Final

MOJAVE MICRO MILL PROJECT

Prevention of Significant Deterioration – Addendum to the Air Dispersion Modeling Analysis

Prepared for
PSGM3, LLC

July 2024

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Final

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Prepared for
PSGM3, LLC
4805 Murphy Canyon Road
San Diego, CA 92123

July 2024

2355 Northside Drive
Suite 100
San Diego, CA 92108
619.719.4200
esassoc.com

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List of Abbreviations

Abbreviation	Term/Phrase/Name
µg/m^3	micrograms per cubic meter
ADM	Air Dispersion Modeling
ADMRT	Air Dispersion & Risk Tool
AERMIC	American Meteorological Society/U.S. Environmental Protection Agency Regulatory Model Improvement Committee
AERMOD	American Meteorological Society/U.S. Environmental Protection Agency Regulatory Model
CARB	California Air Resources Board
EID	Emission Source Identification
EKAPCD	Eastern Kern Air Pollution Control District
FLM	Federal Land Managers
g/s	Grams per second
HAP	Hazardous air pollutant
HARP	Hotspots Analysis and Reporting Program
hr	hour
HRA	Health risk assessment
Kg	kilogram
km	kilometers
L	liter
m	meters
MEIR	Maximum Exposed Individual Resident
MEIW	Maximum Exposed Individual Worker
n/a	Not applicable
OEHHA	Office of Environmental Health Hazard Assessment
project	Mojave Micro Mill
PSD	Prevention of Significant Deterioration
PSGM3	PSGM3, LLC
SCAQMD	South Coast Air Quality Management District
TAC	Toxic air contaminant
USEPA	U.S. Environmental Protection Agency
ZOI	Zone of impact

PSD APPLICATION

PSGM3, LLC (PSGM3), a subsidiary of Pacific Steel Group, submitted the Prevention of Significant Deterioration (PSD) construction permit application for the proposed construction of the Mojave Micro Mill (referred to herein as "project"), a new all-electric steel micro mill facility, to the Eastern Kern Air Pollution Control District (EKAPCD) on May 21, 2024. The following **Chapter 6A Addendum to the Air Dispersion Modeling** is in response to EKAPCD's request (S. Johnson, personal communication, June 28, 2024) to complete a more detailed health risk modeling for compliance with EKAPCD Authority to Construct and Permit to Operate List D.

All other chapters of the PSD application were submitted to the EKAPCD in May 2024 and June 2024.

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CHAPTER 6A
Addendum to the Air Dispersion Modeling

This **Chapter 6A** is an Addendum to Chapter 6 of the PSD application, which describes the Air Dispersion Modeling (ADM) conducted for the proposed PSGM3 project to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) increments. This Addendum to **Chapter 6** describes the health risk modeling conducted to demonstrate compliance with EKAPCD Authority to Construct and Permit to Operate List D (see PSD construction permit application in **Chapter 8**).

List D describes requirements for sources of toxic air contaminants (TACs). Maximum potential TAC emissions from the proposed Mojave Micro Mill facility are documented in Table 2-2 with calculations provided in **Appendix D** of the PSD application. To assess effects of TACs from operations of the proposed PSGM3 project, the following were estimated as part of a health risk assessment (HRA):

- Incremental increase in cancer risk at sensitive receptor locations;
- Incremental increase in cancer risk at worker receptor locations;
- Chronic non-cancer risk at both sensitive and worker receptor locations; and
- Acute risk at short-term locations.

6.1 Model Selection and Inputs

Air dispersion modeling was conducted following the Air Dispersion Modeling Protocol (Protocol) submitted to EKAPCD, United States Environmental Protection Agency (USEPA) Region 9, and Federal Land Managers (FLM) in February 2023 and included in **Appendix F** and discussed in Chapter 6.

The modeling methodology from Section 6.1.1 - Model Used, Section 6.1.2 - Regulatory Options, Section 6.1.3 - Selection of Dispersion Options, Section 6.1.5 - Building Wake Effects (Downwash), Section 6.1.7 - Receptor Grid, Section 6.1.8 - Meteorological Data, and Section 6.1.9 - Terrain Data of the PSD application was used in the HRA.

6.1.1 Averaging Periods

The following averaging periods were used in the modeling:

- Cancer Risk and Chronic Risk: annual average
- Acute Risk: 1-hour maximum

6.1.2 Emission Sources and Source Terms

Table 6A-1 lists the TAC emission sources from the PSGM3 project and the source type used in the modeling. The source parameters for these emission sources used in the modeling are included in Appendix F of the PSD application. The EID numbering and source terms have been revised since finalization of the Protocol and they are based on **Chapter 3** of the PSD application (Emission Rates) and PSGM3 design data.

