 AFY dust suppression requirements, and no change in point of diversion would be required.

If the Bernadot well is not used to meet Proposed Action operational water supply demands, a change in point of diversion would be required. Similar to Alternative 1, worst-case groundwater modeling was conducted, but only for one new well pumping in the middle of the site. Groundwater modeling for this scenario indicates that drawdown near the new well would be 70 feet (PBS&J, 2010b). Predicted drawdown at the existing wells would range from 4 feet at the farthest wells (Figure 4.4-1, Map ID 19) to 18 feet at the closest well (Figure 4.4-1, Map ID 34), which is less than Alternative 1 without the Bernadot well water rights, but greater than Alternative 1 with the Bernadot well water rights. Changes in drawdown in the existing wells ranged from 0.9 to 12.1 percent of available drawdown. Only two wells were modeled to experience a reduction of more than 10 percent of available drawdown. Similar to Alternative 1, because the well locations are not precise, the actual drawdown experienced in each well may vary, and drawdown in the Proposed Action area vicinity would be offset by diminished pumping elsewhere.

Similar to Alternative 1, a change in point of diversion would be required to meet site preparation dust suppression requirements. As for Alternative 1, this effect would be temporary (1 year).

4.4.5 Alternative 5 (No Action Alternative)

No impacts on water resources would occur as a result of the No Action Alternative.

4.4.5.1 Surface Water and Drainage

No impacts on surface water and drainage would occur as a result of the No Action Alternative because no surface disturbance or changes to the existing drainage patterns would occur.

4.4.5.2 Surface Water Quality

No impacts on surface water quality would occur as a result of the No Action Alternative because no surface disturbance or changes to the existing drainage patterns would occur.

Table 4.4-3
Alternative 4 Mine Site Estimated Water Use Requirements

Year after Mining Commences	Aggregate Mining (tons)	Annual Water Use (100 acre-feet/ million tons of mined material)	Annual Water Use (150 acre-feet/ million tons of mined material)	Recycled Water Savings at 150 acre-feet/million tons (85 percent recycled)	Annual Water Use for Dust Suppression and Other Uses (AFY)	Net Annual Water Use (AFY)
1	1,000,000	100 150	128		580	603
2	1,500,000	150 225	191		2	36
3	3,050,000	305	457.5	389	2	71
4	3,300,000	330 495	421		2	76
5	3,300,000	330 495	421		2	76
6	3,500,000	350 525	446		2	81
7	4,000,000	400 600	510		2	92
8	5,000,000	500 750	638		2	115
9	6,000,000	600 900	765		2	137
10	7,000,000	700	1,050	893	2	160
11	7,000,000	700	1,050	893	2	160
12	7,000,000	700	1,050	893	2	160
13	7,000,000	700	1,050	893	2	160
14	7,000,000	700	1,050	893	2	160
15	7,000,000	700	1,050	893	2	160
16	7,000,000	700	1,050	893	2	160
17	7,000,000	700	1,050	893	2	160
18	7,000,000	700	1,050	893	2	160
19	7,000,000	700	1,050	893	2	160
20	7,000,000	700	1,050	893	2	160
21	7,000,000	700	1,050	893	2	160
22	7,000,000	700	1,050	893	2	160
23	7,000,000	700	1,050	893	2	160

Table 4.4-3
Alternative 4 Mine Site Estimated Water Use Requirements

Year after Mining Commences	Aggregate Mining (tons)	Annual Water Use (100 acre-feet/ million tons of mined material)	Annual Water Use (150 acre-feet/ million tons of mined material)	Recycled Water Savings at 150 acre-feet/million tons (85 percent recycled)	Annual Water Use for Dust Suppression and Other Uses (AFY)	Net Annual Water Use (AFY)
24	7,000,000	0	700	1,050	893	2	160
25	7,000,000	0	700	1,050	893	2	160
26	7,000,000	0	700	1,050	893	2	160
27	7,000,000	0	700	1,050	893	2	160
28	7,000,000	0	700	1,050	893	2	160
29	7,000,000	0	700	1,050	893	2	160
30	7,000,000	0	700	1,050	893	2	160
Total	177,650,000		17,765	26,648	22,651		634	4,631

4.4.5.3 Groundwater Resources

No impacts on groundwater resources would occur as a result of the No Action Alternative.

4.4.5.4 Groundwater Quality

No impacts on groundwater quality would occur from the No Action Alternative.

4.4.5.5 Water Supply

No impacts on water supply would occur from the No Action Alternative because no water would be used for mining activities at the proposed site.

4.4.6 Mitigation Measures

Mitigation measures to minimize or eliminate impacts on water resources would include:

WR1 A drainage plan will be developed and implemented in accordance with Clark County development requirements.

WR2 An SWPPP will be developed and implemented for all construction and mining activities.

WR3 BMPs will be developed and implemented to minimize offsite runoff, erosion, and sediment transport.

WR4 A Hazardous Materials Control Plan will be developed and implemented to minimize the potential for contaminant spills and to set cleanup procedures in the case of a spill.

WR5 Water recycling will be developed to minimize project water use and achieve an 85 to 90 percent recycled water use goal.

WR6 Treated water supplies will be provided if 25 or more workers are used during operations and conveyed in a system built to the standards of the NDEP Bureau of Safe Drinking Water and under permits from the Nevada Department of Conservation and Natural Resources, Division of Water Resources. If fewer than 25 workers are used during operations, a treated water supply conveyed in a system built to the standards of the NDEP Bureau of Safe Drinking Water and under permits from the Nevada Department of Conservation and Natural Resources, Division of Water Resources will be provided; groundwater from the water supply well will be tested and meet all EPA drinking water standards; or, an alternative source of potable water (e.g., bottled water) will be supplied.

WR7 No new groundwater water rights will be allowed; all groundwater use must be through existing water rights or transfers of existing water rights.

WR8 Groundwater modeling will be conducted to accurately determine potential effects on local groundwater levels and supplies once the successful applicant's existing points of diversion and change in point of diversion have been identified. Simulated groundwater drawdown at the offsite well located closest to the Proposed Action area will not exceed 10 percent of the total drawdown.

4.5 CULTURAL RESOURCES

This section describes the anticipated effects on cultural resources of the Proposed Action and the alternatives addressed in Chapter 2. The No Action Alternative describes anticipated future conditions if no alternative is selected. A consideration for evaluating the impacts of a project include "the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP or may cause loss or destruction of significant scientific, cultural, or historic resources" (40 CFR 1508.27(b)(8). The significance of impacts on cultural resources associated with the proposed project is based on the extent to which such impacts would result in:

- Adverse effects to districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP
- Loss or destruction of significant scientific, cultural, or historic resources
- Isolation from or alteration of the property's surrounding environment (setting)
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting

The analysis of the alternatives to affect cultural resources is based on the professional judgment and experience of BLM resource specialists, discussions with other agency resource experts and professionals, previous pedestrian surveys, and literature review. The goal of this section is to disclose, to the greatest extent possible, the effects of each alternative on cultural resources, including Historic Properties. Historic Properties are defined as those cultural resources listed in or eligible for listing in the NRHP. Effects to cultural resources would be considered significant if implementation of any of the alternatives affects the qualities that render a resource eligible for listing in the NRHP. Direct and indirect effects were analyzed for cultural resources in terms of type, duration, and intensity. Effects are considered direct if a resource would be immediately and unavoidably impacted by the ground-disturbing activities associated with project implementation, whereas indirect effects consider the associated effects of ground disturbance such as vibration associated with blasting or other activities. The results are described below.

The APE is generally defined as those areas potentially impacted by the alternatives, as well as areas beyond where construction is planned, to consider both the direct and potential indirect effects of project implementation. The proposed project anticipates mining activities to occur on up to 640 acres of land

generally located 2 miles southeast of Sloan Siding and approximately 16 miles south of Las Vegas (Figure 1.0-1). Based on the recommendations of BLM staff, the APE for the proposed project encompasses an area totaling 1,500 acres, which includes the 640 acres of mineral material for sale. The current APE is based on the APE defined for two previous projects: the Mojave Mineral Project and the Las Vegas Valley Disposal Boundary. These projects were located in the same area as the current Proposed Action; the Mojave Mineral Project is described in BLM Report 5-2434, and the Las Vegas Valley Disposal Boundary is described in BLM Report 5-2467.

Based on the results of an existing literature search and previous pedestrian surveys (2001 and 2002), eight cultural resources have been identified in the APE, and all were thoroughly recorded and determined ineligible for listing in the NRHP (White, 2002). These resources are summarized in Table 4.5-1. Table 4.5-2 shows the effects to each of these resources in relation to the Proposed Action and each of the alternatives.

Table 4.5-1
Previously Recorded Cultural Resources in the Area of Potential Effect

Isolate/Site	1	2	3	4	5	6	7	26CK6482
Type	White Chert Primary Flake	Gray Chert Primary Flake	Tan Chert Primary Flake	Tan Chert Primary Flake	Tan Chert Primary Flake	White Chert Primary Flake	Mining Carin	Historic Rock Walls and Refuse Scatter
Resource Size	2.3 x 5.1 cm	3.5 x 4.6 cm	4.5 x 6.7 cm	2.8 x 5.8 cm	2.5 x 4.3 cm	3.7 x 4.4 cm	3 ft diameter x 3 ft high	35 ft N/S by 40 ft E/W area

Source: Adapted from White, 2002; Table 3, p. 19

Table 4.5-2
Potential Effects to Cultural Resources in the Area of Potential Effect for the Proposed Action and Alternatives

Effects to Recorded Cultural Resources								
	Isolate 1*	Isolate 2*	Isolate 3*	Isolate 4*	Isolate 5*	Isolate 6*	Isolate 7*	Historic Site 26CK6482*
Proposed Action	None	Direct	None	None	Direct	Direct	Direct	Indirect
Alternative 1	None	Direct	None	None	Direct	Direct	Direct	Indirect
Alternative 2	None	Direct	None	None	Direct	None	None	Indirect
Alternative 3	None	None	None	None	None	Direct	Direct	None
Alternative 4	None	Direct	None	None	Direct	Direct	Direct	Indirect
Alternative 5 (No Action)	None	None	None	None	None	None	None	None

* Not eligible for listing in the NRHP

4.5.1 Alternative 1 (Two Independent Mineral Material Sales)

Implementation of Alternative 1 would allow the mineral material sale of two 320-acre parcels. Four cultural resources are located in the 640 acres proposed for sale: Isolates 2, 5, 6, and 7 (Table 4.5-1 and Table 4.5-2). Alternative 1 would not avoid these four cultural resources, and it would have a direct and long-term effect because the purpose of Alternative 1 is to allow for the mining and processing of the formation on which they are located. However, as described above, because these resources have been thoroughly recorded and determined ineligible for listing on the NHRP, Alternative 1 would result in no effects to Historic Properties in the APE.

Ground-disturbing activities associated with the implementation of Alternative 1 are also expected to have no effects on subsurface cultural resources. According to the literature review and the results of the pedestrian survey, no indications of intact cultural deposits were observed except at Historic Site 26CK8642. During the pedestrian survey, trowel probes were intuitively used to determine the presence of visible stratigraphy and/or the deposition of cultural material. These provided negative results except at Historic Site 26CK8642 where two shallow and sparse charcoal lens features were partially excavated (White, 2002). The mountainous topography of the inventory area, alluvial nature of the desert environment, and high disturbance of many adjacent localities render it unlikely that intact cultural deposits are present in the APE.

Implementation of Alternative 1 may have an indirect effect on Historic Site 26CK6482. This resource is composed of several low rock wall remnants and a small trash scatter. Blasting activities may cause vibrations that could shift loosely situated rocks in the low rock walls at the site, causing displacement and possible further collapse. Although this effect may be minor to moderate and long-term to Historic Site 26CK6482, this resource has been recommended ineligible for listing in the NRHP. Therefore, no Historic Properties would be affected by blasting activities in the APE.

One potential water source for both quarries would be the LVVWD proposed Sloan 2745 Zone Reservoir. Under Alternative 1, a second water source for the North Site may be obtained from an existing well located in the northeast corner of the APE. An underground pipeline from this secondary water source leading to the quarry would need to be constructed. Disturbance to intact cultural deposits is not expected.

As a result of these combined activities, four known cultural resources located in both the North Site and the South Site would be directly affected, and one cultural resource may be indirectly affected (Table 4.5-2).

The proposed total build-out of the South Site would not include the wash that is suspected to have been part of the Armijo Branch, so no disturbance should occur to the Armijo Branch of the Old Spanish Trail in this area. Alternative 1 would result in no direct effect to Historic Properties, however, implementation of Alternative 1 may result in a visual impact to the historic trail from mining operations as seen from this segment of the Armijo Branch (Sprowl, 2010).

4.5.2 Alternative 2 (Sale of North Site Only)

Under Alternative 2, only two of the eight known cultural resources located in the APE would be directly affected: Isolates 2 and 5. One cultural resource, Historic Site 26CK6482, may be indirectly affected by blasting activities (Table 4.5-2). The reasons for, and the results of the effects to, cultural resources would be the same as those under Alternative 1. Under Alternative 2, no Historic Properties would be affected.

4.5.3 Alternative 3 (Sale of South Site Only)

Alternative 3 would involve the sale of the South Site only. Mining activities associated with Alternative 3 would occur at a sufficient distance (i.e., more than 1,000 feet) such that Historic Site 26CK6482 would not be indirectly affected by blasting. As shown in Table 4.5-2, Alternative 3 would involve long-term direct effects to cultural resource Isolates 6 and 7. There would be no effects to Historic Properties.

4.5.4 Alternative 4 (Single Sale of North Site and South Site)

Alternative 4 would involve the sale of both the North Site and the South Site to a single mining company. The primary difference between Alternative 4 and Alternative 1 is that only one set of ancillary facilities, utilities, and access roads would be constructed under Alternative 4. These structures would be the same as those discussed under Alternative 2, and would be located within the North Site. The water pipeline from the well in the northeast corner of the APE would also be constructed.

Alternative 4 would result in direct effects to four of the cultural resources located in the APE and possible indirect effects to Historic Site 26CK6482 from blasting (Table 4.5-2). These effects are described above under the other alternatives. Under Alternative 4, no Historic Properties would incur direct or indirect effects as a result of its implementation.

4.5.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, no sale of mineral material would be made by the BLM in the Sloan Hills area. Mining operations would not be implemented; therefore, there would be no effect to cultural resources, including Historic Properties, because the sale would not occur.

4.5.6 Mitigation Measures

Because no Historic Properties would be affected by the Proposed Action or any of the alternatives, and because there is low potential for any aspects of the project to affect intact, subsurface cultural deposits, no mitigation measures relating to cultural resources need to be implemented.

4.5.6.1 Accidental Discovery of Human Remains

The possibility exists that ground-disturbing activities during project implementation may uncover previously unknown buried human remains. If human remains, including disarticulated or cremated remains, are discovered during any phase of construction, federal laws and standards, including the Native American Graves Protection and Repatriation Act and its regulations found at 43 CFR 10, apply. If the remains are found to be Native American as defined by the Act (PL 101-601), the BLM will take the lead in the treatment of said remains and any associated objects by implementing the appropriate agency procedures for compliance with the Act.

4.5.6.2 Accidental Discovery of Cultural Resources

The possibility exists that ground-disturbing activities may uncover obscured or buried and previously unknown cultural resources. If buried cultural resources are discovered during mining, such resources could be damaged or destroyed, resulting in adverse effects to cultural resources. If subsurface cultural resources are discovered during construction, or if evidence of an archaeological site or other suspected historic resources is discovered, it is recommended that all ground-disturbing activity cease within 100 feet of the resource. A professional archaeologist or BLM Cultural Resources Specialist will be consulted to assess the find and to determine whether the resource requires further study. This assessment process may require consultation with the SHPO, tribal groups, and other interested parties. Qualified archeological personnel will assist the Lead Agency by generating measures to protect the discovered resources, which may include input from interested parties. Potentially significant cultural resources could consist of, but not be limited to, stone, bone, fossils, wood, or shell artifacts or features including structural remains, historic dumpsites, and hearths.

No further grading will occur in the area of the discovery until the BLM approves the measures to protect the resources. Any archaeological artifacts recovered as a result of mitigation on federal lands will remain the property of the federal government; this does not apply to Native American burial-related resources, however, because their treatment and disposition is governed by existing laws, including the Native American Graves Protection and Repatriation Act.

Reasonable efforts to avoid, minimize, or mitigate adverse effects to the resources will be determined by the BLM. In consultation with the BLM, SHPO, and Native American tribes with concerns about the property, the Advisory Council on Historic Preservation will be notified within 48 hours in compliance with 36 CFR 800.13(b)(3).

4.6 NATIVE AMERICAN RESOURCES

This section describes the anticipated effects of the project alternatives described in Chapter 2 as they pertain to Native American resources. For the purposes of this EIS, an impact to Native American resources would be considered adverse if it resulted in adverse effects to sites with cultural or religious importance to Native American tribes.

4.6.1 Alternative 1 (Two Independent Mineral Material Sales)

Based on the results of literature review, and pedestrian survey, it is unlikely that the mining activities at the project site would have direct or indirect impacts on local Native American resources. No sacred lands, TCPs, or areas associated with traditional usable resources, such as water and toolstone sources, are present in the Proposed Action area. Rock art is also lacking. Native American occupation and use of the project area generally appears to have been minimal due to its lack of exploitable resources (White, 2002).

4.6.2 Alternative 2 (Sale of North Site Only)

No direct or indirect impacts to Native American resources are expected as a result of Alternative 2.

4.6.3 Alternative 3 (Sale of the South Site Only)

No direct or indirect impacts to Native American resources are expected as a result of Alternative 3.

4.6.4 Alternative 4 (Single Sale of North Site and South Site)

No direct or indirect impacts to Native American resources are expected as a result of Alternative 4.

4.6.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, no sale of mineral material would be made by the BLM at the project site. Mining operations would not be implemented; therefore, there would be no effect to Native American resources because the sale would not occur.

4.6.6 Mitigation Measures

Because no Native American resources would be affected by the Proposed Action or any of the alternatives, no mitigation measures relating to Native American resources need to be implemented.

