CEQA INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

TRIANGLE ROCK PRODUCTS, LLC
Merced County, California

LOS BANOS SAND AND GRAVEL QUARRY PROJECT

February 2024

Prepared for:	Merced County Community and Economic Development Department 2222 "M" Street, 2nd Floor Merced, California 95340 (209) 385-7686
Prepared by:	Sespe Consulting, Inc. 374 Poli Street, Suite 200 Ventura, California 93001 (805) 275-1515

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Triangle Rock Products
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1.0 INTRODUCTION

Pursuant to Section 15063 of the California Environmental Quality Act (CEQA) Guidelines (Title 14, California Code Regulations, Sections 15000 et seq.), an Initial Study (IS) is a preliminary environmental analysis that is used by the CEQA Lead Agency as a basis for determining whether an Environmental Impact Report (EIR), a Mitigated Negative Declaration (MND), or a Negative Declaration (ND) is required for a project. At a minimum, the CEQA Guidelines require that an IS contain a project description, description of environmental setting, an identification of environmental effects by checklist or other similar form, an explanation of environmental effects, a discussion of mitigation for significant environmental effects, an evaluation of the project’s consistency with existing applicable land use controls, and the names of persons who prepared the study.

Further, Section 15070 of the CEQA Guidelines states that a Lead Agency may prepare an MND for a project if the IS identifies potentially significant effects, but revisions to the project plans or proposals avoid the effects, or mitigates the effects to a point where clearly no significant effects would occur, and there is no substantial evidence that the project, as revised, may have a significant effect on the environment. At a minimum, the MND circulated for public review shall contain a description of the project, the location of the project, and technical evaluations necessary to support the finding that the project would not have a significant effect on the environment through avoidance, project design features, or the implementation of mitigation measures.

Triangle Rock Products, LLC (Triangle) currently operates an approximately 607-acre aggregate surface mining, processing, and hot-mix asphalt production facility in Merced County (County), known as the Los Banos Sand and Gravel Quarry (“Facility” or “Los Banos Facility”). To allow for the continuation of the existing operation and augment the Facility’s sand and gravel reserves, Triangle has submitted an application to the County to amend their existing Condition Use Permit (CUP 3466) and associated Reclamation Plan (Mine ID# 81-24-0009) to allow them to extract aggregate materials, and complete reclamation, on two properties that adjoin the existing Facility referred to as the Turner and Sunset properties (Project). In accordance with the CEQA Guidelines, this IS/MND has been prepared to evaluate the potential environmental impacts associated with the proposed Project, and to propose avoidance or mitigation measures in instances where a potentially significant environmental impact was identified. This IS/MND includes information to substantiate the conclusions made regarding the Project’s potential significant environmental effects, and discloses information to allow input from public agencies, organizations, and interested members of the public. Pursuant to Section 15367 of the CEQA Guidelines, the County is the Lead Agency for the purposes of administering the requirements of CEQA for the proposed Project, and as such has the primary responsibility for approval or denial of the Project.

2.0 PROJECT DESCRIPTION

As summarized in Section 1.0 above, Triangle currently operates an approximately 607-acre aggregate surface mining, processing, and hot-mix asphalt production facility located in an unincorporated portion of the County. The existing Facility is permitted by the County under two Conditional Use Permits (CUP 3466 for mining and reclamation; CUP 3383 for an onsite hot-mix asphalt [HMA] plant) and an approved site-wide Reclamation Plan (CA Mine ID No. 91-24-0009).

To continue existing operations and provide a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot-mix asphalt and ready-mix concrete (RMC) products, Triangle desires to augment the existing sand and gravel reserves through permitting two properties that adjoin the existing Facility; the Turner and Sunset properties (referred to herein as the "Project sites"). The purpose of this Project is to secure the requisite approval from the County, which would permit the continued extraction of the sand and gravel resources, at the adjacent Turner and Sunset properties. Specifically, this Project would amend the existing CUP 3466 and related Reclamation Plan for the Los Banos Facility to include proposed mining and reclamation at the Turner and Sunset properties.

The Project would not involve any changes to the existing operations other than the location of extraction by allowing for the continued mining of the sand and gravel resources at the Turner and Sunset properties. Consistent with Triangle's existing operations, the aggregate material extracted from the Project sites would continue to be transferred via internal haul trucks and scrapers to the existing processing plant located at the Los Banos Facility. No on-road haul trucks would use public roads to transport the materials, but a crossing point would be designated at Alvarado Trail to permit travel from the southernmost part of the Turner property north to the processing plant. Material would continue to be processed and shipped to delivery locations throughout the region or used onsite to produce hot-mix asphalt or transferred for use by a separately owned and operated ready-mix concrete plant in the same manner as presently occurs. There would be no change to the pace or rate of extraction. No material processing would occur on the Project sites.

See Section 2.3 below provides the Project details which form the basis of the CEQA environmental analysis presented in this IS/MND. Also see Figure 1 which shows the location of the Turner and Sunset properties in relation to the existing Los Banos Facility.

2.1 Project Location & Current Use

The Project sites consists of four assessor's parcels, one comprising the Sunset property and three for the Turner property. The following Assessor's Parcel Numbers (APN's) are listed below for the Project properties.

Table 1: APN's, Ownership & Zoning

Parcel Number	Property Owner	Zoning Designation
Sunset Property 083-210-033-000	CalMat Company 1200 Urban Center Drive Birmingham, Alabama 35242	General Agricultural (A-1)
Turner Property 088-070-039-000	Vulcan Lands, Inc. P.O. Box 385014 Birmingham, Alabama 35235-3523	General Agricultural (A-1)
Turner Property 088-070-079-000	Vulcan Lands, Inc. P.O. Box 385014 Birmingham, Alabama 35235-3523	General Agricultural (A-1)
Turner Property 088-070-086-000	Vulcan Lands, Inc. P.O. Box 385014 Birmingham, Alabama 35235-3523	General Agricultural (A-1)

The Sunset property is a generally flat, disturbed, rectangular shaped property, bounded by agricultural lands and several private residences to the north and west, agricultural land to the south, and the Los Banos Facility immediately to the east. The Sunset property is vacant agricultural land and lacks development. The property has an Agricultural (A) County General Plan land use designation, and a General Agriculture (A-1) Zoning classification.

The Turner property is generally vacant, disturbed land that borders the southern boundary of existing Los Banos Facility. A portion of the property has historically been leased for agricultural-related uses, including a past animal feed company. At the northeast corner, the Delta-Mendota canal directly borders the property. The property has an Agricultural (A) General Plan land use designation, and a General Agriculture (A-1) Zoning classification. The Department of Conservation's (DOC) Farmland Mapping and Monitoring Program (FMMP) map identifies the Turner property to include mostly "vacant or disturbed land," "grazing land" in the southwest part of the site and "farmland of local importance" on the east side of the site. None of these land use designations are listed as types of farmlands that require conservation under the County's agricultural land mitigation program, or subject to a Williamson Act contract.

See Figure 1 below which shows the Project sites and the surrounding environmental setting.

2.2 Surrounding Land Uses

The Turner and Sunset properties are located approximately 4 miles southwest of the City of Los Banos, along State Highway 33, east of Interstate 5 in the San Joaquin Valley. This area of the central valley in California is dominated by agriculture, with many of the rural communities such as Los Banos serving as a local hub to farming and ranching enterprises.

Lands surrounding the Sunset and Turner properties are either fallow agricultural lands, or presently active growing operations for various crops. As is typical for this area, ranch-style residences occupy portions of the surrounding agricultural lands, with two homes to the north of the Sunset property and one to the west. Water conveyance infrastructure, notably portions of the Delta-Mendota Canal and the Central Valley Aqueduct, are located with the Project area.

Table 2 summarizes the land uses within the immediately vicinity of the Los Banos Facility, including the Sunset and Turner properties.

Table 2: Surrounding Land Uses

Direction	Current General Plan Land Use and Zoning Designation	Description
West	Agricultural (A) General Agricultural (A-1)	Agricultural land to the west of the Sunset property, agricultural lands west of the Turner property. A private residence is situated immediately west of the Sunset property, along Sunset Avenue.
East	Agricultural (A) General Agricultural (A-1)	The existing Los Banos Facility is situated adjacent to and east of the Sunset property. Agricultural land lies east of the Turner property.
South	Agricultural (A) General Agricultural (A-1)	Agricultural land occurs south of the Sunset and Turner properties. Further south of the Turner property is the Central Valley Aqueduct.
North	Agricultural (A) General Agricultural (A-1)	Sunset Avenue borders the north side of the Sunset property, along with agricultural land and a private residence on the north side of the road. North of the Turner property is the existing Los Banos Facility. A small section of the Delta-Mendota Canal borders the Turner property.

2.3 Operational Background

As stated above, the Project would allow continued mining at the Facility through resource recovery within two properties, the 32.8-acre Sunset property and the 307.6-acre Turner property. Recovery of aggregates would take place first at the Sunset property, which would then be used for permanent placement of processing fines from the processing plant located at the adjoining Los Banos Facility. The fines (natural clays, silts and fine sands) would be conveyed to the Sunset property after all or portions of the mining there is complete, using an overland slurry pipe. As a result of fines placement, the Sunset property would be returned to an elevation approximately five feet below the existing ground surface.

The continuation of mining operations at the Project sites would occur in the same manner and using the same methods as approved and currently employed at the Los Banos Facility. Mining within the Sunset and Turner properties has been designed to remain above groundwater levels, which is controlled principally by an underlying stratigraphically persistent clay aquitard, referred to as the Corcoran Clay. Based on drilling information, depths to the top of the Corcoran Clay range between approximately 150- and 500-feet below ground level. Mining pits in the Sunset and Turner properties are expected to range between 27-feet to 72-feet below ground surface (bgs); however, the final target mining depth would be dependent on topographic surface elevations in relation to the actual depth of the top of the Corcoran Clay or other local confining clay layer, where present. Once mining is complete at both properties, reclamation would commence in conformance with the Facility's existing Reclamation Plan, as amended to incorporate the Project mining areas, and pursuant to the Surface Mining and Reclamation Act (SMARA). The Project reclamation would provide for open space as an end use, which would be adaptable for a variety of post-mining uses in the future.

In addition to the continued extraction of the aggregate materials, mining operations at both properties would include ancillary activities directly related to the removal of the sand and gravel. These activities would include the following: 1) temporary stockpiling of the mined materials; 2) transport of the sand and gravel material to the existing Los Banos processing plant by material transfer trucks, using internal haul routes (no haul trucks would enter or exit onto public roads);[1] 3) placement of fines from the processing plant into the Sunset pit following completion of mining, as well as fines placement in portions of the Turner pit; 4) overburden placement in the Turner pit, as needed; 5) various site improvements such as construction of access roads, installation of gates, placement of signage to comply with safety measures; 6) routine operation of mobile and fixed mining equipment; and 7) construction of perimeter berms along Sunset Avenue, portions of South Creek Road, the western boundary of the Sunset property, and the southern boundary of the Turner property to contain topsoil and subsoil as needed, as well as to provide a visual buffer for these sections of the mining operation. As stated previously, no material processing would occur on the Turner and Sunset properties; rather the extracted materials would be processed at the existing Los Banos plant.

The Project design and methodology is consistent with the existing mining operations at the Los Banos Facility. The pace and rate of extraction would not change. The number of employees and hours of operation would remain the same, as once the Project commences, existing employees would simply continue operations within the Turner and Sunset properties.

The Project mine plan generally follows the current plan for the Los Banos Facility operations. At the Sunset property, mining would take place within a single pit through excavation with conventional mobile equipment. Side wall slopes would be cut at 2:1 (horizontal to vertical). Once mining is complete at the Sunset property, process fines material (clays, silts, and fine sands) from the Los Banos processing plant would be placed in the mined pit. Mining at the Turner property would be conducted in the same manner; overburden and fines would be placed in the Turner pit over the course of mining in that area.

The Project would utilize the same site security measures currently in place at the Los Banos Facility, and would include gates at each point of ingress/egress from a public road: in this case Sunset Avenue for the Sunset property and South Creek Road for the Turner property. Upon development of the Turner property, fencing would also be erected along both sides of the portion of Alvarado Trail that bisects this mining area. A fence would be installed at the designated crossing point al this road, as well. When not in operation, each access gate would be secured with a lock and placarded with active quarry/no trespassing signage.

Although nighttime operations are not anticipated, since the majority of Project operations would occur during the daytime hours, lighting for nighttime operations and security would only be provided as needed. If installed, lighting within the Project sites would be installed in a manner as to minimize glare. The lights would comply with all applicable County standards and industry practices. High pressure sodium and/or cut-off fixtures (or equivalent International Darksky Association [IDA]-approved fixtures) would be used instead of mercury-vapor fixtures for any required nighttime lighting. The lighting would

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[1] A crossing point would be designated at Alvarado Trail to permit access to the southernmost portion of the Turner property.

also be designed to confine illumination to the active working areas.

Table 3 provides a summary of the Project's operational parameters and compares these to the existing mining and reclamation activities at the Los Banos Facility.

Table 3: Project Summary

Activity / Item	Existing Facility	Proposed Project	Project Change
Project Sites Size (acres)	Los Banos Facility: 606.7 Acres	Sunset Property: 32.8 acres Turner Property: 307.6 acres TOTAL: 947.1 acres	+ 340.4 acres
Total Reclamation Area (acres)	Approximately 606.7 acres Topsoil and subsoil have been salvaged from existing mining areas, and stored in perimeter berms.	Approximately 890.7 acres. Topsoil and subsoil would be salvaged and contained in perimeter berms within the setbacks along Sunset Avenue and portions of South Creek Road, Canyon Road, and Alvarado Trail.	+ 284 acres
Total Mining / Excavation Area (acres)	Approximately 606.7 acres	Approximately 823.3 acres (exclusive property line setbacks).	+ 216.6 acres
Mining Method	Use of excavators, scrapers, dozers, loaders, etc. to extract aggregate material. No onsite processing or blasting required.	Use of excavators, scrapers, dozers, loaders, etc. to extract aggregate material. No onsite processing or blasting required.	No Change
Anticipated Mining Depth (Sunset & Turner Properties)	Approximately 100-feet below ground surface (bgs). Note, excavation depths below groundwater levels are permitted at the exciting Facility.	Approximately 27-feet to 72-feet below ground surface (bgs). Excavation would not occur below groundwater levels.	Extraction would remain above the groundwater in the Project sites.
Processing	Processing (aggregate plant, hot-mix asphalt plant) currently permitted at the existing Los Banos Facility.	No processing would occur on the Project sites. All processing would continue to occur at the existing Facility.	No Change (processing would continue at the existing Facility)
Estimated Total Aggregate Volume	N/A – Existing total aggregate reserves unknown (not provided in past Facility documentation).	36.3 million gross tons (Sunset & Turner Properties)	+ 36.3 million tons
Estimated Average Annual Extraction Rate	1.03 million tons/year	1.03 million tons/year	No Change
Water Use (dust control)	Approximately 173 acre-feet of water per year is obtained from existing wells at the Los Banos Facility.	Approximately 173 acre-feet per year obtained from existing wells at the Los Banos Facility.	No Change

Activity / Item	Existing Facility	Proposed Project	Project Change
Reclamation End Uses	Open space, with shallow basins.	Open space.	No Change
Project Life (Sunset & Turner Properties)	N/A – Existing life of mine unknown (not provided in past Facility documentation).	Approximately 40 years, depending on market demand.	+ 40 years
Material Transport Method	Excavated materials are transferred to the existing Facility's processing plant by haul trucks using internal haul roads. Processed materials are transported off-site for customer deliveries.	Excavated material would be transferred to the existing Los Banos Facility's processing plant by haul truck using internal haul roads (other than at a small crossing area at Alvarado Trail, no haul trucks would enter/exit public roads). Processed materials would be transported off-site for customer deliveries in the same manner is currently in place at the adjoining Los Banos Facility.	No change

2.4 Project Approvals

As noted above, implementation of the Project would require the following County approvals:

1. Amended Conditional Use Permit (CUP) 3466
2. Amended Reclamation Plan

As part of the Project, Triangle has requested that the County approve an amendment to CUP 3466 to allow mining and ancillary activities, including material stockpiling, loading and conveyance of materials, on the Sunset and Turner properties. This request also includes allowing for the transfer and placement of slurry fines from the Los Banos Facility's processing area into the Sunset and Turner pits, and also transfer and placement of overburden within the Turner pit as mining progresses. The following uses and activities on the Project sites would be consistent with the existing Los Banos Facility:

- Extraction of sand and gravel and ancillary activities over the maximum extent of the mining areas on the Sunset and Turner properties to estimated depths of 27- to 72-feet bgs, with actual depths depending on the elevation of the top of the Corcoran Clay. The mine pit design incorporates a standard final reclaimed slope configuration of 2:1 (horizontal to vertical) slopes, and minimum 50-foot offsets from exterior property lines;
- Construction of earthen perimeter berms along Sunset Avenue South Creek Road, the western boundary of the Sunset pit, and the southern boundary of the Turner pit to store topsoil/subsoil, as required by SMARA. The berms would be approximately 4.5- to 5.5-feet high, except for along the north side along Sunset Avenue and northern half of the west side of the Sunset property, where the berms would be approximately 7-feet in height;

- Construction of an employee vehicle and service equipment access gate and road into each excavation area; one connecting to Sunset Avenue and the other along portions of South Creek Road. Additionally, a fence and gate would be installed along both sides of the portion of Alvarado Trail that bisects the Turner property. As previously noted, no on-road haul trucks would be used to transport materials from the mining areas to the Los Banos processing plant, and no haul trucks would enter/exit the Sunset site onto Sunset Avenue or South Creek Road. A designated and gated crossing point would be used to move materials from the southern part of the Turner property across Alvarado Trail to the existing processing plant;
- Operation of loaders, scrapers, and related mining equipment, as necessary, to extract material from the Sunset and Turner properties; and
- Post-mining site reclamation to open space adaptable for various future uses by grading, re-soiling and revegetation.

Triangle has also requested that the County approve an amendment to the existing Reclamation Plan, submitted to the County under separate cover, that incorporates the Sunset and Turner mined lands, and calls for reclamation and revegetation of these areas as part of the reclamation of the Los Banos Facility operation following completion of mining.

2.5 Lead Agency & Applicant/Operator Information

Project Title:	Los Banos Sand and Gravel Quarry CEQA Initial Study / Mitigated Negative Declaration
Applicant/Operator:	Triangle Rock Products, LLC 31 Rancho Camino Drive Pomona, California 91776
Lead Agency/Contact:	County of Merced Community and Economic Development Department 2222 M Street, 2nd Floor Merced, California 95340 (209) 385-75654 Contact: Tiffany Ho Contact Email: tiffany.ho@countyofmerced.com

Figure 1: Site Overview & Existing Conditions

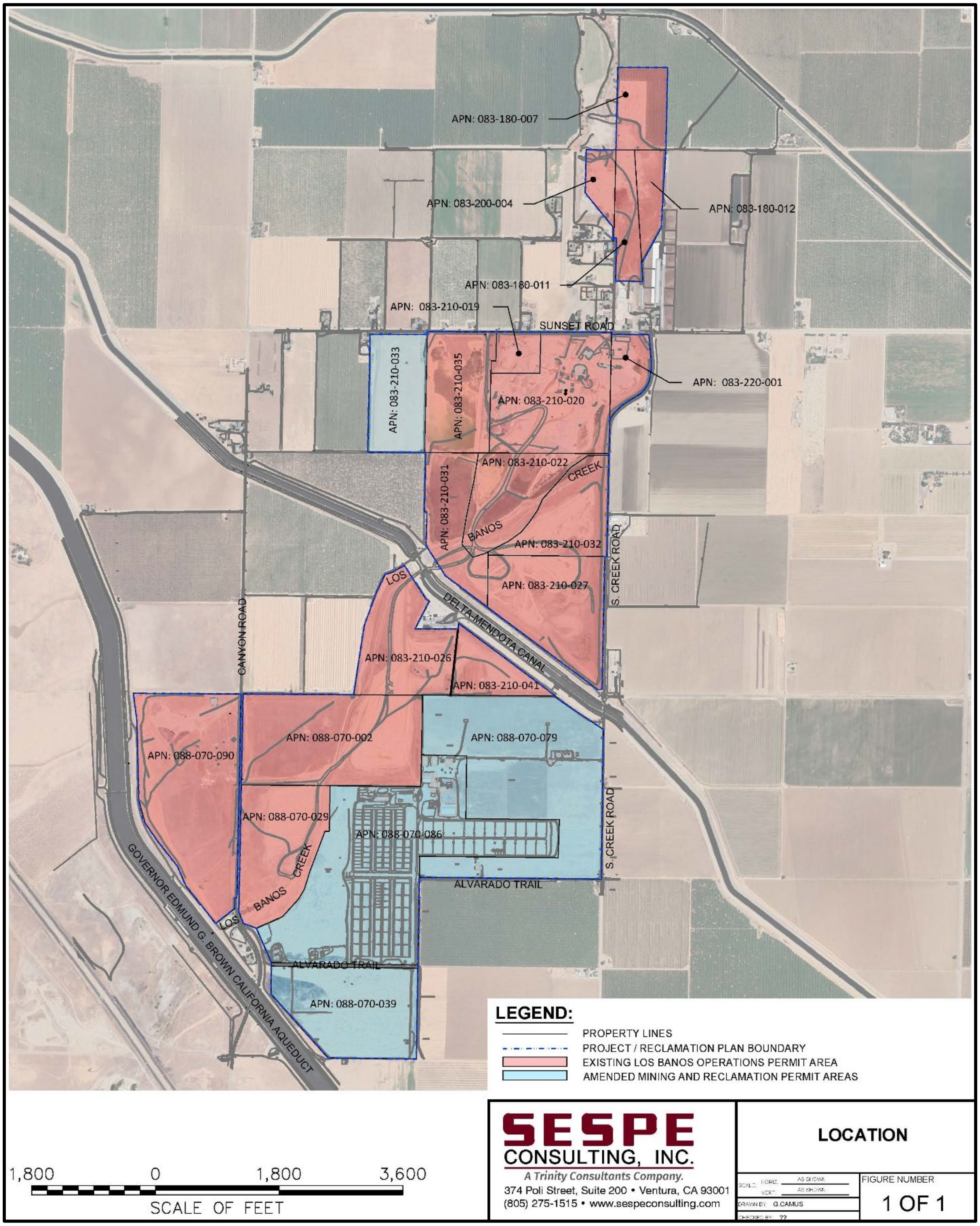
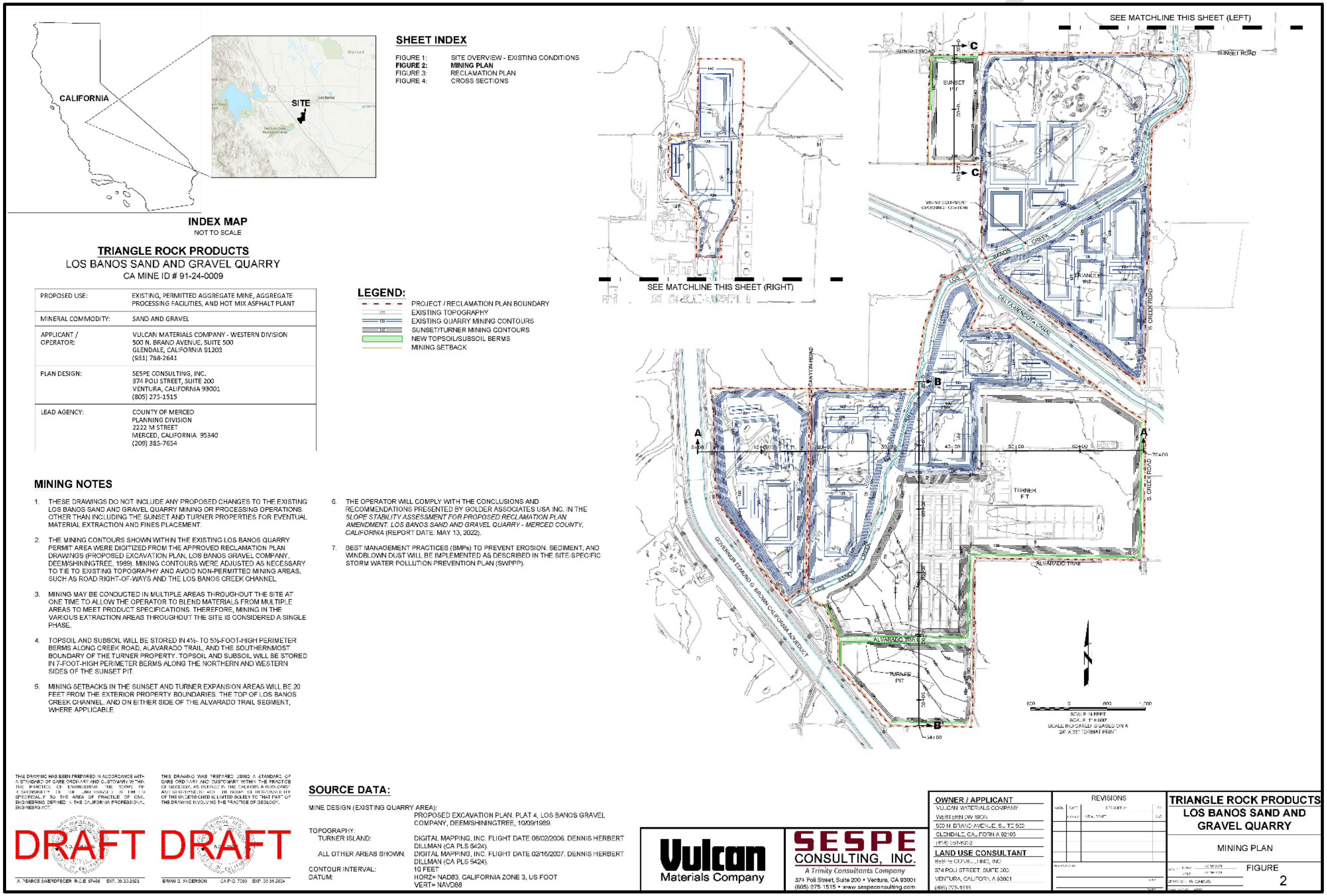


Figure 2: Mining Plan



TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY
CA MINE ID # 91-24-0009

PROPOSED USE:	EXISTING, PERMITTED AGGREGATE MINE, AGGREGATE PROCESSING FACILITIES, AND HOT MIX ASPHALT PLANT
MINERAL COMMODITY:	SAND AND GRAVEL
APPLICANT / OPERATOR:	VULCAN MATERIALS COMPANY - WESTERN DIVISION 500 N. BRAND AVENUE, SUITE 500 GLENDALE, CALIFORNIA 91203 (931) 768-2641
PLAN DESIGN:	SESPE CONSULTING, INC. 374 POLI STREET, SUITE 200 VENTURA, CALIFORNIA 93001 (805) 275-1515
LEAD AGENCY:	COUNTY OF MERCED PLANNING DIVISION 2222 M STREET MERCED, CALIFORNIA 95340 (209) 385-7654

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FIGURE 1:	SITE OVERVIEW - EXISTING CONDITIONS
FIGURE 2:	**MINING PLAN**
FIGURE 3:	RECLAMATION PLAN
FIGURE 4:	CROSS SECTIONS

LEGEND:

‒ ‒ ‒	PROJECT / RECLAMATION PLAN BOUNDARY
―	EXISTING TOPOGRAPHY
═	EXISTING QUARRY MINING CONTOURS
═	SUNSET/TURNER MINING CONTOURS
🟩	NEW TOPSOIL/SUBSOIL BERMS
―	MINING SETBACK

MINING NOTES

1. THESE DRAWINGS DO NOT INCLUDE ANY PROPOSED CHANGES TO THE EXISTING LOS BANOS SAND AND GRAVEL QUARRY MINING OR PROCESSING OPERATIONS, OTHER THAN INCLUDING THE SUNSET AND TURNER PROPERTIES FOR EVENTUAL MATERIAL EXTRACTION AND FINES PLACEMENT.
2. THE MINING CONTOURS SHOWN WITHIN THE EXISTING LOS BANOS QUARRY PERMIT AREA WERE DIGITIZED FROM THE APPROVED RECLAMATION PLAN DRAWINGS (PROPOSED EXCAVATION PLAN, LOS BANOS GRAVEL COMPANY, DEEM/SHININGTREE, 1989). MINING CONTOURS WERE ADJUSTED AS NECESSARY TO TIE TO EXISTING TOPOGRAPHY AND AVOID NON-PERMITTED MINING AREAS, SUCH AS ROAD RIGHT-OF-WAYS AND THE LOS BANOS CREEK CHANNEL.
3. MINING MAY BE CONDUCTED IN MULTIPLE AREAS THROUGHOUT THE SITE AT ONE TIME TO ALLOW THE OPERATOR TO BLEND MATERIALS FROM MULTIPLE AREAS TO MEET PRODUCT SPECIFICATIONS. THEREFORE, MINING IN THE VARIOUS EXTRACTION AREAS THROUGHOUT THE SITE IS CONSIDERED A SINGLE PHASE.
4. TOPSOIL AND SUBSOIL WILL BE STORED IN 4½- TO 5½-FOOT-HIGH PERIMETER BERMS ALONG CREEK ROAD, ALAVARADO TRAIL, AND THE SOUTHERNMOST BOUNDARY OF THE TURNER PROPERTY. TOPSOIL AND SUBSOIL WILL BE STORED IN 7-FOOT-HIGH PERIMETER BERMS ALONG THE NORTHERN AND WESTERN SIDES OF THE SUNSET PIT.
5. MINING SETBACKS IN THE SUNSET AND TURNER EXPANSION AREAS WILL BE 20 FEET FROM THE EXTERIOR PROPERTY BOUNDARIES, THE TOP OF LOS BANOS CREEK CHANNEL, AND ON EITHER SIDE OF THE ALVARADO TRAIL SEGMENT, WHERE APPLICABLE.
6. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS AND RECOMMENDATIONS PRESENTED BY GOLDER ASSOCIATES USA INC. IN THE *SLOPE STABILITY ASSESSMENT FOR PROPOSED RECLAMATION PLAN AMENDMENT, LOS BANOS SAND AND GRAVEL QUARRY - MERCED COUNTY, CALIFORNIA* (REPORT DATE: MAY 13, 2022).
7. BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT EROSION, SEDIMENT, AND WINDBLOWN DUST WILL BE IMPLEMENTED AS DESCRIBED IN THE SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

THIS DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF ENGINEERING. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SPECIFICALLY TO THE AREA OF PRACTICE OF CIVIL ENGINEERING DEFINED IN THE CALIFORNIA PROFESSIONAL ENGINEERS ACT.

A. PEARCE SWERDFEGER R.C.E 67466 EXP. 09-30-2023

THIS DRAWING WAS PREPARED USING A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF GEOLOGY, AS DEFINED IN THE CALIFORNIA GEOLOGIST AND GEOPHYSICIST ACT. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SOLELY TO THAT PART OF THE DRAWING INVOLVING THE PRACTICE OF GEOLOGY.

BRIAN G. ANDERSON CA P.G. 7009 EXP. 03-31-2024

SOURCE DATA:

MINE DESIGN (EXISTING QUARRY AREA):	PROPOSED EXCAVATION PLAN, PLAT 4, LOS BANOS GRAVEL COMPANY, DEEM/SHININGTREE, 10/09/1989.
TOPOGRAPHY:	
TURNER ISLAND:	DIGITAL MAPPING, INC. FLIGHT DATE 06/02/2006, DENNIS HERBERT DILLMAN (CA PLS 5424).
ALL OTHER AREAS SHOWN:	DIGITAL MAPPING, INC. FLIGHT DATE 02/16/2007, DENNIS HERBERT DILLMAN (CA PLS 5424).
CONTOUR INTERVAL:	10 FEET
DATUM:	HORZ= NAD83, CALIFORNIA ZONE 3, US FOOT VERT= NAVD88

OWNER / APPLICANT
VULCAN MATERIALS COMPANY
WESTERN DIVISION
500 N. BRAND AVENUE, SUITE 500
GLENDALE, CALIFORNIA 91203
(818) 553-8832

LAND USE CONSULTANT
SESPE CONSULTING, INC
374 POLI STREET, SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515

TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY

MINING PLAN

FIGURE
2

Figure 3: Reclamation Plan

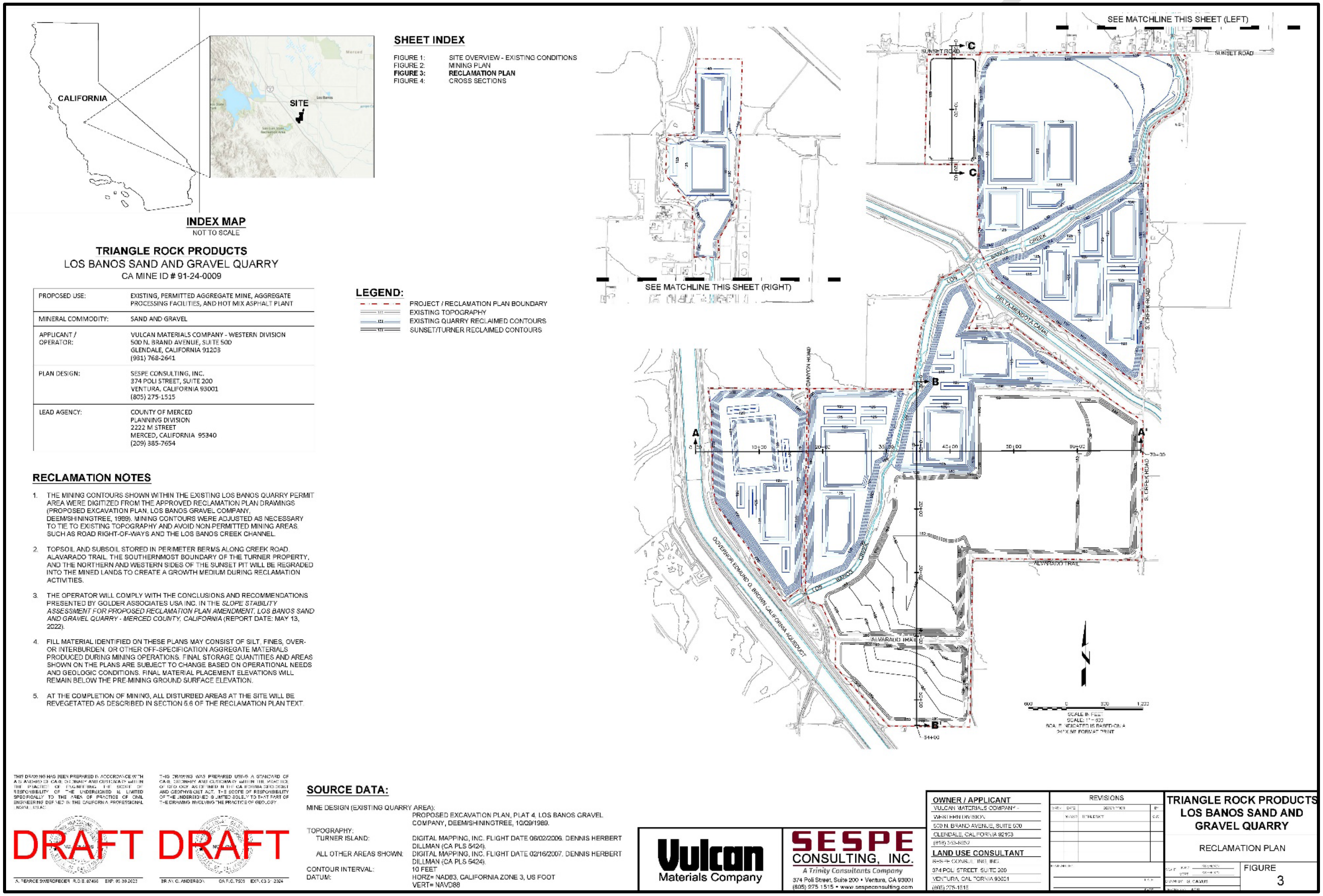

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FIGURE 1: SITE OVERVIEW - EXISTING CONDITIONS
FIGURE 2: MINING PLAN
FIGURE 3: RECLAMATION PLAN
FIGURE 4: CROSS SECTIONS

TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY
CA MINE ID # 91-24-0009

PROPOSED USE:	EXISTING, PERMITTED AGGREGATE MINE, AGGREGATE PROCESSING FACILITIES, AND HOT MIX ASPHALT PLANT
MINERAL COMMODITY:	SAND AND GRAVEL
APPLICANT / OPERATOR:	VULCAN MATERIALS COMPANY - WESTERN DIVISION 500 N. BRAND AVENUE, SUITE 500 GLENDALE, CALIFORNIA 91203 (931) 768-2641
PLAN DESIGN:	SESPE CONSULTING, INC. 374 POLI STREET, SUITE 200 VENTURA, CALIFORNIA 93001 (805) 275-1515
LEAD AGENCY:	COUNTY OF MERCED PLANNING DIVISION 2222 M STREET MERCED, CALIFORNIA 95340 (209) 385-7654

LEGEND:

PROJECT / RECLAMATION PLAN BOUNDARY
EXISTING TOPOGRAPHY
EXISTING QUARRY RECLAIMED CONTOURS
SUNSET/TURNER RECLAIMED CONTOURS

RECLAMATION NOTES

1. THE MINING CONTOURS SHOWN WITHIN THE EXISTING LOS BANOS QUARRY PERMIT AREA WERE DIGITIZED FROM THE APPROVED RECLAMATION PLAN DRAWINGS (PROPOSED EXCAVATION PLAN, LOS BANOS GRAVEL COMPANY, DEEM/SHININGTREE, 1989). MINING CONTOURS WERE ADJUSTED AS NECESSARY TO TIE TO EXISTING TOPOGRAPHY AND AVOID NON-PERMITTED MINING AREAS. SUCH AS ROAD RIGHT-OF-WAYS AND THE LOS BANOS CREEK CHANNEL.
2. TOPSOIL AND SUBSOIL STORED IN PERIMETER BERMS ALONG CREEK ROAD. ALAVARADO TRAIL. THE SOUTHERNMOST BOUNDARY OF THE TURNER PROPERTY, AND THE NORTHERN AND WESTERN SIDES OF THE SUNSET PIT WILL BE REGRADED INTO THE MINED LANDS TO CREATE A GROWTH MEDIUM DURING RECLAMATION ACTIVITIES.
3. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS AND RECOMMENDATIONS PRESENTED BY GOLDER ASSOCIATES USA INC. IN THE *SLOPE STABILITY ASSESSMENT FOR PROPOSED RECLAMATION PLAN AMENDMENT, LOS BANOS SAND AND GRAVEL QUARRY - MERCED COUNTY, CALIFORNIA* (REPORT DATE: MAY 13, 2022).
4. FILL MATERIAL IDENTIFIED ON THESE PLANS MAY CONSIST OF SILT, FINES, OVER- OR INTERBURDEN. OR OTHER OFF-SPECIFICATION AGGREGATE MATERIALS PRODUCED DURING MINING OPERATIONS. FINAL STORAGE QUANTITIES AND AREAS SHOWN ON THE PLANS ARE SUBJECT TO CHANGE BASED ON OPERATIONAL NEEDS AND GEOLOGIC CONDITIONS. FINAL MATERIAL PLACEMENT ELEVATIONS WILL REMAIN BELOW THE PRE-MINING GROUND SURFACE ELEVATION.
5. AT THE COMPLETION OF MINING, ALL DISTURBED AREAS AT THE SITE WILL BE REVEGETATED AS DESCRIBED IN SECTION 5.6 OF THE RECLAMATION PLAN TEXT.

SOURCE DATA:

MINE DESIGN (EXISTING QUARRY AREA):	PROPOSED EXCAVATION PLAN, PLAT 4, LOS BANOS GRAVEL COMPANY, DEEM/SHININGTREE, 10/09/1989.
TOPOGRAPHY:	
TURNER ISLAND:	DIGITAL MAPPING, INC. FLIGHT DATE 06/02/2006. DENNIS HERBERT DILLMAN (CA PLS 5424).
ALL OTHER AREAS SHOWN:	DIGITAL MAPPING, INC. FLIGHT DATE 02/16/2007. DENNIS HERBERT DILLMAN (CA PLS 5424).
CONTOUR INTERVAL:	10 FEET
DATUM:	HORZ= NAD83, CALIFORNIA ZONE 3, US FOOT VERT= NAVD88

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Materials Company

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REVISIONS

TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY

RECLAMATION PLAN

FIGURE
3

3.0 ENVIRONMENTAL CHECKLIST & CEQA EVALUATION

The Environmental Checklist in this IS/MND is consistent with the CEQA Environmental Checklist Form included as Appendix G of the CEQA Guidelines. The IS/MND evaluates the potential for the Project to result in environmental impacts, evaluates the significance of those impacts, and defines mitigation measures to avoid or reduce impacts to less than significant levels. The environmental factors checked below would be potentially affected by the Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics
☐ Biological Resources
☐ Geology / Soils
☐ Hydrology / Water Quality
☐ Noise
☐ Recreation
☐ Utilities / Service Systems
☐ Agriculture and Forestry Resources
☐ Cultural Resources
☐ Greenhouse Gas Emissions
☐ Land Use / Planning
☐ Population / Housing
☐ Transportation
☐ Wildfire
☐ Air Quality
☐ Energy
☐ Hazards & Hazardous Materials
☐ Mineral Resources
☐ Public Services
☐ Tribal Cultural Resources
☐ Mandatory Findings of Significance

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

04/04/2024
Date

3.1 Aesthetics

A *Visual Impact Analysis* was prepared by Sespe Consulting, Inc. (Sespe, 2022) to assess the potential visual effects resulting from the implementation of the proposed Project. See Appendix A for a copy of the full Visual Impact Analysis report.

I. AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The Project would not have a substantial adverse effect on a scenic vista. The Merced County *2030 General Plan* (Merced County, 2016), notes that scenic vistas within the County generally include views of (and from) the "*Sierra Nevada mountain ranges, and the Los Banos Creek, Merced, San Joaquin, and Bear Creek river corridors*" (Merced County, 2016). Therefore, the primary scenic vistas within the Project vicinity would be views from the Los Banos Creek/Reservoir located approximately 0.5 to 1.5 miles away to the southwest, across Interstate 5 (I-5). There is a potential for the Project to be visible from viewpoints near the Los Banos Creek/Reservoir due to the slightly higher elevation of the viewpoints in this area compared to the flat topography surrounding the Sunset and Turner properties within the valley below.

Note that the Merced *County Code* (Merced County, 2022) does not designate any specific scenic vistas within the Project vicinity.

To quantify the Project's potential visual effects, photo simulations were prepared showing the Turner and Sunset properties during both active mining operations as well as post-mining reclamation. Refer to the photo simulations in Appendix A of the Visual Impact Analysis (Appendix A within this IS/MND). Of seven selected viewpoints, only Viewpoint #5 is of/from a scenic vista as defined in the Merced County *2030 General Plan* (Merced County, 2016). The simulations show that neither the mining operations nor the subsequent reclamation/revegetation of the Project site would adversely affect views of the surrounding valley from Los Banos Creek/Reservoir. Due to the distance between viewpoints within the Los Banos Creek/Reservoir and the closest area of new disturbance (i.e., southern portion of the Turner Property), development of the Project would not degrade the regional visual quality in this area. Additionally, the Project would not require the construction of structures or topographic features that would extend above the existing native grade, and therefore the Project sites would not obstruct views of other surrounding scenic resources. The Project would maintain views of the surrounding natural landforms and ridgelines from other public viewpoints within the valley and would therefore not expected to impede scenic views of Los Banos Creek/Reservoir.

In addition to scenic views from the Los Banos Creek/reservoir described above, the visual rating system published by the Bureau of Land Management (BLM) was also utilized to quantify visual impacts resulting from the proposed Project at seven specific viewpoints (outlined in Appendix A of the Visual Impact Analysis). These locations were selected for further analysis because they represent areas considered to have potentially high Project visibility, both surrounding the Project sites and along nearby routes of travel. Through this analysis, the existing views, active project mining views, and reclaimed views were given individual BLM rating criteria scores to determine the significance of visual impacts at each location. The BLM's Visual Rating Management (VRM) system objectively rates the quality of visual resources and evaluates changes in scenic quality attributed to a proposed change in land use. While there are a number of standardized methods for rating visual quality, the BLM's VRM method is believed to be superior as it allows the various landscape elements that comprise visual quality to be easily quantified and rated, while minimizing issues of ambiguity and subjectivity. Although the Project has no Federal nexus, use of the VRM is considered appropriate as it allows visual resources and impacts to be subjectively quantified. Therefore, in the absence of adopted County thresholds for evaluating the significance of project visual impacts, the BLM's VRM is utilized herein.

Referring to the photo simulations and the BLM ratings criteria scores summarized in Appendix A of the Visual Impact Analysis, simulated views from all viewpoints assessed, including those from Canyon Road leading up to Los Banos Creek/Reservoir, are not anticipated to significantly change or be adversely impacted as a result of the Project. Conversely, once reclamation and revegetation of the Project sites is complete, the overall visual quality of the Project sites and surrounding areas are expected to improve at most viewpoints compared to the baseline conditions. As part of reclamation, both the Sunset and Turner properties, including the remaining stockpiles and excavation pits presently approved, would be revegetated via hydroseeding (or other approved revegetation method), to restore the perennial plant communities and to recreate a natural plant cover that is consistent with the surrounding environment. Additionally, while the excavation pits would be visible from certain public viewpoints during active mining at the Sunset and Turner properties, aggregate mining and processing has been occurring in the area for decades, and therefore views of the exposed surfaces and excavation equipment would not be inconsistent with the existing character of the area.

For the reasons outlined above, the Project would not have a substantial adverse effect on scenic vistas surrounding the Project sites, and impacts would be less than significant with no mitigation required. Refer to the complete Visual Impact Analysis in Appendix A for additional detail.

b) **Less Than Significant Impact:** The Project would not substantially damage scenic resources within a state scenic highway. The State of California officially designates State scenic highways through the "California Scenic Highway Program," managed by the California Department of Transportation (Caltrans). Highways may also be designated as "Candidate" scenic highways, pending official designation. Pursuant to the Street and Highway Code, Section 263 et. seq., there are no candidate or designated State scenic highways within the immediate vicinity of the Project sites. The closest scenic highways are portions of I-5 extending north from the intersection of State Route 152 (SR-152)/SR-33 and portions of SR-152 extending westward from the intersection of I-5, located approximately 4.2 miles to the northwest of the Sunset property. These portions of I-5 and SR-152/SR-33 are both "Officially Designated" state scenic highways. Due to the distance between the Project sites and these highways, as well as intervening topography, the Project sites is not visible from the designated scenic portions of I-5 and SR-152/SR-33. Therefore, the Project would not substantially damage scenic resources within a State scenic highway, and there would be no impacts.

c) **Less Than Significant Impact:** The Project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings. As discussed above under CEQA Criteria a), predicted visual impacts resulting from the Project at nearby sensitive public viewpoints were assessed using the BLM's rating criteria. This analysis concluded that there would be no significant visual impacts resulting from the Project at nearby locations. While visual quality may be minimally degraded at certain public viewpoints during active mining, ultimately visual quality at the seven viewpoints assessed are expected to be improved once mining is completed and the sites are reclaimed. As discussed above, the proposed reclamation plan includes revegetation via hydroseeding, which aims to restore the sites to a condition similar to what is existing onsite and within the surrounding environment today. For additional detail, refer to photo simulations in Appendix A of the Visual Impact Analysis.

Although the Project sites are not located within an urbanized area of the County, zoning and other applicable County regulations governing scenic quality were considered. Specifically, scenic/visual policies outlined in the Merced County *General Plan* (Merced County, 2016) and Merced County *Code of Ordinances* (Merced County, 2022) were reviewed to determine applicability to the Project. For a summary of the Project's consistency with the applicable County policies, refer to Table 4 and Table 5 within the Visual Impact Analysis (Appendix A) report prepared by Sespe. As outlined within Table 4 and Table 5 in the Visual Impact Analysis, the Project would not conflict with any applicable County goals, policies or ordinances governing scenic quality. Project design features including construction of the perimeter screening berms, as well as the post-mining reclamation and revegetation activities outlined within the Reclamation Plan Amendment, such as removal of remaining equipment structures, revegetation of the site using perennial species for use as open space/wildlife habitat, and stabilization of remaining slopes, would sufficiently protect existing visual resources and ensure the Project is compatible with applicable County general plan policies and zoning ordinance. Therefore, the Project would not substantially degrade the existing visual character of the Project sites or surrounding areas, would not significantly impact sensitive public viewpoints, or conflict with any applicable policies or plans meant to protect scenic resources, and impacts are considered less than significant with no mitigation required.

d) **Less Than Significant Impact:** The proposed Project would not create new sources of substantial light or glare which would adversely affect daytime or nighttime views in the area. The issue of light and glare is typically associated with excessively bright nighttime lighting that crosses over property lines (i.e., "light trespass") and illuminates off-site yards or bedroom windows. It is also associated with the condition that occurs when excessive nighttime lighting creates a "skyglow" effect.

The proposed Project activities are anticipated to occur during daylight hours (i.e., between 7:00 a.m. to 7:00 p.m.), consistent with the Facility's existing operations, and would therefore not require outdoor lighting. Additionally, no new structures, temporary or permanent, that would require electrical lighting are proposed as part of the Project. If utilized, nighttime lighting would be limited to portable lights or small lights affixed to mobile equipment (i.e., dozers, excavators, etc.) for safety purposes. Although not anticipated, temporary nighttime lighting for safety or security may also be required, consistent with the Facility's existing operations. If installed, any temporary lighting within the Project sites would be installed in a manner to minimize glare. The lights would comply with all applicable County standards and industry practices. High pressure sodium and/or cut-off fixtures (or equivalent International Dark-sky Association [IDA]-approved fixtures) would be used instead of mercery-vapor fixtures for any required nighttime lighting. The lighting would also be designed to confine illumination to the active working areas only.

Therefore, by employing minimal nighttime lighting fixtures and utilizing the proposed lighting and design features (i.e., downcast lights, high pressure sodium and/or cut-off fixtures, etc.), the Project would have a less than significant impact associated with light and glare with no mitigation required.

3.2 Agriculture and Forestry Resources

The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on agriculture or forestry resources.

II. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The proposed Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Both the Sunset and Turner properties are generally vacant, disturbed land that borders the existing Facility; however, a portion of the Turner property has historically been leased for agricultural related uses. Lands surrounding the Sunset and Turner properties are either fallow agricultural lands, or presently active growing operations for various crops.

According to the mapping information available through the California Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP), the Sunset and Turner Properties are comprised of lands with the following farmland designations: Vacant or Disturbed Land; Grazing Land; and, Farmland of Local Importance. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance are mapped within the Project area (https://www.conservation.ca.gov/dlrp/fmmp/Pages/Merced.aspx).

Although portions of the Project sites have a "Farmland of Local Importance" designation, the existing conditions of these lands are fallow and as such does not provide ideal conditions for farming. Additionally, none of these land use designations are listed as types of farmlands that require conservation under the County's agricultural land mitigation program. Further, the use of the Sunset and Turner properties for mining would not preclude future farming operations within the Project sites, as no permanent buildings, paving, or developments that would impede the use of the site for agricultural production are proposed. After mining activities conclude, the site would be restored back to open space land uses thus allowing the possibility for agricultural uses to occur on the Project sites in the future. For these reasons, the conversion of Farmland of Local Importance within the Sunset property and portions of the Turner property would not constitute a significant impact and the proposed Project would have less than significant impacts regarding Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, with no mitigation required.

b) **No Impact:** See response to CEQA Criteria a) above. The proposed Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract. The proposed Project sites are currently included in the Merced County General Plan as having an Agricultural (A-1) Zoning and land use designation (Merced County, 2016); however, under the General Plan, mining is consistent with this land use designation and is allowable in A-1 zones with approval of a Conditional Use Permit (Merced County Code – §18.10.020). While the Project sites and surrounding areas are zoned for Agricultural (A-1), neither the Project nor adjacent areas are under a Williamson Act contract, and the Project does not require changes to the County's existing General Plan or Zoning designation. Specifically, mining is an allowable use within the County's A-1 land use designation with approval of a Conditional Use Permit (Merced County, 2022). Therefore, the proposed Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract, and there would be no impact.

c) **No Impact:** The proposed Project would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned as timberland production. The Project sites (i.e., Sunset and Turner properties) are fallow agricultural lands. The Project area is not zoned for forest land or timberland, and no zoning changes are proposed. Therefore, no Project impacts pertaining to zoning for forest land or timberland would occur.

d) **No Impact:** The proposed Project would not result in the loss of forest land or conversion of forest land to non-forest use. As discussed under CEQA Criteria a) and b) above, the Project sites are comprised of fallow farmland and vacant/disturbed areas. No forest land exists within or adjacent to the Project Sites. Therefore, no impacts related to the loss of forest land or conversion of forest land to non-forest use would occur.

e) **Less Than Significant Impact:** See responses to CEQA Criteria a) and b) above. The proposed Project does not involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use, or conversion of forest land to non-forest use. The Project sites are currently zoned as Agricultural (A-1) in the Merced County General Plan in which mining is an allowable use with approval of a Conditional Use Permit (Merced County, 2022). Additionally, the Project sites are not zoned as forest land. Although portions of the Project sites have been designated as "Farmland of Local Importance" by the State DOC, the proposed Project would not impede the use of the site for future agricultural uses, as no permanent structures would be constructed as a part of the Project. Further, after mining operations conclude, the Project sites would be restored back to open space which would allow the site to be utilized for agricultural purposes in the future. For these reasons, the proposed Project would result in less than significant impacts regarding the conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

3.3 Air Quality

The following section is based upon the *Air Quality, Health Risk, and Climate Change Impact Assessment* (Air Report) prepared by Sespe Consulting, Inc. (Sespe, 2024). The Air Report quantified and determined the significance of air quality, health risk, and climate change impacts associated with the proposed Project (i.e., material extraction within the Sunset and Turner properties) pursuant to the California Environmental Quality Act (CEQA). Refer to Appendix B for full copy of the Sespe, 2022 Air Report.

III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The proposed Project would not conflict with or obstruct the implementation of any applicable air quality plan. The Project is located in the central portion of the San Joaquin Valley within the central portion of the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of the San Joaquin Valley Unified Air Pollution Control District (SJVAPCD). The Project would be required to comply with the regional air quality policies and regulations promulgated by the SJVAPCD and participate in reducing air pollutant emissions. Resource extraction would continue to occur at the same rate as currently occurs at Triangle's existing Los Banos Facility. Additionally, mining methods such as the number and type of mobile equipment would remain the same as is currently in place for the existing Los Banos Facility. Lastly, continued mining that would occur as a result of the Project would not induce growth, and the annual amount of material mined would remain unchanged. Aggregate mining is a result of population growth, which is considered in the applicable state and local air quality plans. Therefore, the proposed Project would not obstruct implementation of applicable SJVAPCD air quality plans and impacts are considered less than significant.

b) **Less Than Significant Impact:** The proposed Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard. CEQA defines cumulative impacts as two or more individual effects which, when considered together, are either significant or "cumulatively considerable", meaning they add considerably to a significant environmental impact. An adequate cumulative impact analysis considers a project over time and in conjunction with other past, present, and reasonably foreseeable future projects whose impacts might compound those of the project being assessed.

By its very nature, air pollution is largely a cumulative impact. The non-attainment status of regional pollutants is a result of both past and present development, and future attainment of State and Federal ambient air quality standards would be a function of successful implementation of the SJVAPCD's attainment plans. Consequently, the SJVAPCD's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.

A CEQA Lead Agency, in this case the County, may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously approved plan or mitigation program, including but not limited to an air quality attainment or maintenance plan that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (CCR §15064(h)(3)).

Thus, if project emissions (i.e., change from baseline) exceed thresholds for NOx, ROG, PM_{10} or $PM_{2.5}$, then the project would result in a cumulatively considerable net increase of a criteria pollutant for which the SJVAPCD is in non-attainment under applicable Federal or State ambient air quality standards. This does not imply that if the project impact is less than those significance criteria, it cannot be cumulatively significant.

Per the Air Report analysis in Appendix B, Table 4 below presents the Project's annual emissions for applicable criteria pollutants and the associated significance criteria established by the SJVAPCD. As required by CEQA, the level of significance is determined by the net change (or increment) between pre-project environmental conditions (i.e., baseline) and post-project (i.e., future) environmental conditions. Due to the fact that certain regulatory requirements would require Triangle to use of cleaner engines and new technology to be phased in over the coming operational years, some Project source emission values shown in Table 4 are negative. Negative values represent a reduction in emissions from Project baseline due to incorporation of these cleaner engines and new technologies in future operation years.

If the project would comply with the requirements in a previously approved plan or mitigation program, including but not limited to an air quality attainment or maintenance plan that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area in which the project is located, then the project's incremental contribution to a cumulative effect is not cumulatively considerable (CEQA Guidelines §15064(h)(3)).

Table 4: Annual Project Criteria Pollutant Emissions

Criteria Pollutant	Project Permitted Sources (tons/year)	Permitted Sources Significance Threshold (tons/year)	Exceeds Threshold?	Project Exempt Sources (tons/year)	Project Exempt Sources Significance Threshold	Exceeds Threshold?
ROG	0	10	No	-0.048	10	No
CO	0	100	No	-0.13	100	No
NO_X	0	10	No	-0.90	10	No
PM_{10} (total)	0	15	No	-50.04	15	No
$PM_{2.5}$	0	15	No	-10.65	15	No
SO_X	0	27	No	0.00	27	No

Source: See the Air Report in Appendix B.

Note: Negative values result when the Project emissions are less than the baseline emissions, and represent future emissions reductions due to Triangle's required use of newer technology and lower emission equipment/vehicles. Additionally, permitted emissions sources include stockpiles, which would have the same criteria pollutant emissions levels in the existing baseline as the future Project scenario, resulting in no change or increase Project emissions as shown above.

Impact analysis for a project's potential to exceed or contribute to exceedance of an ambient air quality standard (AAQS) normally involves modeling emissions to predict the concentration of pollutant(s) at the property line. However, SJVAPCD has established a screening level of 100 pounds per day (lb/day) for criteria pollutants. SJVAPCD allows emission reduction from the implementation of project design features and mitigation measures to be included in the screening analyses. Project emissions are compared to the 100 lb/day screening level as shown in Table 5.

Table 5: Daily Project Criteria Pollutant Emissions

Criteria Pollutant	CO lbs/day	NO_x lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day	SO_x lbs/day
Baseline	48	60	1,475	315	0.18
Project	78	74	870	187	0.32
Change/Increase due to Project	+31	+13	-605	-129	+0.14
Screening Criteria	100	100	100	100	100
Exceeds Criteria?	No	No	No	No	No

Source: See the Air Report in Appendix B.

Project Impact represents the difference between the Project and the baseline.

As shown in Table 4 and Table 5 above, the Project's emissions do not exceed applicable SJVAPCD criteria pollutant screening thresholds. Therefore, the Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (AAQS), and therefore potential impacts would be less than significant.

c) **Less Than Significant Impact:** The proposed Project would not expose sensitive receptors to substantial pollutant concentrations. Per the analysis presented in the Air Report in Appendix B, Table 6 presents health risk assessment results for the Project and compares them to applicable thresholds.

Health risk is determined based on the change in conditions associated with the implementation of the Project. Baseline risk is modeled as negative risk (emissions going away), while Project (i.e., mining in the Sunset and Turner) risk is modeled as positive (new emissions). In many cases, Project emissions end up being lower than those in the baseline, due to newer technologies and updated regulations being phased in over the coming operational years. In such cases, risk to receptors may be reduced, as the Project results in a reduction of emissions over the operational life. In cases where risk to a receptor is greater in the baseline than in the Project, the risk is represented as a negative number.

Table 6: Project Health Risk Impacts and Comparison to Significance Thresholds

Receptor Figure Label – Type	Receptor Model ID #	Excess Cancer Cases per Million People Exposed	Chronic Hazard Index	Acute Hazard Index
1 – Residential – MEIR Cancer, Chronic, Acute	6,635	8.4	0.24	0.09
23 – Worker – MEIW	6,657	-1.0	<0.01	<0.01
Significance Threshold	**N/A**	**20**	**1.0**	**1.0**
Threshold Exceeded?	**N/A**	**No**	**No**	**No**

Source: See the Air Report in Appendix B.
Note: These receptors represent locations of highest exposure. Discrepancies between table and appendix values may exist due to rounding. Negative values represent risk levels that when compared to baseline levels are less than the baseline level – resulting in a beneficial impact.
MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact.

As demonstrated by Table 6 above, the Project's health risk was determined to be less than significant. Therefore, the Project would not expose nearby sensitive receptors to substantial pollutant concentrations, and there would be less than significant impacts related to health risk and related toxic air contaminant (TAC) emissions.

d) **Less Than Significant Impact:** The proposed Project would not result in other emissions (such as those leading to odors) that could adversely affect a substantial number of people. Project baseline conditions include similar sources to the Project sources that could cause odor. SJVACPD provides a screening table of facilities that are considered sources of significant odors.

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions. The SJVAPCD has identified some common types of facilities that have been known to produce odors in the San Joaquin Valley. These are presented in Table 7 below along with a reasonable distance from the source within which, the degree of odors could possibly be significant (It should be noted that aggregate mining/processing facilities are not included on Table 7). If the proposed project would result in sensitive receptors being located closer than the screening level distances, a more detailed analysis should be provided and include information regarding odor complaints.

Table 7: Odor Screening Distances (SJVACPD)

Type of Facility	Odor Screening Distance (miles)
Wastewater Treatment Facilities	2
Sanitary Landfill	1
Transfer Station	1
Composting Facility	1
Petroleum Refinery	2
Asphalt Batch Plant	1
Chemical Manufacturing	1
Fiberglass Manufacturing	1
Painting/Coating Operations (e.g., auto body shops)	1
Food Processing Facility	1
Feed Lot/Dairy	1
Rendering Plant	1

Source(s): See the Air Report in Appendix B (SJVAPCD, 2015).

Aggregate mining and processing facilities are not included in the SJVAPCD established table as potential significant odor generating sources. In addition, SJVAPCD has regulations that require facilities not to present a nuisance to the adjacent areas. Odor complaints are addressed under the SJVAPCD nuisance rule (Rule 4102). The Project would comply with SJVAPCD rules and regulations. Therefore, it is not anticipated that objectionable odors affecting a substantial number of people could result from the Project, and Project impacts would be less than significant with no mitigation required.

3.4 Biological Resources

The following section is based upon the analysis presented in the *Biological Resources Assessment* report prepared by ELMT Consulting (ELMT, 2024). The report is based upon ELMT biologist Travis J McGill's inventory and evaluation of the habitat and conditions within the Project sites on February 9, 2022. The report provides an in-depth assessment of the suitability of the on-site habitat to support special status wildlife species as well as special-status plants identified by the California Natural Diversity Data Base (CNDDB), the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California, as well as other electronic databases to identify species with the potential for occurring in the vicinity of the Project sites. See Appendix C for ELMT's full report.

IV. BIOLOGICAL RESOURCES: Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a) **Less Than Significant Impact with Mitigation Incorporated:** The proposed Project would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plants, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service

(USFWS). ELMT evaluated the potential for special-status species to occur in the Project area, and their findings are summarized below. Refer to ELMT's full report in Appendix C for additional detail.

Special-Status Plant Species**:** No special-status plant species were observed within the boundaries of the project sites during the field investigation. Of the twenty-one (21) special-status plant species recorded in the California Natural Diversity Database (CNDDB) and the California Native Plant Society (CNPS) in the Volta, Los Banos, Ortigalita Peak North West, and Charleston School USGS 7.5-minute quadrangle, none of these special-status plant species were observed on-site during the field investigation. Furthermore, based on habitat requirements for specific special-status plant species and the availability and quantity of habitats needed by each species, ELMT determined that the Project sites does not provide suitable habitat for any of the special-status plant species known to occur in the area and are presumed to be absent from site-adjacent improvement areas. Based on habitat requirements, availability/quality of habitat needed by each species, and known distributions, special-status plant species are not expected to occur on the project sites and are presumed absent. Therefore, the proposed Project would not result in impacts to special-status plant species and no mitigation would be required.

Special-Status Wildlife Species: Based on habitat requirements for specific special-status wildlife species and the availability and quality of habitats needed by each species, determinations for the potential occurrence of each species were made. It was determined that the Project sites have a moderate potential to provide suitable habitat for great egret, great blue heron, norther harrier, snowy egret, and a low potential to provide suitable habitat for burrowing owl, crackling goose, ferruginous hawk, Swainson's hawk, prairie falcon, loggerhead shrike, Yuma myotis, and long-billed curlew. California horned lark (Eremophila alpestris actia), with a CNDDB rank of S4, was the only special-status species observed onsite. Species with a CNDDB rank S4 are "Apparently Secure" and are "[a]t a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences". All other remaining special-status wildlife species are presumed to be absent based on habitat requirements, availability/quality of habitat needed by each species, and known distributions.

Of the aforementioned species, Swainson's hawk is the only State listed species. All other species are not formally listed as federally or State threatened or endangered. The Project sites and immediately surrounding area do not provide suitable nesting opportunities for Swainson's hawk. Therefore, the project sites are only expected to provide marginal foraging opportunities for Swainson's hawk and may be used by other migratory nesting birds during the breeding season. Project activities would have the potential to disturb, damage, or destroy potential nests at the Project sites. Accordingly, Project impacts would be potentially significant and implementation of Mitigation Measure BIO-1 is required to address potential impacts to special-status wildlife species:

> ***Mitigation Measure BIO-1:*** *If vegetation removal occurs during the nesting bird season (February 1st through August 31st), a pre-construction clearance survey shall be conducted within three (3) days of the start of any vegetation removal to ensure that no nesting birds would be disturbed. The biologist conducting the clearance survey shall document a negative survey with a brief letter report indicating that no impacts to active avian nests would occur. If an active avian nest is discovered during the pre-construction clearance survey, construction activities shall stay*

outside of a 300-foot buffer around the active nest. For listed and raptor species, this buffer shall be expanded to 500 feet. A biological monitor shall be present to delineate the boundaries of the buffer area and monitor the active nest to ensure that nesting behavior is not adversely affected by construction activities. Once the young have fledged and left the nest, or the nest otherwise becomes inactive under natural conditions, construction activities within the buffer area may occur.

With implementation of pre-construction nesting bird clearance survey under **Mitigation Measure BIO-1** summarized above, impacts to the aforementioned species would be less than significant.

No kit fox or kit fox signs (dens, scat, etc.) were observed on site and the species is presumed absent. As a result, implementation of the proposed project would not impact San Joaquin kit fox movement or suitable habitat.

With the implementation of the pre-construction nesting bird clearance survey, the Project would not have an adverse effect, directly or indirectly, or through habitat modifications, on any species identified as a candidate, sensitive, or special status species. Therefore, through implementation of the pre-construction clearance survey (i.e., **Mitigation Measure BIO-1**), Project impacts would be less than significant, with mitigation incorporated.

b) **Less Than Significant Impact:** The proposed Project would not have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations by the CDFW or USFWS. A review of the USFWS National Wetlands Inventory (NWI) documented several aquatic resources adjacent to the Project sites. However, with the exception of Los Banos Creek, most of the classified aquatic resources are man-made (i.e., California Aqueduct, Delta Mendota Canal, and pots associated with existing mining activities).

Both the Sunset and Turner properties consist of vacant, generally undeveloped land that has been subject to a variety of anthropogenic disturbances associated with historic agricultural and ranching activities, and routine weed abatement/disking activities. ELMT reviewed historic aerials which show these activities have been ongoing since at least 1946. As such, ELMT observed minimal plant communities on the project sites. Four (4) plant communities, rather land types, were observed onsite, which include the following: fallow agricultural; active agricultural; disturbed and developed land types.

No jurisdictional drainage and/or wetland features were observed on the Project sites during the field investigation. Further, no blueline streams have been recorded on the Project sites. The Turner site is bordered on the northeast by the Mendota canal and on the southwest by the California Aqueduct. The area northwest and between the canals is the Los Banos Creek channel. This area appears to have undergone historical mining operations in the past but is not part of the current Los Banos operations. North of the Los Banos Creek are agricultural fields. The Sunset site is located north of the Mendota Canal. Based on current site conditions and design plans, no impacts to the Los Banos Creek, the California Aqueduct, or the Delta Mendota Canal are expected to occur from Project implementation.

Based on the analysis presented in the Biological Resource Assessment, ELMT determined the Project sites do not support riparian habitat, sensitive natural communities, wetlands, or trees that would need to be preserved and no Project-related impacts to these types of resources are anticipated. Therefore, the Project would not have an adverse effect, directly or indirectly, on any riparian or sensitive natural communities identified by either local/regional plans or by the CDFW or USFWS. Therefore, impacts are less than significant with no mitigation required.

c) **Less Than Significant Impact:** The proposed Project would not have a substantial adverse effect on state or federal protected wetlands through direct removal, filling, hydrological interruption, or other means. There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The U.S. Army Corps of Engineers (Corps) Regulatory Branch regulates discharge of dredge and/or fill materials into “Waters of the United States” pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFW regulates alterations to streambed and associated plant communities pursuant to Section 1602 of the Fish and Game Code, and the Regional Water Quality Control Board (Regional Board) regulates discharges into surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

Prior to conducting a field investigation, ELMT reviewed aerial photography to locate and inspect any potential natural drainage features, ponded areas, or water bodies that may fall under the jurisdiction of the Corps, Regional Board, and/or CDFW. As mentioned under CEQA Criteria b) above, no jurisdictional drainage and/or wetland features were observed on the Project sites or during the field investigations. As such, the Project would not have a substantial adverse effect on federally protected wetlands (including but not limited to marsh, vernal pool, coastal, etc.) as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means, and Project impacts would be less than significant, with no mitigation required.

d) **Less Than Significant Impact:** The proposed Project would not interfere substantially with the movement of any native resident migratory fish or wildlife species, nor disrupt native nursery sites. The California Aqueduct and Delta Mendota Canal provide travel corridors for wildlife species to connect to habitats located to the north and south of the Project sites. However, existing mining, agricultural, and ranching activities between the California Aqueduct and Delta Mendota Canal have limited wildlife movement opportunities through this immediate area. Implementation of the proposed Project is not expected to substantially change the existing landscape and is not expected to modify or compromise wildlife movement opportunities or prevent the surrounding habitat from continuing to support wildlife movement. As a result, implementation of the proposed Project would not disrupt or have any adverse effects on any migratory corridors or linkages in the surrounding area. Therefore, the Project would have less than significant impacts, with no mitigation required.

e) **No Impact:** The proposed Project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Both the *Merced County – General Plan* and the *Merced County – Zoning Ordinance* were reviewed. Specifically, the Natural Resource Element of the General Plan outlines County goals and policies in place to achieve management and preservation of natural resources. However, no tree preservation or biological resource protection policies that specifically protect tree species identified on or adjacent to the Project sites are currently in place. Therefore, the Project would have no impacts related to any local policies or ordinances protecting biological resources.

f) **No Impact:** See response to CEQA Criteria e) above. As previously discussed, the Project would not conflict with the provisions of any adopted Habitat Conservation Plan, Natural Community Conservation Plan, and/or other approved local, regional, and/or state habitat conservation plan. There are no adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan that cover the Project area, or that would apply to the Project. Therefore, the Project would have no impact.

3.5 Cultural Resources

The following section is based upon a *Cultural Resources Study*, dated April 2022, prepared by Tom Origer & Associates (Tom Origer & Associates, 2024). This report evaluated potential impacts to cultural resources resulting from the proposed Project (i.e., material excavation within the Sunset and Turner properties). As part of their evaluation, Tom Origer & Associates conducted archival and background records research that focused on cultural, paleontological, and Native American resources, as well as a pedestrian field survey of the Project area. See Appendix D for a copy of the full Cultural Resources Study report.

V. CULTURAL RESOURCES. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Cause a substantial adverse change in the significance of a historical resource pursuant to in § 15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☐	☒	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

a) **Less Than Significant Impact:** The Project would not cause a substantial adverse change in the significance of historic resources pursuant to §15064.5. The Office of Historic Preservation (OHP) has determined that structures in excess of 45 years of age could be important historical resources, and former buildings and structure locations could be important archaeological sites. As such, as part of the Cultural Resources Study, Tom Origer & Associates examined 19th and 20th-century maps and aerial photographs to gain insight into the nature and extent of historical development in the general vicinity of the Project sites. The review showed that the first features to appear within the study area was in 1921, and consisted of two ditches, one on the Sunset parcel and one on the Turner parcel (Tom Origer & Associates, 2024). A building appears in the northeast corner of the Sunset parcel in 1947 and is no longer depicted by 1960. However, another building appears in the northwest corner and a well appears in the southwest corner. One additional building is shown near the building in the northwest corner in 1971 and by 2004 the buildings are demolished. On the Turner parcel, several agricultural and residential buildings are shown on the property between 1947 and 1971. Nearly every building on the property was demolished by 2010; though several foundations are still visible. The only remaining building on the property is a large barn, constructed between 1967 and 1971.