TABLE 6A-1
TAC MODELED EMISSION SOURCES AND SOURCE TYPES

EID Number	Source Description	Source Type
EID-06	Melt Shop Baghouse	Point
EID-08	Roll Mill Vent	Buoyant Line
EID-16	Emergency Fire Water Pump	Point
EID-17	Emergency Cooling Water Pump	Point
EID-18	Emergency Generator	Point

NOTE: EID = Emission Source Identification
SOURCE: Data compiled by Environmental Science Associates in 2024

Emission rates from the emission sources described above were represented in the AERMOD modeling as a unitized (1 gram/second) emission rate for each source. The modeled concentration at each receptor (micrograms per cubic meter [μ/m^3]/[g/s]) represents a "dispersion factor," which was then multiplied by the actual emission rate of each source to determine actual concentrations, and the result from all the modeled sources at each receptor was combined.

6.1.3 Receptor Grid

The receptor grid, as shown in **Figure 6-2** of **Appendix G** of the PSD application, was used for the TAC dispersion modeling. Ground level and receptor resolution of 100 meters by 100 meters or finer (i.e. 50 meters by 50 meters or 25 meters by 25 meters) in areas of potential sensitive and worker receptors closest (i.e. one kilometer) to the site boundary consistent with SCAQMD AB 2588 and Rule 1402 Supplemental Guidelines.

6.2 Ground Level Concentrations

Ground level concentrations of TACs were calculated using the hazardous air pollutants (HAPs) emissions estimates, as found in PSD application Table 2-1 and Appendix D. To estimate the annual average TAC concentrations, the annual pounds per year of each pollutant for each source was multiplied by the respective sources' annual "dispersion factor," to determine cumulative concentrations, and the concentrations from all the TAC sources at each receptor were combined.

Similarly, for short-term, 1-hour concentrations, the maximum pounds per hour of each pollutant for each source was multiplied by the respective sources' one-hour "dispersion factor," to determine actual

concentrations, and the concentrations from all the modeled sources at each receptor were combined. For the maximum one-hour estimates, PSGM3 has confirmed to the EKAPCD that testing and maintenance on the emergency units would not occur concurrently. Therefore, for the maximum one-hour emission rates, only the largest of the three emergency engines, EID-18, was used in the calculation.

6.3 Risk Characterization Methods

This section discusses the health risk assessment modeling methodologies that were followed to demonstrate compliance with EKAPCD Authority to Construct and Permit to Operate List D. All health risk modeling input and output have been submitted to EKAPCD in **Appendix K** of this Addendum.

The HRA calculates health risks from operations of PSGM3 project's TAC emissions sources using risk parameters from the South Coast Air Quality Management District's *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act* (2020) and the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA Guidelines) (2015). The health risk assessment was completed using the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program Version 2 (HARP2) Air Dispersion & Risk Tool (ADMRT) version 22118.

6.3.1 Risk Scenarios

Cancer risk, chronic hazard index, and acute hazard index from exposure to TACs were evaluated for multiple receptor types. Both individual residents and worker receptors were evaluated. For the individual resident health risk analysis, an exposure duration for 30 years with intake rate percentiles from the OEHHA Derived Method were utilized. With the OEHHA Derived Method, cancer risk assessments use the high-end point estimate (95th percentile) for the two dominant exposure pathways (e.g., soil and breast milk) and the average (65th percentile) point estimate for the other pathways. For non-cancer chronic assessments, the inhalation pathway is always considered a dominant pathway. The next two dominant pathways use the 95th percentile, while the remaining pathways use the average intake rate.

For the worker health risk analysis, an exposure duration for 25 years with intake rate percentiles from the OEHHA Derived Method were utilized.

6.3.2 Exposure Pathways

For the residential assessment, the mandatory minimum pathways of inhalation, soil ingestion, dermal, breast milk ingestion were selected. For the worker assessment, worker pathways of inhalation, soil ingestion, and dermal were selected. For both individual resident and worker, the deposition rate for the non-inhalation pathways was modeled as uncontrolled or 0.05 meters/second.

6.1.1.1 Inhalation Pathway

Daily breathing rates are from OEHHA and based on SCAQMD guidance, for individual residents, the 95th percentile 24-hour breathing rates for third trimester and age 0–2 years were utilized and then the 80th percentile 24-hour breathing rates was used for age 2–16 years and age 16–30 years. For worker receptors, the 95th percentile 8-hour moderate-intensity breathing rates were applied to the age 16–70 years.

For individual residents, the fraction of time at home was used for both age bins less than 16 years and age bins greater than 16 years, consistent with OEHHA Guidelines, because there is no school within the one per million (or greater) cancer risk isopleth.

