CHAPTER 7
Additional Analysis of Project Impacts

This additional analysis of project impacts includes an assessment of construction impacts, soil and vegetation impacts, a growth analysis, and a visibility and deposition analysis. As listed in Chapter 3, *Emissions Estimates*, the proposed Mojave Mill Project is expected to emit the air pollutants in the quantities listed in **Table 7-1**.

TABLE 7-1
SUMMARY OF POTENTIAL FACILITY-WIDE EMISSIONS

Pollutant	Potential Project Emissions (tpy)
NOx	22.79
CO	418.99
PM	17.70
PM_{10}	12.84
$PM_{2.5}$	10.95
SO_2	23.12
VOC	22.70
H_2SO_4 Mist	0.00
Lead	0.05
Fluorides	0.00
H_2S	0.00
TRS	0.00
Mercury	0.04
GHGs (CO_2e)	100,092

NOTES: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; H_2S = hydrogen sulfide; H_2SO_4 = sulfuric acid; NO_X = nitrogen oxides; PM = total particulate matter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; tpy = tons per year; TRS = total reduced sulfur; VOC = volatile organic compounds

SOURCE: Data compiled by Environmental Science Associates in 2024

7.1 Construction Impacts

A final environmental impact report (EIR) was prepared for the project in accordance with the California Environmental Quality Act (CEQA) Guidelines. As required by CEQA, the EIR includes appropriate review and analysis of the project's environmental impacts and mitigation measures to reduce those impacts. On March 19, 2024, the Kern County Board of Supervisors certified the final Mojave Micro Mill

Project EIR (State Clearinghouse Number [SCH No.] 2022100646); adopted Section 15091 Findings of Fact and a Section 15093 Statement of Overriding Considerations; and adopted the revised Mitigation Monitoring and Reporting Program.

The certified EIR determined that construction would result in a less-than-significant impact for other emissions (such as those leading to odors) adversely affecting a substantial number of people. The EIR determined that construction would result in a significant impact related to potential conflicts with or obstructed implementation of the Eastern Kern Air Pollution Control District (EKAPCD) 2023 Air Quality Attainment Plan. However, construction would be required to comply with applicable EKAPCD rules and regulations. Further, with implementation of EIR Mitigation Measures 4.3-1 and 4.3-2, construction emissions would be reduced to below the EKAPCD significance thresholds. Therefore, construction impacts related to potential conflicts with or obstructed implementation of the EKAPCD 2023 Air Quality Attainment Plan would be reduced to a less-than-significant level.

The EIR determined that project construction would result in a significant impact related to a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard, because temporary unmitigated emissions of nitrogen oxides (NO_X) would exceed the EKAPCD significance threshold. However, with implementation of EIR Mitigation Measures 4.3-1 and 4.3-2, NO_X construction emissions would be reduced to below the EKAPCD significance threshold. Therefore, construction emissions would be reduced to a less-than-significant level.

The EIR determined that construction would result in a significant impact related to exposure of sensitive receptors to substantial pollutant concentrations. With implementation of EIR Mitigation Measures 4.3-1 and 4.3-2, construction-related health risk impacts would be reduced to a less-than-significant level. With implementation of EIR Mitigation Measures 4.3-1, 4.3-2, and 4.3-3, construction-related visibility impacts would be reduced to a less-than-significant level. With implementation of EIR Mitigation Measures 4.3-2, 4.3-4, and 4.3-5, construction-related Valley Fever impacts would be reduced to a less-than-significant level. Impacts related to carbon monoxide (CO) hotspots and asbestos would be less than significant. In summary, construction impacts related to exposure of sensitive receptors to substantial pollutant concentrations would be reduced to a less-than-significant level.

With respect to greenhouse gas (GHG) emission impacts, the EIR determined that the project would generate GHG emissions that would not conflict with applicable GHG reduction plans and policies. Further, given that GHG emission impacts are inherently cumulative, the project's incremental contribution to cumulatively significant GHG emissions would be less than cumulatively considerable, and impacts would be less than significant.

7.1.1 Mitigation Measures

Consistent with the mitigation measures included in the final EIR for the Mojave Micro Mill Project, and as described above, the following mitigation measures would be implemented to minimize the potential impacts of the project on air quality.

7.1.1.1 Mitigation Measure 4.3-1

To control NO_X and PM [particulate matter] emissions during construction and operation, the Project proponent/operator and/or its contractor(s) shall implement the following measures during by the County:

a. Off-road equipment engines over 25 horsepower shall be equipped with United States Environmental Protection Agency (EPA) Tier 4 or higher.

b. All equipment shall be maintained in accordance with the manufacturer's specifications.

c. Heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 5 minutes.

d. Notification shall be provided to trucks and vehicles in loading or unloading queues that their engines shall be turned off when not in use for more than 5 minutes.

e. Electric equipment shall be used to the extent feasible in lieu of diesel or gasoline powered equipment.

f. All vehicles shall be equipped with proper emissions control equipment and kept in good and proper running order to substantially reduce NO_X emissions.

g. Existing electric power sources shall be used to the extent feasible. This measure would minimize the use of higher polluting gas or diesel generators.

h. The hours of operation of heavy-duty equipment and/or the quantity of equipment in use shall be limited to the extent feasible.