In addition to the structures described above, several building pads and building remains were found throughout the study area. Research did not show that the people associated with the study area were important to local, regional, or state history. Additionally, the building pads are not architecturally distinctive, and there is no data potential from the building remains as there were no archaeological deposits or features found at these locations. While these building remains could be associated with the important theme of agriculture in the Central Valley, they no longer convey anything important about this theme. Therefore, according to Tom Origer & Associates, these locations would not meet criteria for inclusion on the California Register.

Further, Janine Origer of Tom Origer and Associates, whose qualifications meet the Secretary of the Interior's Standards for architectural history, provided the following opinion regarding the built environment. "The extant barn is not architecturally distinctive. Given the other buildings associated with this barn have been demolished, and the former owners and tenants of the study area were not important, this barn would also not meet the criteria for inclusion on the California Register" (Tom Origer & Associates, 2024).

Based upon the findings summarized above and within the Cultural Resources Study in Appendix D, Tom Origer and Associates determined that the Project would have a less than significant impact to built environment resources. Therefore, the Project would not have an adverse effect on those historic resources not yet formally evaluated. Therefore, Project impacts would have a less than significant impact on historic resources as defined under §15064.5, and no mitigations would be required.

b) **Less Than Significant Impact:** The Project would not have a significant impact to archaeological resources pursuant to §15064.5. As described in the Cultural Resources Study (Appendix D), Tom Origer and Associates conducted archival research which comprised of examination of the library and files at the Central California Information Center, California State University – Stanislaus. Research was also completed to determine the potential for buried archaeological deposits.

A review was completed of the archaeological site base maps and records, survey reports, and other materials on file at the Central California Information Center (CCIC), University of California, Stanislaus by CCIC staff. This archival research found that a portion of the study area had been previously subjected to a cultural resources survey (Moratto *et al.* 1990; Moratto *et al.* 1994). One resource has been recorded within the study area (Krantz 1956). The resource was the reported location of a village where 170 mortars were collected. The record is not very descriptive and suggests that nothing was visible at the location when it was recorded in 1956 (Krantz 1956). In addition, the 1956 record states that there are farm buildings on the site; however, review of historical maps and aerial photos does not show that any buildings have existed at the location plotted on the CCIC's maps (GLO 1855a, 1855b, 1875; UCSB 1957; USGS 1913, 1920, 1921, 1947, 1960, 1961, 1967, 1971b). The location was again visited in 1972 and there was again no evidence of archaeological specimens or soils present, it was assumed that the site was destroyed by a stockyard and feed company (Malone 1972). No ethnographic villages have been reported within one mile of the study area (Kroeber 1925; Latta 1977; Wallace 1978). See the Cultural Resources Study in Appendix D for a detailed summary of potential archaeological sites within the Project area.

Based upon Tom Origer and Associates archival research, a site (P-24-000102) was previously documented within the study area. However, Tom Origer and Associates further notes that unless an archaeological site is completely excavated and the soils removed, evidence of archaeological sites remain in the form of darkened or mottled soils, lithic debris, and other components of archaeological sites. In the survey conducted by Malone in 1972, Malone suggests that the former feedlot destroyed the site, but there was no evidence that the construction of the feedlot either dug up and removed soils or that soils were hauled in which could cover the site. In addition, the feedlot buildings and structures are located outside of the plotted location of P-24-000102. As such, it is Tom Origer and Associates opinion that the plotted locations of the site by Krantz (1956) is incorrect and there was no archaeological site at this location. This is supported by the lack of archaeological specimens and soils on the surface at the plotted location of this site, the lack of archaeological specimens in animal burrows within and near the plotted location of this site, and the lack of archaeological specimens within the bank of the adjacent Los Banos Creek (see Appendix D).

Based upon their evaluation, Tom Origer and Associates determined that no archaeological site indicators were found during the study, including the location of previously documented site P-24-000102, as Tom Origer and Associates believes that this site was incorrectly mapped by Krantz (1956) and would therefore not be impacted by the Project. Additionally, since Tom Origer and Associates were able to examine subsurface soils along places of high buried site sensitivity and saw no buried archaeological site indicators, the potential for buried archaeological sites within the study area is reduced to a moderate potential which corresponds to a 2% to 3% probability of there being buried sites within the study area. As such, the Project would have a less than significant impact on archeological resources as defined under §15064.5, and no mitigations would be required. See the Cultural Resources Study in Appendix D for additional detail.

c) **Less Than Significant Impact with Mitigation Incorporated:** See responses to CEQA Criteria a) and b) above. Although considered unlikely based upon the findings within the Cultural Resources Study (Appendix D), when conducting new ground disturbing activities, as would be conducted in the Sunset and Turner properties, there is always a potential that undiscovered human remains could be discovered within the Project area. Therefore, consistent with the CEQA Guidelines, Tom Origer and Associates recommends the following mitigation measure to address potential impacts to undiscovered cultural resources/human remains:

> ***Mitigation Measure CUL-1:*** *If human remains are encountered, excavated, or disturbed at the Project site activities would be halted within the vicinity of the find, and the County coroner would be contacted. If the coroner determines the remains are Native American, the coroner shall contact the Native American Heritage Commission (NAHC). The NAHC will then identify the person or persons believed to be the most likely descended from the deceased Native American. The most likely descendent will then make recommendations regarding the treatment of the remains with appropriate dignity.*

Through implementation of **Mitigation Measure CUL-1** described above, and continued adherence to the State of California's Health and Safety Code Section 7050.5 regarding proper handling and treatment of unexpected buried human remains that may be exposed during minimal onsite grading or construction activities, the Project would have a less than significant impact to undiscovered human remains, with mitigation incorporated.

3.6 Energy

The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on energy resources.

VI. ENERGY. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The proposed Project would not result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources. As discussed in Section III – Air Quality above, the primary sources of energy consumed as a result of the Project would be fuel (diesel and gasoline) due to onsite equipment activity (off-road equipment). However, because the rate of aggregate and material extraction as well as the mining methods, the number and types of equipment, and the number of onsite employees would not change or increase as a result of the Project compared to what is currently in place at the existing Los Banos Facility, the amount of fuel energy consumed as a result of Project operations would not substantially change or increase. Additionally, no onsite processing would occur, and no new vehicle or truck trips would be generated by the Project for material hauling or employees. Consequently, the Project would not result in any new energy demand. Additionally, the Project would ensure a local source of high-quality aggregate could continue to be provided to the County by allowing the Los Banos Facility to continue existing operations, which in turn would minimize the need to import aggregate from further away, thus reducing fuel consumption associated with long distance trucking. For these reasons, the Project would not result in unnecessary consumption of energy resources, and would therefore have less than significant impacts, with no mitigation required.

b) **Less Than Significant Impact:** The proposed Project would not conflict with or obstruct a state or local plan related to renewable energy or energy efficiency. As discussed under CEQA Criteria a) above, the Project would not consume any additional energy resources beyond what is already consumed as part of Triangle's existing operations at the Los Banos Facility. Additionally, the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic and Safety Administration (NHTSA) have adopted fuel efficiency standards for medium- and heavy-duty trucks which apply to truck fleet operators, such as Triangle. The California Air Resource Board (CARB) has also adopted cleaner technology and fuel standards pursuant to Assembly Bill (AB) 1493. While Phase 1 and Phase 2 regulation published by both the USEPA, NHTSA, and CARB primarily apply to manufactures of on-road vehicles and not the end user, it is assumed that Triangle and contractors would continue to ensure engines operating onsite are certified in accordance with the appropriate state and federal regulations. This would also ensure that efficiency of mobile equipment and vehicles would continue to improve, as applicable, over the life of the Project through compliance with increasingly stringent standards adopted by applicable regulatory agencies.

The State of California’s Energy Efficiency Strategic Plan (CPUC, 2011) outlines specific goals and strategies to help promote energy efficiency in California’s industrial sector in three (3) areas: 1) Support industry adoption of energy efficiency by integrating energy efficiency savings with achievement of GHG goals; 2) Build market value of and demand for energy efficiency; and 3) Provide technical and public policy guidance for resource efficiency. The Energy Efficiency Strategic Plan promotes reductions in energy consumption through compliance with greenhouse gas (GHG) emission reductions, water conservation, and proper waste disposal. As applicable, the Project would continue to utilize the best available equipment throughout the life of the Project to improve diesel fuel efficiency, and equipment that uses energy would implement modern design and technology to maximize efficiency improvement.

For the reasons outlined above, through continued adherence to plans and policies promulgated by the EPA, CARB, and other applicable federal and state agencies, the Project would not conflict with or obstruct any statewide, regional, or local energy efficiency plans. Additionally, as discussed in CEQA Criteria a) above, the Project would not substantially increase fuel energy consumption beyond the baseline condition. Therefore, the Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, and impacts would be less than significant, with no mitigation required.

3.7 Geology and Soils

The following section is based upon the *Geology and Soils Environmental Assessment* and *Slope Stability Assessment* completed by Golder Associates USA Inc. (Golder, 2022). Golder's assessment describes the local and regional geologic, soils, and seismic conditions that occur in the vicinity of the Los Banos Facility. See Appendix E for a copy of Golder's full reports.

VII. GEOLOGY AND SOILS. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death due to earthquakes and/or slope instability. See description below.

   i. **Fault Rupture:** The Project sites are not located within a State of California Alquist-Priolo (APP) Earthquake Fault Zone. The closest known active APP fault to the site is the Ortigalita fault zone, which is located approximately 6 miles southwest of the Project sites' southwestern boundary. No known active fault strands or segments trend across or towards the Project sites. Therefore, the probability of surface fault rupture occurring at the Project sites are considered to be low.

Based on the seismic setting, the Project is situated in an area that has the potential for moderate ground shaking. However, because no buildings or structures would be constructed for human occupancy as a result of the Project, the potential for substantial adverse effects is minimal. As described above, the nearest AP mapped fault zone, the Ortigalita fault zone, is mapped to the southwest and well-outside of the Project boundary. For these reasons, there would be no significant effect should a seismic event along the Ortigalita fault zone result in surface rupture, and thus Project impacts would be less than significant with respects to ground/fault rupture with no mitigation required.

ii. **Seismic Ground Shaking:** The Project would not cause a substantial adverse impact, either directly or indirectly from strong seismic ground shaking. The Project sites are located in an area that is subject to seismic events of various magnitudes and intensities and has a moderate seismic hazard potential according to the 2016 Earthquake Shaking Potential for California Map produced by Branum et al. (2016) for the California Geological Survey (CGS). Expected seismic activity within the Project vicinity could result in seismically induced ground shaking. Ground shaking intensity is largely a function of distance from the earthquake epicenter and underlying geology.

Generally, this area of the County is located in an area with a moderate seismic hazard potential in comparison to most other regions in California (Branum et al., 2016). As described above under CEQA Criteria a)i above, the nearest mapped active (i.e., Holocene) fault to the site is the Origalita fault zone, which lies approximately 6 miles southwest of the southwestern boundary of the Project sites. The Origalita fault zone is a major dextral (right lateral) strike-slip fault in the central Coast Range, and it is a part of the larger San Andreas Fault system. Using the U.S. Geological Survey's (USGS) web-based Unified Hazard Tool, a peak ground acceleration (PGA) of 0.44 g is associated with a 10% probability of exceedance in a 50-year period (i.e., a mean return period of 475 years) at the Project sites.

The most common impact associated with a strong ground shaking event is damage to structures. However, the Project does not include the construction of any new structures or other features for occupancy, nor would the Project alter any existing structures. Rather, the primary seismic hazard relates to seismically induced ground failure of the proposed quarry slopes. As a part of Golder's geotechnical evaluation (Golder, 2022), both static and pseudostatic analyses were performed for the design slope configurations for the Sunset and Turner properties. This analysis determined that the proposed 2H:1V (horizontal to vertical) wall slopes are stable, given acceptable factors of safety (FOS), specifically under seismic conditions. Therefore, the potential impact of seismic hazards due to ground shaking is less than significant with no mitigation required.

iii. **Ground Failure/Liquefaction:** The Project would not cause a substantial adverse impact, directly or indirectly, from seismic-related ground failure, including liquefaction. With regard to the potential for ground failure such as subsidence (the lowering of the ground surface caused by factors like compaction or a decrease in groundwater level) or soil liquefaction, both natural and man-made can be contributing factors. For instance, natural phenomena that may induce subsidence include seismically induced settlement (liquefaction); soil consolidation; oxidation or dewatering of organic-rich soils; and collapse of subsurface cavities. Man-made activities such as withdrawing subsurface fluids without the pumping of groundwater or oil may cause subsidence by decreasing pore pressure. Since the Project does not involve withdrawal of any pore fluids and mining is planned to remain above the regional groundwater level, no associated ground subsidence would occur.

Further, the Project sites' soil consists of consolidated sandy/gravelly soils underlain by the Corcoran Clay and are not expected to be susceptible to widespread liquefaction when subject to the 475 year PGA. For these soil conditions, liquefaction of sandy layers would be the primary potential source of significant subsidence. However, a liquefaction analysis was completed for the Project sites based on subsurface conditions encountered in the geotechnical investigation finding that while it is possible that some relatively thick and or discontinuous layers/lenses of potentially liquifiable soils exist in small areas of the Turner Property, the potential effect on a global slope stability if they were to liquify would likely be negligible. The analysis concluded that the subsurface materials at the site are not considered to be susceptible to significant liquefaction, and the factors of safety (FOS) for the site against liquefaction are adequate. See Golder's report in Appendix E for additional detail. Therefore, potential Project impacts related to seismic-related ground failure, including liquefaction, are less than significant with no mitigation required.

iv. **Landslides:** Landslides and debris flows are forms of mass wasting, the movement of soils and rock under the influence of gravity. A landslide may occur if source material on a slope is triggered by some mechanism. Source materials include loose or relatively weak soils/rocks. Triggering mechanisms include earthquakes, saturation from rainfall, and erosion.

The primary landslide risk for the proposed Project is associated with man-made excavation slopes associated with mining. As such, a Slope Stability Analysis (Golder, 2022) was also completed by Golder for the proposed mine pit slopes, and is included by reference within the Geology and Soils Environmental Assessment in Appendix E. The analyses indicates that the proposed 2H:1V (horizontal to vertical) quarry slopes are stable for the proposed end use. Given the otherwise relatively flat topography of the Project sites, and the demonstrated slope stability associated with the design pit slopes, Golder concluded that the landslide risk at the site is minimal, and therefore potential impacts related to landslides would be less than significant and no mitigation required.

b) **Less Than Significant Impact:** The Project would not result in substantial soil erosion or loss of topsoil. As discussed within Golder's report (see Appendix E), the soils in the Project vicinity are generally characterized by poorly to well-drained sands and gravelly loams, based on Natural Resources Conservation Service (NRCS) Web Soil Survey data. The soil profiles tend to range upward of approximately 50 to 60 inches in total profile thickness and are underlain by alluvial deposits. Because the Project would comply with the Surface and Mining Reclamation Act (SMARA), and therefore salvage and maintain the topsoil/subsoil located on the Sunset and Turner properties before mining begins, there would be no loss of the onsite soils. As described in the Project's Amended Reclamation Plan prepared by Sespe Consulting, Inc. (Sespe, 2022). Topsoil/subsoil salvaged from the Project sites would be stored in perimeter berms for later use in support of site reclamation and revegetation.

Erosion is the process by which soil and sediment are removed from one area and transported to another. The main natural erosion forces are rainfall, wind, percolation of water that slowly dissolves rock (water is known as the universal solvent; because given time, it would eventually dissolve or wear any rock or other surface materials), or landslides. Erosion of the surface caused by rainwater is known as sheet-wash. Sheet-wash is described as water flowing across land picking up particles of soil or organic materials and carrying them away. Additionally, rainwater flows can cause rilling, which is when runoff water forms shallow broad channels across an area. Both sheet-wash and rilling leave patches of deposited soil material as a result of decreasing water velocity that can result from diminishing land gradient or from slackening rainwater. Wind erosion picks up small soil particles or bounces or rolls large particles along the land surface. Wind erosion is most serious when the soil is bare and exposed to strong wind. Although all of these erosion processes are natural, human activity can often multiply the frequency and size of the erosion event. Human activities that can increase erosion include:

- Reducing the rate by which water can enter the soil (e.g., covering the land with impervious surfaces such as houses, roads, and shopping centers), and thereby, promote rapid runoff and greater erosive power of the water;
- Making drainage systems which concentrate runoff without controlling flow;
- Using poor agricultural practices such as overgrazing and cutting furrows down slope rather than with the natural contour of the land; and/or
- Excavating an area, which removes the vegetation and leaves the soil exposed to erosive factors.

The planned material excavation of the Project sites would be constrained to the pit areas design for the Sunset and Turner properties, both of which would include perimeter berms along portions of the public roadways bordering the mining areas. The berms are a design feature of the Project, which would provide a visual buffer and serve to store salvaged soil/subsoil that would be used for reclamation once mining is complete. Given the location and composition of the berms, these features would be able to naturally re-establish vegetation, providing a resistant surface cover. At the same time, the berms would contain surface flows along these boundary areas, reducing the potential for sediment entrainment and offsite deposition by erosion. Based on the Project design features, including conformance with the Best Management Practices (BMP) specified in the existing Los Banos Facility site-wide Stormwater Pollution Prevention Plan (SWPPP), which would be updated accordingly following Project approval, the Project would have a less than significant impact with respect to erosion and loss of topsoil, with no additional mitigations required.

c) **Less Than Significant Impact:** The Project would not be located on or result in unstable geological deposits or soils such that on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse would potentially occur. As discussed under CEQA Criteria a) and b) above, the Project is located on a relatively flat ground surface, comprised of alluvial deposits considered stable. With implementation of the Project, and notable excavation of the alluvium, the final landform would include the Sunset pit being backfilled within approximately 5-feet of the existing grade in the Sunset property through placement of fine materials from the aggregate plant, as well as partial backfill of overburden as necessary to achieve operational objectives. Similarly, a portion of the Turner area would be backfilled with fines and overburden to essentially the same grade. The remainder of the Turner area would be a pit with 2H:1V final side-wall slopes up to 50 to 80 feet in height (Golder, 2022). Although the proposed slope configurations of 2:1 meet SMARA's prescriptive standards and are presumptively stable, Golder (2022) conservatively performed static and pseudostatic stability analyses to disclose all potentially relevant slope data. In summary Golder determined the slopes would be sufficiently stable to meet the applicable SMARA performance standards for the Project. See Golder's report in Appendix E for additional detail. For these reasons, there would be less than significant impacts related to unstable geologic units and soil, with no mitigation required.

d) **No Impact:** The Project would not be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property. As discussed above, the Project entails the excavation of alluvial materials, and subsequent backfilling portions of the mine pits with fines from the processing plant and overburden. No temporary or permanent structures would be built as part of the Project, nor would the limits of the excavations be near any building or other structures that are occupied. Golder's (2022) review of the NRCS Web Soil Survey did not identify soils containing highly plastic clays or other characteristics indicative of a high shrink-swell potential. Given the lack of potential for expansive soils and considering that no buildings or other structures are located within or adjacent to the Project footprint, and none are proposed as a result of the Project, there would be no impacts.

e) **No Impact:** The Project does not have soils incapable of supporting the use or installation of septic tanks or alternative wastewater disposal systems. No conventional septic tanks, leach fields or other waste disposal systems would be installed as part of the Project. Historically, septic tanks occupied a portion of the Turner property. However, the associated residential dwellings have been demolished and the septic systems are no longer active. These systems would be removed and properly disposed of as part of the Project, prior to any mining or significant ground disturbance. Therefore, the Project would have no new impacts related to septic tanks or alternative wastewater disposal systems.

f) **Less Than Significant Impact:** The Project would not directly or indirectly destroy unique paleontological resources or unique geologic features. With respect to unique geological features, based on Golder's (2022) review of geologic literature and studies for the area, these types of features are not mapped within or near the Project boundary.

In addition to Golder's report, Sespe Consulting Inc. also prepared a Paleontological Resources Assessment (Sespe, 2024) in accordance with ordinary and generally accepted standards of practice using the current Society of Vertebrate Paleontology (SVP) Standard procedures for the Assessment and Mitigation of Adverse impact to Paleontological Resources (2010). The evaluation involved both a literature review and database research, as well as a pedestrian foot survey. See Appendix F for a copy of Sespe's full paleontological report. Sespe's report documented that paleontological resources were not identified or observed at the Project sites, nor are there reported occurrences of fossil material within the alluvium presently extracted at the adjoining Los Banos Facility, specifically within the existing excavation pits. Moreover, a database search performed by the University of California Museum of Paleontology (UCMP) did not identify any recorded fossil localities within the Project vicinity; only one recorded vertebrate locality was found approximately 10 miles south of the site. The fossil material in which the vertebrate was documented was Corcoran Clay, which is stratigraphically below the bottom of the target alluvial resource proposed to be mined as part of the Project. Thus, the Project is not expected to affect paleontological resources directly or indirectly. For the reasons outlined above, the proposed Project would not directly or indirectly destroy unique paleontological resources or unique geological features, and impacts would be less than significant, with no mitigation required. See Sespe's Paleontological Resources Assessment in Appendix F for additional detail.

3.8 Greenhouse Gas Emissions

The following section is based upon the Air Quality, Health Risk, and Climate Change Impacts Assessment (Air Report) prepared by Sespe Consulting, Inc. (Sespe, 2024). The report quantifies and determines the significance of air quality, health risk, and climate change impacts associated with the Project. See Appendix B for a copy of Sespe's full Air Report.

VIII. GREENHOUSE GAS EMISSIONS. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. As noted in the SJVAPCD's final *Guidance for Assessing and Mitigating Air Quality Impacts* (SJVAPCD, 2015) "It is widely recognized that no single project could generate enough GHG emissions to noticeably change the global climate temperature. However, the combination of GHG emissions from past, present, and future projects could contribute substantially to global climate change. GHG emissions, and their associated contribution to climate change, are inherently a cumulative impact issue. Therefore, project-level impacts of GHG emissions are treated as one-in-the-same as cumulative impacts." (SJVAPCD, 2015, p. 111). This concept is also reflected in California Air Resources Board's (CARB's) 2017 Scoping Plan (CARB, 2017), which regulates fuels at a level in the supply chain above the Project, such that the Project has no choice but to use energy in California that is already regulated. The Project therefore does not have its own emissions but is simply a location in which GHG emissions are taking place as a result of fuel that is already regulated.

Furthermore, as discussed under Section III – Air Quality, the Project would not increase the quantity of fuel energy consumed onsite, as the Project would not change or increase the rate of material extraction, the number or operating hours of onsite mobile equipment, or the number of onsite employees or related vehicle trips. As discussed un CEQA Criteria b) below, while the Project may result in a slight increase in GHG emissions due to the slightly longer onsite distance mobile-equipment would need to travel, this increase would be negligible (i.e., 3 MT of CO2e per year). Therefore, the Project itself would have a less than significant impact to the environment.

b) **Less Than Significant Impact:** As discussed under CEQA Criteria a) above, the Project would not increase GHG emissions, and Project GHG emissions are not expected to be cumulatively considerable. As quantified in the Air Report (Appendix B), Project emissions of GHGs are presented in Table 8 below, primarily for purposes of disclosure. The Project would emit GHGs from fuel burned in vehicle engines and fuel burned in stationary equipment. Transportation fuel suppliers and importers are required to report emissions under the Cap-and-Trade which is designed to reduce GHG emissions as needed to achieve emissions reductions described in related planning documents which primarily consists of the Assembly Bill (AB) 32 Scoping Plan. Thus, the emissions reductions would occur at a level in the supply chain above the Project which would have no choice but to use fuels with GHG intensities that are consistent with the Scoping Plan. As outlined in SJVAPCD Policy APR-2025, because the Project uses fuels consistent with the scoping plan, Project GHG emissions are determined to have a less than significant impact on global climate change under CEQA**.**

Table 8: Project GHG Emissions

Source	CO_2e (MT/year)
Baseline Emissions	1,844
Project Emissions	1,847
Net GHG Emissions Increase due to the Project	+3

Source: See the Air Report in Appendix B.
Note that this information is provided for disclosure purposes. Emissions are a result of sources already regulated by the Scoping Plan.

In summary, net GHG emissions resulting from the Project would only increase by +3 MT of CO_2e per year. In addition, each Project source would emit GHGs in amounts consistent with the AB 32 Scoping Plan. Therefore, the Project impact related to GHG emissions is less than significant, with no mitigation required.

3.9 Hazards and Hazardous Materials

The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on hazards and hazardous materials.

IX. <u>HAZARDS AND HAZARDOUS MATERIALS</u>. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

a) **Less Than Significant Impact:** The Project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. No significant quantities of chemicals and/or hazardous materials would be utilized and/or generated onsite, and no onsite hazardous waste would be generated by the Project. The only hazardous materials present onsite would be fuels and oils within the engines of mobile equipment (e.g., scrapers, excavators, dozers, loaders, etc.) operating at the Los Banos Facility. If needed, fuels, lubricating oils, or other equipment/maintenance supplies may be brought onsite to conduct minor/routine maintenance on off-road vehicles. While not expected, should a release of a hazardous substance (e.g., fuels, lubricating oils, etc.) occur, due to a mobile equipment malfunction and/or leak, the release would be properly contained and cleaned up in accordance with applicable local, State, and federal regulations. Furthermore, the Project would follow the containment and cleanup procedures outlined within the existing Spill Prevention Control and Countermeasure Plan (SPCC) and the Hazardous Materials Business Plan (HBMP) presently in effect at the existing Los Banos Facility. Both the SPCC and HMBP would be updated as needed following Project approval. Therefore, with the implementation of current site-specific containment and control measures, the potential for a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials related to the proposed Project is low, resulting in a less than significant impact with no mitigation required.

b) **Less Than Significant Impact:** The proposed Project would not create a significant hazard to the public through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. As described under CEQA Criteria a) above, fuels and oils associated with the mobile equipment (e.g., scrapers, excavators, dozers, loaders, etc.) would be used and transferred to this equipment using mobile fueling and maintenance trucks, in the same manner as currently occurs at the existing Los Banos Facility. If needed, fuels, lubricating oils, or other equipment/maintenance supplies may be brought onsite to conduct minor/routine maintenance on off-road vehicles. As described above, if an accidental spill or leakage of fuels or lubricants from equipment or vehicles were to occur, the Project would follow appropriate protocols outlined in the SPCC and HMBP presently in effect for the Los Banos Facility. Accordingly, the existing SPCC plan and HMBP, as well as the existing Storm Water Pollution Prevention Plan (SWPPP), would be appropriately amended to include coverage for the Sunset and Turner properties following Project approval. Therefore, through the continued implementation site-specific containment and control measures, the potential for an accidental release of significant quantities of hazardous materials that could affect the surrounding environment would remain low, resulting in a less than significant impact with no mitigation required.

c) **No Impact:** The Project would not emit hazardous emissions, materials substances, or waste within one-quarter mile of an existing or proposed school. The Project sites are located approximately 4 miles southwest of the City of Los Banos, within the County. This area of California's Central Valley is dominated by agriculture. Lands surrounding the Sunset and Turner properties are either fallow agricultural lands, or presently active growing operations for various crops. The nearest school to the Project sites is Los Banos Middle School, located over 2 miles away from the Sunset property to the northeast (approximately 2.8 miles from the Turner property). Therefore, no Project impacts associated with emitting or handling hazardous materials within 0.25 miles of an existing or proposed school would occur.

d) **Less Than Significant Impact:** The proposed Project would not be located on an active hazardous materials site and would not create a significant hazard to the public or the environment. In 2006 ENV America, Inc. (ENV) performed a Phase I and a Phase II Environmental Site Assessment(s) for the Turner Site to identify recognized environmental conditions or historical environmental conditions in connection with the property. The Phase I identified two environmental conditions in connection with the property: (1) the historical land use as a cattle feedlot and corral; and (2) the historical presence of a "cattle dipping pond" in the northwestern portion of the property. ENV also identified the presence of three underground storage tanks (USTs) on the Turner site. Subsequent soil sampling indicated elevated concentrations of nitrate and dissolved solids from the feedlot and corral. ENV's subsequent subsurface investigation (i.e., Phase II) of the USTs identified diesel contaminated soil beneath the footprint of a former fuel storage shed. The size of the plume was characterized as approximately 15,000 square feet. The California State Water Resource Control Board's Geotracker website indicated the remediations was addressed by excavating 2,600 pounds of contaminated soil in August 2008 and the cleanup case was closed December 2009. No groundwater remediation was proposed. The Regional Water Quality Control Board (RWQCB) sent Triangle a closure letter in 2009 confirming that no further corrective action was required. The case closure summary attached to the letter indicated while the core of the contamination had been removed, the residual soil contamination had not significantly impacted groundwater beyond the immediate area of soil impact.

As part of this Project, prior to mining in the area delineated as having residual petroleum affected soils, a work plan would be submitted and approved by the RWQCB to remediate these remaining soils, along with confirmatory soil sampling and analysis. A completion report would then be submitted to the RWQCB and County, confirming that the remedial action is complete.

Furthermore, as described under CEQA Criteria a) and b) above, the Project would comply with applicable federal and state regulations and local policies through the implementation of these pollution prevention and response plans (i.e., SPCC, HMBP, SWPPP). Implementation of pollution prevention and containment measures would prevent potential impacts to groundwater or surface water quality.

For these reasons, and through submittal/approval of the completion report by the RWQCB and County, confirming that the remedial action is complete, the Project would not be located on an active hazardous materials site that could potentially create a significant hazard to the public or the environment related to hazardous materials sites, and impacts would be less than with no further mitigation required.

e) **No Impact:** The Project is not located within an airport land use plan area or within 2 miles of a public airport or a public use airport, which could result in a safety hazard or excessive noise for people residing or working in the Project area. The airport closest to the Project sites is the Los Banos Municipal Airport, a city-owned public-use airport, located over 2 miles from the Sunset property (approximately 3.3 miles from the Turner property). Therefore, no impacts would occur as a result of the proposed Project.

f) **No Impact:** The Project would not impair implementation of, or physically interfere with, adopted emergency plans or emergency evacuation plans, primarily because the Project would not add to off-site vehicle trips or traffic congestion above existing levels that may result in the delay of emergency response activities. Specifically, no new onsite employees or off-site haul trucks would be required as a result of the Project. Furthermore, the Project sites are in a remote agricultural region, located adjacent to Triangle's existing Los Banos Facility. The proposed properties (Turner and Sunset) would be accessed via the existing private driveways off of Sunset Drive and S. Creek Road, and no alterations to the existing access points and adjacent public roadways are proposed. In the unlikely event of an emergency that would require on-site evacuation, existing evacuation ingress/egress points and public access roads have sufficient capacity to safely evacuate the on-site employees.

Merced County's Emergency Operations Plan (EOP) (Merced County, 2017) and Multi-Jurisdictional Hazards Mitigation Plan (Merced County, 2021) were also reviewed. The Project would not conflict with any applicable provisions found in the County's emergency response or hazard mitigation plan(s). See Section XX – Wildfire below for additional detail.

Therefore, the Project would not impair implementation of, or physically interfere with an adopted emergency response or evacuation plan, and no new impacts would occur.

g) **Less Than Significant Impact:** The Project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires. In 2007 CalFire adopted Fire Hazard Severity Zone (FHSZ) maps for State Responsibility Areas (SRA), which are intended to assist local agencies planning for fire hazards. Accordingly, the State FHSZ map was reviewed to determine if the Project occurs in a moderate, high, or very high FHSZ. Based on CalFire's FHSZ maps for the County (https://egis.fire.ca.gov/FHSZ/), the Project lies outside of a SRA FHSZ; however, a portion of the Project sites, specifically the southwest portion of the Turner property, does fall within a Local Responsibility Area (LRA) designated as having "Moderate" FHSZ.

Although the Project is located within a "Moderate" LRA FHSZ, the site would not be susceptible to significant risk from a fire. Alternatively, due to the nature of the mining operations, specifically the fact that onsite operations would involve the removal of drought impacted vegetation and debris from the Sunset and Turner properties, the Project sites would serve as a man-made fire break and would therefore help alleviate wildfires that pass through the Project area. Moreover, since the County Fire Department and/or City of Los Banos Fire Department would serve as first responders. The City of Los Banos Station No. 2 is the closest fire station to the Project sites and is located approximately 5.5 miles to the northeast. Due to the low risk of fire, development of the Project is not expected to create an undue burden on either of these fire departments. Ultimately, clearing of combustible materials (i.e., existing low-lying vegetation) from the site to allow the mining operations to commence would create a "defensible space" which would help prevent the spread of wildfire. For these reasons, the Project would not expose people or structure, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

3.10 Hydrology and Water Quality

Portions of the following discussions are based upon the *Water Supply Assessment* prepared by Sespe Consulting, Inc. (Sespe, 2024), as well as the *Drainage Report* (Sespe, 2022) also prepared by Sespe. The Water Supply Assessment followed the requirements of the California Water Code §10910 and provides the pertinent water supply information pursuant to California Senate Bill (SB) 610, as described in the *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning*. The Drainage Report identified tributary watershed(s) and floodplains within the Project area, and calculated on-site runoff volumes and pit inundation depth for the mining and final reclaimed conditions. See Appendix G for the Drainage Report and Appendix H for the Water Supply Assessment.

X. HYDROLOGY AND WATER QUALITY. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☐	☒	☐
i. result in substantial erosion or siltation on- or offsite;	☐	☐	☒	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv. impede or redirect flood flows?	☐	☐	☒	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

a) **Less Than Significant Impact:** The Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water supply. The Project would not encroach upon or otherwise impact Los Banos Creek, nor would the mining activities result in drainage to the creek, the California Aqueduct, or Delta Mendota Canal. Local drainage as a result of dust control as well as direct precipitation would be retained within the excavated pits and would not be released. Additionally, Triangle would continue to implement a site-specific Storm Water Pollution Prevention Plan (SWMPP), and implementation of the best management practices (BMPs) described therein, as well as through maintenance of the perimeter topsoil/subsoil storage berms, would ensure storm water runoff from access roads into the Sunset and Turner mining areas would be directed towards the pits. See the Drainage Report (Sespe, 2022) in Appendix G for additional detail.

According to the most recent 2018 Water Quality Control Plan (Basin Plan) for the Central Valley Regional Water Quality Control Board (CVRWQCB), the Project sites are located within the Delta-Mendota Canal Hydrologic Unit of the San Joaquin Hydrologic Basin. Groundwater in this hydrologic unit has the following beneficial uses: municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO), as identified in the Basin Plan.

Groundwater conditions in relation to mining at the adjacent Los Banos Facility have occurred since 1990, with depth to water recorded from six dedicated monitoring wells. According to the recent monitoring report prepared by Schmidt and Associates (2020), groundwater generally flows to the east in the northern Project area, with an east-northeast component in the southern area. Measured groundwater depths in the area surrounding the Project sites during October 2020 monitoring ranged from 29.3-feet to 60.5-feet below ground surface (bgs). In addition to performing measurements of groundwater depths, a water sample collected from monitoring well MW-4 was analyzed for general chemistry (major cations and anions, electrical, pH, total dissolved solids), arsenic, chromium, and total organic carbon, as well as dibromochloropropane and 1,2-dibromoethane, compounds found in agricultural pesticide products. Laboratory results reported non-detectable concentrations for these pesticide constituents. For the inorganic cations/anions arsenic and chromium, the reported concentrations are consistent with background levels found within the San Joaquin Hydrologic Basin. Based on these results, Schmidt and Associates (2020) determined that there is no indication that mining and processing operations at the Los Banos Facility have affected groundwater quality.

As discussed above, mining at the Sunset and Turner properties would be conducted in the same manner as is presently done at the Los Banos Facility, using similar methods and equipment. Moreover, the mine plan for each of these areas is essentially the same as that of the current operations, with a desired final pit configuration of 2:1 (horizontal to vertical) with depths of approximately 27- to 72- feet deep depending on the top of the Corcoran Clay, an aquitard that extends underneath the Project sites side slopes and floor elevation of 120-feet above mean seal level (amsl); however, mining within the Sunset and Turner properties has been designed to occur above the top of the water table. Given that the Project would not change the mining method, extend below the Corcoran Clay, an aquitard layer, extraction of the sand and gravel resource would take place above the regional groundwater table in the Turner and Sunset properties. Therefore, the Project would not affect groundwater hydraulic conditions or water quality.

A Drainage Study was prepared by Sespe (Sespe, 2022) to satisfy the requirements of SMARA and analyzed the site hydrology under 25-year/1-hour, 25-year/24-hour, and 100-year/24-storm event scenarios. See Appendix G for a copy of the Drainage Study. This study was used to evaluate the onsite runoff volumes and pit inundation depth of the site in the end of mining and reclamation states for the Sunset and Turner Properties. Based on the HydroCAD™ model prepared in support of the study, the analysis of both the end of mining and reclaimed scenarios concluded that the mining/reclaimed pits at the Sunset and Turner Properties, as designed, would capture all the majority of onsite rainfall and any local runoff from surrounding properties. Along the perimeter of the site, some sheet flow may occur, such as along the outside slopes of the perimeter berms, however any nominal quantity of stormwater that falls outside the excavation pit would be managed and discharged pursuant to the National Pollutant Discharge Elimination System (NPDES) Industrial General Permit (IGP). Consistent with Triangle's existing protocols, silt fences and straw waddles would be used as needed at the toe of the berms to control erosion and runoff.

Because the Project would not discharge any significant runoff (through site design features and implementation of a SWPPP) to or directly encroach into nearby water features, and because mining would occur above the Corcoran Clay, and therefore above the groundwater table, the Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, and there would be less than significant impacts with no mitigation required.

b) **Less Than Significant Impact:** The Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge. The Project sites are situated in a section of the Delta-Mendota Subbasin which is a part of the San Joaquin River Basin. The groundwater basin is characterized as a two-aquifer system created by the Corcoran Clay Layer, generating a confined aquitard. The Project would continue sourcing its water from the two existing onsite groundwater and recycled water production wells located within Triangle's existing Los Banos Facility. Triangle currently pumps approximately 173 acre-feet of groundwater on a yearly basis for its Los Banos Facility operations. Based on a water resources study prepared by Integrated Resource Management, Inc. (IRM, 2022), Triangle maintains the right to continue to pump and use water from Delta-Mendota Subbasin for its mining and aggregates processing, as well as construction materials batching operations. The Project would continue to extract materials at the same rate as the current operations at the Los Banos Facility, which is approximately 1.03 million tons per year. Since the rate of extraction would be the same, the annual water demand for aggregate processing, dust control and irrigation would also remain unchanged. Thus, the Project would not create a new demand on groundwater resources in the Delta-Mendota Groundwater Subbasin.

The water demand established for the existing operations, which is based on the maximum annual demand associated with material extraction in the current mining area, was used to establish a baseline demand. Based on production volumes for the existing mining operations, Sespe calculated an annual water demand of approximately 173 acre-feet per year. Thus, given that the usage would remain the same, the Project water demand would be 173 acre-feet annually. Given that as much as 65 percent of the total water is recycled, this is a conservative method that does not credit the recycled water use and assumes the total production is sourced from groundwater.

The annual demand equates to 6,920 acre-feet over the anticipated 40-year life of the Project (note this includes existing/permitted operations at the Facility, as well as future operations at the Sunset and Turner properties), inclusive of site reclamation activities following full exhaustion of the sand and gravel resource. This Project demand ties directly to the planned consumptive uses, which is principally for the wash plant and batch plant, dust control during mining and transport of the harvested materials to the plant site, and for periodic irrigation as needed to support revegetation as part of site reclamation.

Sustainable Groundwater Management Act (SGMA) defines sustainable yield (SY) as “the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, which can be withdrawn annually from a groundwater supply without causing an undesirable result.” The Delta-Mendota Technical Working Group developed sustainable yield estimates for the Upper and Lower Aquifer separately. Because the Project’s groundwater supply wells are not screened in the upper aquifer the SY estimates of 325,000 acre-feet/year to 480,000 acre-feet/year was not considered for this water supply assessment.

Based on historic production rates the Project would use the maximum of 173 acre-feet annually as the most conservative approach under a “normal year”. Water requirements vary somewhat throughout the year, and with the amount of annual precipitation. In a year with below normal precipitation, the Project sites can experience up to 29 percent less rainfall than in a normal year, additional water would be required to make up the difference. The total water demand in a dry year would be 223 acre-feet, representing 29 percent increase over a “normal" precipitation year. Which is less than 1 percent of the lower aquifer sustainable yield. Therefore, the Project would not have any significant effect on the future use of the aquifer since it does not create any new demand and the continued use is well below the sustainable yield limit during normal, dry, and multiple dry years.

Based upon the evaluation presented in the Water Supply Assessment (Appendix H), the Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin. Therefore, impacts would be less than significant, with no mitigation required.

c) **Less Than Significant Impact:** See discussions below.

i. **Erosion/Siltation:** The proposed Project would not substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion on- or offsite. As discussed above and within the Drainage Report (Appendix G), The Project has been designed to contain runoff onsite. Specifically, the pits from the mining operation would provide storage basins capable of capturing the full extents of the modeled storm events. Due to the small tributary area and nature of the soil, debris flows are anticipated to be negligible and to be contained within the pit. While stormwater that falls on the outside slope of the perimeter berms could potentially drain outside the excavation pits, this quantity of storm water would be minimal, and would not increase the total potential for offsite discharge compared to existing conditions. Consistent with Triangle's existing protocols, silt fences and straw waddles would be used as needed at the toe of the berms to control erosion and runoff.

Table 9 displays the model inputs and computed adjusted curve number and anticipated runoff from the end of mining site condition during the three (3) storm events. HydroCAD® model output files are included in the full Drainage Report in Appendix G.

Table 9: Sunset and Turner Properties Hydrologic Data, Maximum Extent of Mining Condition

Drainage Area	Area (acres)	Total Pit Capture Capacity (acre-feet)	Storm Event	Adjusted CN*	Total Runoff (acre-feet)
Sunset 1 (SU01)	33.02	786	25-year, 1-hour	87	0.22
			25-year, 24-hour		2.80
			100-year, 24-hour		4.31
Turner 2 (TU02)	249.24	7,859	25-year, 1-hour	86	1.38
			25-year, 24-hour		19.86
			100-year, 24-hour		31.00
Turner 3 (TU03)	56.09	1,080	25-year, 1-hour	85	0.25
			25-year, 24-hour		4.20
			100-year, 24-hour		6.65

See the Drainage Report in Appendix G for additional detail.

Similarly, Table 10 displays the model inputs and computed adjusted curve number and anticipated runoff from the reclaimed site condition during the three (3) storm events. See the HydroCAD® model output files in Appendix G for additional detail.

Table 10: Sunset and Turner Properties Hydrologic Data, Reclaimed Condition

Drainage Area	Area (acres)	Total Pit Capture Capacity (acre-feet)	Storm Event	Adjusted CN*	Total Runoff (acre-feet)
Sunset 1 (SU01)	33.02	127	25-year, 1-hour	60	0.00
			25-year, 24-hour		0.24
			100-year, 24-hour		0.73
Turner 2 (TU02)	133.24	5,670**	25-year, 1-hour	56	0.00
			25-year, 24-hour		0.43
			100-year, 24-hour		1.85
Turner 3 (TU03)	116.00	1,080	25-year, 1-hour	56	0.00
			25-year, 24-hour		0.37
			100-year, 24-hour		1.61

See the Drainage Report in Appendix G for additional detail.

As determined in the Drainage Report and summarized in Table 9 and Table 10 above, because the Project would not discharge significant runoff through implementation of site design features, such as the perimeter berms, and implementation of BMPs outlined within the site-specific SWPPP, the site is not expected to have any significant impacts to downstream areas. No direct encroachment into the surrounding water bodies (i.e., Los Banos Creek, the California Aqueduct, or Delta Mendota Canal) or existing floodplain is planned during the expansion of mining into the Sunset and Turner properties. Local drainage within the mining operation would be collected in the excavated pits and would not be released. Due to site topography and design, and through the implementation of applicable BMPs, the chances of discharge, erosion, and/or sedimentation from the Project sites that could adversely impact adjacent properties is considered low, and potential impacts related to substantial erosion or siltation on- or off-site would be less than significant.

ii. **Flooding:** As discussed above, the proposed Project would not substantially alter the existing drainage pattern of the Project sites or adjacent areas in a manner that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Generally, stormwater that falls on the Sunset and Turner properties would be contained within the excavation pits, and would either naturally evaporate or infiltrate into the ground. Development of the Project would also not add any paving or impervious surface areas. Through implementation of BMPs outlined in the site-specific SWPPP, any stormwater that falls on the Project sites would be captured or controlled. For these reasons, the proposed Project would not result in flooding on- or off-site, and the Project would have less than significant impacts.

iii. **Stormwater Drainage Systems/Sources of Polluted Runoff:** As discussed above and within the Drainage Report (Appendix G), other than minimal quantities of stormwater that might fall on the outside slope of the perimeter berms, the excavation pits within the Sunset and Turner properties would retain the majority of storm water from the modeled storm events for both the maximum extent of mining and reclaimed conditions. Specifically, see Table 9 and Table 10 above and the Drainage Report (Appendix G), which show that the pit bottoms would retain the majority of storm water from the modeled storm events on-site for both the maximum extent of mining and reclaimed conditions. As such, the proposed mining pits would not contribute to off-site flow in either modeled condition, and other than minimal stormwater that would sheet flow along the outside slopes of the perimeter berms, the Sunset and Turner sites would provide storage basins capable of capturing the full extents of the modeled storm events. As such, the proposed mining pits would not contribute to off-site flow for both conditions. Due to the small tributary area and nature of the soil, debris flows are anticipated to be negligible and to be contained within the pit.

Additionally, other than minimal quantities of fuels and lubricating oils found within onsite equipment, the Project would also not use hazardous materials or generate hazardous wastes onsite. The Project would follow the containment and cleanup procedures outlined within the existing Spill Prevention Control and Countermeasure Plan (SPCC) and the Hazardous Materials Business Plan (HBMP) presently in effect at the existing Los Banos Facility. Both the SPCC and HMBP would be updated as needed following Project approval.

For the reasons outlined above, the proposed Project would not create or contribute substantial amounts of runoff or provide substantial additional sources of polluted runoff, and there would be no new impacts.

iv. **Impede/Redirect Flood Flows:** The proposed Project would not substantially alter the existing drainage pattern of the site or area in a manner that would impede or redirect flood flows. As discussed above and within the Drainage Report (Appendix G), The Project has been designed to contain most runoff onsite. The Project would not encroach into the surrounding water bodies (i.e., Los Banos Creek, the California Aqueduct, or Delta Mendota Canal) or existing floodplain is planned during the expansion of mining into the Sunset and Turner properties. Direct precipitation, and resulting runoff, would not flow from the Sunset or Turner properties when mined to the maximum extent. As descried above, other than minimal quantities of stormwater that might fall on the outside slope of the perimeter berms, the mining pits on the Sunset and Turner properties would capture the majority of on-site rainfall and any local run-on from the surrounding areas as well. Due to the low flooding potential of the Project area, and because the Project contain stormwater/flood flows, the potential for a significant drainage or flood hazard impact on the environment is considered low, and the Project would not create a new impediment to surface flow or change flood flow patterns. Thus, the Project would have no impacts related to flood flows.

d) **Less Than Significant Impact**: The proposed Project would not be located in designated tsunami or seiche zones, and would not result in the potential for pollutants to be released to the environment by inundation. The Project sites are located within California's Central Valley region, far away from the Pacific Ocean or other larger inland body of water. The Project sites are not located within a mapped tsunami or seiche hazard area as defined under the Department of Conservation's Seismic Hazards Mapping Act and related seismic hazard maps (DOC, 2022).

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 06047C0825G (Effective Date - December 2, 2008), the Project sites are impacted by a Zone X floodplain. Zone X is identified by FEMA as areas of 0.2% (500-year) annual chance of flood; areas of 1% (100-Year) annual chance of flood with depths of less than 1 foot or areas with drainage areas less than 1 square mile; and areas protected by levees from 1% (100-year) annual chance of flood. The above referenced FIRM is included in the Drainage Report in Appendix G.

Although a portion of the Project sites are within FEMA's Zone X floodplain, the Project would not directly encroachment into the surrounding water bodies (i.e., Los Banos Creek, the California Aqueduct, or Delta Mendota Canal) or existing floodplain during the expansion of mining into the Sunset and Turner properties. Conversely, local drainage within the mining operation would be collected in the excavated pits and would not be released, thereby reducing potential impacts related to offsite flooding when compared to existing conditions. Therefore, the Project would not result in a risk of released pollutants due to project inundation, and therefore Project impacts would be less than significant with no mitigation required.

e) **Less Than Significant Impact:** See responses to CEQA Criteria a) through d) above. The proposed Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

As discussed in Water Supply Assessment (Appendix H), the California Water Code (Section 13240) requires the preparation and adoption of water quality control plans (Basin Plans). Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. California state law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050(f)). State law also requires that Basin Plans conform to the policies set forth in the Water Code beginning with Section 13000. The Project sites are situated in the jurisdictional boundaries of the Central Valley Region and is coordinated through the Central Valley Regional Water Quality Control Board (Regional Water Board) which first adopted the Basin Plan in 1975 (CRWQCB, 2018).

Triangle's land holdings located North of Sunset Avenue are in the San Joaquin River Exchange Contractors Water Authority Groundwater Sustainability Agency (GSA). The property, including both the Turner and Sunset properties, located south of Sunset Avenue are within the Central Delta-Mendota GSA. The properties south of Sunset Avenue are governed by the Northern and Central Delta-Mendota GSP (IRM, 2022).

The beneficial use of water from 2017 through 2021 for aggregate production at the existing facility was determined for the existing Los Banos operations, which is estimated at approximately 173 acre-feet per year. To provide for this beneficial use, Triangle has been using groundwater from the Delta-Mendota Subbasin within the greater SJGWB since the existing groundwater wells were installed from 1979 through 2005 (IRM, 2005).

In accordance with Govt. Code § 66473.7(a)(2), a sufficient water supply for a project constitutes the total supply of water available during normal, single dry and multiple dry years within a 20-year projected demand period. As previously stated, the existing groundwater supply well draws from the Delta-Mendota Groundwater Subbasin.

SGMA defines sustainable yield (SY) as "the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, which can be withdrawn annually from a groundwater supply without causing an undesirable result." The Delta-Mendota Technical Working Group developed sustainable yield estimates for the Upper and Lower Aquifer separately. Because the Project's groundwater supply wells are not screened in the upper aquifer the SY estimates of 325,000 acre-feet/year to 480,000 acre-feet/year was not considered for this water supply assessment.

Based on historic production rates the Project would use the maximum of 173 acre-feet annually as the most conservative approach under a “normal year”. Water requirements vary somewhat throughout the year, and with the amount of annual precipitation. In a year with below normal precipitation, the project sites can experience up to 29 percent less rainfall than in a normal year, additional water would be required to make up the difference. The total water demand in a dry year would be 223 acre-feet, representing 29 percent increase over a “normal" precipitation year, which is less than 1 percent of the lower aquifer sustainable yield. Accordingly, the Project would have a less than significant impact with respect to a groundwater management plan.

Lastly, the Project activities would not result in waste streams or discharges that would be subject to regulation under an applicable water quality control plan. Triangle would continue to implement BMP’s outlined within the site-specific SWPPP to protect surface and ground water quality to ensure operations do not adversely impact water resources.

For these reasons, the Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

3.11 Land Use and Planning

The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on land use and planning.

XI. LAND USE AND PLANNING. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Physically divide an established community?	☐	☐	☐	☒
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

a) **No Impact:** The Project would not divide a currently established community. The Project sites currently have a Merced County General Plan (Merced County, 2016) land use designation of Agricultural (A), and Zoning (Merced County, 2022) land use designation of General Agricultural (A-1). Additionally, the surrounding land uses, include Triangle's existing Los Banos Facility, and open agriculture lands area also designated as Agricultural (A) and General Agricultural (A-1) General Plan and Zoning land use designations. Some associated ranch-style residences are located on these agricultural lands, which is typical for this area of Central California. The closest established community to the project sites is the City of Los Banos, located approximately 4 miles to the northeast of the Project sites. The Project sites are not part of an established city, community or neighborhood as designated by the County, and development of the Sunset and Turner properties would not be inconsistent with the existing adjacent Los Banos Facility, which has been in operation for decades. As such, development of Project would not divide an established community, and no impacts would occur.

b) **No Impact:** The Project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. As described above, the Sunset and Turner properties are included in the Merced County General Plan and are designated as Agricultural (A) within the General Plan, and also have a General Agricultural (A-1) Zoning designation. With these County land use designations, mining is an allowable use with approval of a Conditional Use Permit (Merced *County Code* §18.10.020). As such, the Project would not require changes to the County's existing General Plan or Zoning designations for the Project sites, nor would the Project conflict with the existing land use designation/land use plans in order to mitigate an environmental effect. Therefore, the proposed Project would not cause a significant environmental impact due to a conflict with a land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no impacts would occur.

3.12 Mineral Resources

The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on mineral resources.

XII. MINERAL RESOURCES. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

a) **No Impact:** There would be no loss of availability of a known mineral resource that would be of value to the region and the residents of the State. Surface Mining and Reclamation Act of 1975 (SMARA) requires the State Geologist to classify mineral lands to help identify and protect mineral resources in California. Mineral lands are mapped and assigned Mineral Resource Zones (MRZ) using the State's mineral land classification system. Based on a review of State Minerals Land Classification reports and designations, the Project sites are located within Mineral Resource Zone 2 (MRZ-2a SG-1), which are areas underlain by mineral deposits where geological data indicate that significant measures or indicated resources are present. Because the Project proposes to extract of these valuable aggregate resources within the Sunset and Tuner properties, the Project would result in a net benefit. Therefore, because the Project proposes to extract aggregate, the Project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State, and no impacts would occur.

b) **No Impact:** See Response to CEQA Criteria a) above. The Project would not result in the loss of availability of locally important mineral resources delineated on a local general plan, specific plan, or other land use plan. Conversely, the Project proposes to conduct extraction of these valuable resources via surface aggregate mining operations at the Sunset and Turner properties, which in turn would ensure Triangle's existing Los Banos Facility could continue to provide an important local source of high-quality aggregate products to the Central Valley region of California. Therefore, the Project would increase the availability of permitted aggregate resources within Merced County, resulting in a beneficial impact.

3.13 Noise

The following section is based upon the *Noise Impact Analysis* (Noise Report) prepared by Sespe Consulting, Inc. (Sespe, 2024). The Noise Report quantifies the ambient/background noise levels within the vicinity of the Project sites and identifies potential noise effects at nearby sensitive receptors due to the development and operation of the proposed Project (i.e., materials extraction, handling, and reclamation within the Turner and Sunset properties). See Appendix I for a copy of Sespe's full Noise Report.

XIII. NOISE. Would the project result in:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a) **Less Than Significant Impact:** The Project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of applicable standards. Noise standards that apply to the Project are published in the Merced County *2030 General Plan* (Merced County, 2016) and *County Code* (Merced County, 2022). As such, noise levels resulting from mining operations occurring within the Turner and Sunset properties were estimated within the Noise Report (see Appendix I) and compared to the applicable County standards. While Project noise levels experienced at sensitive receptors adjacent to the Sunset property are expected to be in compliance with applicable County standards once perimeter berms are installed, there is a potential for equipment (i.e., scrapers/dozers) to generate elevated noise levels during initial site preparation/berm construction. This is because mobile equipment needed to construct the perimeter topsoil/subsoil berms would be operating at-grade within line -of-sight of nearby residences/sensitive receptors. However, these potential impacts would be short-term and temporary in nature and would occur during daytime hours (7:00 a.m. – 6:00 p.m.) weekday (i.e., Monday through Friday) only, when nearby residences would be less sensitive to noise generated by scrapers and dozers. Additionally, noise generate during temporary berm construction activities would be considered "noise from construction activity" which are exempt from the County's other sound level limitations, specifically those identified in County Code Section 10.60.030. Specifically, Section 10.60.030(B)(5) states that "construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained" is considered exempt from the other County Code noise standards (Merced County, 2022). Therefore, temporary noise generated during berm construction between the hours of 7:00 a.m. and 6:00 p.m. would be exempt from the County's sound level limits in Section 10.60.030(A) of the County Code, and would therefore be less than significant so long as the activities occur between the hours cited above.

Further, once the perimeter berms are constructed, Project noise levels experienced at all sensitive receptors would be below the applicable Merced County standards. Therefore, upon completion of the 7-foot-high perimeter berm along the northern side and northern half of the west side of the Sunset property, as well as the 4.5- to 5.5-foot-high perimeter berms along the other Project sites perimeters, Project noise at nearby receptors would be less than significant. Additionally, as the excavation pits deepen, equipment noise would be progressively minimized by the pit walls as they would sufficiently break line-of-sight between movable equipment and nearby residential receptors.

Based upon the Project operations and the assumptions summarized above, the Noise Report in Appendix I estimated Project noise levels during normal mining operations/aggregate extraction would not exceed the applicable County thresholds at any receptors located adjacent to the Sunset and Turner properties. Table 11 and Table 12 below shows the estimated daytime (7:00 a.m. – 10:00 p.m.) average (L_{eq}), median (L_{50}) and maximum (L_{max}), as well as the 24-hour instantaneous maximum (L_{max}) and Day-Night (L_{dn}) noise levels experienced at nearby residential receptors as a result of initial ground preparation/berm construction and subsequent Project mining operations/extraction of aggregates.

Table 11: Project Noise Significance Determination – Merced County General Plan

Daytime (7:00 a.m. – 10:00 p.m.)						
Receptor	Outdoor Area					
	Median (L_{50})			Maximum (L_{max})		
	Project Noise	Threshold	Potentially Significant?	Project Noise	Threshold	Potentially Significant?
R1	50.8	55	No	78.3	81.3	No
R2	50.6	55	No	78.3	81.3	No
R3	52.8	55	No	78.3	81.3	No
R4	51.9	55	No	77.9	80.9	No
R5	50.2	55	No	77.9	80.9	No
R6	49	55	No	81.5	84.5	No
R7	46.7	55	No	79.8	82.8	No
R8	48.6	55	No	81.6	84.6	No
Receptor	Interior					
	Median (L_{50})			Maximum (L_{max})		
	Project Noise	Threshold	Potentially Significant?	Project Noise	Threshold	Potentially Significant?
R1	30.8	35	No	58.3	61.3	No

Daytime (7:00 a.m. – 10:00 p.m.)						
R2	30.6	35	No	58.3	61.3	No
R3	32.8	35	No	58.3	61.3	No
R4	31.9	35	No	57.9	60.9	No
R5	30.2	35	No	57.9	60.9	No
R6	29	35	No	61.5	64.5	No
R7	26.7	35	No	59.8	62.8	No
R8	28.6	35	No	61.6	64.6	No

See the Noise Report in Appendix I for additional detail.

Table 12: Project Noise Significance Determination – Merced County Code

Outdoor Area			
Receptor	**Daytime (7:00 a.m. – 10:00 p.m.)**		
	Average (L_{eq})		
	Project Noise	**Threshold**	**Potentially Significant?**
R1	55.6	64.4	No
R2	55.5	64.4	No
R3	57	64.4	No
R4	56.3	61	No
R5	55.2	61	No
R6	54.5	61.1	No
R7	52.6	59.8	No
R8	54.4	61.4	No
Receptor	**24-Hour**		
	Maximum (L_{max})		
	Project Noise	**Threshold**	**Potentially Significant?**
R1	78.3	81.3	No
R2	78.3	81.3	No
R3	78.3	81.3	No
R4	77.9	80.9	No
R5	77.9	80.9	No
R6	81.5	84.5	No
R7	79.8	82.8	No
R8	81.5	84.5	No
Receptor	**24-Hour**		
	Day-Night (L_{dn})		
	Project Noise	**Threshold**	**Potentially Significant?**

Outdoor Area			
R1	58.7	65	No
R2	58.7	65	No
R3	59.1	65	No
R4	57.9	65	No
R5	57.5	65	No
R6	56.4	65	No
R7	54.9	65	No
R8	56.3	65	No

See the Noise Report in Appendix I for additional detail.

Note that the estimated Project noise levels present in Table 11 and Table 12 below take into account noise attenuation provided by the approximate 7-foot-high berm proposed to be constructed along the northern side and northern half of the western edge of the Sunset property. Specifically, it was assumed Project noise levels experienced at Receptors R1, R2 and R3 would be reduced by approximately -11 decibels, due to the 7-foot berm blocking line-of-sight between the residences and the mining equipment operating within the Sunset property.

In conclusion, while initial site preparation and berm construction would create short-term temporary noise, these activities would occur during daytime (7:00 a.m. – 6:00 p.m.) hours, Monday through Friday, only when residences would be less sensitive to noise generated by the scrapers/dozers. All construction equipment used during site preparation/berm construction at the Sunset property would be properly muffled and maintained in accordance with County Code. Additionally, these potential impacts would be short-term and temporary in nature and would occur during daytime hours (7:00 a.m. – 6:00 p.m.) weekday (i.e., Monday through Friday) only in accordance with Section 10.60.030(B)(5) of the County Code, when nearby residences would be less sensitive to noise generated by scrapers and dozers. Specifically, Section 10.60.030(B)(5) states that "*construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained*" is considered exempt from the other Municipal Code noise standards (Merced County, 2022). Accordingly, temporary noise impacts would be less than significant with no mitigation required.

As shown in Table 11 and Table 12 (see Appendix I), the Project would not generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the Merced County General Plan, County Code, or other applicable agency standards. Therefore, impacts would be less than significant, with no mitigation required.

b) **Less Than Significant Impact:** The Project would not generate excessive groundborne vibration or groundborne noise levels. To assess Project vibration impacts at each receptor location, the vibration resulting from mobile mining equipment (i.e., large bulldozer) operating within the Sunset and Turner properties to determine worst-case vibration levels experienced at nearby receptors due to onsite mining operations. Conservatively, it was assumed mining equipment would operate in the onsite areas closest to the receptors (i.e., residences) of concern. Using these conservative assumptions, the Noise Report found that estimated Project vibration levels experienced at nearby receptors would be well below the applicable County significance criteria. Table 13 summarizes the predicted groundborne vibration impacts resulting from Project operations. See Appendix I for additional detail.

Table 13: Predicted Project Vibration Levels at Receptors

Receptors	Distance (feet)	Predicted Vibration – PPV (in/sec) [A]	Applicable Merced County Threshold – PPV (in/sec)	Significant?
R1	955	0.002	> 0.003	No
R2	995	0.002	> 0.003	No
R3	600	0.003	> 0.003	No
R4	1,860	0.001	> 0.003	No
R5	2,265	0.001	> 0.003	No
R6	2,610	0.001	> 0.003	No
R7	3,450	0.000	> 0.003	No
R8	2,750	0.001	> 0.003	No

Additionally, although not utilized for significance determination, the predicted Project vibration levels at nearby receptors are considered “barely perceptible” per applicable Caltrans criteria. Therefore, as summarized in Table 13 above, the proposed Project would not generate excessive groundborne vibration levels, and there would be less than significant impacts with no mitigation required.

c) **No Impact:** The proposed Project sites are not located within 2.0 miles of any private or public airports or airstrips, or in an area governed by an airport land use plan. As discussed previously, the closest airport/airstrip is the Los Banos Municipal Airport, located approximately 2.7 miles to the northeast of the Sunset property. Furthermore, the Project does not involve the creation of a new noise-sensitive land use (i.e., residences), that could be affected by existing airplane noise. Therefore, the Project would have no impact related to airport/airstrip noise levels.

3.14 Population and Housing

XIV. <u>POPULATION AND HOUSING</u>. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
i. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) **No Impact:** The proposed Project would not induce substantial unplanned population growth. The Project would not involve construction of new residences, nor would it require an additional number of personnel or contractors working on- or off-site. Additionally, no new or extended public roadways or public utility facilities or infrastructure are proposed. Therefore, the Project would not increase utilities or other infrastructure to the Project area that may otherwise indirectly induce population growth in the County. Accordingly, the proposed Project would not induce substantial unplanned population growth in an area, either directly or indirectly, and no impacts would occur.

b) **No Impact:** The proposed Project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere. The Project sites are located in a relatively remote area that has historically been subject to various agricultural and livestock operations and related activities. The adjacent land uses include Triangle's existing Los Banos Facility and open agricultural lands, with some associated rural residences. The Project sites do not contain existing dwelling units and the proposed Project would not displace any persons or existing houses. Additionally, the Project would not increase the number of on- or off-site employees. For these reasons, the proposed Project would not displace a substantial number of existing people or housing or necessitate the construction of replacement housing elsewhere, and no impacts would occur.

3.15 Public Services

XV. PUBLIC SERVICES.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
I. Fire protection?	☐	☐	☐	☒
II. Police protection?	☐	☐	☐	☒
III. Schools?	☐	☐	☐	☒
IV. Parks?	☐	☐	☐	☒
V. Other public facilities?	☐	☐	☐	☒

a) **No Impact:** See discussions below:

i. **Fire Protection:** The proposed Project would not result in substantial adverse physical impacts to any fire protection services. The Project would not add to off-site traffic congestion above existing levels that may result in a delay of response time by the fire department. Moreover, combustible materials, specifically existing low-lying vegetation, would be cleared from the site to allow for mining, which in turn would create a "defensible space" that helps prevent the spread of possible fires. As discussed above, in the unlikely event of a fire, the Merced County Fire Department and/or the City of Los Banos Fire Department would serve as first responders. The City of Los Banos Station No. 2 is the closest fire station to the Project sites, located approximately 5.5 miles northeast, and could quickly respond to a fire within the Project area. For these reasons, the proposed Project would not have an effect upon existing fire services, or generate a need for new fire protection services to maintain acceptable service ratios, response times, or other performance objectives within Merced County. As such, no impacts would occur.

ii. **Police Protection:** The proposed Project would not adversely affect police protection services within the County. As described above, the Project area is located in open area lands surrounded by Triangle's existing Los Banos Facility and open agricultural lands. The proposed Project does not include new housing and would not require additional onsite employees beyond those who currently work at the existing Los Banos Facility. Additionally, the Project would not directly or indirectly induce population growth that would increase demand for police protection services. Therefore, the proposed Project would not have an effect upon existing police services, nor would it result in a need for new police protection services to maintain acceptable services, response times, or other performance objectives within Merced County. Therefore, no impacts would occur.

iii. **Schools:** The proposed Project would not result in substantial adverse physical impacts to any schools. Based on the nature of the Project and the fact that the number of on- and off-site employees would not change from existing levels, the Project would not generate an increased demand for public schools, or other related facilities within the County. Additionally, the Project would not generate development or changes in land use intensities that would change or increase student enrollment in the Merced County school system. Therefore, the proposed Project would not have an effect upon or result in a need for new schools, nor would it physically alter existing schools, and no impacts would occur.

iv. **Parks:** The proposed Project would not result in substantial adverse physical impacts to any parks. As discussed under Section XVI – Recreation below, the Project does not include new housing and the number of on- and off-site employees would not increase above existing levels. The Project would not directly or indirectly induce population growth in the area that would require the construction or expansion of recreational facilities. Therefore, the proposed Project would not require the construction or expansion of recreational facilities (e.g., neighborhood or regional parks). As such, the proposed Project would not have an effect upon or result in a need for new parks within the County, and no impacts would occur.

v. **Other Public Facilities:** The proposed Project would not result in substantial adverse physical impacts to other public facilities. The Project does not include new housing and the number of on-and off-site employees would not increase above existing levels. Additionally, the Project would not directly or indirectly induce population growth in the County such that an increased demand for other public facilities, such as libraries, would result. Lastly, the Project would not require additional utility connections such as electricity, natural gas, or telephone/cable lines. Therefore, the proposed Project would not have an effect upon existing public facilities, or result in a need for new or public facilities, and no impacts would occur.

3.16 Recreation

XVI. RECREATION.	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

a) **No Impact:** The proposed Project would not increase the use of existing neighborhood and regional parks, or other recreational facilities. The nearest park to the Project area is Oliveira Park, located approximately 2 miles northeast of the Sunset property and 2.5 miles northeast of the Turner property. The Project would not affect this existing regional park. Additionally, the Project does not include new housing and the number of on- and off-site employees would not increase above existing levels. Furthermore, the Project would not directly or indirectly induce population growth in the area that would increase the use of existing neighborhood and regional parks or other recreation facilities. Therefore, the proposed Project would have no impacts.

b) **No Impact:** The proposed Project does not include recreational facilities or require the construction or expansion of recreational facilities. As discussed above, the Project does not include new housing, nor would it directly or indirectly induce population growth in the area that would require the construction or expansion of recreational facilities. Therefore, the proposed Project would have no impacts.

3.17 Transportation

XVII. TRANSPORTATION. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Conflict with program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b. Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☐	☒
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d. Result in inadequate emergency access?	☐	☐	☐	☒

a) **No Impact:** The Project would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. As noted previously, the proposed Project would not add to off-site traffic congestion above existing levels, nor would the Project change the manner in which trucks and vehicles access or egress the existing Los Banos Facility onto the adjacent public roadways. Material extracted from the Sunset and Turner properties would be transported to the existing onsite processing plant using internal haul roads in the same manner as currently occurs. No on-road haul trucks would use public roads to transport the materials, except for at a crossing point that would be designated at Alvarado Trail to permit travel from the southernmost part of the Turner property north to the processing plant. From there, material would continue to be processed and shipped to delivery locations throughout the region or used onsite to produce hot-mix asphalt or transferred for use by a separately owned and operated ready-mix concrete plant in the same manner as presently occurs. Furthermore, there are no bicycle, pedestrian, or transit facilities presently located within the Project area. For these reasons, the Project would not conflict with any County program plans, ordinances or policies related to public circulation systems, including transit, roadway, bicycle and pedestrian facilities. As such, the Project would have no new impacts.

b) **No Impact:** The proposed Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b). CEQA Guidelines Section 15064.3(b) requires that a project's potential transportation impacts be evaluated using the "vehicle miles traveled (VMT)" metric, which refers to the amount and distance of automobile travel attributable to a project daily. To address the requirements of CEQA Guidelines Section 15064.3(b), in 2018 the Governor's Office of Planning and Research (OPR) published the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR, 2018), which states that "Projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant vehicle miles travelled (VMT) impact." As discussed, the number of onsite employees, and therefore daily employee vehicle trips, would not change from existing (baseline) levels. Additionally, although truck trips are generally not considered within a CEQA VMT analysis, nonetheless the Project would not change or increase the number of haul trucks to and from the facility compared to existing levels. Therefore, the proposed Project would result in no new VMTs and would therefore not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)(3). As such, no impacts would occur.

c) **Less Than Significant Impact:** The Project would not substantially increase hazards due to a geometric design feature or incompatible uses. The Project would not require any changes to existing driveways, ingress/egress points, adjacent roadways, parking spots, or other existing roadway design features. Additionally, the Project area has been historically utilized for aggregate mining, and therefore excavation within the Sunset and Turner properties would not create incompatible uses along the adjacent roadways.

Note that a portion of Alvarado Trail extends through the southern part of the Turner property, and mining would take place in a southern pit to the south of this public roadway. Therefore, once mining commences in the southern portion of the Turner property, at times material would need to be hauled across Alvarado Trail to the northern mining area to connect with the existing internal haul road that connects with the existing processing plant area. Although equipment and haul trucks would have to cross this small portion of Alvarado Trail, these crossings would be infrequent, and would be complete when no other vehicles are utilizing the roadway. Consistent with Triangle’s existing operations, onsite employees would continue to be trained on how to safely cross this portion of Alvarado Trail, and the road would be frequently maintained and swept to ensure fugitive road dust is kept to a minimum.

For these reasons, the Project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) or alterations to nearby roadways. The only public roadway on which Project equipment and trucks would have to travel is Alvarado trail, but Triangle would do so in a safe manner, and would ensure that the crossing area is appropriately maintained to ensure public access is not impeded or effected in any way. Therefore, Project impacts would be less than significant, with no mitigation required.

d) **No Impact:** The proposed Project would not result in inadequate emergency access. As discussed above, there are no proposed design changes to the existing ingress/egress points connecting to Sunset Avenue and S. Creek Road, nor would it result in alterations to existing adjacent roadways, parking areas, or other circulation facilities. Project equipment and vehicles would continue to be parked off public roads within designated onsite parking areas so as not to block onsite emergency evacuation routes. Additionally, no road closures are proposed during Project mineral extraction phases or reclamation activities, and equipment and vehicles crossing Alvarado Trail would be conducted in a safe manner. Therefore, the proposed Project would not impede existing emergency access in the Project Vicinity, and no impacts would occur.

3.18 Tribal Cultural Resources

XVIII. TRIBAL CULTURAL RESOURCES.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

On July 1, 2015, California Assembly Bill 52 (AB 52) of 2014 went into effect, expanding CEQA by defining a new resource category, “tribal cultural resources.” AB 52 states, “A project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment” (PRC Section 21084.2). It further states the lead agency shall establish measures to avoid impacts altering the significant characteristics of a tribal cultural resource, when feasible (PRC Section 21084.3).