No adjustment factors were applied to the worker risk evaluation because the facility operating schedule is continuous. Inputs used for the inhalation pathway are presented in **Table 6A-2.**

TABLE 6A-2
INHALATION EXPOSURE PARAMETERS

Receptor Type	Age Group	Daily Breathing Rate (L/kg day or L/kg 8hrs)[a]	Fraction of Time at Home (unitless)[b]	Model Adjustment Factor (unitless)[c]
Individual Residents	Third Trimester	361	0.85	n/a
	Age 0–2 Years	1,090	0.85	n/a
	Age 2–16 Years	572	0.72	n/a
	Age 16-30 Years	261	0.73	n/a
Workers	Age 16–70 Years	230	n/a	1

NOTE: L = liter; kg = kilogram; hrs = hours; n/a = not applicable.

a. Unit of measure for resident is L/[kg day] and for worker L/[kg 8hrs]
b. Fraction of time at home applies to resident receptors only
c. Modeling adjustment factors apply to worker receptors only

SOURCE: Data compiled by Environmental Science Associates in 2024

6.1.1.2 Soil Ingestion Pathway

The soil ingestion pathway applies to both the residential and worker receptors. Default settings were used; no advanced tier 2 options were evaluated. The soil accumulation period was not changed from the default days.

6.1.1.3 Dermal Pathway

The dermal pathway applies to both the residential and worker receptors. Default settings were used; no advanced tier 2 options were evaluated. The climate selected was “Warm”, which is the climate selection that best represents the PSGM3 project’s location in unincorporated southeastern Kern County, California.

6.1.1.4 Breast Milk Ingestion Pathway

The breast milk ingestion pathway applies only to the residential receptor. Default settings were used; no advanced tier 2 options were evaluated.

6.4 Health Risk Assessment Results

Health risk modeling input and output files have been submitted to EKAPCD and are available upon request (Appendix K).

6.4.1 Cancer Risk Results

The HRA evaluated the health risks from the 30-year exposure period of PSGM3 operations at residential receptors locations and 25-year exposure period of PSGM3 operations at worker receptor locations. For the residential cancer risk assessment, all modeled receptors in the receptor grid were analyzed with residential exposure parameters to find zone of impact (ZOI). The zone of impact is defined as an isopleth where the total excess lifetime cancer risk from exposure to all emitted carcinogens is greater than one per million. The residential cancer risk isopleths and its ZOI a show in **Figure 6A-1** included in **Appendix K**.

Similarly, for the worker cancer risk assessment, all modeled receptors in the receptor grid were analyzed with worker exposure parameters. There is no ZOI for the worker cancer risk because all isopleths were less than one per million.

To find the maximum exposed individual resident (MEIR), zoning parcels as well as other mapping tools were used to find land uses that contain residential structures. The MEIR was found to be to the west of the project site, on the west side of Highway 14. The maximum incremental increase in cancer risk for the individual resident is presented in **Table 6A-3** and its location is shown in **Figure 6A-2** (Appendix K).

The surrounding land uses that could contain worker or workplace structures were also evaluated in order to determine the maximum exposed individual worker (MEIW) receptor. The MEIW was found to be a structure located approximately 30 meters (98 feet) north of the project site's property boundary. The maximum incremental increase in cancer risk for the worker is presented in Table 6A-3 and its location is shown in **Figure 6A-3** (Appendix K).

TABLE 6A-3
MAXIMUM OPERATIONAL HEALTH RISK IMPACTS FOR OFF-SITE RECEPTORS

Receptor Type	Maximum Cancer Risk (per one million)	Chronic Hazard Index	Acute Hazard Index
Individual Resident	2.68	0.01	0.91
Worker	0.09	0.01	0.91

SOURCE: Data compiled by Environmental Science Associates in 2024

6.4.2 Chronic Hazard Index Results

The HRA evaluated the chronic non-cancer health risks from exposure of PSGM3 operations at residential receptors locations and at worker receptor locations. The chronic hazard index was found for all modeled receptors in the modeling domain. The land uses that could contain residential or worker structures were used to find the maximum individual resident and maximum worker chronic hazard index. The locations with the highest chronic hazard index for the maximum impacted individual resident and the maximum impacted worker were the same locations as the cancer risk MEIR and MEIW, respectively. The maximum chronic hazard index for both individual resident and worker are presented in Table 6A-3 and their locations shown in **Figure 6A-4** (Appendix K).

6.4.3 Acute Hazard Index Results

The HRA evaluated the acute health risks from exposure of PSGM3 operations at any receptor location where an individual could be exposed to short-term emissions. The acute hazard index was found for all modeled receptors in the modeling domain including fenceline receptors. **Figure 6A-5** in Appendix K shows the full acute hazard index isopleths out to a value of 0.1 or the acute ZOI. The location with the highest acute hazard index was on the west side of the PSGM3 project's fenceline. The maximum acute hazard index results are presented in Table 6A-3 and its location shown in **Figure 6A-6** (Appendix K).

6.4.4 Conclusions

The analysis shows that the PSGM3 project will not adversely impact health risks in the area surrounding the facility.

CHAPTER 8A
References

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USEPA (U.S. Environmental Protection Agency). 2017a. *Guideline to Air Quality Models*. May 2017. Available: https://www.epa.gov/sites/production/files/2020-09/documents/appw_17.pdf. Accessed April 2024.