Time Frame for Implementation and Responsible Monitoring Agency

Mitigation Measure 4.3-1 would be implemented during construction and operation of the facility. The Kern County Planning and Natural Resources Department would be the responsible monitoring agency.

Steps to Compliance

a. This mitigation measure shall be incorporated as a condition of approval for any site plan review.

b. The Project proponent shall ensure construction and operation parameters, as identified in the mitigation measure, are adopted, and maintained.

c. Kern County Natural Resources Department shall verify in the field during the construction phase of the Project.

7.1.1.2 Mitigation Measure 4.3-2

To control fugitive PM emissions during construction, prior to the issuance of grading or building permits and any earthwork activities, the Project proponent shall prepare a comprehensive Fugitive Dust Control Plan for review and approval by the Eastern Kern Air Pollution Control District and submitted to the Kern County Planning and Natural Resources Department. The plan shall include all Eastern Kern Air Pollution Control District recommended measures, including but not limited to, the following:

a. All soil being actively excavated or graded shall be sufficiently watered to prevent excessive dust. Watering shall occur as needed with complete coverage of disturbed soils areas. Watering shall take place a minimum of three times daily where soil is being actively disturbed unless dust is otherwise controlled by rainfall or use of a dust suppressant.

b. Vehicle speed for all on site (i.e., within the Project boundary) construction vehicles shall not exceed 15 mph [miles per hour] on any unpaved surface at the construction site. Signs identifying construction vehicle speed limits shall be posted along onsite roadways, at the site entrance/exit, and along unpaved site access roads.

c. Vehicle speeds on all offsite unpaved Project site access roads (i.e., outside the Project boundary) construction vehicles shall not exceed 25 mph. Signs identifying vehicle speed limits shall be posted along unpaved site access roads and at the site entrance/exit.

d. All onsite unpaved roads shall be effectively stabilized of dust emissions using water or Eastern Kern Air Pollution Control District approved dust suppressants/palliatives, sufficient to prevent wind-blown dust from exceeding 20 percent opacity for more than three minutes in an hour and to ensure fugitive dust would not be visible beyond the property line. If water is used, watering shall occur a minimum of three times daily, sufficient to keep soil moist along actively used roadways. During the dry season, unpaved road surfaces and vehicle parking/staging areas shall be watered immediately prior to periods of high use (e.g., worker commute periods, truck convoys). Reclaimed (nonpotable) water shall be used to the extent available and feasible.

e. The amount of the disturbed area (e.g., grading, excavation) shall be reduced and/or phased where possible.

f. All disturbed areas shall be sufficiently watered or stabilized by Eastern Kern Air Pollution Control District approved methods to prevent excessive dust. On dry days, watering shall occur a minimum of three times daily on actively disturbed areas. Watering frequency shall be increased whenever wind speeds exceed 15 mph or, as necessary, to prevent wind-blown dust exceeding 20 percent opacity at nearby residences or public roads. Reclaimed (nonpotable) water shall be used to the extent available and feasible.

g. All clearing, grading, earth-moving, and excavation activities shall cease during periods when dust plumes of 20 percent or greater opacity affect public roads or nearby occupied structures.

h. All disturbed areas anticipated to be inactive for periods of 30 days or more shall be treated to minimize wind-blown dust emissions. Treatment may include, but is not limited to, the application of an Eastern Kern Air Pollution Control District approved chemical dust suppressant, gravel, hydro-mulch, revegetation/seeding, or wood chips.

i. All active and inactive disturbed surface areas shall be stabilized, where feasible.

j. Equipment and vehicle access to disturbed areas shall be limited to only those vehicles necessary to complete the construction activities.

k. Where applicable, permanent dust control measures shall be implemented as soon as possible following completion of any soil-disturbing activities.

l. Stockpiles of dirt or other fine loose material shall be stabilized by watering or other appropriate methods sufficient to reduce visible dust emissions to a limit of 20 percent opacity. If necessary and where feasible, three-sided barriers shall be constructed around storage piles and/or piles shall be covered by use of tarps, hydro-mulch, woodchips, or other materials sufficient to minimize wind-blown dust.

m. Water shall be applied prior to and during the demolition of onsite structures sufficient to minimize wind-blown dust.

n. Where acceptable to the fire department and feasible, weed control shall be accomplished by mowing instead of disking, thereby leaving the ground undisturbed and with a mulch covering.

o. All trucks hauling dirt, sand, soil, or other loose materials shall be covered or shall maintain at least six inches of freeboard (minimum vertical distance between top of the load and top of the trailer) in accordance with California Vehicle Code Section 23114.

p. Gravel pads, grizzly strips, or other material track-out control methods approved for use by Eastern Kern Air Pollution Control District shall be installed where vehicles enter or exit unpaved roads onto paved roadways.