AB 52 also establishes a formal consultation process for California tribes regarding tribal cultural resources. The consultation process must be completed before a CEQA document can be certified or adopted. Under AB 52, lead agencies (in this instance, Merced County) are required to “begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project.” Native American tribes to be included in the process are those that have requested notice of projects proposed in the jurisdiction of the lead agency.

On January 8, 2024, the County distributed AB 52 consultation letters for the proposed Project, including Project information, a map, and contact information, to one Native American tribe. Specifically, the Table Mountain Rancheria was the only tribal government provided with an AB 52 consultation letter.

Under AB 52, Native American tribes have 30 days to respond and request further project information and request formal consultation. To date, the one tribe contacted (i.e., the Table Mountain Rancheria) responded within 30 days of receiving the AB 52 letter, requesting a formal consultation meeting. Accordingly, AB 52 consultation will be completed for the Project through ongoing government-to-government consultation.

a) **No Impact:** See discussion below.

   i. **No Impact:** The proposed Project would not cause a substantial adverse change in the significance of a tribal cultural resource. No tribal cultural resources have been identified on or near the Project area.

      As discussed above, in accordance PRC Section 21074 – AB 52, the County contacted one tribe, the Table Mountain Rancheria, to obtain their input and concern with potential impacts to tribal cultural resources as a result of the Project. A consultation meeting was held on February 6, 2024, with a representative from the Table Mountain Rancheria tribe, the County, and members of the applicant's team. The Tribe requested to review the Cultural Resources Study (see Appendix D) and indicated they would follow up if they had further questions or required further consultation. To date, no follow up communications have been received from the Table Mountain Rancheria tribe, and no other responses or input has been received from the other tribes pursuant to PRC Section 21074 – AB 52.

      For these reasons, the Project would not cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074. Therefore, no impacts would occur.

   ii. **No Impact:** See response to CEQA Criteria a)i above. The Project would not cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074, and therefore no impacts would occur.

3.19 Utilities and Service Systems

XIX. UTILITIES AND SERVICE SYSTEMS. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

a) **Less Than Significant Impact:** As discussed above, the Project would not result in an increase of onsite employees, and other relocated mining activities into the Sunset and Turner properties, the Project would change Triangle existing Los Banos Facility, including the existing processing plants. Water would continue to be obtained from the two existing wells (DW-1 and DW-2) located at the Los Banos Facilities, and no new wells would be required within the Sunset and Turner properties.

Although not anticipated, electrical service for ancillary equipment such as light stands would be provided by Pacific Gas & Electric (PG&E), which serves current operations. Should portable lighting be needed for nighttime operations, it would be powered using a small portable generator, and therefore would not require incremental electricity usage. Further, since the rate of aggregate material extraction and mining methods with the Project would remain the same as is currently in place for the existing Facility, the amount of electrical energy consumed would also not change or increase. Consequently, the Project would not result in any new power demand.

No septic systems or commercial bathrooms would be located on the Project sites. Onsite employees would continue to use existing bathroom facilities at the adjacent Los Banos Facility. Portable bathrooms placed onsite would continue to be regularly serviced by a local contractor. The waste would continue to be disposed of offsite by vendors servicing the portable toilet.

Cell phones and radios would continue to be used by onsite employees for telecommunications, as is currently being done. Additionally, there would be no natural gas used onsite as part of the Project.

Consistent with Triangle's existing operations, storm water runoff from access roads into the Sunset and Turner mining areas would continue to be directed towards the pits by the perimeter berms, and managed using appropriate best management practices (BMPs) as specified in the Storm Water Pollution Prevention Plan (SWMPP). As discussed in Section X – Hydrology and Water Quality above, Sespe Consulting, Inc. (Sespe, 2022) performed a surface drainage analysis for flows using HydroCAD^{TM} to further evaluate the drainage aspects of the Project. Using the results of this drainage analysis, surface flow control and management measures are incorporated into the Project design. This Drainage Study demonstrates that surface run-on and run-off can be managed entirely onsite for the design-level 25-year storm event, as required under the California Surface Mining and Reclamation Act (SMARA). Specifically, see the results of the HydroCAD® model presented in Table 9 and Table 10 in Section X – Hydrology and Water Quality above, which show the pit bottoms would retain storm water from the modeled storm events on-site for both the maximum extent of mining and reclaimed conditions. As such, the proposed mining pits would not contribute to off-site flow in either modeled condition. The pits from the mining operation would provide storage basins capable of capturing the full extents of the modeled storm events. Due to the small tributary area and nature of the soil, debris flows are anticipated to be negligible and to be contained within the pit. Therefore, as demonstrated through Sespe's Drainage Report, and through ongoing compliance with Triangle's existing SWPPP, the Project would have less than significant impacts related to stormwater.

For the reasons outlined above, the Project would not result or require the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electrical power, natural gas, or telecommunications facilities of which could cause significant environmental effects, and impacts would be less than significant with no mitigation required.

b) **Less Than Significant Impact:** Water for the Project would continue to be provided by the two existing wells (DW-1 and DW-2) located within the Los Banos Facility. Because the rate of material extraction and processing would not change, and because the number of onsite employees would not increase as a result of the Project, there would be no increase in water consumption or water supply as a result of the Project. Sespe Consulting Inc. (2022) prepared a Water Supply Assessment to evaluate if existing water supplies would be sufficient to supply future operations in the Sunset and Turner properties. A copy of the Water Supply Assessment report is provided as Appendix H.

Based on historic production rates the Project would use the maximum of 173 acre-feet annually as the most conservative approach under a "normal year". Water requirements vary somewhat throughout the year, and with the amount of annual precipitation. In a year with below normal precipitation, the Project sites can experience up to 29 percent less rainfall than in a normal year, additional water would be required to make up the difference. The total water demand in a dry year would be 223 acre-feet, representing 29 percent increase over a "normal" precipitation year. Which is less than 1 percent of the lower aquifer sustainable yield. Table 14 summarizes the estimate Project water demands, and the available supplies determined within the Water Supply Assessment (see Appendix H). Based upon the results of Sespe's analysis summarized in Table 14 below, the Project would not have any significant effect on the future use of the aquifer since it does not create any new demand and the continued use is well below the sustainable yield limit during normal, dry, and multiple dry years.

Table 14: Water Supplies and Demands

Description	Hydrologic Year Type (AFY)		
	Normal	Dry	Multi-Dry
Annual Water Demands			
Existing Site Water Demands [1, 3]	173	223	223
Groundwater Supply			
Lower Aquifer [2]	250,000	230,000	230,000
Conservative Total Supply			
Excess of Supply Over Regional Demand	249,827	229,820	229,820

See the Water Supply Assessment in Appendix H for additional detail.
Notes:

1. Existing water demands assumes the maximum over the last five years and dry years assume 29% increase.
2. The groundwater supply wells are screened in the lower aquifer; Groundwater Supply from GSP Lower Aquifer SY ranges for normal, dry, and multiple dry years.
3. Dry and Multi-Dry years determined calculate percent difference between average of normal year precipitation and average of dry year precipitation. Data from Los Banos Station ID 56 from years 1905 through 2022 (CIMIS, 2022).

As described in the Water Supply Assessment (Appendix H), the Project would not create any incremental demand on water supplies and the two existing wells have sufficient capacity to serve the Project, based on the estimated average annual demand of 173 acre-feet projected demand for normal water years and 223 acre-feet for single and multiple dry years. Since the per unit quantity of water needed for the Project would be equivalent to that amount used for ongoing baseline mining at the existing Los Banos Facility, there would be no new demand created, nor incremental loss that would result. Therefore, the Project would have less than significant impacts, with no mitigation required.

c) **No Impact:** As discussed above, no new septic system or commercial bathrooms would be located on the Project sites. Onsite employees would continue to utilize existing bathroom facilities at the Los Banos Facility. Onsite portable bathrooms would continue to be regularly serviced by a local contractor. Waste would continue to be properly collected and disposed of offsite by third party vendors. Therefore, no impacts would occur.

d) **No Impact:** The Project would not generate significant quantities of solid waste that would exceed state or local standards, or that would exceed the capacity of local disposal facilities, or that otherwise impair the attainment of state and local solid waste reduction goals. Minimal quantities of refuse (food wrappers, cans/bottles, etc.) may be generated by onsite employees; however, the Project would generate similar quantities of solid waste compared to Triangle's existing operations, and waste would continue to be properly collected and disposed of in the same manner as currently occurs at the Los Banos Facility. Additionally, minimal quantities of solid waste may also be generated during site preparation of the Turner properties, specifically agricultural structures/materials would need to be removed. Intermittent waste generated as a result of site preparation activities would also be properly collected and disposed of offsite by an appropriate third party. The Project would be sufficiently served by existing Class I, II, and/or III solid waste landfills within the County that have sufficient capacity to meet the Project’s minimal needs in terms of solid waste generation and disposal. Therefore, the Project would have no new impacts.

e) **No Impact:** As discussed above, the Project would not generate quantities of solid waste beyond what is currently produced at Triangle’s existing Los Banos Facility. Any solid waste generated within the Sunset and Turner properties by onsite operations/employees would continue to be collected and managed according to state and local requirements, and properly disposed of offsite. The Project would comply with federal, state, and local solid waste statutes and regulations, and new impacts would occur.

3.20 Wildfire

XX. WILDFIRE. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or uncontrolled spread of a wildfire?	☐	☐	☐	☒
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

In 2007 CalFire adopted Fire Hazard Severity Zone (FHSZ) maps for State Responsibility Areas (SRA), which are intended to assist local agencies planning for fire hazards. Accordingly, the State FHSZ map was reviewed to determine if the Project occurs in a moderate, high, or very high FHSZ. Based on CalFire's FHSZ maps for Merced County (https://egis.fire.ca.gov/FHSZ/), the Project lies outside of a SRA FHSZ. Although the Project is not within a SRA, a portion of the Project sites, specifically the southwest portion of the Turner property, does fall within a Local Responsibility Area (LRA) designated as having "Moderate" FHSZ.

a) **No Impact:** As discussed in Section IX – Hazards and Hazardous Materials above, the Project would not substantially impair an adopted emergency response plan or emergency evacuation plan. Specifically, Merced County's Emergency Operations Plan (EOP) (Merced County, 2017) and Multi-Jurisdictional Hazards Mitigation Plan (Merced County, 2021) were reviewed, and the Project would not conflict with any applicable provisions found in the County's emergency response or hazard mitigation plan(s). The Project would also not add to off-site vehicle trips or traffic congestion above existing levels that may result in the delay of emergency response activities. Specifically, no new onsite employees or off-site haul trucks would be required as a result of the Project. Therefore, the Project would not impair adopted emergency response plans or emergency evacuation plans, and there would be no impacts.

b) **No Impact:** The Project would not exacerbate wildfire risks due to slope, prevailing winds, and other factors. The Project area is generally flat, disturbed, open area lands that has historically been disturbed by various agricultural and livestock operations and relative activities. Conversely, the Sunset and Turner properties would be cleared of existing vegetation and debris to allow for mining operations, which in turn would reduce risks associated with wildfire. Additionally, slopes angles within the excavation pits would not exceed 2:1 (horizontal to vertical), and would remain in compliance with applicable Surface Mining and Reclamation Act (SMARA) requirements, as well as the slope stability and safety requirements outlined in the approved Reclamation Plan. The Project sites would continue to be maintained in an orderly manner and would remain clear of potentially flammable vegetation. For these reasons outlined above, the Project would not exacerbate a wildfire risk or expose Project personnel or offsite receptors to increased risk due to uncontrolled wildfire. Instead, during active mining, the site(s) would act as a "fire break" or "safe zone" minimizing the spread of a wildfire in the area. Therefore, the Project would have no impact.

c) **No Impact:** The Project would not involve the installation or maintenance of infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. Other than the crossing point that would be designated at Alvarado Trail to permit travel from the southernmost part of the Turner property north to the processing plant, the Project does not propose alterations to nearby public roadways, or existing driveways and access points. Additionally, no significant utility infrastructure would need to be installed onsite, nor would existing utility infrastructure need to be relocated or expanded as a result of the Project. Existing infrastructure would be maintained, and mobile equipment fueling and maintenance would continue to be conducted in accordance with the existing safety and spill prevention procedures. For these reasons, the Project would not require the installation or maintenance of associated infrastructure that may exacerbate fire risk or result in temporary or ongoing impacts to the environment, and there would be no impacts.

d) **No Impact:** The Project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of run-off, post-fire slope instability, or drainage changes. No major man-made or natural landform areas with landslide potential exist within or adjacent to the Project sites with landslide potential. During active mining, the sites would be cleared of vegetation and the barren excavation pits would act as a "fire break" or "safe zone" minimizing the spread of a wildfire in the area. As such, the Project would not expose people or structures to significant risks related to run-off, post-fire slope instability, or drainage changes, and there would be no impacts.

3.21 Mandatory Findings of Significance

XXI. **MANDATORY FINDINGS OF SIGNIFICANCE**.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a) **Less Than Significant Impact**: The Project would not have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. As discussed above, the Project involves a continuation of mining within the Sunset and Turner properties, which are located adjacent to the existing Los Banos Facility.

Both the Sunset and Turner properties have been subject to a variety of anthropogenic disturbances associated with historic agricultural and ranching activities, as well as routine weed abatement/disking activities. Based on the discussions above (see Section IV – Biological Resources and ELMT's *Biological Resources Report* in Appendix C) the Sunset and Turner currently consist of four plant communities (i.e., fallow agricultural, active agricultural, disturbed, and developed land), none of which represent valuable habitat. The Project would have no significant impacts to threatened, endangered, candidate, or special status species. Additionally, there were no water features, jurisdictional drainages, or wetland features observed on the Project sites during ELMT's field surveys. As such, development of the Project sites would not cause a fish or wildlife population to drop below self-sustaining levels, eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal.

Further, as discussed in Section V – Cultural Resources and within the revised Cultural Resources Study prepared by Tom Origer & Associates, the Project would not have the potential to substantially adversely affect previously unidentified archaeological resources or eliminate important examples of the major periods of California history or prehistory. Only one resource has been recorded within the study area (Krantz 1956), specifically the reported location of a village where 170 mortars were collected (P-24-000102). However, Tom Origer and Associates notes that based upon their evaluation, they determined that no archaeological site indicators were found during the study, including the location of previously documented site P-24-000102, as Tom Origer and Associates believes that this site was incorrectly mapped by Krantz (1956) and would therefore not be impacted by the Project. Additionally, since Tom Origer and Associates were able to examine subsurface soils along places of high buried site sensitivity and saw no buried archaeological site indicators, the potential for buried archaeological sites within the study area is reduced to a moderate potential which corresponds to a 2% to 3% probability of there being buried sites within the study area. As such, the Project would have a less than significant impact on archeological resources as defined under §15064.5, and no mitigations would be required. See the Cultural Resources Study in Appendix D for additional detail.

For the reasons outlined above, the Project would not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory, and therefore the Project would have less than significant impacts.

b) **Less Than Significant Impact:** The Project does not have potential impacts that are individually limited, but cumulatively considerable. Based on the analysis contained in this CEQA Initial Study, as well as the technical appendices, the proposed Project would not result in any significant and unmitigable impacts in any environmental categories. In all cases, effects associated with the Project would be limited to the Project sites/disturbance footprint (i.e., the Sunset and Turner properties) and either result in no new impacts or less than significant impacts, with mitigation incorporated. As such, Project impacts are of such a negligible degree that they would not result in a significant contribution to any cumulative impacts. This is largely due to the fact that the Project activities would not significantly alter the environment beyond the existing/baseline condition, and the site would be fully reclaimed in accordance with SMARA once mining activities are completed. Under the Project, Triangle's existing mining and processing operations would not change or increase in intensity, but rather material excavation would simply transfer to the adjacent Sunset and Turner properties.

Cumulative impacts could result if the construction of other projects within the County also occur at the same time as the proposed Project and in the same geographic scope, such that the effects of similar impacts of multiple projects combine to create greater levels of impact than would occur at the Project-level. For example, if the construction of other projects in the area occurs at the same time as construction of the proposed Project, combined noise and transportation impacts may be greater than at the project-level. The County has no other project applications or plans on file for projects in the vicinity of the proposed Project site. Additionally, based on the analysis contained in this CEQA IS/MND, Project-specific impacts would be less than significant, and therefore would not combine with the impacts of other projects to create cumulative effects related to air quality, noise, and transportation/traffic. In general, potential Project effects related to these resource areas, including those where potentially significant impacts required mitigation, would be site-specific (e.g., dust, noise, etc.), and would diminish with distance from the Project site. For these reasons, the Project is not expected to have impacts that are cumulatively considerable. See the individual environmental resource discussions above for additional detail.

For these reasons, the incremental effects of the proposed Project would not be cumulatively considerable when viewed in connection with the effects of past project, current projects, or probable future projects, and the Project would have less than significant impacts.

c) **Less Than Significant Impacts:** Based on the analysis contained in this IS/MND and the technical appendices attached, the proposed Project would not exceed any significance thresholds or result in significant impacts per the environmental categories typically associated with indirect or direct effects to human beings, such as aesthetics, air quality, hazards and hazardous materials, noise, public services, or transportation. As discussed within Section III – Air Quality, Section VIII – Geology and Soils, Section IX – Hazards and Hazardous materials, Section X – Hydrology and Water Quality, Section XIII – Noise, Section XV – Public Services, and Section XVII – Transportation of this document, the proposed Project would not expose persons to the hazards of toxic air emissions, chemical or explosive materials, ground-shaking, flooding, noise, or transportation hazards. For these reasons, the proposed Project does not have a Mandatory Finding of Significance due to environmental effects that could cause substantial adverse effects on humans, and there would be less than significant impacts.

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5.0 LIST OF PREPARERS

Merced County is the CEQA lead agency responsible for the preparation of this Initial Study/Mitigated Negative Declaration (IS/MND).

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- John Hecht, P.E. – Sespe Consulting, Inc.
- Graham Stephens – Sespe Consulting, Inc.
- Eric Von Berg – Rincon Consultants, Inc.
- Adam Guernsey, Esq. – Harrison, Temblador, Hungerford & Guernsey

Lastly, in addition to the County and technical sub-consultants/individuals listed above, the following firms were responsible for preparing the following technical studies/appendices:

- Biological Resources Assessment – ELMT Consulting
- Cultural Resources Study – Tom Origer & Associates
- Geology and Soils Environmental Assessment(s) – Golder Associates USA Inc.

APPENDIX A

Visual Impact Analysis (Sespe, 2022)

SESPE CONSULTING, INC.
A Trinity Consultants Company

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VISUAL IMPACT ANALYSIS

LOS BANOS SAND AND GRAVEL QUARRY

Triangle Rock Products, LLC
Merced County, California

November 2022

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VISUAL IMPACT ANALYSIS

LOS BANOS SAND AND GRAVEL QUARRY

Triangle Rock Products, LLC
Merced County, California

November 2022

Graham Stephens
Project Manager
Sespe Consulting, Inc.

Visual Impact Analysis
Los Banos Sand and Gravel Quarry Project

Triangle Rock Products, LLC
November 2022

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VISUAL IMPACT ANALYSIS

Los Banos Sand and Gravel Quarry Project
Triangle Rock Products, LLC

November 2022

EXECUTIVE SUMMARY

Triangle Rock Products dba Triangle Rock Products, LLC ("Triangle") currently operates an approximately 606-acre aggregate surface mining, processing, and hot-mix asphalt production facility in Merced County (County), known as the Los Banos Sand and Gravel Operation (the "Los Banos Facility"). To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as continue to furnish aggregates for hot-mix asphalt (HMA) and ready-mix concrete (RMC) products, Triangle desires to augment the existing sand and gravel reserves by extracting materials from two (2) additional properties, the Turner and Sunset properties, which adjoin the existing operations (the "Project").

This Visual Impact Report (VIA) has been prepared to identify the potential visual and aesthetic effects associated with the continued operation of the proposed Project. This VIA analysis utilized assessment practices employed by the Bureau of Land Management (BLM) to quantify visual resources and assess effects of the Proposed Project. Furthermore, policies and regulations pertaining to aesthetics and visual resources outlined within the Merced County General Plan and Count Code were reviewed to address assess potential impacts and their level of significance of the proposed Project. Mitigation Measures are recommended to protect viewsheds where visual impacts were determined to be potentially significant.

The report has the following findings with respect to Visual Resources, which address the specific impact statements within the California Environmental Quality Act (CEQA) Guidelines Appendix G Environmental Checklist Form (California Code of Regulations, Title 14, Division 6, Chapter 3, § 15000 – 15387):

a) *Would the Project have a substantial adverse effect on a scenic vista?* (See Section 5.1.1).

The Merced County General Plan notes that scenic vistas within the County generally include views of (and from) the "*Sierra Nevada mountain ranges, and the Los Banos Creek, Merced, San Joaquin, and Bear Creek river corridors*" (Merced County, 2016). The Los Banos Creek/Reservoir located approximately 0.5 to 1.5 miles to the southwest of the Project, across Interstate 5 (I-5), and is the primary scenic vista within the Project vicinity. Photo simulations were prepared to show both active mining operations and post-mining reclamation views at the Sunset and Turner properties. The simulations showed that neither the mining operations nor the subsequent reclamation/revegetation of the Project site would adversely affect views of the surrounding valley from the Los Banos Creek/Reservoir, and would not degrade the regional visual quality. Additionally, the Project would maintain views of the surrounding natural landforms and ridgelines from public viewpoints within the valley.

The BLM's rating system was also utilized to analyze adverse effects on public viewpoints surrounding the Project site. The existing views, active project mining views, and reclaimed views were given individual BLM rating criteria scores at each viewpoint. A potentially significant impact would result if it were determined that the Project could potentially lower the visual quality of an identified sensitive viewpoint by -3 points or more. Table 3 in Section 5.1.1 summarizes the BLM rating criteria scores of the simulated views from all locations (i.e., Locations #1 through Location #7), including those from Canyon Road leading up to Los Banos Creek/Reservoir (i.e., Location #5). As show in Table 3, sensitive viewpoints are not anticipated to significantly change or adversely impacted because of the Project. Conversely, once reclamation and revegetation of the Project site is complete, overall visual quality of the Project site and surrounding areas are expected to improve at most viewpoints compared to the baseline conditions. For these reasons, the Project would not have a substantial adverse effect on scenic vistas surrounding the Project site, and impacts would be less than significant with no mitigation required.

b) Would the Project Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway? (See Section 5.1.2)

The State of California officially designates State Scenic Highways through the "California Scenic Highway Program", managed by the California Department of Transportation (Caltrans). Highways may also be designated as "Candidate" scenic highways, pending official designation. Pursuant to Caltrans's Street and Highway Code, Section 263 et. seq., no candidate or designated State scenic highways exist within the vicinity of the Project site. The closest State scenic highways are segments of I-5 and State Route 152 (SR-152) located approximately 4.2 miles to the northwest of the Sunset property. Due to the large distance between the Project site and these highways, as well as intervening topography, the Project site is not visible from the designated scenic portions of I-5 and SR-152. Therefore, the Project would not substantially damage scenic resources within a State scenic highway, and there would be no impacts with no mitigation required.

c) Would the Project, in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (public views are those that are experiences from publicly accessible vantage points). If the project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality? (See Section 5.1.3)

The BLM's rating criteria was utilized to assess visual impacts resulting from the Project at nearby sensitive viewpoints. As shown in Table 3 in Section 5.1.1, it was determined that there would be no significant visual impacts resulting from the Project at nearby locations. While visual quality may be slightly degraded at certain viewpoints during active mining operations, post-mining revegetation of the disturbed areas via hydroseeding would create a plant cover consistent with the surrounding environment, thus minimizing visual impacts once mining operations are complete.

Zoning and other applicable County regulations governing scenic quality were also considered. Specifically, scenic/visual policies outlined in the Merced County *General Plan* (Merced County, 2016) and Merced County *Code of Ordinances* (Merced County, 2022) were reviewed to determine applicability to the Project (refer to Table 4 and Table 5 in Section 5.1.3 for complete discussion and summary regarding Merced County's policy and regulations governing scenic quality). It was determined that the Project would not conflict with applicable County goals, policies, or ordinances governing scenic quality. Project design features including construction of the perimeter berms, as well as post-mining reclamation and revegetation activities, ensure that the Project is compatible with these applicable County general plan policies and zoning ordinances.

Per the discussions and summaries presented in Table 4 and Table 5 in Section 5.1.3, the Project would not substantially degrade the existing character of the Project site or surrounding areas, would not significantly impact sensitive public viewpoints, or conflict with any applicable policies or plans meant to protect scenic resources. Therefore, impacts are considered less than significant with no mitigation required.

d) Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? (See Section 5.1.4)

Project operations would occur during the daytime hours only (i.e., between 7:00 a.m. to 7:00 p.m.), and would not require outdoor lighting. No new structures, temporary or permanent, that would require electrical lighting are proposed. If utilized, onsite lighting would be limited to portable lights or small lights affixed to the mobile equipment (i.e., dozers, excavators, etc.) for safety purposes. Although not anticipated, temporary lighting within the Project site would be installed in a manner so as to minimize glare. High pressure sodium and/or cut-off fixtures would be used instead of mercery-vapor fixtures for any required nighttime lighting. The lighting would be designed to only illuminate active working areas.

By employing minimal nighttime lighting fixtures and utilizing the proposed lighting and design features (i.e., downcast lights, high pressure sodium, and/or cut-off fixtures, etc.), the Project would have a less than significant impact associated with light and glare with no mitigation required.

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VISUAL IMPACT ANALYSIS

Los Banos Sand and Gravel Quarry Project
Triangle Rock Products, LLC

November 2022

1.0 INTRODUCTION

Sespe Consulting, Inc. ("Sespe") has prepared the following Visual Impact Analysis (VIA) on behalf of Triangle Rock Products dba Triangle Rock Products, LLC ("Triangle"), to identify the potential visual and aesthetic effects associated with the continued operation of the Triangle Rock Products Los Banos Sand and Gravel Quarry (also referred to as the "Los Banos Facility"), located in unincorporated Merced County ("County"), California. Triangle seeks to continue existing operations through augmentation of additional mineral resource reserves by entitling two new properties that adjoin the existing operations, specifically the Turner and Sunset properties (herein referred to as the "Project sites"). Triangle is currently seeking the requisite approval from the County to permit mineral resource recovery at these properties, along with a corresponding revision to the site reclamation plan, which will allow for extraction, handling, and conveyance of the mined materials to the existing processing plant. Following the completion of mining, the Project sites will be reclaimed and revegetated open space, similar to current conditions and adaptable for a variety of post-mining uses in the future. Specifically, this Project would amend Triangle's existing Conditional Use Permit (CUP) 3466 and related Reclamation Plan (Mine ID# 81-24-0009) for the existing Los Banos Facility operations, to include proposed mining and post-mining reclamation at the Turner and Sunset properties. See Figure 1 in Appendix A which shows the Project site(s) and surrounding setting.

This VIA quantifies the potential impacts to aesthetic and visual resources associated with the Project on nearby public viewpoints. Project visual impacts are presented, and quantified utilizing assessment practices employed by the Bureau of Land Management (BLM), and mitigation measures are recommended to protect viewsheds where visual impacts were determined to be potentially significant.

The County is the lead agency for purposes of administering the requirements of the California Environmental Quality Act (CEQA), and for preparing the appropriate CEQA environmental document. Sespe has prepared this VIA to be included as a technical appendix within the County's subsequent CEQA documentation.

2.0 PROJECT DESCRIPTION

2.1 Location

The Project sites (i.e., the Sunset and Turner properties) consist of four parcels, one comprising the Sunset property (APN 083-210-033-000) and three comprising the Turner property (APNs 088-070-079-000, 088-070-086-000, and 088-070-039-000). The Sunset and Turner properties are generally flat, disturbed, open area lands that have historically been subject to various agricultural and livestock operations and related activities. Surrounding land uses include Triangle's existing Los Banos Sand and Gravel operations and open agricultural lands, with some associated residences. The City of Los Banos is located approximately 4 miles to the northeast of the Project site and is reached via Sunset Road and Ortiligata Road. Please see Figure 1 (Appendix A) which shows the regional Project site setting.

2.2 Project Background & Objectives

Triangle currently extracts and processes aggregate materials at the existing Los Banos Sand and Gravel Quarry located immediately east of the Sunset property, and immediately north and west of the Turner property (Figure 1). The existing Los Banos Facility is permitted by the County under the following entitlements: CUP 3466 for mining and reclamation, CUP 3383 for an onsite hot-mix asphalt (HMA) plant, and an approved site-wide Reclamation Plan (Mine ID# 91-24-0009).

The Project would not involve any changes to the existing operations other than allowing for the continued mining of the sand and gravel resources at the adjacent Turner and Sunset properties and subsequent reclamation, which is described in greater detail below. Consistent with Triangle's existing operations, the aggregate material extracted from the Project sites would be transferred via internal haul trucks and scrapers to the existing processing plant located at the Los Banos Facility. Material would then be processed and shipped to delivery locations throughout the region in the same manner as presently occurs. Consistent with existing operations, extracted material would also be used onsite to produce hot-mix asphalt or transferred to a separately owned and operated ready-mix concrete plant. No material processing would occur on the Turner or Sunset properties.

Proposed mining operations at the Sunset and Turner properties would be typical of surface aggregate extraction operations and would be conducted in the same manner as currently occurs at the adjacent Los Banos Facility. Specifically, aggregate material would initially be extracted from the Sunset property in a single pit, followed by placement of process fines (clays, silts and sands) into the previously excavated areas. Subsequent mining at the Turner property would occur in two pits, followed by placement of fines from the processing plant overburden back into the excavated areas.

Consistent with ongoing operations, mining would entail the use of mobile excavators, loaders and transfer trucks to extract and move the materials from extraction basins located at the Turner and Sunset properties. Blasting would not be required. Annual extraction rates and quantities would also not change as a result of the Project. It is estimated that a total of approximately 36.3 million gross tons (inclusive of fines and overburden) of sand and gravel would be extracted from the Turner and Sunset properties over approximately 40 years; however, the life of the reserves will ultimately be dependent on market demand.

Both the Turner and Sunset properties are owned by Triangle and have been subject to historical surface disturbance due to past agricultural uses. The Turner property is approximately 308 acres in size and is located immediately south and east of the existing Los Banos Facility. It is located between the Delta-Mendota Canal to the northeast, and the California Aqueduct to the southwest. The Sunset property is approximately 33 acres in size and is located immediately west of the existing Los Banos Facility just south of Sunset Avenue. Refer to Figure 1 (Appendix A) for an overview map showing the existing Sunset and Turn properties in relation to Triangle's existing operations. Recovery of aggregates at the Turner and Sunset properties is planned to occur at depths generally ranging from approximately 29- to 72-feet below ground surface (bgs) depending on location; however, mining has been designed to remain above groundwater. The final mining depth will ultimately be dependent upon the underlying depth to groundwater, which is monitored by measuring water levels in onsite wells.

Prior to mining, the sites would be cleared, and the topsoil/subsoil and overburden would be removed. Consistent with Triangle's existing procedures at the Los Banos Facility, topsoil/subsoil would be salvaged and contained in perimeter earthen berms with approximate heights of 4.5- to 5.5-feet, except along the northern and northern half of the western boundary along the Sunset property, where the berms will be approximately 7-feet in height. Additionally, a perimeter berm will be constructed along portions of the eastern and southern boundary of the Turner property for topsoil/subsoil storage. During reclamation, topsoil and subsoil within the berms will be used to support revegetation in those Project areas where the vegetative community would be re-established following completion of mining. Overburden materials will be placed into the excavation areas, as well as fines recovered from the aggregates processing plant.

After site preparation (i.e., removal of topsoil/subsoil and overburden), resource recovery operations would commence and generally continue until reaching the respective design pit depth. At this time, Triangle plans to mine the Sunset property first, so that the excavation pit may be used to place excess fines from the Los Banos Facility processing plant following mining. These fines would be slurried via an overland pipe to the Sunset pit after mining there is complete, and continue until the slurry material reaches within approximately 5-feet of the native surface elevation. As mining occurs at the Sunset property, material excavation will initiate at the Turner property and will continue until the resource is depleted. Depending on market demand and product needs, blending may occur using materials from multiple areas, including the Sunset and Turner properties. As discussed above, both Project mining areas would use the same methods and equipment as is presently employed at the existing Los Banos Facility.

After the aggregate reserves are fully exhausted and mining ceases, reclamation of the Project sites would commence in accordance with the approved Los Banos Sand and Gravel Reclamation Plan, which will be amended to include both the Sunset and Turner properties. Project reclamation would follow the same procedures as currently in effect at the Los Banos Facility, and would generally involve regrading, re-soiling and revegetation on the mined lands to open space. The reclaimed end use would remain the same as that already approved for the Los Banos Facility (i.e., open space).

The major components of the proposed Project operations include the following activities at the Sunset and Turner properties. The potential effects related to visual and aesthetic resources of these proposed activities within the Sunset and Turner properties have been considered and evaluated within this VIA:

- Site preparation, including clearing the site, removal and salvaging of topsoil and subsoil;

- As needed, construction of perimeter earthen berms approximately 4.5- to 5.5-foot-high, except at the northern edge and northern half of the western boundary of the Sunset site, where the berm height will be approximately 7-feet high, for topsoil/subsoil salvage and storage;
- Surface mining and material conveyance;
- Placement of overburden and fines in the excavated areas;
- Temporary stockpiling and transfer of recovered material via haul truck to the existing processing facility;
- Operation of mobile and stationary mining equipment;
- Various site improvements for access, safety, and other requirements; and
- Post-mining reclamation and revegetation to open space.

The Project design and methodology is consistent with the current mining operations at the existing Los Banos Facility. The number of onsite employees and the hours of operation (excavation generally occurs between the hours of 7:00 a.m. and 7:00 p.m.) would remain the same. Once the Project commences, existing employees and mobile equipment would simply move to conduct mining on the Turner and Sunset properties.

The Project mine and reclamation site design and slope configurations are consistent with the current mining and reclamation operations at the existing Los Banos Facility. At the Sunset property, mining would take place within a single pit through excavation with conventional mobile equipment. Side wall slopes would be cut at 2:1 (horizontal to vertical). Once mining is complete at the Sunset property, process fines material (clays, silts and fine sands) from the Los Banos processing plant would be placed in the mined pit. Mining at the Turner property would be conducted in the same manner; overburden and fines would be placed in the Turner pit over the course of mining in that area.

Refer to Figure 3 in Appendix A which shows the proposed Project mining and reclamation slope configurations and site design features at both the Sunset and Turner properties.

3.0 EXISTING SETTING

As discussed above, the Project sites are located in unincorporated Merced County, approximately 4 miles southwest of the City of Los Banos, California. This area of California's central valley is dominated by agriculture, with many of the rural communities, such as Los Banos, serving as a local hub to farming and ranching enterprises.

The following sections discuss the existing regulatory and environmental settings applicable to the Project.

3.1 Regulatory Setting & Visual Fundamentals

This section discusses the Project's regulatory setting. Specifically, the Merced County *2030 General Plan* (Merced County, 2016) and the Merced County *Code of Ordinances* (Merced County, 2022) are discussed. Federal visual resource elevation standards from the U.S. Bureau of Land Management (BLM) (Bureau of Land Management, 1984) and applicable State guidance from the California Department of Transportation's (Caltrans) (Caltrans, 2008) are also discussed in this section. Please see Appendix C for additional detail.

3.1.1 Federal Standards

The BLM has developed the Visual Resources Management (VRM) System to objectively rate the quality of visual resources and evaluate changes in scenic quality attributed to a proposed change in land use. This methodology is based on the BLM visual impact assessment procedures provided in the "VRM Manual" Section 8400 (Bureau of Land Management, 1984). The BLM system uses quantitative and qualitative methods to measure potential visual impacts. This method includes defining the Project setting and viewshed, identifying sensitive view receptors for assessment, analyzing the baseline visual quality and character of the identified views, depicting the visual appearance of a project from the identified views, assessing the project's impacts to those views in comparison to their baseline visual quality and character, and proposing methods to mitigate any potentially significant visual impacts identified.

"Visual quality" is a measure of a landscape or a view's visual and aesthetical appeal. While there are a number of standardized methods for rating visual quality, the "Scenic Quality Rating Criteria" method utilized by the BLM is believed to be superior because it allows the various landscape elements that comprise visual quality to be easily quantified and rated, while minimizing issues of ambiguity or subjectivity.

According to this method, visual quality is rated according to the presence and characteristics of seven key components of the landscape. These components include landform, vegetation, water, color, adjacent scenery, scarcity and cultural modifications.

1. The "landform" component of the visual quality rating criteria takes into account the fact that topography becomes more interesting visually as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, or they may be exceedingly artistic and subtle (such as certain badlands, pinnacles, arches, and other extraordinary formations).

2. The “vegetation” component of the rating criteria gives primary consideration to the variety of patterns, forms, and textures created by plant life. Short-lived displays are given consideration when they are known to be recurring or spectacular. Consideration is also given to smaller scale vegetational features that add striking and intriguing detail elements to the landscape (e.g., gnarled or wind-beaten trees, etc.).
3. The “water” component of the rating criteria recognizes that visual quality is largely tied to the presence of water in scenery, as it is that ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score for the water component.
4. The “color” component of the visual quality rating criteria considers the overall color(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.). Key factors that are used when rating the color of scenery are variety, contrast, and harmony.
5. The “adjacent scenery” component of the rating criteria takes into account the degree to which scenery outside the view being rated enhances the overall impression of the scenery under evaluation. The distance of influence for adjacent scenery normally ranges from 0 to 5 miles, depending upon the characteristics of the topography, the vegetation cover, and other such factors. This factor is generally applied to views that would normally rate very low in score, but the influence of the adjacent high visual quality would enhance the visual quality and raise the score.
6. The “scarcity” component of the visual quality rating criteria provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within a region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often, it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery – the scarcity factor can be used to recognize this type of area and give it the added emphasis it should have.
7. The “cultural modifications” component of the visual quality rating criteria takes into account any man-made modifications to the landform, water, vegetation, and/or the addition of man-made structures. Depending on their character, these cultural modifications may detract from the scenery in the form of a negative intrusion, or they may complement and improve the scenic quality of a view.

Per BLM guidelines, in the visual resource inventory process public lands are given an A, B, or C rating based on the apparent scenic quality which is determined using the seven key factors described above. During the rating process, each of these key factors are ranked on a comparative basis with similar features within the physiographic province. Table 1 below displays the point values associated with the seven key factors. Based on this point system, a score of 19 or more receives and A rating, a score between 12 and 18 receives a B rating, and a score of 11 or less receives a C rating.

Table 1 BLM Scenic Quality Inventory & Evaluation Chart

Key Factors	Rating Criteria and Score		
Landform	High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. **Score 5**	Steep canyons, mesas, buttes, cinder cones, and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features which are interesting though not dominant or exceptional. **Score 3**	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. **Score 1**
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. **Score 5**	Some variety of vegetation, but only one or two major types. **Score 3**	Little or no variety or contrast in vegetation. **Score 1**
Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. **Score 5**	Flowing, or still, but not dominant in the landscape. **Score 3**	Absent, or present, but not noticeable. **Score 0**
Color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. **Score 5**	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element. **Score 3**	Subtle color variations, contrast, or interest; generally mute tones. **Score 1**
Influence of Adjacent Scenery	Adjacent scenery greatly enhances visual quality. **Score 5**	Adjacent scenery moderately enhances overall visual quality. **Score 3**	Adjacent scenery has little or no influence on overall visual quality. **Score 0**
Scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. **[1]Score 5+**	Distinctive, though somewhat similar to others within the region. **Score 3**	Interesting within its setting, but fairly common within the region. **Score 1**
Cultural Modifications	Modifications add favorably to visual variety while promoting visual harmony. **Score 2**	Modifications add little or no visual variety to the area and introduce no discordant elements. **Score 0**	Modifications add variety but are very discordant and promote strong disharmony. **Score -4**

Source: Manual H-8410-1 – Visual Resource Inventory (Bureau of Land Management, 1984) (see Appendix C).

1 – A rating of greater than 5+ can be given but must be supported by written justification.

An important premise of the VRM evaluation method is that views with the most variety and most harmonious composition have the greatest scenic value. Another important concept is that man-made features within a landscape do not necessarily detract from the scenic value. In fact, certain man-made features which complement the natural landscape may actually enhance overall visual quality. As such, determining overall visual quality is important to assess the project's effect relative to the "visual character" of the project setting.

Generally speaking, projects that create a high level of contrast to the existing visual character of a project setting are more likely to generate adverse impacts due to visual incompatibility. Conversely, projects that create a low level of contrast to the existing visual character are less likely to generate adverse impacts due to inherent visual compatibility. On this basis, project modifications are quantified and evaluated for impact assessment purposes. By comparing the difference in visual quality ratings from the baseline (i.e., "before" condition) to the post-project (i.e., "after" condition) visual conditions, the severity of project related visual impacts can be quantified. It is important to note that in some cases visual changes caused by the project may actually have a beneficial visual effect and overall enhance scenic quality of an area.

3.1.2 State Standards

The State of California officially designates State scenic highways through the "California Scenic Highway Program," which is managed by Caltrans. A highway may be designated "scenic" depending on how much of the natural landscape can be seen by travelers, the scenic quality of the surrounding landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. Highways may also be identified as "candidate" scenic highways, pending official designation. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et. seq. A list of existing State scenic highways can be found in Street and Highway Code, Section 263 (Caltrans, 2008).

Please note, no candidate or officially designated State scenic highways are located within the immediate vicinity of the Project site. The closest state scenic highways are the portions of Interstate 5 (I-5) extending north from the intersection of State Route 152 (SR-152)/SR-33, and portions of SR-152 extending westward from that same intersection. These intersecting segments of I-5 and SR-152 are located approximately 4.2 miles to the northwest of the Sunset property. These portions of I-5 and SR-152 are both "Officially Designated" state scenic highways. Note that due to the large distance between the Project site and these highways, the Project is not visible from the officially designated portions of I-5 and SR-152. Please see Figure 1 in Appendix A which displays the locations of Caltrans designated State Scenic Highways in relation to the Project site.

3.1.3 Merced County General Plan – Visual Policies & Guidelines

The *2030 Merced County General Plan* (Adopted December 10, 2013; amended July 12, 2016), specifically the Land Use and Community Character Element, and the Natural Resources Element have goals and policies related to conservation of visual resources within County lands (Merced County, 2016). County General Plan visual policies that potentially apply to the Project are listed below. Also see Appendix C for relevant excerpts.

LAND USE ELEMENT

Goal LU-5.E: *Designate adequate land for, and promote development of, industrial uses to meet the present and future needs of County residents for jobs and to maintain economic vitality.*

> ***Policy LU-5.E.3 – Industrial Development Design (RDR):*** *Require that all industrial uses located adjacent to planned non-industrial areas or roads carrying significant non-industrial traffic be designed with landscaping and setbacks.*
>
> ***Policy LU-5.E.4 – Industrial and Business Park Development (RDR):*** *Ensure future industrial and business park development is compatible with surrounding land uses through the use of landscaping, screening, and other buffers.*

NATURAL RESOURCES ELEMENT

Goal NR-3: *Facilitate orderly development and extraction of mineral resources while preserving open space, natural resources, and soil resources and avoiding or mitigating significant adverse impacts.*

> ***Policy NR-3.6 – Buffers between Mining Operations and Adjacent Uses (RDR):*** *Require operators of new mines to provide buffers or physical barriers between the mining operation and any existing nearby incompatible land uses when a significant impact is identified during the development review process. Require surface mining operations in dredge tailing areas along the Merced River corridor to design riparian vegetation buffers consistent with the Merced River Corridor Restoration Plan.*

Goal NR-4: *Protect scenic resources and vistas.*

> ***Policy NR-4.1 – Scenic Resource Preservation (RDR):*** *Promote the preservation of agricultural land, ranch land, and other open space areas as a means of protecting the County's scenic resources.*
>
> ***Policy NR-4.2 – Special Review Process for Structures Adjacent to Scenic Highways (IGC, RDR):*** *Coordinate with Caltrans, during the review of proposed structures and activities located adjacent to State-designated scenic highways, to ensure that scenic vistas and local scenic values are not significantly degraded.*
>
> ***Policy NR-4.3 – Building Design (RDR):*** *Require that siting and design of buildings protect, improve, and enhance the scenic quality of the built and natural environments and take full advantage of scenic resources through site orientation, building setbacks, preservation of viewsheds, height limits, and the use of appropriate construction materials and exterior modulation.*
>
> ***Policy NR-4.4 – New Roads (RDR):*** *Consider the surrounding landscape, topography, and existing scenic values when determining the location and construction of new roads.*
>
> ***Policy NR-4.5 – Light Pollution Reduction (RDR):*** *The County shall develop and implement a lighting ordinance to require good lighting practices, such as the use of specific light fixtures that reduce light pollution, minimize light impacts, and preserve views of the night sky. The ordinance shall contain standards to avoid light trespass, particularly from developed uses, to sensitive wildlife corridors and refuges.*

3.1.4 Merced County – Code of Ordinances

The Merced *County Code*, specifically Title 18 – Zoning Code, contains various policies and standards related to visual/aesthetical resources (Merced County, 2022). The following countywide ordinances potentially apply to visual resources and impacts associated with the Project. As noted above, the Project sites (i.e., Turner and Sunset properties) have a “General Agricultural (A-1)” County zoning designations.

TITLE 18 – ZONING CODE

ARTICLE 3 – REGULATIONS APPLICABLE TO ALL ZONES

Chapter 18.34 – Fences, Walls, and Hedges

Section 18.34.050 – Screening
Where screening is required in this Code or as a condition of approval, a combination of materials shall be used, including solid masonry walls, wood or chain link fences, berms, and landscaping (See also Section 18.36.050(F) General Landscape Standards: Screening).

Chapter 18.36 – Landscaping

Section 18.36.010 – Purpose
The County promotes the value and benefits of landscapes while recognizing the need to use limited water resources as efficiently as possible. In compliance with applicable State standards and guidelines, and to promote the County’s goals and standards regarding sustainable development, this chapter establishes minimum landscape standards for all uses for enhancing the appearance of developments, reducing heat and glare, controlling soil erosion, enhancing on-site stormwater management, conserving water, establishing a buffer and/or screen between residential and non-residential land uses, and ensuring the ongoing maintenance of landscaped areas.

Section 18.36.050 – General Landscape Standards

F. Screening.
   1. *Developments shall provide sufficient screening so that neighboring properties are effectively shielded from any adverse impacts of that development or so that the new developing use shields itself from existing potential impacts from uses already in operation. No screening is required between single-family residences.*
   2. *Tables 3-3 through 3-5, set forth the type of screening methods required between various uses to buffer potential negative impacts.*
   3. *The three basic types of screens that are established by Table 2-3, Residential, Institutional, and Office Adjacent Use Screening Requirements, are as follows (see also Figures 3-6, 3-7, and 3-8):*

Chapter 18.122 – Site Plan and Design Review

18.122.010 – Purpose:

A. Purpose*. The purpose of this chapter is to provide a process for the appropriate review of development projects by the applicable Review Authority specified in Table 6-3 (Review Authority for Site Plan and Design Review).*

B. Intent*. The intent of this chapter is to ensure that all approved site and structural development:*

1. *Promotes the orderly development of the County in compliance with the goals, objectives, and policies of the General Plan, any applicable specific plan, the applicable standards specified in this Zoning Code, and any applicable design guidelines;*
2. *Respects the physical and environmental characteristics of the site;*
3. *Ensures safe and convenient access and circulation for pedestrians and vehicles;*
4. *Exemplifies high-quality design practices;*
5. *Encourages the maintenance of a distinct neighborhood and/or community identity; and*
6. *Minimizes or eliminates negative or undesirable visual impacts. (Ord. 1976 § 2, 2019).*

18.122.040 – Application Filing, Processing, and Review

- ***D. Standards of Review****. When reviewing development plans that are subject to Site Plan and Design Review, the following criteria, in addition to other principles of good design, shall be considered as part of the review:*
  - *1.* ***Compatibility.*** *Compatibility shall be ensured and determined by use of the following criteria:*
    - *a. The arrangement, design, location, and size of all structures should be visually harmonious with the project site and with the surrounding sites and structures.*
    - *b. New development, alteration, and/or enlargement of existing development should enhance and improve the appearance of the project vicinity and be compatible with the character and quality of surrounding development.*
    - *c. The proposed development should protect the development site as well as surrounding properties from noise, odor, vibration, and other impacts that may have an adverse impact.*
    - *d. The height and bulk of proposed structures on the site should be in scale with the height and bulk of structures on surrounding sites and should not visually dominate or call undue attention to the site.*
    - *e. The location and configuration of structures should minimize interference with the privacy and views of occupants of surrounding structures.*
  - *3.* ***Landscape, Lighting, Parking, Signs, and Other Design Details.*** *Landscaping, lighting, parking, signs, and other design details shall be provided in all proposed development and shall be determined by use of the following criteria:*
    - ***a. Equipment and Utilities.***
      - *(2) Mechanical equipment on the site shall be appropriately screened from public view.*
    - ***c. Landscaping.***
      - *(1) Landscaping should be designed in a way as to accent the property. Special effort should be given to colorful, creative, and varied planting designs that use native and native-compatible species that provide visual interest and water efficiency.*
      - *(8) All landscaping shall conform to the provisions of Chapter 18.36 (Landscaping).*
    - ***d. Outdoor Lighting.***
      - *(1) Lighting shall be located so as to avoid glare and to reflect the light away from abutting property and rights-of-way while recognizing the importance of security.*

(3) Pole-mounted lighting should be of an appropriate scale to complement the structure that it serves. Wherever possible, decorative poles and fixtures should be used.

(4) All outdoor lighting shall conform to the provisions of Section 18.40.070 (Outdoor Lighting).

3.2 Environmental Setting

This section describes the existing environment and visual features in and around the Project site, as well as the potentially sensitive public viewpoints of concern that could be adversely impacted by the proposed Project. For this Project, the existing visual setting includes the current state of the Turner and Sunset properties, as well as Triangle's exiting aggregate extraction and processing operations at the Los Banos Facility.

3.2.1 Regional Setting & Roadways

As discussed above, the Sunset and Turner Project sites are located within the County of Merced and are situated about 4 miles southwest of the City of Los Banos, located south of State Route 33 (SR-33), and east of Interstate 5 (I-5) in the San Joaquin Valley. This area of the central valley in California is dominated by agriculture, with many of the rural communities such as Los Banos, serving as a local hub to farming and ranching enterprises.

Lands surrounding the Sunset and Turner properties are either fallow agricultural lands, or presently active growing operations for various row crops. As is typical for this area, various ranch-style residences occupy portions of the agricultural lands surrounding the Project sites, with two homes to the north of the Sunset property and one to the west. Other residences are located approximately 0.25 miles to the east/southeast of the southern edge of the Turner property as well. Water conveyance infrastructure, notably portions of the Delta-Mendota Canal and the Central Valley Aqueduct, are located within the Project area. There are no hiking trails, parks, or other public recreation areas located within the vicinity of the Project.

The existing topography surrounding the Project is generally flat, with no raised topographic features of note. The topography to the southwest of the Project site across I-5 is slightly elevated and comprised of low-lying foothills along Canyon Road leading west to the Los Banos Creek Reservoir. The Project site is most visible when travelling on adjacent public roadways, specifically Sunset Drive along the northern boundary of the Sunset property, and S. Creek Road along the eastern boundary of the Turner property. Please see Figure 1 (Appendix A) which displays the regional setting of the Project.

3.2.2 Existing Project Sites

The approximate 20-acre Sunset property is flat, disturbed, rectangular shaped site, bounded by agricultural lands and several private residences to the north and west, agricultural land to the south, and Triangle's existing Los Banos Facility immediately to the east. Sunset Avenue runs east to west along the north boundary of the site. Currently, the Sunset property is vacant, and lacks development or structures. The property has an "Agricultural (A)" County General Plan land use designation and a "General Agriculture (A-1)" Zoning classification.

The approximate 308-acre Turner property is mostly vacant, disturbed land that borders the southern and southeast boundary of the existing Los Banos Facility. A portion of the property has historically been leased for agricultural related uses. As shown on Figure 2 (Appendix A), there is an existing agricultural-related structure and related storage bins, stockpiles, miscellaneous equipment, etc. within the northwest portion of the Turner property. These existing agricultural structures would be removed prior to commencement of mining operations. At the northeast corner, the Delta-Mendota canal directly borders the property. The Turner property also has an "Agricultural (A)" General Plan land use designation, and a "General Agriculture (A-1)" Zoning classification.

3.2.3 Local Viewpoints & Scenic Vistas

To assess the state of visual resources within the Project vicinity, and to quantify the visual and aesthetical impacts resulting from the proposed Project, numerous viewsheds were mapped and photographed in the field by Sespe staff on March 8th and 9th 2022. On those days, the atmospheric conditions were clear, calm, and sunny, and therefore represent conditions under which the highest level of potential Project visibility would occur. The chosen viewsheds were established by determining the areas surrounding the Sunset and Turner properties that are most utilized/travelled by the public, and would have a potentially unobstructed or partial line-of-sight view of the proposed Project mining and reclamation areas. As described previously, the areas surrounding the Project site are mostly flat. While there are few existing buildings, structures or topography, existing vegetation and developed agricultural orchards surround the Project sites, and generally obscures views of Project site from more distant viewpoints. For this reason, the Project viewshed is generally limited to the publicly accessible areas located adjacent to the perimeter of the Project site along publicly accessible roadways within the valley.

Based on the CEQA Guidelines Checklist (see Section 4.0) and applicable Merced County policies (see Section 3.1.3 and Section 3.1.4 respectively), the primary types of sensitive viewpoints selected for further assessment included scenic vistas, scenic highways, nearby residences, and public parks/recreational facilities that are located within the Project viewshed. Table 2 below outlines the evaluated viewpoints. These locations were selected as they represent areas considered to have potentially high Project visibility, both surrounding the Project site and along nearby routes of travel. Additionally, visual impacts at these closest public viewpoints conservatively account for potentially affected views at locations farther from the Project site. Please see Figure 2 in Appendix A which displays the location of these public viewpoints in relation to the Project site.

Table 2 Summary of Potentially Sensitive Viewpoints

Map Reference	Location	Approx. Distance from Project Site	Description
#1	Northwest corner of Sunset property / Sunset Drive	Adjacent to the Project site	This viewpoint is located adjacent to the northwest corner of the Sunset property, looking east toward the Project site along Sunset Drive.
#2	Northeast corner of Sunset property / Sunset Drive	Adjacent to the Project site	This viewpoint is located adjacent to the northeast corner of the Sunset property, looking west toward the Project site along Sunset Drive.

Map Reference	Location	Approx. Distance from Project Site	Description
#3	Northeast corner of Turner property / S. Creek Road	Adjacent to the Project site	This viewpoint is located adjacent to the northeast corner of the Turner property, looking south toward the Project site from the Delta-Mendota Canal along S. Creek Road.
#4	South/southwest of Turner property / Canyon Road	Adjacent to the Project site	This viewpoint is located adjacent to the south/southwest corner of the Turner property, looking northeast toward the Project site from Canyon Road.
#5	South of Turner property / Canyon Road	0.5 miles (approx.) to the south	This viewpoint is located approximately 0.5 miles south of the Turner property, across I-5 along Canyon Road, looking northeast toward the Project site from the low-lying foothills leading toward the Los Banos Creek Reservoir.
#6	East of Turner property / S. Creek Road	Adjacent to the Project site	This viewpoint is located adjacent to the eastern boundary of the Turner property, looking toward the Project site from S. Creek Road.
#7	Southeast of Turner property / S. Creek Road	0.8 miles (approx.) to the southeast	This viewpoint is located approximately 0.8 miles southeast of the Turner property, along S. Creek Road, looking northwest toward the Project site from the Central Valley Aqueduct along S. Creek Road.

See Figure 2 which displays the locations of the viewpoints described above.

4.0 SIGNIFICANCE THRESHOLDS

The CEQA Guidelines include a set of criteria that should be evaluated for all applicable projects. These criteria are found in the Environmental Checklist in Appendix G of the CEQA Guidelines (CCR, Title 14, Division 6, Chapter 3, § 15000 – 15387). Section I of the Environmental Checklist outlines criteria for aesthetical analysis, and these specific criteria form the basis of the significance thresholds utilized to determine impacts visual and aesthetic resources resulting from the Project. Specifically, the CEQA Guidelines indicate that a Project will have a significant effect if any of the following are true:

a) *Have a substantial adverse effect on a scenic vista*?

b) *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

c) *In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

d) *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

The Project's visual impacts are assessed on the basis of these specific criteria within Section 5.0 of this VIA.

4.1 Rating Visual Quality

As described in Section 3.1.1, the BLM developed the VRM System to objectively rate the quality of visual resources and evaluating changes in scenic quality attributed to a proposed change in land use, in this case the proposed mining operations and subsequent reclamation within the Sunset and Turner properties. As described previously, the BLM system uses quantitative and qualitative methods to measure potential visual impacts. According to this method, visual quality is rated according to the presence and characteristics of seven key components of the landscape. Specifically, these components include landform, vegetation, water, color, adjacent scenery, scarcity and cultural modifications.

Per BLM guidelines, in the visual resource inventory process lands are given an A, B, or C rating based on the apparent scenic quality which is determined using the seven key factors described above. During the rating process, each of these key factors are ranked on a comparative basis with similar features within the physiographic province. See Table 1 which displayed the point values associated with the seven key factors. Based on this point system, a score of 19 or more receives and A rating, a score between 12 and 18 receives a B rating, and a score of 11 or less receives a C rating.

By comparing the difference in visual quality ratings from the baseline ("before" condition) to post-project ("after" condition) visual conditions, the severity of project related visual impacts can be quantified. However, in some cases, visual changes caused by projects may actually have a beneficial visual effect and may enhance scenic quality. Although the Project has no Federal nexus, use of the VRM is considered appropriate as it allows visual resources and impacts to be subjectively quantified. In the absence of adopted regulatory thresholds for evaluating the significance of project visual impacts, the following BLM designations are used, herein, to rank the significance of project impacts:

- **Potentially Significant Impact:** Any impact that could potentially lower the visual quality of an identified sensitive viewpoint by 3 points, or more, and for which no feasible or effective mitigation can be identified.
- **Less Than Significant Impact with Mitigation Incorporated:** Any impact that could potentially lower the visual quality of an identified sensitive viewpoint by 3 points or more but can be reduced to less than 3 points with mitigation incorporated. Therefore, specific mitigation measures are provided to reduce the impact to a less than significant level.
- **Less Than Significant Impact:** Any impact that could potentially lower the visual quality of an identified sensitive viewpoint by 2 points or less. In visual impact analysis, a less than significant impact usually occurs when a project's visual modifications can be seen but do not dominate, contrast with, or strongly degrade a sensitive viewpoint.
- **No Impact:** The project would not have an impact from an identified sensitive viewpoint. In visual impact analysis, there is no impact if the project's potential visual modifications cannot be seen from an identified sensitive viewpoint.

The BLM's rating criteria will be utilized to rate visual impacts resulting from the proposed Project at the seven specific viewpoints listed in Table 2. Specifically, the BLM's standards will be utilized to address CEQA Checklist items *a)* and *c)* below. Please see Section 5.1.1 and Section 5.1.3 below for more details.

5.0 PROJECT LEVEL IMPACTS & MITIGATION MEASURES

5.1 Impact Assessment

5.1.1 Substantial Adverse Effect on a Scenic Vista

Impact Statement

Impact AESTHETICS-1: *Would the Project have a substantial adverse effect on a scenic vista?* **(Appendix G Threshold Criteria (a))**

Impact Analysis

The Merced County *2030 General Plan* (Merced County, 2016), specifically the Natural Resources Element, notes that scenic vistas within the County generally include views of (and from) the "*Sierra Nevada mountain ranges, and the Los Banos Creek, Merced, San Joaquin, and Bear Creek river corridors*" (Merced County, 2016). Therefore, the primary scenic vistas within the Project vicinity would be views from the Los Banos Creek/Reservoir located approximately 0.5 to 1.5 miles away to the southwest, across I-5. Due to viewpoints from this location sitting at a slightly higher elevation compared to the flat topography surrounding the Sunset and Turner properties within the valley below, the Project could be potentially visible from the Los Banos Creek/Reservoir.

Note that the Merced *County Code* (Merced County, 2022) does not designate any specific scenic vistas within the Project vicinity.

To quantify the Project's potential visual effects at the seven viewpoint locations described in Table 2, photos simulations were prepared showing of the Turner and Sunset properties during both active mining operations as well as post-mining reclamation. Of seven selected viewpoints, only Location #5 is of/from a scenic vista as identified in the Merced County General Plan. As shown in the simulations, neither the mining operations nor the subsequent reclamation/revegetation of the Project site would adversely affect views of the surrounding valley from Los Banos Creek/Reservoir. Due to the large distance between viewpoints within the Los Banos Creek/Reservoir and the closest area of new disturbance (i.e., southern portion of the Turner property), development of the Project would not degrade the regional visual quality. Additionally, the Project would not require the construction of large structures or topographic features that would extend above the existing native grade, and therefore the Project site would also not obstruct views of other surrounding scenic resources. The Project will maintain views of the surrounding natural landforms and ridgelines from other public viewpoints within the valley and is therefore not expected to impede scenic views of Los Banos Creek/Reservoir.

In addition to scenic views from the Los Banos Creek/Reservoir described above, the BLM's rating system was also utilized to address CEQA criterion *a)* for the remainder of the viewpoints. Specifically, the BLM's VRM rating system was used to quantify visual impacts resulting from the proposed Project at the seven specific viewpoints listed in Table 2. Please see the exhibits/visual simulations presented in Appendix B, which compare the existing (i.e., baseline) Project site views to the simulated interim mining conditions as well as the simulated reclaimed post-Project views. The existing views, active project mining views, and reclaimed views were given individual BLM rating criteria scores to determine the significance of visual impacts at each location. Table 3 below summarizes the relevant BLM ratings criteria scores determined at each location. As described in Section 4.1, a potentially significant impact would result if it is determined that the Project could potentially lower the visual quality of an identified sensitive viewpoint by -3 points or more.

Table 3 BLM Visual Project Impacts at Nearby Viewpoints

Location #	Existing View Rating	Project Mining View Rating	Project Reclamation View Rating	Highest Ratings Change due to Project	Significant? [1]
#1	5	3	7	-2	Less Than Significant Impact
#2	8	6	9	-2	Less Than Significant Impact
#3	5	4	6	-1	Less Than Significant Impact
#4	6	4	5	-2	Less Than Significant Impact
#5	9	8	10	-1	Less Than Significant Impact
#6	6	4	5	-2	Less Than Significant Impact
#7	5	5	5	0	No Impact

See Figure 2 (Appendix A) which displays the location of each viewpoint in relation to the Project site.

1 – A potentially significant impact would result if it is determined that the Project could potentially lower the visual quality of an identified sensitive viewpoint by -3 points or more (see Section 4.1).

Referring to the photo simulations in Appendix B and the BLM ratings criteria scores summarized in Table 3 above, simulated views from all locations (i.e., Locations #1 through #7), including those from Canyon Road leading up to Los Banos Creek/Reservoir (i.e., Location #5), are not anticipated to significantly change or be adversely impacted as a result of the Project. Conversely, once reclamation and revegetation of the Project site is complete, the overall visual quality of the Project site and surrounding areas are expected to improve at most viewpoints compared to the baseline conditions. As part of reclamation, both the Sunset and Turner properties, including the remaining stockpiles and excavation pits presently approved, would be revegetated via hydroseeding (or other approved revegetation method) to restore the native plant communities and to recreate a natural plant cover that is consistent with the surrounding environment. Additionally, while the excavation pits would be visible from certain public viewpoints during active mining at the Sunset and Turner properties, aggregate mining and processing has been occurring in the area for decades, and therefore views of the exposed surfaces and excavation equipment would not be inconsistent with the existing character of the area.

As shown in Table 3 above, using the BLM's rating criteria, predicted visual impacts resulting from the Project at nearby viewpoints are expected to not significantly change or be adversely impacted through implementation of the proposed Project, and impacts are therefore considered less than significant at all locations analyzed. For these reasons, the Project would not have a substantial adverse effect on scenic vistas surrounding the Project site, and impacts would be **less than significant** with **no mitigation required**.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

5.1.2 Substantial Damage Scenic Resources within a Scenic Highway

Impact Statement

Impact AESTHETICS-2: *Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?* **(Appendix G Threshold Criteria (b))**

Impact Analysis

As described in Section 3.1.2, there are no candidate or designated State scenic highways within the immediate vicinity of the Project site. Refer to Figure 1 in Appendix A which displays the locations of Merced County state scenic highways in relation to the Project site. The closest state scenic highways are portions of Interstate 5 (I-5) extending north from the intersection of State Route 152 (SR-152), and portions of SR-152 extending westward from the same intersection with I-5. Both of these "Officially Designated" state scenic highway segments are located approximately 4.2 miles to the northwest of the Sunset property. Due to the large distance between the Project site and these highways, as well as intervening topography, the Project site is not visible from the designated scenic portions of I-5 and SR-

152. Therefore, the Project will not substantially damage scenic resources within a State scenic highway, and there would be **no impact** with **no mitigation required**.

Level of Significance Before Mitigation

No impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

5.1.3 Substantially Degrade the Existing Visual Character/Quality of the Site/Surroundings

Impact Statement

Impact AESTHETICS-3: *Would the project, in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?* **(Appendix G Threshold Criteria (c))**

Impact Analysis

As described in Section 5.1.1, predicted visual impacts resulting from the Project at nearby sensitive public viewpoints were assessed using the BLM’s rating criteria. As shown in Table 3, there would be no significant visual impacts resulting from the Project at nearby locations. While visual quality may be minimally degraded at certain public viewpoints during active mining, ultimately visual quality at the viewpoints assessed (i.e., Locations #1 through #7) is expected to be improved once mining is completed and the sites are reclaimed. This is due to proposed revegetation via hydroseeding, which would restore the sites to a condition consistent with disturbed fallow agricultural fields/weedy fields, similar to what is existing onsite currently. Please refer to the photo simulations in Appendix B for additional detail.

Although the Project site is not located within an urbanized area of Merced County, nonetheless zoning and other applicable County regulations governing scenic quality were considered. Specifically, scenic/visual policies outlined in the Merced County *General Plan* (Merced County, 2016) and Merced County *Code of Ordinances* (Merced County, 2022) were reviewed to determine applicability to the Project. A summary of the Project’s consistency with the applicable County policies is presented below in Table 4 and Table 5 below. Non-applicable policies, specifically those that are considered to be the sole domain of the County for implementation or those that, by virtue of the Project characteristics and location, do not relate to the policy were excluded from this discussion. Please see Section 3.1.3 and 3.1.4 for a more comprehensive list of County policies related to visual resources.

Table 4 Merced County – General Plan

Policy	Consistency Analysis
LAND USE ELEMENT	
Goal LU-5.B: Preserve and enhance the design, heritage, historic character, and quality of life of Urban Communities in Merced County.	
Goal LU-5.E: Designate adequate land for, and promote development of, industrial uses to meet the present and future needs of County residents for jobs and to maintain economic vitality.	
Policy LU-5.E.3 – Industrial Development Design (RDR): Require that all industrial uses located adjacent to planned non-industrial areas or roads carrying significant non-industrial traffic be designed with landscaping and setbacks.	See response above. Earthen perimeter berms (ranging from 4.5/5.5- to 7-feet in height) will be constructed in areas adjacent to nearby residences and traveled roadways to sufficiently screen views of active mining operations from the public. These berms will provide a visual buffer along adjacent non-industrial areas and/or roads carrying non-industrial traffic. Additionally, both the berms and industrial operations within the Sunset and Turner properties will adhere to Merced County's setback requirements as outlined in the County Municipal Code. For these reasons, the Project is consistent with this policy.
Policy LU-5.E.4 – Industrial and Business Park Development (RDR): Ensure future industrial and business park development is compatible with surrounding land uses through the use of landscaping, screening, and other buffers.	See responses above. The Project site is surrounded by either fallow agricultural lands, or presently active growing operations for various crops. To minimize visual impacts to these surrounding areas during active mining, earthen berms will be constructed to create a visual buffer. Additionally, once mining is complete, the Project's reclamation and revegetation activities would return the disturbed mining site to a condition similar to the surrounding natural environment. Hydroseeding would also be used to reestablish natural plant communities. As such, the project is consistent with this policy.
Goal NR-3: Facilitate orderly development and extraction of mineral resources while preserving open space, natural resources, and soil resources and avoiding or mitigating significant adverse impacts.	
Policy NR-3.6 – Buffers between Mining Operations and Adjacent Uses (RDR): Require operators of new mines to provide buffers or physical barriers between the mining operation and any existing nearby incompatible land uses when a significant impact is identified during the development review process. Require surface mining operations in dredge tailing areas along the Merced River corridor to design riparian vegetation buffers consistent with the Merced River Corridor Restoration Plan.	See responses above. The Project has been designed to be screened from nearby public viewpoints/incompatible land uses through the use of perimeter earthen berms. The Project site is not within the Merced River corridor, or subject to the Merced River Corridor Restoration Plan. Through use of perimeter berms to provide buffering/physical barriers, the Project is consistent with this policy.
Goal NR-4: Protect scenic resources and vistas.	

Policy	Consistency Analysis
Policy NR-4.1 – Scenic Resource Preservation (RDR): Promote the preservation of agricultural land, ranch land, and other open space areas as a means of protecting the County's scenic resources.	The existing County zoning designation for the Sunset and Turner properties is Agricultural (A-1). While both sites have historically been used for agricultural purposes, currently both sites are fallow. While mining in these areas would temporarily preclude their use for agricultural purposes, as detailed in the reclamation plan, the reclaimed end use for the mined lands will be revegetated open space. Additionally, existing topsoil/subsoil will be preserved within the perimeter earthen berms, and spread throughout the sites as part of reclamation. Once the sites are reclaimed to revegetated open space, the property could be readapted for various agricultural purposes at some point in the future. As such, the Project complies with this policy.
Policy NR-4.2 – Special Review Process for Structures Adjacent to Scenic Highways (IGC, RDR): Coordinate with Caltrans, during the review of proposed structures and activities located adjacent to State-designated scenic highways, to ensure that scenic vistas and local scenic values are not significantly degraded.	See Section 5.1.2 above. The Project site is not nearby an officially designate or eligible State scenic highway, nor would the Project site be visible from any to State-designated scenic highways within the County. Therefore, the Project is consistent with this policy.
Policy NR-4.3 – Building Design (RDR): Require that siting and design of buildings protect, improve, and enhance the scenic quality of the built and natural environments and take full advantage of scenic resources through site orientation, building setbacks, preservation of viewsheds, height limits, and the use of appropriate construction materials and exterior modulation.	Other than the perimeter berms, the proposed Project does not involve the construction of any structures or buildings. The perimeter berms have been designed to adhere to applicable County height and setback requirements. As such, the Project is consistent with this policy.
Policy NR-4.4 – New Roads (RDR): Consider the surrounding landscape, topography, and existing scenic values when determining the location and construction of new roads.	The Project would not require the construction of any new roads. Internal haul roads would be sufficiently screened from public view through the use of perimeter berms. Therefore, the Project is consistent with this policy.
Policy NR-4.5 – Light Pollution Reduction (RDR): The County shall develop and implement a lighting ordinance to require good lighting practices, such as the use of specific light fixtures that reduce light pollution, minimize light impacts, and preserve views of the night sky. The ordinance shall contain standards to avoid light trespass, particularly from developed uses, to sensitive wildlife corridors and refuges.	See Section 5.1.4 below for additional detail. Project operations would occur during daytime hours only (i.e., 7:00 a.m. – 7:00 p.m.), and therefore permanent nighttime lighting fixtures would not be required. If onsite lighting is required, the Project will utilize high pressure sodium and/or cut-off fixtures instead of mercury vapor fixtures, and the lighting would be designed to confine illumination to the Project site and/or to areas that do not include light-sensitive uses. Therefore, the project is consistent with this policy.

Table 5 Merced County – Code of Ordinances

Policy	Consistency Analysis
TITLE 18 – ZONING CODE	
ARTICLE 3 – REGULATIONS APPLICABLE TO ALL ZONES	
Chapter 18.34 – Fences, Walls, and Hedges	
Section 18.34.050 – Screening: Where screening is required in this Code or as a condition of approval, a combination of materials shall be used, including solid masonry walls, wood or chain link fences, berms, and landscaping (See also Section 18.36.050(F) General Landscape Standards: Screening).	The Project has been designed to be screened from nearby public areas to minimize visual impacts. Specifically, earthen perimeter berms (ranging from 4.5/5.5- to 7-feet in height) will be constructed in areas adjacent to nearby residences and traveled roadways to sufficiently screen views of active mining operations from the public. The use of earthen berms is an acceptable screening method and consistent with the County Code of Ordinances. Therefore, the Project is consistent with this policy.
Chapter 18.36 – Landscaping	
Section 18.36.050 – General Landscape Standards **F. Screening.** 1. Developments shall provide sufficient screening so that neighboring properties are effectively shielded from any adverse impacts of that development or so that the new developing use shields itself from existing potential impacts from uses already in operation. No screening is required between single-family residences.	See response above. The Project has been designed to minimize impacts to neighboring properties. Specifically, earthen perimeter berms (ranging from 4.5/5.5- to 7-feet in height) will be constructed in areas adjacent to nearby residences and traveled roadways to sufficiently screen views of active mining operations from the public. These berms will provide a visual buffer and screen views of active mining from nearby residences. Therefore, the Project is consistent with this policy.
Chapter 18.122 – Site Plan and Design Review	
Section 18.122.010 – Purpose **A. Purpose.** The purpose of this chapter is to provide a process for the appropriate review of development projects by the applicable Review Authority specified in Table 6-3 (Review Authority for Site Plan and Design Review).	Section of 18.122.010 of the County Code of Ordinances contains various provisions related to site design, screening, landscaping, lighting, etc. As discussed in detailed above, the Sunset and Turner sites have been designed to comply with applicable provisions of the County Code, and to maintain the visual quality of the Project area. The perimeter berms would sufficiently screen views of active mining operations from nearby residences and roadways. Permanent nighttime lighting would not be required, and any temporary onsite lighting would be designed to not impact neighboring properties or create glare. Lastly, following mining, both properties would be fully reclaimed and revegetated to open space consistent with the surrounding visual character. For these reasons, the Project is consistent with the County's site design requirements outlined in the Code of Ordinances.