4.7 LAND USE

Although no specific thresholds of significance are provided by NEPA as related to land use, conflicts with existing or proposed land use or other land use impacts were considered significant if the Proposed Action would result in one or more of the following:

- Substantial conflict with environmental plans and community goals
- Substantial conflict with currently established area uses (such as recreational, religious, educational, or scientific)

- A substantial conversion of agricultural land to non-agricultural use or impairment of the agricultural productivity of agricultural land
- A long-term loss of access to public facilities, businesses, or residences
- Substantial conflict with current uses of existing land
- Substantial conflict with existing utilities and public rights-of-way

4.7.1 Alternative 1 (Two Independent Mineral Material Sales)

Alternative 1 may impact current and future land use plans in the project vicinity. Land use conflicts associated with the interaction between the Proposed Action and future and existing residential and commercial development are likely to occur. The noise, dust, increased traffic, and changes to the visual character of the area associated with Alternative 1 may decrease the attractiveness of the area for residential, commercial, and planned community development.

Existing land use in the project vicinity may be impacted by Alternative 1. Land use conflicts are likely to result from the presence of a mining operation in the vicinity of residential areas. The community nearest to the mine sites is the town of Sloan, located approximately 7,800 feet from the northwest corner of the proposed North Site and about 9,100 feet from the northwest corner of the South Site. Residents of Sloan, as well as more distant communities, may be impacted by increased noise, dust, traffic, and changes to the visual character of the area. Impacts are expected to decrease with distance from the proposed project.

No agricultural lands occur in the project vicinity and therefore would not be impacted by implementation of Alternative 1.

No long-term loss of access to public facilities, businesses, or residences would occur as a result of Alternative 1.

Nine rights-of-way are in the vicinity of the Proposed Action (Table 3.7-1). Of the nine, only two are likely to be impacted by the Proposed Action: the Los Angeles/Salt Lake Railroad right-of-way (Number 3944652) and the Las Vegas Boulevard right-of-way (Number 3946441). Access roads and utilities for the North Site and South Site would begin in the Las Vegas Boulevard right-of-way and, after splitting, would cross the Los Angeles/Salt Lake Railroad right-of-way in two locations. Impacts to the Las Vegas Boulevard right-of-way would include a change within the right-of-way due to the additional turn lane that would be constructed. Temporary construction impacts from the turn lane and access road construction would result in decreased access to the area. Impacts on the Los Angeles/Salt Lake Railroad right-of-way would occur from two crossings of the right-of-way by the site access roads/utilities. Mining activities at the North Site would impact portions of the Los Angeles/Salt Lake Railroad right-of-way in the southwestern portion of Township 23 South, Range 61 East, Section 29. The right-of-way is currently

unoccupied, and impacts to current uses would be minimal. No other rights-of-way would be impacted by the Proposed Action.

Public facilities in the vicinity of the Proposed Action area may be impacted temporarily during construction of access roads utilities. No long-term impacts on existing utilities and public rights-of-way from Alternative 1 are anticipated.

Overall, implementation of Alternative 1 would result in long-term, moderate, but localized impacts to land use in the Proposed Action area.

4.7.2 Alternative 2 (Sale of North Site Only)

Impacts to land use from implementation of Alternative 2 would be similar to those described for Alternative 1. The scope of impacts would decrease because only the North Site would be developed. Impacts on existing and future land use, agricultural lands, and public facilities, businesses, or residences would be the same as described for Alternative 1.

Impacts to existing rights-of-way would be the same as those described for Alternative 1 except that the access road/utilities would cross only the Los Angeles/Salt Lake Railroad right-of-way in one location.

4.7.3 Alternative 3 (Sale of South Site Only)

Impacts to land use from implementation of Alternative 3 would be similar to those described for Alternative 2. Impacts on the Los Angeles/Salt Lake Railroad right-of-way would be the same as for Alternative 2; however, the location where the access road/utilities would cross the right-of-way would change. The other differences in impacts would occur as visual impacts to the Las Vegas Valley would be minimized due to screening from the remaining material north of the South Site. Impacts from mine operations would last only for 20 years under Alternative 3 rather than 30 years for the other alternatives.

4.7.4 Alternative 4 (Single Sale of North Site and South Site)

Impacts on land use from Alternative 4 would be similar to those described for Alternative 1. The one difference in impacts would be from only one access road/utility crossing the Los Angeles/Salt Lake Railroad right-of-way.

4.7.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, land use conflicts associated with interaction between residential development and active mining would not occur. There would be no changes to existing land use or land use plans. There would be no issuance of right-of-way grants, and the proposed mines, utilities, and access roads would not be built; therefore, there would be no impacts to land use from the No Action Alternative.

4.7.6 Mitigation Measures

Mitigation measures to minimize or eliminate impacts on land use would include:

LU1 Reclamation of non-essential areas disturbed during construction would be accomplished in the first appropriate season after construction.

LU2 The successful applicant(s) shall coordinate NDOT, NDEP, Clark County, and any affected businesses regarding access, construction scheduling, and dust control measures to minimize disruptions.

4.8 VISUAL RESOURCES

The BLM VRM Guidelines (BLM, 1986a) and the Visual Resource Contrast Rating (BLM, 1986b) were used to analyze impacts associated with implementation of the Proposed Action and No Action Alternative.

The visual resource classes that have been assigned based on scenic quality, sensitivity level, and delineation of distance zones to the areas in the project vicinity are Class III. Inventory classes provide the basis for considering visual values and are informational (BLM, 1986a).

The objective of Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape can be moderate. Management activities may attract attention but should not dominate the view of the casual observer. As in Class II, changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

NEPA provides no specific thresholds of significance to determine the significance of visual impacts. For purposes of this EIS, impacts to visual resources would be considered significant if any of the following results:

- Substantial obstruction of a scenic vista
- Substantial alteration of scenic resources (e.g., historic buildings or scenic highway)
- Substantial increase in light or glare on surrounding properties
- Conflict with locally adopted scenic, aesthetic, or visual plans and policies (e.g., BLM RMP)

The impacts to visual resources that may result from the construction and operation of the Proposed Action and No Action Alternative are described below.

4.8.1 Visual Simulations

Visual simulations were conducted from three KOPs. These visual simulations were prepared for selected KOPs to provide representative simulations of the effects that the action alternatives would have on the views from critical viewpoints. To create the simulations, photographs were taken from selected locations

at each KOP to provide the clearest view of the landscape that would be affected by an action alternative. A graphic artist then created artistic renderings of the view from each photograph. These renderings were then modified to simulate views from each KOP at 5, 20, and 30 years of mine development. The simulations were conducted for Alternative 1 only, because this alternative would result in the greatest amount of surface disturbance and would be the most visible alternative from the three KOPs.

4.8.2 Visual Contrast Rating

Visual contrast ratings were developed for all the KOPs in accordance with the Visual Resource Contrast Rating (BLM, 1986b). The visual contrast ratings were developed for the final stage of mining under each alternative to capture visual impacts when they would be the greatest. Worksheets used for the visual contrast ratings are in Appendix D. Under the VRM visual contrast rating system, the features of an activity under analysis are categorized as landforms/water, vegetation, or structures. Degree of contrast is then calculated for four basic elements of a landscape (form, line, color, and texture) for each category. Four degrees of contrast are used to rate the landscape elements:

- **None.** The element contrast is not visible or perceived.
- **Weak.** The element contrast can be seen but does not attract attention.
- **Moderate.** The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong.** The element contrast demands attention, would not be overlooked, and is dominant in the landscape.

The action alternatives have features that fall under three categories: landform/water, vegetation, and structures. Features of the action alternatives that are assigned to the landforms/water category are roads, stockpile areas, and open pit mines. Features of the action alternatives assigned to the structures category are the ancillary facilities. Expected visual characteristics of these features are shown in Table 4.8-1. The visual contrast ratings for each alternative were based on these characteristics.

Table 4.8-1
Visual Characteristics of the Action Alternatives

Element	Landform/Water	Vegetation	Structures
Form	Narrow (roads) Conical (stockpile areas) Concave/block (mines)	Smooth/simple	Symmetrical/ rectangular/solid
Line	Curving (roads) Convex (stockpile areas) Bold/concave (mines)	Simple/weak/ irregular	Vertical/horizontal/straight
Color	Dark gray (roads) Browns/ reddish browns/tans (stockpiles and mines)	Browns/greens	Browns and tans
Texture	Smooth/directional (roads) Medium/rough (stockpile areas) Coarse/ordered/directional (mines)	Fine/even/ continuous	Smooth/directional/ clumped

Photographs from KOP 1, KOP 2, and KOP 3 are shown in Figure 4.8-1. Visual simulations at 5, 20, and 30 years of mine development of Alternative 1 from KOP 1 are shown in Figure 4.8-2; visual simulations from KOP 2 are shown in Figure 4.8-3; and visual simulations from KOP 3 are shown in Figure 4.9-4.

KOP 1

KOP 2

KOP 3

Figure 4.8-1
Photographs at KOP 1, KOP 2, and KOP 3 used to create artistic renderings of Alternative 1

Prepared By PBSJ

PROPOSED SLOAN HILLS
COMPETITIVE MINERAL MATERIAL SALES EIS

NATIONAL SYSTEM OF PUBLIC LANDS

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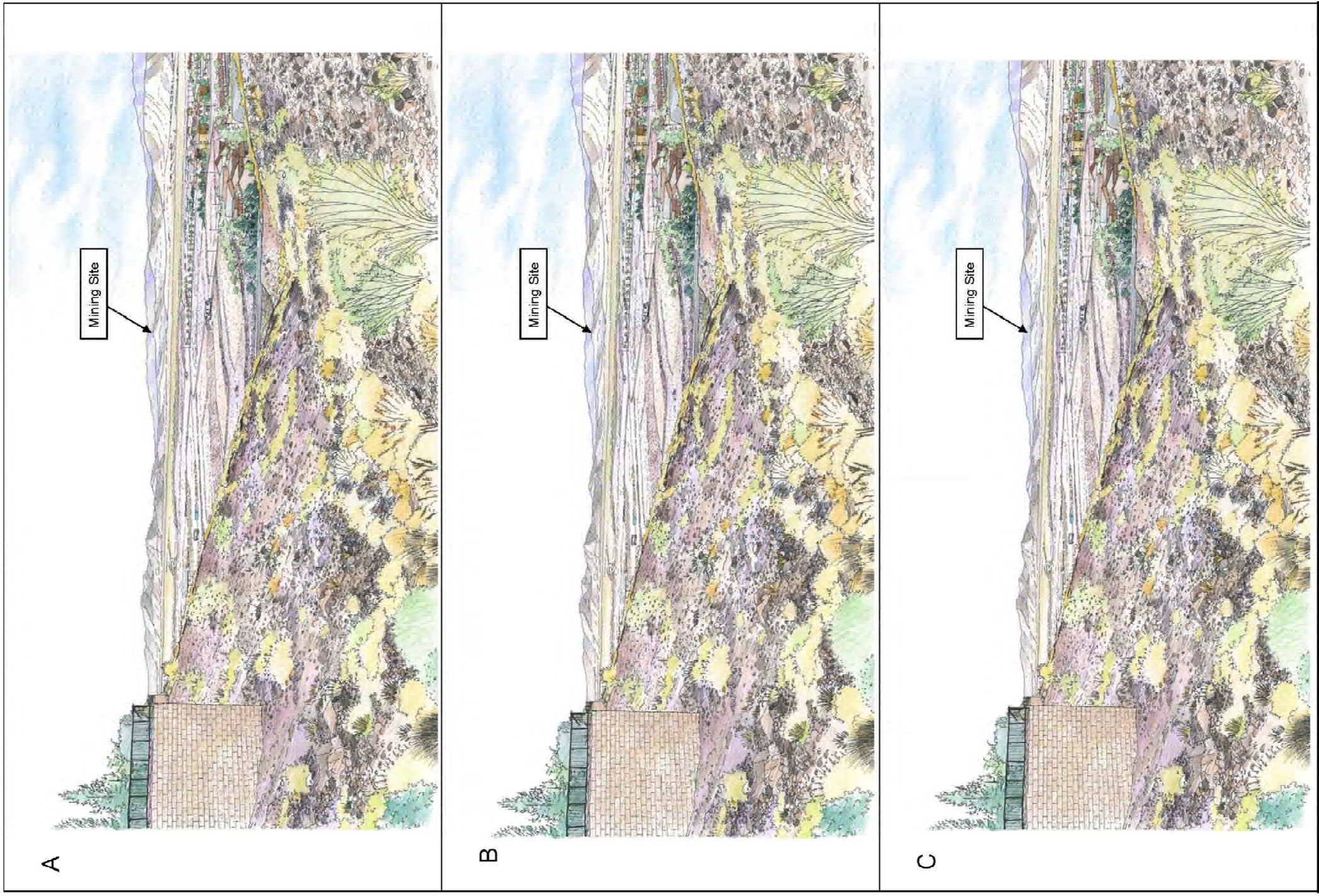

PROPOSED SLOAN HILLS
COMPETITIVE MINERAL MATERIAL SALES EIS

Figure 4.8-2
Visual Simulations of Alternative 1 from Key Observation Point 1 at (A) 5 years of mine development, (B) 20 years of mine development, and (C) 30 years of mine development.

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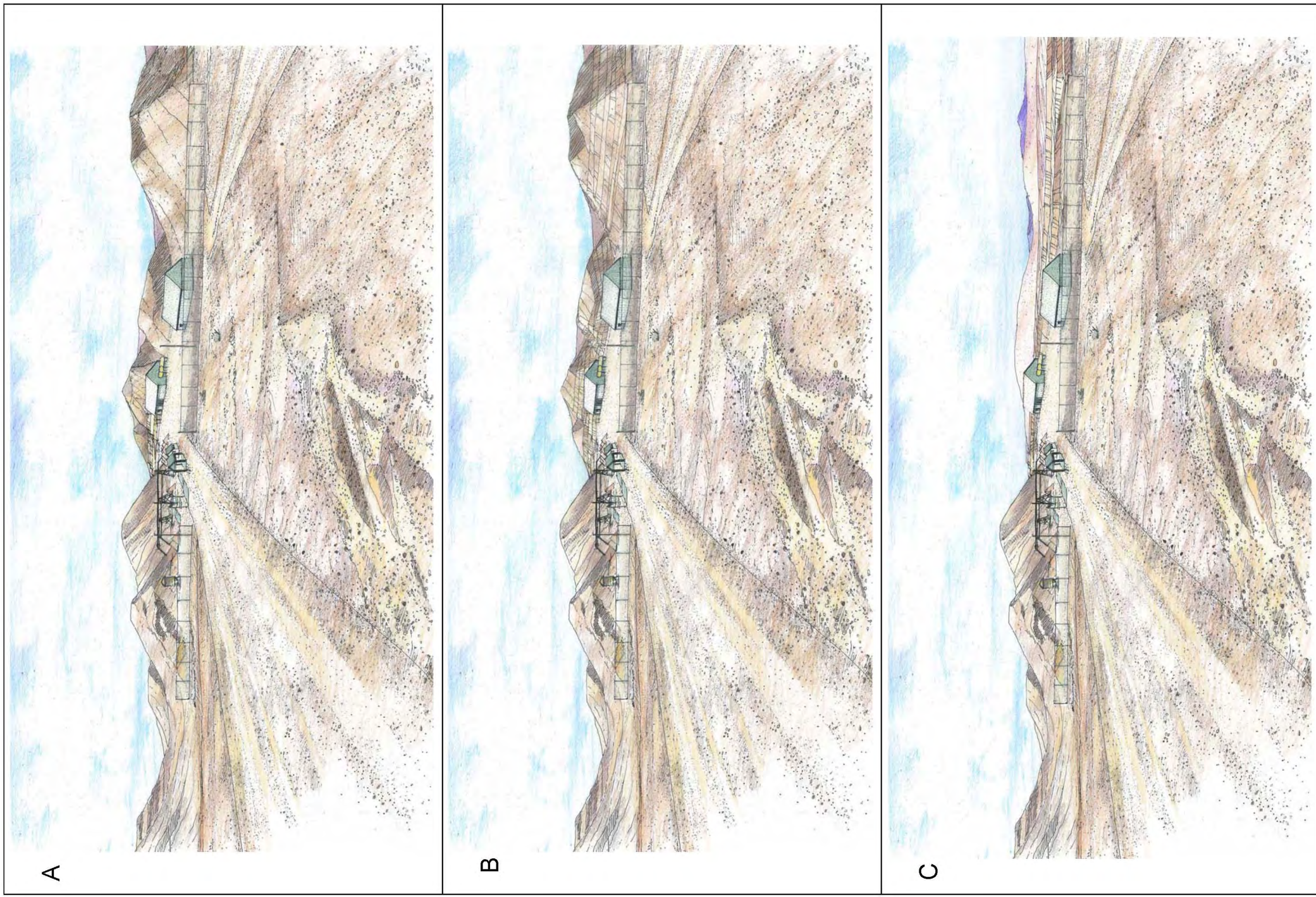

Figure 4.8-3
Visual Simulations of Alternative 1 from Key Observation Point 2 at (A) 5 years of mine development, (B) 20 years of mine development, and (C) 30 years of mine development.