q. Haul trucks and off-road equipment leaving the site shall be washed with water or high-pressure air, and/or rocks/grates at the Project entry points shall be used, when necessary, to remove soil deposits and minimize the track out/deposition of soil onto nearby paved roadways.

r. During construction, paved road surfaces adjacent to the site access road(s), including adjoining paved aprons, shall be cleaned, as necessary, to remove visible accumulations of track-out material. If dry sweepers are used, the area shall be sprayed with water prior to sweeping to minimize the entrainment of dust. Reclaimed water shall be used to the extent available.

s. Portable equipment, 50 horsepower or greater, used during construction activities (e.g., portable generators) shall require California statewide portable equipment registration (issued by California Air Resources Board) or an Eastern Kern Air Pollution Control District permit.

t. The Fugitive Dust Control Plan shall identify a designated person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures, as necessary, to minimize the transport of dust off site and to ensure compliance with identified fugitive dust control measures. Contact information for a hotline shall be posted on site should any complaints or concerns be received during working hours and holidays and weekend periods when work may not be in progress. The names and telephone numbers of such persons shall be provided to the Eastern Kern Air Pollution Control District Compliance Division prior to the start of any grading or earthwork.

u. Signs shall be posted at the Project site entrance and written notifications shall be provided a minimum of 30 days prior to initiation of Project construction to residential land uses located within 1,000 feet of the Project site. The signs and written notifications shall include the following information: (a) Project Name; (b) Anticipated Construction Schedule(s); and (c) Telephone Number(s) for designated construction activity monitor(s) or, if established, a complaint hotline.

v. The designated construction monitor shall document and immediately notify Eastern Kern Air Pollution Control District of any air quality complaints received. If necessary, the Project operator and/or contractor will coordinate with Eastern Kern Air Pollution Control District to identify any additional feasible measures and/or strategies to be implemented to address public complaints.

w. The solar array shall obtain a permit from the Eastern Kern Air Pollution Control District and implement phased removal of vegetation from the site to ensure dust control during construction.

Time Frame for Implementation and Responsible Monitoring Agency

Mitigation Measure 4.3-2 would be implemented before the issuance of any grading permit. The Kern County Planning and Natural Resources Department and EKAPCD would be the responsible monitoring agencies.

Steps to Compliance

a. This mitigation measure shall be incorporated as a condition of approval for any site plan review.

b. The Project proponent shall prepare a Fugitive Dust Control Plan, as identified in the mitigation measure.

c. The Project proponent shall submit the Fugitive Dust Control Plan to the Eastern Kern Air Pollution Control District and the Kern County Planning and Natural Resources Department for review and approval prior to the issuance of any grading permit.

d. The Kern County Public Works Department shall verify compliance of vehicular control measures in the field during the construction and decommissioning phases of the Project.

e. The notice shall be mailed to all parcels within 1,000 feet of the Project site and one sign shall be posted at the construction site, no sooner than 30 days prior to construction.

f. Documentation shall be sent to the Kern County Planning and Natural Resources Department.

g. The Kern County Public Works Department shall verify in the field during the construction phase of the Project.

7.1.1.3 Mitigation Measure 4.3-3

Complete a screening procedure approved by the Federal Land Manager that demonstrates the 98th percentile change in light extinction is less than 5 percent for each modeled year, when compared to the annual average natural condition value for the Class I areas within 100 km [kilometers] of the proposed site.

Time Frame for Implementation and Responsible Monitoring Agency

Mitigation Measure 4.3-3 would be implemented before the issuance of building or grading permits. The Federal Land Manager and Kern County Planning and Natural Resources Department would be the responsible monitoring agencies.

Steps to Compliance

a. This mitigation measure shall be incorporated as a condition of approval for any site plan review.

b. The proponent shall submit a screening procedure to the Federal Land Manager for approval prior to the issuance of building or grading permits.

c. Contact information for the Federal Land Manager and a copy of the submitted screening procedure shall be submitted to the Kern County Planning and Natural Resources Department to be kept on file.

7.1.1.4 Mitigation Measure 4.3-4

To minimize personnel and public exposure to potential Valley Fever-containing dust on and off site, the following control measures shall be implemented during Project construction:

a. Equipment, vehicles, and other items shall be thoroughly cleaned of dust before they are moved off site to other work locations.

b. Wherever possible, grading, and trenching work shall be phased so that earth-moving equipment is working well ahead or downwind of workers on the ground.

c. The area immediately behind grading or trenching equipment shall be sprayed with water before ground workers move into the area.

d. In the event that a water truck runs out of water before dust is sufficiently dampened, ground workers being exposed to dust shall leave the area until a truck can resume water spraying.

e. To the greatest extent feasible, heavy-duty earth-moving vehicles shall be closed-cab and equipped with a HEP-filtered air system.

f. Workers shall receive training in procedures to minimize activities that may result in the release of airborne Coccidioides immitis (CI) spores, to recognize the symptoms of Valley Fever, and shall be instructed to promptly report suspected symptoms of work-related Valley Fever to a supervisor. Evidence of training shall be provided to the Kern County Planning and Natural Resources Department within 5 days of the training session.