As outlined in Table 4 and Table 5 above, the Project would not conflict with applicable County goals, polices or ordinances governing scenic quality. Project design features including construction of the perimeter screening berms, as well as the post-mining reclamation and revegetation activities outlined within the Reclamation Plan Amendment, such as removal of remaining equipment structures, revegetation of the site using native species for use as open space/wildlife habitat, and stabilization of remaining slopes, will sufficiently protect existing visual resources and ensure the Project is compatible with applicable County general plan policies and zoning ordinances.

Furthermore, as described in Section 5.1.1 above, predicted visual impacts resulting from the Project at nearby sensitive public viewpoints were assessed using the BLM's rating criteria. As shown in Table 3, there would be no significant visual impacts resulting from the Project at nearby locations. Conversely, visual quality at the viewpoints assessed (i.e., Locations #1 through #7) are expected to be improved through implementation of the proposed Project. This is due to proposed revegetation via hydroseeding, which would restore the sites to a condition consistent with disturbed fallow agricultural fields, similar to what existing onsite and within the surrounding environment today. Please refer to the photo simulations in Appendix B for additional detail.

Per the discussions and summaries presented in Table 4 and Table 5 above, the Project would not substantially degrade the existing visual character of the Project site or surrounding areas, would not significantly impact sensitive public viewpoints, or conflict with any applicable policies or plans meant to protect scenic resources. Therefore, impacts are considered **less than significant** with **no mitigation required**.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

5.1.4 Create New Sources of Light or Glares that would Affect Views

Impact Statement

Impact AE-4: *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?* **(Appendix G Threshold Criteria (d))**

Impact Analysis

The issue of light and glare is typically associated with excessively bright nighttime lighting that crosses over property lines (aka "light trespass") and illuminates off-site yards or bedroom windows. It is also associated with the condition that occurs when excessive nighttime lighting creates a "skyglow" effect.

As discussed above, Project operations would continue to occur during the daytime hours only (i.e., between 7:00 a.m. to 7:00 p.m.), and therefore would not require outdoor lighting. Additionally, no new structures, temporary or permanent, that would require electrical lighting are proposed as part of the Project. If utilized, nighttime lighting would be limited to portable lights or small lights affixed to the mobile equipment (i.e., dozers, excavators, etc.) for safety purposes. Additionally, although not anticipated, temporary nighttime lighting for safety or security may also be required. If installed, any temporary lighting within the Project site would be installed in a manner so as to minimize glare. The lights would comply with all applicable County standards and industry practices. High pressure sodium and/or cut-off fixtures (or equivalent International Darksky Association [IDA]-approved fixtures) would be used instead of mercery-vapor fixtures for any required nighttime lighting. The lighting would also be designed to confine illumination to the active working areas only.

By employing minimal nighttime lighting fixtures and utilizing the proposed lighting and design features (i.e., downcast lights, high pressure sodium and/or cut-off fixtures, etc.), the Project would have a **less than significant** impact associated with light and glare with **no mitigation required**.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

6.0 FINDINGS

This Visual Impact Assessment (VIA) finds that:

- Project visual impacts without mitigation are less than significant at nearby public viewpoints analyzed; and
- The Project will result in either less than significant impacts, or no impacts at nearby viewpoints.

7.0 REFERENCES

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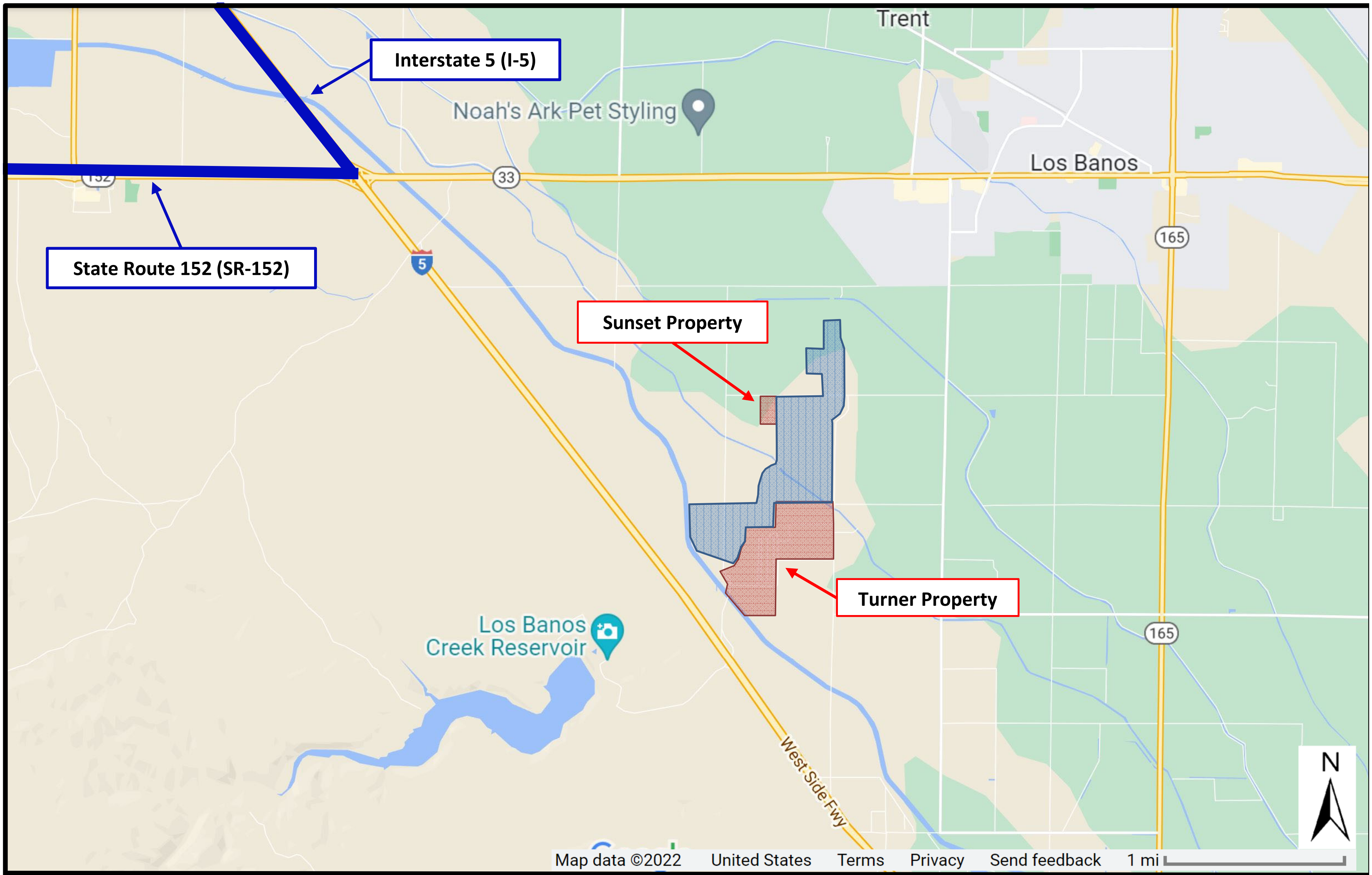
APPENDIX A

Figures



Source: Google Earth (2022)

▨ Existing Los Banos Quarry Boundary (approx.)

▨ Proposed Project Boundaries (Sunset & Turner Properties) (approx.)

▬ State Scenic Highway(s) - Officially Designated (I-5 & SR-152)

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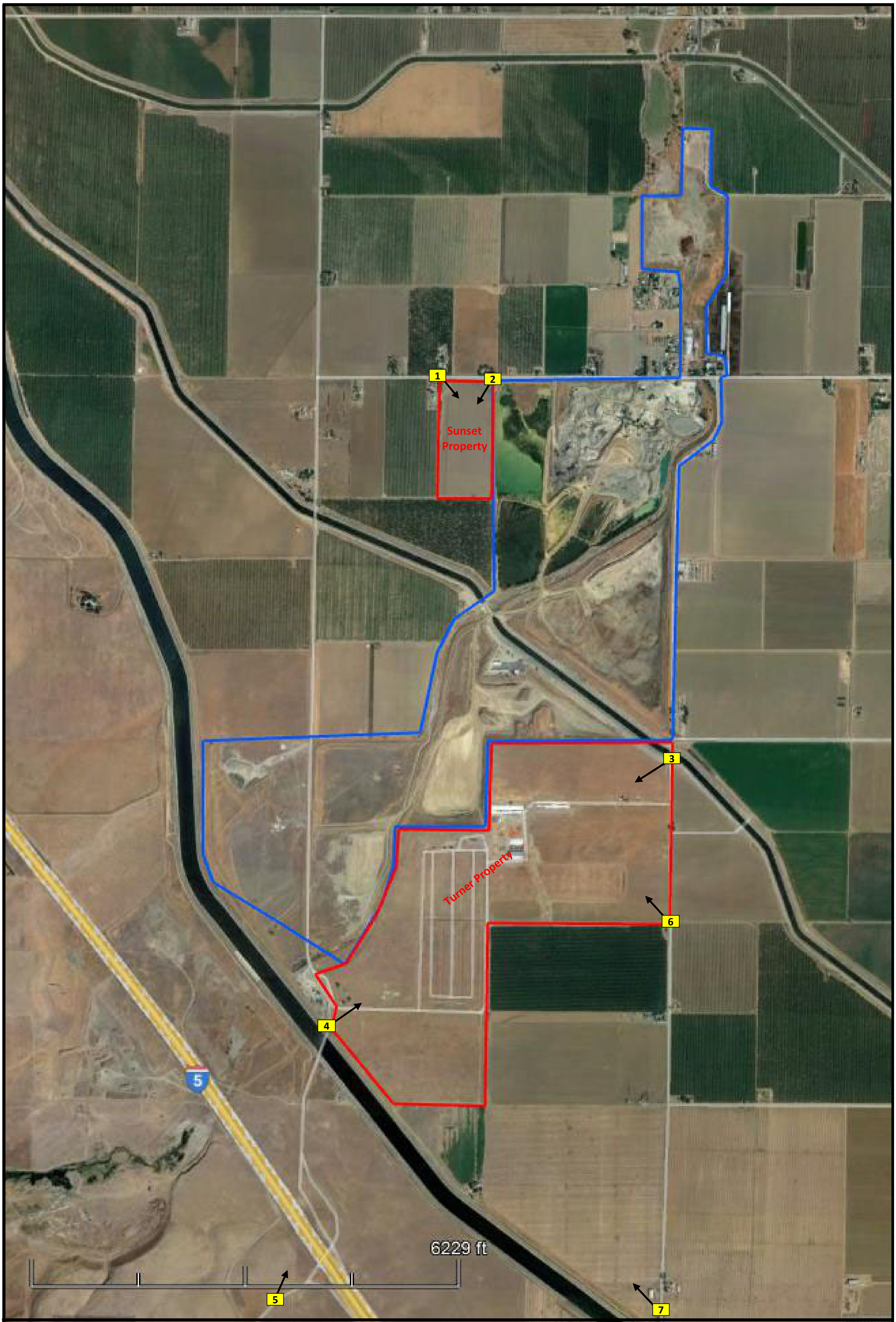
FIGURE **1**	**REGIONAL LOCATION MAP** Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	See Above	DRAWN BY:	MNL



Source: Google Earth (2022)

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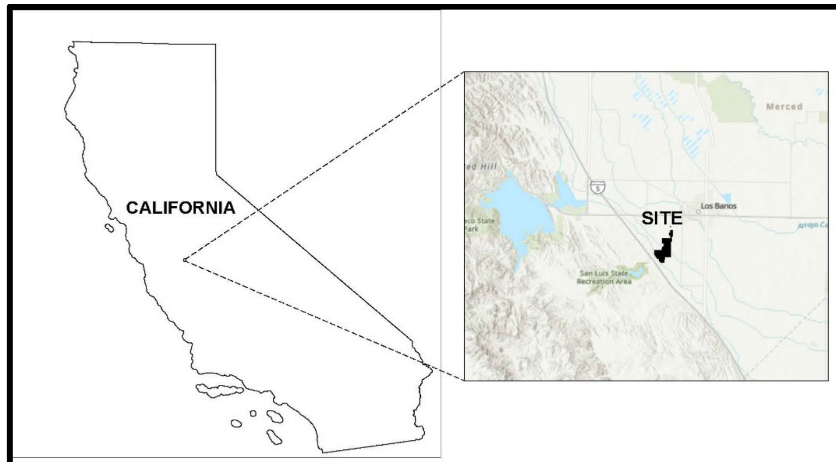
🟦 Existing Los Banos Facility Boundary (approx.)
🟥 Proposed Project (Sunset & Turner Properties) Boundaries (approx.)
🟨 Baseline Photo/Simulation Locations

FIGURE

2

LOS BANOS - PROJECT VIEWPOINTS
Triangle Rock Products, LLC
Los Banos Sand and Gravel Quarry
Merced County, California

PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	See Above	DRAWN BY:	GPS



INDEX MAP

NOT TO SCALE

SHEET INDEX

FIGURE 1:	SITE OVERVIEW - EXISTING CONDITIONS
FIGURE 2:	**MINING PLAN**
FIGURE 3:	RECLAMATION PLAN
FIGURE 4:	CROSS SECTIONS

TRIANGLE ROCK PRODUCTS

LOS BANOS SAND AND GRAVEL QUARRY

CA MINE ID # 91-24-0009

PROPOSED USE:	EXISTING, PERMITTED AGGREGATE MINE, AGGREGATE PROCESSING FACILITIES, AND HOT MIX ASPHALT PLANT
MINERAL COMMODITY:	SAND AND GRAVEL
APPLICANT / OPERATOR:	VULCAN MATERIALS COMPANY - WESTERN DIVISION 500 N. BRAND AVENUE, SUITE 500 GLENDALE, CALIFORNIA 91203 (931) 768-2641
PLAN DESIGN:	SESPE CONSULTING, INC. 374 POLI STREET, SUITE 200 VENTURA, CALIFORNIA 93001 (805) 275-1515
LEAD AGENCY:	COUNTY OF MERCED PLANNING DIVISION 2222 M STREET MERCED, CALIFORNIA 95340 (209) 385-7654

LEGEND:

— · —	PROJECT / RECLAMATION PLAN BOUNDARY
130	EXISTING TOPOGRAPHY
130	EXISTING QUARRY MINING CONTOURS
130	SUNSET/TURNER MINING CONTOURS
🟩	NEW TOPSOIL/SUBSOIL BERMS
—	MINING SETBACK

MINING NOTES

1. THESE DRAWINGS DO NOT INCLUDE ANY PROPOSED CHANGES TO THE EXISTING LOS BANOS SAND AND GRAVEL QUARRY MINING OR PROCESSING OPERATIONS, OTHER THAN INCLUDING THE SUNSET AND TURNER PROPERTIES FOR EVENTUAL MATERIAL EXTRACTION AND FINES PLACEMENT.
2. THE MINING CONTOURS SHOWN WITHIN THE EXISTING LOS BANOS QUARRY PERMIT AREA WERE DIGITIZED FROM THE APPROVED RECLAMATION PLAN DRAWINGS (PROPOSED EXCAVATION PLAN, LOS BANOS GRAVEL COMPANY, DEEM/SHININGTREE, 1989). MINING CONTOURS WERE ADJUSTED AS NECESSARY TO TIE TO EXISTING TOPOGRAPHY AND AVOID NON-PERMITTED MINING AREAS, SUCH AS ROAD RIGHT-OF-WAYS AND THE LOS BANOS CREEK CHANNEL.
3. MINING MAY BE CONDUCTED IN MULTIPLE AREAS THROUGHOUT THE SITE AT ONE TIME TO ALLOW THE OPERATOR TO BLEND MATERIALS FROM MULTIPLE AREAS TO MEET PRODUCT SPECIFICATIONS. THEREFORE, MINING IN THE VARIOUS EXTRACTION AREAS THROUGHOUT THE SITE IS CONSIDERED A SINGLE PHASE.
4. TOPSOIL AND SUBSOIL WILL BE STORED IN 4½- TO 5½-FOOT-HIGH PERIMETER BERMS ALONG CREEK ROAD, ALAVARADO TRAIL, AND THE SOUTHERNMOST BOUNDARY OF THE TURNER PROPERTY. TOPSOIL AND SUBSOIL WILL BE STORED IN 7-FOOT-HIGH PERIMETER BERMS ALONG THE NORTHERN AND WESTERN SIDES OF THE SUNSET PIT.
5. MINING SETBACKS IN THE SUNSET AND TURNER EXPANSION AREAS WILL BE 20 FEET FROM THE EXTERIOR PROPERTY BOUNDARIES, THE TOP OF LOS BANOS CREEK CHANNEL, AND ON EITHER SIDE OF THE ALVARADO TRAIL SEGMENT, WHERE APPLICABLE.
6. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS AND RECOMMENDATIONS PRESENTED BY GOLDER ASSOCIATES USA INC. IN THE *SLOPE STABILITY ASSESSMENT FOR PROPOSED RECLAMATION PLAN AMENDMENT, LOS BANOS SAND AND GRAVEL QUARRY - MERCED COUNTY, CALIFORNIA* (REPORT DATE: MAY 13, 2022).
7. BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT EROSION, SEDIMENT, AND WINDBLOWN DUST WILL BE IMPLEMENTED AS DESCRIBED IN THE SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

Sespe Consulting, Inc. (2022)

N

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FIGURE	LOS BANOS - MINE PLAN Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
3			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	See Above	DRAWN BY:	GPS

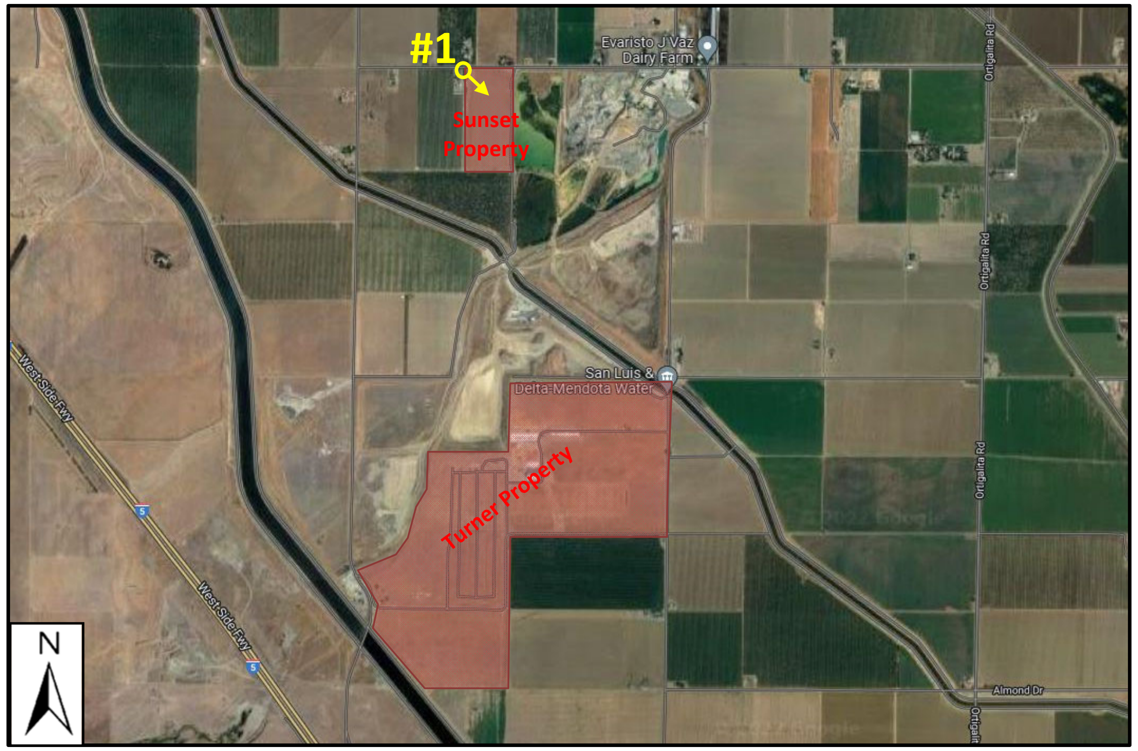
APPENDIX B

Photo Simulations

PHOTO SIMULATION - VIEWPOINT #1

Key	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	2
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	0
TOTAL	**5**

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	-1
TOTAL	**3**

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	2
Vegetation	2
Water	0
Color	2
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	0
TOTAL	**7**

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

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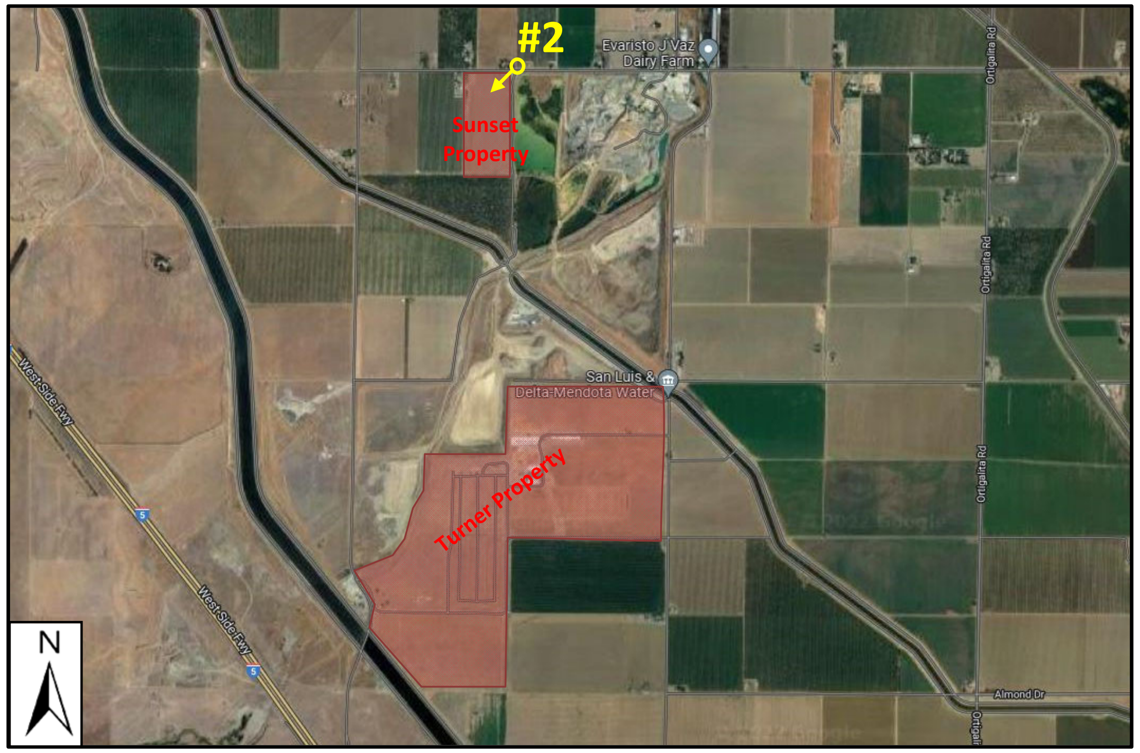
LOCATION	VIEWPOINT - LOCATION #1 Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
#1			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

PHOTO SIMULATION - VIEWPOINT #2

Key	Ratings Score
Landform	2
Vegetation	2
Water	0
Color	2
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	**8**

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	2
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	**6**

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	2
Vegetation	3
Water	0
Color	2
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	**9**

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

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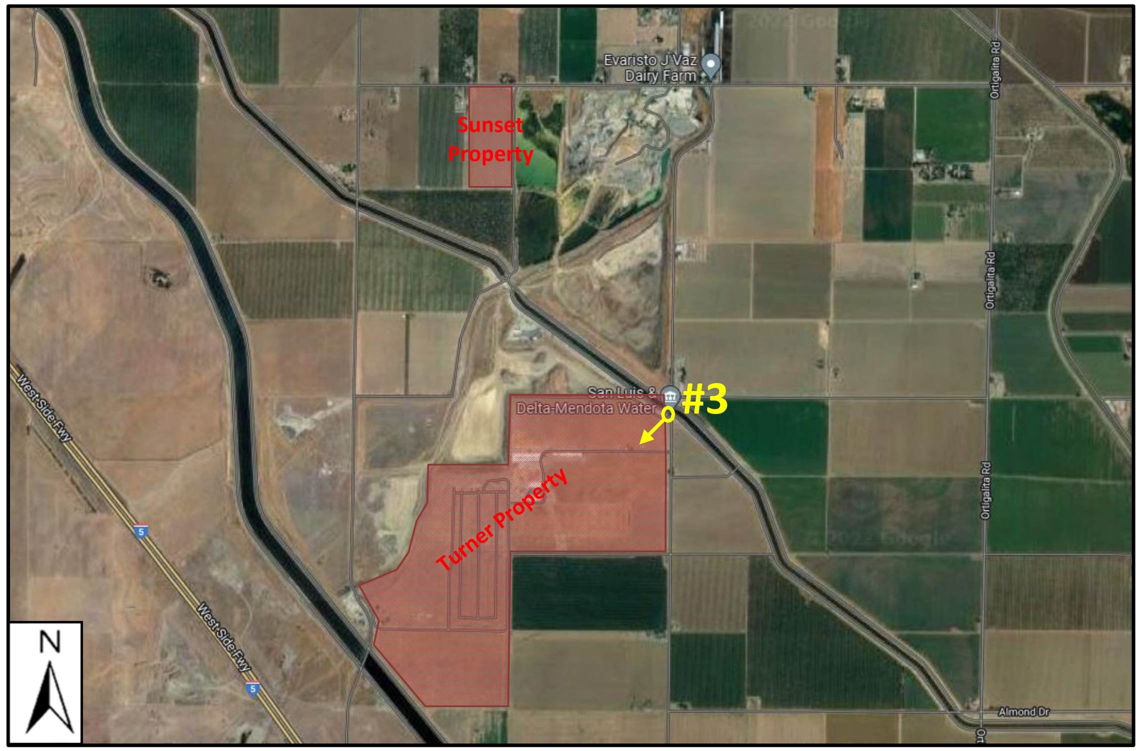
LOCATION	VIEWPOINT - LOCATION #2 Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
#2			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

PHOTO SIMULATION - VIEWPOINT #3

Key	Ratings Score
Landform	1
Vegetation	1
Water	1
Color	1
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	0
TOTAL	**5**

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	1
Color	0
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	-1
TOTAL	**4**

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	1
Vegetation	2
Water	1
Color	1
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	0
TOTAL	**6**

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

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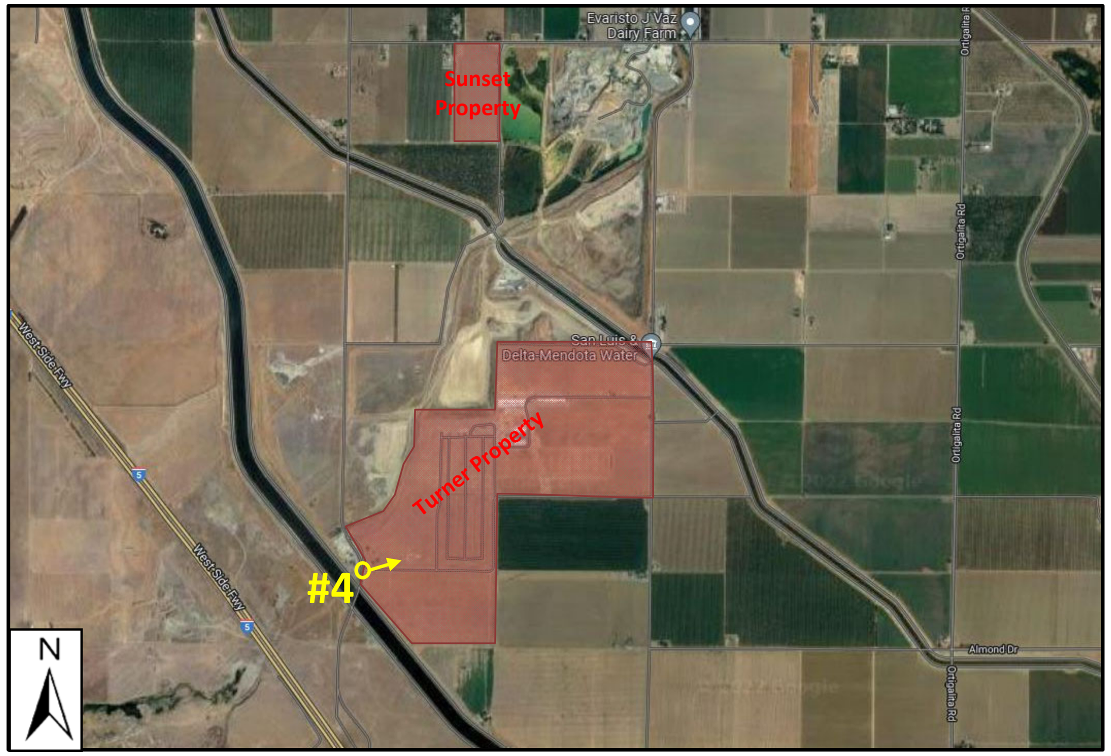
LOCATION	VIEWPOINT - LOCATION #3 Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
#3			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

PHOTO SIMULATION - VIEWPOINT #4

Key	Ratings Score
Landform	1
Vegetation	2
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	6

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	-1
TOTAL	4

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	0
Scarcity	1
Cultural Modifications	0
TOTAL	5

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

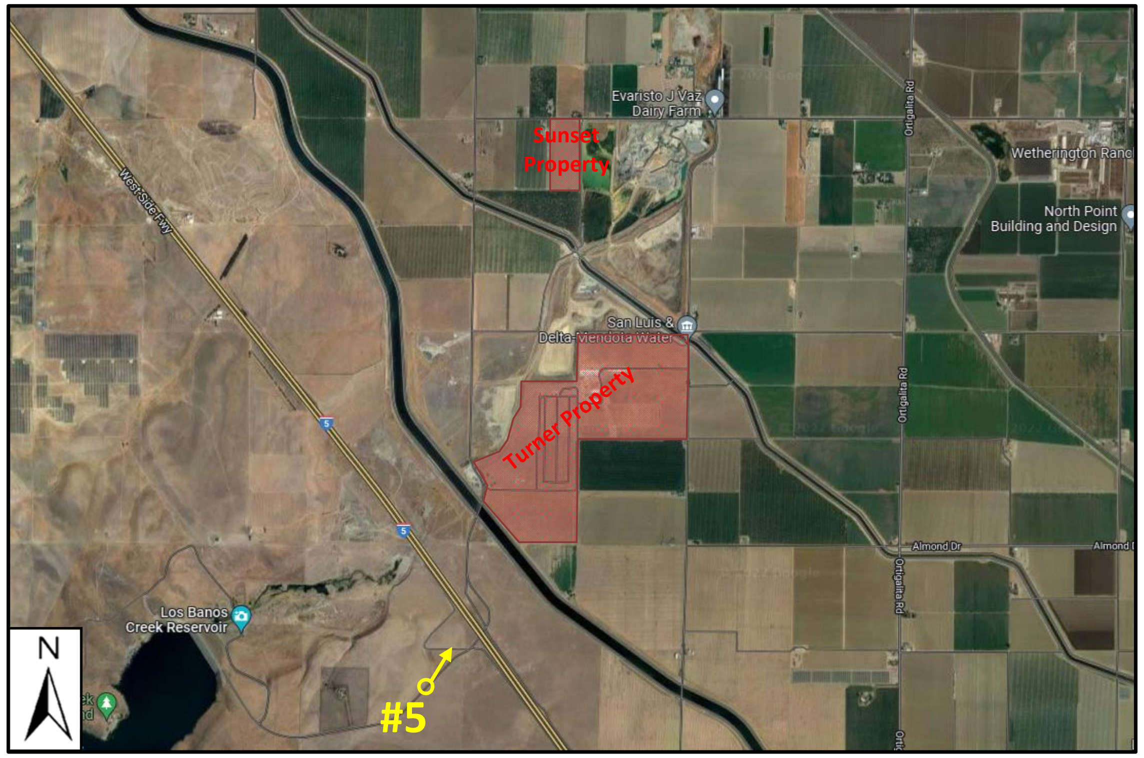
SESPE CONSULTING, INC.

LOCATION	VIEWPOINT - LOCATION #4 Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
#4			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

PHOTO SIMULATION - VIEWPOINT #5

Key	Ratings Score
Landform	2
Vegetation	3
Water	0
Color	2
Influence of Adjacent Scenery	3
Scarcity	1
Cultural Modifications	0
TOTAL	**9**

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	2
Vegetation	2
Water	0
Color	1
Influence of Adjacent Scenery	3
Scarcity	1
Cultural Modifications	-1
TOTAL	**8**

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	2
Vegetation	2
Water	0
Color	2
Influence of Adjacent Scenery	3
Scarcity	1
Cultural Modifications	0
TOTAL	**10**

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

SESPE CONSULTING, INC.

LOCATION

#5

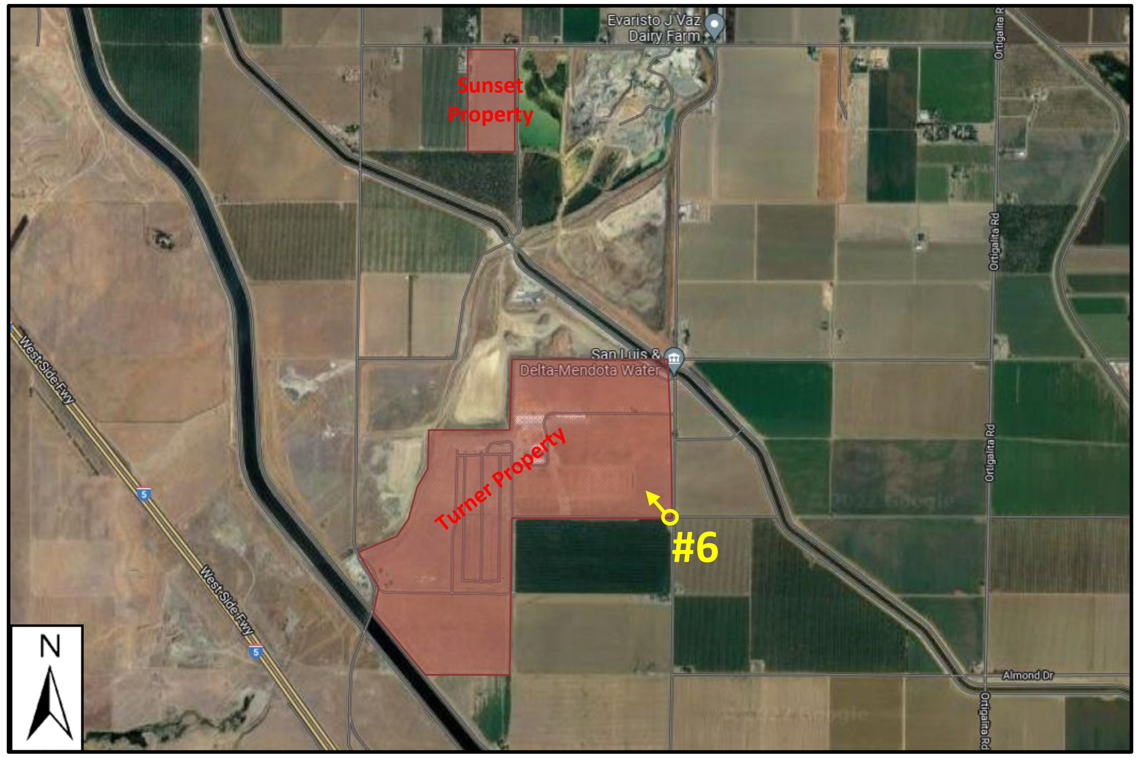
VIEWPOINT - LOCATION #5
Triangle Rock Products, LLC
Los Banos Sand and Gravel Quarry
Merced County, California

PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

PHOTO SIMULATION - VIEWPOINT #6

Key	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	2
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	6

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	-1
TOTAL	4

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	5

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

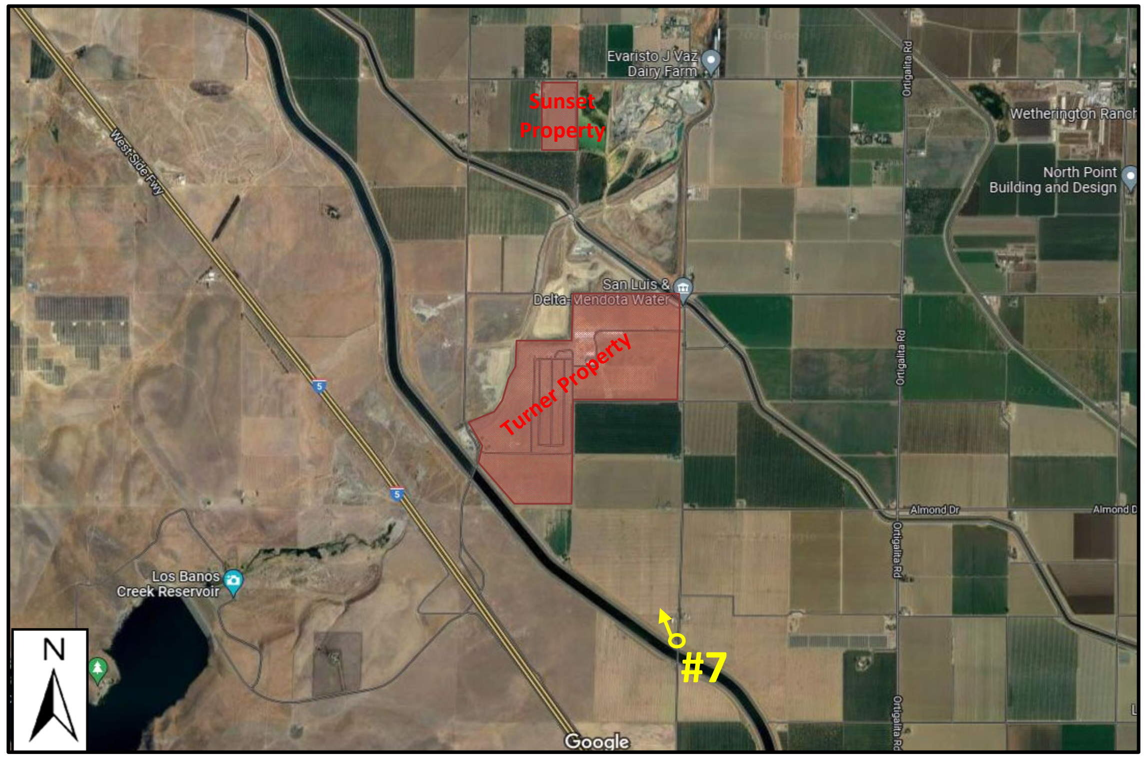
SESPE
CONSULTING, INC.

LOCATION	VIEWPOINT - LOCATION #6 Vulcan Materials Company Los Banos Sand and Gravel Quarry Merced County, California		
#6			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

PHOTO SIMULATION - VIEWPOINT #7

Key	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	5

Existing/Baseline Photo



Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	5

Simulated Mining/Excavation View

Key Factors	Ratings Score
Landform	1
Vegetation	1
Water	0
Color	1
Influence of Adjacent Scenery	1
Scarcity	1
Cultural Modifications	0
TOTAL	5

Simulated Reclaimed Site View

Note: The rating system/scores shown above are based on the U.S. Bureau of Land Management's (BLM) Visual Resources Management (VRM) System.

SESPE
CONSULTING, INC.

LOCATION	**VIEWPOINT - LOCATION #7** Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
#7			
PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	N/A	DRAWN BY:	MNL

APPENDIX C

Regulatory References

Manual H-8410-1 - Visual Resource Inventory

Table of Contents

Illustrations

I. General Guidance.

A. Overview. The visual resource inventory process provides BLM managers with a means for determining visual values. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resources. Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value. The inventory classes provide the basis for considering visual values in the resource management planning (RMP) process. Visual Resource Management classes are established through the RMP process for all BLM-administered lands (see also Manual 1625.3). During the RMP process, the class boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMP's. Visual management objectives are established for each class. (See Section VB.)

B. Implementation Options. The detail of the inventory will vary with the visual character of the landscapes being inventoried. For example, the flat, colorless, and barren mancos shale area in southeastern Utah should not be given the same treatment as the rugged and colorful formations of the Colorado River area. Sensitive areas such as those near major highways or communities or adjacent to national parks should be given special treatment. It may be necessary to modify or make adaptations to the inventory system in such places as Alaska where the resource characteristics and the land-use patterns are significantly different from those in the Western States. These adaptations must (1) provide a more cost-effective way to complete a quality inventory, and (2) keep the conceptual framework of the Visual Resource Management (VRM) system intact.

C. Material Storage. All visual resource inventory rating forms, overlays, slides, and written material should be filed in the Resource Area Office.

II. Scenic Quality Evaluation. Scenic quality is a measure of the visual appeal of a tract of land. In the visual resource inventory process, public lands are given an A, B, or C rating based on the apparent scenic quality which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications (see Illustrations 1, 2, 3, and 4). During the rating process, each of these factors are ranked on a comparative basis with similar features within the physiographic province. Use the physiographic provinces as delineated by Fenneman (see Illustrations 5 and 6) to the extent possible. The boundaries of these provinces may be refined to fit local situations. The "Ecoregions of the United States" by R. C. Bailey may be helpful in making these refinements. An important premise of the evaluation is that all public lands have scenic value, but areas with the most variety and most harmonious composition have the greatest scenic value. Another important concept is that the evaluation of scenic quality is done in relationship to the natural landscape. This does not mean that man-made features within a landscape necessarily detract from the scenic value. Man-made features that complement the natural landscape may enhance the scenic value. Evaluations should avoid any bias against man-made modification to natural landscape.

A. Delineating Scenic Quality Rating Units (SQRU's). The planning area is subdivided into scenic quality rating units for rating purposes. Rating areas are delineated on a basis of: like physiographic characteristics; similar visual patterns, texture, color, variety, etc.; and areas which have similar impacts from man-made modifications. The size of SQRU's may vary from several thousand acres to 100 or less acres, depending on the homogeneity of the landscape features and the detail desired in the inventory. Normally, more detailed attention will be given to highly scenic areas or areas of known high sensitivity. Map and number each SQRU on an overlay as shown in Illustration 7.

B. Evaluating Scenic Quality. It is recommended that an interdisciplinary team do the evaluations. Ideally, one team member should have an environmental design arts background. All participants should have an understanding of the visual resource inventory system and be familiar with the areas to be evaluated. Evaluate each SQRU by observing the area from several important viewpoints. Scores should reflect the evaluator’s overall impression of the area. After evaluating all the SQRU's, show the scenic ratings on the scenic quality overlay (see Illustration 7). Record the rating on the Scenic Quality Rating Summary - Bureau Form 8400-5 (see Illustration 4). Bureau Form 8400-1 (see Illustration 3) may be used as a worksheet for completing each scenic quality evaluation. A photographic record should be maintained for the area. Photographs and completed evaluation forms should be filed for future reference.

III. Sensitivity Level Analysis. Sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern.

A. Factors to Consider.

1. Type of Users. Visual sensitivity will vary with the type of users. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.

2. Amount of Use. Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase.

3. Public Interest. The visual quality of an area may be of concern to local, State, or National groups. Indicators of this concern are usually expressed in public meetings, letters, newspaper or magazine articles, newsletters, land-use plans, etc. Public controversy created in response to proposed activities that would change the landscape character should also be considered.

4. Adjacent Land Uses. The interrelationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the view shed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive.

5. Special Areas. Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Areas of Critical Environmental Concern (ACEC), frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.

6. Other Factors. Consider any other information such as research or studies that includes indicators of visual sensitivity.

B. Delineation of Sensitivity Level Rating Units (SLRU's). There is no standard procedure for delineating SLRU's. The boundaries will depend on the factor that is driving the sensitivity consideration. Consequently, a thorough review of the factors referred to in IIIA should be completed before any attempt is made to delineate SLRU's. Distance zone may also play an important role in identifying the SLRU boundaries.

C. Documentation Requirements.

1. Narrative. Prepare a summary statement with the essential facts and rationale to support the conclusions reached on sensitivity levels. The format for presenting this information is optional. As a minimum, the summary data must be entered on Form 8400-6 (see Illustration 8). Backup information used to evaluate each of the factors should be maintained with the inventory record.

2. Map Overlay. Prepare an overlay (see Illustration 9) showing the sensitivity rating units and ratings.

D. Completion of Sensitivity Rating. The instructions for completing the sensitivity ratings are shown in Illustration 8. Ideally, the rating should be done as a team effort involving the Area or District VRM Coordinator, Area Manager, and at least one other staff person. If timing or funding will to allow this approach, the rating may be done by the VRM coordinator and reviewed by the Area Manager. Management should be in agreement on the summary rating for each SLRU.

IV. Distance Zones. Landscapes are subdivided into 3 distanced zones based on relative visibility from travel routes or observation points. The 3 zones are: foreground-middleground, background, and seldom seen. The foreground-middleground (fm) zone includes areas seen from highways, rivers, or other viewing locations which are less than 3 to 5 miles away. Seen areas beyond the foreground-middleground zone but usually less than 15 miles away are in the background (bg) zone. Areas not seen as foreground-middleground or background (i.e., hidden from view) are in the seldom-seen (ss) zone.

A. Mapping Distance Zones. Prepare a distance zone overlay (see Illustration 10) using a base map common to the scenic quality base map. Distance zones are determined in the field by actually traveling along each route and observing the area that can be viewed. If the route is a highway or trail, it should be traveled in both directions, unless it is a one-way route. River use usually is one way; however, if there is up-river travel, it too should be evaluated from both directions. If a vehicle or boat is used for this field survey, it is best to have both a driver and an observer. Distance zones should be mapped for all areas. While they are not necessary to determine classes in Class A scenic areas or for areas with low sensitivity levels, distance zones can provide valuable data during the RMP process when adjustments to VRM classes are made to resolve resource allocation conflicts.

1. Foreground-Middleground Zone. This is the area that can be seen from each travel route for a distance of 3 to 5 miles where management activities might be viewed in detail. The outer boundary of this distance zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. In some areas, atmospheric conditions can reduce visibility and shorten the distance normally covered by each zone. Also, where the foreground-middleground zone from one travel route overlaps the background from another route, use only the foreground-middleground designation.

2. Background Zone. This is the remaining area which can be seen from each travel route to approximately 15 miles. Do not include areas in the background which are so far distant that the only thing discernible is the form or outline. In order to be included within this distance zone, vegetation should be visible at least as patterns of light and dark.

3. Seldom-Seen Zone. These are areas that are not visible within the foreground-middleground and background zones and areas beyond the background zones.

B. Coordinating Distance Zones Delineation and Sensitivity Level Analyses. It is recommended that distance zones be delineated before the sensitivity analysis is done. The distance zone delineations provide valuable information that can be very useful in the sensitivity analysis. For example, the foreground-middleground zones are more visible to the public and changes are more noticeable and are more likely to trigger public concern. Also, the boundaries of the distance zones are very useful in helping to establish sensitivity rating units.

V. Visual Resource Classes and Objectives.

A. Purposes of Visual Resource Classes. Visual resource classes are categories assigned to public lands, which serves two purposes: (1) an inventory tool that portrays the relative value of the visual resources, and (2) a management tool that portrays the visual management objectives. There are four classes (I, II, III, and IV).

1. Visual Resource Inventory Classes. Visual resource inventory classes are assigned through the inventory process. Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape. This includes areas such as national wilderness areas, the wild section of national wild and scenic rivers, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape. Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance zones. This is accomplished by combining the 3 overlays for scenic quality, sensitivity levels, and distance zones and using the guidelines shown in Illustration 11 to assign the proper class. The end product is a visual resource inventory class overlay as shown in Illustration 12. Inventory classes are informational in nature and provide the basis for considering visual values in the RMP process. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

2. Visual Resource Management Classes. Visual resource management classes are assigned through RMP's. The assignment of visual management classes is ultimately based on the management decisions made in RMP's. However, visual values must be considered throughout the RMP process. All actions proposed during the RMP process that would result in surface disturbances must consider the importance of the visual values and the impacts the project may have on these values. Management decisions in the RMP must reflect the value of visual resources. In fact, the value of the visual resource may be the driving force for some management decisions. For example, highly scenic areas which need special management attention may be designated as scenic Areas of Critical Environmental Concern and classified as VRM Class I based on the importance of the visual values. A map is developed in each RMP showing the approved visual resource management classes.

B. Objectives for Visual Resource Classes.

1. Class I Objective. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

2. Class II Objective. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

3. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

4. Class IV Objectives. The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

C. Rehabilitation Areas. Areas in need of rehabilitation from a visual standpoint should be flagged during the inventory process. The level of rehabilitation will be determined through the RMP process by assigning the VRM class approved for that particular area.

D. Interim VRM Classes and Objectives. Interim visual management classes are established where a project is proposed and there are no RMP approved VRM objectives. These classes are developed using the guidelines in Section I to V and must conform with the land-use allocations set forth in the RMP which covers the project area. The establishment of interim VRM classes will not require a RMP amendment, unless the project that is driving the evaluation requires one.

Please see Instructions at bottom of page on how to rate the visual quality of scenic resources.

Illustration 1 - Scenic Quality - Explanation of Rating Criteria

Landform

Topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, as the Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangell Mountain Range in Alaska, or they may be exceedingly artistic and subtle as certain badlands, pinnacles, arches, and other extraordinary formations.

Vegetation

Give primary consideration to the variety of patterns, forms, and textures created by plant life. Consider short-lived displays when they are known to be recurring or spectacular. Consider also smaller scale vegetational features which add striking and intriguing detail elements to the landscape (e.g., gnarled or wind beaten trees, and joshua trees).

Water

That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

Color

Consider the overall color(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) as they appear during seasons or periods of high use. Key factors to use when rating "color" are variety, contrast, and harmony.

Adjacent Scenery

Degree to which scenery outside the scenery unit being rated enhances the overall impression of the scenery within the rating unit. The distance which adjacent scenery will influence scenery within the rating unit will normally range from 0-5 miles, depending upon the characteristics of the topography, the vegetative cover, and other such factors. This factor is generally applied to units which would normally rate very low in score, but the influence of the adjacent unit would enhance the visual quality and raise the score.

Scarcity

This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery - the scarcity factor can be used to recognize this type of area and give it the added emphasis it needs.

Cultural Modifications

Cultural modifications in the landform/water, vegetation, and addition of structures should be considered and may detract from the scenery in the form of a negative intrusion or complement or improve the scenic quality of a unit. Rate accordingly.

INSTRUCTIONS

Purpose: To rate the visual quality of the scenic resource on all BLM managed lands.
How to Identify Scenic Value: All Bureau lands have scenic value.
How to Determine Minimum Suitability: All BLM lands are rated for scenic values. Also rate adjacent or intermingling non-BLM lands within the planning unit.
When to Evaluate Scenic Quality: Rate for scenery under the most critical conditions (i.e., highest user period or season of use, sidelight, proper atmospheric conditions, etc.).
How to Delineate Rating Areas: Consider the following factors when delineating rating areas.

1. Like physiographic characteristics (i.e., land form, vegetation, etc.).
2. Similar visual patterns, texture, color, variety, etc.
3. Areas which have a similar impact from cultural modifications (i.e., roads, historical and other structures, mining operations, or other surface disturbances).

Explanation of Criteria: (See Illustration 1)
NOTE: Values for each rating criteria are maximum and minimum scores only. It is also possible to assign scores within these ranges.

SCENIC QUALITY

A = 19 or more
B = 12-18
C = 11 or less

Illustration 2 - Scenic Quality Inventory and Evaluation Chart

Key factors	**Rating Criteria and Score**		
Landform	High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. **Score 5**	Steep canyons, mesas, buttes, cinder cones, and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features which are interesting though not dominant or exceptional. **Score 3**	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. **Score 1**
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. **Score 5**	Some variety of vegetation, but only one or two major types **Score 3**	Little or no variety or contrast in vegetation. **Score 1**
Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. **Score 5**	Flowing, or still, but not dominant in the landscape. **Score 3**	Absent, or present, but not noticeable. **Score 0**
Color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. **Score 5**	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element. **Score 3**	Subtle color variations, contrast, or interest; generally mute tones. **Score 1**
Influence of adjacent scenery	Adjacent scenery greatly enhances visual quality **Score 5**	Adjacent scenery moderately enhances overall visual quality. **Score 3**	Adjacent scenery has little or no influence on overall visual quality. **Score 0**

Key factors	Rating Criteria and Score		
Scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. ***Score 5+**	Distinctive, though somewhat similar to others within the region. **Score 3**	Interesting within its setting, but fairly common within the region. **Score 1**
Cultural modifications	Modifications add favorably to visual variety while promoting visual harmony. **Score 2**	Modifications add little or no visual variety to the area, and introduce no discordant elements **Score 0**	Modifications add variety but are very discordant and promote strong disharmony. **Score -4**

* A rating of greater than 5 can be given but must be supported by written justification.

Form 8400-1
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date

District

Resource Area

Scenic quality rating unit

1. Evaluators *(names)*

2. LANDSCAPE CHARACTER *(Feature)*

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE *(General)*
FORM			
LINE			
COLOR			
URE			

3. Narrative

4. SCORE *(Circle Appropriate Level)**				
	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5	3	1	
b. Vegetation	5	3	1	
c. Water	5	3	0	
d. Color	5	3	1	
e. Adjacent Scenery	5	3	0	
f. Scarcity	5+	3	1	
g. Cultural Modification	2	0	-4	
TOTALS	+	+	=	

SCENIC QUALITY CLASSIFICATION

☐ A 19 or more

☐ B – 12–18

☐ C – 11 or less

(Instructions on reverse)

INSTRUCTIONS

Following are the instructions for completing the form. The numbers correspond with the item numbers on the form.

1. **Evaluators.** List the names of the persons involved in the rating.
2. **Landscape Character.** Briefly describe the major features and elements in the landscape. Refer to illustrations 4, 5, 6, and 7 of the BLM Handbook 1-8431-1 for guidelines on the terminology to be used to describe the elements.
3. **Narrative.** Briefly describe the general character of the landscape as it relates to the immediate surroundings and to similar landscape features within the physiographic province.
4. **Scores.** Rate the scenic quality using the criteria and guidelines in the BLM Handbook 1-8410-1 Section II. Record the scores by circling the appropriate numbers. If the rating more appropriately falls between the listed numbers, write in the desired number and circle it. For example, if the desired number for "color" falls between 3 and 5, write in the number 4 and circle it. Explain any unusual factors affecting a rating under the "explanation and rationale" column. If more space is needed, continue the explanation on this page. After the ratings are completed total the scores and check the appropriate classification block.

U.S. Government Printing Office: 1988-573-017/81455 R8

Form 8400–1
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY FIELD INVENTORY

Date Aug. 15, 1985

District Moab

Resource Area Grand

Scenic quality rating unit 024

1. Evaluators *(names)* Bob Tumwater, Russ Grimes, Pete Jordon

2. LANDSCAPE CHARACTER *(Feature)*

	a. LANDFORM/WATER	b. VEGETATION	c. STRUCTURE *(General)*
FORM	Deeply cut side canyons with vertical walls leading into flat open valley w/ slow meandering river	Simple forms created by patterns in vegetation	Oval, elongated, and linear.
LINE	Horizontal and vertical in cliff formations, jagged ridge lines, and meandering river	Irregular, indistinct	Rounded, vertical
COLOR	Orange and greys dominant, deep blue in settling pond	Dark green in river bottom, grey elsewhere	Light green & grey
URE	Coarse	Medium grain, sparse, and uneven random.	Uneven

3. Narrative

This SQRU includes the flat and meandering river bed of the Colorado River and the deeply dissected canyons to the north. It differs in landform and vegetation from the surrounding areas. The rock formations and topography are fairly common in the physiographic province but it is uncommon to have a river flowing through this type of landscape. The potash plant which lies in the middle of this area is a major visual intrusion which can be seen from several overlooks and the river.

4. SCORE *(Circle Appropriate Level)**

	HIGH	MEDIUM	LOW	EXPLANATION OR RATIONALE
a. Landform	5 [✓ 4]	3	1	
b. Vegetation	5	3 [✓ 2]	1	
c. Water	[✓ 5]	3	0	
d. Color	[✓ 5]	3	1	
e. Adjacent Scenery	5 [✓ 4]	3	0	See explanation on reverse
f. Scarcity	5+	[✓ 3]	1	
g. Cultural Modification	2	0	[✓ -3] -4	
TOTALS	18 +	5 +	(-3) =	20

SCENIC QUALITY CLASSIFICATION

☑ A 19 or more

☐ B – 12–18

☐ C – 11 or less

Rel. 8-28
1/17/86

(Instructions on reverse)

INSTRUCTIONS

Following are the instructions for completing the form. The numbers correspond with the item numbers on the form.

1. **Evaluators.** List the names of the persons involved in the rating.
2. **Landscape Character.** Briefly describe the major features and elements in the landscape. Refer to illustrations 4, 5, 6, and 7 of the BLM Handbook 1-8431-1 for guidelines on the terminology to be used to describe the elements.
3. **Narrative.** Briefly describe the general character of the landscape as it relates to the immediate surroundings and to similar landscape features within the physiographic province.
4. **Scores.** Rate the scenic quality using the criteria and guidelines in the BLM Handbook 1-8410-1 Section II. Record the scores by circling the appropriate numbers. If the rating more appropriately falls between the listed numbers, write in the desired number and circle it. For example, if the desired number for "color" falls between 3 and 5, write in the number 4 and circle it. Explain any unusual factors affecting a rating under the "explanation and rationale" column. If more space is needed, continue the explanation on this page. After the ratings are completed total the scores and check the appropriate classification block.

<u>Comments on 4f – Adjacent scenery</u>: The high scenic rating of "4" was given to this factor because of the high scenic value of the surrounding areas that can be seen from within the SQRU. These scenic areas include Behind-the-Rocks area, Canyonlands country, and the La Sal mountains.

U.S. Government Printing Office: 1988-573-017/81455 R8

Form 8400-5
(May 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY RATING SUMMARY

Date

District

Resource Area

1. Evaluators (*names*)

SCENIC QUALITY RATING UNITS (1)	Landform (2)	Vegetation (3)	Water (4)	Color (5)	Adjacent Scenery (6)	Scarcity (7)	Cultural Modification (8)	Total Score (9)	Scenic Quality Rating (10	EXPLANATION (11)

INSTRUCTIONS

Form is used in conjunction with the Scenic Quality Inventory and Evaluation Chart.

Form 8400
(May 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SCENIC QUALITY RATING SUMMARY

Date Aug. 16, 1985

District Moab

Resource Area Grand

1 Evaluators (*names*) Bob Tumwater, Russ Grimes, Pete Jordon

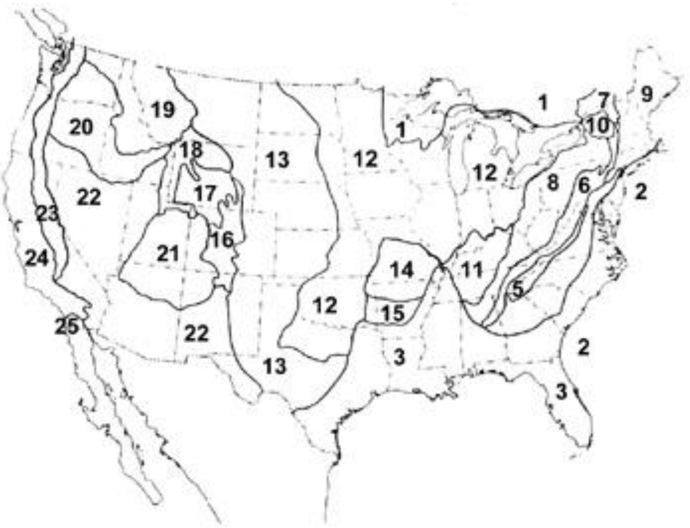
SCENIC QUALITY RATING UNITS (1)	Landform (2)	Vegetation (3)	Water (4)	Color (5)	Adjacent Scenery (6)	Scarcity (7)	Cultural Modification (8)	Total Score (9)	Scenic Quality Rating (10	EXPLANATION (11)
001	3	4	5	4	2	2	0	20	A	colorful waterway
002	3	1	0	2	3	2	0	11	C	rolling hills, colorless, little veg.
003	2	1	0	2	3	2	0	10	C	flat, colorless, barren
004	4	3	4	4	3	1	0	19	A	water, scenic cliffs, & interesting veg.
005	4	3	0	4	4	3	0	18	B	scenic cliffs
006	1	1	0	2	2	2	0	8	C	flat, colorless, barren
007	4	4	5	4	3	2	0	22	A	water, riverside veg., colorful cliffs
008	3	3	0	3	3	3	0	15	B	good mixture of color, typo., & veg.
009	3	2	0	2	2	2	0	11	C	rugged but otherwise mountainous
010	1	2	0	2	3	2	0	10	C	mountainous but good view of N.P.

INSTRUCTIONS

Form is used in conjunction with the Scenic Quality Inventory and Evaluation Chart.

Illustration 5 - Physiographic Province Map - Continental United States

1946 – Prepared by Nevin M. Fenneman and USGS

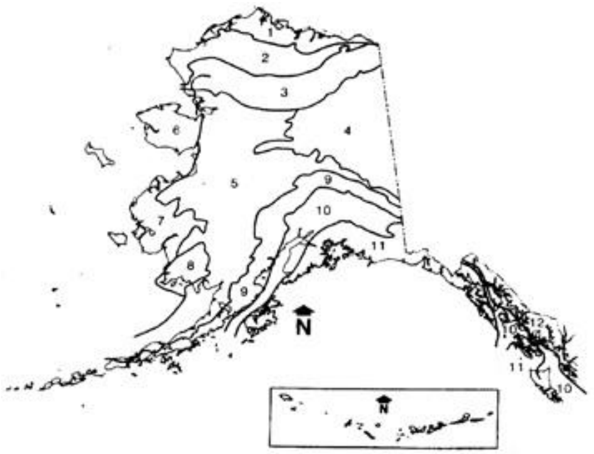


LEGEND

1. SUPERIOR UPLAND
2. CONTINENTAL SHELF
3. COASTAL PLAIN
4. PIEDMONT
5. BLUE RIDGE
6. VALLEY AND RIDGE
7. ST LAWRENCE VALLEY
8. APPALACHIAN PLATEAUS
9. NEW ENGLAND
10. ADIRONDACK
11. INTERIOR LOW PLATEAUS
12. CENTRAL LOWLAND
13. GREAT PLAINS
14. OZARK PLATEAUS
15. OUACHITA
16. SOUTHERN ROCKY MTNS
17. WYOMING BASIN
18. MIDDLE ROCKY MTNS
19. NORTHERN ROCKY MTNS
20. COLUMBIA PLATEAUS
21. COLORADO PLATEAUS
22. BASIN AND RANGE
23. CASCADE – SIERRA MTNS
24. PACIFIC BORDER
25. LOWER CALIFORNIA

Illustration 6 - Physiographic Province Map – Alaska

USGS PAPER NO. 482. CLYDE WAHRAFTIG

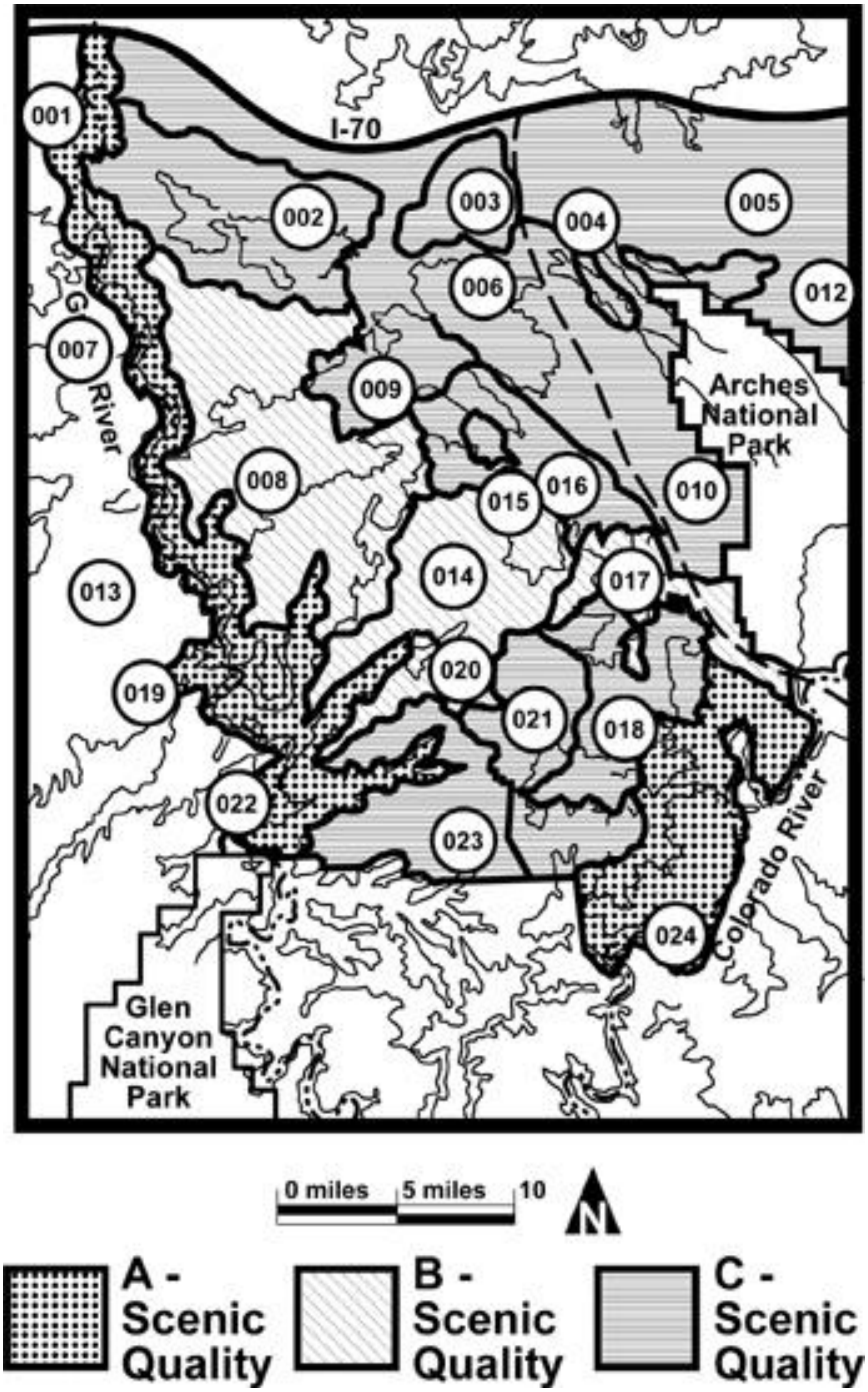


LEGEND

1. ARCTIC COASTAL PLAIN
2. ARCTIC FOOTHILLS
3. ARCTIC MOUNTAINS
4. NORTHERN PLATEAUS
5. WESTERN ALASKA
6. SEWARD PENINSULA
7. BERING SHELF
8. AHKLUN MOUNTAINS
9. ALASKA – ALUTIAN
10. COASTAL TROUGH
11. PACIFIC BORDER RANGES
12. COAST MOUNTAINS

Illustration 7 - Scenic Quality Overlay

Big Flat Squaw Park - West Planning Unit - Bureau of Land Management



Form 8400-6
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SENSITIVITY LEVEL RATING SHEET

Date

District

Resource Area

1. Evaluators *(names)*

SENSITIVITY LEVEL RATING UNIT (1)	Type of User (2)	Amount of Use (3)	Public Interest (4)	Adjacent Land Uses (5)	Special Areas (6)	Other Factors (7)	Overall Rating (8)	EXPLANATION (9)

(Instructions on reverse)

Form 8400-6
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SENSITIVITY LEVEL RATING SHEET

Date Aug. 15, 1985

District Moab

Resource Area Grand

Evaluators (*names*) Bob Tumwater, Russ Grimes, Pete Jordon

SENSITIVITY LEVEL RATING UNIT (1)	Type of User (2)	Amount of Use (3)	Public Interest (4)	Adjacent Land Uses (5)	Special Areas (6)	Other Factors (7)	Overall Rating (8)	EXPLANATION (9)
001	H	H	H	H	H	–	H	within f/m zone of I-70 & U163
002	H	L	M	L	H	–	H	visible from river & floatboat users
003	L	L	L	L	L	–	L	isolated area with low scenic values
004	H	M	H	M	M	–	H	f/m zone for State Park entrance road

(Instructions on reverse)

Rel. 8-28
1/17/86

INSTRUCTIONS

Steps in the Sensitivity Level Analysis

1. Divide the inventory area into logical sensitivity rating units.

2. Analyze the factors which indicate visual sensitivity.

3. For each rating unit, rate each factor as high, moderate, or low using the following outline as a general guide:

   a. *Type of Users.* Maintenance of visual quality is:

   — a major concern for most users .... High

   — a moderate concern for most users .... Moderate

   — a low concern for most users .... Low

   b. *Amount of use.* Maintenance of visual quality becomes more important as the level of use increases(see table below):

   — high level of use .... High

   — moderate level of use .... Moderate

   — low level of use .... Low

   c. *Public Interest.* Maintenance of visual quality is:

   — a major public issue .... High

   — a moderate public issue .... Moderate

   — a minor public issue .... Low

   d. *Adjacent Land Uses.* Maintenance of visual quality to sustain adjacent land use objectives is:

   — very important .... High

   — moderately important .... Moderate

   — slightly important .... Low

   e. *Special Area.* Maintenance of visual quality to sustain Special Area management objectives is:

   — very important .... High

   — moderately important .... Moderate

   — slightly important .... Low

4. Determine the over-all sensitivity level for each rating unit. This is a judgmental process which requires a careful analysis of all the above factors. Review the ratings given to each factor and analyze the relationship between factors. A high rating in any one factor does not necessarily mean that the over all sensitivity level rating should be high. For example, the rating for "type of users" might be high but the "amount of use" might be low. Consequently, the over-all rating could be low or moderate. Management should be involved in this rating process.

5. Record the ratings and explanation on the sensitivity level rating sheet.

TABLE FOR CLASSIFYING AMOUNT OF USE

TYPE AREA	HIGH	MODERATE	LOW
Roads & Highways	Greater than 45,000 visits/yr.	5,000-45,000 visits/yr.	Lesser than 5,000 visits/yr.
Rivers & Trails	Greater than 20,000 visits/yr.	2,000-20,000 visits/yr.	Lesser than 2,000 visits/yr.
Recreation Sites	Greater than 10,000 visitor days/yr.	2,000-10,000 visitor days/yr.	Lesser than visitor 2,000 days/yr.