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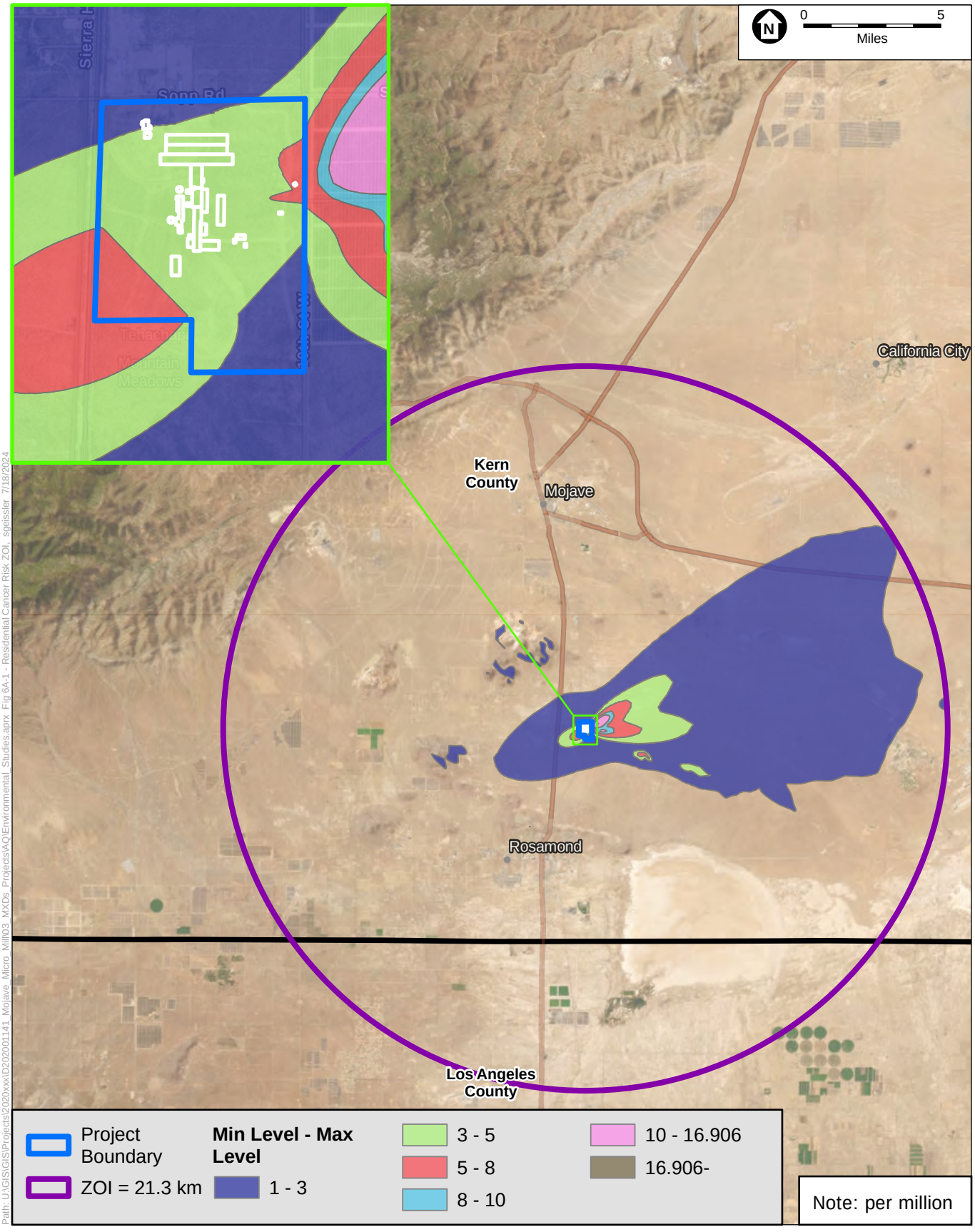
Appendix J
Health Risk Modeling Figures