PROPOSED SLOAN HILLS
COMPETITIVE MINERAL MATERIAL SALES EIS

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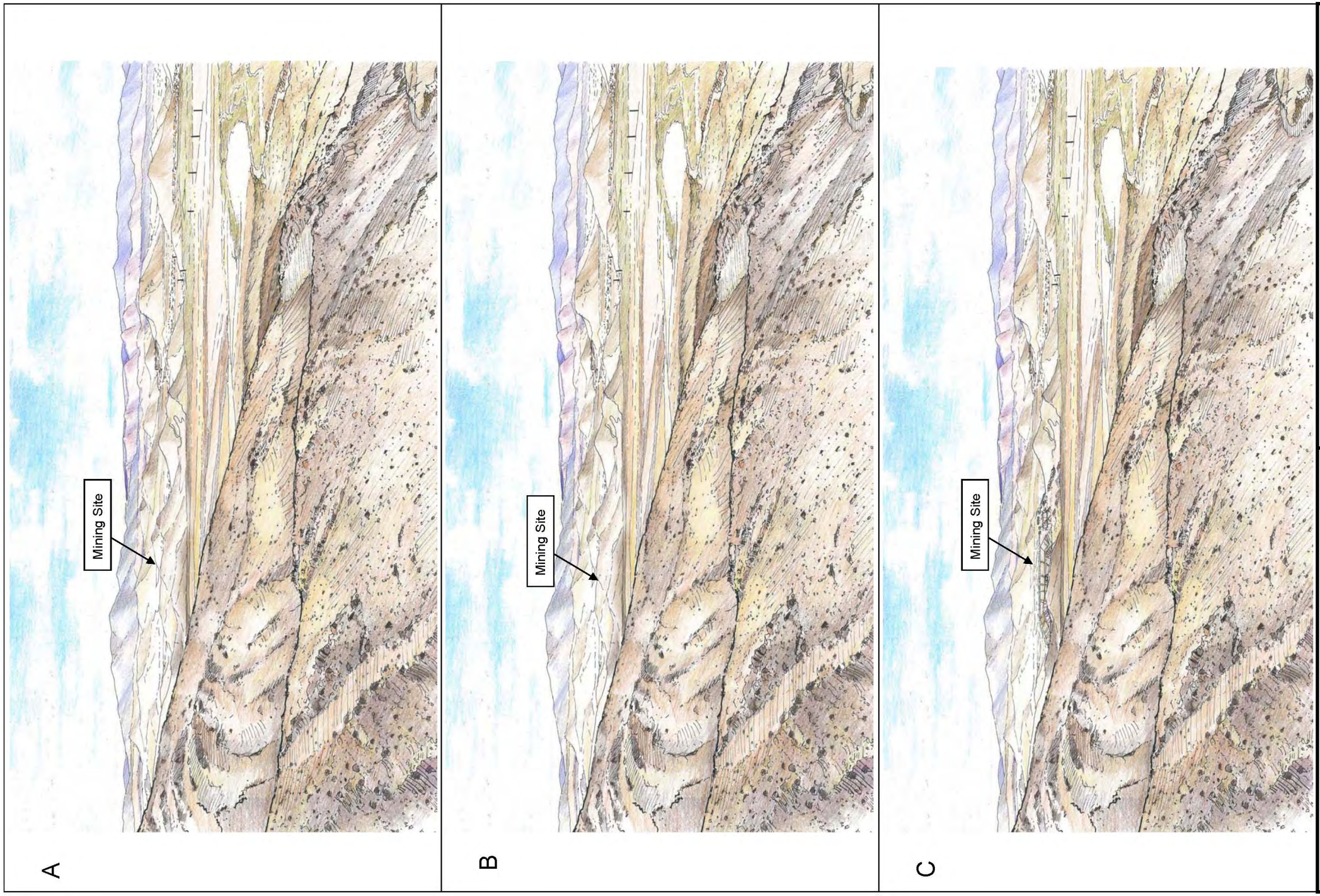

Figure 4.8-4
Visual Simulations of Alternative 1 from Key Observation Point 3 at (A) 5 years of mine development, (B) 20 years of mine development, and (C) 30 years of mine development.

PROPOSED SLOAN HILLS
COMPETITIVE MINERAL MATERIAL SALES EIS

Prepared By PBSJ

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4.8.3 Alternative 1 (Two Independent Mineral Material Sales)

Under Alternative 1, the mountain ridge that runs along the eastern edge of the mineral extraction boundary would be left intact until the final 5 years of mine development. This ridge would obscure the view of the mine sites from the residential communities and KOP 1 to the northeast of the Proposed Action area and from the North McCullough Wilderness Area (KOP 3) to the east of the Proposed Action area until the final years of mine development.

The visual contrast ratings for Alternative 1 for the three KOPs are shown in Table 4.8-2. Based on these ratings, the VRM objectives that apply to the Proposed Action area would not be met. For KOP 2, a strong degree of contrast and a significant change in the landform/water characteristic would be introduced. This strong degree of contrast would be inconsistent with Class III objectives and BLM management directives, which permit only a moderate degree of contrast. Implementation of Alternative 1 would result in a significant impact on the visual resource setting of the area. Effects on the landscape at KOP 1 and KOP 3 would be weak and moderate, respectively.

Table 4.8-2
Visual Contrast Ratings for Alternative 1

KOP	Element	Landform/Water	Vegetation	Structures
1: Seven Hills	Form W	eak	Weak	None
	Line W	eak	Weak	None
	Color	Weak	Weak	None
	Texture	Weak	Weak	None
2: Las Vegas Boulevard	Form Strong		Moderate	Moderate
	Line Mode	rate	Weak	Moderate
	Color	Weak	Moderate	Moderate
	Texture Strong		Weak	Moderate
3: North McCullough Wilderness Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak
4: Battista Lane and Larson Road	Form W	eak	Weak	None
	Line W	eak	Weak	None
	Color	Weak	Weak	None
	Texture	Weak	Weak	None
7: Sloan Canyon National Conservation Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak

4.8.4 Alternative 2 (Sale of North Site Only)

Impacts to visual resources from the implementation of Alternative 2 would be similar to those for Alternative 1. The North Site mine would be developed in a manner similar to Alternative 1 so that the mountain ridge along the eastern edge of the mineral extraction boundary would be left intact until the final 5 years of mine development.

The visual contrast ratings for Alternative 2 for the three KOPs are shown in Table 4.8-3. Based on these ratings, the VRM objectives that apply to the Proposed Action area would not be met. For KOP 2, a strong degree of contrast and a significant change in the landform/water characteristic would be introduced. This strong degree of contrast would be inconsistent with Class III objectives and BLM management directives, which permit only a moderate degree of contrast. Implementation of Alternative 2 would result in a significant impact on the visual resource setting of the area. Effects on the landscape at KOP 1 and KOP 3 would be weak and moderate, respectively.

Table 4.8-3
Visual Contrast Ratings for Alternative 2

KOP	Element	Landform/Water	Vegetation	Structures
1: Seven Hills	Form W	eak	Weak	None
	Line W	eak	Weak	None
	Color	Weak	Weak	None
	Texture	Weak	Weak	None
2: Las Vegas Boulevard	Form Strong		Moderate	Moderate
	Line Mode	rate	Weak	Moderate
	Color	Weak	Moderate	Moderate
	Texture Strong		Weak	Moderate
3: North McCullough Wilderness Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak
4: Battista Lane and Larson Road	Form W	eak	Weak	None
	Line W	eak	Weak	None
	Color	Weak	Weak	None
	Texture	Weak	Weak	None
7: Sloan Canyon National Conservation Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak

4.8.5 Alternative 3 (Sale of South Site Only)

Visual resource impacts from the implementation of Alternative 3 would be less in magnitude than the impacts from implementation of Alternative 1 or Alternative 2. Changes in the visual character of the area from Alternative 3 would be obscured by hills located in the North Site, which would be left intact. The mine and associated facilities would not be perceptible from KOP 1 or KOP 2. The view from KOP 3 would be similar; however, the size of the open pit mine would be smaller and would therefore not dominate the landscape as strongly. Impacts from Alternative 3 would be less than significant and would be consistent with Class III objectives and BLM management directives. Table 4.8-4 shows the visual contrast ratings for Alternative 3.

Table 4.8-4
Visual Contrast Ratings for Alternative 3

KOP	Element	Landform/Water	Vegetation	Structures
1: Seven Hills	Form Non	e	None	None
	Line Non	e	None	None
	Color Non	e	None	None
	Texture	None	None	None
2: Las Vegas Boulevard	Form Non	e	None	None
	Line Non	e	None	None
	Color Non	e	None	None
	Texture	None	None	None
3: North McCullough Wilderness Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak
4: Battista Lane and Larson Road	Form Non	e	None	None
	Line Non	e	None	None
	Color Non	e	None	None
	Texture	None	None	None
7: Sloan Canyon National Conservation Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak

4.8.6 Alternative 4 (Single Sale of North Site and South Site)

Visual resource impacts from the implementation of Alternative 4 would be the same as those for Alternative 1 (Table 4.8-5). There would be a significant change in the landform/water characteristic of the area. This change would not be consistent with Class III objectives or BLM management directives.

Table 4.8-5
Visual Contrast Ratings for Alternative 4

KOP	Element	Landform/Water	Vegetation	Structures
1: Seven Hills	Form W	eak	Weak	None
	Line W	eak	Weak	None
	Color	Weak	Weak	None
	Texture	Weak	Weak	None
2: Las Vegas Boulevard	Form Strong		Moderate	Moderate
	Line Mode	rate	Weak	Moderate
	Color	Weak	Moderate	Moderate
	Texture Strong		Weak	Moderate
3: North McCullough Wilderness Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak
4: Battista Lane and Larson Road	Form W	eak	Weak	None
	Line W	eak	Weak	None
	Color	Weak	Weak	None
	Texture	Weak	Weak	None
7: Sloan Canyon National Conservation Area	Form Mode	rate	Moderate	Weak
	Line Wea	k	Weak	Weak
	Color Wea	k	Moderate	Weak
	Texture Mode	rate	Weak	Weak

4.8.7 Alternative 5 (No Action Alternative)

There would be no impacts to the visual resource setting of the area from the No Action Alternative. Implementation of this alternative would be consistent with Class III objectives and BLM management directives.

4.8.8 Lightscapes

The mining applicants have proposed to operate the mines on a 24-hour-per-day basis if there is a market demand for materials. Nighttime operations would require the use of lighting for security and safety. Lighting can result in a variety of impacts. Glare is direct light shining from a fixture (luminaire) or the reflection of light off of a surface that makes it difficult to see or causes discomfort. Glare is especially problematic for motorists. Light trespass describes the impacts of shining light onto neighboring properties when that light is intrusive or objectionable. Sky glow refers to the impact of the composite illumination coming from towns, cities, and other developed areas. It is the yellowish glow visible in the sky when looking from a relatively dark area toward a nearby town or city. All of these impacts can

degrade the visual quality of an area. They can also affect dark-sky activities, such as recreational and scientific space observation.

Based on the location of the Proposed Action area, it was concluded that the action alternatives would not contribute substantially to sky glow. The cities of Las Vegas and Henderson are located within a few miles of the Proposed Action area, and the impacts of the cities' lighting on the dark sky substantially exceed the amount of impact that any action alternative would contribute.

The action alternatives are not anticipated to result in light trespass of the residences in the areas surrounding the Proposed Action area. For the action alternatives to result in the illumination of the properties of the residences in Las Vegas or Henderson, the lighting of the mine site(s) would be required to be extremely high-powered and directed toward those properties.

Because a lighting plan has not yet been developed for the action alternatives, there is a potential for the glare from direct lighting to impact the views of motorists and the surrounding residents (visual distraction). Mitigation measures described in Section 4.8.9 would ensure that impacts from glare are not significant.

4.8.9 Mitigation Measures

Because it was determined that implementation of an action alternative would be inconsistent with the VRM management objectives of the area, mitigation measures are proposed to reduce the contrast of the mine(s) features. The following measures would be incorporated into a mineral material sales contract:

VR1 The successful applicant will develop a BLM-approved reclamation plan (Section 2.6) that will address the salvage of topsoil for reseeding; the recontouring of the land surface, where feasible; the treating of weeds; and the revegetation of disturbed areas.

VR2 Mine facilities will be painted colors that blend with the background colors, unless prevented by safety or other permitting requirements. Color choice for structures will be one of BLM's Standard Environmental Colors and will be approved by the BLM Contrast Rating Forms.

VR3 Upon project termination, the aboveground mine facilities will be removed and the area revegetated in accordance with BLM policy.

VR4 The reclamation plan developed by the successful applicant(s) will include a plan to restore desert varnish to areas that were disturbed during mining activities.

To mitigate impacts of potential glare from lighting to a level that is not significant, the following measures will be incorporated:

VR5 Prior to issuing a mineral material sales contract, the applicant will submit a lighting plan for review and approval by the BLM. The lighting plan will describe the locations of lighting, the purpose of lighting, the types of lights to be used, the hours of operation, and any measures incorporated to reduce glare. The Southern Nevada Regional Heliport will also be given the opportunity to review and comment on the proposed lighting plan.

VR6 Full-cutoff lighting will be used at the mine facilities to reduce nighttime light impacts.

VR7 All onsite lighting will be situated or shielded in such a manner that the luminaries will not be visible from off site except when needed for safety.

4.9 NOISE AND VIBRATION

The implementation of the Proposed Action or alternatives could affect the noise environments of lands under the jurisdiction of the BLM, Clark County, or the City of Henderson. Sensitive receptors exist to the west of I-15 in the town of Sloan and to the northeast of the Proposed Action area in the master-planned communities of Seven Hills, Inspirada, and Anthem. Each government entity regulates noise and vibration through the establishment of ordinances and policies that are identified in Section 3.8.3 and the following subsections.

Impacts from noise and vibration would be considered significant if an alternative would result in:

- A substantial permanent increase in ambient noise levels
- Exposure of people to noise levels in excess of local standards
- Exposure of people to excessive ground-borne vibration
- A substantial temporary or periodic increase in ambient noise levels in excess of local standards

The noise and vibration impacts from the Proposed Action and alternatives presented below would reflect short-term, long-term, direct, and indirect impacts. Construction and mining noise levels are calculated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model.

4.9.1 Alternative 1 (Two Independent Mineral Material Sales)

This alternative consists of two proposed competitive mineral material sales that would result in two open pit dolomite/limestone quarries and associated facilities. In the future, the two open pits would merge into one open pit. Each mining company would maintain a separate site for facilities and staging, and each would be responsible for acquiring the necessary water rights and other utility and access rights-of-way.

Major construction phases would consist of site preparation, grading, and facility construction. Noise emissions would vary with each construction phase, depending on the construction activity and the associated equipment. Site preparation would require the use of combustion-engine-powered earth-moving equipment. Equipment would include backhoes, scrapers, dump trucks, graders, and front-end

loaders. Vehicle engine noise, vehicle movement, and rock and debris removal would dominate noise emissions during site preparation.

The dolomite and limestone materials on the proposed project site would be developed using traditional aboveground quarrying techniques, including stripping, drilling, blasting, loading, and hauling of both production and waste mineral products. The rock is of a hardened nature requiring drilling and blasting. Blast holes would be drilled with a bench-type down-hole hammer and would be loaded with bulk blasting agent (ammonium nitrate/fuel oil or other appropriate agents) and delayed primer explosives that permit timing the sequence of initiation. Blasting would be conducted using the NONEL SnapDet Initiation System, which eliminates the use of a primer cord, a major source of noise. Blasting would occur irregularly throughout the period of the mining sequence, depending on development of the pit. Blasting may occur twice per week with a maximum of 10 times per month. Blasting would typically be conducted only during the day shift on a 5-day-per-week basis.

Construction activities would be subject to County statutes that prohibit disturbing the peace. It is anticipated that short-term sound levels from construction activities would be approximately 43 dBA L_{eq} at the nearest residences (approximately 1.2 miles from the limits of the project area) and 46 dBA L_{eq} at the North McCullough Wilderness Area (approximately 0.8 mile from the limits of the project area), as shown in Table 4.9-1. As stated in Section 3.9.3, the EPA has determined that in order to protect the public from activity interference and annoyance outdoors, noise levels should not exceed 55 dBA. Construction activities would be conducted in accordance with the Clark County Code, which limits construction activities to daytime hours. Therefore, construction noise is not expected to significantly impact sensitive receptors near the proposed project.

Project operation would use combustion-engine-powered equipment similar to the construction phase, as well as mining, excavation, and blasting techniques. These long-term operational noise impacts are expected to be approximately 52 dBA at the nearest residential receptors and not significantly impact residential communities. At the North McCullough Wilderness Area, noise levels attributable to this alternative would be approximately 55 dBA, as shown in Table 4.9-1. In general, the effects of noise on wildlife are not completely understood. The reaction of animals to noise varies depending on the species, the ambient noise levels in which the animals in question live, the time of year/day, the age and sex of the animals, and their historical experiences. Based on the limited understanding of numerical thresholds for wildlife, for the purposes of this analysis the most stringent threshold that is applied to the human environment (residential areas) is applied to the wildlife of North McCullough Wilderness Area. Further, the 55 dBA L_{dn} threshold established by the EPA is a 24-hour threshold. Project-related activities may take place over 24-hour periods, depending on the demand for materials from the project site. As such, noise levels at the North McCullough Wilderness Area may exceed 55 dBA L_{dn} as a result of implementation of this alternative, and noise associated with this alternative would therefore be considered a potentially significant impact with respect to the North McCullough Wilderness Area.

Table 4.9-1
Estimated Alternative 1 Noise Levels

Project Phase	Location (Distance to Proposed Action Area)	Estimated Noise Level (dB)[1]	Estimated Maximum Vibration (VdB)[2]
Site Preparation and Grading	Proposed Action Area (50 feet)	85	78
	Town of Sloan (1.2 miles)	42	14
	Inspirada (1.2 miles)	43	15
	North McCullough Wilderness Area (0.8 mile)	46 20	
Mining Operations	Proposed Action Area (50 feet)	94	91
	Town of Sloan (1.2 miles)	52	27
	Inspirada (1.2 miles)	52	28
	North McCullough Wilderness Area (0.8 mile)	55 33	

Note: FHWA's Roadway Construction Noise Model used to calculate noise levels.
1 FHWA's Roadway Construction Noise Model was used to analyze the noise generated at nearby sensitive receptors from the equipment listed in Table 3.9-2 for Site Preparation and Grading and Mining Operations.
2 Assumes strongest vibration activity for each project phase, with Scraper for Site Preparation and Grading and Blasting for Mining Operations. Calculated using Lv(D)=Lv(25ft)-30log(D/25).

As noted previously, mining operation activities would include blasting that could generate vibration levels of 91 VdB at the Proposed Action area. At the nearest residential uses, approximately 1.2 miles away, the vibration from blasting would equal approximately 28 VdB, which is well below the 65 VdB threshold of perception for many people. Vibration levels at North McCullough Wilderness Area could reach 33 VdB, which is also well below the 65 VdB threshold of human perception. Although some animals are more sensitive to vibration than humans, 37 VdB is considerably less than typical background vibration and is not expected to significantly impact wilderness areas near the Proposed Action area. These would be considered acceptable vibration occurrences and would not significantly impact nearby sensitive receptors.