Illustration 9 - Sensitivity Level Overlay

Big Flat Squaw Park - West Planning Unit - Bureau of Land Management

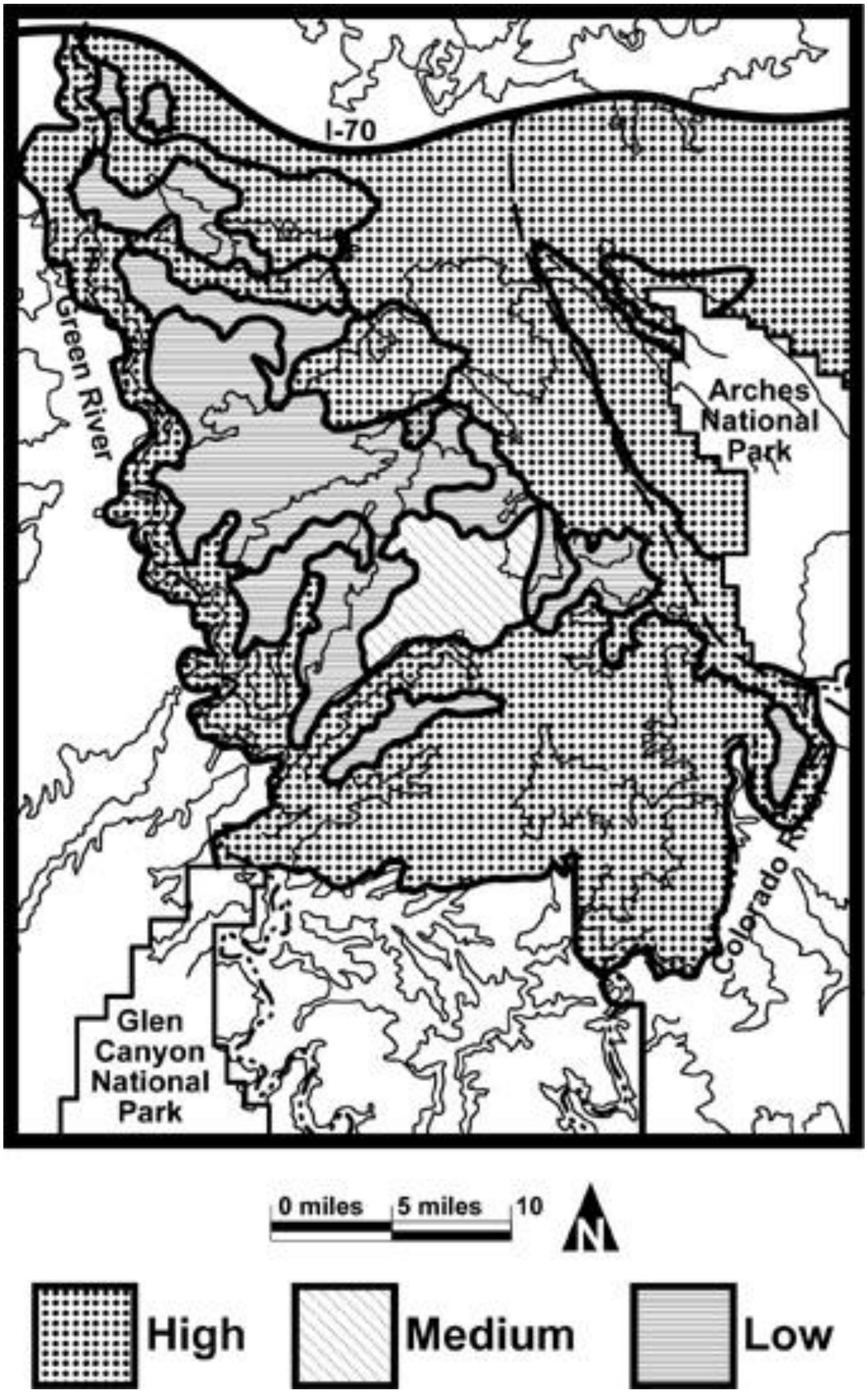


Illustration 10 - Distance Zone Overlay

Big Flat Squaw Park - West Planning Unit - Bureau of Land Management

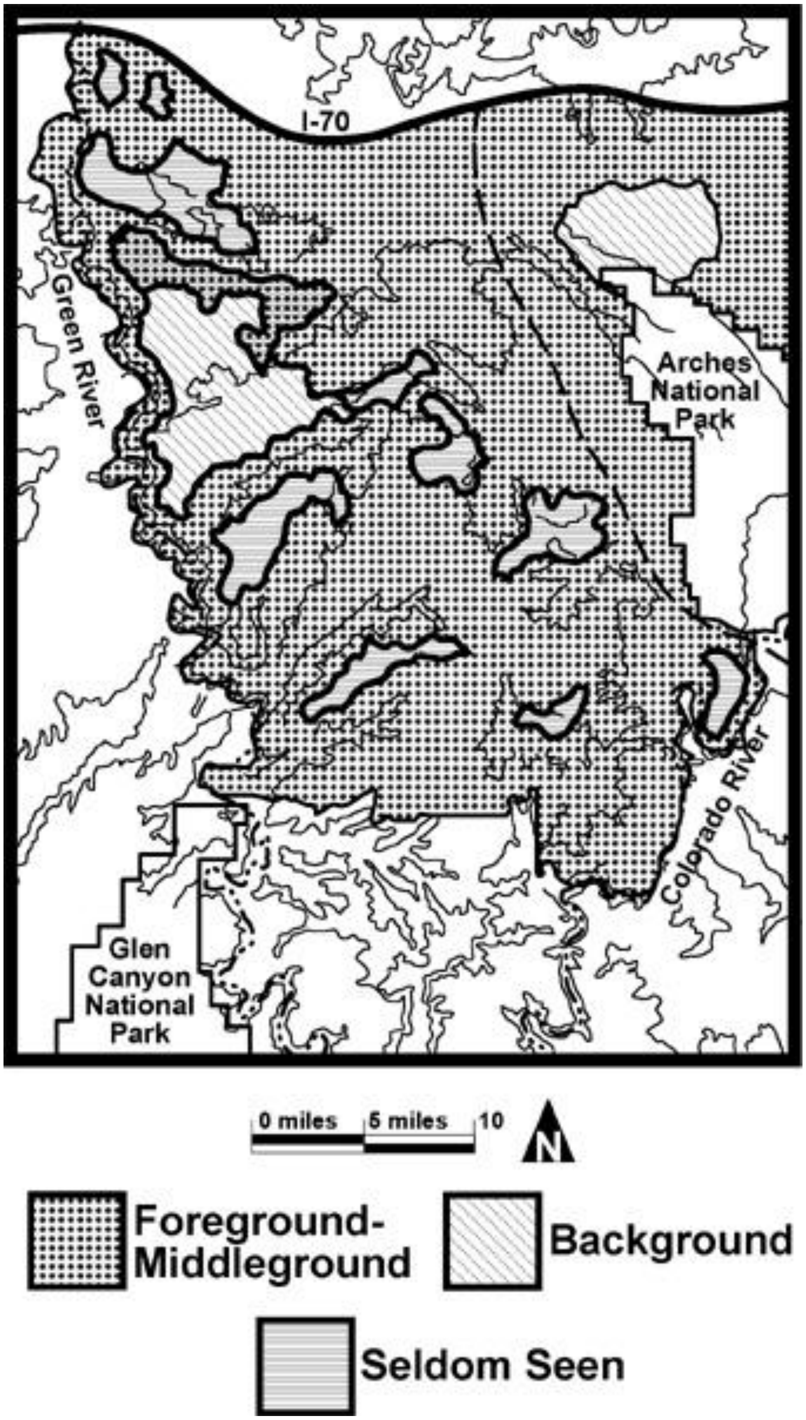


Illustration 11 - Determining Visual Resource Inventory Classes

A. Basis for Determining Visual Resource Inventory Classes

1. Class I. Class I is assigned to all special areas where the current management situations requires maintaining a natural environment essentially unaltered by man.

2. Classes II, III, and IV. These classes are assigned based on combinations of scenic quality, sensitivity levels, and distance zones as shown in the following matrix:

Visual Sensitivity Levels

		High			**Medium**			**Low**
Special Areas		I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II
	B	II	III	III* IV*	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
		f/m	b	s/s	f/m	b	s/s	s/s
		Distance Zones						

* If adjacent areas is Class III or lower assign Class III, if higher assign Class IV

B. How to Map Visual Resource Inventory Classes II, III, and IV.

Mapping inventory classes can be cumbersome and time consuming if not done in a systematic manner. Many systems have been developed to do this task. One that has been used effectively is:

Step I: Code each of the 3 overlays as follows:

Scenic Quality	A ▤	B ▧	C ▱
Sensitivity Levels	High ▦	Medium ▤	Low ▱
Distance Zones	F/M ▨	B ▱	S/S ▱

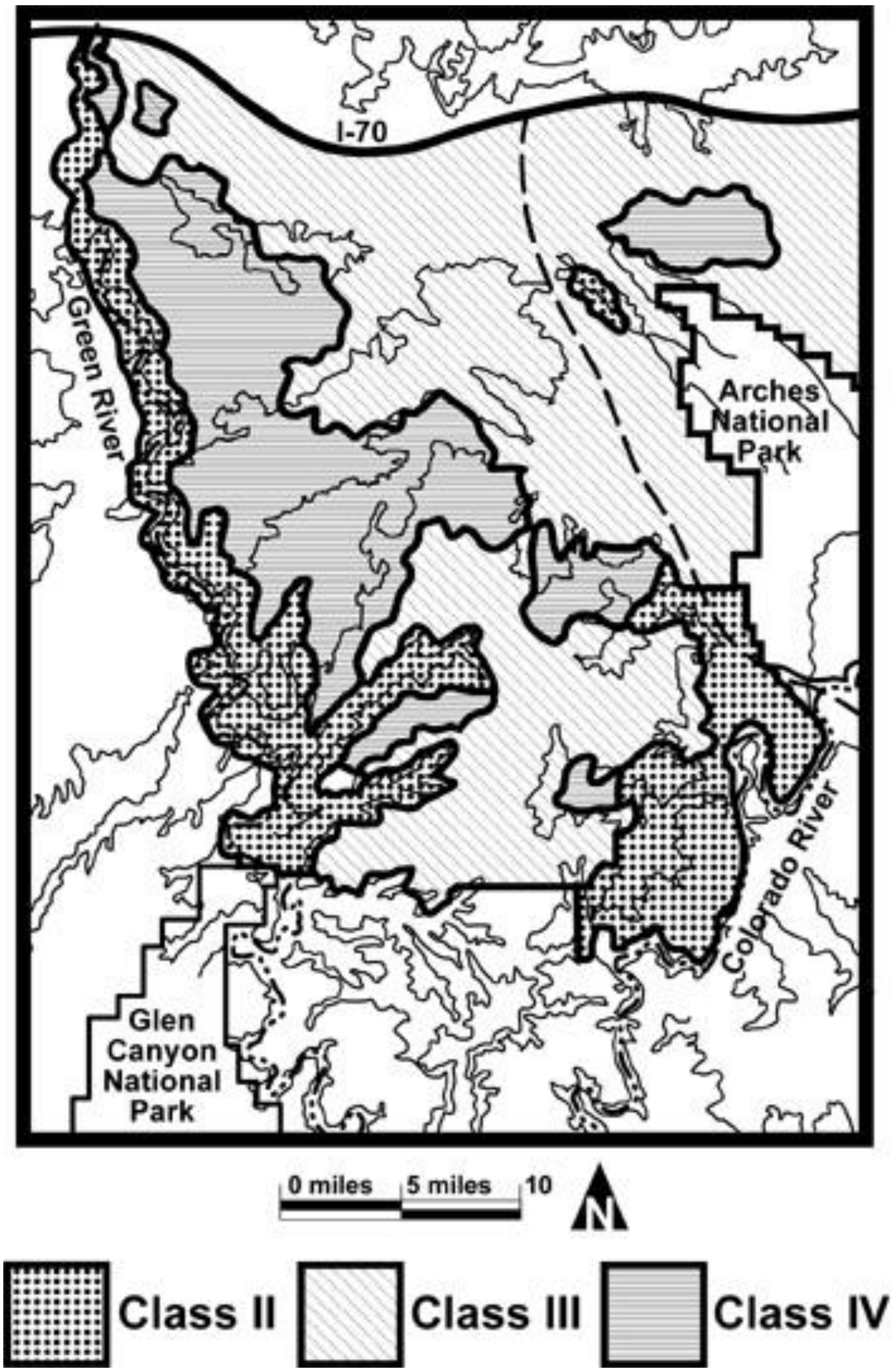
Step 2: Copy the codes from the overlays onto a single new overlay.

Step 3: Delineate the boundaries of the inventory classes on a new overlay using the following information as a guide:

Class II	or more lines	▩
Class III	3 lines	▦
Class IV	2 lines or less	

Illustration 12 - Visual Resource Inventory Class Overlay

Big Flat Squaw Park - West Planning Unit - Bureau of Land Management



Policy LU-5.A.7: Municipal Advisory Council Role (RDR)
Use Municipal Advisory Councils to assist the County in identifying local goals and values in preparation and implementation of Community Plans.

Policy LU-5.A.8: Urban Community Boundaries (RDR)
Limit the expansion of Urban Community boundaries when not a part of a community planning process, unless an expansion is necessary to accommodate public infrastructure, schools, or parks.

Urban Community Character and Design

The policies in this subsection address community character and design within Urban Communities. This includes the effort to preserve the unique character and heritage of these areas as they develop. Through specific urban design guidelines and standards, the County will be able to preserve the spirit and history of each community and enhance the quality of life for its residents.

Goal LU-5.B	Preserve and enhance the design, heritage, historic character, and quality of life of Urban Communities in Merced County.

Policy LU-5.B.1: Community Plan Design Guidelines (RDR)
Develop, maintain, and implement urban design guidelines and uniform policies in new or updated community plans that emphasize the individual character of each community.

Policy LU-5.B.2: Major Street Corridors and Intersections (RDR)
Develop illustrated design guidelines and streetscape standards for all development occurring along major street corridors and important intersections within Urban Communities.

Policy LU-5.B.3: Distinctive Neighborhoods (RDR)
Encourage the development of diverse and distinctive communities and neighborhoods that build on the patterns of the natural landscape and existing development, and are responsive to their location and context.

Policy LU-5.B.4: Integrate Natural Features (RDR)
Emphasize each community's natural features as the visual framework for new development and redevelopment.

Policy LU-5.B.5: Streetscape Continuity (RDR)
Ensure that streetscape elements (e.g., street signs, trees, furniture) maintain a visual continuity and follow a common image for each Urban Community.

Policy LU-5.B.6: Crime Prevention through Design (RDR)
Encourage open space areas, bicycle and pedestrian systems, and housing projects to incorporate crime prevention site design elements.

Policy LU-5.B.7: Screening Industrial Uses (RDR)
Require new industrial uses to be screened, either by landscaping or site design, from existing residential uses and public facilities (e.g., schools, parks) in order to minimize visual impacts within Urban Communities.

Policy LU-5.B.8: Gateways/Entry-points (RDR)
Identify key entry points on the edges of the communities, and support programs and projects that enhance gateways and transitional zones between communities, to make each community more distinct and inviting for residents, workers, and visitors.

Policy LU-5.B.9: Adaptive Reuse (RDR)
Encourage and promote the presentation and adaptive reuse of locally-, State-, or Federally-listed historic resources and structures in order to preserve Merced County's historic heritage.

Policy LU-5.B.10: Green Building Development (RDR) 🌎
Maximize use of passive and active solar and/or wind energy resources, and require incorporation of green building design and technology into new development within Urban Communities.

Urban Community Residential Development

New residential development in unincorporated Merced County will be concentrated in Urban Communities with adequate public services and infrastructure in order to achieve efficient development patterns at higher average densities. These higher densities will help limit the conversion of productive agricultural lands for residential land uses. The policies in this section address future residential development within Urban Communities.

Goal LU-5.C	Provide adequate, efficient, and high quality residential development that accommodates the housing needs of all income groups expected to reside in Merced County.

Policy LU-5.C.1: Residential Development (RDR)
Apply a range of residential densities to Urban Communities in order to promote walkable neighborhoods, facilitate affordable housing, and provide transition between urban and rural edges.

Policy LU-5.C.2: Vacant Land Redesignation (RDR)
Selectively re-designate vacant land for higher-density residential uses within Urban Communities to facilitate infill development when adequate infrastructure and services are, or can become, available.

Policy LU-5.C.3: High-Density Development (RDR)
Promote the development of higher-density housing within Urban Communities located along major transportation corridors and transit routes and served by the full range of urban services, including neighborhood commercial uses, community centers, and public services.

Policy LU-5.D.7: Castle Air Force Base Reuse Plan (RDR/MPSP)
Use the Castle Air Force Base Reuse Plan as the Community Plan and the Special Planning Zone development standards to guide redevelopment of the former Air Force Base.

Urban Community Business Park and Industrial Development

Business Park and industrial development is important for future job and economic growth in the County. The policies in this subsection address industrial development in Urban Communities.

Goal LU-5.E	Designate adequate land for, and promote development of, industrial uses to meet the present and future needs of County residents for jobs and to maintain economic vitality.

Policy LU-5.E.1: Biotechnology and Biofuels (JP)
Encourage industrial and research-oriented businesses in Urban Communities which specialize in biotechnologies and biofuels that enhance agricultural productivity, enhance food processing, provide new agriculturally-related products and markets, or otherwise enhance the agricultural sector in the County.

Policy LU-5.E.2: Location Consideration (RDR)
Apply the Business Park and Industrial land use designations as appropriate along major roads and on the edges of Urban Communities to help buffer agricultural land from urban areas and to separate residential areas from highway and railroad noise.

Policy LU-5.E.3: Industrial Development Design (RDR)
Require that all industrial uses located adjacent to planned non-industrial areas or roads carrying significant non-industrial traffic be designed with landscaping and setbacks.

Policy LU-5.E.4: Industrial and Business Park Development (RDR)
Ensure future industrial and business park development is compatible with surrounding land uses through the use of landscaping, screening, and other buffers.

New Urban Communities

New Urban Communities, or “New Towns,” provide an opportunity for Merced County to accommodate future growth in new, balanced communities that provide full urban infrastructure and services, employment generating land uses, and institutional facilities. The establishment of new Urban Communities in Merced County is dependent upon meeting the dual goals of locating growth in areas away from productive agricultural land and providing urban areas in geographic locations which will help accommodate future growth that has historically occurred in the unincorporated parts of Merced County. Since the County is committed to commercial agricultural production as our core economic activity, the policies in this section require that new Urban Communities only be allowed if they are located off of the valley floor, or clearly do not convert productive agricultural land to urban uses.

Policy NR-2.6: Open Space Impacts (MPSP/IGC/JP) 🌎
Work with public agencies and private energy providers to ensure that energy projects avoid or minimize impacts to open space, natural resources, and productive agricultural land.

Policy NR-2.7: Residential Rehabilitation and Improvement (RDR) 🌎
Encourage the rehabilitation and improvement of existing single-family and multi-family units to achieve greater energy efficiency.

Policy NR-2.8: Energy Efficient County Facilities (RDR) 🌎
Replace existing traffic lights, street lights, and other electrical uses with energy efficient bulbs and appliances in the course of ongoing maintenance/replacement as funding permits.

Policy NR-2.9: Energy Conservation (RDR) 🌎
Encourage and maximize energy conservation and identification of alternative energy sources (e.g., wind or solar).

Policy NR-2.10: Efficiency Education (RDR) 🌎
Work with energy providers to educate the public about energy efficiency, water conservation, and other greenhouse gas reduction measures.

Policy NR-2.11: Energy-Efficiency Focused Design (RDR) 🌎
Encourage the use of energy-efficiency design features such as site orientation, light colored building materials, and tree canopies.

Policy NR-2.12: Green Practices Education (RDR) 🌎
Encourage recycling, composting, source reduction, and education efforts throughout the County for residents, businesses, industries, institutions, and construction.

SOIL AND MINERAL RESOURCES

Merced County is rich in nonfuel mineral and soil resources; however, there are very few traditional hard rock mines in operation today. The County's mineral resources are primarily sand and gravel, which are ample in the County. The policies in this section address the extraction of known mineral resources, prevent the encroachment of incompatible uses adjacent to mineral resources and ensure that resource extraction is compatible with the health and safety of County residents.

Goal NR-3	Facilitate orderly development and extraction of mineral resources while preserving open space, natural resources, and soil resources and avoiding or mitigating significant adverse impacts.

Policy NR-3.1: Soil Protection (RDR/SO)
Protect soil resources from erosion, contamination, and other effects that substantially reduce their value or lead to the creation of hazards.

Policy NR-3.2: Soil Erosion and Contamination (RDR)
Require minimal disturbance of vegetation during construction to improve soil stability, reduce erosion, and improve stormwater quality.

Policy NR-3.3: Soil Improvement (RDR)
Encourage landowners to participate in programs that reduce soil erosion and increase soil productivity. This shall include promoting and coordinating the efforts of University of California Cooperative Extension, various Resource Conservation Districts, and other similar agencies and organizations.

Policy NR-3.4: New Development Compatibility (RDR)
Ensure that new development is compatible with existing and potential surface mining areas and operations as identified on the Mineral Resource Zone Maps prepared by the State Division of Mines and Geology and other mineral resource areas identified by the County. The County shall:

a. Require development applicants near identified mineral resources to prepare a statement that specifies why the County should permit the proposed land use and describe how the benefits of the proposed use would clearly outweigh the impacts that may limit the potential to extract mineral resources in that area.

b. Require new incompatible land uses adjacent to existing mining operations to provide a buffer between the development and adjacent mining operations adequate to mitigate significant impacts to mineral land uses. The buffer distance shall be based on an evaluation of noise, aesthetics, drainage, operating conditions, biological resources, topography, lighting, traffic, operating hours, and air quality.

c. Require written notification to be sent to mining operators and subject landowners of land use entitlement applications for potentially incompatible land uses in areas where mining operations are currently taking place.

Policy NR-3.5: Mineral Resource Protection (RDR)
Require areas identified with mineral deposits on either the State Mine Land Classification Maps provided by the State Mining and Geology Board's Classification Report, or site-specific information, remain protected for possible future mineral extraction. Impose conditions upon new incompatible land uses in areas surrounding identified mineral deposits for the purpose of mitigating significant land use conflicts prior to approving a use that would otherwise be incompatible with mineral extraction. The identified mineral deposit may be determined by the classification maps, Classification Report, separate County maps, or on a site-specific basis.

Policy NR-3.6: Buffers between Mining Operations and Adjacent Uses (RDR)
Require operators of new mines to provide buffers or physical barriers between the mining operation and any existing nearby incompatible land uses when a significant impact is identified during the development review process.

Policy NR-3.7: Merced River Corridor Buffers (RDR)
Require surface mining operations in dredge tailing areas along the Merced River corridor to design riparian vegetation buffers consistent with the Merced River Corridor Restoration Plan.

Policy NR-3.8: Habitat Restoration and Buffer Incentives (RDR)
Support and encourage property owners and surface mining operators to pursue one or more of the following incentives:

a. State and Federal habitat restoration funding for restoring wildlife habitat;

b. Conservation easements following reclamation for restoring wildlife habitat; and

c. Other local, State, and Federal incentives.

Policy NR-3.9: Riparian and Critical Habitat Protection (RDR)
Protect or mitigate, in compliance with local, State, and Federal requirements, areas of riparian vegetation along rivers, streams, and other habitats that support threatened, endangered, or other sensitive species. This shall include:

a. Requiring mining operators that propose mining operations that will have a significant adverse impact on these resources to mitigate to the fullest extent that the California Environmental Quality Act (CEQA) requires for such impacts and obtain the necessary State and Federal permits prior to operation.

b. Encouraging mining operators that impact natural resources to propose an end use that will result in minimal loss of resources.

c. Referring all surface mining applications to the appropriate local, State, and Federal agencies to consult with the agencies regarding project design, mitigation, and reclamation efforts.

Policy NR-3.10: Disturbance to Productive Agricultural Farmland (RDR)
Encourage property reclamation to productive agricultural farmland, rather than habitat or an alternative non-agricultural land use, when a surface mining application involves disturbance of productive agricultural farmland.

Policy NR-3.11: Concurrent Reclamation (RDR)
Require reclamation of mining sites concurrent with extraction activities rather than after extraction has been completed.

Policy NR-3.12: Sand and Gravel Extraction Control (RDR)
Ensure that strict control is maintained on sand and gravel extractions in streambed channels and within areas designated as having sensitive habitat and open space resources.

Policy NR-3.13: Agricultural Land Disturbance (RDR)
Require mining projects to obtain agricultural conservation easements of similar quality to the farmland converted consistent with Implementation Program AG-J at a minimum of 1:1 ratio for each acre of productive agricultural land converted as a result of mining and not returned to agricultural production.

Policy NR-3.14: Residual Mercury Survey and Mitigation Requirement (RDR/SO)
Require the evaluation of existing mercury deposits within dredge tailings for mining, urban development, and infrastructure projects located in the historic dredger tailings along the Merced River or elsewhere in the county, and identify adequate mitigation necessary to prevent the migration of mercury-containing sediments or fines to the Merced River or its tributary waterways, or result in the contamination of adjacent properties as a result of the construction process by severing all exposure pathways that could result in the release of mercury into the aquatic environment.

Policy NR-3.15: Drainage Course Setbacks (RDR/SO/IGC)
Within all areas designated for urban land uses by the 2030 General Plan, all structures, paving, or grading shall be set back from rivers, creeks, channels or other major waterways at least twenty feet from the top of bank or twenty feet plus twice the channel depth measured from the toe of the near embankment, whichever is greater, unless a greater setback is required by state or federal regulation.

SCENIC RESOURCES

The rural and agricultural landscapes provide the primary scenic resources in Merced County. The County also has many scenic vistas, such as the Coastal and Sierra Nevada mountain ranges, and the Los Banos Creek, Merced, San Joaquin, and Bear Creek river corridors. State Route 152 and Interstate 5 are designated scenic routes in parts of the county. Preservation of the County's scenic features, both natural and working landscapes, enhances the amenity value and economic development potential of the County as it adds to the quality of life for existing and future residents. The policies in this section address the management, protection, and preservation of the County's scenic resources. *(Note: See the Land Use Element for additional goals and policies related to urban design).*

Goal NR-4	Protect scenic resources and vistas.

Policy NR-4.1: Scenic Resource Preservation (RDR)
Promote the preservation of agricultural land, ranch land, and other open space areas as a means of protecting the County's scenic resources.

Policy NR-4.2: Special Review Process for Structures Adjacent to Scenic Highways (IGC, RDR)
Coordinate with Caltrans, during the review of proposed structures and activities located adjacent to State-designated scenic highways, to ensure that scenic vistas and local scenic values are not significantly degraded.

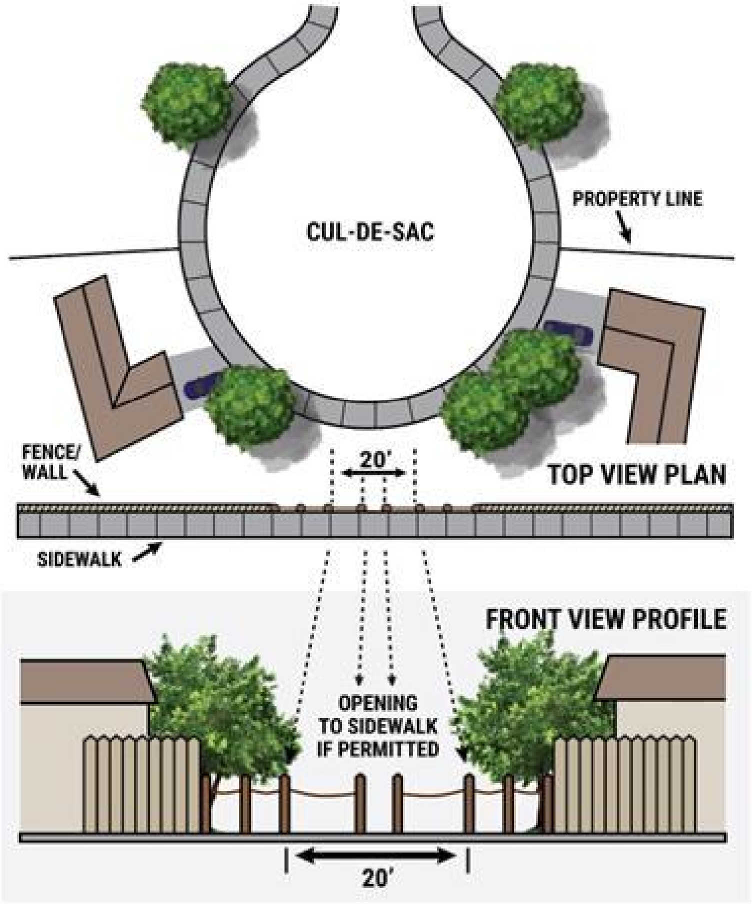
Policy NR-4.3: Building Design (RDR)
Require that siting and design of buildings protect, improve, and enhance the scenic quality of the built and natural environments and take full advantage of scenic resources through site orientation, building setbacks, preservation of viewsheds, height limits, and the use of appropriate construction materials and exterior modulation.

Policy NR-4.4: New Roads (RDR)
Consider the surrounding landscape, topography, and existing scenic values when determining the location and construction of new roads.

Policy NR-4.5: Light Pollution Reduction (RDR)
The County shall develop and implement a lighting ordinance to require good lighting practices, such as the use of specific light fixtures that reduce light pollution, minimize light impacts, and preserve views of the night sky. The ordinance shall contain standards to avoid light trespass, particularly from developed uses, to sensitive wildlife corridors and refuges.

Figure 3-4

Fences, Walls, and Hedges at Ends of Cul-de-Sacs



(Ord. 1976 § 2, 2019).

18.34.050 Screening

Where screening is required in this Code or as a condition of approval, a combination of materials shall be used, including solid masonry walls, wood or chain link fences, berms, and landscaping (See also Section 18.36.050(F) General Landscape Standards: Screening). (Ord. 1976 § 2, 2019).

18.34.060 Noise Barrier

18.36.040 Definitions

Director. Merced County Planning Director or designee.

Friable. Soil condition that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

Mulch. Any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, or decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

Planting Hole. A hole in the ground that is dug for landscaping materials such as trees or shrubs.

Public Works Director. Merced County Public Works Director or designee.

Residential Landscape. Landscapes surrounding single-family or multi-family homes. (Ord. 1976 § 2, 2019).

18.36.050 General Landscape Standards

A. **Plant Materials.** The selection of plant materials shall include:

  1. 90 percent drought-resistant and well-suited to local climate or naturally occurring;

  2. A combination of deciduous and evergreen (trees, shrubs, and groundcover);

  3. Materials which help prevent:

     a. Dust,

     b. Erosion,

     c. Heat and glare,

     d. Graffiti on walls and structures;

  4. 10 percent non-drought tolerant materials may be used if grouped together for possible separate irrigation;

  5. Attention to:

     a. Appearance, including plant height, plant spread and growth rate,

     b. Function of plants,

    c. Moisture requirements,

    d. Potential root damage to adjacent facilities,

    e. Disease and pest susceptibility, and

    f. Other required information including:

        (1) Soil type,

        (2) Slope,

        (3) Degree of maintenance,

    g. Location of plants, so at maturity, plants do not interfere with:

        (1) Service lines,

        (2) Visibility,

        (3) Adjacent property owners, and

        (4) Solar access.

B. **Plant Coverage.**

1. Turf shall be limited to 30 percent of total landscaped area; exceptions may be granted by the Director.

2. Trees and shrubs shall be clustered together for accent to form aesthetically-pleasing groupings and patterns.

3. The density and placement of plants are to be determined by the plant size at maturity. When initially installed, groundcover shall give enough coverage for a pleasing appearance on all landscaped areas.

4. Shrubs shall be a minimum size of one gallon and trees a minimum size of 15 gallons.

5. Interim groundcover may be provided until plants reach maturity. Groundcover materials may consist of:

    a. Rocks,

    b. Gravel, or

    c. Wood mulch or chips.

C. Plan shall follow any project specific conditions of approval.

D. **Planter Construction.**

1. All planter areas shall provide positive drainage flow away from paved areas or intrusion into or on adjacent buildings or structures.

2. Planter areas shall have either a six-inch raised concrete or treated wooden curb directly behind sidewalks and paved areas or shall be recessed two inches below adjoining paved areas, with a minimum 4:1 slope away from paved edge to protect the landscaping and control water runoff, silt, and erosion onto the paved area.

3. The size and location of planter areas required in this chapter shall be shown on the approved plot plan, concept plan, or in the conditions of approval.

4. Minimum widths for planter beds shall be (measured from the inside of curbing or acceptable permanent border):

   a. 12 inches for groundcover;

   b. 40 inches for shrubs; and

   c. 60 inches for trees.

E. **Compacted Soils.** Prior to the planting of any materials, the compacted soils surrounding a building site shall be returned to a friable condition.

F. **Screening.**

1. Developments shall provide sufficient screening so that neighboring properties are effectively shielded from any adverse impacts of that development or so that the new developing use shields itself from existing potential impacts from uses already in operation. No screening is required between single-family residences.

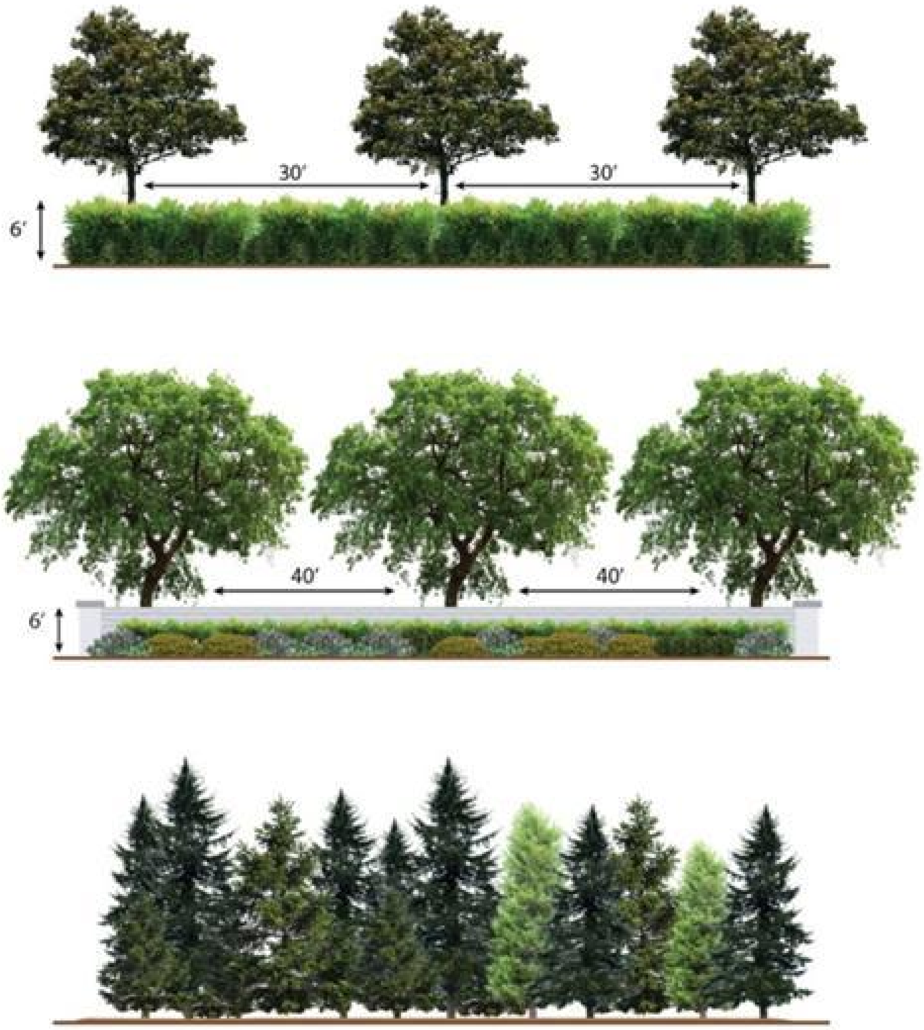
2. Tables 3-3 through 3-5, set forth the type of screening methods required between various uses to buffer potential negative impacts.

3. The three basic types of screens that are established by Table 2-3, Residential, Institutional, and Office Adjacent Use Screening Requirements, are as follows (see also Figures 3-6, 3-7, and 3-8):

   a. **Opaque Screen—Type A.** An opaque screen is intended to exclude all visual contact between uses and to create a strong impression of spatial separation. This screen is opaque from ground level to a height of at least six feet, with intermittent visual obstructions from the opaque portion to a height with landscaping of at least 20 feet. The opaque screen may be composed of a wall, fence, and/or landscape berm densely planted with vegetation. Proposed planted screens will be judged on the basis of the average mature height and density of foliage of the subject species, or field observation of existing vegetation. The opaque portion of the screen must be opaque in all seasons of the year. At maturity, the screen should not contain any completely unobstructed openings more than five feet wide. See Figure 3-6 (Opaque Screens—Type A).

Figure 3-6

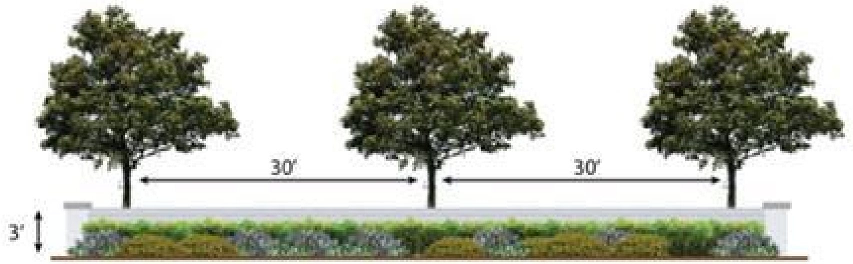
Opaque Screens—Type A

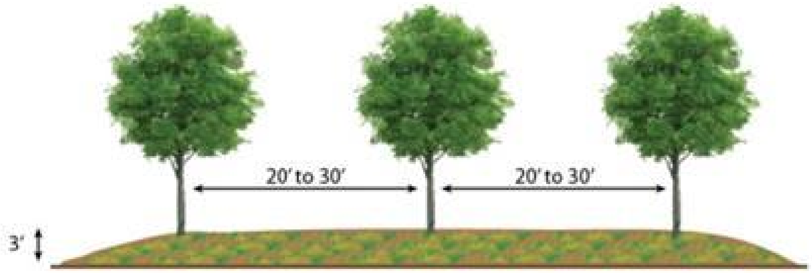


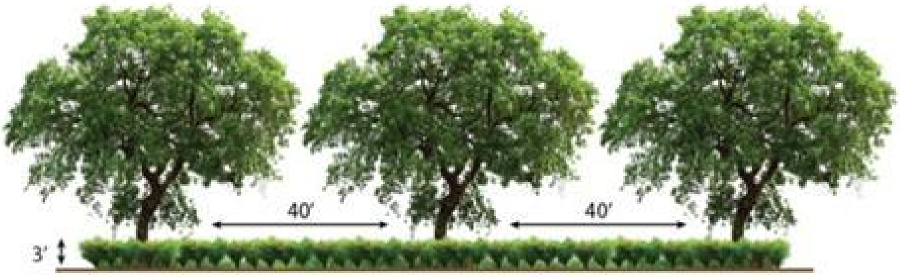
b. **Semi-Opaque Screen—Type B.** The semi-opaque screen is intended to partially block visual contact between uses and to create a strong impression of the separation of spaces. This screen is opaque from the ground to height of at least three feet, with intermittent visual obstruction from above the opaque portion to a height with landscaping of at least 20 feet. The semi-opaque screen may be composed of a wall, fence, and/or landscaped berm, or planted vegetation. Proposed planted screens will be judged on the basis of the average mature height and density of foliage of the subject species, or field observation of existing vegetation. At maturity, the portion of intermittent visual obstructions should not contain any completely unobstructed openings more than 15 feet wide. See Figure 3-7 (Semi-Opaque Screens—Type B).

Figure 3-7

Semi-Opaque Screens—Type B







c. **Broken Screen—Type C.** The broken screen is intended to create the impression of a separation of spaces without necessarily eliminating visual contact between the spaces. This screen is composed of intermittent visual obstructions from the ground to a height with landscaping of at least 20 feet. It may be composed of a wall, fence, and/or landscaped earth berm or planted vegetation. Proposed planted screens or natural vegetation will be judged on the basis of the average mature height and density of foliage of the subject species, or field observation of existing vegetation. The screen may contain deciduous plants. See Figure 3-8 (Broken Screens—Type C).

Figure 3-8

Broken Screens—Type C

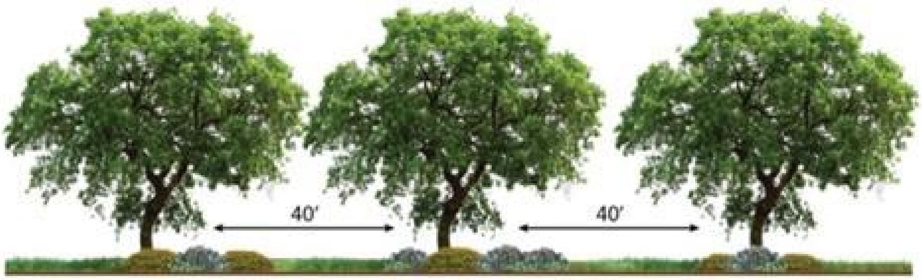


Table 3-3

Residential, Institutional, and Office Adjacent Use Screening Requirements

O	Opaque
SO	Semi-Opaque
B	Broken
-	No Requirement

	Adjacent Existing Uses					
Proposed Land Use	**One- and Two-Family**	**Multi-Family**	**Mobile and Modular Home Parks**	**Group Care Facilities**	**Schools, Places of Assembly, Hospitals**	**Offices**

	Adjacent Existing Uses					
Proposed Land Use	**One- and Two-Family**	**Multi-Family**	**Mobile and Modular Home Parks**	**Group Care Facilities**	**Schools, Places of Assembly, Hospitals**	**Offices**
Residential						
One- and Two-Family Subdivisions	-	O	O	O	O	O
Multi-Family Residences	O	B	SO	O	SO	SO
Mobile and Modular Home Parks	O	SO	B	SO	SO	SO
Group Care Facilities	O	O	O	B	B	SO
Office and Financial						
All Offices Including Medical	O	SO	SO	O	-	-
Institutional						
Schools, Libraries, Places of Assembly, Hospitals, Clinics, and Clubs	O	SO	SO	O	-	B
Commercial						
Retail Sales	O	O	O	O	SO	-
Auto Service and Equipment Rental (with outdoor storage)	O	O	O	O	SO	O
Commercial Storage	O	O	O	O	O	O
Hotels, Motels, Restaurants, and Nightclubs	O	O	O	O	O	B
Veterinarian Hospitals with Boarding and Kennels	O	O	O	O	O	O
Manufacturing and Storage						
Uses Conducted Totally Indoors	O	O	O	O	O	O
Uses Conducted Substantially Outdoors	O	O	O	O	O	O
Scrap Materials, Salvage Yard	O	O	O	O	O	O

	Adjacent Existing Uses					
Proposed Land Use	One- and Two-Family	Multi-Family	Mobile and Modular Home Parks	Group Care Facilities	Schools, Places of Assembly, Hospitals	Offices
Public Utility Installations						
Fully Enclosed in a Structure	O	O	O	SO	SO	SO
Partially Enclosed in a Structure	O	O	O	O	O	O

Table 3-4

Commercial Adjacent Use Screening Requirements

O	Opaque
SO	Semi-Opaque
B	Broken
-	No Requirement

	Adjacent Existing Uses				
Proposed Land Use	Retail Sales	Auto Service and Equipment Storage	Commercial Storage	Hotels, Motels, Restaurants, Nightclubs	Veterinarian Hospital with Boarding and Kennel
Residential					
One- and Two-Family Subdivisions	O	O	O	O	O
Multi-Family Residences	SO	O	SO	SO	O
Mobile and Modular Home Parks	SO	O	SO	SO	O
Group Care Facilities	O	O	O	O	O
Office and Financial					
All Offices Including Medical	-	-	-	-	-
Institutional					
Schools, Libraries, Places of Assembly, Hospitals, Clinics, and Clubs	B	-	-	B	-

	Adjacent Existing Uses				
Proposed Land Use	**Retail Sales**	**Auto Service and Equipment Storage**	**Commercial Storage**	**Hotels, Motels, Restaurants, Nightclubs**	**Veterinarian Hospital with Boarding and Kennel**
Commercial					
Retail Sales	-	-	-	-	-
Auto Service and Equipment Rental (with outdoor storage)	SO	-	-	O	-
Commercial Storage	SO	-	-	SO	-
Hotels, Motels, Restaurants, and Nightclubs	-	-	-	-	-
Veterinarian Hospitals with Boarding and Kennels	O	SO	-	O	-
Manufacturing and Storage					
Uses Conducted Totally Indoors	SO	-	-	O	-
Uses Conducted Substantially Outdoors	O	SO	B	O	SO
Scrap Materials, Salvage Yard	O	O	O	O	SO
Public Utility Installations					
Fully Enclosed in a Structure	SO	-	-	B	-
Partially Enclosed in a Structure	O	SO	SO	O	B

Table 3-5

Manufacturing and Storage, Public Utility Installations Adjacent Use Screening Requirements

O	Opaque
SO	Semi-Opaque
B	Broken
-	No Requirement

	Adjacent Existing Uses				
Proposed Land Use	**Uses Fully Indoors**	**Uses Substantially Outdoors**	**Scraps Materials and Salvage Yards**	**Fully Enclosed in a Structure**	**Partially Enclosed in a Structure**

Residential					
One- and Two-Family Subdivisions	O	O	O	O	O
Multi-Family Residences	B	O	O	B	O
Mobile and Modular Home Parks	B	O	O	B	O
Group Care Facilities	B	O	O	B	O
Office and Financial					
All Offices Including Medical	-	-	-	-	-
Institutional					
Schools, Libraries, Places of Assembly, Hospitals, Clinics, and Clubs	-	-	-	-	-
Commercial					
Retail Sales	-	-	-	-	-
Auto Service and Equipment Rental (with outdoor storage)	B	-	-	-	-
Commercial Storage	-	-	-	-	-
Hotels, Motels, Restaurants, and Nightclubs	-	-	-	-	-
Veterinarian Hospitals with Boarding and Kennels	-	B	-	B	-
Manufacturing and Storage					
Uses Conducted Totally Indoors	-	-	-	B	SO
Uses Conducted Substantially Outdoors	O	-	-	SO	-
Scrap Materials, Salvage Yard	SO	B	-	SO	SO
Public Utility Installations					
Fully Enclosed in a Structure	-	-	-	-	-
Partially Enclosed in a Structure	B	B	-	B	-

G. **Parking Lots.** When the total uncovered parking area on the property (including adjoining parcels over which the property has parking privileges) exceeds 3,600 square feet, the following shall be required, in addition to other provisions of this section, as part of a landscape plan:

1. **Separation of Uses.** Where nonresidential parking areas abut residentially zoned or developed property, a masonry wall, of not less than six feet in height, shall be constructed and maintained with shrubs and/or vines between the parking area and the adjoining residentially zoned or developed property.

2. **Shade Trees.** Where trees already exist on the property, the design of the parking area should make the best use of the existing growth and shade.

3. **Planter Islands.** Planter islands shall be located at least every six parking spaces and shall be designed as follows:

   a. **Minimum Width.** Five feet where separate wheel stops are provided two feet away from the planter island, nine feet if cars overhang. Figure 3-9 (Parking Lot Landscaped Areas).

   b. **Curbing and Landscaping Required.** Planter islands shall be surrounded by six-inch-wide curbing and landscaped.

   c. **Required Trees.** Each planter island shall include one shade tree. See Figure 3-10 (Parking Lot Landscaping Tree Spacing).

   d. **Curbing at Island Ends.** Rounded curbing is required with a minimum radius of three feet, or half the planter width.

4. **Perimeter Landscaping.** All parking lots shall provide a perimeter landscape strip, a minimum of five feet wide where wheel stops are placed two feet away from the landscaping strip; a minimum of seven feet wide if cars overhang; and 10 to 20 feet wide where the parking lot abuts a residentially-zoned parcel. Perimeter landscaping shall be protected by a six-inch curb.

Figure 3-9

Parking Lot Landscaped Areas

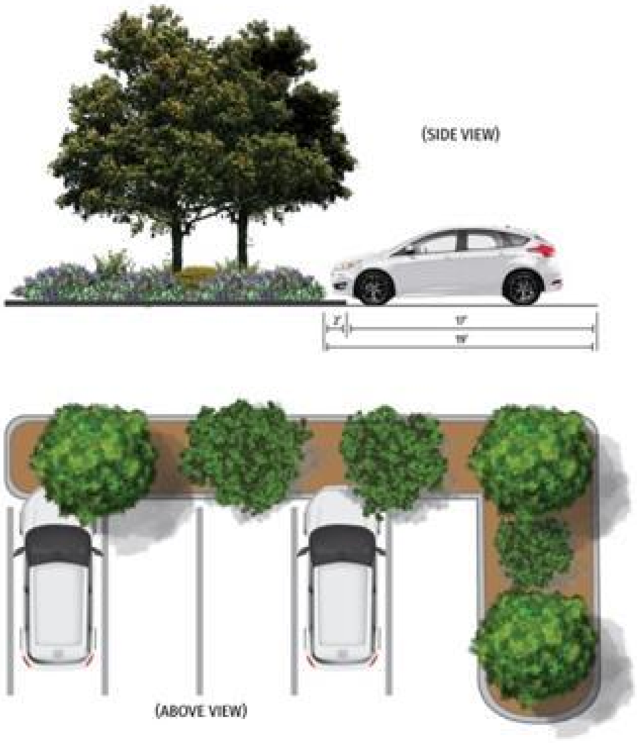
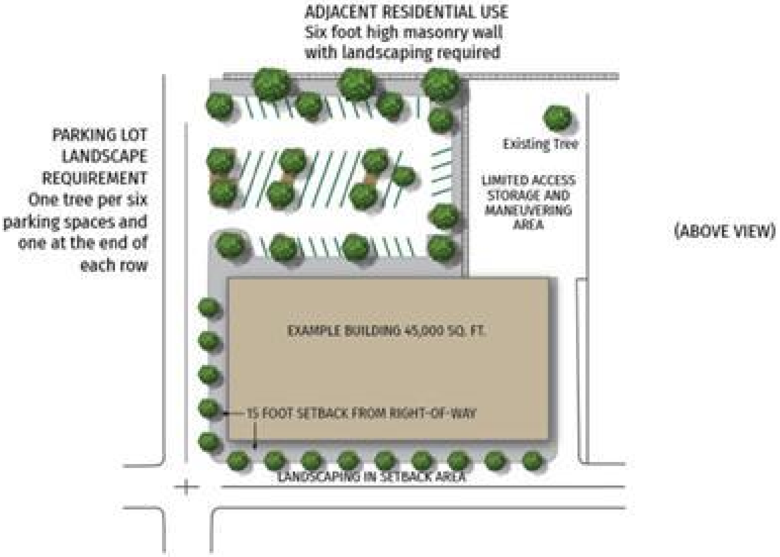


Figure 3-10

Parking Lot Landscaping Tree Spacing



H. **Street Trees.**

1. Street trees shall be required to meet three of the purposes listed at the beginning of this chapter:

   a. Aesthetic enhancement of new development;

   b. Promote the conservation of water using indigenous and drought-tolerant species; and

   c. Reduce heat and glare and balance solar insulation or solar gain.

2. Street trees shall be planted by subdivision developers in the following residential zone (See Table 3-6: Residential Front Setback Landscaping):

   a. M-H (Single-family mobile home residential);

   b. R-1 (Single-family residential);

   c. R-1-5000 (Single-family residential); and

   d. R-2 (Two-family residential).

3. Street trees shall be planted subject to the following:

   a. The location and type of tree shall be approved by the Department and the Department of Public Works.

b. The types of trees should be limited to those that are not conducive to damaging house foundations or sidewalks. One specific species of drought-resistant tree should be required per subdivision.

c. The type of tree shall be determined prior to the recording of the final map and installed prior to occupancy of each residence unless approved otherwise.

d. An adequate means of maintenance shall be provided subject to the approval of the Department and the Department of Public Works.

4. **Street Tree Replacement.** If a street tree is removed, it shall be replaced with another street tree. (Ord. 1976 § 2, 2019).

18.36.060 Residential Zone Landscape Standards

A. **Applicability.** Residential development shall incorporate landscaping in all yard areas that are not specifically used for driveways, walkways, patios, or similar purposes. Residential landscaping shall be approved by the Department and shall be in compliance with the regulations of this chapter.

1. Residential development located in the R-3 and R-4 zones shall have a minimum of 25 percent of the required landscaped area be usable as open recreational area. Landscaping shall be used to manage and treat stormwater to the maximum extent feasible; see Table 3-6 (Residential Front Setback Landscaping).

2. Residential development located in the R-1, R-1-5000, M-H, and R-2 zones shall have a minimum of 35 percent of the required landscaped area be usable as open recreational area. Landscaping shall be used to manage and treat stormwater to the maximum extent feasible; see Table 3-6 (Residential Front Setback Landscaping).

B. **Fences and Walls.** See Chapter 18.34 (Fences, Walls, and Hedges).

C. **Sight Distance.** All landscape treatments, walls, berms, and plants shall comply with the sight distance requirements in County Code Chapter 13.24 (Sight Distance at Public Intersections and Private Driveways).

Table 3-6

Residential Front Setback Landscaping

Residential Zone	Front Setback (feet)	Frequency	Additional Requirements
R-1	15 ft	One tree per parcel	
R-1-5000	15 ft	One tree per parcel	
M-H	10 ft	One tree per parcel	
R-2	20 ft	One tree per parcel	
R-3	20 ft	-	18.36.050(F)

18.120.080 Post-Decision Procedures

The procedures and requirements in Chapter 18.130 (Permit Implementation, Time Limits, and Extensions), and those related to appeals and revocation in Article 7 (Zoning Code Administration) shall apply following the decision on a Reasonable Accommodation application. (Ord. 1976 § 2, 2019).

Chapter 18.122 SITE PLAN AND DESIGN REVIEW

18.122.010 Purpose

A. **Purpose.** The purpose of this chapter is to provide a process for the appropriate review of development projects by the applicable Review Authority specified in Table 6-3 (Review Authority for Site Plan and Design Review).

B. **Intent.** The intent of this chapter is to ensure that all approved site and structural development:

1. Promotes the orderly development of the County in compliance with the goals, objectives, and policies of the General Plan, any applicable specific plan, the applicable standards specified in this Zoning Code, and any applicable design guidelines;

2. Respects the physical and environmental characteristics of the site;

3. Ensures safe and convenient access and circulation for pedestrians and vehicles;

4. Exemplifies high-quality design practices;

5. Encourages the maintenance of a distinct neighborhood and/or community identity; and

6. Minimizes or eliminates negative or undesirable visual impacts. (Ord. 1976 § 2, 2019).

18.122.020 Applicability

A. **When Required.** The following types of projects require a Design Review Permit:

1. Three or more new residential units.

2. One or more new residential unit on a sensitive site as defined in subsection C (Sensitive Sites) below.

3. New non-residential buildings, structures physical site improvements determined to be significant in accordance with subsection B (Significant Projects) below.

	Review Level(1)(2)	
	Director	**Commission(3)**
Comprehensive sign programs	Decision	Appeal
Signs (excluding freeway and monument signs) permanent and temporary	Decision	Appeal
Freeway signs	Decision	Appeal
Monument signs	Decision	Appeal
Other Review		
Joint and off-site parking plans	Decision	Appeal
Outdoor dining	Decision	Appeal
Planned development permits	Decision	Appeal
Subdivisions/condominiums	Decision	Appeal

Notes:

1. “Decision” is a discretionary action where the Review Authority makes the final decision on the matter; “Appeal” means that the Review Authority may consider and decide upon an appeal of the decision of the previous Review Authority, in compliance with Chapter 18.144 (Appeals); “Recommend” means that the Review Authority should provide preliminary review and forward input to the next higher Review Authority for consideration.

2. The Director may defer action and refer the request to the Commission for the final decision.

3. All decisions of the Commission are appealable to the Board in compliance with Chapter 18.144 (Appeals).

B. **Determination of Review Authority by Director.** The applicable Review Authority for items not listed in Table 6-3 shall be determined by the Director. (Ord. 1976 § 2, 2019).

18.122.040 Application Filing, Processing, and Review

A. **Application Filing.** All projects subject to review shall require an application for a Site Plan and Design Review which shall be filed and processed in compliance with Chapter 18.112 (Application Processing Procedures). The application shall include the information and materials specified in the most up-to-date Department handout for Site Plan and Design Review applications, together with the required fee in compliance with the Fee Schedule. It is the responsibility of the applicant to provide evidence in support of the findings required by Section 18.122.050 (Findings and Decision). Initial review of the application, including time requirements and requests for information, shall be as provided in Section 18.112.070 (Initial Application Review).

B. **Review with Other Land Use Applications.** If the project for which the request for Site Plan and Design Review is being made also requires some other discretionary approval (e.g., Conditional Use Permit), the applicant shall file the information required by subsection A (Application Filing), together for concurrent review with the application for discretionary approval.

C. **Application Review.**

1. The Director shall review each application for a Site Plan and Design Review to ensure that the application is consistent with the purpose of this chapter; applicable development standards and regulations of this Zoning Code; any applicable policies of the General Plan; and any design guidelines and policies that may apply.

2. After the Director deems the Site Plan and Design Review application complete, the Review Authority shall either approve or deny the Site Plan and Design Review application and, if approved, may impose conditions deemed reasonable and necessary to protect the public health, safety, and general welfare and ensure compliance with this chapter and various regulations of the County in compliance with Section 18.122.050 (Findings and Decision).

D. **Standards of Review.** When reviewing development plans that are subject to Site Plan and Design Review, the following criteria, in addition to other principles of good design, shall be considered as part of the review:

1. **Compatibility.** Compatibility shall be ensured and determined by use of the following criteria:

    a. The arrangement, design, location, and size of all structures should be visually harmonious with the project site and with the surrounding sites and structures.

    b. New development, alteration, and/or enlargement of existing development should enhance and improve the appearance of the project vicinity and be compatible with the character and quality of surrounding development.

    c. The proposed development should protect the development site as well as surrounding properties from noise, odor, vibration, and other impacts that may have an adverse impact.

    d. The height and bulk of proposed structures on the site should be in scale with the height and bulk of structures on surrounding sites and should not visually dominate or call undue attention to the site.

    e. The location and configuration of structures should minimize interference with the privacy and views of occupants of surrounding structures.

2. **Architectural Design and Detail.** Architectural design and detail shall be provided in all proposed development and shall be determined by use of the following criteria:

    a. Every effort should be given to design new structures in keeping with a recognized and established architectural style using structure articulation, structure colors, fenestration, massing, materials, scale, and other architectural elements of that style.

b. Elements of good urban design and architecture should be implemented in all projects.

c. Where no consistent architectural style or pattern is present, structure design and massing should be used to complement existing development.

d. Architectural treatment of all structures located on a site should be visually coordinated and, if possible, architecturally compatible with the surrounding area.

e. Long, unembellished structure walls should be avoided by incorporating structure articulation (e.g., arcades, decks, material variation, porches, public art, roofline variation, varied setbacks, and window(s) and other similar methods).

f. Garish, inharmonious, or out-of-character colors should not be used on any structure, face, or roof visible from the street or from an abutting site.

g. Roof-mounted equipment shall be fully screened. Acceptable methods of screening may include parapet walls or some other creative manner as an architectural solution. Individual equipment screens may only be used for structures after all other methods of screening have been explored.

h. Rooflines on a structure should create design interest and be compatible throughout the structure and with existing structures and surrounding development.

i. The design of the structures, driveways, landscaping, lighting, loading facilities, parking areas, signs, solar facilities, and other sight features should show proper consideration for the functional aspects of the site (e.g., vehicular or vehicle pedestrian, bicycle circulation) and the visual effect of the development on surrounding development.

j. Pedestrian amenities (e.g., arbors, architectural lighting, fountains, hardscape, public art, trellis) and other design features should be provided on larger development projects.

k. Green building practices should be used whenever feasible.

l. Electrical equipment (e.g., switchgear and similar items) should be located within an electrical room and integrated into the structure’s footprint.

m. Interior roof access shall be used. Exterior roof ladders are prohibited.

3. **Landscape, Lighting, Parking, Signs, and Other Design Details.** Landscaping, lighting, parking, signs, and other design details shall be provided in all proposed development and shall be determined by use of the following criteria:

a. **Equipment and Utilities.**

(1) Utility boxes and other similar equipment should be located where they are well screened from public view.

(2) Mechanical equipment on the site shall be appropriately screened from public view.

(3) When possible, all utilities should be installed underground.

b. **Fences/Walls.**

(1) Fencing, walls, solid waste enclosures, and accessory structures should be harmonious with the principal structure and other structures on the site.

(2) Retaining walls that are visible from public views should be limited in height, whenever possible. Decorative block should be used for all retaining walls and shall be finished with graffiti proof paint. When taller retaining walls are necessary, they should be designed to reduce visual impact.

c. **Landscaping.**

(1) Landscaping should be designed in a way as to accent the property. Special effort should be given to colorful, creative, and varied planting designs that use native and native-compatible species that provide visual interest and water efficiency.

(2) Attention shall be given to selecting parking lot trees that provide the maximum amount of shade.

(3) When mature trees are present on a site, every effort should be made to assess the value of the trees and, if reasonable, the trees should be incorporated into the proposed landscape plans. Allow only aphid resistance and other undesirable pest resistant type trees.

(4) Pedestrian paths should be incorporated into site design to provide access and visual interest and to provide the most effective pedestrian access to structures.

(5) Decorative hardscape should be integrated into project areas to provide visual interest.

(6) In the parking and driveway areas, decorative hardscape should be used at driveway access points and nodes in the parking area.

(7) In pedestrian areas, decorative hardscape should be used near entries, within patio areas, and at other focal points in the project.

(8) All landscaping shall conform to the provisions of Chapter 18.36 (Landscaping).

d. **Outdoor Lighting.**

(1) Lighting shall be located so as to avoid glare and to reflect the light away from abutting property and rights-of-way while recognizing the importance of security.

(2) Wall-mounted lighting fixtures should be decorative and be compatible with the architectural style of the structure(s). Wall packs and fixtures that spread uncontrolled light shall be prohibited.

(3) Pole-mounted lighting should be of an appropriate scale to complement the structure that it serves. Wherever possible, decorative poles and fixtures should be used.

(4) All outdoor lighting shall conform to the provisions of Section 18.40.070 (Outdoor Lighting).

e. **Parking.**

(1) Parking and loading facilities should function efficiently with minimum obstruction of traffic on surrounding streets while facilitating on-site circulation.

(2) Wherever possible, driveway access to parking areas should have as shallow of a slope as possible to provide proper drainage and facilitate ease of access.

(3) All parking and loading facilities shall conform to the provisions of Chapter 18.38 (Off-Street Parking and Loading).

f. **Signs.**

(1) Signs should be creatively designed so as to improve the aesthetic aspects of the development as well as identify a business or location.

(2) With a focus on graphic design, signs shall be clearly readable and shall utilize materials, textures, colors, and illumination that complement the structure and site design.

(3) Consideration should be given to the location and size of signs to ensure visual compatibility and vehicular and pedestrian safety.

(4) Landscaping shall be incorporated into the design and installation of ground-mounted signs.

(5) All signs shall conform to the provisions of Chapter 18.44 (Sign Regulations).

g. **Crime Prevention Through Environmental Design.** All applicable development projects shall be designed to appropriately incorporate Crime Prevention Through Design (CPTED) design principles.

E. **On-Site Inspection.** An application for a Site Plan and Design Review may require that the Director perform an on-site inspection of the subject parcel before confirming that the request complies with all of the applicable criteria and provisions specified in this chapter.

F. **Public Notice and Hearing.**

1. Public notice of a pending action on a Design Review Permit application, reviewed by the Director, shall be provided in compliance with Section 18.146.020(C) (Public Notice—Alternative Notice for Director's Decision Without a Public Hearing). The Director, as Hearing Officer, shall only hold a public hearing for a Design Review Permit application upon receiving a written request for a public hearing.

2. If a Design Review Permit application is referred to the Commission or Board, the Design Review Permit shall only be reviewed and acted upon at a noticed public hearing in compliance with Chapter 18.146 (Public Notices).

G. **Appeal Provisions.** The Review Authority's decision may be appealed in compliance with Chapter 18.144 (Appeals). (Ord. 1990 § 1, 2020; Ord. 1976 § 2, 2019).

18.122.050 Findings and Decision

A. **Meets Requirements of This Chapter.** The Review Authority shall determine whether or not the Site Plan and Design Review application meets the requirements of this chapter.

B. **Referral of Application.**

1. The Director may defer action and refer the application to the next higher Review Authority for the final decision.

2. The referral shall be placed on the agenda of the next available regular Hearing Officer meeting following the referral.

C. **Discretionary Review by Other Review Authority.**

1. If the application is filed concurrently with another discretionary land use application, the decision to approve or deny the Site Plan and Design Review shall be made by the authority responsible for reviewing the other discretionary land use application in compliance with the applicable review procedure for the other discretionary review and Table 6-1 (Review Authority).

2. The decision to approve or deny the Site Plan and Design Review shall be made in compliance with subsection E (Required Findings).

D. **Review Authority's Action.**

1. An application for a Site Plan and Design Review may be approved, conditionally approved, or denied by the Review Authority.

2. The Director or Commission shall consider an application in a timely manner after it is deemed complete. A decision of the Director or Commission shall be made in writing.

3. The written decision including any findings and/or conditions of approval shall be mailed to the applicant and kept on file in the Department.

E. **Required Design Findings.** The Review Authority may approve a Site Plan and Design Review application, only after first making all of the following findings. The proposed development is:

1. Consistent with the General Plan and any applicable specific and community plans and is in compliance with all applicable provisions of this Zoning Code and all other County ordinances and regulations;

APPENDIX B

Air Quality, Health Risk, and Climate Change Impact Assessment (Sespe, 2024)

SESPE
CONSULTING, INC.
A Trinity Consultants Company
3990 Old Town Ave. Suite A203 • San Diego, CA 92110 • Office (619) 894-8669 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Los Banos Quarry Project
Merced County, California

February 2, 2024

Prepared for:
Triangle Rock Products, LLC
31 Rancho Camino Drive, Suite 300
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Prepared by:
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Scott Cohen, P.E., C.I.H. – Principal Engineer

Andre Almeida 2/2/2024
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AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Los Banos Sand and Gravel Quarry
Merced County, California
February 2, 2024

EXECUTIVE SUMMARY

Triangle Rock Products dba Triangle Rock Products, LLC (Triangle) currently operates an approximately 607-acre surface mining, processing, and hot mix asphalt production facility in Merced County (“County”), known as the Los Banos Sand and Gravel operation (“Facility” or “Los Banos Facility”). To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot mix asphalt and ready-mix concrete (RMC) products, Triangle desires to augment the existing sand and gravel reserves by extracting materials from two additional properties, the Turner and Sunset properties (the “Project sites”), which adjoin the existing operations. Extraction of materials from these Project sites would ensure Triangle could maintain existing processing and export throughput levels from the Los Banos Facility.

The aggregate material extracted from the Project sites would be transferred via internal haul trucks and scrapers (no haul trucks would enter/exit onto public roads) to the existing processing plant at the Los Banos Facility. In the same manner as presently occurs, material would then be processed and shipped to delivery locations throughout the region, or used onsite to produce hot mix asphalt or transferred for use by a separately owned and operated ready-mix concrete plant. No material processing would occur on the Project sites. This Air Quality, Health Risk, and Climate Change Impact Assessment (Report) has been prepared to quantify and determine the significance of air quality, health risk, and climate change impacts associated with the Project pursuant to the California Environmental Quality Act (CEQA).

The following Project activities and features would potentially affect air emissions and are assessed within this Report.

- Site preparation, including clearing the site, removal and salvaging of topsoil and subsoil;
- As needed, construction of perimeter earthen berms approximately 4.5- to 7-foot-high along the Project site perimeters for topsoil/subsoil salvage and storage;
- Surface mining and conveyance of approximately 1.03 million tons of material per year, based on market demand;
- Temporary stockpiling and transfer of recovered material via haul truck to the existing Facility;
- Operation of mobile mining equipment;

- Various site improvements for access, safety, and other requirements; and
- Post-mining reclamation and revegetation to open space.

Processing levels will remain unchanged on the existing Facility, therefore materials extracted from the Project sites will substitute for materials mined in existing mining areas. Project emissions are quantified by comparing existing emissions occurring in mining areas of the existing Los Banos Facility to emissions that will occur on the Project sites (i.e., Turner and Sunset properties).

The Report has the following findings with respect to Air Quality and Greenhouse Gasses (GHG), which address the specific impact statements within the CEQA Guidelines Appendix G Environmental Checklist Form (California Code of Regulations, Title 14):

1. Air Quality

a) The Project would NOT conflict with or obstruct implementation of any applicable air quality plan. Potential conflicts with applicable air quality plans have been analyzed and ruled out (see Section 2.5.1).

The Project would be required to comply with regional air quality rules promulgated by the SJVAPCD and participate in reducing air pollutant emissions. Resource extraction would continue to occur at existing rates. Mining does not induce growth, and the amount of material mined on an annual basis would remain unchanged. Aggregate mining is a result of population growth, which is considered in air quality plans. Therefore, Project would not obstruct implementation of applicable SJVAPCD air quality plans and therefore be less than significant.

b) The Project would NOT result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable Federal or State ambient air quality standard (see Section 2.5.2).

Table ES-1 presents Project annual emissions for each criteria pollutant and the associated significance criteria established by SJVAPCD. As required by CEQA, the level of significance is determined by the net change (or increment) between pre-project environmental conditions (i.e., existing or Baseline) and post-project (i.e., future, or simply Project) environmental conditions. Because regulatory requirements now require cleaner engines and the use of new technology to be phased in over the coming years, some Project source emission values shown in Table ES-1 are negative. Negative values represent a reduction in emissions from Baseline due to cleaner engines or new technologies being phased in through the life of the Project. This is demonstrative of the Project paying its fair share to reduce cumulatively considerable impact.

If a project will comply with the requirements in a previously approved plan or mitigation program, including but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located, then the project's incremental contribution to a cumulative effect is not cumulatively considerable (CEQA Guidelines §15064(h)(3)).

Table ES-1 Annual Project Emissions and Comparison to APCD Significance Criteria

Criteria Pollutant	Project Permitted Sources (tons/yr)	Permitted Sources Significance Threshold (tons/yr)	Exceeds Permitted Sources Threshold?	Project Permit Exempt Sources (tons/yr)	Permit Exempt Sources Significance Threshold	Exceeds Permit Exempt Threshold?
ROG	0	10	No	-0.048	10	No
CO	0	100	No	-0.13	100	No
NO_x	0	10	No	-0.90	10	No
PM_{10} (total)	0	15	No	-50.04	15	No
$PM_{2.5}$	0	15	No	-10.65	15	No
SO_X	0	27	No	0.00	27	No

Source: Appendix C.

Note: Negative values result when the Project emissions are less than the Baseline emissions and represent emissions reductions due to newer technology and lower emission equipment.

The Project's "Permitted" sources include stockpiles only, which would have the same emissions levels as in the Baseline, therefore resulting in no Project emissions as shown above.

Impact analysis for a project's potential to exceed or contribute to exceedance of an ambient air quality standard (AAQS) normally involves modeling emissions to predict the concentration of pollutant(s) at the property line. However, SJVAPCD has established a screening level of 100 lb/day for criteria pollutants. SJVAPCD allows emission reduction from the implementation of project design features and mitigation measures to be included in the screening analyses. Project emissions are compared to the 100 lb/day screening level as shown in Table ES-2.

Table ES-2 Project On-site Daily Emissions and Model Screening Level Comparison

Criteria Pollutant	CO lbs/day	NO_x lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day	SO_x lbs/day
Baseline	48	60	1,475	315	0.18
Project	78	74	870	187	0.32
Change in Emissions due to Project	+31	+13	-605	-129	+0.14
Screening Criteria	100	100	100	100	100
Exceeds Criteria?	No	No	No	No	No

Source: Appendix C.

Project Impact represents the difference between the future operations with Project compared to the existing Baseline.

As shown in Tables ES-1 and ES-2, PM_{10} emissions increases associated with the Project do not exceed applicable screening thresholds.

c) The Project would not expose sensitive receptors to substantial pollutant concentrations (see Section 2.5.3).

Table ES-3 presents health risk assessment results for the Project and compares them to applicable thresholds. Health risk is determined based on the change in conditions associated with the implementation of the Project. Baseline risk is modeled as negative risk (emissions going away), and Project risk is modeled as positive (new emissions). In many cases, future Project emissions end up being lower than those in the Baseline, due to newer technologies and updated regulations. In such cases, risk to receptors may be reduced compared to today, as the Project results in a reduction of emissions over time. In cases where risk to a receptor is greater in the Baseline than in the Project, the risk is represented as a negative number.

Table ES-3 Project Health Risk Impacts and Comparison to Significance Thresholds

Receptor Figure Label – Type	Receptor Model ID #	Excess Cancer Cases per Million People Exposed	Chronic Hazard Index	Acute Hazard Index
1 – Residential – MEIR Cancer, Chronic, Acute	6635	8.4	0.24	0.09
23 – Worker – MEIW	6657	<0	<0.01	<0.01
Significance Threshold	**N/A**	**20**	**1.0**	**1.0**
Threshold Exceeded?	**N/A**	**No**	**No**	**No**

Source: Appendix E.

Note: These receptors represent locations of highest exposure. Discrepancies between table and appendix values may exist due to rounding. Less than zero (negative) values represent risk levels that when compared to Baseline levels are less than the Baseline level – resulting in a beneficial impact.
MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact
PMI is Receptor 6692 located at the facility boundary and has an Acute HI of 0.67773, see Appendix D for further detail.
Worker risk is calculated based on a 25 year timeframe and varies based on timeframe chosen, but in each case is less than stated values.

As demonstrated by Table ES-3, the Project's health risk was determined to be less than significant.

d) The Project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people (see Section 2.5.4).