g. A Valley Fever informational handout shall be provided to all onsite construction personnel. The handout shall, at a minimum, provide information regarding the symptoms, health effects, preventative measures, and treatment. Additional information and handouts can be obtained by contacting the Kern County Public Health Services Department.

h. Onsite personnel shall be trained on the proper use of personal protective equipment, including respiratory equipment. National Institute for Occupational Safety and Health-approved respirators shall be provided to onsite personnel, upon request. When exposure to dust is unavoidable, provide appropriate NIOSH [National Institute for Occupational Safety and Health]-approved respiratory protection to affected workers. If respiratory protection is deemed necessary, employers must develop and implement a respiratory protection program in accordance with Cal/OSHA's [California Division of Occupational Safety and Health] Respiratory Protection standard (8 CCR [California Code of Regulations] 5144).

Time Frame for Implementation and Responsible Monitoring Agency

Mitigation Measure 4.3-4 would be implemented during construction of the Project. The Kern County Public Health Services Department, Kern County Planning Department, and Kern County Public Works Department would be the responsible monitoring agencies.

Steps to Compliance

a. This mitigation measure shall be incorporated as a condition of approval for any site plan review.

b. All Valley Fever materials shall be provided to all construction personnel prior to construction activities.

c. The Project proponent shall ensure practices are implemented as outlined in mitigation.

d. The proponent shall provide training session materials, handout(s), and schedule of training to Kern County Planning and Natural Resources Department within 5 days of the training session.

e. Kern County Public Works Department shall verify compliance in the field during construction.

7.1.1.5 Mitigation Measure 4.3-5

Prior to the issuance of any grading permit, a one-time fee shall be paid to the Kern County Public Health Services Department in the amount of $3,200 for Valley Fever public awareness programs.

Time Frame for Implementation and Responsible Monitoring Agency

Mitigation Measure 4.3-5 would be implemented before the issuance of grading permits. The Kern County Public Health Services Department and Kern County Planning Department would be the responsible monitoring agencies.

Steps to Compliance

a. This mitigation measure shall be incorporated as a condition of approval for any site plan review.

b. The Project proponent shall pay the one-time fee to the Kern County Public Health Services Department.

c. The proponent shall provide proof of payment to the Kern County Planning and Natural Resources Department prior to issuance of grading permits.

7.1.1.6 Mitigation Measure 4.3-6

Prior to the issuance of grading or building permits, a COVID Health and Safety Plan shall be prepared in accordance with the California Department of Public Health Guidance. A copy of the COVID Health and Safety Plan shall be submitted to the Kern County Planning and Natural Resources Department for review and approval.

Time Frame for Implementation and Responsible Monitoring Agency

Mitigation Measure 4.3-6 would be implemented before the issuance of grading or building permits. The Kern County Planning Department would be the responsible monitoring agency.

Steps to Compliance

This mitigation measure shall be incorporated as a condition of approval.

7.2 Vegetation Impacts

This section describes the vegetation resources that could be affected by emissions of CO, carbon dioxide (CO_2), nitrogen dioxide (NO_2), particulate matter equal to and less than 10 microns or less than 2.5 microns in diameter (PM_{10}/$PM_{2.5}$), sulfur dioxide (SO_2), and volatile organic compounds (VOCs), and synergistic effects of pollutants produced by the project. Included are descriptions of the plant communities found within the immediate project vicinity and the potential effects of the project's air pollutant emissions on vegetation.

Impacts on vegetation can occur through both acute and prolonged or chronic exposures to pollution. Impacts of acute exposure have been observed as internal physical damage to leaf tissues, while impacts from chronic or prolonged exposure are associated with a decreased ability to perform physiological processes such as photosynthesis, carbon allocation, and stomatal functioning (Hill and Littlefield 1969; Hällgren 1984; USEPA 2018). Potential impacts on vegetation from the project's air pollutant emissions are evaluated below based on publicly available data and peer-reviewed papers, as well as the U.S. Environmental Protection Agency's (USEPA) Integrated Science Assessments of criteria pollutants.

USEPA has indicated that ambient air concentrations of criteria pollutants below the secondary national ambient air quality standards (NAAQS) standards generally will not result in harmful effects, although sensitive vegetation species and soil types may experience harmful effects at low ambient air concentrations for regulated pollutants for which no NAAQS are established (USEPA 1990). The project area is characterized by grasslands and shrub communities in the Mojave Basin and Range ecoregion, with a warm, dry climate (Griffith et al. 2016). As classified by the Kern County Planning and Natural

Resources Department (2023), natural vegetation communities and vegetated land cover types within the project area include the following:

- Allscale Scrub (*Atriplex polycarpa* Shrubland Alliance), dominated by allscale and interspersed with other shrub species including western Joshua trees and with a dense layer of herbaceous vegetation.
- Creosote Bush Scrub (*Larrea tridentata* Shrubland Alliance), similar to Allscale Scrub, although allscale and creosote bush are co-dominant.
- Red Brome or Mediterranean Grass Grasslands (*Bromus rubens*—*Schismus* [*arabicus, barbatus*] Herbaceous Semi-Natural Alliance), characterized by a dense, low-growing herbaceous layer of red brome and Mediterranean grass, along with other forbs.
- Disturbed Creosote Bush Scrub (*Larrea tridentata* Shrubland Alliance), similar to Creosote Bush Scrub, although the habitat has been altered by vegetation removal.