In addition, haul trucks proceeding to and from the project site would generate operational noise along local roadways and I-15. Operation of the proposed project would generate an estimated 1,204 daily vehicle trips (1,116 of which would be heavy trucks), which would generate roadway noise associated with their operation and movement along haul routes. The proposed access utility roads would not proceed closer to receptors than the operations of the project site. Further, haul truck noise is generally considered to be less than that analyzed as part of the onsite operational noise evaluation discussed above (see Table 3.9-3 for clarification). Roadway noise levels were estimated along the access road and I-15, using data provided in Sections 3.10 and 4.10 and the FHWA Traffic Noise Model and Highway Noise Prediction Model (FHWA-RD-77-108). Taking into account the distance from the proposed access road

that would allow for up to 1,204 daily vehicle trips, noise levels at the closest sensitive receptor (North McCullough Wilderness Area) would not exceed 35 dBA L_{dn}, which is less than the EPA threshold of 55 dBA L_{dn}. For traffic along I-15, truck traffic associated with the proposed project would result in minimal increases in roadway noise volumes (0.1 dBA Ldn, north of Sloan Road, and 0.3 dBA Ldn, south of Sloan Road). Generally, a 3 dBA increase in noise levels is considered audible; therefore, impacts associated with the movement of materials to and from the project site would not be considered significant.

According to the standards in 30 CFR 816.67, overpeak sound-pressure vibration levels associated with blasting cannot exceed 133 dB. At the nearest residential uses, approximately 1.2 miles away, this would equal approximately 84 VdB, which is considered acceptable only if there are an infrequent number of events per day. Because the blasting activities would occur irregularly throughout the period of the mining sequence (no more than twice per week with a maximum of 10 times per month) and would be conducted in accordance with applicable blasting ordinance(s), such as the City of Henderson or Clark County ordinances, this would be considered an acceptable vibration occurrence and would not significantly impact residential communities.

Implementation of Alternative 1 would result in imperceptible short-term noise and vibration impacts according to EPA and natural standards, and moderate to imperceptible long-term noise and vibration impacts according to the EPA and natural standards. These impacts would be less than significant.

4.9.2 Alternative 2 (Sale of North Site Only)

Under this alternative, only the mineral material in the North Site would be sold by competitive bid. Major construction phases would consist of site preparation, grading, and facility construction. Noise emissions would vary with each construction phase, depending on the construction activity and the associated equipment. Site preparation would require the use of combustion-engine-powered earth-moving equipment. Equipment would include backhoes, scrapers, dump trucks, graders, and front-end loaders. Vehicle engine noise, vehicle movement, and rock and debris removal would dominate noise emissions during site preparation.

Mine development under Alternative 2 would employ the same methods as those described for Alternative 1 (Section 4.9.1). Short-term sound levels from construction activities would be approximately 43 dBA at the nearest residences, located approximately 1.2 miles away from the Proposed Action area, as shown in Table 4.9-2. Based on EPA guidelines, 45 dBA is consistent with “normal suburban residential” areas (EPA, 1971). Further, the EPA has determined that in order to protect the public from activity interference and annoyance outdoors, noise levels should not exceed 55 dBA. Therefore, construction noise is not expected to significantly impact residential communities near the proposed project. In addition, construction noise under this alternative would reach sound levels of 45.8 dBA at North McCullough Wilderness Area. As stated above under the impact evaluation of Alternative 1, due to the uncertainty of numerical thresholds for noise impacts to wildlife, the most stringent threshold that is applied to the human environment (residential areas) is applied to the wildlife of

North McCullough Wilderness Area. Therefore, construction noise of 46 dBA is not expected to significantly impact wilderness areas near the Proposed Action area.

Long-term operational noise impacts are expected to be approximately 52 dBA at the nearest residential receptors, which would not significantly impact residential communities. Operational noise levels at the North McCullough Wilderness Area would be approximately 54 dBA, which would not be expected to significantly impact sensitive receptors. Impacts associated with haul truck operations would be less than that discussed under Alternative 1 due to the fewer number of haul trucks but would also not be considered significant.

Table 4.9-2
Estimated Alternative 2 Noise Levels

Project Phase	Location (Distance to Proposed Action Area)	Estimated Noise Level (dB)[1]	Estimated Maximum Vibration (VdB)[2]
Site Preparation and Grading	Proposed Action Area (50 feet)	85	78
	Town of Sloan (1.2 miles)	42	14
	Inspirada (1.2 miles)	43	15
	North McCullough Wilderness Area (1.0 mile)	44 17	
Mining Operations	Proposed Action Area (50 feet)	94	91
	Town of Sloan (1.2 miles)	52	27
	Inspirada (1.2 miles)	52	28
	North McCullough Wilderness Area (1.0 mile)	54 30	

Note: FHWA's Roadway Construction Noise Model used to calculate noise levels.
1 FHWA's Roadway Construction Noise Model was used to analyze the noise generated at nearby sensitive receptors from the equipment listed in Table 3.9-2 for Site Preparation and Grading and Mining Operations.
2 Assumes strongest vibration activity for each project phase, with Scraper for Site Preparation and Grading and Blasting for Mining Operations. Calculated using Lv(D)=Lv(25ft)-30log(D/25).

Mining operation activities would include blasting that could generate vibration levels of 91 VdB at the Proposed Action area. At the nearest residential uses, approximately 1.2 miles away, the vibration from blasting would equal approximately 28 VdB, which is well below the 65 VdB threshold of perception for many people. Vibration levels at North McCullough Wilderness Area could reach 33 VdB, which is also well below the 65 VdB threshold of human perception. Although some animals are more sensitive to vibration than humans, 37 VdB is considerably less than typical background vibration and is not expected to significantly impact wilderness areas near the Proposed Action area. These would be considered acceptable vibration occurrences and would not significantly impact residential communities or wilderness areas.

Overpeak sound-pressure vibration levels associated with blasting would be approximately 84 VdB at the nearest residential uses, which is considered an acceptable impact only if there are an infrequent number of events per day. Because the blasting activities would occur irregularly throughout the period of the mining sequence (no more than twice per week with a maximum of 10 times per month) and would be conducted in accordance with applicable blasting ordinance(s) such as the City of Henderson or Clark County ordinances, this would be considered an acceptable vibration occurrence and would not significantly impact residential communities.

Implementation of Alternative 2 would result in imperceptible short-term noise and vibration impacts according to EPA and natural standards and moderate to imperceptible long-term noise and vibration impacts according to the EPA and natural standards. These impacts would be less than significant.

4.9.3 Alternative 3 (Sale of South Site Only)

Under this alternative, only the mineral material in the South Site would be sold by competitive bid. Major construction phases would consist of site preparation, grading, and facility construction. Noise emissions would vary with each construction phase, depending on the construction activity and the associated equipment. Site preparation would require the use of combustion-engine-powered earth-moving equipment. Equipment would include backhoes, scrapers, dump trucks, graders, and front-end loaders. Vehicle engine noise, vehicle movement, and rock and debris removal would dominate noise emissions during site preparation.

Mine development under Alternative 3 would employ the same methods as those described for Alternative 1 in Section 4.9.1. Short-term sound levels from construction activities would be approximately 41 dBA at the nearest residences, located approximately 1.4 miles away from the Proposed Action area, as shown in Table 4.9-3. Based on EPA guidelines, 41 dBA is consistent with a “quiet community noise environment” (EPA, 1971). Further, the EPA has determined that in order to protect the public from activity interference and annoyance outdoors, noise levels should not exceed 55 dBA. Therefore, construction noise is not expected to significantly impact residential communities near the Proposed Action area. Construction noise would reach sound levels of 46 dBA at the North McCullough Wilderness Area. As stated under the impact evaluation of Alternative 1, due to the uncertainty of numerical thresholds for noise impacts to wildlife, the most stringent threshold that is applied to the human environment (residential areas) is applied to the wildlife of the North McCullough Wilderness Area. Therefore, construction noise of 46 dBA is not expected to significantly impact wilderness areas near the project area.

Project operation would use combustion-engine-powered equipment similar to the construction phase, as well as mining, excavation, and blasting techniques. These long-term operational noise impacts would be approximately 51 dBA at the nearest residential receptors and would not significantly impact residential communities. With respect to the North McCullough Wilderness Area, noise levels associated with this alternative would reach approximately 55 dBA L_{eq}. Based on the limited understanding of numerical

thresholds for wildlife, for the purposes of this analysis, the most stringent threshold that is applied to the human environment (residential areas) is applied to the wildlife of the North McCullough Wilderness Area. Further, the 55 dBA L_{dn} threshold established by the EPA is a 24-hour threshold. Project-related activities may take place over 24-hour periods, depending on the demand for materials from the project site. As such, noise levels at the North McCullough Wilderness Area may exceed 55 dBA L_{dn} as a result of implementation of this alternative, and noise associated with this alternative would therefore be considered a potentially significant impact with respect to the North McCullough Wilderness Area.

Table 4.9-3
Estimated Alternative 3 Noise Levels

Project Phase	Location (Distance to Proposed Action Area)	Estimated Noise Level (dB)[1]	Estimated Maximum Vibration (VdB)[2]
Site Preparation and Grading	Proposed Action Area (50 feet)	85	78
	Town of Sloan (1.7 miles)	39	10
	Inspirada (1.4 miles)	41	13
	North McCullough Wilderness Area (0.8 mile)	46 20	
Mining Operations	Proposed Action Area (50 feet)	94	91
	Town of Sloan (1.7 miles)	49	23
	Inspirada (1.4 miles)	51	26
	North McCullough Wilderness Area (0.8 mile)	55 33	

Note: FHWA's Roadway Construction Noise Model used to calculate noise levels.
1 FHWA's Roadway Construction Noise Model was used to analyze the noise generated at nearby sensitive receptors from the equipment listed in Table 3.9-2 for Site Preparation and Grading and Mining Operations.
2 Assumes strongest vibration activity for each project phase, with Scraper for Site Preparation and Grading and Blasting for Mining Operations. Calculated using Lv(D)=Lv(25ft)-30log(D/25).

Impacts associated with haul truck operations would be less than that discussed under Alternative 1 due to the fewer number of haul trucks, but would also not be considered significant because the proposed access roads to be used by the haul trucks would not proceed along routes that would lessen the distance between the noise source and the nearest sensitive receptor.

Mining operation activities would include blasting that could generate vibration levels of 91 VdB at the Proposed Action area. At the nearest residential uses, approximately 1.4 miles away, the vibration from blasting would equal approximately 26 VdB, which is well below the 65 VdB threshold of perception for many people. Vibration levels at the North McCullough Wilderness Area could reach 33 VdB, which is also well below the 65 VdB threshold of human perception. Although some animals are more sensitive to vibration than humans, 33 VdB is considerably less than typical background vibration and is not expected

to significantly impact wilderness areas near the Proposed Action area. These would be considered acceptable vibration occurrences and would not significantly impact residential communities or wilderness areas. Table 4.9-4 shows the estimated Alternative 4 noise levels.

Table 4.9-4
Estimated Alternative 4 Noise Levels

Project Phase	Location (Distance to Proposed Action Area)	Estimated Noise Level (dB)[1]	Estimated Maximum Vibration (VdB)[2]
Site Preparation and Grading	Proposed Action Area (50 feet)	85	78
	Town of Sloan (1.2 miles)	42	14
	Inspirada (1.2 miles)	43	15
	North McCullough Wilderness Area (0.8 mile)	46 20	
Mining Operations	Proposed Action Area (50 feet)	94	91
	Town of Sloan (1.2 miles)	52	27
	Inspirada (1.2 miles)	52	28
	North McCullough Wilderness Area (0.8 mile)	55 33	

Note: FHWA's Roadway Construction Noise Model used to calculate noise levels.
1 FHWA's Roadway Construction Noise Model was used to analyze the noise generated at nearby sensitive receptors from the equipment listed in Table 3.9-2 for Site Preparation and Grading and Mining Operations.
2 Assumes strongest vibration activity for each project phase, with Scraper for Site Preparation and Grading and Blasting for Mining Operations. Calculated using Lv(D)=Lv(25ft)-30log(D/25).

Overpeak sound-pressure vibration levels associated with blasting would be approximately 84 VdB at the nearest residential uses, which is considered an acceptable impact only if there are an infrequent number of events per day. Because the blasting activities would occur irregularly throughout the period of the mining sequence (no more than twice per week with a maximum of 10 times per month) and would be conducted in accordance with applicable blasting ordinance(s) such as the City of Henderson or Clark County ordinances, this would be considered an acceptable vibration occurrence and would not significantly impact residential communities.

Implementation of Alternative 3 would result in imperceptible short-term noise and vibration impacts according to EPA and natural standards, and moderate to imperceptible long-term noise and vibration impacts according to the EPA and natural standards. These impacts would be less than significant.

4.9.4 Alternative 4 (Single Sale of North Site and South Site)

Under this alternative, the BLM would simultaneously sell the mineral materials in the North Site and the South Site to a single applicant. The sale of mineral material would be by competitive bid. Major

construction phases would consist of site preparation, grading, and facility construction. Noise emissions would vary with each construction phase, depending on the construction activity and the associated equipment. Site preparation would require the use of combustion-engine-powered earth-moving equipment. Equipment would include backhoes, scrapers, dump trucks, graders, and front-end loaders. Vehicle engine noise, vehicle movement, and rock and debris removal would dominate noise emissions during site preparation.

Mine development under Alternative 4 would employ the same methods as those described for Alternative 1 (Section 4.9.1). Short-term sound levels from construction activities would be approximately 43 dBA at the nearest residences, located approximately 1.2 miles away from the Proposed Action area. Based on EPA guidelines, 43 dBA is consistent with a "quiet community noise environment" (EPA, 1971). Therefore, construction noise is not expected to significantly impact residential communities near the Proposed Action area. Construction noise would reach sound levels of 46 dBA at North McCullough Wilderness Area. As stated above under the impact evaluation of Alternative 1, due to the uncertainty of numerical thresholds for noise impacts to wildlife, the most stringent threshold that is applied to the human environment (residential areas) is applied to the wildlife of the North McCullough Wilderness Area. Therefore, construction noise of 46 dBA is not expected to significantly impact wilderness areas near the Proposed Action area.

Project operation would use combustion-engine-powered equipment similar to the construction phase, as well as mining, excavation, and blasting techniques. These long-term operational noise impacts are expected to be approximately 52 dBA at the nearest residential receptors, which would not significantly impact residential communities. With respect to the North McCullough Wilderness Area, noise levels associated with this alternative would reach approximately 55 dBA L_{eq}. Based on the limited understanding of numerical thresholds for wildlife, for the purposes of this analysis the most stringent threshold that is applied to the human environment (residential areas) is applied to the wildlife of the North McCullough Wilderness Area. The 55 dBA L_{dn} threshold established by the EPA is a 24-hour threshold. Project-related activities may take place over 24-hour periods, depending on the demand for materials from the project site. Noise levels at the North McCullough Wilderness Area may exceed 55 dBA L_{dn} as a result of implementation of this alternative, and noise associated with this alternative would therefore be considered a potentially significant impact with respect to the North McCullough Wilderness Area.

Impacts associated with haul truck operations would be less than that discussed under Alternative 1 due to the fewer number of haul trucks, but would also not be considered significant because the proposed access roads to be used by the haul trucks would not proceed along routes that would lessen the distance between the noise source and the nearest sensitive receptor.

Mining operation activities would include blasting that could generate vibration levels of 91 VdB at the Proposed Action area. At the nearest residential uses, approximately 1.2 miles away, the vibration from

blasting would equal approximately 28 VdB, which is well below the 65 VdB threshold of perception for many people. Vibration levels at the North McCullough Wilderness Area could reach 33 VdB, which is also well below the 65 VdB threshold of human perception. Although some animals are more sensitive to vibration than humans, 37 VdB is considerably less than typical background vibration and is not expected to significantly impact wilderness areas near the Proposed Action area. These would be considered acceptable vibration occurrences and would not significantly impact residential communities or wilderness areas.

Overpeak sound-pressure vibration levels associated with blasting would be approximately 84 VdB at the nearest residential uses, which is considered an acceptable impact only if there are an infrequent number of events per day. Because the blasting activities would occur irregularly throughout the period of the mining sequence (no more than twice per week with a maximum of 10 times per month) and would be conducted in accordance with applicable blasting ordinance(s) such as the City of Henderson or Clark County ordinances, this would be considered an acceptable vibration occurrence and would not significantly impact residential communities.

Implementation of Alternative 4 would result in imperceptible short-term noise and vibration impacts according to EPA and natural standards, and moderate to imperceptible long-term noise and vibration impacts according to the EPA and natural standards. These impacts would be less than significant.

4.9.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, the BLM sale of mineral material would not occur in the Sloan Hills area. Mining operations in the Proposed Action area would not be authorized or approved. No surface disturbance would occur, and no noise or vibration impacts would occur.

4.9.6 Mitigation Measures

The following measures would be implemented as standard operating procedures and considered BMPs. Any noise measurements conducted as part of the performance of these measures will be conducted at the property line of the affected receptor. The measures include:

NV1 Locating stationary construction equipment as far from nearby noise receptors as possible.

NV2 Shutting off idling equipment.

NV3 Scheduling construction operations to avoid periods of noise annoyance, as determined through consultation with Clark County and the BLM and defined in special provisions. Blasting and rock drilling activities will not occur between the hours of 6 p.m. and 6 a.m.

NV4 Notifying nearby affected parties if extremely noisy work occurs.

NV5 Installing temporary or portable acoustic barriers around stationary construction noise source.

4.10 TRANSPORTATION

This section describes the transportation impacts that would result from the development of the Proposed Action or alternatives.

4.10.1 Standards of Significance

Clark County has established the following policies pertaining to transportation infrastructure:

Policy T-3.3 Anticipate and address transportation system deficiencies that threaten the safety of users.

Policy T-4.1 Minimize the environmental impacts associated with road construction and maintenance, especially with respect to residential areas, parks, and other protected and unprotected natural areas, including mitigation associated with development adjacent to areas of conserved habitat.

Policy T-5.3 LOS D should be the design objective for non-residential local, collector, and arterial streets. LOS C should be the design objective for residential local, collector, and arterial streets.