Baseline conditions include similar sources to the Project sources that could cause odor. SJVACPD provides a screening table of facilities that are considered sources of significant odors. Aggregate mining and processing facilities are excluded from the SJVAPCD list of potential significant odor generating sources. In addition, SJVAPCD has regulations that require facilities not to present a nuisance to the adjacent areas. Odor complaints are addressed under the SJVAPCD nuisance rule (Rule 4102). The Project would comply with SJVAPCD rules and regulations. Therefore, Project impact related to odor is less than significant.

2. Greenhouse Gasses (GHGs)

Project GHG emissions are presented in Table ES-4.

Table ES-4 Project GHG Emissions

Source	CO_2e (MT/yr)
Baseline Emissions	1,844
Project Emissions	1,847
Change in GHG Emissions due to Project	+3
SJVAPCD APR 2015 Zero Equivalency Threshold	230
Net Emissions Change Between Baseline and Project is greater than Zero Equivalency Threshold?	No

Source: Appendix C.

a) The Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (see Section 3.5.1).

"It is widely recognized that no single project could generate enough GHG emissions to noticeably change the global climate temperature. However, the combination of GHG emissions from past, present, and future projects could contribute substantially to global climate change. GHG emissions, and their associated contribution to climate change, are inherently a cumulative impact issue." (SJVAPCD, 2015, p. 111). As recognized by SJVAPCD in the preceding quote, climate change is a cumulative effect and therefore it's recognized that no single project is large enough to solely impact climate change.

This concept is also reflected in California's 2017 Climate Change Scoping Plan and the recently approved 2022 Proposed Scoping Plan. Regulations are implemented in order to reduce the cumulative impact of GHG emissions on a statewide level. Along these lines, carbon standards for fuel is regulated at a level in the supply chain above that of an individual project, such that a project has no choice but to purchase and use fuel energy in California that is already regulated. This is specifically referenced in SJVAPCD Policy APR – *2025 CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation,* which states: "In conclusion, all GHG emissions increases resulting from the combustion of any fuel produced, imported, and/or delivered in California are mitigated under Cap-and-Trade…Therefore, GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA" (SJVAPCD, 2014). The Project therefore does not have its own emissions resulting from fuel energy consumption, but is simply a location in which GHG emissions are taking place as a result of fuel that is already regulated through Cap-and-Trade, as well as other State regulations such as applicable Low-Carbon Fuel Standards (LCFS). Therefore, the Project itself cannot have a significant impact on the environment.

Moreover, the incremental project emissions are less than the SJVAPCD zero equivalency threshold established in APR 2015 (See section 3.1.4). As such, the emissions are not considered significant.

b) The Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. Potential conflicts with applicable air quality plans have been analyzed and ruled out (see section 3.5.2).

Project emissions of GHGs are presented in Table ES-4 above, primarily for purposes of disclosure. The Project would emit GHGs from fuel burned in mobile equipment engines. As discussed above, equipment fuel suppliers and importers are required to report emissions under the Cap-and-Trade which is designed to reduce GHG emissions as needed to achieve emissions reductions described in related planning documents, primarily the AB 32 Scoping Plan described above. Thus, the emissions reductions will occur at a level in the supply chain above the Project which will have no choice but to use fuels with GHG intensities that are consistent with the Scoping Plan and other applicable LCFS. As outlined in SJVAPCD Policy APR-2025, because the Project uses fuels consistent with the Scoping Plan, Project GHG emissions are determined to have a less than significant impact on global climate change under CEQA.

Appendix B includes regulations, legislation, and executive orders related to GHG emissions in California. Moreover, Appendix B includes a summary of actions and policy related to the 2017 and 2022 GHG Scoping Plans. Potential conflicts between the Project and the plans, policies, and regulations have been considered and ruled out.

In summary, The GHGs associated with the Project would be consistent with the AB 32 Scoping Plan and SJVAPCD policy. Therefore, the Project impact on GHG emissions is less than significant.

Air Quality and Climate Change Impact Assessment

Triangle Rock Products
Los Banos Sand and Gravel Quarry

February 2, 2024

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APPENDICES

1.0 INTRODUCTION

Triangle Rock Products ("Triangle") currently operates an approximately 607-acre surface mining, processing, and hot mix asphalt production facility in Merced County ("County"), known as the Los Banos Sand and Gravel operation ("Facility" or "Los Banos Facility").

To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot mix asphalt and ready-mix concrete (RMC) products, Triangle desires to augment the existing sand and gravel reserves through entitling two properties that adjoin the existing operations; the Turner and Sunset properties (herein after the "Project" or the "Project sites"). The Project entails extraction of the sand and gravel resources at these properties, along with ancillary activities that will allow for handling and conveyance of the excavated materials at the Turner and Sunset properties. This Air Quality, Health Risk, and Climate Change Impact Assessment (Report) has been prepared to quantify and determine the significance of air quality, health risk, and climate change impacts associated with the Project.

The Project would not involve any changes to the existing operations other than allowing for the continued mining of the sand and gravel resources at the Turner and Sunset properties, which are described in detail below. Consistent with Triangle's existing operations, the aggregate material extracted from the Project sites would be transferred via internal haul trucks and scrapers (no haul trucks would enter/exit onto public roads) to the existing processing plant at the Los Banos Facility. In the same manner as presently occurs, material would then be processed and shipped to delivery locations throughout the region, or used onsite to produce hot mix asphalt or transferred for use by a separately owned and operated ready-mix concrete plant. No material processing would occur on the Project sites.

Surrounding land uses include Triangle's existing Los Banos Sand and Gravel operations and open agricultural lands, with some associated residences. The City of Los Banos is located approximately 4 miles to the northeast of the Project site, and is reached via Sunset Road and Ortiligata Road.

Mining operations at the Sunset and Turner properties would be typical of surface aggregate extraction operations, and would be conducted in the same manner as is currently occurring at the Los Banos Facility. Specifically, mining would be conducted in discrete pits, followed by placement of process fines (clays, silts and sands) into the previously excavated area. Aggregate material is planned to initially be extracted from the Sunset property in a single pit, followed by placement of process fines (clays, silts and sands) into the previously excavated areas. Subsequently, mining at the Turner property would occur within a two pits (separated by Alvarado Trail), followed by placement of overburden back into the excavated area.

Consistent with ongoing operations, mining would entail using mobile excavators, loaders and transfer trucks to extract and move the materials from extraction basins located at the Turner and Sunset properties. Thus, blasting would not be required, nor would on-road haul trucks be needed to transfer the mined aggregate to the existing processing plant. Annual extraction rates and quantities would not change as a result of the Project, and it is expected that a total of approximately 36.3 million gross tons of sand and gravel would be extracted from the Turner Island and Sunset properties. The life of the reserves will be dependent on market demand, but excavation is anticipated to occur over an approximate 40-year period.

Both the Turner and Sunset properties are owned by Triangle and have been subject to historical surface disturbance due to past agricultural uses. The Turner property is approximately 308 acres in size, located immediately south and east of the existing Los Banos Facility. It is located between the Delta-Mendota Canal to the northeast, and the California Aqueduct to the southwest. The Sunset property is approximately 33 acres in size and is located immediately west of the existing Los Banos Facility just south of Sunset Avenue. Recovery of aggregates at both the Sunset and Turner properties is planned to occur at depths generally ranging from 27-feet to 72-feet below ground surface (bgs), depending on location, for an average target elevation of 125-feet to 150-feet above mean sea level (amsl); however, mining at the Project sites has been designed to remain above groundwater, and the final mining depth will ultimately be dependent upon underlying depth to groundwater. The method of resource recovery would entail using conventional earth moving equipment (dozers, scrapers, excavators) in the same manner as currently occurs. The design mine plan at this pit floor elevation is estimated to produce 36.3 bank million gross tons (MT) of material, suitable for processing into various types of aggregate products.

Prior to mining, the site would be cleared, and the topsoil/subsoil and overburden would be removed. Consistent with Triangle’s existing procedures at the Los Banos Facility, topsoil/subsoil would be salvaged and contained in approximately 4.5- to 5.5-foot-tall perimeter earthen berms on the Turner and Sunset properties, except along the northern (i.e., adjacent to Sunset Avenue) and northern half of the western perimeter of the Sunset property, where the berms will be approximately 7-feet in height. During reclamation, topsoil and subsoil within the berms may be used as needed to support revegetation in those areas within the Project site where the vegetative community will be re-established following completion of mining. Overburden and interburden materials would either be conveyed to the Los Banos plant in the same manner as the extracted aggregate, or managed in designated areas for eventual surface placement during reclamation.

After site preparation (i.e., removal of topsoil/subsoil and overburden) in portions of the Turner and Sunset properties slated for mining, resource extraction in these areas would commence and generally continue until reaching the respective design pit depth. At this time, Triangle plans to mine the Sunset property first, with the excavation pit being used to place excess fines from the Los Banos Facility processing plant following mining. These fines would be slurried via an overland pipe to the Sunset pit after mining there is complete, and continue until the slurry material reaches within approximately 5-feet of the native surface elevation. It is anticipated that once mining is finished at Sunset, the Turner property would then begin to be mined, depending on material quality and market demand. As conducted in the current Los Banos operations, overburden and interburden materials may be placed back into the Turner pit as warranted. As discussed above, both mining areas would use the same methods and equipment as those presently employed at the existing Los Banos Facility.

After the aggregate reserves are fully exhausted and mining ceases, reclamation of the Project would commence in accordance with the approved Los Banos Sand and Gravel Reclamation Plan, which has been amended to include both the Sunset and Turner properties, and provided to the County under separate cover. Project reclamation would follow the same procedures as currently in effect at the Los Banos Facility, and would generally involve regrading, re-soiling and revegetation on the mined lands to open space. The amended Reclamation Plan complies with the current reclamation performance standards pursuant to the California Surface Mining and Reclamation Act (SMARA). The reclaimed end use would remain the same as that already approved for the Los Banos Facility, specifically open space.

The major components of the proposed Project operation include the following activities at the Sunset and Turner properties:

- Site preparation, including clearing the site, removal and salvaging of topsoil and subsoil;
- As needed, construction of perimeter earthen berms approximately 4.5- to 5.5-foot-high for topsoil/subsoil salvage and storage, except at the northern edge and northern half of the western side boundary of the Sunset site where the berm height will be an approximate height of 7-feet high;
- Surface mining and material conveyance at a rate of 1.03 million tons per year;
- Temporary stockpiling and transfer of recovered material via haul truck on internal roads;
- Operation of mobile and stationary mining equipment;
- Various site improvements for access, safety, and other requirements; and
- Post-mining reclamation and revegetation to open space.

The Project design and methodology is consistent with the existing mining operations at the Los Banos Facility. The number of employees and the hours of operation would remain the same, as once the Project commences, existing employees would simply move to conduct mining on the Turner and Sunset properties. The mine and reclamation site design is consistent with the current approved mining and reclamation plan for the existing Los Banos Facility.

2.0 AIR QUALITY

This AQCCIA was prepared using current best practices including the Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) (SJVAPCD, 2015) and the Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015). Methods or guidance provided by the SJVAPCD were also used.

2.1 Regulatory Setting

Both the state and the federal government have established health-based criteria called Ambient Air Quality Standards (AAQS) for six air pollutants. These "criteria pollutants" are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter ($PM_{2.5}$ and PM_{10}), each of which is described more fully in Appendix B (Characteristics of Air Pollutants). State and Federal Ambient Air Quality Standards are presented in Table 1. Many constituents in air emissions other than criteria pollutants result in health effects and are regulated as toxic air contaminants (TACs) using health risk assessment methods (i.e., as opposed to comparing concentration of criteria pollutant to an AAQS). Diesel particulate matter (DPM) and respirable crystalline silica (RCS) are two TACs of concern associated with Project sources and are also discussed in Appendix B.

2.1.1 Federal

2.1.1.1 Criteria Pollutants

The Clean Air Act (CAA) is the comprehensive Federal law that regulates air emissions from stationary and mobile sources. Congress established much of the basic structure of the CAA in 1970, and made major revisions in 1977 and 1990. “The Clean Air Act in a Nutshell: How It Works” (EPA, 2013) contains a thorough yet concise summary of how US EPA implements the CAA. Table 1 presents Federal and State AAQS. Table 2 identifies how the CAA applies to The Project.

Table 1 State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O$_3$) [8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM$_{10}$) [9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM$_{2.5}$) [9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO$_2$)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO$_2$)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectro-photometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1,300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape			

Pollutant	Averaging Time	California Standards[1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography	**No National Standards**		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: CARB, May 4, 2016.

Up to date as of June 10, 2022. See footnotes on following page.

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µ g/m3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the US EPA for further clarification and current National policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method, which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard, may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
6. Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the US EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the US EPA.
8. On October 1, 2015, the National 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the National annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing National 24- hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour National standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the National 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the National 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the National standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour National standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 National standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour National standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour National standard to the California standard the units can be converted to ppm. In this case, the National standard of 75 ppb is identical to 0.075 ppm.
12. The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The National standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Table 2 Applicability of US EPA Activities under the CAA to the Project

US EPA Activity	Applicable to Project Sources?
Establish air quality standards.	Yes, see **Impact AQ-2**.
Designate quality of air in attainment areas.	No, the Project is not an attainment area.
Administrate state implementation plans.	No, the Project is not a SIP.
Require additional programs in nonattainment areas.	Yes, the Project would comply with SJVAPCD programs and rules that address nonattainment.
Provide guidance on control techniques.	No, the Project would employ standard controls.
Regulate interstate air pollution.	No, the Project is not a state.
Require plans to maintain clean air after a nonattainment area meets the standard.	Yes, the Project would comply with SJVAPCD programs and rules that maintain attainment.
Preserve clean air in attainment areas.	Yes, the Project would comply with SJVAPCD programs and rules that preserve attainment.
Adopt National standards for new stationary sources.	Yes, new stationary sources at the Project that have an applicable New Source Performance Standard (NSPS) are discussed in this subchapter.
Adopt National standards or guidelines for consumer and commercial products.	No, the Project does not buy products that emit air pollutant from vendors outside the country.
Adopt National standards for new vehicles and engines, and fuels.	No, the Project does not manufacture vehicles, engines, or fuels.
Regulate emissions from oil drilling on the Outer Continental Shelf.	No, the Project is not drilling oil or located on the Outer Continental Shelf.
Regulate hazardous air pollutants.	Yes, the Project is subject to the NESHAP for engines as discussed in this subchapter.
Protect visibility in National parks by regulating regional haze.	No, the Project is approximately 10 miles from the boundary of Sequoia National Park but does not include a major stationary source.
Control acid rain by regulating NO_2 and SO_2 emissions from power plants.	No, the Project does not include a power plant or other major source of combustion pollutants.
Protect stratospheric ozone by regulating ozone-depleting compounds (e.g., chlorofluorocarbons).	No, the Project would purchase refrigerants and other classes of products from a U.S. vendor.
Regulate major sources of air pollution by administrating a Federal operating permit program.	No, the Project is a minor source that does not require a Federal operating permit.

Regulations Affecting New Diesel Engines

US EPA regulates emissions from new non-road (i.e., off-road, portable, and stationary) internal combustion engines by tiered standards (e.g., compression-ignition engines in 40 CFR 89.112, 40 CFR 1039.101, and 40 CFR 1039.102). Emissions from new non-road engines are regulated using standards that apply by model year, class of vehicle, and fuel type (e.g., heavy-heavy duty diesel engines in 40 CFR 86.004-11, 40 CFR 86.007-11, and 40 CFR 86.099-11). These regulations affect manufacturers but are relevant to the Project because diesel engines are the primary source of Project emissions besides dust.

Engine tiers are emissions standards that were phased-in by size and model year between 1996 and 2015. Tier 0 engines are engines that were built before the applicable engine tier standard came into effect for each engine size. Table 3 presents the emissions factors for each tier.

Table 3 Engine Tier Emissions Standards

Engine Tier	NO_x + NMHC (g/hp-hr)	NMHC (g/hp-hr)	NO_x (g/hp-hr)	CO (g/hp-hr)	PM (g/hp-hr)
1	Ns	1.0	6.9	8.5	0.40
2	4.9	Ns	Ns	2.6	0.15
3	3.0	Ns	Ns	2.6	0.15
4 Interim	3.0	Ns	Ns	2.6	0.015
4 Final	Ns	0.19	0.3	2.6	0.015

Notes: ns = no standard; and 1.341 hp/kW is used to convert kW in the regulation to hp in this table.

Regulations Affecting Sources of Hazardous Air Pollutants

The Federal Clean Air Act Amendments (CAAA) Section 112(k) requires the EPA to reduce hazardous air pollutant (HAP) risks in urban areas. The EPA's strategy for reducing these risks is discussed in the *Integrated Urban Air Toxics Strategy*. Among the major new programs are the operating permits program (Title V) and provisions to phase out ozone-depleting substances (Title VI). Existing programs that have seen major changes due to the amendments include attainment provisions for the National Emissions Standards for Hazardous Air Pollutants (NESHAP) program.

The provisions in Title I that address the control of HAP emissions, or air toxics, include provisions for the promulgation of NESHAP, or maximum achievable control technology (MACT) standards, as well as several related programs to enhance and support the NESHAP Program. The activities and responsibilities required under Section 112 directly affect not only the EPA but State and local regulatory agencies as well. In addition to air quality agencies administering the majority of Section 112, the storage of acutely hazardous materials above threshold quantities is administrated under Section 112 by the State Office of Emergency Management (OEM) through the local Certified Unified Permitting Agencies (CUPAs).

2.1.2 State

The California Air Resources Board (CARB) coordinates and oversees both state and federal air pollution control programs in California. CARB oversees activities of local air districts and is responsible for incorporating air quality management plans developed by each air district into the State Implementation Plan (SIP) for Federal EPA approval. CARB maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these stations are used by CARB and EPA to classify areas as “attainment” or “nonattainment” with respect to each pollutant and to monitor progress towards attaining air quality standards. ARB has divided the State into 15 air basins. Significant authority for air quality control is delegated to local air districts that regulate emissions from stationary sources and develop attainment plans.

2.1.2.1 Criteria Pollutants

The State of California began to set California ambient air quality standards (CAAQS) in 1969. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are also listed in Table 1.

Originally, there were no deadlines for the air districts to meet the CAAQS, or to be in “attainment” with the CAAQS. However, the California Clean Air Act (CCAA) provided a timeframe and a planning structure to promote their attainment levels. The CCAA required air districts that did not have air quality in their air basins that met the standards (nonattainment areas) in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan. The attainment plans require a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented.

2.1.2.2 Toxic Air Contaminants

The CARB Statewide comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act (AB 1807, 1983) created California’s program to reduce exposure to air toxics. The Air Toxics “Hot Spots” Information and Assessment Act (AB 2588, 1987) requires a Statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Under AB 1807, CARB is required to use certain criteria in the prioritization for the identification and control of air toxics. In selecting substances for review, CARB must consider criteria relating to “the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community.” AB 1807 also requires CARB to use available information gathered from the AB 2588 program to include in the prioritization of compounds. The list of Toxic Air Contaminants (TACs) includes all federal HAPs plus the following pollutants: 1,2-dibromoethane, 1,2-dichloroethane, hexavalent chromium, cadmium, inorganic arsenic, nickel, inorganic lead, diesel particulate matter, and environmental tobacco smoke (17 CCR § 93000 and §93001).

Under AB 2588, facilities are required to report air toxic emissions, ascertain health risks and notify nearby residents of significant risks. In September 1992, the Hot Spots Act was amended by Senate Bill 1731, which required facilities that pose a significant health risk to reduce their risk through a risk management plan. The emissions inventory and risk assessment information from this program is incorporated into this AQCCIA as discussed in Section 3.4.

In July 2007, CARB adopted an airborne toxic control measure (ATCM) for in-use off-road diesel vehicles (13 CCR § 2449 et seq.). This regulation required that specific fleet average requirements be met for NO_x emissions and for particulate matter emissions. Where average requirements cannot be met, BACT requirements apply. The regulation also included several recordkeeping and reporting requirements.

After a series of revisions and amendments, the Final Regulation Order, effective November 30, 2018, establishes a tier-based phase out schedule that is outlined in Table 4 for small fleets (cumulative horsepower of up to 750) and large fleets (cumulative horsepower of greater than 750).

Table 4 Portable Engine ATCM Phase-Out Schedule

Engine Certification	Engines Rated 50 to 750 bhp		Engines Rated >750 bhp
	Large Fleet	Small Fleet	
Tier 1	1/1/2020	1/1/2020	1/1/2022
Tier 2 built prior to 1/1/2009	1/1/2022	1/1/2023	1/1/2025
Tier 2 built on or after 1/1/2009	NA	NA	1/1/2027
Tier 3 built prior to 1/1/2009	1/1/2025	1/1/2027	NA
Tier 3 built on or after 1/1/2009	1/1/2027	1/1/2029	NA
Tier 1, 2, and 3 flexibility engines	December 31 of the year 17 years after the date of manufacture. This provision shall not apply to any engine operation before the effective date of this regulation.		

Source: (CARB, 2018).

The Project's engine fleet is classified as a "Large Fleet" because the cumulative horsepower is greater than 750 hp. As demonstrated by Table 4, the Project's engine emissions will decrease over time as older engines are phased out. In order to estimate the emissions factors associated with Project engines, CalEEMod Appendix G-11 default engine emissions factors were used. These emissions factors represent average emissions factors for each engine type in a fixed time period, and take into account the phase out schedule detailed in Table 4.

The CARB ATCM for Stationary Compression Ignition Engines (17CCR § 93115 et. seq.) contains tables of emissions standards that vary based on the size, use, and existence of the engine. Specifically, new engines have to meet emissions standards for all pollutants while existing engines comply by reducing emissions of DPM by 85% or more. Engines used in agricultural operations have separate requirements as well.

Because the Project is located on an alluvial deposit, and naturally occurring asbestos (NOA) is not found in alluvium, the following ATCM for construction, grading, quarrying and surface mining operations applies to the Project:

- Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) requires the implementation of mitigation measures to minimize emissions of asbestos-laden dust unless an exemption in the ATCM applies. Applicable to this Project, the ATCM states that the "APCO may provide an exemption for crushing, screening and conveying equipment, stockpiles, and off-site material transport at a sand and gravel operation if the operation processes only materials from an alluvial deposit."

On July 26, 2017, Governor Brown approved Assembly Bill No. 617 ("AB 617"). AB 617 added and amended various sections of the California Health and Safety Code. The intent of AB 617 is to develop a collaborative relationship between CARB and local air districts to facilitate community participation, provide a science-based foundation supporting the identification of communities with high cumulative exposure burdens, accelerate the development and use of advanced air monitoring methods and equipment, and support the use of new mobile and stationary source technology. Specific communities have been identified as priority disadvantage communities that are currently subject to AB 617 requirements. The Project is not located in or near an identified AB 617 community.

2.1.3 San Joaquin Valley Unified Air Pollution Control District

The 1976 Lewis Air Quality Management Act established the San Joaquin Valley Unified Air Pollution Control District (SJVAPCD or District) and other air districts throughout the state. The Federal Clean Air Act Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the state.

The CCAA provides the SJVAPCD with the authority to manage transportation activities and regulate stationary source emissions. Indirect sources of pollution are those sources related to a stationary facility or development project (see Rule 9510) but otherwise outside the Air District authority to regulate. An example of this would be the motor vehicles at an intersection, a mall, and on highways. As a State agency, CARB regulates motor vehicles and fuels for their emissions.

The SJVAPCD has adopted several attainment plans to achieve State and Federal air quality standards. The SJVAPCD continuously monitors the region's progress implementing attainment plans and periodically reports to CARB and the EPA. Finally, SJVAPCD periodically revises attainment plans to reflect new conditions and requirements in accordance with schedules mandated by the CCAA and Clean Air Act Amendments (CAAA).

2.1.3.1 Air Quality Management Plans

The following are State plans that have been adopted by the SJVAPCD.

Ozone Plans:

Extreme 1-Hour Ozone Attainment Demonstration Plan

On June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, along with its associated designations and classifications. Prior to this, the EPA had designated the SJVAPCD as "extreme nonattainment" for this standard. The EPA granted approval for the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010, with an effective date of April 7, 2010. In 2014, the SJVAPCD was granted attainment status for the revoked 1-hour ozone NAAQS of 124 ppb. Subsequently, in June 2023, the District Governing Board adopted the 2023 Maintenance Plan and Redesignation Request, in order to terminate anti-backsliding provisions for the revoked 1-hour ozone standard. The Maintenance Plan includes a demonstration that the SJVAPCD will still be in attainment for the 1-hour ozone NAAQS through 2036.

2007 8-Hour Ozone Plan

This plan sets forth measures and a "dual path" strategy to attain the federal 8-hour ozone standard for the SJVAB by reducing emissions on ozone and particulate matter precursors. The plan also includes provisions for improved pollution control technologies for mobile and stationary sources, as well as an increase in State and federal funding for incentive-based measures to reduce emissions. All local measures were to be adopted by the SJVAPCD before 2012. This plan was approved by the EPA on March 1, 2012. On November 26, 2012, however, the EPA withdrew its determination that the plan satisfied the Clean Air Act requirements regarding emission growth caused by growth in vehicle-miles traveled. All other determinations in the EPA's March 1, 2012, rule approving the plan remain unchanged and in effect.

2016 Ozone Plan for 2008 8 Hour Ozone Standard

In order to meet the December 31st, 2031 deadline for attainment, this plan incorporates emissions reduction strategies for stationary sources including regulatory actions; incentive programs; technology advancement programs; policy and legislative activities; public outreach, education, and communication; and undefined strategies under "black box" provisions. The plan demonstrates that existing regulations go above and beyond the Federal Reasonably Available Control Technology (RACT) requirement. The plan also emphasizes that mobile source emissions, which fall under state and federal jurisdiction, make up over 85% of the Valley's NO_x emissions. For this reason, the District requested that CARB and EPA adopt and implement strategies so that sources outside District authority would be controlled enabling the standard to be met without the need for "black box" provisions. Moreover, the plan states that CARB and EPA action will be essential to attainment with the AAQS.

2020 Reasonable Available Control Technology (RACT) Demonstration for the 2015 8-Hour Ozone Standard

The 2020 RACT Demonstration (The Demonstration) includes a comprehensive evaluation of all NO_x and VOC District rules to ensure that each rule meets or exceeds RACT. District rules were reviewed and compared to federal, state, and local regulations. State suggested control measures and technology clearinghouses were revised to ensure major sources and EPA Control Technique Guidelines sources in the jurisdiction of the SJVAPCD were subject to RACT. The Demonstration fulfills the federal Clean Air Act requirements and demonstrates that all federal RACT requirements are satisfied by SJVAPCD rules.

Particulate Matter Plans:

2007 PM_{10} Maintenance Plan

On October 25, 2007, CARB approved the SJVAPCD's 2007 PM_{10} Maintenance Plan and Request for Redesignation with modifications to the transportation conformity budgets. On September 25, 2008, the EPA redesignated the SJVAB to attainment for the PM_{10} NAAQS and approved the PM_{10} maintenance plan.

2012 $PM_{2.5}$ Plan

The US EPA set the first $PM_{2.5}$ standard in 1997 and in 2005 designated the Valley as nonattainment for the 1997 standard. The 1997 standard has two limits of attainment: an annual average of 15 $\mu g/m^3$ and a 24-hour average of 65 $\mu g/m^3$. The SJVAPCD adopted the 2008 $PM_{2.5}$ Plan in April 2008 to demonstrate how the Valley would come into attainment of the 1997 $PM_{2.5}$ standard by no later than April 2015. US EPA subsequently lowered the 24-hour standard to 35 $\mu g/m^3$ in 2006 and re-issued the nonattainment designation for the San Joaquin Valley in 2009. Through continued implementation of the 2008 $PM_{2.5}$ Plan, the San Joaquin Valley was expected to be in attainment of the 1997 annual standard by 2015.

The 2012 $PM_{2.5}$ Plan builds on the prior $PM_{2.5}$ plans and demonstrates attainment of the newer 2006 24-hour $PM_{2.5}$ standard by the federal attainment deadline of 2019, with the majority of the Valley actually experiencing attainment ahead of 2019. The SJVAPCD, in collaboration with CARB, based this attainment demonstration on comprehensive analysis, careful evaluation, and a sound scientific foundation. Using the SJVAPCD Governing Board's guiding principles adopted in February 2012, this plan emphasizes public health as the number one priority in meeting federal ambient air quality standards (NAAQS).

The 2012 $PM_{2.5}$ Plan is a multifaceted strategy that utilizes a combination of conventional and innovative control strategies to reduce emissions of $PM_{2.5}$ and other pollutants that form $PM_{2.5}$. The San Joaquin Valley's successes in adopting regulations and other strategies that have improved the San Joaquin Valley's air quality provide the foundation for the Plan. In developing the Plan, the SJVAPCD claims to have left "no stone unturned" in evaluating all sources of emissions for potential strategies to reduce emissions.

In addition to reducing direct emissions of $PM_{2.5}$, the 2012 $PM_{2.5}$ Plan focuses on reducing oxides of nitrogen (NO_x) emissions, which is a predominant pollutant not only in the formation of $PM_{2.5}$ in the San Joaquin Valley, but is also the focus of SJVAPCD's ozone reduction strategies. This overlapping significance and emphasis on reducing NO_x emissions helps to address both of the San Joaquin Valley's biggest air quality challenges, $PM_{2.5}$ and ozone. Along with comprehensive efforts at the local level to reduce emissions, reducing mobile source emissions that are not under the direct authority of SJVAPCD are critical to attaining the standard, and the 2012 $PM_{2.5}$ Plan includes State and federal measures that will provide significant new emissions reductions in the coming years. As outlined below, the plan's comprehensive control strategy includes regulatory actions, incentive programs, technology advancement, policy and legislative positions, public outreach, participation and communication, and additional strategies.

2015 Plan for the 1997 $PM_{2.5}$ Standard

The 2015 Plan for the 1997 $PM_{2.5}$ Standard was adopted on April 16, 2015, and addresses the EPA annual $PM_{2.5}$ standard of 15 µg/m3 as well as the EPA 24-hour $PM_{2.5}$ standard of 65 µg/m3 both of which were established in 1997. The plan's strategy focuses on attaining the standard quickly, as well as prioritizing $PM_{2.5}$ emissions that pose the most health risk to residents.

2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard

The 2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard was adopted by the District on September 15, 2016. This plan addresses the $PM_{2.5}$ NAAQS of 12 $\mu g/m^3$ with an attainment deadline of December 31, 2021, established in 2012. The attainment deadline was not achieved, the plan itself demonstrates the impracticability of attainment before the deadline and requests the area be reclassified from moderate to serious nonattainment.

2018 Plan for the 1997, 2006 and 2012 $PM_{2.5}$ Standards

Adopted on November 15, 2018, the plan includes significant incentive-based control measures as well as control measures for stationary and area industrial sources. The plan also calls on CARB to act in order to achieve reductions of mobile sources.

SB 656 Particulate Matter Control Measure Implementation Schedule

Senate Bill (SB) 656 was enacted in 2003 and codified as Health and Safety Code Section 39614. SB 656 seeks to reduce exposure to PM_{10} and $PM_{2.5}$ and make further progress toward attainment of the NAAQS and CAAQS for PM_{10} and $PM_{2.5}$. SB 656 required CARB, in consultation with local air districts, to develop and adopt lists of "the most readily available, feasible, and cost-effective" particulate matter control measures. Subsequently, air districts were required to adopt implementation schedules for relevant control measures. In June 2005, the SJVAPCD adopted its SB 656 Particulate Matter Control Measure Implementation Schedule, and has adopted each relevant strategy into their rules.

2.1.3.2 SJVAPCD Rules and Regulations

The following SJVAPCD rules and regulations are potentially applicable to Project sources. Rule summaries are provided to clarify applicability.

Regulation II (Permits):

Rule 2010 (Permits Required)

Rule 2010 requires, prior to construction, any newly proposed air-polluting facilities to first obtain an Authority to Construct from the Air Pollution Control Officer. Prior to operation of the new facility, the SJVAPCD also requires that any new facility obtain a Permit to Operate from the Air Pollution Control Officer. Permits to Operate must be posted and maintained on or near the source of the air pollution.

Rule 2201 (New and Modified Stationary Source Review)

Rule 2201 establishes SJVAPCD's program to limit emissions at new and modified sources so that there is no net increase in emissions within the SJVAB. Rule 2201 uses BACT and mechanisms such as emissions offsets, to ensure that AAQS are met or maintained. Criteria pollutants are regulated under this Rule, including VOC, NO_x, SO_x, PM_{10}, $PM_{2.5}$, and CO. Under Rule 2201, BACT is required if the emissions of a regulated pollutant would exceed two pounds per day. In addition, emission offsets to mitigate an increase in emissions from a new or modified stationary source would be required if the facility's emissions exceed the following amounts:

- 20,000 pounds per year of NO_x or VOC;
- 200,000 pounds per year of CO;
- 54,750 pounds per year of SO_x; or
- 29,200 pounds per year of PM_{10}.

Project equipment that would be subject to this rule includes stationary sources such as stockpiles.

This rule also includes significance thresholds for Federal Major Modifications at Major Source facilities. The existing Facility is not a Major Source, and this will not change as a result of the Project.

Rule 2280 (Portable Equipment Registration)

Rule 2280 outlines the procedure and requirements associated with the registration of portable emissions units. Rule 2280 would be applicable to the Project if temporary construction requires equipment (such as a generator set) under Rule 2280.

Regulation III (Fees):

Regulation III contains rules related to District fees. The Project may be subject to fees related to permitting, air toxics, dust, as well as others.

Regulation IV (Prohibitions):

Rule 4002 (National Emission Standards for Hazardous Air Pollutants)

Rule 4002 incorporates the National Emission Standards for Hazardous Air Pollutants (NESHAPs) as set forth in 40 CFR Part 61, and the NESHAPs for source categories as set forth in 40 CFR Part 63. 40 CFR Part 61 includes emission standards for several known toxic air pollutants, such as beryllium, mercury, and vinyl chloride. 40 CFR Part 63 regulates NESHAP by source categories. Both regulations also include test methods and procedures, as well as monitoring, notification, and recordkeeping requirements.

Rule 4101 (Visible Emissions)

Rule 4101 prohibits emissions of visible air contaminants from any potential source of air contaminants. The rule prohibits air contaminants, other than water vapor, from resulting in greater than Number 1 on Ringelmann Chart (i.e., 20 percent opacity) for a combined period of more than 3 minutes of any hour.

Rule 4102 (Nuisance)

To protect the public health, Rule 4102 prohibits any person from discharging such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public. Odors are typically addressed under this rule.

Rule 4201 (Particulate Matter Concentration)

To protect the ambient air quality, Rule 4201 establishes a particulate matter emission standard. A release or discharge of dust, fumes, or total suspended particulate matter emissions into the atmosphere from any single-source operation may not exceed 0.1 gr/dscf. Rule 4201 includes test methodology to determine the particulate concentration in an exhaust stream.

Rule 4202 (Particulate Matter Emission Rate)

Rule 4202 limits particulate matter emissions and applies to any source operation that emits or may emit particulate matter. The rule specifies allowable emissions rates based on process weight rate calculations.

Regulation VIII (Fugitive PM_{10} Prohibitions):

The rules under Regulation VIII are intended to reduce ambient concentrations of particulate matter (PM_{10} or larger) and were developed pursuant to EPA guidance for Serious PM_{10} Nonattainment Areas. These rules are applicable to specified anthropogenic sources. Applicability of each rule is discussed below and requirements are presented for rules that apply to the Project. Rule 8081 is omitted because it only applies to agricultural sources.

Rule 8011 (General Requirements)

Rule 8011 contains resources referenced by other rules in Regulation VIII including definitions of terms (74), exemptions (4), general requirements related to road dust controls (4), test methods for visual opacity (2) and surface stabilization (6) included as appendices to the Rule, a recordkeeping requirement, and provision allowing operators to implement a Fugitive PM_{10} Management Plan (FPMP) that is designed to achieve 50% control efficiency that has been approved by the APCO.

Rule 8021 (Construction, Demolition Excavation, Extraction, and Other Earthmoving Activities)

Rule 8021 prohibits construction, demolition, excavation, extraction, or other earthmoving activities unless the appropriate requirements are sufficiently implemented to limit visible dust emissions (VDE) to 20% opacity.

Rule 8031 (Bulk Materials)

Rule 8031 requires any facility that performs outdoor handling, storage, and transport of bulk materials to use appropriate methods as listed in Rule 8031 to limit VDE to 20 percent opacity or to comply with the conditions for a stabilized surface as defined in Rule 8011 (General Requirements). Appropriate methods to limit VDE listed in Rule 8031 include:

- Applying water or chemical/organic stabilizers/suppressants;
- Constructing and maintaining sufficient barriers to obstruct wind;

- Storing materials on stabilized surfaces; covering bulk materials with tarps, plastic, or other suitable material; limiting on-site vehicle speed;
- Loading haul trucks to limit VDE;
- Applying water on the top of loads to limit VDE;
- covering haul trucks with tarps or other covers to limit VDE; and
- Maintaining haul trucks to prevent spillage or loss of bulk materials.

Rule 8041 (Carryout and Trackout)

The purpose of Rule 8041 is to prevent or limit fugitive dust emissions from carryout and trackout on paved public roads or the paved shoulders of paved public roads. Facilities subject to Rules 8021, 8031, 8061, or 8071 must also comply with this rule. Rule 8041 requires that affected facilities prevent and/or clean up carryout and trackout at the end of each workday. Cleanup of carryout and trackout is accomplished by manually sweeping and picking up, operating a rotary brush or broom accompanied by sufficient wetting to limit VDE to 20% opacity, operating a PM_{10}-efficient street sweeper that has a pick-up efficiency of at least 80%, or flushing with water if curbs and gutters are not present and where the use of water will not result in a source of trackout material or other adverse impacts, such as a water quality violation under the National Pollutant Discharge Elimination System program. Rule 8041 requires that owners/operators of sites with paved interior roads use a trackout control device to reduce carryout and trackout. Rule 8041 prohibits the use of blower devices, dry rotary brushes, or brooms for removal of carryout and trackout on public roads.

Rule 8051 (Open Areas)

The purpose of Rule 8051 is to limit fugitive dust emissions from open areas. The rule applies to any open area having 0.5 acre or more within urban areas, or 3.0 acres or more within rural areas, and that contains at least 1,000 square feet of disturbed surface area. Whenever open areas are disturbed or vehicles are used in open areas, an owner/operator must implement one or a combination of control measures to comply with the conditions of a stabilized surface at times and to limit VDE to 20 percent opacity. Control measures to be used include applying and maintaining water or dust suppressant(s) to unvegetated areas or establishing vegetation on previously disturbed areas; or paving, applying, and maintaining gravel, or applying and maintaining chemical/organic stabilizers/suppressants. Where open areas are disturbed due to trespass, such activities should be prevented by posting “No Trespassing” signs or installing physical barriers such as fences.

Rule 8061 (Paved and Unpaved Roads)

The purpose of Rule 8061 is to limit fugitive dust emissions from paved and unpaved roads by implementing control measures and design criteria. This rule applies to any new or existing public or private paved or unpaved road, road construction project, or road modification project. Rule 8061 requires that new or modified paved roads have certain specifications based on the road’s existing or projected annual average daily trips (AADT). Requirements include minimum paved or stabilized shoulder widths, as well as curbing, intersection, and median specifications. The rule prescribes requirements for maintenance of public paved roads, including specifications for PM_{10}-efficient sweepers and road cleanup. Rule 8061 also includes requirements for unpaved road segments. Unpaved road segments with 26 or more AADT must stabilize road surfaces by application of water, chemical dust suppressant, washed gravel, or similar measures. In addition, the visible dust emissions associated with such areas is limited to 20 percent opacity. Unpaved roads with fewer than 26 AADT are exempt from some requirements of this rule.

Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas)

This rule limits fugitive dust emissions from unpaved vehicle and equipment traffic areas. Unpaved vehicle and equipment traffic areas with 50 or more AADT must stabilize road surfaces by application of water, chemical dust suppressant, washed gravel, or similar measures. In addition, the visible dust emissions associated with such areas is limited to 20 percent opacity. Unpaved vehicle and equipment traffic areas with less than 50 AADT are exempt from Rule 8071.

2.1.3.3 CEQA Guidance

The SJVAPCD Air Quality Modeling: Permitting and CEQA webpage[1] links to documents prepared by the District and others and notes that modeling guidance provided by the SJVAPCD is dated and may not be the best approach if one is trying to use currently accepted methods such as those employed by OEHHA. For this reason, the Report has been written with the Air Toxics Hotspots Program Guidance Manual for the Preparation of Risk Assessments (OEHHA, 2015).

2.1.4 Merced County General Plan Air Quality Policies

The Merced County General Plan Air Quality Element has a number of policies that are applicable to The Project. Air Quality General Plan goals are outlined below. Policies that are potentially relevant to the Project operations are also listed under each goal.

Goal AQ-1 Reduce air pollutants and greenhouse gas emissions and anticipate adaptation due to future consequences of global and local climate change.

Policy AQ-1.1 Energy Consumption Reduction

Encourage new residential, commercial, and industrial development to reduce air quality impacts from energy consumption.

Policy AQ-1.2 Business Energy Reduction Strategies

Encourage all businesses to: replace high mileage fleet vehicles with more efficient and/or alternative fuel vehicles; increase the energy efficiency of facilities; transition toward the use of renewable energy instead of non-renewable energy sources; adopt purchasing practices that promote emissions reductions and reusable materials; and increase recycling.

Policy AQ-1.5 Climate Action Plan

Prepare a Climate Action Plan that includes an inventory of 1990 and 2010 greenhouse gas emissions, determines project air quality impacts using analysis methods and significance thresholds recommended by the SJVAPC, and identify strategies to achieve State emission reduction targets.

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[1] http://valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm#modeling_guidance

Goal AQ-2 Mitigate significant local and regional air quality impacts of projects through the CEQA process.

Policy AQ-2.1 Air Quality Plan Compliance

Require all development projects to comply with applicable regional air quality plans and policies.

Policy AQ-2.2 Development Review Process

Use the development review process to achieve measurable reductions in criteria pollutant, toxic air contaminants, and greenhouse gas emissions.

Policy AQ-2.3 Cumulative Impacts

Encourage the reduction of cumulative air quality impacts produced by projects that are not significant by themselves, but result in cumulatively significant impacts in combination with other development.

Policy AQ-2.4 Mitigation

Require that local and regional air quality impacts identified during CEQA review for projects reviewed and approved by the County are consistently and fairly mitigated.

Policy AQ-2.5 Innovative Mitigation Measures

Encourage innovative mitigation measures and project redesign to reduce air quality impacts by coordinating with the San Joaquin Valley Air Pollution Control District, project applicants, and other interested parties.

Policy AQ-2.6 County Decision-Making Process

Require climate change planning and program implementation in the County decision making process.

Policy AQ-2.7 Air District Best Performance Standards

Require the County to use the Best Performance Standards adopted by SJVAPCD during the development review and decision-making process to ensure new projects meet the targets set by the district.

Goal AQ-3 Improve air quality through improved public facilities and operations and to serve as a model for the private sector.

Goal AQ-4 Reduce traffic congestion and vehicle trips through more efficient infrastructure and support for trip reduction programs.

Goal AQ-5 County residents are protected from toxic air pollutants and noxious odors from industrial, manufacturing, and processing facilities, and agricultural operations.

Goal AQ-6 Improve air quality in Merced County by reducing emissions of PM_{10}, $PM_{2.5}$, and other particulates from mobile and non-mobile sources.

Policy AQ-6.1 Particulate Emissions from Construction

Support the San Joaquin Valley Air Pollution Control District's efforts to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible and consistent with State and Federal regulations.

Policy AQ-6.3 Paving Materials

Require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.

Policy AQ-6.5 Industrial Best Management Practices

Require industrial facilities to incorporate economically feasible Best Management Practices and control technology to reduce PM_{10} and $PM_{2.5}$ emissions consistent with State and Federal regulations.

2.2 Environmental Setting

The environmental setting includes the physical setting against which changes that would occur with the Project are compared in order to determine the Project's potential air quality impact. The environmental setting also includes factors that influence the setting such as meteorology, geography, and the locations of emission sources and receptors. Frequency and severity of high pollutant concentrations in the air as well result in adverse health effects which are also part of the physical setting and the primary reason for regulating air pollutants. Air quality standards are set at levels that will protect health, including the health of sensitive populations. Descriptions of regional and Project site air quality are provided in this section.

2.2.1 Regional Setting

The Project site is located in the San Joaquin Valley within the central portion of the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of the SJVAPCD. Air pollution is directly related to several factors including a region's topographic features. The SJVAB is defined by the Sierra Nevada Mountain range in the east (8,000 to 14,000 feet in elevation), the Coast Range in the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains in the south (6,000 to 8,000 feet in elevation). The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the Pacific Ocean at the Carquinez Strait, where the San Joaquin-Sacramento Delta empties into San Francisco Bay (County of Fresno, 2011).

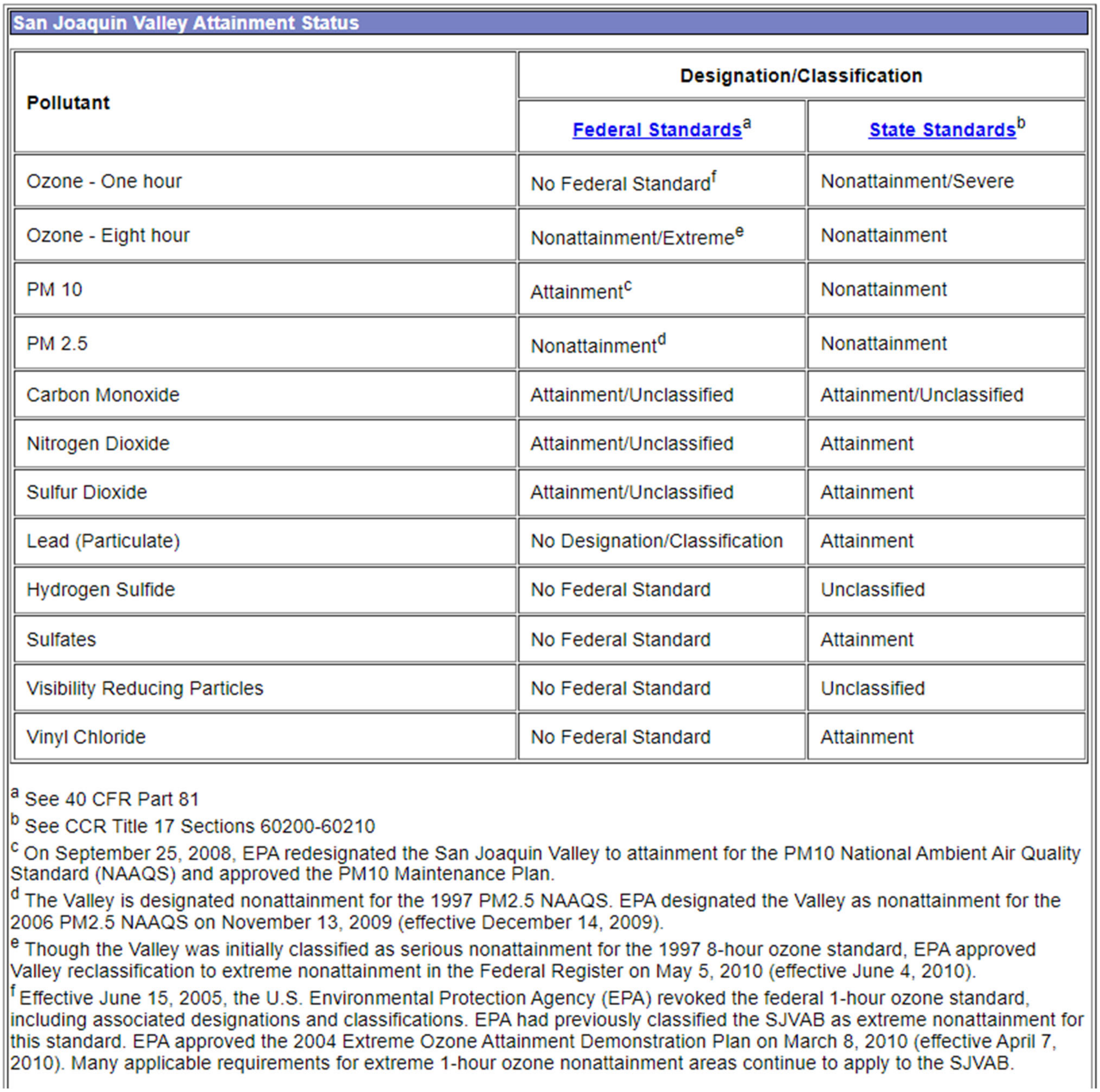
Although marine air generally flows into the basin from the San Joaquin River delta, the region's topographic features restrict air movement within the basin. The Coast Range hinders wind access into the valley from the west, the Tehachapi Mountains prevent southerly passage of air, and the Sierra Nevada Mountain range to the east is a barrier to air movement. These topographic features result in weak air flow, which becomes blocked vertically by high barometric pressure over the valley. As a result, the SJVAB is susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (1,500 to 3,000 feet) (County of Fresno, 2011).

During the summer season, wind usually originates at the north end of the Valley, through Tehachapi Pass into the Southeast Desert Air Basin. During the winter, wind occasionally originates in the south end of the Valley and flows in a north-northwesterly direction. Also, during the winter months, the Valley experiences light, variable winds, less than 10 miles per hour (mph). Low wind speeds combined with low inversion layers in the winter create a climate conducive to the accumulation of CO and PM_{10} (County of Fresno, 2011).

According to Western Regional Climate Center (WRCC), the Los Banos Det Resv Station (045120) located within 3 miles from the Project site, is the nearest climatological monitoring station. Based on the period of record (07/01/1968 to 12/31/2007), average monthly temperature has ranged from a minimum of 38.7° Fahrenheit (F) to a maximum of 94.6° F. December and January are typically the coldest months with July and August the warmest (WRCC, 2022). The annual rainfall totals approximately 8.4 inches and mostly occurs between November and April (WRCC, 2022).

Data collected at permanent monitoring stations are used by the US EPA to classify regions as “attainment” or “nonattainment,” depending on whether the regions met the requirements stated in the primary federal and state AAQS. The San Joaquin Valley is a single air quality nonattainment area. The attainment status in the SJVAB is shown in Table 5.

Table 5 San Joaquin Valley Attainment Status



San Joaquin Valley Attainment Status

Pollutant	**Designation/Classification**	
	Federal Standards[a]	**State Standards**[b]
Ozone - One hour	No Federal Standard[f]	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Extreme[e]	Nonattainment
PM 10	Attainment[c]	Nonattainment
PM 2.5	Nonattainment[d]	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

[a] See 40 CFR Part 81

[b] See CCR Title 17 Sections 60200-60210

[c] On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.

[d] The Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009).

[e] Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).

[f] Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.

Source: San Joaquin Valley Unified APCD (SJVAPCD, 2022)

2.2.2 Local Setting

Project site properties are located within the County of Merced, about 4 miles southwest of the City of Los Banos, on State Highway 33, east of Interstate 5. This area of the Central Valley in California is dominated by agriculture, with many of the rural communities such as Los Banos, serving as a local hub for farming and ranching enterprises.

Lands surrounding the Sunset and Turner properties are either fallow agricultural lands, or presently active growing operations for various crops. As is typical for this area, the ranch-style residences occupy portions of the agricultural lands, with two homes to the north of the Sunset property and one to the west. Water conveyance infrastructure, notably portions of the Delta-Mendota Canal and the Central Valley Aqueduct, are located within the Project area.

SJVAPCD maintains ambient air quality monitoring stations throughout the SJVAB in order to measure compliance with NAAQS/CAAQS. The closest ambient air quality monitoring stations to the Project site are both located in the City of Merced (an urban location). These stations are located approximately 30 miles north-east of the Project site (a rural location) and measure O_3, PM_{10}, and $PM_{2.5}$.

Air quality at the Project site is expected to be better than air quality at the Merced monitoring stations because the monitoring station is located within an urban area where there are more emissions sources. The Project site and surrounding lands are characterized as rural with few air emissions sources and so one would expect fewer hot spots and/or near field exposures as compared to more urban areas where there are many sources and where ambient measurements are collected. Regional pollutant (e.g., ozone and $PM_{2.5}$) concentrations measured at the Merced stations conservatively represent concentrations on-site because these amounts are added to Project concentrations and to cumulative concentration is compared to the AAQS in order to determine the Project's impact.

Ambient concentrations and number of days when the primary air quality standards were exceeded are presented in Table 6 and Table 7. Carbon monoxide and sulfur dioxide are omitted in these tables because the pollutants are not currently monitored within Merced County and concentrations measured at all monitoring stations within SJVAB have been less than State or Federal standards over the past five years. Ozone levels exceeded the State one-hour and eight-hour standards and the federal eight-hour standard in each of the past five years. PM_{10} levels exceeded only the state standard in the last five years. $PM_{2.5}$ levels exceeded the federal standard for the past five years. A summary of ambient air quality standards is presented in Table 1.

Table 6 Ambient Air Quality in the Project Area

Concentration and Averaging Period	Ambient Air Quality Standard	2016	2017	2018	2019	2020
Ozone 1-hr	0.09 ppm (State, max.)	0.097	0.093	0.104	0.087	0.100
Ozone 8-hr	0.070 ppm (State, max.)	0.086	0.084	0.083	0.076	0.087
	0.070 ppm (Fed., 4th high)	0.082	0.078	0.079	0.072	0.079
NO_2 1-hr	0.18 ppm (State, max.)	0.035	0.038	0.045	0.038	0.038
	0.100 ppm (Fed., 98th %ile)	0.0318	0.0350	0.0356	0.0336	0.0310
NO_2 Annual	0.030 ppm (State) 0.053 ppm (Fed.)	0.006	0.007	0.007	0.006	0.006
PM_{10} 24-hr	50 µg/m^3 (State, max.)	64.5	144.0	142.7	99.1	209.9
	150 µg/m^3 (Fed., 2nd high)	62.9	94.4	80.1	80.6	123.0
PM_{10} Annual	20 µg/m^3 (State)	29.5	35.8	34.6	29.8	*
$PM_{2.5}$ 24-hr	35 µg/m^3 (Fed., 98th %ile)	32.8	44.7	56.0	23.4	78.3
$PM_{2.5}$ Annual	12 µg/m^3 (State, max.)	11.9	13.2	15.1	9.1	14.6
	12.0 µg/m^3 (Fed., 3 Yr Avg.)	11.8	12.7	13.4	12.5	13.0

*Data Not Available

Source: Trends Summary for O_3, PM_{10}, $PM_{2.5}$ and Top 4 Summary for NO_2. (CARB, 2022).

Max. = Maximum. Hr = Hour. Fed. = Federal. ppm = parts per million. µg/m3 = micrograms per cubic meter.

4th high = Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.

2nd high = Not to be exceeded more than once per year on average over 3 years.

98th %ile = 98th percentile of: 1-hour daily maximum concentrations for the 1-hr NO_2 NAAQS; and of 24-hour average concentrations for PM_{10} and $PM_{2.5}$, averaged over 3 years.

ND – insufficient data available to determine. NA – data are not available from the listed sources.

Carbon monoxide and sulfur dioxide are not presented in these tables because the pollutants are not currently monitored within Merced County and concentrations measured at all monitoring stations within the Air Basin have been less than State or federal standards over the past five years.

PM_{10} concentration values are taken from the Merced 2334 M St. Monitoring Station. Other criteria pollutant concentration values are taken from the Merced S-Coffee Avenue Monitoring Station.

Table 7 Number of Days Exceeding Air Quality Standards in Merced

Year	Days Exceeding State 1-Hour O_3	Days Exceeding State 8-Hour O_3	Days Exceeding Federal 8-Hour O_3	Days Exceeding State 24-Hour PM_{10}[a]	Days Exceeding Federal 24-Hour $PM_{2.5}$[a]
2016	2	29	28	38.9	0
2017	0	17	16	76.6	0
2018	4	23	21	59.6	0
2019	0	6	6	54.4	0
2020	2	21	20	*	5.8

Source: Trends Summary (CARB, 2022).

[a] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and 3 days, respectively. "Numbers of days exceeding the standards" are mathematical estimates.

ND – insufficient data available to determine.

PM_{10} values are taken from the Merced 2334 M St. Monitoring Station. Other criteria pollutant values are taken from the Merced S-Coffee Avenue Monitoring Station.

2.2.3 Health Effects Setting

NAAQS/CAAQS and Reference Exposure Levels (REL) that are used for health risk assessment are designated for each pollutant at a level where no "adverse health effect" would occur to sensitive populations. The OEHHA relies upon the definition of "adverse health effect" published by American Thoracic Society (ATS). ATS published a definition in 1985 and then amended the definition in 2000 to address issues not covered by the 1985 definition. From the 1985 definition, "adverse respiratory health effect" means:

> *Medically significant physiologic or pathologic changes generally evidenced by one or more of the following:*
> 1. *Interference with the normal activity of the affected person or persons;*
> 2. *Episodic respiratory illness;*
> 3. *Incapacitating illness;*
> 4. *Permanent respiratory injury; and/or*
> 5. *Progressive respiratory dysfunction* (OEHHA, 2004).

As discussed by OEHHA, the 2000 ATS publication (see copy in Appendix B of this AQCCIA) recommended that the following "dimensions" of adverse effects be considered when determining an adverse health effect:

1. *<u>Biomarkers</u>: These should be considered; however, it must be kept in mind that few biomarkers have been validated sufficiently to establish their use for defining a point at which a response becomes adverse, consequently, not all changes in biomarkers should necessarily be considered adverse.*

2. *<u>Quality of life</u>: In recent years, decreased health-related quality of life has become widely accepted as an adverse health effect. The review committee concluded that reduction in quality of life, whether in healthy persons or persons with chronic respiratory disease, should be considered as an adverse effect.*

3. *<u>Physiological impact</u>: The committee recommended that small, transient reductions in pulmonary function should not necessarily be regarded as adverse, although permanent loss of lung function should be considered adverse. The committee also recommended that reversible loss of lung function in conjunction with symptoms should be considered adverse.*

4. *<u>Symptoms</u>: Air pollution-related symptoms associated with reduced quality of life or with a change in clinical status (i.e., requiring medical care or a change in medications) should be considered adverse at the individual level. At the population level, the committee suggested that any detectable increase in symptom frequency should be considered adverse.*

5. *<u>Clinical outcomes</u>: Detectable effects of air pollution on clinical measures should be considered adverse. More specifically, the ATS committee cited as examples increases in emergency department visits for asthma or hospitalizations for pneumonia, at the population level, or an increased need to use bronchodilator medication, at the individual level. The committee recommended that: "no level of effect of air pollution on population-level clinical indicators can be considered acceptable."*

6. *<u>Mortality</u>: Increased mortality should clearly be judged as adverse.*

7. *Population health versus individual risk: The committee concluded that a shift in risk factor distribution, and hence the risk profile of an exposed population, should be considered adverse when the relationship between the risk factor and the disease is causal, even if there is no immediate occurrence of obvious illness* (OEHHA, 6/2004).

Based on these recommendations, many health outcomes found to be associated with criteria pollutants could be considered adverse, including pulmonary function changes accompanied by symptoms, pulmonary function changes and respiratory symptoms that reduce quality of life, large changes in pulmonary function, clinical outcomes such as emergency department visits for asthma, hospitalization for respiratory and cardiovascular disease, and mortality. In addition, outcomes such as increase in airway reactivity and inflammation may be considered adverse if they signify increases in the potential risk profile of the population.

> *With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment.* (ATS, 2000).

Finally, according to ATS, research now shows that some highly susceptible individuals may respond to common exposures at or close to natural background pollutant levels that are often unavoidable.

2.3 Significance Thresholds

Determination of whether impacts exceed the significance thresholds is performed using the threshold criteria and methodologies established by the CEQA lead agency and/or air district.

2.3.1 CEQA Guidelines Appendix G

As stated, in the Appendix G Environmental Checklist, where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations:

Would the project:

a) Conflict with or obstruct implementation of applicable air quality plan?
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?
c) Expose sensitive receptors to substantial pollutant concentrations?
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The SJVAPCD guidelines, rules and regulations that were considered in the following determinations are discussed below in Section 2.3.2.

2.3.2 SJVAPCD Guidance

SJVAPCD recommends that application of the GAMAQI criteria when evaluating project-specific impacts on air quality within the SJVAB. The SJVAPCD identifies threshold criteria that separate a project's short-term emissions from its long-term emissions. The short-term emissions are mainly related to the construction phase of a project and are recognized to be temporary. The long-term emissions are mainly related to the activities that will occur indefinitely as a result of project operations. In addition, CEQA states another condition that could establish a project as having a significant effect on the environment is effects that are considered "cumulatively considerable." Threshold criteria for Project construction impacts, Project operations, and cumulative impacts are discussed below.

SJVAPCD Rules and Regulations

SJVAPCD recommends that air quality assessments reflect emission reductions achieved through compliance with SJVAPCD rules and regulations. The applicable SJVAPCD rules and regulations are provided in Section 2.1.4.

Regional Impacts from Criteria Pollutant Emissions

The quantities of pollutants above which SJVAPCD believes would have a significant effect on air quality are presented in Table 8. Consitent with SJVAPCD guidance, impacts from construction, operational non-permitted equipment and activities, and/or operational permitted equipment and activities are evaluated independently from one another. The threshold criteria are applied on a calendar year basis. For construction emissions, the annual emissions are evaluated on a rolling 12-month period.

Localized Impacts from Criteria Pollutants and Toxic Air Contaminants

The thresholds of significance for Ambient Air Quality are based on the CAAQS and NAAQS. A project would be considered to have a significant impact if its emissions are predicted to cause or contribute to a violation of an ambient air quality standard by exceeding any CAAQS/NAAQS. The standards are listed above in Table 1. Significance thresholds used by SJVAPCD are presented in Table 8.

Table 8 SJVACPD Threshold Criteria for Assessing Impacts

Criteria Pollutants			
Pollutant	Construction Phase [b] (ton/yr)	Operation Phase Permit-Required [c] (ton/yr)	Operation Phase Permit-Exempt [c] (ton/yr)
CO	100	100	100
NO_x	10	10	10
ROG	10	10	10
SOx	27	27	27
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15
Recommended Toxic Air Contaminants (TACs), Odor Thresholds[b]			
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 20 in 1 million Chronic & Acute Hazard Index ≥ 1.0 (project increment)		
Odor	More than one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period. (Screening distance is one mile for HMA plants.)		
Ambient Air Quality Standards [d]			
Screening Criteria	100 lb/day of any criteria pollutant after implementation of mitigation measures.		
Modeling Criteria	If modeling is required because emissions exceed the screening criteria (100 lb/day), then the project would have a significant impact on an AAQS if the project concentration plus background concentration measured at the closest air monitoring station exceeds the most stringent AAQS or Significant Impact Level (SIL) in cases where background concentration already exceeds or nearly exceeds the AAQS.		

a Based on SJVAPCD "Air Quality Thresholds of Significance – Criteria Pollutants". (San Joaquin Valley Air Pollution Control District, 2015)
b Based on SJVAPCD "Recommended Thresholds of Significant Impact". (San Joaquin Valley Air Pollution Control District, 2012)
c Based on SJVAPCD "Ambient Air Quality Standards & Valley Attainment Status" (San Joaquin Valley Air Pollution Control District, n.d.)
d Based on SJVAPCD "Guidance for Assessing and Mitigating Air Quality Impacts". (SJVAPCD, 2015)

Screening Threshold for On-Site Emissions

In addition to the CAAQS/NAAQS, the GAMAQI contains Ambient Air Quality Screening Tools. Impacts require a detailed assessment when on-site emission increases from construction activities or operational activities exceed the 100 pounds per day (lb/day) screening level for each criteria pollutant evaluated after implementation of enforceable mitigation measures. Under such circumstance, the SJVAPCD recommends that an ambient air quality analysis be performed. An ambient air quality analysis uses air dispersion modeling to determine if emission increases from a project will cause or contribute to a violation of the ambient air quality standards.

For stationary source projects, the GAMAQI states that on-site construction emissions, on-site operational emissions from permitted equipment and activities, and on-site operational emissions from non-permitted equipment and activities each would be screened separately by comparison the 100 lb/day threshold.

Odors

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, there are no quantitative or formulaic methodologies to determine if potential odors would have a significant impact. Rather, projects must be assessed on a case-by-case basis.

SJVAPCD GAMAQI recommends that all available pertinent information should be considered in order to qualitatively determine if a significant impact is likely to occur. SJVAPCD recommends that applicable information regarding the characteristics of the odor source be disclosed. Consideration of such parameters assists in evaluating the potential for odor impacts as a result of the proposed Project.

SJVAPCD has identified some common types of facilities that have been known to produce odors in the SJVAB. These are presented in Table 9. Table 9 is used as a screening tool to qualitatively assess a project's potential to adversely affect area receptors. This list of facilities is not all-inclusive; however, aggregate mining and processing is not one of the facilities identified by the District as a potential source of significant odors.

Table 9 Screening Levels for Potential Odor Sources

Type of Facility	Distance (miles)
Wastewater Treatment Facilities	2
Sanitary Landfill	1
Transfer Station	1
Composting Facility	1
Petroleum Refinery	2
Asphalt Batch Plant	1
Chemical Manufacturing	1
Fiberglass Manufacturing	1
Painting/Coating Operations (e.g., auto body shops)	1
Food Processing Facility	1
Feed Lot/Dairy	1
Rendering Plant	1

Source: (SJVAPCD, 2015, p. 103).

Cumulative Impacts

When assessing whether there is a new significant cumulative effect, SJVAPCD recommends that whether or not the incremental effects of the project are cumulatively considerable be evaluated. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects [14 CCR § 15064(h)(1)].

If a project will comply with the requirements in a previously approved plan or mitigation program, including, but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which a project is located, then the project's incremental contribution to a cumulative effect is not cumulatively considerable (CEQA Guidelines §15064(h)(3)).

Locally Cumulative Impacts

Impacts from TACs are localized impacts. SJVAPCD has established thresholds of significance for TACs that are extremely conservative and protective of health impacts on sensitive receptors. Because impacts from TACs are localized and the thresholds of significance for TACs have been established at such a conservative level, risks over the individual thresholds of significance are also considered cumulatively significant. Criteria pollutants may also be assessed for localized impact if emissions are greater than the SJVAPCD emissions thresholds. Similar to TACs, these pollutants would be considered cumulatively significant if the localized impact is significant.

Regionally Cumulative Impacts

The SJVAPCD concludes that when activities and emissions from non-permitted sources are individually significant, they are also cumulatively significant, because the Project significance thresholds are set at the amount that is cumulatively considerable. Additionally, SJVAPCD's attainment plans demonstrate that NSR offset requirements ensure the District will achieve attainment. Consequently, emission impacts from sources permitted consistent with NSR requirements are not cumulatively significant, as the attainment plan considers each source within the SJVAPCD jurisdictional area. The tons/year thresholds were developed for the non-attainment area, and represent the amount that is cumulatively considerable for a non-attainment area.

2.4 Methodology

Guidelines and emissions thresholds established by the SJVAPCD in the GAMAQI (SJVAPCD, 2015) are used to assess impacts in this AQCCIA. The SJVAPCD also requires evaluation of cumulative air quality impacts, which are further discussed in Section 2.5.

2.4.1 Assumptions and Project Design Features

The impact assessment incorporates the following general assumptions:

- The excavation and associated equipment would operate in compliance with applicable air quality regulations.
    - Diesel engines would comply with applicable State regulations (i.e., air toxic control measures (ATCM)). This includes labeling of off-road equipment with registration numbers assigned by CARB, establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).
    - The Project would comply with SJVAPCD Regulation VIII, "Fugitive PM_{10} Prohibition" and would include the following measures:

   i. The area to be excavated will be irrigated or sprayed by water trucks when visible dust is observed during excavation activities.
   ii. A water truck will be utilized to wet down the haul road from the excavation to the plant site as necessary to meet SJVAPCD fugitive dust requirements.
   iii. Records demonstrating compliance with fugitive dust requirements will be maintained for those days that a control measure was implemented and include the type of control measure(s) used, the location and extent of coverage, the date, the amount, and frequency of dust suppressant applied (Rule 8011, Section 6.2).
   iv. Limit visible dust emissions to 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour and comply with the conditions for stabilized surface areas (Rule 8021, Section 5.0; Rule 8031, Section 5.0).
   v. Stabilize disturbed areas that are greater than 0.5 acres in size and which remain inactive for seven (7) days (Rule 8021, Section 5.2).
   vi. Stabilize stockpile surfaces (Rule 8031, Section 5.0).
   vii. Maintain a stabilized surface on the unpaved haul road (Rule 8021, Section 5.2).
   viii. During high wind conditions, cease excavation and other earthmoving activities that disturb the soil whenever visible dust emissions exceed 20 percent opacity. Continue operation of water trucks/control devices when activities cease, unless unsafe to do so. (Rule 8021, Section 5.4).
   ix. Prevent unauthorized vehicle disturbance of open areas by posting signs or installing physical barriers such as fences, gates, posts, and/or other appropriate barriers to effectively prevent access to the area(s) (Rule 8051, Section 5.0).

- The Project would not store hazardous substances or acutely hazardous substances in quantities that would be subject to chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).

- The Project will be managed such that there will be no increase in the production rate of aggregates from the Baseline level of 1.03 million tons per year extracted. Therefore, the number of haul trucks traveling offsite on public roads will not increase from Baseline.

- The model assumes that the Sunset Property will be mined first, followed by the Turner Property. This is conservative, as emissions will take place closer to modeled receptors earlier in the project, which increases risk due to age sensitivity factors.

- No material processing would occur within the Turner and Sunset properties. All excavated material would be transported offsite to the existing Los Banos Facility.

- The number of employees will not increase beyond the existing number of onsite employees required for the existing Los Banos Facility.

- The type and number of mobile equipment operating within the Project sites would be the same as those currently operating within the existing Los Banos Facility.

- Activities associated with the Project will comply with applicable rules and regulations.

- Roads upon which material is hauled to the onsite plant for processing shall be controlled by methods that will achieve 90% reduction of fugitive dust. This can be achieved by frequent watering, use of chemical dust suppressants, or a combination of watering and chemical dust suppressants. Other methods which achieve 90% reduction of fugitive dust may be acceptable with Lead Agency approval.

2.4.2 Emissions Calculations Methodologies

Emissions from combustion sources associated with the Project are limited to non-road diesel engines and are calculated in Appendix C using the methods presented below.

Fugitive dust emissions associated with the Project are a result of excavation, transfer, stockpiling, and off-road transportation of aggregates materials, and are calculated in Appendix C using the methods presented below.

Pollutant emissions associated with fugitive dust are speciated into individual Toxic Air Contaminants (TACs) based on speciation profiles provided by the SJVAPCD and, as applicable, the San Diego Air Pollution Control District (SDAPCD).

Non-Road Engines

Non-road engine emissions in off-road vehicles were calculated using the CalEEMod default method and emissions factors. Engine emissions rates decrease over time as the fleet is turned over and controls are implemented to comply with CARB regulations (i.e., In-Use Off-Road and Portable Engine ATCMs). Appendix A of the CalEEMod User Manual contains the following equation for quantifying off-road engine emissions.

$$Emissions_{DieselEx} = \sum_{i} (EF_i \times Pop_i \times AvgHP_i \times Load_i \times Activity_i)$$

Where:

EF = Emission factor in grams per horsepower-hour (g/bhp-hr)
Pop = Population, or the number of pieces of equipment.
AvgHP = Maximum rated average horsepower.
Load = Load factor.
Activity = Hours of operation.
i = Equipment type.

Off-road engine emissions factors were estimated based CalEEMod Appendix G-11: Off-road Emissions Factors. Baseline emissions factors were based on the emissions rates listed for 2022. Mining of the Sunset property is modeled based on emissions rates for 2023, and mining of the Turner property is modeled based on emissions rates for 2025. These assumptions are conservative as the majority of the Baseline period takes place prior to 2022 (when engines had higher emissions) and the majority of future Project excavation takes place after 2025 (when engines will have lower emissions).

Excavation

Fugitive dust emissions generated during excavation are a result of dozer ripping, as the alluvial deposit does not require blasting. Dozer emissions were calculated based on the default methodology outlined in CalEEMod Appendix C Section 4.4.2, Bulldozing.

$$EF_{PM15} = \frac{C_{PM15} * (S)^{1.2}}{(M)^{1.4}}$$

$$EF_{PM10} = EF_{PM15} * F_{PM10}$$

Where: EF = emission factor (lb/hr).
C = arbitrary coefficient used by AP-42.
M = material moisture content (%).
s = material silt content (%). F = scaling factor

Excavation also incorporates the use of an excavator, however the emissions associated with the excavator are accounted for as drops which are calculated as part of material transfer detailed below.

Material Transfer

Material dropping from the excavator to haul trucks and from the haul trucks to the ground emit fugitive dust. Material drop emissions were calculated using the CalEEMod default methodology which is based on the following emissions factor equation from AP-42 Section 13.2.4.

$$EF = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where: E = emission factor (lb/ton).
k = particle size multiplier (dimensionless: 0.35 for PM_{10}).
U = mean wind speed, (miles per hour [mph]).
M = material moisture content (%).