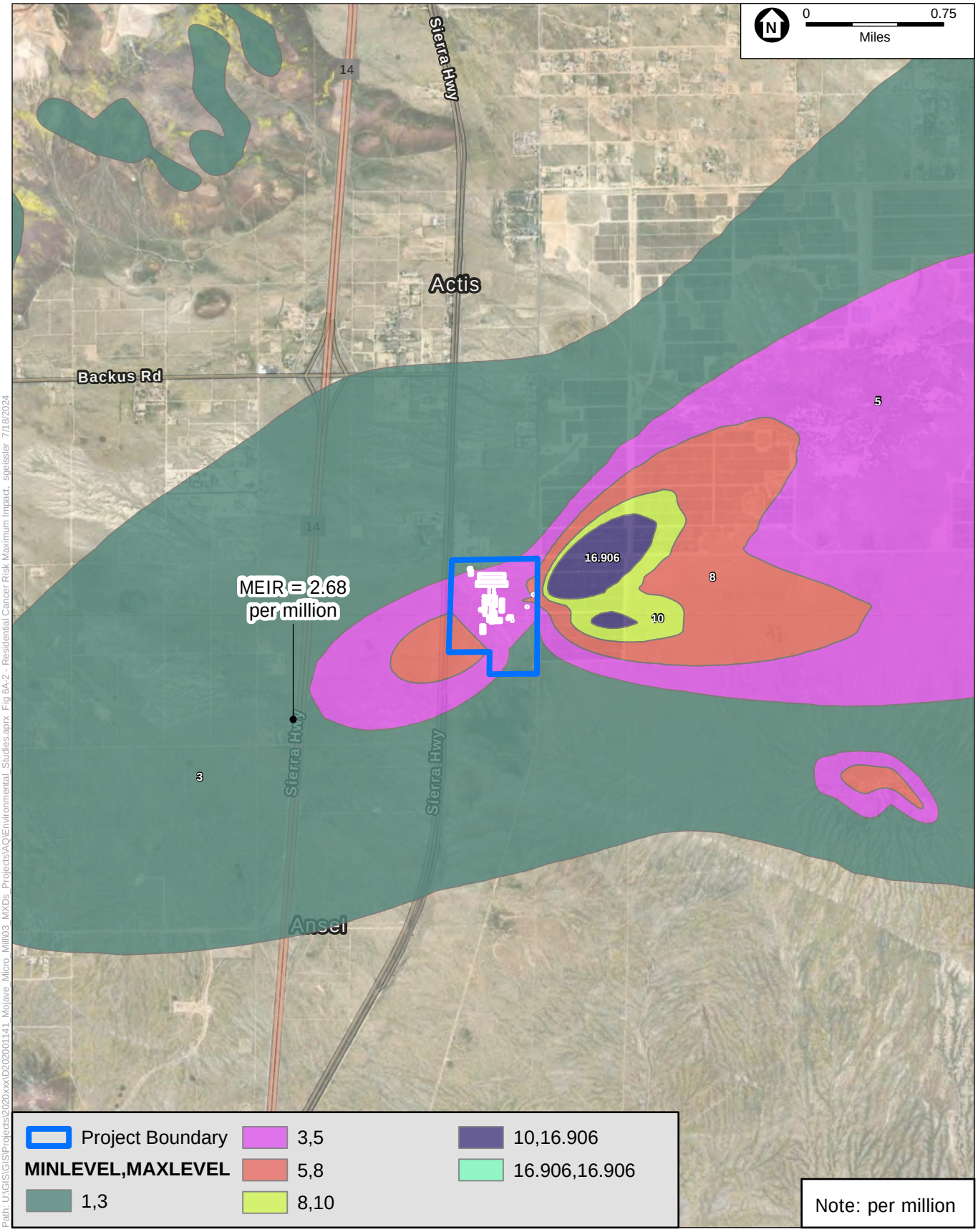


SOURCE: ESA, 2024

Mojave Mills Project

Figure 6A-1
Residential Cancer Risk ZOI

ESA

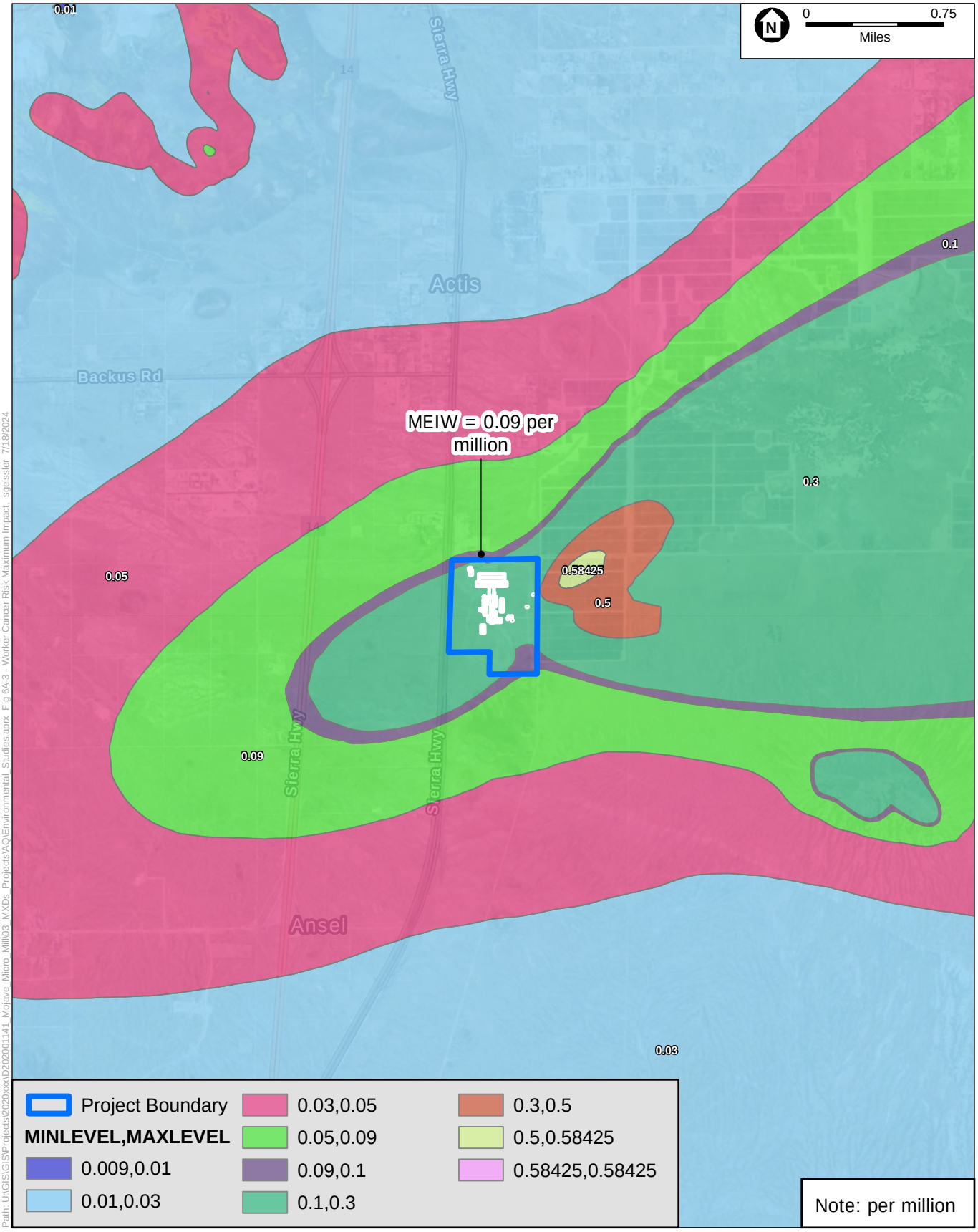


SOURCE: ESA, 2024

Mojave Mills Project