Policy T-5.6 Support the planning and development of safe and efficient freight transportation corridors.

All of the roadway segments analyzed for this study are classified as “non-residential” roads. Policy T-5.3 states that the design objective for the functional classification system in Clark County should not exceed a LOS D (as defined by the current edition of the Highway Capacity Manual) for all non-residential developments; this means that an LOS of A, B, C, or D would be considered acceptable operating conditions, and an LOS of E or F would be considered unacceptable.

Based on above policies, for the purposes of this EIS, impacts on transportation and circulation would be considered adverse if they resulted in any of the following conditions:

- A decrease in the LOS for a non-residential road from A, B, C, or D to E or F
- Adverse effects on road pavement integrity
- Adverse effects on public safety
- Adverse effects on the surrounding environment

4.10.2 Alternative 1 (Two Independent Mineral Material Sales)

Alternative 1 consists of the sale of the North Site and South Site to two separate mining companies that would operate independently. The two sites are located immediately adjacent to each other. It is

anticipated to take 10 years to ramp up to full production. At full production, the plant and mine equipment are scheduled to generally operate 5 days a week, with the option to operate up to 7 days a week. The option to operate up to 7 days a week would be the exception and would be based on market demand and would likely not be for extended periods. For analysis purposes, the estimated number of trips that would be made to and from the site during the weekday AM and PM peak hours were chosen to represent the peak conditions corresponding to a shift change. These hours also typically represent the 30th highest hour or design hour in an urban area. It is estimated that at full production, each facility would produce 5 million tons per year, for a combined total of 10 million tons per year.

Access would be provided to the project sites via the construction of a two-lane road (Figure 2.1-1 and Figure 2.1-3). This road would connect with South Las Vegas Boulevard approximately 1 mile south of its intersection with Sloan Road. All daily operation and maintenance personnel and equipment would access the two sites via this road. The road would fork as it approaches the sites, with one branch connecting to the North Site and another branch connecting to the South Site. Initially, the road would be constructed of gravel with water dust suppression controls. The access road would be paved by the time the site reaches full production. The total length of access road to the two sites would be less than 3 miles. A truck wheel cleaning system would be installed if necessary to minimize “track out.”

Excavated material would be hauled away from the site using 18-wheel, diesel-powered tractors pulling bottom dump trailers carrying a maximum load of 42 tons per trip. Other smaller truck configurations could also be used to deliver product from these operations. For the purposes of this EIS, a conservative average load of approximately 32 tons was used to calculate anticipated truck trips (Table 4.10-1).

Table 4.10-1
Average Number of Truck Trips per Day for Alternative 1

	North Site		South Site	
	Year 1	Year 10	Year 1	Year 10
Annual Production (tons)	750,000	5,000,000	250,000	5,000,00 0
Annual Days of Operation	280	280	280	280
Average Daily Production (tons)	2,679	17,857	893	17,857
Haul Truck Capacity (tons)	42	42	42	42
Average Load (tons)	32	32	32	32
Average Number of Truck Trips per Year	23,438	156,250	7,813	156,250
Average Number of Truck Trips per Day	84	558	28	558

Source: TerraMins, Inc., 2009b

Each plant site would have an established traffic management plan for onsite operations (loading, weighing, and exiting), and it would comply with a site-specific safety plan. Traffic patterns would be reviewed periodically for consistency. Thirty parking spaces would be provided at each site for

employees and visitors. The total size of each parking lot would be 22 feet by 300 feet, or 6,600 square feet (Figure 4.10-1). Ten parking spaces would be provided at each site for heavy equipment to be used on site. The employee parking lot would be paved, and the heavy equipment parking area would have gravel surfaces.

4.10.2.1 Trip Generation for Alternative 1

As shown in Table 4.10-1, there would be an estimated 558 truck trips per day to each site once full production is reached (year 10); this would mean an estimated combined total of 1,116 truck trips entering and exiting the mining area via the proposed access road.

The estimated number of onsite employees is between 20 and 30 people at each site. These newly created positions would be at the site and attempts would be made to hire locally. An estimated 10 to 15 contractors would be at each site as needed.

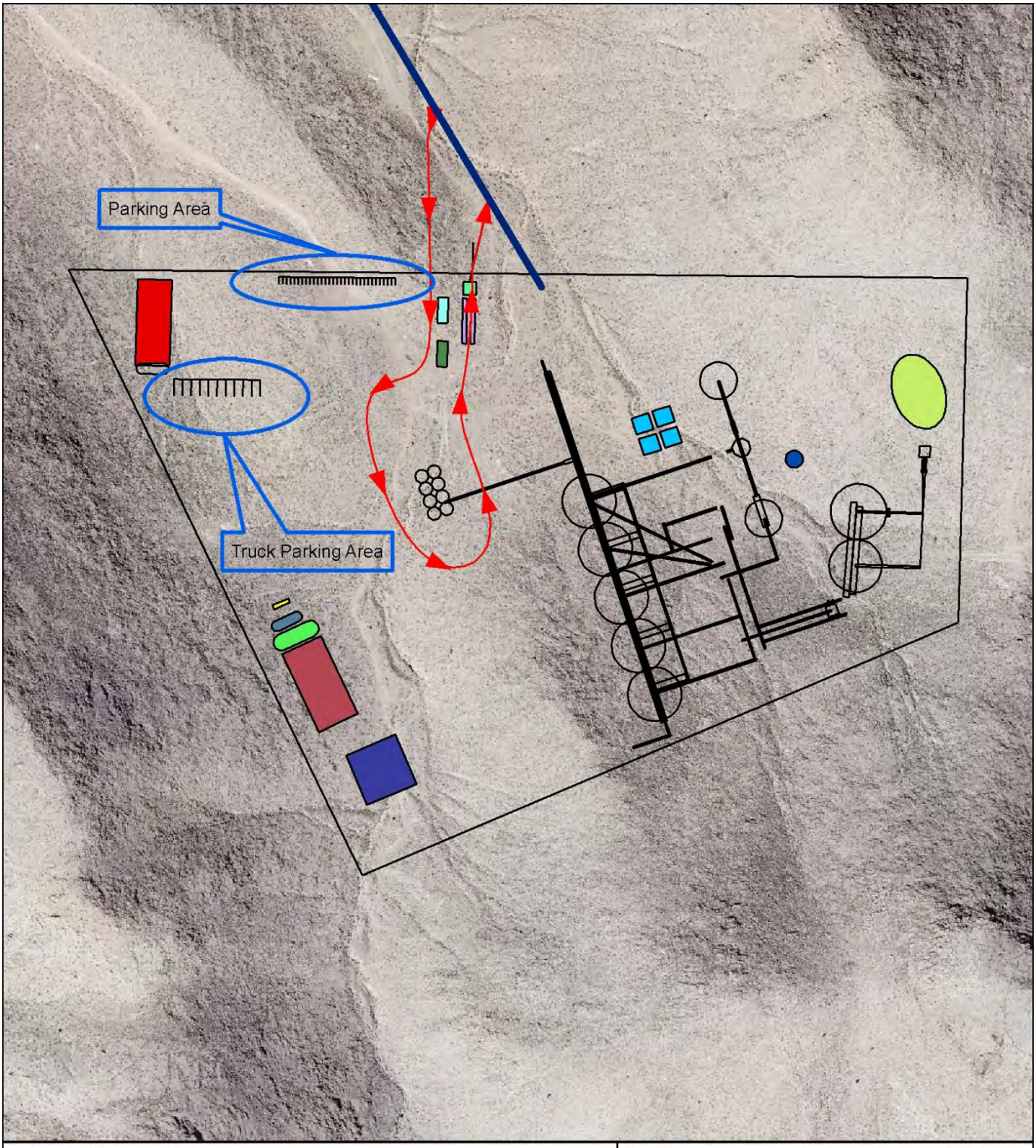
In addition to the daily trips to and from the site by trucks hauling the excavated material, employees, and contractors, there would be trips by trucks delivering fuels, lubricants, and maintenance supplies, and trucks hauling solid waste away from the mining sites. The total number of trips traveling to and from the site each day is estimated to be 1,204.

Table 4.10-2 shows the estimated number of trips that would be made to and from the sites during the AM peak hour (usually considered to be 7:00 a.m. to 9:00 a.m.), the PM peak hour (usually considered to be 4:00 p.m. to 6:00 p.m.) and over the course of an entire day. Data in the table for the AM and PM peak hours represent the most extreme conditions—a simultaneous shift change at both mine operations while both mines continue to operate at full production levels, with a steady stream of haul trucks entering and exiting both sites.

Table 4.10-2
Trip Generation for Alternative 1

Time Period	Truck Trips		Other Vehicle Trips		Total Trips	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak Hour	93	93	77	1	170	94
PM Peak Hour	93	93	1	77	94	170
Daily 1,116		1,116	88	88	1,204	1,204

Other vehicle trips = trips made by employees to and from the site, plus site deliveries
Assume 25 onsite employees plus 13 contractors at each mining site.
Assume 12 delivery trips per day per both mines (i.e., 6 trips per mine).



Source: Clark County, Nevada.

- Access Road & Utility Corridor
- Traffic Flow
- 10,000 Gallon Above Ground Unleaded Fuel Tanks
- 20,000 Gallon Above Ground Diesel Tank
- Aggregate Loadout
- Off-Highway Shop
- Office, Restroom & Septic Tank
- Parts Storage
- Raw Material Stock Pile
- Scale House
- Scales
- Temporary Generator
- Truck Shop
- Truck Wash
- Water Recovery Ponds
- Water Tank

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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.

Proposed Sloan Hills Competitive Mineral Material Sales Environmental Impact Statement

Figure 4.10-1
Site Plan Showing Parking Areas

Prepared by: PBSJ

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4.10.2.2 Trip Distribution for Alternative 1

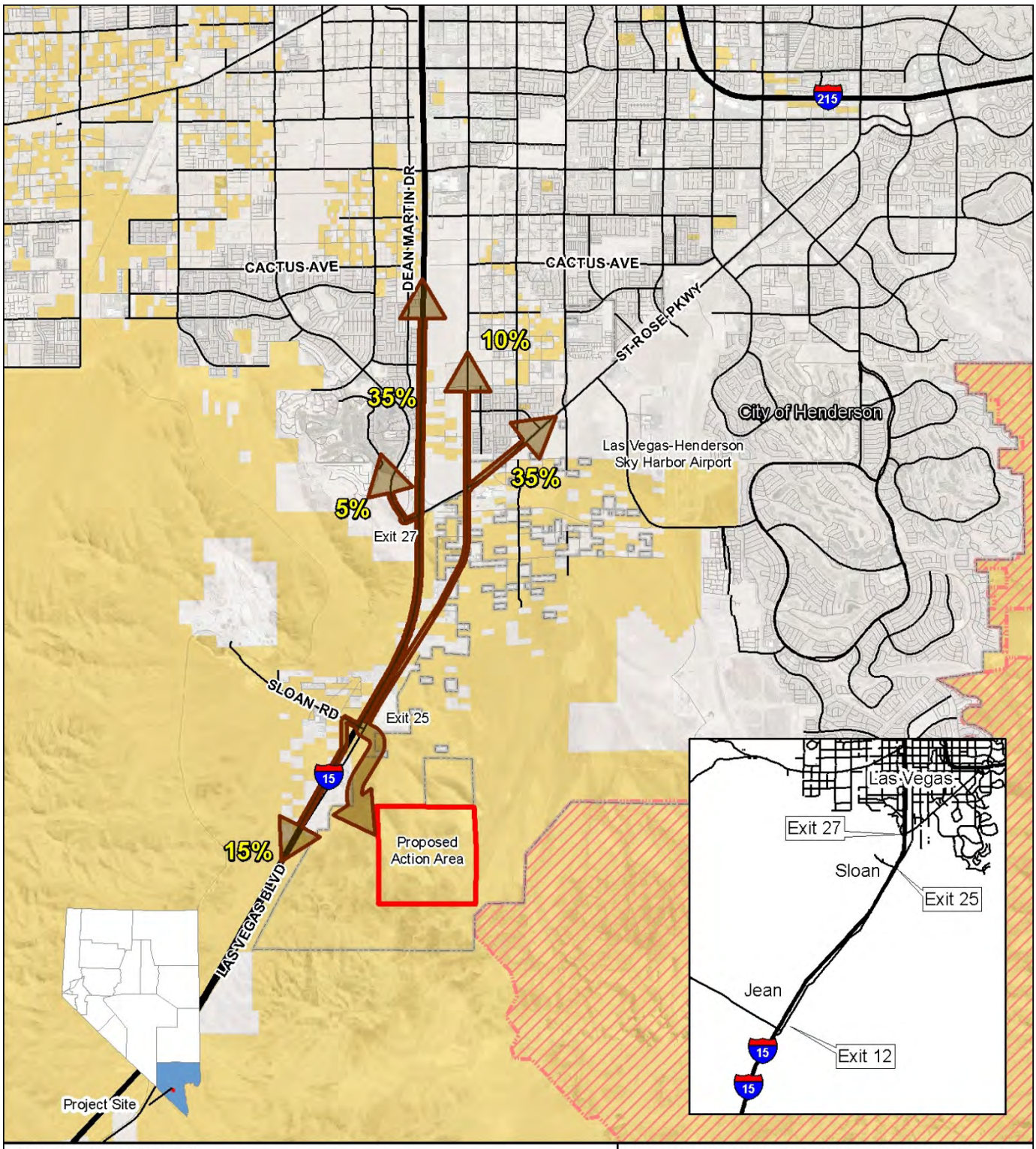
The anticipated haul direction would be subject to market demand at the time but is anticipated to be approximately 85 percent to the north into the Las Vegas/Henderson areas and 15 percent to the south. Haul distances would be from 1 to 40 miles from the Proposed Action area. Figure 4.10-2 shows how trips traveling to and from the mining sites would be distributed on the surrounding roadway network.

4.10.2.3 Traffic Impacts of Alternative 1

Prior to the start of the proposed mining activities, there would be an initial mobilization, site preparation, and mine development phase lasting approximately 18 months to prepare the site for excavation activity. This phase would involve the construction of the access road connecting the mine sites to South Las Vegas Boulevard, the construction of the parking areas, and the construction/assembly of the onsite buildings and facilities that will be needed once excavation begins. These building and facilities would include an office building, a truck repair and maintenance building, scale houses, a fueling facility, parts and equipment storage areas, and a crushing and screening operation. It would also include the collection of all trash and miscellaneous debris within the site boundaries and its hauling off site for disposal. Virtually all of this activity will occur on site, and the only potentially significant traffic impact of this initial phase would be due to the transportation to the site of the heavy equipment that will be used for excavation. This equipment would include front-end loaders, dozers, 10,000-gallon water trucks, cranes, portable crushing and screening equipment, and forklifts. Some of this equipment will need to be transported to the site on oversized flatbed trucks.

Once excavation begins, the primary traffic impacts would be due to employees, haul trucks, and delivery trucks traveling to and from the site on a daily basis. The impact of the addition of project traffic to the existing volumes on the surrounding roadway network and the corresponding change in LOS was estimated based on full production at both mine sites. Vehicle trips traveling to and from the mine sites were added to existing traffic on the surrounding roadway network.

Tables 4.10-3, 4.10-4, 4.10-5, and 4.10-6 compare the existing traffic conditions to conditions of Alternative 1. Results show that the project would have minimal impact on traffic conditions, and all roadway segments would continue to operate at acceptable LOS.



Source: Clark County, Nevada, BLM.

Proposed Action Area
City of Henderson Jurisdictional Boundary
National Conservation Area
Bureau of Land Management
Private

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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.

1 inch = 7,000 feet

7,000 3,500 0 7,000 Feet

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Proposed Sloan Hills Competitive Mineral Material Sales
Environmental Impact Statement

Figure 4.10-2
Traffic Distribution

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Table 4.10-3
Existing Plus Alternative 1 Freeway Traffic Operations Analysis

Freeway Segment	2010 Existing Conditions				2010 Plus Alternative 1 Conditions			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS
I-15 Northbound								
South of Sloan Road off-ramp	3.8 A		6.8	A	3.9	A	6.8	A
Between Sloan Road on-ramp and St. Rose Parkway off-ramp	4.8 A		6.9	A	5.0	A	7.2	A
North of St. Rose Parkway on-ramp	8.3 A		9.3	A	8.4	A	9.6	A
I-15 Southbound								
North of St. Rose Parkway off-ramp	8.5 A		7.9	A	8.8	A	8.1	A
Between St. Rose Parkway on-ramp and Sloan Road off-ramp	7.4 A		4.8	A	7.8	A	5.0	A
South of Sloan Road on-ramp	6.7 A		4.6	A	6.8	A	4.7	A

Veh/Ln/Mi = Vehicles per lane per mile

Table 4.10-4
Existing Plus Alternative 1 Merge/Diverge Traffic Operations Analysis

Freeway Segment	Analysis Type	2010 Existing Conditions				2010 Plus Alternative 1 Conditions			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS
I-15 Northbound									
Sloan Road off-ramp	Diverge	6.9	A	11.0	B	7.2	A	11.1	B
Sloan Road on-ramp	Merge	9.1	A	10.8	B	9.6	A	11.5	B
St. Rose Parkway off-ramp	Diverge	8.4	A	11.3	B	8.6	A	11.8	B
I-15 Southbound									
St. Rose Parkway on-ramp	Merge	11.4	B	8.7	A	11.9	B	9.0	A
Sloan Road off-ramp	Diverge	12.0	B	8.3	A	12.6	B	8.7	A
Sloan Road on-ramp	Merge	10.4	B	8.2	A	10.6	B	8.5	A

Veh/Ln/Mi = Vehicles per lane per mile

Table 4.10-5
Existing Plus Alternative 1 Unsignalized Intersection Traffic Operations Analysis

Reference Number	Intersection Location	2010 Existing Conditions				2010 Plus Alternative 1 Conditions			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Density (Veh/Ln/Mi)	LOS	Density *Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS
1	Sloan Road at I-15 southbound on-ramp Westbound Left	7.4	A	7.4	A	8.1	A	8.3	A
2	Sloan Road at I-15 Southbound off-ramp Southbound Approach	9.5	A	9.0	A	11.0	B	10.2	B
3	Sloan Road at Las Vegas Boulevard Northbound Left Eastbound Approach	7.3 9.5	A A	7.3 9.6	A A	8.4 12.2	A B	8.4 11.9	A B
4	I-15 Northbound on-/off-ramp at Las Vegas Boulevard Northbound Left Eastbound Approach	7.7 10.0	A A	7.4 9.7	A A	8.4 11.0	A B	8.2 11.3	A B
9	Las Vegas Boulevard at Site Access Southbound Left Westbound Approach	N/A N/A	N/A N/A	N/A N/A	N/A N/A	8.6 8.8	A A	8.5 10.8	A B

Veh/Ln/Mi = Vehicles per lane per mile

Table 4.10-6
Existing Plus Alternative 1 Signalized Intersection Traffic Operations Analysis

Reference Number	Intersection Location	2010 Existing Conditions				2010 Plus Alternative 1 Conditions			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS	Density (Veh/Ln/Mi)	LOS
6	St. Rose Parkway at I-15 on-/off-ramps	29.2	C	30.1	C	29.3	C	30.1	C
7	St. Rose Parkway at Las Vegas Boulevard	30.7 C		31.3	C	34.5	C	36.6	D

Veh/Ln/Mi = Vehicles per lane per mile

Access to the Proposed Action area would be consolidated to a single point, where the proposed access road would intersect with South Las Vegas Boulevard, is a two-lane road at this location. There is little development along this stretch of South Las Vegas Boulevard. Two commercial properties are located approximately 500 feet north of the intersection with the proposed mine access road. One appears to be an auto and heavy equipment demolition business, and the other appears to be a go-kart racing track. Neither of these businesses would produce nor attract numerous vehicle trips on an average weekday when the proposed mines would be in operation. With little development to attract or produce trips, the volume of traffic on this section of South Las Vegas Boulevard is very low, with a daily volume of between 1,000 and 7,500 vehicles.