Although the above-listed communities are not classified as sensitive natural communities, the western Joshua tree (*Yucca brevifolia*), a state candidate species for listing as threatened, also occurs at the project site (Kern County Planning and Natural Resources Department 2023).

Overall, the project's emissions of criteria pollutants would not cause or contribute to an exceedance of the NAAQS, and the project area is designated as Unclassified/Attainment or Maintenance for all NAAQS except the eight-hour ozone standard.[1] The project area is in attainment for all California ambient air quality standards except the eight-hour ozone standard and the 24-hour PM_{10} standard. Therefore, the project is not expected to cause significant adverse impacts on vegetation. A discussion of each federally regulated criteria pollutant is included below.

7.2.1 Carbon Monoxide

Increases in CO emissions have the potential to adversely affect vegetation. Direct effects of exposure to high concentrations of CO include reduced photosynthesis rates and an increased potential for oxidative damage, and indirect effects of CO on vegetation include changes in soil pH (USEPA 2020a; Muneer et al. 2014). Plants with an increased exposure to CO overproduce reactive oxygen species (including hydrogen peroxide and singlet oxygen), resulting in reduced photosynthesis and carbohydrate and sucrose (Muneer et al. 2014). The enhanced production of reactive oxygen species can threaten plant cells and deplete energy and may affect processes such as plant growth, development, stomatal responses, and stress responses (Mittler et al. 2004). Alternatively, some plants remove gaseous air pollutants, including CO, from the air (USEPA 2020a).

The modeled maximum eight-hour and one-hour CO concentrations from emissions produced by the project are predicted to be 18.48 micrograms per cubic meter ($\mu g/m^3$) and 97.80 $\mu g/m^3$, respectively. Overall, project emissions of CO would not cause or contribute to an exceedance of the NAAQS, and the project area is designated as Unclassified/Attainment for CO; therefore, adverse impacts on vegetation from CO emissions are not anticipated. The modeling results are included in Appendix H.

[1] Attainment status presented here is based on the NAAQS.

7.2.2 Carbon Dioxide

USEPA has indicated that an evaluation of additional impacts from GHG emissions is not necessary, or possible, given current climate change modeling (USEPA 2010). However, studies indicate that CO_2 does not adversely affect vegetation. Rather, vegetation exposed to elevated CO_2 levels exhibits an increase in nitrogen use and photosynthesis efficiency (Drake et al. 1997). Therefore, the project's CO_2 emissions are not expected to adversely affect vegetation within the project vicinity.

7.2.3 Sulfur Dioxide

Exposure to SO_2 can negatively affect various types of vegetative communities including trees, shrubs, herbaceous plants, and crop plants (Kozlowski and Constantinidou 1986). Acute and chronic exposure to SO_2 directly affects vegetation by inhibiting photosynthesis, disrupting photosynthetic mechanisms, and causing water loss within plant cells. These direct effects appear as flecking, bronzing, and necrosis of leaf tissue (Kozlowski and Constantinidou 1986).

Long-term exposure to high concentrations of SO_2 may also reduce the quantity and quality of plant yield. Injuries to vegetation vary by species, as well as by dose and exposure duration. In a study assessing the impact of SO_2 exposure on lichens—generally considered to be highly sensitive to air pollution, and thus a conservative indicator of potential impacts—were observed beginning when SO_2 reached concentrations of 400 $\mu g/m^3$ (lowered growth and CO_2 update over six-hour exposure) (Hart et al. 1988). Deleterious effects, including injury and decreased abundance, have also been documented at lower concentrations.

However, the project's emissions would not exceed either the federal Prevention of Significant Deterioration (PSD) threshold or the federal Significance Emission Rate threshold, and thus the project is not a major source of SO_2. The project's one-hour, three-hour, 24-hour, and annual SO_2 emissions would be approximately 5.42 $\mu g/m^3$, 2.31 $\mu g/m^3$, 0.46 $\mu g/m^3$, and 0.08 $\mu g/m^3$, respectively. Therefore, SO_2 emissions would be unlikely to adversely affect vegetation within and adjacent to the project area. The modeling results are included in Appendix H.

7.2.4 Nitrogen Oxides

Emissions of NO_X can adversely affect vegetation. Impacts on plants via foliar injury commonly occur when the plants are exposed to short-term, high concentrations of NO_X; a one-hour concentration of 7,520 $\mu g/m^3$ would result in a 5 percent foliar injury for most plant species (USEPA 1993). Further, long-term exposures of phytotoxic doses of NO_X range from 280 to 560 $\mu g/m^3$ (Taylor and McLean 1970).