Moisture content of twelve percent (12%) is used which is the default value in CalEEMod and reflects the fact that materials are watered as necessary to control dust (i.e., no additional control efficiency for watering is applied to this source). The mean wind speed of 6.26 miles per hour (mph) is used based upon the mean wind speed for the Merced Airport in Table 1 of CalEEMod Appendix G. Material drops from excavation equipment would occur into stockpile areas, as well as into vehicles being loaded for material transport.

Stockpile/Loadout Areas

Emissions from sources in these areas are calculated using the SJVAPCD's uncontrolled emissions factor of 5.27 lb-PM_{10}/acre-day and recommended 80% control efficiency for watering of stockpiles containing greater than one percent material smaller than 3/8-inch (SJVAPCD, 2013).

Travel on On-site Unpaved Roads

Road dust emissions are calculated using CalEEMod and AP-42 emissions factors. AP-42 Section 13.2.2 (November 2006) contains the following emissions factor equation for vehicles traveling on unpaved roads at industrial sites:

$$E_{ext} = \left[k\left(\frac{s}{12}\right)^{0.9} \times \left(\frac{W}{3}\right)^{0.45}\right]$$

Where: E_{ext} = annual particulate emission factor (having units matching the units of k),
k = particle size multiplier units of interest (e.g., 1.5 lb/VMT for PM_{10}),
s = surface material silt content (%),
W = average weight (tons) of the vehicles traveling the road,

Unpaved road emissions were calculated for on-road trucks traveling on the Project site to haul material to the existing processing plants. The Baseline control efficiency for watering unpaved roads was assumed to be 80 percent based on AP-42 13.2.2 – Unpaved Roads, Figure 13.2.2-2 of AB-42. Consistent with the Project design feature noted above, control efficiency utilizing for the Project was assumed to be 90 percent through the use of additional watering or chemical dust suppressants. The silt content of the unpaved roads was assumed to be 4.8 percent per AP-42 Table 13.2.2-1 (Sand and Gravel Processing). Off-road truck weight (40 tons empty, 90 tons full) was obtained for a representative 50-ton capacity truck from the Caterpillar Performance Handbook. Annual emissions were adjusted for rainfall, assuming 29 days a year exceeding 0.01 inch of rainfall based on data from CalEEMod Appendix G-2 for Merced Municipal Airport.

2.4.3 CEQA Baseline

In the past, mining has occurred at a rate of 1.03 million tons per year. This mining rate would continue and not change or increase under the Project. The excavated materials were hauled by truck to the onsite processing plant, processed, and exported. The Project would have the same number of onsite employees and the same type and number of standard aggregate mining equipment would be used as in the Baseline. Because the Project would not increase production rate, for both aggregates extraction as well as the existing processing plant, above Baseline levels, the number of trips and Vehicle Miles Traveled (VMT) by on-road trucks delivering product to the market would also not change from Baseline levels. Triangle would continue operation of these existing sources of air emissions (i.e., on-road haul trucks and employee vehicles leaving the Los Banos Facility, materials processing at the existing plant[s]), and these existing activities would not be affected by the Project.

Baseline for Non-Road Engines

Baseline round trip haul distance from the excavation to the processing plant was assumed to be 3.07 miles. This average trip length accesses the center of the Baseline mining area(s), therefore providing an accurate estimate of the average trip in the Baseline mining area. Loader, excavator and haul truck activity levels were based on haul distance and cycle time analysis (Appendix C). The dozer and water trucks were assumed to have a fixed number of operational hours. Baseline equipment activity is summarized in Table 10.

Table 10 Baseline Equipment and Activity for Excavation

Equipment	HP	Annual Activity Level (hours)	Daily Operating Hours
980 Loader	390	1,546	9.4
390 Excavator	530	1,315	8
Dozer	600	1,251	8
Water Truck	600	1,000	4
Haul Trucks	600	8,238	50

Source: Appendix C

Loader, Excavator, and Haul Truck activity levels based on cycle time analysis. Dozer and water truck activity levels based on fixed operating hours.

Excavation equipment emission factors in the Baseline were obtained from the CalEEMod Appendix G Table 11 Off-road Emissions Factors for the year 2022. Annual emissions in the Baseline are summarized in Table 11.

Table 11 Baseline Excavation Exhaust Emissions

Period	Units	ROG	CO	NO_x	SO_2	PM_{10} (diesel)	$PM_{2.5}$ (diesel)
Annual	Tons	0.6	4.0	5.0	0.02	0.18	0.17
Max Daily	lbs	7.4	47.6	60.3	0.18	2.21	2.03
Max Hourly	lbs	0.4	2.9	3.9	0.01	0.14	0.13

Source: Appendix C.

Baseline for On-Road Engines

The Production rate or the amount of material produced by the Project would remain unchanged from the Baseline level. Thus, off-site haul trucks and associated emissions would not change or increase, and would eventually decrease from the Baseline due to phase-in of CARB engine regulations over future years. This primarily affects cancer risk, which is a multi-year impact.

Baseline Emissions Summary

Table 12 presents Baseline emissions for each emissions source associated with the existing activity. Sources are divided into two categories: Stationary Sources and Permit Exempt Sources. Note, these two source categories track with the applicable guidance and CEQA thresholds published by the SJVAPCD. PM_{10} and $PM_{2.5}$ emissions in Table 12 include both fugitive emissions and engine exhaust emissions.

Table 12 Baseline Annual Emissions Summary

Baseline Emissions (tons/yr)							
		ROG	**CO**	**NO_x**	**SO_2**	**PM_{10} Total**	**$PM_{2.5}$ Total**
Permitted Sources	Aggregates Storage	--	--	--	--	0.19	0.06
Permit Exempt Sources	Excavation Emissions	0.2	1.1	1.6	0.004	0.2	0.1
	Aggregates Transfer/Drops	--	--	--	--	0.88	0.26
	Off-Road Vehicle Haul	0.45	2.86	3.46	0.011	120.0	25.5
	Total Emissions	**0.6**	**4.0**	**5.0**	**0.02**	**121.3**	**25.9**

Source: Appendix C.
-- Indicates no emissions

2.4.4 Site Preparation Emissions

Prior to initiating mining, subsoil/topsoil will be salvaged and contained in the earthen perimeter berms along the northern and portion of the western boundaries of the Sunset property, and portions of the Turner property as applicable. During reclamation, as required by the SMARA, topsoil and subsoil in the berms will be spread throughout the mined areas to support revegetation and to re-established vegetative communities following completion of mining. Thus, during this initial stage at each property, grading using scrapers and/or dozers and excavators would salvage the available topsoil and subsoil and store it within the perimeter berms prior to mining.

Following site preparation and formation of the perimeter topsoil/subsoil berms, normal material extraction would commence. All excavated material (i.e., aggregate, overburden) would be handled in the same manner as currently occurs at the existing Los Banos Facility. Specifically, aggregate material would be transferred to the Los Banos Facility processing plant for processing. Consistent with existing operations, excess material (i.e., overburden) would either be transferred to the existing Los Banos Facility for storage, and/or stored in discrete piles at the Sunset or Turner mining areas. Additionally, if large boulders were excavated during the course of mining, this material would be left within the confines of the mining pits and left in place as part of the reclamation process.

Grading and overburden removal would not result in activity levels at the Sunset or Turner sites that would exceed Baseline levels. Material extraction for the Project involves the same processes as currently occurring at the Los Banos Facility, specifically material dozing, storage, drops, and hauling using internal haul roads as needed.

Because site preparation activities would be far lower than during normal mining operations, site preparation emissions are considered de minimis. Additionally, because normal mining involves more equipment, longer operating hours, and larger quantities of materials, it can be presumed that any impacts determined for the Project mining operations would necessarily address any lesser impacts that could result during the site preparation. Site preparation emissions are calculated for disclosure purposes using CalEEMod, and can be found in Appendix F.

2.4.5 Project Emissions

For the purposes of this analysis, future excavation was assumed to occur for 40 years, and the annual production rate was assumed to be 1.03 million gross tons. Mining of the Sunset property is modeled to occur over the course of the first two years of the Project, which is conservative, as this would require mining at full capacity within a closer proximity to potential receptors. Assuming maximum rate is achieved this early in the Project is also conservative, as modeled receptors are assumed to be infants and more sensitive to emissions.

As discussed previously, Project excavation activity would not exceed the historical levels in the Baseline. Accordingly, dust emissions related to excavation, material handling, and stockpiling would also not increase. However, these excavation emissions would change locations in which they are emitted, specifically from the existing mineral reserves currently being mined within the Los Banos Facility to the Project sites (i.e., Sunset and Turner and properties). Additionally, because the Turner site is geographically further from the existing Los Banos Facility processing plant(s) than the existing mining areas, an increase in haul road emissions would also result due to the Project.

Excavation Phase Non-Road Engines

Table 13 presents the size, type and hours of operation for equipment that would be involved in Project excavation.

Table 13 Excavation Equipment

Equipment	HP	Annual Activity Level (hours)	Daily Operating Hours
980 Loader	390	1,546	9.4
390 Excavator	530	1,315	8
Dozer	600	1,251	8
Water Truck	600	1,000	4
Haul Trucks	600	8,238	50

Source: Appendix B.

Annual hours of operation for the loaders, excavator, and haul trucks were determined based upon cycle time analysis using methods in the Caterpillar Performance Handbook, whereas the dozer and water truck operation was estimated based on fixed operating hours. (Appendix C).

Material Transfer/Drops

Consistent with existing operations, mined materials would be transferred to into stockpiles as well as haul trucks in the mining area. These emissions were estimated using the drop equation outlined in Section 2.4.2.

Excavation Phase Stockpile/Loadout Area

The stockpile area would not increase from Baseline levels with the Project. Mining areas were assumed to have one acre of stockpiled materials, based on aerial photography of stockpiles in mining areas during the Baseline period. Emissions were calculated using the emissions factor and control efficiency recommended in Stationary Source Policy 1610 (SJVAPCD, 2013).

Excavation Phase Travel on Roads

Emissions from travel on roads depend upon the number of trips, length of the road, weight and speed of the vehicle and road surface condition.

Road lengths in the Baseline were determined based on aerial photography on Google Earth™ taken during the Baseline period. A road length that accessed the center of the Baseline mining area from the processing area was chosen as a representative road length for the Baseline scenario. Similarly, for Project emissions, a haul route that accessed the center of the Sunset property was chosen for mining of the Sunset property, and a haul route that accessed the center of the south end of the Turner property was chosen for mining of the Turner property. See Figure 3 for more details about modeled onsite haul roads.

Future Emissions Summary

For emissions calculations, the Project is assumed to operate at a production rate of 1.03 million tons/year. The model assumes that two years of operation will be conducted in the Sunset property, followed by 28 years in the Turner property. Note the actual length of mining for the Project will be dependent on the aggregate quality in a given area and the market demand. Project excavation maximum annual emissions would occur during years 2 to 40 of the Project, as the Turner property is further from the processing area and therefore involves longer haul trips to transport excavated material to the existing process plant(s). Note that although mining under the Project could occur for up to 40 years depending upon market demand, for emissions calculations purposes, assuming all excavation could occur within the initial 30 years is more conservative as it both condenses said Project emissions when engines are presumed to be less efficient/clean per applicable CARB regulations. Using these assumptions, Project maximum annual emissions are shown in Table 14.

Table 14 Project Emissions Summary

Project Emissions (tons/yr)							
		ROG	**CO**	**NO_x**	**SO_2**	**PM_{10} Total**	**$PM_{2.5}$ Total**
Permitted Sources	Aggregates Storage	--	--	--	--	0.19	0.06
Permit Exempt Sources	Excavation	0.1	1.1	1.1	0.004	0.2	0.1
	Aggregates Transfer/Drops	--	--	--	--	0.9	0.3
	Off-Road Vehicle Haul	0.43	2.81	3.08	0.0113	70.0	14.9
Project Emissions		**0.6**	**3.9**	**4.1**	**0.02**	**71.3**	**15.3**
Baseline Emissions		**0.6**	**4.0**	**5.0**	**0.02**	**121.3**	**25.9**
Change in Emissions due to Project		**-0.05**	**-0.1**	**-0.9**	**0.00**	**-50**	**-10.6**

Note: Negative values result when the Project emissions are less than the Baseline emissions and represent emissions reductions due to newer technology and lower emission equipment.
Source: Appendix C.
-- indicates no emissions

2.4.6 Health Risk Assessment

A health risk assessment (HRA) was performed using current best practices including methods from the HRA Guidelines (OEHHA, 2015). The four steps involved in the risk assessment process are: 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization. These four steps were used to assess health risk for the Project, and each is discussed in the sections below.

Hazard Identification and Quantification

For air toxics sources, hazard identification involves the pollutant(s) of concern emitted by a facility, and the types of adverse health effects associated with exposure to the chemical(s), including whether a pollutant is a potential human carcinogen or is associated with other types of adverse health effects. Appendix A of the HRA Guidelines includes a list of TACs that are used for HRA in California.

Diesel Particulate Matter (DPM) is was formerly the primary toxic constituent emitted by mining projects. DPM has an assigned cancer potency factor (CPF) and a non-cancer reference exposure level (REL) that are used to evaluate the risk from the DPM concentration present. However, diesel engines emit fewer particulates today than ever, causing arsenic and other metals in fugitive dust to be the primary TACs of concern in mines.

Fugitive emissions were generally speciated into constituent TACs based on SJVAPCD speciation profiles. San Diego Air Pollution Control District (SDAPCD) speciation profiles were also used when speciation data was not available from SJVACPD. The resulting mass of each TAC was used as input along with the dispersion coefficients to predict the ground level concentration (GLC) of each TAC which could then be used to evaluate the dose received by each receptor along each exposure pathway and, in the case of non-cancer risk, on each target organ, which was performed using HARP2 as discussed in the following subsections.

TACs incorporated in the HRA can be found in Table 15. Specific speciation profiles for road-based emissions, aggregates processing emissions, storage emissions, and excavation emissions can be found in Appendix C. Diesel emissions were evaluated for diesel particulate matter.

Table 15 Toxic Air Contaminants Incorporated in HRA

CAS	Chemical Name
7429905	Aluminum
7440382	Arsenic
7440393	Barium
7440417	Beryllium
7440439	Cadmium
18540299	Hexavalent Chromium
7440473	Chromium
7440484	Cobalt
7440508	Copper
7439921	Lead
7439965	Manganese
7440020	Nickel
7782492	Selenium
1175	Silica, Crystalline
7440666	Zinc

Source: Appendix C

The HRA considered whether health risk from asbestos should be quantified. It was determined based on review of available maps (California Department of Conservation, Division of Mines and Geology, 2000) and language in the Asbestos ATCM's (17CCR §93105 and §93106) that allows the APCO to exempt sand and gravel facilities operating in alluvial deposits, that asbestos is unlikely to exist within, or upstream from, the Project site. Therefore, asbestos was excluded from the HRA.

Exposure Assessment

The purpose of exposure assessment is to estimate the extent of public exposure to emitted substances. For the Hot Spots program, in practice this means estimating exposures for those emitted substances for which potential cancer risk or noncancer health hazards for acute, repeated 8-hour, and chronic exposures will be evaluated. This involves emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimation of short-term (e.g., 1-hour maximum), 8-hour average, and long-term (annual) exposure levels.

Hot Spots Analysis and Reporting Program (HARP2) software developed by CARB can be used to model ground level concentrations at specific off-site locations. HARP2 incorporates the US EPA-approved dispersion model, American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). AERMOD is a steady-state plume model based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. CARB recommends AERMOD for Hot Spots risk assessments (OEHHA, 2015).

In this HRA, the air dispersion modeling was performed separately from HARP2 using AERMOD View by Lakes Environmental, Version 10.2.1 running the Lakes AERMOD MPI executable Version 21112. Output from the Lakes software program were imported to HARP2 (dated 22118) which was then used to perform the risk characterization portion of the HRA. The process of using air dispersion modeling results as the basis of HRA follows these four steps:

1. Air dispersion modeling is used to estimate annual average and maximum one-hour ground level concentrations (GLC). The air dispersion modeling results are expressed as an air concentration or in terms of (Chi over Q) for each receptor point. (Chi over Q) is the modeled downwind air concentration (Chi) based on an emission rate of one gram per second (Q). (Chi over Q) is expressed in units of micrograms per cubic meter per gram per second, or (µg/m^3)/(g/s). (Chi over Q) is sometimes written as (X/Q) and is sometimes referred to as the dilution factor.

2. When multiple substances are evaluated, the X/Q is normally utilized since it is based on an emission rate of one gram per second. The X/Q at the receptor point of interest is multiplied by the substance-specific emission rate (in g/s) to yield the substance-specific GLC in units of µg/m^3. The following equations illustrate this point.

$$GLC = \left(\frac{X}{Q}\right) \times Q_{Substance}$$

$$\frac{X}{Q} = (Chi\ over\ Q)\ in\ \left(\frac{{}^{\mu g}/_{m^3}}{{}^{g}/_{s}}\right), from\ model\ results\ with\ unit\ emission\ rate$$

$$Q_{Substance} = substance\ emission\ rate\ \left({}^{g}/_{s}\right)$$

3. The applicable exposure pathways (e.g., inhalation, soil contact, fish consumption) are identified for the emitted substances, and the receptor locations are identified. This determines which exposure algorithms are ultimately used to estimate dose. After the exposure pathways are identified, the fate and transport algorithms are used to estimate concentrations in the applicable exposure media (e.g., soil or water) and the exposure algorithms are used to determine the substance-specific dose.

4. The dose is used with cancer and noncancer health values to calculate the potential health impacts for the receptor. An example calculation using the high-end point-estimates for the inhalation (breathing) exposure pathway can be found in Appendix I of the HRA Guidelines (OEHHA, 2015).

AERMOD was used as described above to calculate a X/Q for each source-receptor combination by setting the emission rate for each source in the model to one gram per second (1 g/s). Other parameters used in AERMOD describe overall control of the model domain and functionality (e.g., coordinate system, terrain, non-default options, etc.), receptors (e.g., location, height), sources (e.g., size, location, exhaust velocity, temperature, operating schedule), meteorology (files provided by SJVAPCD), and output file options.

The Control Pathway of AERMOD was set to provide output in units of concentration; and both wet and dry plume depletion were disabled. The non-regulatory default option of flat terrain was selected as well as the beta option "Adjusted Friction Velocity (u*) in AERMET (ADJ_U*)" as discussed above. Pollutant/averaging options were set to PM_{10} with averaging times of 1-hour and the period of the meteorological data file (i.e., five years). The rural dispersion coefficient was used, and exponential decay was excluded.

Following SJVAPCD guidance, facility fence line receptors were placed every 50 meters. Two receptor grids were used in the AERMOD model: a fine grid with 100 m spacing and a coarse grid with 1000m spacing, for a total of 7,002 grid-based receptors. 30 discrete receptors were also chosen based on residences and workplaces in the area surrounding the facility. These receptors were chosen by visual inspection of aerial photography. The discrete receptors are shown on Figure 3 (Appendix A). A description of each receptor used in the model is available in Table 16.

Sources that existed during the Baseline period and those proposed by the Project are illustrated on Figure 3 (Appendix A) and source parameters are summarized in Table 17. Project and Baseline sources were included in the model. Project sources were assigned positive emissions values and Baseline sources were assigned negative values so that the HRA result represent the change in health risk resulting from the Project. Variable emissions sources were used to simulate emissions from the Project 16 hours per day, between the hours of 5:00 a.m. and 9:00 p.m.

Output of the dispersion model in the form of plotfiles, one for each combination of source and averaging period, that contain X/Q values were then used in HARP2 with the emissions rates presented above and other human exposure parameters discussed below to predict the acute, non-cancer chronic, and cancer risk at each receptor. The modeling files are provided in Appendix F.

Table 16 Receptors

Figure ID Number	Model ID Number	X Coordinate (m)	Y Coordinate (m)	Description
N/A	1 to 6634	N/A	N/A	Grid Receptors
1	6635	686526	4099896	Residence
2	6636	686521	4099958	Residence
3	6637	686544	4100042	Residence
4	6638	686576	4100057	Residence
5	6639	686740	4100015	Residence
6	6640	686867	4100018	Residence

Figure ID Number	Model ID Number	X Coordinate (m)	Y Coordinate (m)	Description
7	6641	686979	4100031	Residence
8	6642	687236	4100030	Residence
9	6643	687444	4100038	Residence
10	6644	687514	4100050	Residence
11	6645	687574	4100055	Residence
12	6646	687671	4100038	Residence
13	6647	687747	4100039	Residence
14	6648	687798	4100053	Residence
15	6649	688285	4099988	Residence
16	6650	687781	4099698	Residence
17	6651	687637	4099131	Residence
18	6652	687682	4098517	Residence
19	6653	687662	4097223	Residence
20	6654	687586	4097164	Residence
21	6655	687536	4096804	Residence
22	6656	686793	4096393	Residence
23	6657	686072	4097192	Worker
24	6658	684993	4098959	Residence
25	6659	685315	4099169	Residence
26	6660	685965	4099456	Residence
27	6661	686060	4099725	Residence
28	6662	685929	4099821	Residence
29	6663	686182	4099916	Residence
30	6664	686351	4100027	Residence
N/A	6665 to 6992	N/A	N/A	Fence-line Receptors

Note: Project is in UTM Zone 11N.

Once emissions exit the source, the substances emitted will be dispersed in the air. The emission plume may contain both vapor phase substances and particulates. A semi-volatile organic toxicant can partition into both vapor and particulate phases. Particulates can deposit on vegetation, on soil, and in water at a rate that is dependent on the particle size. A deposition rate of 0.05 m/s was used for the Project HRA. The following algorithms are used to estimate concentrations in environmental media including air, soil, water, vegetation, and animal products.

Table 17 Emissions Source Parameters for Baseline and Project

AERMOD ID	Description	Type	X Coordinate (m)	Y Coordinate (m)	Size [a]	Other Parameters
BMINE	Baseline excavation area	Area Poly	685544.95	4098325.57	636,047m^2	Release Height = 0m
1HAUL	Sunset Haul Road	Line Volume	687351.56	4099725.36	1,160 m	Plume Height: 5.1 m Plume Width: 13.32 m
BHAUL	Baseline Haul Road	Line Volume	687379.98	4099722.06	2,476.5 m	Plume Height: 5.1 m Plume Width: 13.32 m
2HAUL	Turner Haul Road	Line Volume	687380.81	4099722.11	2,888 m	Plume Height: 5.1 m Plume Width: 13.32 m
2MINE	Turner Excavation Area	Area Poly	686927.34	4098260.47	808,789 m^2	Release Height = 0 m
1MINE	Sunset Excavation Area	Area Poly	686583.15	4099964.34	93,147 m^2	Release Height = 0 m
BSTRG	Baseline Mine Area Material Storage	Volume	685773.14	4098205.21	4,096m^2	Release Height = 3m Side Length=64m
2STRG	Turner Mine Area Material Storage	Volume	686605.52	4097178.68	4,096m^2	Release Height = 3m Side Length=64m
1STRG	Sunset Mine Area Material Storage	Volume	686652.74	4099717.32	4,096m^2	Release Height = 3m Side Length=64m
BDRP	Baseline Material Drop	Volume	685998.30	4097958.73	9m^2	Release Height = 2m Side Length=3m
2DRP	Turner Material Drop	Volume	686537.39	4097156.71	9m^2	Release Height = 2m Side Length=3m
1DRP	Turner Material Drop	Volume	686690.35	4099694.30	9m^2	Release Height = 2m Side Length=3m

[a] Flat terrain was used so each source has base elevation of zero meters.

[b] Haul road parameters by EPA methods (EPA, 2012).

[c] Initial dimensions by EPA methods (EPA, 1995).

Determination of the concentration in air is made using X/Q and the emissions rate (g/s) as discussed above. The concentration of the substance in soil (Cs) is a function of the deposition, accumulation period, chemical specific soil half-life, mixing depth, and soil bulk density. For simplicity and health protection, the Tier 1 default assumes 70-year soil deposition for the accumulation period at end of 70-year facility lifetime. The water pathway is evaluated as if a standing water body (e.g., pond or lake) is impacted by facility emissions and is used as a source for drinking water by food-producing animals or humans, or is a source of angler-caught fish. The average concentration of the substance in water (Cw) is a function of direct deposition (material carried in by surface run-off may occur as well but is not modeled). Concentrations in vegetation, animal products, angler caught fish, and mother's milk are predicated on the concentrations estimated to be in the air, water, and soil. The Project HRA includes air, soil ingestion, home grown produce, and mother's milk as pathways of exposure. Detailed discussion of the methodologies used to determine the concentrations in various media to which receptors may be exposed is located in Subchapter 5.3 of the HRA Guidelines.

Once the concentrations of substances are estimated in air, soil, water, plants, and animal products, they are used to evaluate estimated exposure to people. Exposure is evaluated by calculating the daily dose in milligrams per kilogram body weight per day (mg/kg/d). The HRA Guidelines describe the algorithms used by HARP2 to calculate this dose for exposure through inhalation, dermal absorption, and ingestion pathways. All chemicals are assessed for exposure through inhalation. Emissions of semi-or non-volatile multi-pathway substances (e.g., earth metals in fugitive dust), the soil ingestion pathway and the dermal soil exposure pathway are also assessed. The mother's milk pathway is used depending on the multi-pathway substance released. The Project HRA assessed each of these pathways.

Inhalation Dose

The dose through the inhalation route is estimated for cancer risk assessment and noncancer hazard assessment. Both residential and offsite worker exposures are considered. Since residential exposure includes near-continuous long-term exposure at a residence and workers are exposed only during working hours (i.e., 8 hours/day), different breathing rate distributions are used.

Exposure through inhalation is a function of the breathing rate, the exposure frequency, and the concentration of a substance in the air. For residential exposure, the breathing rates are determined for specific age groups, so inhalation dose (Dose-air) is calculated for each of these age groups, 3rd trimester, 0<2, 2<9, 2<16, 16<30 and 16-70 years. OEHHA used the mother's breathing rates to estimate dose for the 3rd trimester fetus assuming the dose to the fetus during the 3rd trimester is the same as the mother's dose. These age-specific groupings are needed in order to properly use the age sensitivity factors for cancer risk assessment. Tier 1 evaluations and the Project HRA use the high-end point estimate (i.e., the 95th percentiles) breathing rates for the inhalation pathway in order to avoid underestimating cancer risk to the public, including children. The following equation is used to determine dose for the inhalation pathway.

$$Dose_{Air} = C_{Air} \times \left\{\frac{BR}{BW}\right\} \times A \times EF \times 10^{-6}$$

Where:

$Dose_{Air}$ = Dose through inhalation (mg/kg/d)

C_{Air} = Concentration in air (µg/m^3)

{BR/BW} = Daily breathing rate normalized to body weight (L/kg body weight-day)

A = Inhalation absorption factor (unitless)

EF = Exposure frequency (unitless), days/365 days

10^{-6} = Micrograms to milligrams conversion, liters to cubic meters conversion

As discussed above, recommended values for the breathing rate normalized to body weight term, {BR/BW}, are the 95th percentile high-end point estimate that is used for Tier 1 HRAs like the Project HRA. This term has several values that are needed to assess cancer risk for each age bins designated in the HRA Guidelines (i.e., third trimester, 0 to 2, 2 to 16 and 16 to 70 years). These values as well as parametric model distributions used for Tier 3 and Tier 4 stochastic analysis are provided in the HRA Guidelines. The inhalation absorption factor, A, is recommended to be assigned a value of one (i.e., 100% of dose is absorbed) but may also be assigned the value determined by the toxicological study upon which the REL for the substance is based. Exposure frequency is recommended to be 350 days for residential exposures. Table 18 presents the mean and high-end point estimates for residential intake rates that were assumed in the Project HRA.

For worker exposure, the HARP2 default assumes working age begins at 16 years, and that exposures to facility emissions occur during the work shift, typically up to 8 hours per day during work days. Breathing rates that occur over an 8-hour period vary depending on the intensity of the activity, and are used to estimate the inhalation dose. The 8-hour breathing rates may also be used for cancer risk assessment of children and teachers exposed at schools during school hours.

Table 18 Point Estimates of Residential Daily Breathing Rates by Age Group

Estimate	3rd Trimester[1] (L/kg BW-day)[2]	0<2 Years (L/kg BW-day)	2<16 Years (L/kg BW-day)	16<30 Years (L/kg BW-day)
Mean (65%ile)[3]	225	658	452	210
High-End (95%ile)	361	1090	745	335

Source: (OEHHA, 2015, pp. 5-25).

[1] 3rd trimester breathing rates based on breathing rate of pregnant women using the assumption that the dose to the fetus during the 3rd trimester is the same as that to the mother.

[2] Values are in units of liters of air per kilogram of body weight per day.

[3] Mean values were not used in the HRA and are provided for informational purposes only.

Exposed workers may be engaged in activities ranging from desk work, which would reflect breathing rates of sedentary/passive or light activities, to farm worker activities, which would reflect breathing rates of moderate intensity. OEHHA recommends default (Tier 1) point estimate 8-hour breathing rates in L/kg-8-hrs based on the mean and 95th percentile of moderate intensity activities, 170 and 230 L/kg-8-hrs, respectively, for adults 16-70 years old.

Non-cancer health risks were determined in HARP2 by dividing the GLC of each pollutant at each receptor by the corresponding reference exposure level (REL, units of $\mu g/m^3$) resulting a hazard index (HI). The HIs for pollutants affecting each target organ were then summed to determine the total HI for each target organ. The target organ with the greatest HI is reported as the non-cancer health risk at each receptor. Worker chronic non-cancer health risk results were multiplied by a Worker Adjustment Factor (WAF) of 4.2 which represents the amount overlap between the Project operating schedule and the worker's work schedule; both of which are assumed to be 8 hr/day, 5 days/wk. The mean and high-end intake rates for workers were 170 and 230 liters per kilogram per 8-hours (L/kg-8-hrs). Workers were assumed to be exposed for 25 years as recommended in the HRA Guidelines (OEHHA, 2015, pp. 5-26).

Annual residential dose was calculated by HARP2 using the GLC (mg/m^3), the intake rate (L/kg-day), 350 days/yr exposure frequency, and an assumption that the entire mass of pollutants inhaled is absorbed into the body of the individual exposed (i.e., no pollutants are exhaled). A fraction of time at home (FAH) of 85% was applied for individuals of any age. Annual worker dose was calculated the same way and adjusted to 250 days/yr exposure frequency by multiplying the result by 0.68.

Inhalation dose of each pollutant at each receptor for each year was then multiplied in HARP2 by the inhalation cancer slope factor for the pollutant to estimate annual cancer risk in units of excess cancer cases per million individuals exposed. The total cancer risk from inhalation was then calculated by summing the annual risk from each pollutant and year of exposure. Residential cancer risk assumed exposure duration of 30 years as recommended by OEHHA (OEHHA, 2015, pp. 8-1) and the OEHHA Derived Method intake rate for all exposure pathways and all ages which is more conservative than the recommended Risk Management Policy (RMP) (95/80%ile combination for inhalation pathway and 65%ile for other pathways), and RMP Derived Method (95/80%ile combination for two dominant exposure pathways and 65%ile for other pathways). The RMP 95/80%ile combination refers to applying the 95th percentile intake rate for ages less than two years and the 80th percentile intake rate for ages over two years whereas the OEHHA Derived Method uses 95%ile intake rate for all ages and results in greater risk estimates which is conservative.

Ingestion Pathway

The average concentration of pollutants in soil is a function of the deposition, accumulation period, chemical specific half-life, mixing depth, and soil bulk density. For simplicity and health protection, the HARP2 default 70-year soil deposition for the accumulation period was assumed. As discussed above, the conservative deposition rate (0.05 m/s) was applied. Equations and parameters used to estimate the concentration of pollutant in the soil from the GLC can be found in the HRA Guidelines (p. 5-6 to 5-8).

The exposure dose through residential soil ingestion varies by age and was calculated for each age group. The dose is calculated by HARP2 based on the concentration in soil, pollutant specific gastrointestinal relative absorption fraction (GRAF, unitless), soil ingestion rate (mg/kg-day), and exposure frequency using the equation presented in the HRA Guidelines (p. 5-43). For simplicity, GRAF was assigned a value of one which represents the entire mass of pollutant being absorbed. Soil ingestion rates vary by age and the high-end point estimates shown in Table 19 were used.

Table 19 Soil Ingestion Rate Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	0.7	20	3	0.7
High-End (95%ile)	3	40	10	3

Source: (OEHHA, 2015, pp. 5-44).

[1] 3rd trimester is assumed to be the mother's soil ingestion rate.

[2] Values are in units of milligrams of pollutant ingested per kilogram of body weight per year.

[3] Geometric mean (GM) values were not used in the HRA and are provided for informational purposes only.

Dermal Pathway

Exposure through dermal absorption (dose-dermal) is a function of the soil or dust loading of the exposed skin surface, the amount of skin surface area exposed, and the concentration and availability of the pollutant. The annual dermal load (ADL) is a composite of the body surface area per kg body weight, exposure frequency, and soil adherence to the skin. High-end point estimates of ADL for individuals located in a mixed climate were used.

Table 20 Annual Dermal Loading Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	1,100	2,200	5,700	1,100
High-End (95%ile)	2,400	2,900	8,100	2,400

Source: (OEHHA, 2015, pp. 5-37).

[1] 3rd trimester based on ADL of mother normalized to body weight assuming exposure to the mother and feus are the same.

[2] Values are in units of milligrams of pollutant on skin per kilogram of body weight per year.

[3] Mean values were not used in the HRA and are provided for informational purposes only.

High-end ADL was combined with the concentration of pollutant in soil, the fraction absorbed across skin (pollutant-specific factor), the exposure duration (i.e., 70 years) and the averaging time (i.e., 70-year lifetime) using equations presented in the HRA Guidelines (p. 5-41) to estimate the dermal dose for each residential receptor. Worker receptors used the adult ADL and omitted exposure duration and averaging time from the calculation.

Mother's Milk Pathway

Estimates of the concentration of pollutants in a mother's milk require the use of the air, water, and soil environmental fate evaluations. Infants would be exposed to the pollutants in concentrations equal to the concentrations at which the mother is exposed from birth up to 25 years of age when the infant is born. The exposed infant is assumed to be fully breastfed for the first year of life. The summed average dose daily dose (mg/kg-day) from all pathways is calculated for the nursing mother using equations in the HRA Guidelines (p. 5-59). Breast milk intake rates of 101 and 139 g/kg-day are used by HARP2.

Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between exposure to an agent and incidence of an adverse health effect in exposed populations. In quantitative carcinogenic risk assessment, the dose-response relationship is expressed in terms of a potency slope that is used to calculate the probability or risk of cancer associated with an estimated exposure. Cancer potency factors (CPF) are expressed as the 95th percent upper confidence limit of the slope of the dose response curve estimated assuming continuous lifetime exposure to a substance. Typically, potency factors are expressed as units of inverse dose (e.g., $(\text{mg/kg BW/day})^{-1}$) or inverse concentration (e.g., $(\mu\text{g/m3})^{-1}$). It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis. (OEHHA, 2015).

For noncarcinogenic effects, dose-response data developed from animal or human studies are used to develop acute, 8-hour, and chronic noncancer Reference Exposure Levels (RELs). The acute, 8-hour and chronic RELs are defined as the concentration at which no adverse noncancer health effects are anticipated even in sensitive members of the general population, with infrequent one-hour exposures, repeated 8-hour exposures over a significant fraction of a lifetime, or continuous exposure over a significant fraction of a lifetime, respectively. The most sensitive health effect is chosen to develop the REL if the chemical affects multiple organ systems. Unlike cancer health effects, noncancer health effects are generally assumed to have thresholds for adverse effects. In other words, injury from a pollutant will not occur until exposure to that pollutant has reached or exceeded a certain concentration (i.e., threshold) and/or dose. The acute, 8-hour, and chronic RELs are air concentrations intended to be below the threshold for health effects for the general population (OEHHA, 2015).

The actual threshold for health effects in the general population is generally not known with any precision. Uncertainty factors are applied to the Lowest Observed Adverse Effects Level (LOAEL) or No Observed Adverse Effects Level (NOAEL) or Benchmark Concentration values from animal or human studies to help ensure that the chronic, 8-hour and acute REL values are below the threshold for human health for nearly all individuals. Table 21 summarizes the health values that were used in the dose-response assessment.

Table 21 Health Values for TACs Potentially Emitted by Project

CAS	TAC Name	Inh. Cancer URF $(\mu g/m^3)^{-1}$	Inh. Cancer Slope Factor $(mg/kg\text{-}d)^{-1}$	Oral Cancer Slope Factor $(mg/kg\text{-}d)^{-1}$	Acute REL $(\mu g/m^3)$	Inh. Chronic REL $(\mu g/m^3)$	Oral Chronic REL $(\mu g/m^3)$	Inh. Chronic REL 8HR $(\mu g/m^3)$
7440382	Arsenic	0.0033	12	1.5	0.2	0.015	3.50E-06	0.015
7440417	Beryllium	0.0024	8.4	--	--	0.007	0.002	--
7440439	Cadmium	0.0042	15	--	--	0.02	0.0005	--
7440473	Chromium	--	--	--	--	--	--	--
18540299	Cr(VI)	0.15	510	0.5	--	0.2	0.02	--
7440508	Copper	--	--	--	100	--	--	--
7439921	Lead	1.20E-05	0.042	0.0085	--	--	--	--
7439965	Manganese	--	--	--	--	0.09	--	0.17
7440020	Nickel	0.00026	0.91	--	0.2	0.014	0.011	0.06
7782492	Selenium	--	--	--	--	20	0.005	--
7440666	Zinc	--	--	--	--	--	--	--
9901	DieselExhPM	0.0003	1.1	--	--	5	--	--
1175	Silica, Crystln	--	--	--	--	3	--	--
7429905	Aluminum	--	--	--	--	--	--	--
7440393	Barium	--	--	--	--	--	--	--
7440484	Cobalt	0.0077	27	--	--	--	--	--

Source: HARP2 output file type PolDB.csv.

-- indicates no value ascribed in HARP2

Risk Characterization

Risk characterization is the final step of the HRA. In this step, information developed through the exposure assessment is combined with information from the dose-response assessment to characterize risks to the general public from emissions. In the California, OEHHA conducts the dose-response assessment during the development of cancer potency factors and Reference Exposure Levels. These are used in conjunction with the exposure estimates to estimate cancer risk and evaluate hazard from noncancer toxicity of emitted chemicals. Under AB2588, risk characterizations present both individual and population-wide health risks. A general summary of the risk characterization components includes the following items and information.

- The locations of the point of maximum impact (PMI), the maximum exposed individual receptor (MEIR), and the maximum exposed individual worker (MEIW) are to be identified. The PMI, MEIW, and MEIR for cancer risk and for noncancer hazard indices (averaging times for acute 1-hour, repeated 8-hour, and chronic hazard indices) may not be the same location; all should be identified.
- The location of any specified sensitive receptors (e.g., schools, hospitals, daycare, or eldercare facilities) should be identified.
- Estimates of population-wide cancer risk and noncancer hazard.

Cancer Risk

Cancer risk is calculated by multiplying the daily inhalation or oral dose, by a cancer potency factor, the age sensitivity factor, the frequency of time spent at home (for residents only), and the exposure duration divided by averaging time, to yield the excess cancer risk. As described below, the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location. A brief description of the age sensitivity factors, exposure duration, and frequency of time spent at home are included below. These factors are discussed in various technical support documents to the HRA Guidelines.

OEHHA has determined that young animals are more sensitive than adult animals to exposure to many carcinogens. Therefore, OEHHA developed age sensitivity factors (ASFs) to take into account the increased sensitivity to carcinogens during early-in-life exposure. In the absence of chemical-specific data, OEHHA recommends a default ASF of 10 for the third trimester to age 2 years, and an ASF of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood. These values manifest in the intake parameters presented below.

FAH during the day can be used to adjust exposure duration and cancer risk from a specific facility's emissions, based on the assumption that exposures to the facility's emissions are not occurring away from home. From the third trimester to age <2 years, 85% of time is spent at home. From age 2 through <16 years, 72% of time is spent at home. From age 16 years and greater, 73% of time is spent at home. Facilities with a school within the 1×10^{-6} (or greater) isopleth are directed to use FAH = 1 for the child age groups (3rd Trimester, 0<2 years, and 2<16 years).

For residential inhalation exposure, cancer risk must be separately calculated for specified age groups because of age differences in sensitivity to carcinogens and age differences in intake rates (per kg body weight). Separate risk estimates for these age groups provide a health-protective estimate of cancer risk by accounting for greater susceptibility in early life, including both age-related sensitivity and amount of exposure. The following equation illustrates the formula for calculating residential inhalation cancer risk.

$$RISK_{inh-res} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT} \times FAH$$

Where:

$RISK_{inh\text{-}res}$ = Residential inhalation cancer risk

$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

ASF = Age sensitivity factor for a specified age group (unitless)

ED = Exposure duration (in years) for a specified age group

AT = Averaging time for lifetime cancer risk (years)

FAH = Fraction of time spent at home (unitless)

Cancer risks calculated for individual age groups are summed to estimate the total cancer risk over the period of interest and/or lifetime. Cancer risk is typically expressed in “chances per million” (cancer risk × 10^6) but may also be expressed in other ways, such as “chances per 100,000” or “chances per 10 million” (cancer risk × 10^7).

For assessment of off-site worker cancer risk at the MEIW, the default assumes working age begins at 16 years. The daily inhalation dose ($DOSE_{air}$) is based on the adjusted 8-hour concentration at the MEIW (for noncontinuous sources) and amount of time the offsite worker’s schedule overlaps with the facility’s emission schedule. The duration of exposure at the MEIW receptor is 25 years. Additional consideration for offsite worker cancer risk assessment is whether there are women of child-bearing age at the MEIW location and whether the MEIW has a daycare center. Under most circumstances, cancer risk accumulated by inhalation is calculated using the following equation:

$$RISK_{inh-work} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT}$$

Where:

$RISK_{inh\text{-}work}$ = Worker inhalation cancer risk

$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

ASF = Age sensitivity factor for a specified age group (one for working age 16 to 70)

ED = Exposure duration (in years) for a specified age group (25 years)

AT = Averaging time for lifetime cancer risk (70 years)

As discussed previously, some substances (e.g., semi-volatile organics and metals) are carcinogenic regardless of how they enter the body. Exposures to these substances are called multi-pathway. HRA for a facility that emits a multi-pathway pollutant must, at a minimum, evaluate doses from soil ingestion and dermal exposure. If polycyclic aromatic hydrocarbons, lead, dioxins, furans, or polychlorinated biphenyls are emitted, then the breast-milk consumption pathway becomes mandatory for residential receptors. OEHHA has developed transfer coefficients for these chemicals from the mother to breast milk. The other exposure pathways (e.g., ingestion of homegrown produce or fish) are only evaluated for residential receptors if the facility impacts that exposure medium and the receptor under evaluation can be exposed to that medium or pathway.

Non-inhalation residential cancer risk is calculated using the same steps as inhalation cancer risk. The pathway under evaluation (e.g., soil ingestion) is multiplied by the substance-specific oral slope factor, expressed in units of inverse dose (i.e., $(mg/kg/day)^{-1}$), the appropriate ASF, and exposure duration divided by averaging time to yield the cancer risk for a specified age grouping. Cancer risk for each age group is summed as appropriate for the exposure duration.

If multiple substances are emitted, the substance-specific cancer risks for all exposure pathways are summed to give the (total) multi-pathway cancer risk at the receptor location. HARP2 displays the multi-pathway risk for each carcinogenic substance and a breakdown of the cancer risk from each exposure pathway.

This HRA evaluates mother’s milk due to presence of lead in fugitive dust. The default assumption inherent in the intake rate is that the infant’s only source of food is breast for the first year (e.g., is fully breastfed), which is one-half of the 0<2 year age group used in the Hot Spots program. Thus, the cancer risk by the mother’s milk pathway is calculated with a slightly modified equation using a different exposure duration. Once the cancer risk is determined for the mother’s milk pathway then it is summed with the other risks to calculate the total cancer risk for the receptor.

OEHHA recommends that exposure from projects longer than 2 months but less than 6 months be assumed to last 6 months (e.g., a 2-month project would be evaluated as if it lasted 6 months). Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs. Thus, for example, if one is evaluating a proposed 10-year project, the cancer risks for the residents would be calculated based on exposures starting in the third trimester through the first ten years of life.

Non-Cancer Risk

Estimates of noncancer inhalation health impacts are determined by dividing an airborne concentration at the receptor by the appropriate REL. This is termed the Hazard Index (HI) Approach. A REL is used as an indicator of potential noncancer health impacts and is defined as the concentration at which no adverse noncancer health effects are anticipated. When a health impact calculation is performed for a single substance, then it is called the hazard quotient (HQ). Each REL for a substance will have one or more target organ systems (e.g., respiratory system, nervous system, etc.) where the substance can have a noncancer health impact. Thus, all HQs have specified target organ systems associated with them. The sum of the Hazard HQs of all chemicals emitted that impact the same target organ is the HI. Inhalation RELs for noncancer health impacts have been developed for acute, 8-hour, and chronic exposures to a number of substances.

Acute RELs are designed to protect against the maximum 1-hour ground level concentration at the receptor. Chronic RELs protect against long-term exposure to the annual average air concentration spread over 24 hours/day, 7 days/week.

Eight-hour RELs are designed to protect people with daily 8-hour schedules, such as offsite workers, in an impacted zone. The 8-hour RELs are used for typical daily work shifts of 8-9 hours and represent concentrations at or below which health impacts would not be expected even for sensitive subpopulations in the general population with repeated daily 8-hour exposures over a significant fraction of a lifetime. The 8-hour RELs can be used to evaluate the potential for health impacts (including effects of repeated exposures) in offsite workers, and to children and teachers exposed during school hours.

Acute, 8-hour, and chronic RELs are needed because the dose metrics and even the health impact endpoints may be different with the different exposure durations of acute, daily 8-hour, and chronic exposures. Also, although chronic REL values are lower or set the same as 8-hour RELs, there are some cases such as special meteorological situations (e.g., significant diurnal-nocturnal meteorological differences) or intermittent exposures where the 8-hour REL may be more protective than the chronic REL.

As discussed above, in order to calculate the acute, 8-hour, or chronic HQ, the maximum ground-level concentration (in µg/m^3) during the appropriate period of time (i.e., 1-hour acute, 8-hour, and 1-year chronic) is divided by the corresponding REL (in µg/m^3) for the substance. If a receptor is exposed to multiple substances that target the same organ system, then the HQs for the individual substances are summed to obtain a Hazard Index (HI) for that target organ as shown in the following equations.

$$HI_{\ Organ1} = \frac{C_{air,1}}{REL_1} + \frac{C_{air,2}}{REL_2} + \cdots + \frac{C_{air,n,}}{REL_n}$$

or

$$HI_{Organ1} = HQ_1 + HQ_2 + \cdots + HQ_n$$

A HI of 1.0 or less indicates that adverse health effects are not expected to result from exposure to emissions of that substance. As the HI increases above one, the probability of human health effects increases by an undefined amount. However, HI above one is not necessarily indicative of health impacts due to the application of uncertainty factors in deriving the RELs.

There are non-cancer multi-pathway pollutants that are assessed for inhalation, ingestion, and other non-inhalation pathways. Nickel and arsenic are two that are found in fugitive dust and so the non-inhalation exposures to these metals are assessed for the corresponding target organs. Specifically, nickel effects the respiratory, hematologic, and alimentary systems while arsenic affects development; the nervous and cardiovascular systems; and the skin.

2.5 Project-Level Impacts and Mitigation Measures

2.5.1 Conflict with or Obstruction to the Implementation of an Air Quality Plan

Impact Statement

Impact AQ-1: *Would the Project conflict with or obstruct implementation of the applicable air quality plan?* **(Appendix G Threshold Criteria (a))**

Impact Analysis

The SJVAPCD is tasked with implementing programs and regulations required by the CAA and the CCAA. In that capacity, the SJVAPCD has prepared plans to attain Federal and State ambient air quality standards. The SJVAPCD has established thresholds of significance for criteria pollutant emissions, which are based on SJVAPCD New Source Review (NSR) offset requirements for stationary sources. Stationary sources in the SJVAPCD are subject to some of the toughest regulatory requirements in the nation. Emission reductions achieved through implementation of SJVAPCD offset requirements are a major component of the SJVAPCD's air quality plans. Thus, projects with emissions below the thresholds of significance for criteria pollutants would be determined to "Not conflict or obstruct implementation of the SJVAPCD's air quality plan" (SJVAPCD, 2015, p. 65). Table 22 and Table 23 demonstrate that the Project does not exceed thresholds of significance for criteria pollutants.

Table 22 Project Criteria Pollutant Annual Emissions Increase

Criteria Pollutant	Permitted Sources (tons/yr)	Permitted Sources Significance Threshold (tons/yr)	Exceeds Permitted Sources Threshold?	Permit-Exempt Sources (tons/yr)	Permit-Exempt Sources Significance Threshold	Exceeds Permit-Exempt Threshold?
ROG	0	10	No	-0.048	10	No
CO	0	100	No	-0.13	100	No
NO_x	0	10	No	-0.90	10	No
PM_{10} (total)	0	15	No	-50.04	15	No
$PM_{2.5}$	0	15	No	-10.65	15	No
SO_X	0	27	No	0.00	27	No

Source: Appendix C.

Note that emissions listed above represent the difference between emissions in the Baseline and emissions associated with the Project activities. Therefore, emissions demonstrated above are the result of increased haul distances with the Project. Other emissions, such as emissions from quarrying, stockpiles, and aggregates handling would not increase with the Project, and are therefore not applicable to the significance thresholds listed above.

Table 23 Project Criteria Pollutant Daily Emissions

Criteria Pollutant	CO lbs/day	NO_x lbs/day	PM_{10} lbs/day	$PM_{2.5}$ lbs/day	SO_x lbs/day
Baseline	48	60	1,475	315	0.18
Project	78	74	870	187	0.32
Emissions Increase due to Project	+31	+13	-605	-129	+0.14
Screening Criteria	100	100	100	100	100
Exceeds Criteria?	No	No	No	No	No

Source: Appendix C.

Project impact represents difference between future Project emissions compared to existing Baseline emissions.

Project operators would be required to comply with regional air quality rules promulgated by the SJVAPCD and participate in reducing air pollutant emissions. Aggregates production is proportional to population growth, which is a factor that is accounted for in air quality plans. Therefore, the Project would not obstruct implementation of the applicable SJVAPCD air quality plan. Project impacts were determined to be less than significant.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

2.5.2 Net increase of any criteria pollutant

Impact Statement

Impact AQ-2: *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?* **(Appendix G Threshold Criteria (b))**

Impact Analysis

CEQA defines cumulative impacts as two or more individual effects which, when considered together, are either significant or "cumulatively considerable", meaning they add considerably to a significant environmental impact. An adequate cumulative impact analysis considers a project over time and in conjunction with other past, present, and reasonably foreseeable future projects whose impacts might compound those of the project being assessed.

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development. Future attainment of State and Federal ambient air quality standards is a function of successful implementation of the SJVAPCD's attainment plans. Consequently, the SJVAPCD's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.

A CEQA Lead Agency, in this case Merced County, may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (CCR §15064(h)(3)).

Thus, if project emissions (i.e., change from Baseline) exceed thresholds for NO_x, ROG, PM_{10} or $PM_{2.5}$, then a project would result in a cumulatively considerable net increase of a criteria pollutant for which the SJVAPCD is in non-attainment under applicable Federal or State ambient air quality standards. This does not imply that if the project impact is less than those significance criteria, it cannot be cumulatively significant.

The significance criteria are presented in Table 8. As discussed previously, this analysis is conservative because it assumes full excavation operation levels would occur immediately. In reality, site preparation would occur first, which has lower activity levels than full scale excavation.

and show that the Project emissions does not exceed applicable thresholds when compared to the Baseline. Conversely, because regulatory requirements now require cleaner engines and the use of new technology to be phased in over the coming years, some Project source emission values shown in and are negative, which represents fewer emissions compared to the existing/Baseline condition. Therefore, the Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable Federal or State ambient air quality standard and is therefore less than significant.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None.

Level of Significance After Mitigation

Not applicable.

2.5.3 Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Impact Statement

Impact AQ-3: *Would the Project expose sensitive receptors to substantial pollutant concentrations?* **(Appendix G Threshold Criteria (c))**

Impact Analysis

Determination of whether project emissions would expose sensitive receptors to substantial pollutant concentrations is a function of assessing potential health risks. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors. When evaluating whether a development proposal has the potential to result in localized impacts, the nature of the air pollutant emissions, the proximity between the emitting facility and sensitive receptors, the direction of prevailing winds, and local topography must be considered (SJVAPCD, 2015, p. 66).

A Health Risk Assessment was performed as discussed in Section 2.4.6 to evaluate the effects of TACs including DPM from vehicles and other substances potentially found in fugitive dust emissions (i.e., metals and crystalline silica). Table 24 shows the cancer risk at the closest residential receptors. No locations with high densities of sensitive individuals (e.g. schools, nursing homes, residential care facilities, daycare centers, or hospitals) were identified within 2 km of the Project.

Health risk is determined based on the change in conditions associated with the implementation of the Project. The location of certain emissions sources present in the Baseline cease to operate, and emissions location associated with the Project are introduced. Therefore, Baseline risk is modeled as negative risk (emissions going away), and Project risk is modeled as positive (new emissions). In many cases, Project emissions end up being lower than those in the Baseline, due to newer technologies and updated regulations. In such cases, risk to receptors may be reduced, as the Project results in a reduction of emissions. In cases where risk to a receptor is greater in the Baseline than in the Project, the risk is represented as a negative number.

Table 24 Health Risk Assessment Results

Receptor Figure Label – Type	Receptor Model ID #	Excess Cancer Cases per Million People Exposed	Chronic Hazard Index	Acute Hazard Index
1 – Residential – MEIR Cancer, Chronic, Acute	6635	8.4	0.24	0.09
2 – Residential	6636	4.9	0.02	0.08
3 – Residential	6637	2.1	<0.01	0.09
4 – Residential	6638	1.7	<0.01	0.09
5 – Residential	6639	2.5	<0.01	0.04
6 – Residential	6640	1.8	<0.01	0.01
7 – Residential	6641	0.8	<0.01	<0.01
8 – Residential	6642	-0.2	<0.01	<0.01
9 – Residential	6643	-0.5	<0.01	<0.01
10 – Residential	6644	-0.6	<0.01	<0.01
11 – Residential	6645	-0.5	<0.01	<0.01
12 – Residential	6646	-0.6	<0.01	<0.01
13 – Residential	6647	-0.6	<0.01	<0.01
14 – Residential	6648	-0.6	<0.01	<0.01
15 – Residential	6649	-0.6	<0.01	<0.01
16 – Residential	6650	-2.6	<0.01	<0.01
17 – Residential	6651	-13.4	<0.01	<0.01
18 – Residential	6652	-11.4	<0.01	<0.01
19 – Residential	6653	-1.8	0.01	<0.01
20 – Residential	6654	-1.4	0.04	<0.01
21 – Residential	6655	-1.2	0.01	<0.01
22 – Residential	6656	-0.9	0.01	0.01
23 – Worker – MEIW	6657	<0	<0.02	<0.01
24 – Residential	6658	-2.0	<0.01	<0.01
25 – Residential	6659	-2.4	<0.01	<0.01
26 – Residential	6660	-3.1	<0.01	<0.01
27 – Residential	6661	-1.8	<0.01	0.01
28 – Residential	6662	-1.7	<0.01	0.01
29 – Residential	6663	-0.2	<0.01	0.02
30 – Residential	6664	1.0	<0.01	0.03
Significance Threshold	**N/A**	**20**	**1.0**	**1.0**
Threshold Exceeded?	**N/A**	**No**	**No**	**No**

Source: Appendix E.

Note: May vary from appendix values due to rounding. Negative values represent risk levels that when compared to Baseline levels are less than the Baseline level – resulting in a beneficial impact. Worker risk is calculated based on a 25 year timeframe and varies based on timeframe chosen, but in each case is less than stated values.

MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact

PMI is Receptor 6692 located at the facility Fence line and has an Acute HI of 0.67773, see Appendix D for further detail.

As demonstrated by Table 24, health risk associated with the Project is less than significant.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None

Level of Significance After Mitigation

Not applicable.

2.5.4 Odors Affecting a Substantial Number of People

Impact Statement

Impact AQ-4: *Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?* **(Appendix G Threshold Criteria (d))**

Impact Analysis

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, there are no quantitative or formulaic methodologies to determine the presence of a significant odor impact. Rather, the SJVAPCD recommends that odor analyses strive to fully disclose all pertinent information.

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions. The SJVAPCD has identified some common types of facilities that have been known to produce odors in the San Joaquin Valley, and aggregate mining/processing facilities are excluded from this list. (SJVAPCD, 2015)

Diesel exhaust from mobile equipment/vehicles has a slight odor. Odor intensity would decrease rapidly with distance and is not expected to be frequently (or at all) detectable at locations outside of the Project site boundary. Therefore, it is not anticipated that objectionable odors affecting a substantial number of people could result from the Project.

In addition, the Project is required to comply with the SJVAPCD nuisance rule (Rule 4102), which reads:

> *"A person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such person or the public or which cause or have a natural tendency to cause injury or damage to business or property."*

The Project will not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people and therefore, the Project impacts were determined to be less than significant.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

3.0 GREENHOUSE GASES

This section of the AQCCIA assesses potential GHG impacts of the Project. Further discussion of the regulatory setting and applicability of GHG plans, policies, and regulations to the Project can be found in Appendix B. The methodologies used and the information provided in this section are supported by calculations in Appendix C.

3.1 Regulatory Setting

3.1.1 Characteristics of Greenhouse Gases - Climate Change Pollutants

The accumulation of GHGs in the atmosphere contributes to the regulation of the earth's temperature. Some GHGs can remain in the atmosphere for long periods of time (i.e., long-lived). There are six GHGs recognized under the Kyoto Protocol and have been found by the International Panel on Climate Change (IPCC) to have a "Long-lived" effect on global climate change. The primary one associated with the Project are Nitrous Oxides (N_2O). Also see Appendix B for additional detail.

3.1.1.1 Greenhouse Gases - Climate Change Pollutants

In general, there are six (6) compounds/classes of GHGs that are counted when emissions are inventoried. Each GHG exhibits a different global warming potential (GWP). The mass of emissions of each GHG is multiplied by its GWP to determine the carbon dioxide equivalent (CO_2e) potential for global warming. GWPs have changed over time by the Intergovernmental Panel on Climate Change (IPCC) which is considered an authority on GHGs and their effects. The CAP and CARB emissions inventories and plans use GWPs that are an iteration or two behind and the most recent IPCC publication. Characteristics of each long-lived GHG and the associated GWP is presented below.

Carbon Dioxide (CO_2) is an odorless, colorless natural GHG. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include burning coal, oil, natural gas, and wood. By definition, CO_2 has a GWP equal to one (1).

Methane (CH_4) is a flammable GHG. A natural source of CH_4 is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources include landfills, fermentation of manure, and ruminants such as cattle. CH_4 has a GWP equal to 28.

Nitrous Oxide (N_2O) is a colorless GHG. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O has a GWP equal to 265.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for chlorofluorocarbons (CFCs). Of all the GHGs, they are one of three groups with the highest global warming potential. HFCs are human made for applications such as air conditioners and refrigerants. HFCs have GWPs that range from 124 (HFC 125a) to 14,300 (HFC 23).

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. PFCs have GWPs that range from 7,390 (PFC 14) to 12,200 (PFC 116).

Sulfur Hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection. SF_6 has a GWP equal to 22,800.

3.1.2 Federal

To date, there is no federal overarching law specifically related to climate change or the reduction of GHGs. The Environmental Protection Agency (EPA) authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA,* 549 US 497 (2007). The Supreme Court found that GHGs are air pollutants covered by the Clean Air Act, and the EPA Endangerment Findings concluded the elements CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 threatened public health for both current and future generations. In 2009, the U.S. EPA published a rule for the mandatory reporting of GHG from sources that in general emit 25,000 metric tons or more of carbon dioxide equivalent per year in the United States. Implementation of 40 CFR Part 98 is referred to as the Greenhouse Gas Reporting Program (GHGRP). This collection of comprehensive, nationwide emissions data is intended to provide a better understanding of the sources of GHGs and to guide development of policies and programs to reduce emissions (U.S. EPA, 2013). Additional federal actions have included the implementation of standards for vehicles, biofuel production, and power generation. Federal actions relating to GHG emissions are summarized and provided in Appendix B.

3.1.3 State

A list of the California legislation over the last approximately 32 years is provided in Appendix B. Moreover, Appendix B contains a summary of GHG scoping plan goals/actions, and describes the impact of the Project on these actions.

On December 14, 2017, CARB approved the 2017 Climate Change Scoping Plan Update (Scoping Plan) which aims to reduce GHG emissions. The Scoping Plan "is a package of economically viable and technologically feasible actions to not just keep California on track to achieve its 2030 target, but stay on track for a low- to zero-carbon economy by involving every part of the state. Every sector, every local government, every region, every resident is part of the solution. The Plan underscores that there is no single solution but rather a balanced mix of strategies to achieve the GHG target. "This Plan highlights the fact that a balanced mix of strategies provides California with the greatest level of certainty in meeting the target at a low cost while also improving public health, investing in disadvantaged and low-income communities, protecting consumers, and supporting economic growth, jobs and energy diversity. Successful implementation of this Plan relies, in part, on long-term funding plans to inform future appropriations necessary to achieve California's long-term targets." (2017 Scoping Plan, p. ES4).

Recently adopted, the Proposed 2022 Scoping plan outlines updates that build on the successes of the previous 2017 Scoping Plan. As the updated plan notes, “Meeting the AB 32 2020 GHG emissions reduction target several years earlier than mandated demonstrated that developing mitigation strategies through a public process, where all stakeholders have a voice, leads to effective actions that address climate change and yields a series of additional economic and environmental co-benefits to the state.”

The relationship between Statewide and local action is a major topic of the 2022 Scoping Plan. “When a local CAP complies with CEQA requirements, individual projects that comply with the CAP are allowed to streamline the project-specific GHG analysis… Jurisdictions without formal CAPs also have important opportunities within this context. These jurisdictions can still take actions that effectively translate key state plans, goals, and targets, including those articulated in this Scoping Plan for local action.”

The proposed plan emphasizes that lead agencies are tasked with a large part of the CEQA process when it comes to GHG emissions, but are able to use state priorities as a guide. “One challenge local jurisdictions have faced is how to evaluate and adopt quantitative, locally appropriate goals that align with statewide goals. An effective response to this challenge is to focus on goals that can help implement overall state priorities—enabling the key transformations California needs.”

It is also clear that the scoping plan places authority with the lead agency with regards to GHG emissions and mitigation, stating, “When a lead agency determines that a proposed project would result in potentially significant GHG impacts due to its GHG emissions or a conflict with state climate goals, the lead agency must impose feasible mitigation measures to minimize the impact.”

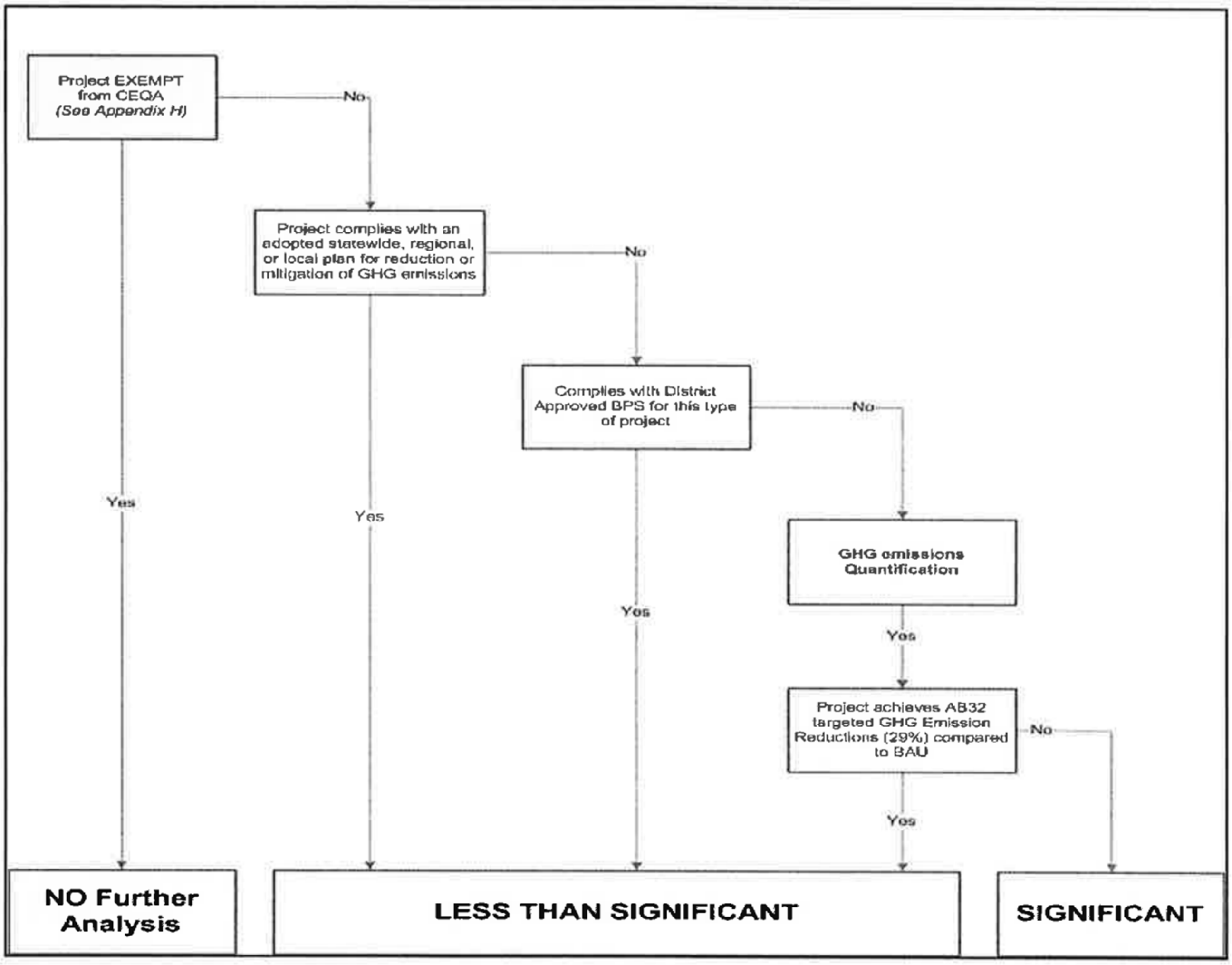
Appendix B includes comprehensive review of GHG regulations and legislation in California. The applicability of recent executive orders to the Project is also considered in Appendix B. Appendix B summarizes goals and actions from the 2017 and 2022 GHG Scoping plans, and includes information from Table 2-1 of the 2022 Scoping Plan, “Actions for the Scoping Plan Scenario: AB32 GHG Inventory Sectors, as well as discussion regarding how each action relates the Project.

3.1.4 San Joaquin Valley Unified Air Pollution Control District

In 2009, the SJVAPCD established a framework for significance determination regarding GHG emitting projects in the *District Policy Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency* (SJVAPCD, 2009). The document outlines a methodology to determine if a project meets the Best Performance Standards (BPS) for GHG emissions. The Document states, “Projects implementing BPS would be determined to have a less than significant individual and cumulative impact on global climate change and would not require project specific quantification of GHG emissions”. When serving as the lead agency, the District requires stationary sources that do not comport with a BPS to demonstrate GHG reductions of 29% as compared to Business-as-Usual. Business-as-Usual is defined by the District as “The emissions for a type of equipment or operation within an identified class and category projected for the year 2020, assuming no change in GHG emissions per unit of activity as established for the Baseline period”.

In 2014, the District expanded on this approach, taking into account CARB regulations adopted in 2010 which established a cap-and-trade program for the largest sources of GHG emissions in the State. District Policy APR – *2025 CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation* (SJVAPCD, 2014) outlines a more streamlined approach which follows the steps outlined in Chart 1 below.

Chart 1 – SJVAPCD Policy APR 2025 Figure 1



As outlined in Chart 1, Project significance is determined using a tiered approach. GHG emissions quantification and comparison to BAU as contemplated in the *District Policy Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency* occurs only after a series of prior steps which may result in the Project being determined to be less than significant. Projects that comply with an adopted statewide, regional, or local plan for reduction or mitigation of GHG emissions are considered to be less than significant.

The policy continues to clarify that the Cap-and-Trade program is a statewide mitigation plan. "In conclusion, all GHG emissions increases resulting from the combustion of any fuel produced, imported, and/or delivered in California are mitigated under Cap-and-Trade… Therefore, GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA" (SJVAPCD, 2014).

APR 2015 and Zero Equivalency Threshold

San Joaquin Valley APCD APR 2015 establishes a level below which GHG emissions are considered equivalent to zero. "This policy establishes a level of greenhouse emissions below which project specific increases in greenhouse gas emissions would be considered equivalent to zero for CEQA purposes… the zero equivalency level is established at 230 metric tons-CO2e/year". (SJVAPCD, 2012). Therefore, Projects with emissions of less than or equal to 230 metric tons-CO2e/year of emissions would be considered to have zero emissions from a CEQA perspective.

3.1.5 Merced County

The Merced County Climate Action Plan (CAP) is currently under development. According to the county, the plan will include the following (County of Merced, n.d.):

- Goals, policies, and strategies that are consistent with the goals of established County plans and committees.
- Identify strategies that are coordinated with and connect to the regional and state legislation.
- Require consistency with the County's applicable planning and design standards; and include reference to applicable incentives.
- Funding resources and programs to facilitate implementation and reduction of energy usage and GHG emissions.
- A method of tracking the County's progress in meeting the targets of SB 375 and SB 32.

General Plan 2030

The Merced County General Plan Air Quality Element has a number of policies that are applicable to The Project. Air Quality El General Plan goals AQ – 1 is outlined below as it is explicitly applicable to Green House Gas emissions. Policies that are particularly relevant to the Project operations are also listed under the goal.

Goal AQ-1 Reduce air pollutants and greenhouse gas emissions and anticipate adaptation due to future consequences of global and local climate change.

Policy AQ-1.1 Energy Consumption Reduction

Encourage new residential, commercial, and industrial development to reduce air quality impacts from energy consumption.

Policy AQ-1.2 Business Energy Reduction Strategies

Encourage all businesses to: replace high mileage fleet vehicles with more efficient and/or alternative fuel vehicles; increase the energy efficiency of facilities; transition toward the use of renewable energy instead *of non-renewable energy sources; adopt purchasing practices that promote emissions reductions and reusable materials; and increase recycling.*

Policy AQ-1.5 Climate Action Plan

Prepare a Climate Action Plan that includes an inventory of 1990 and 2010 greenhouse gas emissions, determines project air quality impacts using analysis methods and significance thresholds recommended by the SJVAPC, and identify strategies to achieve State emission reduction targets.

Policy AQ-1.7 Heat Island Effect Reduction

Require increased tree canopy and reflective surface materials in order to reduce the heat island effect (i.e., increased temperatures do to heat radiation off paved surfaces and rooftops). This includes:

a) Preserving agricultural lands, wildlife habitat and corridors, wetlands, watersheds, groundwater recharge areas, and other open space that provide carbon sequestration benefits;
b) Establishing a mitigation program for development of those types of open space that provide carbon sequestration benefits;
c) Requiring like-kind replacement for, or impose mitigation fees on, land development that results in the loss of carbon sequestering open space; and
d) Using mitigation funds generated to protect existing open space.

3.2 Environmental Setting

Climate change refers to global changes in the average weather of the earth measured by changes in wind patterns, storms, precipitation, and temperature. While climate change is global in scale, California-specific impacts to the climate may result in a loss of snow-pack, increased risk of large wildfires, and a potential reduction in the quality and quantity of certain agricultural products.

Gases that trap heat in the atmosphere are GHGs, analogous to the way a greenhouse retains heat. Consequently, these GHG emissions are believed to directly affect the global climate.

Emissions Inventories

CARB's most recent GHG emission inventory, the 2020 Edition, tracks the emissions of seven GHGs identified in the California Health and Safety Code for years 2000 to 2018. In 2018, total GHG emissions were 425 $MMTCO_2e$, an increase of 1.0 $MMTCO_2e$ compared to 2017. Emissions have decreased since peak levels in 2004. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product [GDP]) is declining, representing a 43% decline since 2000, while the State's GDP has grown 59% during this period (Trend Report, 2020, pp. 1-3).

The transportation sector remains the largest source of GHG emissions in the State, accounting for 40% of statewide emissions in 2018. Emissions from the electricity sector have increased slightly in 2018 and account for 15% of the inventory. Emissions from the remaining sectors have remained relatively constant, although emissions from high-GWP gases have continued to climb as they replace ozone depleting substances banned under the Montreal Protocol (Trend Report, 2020, p. 5).