Several potentially significant operational impacts exist at the intersection of South Las Vegas Boulevard and the access road to the Proposed Action area. With the mine operation, trucks and autos would enter the site by turning from South Las Vegas Boulevard into the mine access road, as well as trucks and autos exiting the mine by turning from the mine access road onto South Las Vegas Boulevard. For example, trucks loaded with excavated material would exit the site and turn right onto South Las Vegas Boulevard to travel north, and trucks destined for points south would turn left (across oncoming northbound traffic) onto South Las Vegas Boulevard. Based on the estimated trip distribution shown in Figure 4.10-2, most of the trucks leaving the mines would travel north. The loaded trucks would be slower to accelerate up to highway speeds and may significantly impede the flow of oncoming traffic. Trucks returning to the mining sites would be empty, and therefore lighter, which would make it easier for them to slow down before turning onto the access road from South Las Vegas Boulevard.

The amount of truck traffic entering and exiting the project site would begin relatively low and gradually grow over time as production at the mines increases (Table 4.10-1). An initial evaluation was conducted to determine whether the operational impacts of the haul trucks and auto trips by mine employees at the intersection of South Las Vegas Boulevard and the access road would be significant enough to require mitigation. Mitigation could include the construction of acceleration and deceleration tapers on the east side of South Las Vegas Boulevard for trucks to safely enter and exit the project site, the widening of South Las Vegas Boulevard to allow for a dedicated left-turn lane for trucks returning to the mines, and the installation of a traffic control device, such as a traffic signal. This evaluation was conducted assuming a worst-case scenario (i.e., during peak hour traffic conditions at build-out) when traffic on the surrounding roadways, such as Las Vegas Boulevard, is at its highest levels, and the greatest number of autos and trucks are entering and exiting the mine sites. Even under these extreme conditions, the volumes at the intersection do not meet standards for implementation of a traffic control signal (Manual on Uniform Traffic Control Devices signal warrant criteria). The NDOT Access Management Systems and Standards developed guidelines for left-turn lane requirements for two-lane unsignalized roads were reviewed. Left-turn requirements are based on operating speeds and design hour volumes. The purpose of the review was to determine whether a separate Las Vegas Boulevard southbound left-turn lane would be necessary under build-out conditions at the entrance to the site. Based on the projected 20-year design hour volumes and the operating speeds of traffic, a Las Vegas Boulevard southbound left-turn lane at the

small in comparison to the groundwater basin volume; therefore, potential pollutants that might migrate to groundwater would not have a measurable effect on water quality.

Mining activities would lower the land surface at both the North Site and South Site to approximately 2,500 feet above mean sea level. Mining activities are not anticipated to encounter groundwater, and no dewatering would be required.

No treatment is anticipated for industrial uses; use of groundwater for dust suppression and process water would not require high quality water. Because 20 to 30 people would be working at the project site, a treated water supply may be required (a treated water supply is required for 25 or more people). Groundwater to be used for potable service would be conveyed in a system built to the standards of the NDEP Bureau of Safe Drinking Water and under permits from the Nevada Department of Conservation and Natural Resources, Division of Water Resources. If fewer than 25 people are working at the project site a treated drinking water supply is not required. As identified in Section 3.4.2.4, quality of groundwater in the Proposed Action area, for parameters measured, is within drinking water standards. However, because underlying groundwater quality is unknown and all drinking water parameters were not measured, untreated groundwater may not be potable and could adversely affect workers if used as drinking water supply.

4.4.1.5 Water Use

Water would be pumped from the Las Vegas Groundwater Basin. For all alternatives, process water would be recycled using economical methods. These methods may include mechanical presses, sealed and lined ponds, and other water treatment techniques. Stockpile areas would be designed to ensure maximum recapture of surface waters. No process water is planned to be discharged to the groundwater. The specific processes would be determined at the detail design stage by the successful applicant. Furthermore, in the long-term, on-septic system effluent would return some of the groundwater used to support personnel back into the basin as effluent slowly percolates to groundwater.

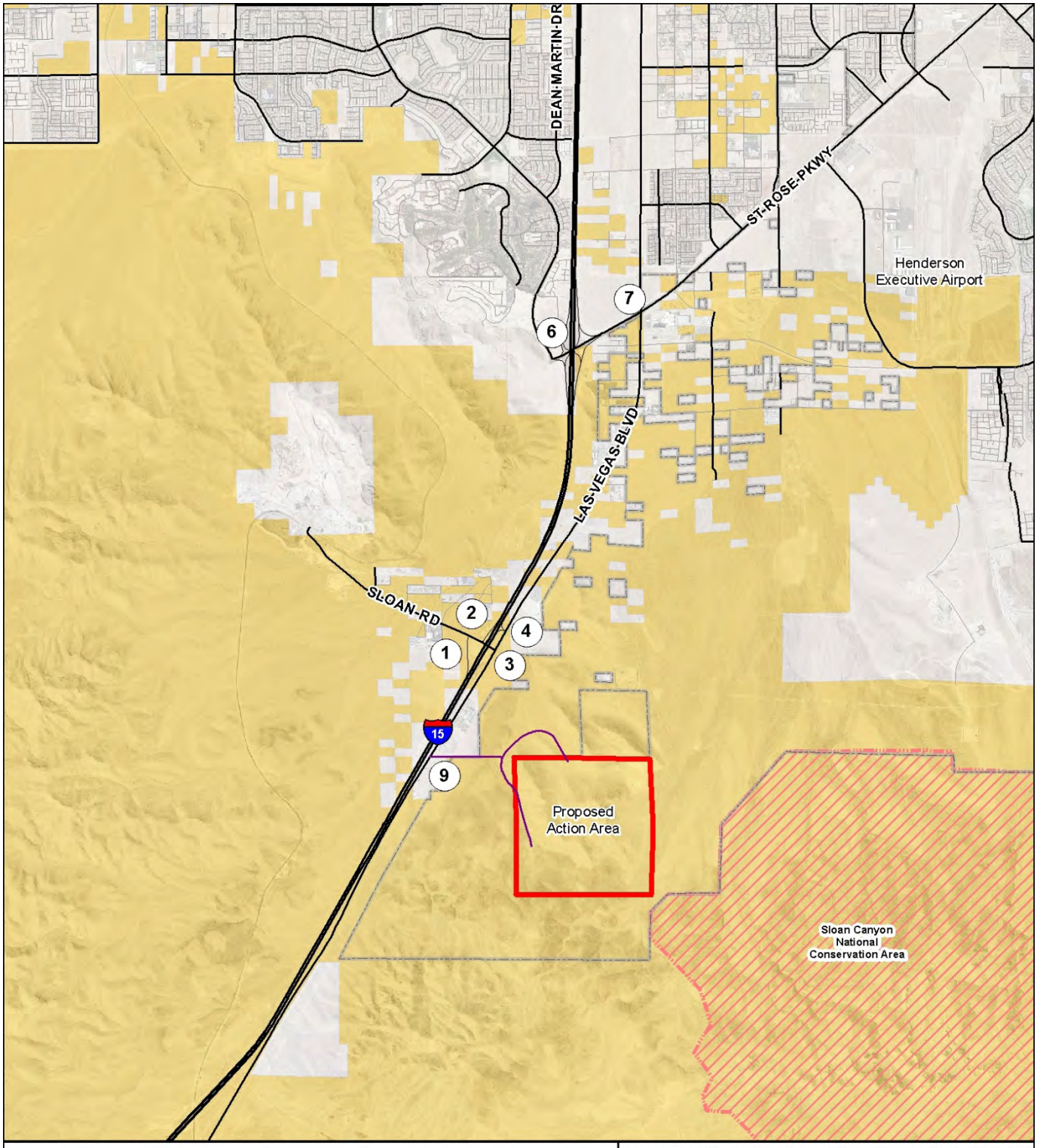
Mining of limestone and dolomite typically requires approximately 100 to 150 AFY of water per 1 million tons of mined material. The expected conservation of water supplies and use of recycled water is 85 to 90 percent. Therefore, between 2,523 and 3,465 acre-feet of water would be needed over the life of the mine at the North Site, with an additional 1,728 to 2,283 acre-feet for the mine at the South Site. Estimated annual water use for both mine sites is shown in Tables 4.4-1 and 4.4-2 for each year of operation after mining commences.

entrance to the site is required to protect the traveling public. The need for a northbound acceleration lane at the site access and Las Vegas Boulevard was also investigated. Acceleration lane requirements are based on operating speeds, 20-year projections of average daily volumes, and peak hour operations. Based on NDOT's guidelines, a northbound acceleration lane at the intersection of the site's access and Las Vegas Boulevard is not required.

One relatively inexpensive step that can be taken to ensure that the operational impacts at the intersection of South Las Vegas Boulevard and the access road are minimized is to stagger the start and stop times for mine employees so that they do not coincide with the AM and PM peak hours for traffic on surrounding roadways. For example, having employees report to work at 6:00 a.m., 1 hour before the start of the AM peak hour. It would also be beneficial if the start and stop times of the two operations are staggered so that the shift changes at both mines do not occur simultaneously.

The project duration is expected to be between 20 and 30 years. The addition of more than 1,000 fully-loaded truck trips per day over this period would have a significant impact on the pavement condition and structural integrity of the surrounding roadway network. The addition would accelerate the structural deterioration of the roads and reduce the lifespan of the pavement. As a consequence, state and county agencies would need to engage in road repairs sooner and more frequently than they would if the project did not occur.

Figure 4.10-3 shows the locations of the intersections that were analyzed under existing plus Alternative 1 traffic conditions. The existing plus Alternative 1 peak hour traffic volumes and lane arrangements for the freeway mainline and ramps are shown in Figure 4.10-4. The existing plus Alternative 1 peak hour traffic volumes and lane arrangements are shown for each intersection in Figure 4.10-5. The AM peak hour traffic volumes reflect a 1-hour time slice from counts taken between 7:00 a.m. and 9:00 a.m., while the PM peak hour traffic volumes reflect a 1-hour time slice from counts taken between 4:00 p.m. and 6:00 p.m.



Access Road & Utility Corridor
Proposed Action Area
City of Henderson Jurisdictional Boundary
National Conservation Area
Bureau of Land Management
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1 inch = 5,000 feet

5,000 2,500 0 5,000 Feet

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Proposed Sloan Hills Competitive Mineral Material Sales
Environmental Impact Statement

Figure 4.10-3
2010 Existing Plus Alternative 1
Intersections Locations

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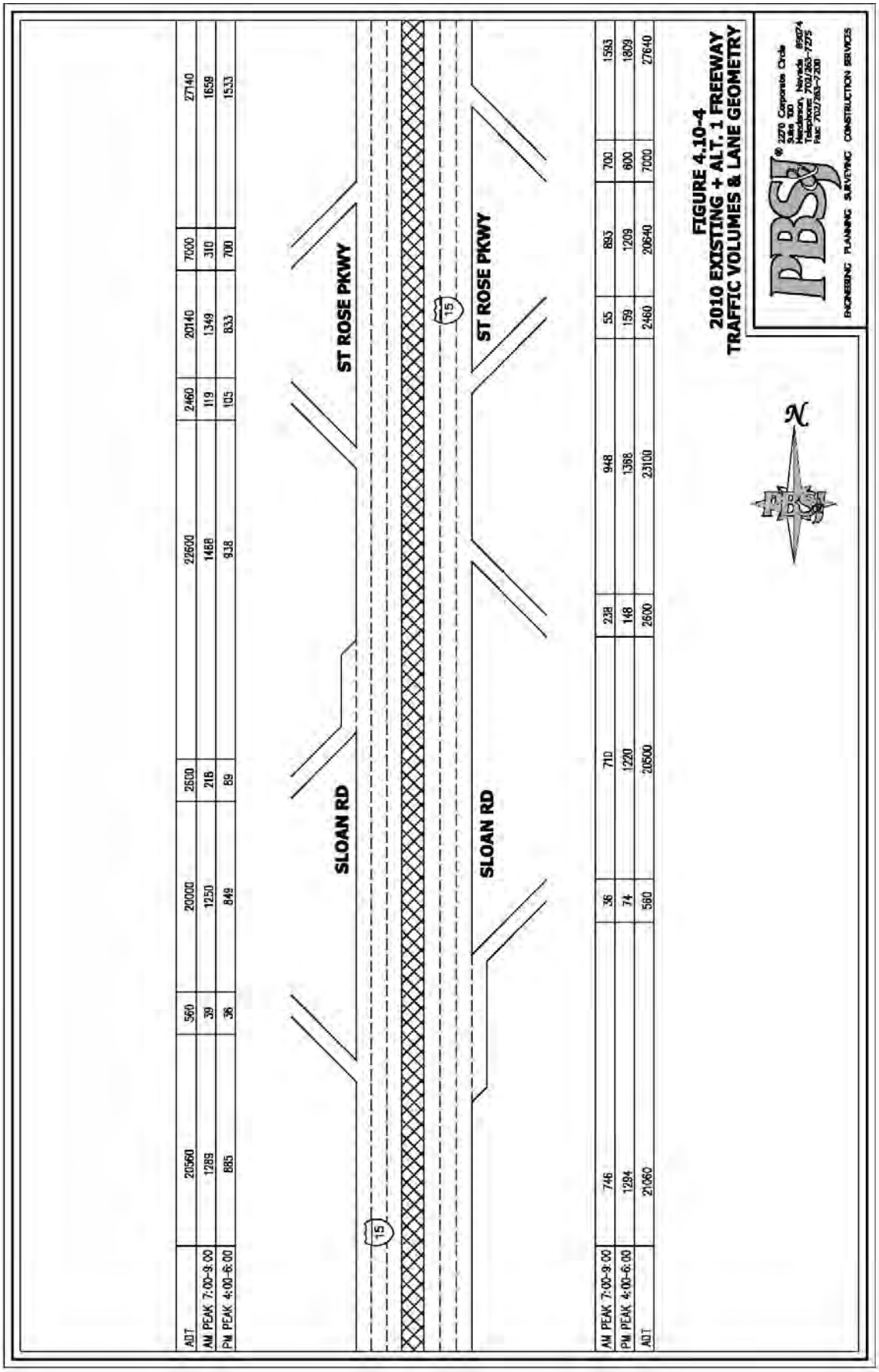

ADT	20560	560	20000	2600	22600	2460	20140	7000	27140
AM PEAK 7:00-9:00	1289	39	1250	218	1468	119	1349	310	1658
PM PEAK 4:00-6:00	885	36	849	89	938	105	833	700	1533

AM PEAK 7:00-9:00	746	36	710	238	948	55	893	700	1593
PM PEAK 4:00-6:00	1294	74	1220	148	1368	159	1209	600	1809
ADT	21060	560	20500	2600	23100	2460	20640	7000	27640

FIGURE 4.10-4
2010 EXISTING + ALT. 1 FREEWAY TRAFFIC VOLUMES & LANE GEOMETRY

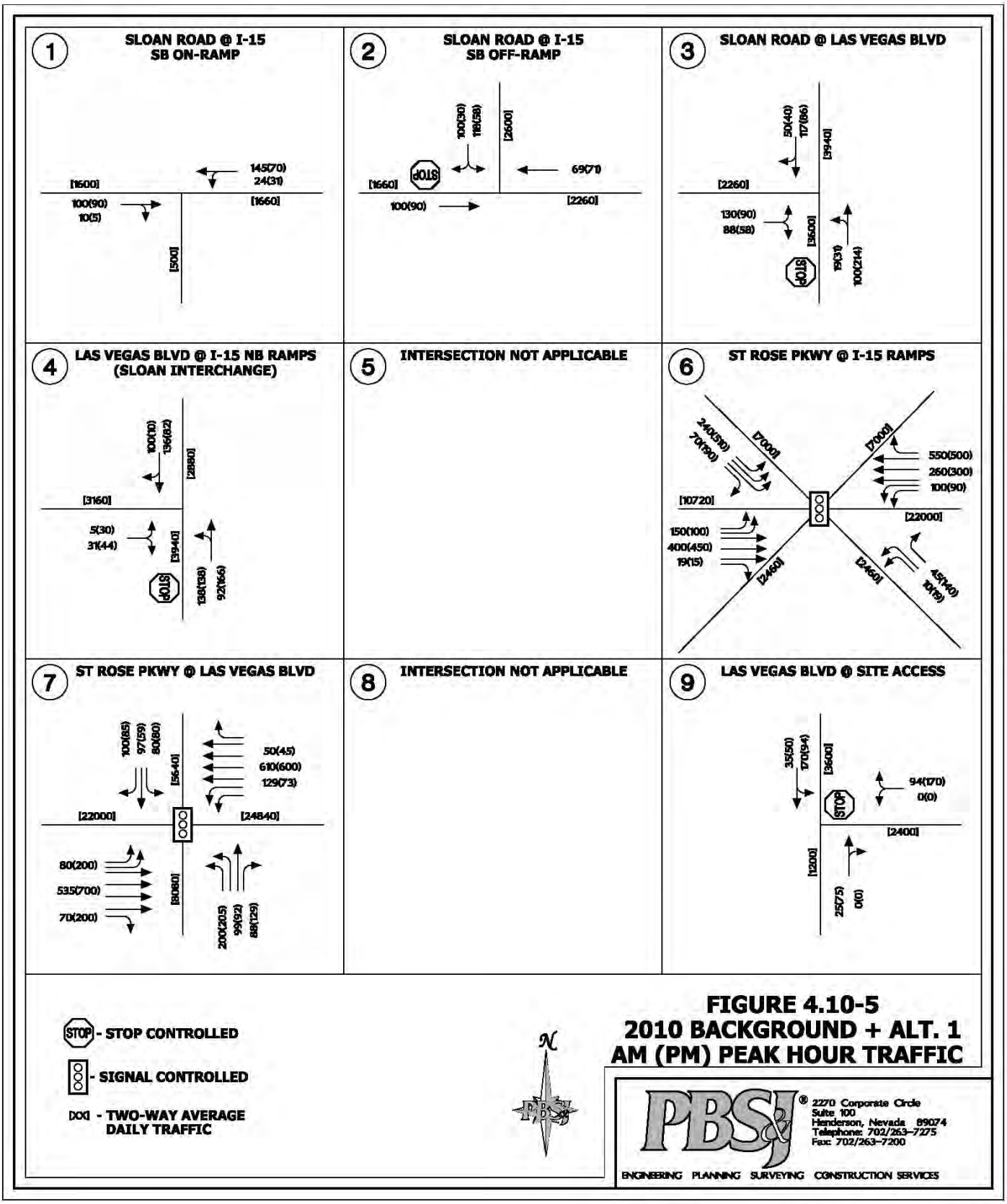

FIGURE 4.10-5
2010 BACKGROUND + ALT. 1
AM (PM) PEAK HOUR TRAFFIC

4.10.3 Alternative 2 (Sale of North Site Only)

Alternative 2 consists of the development of the North Site only. It is anticipated to take 10 years to ramp up to full production. At full production, the plant and mine equipment would be scheduled to operate based on market demand, up to 24 hours per day and 7 days per week, and would produce 5 million tons of construction aggregates per year.