However, studies indicate varying levels of NO_X sensitivity among plant species, and absorption of air pollutants is often greater under wet soil conditions because of the high turgor and larger stomal aperture (Kozlowski and Constantinidou 1986). The project area's climate is dry, and soil types in the project area are well to somewhat excessively drained and are not considered hydric. With the project area's environmental conditions prohibiting rapid absorption, vegetation in the project area may be less susceptible to exposure to high concentrations of NO_X. Because the project's emissions would not exceed either the federal PSD threshold or the federal Significance Emission Rate threshold, the project is not a major source of NO_X. The project's one-hour and annual NO_X emissions would be approximately 8.83

µg/m^3 and 0.30 µg/m^3, respectively. Therefore, NO_X emissions would be unlikely to adversely affect vegetation within and adjacent to the project area. The modeling results are included in Appendix H.

7.2.5 Particulate Matter

Studies indicate adverse effects on vegetation within the immediate vicinity of a particulate matter source, although the specific effect is highly variable and influenced by plant characteristics (Soheili et al. 2023). Particulate matter most commonly causes physical injury to plants when deposition smothers the leaf surface. Leaf surfaces are covered with a waxy cuticle that protects plants from moisture loss and damage from ultraviolet radiation; particulate matter can accumulate in this waxy layer and introduce pollutants, depending on the constituents within the particulates (USEPA 2018). Particulate matter has also been observed to injure plant tissues when absorbed as phytotoxic gases or when fine particulates enter the leave through the stoma (Grantz et al. 2003; Da Silva et al. 2006).

Vegetation that has been smothered by particulates exhibits a reduced ability to transmit light, thus inhibiting photosynthesis, and may show reduced vigor. The modeled maximum 24-hour PM_{10} and $PM_{2.5}$ concentrations from emissions produced by the project are predicted to be 3.61µg/m^3 and 0.52 µg/m^3, respectively. When considered with ambient air quality data, PM_{10} and $PM_{2.5}$ concentrations are predicted to be below the current secondary NAAQS for particulates, which were established to protect against ecological effects (USEPA 2018). Therefore, PM emissions would be unlikely to adversely affect vegetation within and adjacent to the Project area. The modeling results are included in Appendix H.

7.2.6 Synergistic Effects of Pollutants

Synergistic effects may occur when two or more pollutants interact and combine effects. The synergistic effects of pollutants would have a greater total effect on vegetation than one single pollutant. The accumulation of air pollutants in the atmosphere damages vegetation and decreases the functionality of plants. Relevant studies exhibit the synergistic effects of various combinations of CO, CO_2, NO_X, and SO_2 (USEPA 2018). Vegetation exposed to the synergistic effects of high concentrations of pollutants is reported to have an inhibited ability to photosynthesize and germinate seeds, exhibits stunted growth, and may obtain physical injuries (Reinert et al. 1975).

However, because the project site is in an area designated as Attainment/Unclassifiable for all criteria pollutants except ozone based on the federal standards, and because the project would not cause or contribute to an exceedance of the NAAQS, significant adverse synergistic effects on plants is not expected as a result of the project.

7.2.7 Volatile Organic Compounds

Although VOC emissions are regulated by USEPA, VOCs alone are not one of the six criteria pollutants with set NAAQS. Rather, the chemical reaction of VOCs with NO_X in the presence of sunlight results in the formation of ozone. Ozone, commonly referred to as “ground-level ozone,” is a criteria pollutant with set NAAQS. Ozone is generated over a large area and is the primary constituent of photochemical smog, which can be transported or spread by wind.

When plants are exposed to ozone, impacts include decreased growth and visible injury to leaves. Similar to the effects of particulate matter on vegetation, ozone may affect vegetation by physically smothering

the leaf surface, creating damage and injury to the plant. Smothering affects the ability of plants to produce and store food, making them more susceptible to impacts from insects, disease, other pollutants, and extreme-weather events. Negative impacts on vegetation from chronic exposures to ozone are observed at concentrations greater than or equal to 196 $\mu g/m^3$ (Heath 1975). Studies have found that local dry periods tend to decrease the incidence and severity of foliar injury (USEPA 2020b). Further, ozone injury indices have been documented to fluctuate in response to seasonal conditions and site moisture conditions in the Northeast and north-central U.S. (Smith 2012).

The project site is within an area designated as nonattainment for the ozone NAAQS, and vegetation in the project vicinity may already be subject to deleterious effects from the presence of ground-level ozone. However, the project's emissions would not exceed either the federal PSD threshold or the federal Significance Emission Rate threshold for VOCs, and the project's emissions would be subject to permit requirements such that the project's contribution to ozone is not expected to be more than *de minimis*.

7.3 Soil Impacts

According to data obtained from the U.S. Natural Resources Conservation Service's Web Soil Survey, soils within the project site are characterized by loamy sand and sandy loam, specifically:

- Cajon loamy sand, 0 to 5 percent slopes.
- DeStazo sandy loam, 0 to 2 percent slopes.
- Garlock loamy sand, 2 to 9 percent slopes.