Figure 6A-2
Residential Cancer Risk Maximum Impact

ESA



SOURCE: ESA, 2024

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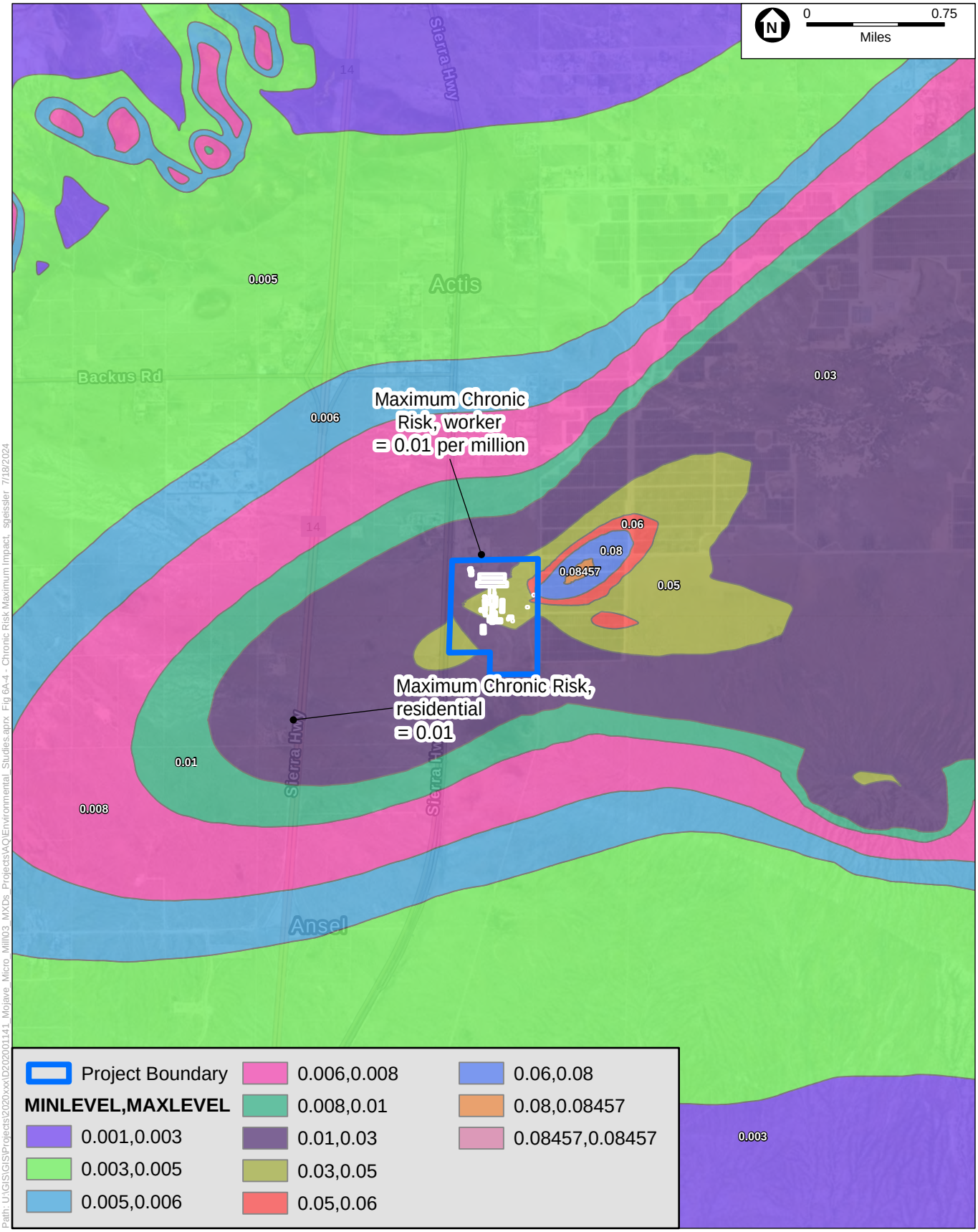
Figure 6A-3
Worker Cancer Risk Maximum Impact