Most details about transportation to and from the site is the same as described for Alternative 1. Access would be provided to the project site via the construction of a gravel road that would connect with South Las Vegas Boulevard. Table 4.10-7 shows the average number of truck trips per day for Alternative 2.

Table 4.10-7
Average Number of Truck Trips per Day for Alternative 2

	North Site	
	Year 1	Year 10
Annual Production (tons)	750,000	5,000,000
Annual Days of Operation	280	280
Average Daily Production (tons)	2,679	17,857
Haul Truck Capacity (tons)	42	42
Average Load (tons)	32	32
Average Number of Truck Trips per Year	23,438	156,250
Average Number of Truck Trips per Day	84	558

Source: TerraMins, Inc., 2009b

4.10.3.1 Trip Generation for Alternative 2

The number of trips traveling to and from the site would be 50 percent less than for Alternative 1. As shown in Table 4.10-8, an estimated 558 truck trips and 602 total trips per day would travel to and from the site.

Table 4.10-8
Trip Generation for Alternative 2

	Truck Trips		Other Vehicle Trips		Total Trips	
Time Period	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak Hour	46.5	46.5	38.5	0.5	85	47
PM Peak Hour	46.5	46.5	0.5	38.5	47	85
Daily	558	558	44	44	602	602

Other vehicle trips = trips made by employees to and from the site, plus site deliveries
Assume 38 employees and contractors
Assume 6 delivery trips to and from the site per day

4.10.3.2 Trip Distribution for Alternative 2

The trip distribution patterns for Alternative 2 would be the same as for Alternative 1 (Figure 4.10-2).

4.10.3.3 Traffic Impacts of Alternative 2

The impact of Alternative 2 on the volumes and LOS of the surrounding roadway network would be considerably less than the traffic impacts for Alternative 1 because only one of the two mine sites would be in operation. Because only minimal impacts would result from the development of Alternative 1, there would also be minimal traffic impacts from the development of Alternative 2, and all roadway segments would operate at acceptable LOS.

Similar to Alternative 1, two potentially significant impacts are associated with the development of this project:

- A potentially significant traffic impact of the initial mobilization, site preparation, and mine development phase would be due to the transportation of the heavy equipment that would be used to excavate the site. This equipment would include front-end loaders, dozers, 10,000-gallon water trucks, cranes, and forklifts. Some of this equipment would need to be transported to the site on oversized flatbed trucks.

- A potentially significant impact would be an acceleration of the structural deterioration and reduction in the lifespan of the surrounding roadway network due to project-related truck traffic. The extent to which the project would contribute to this deterioration is determined by the amount of truck traffic that would be generated by the project. Because Alternative 2 would generate half as much truck traffic as Alternative 1, it would be responsible for approximately half as much damage to the roads.

4.10.4 Alternative 3 (Sale of South Site Only)

Alternative 3 consists of the development of the South Site only. It is anticipated to take 10 years to ramp up to full production. At full production, the plant and mine equipment are scheduled to operate based on market demand, up to 24 hours per day and seven days per week, and would produce 5 million tons per year.

Most details about transportation to and from the site are the same as those described for Alternative 1. Access to the project site would be provided via the construction of a gravel road that would connect with South Las Vegas Boulevard.

Table 4.10-9 shows the average number of truck trips per day for Alternative 3.

Table 4.10-9
Average Number of Truck Trips per Day for Alternative 3

	South Site	
	Year 1	Year 10
Annual Production (tons)	250,000	5,000,000
Annual Days of Operation	280	280
Average Daily Production (tons)	893	17,857
Haul Truck Capacity (tons)	42	42
Average Load (tons)	32	32
Average Number of Truck Trips per Year	7,813	156,250
Average Number of Truck Trips per Day	28	558

Source: TerraMins, Inc., 2009b

4.10.4.1 Trip Generation for Alternative 3

The number of trips traveling to and from the site would be 50 percent less than for Alternative 1. As shown in Table 4.9-10, an estimated 558 truck trips and 602 total trips per day would travel to and from the site.

Table 4.9-10
Trip Generation for Alternative 3

	Truck Trips		Other Vehicle Trips		Total Trips	
Time Period	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak Hour	46.5	46.5	38.5	0.5	85	47
PM Peak Hour	46.5	46.5	0.5	38.5	47	85
Daily	558 558		44	44	602 602	

Other vehicle trips = trips made by employees to and from the site, plus site deliveries
Assume 38 employees and contractors.
Assume 6 delivery trips to and from the site per day.

4.10.4.2 Trip Distribution for Alternative 3

The trip distribution patterns for Alternative 3 would be the same as for Alternative 1 (Figure 4.9-2).

4.10.4.3 Traffic Impacts of Alternative 3

The impact of Alternative 3 on the volumes and LOS of the surrounding roadway network would be considerably less than the traffic impacts for Alternative 1, but the same as the impacts generated by Alternative 2. Both Alternatives 2 and 3 would generate approximately 50 percent of the traffic generated by Alternative 1. Because minimal impacts would result from the development of Alternative 1, there

would also be minimal traffic impacts from the development of Alternative 3, and all roadway segments would operate at acceptable LOS.

Similar to Alternative 1, two potentially significant impacts are associated with the development of this project:

- A potentially significant traffic impact of the initial mobilization, site preparation, and mine development phase would be due to transporting the heavy equipment that would be used to excavate the site. This equipment would include front-end loaders, dozers, 10,000-gallon water trucks, cranes, and forklifts. Some of this equipment would need to be transported to the site on oversized flatbed truck.

- A potentially significant impact would be an acceleration of the structural deterioration and reduction in the lifespan of the surrounding roadway network due to project-related truck traffic. The extent to which the project would contribute to this deterioration is determined by the amount of truck traffic that would be generated by the project. Because Alternative 3 would generate half as much truck traffic as Alternative 1, it would be responsible for approximately half as much damage to the roads.

4.10.5 Alternative 4 (Single Sale of North Site and South Site)

Alternative 4 consists of the sale of both the North Site and South Site to a single mining company. It is anticipated to take 10 years to ramp up to full production. At full production, the plant and mine equipment are scheduled to operate based on market demand, up to 24 hours per day and 7 days per week, and would produce 7 million tons of construction aggregate per year. Table 4.9-1 shows the average number of truck trips per day for Alternative 4.

Having one company operate both mines would enable a more efficient operation than Alternative 1, where two companies would be involved. These efficiencies include the following:

- Only one access point to the mine would be needed for vehicles and utilities.

- The South Site would not be needed, and the corresponding access road to the South Site would not be required.

- This alternative would have significantly fewer access and mine roads to maintain than the two separate operations running concurrently.

- This alternative would reduce onsite traffic pattern issues when compared to two separate operations running concurrently.

- Alternative 4 would have only one site parking area, not two as for two separate operations operating concurrently.
- Alternative 4 would require only one set of materials to be brought to and stored on site.

Table 4.9-11
Average Number of Truck Trips per Day for Alternative 4

	North and South Sites	
	Year 1	Year 10
Annual Production (tons)	750,000	7,000,000
Annual Days of Operation	280	280
Average Daily Production (tons)	2,679	25,000
Haul Truck Capacity (tons)	42	42
Average Load (tons)	32	32
Average Number of Truck Trips per Year	23,438	218,750
Average Number of Truck Trips per Day	84	781

Source: TerraMins, Inc., 2009b

4.10.5.1 Trip Generation for Alternative 4

The number of trips traveling to and from the site would be 30 percent less than Alternative 1 because annual production would be 7 million tons per year, as opposed to 10 million tons per year. As shown in Table 4.9-12, an estimated 781 truck trips and 842 total trips per day would travel to and from the site.

Table 4.9-12
Trip Generation for Alternative 4

	Truck Trips		Other Vehicle Trips		Total Trips	
Time Period	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak Hour	65.1	65.1	53.7	0.7	118.8	65.8
PM Peak Hour	65.1	65.1	0.7	53.7	65.8	118.8
Daily 781		781	61.4	61.4	842.4	842.4

Other vehicle trips = trips made by employees to and from the site, plus site deliveries
Assume 53 employees and contractors.
Assume 8 delivery trips to and from the site per day .

4.10.5.2 Trip Distribution for Alternative 4

The trip distribution patterns for Alternative 3 would be the same as for Alternative 1 (Figure 4.9-2).

4.10.5.3 Traffic Impacts of Alternative 4

The impact of Alternative 4 on the volumes and LOS of the surrounding roadway network would be considerably less than the traffic impacts of Alternative 1, but would be more than the impacts of Alternatives 2 and 3. Alternative 4 would generate approximately 70 percent of the traffic generated by Alternative 1. Because minimal impacts would result from the development of Alternative 1, there would also be minimal traffic impacts from the development of Alternative 4, and all roadway segments would operate at acceptable LOS.

Similar to Alternative 1, two potentially significant impacts would be associated with the development of this project:

- A potentially significant traffic impact of the initial mobilization, site preparation, and mine development phase would be due to transporting the heavy equipment that would be used to excavate the site. This equipment would include front-end loaders, dozers, 10,000-gallon water trucks, cranes, and forklifts. Some of this equipment would need to be transported to the site on oversized flatbed truck.

- A potentially significant impact would be an acceleration of the structural deterioration and reduction in the lifespan of the surrounding roadway network due to project-related truck traffic. The extent to which the project would contribute to this deterioration would be determined by the amount of truck traffic generated by the project. Because Alternative 4 would generate 70 percent as much truck traffic as Alternative 1, it would be responsible for approximately 70 percent as much damage to the roads.

4.10.6 Alternative 5 (No Action Alternative)

There would be no adverse traffic impacts to the surrounding roadway network from implementation of the No Action Alternative. Existing traffic conditions on I-15, Las Vegas Boulevard, St. Rose Parkway, and Dean Martin Drive/Industrial Road would be unaffected.

4.10.7 Mitigation Measures

The following mitigation measures will be required to reduce the magnitude of potentially significant traffic impacts:

TT1 The transportation of any heavy equipment, such as dozers and cranes, to the mine site on oversized flatbed trucks should occur during off-peak hours and along County-approved truck routes to minimize impacts to traffic on the surrounding roadway network. Alternative 1 would require the greatest amount of equipment to be assembled on site because it would involve the operation of two mines, each producing 5 million tons per year. Alternatives 2 and 3 would require the least amount of onsite equipment.

TT2 To mitigate the additional wear and accelerated structural deterioration of County roadways due to the addition of project-related truck traffic, the successful applicant would be required to enter into a fee-based Roadway Impact Agreement with the Clark County Department of Public Works to mitigate possible damage to county roads resulting from hauling material from the site. The amount of the fee would depend on the level of truck traffic added to the surrounding roadway network and would vary between the different project alternatives. Alternative 1 is estimated to contribute to the greatest deterioration; Alternatives 2 and 3 would contribute the least.

TT3 The traffic impact analysis in this section is based on limited data and assumptions provided by the project applicants (CEMEX and SRP). In particular, no turning movement data were collected that would enable estimation of the Proposed Action's potential impacts to the major intersections in the immediate vicinity; these include several intersections located immediately north of where the proposed access road would intersect South Las Vegas Boulevard: the intersection of South Las Vegas Boulevard and Sloan Road and the intersection of South Las Vegas Boulevard and the on-ramps and off-ramps to I-15. Therefore, once full production is reached, the project applicant should pay for a traffic consultant to (1) collect AM and PM peak hour turning movement counts at the major intersections in the immediate vicinity of the project, including the proposed intersection of South Las Vegas Boulevard and the mine access road, South Las Vegas Boulevard and Sloan Road, and South Las Vegas Boulevard and the on/off ramps to I-15, (2) conduct a traffic impact study to analyze the actual operations at these intersections, and (3) reevaluate the need for mitigation measures based on the data and analysis.

4.11 SOCIOECONOMICS

The region of influence for the socioeconomic analysis is Clark County, because social and economic effects occur in community and county jurisdictions rather than resource-based areas of influence. Population and labor data are provided for communities located closest to the Proposed Action area because project construction and operation workforce would be based in the nearby cities of Las Vegas, Henderson, and Sloan. Demographic data for Nevada are included to set the proposed project in a regional context.

4.11.1 Alternative 1 (Two Independent Mineral Material Sales)

Alternative 1 consists of the sale of the North Site and South Site to two separate mining companies that would operate independently. Direct effects to social and economic resources from operation and maintenance of this alternative would be minimal. These effects would be concentrated in Clark County, primarily the cities of Las Vegas and Henderson.

4.11.1.1 Employment and Economy

In 2008 Nevada ranked second in the U.S. in terms of value of overall non-fuel mineral production (Nevada Bureau of Mines and Geology, 2009). Nevada's mineral value in 2008 was copper ($569 million), followed by construction aggregate ($225 million). The local economy benefits from construction aggregate mining. In Clark County, aggregate is mined locally to reduce transportation costs and related highway safety concerns. Construction of new homes, casinos, businesses, schools, and roads requires local sources of sand, gravel, crushed stone, gypsum, and raw materials for cement, all of which are abundant in Clark County. The mining industry directly employed 12,198 people in 2008, and the industry is responsible for another 52,000 jobs related to providing the goods and services needed by the industry and its employees (Nevada Bureau of Mines and Geology, 2009).

The estimated mobilization and site preparation would take approximately 7 to 12 months, and an additional 6 months of mine development would occur after mobilization and site preparation. Excavation activities at the North Site would occur over a projected 30-year period, while the excavation activities at the South Site would occur over a projected 20-year period. Implementation of Alternative 1 would not change the current regional employment or industry trends. The estimated number of long-term, full-time employees at the site would be 20 to 30 people. Attempts would be made to hire locally for newly created positions. The average wage rate would be approximately $18 per hour. Additionally, approximately 10 to 15 contractors would be on site on an as-needed basis (TerraMins, 2009). Given the high unemployment rate (14.4 percent as of July 2010) in Clark County and the number of construction and mining workers in Clark County (74,120 and 288 employees, respectively), all new employees are anticipated to reside in the proximity of the Proposed Action area, and no substantial change to employment in the region is anticipated. Induced employment would be generated through household spending, including goods and services purchased by employees. However, because the new workers would come from the local construction workforce, there would be no significant direct impact to employment or the economy as a result of Alternative 1.

4.11.1.2 Value of Mineral Materials

The sale of mineral material is a source of government (federal and local) revenue. For the issuance of competitive mineral material sales contracts greater than $2,000 in value, the BLM requires the deposit of a performance bond of an amount sufficient to meet the reclamation standards provided for in the contract. The amount of the bond may vary depending on the contract, but would not exceed 20 percent of the total value of the contract. At the time of the sale, the BLM also requires that applicants submit a deposit that is 5 percent of the appraised value of the contract. The successful applicant of the competitive sale must also pay to the BLM a cost recovery fee and all processing costs incurred after the notice of the sale is issued. In the western states, 76 percent of the money derived from BLM mineral material sales is deposited in the Reclamation (Trust) Fund, 20 percent goes to the General (Federal) Treasury, and 4 percent goes to the state in which the sale was made.

The monetary value to be gained from the issuance of mineral material sales contracts is based on the appraised volume of the mineral materials that would be sold during the term of the contracts. During the competitive bid process, BLM would conduct a site-specific appraisal to determine the fair market value of minerals to be sold. The cost of the mineral material sales contracts would be determined during the competitive bid process, and the successful applicants would be required to pay a set fee per ton of material sold under the contracts. Currently, typical fees are approximately $1 per ton, but would vary depending on timing of the sales and the results of the site-specific appraisal. An economic analysis of the value of the mineral that would be mined under each action alternative was prepared by Thomas Carroll and Associates (Carroll, 2010). Table 4.11-1 shows the estimated value of mined aggregate materials once sold, adjusted for inflation. The data are shown in 10-year increments because contracts would be issued for a term of 10 years with the potential to renew at 10-year intervals.