The project vicinity is underlain by similar soils, along with rocky outcrops (NRCS 2024). These soils are well to somewhat excessively well drained, non-hydric, and formed from alluvium; rocky outcrops southwest of and outside the project area are associated with nearby mountains and hilly landforms and comprise bedrock.

In general, air pollution can enter the soil via biogeochemical pathways of acidification for NO_X and SO_2; eutrophication via introduction of nitrogen and sulfur, and direct impacts via deposition of nitrogen and sulfur in particulate matter (USEPA 2018). The impact of NO_X and SO_2 deposition on soil can be positive or negative, depending on soil composition; where soils are nitrogen limited, deposition can stimulate growth. However, where soils are sensitive, deposition of nitrogen and sulfur can cause soil acidification and negatively affect plant growth (USEPA 2018). Further, NO_X emissions from soil are among the natural sources of nitrogen oxides, and in California's agricultural regions, soil-derived NO_X actually constitutes a portion of California's overall NO_X emissions (CARB 2024b). The impacts of particulate matter deposition on soil depend on the contents of the particulates (e.g., the presence of metals or other constituents), as well as soil characteristics such as pH and moisture content (USEPA 2018). Overall, the project's anticipated NO_X, SO_2, and PM emission rates and resulting project impacts are not expected to adversely affect soils in the project area because the emissions rates would be below the NAAQS.

Soils are known to remove CO from the atmosphere; soils also sequester CO_2 in the form of decomposing plant matter. Based on a study conducted along a California freeway (Ingersoll et al. 1974), soils constantly exposed to high levels of CO have higher CO uptake capabilities; however, desert soils have the lowest potential for CO uptake capacity, and CO uptake of agricultural soils generally occurs at a lower rate than soil under natural vegetation. The rate of CO uptake by the soils in the project area is not expected to be

weakened with the CO emitted by the project. Further, the project's anticipated CO emission rates are not expected to adversely affect soils in the project area because the emissions rates would be below the NAAQS.

Finally, ozone has been documented to affect soil decomposition, soil carbon, and soil nitrogen; some of these impacts relate directly to impacts of ozone on vegetation (including impacts on nitrogen cycling [USEPA 2020b]). However, as described above, the project's emissions would be below the VOC thresholds and would be subject to permit requirements such that the project's contribution to ozone is not expected to be more than *de minimis*.

7.4 Industrial, Residential, and Commercial Growth Impacts

A final EIR, certified by the Kern County Board of Supervisors on March 19, 2024, was prepared for this project in accordance with the CEQA Guidelines. The certified EIR included an evaluation of growth impacts. The EIR determined that the project would not induce substantial growth. Construction workers would be drawn primarily from the local labor pool or would temporarily stay in hotels in local communities. The construction phase is expected to last approximately 24 months and would be temporary. Additionally, approximately 515 workers would be needed during the construction phase. Therefore, because of the temporary nature of the construction phase, the project is not expected to induce substantial population growth.

During the operational phase, the project would employ approximately 440 workers. Approximately 417 of the proposed workers would be hourly and salaried employees and 23 would be third-party employees used mostly for on-site security and slag processing. The employees needed for the project's operational phase would most likely be drawn from the surrounding cities and unincorporated communities. These areas would include but not be limited to the unincorporated communities of Rosamond and Mojave and the cities of Tehachapi, Lancaster, and Palmdale. Given the size of the surrounding communities, the nature of the job, and the area's relatively high unemployment rate, the project's operational phase is not expected to induce substantial population growth.

7.5 Visibility and Deposition Analysis

The visibility impairment analysis is part of the requirement for an additional impacts analysis under the PSD program.

7.5.1 Class I Area Analysis

Class I areas are protected more stringently under the PSD program than under the NAAQS. Class I areas include national parks, wilderness areas, and other areas of special national and cultural significance. Five Class I areas are within 200 kilometers of the project site (**Table 7-2**).

TABLE 7-2
CLASS I AREAS WITHIN 200 KILOMETERS OF THE PROJECT SITE

Class I Area	State	Distance from Project Site (km)
San Gabriel Wilderness	California	67
Domeland Wilderness	California	85
Cucamonga Wilderness	California	88
Sequoia National Forest	California	150
Joshua Tree National Park	California	180

NOTE: km = kilometers
SOURCE: Data compiled by Environmental Science Associates in 2024

Following the most recent Federal Land Managers' Air Quality Related Values Work Group (FLAG) Workshop procedures (USFS et al. 2010), the screening procedure (ratio of initial cumulative annual emissions divided by distance to Class I area, referred to as "Q/D") was used to determine whether the project could opt (screen) out of an air quality–related value assessment for visibility and deposition with the CALPUFF modeling system. Following the FLAG screening procedures and using annualized emissions based on the maximum 24-hour emission rates, emissions of NO_X, SO_2, $PM_{10}/PM_{2.5}$, and H_2SO_4 mist were summed and divided by the distance to the respective Class I area. The annualized emissions rates calculated in this manner are only for the Q/D analysis and are not indicative of proposed annual sitewide emission rates listed in Section 3.0. **Table 7-3** summarizes the screening analysis for each Class I area located within 200 kilometers of the project site.