ESA



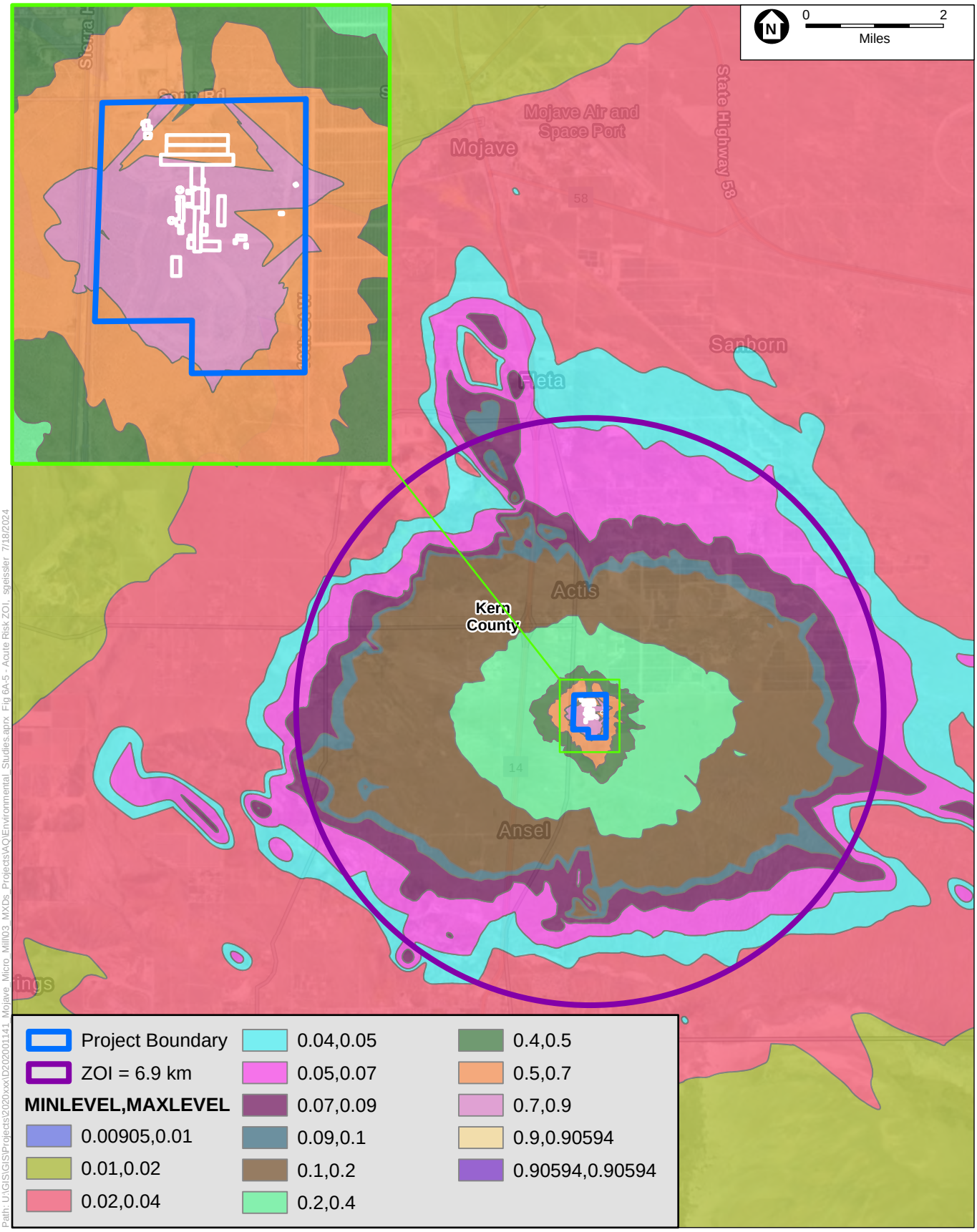
Path: U:\GIS\GIS\Projects\2020xxx\D202001141_Mojave_Micro_Mill\03_MXDs_Projects\AQ\Environmental_Studies.aprx Fig 6A-4 - Chronic Risk Maximum Impact sgeissler 7/18/2024