Table 4.11-1
Value of Mineral Material Sales Contracts for Alternative 1

Contract Interval (years)	Aggregate Material Mined (tons)	Approximate Value of Mined Aggregate (adjusted for inflation) ($)	Government Value of Contract ($)		
			Reclamation Fund	General (Federal) Treasury	General (State) Treasury
0–10	49,650,000	769,718,677	37,734,000	9,930,000	1,986,000
10–20	100,000,000	2,261,968,799	76,000,000	20,000,000	4,000,000
20–30	50,000,000	1,764,968,655	38,000,000	10,000,000	2,000,000
Total	199,650,000	4,796,656,130	151,734,000	39,930,000	7,986,000

4.11.1.3 Population

In 2008 the populations in Las Vegas and Henderson were 593,528 and 269,538, respectively, for a combined population of 863,066. Even if newly hired workers moved into the area accompanied by a spouse and child, they would account for less than a 1 percent increase in the population of Las Vegas and Henderson; therefore, no effects to population are anticipated as a result of Alternative 1.

Because the new employees would primarily come from the local workforce, there would be no increase in population or demand for permanent or temporary housing. No direct impacts to housing are anticipated as a result of Alternative 1.

4.11.1.4 Property Valuation and Taxation

An economic impact analysis for the proposed Sloan Hills site (Carroll, 2009) indicated that property in the vicinity of the Sloan mine sold for more than twice the price of property in the vicinity of other Clark County quarries (Cactus, Blue Diamond, and Lone Mountain). However, it appears there is a direct correlation with housing prices and distance from quarrying activities. For instance, a house 2 miles from a quarry would typically sell for 14.2 percent more than an equivalent house 1 mile from the quarry,

assuming the two sales occurred at the same time. However, this may be more of a reflection of developers being able to acquire inexpensive land adjacent to established quarrying activities and offer real estate at a lower price than property owners suffering lower property values as a result of quarrying activities. With real estate prices in a continual decline, quarrying activities that provide well-paying jobs that allow families to buy housing or keep their current housing is likely to provide more stability to real estate prices than opening new quarries in the vicinity of the Sloan quarry would likely depress them (Carroll, 2009). Implementation of Alternative 1 would not result in an influx of new taxpayers or changes to property values or local taxes; therefore, no effects to property valuation and taxation is anticipated as a result of Alternative 1.

4.11.2 Alternative 2 (Sale of North Site Only)

Under Alternative 2, only the North Site would be sold by competitive bid (Figure 2.2-1).

4.11.2.1 Employment and Economy

Impacts to employment would be the same as those described for the North Site under Alternative 1.

4.11.2.2 Value of Mineral Materials

The monetary value to be gained from the issuance of mineral material sales contracts under Alternative 2 is shown in Table 4.11-2. The data are shown in 10-year increments because contracts would be issued for a term of 10 years with the potential to renew at 10-year intervals.

Table 4.11-2
Value of Mineral Material Sales Contracts for Alternative 2

Contract Interval (years)	Aggregate Material Mined (tons)	Approximate Value of Mined Aggregate (adjusted for inflation) ($)	Government Value of Contract ($)		
			Reclamation Fund	General (Federal) Treasury	General (State) Treasury
0–10	25,650,000	392,258,936	19,494,000	5,130,000	1,026,000
10–20	50,000,000	1,130,984,399	38,000,000	10,000,000	2,000,000
20–30	50,000,000	1,764,968,655	38,000,000	10,000,000	2,000,000
Total	376,950,000	9,864,635,970	286,482,000	75,390,000	15,078,000

4.11.2.3 Population

Impacts to population and housing would be the same as for Alternative 1.

4.11.2.4 Property Valuation and Taxation

Impacts to property valuation and taxation would be the same as for Alternative 1.

4.11.3 Alternative 3 (Sale of South Site Only)

Under Alternative 3, only the South Site would be sold by competitive bid (Figure 2.3-1). The North Site would not be sold and would therefore not be quarried for construction aggregate materials.

4.11.3.1 Employment and Economy

Impacts to employment would be the same as those described for the South Site under Alternative 1.

4.11.3.2 Value of Mineral Materials

The monetary value to be gained from the issuance of mineral material sales contracts under Alternative 3 is shown in Table 4.11-3. The data are shown in 10-year increments because contracts would be issued for a term of 10 years with the potential to renew at 10-year intervals.

Table 4.11-3
Value of Mineral Material Sales Contracts for Alternative 3

Contract Interval (years)	Aggregate Material Mined (tons)	Approximate Value of Mined Aggregate (adjusted for inflation) ($)	Government Value of Contract ($)		
			Reclamation Fund	General (Federal) Treasury	General (State) Treasury
0–10 years	24,000,000	377,459,741	18,240,000	4,800,000	960,000
10–20 years	50,000,000	1,130,984,399	38,000,000	10,000,000	2,000,000
Total	74,000,000	4,525,332,420	56,240,000	14,800,000	2,960,000

4.11.3.3 Population

Impacts to population and housing would be the same as for Alternative 1.

4.11.3.4 Property Valuation and Taxation

Impacts to property valuation and taxation would be the same as for Alternative 1.Alternative 4 (Single Sale of North Site and South Site).

Under Alternative 4, the BLM would sell the mineral rights, simultaneously, of the North Site and the South Site to a single applicant.

4.11.3.5 Employment and Economy

Impacts to employment would be the same as for Alternative 1.

4.11.3.6 Value of Mineral Materials

The monetary value to be gained from the issuance of mineral material sales contracts under Alternative 4 is shown in Table 4.11-4. The data are shown in 10-year increments because contracts would be issued for a term of 10 years with the potential to renew at 10-year intervals.

Table 4.11-4
Value of Mineral Material Sales Contracts for Alternative 4

Contract Interval (years)	Aggregate Material Mined (tons)	Approximate Value of Mined Aggregate (adjusted for inflation) ($)	Government Value of Contract ($)		
			Reclamation Fund	General (Federal) Treasury	General (State) Treasury
0–10	49,650,000	769,718,677	37,734,000	9,930,000	1,986,000
10–20	100,000,000	2,261,968,799	76,000,000	20,000,000	4,000,000
20–30	50,000,000	1,764,968,655	38,000,000	10,000,000	2,000,000
Total	199,650,000	4,796,656,130	151,734,000	39,930,000	7,986,000

4.11.3.7 Population

Impacts to population and housing would be the same as for Alternative 1.

4.11.3.8 Property Valuation and Taxation

Impacts to property valuation and taxation would be the same as for Alternative 1.

4.11.4 Alternative 5 (No Action Alternative)

4.11.4.1 Employment and Economy

Under the No Action Alternative, no new workers would be employed in the Sloan Hills area, and the potential for current unemployed construction and mining workers obtaining employment would not occur.

4.11.4.2 Value of Mineral Materials

Under the No Action Alternative, mining applicants would be required to find a suitable alternate site to mine construction aggregate materials. If an alternate site is chosen that is not located on lands administered by the BLM, implementation of the No Action Alternative would result in the loss of approximately $74 million and $199 million in government revenue.

4.11.4.3 Population

There would be no impacts to population or housing as a result of the No Action Alternative.

4.11.4.4 Property Valuation and Taxation

There would be no change in property values or taxation in the region as a result of the No Action Alternative.

4.11.5 Mitigation Measures

No mitigation is proposed for impacts to socioeconomics.

4.12 SPECIAL MANAGEMENT AREAS

For the purposes of this EIS, impacts on special management areas would be considered significant if an alternative would:

- Restrict public access to a special management area.
- Cause changes within a special management area that are not compatible with the management objectives of that area.

4.12.1 Alternative 1 (Two Independent Mineral Material Sales)

4.12.1.1 National Conservation Areas

Impacts on National Conservation Areas from Alternative 1 could include increased levels of fugitive dust, increased noise levels, and visual impacts in the Sloan Canyon NCA. No impacts on the Red Rock Canyon NCA are anticipated. Increased project-related dust may have unintended effects on vegetation in the Sloan Canyon NCA. Mitigation measures for dust impacts are in Section 4.1.9.

Increased noise levels from construction and operation of the proposed mines could impact the Sloan Canyon NCA. Impacts would be greatest near the northwest portion of the NCA and would decrease with distance from the proposed mine sites. Mitigation measures would minimize impacts from noise. Mitigation measures for noise impacts are in Section 4.9.6.

The project sites may be visible from the northwest portion of the Sloan Canyon NCA. Changes in the visual character of the area could change the overall experience of users of the NCA. Visual impacts would increase over the life of the mine as larger areas are mined. Mitigation measures for visual impacts are in Section 4.7.6.

Preferred access into the Sloan Canyon NCA is currently provided by a power line access road from Las Vegas Boulevard. Implementation of mining activities would affect access via this route to Hidden Valley and other areas on the west side of the NCA. Mining would not affect the BLM-designated access route into the NCA, which is provided by a dirt road entering the NCA from the north.

Once the proposed mines are operational, impacts from operations would continue for 10 years, with options to renew mineral material sales contracts at 10-year intervals. Impacts to the Sloan Canyon NCA from the implementation of Alternative 1 would be moderate and long-term.

4.12.1.2 Areas of Critical Environmental Concern

Impacts on the Sloan Rock Art ACEC from Alternative 1 could include increased levels of fugitive dust in the ACEC, increased noise levels, and visual impacts. No impacts on other ACECs are anticipated. Increased project-related dust may have unintended effects on vegetation in the NCA. Mitigation measures for dust impacts are in Section 4.1.9.

Increased noise levels from construction and operation of the proposed mines could impact the Sloan Rock Art ACEC. Impacts from noise would be minimal given the distance from the proposed project site and intervening topography. Mitigation measures would further minimize impacts from noise. Mitigation for noise impacts is in Section 4.8.6.

The project sites may be visible from the ACEC. Changes in the visual character of the area could change the overall experience of users of the ACEC. Visual impacts would increase over the life of the mine as larger areas are mined. Mitigation measures for visual impacts are in Section 4.7.6.

Overall, the impacts on the Sloan Rock Art ACEC from the Proposed Action would be significant. Once the proposed mines are operational, impacts from operations would continue for 10 years, with options to renew mineral material sales contracts at 10-year intervals.

4.12.1.3 Special Recreation Management Areas

Impacts from Alternative 1 could occur to the Jean Lake/Roach and the Las Vegas Valley SRMAs. No impacts on the Nelson/Eldorado SRMA are anticipated. Impacts on the Jean Lake/Roach and the Las Vegas Valley SRMAs would include the loss of 640 acres that were previously available for dispersed recreational uses. Increased noise, fugitive dust, and changes to the visual character of the area would affect the character and rural, undeveloped feel of the surrounding area. Impacts would decrease with distance from the proposed project sites. Mitigation measures would minimize impacts from noise, visual impacts, and dust. Mitigation measures for dust impacts are in Section 4.1.9; mitigation measures for visual impacts are in Section 4.8.6; and mitigation measures for noise impacts are in Section 4.9.6.

Overall, the impacts on SRMAs from the Proposed Action would be significant. Once the proposed mines are operational, impacts from operations would continue for 10 years, with options to renew mineral material sales contracts at 10-year intervals.

4.12.1.4 Wilderness Areas

Impacts on wilderness from Alternative 1 would be limited to the North McCullough Wilderness Area. The South McCullough Wilderness Area and other wilderness areas in Clark County would not be

impacted by Alternative 1. No direct impacts on the North McCullough Wilderness Area would occur because its boundary is approximately 1 mile southeast of the Proposed Action area.

Indirect impacts from Alternative 1 could occur to the wilderness characteristics of naturalness and outstanding opportunities for solitude. Increased project-related dust occurring outside the North McCullough Wilderness Area may have unintended effects on wilderness vegetation. The North McCullough Wilderness Area is becoming increasingly isolated within areas of modern development, and the impacts from Alternative 1 could alter its wildlife patterns. Implementation of Alternative 1 may impact the opportunity for people to experience solitude within the North McCullough Wilderness Area due to increased development, project-related noise, and visual impacts.

Noise associated with Alternative 1 may detract from the wilderness character of the North McCullough Wilderness Area. Impacts from noise would be greatest near the northwest portion of the Wilderness and would decrease with distance from the proposed mine sites. Noise impacts from Alternative 1 would likely be similar to ongoing impacts associated with helicopter and airplane flights over the Wilderness. Mitigation measures would minimize impacts from noise. Mitigation measures for noise impacts are in Section 4.9.6.

The open pit mines may be visible from the northwest portion of the North McCullough Wilderness Area. The changes in the visual character of the area outside of the North McCullough Wilderness Area may impact its wilderness character. Over time, visual impacts on the North McCullough Wilderness Area from the Proposed Action would likely increase as larger areas are mined. Mitigation measures for visual impacts are in Section 4.8.6.

Overall, the impacts on wilderness from the Proposed Action would be significant. Once the proposed mines are operational, impacts from operations would continue for 10 years, with options to renew mineral material sales contracts at 10-year intervals.

4.12.2 Alternative 2 (Sale of North Site Only)

Impacts on special management areas for Alternative 2 would be similar to those described for Alternative 1.

4.12.3 Alternative 3 (Sale of South Site Only)

Impacts on special management areas for Alternative 3 would be similar in scope and nature to those for Alternative 1. However, impacts from mine operations would occur only for 20 years under Alternative 3, rather than the 30 years for the other alternatives.

4.12.4 Alternative 4 (Single Sale of North Site and South Site)

Impacts on special management areas for Alternative 4 would be similar to those described for Alternative 1.

4.12.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, the proposed project and infrastructures would not be built. Therefore, there would be no impacts to special management areas.

4.12.6 Mitigation Measures

Mitigation measures for dust control (Section 4.1.9), visual resources (Section 4.7.6), and noise (Section 4.8.6) would minimize impacts on special management areas.

4.13 RECREATION

For the purposes of this EIS, impacts on recreational resources and wilderness would be considered significant if they result in:

- Visual impacts
- Noise impacts
- Dust/air quality impacts

4.13.1 Alternative 1 (Two Independent Mineral Material Sales)

Implementation of Alternative 1 would affect recreational resources because it would remove 640 acres that were previously available for dispersed recreation. Other impacts, such as increased noise, dust, and traffic, would affect the character and rural, undeveloped feel of the surrounding area. These impacts could have negative impacts on people engaged in hiking, camping, birding and other wildlife observation and study, and hunting in the undeveloped surrounding environment. The new access roads would provide improved access to the area, which could lead to increased recreational opportunities and increased impacts from human use.

The proposed mine sites are within the BLM OHV closure area for the Las Vegas Valley. However, construction of access roads for the mine sites may provide additional or more convenient access to BLM-administered lands south of the mines that are open for OHV use.

Other recreational users of the project vicinity, including within the NCA, may experience more interaction with other users if use levels increase. Users near mine sites would experience increased levels of noise and dust as well as changes to the visual character of the area. Impacts from noise, dust, and visual changes are expected to decrease with distance from the proposed mine sites.

The BLM has specific management objectives for each ROS class. The Proposed Action area is designated as Roaded Natural, while the North McCullough Wilderness Area is classified as ROS class Primitive, and the Sloan Canyon NCA is ROS class Semi-primitive Non-motorized. The management objectives for the Proposed Action area and nearby public lands are shown in Table 4.13-1. Implementation of Alternative 1 would result in the Proposed Action area being closed to further recreation opportunities.

4.13.2 Alternative 2 (Sale of North Site Only)

Impacts on recreational resources from implementation of Alternative 2 would be similar to those described for Alternative 1.

4.13.3 Alternative 3 (Sale of South Site Only)

Impacts on recreational resources from implementation of Alternative 3 would be similar to those described for Alternative 1. However, impacts from mine operations would last only for 20 years under Alternative 3 rather than the 30 years for the other alternatives.

4.13.4 Alternative 4 (Single Sale of North Site and South Site)

Impacts on recreational resources from implementation of Alternative 4 would be similar to those described for Alternative 1.

4.13.5 Alternative 5 (No Action Alternative)

Under the No Action Alternative, the proposed project and infrastructures would not be built. Therefore, there would be no impacts related to recreation.

4.13.6 Mitigation Measures

Mitigation measures for dust control (Section 4.1.8), visual resources (Section 4.8.6), noise (Section 4.9.6), and traffic (Section 4.10.7) would minimize impacts on recreation and wilderness areas.

Table 4.13-1
Recreation Opportunity Spectrum Management Objectives

ROS Class	Management Objective
Primitive (North McCullough Wilderness)	The primitive class is managed to be essentially free from evidence of humans and onsite controls. Motor vehicle use in the area is not permitted. The area is managed to maintain an extremely high probability of experiencing isolation from others (not more than three to six encounters per day) and little to no managerial contact. Independence, closeness to nature, self-reliance, and an environment that offers a high degree of challenge and risk characterize this class. Back-country use and management of renewable resources is subject to the protection of back-country recreational values.
Semi-primitive Non-motorized (Sloan Canyon NCA and some undeveloped public lands)	Semi-primitive non-motorized areas are managed to be largely free from the evidence of humans and onsite controls. Motor vehicle use is not permitted (except as authorized). Facilities for the administration of livestock and for visitor use are allowed but limited. Project designs stress the protection of natural values and maintenance of the predominantly natural environment. Areas are managed to maintain a good probability of experiencing minimum contact with others, self-reliance through the application of back-country skills, and an environment that offers a high degree of risk and challenge. Back-country use and management of renewable resources are dependent on maintaining naturally occurring ecosystems. The consumption of renewable resources is subject to the protection of back-country recreational values.
Rural (Low density residential areas and some undeveloped public lands)	Rural areas are managed to provide a setting that is substantially modified with moderate to high evidence of civilization. Motor vehicle use is permitted. Concentration of users is often high with substantial evidence of others. Resource modification and use practices are mostly dominant in a somewhat manicured environment. Standards for road, highway, and facility development are high for user convenience. Frequency of managerial contact with visitors is moderate to high.

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