TABLE 7-3
CLASS I AREA IMPACT Q/D ANALYSIS

Class I Area	Q [1]	D (km)	Q/D
San Gabriel Wilderness	158.59	67	2.37
Domeland Wilderness	158.59	85	1.87
Cucamonga Wilderness	158.59	88	1.80
Sequoia National Forest	158.59	150	1.06
Joshua Tree National Park	158.59	180	0.88

NOTES: D = distance; km = kilometers; Q = emission rate.
[1] Sum of nitrogen oxides, sulfur dioxide, particulate matter less than 10 microns and less than 2.5 microns in diameter, and sulfuric acid mist (NO_X, SO_2, $PM_{10}/_{2.5}$, and H_2SO_4 mist, respectively), based on maximum 24-hour average emissions annualized to tons per year.
SOURCE: Data compiled by Environmental Science Associates in 2024

In accordance with the FLAG guidance, if the Q/D ratio is less than 10, no air quality–related value analysis is required. Based on the ratio of Q/D, the Class I areas listed in Table 7-3 do not require further analysis of air quality–related value. Thus, no CALPUFF analysis is anticipated to determine further impacts on air quality–related values. A notification letter would be submitted to the Federal Land Managers for concurrence with the above assessment.

7.5.2 Class II Area Analysis

The proposed Mojave Micro Mill facility would comply with the opacity limits of the New Source Performance Standard for Electric Arc Furnaces (40 CFR 60 Subpart AAb), listed as follows:

- 3 percent opacity at the exit from a control device (the secondary baghouse).
- 0 percent opacity from a melt shop during melting and refining and 6 percent opacity during charging.

In addition, particulate emissions from material handling storage silo vents and storage piles would comply with their respective Best Available Control Technology (BACT) guidelines. Particulate emissions from paved and unpaved haul roads would be minimized using watering, sweeping, and vehicle speed restriction as per BACT guidelines. Visibility degradation from project emissions in nearby Class II areas is therefore not indicated.

In accordance with recommendations of USEPA Region 9 as incorporated into the approved modeling protocol for this project, the impacts of project emissions were compared to USEPA's screening ambient threshold concentrations listed in *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals* (USEPA 1980). As a conservative approach, the one-hour averaging time was used in the American Meteorological Society/USEPA Regulatory Model (AERMOD) air dispersion model to compare with one-month and four-hour-average NO_2 impacts, and the eight-hour averaging time was used to compare with the weekly CO impact in the screening guidance.

The impacts were determined using the same modeling methodology as for Class II area impacts. The melt shop baghouse emission source (EID-06) represented 95–99 percent of the emissions of SO_2, NO_2, and CO, excluding the intermittent emissions such as those from emergency engines. To simplify the analysis, all project emissions (see Table 2-1) were modeled as emitting from the melt shop baghouse stack. For NO_2, no credit was taken for the presence of nitric oxide in the melt shop baghouse stack (i.e., 100 percent NO_2 in the stack).

Table 7-4 shows the results of this analysis. The modeling files (Appendix H) will be provided as part of the separate air dispersion analysis submittal.

TABLE 7-4
SCREENING THRESHOLD COMPARISON FOR PLANTS, SOILS, AND ANIMALS

Pollutant	Screening Concentration (µg/m³) [1]	Maximum Modeled Concentration (µg/m³)	Modeled Averaging Time
SO_2—1-hour average	917	5.42	1-hour
SO_2—3-hour average	786	2.31	3-hour
SO_2—annual average	18	0.08	Annual
NO_2—4-hour average	3,760	8.83	1-hour
NO_2—1-month average	564	8.83	1-hour
NO_2—annual average	94	0.30	Annual
CO—weekly average	1,800,000	16.87	8-hour

NOTES: µg/m³ = micrograms per cubic meter; CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide
[1] Source: USEPA 1980.

SOURCE: Data compiled by Environmental Science Associates in 2024

7.6 Conclusion

Based on the discussions provided above, the project's emissions of criteria pollutants would not cause or contribute to an exceedance of the NAAQS, and the project site is in an area is designated as Unclassified/Attainment or Maintenance for all NAAQS. Therefore, the project is not expected to cause significant adverse impacts on vegetation or soils. With respect to industrial, commercial, and residential growth in the area, the certified final EIR developed in accordance with the CEQA Guidelines determined that the project would not induce substantial growth. Modeled ambient concentrations for all pollutants are significantly below the screening threshold concentrations for plants, soils, and animals as listed in USEPA's screening procedure guidance. Finally, the visibility and deposition analysis indicated that no adverse impacts are anticipated on Class I or Class II areas within 200 kilometers of the project site.

Based on the analysis presented in this chapter, the project would not have a significant adverse impact on air quality, soils, vegetation, visibility and/or growth in the surrounding area.