SOURCE: ESA, 2024

Mojave Mills Project

Figure 6A-4
Chronic Risk Maximum Impact

ESA



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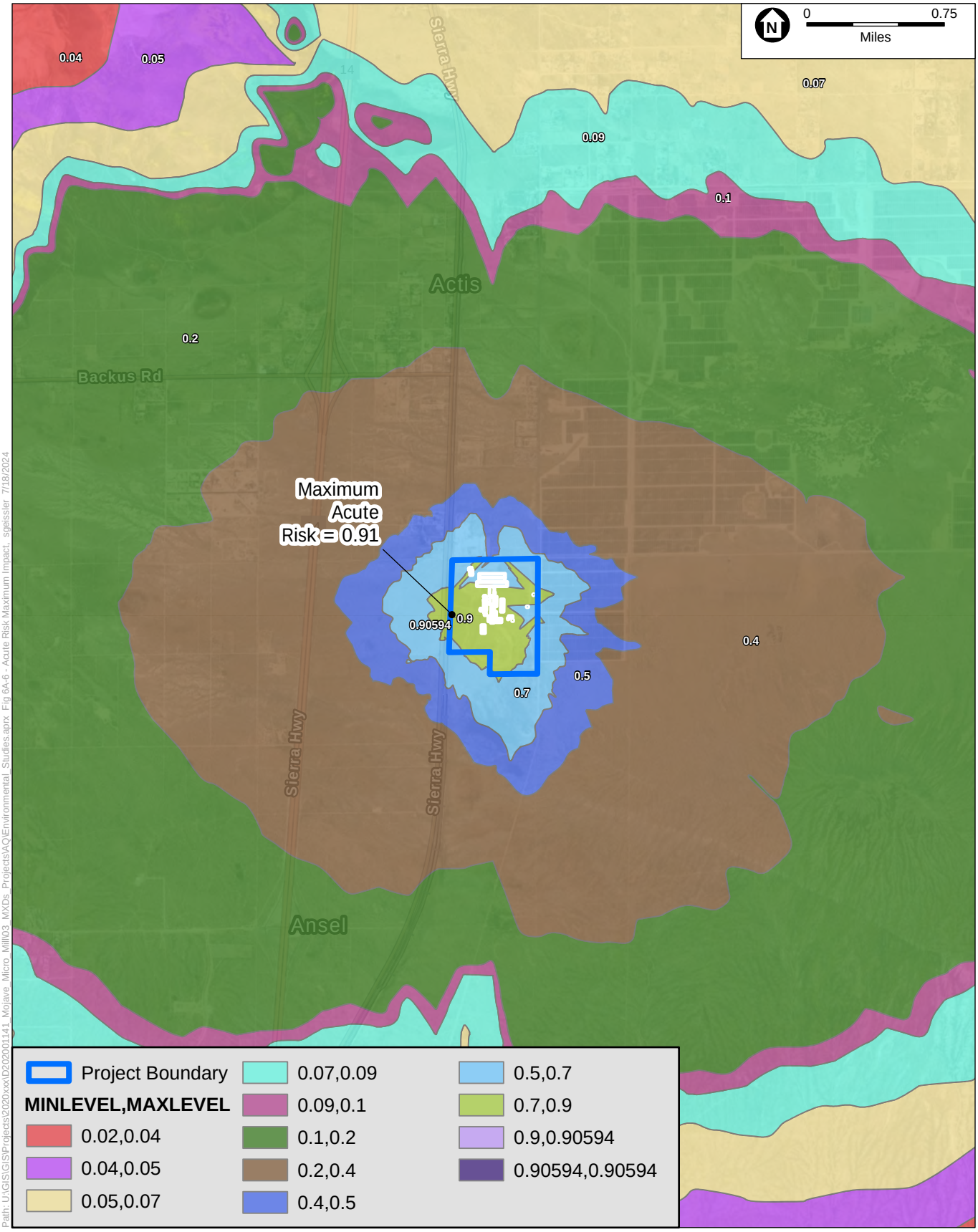
SOURCE: ESA, 2024

Mojave Mills Project

Figure 6A-5
Acute Risk ZOI

ESA



Path: U:\GIS\GIS\Projects\2020xxx\D202001141_Mojave_Micro_Mill\03_MXDs_Projects\AQ\Environmental_Studies.aprx Fig 6A-6 - Acute Risk Maximum Impact sgeissler 7/18/2024

SOURCE: ESA, 2024

Mojave Mills Project

Figure 6A-6
Acute Risk Maximum Impact

ESA

Appendix K
Health Risk Modeling Files

Health risk modeling files have been submitted electronically to the Eastern Kern Air Pollution Control District.