3.3 Threshold Criteria

Determination of whether an impact is significant usually involves the comparison of Project impact levels to threshold criteria set by the lead agency. For air quality and GHG impacts, lead agencies often rely on guidance from a responsible agency. In this report, SJVACPD guidance is utilized, as discussed in Section 3.1.4.

3.3.1 CEQA Guidelines Appendix G

The CEQA Environmental Checklist Form in Appendix G of the CEQA Guidelines presents questions about projects that, if true for a particular project, would be considered a significant impact. This document considers the following CEQA Environmental Checklist Form questions to be the significance thresholds for GHG emissions from this Project.

Would the project:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

3.4 Methodology

3.4.1 CEQA Baseline

The Baseline condition consists of emissions associated with excavation of materials and haul of materials to the existing Los Banos Facility processing plant(s). The amount of work required to excavate and process material at the existing facility and for the Project is considered to be equal because of the similar topography of the sites, similar use of mining equipment, and the fact that the Project would not exceed the previous production rate nor would it increase the amount of offsite on-road haul truck or vehicle traffic. In the maximum project year, emissions would increase as a result of longer haul route distances. The maximum annual CO_2e emissions during the Baseline period is represented by assuming annual production rate of 1.03 million tons per year, and summarized in Table 25. Detailed calculations are provided in Appendix C.

Table 25 Baseline GHG Emissions at Maximum Historical Rate

Source	CO_2e (MT/yr)
Excavation Off-Road Engines	404
Off-Road Vehicle Haul	1,113
Total	**1,518**

Source: Appendix C.

Converted from App. C based on 2204.6 lb/MT. GWP of CH_4 assumed to be 28 per IPCC Fifth Assessment Report (AR5).

3.4.2 Project Emissions

Equipment and activity levels for excavation in the Baseline and for the Project are presented in Section 2.4 and the GHG emissions associated with future Project operations are summarized in Table 26. Detailed calculations are provided in Appendix C.

Table 26 Project GHG Emissions at Proposed Maximum Annual Rate

Source	CO_2e (MT/yr)
Excavation Off-Road Engines	405
Off-Road Vehicle Haul	1,115
Total	**1,520**

Source: Appendix C.

Converted from App. C based on 2204.6 lb/MT. GWP of CH_4 assumed to be 28 per IPCC Fifth Assessment Report (AR5).

3.5 Project-Level Impacts and Mitigation Measures

3.5.1 Generate GHG Emissions That May Have a Significant Impact on the Environment

Impact Statement

Impact GHG-1: *Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?* **(Appendix G Threshold Criteria (a)).**

Impact Analysis

Project GHG emissions are presented in Table 27 below.

Table 27 Project GHG Emissions

Source	CO_2e (MT/yr)
Baseline Emissions	1,844
Project Emissions (Max Year)	1,847
Net Emissions Change between Baseline and Project (Max Year)	+3
SJVAPCD Zero Equivalency Threshold	230
Net Emissions Change Between Baseline and Project is greater than Zero Equivalency Threshold?	No

This information is provided for disclosure purposes. Emissions are a result of sources already regulated by the Scoping Plan.

Source: Appendix C.

Applicable SJVAPCD guidance states that "It is widely recognized that no single project could generate enough GHG emissions to noticeably change the global climate temperature. However, the combination of GHG emissions from past, present, and future projects could contribute substantially to global climate change. GHG emissions, and their associated contribution to climate change, are inherently a cumulative impact issue."

(SJVAPCD, 2015, p. 111). As recognized by SJVAPCD in the preceding quote, climate change is a cumulative effect and therefore no single project alone is large enough to impact climate change.

This concept is also reflected in California's 2022 Climate Change Scoping Plan. Regulations are implemented in order to reduce the cumulative impact of GHG emissions on a statewide level. Fuel is regulated at a level in the supply chain above an individual project, such that the project has no choice but to purchase and use fuel energy in California that is already regulated. The Project itself therefore does not have its own GHG emissions, but is simply a location in which GHG emissions are emitted by consuming fuel that was already regulated through Cap-and-Trade, applicable Low-Carbon Fuel Standards (GHG) and other applicable regulations higher up the supply chain. Therefore, the Project itself cannot have a significant impact on the environment.

Moreover, the incremental project emissions are less than the SJVAPCD zero equivalency threshold established in APR 2015 (See section 3.1.4). As such, the emissions are not considered significant.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

3.5.2 Conflict with an Applicable Plan, Policy or Regulation that Reduces GHGs

Impact Statement

Impact GHG-2: *Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?* **(Appendix G Threshold Criteria (b)).**

Impact Analysis

Project emissions of GHGs are presented in Table 27 above, primarily for purposes of disclosure. The Project would emit GHGs from fuel burned in mobile equipment engines. Transportation fuel suppliers and importers, such as the ones Triangle has and would continue to use, are required to report emissions under the Cap-and-Trade which is designed to reduce GHG emissions as needed to achieve emissions reductions described in related planning documents, which primarily consists of the AB 32 Scoping Plan(s) described previously. Thus, the emissions reductions will occur at a level in the supply chain above the Project which will have no choice but to use fuels with GHG intensities that are consistent with the CARB's Scoping Plan. As outlined in SJVAPCD Policy APR-2025, because the Project uses fuels consistent with the Scoping Plan, Project GHG emissions are determined to have a less than significant impact on global climate change under CEQA. "In conclusion, all GHG emissions increases resulting from the combustion of any fuel produced, imported, and/or delivered in California are mitigated under Cap-and-Trade… Therefore, GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA".

Appendix B includes regulations, legislation, and executive orders related to GHG emissions in California. Moreover, Appendix B includes a summary of actions and policy related to the 2017 and 2022 GHG Scoping Plans. Potential conflicts between the Project and the plans, policies, and regulations have been considered and ruled out.

In summary, the GHGs associated with the Project would be consistent with the AB 32 Scoping Plan and applicable SJVAPCD policies. Therefore, the Project impact on GHG emissions is less than significant.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

4.0 ACRONYMS

AADT	average annual daily trips
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ADJ_U*	adjusted friction velocity
ADL	annual dermal load
AERMET	AERMOD Meteorological Processor
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
APCO	Air Pollution Control Officer
AQCCIA	Air Quality and Climate Change Impact Assessment
ASF	age sensitivity factors
ATCM	airborne toxic control measure
ATS	American Thoracic Society
BACM	best available control measure
BACT	best available control technology
BAU	business-as-usual
BPS	best performance standard
BR	breathing rate
BW	body weight
CAAA	Clean Air Act Amendments
CAAQS	California ambient air quality standards
CAFE	corporate average fuel economy
CalEPA	California Environmental Protection Agency
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers Association
CAT	Climate Action Team
CBE	Communities for a Better Environment
CCAA	California Clean Air Act
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPF	cancer potency factor
CPUC	California Public Utility Commission
CUPA	Certified Unified Permitting Agency
DPM	Diesel particulate matter
DWR	Department of Water Resources
FAH	fraction of time at home
FED	functionally equivalent document
FPMP	fugitive PM_{10} management plan
g/dscm	grams per dry standard cubic meter
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts

GLC	ground level concentration
GM	geometric mean
GRAF	gastrointestinal relative absorption fraction
gr/dscf	grains per dry standard cubic feet
GWP	global warming potential
HARP2	Hot Spots Analysis and Reporting Program
HFC	hydrofluorocarbon
HI	hazard index
hp	horsepower
HQ	hazard quotient
IPCC	International Panel on Climate Change
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LOAEL	lowest observed adverse effects level
MACT	maximum achievable control technology
MEIR	maximum exposed individual receptor
MEIW	maximum exposed individual worker
MPO	metropolitan planning organizations
MT	metric tonnes
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NMHC	non-methane hydrocarbons
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NOAEL	no observed adverse effects level
NSPS	New Source Performance Standards
NSR	New Source Review
NHTSA	National Highway Traffic Safety Administration
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Governor’s Office of Planning and Research
Pb	Lead
PCC	Portland cement concrete
PERP	Portable Equipment Registration Program
PFC	perfluorocarbon
PM	Particulate matter
PM_{10}	PM with aerodynamic diameter less than 10 microns
$PM_{2.5}$	PM with aerodynamic diameter less than 2.5 microns
PMI	point of maximum impact
RACM	reasonably available control measure
RCS	respirable crystalline silica
REL	reference exposure level
RICE	reciprocating internal combustion engine
SB	Senate Bill
SF_6	sulfur hexafluoride
SIP	state implementation plan

SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
TAC	toxic air contaminant
tpy	tons per year
TVP	true vapor pressure
U.S.	United States
US EPA	United States Environmental Protection Agency
VDE	visible dust emissions
VMT	vehicle miles traveled
VOC	volatile organic compounds
WAF	worker adjustment factor
WRCC	Western Regional Climate Center

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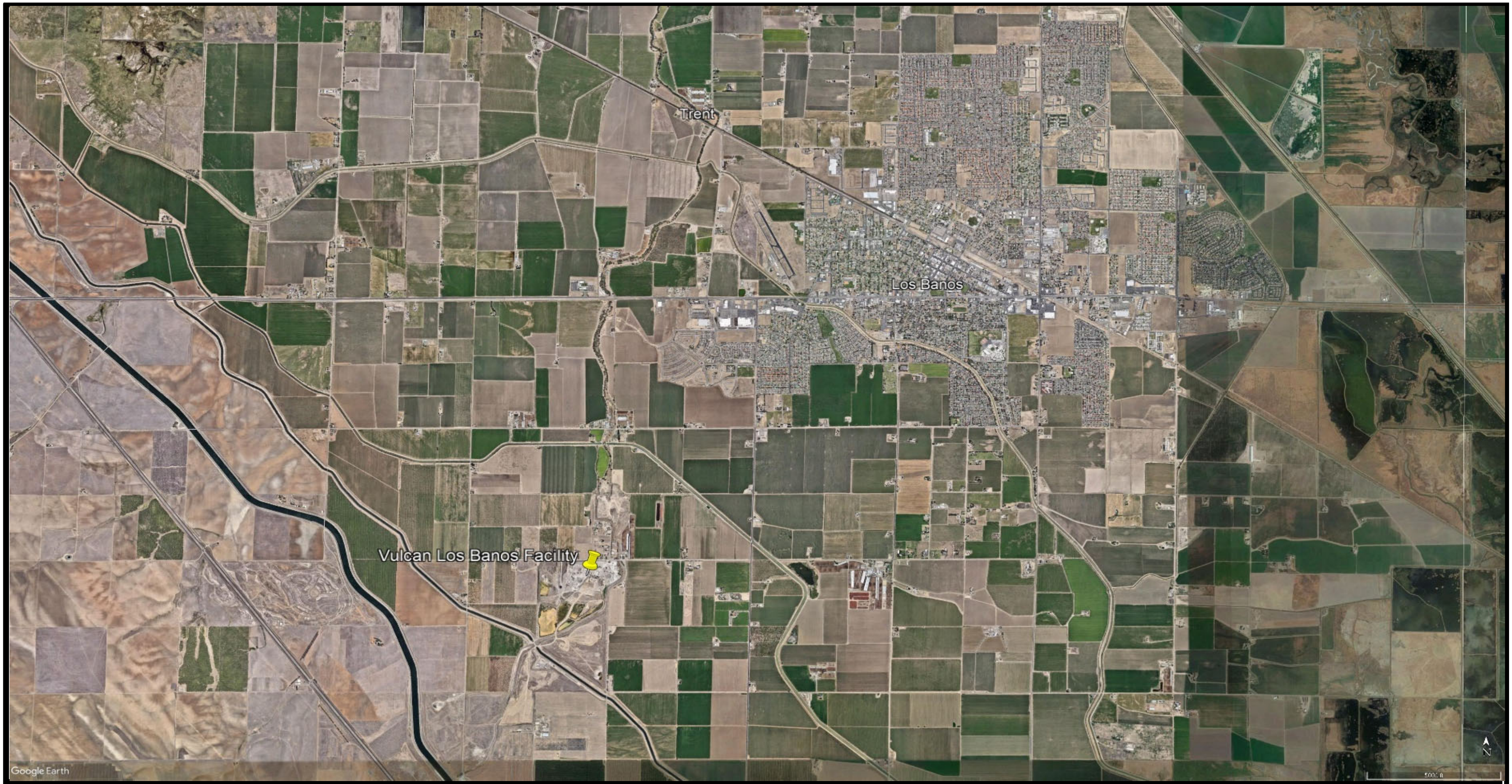
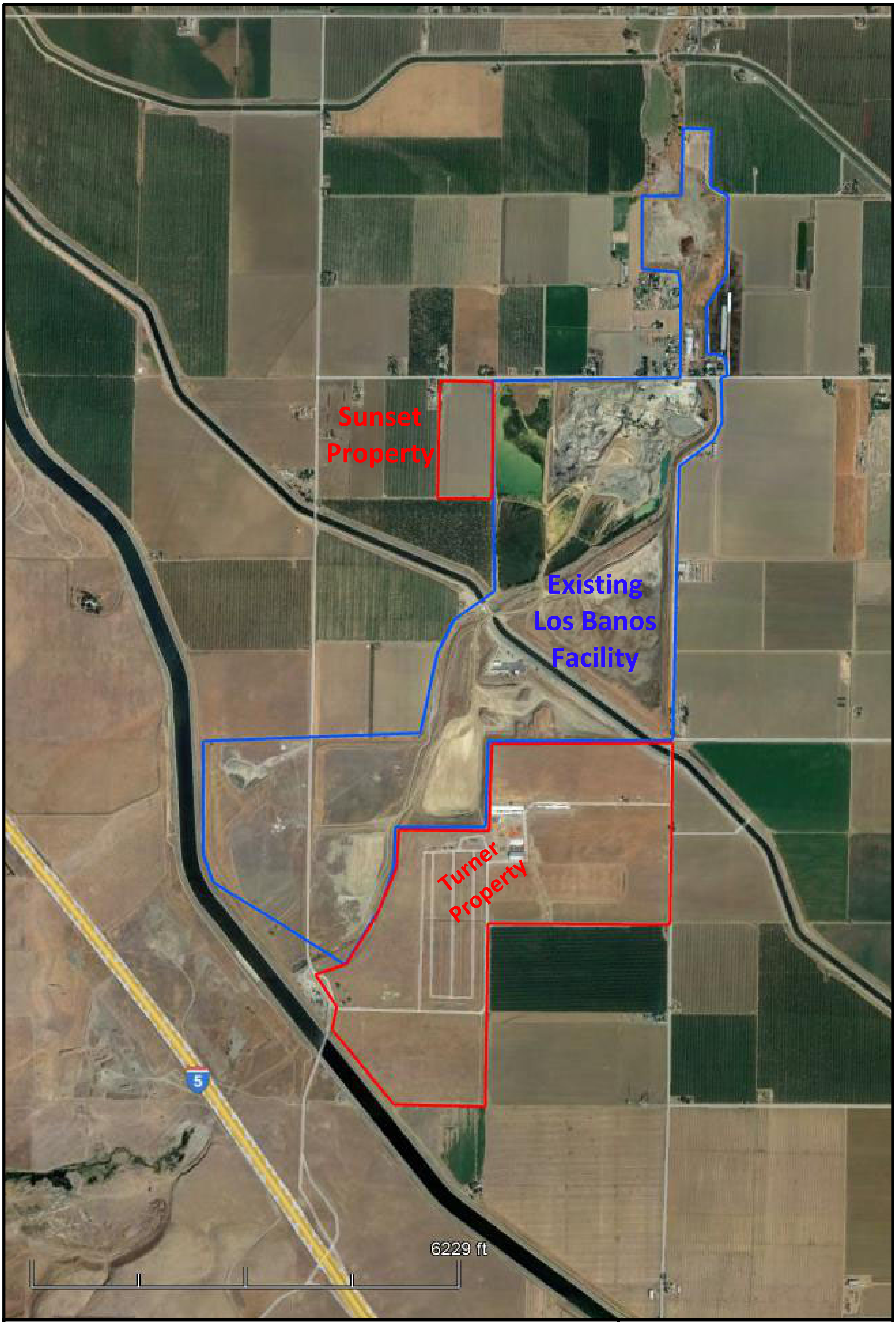
APPENDIX A

FIGURES



SESPE
CONSULTING, INC.

FIGURE 1a	**Site Location** Los Banos Project Triangle Rock Products, LLC Merced County, California		
PROJECT #:	210509.0446	DATE:	7/16/22
SCALE:	SHOWN	DRAWN BY:	ADA



Source: Google Earth (2022)

N

🟦 Existing Los Banos Facility Boundary (approx.)

🟥 Proposed Project (Sunset & Turner Properties) Boundaries (approx.)

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A Trinity Consultants Company

FIGURE

1b

LOS BANOS - PROJECT VIEWPOINTS
Triangle Rock Products, LLC
Los Banos Sand and Gravel Quarry
Merced County, California

PROJECT #:	210509.0446	DATE:	8/30/22
SCALE:	See Above	DRAWN BY:	GPS

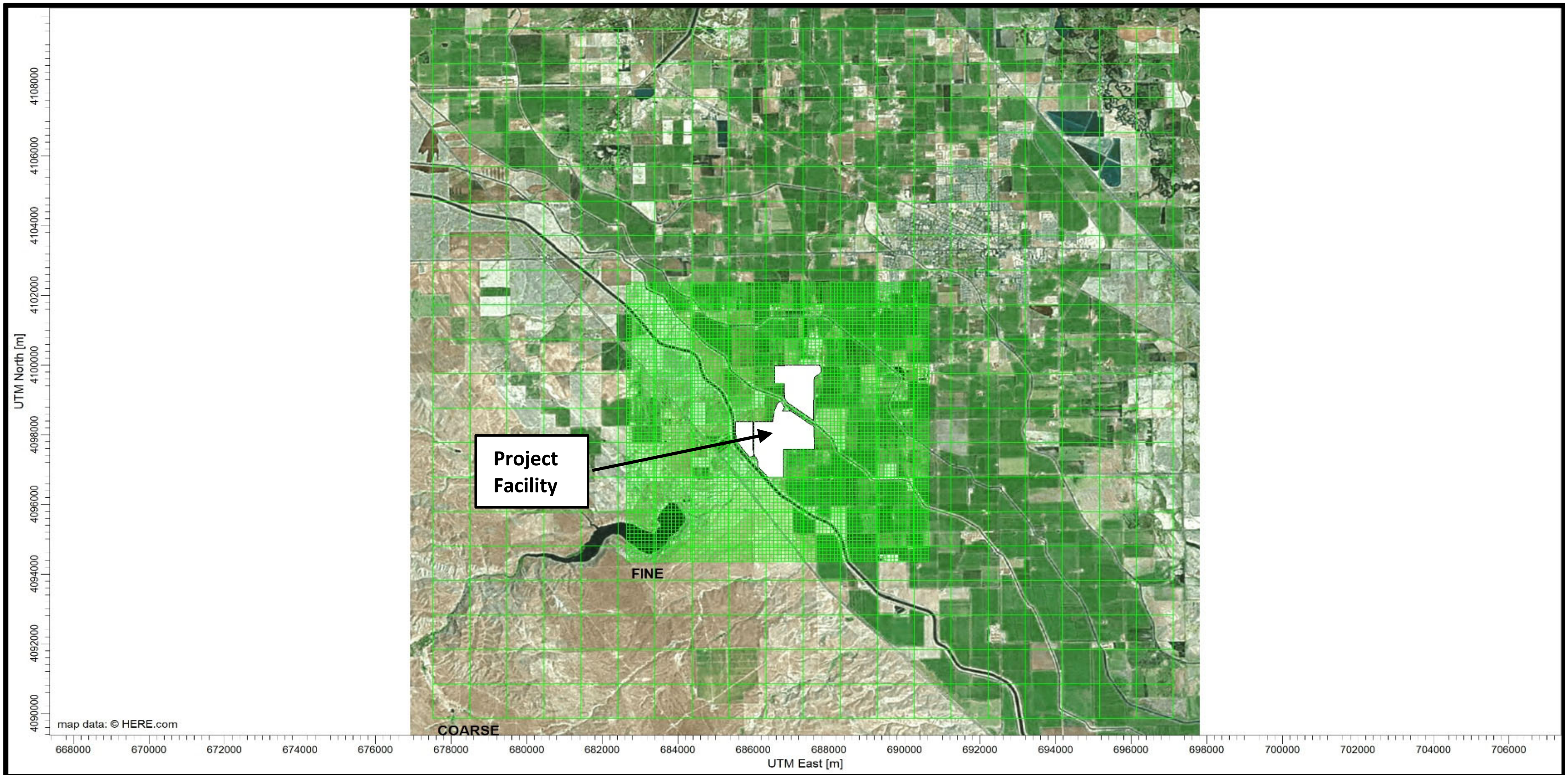

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FIGURE

2

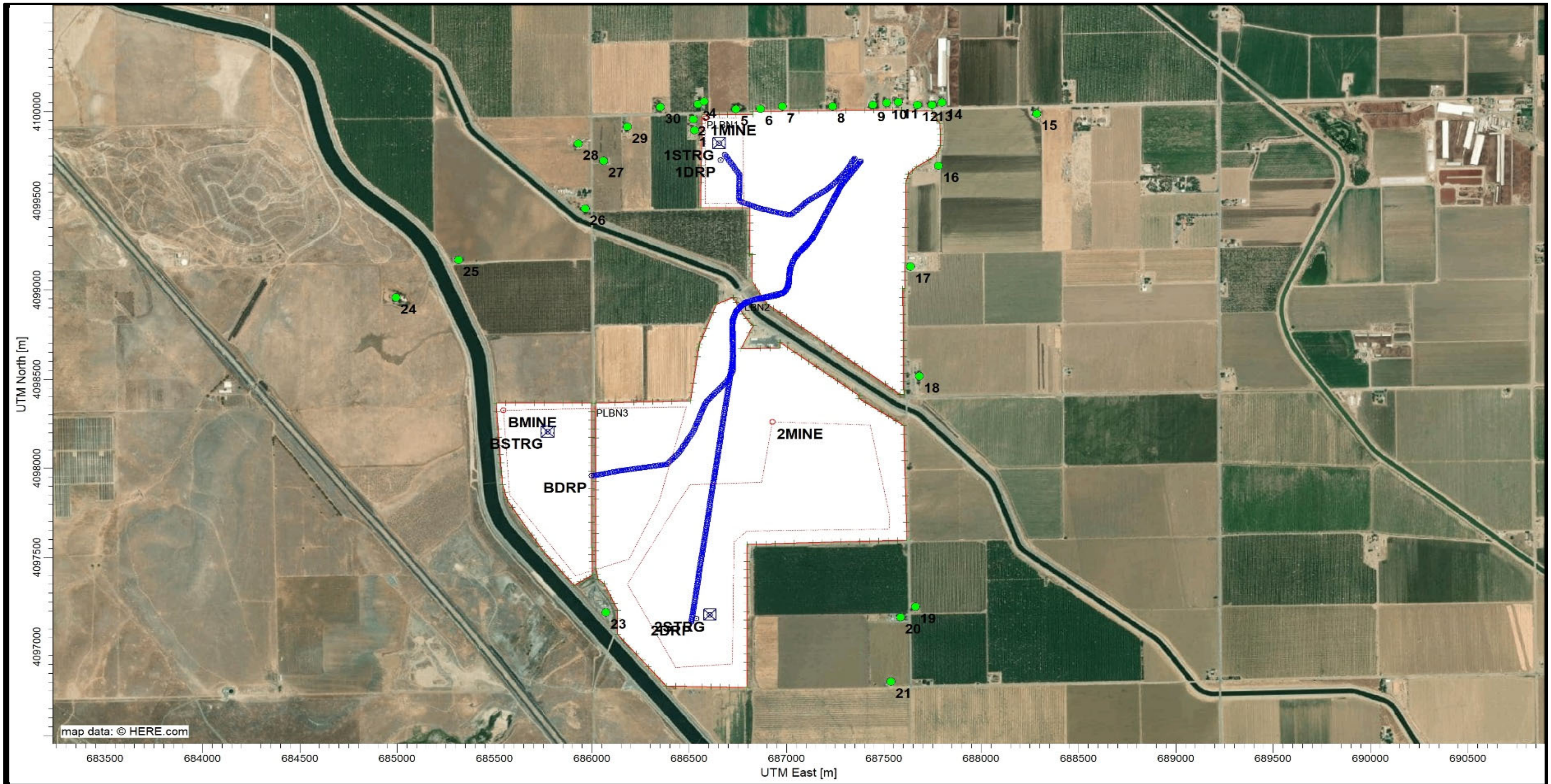
Modeled Receptor Grids

Los Banos Project

Triangle Rock Products, LLC

Merced County, California

PROJECT #:	210509.0446	DATE:	7/16/22
SCALE:	SHOWN	DRAWN BY:	ADA



Small Green dots represent discrete cartesian receptors

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FIGURE

3

Model Sources and Receptors

Los Banos Project

Triangle Rock Products, LLC

Merced County, California

PROJECT #:	210509.0446	DATE:	7/16/22
SCALE:	SHOWN	DRAWN BY:	ADA

Small Green dots represent discrete cartesian receptors

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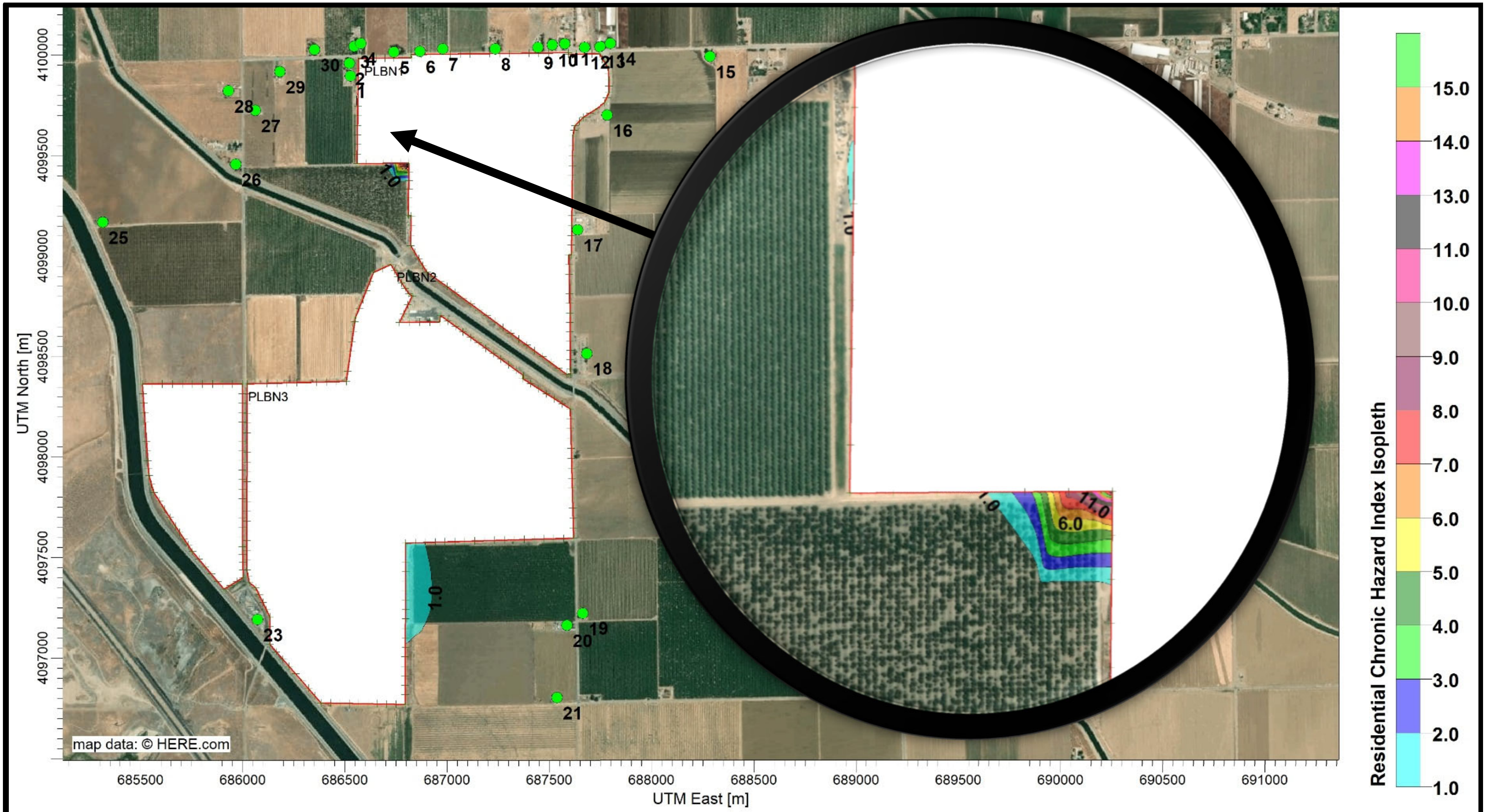
FIGURE 4

Residential Cancer Risk

Los Banos Project
Triangle Rock Products, LLC
Merced County, California

PROJECT #:	210509.0446	DATE:	10/18/22
SCALE:	SHOWN	DRAWN BY:	ADA



Small Green dots represent discrete cartesian receptors

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FIGURE

5

Residential Chronic Hazard Index
Los Banos Project
Triangle Rock Products, LLC
Merced County, California

PROJECT #:	210509.0446	DATE:	10/18/22
SCALE:	SHOWN	DRAWN BY:	ADA

Small Green dots represent discrete cartesian receptors

Only northern area of facility is depicted as off-site cancer risk does not exceed 10 per million exposed in other areas

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FIGURE

6

Worker Cancer Risk
Los Banos Project
Triangle Rock Products, LLC
Merced County, California

PROJECT #:	210509.0446	DATE:	10/18/22
SCALE:	SHOWN	DRAWN BY:	ADA

Small Green dots represent discrete cartesian receptors

Only northern area of facility is depicted as off-site HI does not exceed 1.0 in other areas

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FIGURE

7

Worker Chronic Hazard Index
Los Banos Project
Triangle Rock Products, LLC
Merced County, California

PROJECT #:	210509.0446	DATE:	10/18/22
SCALE:	SHOWN	DRAWN BY:	ADA

APPENDIX B

BACKGROUND INFORMATION

Appendix B
Characteristics of Air Pollutants

Ozone: Ozone (smog) is formed by photochemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOC), rather than being directly emitted. The San Joaquin Valley Air Pollution Control District (SJVAPCD) Health-Based Implementation Strategy prioritizes NO_X reductions over VOC reductions because NO_X reductions would have greater effect on reducing ozone concentrations and be more protective of public health.

O_3 is a pungent, colorless gas typical of photochemical smog. Elevated O_3 concentrations may result in reduced lung function, particularly during vigorous physical activity. This health effect is particularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3 levels peak during summer and early fall.

Breathing ground-level ozone can result in a number of health effects that are observed in broad segments of the population. Some of these effects include:

- Induction of respiratory symptoms;
- Decrements in lung function; and
- Inflammation of airways.

Respiratory symptoms can include:

- Coughing;
- Throat irritation;
- Pain, burning, or discomfort in the chest when taking a deep breath; and
- Chest tightness, wheezing, or shortness of breath.

In addition to these effects, evidence from observational studies indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that ozone can make asthma symptoms worse and can increase sensitivity to asthma triggers.

Carbon Monoxide: Carbon monoxide (CO) is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions.

The severity of symptoms due to CO exposure increases with the blood carboxyhemoglobin (COHb) level. The first signs of CO exposure include mild headache and breathlessness with moderate exercise. Continued exposure may lead to more severe headache, irritability, impaired judgment and memory, and rapid onset of fatigue.

Persons with cardiovascular disease, including those with angina, persons with chronic obstructive pulmonary disease, persons with anemia, and fetuses of pregnant women may be more sensitive to the adverse effects of carbon monoxide exposure. The fetuses of pregnant women, especially those expectant mothers exercising vigorously, may be especially vulnerable due to the much higher affinity of fetal hemoglobin for CO compared to adult hemoglobin.

Persons exposed to methylene chloride are more sensitive to the effects of CO exposure because CO is a metabolite of methylene chloride. Smokers may experience an additional burden of COHb since their carboxyhemoglobin levels are already elevated by smoking.

Nitrogen Oxides: Nitrogen dioxide is a generic term for the mono-nitrogen oxides which include nitric oxide (NO) and NO_2. NO is a colorless, odorless gas and NO_2 is a reddish-brown gas. NO_X is formed from fuel combustion under high temperature or pressure. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_X decreases lung function and may reduce resistance to infection.

Acute exposure to NO_2 may cause pulmonary edema, pneumonitis, and bronchitis. NO_2 is considered a relatively insoluble, reactive gas, such as phosgene and ozone. Once inhaled, NO_2 reaches the lower respiratory tract, affecting mainly the bronchioles and the adjacent alveolar spaces, where it may produce pulmonary edema within hours.

Sulfur Dioxide: Sulfur dioxide is a colorless, irritating gas formed primarily from combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight.

Both controlled laboratory studies and epidemiology studies have shown that people with asthma and children are particularly sensitive to and are at increased risk from the effects of SO_2 air pollution. Asthmatic subjects exposed to levels of SO_2 within regulatory standards have demonstrated increased respiratory symptoms such as shortness of breath, coughing and wheezing, and decrements in lung function.

Lead: Lead (Pb) was phased out of use in gasoline and paint. It is present at trace concentrations in a variety of other materials including most natural materials extracted from the earth's crust. Once in the bloodstream, Pb can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of Pb.

Particulate Matter: Particulate matter (PM) pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset of PM_{10}.

There are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles, power plants, industrial processing, wood burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, and agriculture, and fugitive windblown dust. Because particles originate from a variety of sources, their chemical and physical compositions vary widely.

PM_{10} and $PM_{2.5}$ particles are small enough to be inhaled into, and lodge in, the deepest parts of the lung, evading the respiratory system’s natural defenses. Health problems may occur as the body reacts to these foreign particles.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health-related effects include reduced visibility and soiling of buildings. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body’s ability to fight infections. PM_{10} and $PM_{2.5}$ can aggravate respiratory disease, and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of PM_{10}. These “sensitive populations” include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link PM_{10} exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic PM_{10} can also damage manmade materials and is a major cause of reduced visibility in many parts of the U.S.

Respirable Crystalline Silica: Respirable Crystalline Silica (RCS) means crystalline silicon dioxide with aerodynamic diameter less than four microns (0.0004 cm). Crystalline silica or quartz is ubiquitous in nature. Most dust generated by construction and mining activities including blasting produces dust particles larger than 4 microns. These particles are too large reach alveoli of the lungs which are the target organ. Thus, RCS constitutes a tiny fraction of the dust from these sources and does not represent a significant health risk to neighbors of these types of projects. In order to result in toxic effects, the silica needs to be crystalline, smaller than 4 microns, inhaled, and not exhaled.

Inhalation of RCS initially causes respiratory irritation and an inflammatory reaction in the lungs. Silicosis results from chronic exposure; it is characterized by the presence of histologically unique silicotic nodules and by fibrotic scarring of the lung. Lung diseases other than cancer associated with silica exposure include silicosis, tuberculosis/silicotuberculosis, chronic bronchitis, small airways disease, and emphysema. Ambient air exposures do not cause concern but levels to which workers (e.g., miners, sandblasters) may be exposed have been shown to cause cancer.

Acute exposures to high concentrations cause cough, shortness of breath, and pulmonary alveolar lipoproteinosis (acute silicosis). In a report on the hazards of exposure to crystalline silica, the American Thoracic Society (1997) stated: “Studies from many different work environments suggest that exposure to working environments contaminated by silica at dust levels that appear not to cause roentgenographically visible simple silicosis can cause chronic airflow limitation and/or mucus hypersecretion and/or pathologic emphysema.” Other researchers also concluded that “chronic levels of silica dust that do not cause disabling silicosis may cause the development of chronic bronchitis, emphysema, and/or small airways disease that can lead to airflow obstruction, even in the absence of radiological silicosis.” Fibrotic lesions associated with crystalline silica have also been found at autopsy in the lungs of granite workers who lacked radiological evidence of silicosis (OEHHA, 2004).

Silicosis results from chronic exposure; it is characterized by the presence of histologically unique silicotic nodules and by fibrotic scarring of the lung. Lung diseases other than cancer associated with silica exposure include silicosis, tuberculosis/silicotuberculosis, chronic bronchitis, small airways disease, and emphysema. Silica exposure has been implicated in autoimmune diseases (rheumatoid arthritis, scleroderma, systemic lupus erythematosus) in gold miners and granite workers and in the causation of kidney disease in some occupations, possibly by an immune mechanism (OEHHA, 2004).

Diesel Particulate Matter: Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde, and nickel) have the potential to contribute to mutations in cells that can lead to cancer.

Long-term exposure to diesel exhaust particles poses the highest cancer risk of any toxic air contaminants (TAC) evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). The California Air Resources Board (CARB) has estimated that about 70 percent of the cancer risk that the average Californian faces from breathing TACs stems from diesel exhaust particles. In a comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely than workers who were not exposed to diesel emissions to develop lung cancer. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer.

Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated similar cancer risks from diesel exhaust as those calculated by OEHHA and CARB.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among people suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can reduce lung function in children.

Appendix B
Greenhouse Gases – Characteristics of Climate Pollutants, Regulatory Setting, and Project Applicability

1.1 Regulatory Section

1.1.1 Characteristics of Climate Pollutants

The accumulation of greenhouse gases (GHGs) in the atmosphere contributes to the regulation of the earth's temperature. Some GHGs can remain in the atmosphere for long periods of time (i.e., long-lived). There are six GHGs recognized under the Kyoto Protocol and have been found by the International Panel on Climate Change (IPCC) to have a "Long-lived" effect on global climate change. In addition, California has identified "short-lived" climate pollutants. These are described below. The primary one associated with the Project are Nitrous Oxides (N_2O).

1.1.1.1 Long-Lived Climate Pollutants

In general, there are six (6) compounds/classes of GHGs that are counted when emissions are inventoried. Each GHG exhibits a different global warming potential (GWP). The mass of emissions of each GHG is multiplied by its GWP to determine the carbon dioxide equivalent (CO_2e) potential for global warming. GWPs have changed over time by the Intergovernmental Panel on Climate Change (IPCC) which is considered an authority on GHGs and their effects. The CAP and CARB emissions inventories and plans use GWPs that are an iteration or two behind and the most recent IPCC publication. Characteristics of each long-lived GHG and the associated GWP is presented below.

Carbon Dioxide (CO_2) is an odorless, colorless natural GHG. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include burning coal, oil, natural gas, and wood. By definition, CO_2 has a GWP equal to one (1).

Methane (CH_4) is a flammable GHG. A natural source of CH_4 is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources include landfills, fermentation of manure, and ruminants such as cattle. CH_4 has a GWP equal to 28.

Nitrous Oxide (N_2O) is a colorless GHG. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O has a GWP equal to 265.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for chlorofluorocarbons (CFCs). Of all the GHGs, they are one of three groups with the highest global warming potential. HFCs are human made for applications such as air conditioners and refrigerants. HFCs have GWPs that range from 124 (HFC 125a) to 14,300 (HFC 23).

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. PFCs have GWPs that range from 7,390 (PFC 14) to 12,200 (PFC 116).

Sulfur Hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection. SF_6 has a GWP equal to 22,800.

1.1.1.2 Short-Lived Climate Pollutants

Short-lived climate pollutants are climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants, such as carbon dioxide (CO_2). Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. The impacts of short-lived climate pollutants are especially strong over the short term. Reducing these emissions can make an immediate beneficial impact on climate change.

Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Diesel particulate matter (DPM) emissions are a major source of black carbon and are also toxic air contaminants that have been regulated and controlled in California for several decades in order to protect public health.

Fluorinated gases (F-gases) are the fastest growing source of greenhouse gas emissions in California and globally. They include ozone-depleting substances that are being phased out globally under the Montreal Protocol, and their primary substitute, hydrofluorocarbons (HFCs). Most F-gas emissions come from leaks of these gases in refrigeration and air-conditioning systems. Emissions also come from aerosol propellants, fire suppressants, and foam-expansion agents.

1.1.2 Federal

To date, there is no federal overarching law specifically related to climate change or the reduction of GHGs. The Environmental Protection Agency (EPA) authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA,* 549 US 497 (2007). The Supreme Court found that GHGs are air pollutants covered by the Clean Air Act, and the EPA Endangerment Findings concluded the elements CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 threatened public health for both current and future generations. In 2009, the U.S. EPA published a rule for the mandatory reporting of GHG from sources that in general emit 25,000 metric tons or more of carbon dioxide equivalent per year in the United States. Implementation of 40 CFR Part 98 is referred to as the Greenhouse Gas Reporting Program (GHGRP). This collection of comprehensive, nationwide emissions data is intended to provide a better understanding of the sources of GHGs and to guide development of policies and programs to reduce emissions. (U.S. EPA,

2013) Additional federal actions have included the implementation of standards for vehicles, biofuel production, and power generation. Federal actions relating to GHG emissions are summarized and provided in Table 1 below.

Table 1 **– Federal Actions Relating to GHG Emissions**

Date	Action	Description
April 2, 2007	*Massachusetts v. EPA*, 549 U.S. 497	Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. (528-29.)
September 22, 2009	Mandatory Reporting Rule	This rule and subsequent rules which amend 40 CFR Part 98 require and govern the collection accurate and timely data on GHG emissions that can be used to inform future policy decisions.
December 7, 2009	EPA Endangerment Findings	• Elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the “endangerment finding.” • Combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the “cause or contribute finding.” (*Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (Dec. 15, 2009) 74 Fed. Reg. 66496, 546.)
December 19, 2007	Energy Independence and Security Act (EISA)	• Increase the supply of alternative fuel sources by requiring fuel producers to use at least 36 billion gallons of biofuel in 2022. • Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and establish a fuel economy program for medium and heavy duty vehicles. • Prescribe or revise standards affecting regional efficiency for heating and cooling products.
April 2010, September 2011, and August 2012	EPA and NHTSA Joint Final Rules for Vehicle Standards	• In 2010, established a National program consisting of new standards for light-duty vehicles model years 2012 through 2016 which achieve the 250 g CO_2/mile (35 mpg) target in the EISA beginning with the 2016 model year fleet. • In 2011, approved GHG emissions standards for medium and heavy duty trucks model years 2014 through 2018. • In 2012, approved standards for model year 2017 and beyond light duty vehicles to 163 g CO_2/mile (i.e., 54.5 mpg if achieved only by fuel efficiency) for model year 2025.

Date	Action	Description
January 2, 2011	Clean Air Act Permitting for GHGs	On June 23, 2014, the U.S. Supreme Court issued its decision in Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427 (2014) ("UARG"). The Court held that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT).
August 3, 2015	Clean Power Plan	The Plan provides standards for power plants, customized goals for states to cut the carbon pollution from power plants, national consistency, accountability and a level playing field while reflecting each state's energy mix. On February 9, 2016, the Supreme Court stayed implementation of the Clean Power Plan pending judicial review. EPA claims "The Court's decision was not on the merits of the rule. EPA firmly believes the Clean Power Plan will be upheld when the merits are considered because the rule rests on strong scientific and legal foundations."

1.1.3 State

Section 1.1.3.1 summarizes California legislation, regulations, and executive orders enacted prior to or contemporary to the 2017 Scoping plan, providing a background on state regulation of GHG gasses through 2020. The tables in Section 1.1.3.1 were taken from the California government website for climate change (climatechange.ca.gov).

Section 1.1.3.2, provides a summary of the 2017 Climate Change Scoping plan, and the goals of this plan specifically related to the 2030 target reference scenario. While the 2022 Scoping plan is more recent, the 2022 Scoping Plan served as an update to the 2017 Plan, and actions outlined in the 2017 plan are still ongoing and potentially pertinent to the Project. Table 5 contains recommended actions from the 2017 Scoping Plan and their applicability to the Project.

Section 1.1.3.3 outlines major climate legislation and executive orders enacted after the 2017 Scoping Plan, leading up to the 2022 Scoping plan. These Bills/Executive orders are recent and many are directly connected to the 2022 Scoping plan. As such, discussion of each is provided in order to outline their connection to the 2022 Scoping plan and or the Project. This list of legislation and executive orders enacted between the 2017 and 2022 Scoping plans is taken directly from the 2022 Scoping Plan.

Section 1.1.3.4 summarizes the 2022 Scoping Plan, as well as actions to be taken under the Scoping Plan Scenario for AB 32 GHG inventory Sectors. These actions are listed alongside applicable statutes and executive orders, and project applicability to each action is determined.

1.1.3.1 California Regulatory Context: Historical Legislation, Regulation, and Executive Orders

Table 2–**California Climate Change Legislation**

Date	Legislation	Description
September 10, 2018	Senate Bill 100 (De León, Chapter 312, Statues of 2018)	California Renewables Portfolio Standard Program: emissions of greenhouse gases. This bill establishes the 100 Percent Clean Energy Act of 2017 which increases the Renewables Portfolio Standard (RPS) requirement from 50 percent by 2030 to 60 percent, and creates the policy of planning to meet all of the state's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045, for a total of 100 percent clean energy.
July 26, 2017	Assembly Bill 617 (Christina Garcia, Chapter 136, Statutes of 2017)	Companion to Cap-and-Trade Extension Establishes a groundbreaking program to measure and reduce air pollution from mobile and stationary sources at the neighborhood level in the communities most impacted by air pollutants. Requires the Air Resources Board to work closely with local air districts and communities to establish neighborhood air quality monitoring networks and to develop and implement plans to reduce emissions. The focus on community-based air monitoring and emission reductions will provide a national model for enhanced community protection.
July 25, 2017	Assembly Bill 398 (Eduardo Garcia, Chapter 135, Statutes of 2017)	Cap-and-Trade Extension Extends and improves the Cap and Trade Program, which will enable the state to meet its 2030 emission reduction goals in the most cost-effective manner. Furthermore, extending the Cap and Trade Program will provide billions of dollars in auction proceeds to invest in communities across California.
September 19, 2016	Senate Bill 1383 (Lara, Chapter 395, Statutes of 2016)	Short-lived Climate Pollutants Establishes statewide reduction targets for short-lived climate pollutants.
September 8, 2016	Assembly Bill 197 (Eduardo Garcia, Chapter 250, Statutes of 2016)	Greenhouse gas regulations Prioritizes direct emission reductions from large stationary sources and mobile sources.

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Date	Legislation	Description
September 8, 2016	Senate Bill 32 (Pavley, Chapter 249, Statutes of 2016)	Greenhouse Gas emission reduction target for 2030 Establishes a statewide greenhouse gas (GHG) emission reduction target of 40 percent below 1990 levels by 2030.
October 7, 2015	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)	Clean Energy and Pollution Reduction Act of 2015 Establishes targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030.
September 21, 2014	Senate Bill 605 (Lara, Chapter 523, Statutes of 2014)	Short-lived climate pollutants Requires the State Air Resources Board to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants by January 1, 2016.
September 21, 2014	Senate Bill 1275 (De León, Chapter 530, Statutes of 2014)	Charge Ahead California Initiative Establishes a State goal of 1 million zero-emission and near-zero-emission vehicles in service by 2020. Amends the enhanced fleet modernization program to provide a mobility option. Establishes the Charge Ahead California Initiative requiring planning and reporting on vehicle incentive programs and increasing access to and benefits from zero-emission vehicles for disadvantaged, low-income, and moderate-income communities and consumers.
September 21, 2014	Senate Bill 1204 (Lara, Chapter 524, Statutes of 2014)	California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program Creates the California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program funded by the Greenhouse Gas Reduction Fund for development, demonstration, precommercial pilot, and early commercial deployment of zero- and near-zero emission truck, bus, and off-road vehicle and equipment technologies, with priority given to projects benefiting disadvantaged communities.
September 28, 2013	Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013)	Alternative fuel and vehicle technologies: funding programs Extends until January 1, 2024, extra fees on vehicle registrations, boat registrations, and tire sales in order to fund the AB 118, Carl Moyer, and AB 923 programs that support the production, distribution, and sale of alternative fuels and vehicle technologies and air emissions reduction efforts. The bill suspends until 2024 ARB's regulation requiring gasoline refiners to provide hydrogen fueling stations and appropriates up to $220 million, of AB 118 money to create a hydrogen fueling infrastructure in the State.

Date	Legislation	Description
September 28, 2013	Assembly Bill 1092 (Levine, Chapter 410, Statutes of 2013)	Building standards: electric vehicle charging infrastructure Requires the Building Standards Commission to adopt mandatory building standards for the installation of future electric vehicle charging infrastructure for parking spaces in multifamily dwellings and nonresidential development.
September 30, 2012	Senate Bill 535 (De León, Chapter 830, Statutes of 2012)	Greenhouse Gas Reduction Fund and Disadvantaged Communities Requires the California Environmental Protection Agency to identify disadvantaged communities; requires that 25% of all funds allocated pursuant to an investment plan for the use of moneys collected through a cap-and-trade program be allocated to projects that benefit disadvantaged communities and 10 those 25% be use within disadvantaged communities; and requires the Department of Finance to include a description of how these requirements are fulfilled in an annual report.
September 30, 2012	Assembly Bill 1532 (J. Perez, Chapter 807, Statutes of 2012)	Greenhouse Gas Reduction Fund in the Budget Requires the Department of Finance to develop and submit to the Legislature an investment plan every three years for the use of the Greenhouse Gas Reduction Fund; requires revenue collected pursuant to a market-based compliance mechanism to be appropriated in the Annual Budget Act; requires the department to report annually to the Legislature on the status of projects funded; and specifies that findings issued by the Governor related to “linkage” as part of a market-base compliance mechanism are not subject to judicial review.
April 12, 2011	Senate Bill X1-2 (Simitian, Chapter 1, Statutes of 2011)	Governor Edmund G. Brown, Jr. signed Senate Bill X1-2 into law to codify the ambitious 33 percent by 2020 goal. SBX1-2 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of electricity generated from eligible renewable energy resources per year to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2013, 25% by December 31, 2016 and 33% by December 31, 2020. The new RPS goals applies to all electricity retailers in the State including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. This new RPS preempts the California Air Resources Boards' 33 percent Renewable Electricity Standard.
September 29, 2011	Assembly Bill 1504 (Skinner, Chapter 534, Statutes of 2010)	Forest resources and carbon sequestration. Bill requires Department of Forestry and Fire Protection and Air Resources Board to assess the capacity of its forest and rangeland regulations to meet or exceed the State's greenhouse goals, pursuant to AB 32.

Date	Legislation	Description
September 30, 2008	Senate Bill 375 (Steinberg, Chapter 728, Statutes of 2008)	Sustainable Communities & Climate Protection Act of 2008 requires Air Resources Board to develop regional greenhouse gas emission reduction targets for passenger vehicles. ARB is to establish targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations. For more information on SB 375, see the ARB Sustainable Communities page.
October 14, 2007	Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007)	Alternative Fuels and Vehicles Technologies The bill would create the Alternative and Renewable Fuel and Vehicle Technology Program, to be administered by the Energy Commission, to provide funding to public projects to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the State's climate change policies.
August 24, 2007	Senate Bill 97 (Dutton, Chapter 187, Statutes of 2007)	Directs Governor's Office of Planning and Research to develop CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." For more information see the OPR CEQA and Climate Change page.
July 18. 2006	Assembly Bill 1803 (Committee on Budget, Chapter 77, Statutes of 2006)	Greenhouse gas inventory transferred to Air Resources Board from the Energy Commission.
August 21, 2006	Senate Bill 1 (Murray, Chapter 132, Statutes of 2006)	California's Million Solar Roofs plan is enhanced by PUC and CEC's adoption of the California Solar Initiative. SB1 directs PUC and CEC to expand this program to more customers, and requiring the State's municipal utilities to create their own solar rebate programs. This bill would require beginning January 1, 2011, a seller of new homes to offer the option of a solar energy system to all customers negotiating to purchase a new home constructed on land meeting certain criteria and to disclose certain information.
September 26, 2006	Senate Bill 107 (Simitian, Chapter 464, Statutes of 2006)	SB 107 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of renewable electricity (Renewable Portfolio Standard) generated per year, from 17% to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2010.

Date	Legislation	Description
September 27, 2006	Assembly Bill 32 (Núñez, Chapter 488, Statutes of 2006)	California Global Warming Solutions Act of 2006. This bill would require Air Resources Board (ARB) to adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020. ARB shall adopt regulations to require the reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with this program. AB 32 directs Climate Action Team established by the Governor to coordinate the efforts set forth under Executive Order S-3-05 to continue its role in coordinating overall climate policy. See more information on AB 32 at ARB.
September 12, 2002	Senate Bill 1078 (Sher, Chapter 516, Statutes of 2002)	This bill establishes the California Renewables Portfolio Standard Program, which requires electric utilities and other entities under the jurisdiction of the California Public Utilities Commission to meet 20% of their renewable power by December 31, 2017 for the purposes of increasing the diversity, reliability, public health, and environmental benefits of the energy mix.
September 7, 2002	Senate Bill 812 (Sher, Chapter 423, Statutes of 2002)	This bill added forest management practices to the California Climate Action Registry members' reportable emissions actions and directed the Registry to adopt forestry procedures and protocols to monitor, estimate, calculate, report, and certify carbon stores and carbon dioxide emissions that resulted from the conservation-based management of forests in California.
July 22, 2002	Assembly Bill 1493 (Pavley, Chapter 200, Statutes of 2002)	The "Pavley" bill requires the registry, in consultation with ARB, to adopt procedures and protocols for the reporting and certification of reductions in greenhouse gas emissions from mobile sources for use by the ARB in granting the emission reduction credits. This bill requires the ARB to develop and adopt, by January 1, 2005, regulations that achieve the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks. For more information on AB 1493 Pavley I, see the ARB Clean Car Standards page.
October 11, 2001	Senate Bill 527 (Sher, Chapter 769, Statutes of 2001)	This bill revises the functions and duties of the California Climate Action Registry and requires the Registry, in coordination with CEC to adopt third-party verification metrics, developing GHG emissions protocols and qualifying third-party organizations to provide technical assistance and certification of emissions baselines and inventories. SB 527 amended SB 1771 to emphasize third-party verification.

Date	Legislation	Description
September 30, 2000	Senate Bill 1771 (Sher, Chapter 1018, Statutes of 2000)	SB 1771 establishes the creation of the non-profit organization, the California Climate Action Registry and specifies functions and responsibilities to develop a process to identify and qualify third-party organizations approved to provide technical assistance and advice in monitoring greenhouse gas emissions, and setting greenhouse gas (GHG) emissions baselines in coordination with CEC. Also, the bill directs the Registry to enable participating entities to voluntarily record their annual GHG emissions inventories. Also, SB 1771 directs CEC to update the State's greenhouse gas inventory from an existing 1998 report and continuing to update it every five years.
September 28, 1988	Assembly Bill 4420 (Sher, Chapter 1506, Statutes of 1988)	The California Energy Commission (CEC) was statutorily directed to prepare and maintain the inventory of greenhouse gas emissions (GHG) and to study the effects of GHGs and the climate change impacts on the State's energy supply and demand, economy, environment, agriculture, and water supplies. The study also required recommendations for avoiding, reducing, and addressing related impacts - and required the CEC to coordinate the study and any research with federal, state, academic, and industry research projects.

Source: California Air Quality and Climate Legislation | California Air Resources Board

Table 3 **– California Climate Change Regulations**

Regulation	Description
Greenhouse Gas Reduction Fund	State program allocating proceeds from cap-and-trade auctions to support investments and projects that reduce greenhouse gas emissions throughout California.
Amendments to the Mandatory Greenhouse Gas Reporting Regulation	The CARB Regulation for the Mandatory Reporting of Greenhouse Gas Emissions was originally approved in 2007 and revised in 2010, 2012, 2013, 2014, 2016 and 2018. Amendments to MRR were approved on March 29, 2019 and became effective on April 1, 2019, for 2019 data. The 2019 amendments were implemented to: • Support California's Cap-and-Trade Regulation to ensure consistency with the calculation of compliance obligations • Ensure that reported GHG emissions and product data are accurate and complete in order to support California's GHG reduction programs

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Regulation	Description
Cap & Trade Amendments	December 2018 amendments to the cap-and-trade regulation included: • New price containment points and a price ceiling • Limits on offset use • New industrial facility leakage assistance factors for 2018 and beyond • Clarifications on electric and gas utility use of allowance value • Compliance provisions for Energy Imbalance Market (EIM)-related GHG emissions • Offset invalidation clarifications • Streamlining implementation requirements • Adjustments to linkage reflecting Ontario's actions to revoke its participation in the cap-and-trade market. September 2016 amendments to the cap-and-trade regulation included: • Emission caps for the post-2020 program • Post-2020 continuation of the allowance price containment reserve • Linking with Ontario's cap-and-trade program • Compliance with the federal Clean Power Plan • Modifications to allowance allocation
Low Carbon Fuel Standard	In September 2015, the Air Resources Board re-adopted the Low Carbon Fuel Standard, to settle issues arising from lawsuits. The requirement is still a 10 percent reduction in the carbon intensity of transportation fuels.
Cap & Trade Offset Protocols	The Air Resources Board has adopted five protocols for offset compliance projects. In addition to the original four protocols adopted in 2011, ARB has adopted: Mine Methane Capture (MMC) Projects Compliance Offset Protocol, adopted April 2014
Cap & Trade Link with Quebec	California linked its cap-and-trade program with Quebec's program in January 2014. Linkage allows for the use of compliance instruments from Quebec's greenhouse gas emission trading system to meet compliance obligations pursuant to the California Cap-and-Trade Regulation, and the reciprocal approval of compliance instruments issued by California to meet compliance obligations in the external trading program.
Building Energy Efficiency Standards	The Energy Commission's 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The Standards, which took effect on January 1, 2014, offer builders better windows, insulation, lighting, ventilation systems and other features that reduce energy consumption in homes and businesses.
Advanced Clean Cars Standard	The Advanced Clean Cars Program, approved in January 2012, will achieve additional GHG reductions from passenger vehicles for model years 2017-2025. This Program represents a new approach to passenger vehicles (cars, light trucks) by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards known as Low Emission Vehicles (LEV) III. The new approach also includes efforts under the Zero-Emission Vehicle Program to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California.

Regulation	Description
Water Appliance Standards	The Energy Commission’s 2015 Water Appliance Standards are projected to save 10 billion gallons in the first year, increasing over time to 100 billion gallons of water per year. The energy efficiency and water standards require water appliances to consume less water thereby using less energy while performing the same function. The standards apply to toilets and urinals; residential lavatory faucets; kitchen faucets; public lavatory faucets.
Cap & Trade Rulemaking Activities	A proposed California cap on greenhouse gas emissions and a market-based compliance mechanisms, including compliance offset protocols. OAL approved the rulemaking and filed it with the Secretary of State on December 13, 2011. The regulation will become effective on the January 1, 2012.
Low Carbon Fuel Standards (LCFS)	The regulations are designed to reduce the carbon intensity (CI) of transportation fuels used in California by at least 10 percent by the year 2020. The Air Resources Board approved the LCFS regulation for adoption on April 23, 2009. The regulation entered into full effect on April 15, 2010. Based upon feedback from stakeholders, amendments to the regulations were proposed by the Board in December 2011.
33% Renewable Portfolio Standard	On May 5, 2011, the California Public Utilities Commission adopted the Order Instituting Rulemaking (R.) 11-05-005 to open a new proceeding for the implementation and administration of the 33% RPS Program. The primary focus of the R.11-05-005 proceeding was the implementation of the new 33% RPS law, Senate Bill (SB) 2 (1X) (Simitian), stats. 2011.
Mandatory Commercial Recycling	This regulation addresses recycling requirements for businesses that generate 4 or more cubic yards of commercial solid waste per week and multifamily residential dwellings with 5 or more units, regardless of the amount of waste generated; local jurisdiction requirements for education, outreach, monitoring and reporting; and CalAsphalt and concrete recycling review. The regulations were approved on May 7, 2012.

Source: (Climate Change | California Air Resources Board, 2021).

Table 4 **– California Climate Change Executive Orders**

Date	Executive Order	Description
September 23, 2020	N-79-20	EO-N-79-20 requires all California vehicles to be emissions free; cars and passenger trucks by 2035, medium and heavy duty trucks by 2045.
September 20, 2019	N-19-19	EO-N-19-19 requires various state agencies to leverage their existing investments, spending, or state-owned building to further CA's climate goals.
September 10, 2018	B-55-18	EO-B-55-18 establishes a new statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter.

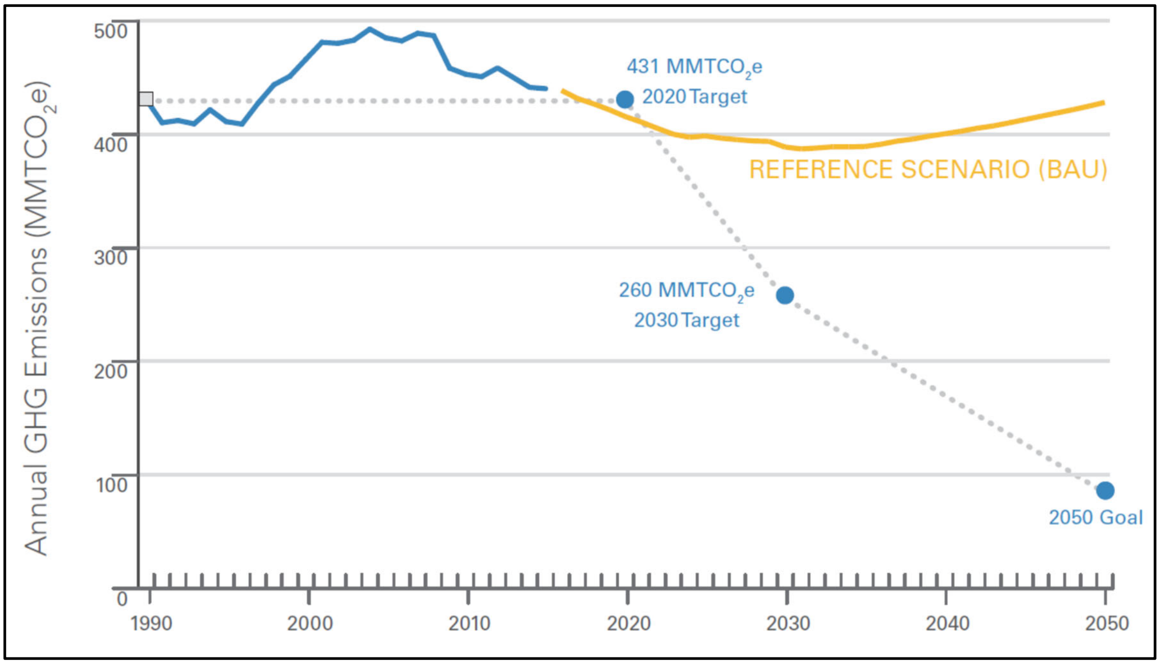
Date	Executive Order	Description
July 17, 2015	B-32-15	EO-B-32-15 Sets goals for ZEVs in freight transportation
April 29, 2015	B-30-15	EO-B-30-15 sets an interim greenhouse gas (GHG) emissions target for 2030 at 40 percent below 1990 levels.
April 25, 2012	B-18-12	EO-B-18-12 calls for significant reductions in State agencies' energy purchases and GHG emissions. The Executive Order included a Green Building Action Plan, which provided additional details and specific requirements for the implementation of the Executive Order
March 23, 2012	B-16-12	EO-B-16-12 orders State agencies to facilitate the rapid commercialization of zero-emission vehicles (ZEVs). The Executive Order sets a target for the number of 1.5 million ZEVs in California by 2025. Also, the Executive Order sets as a target for 2050 a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels.
September 15, 2009	S-21-09	EO-S-21-09 coordinates renewable energy efforts between CARB, CPUC, and Cal ISO.
November 17, 2008	S-14-08	EO-S-14-08 establishes renewable energy generation share for retail sellers of electricity in California.
November 14, 2008	S-13-08	EO-S-13-08 directs State agencies to plan for sea level rise and climate impacts through coordination of the State Climate Adaptation Strategy.
January 18, 2007	S-01-07	EO-S-01-07 establishes the 2020 target and Low Carbon Fuel Standard. The EO directs the Secretary of Cal/EPA as coordinator of 2020 target activities and requires the Secretary to report back to the Governor and Legislature biannually on progress toward meeting the 2020 target.
October 18, 2006	S-20-06	EO-S-20-06 establishes responsibilities and roles of the Secretary of Cal/EPA and State agencies in climate change.
April 25, 2006	S-06-06	EO-S-06-06 directs Secretary of Cal/EPA to participate in the Bio-Energy Interagency Working Group and addresses biofuels and bioenergy from renewable resources.
June 1, 2005	S-03-05	EO-S-3-05 establishes greenhouse gas emission reduction targets, creates the Climate Action Team, and directs the Secretary of Cal/EPA to coordinate efforts with meeting the targets with the heads of other State agencies. The EO requires the Secretary to report back to the Governor and Legislature biannually on progress toward meeting the GHG targets, GHG impacts to California, Mitigation and Adaptation Plans.
December 14, 2004	S-20-04	EO-S-20-04 (Green Buildings) directs State agencies to reduce energy use in State owned buildings by 20% by 2015 and increase energy efficiency.
April 20, 2004	S-07-04	EO-S-07-04 designates the 21 interstate freeways in California as the "California Hydrogen Highway Network" and directs state agencies to plan and build a network of hydrogen fueling stations along these routes by 2010.

Source: (California Climate Executive Orders - Wikipedia, 2021)

1.1.3.2 The 2017 ARB Climate Change Scoping Plan

On December 14, 2017, CARB approved the 2017 Climate Change Scoping Plan Update (Scoping Plan) which aims to reduce GHG emissions according to the following graphic. The Scoping Plan "is a package of economically viable and technologically feasible actions to not just keep California on track to achieve its 2030 target, but stay on track for a low- to zero-carbon economy by involving every part of the state. Every sector, every local government, every region, every resident is part of the solution. The Plan underscores that there is no single solution but rather a balanced mix of strategies to achieve the GHG target. This Plan highlights the fact that a balanced mix of strategies provides California with the greatest level of certainty in meeting the target at a low cost while also improving public health, investing in disadvantaged and low-income communities, protecting consumers, and supporting economic growth, jobs and energy diversity. Successful implementation of this Plan relies, in part, on long-term funding plans to inform future appropriations necessary to achieve California's long-term targets." (2017 Scoping Plan, p. ES4).

Chart 1 – 2030 Target Scoping Plan Reference Scenario



Source: Figure 6 (2017 Scoping Plan, p. 24)

> *The development of the Scoping Plan began by first modeling a Reference Scenario (BAU). The Reference Scenario is the forecasted statewide GHG emissions through 2030 with existing policies and programs, but without any further action to reduce GHGs. [2017 Scoping Plan] Figure 6 [above] provides the modeling results for a Reference Scenario for this Scoping Plan. The graph shows the State is expected to reduce emissions below the 2020 statewide GHG target, but additional effort will be needed to maintain and continue*

> *GHG reductions to meet the mid- (2030) and long-term (2050) targets. Figure 6 depicts a linear, straight-line path to the 2030 target. It should be noted that in any year, GHG emissions may be higher or lower than the straight line. That is to be expected as periods of economic recession or increased economic activity, annual variations in hydropower, and many other factors may influence a single or several years of GHG emissions in the State. CARB's annual GHG reporting and inventory will provide data on progress towards achieving the 2030 target.*
> (2017 Scoping Plan, p. 23).

The Scoping Plan states that the California Legislature has shaped the State's climate change program, setting out clear policy objectives over the next decade including:

- *40% reduction in GHG emissions by 2030;*
- *50% renewable electricity;*
- *Double energy efficiency savings;*
- *Support for clean cars;*
- *Integrate land use, transit, and affordable housing to curb auto trips;*
- *Prioritize direct reductions;*
- *Identify air pollution, health, and social benefits of climate policies;*
- *Slash "super pollutants" (i.e., hydrofluorocarbons or HFCs);*
- *Protect and manage natural and working lands;*
- *Invest in disadvantaged communities; and*
- *Strong support for Cap-and-Trade.*

(2017 Scoping Plan, p. ES6).

Reference Scenario 2030 emissions estimate of 389 $MMTCO_2e$ to the 2030 target of 260 $MMTCO_2e$ and the level of 2030 emissions with the known commitments, estimated to be 320 $MMTCO_2e$. The known commitments are expected to result in emissions that are 60 $MMTCO_2e$ above the target in 2030, and have a cumulative emissions reduction gap of about 236 $MMTCO_2e$. This means the known commitments do not decline fast enough to achieve the 2030 target. The remaining 236 $MMTCO_2e$ of estimated GHG emissions reductions would not be achieved unless further action is taken to reduce GHGs. Consequently, for the Scoping Plan Scenario, the Post-2020 Cap-and-Trade Program would need to deliver 236 $MMTCO_2e$ cumulative GHG emissions reductions from 2021 through 2030. If the estimated GHG reductions from the known commitments are not realized due to delays in implementation or technology deployment, the post-2020 Cap-and-Trade Program would deliver the additional GHG reductions in the sectors it covers to ensure the 2030 target is achieved.

Table 5 **– Climate Change Policies and Measures , Actions from the 2017 Scoping Plan**

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Greenhouse Gases – Characteristics of Climate Pollutants, Regulatory Setting, and Project Applicability

Recommended Action	Applies to Project?
Implement SB 350 by 2030: • Increase the Renewables Portfolio Standard to 50 percent of retail sales by 2030 and ensure grid reliability. • Establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030. • Reduce GHG emissions in the electricity sector through the implementation of the above measures and other actions as modeled in IRPs to meet GHG emissions reductions planning targets in the IRP process. Load-serving entities and publicly-owned utilities meet GHG emissions reductions planning targets through a combination of measures as described in IRPs.	No, Project will purchase grid electricity, not administrate it.
Implement Mobile Source Strategy (Cleaner Technology and Fuels): • At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025. • At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030. • Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean Cars regulations. • Medium- and heavy-duty GHG Phase 2. • Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low-NO_X standard. • Last Mile Delivery: New regulation that would result in the use of low NO_X or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for class 3-7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030. • Further reduce VMT through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."	No, Project vehicles are heavy-heavy duty and were not subject to heavy-duty GHG Phase 1 regulations. Thus, they would be unlikely to be subject to these measures.
Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).	No, Project does not affect SB 375 targets.
By 2019, adjust performance measures used to select and design transportation facilities. • Harmonize project performance with emissions reductions, and increase competitiveness of transit and active transportation modes (e.g., via guideline documents, funding programs, project selection, etc.).	No, Project does not affect viability of transit or active modes.

Appendix B
Greenhouse Gases – Characteristics of Climate Pollutants, Regulatory Setting, and Project Applicability

Recommended Action	Applies to Project?
By 2019, develop pricing policies to support low-GHG transportation (e.g., low-emission vehicle zones for heavy duty, road user, parking pricing, transit discounts).	No, Project does not affect government pricing policies.
Implement California Sustainable Freight Action Plan: • Improve freight system efficiency. • Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.	No, Project does not affect whether Freight Action Plan can be implemented.
Adopt a Low Carbon Fuel Standard with a CI reduction of 18 percent.	No, Project does not affect CARB's ability to adopt standards.
Implement the Short-Lived Climate Pollutant Strategy by 2030: • 40 percent reduction in methane and hydrofluorocarbon emissions below 2013 levels. • 50 percent reduction in black carbon emissions below 2013 levels.	No, Project does not affect whether SLCP strategy can be implemented.
By 2019, develop regulations and programs to support organic waste landfill reduction goals in the SLCP and SB 1383.	No, Project does not affect CARB's ability to adopt regulations.
Implement the post-2020 Cap-and-Trade Program with declining annual caps.	No, Project does not affect CARB's ability to implement Cap-and-Trade.
By 2018, develop Integrated Natural and Working Lands Implementation Plan to secure California's land base as a net carbon sink: • Protect land from conversion through conservation easements and other incentives. • Increase the long-term resilience of carbon storage in the land base and enhance sequestration capacity • Utilize wood and agricultural products to increase the amount of carbon stored in the natural and built environments • Establish scenario projections to serve as the foundation for the Implementation Plan	No, Project does not affect ability to develop such a plan.
Establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018.	No, Project does not affect ability to establish such a framework.

Recommended Action	Applies to Project?
Implement Forest Carbon Plan	No, Project does not affect ability to implement such a plan.
Identify and expand funding and financing mechanisms to support GHG reductions across all sectors.	No, Project does not affect whether CARB can identify and expand funding.

Source: (CARB, 2017, pp. 103-104).

1.1.3.3 Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Table 6 Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
Assembly Bill 1279 (AB 1279) (Muratsuchi, Chapter 337, Statutes of 2022) The California Climate Crisis Act	AB 1279 establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. The bill requires CARB to ensure that Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO2 removal solutions and carbon capture, utilization, and storage (CCUS) technologies. This bill is reflected directly in the 2022 Scoping Plan.	No, the Project does not affect the States ability to establish a policy of achieving carbon neutrality.
Senate Bill 905 (SB 905) (Caballero, Chapter 359, Statutes of 2022) Carbon Capture, Removal, Utilization, and Storage Program	SB 905 requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program to evaluate, demonstrate, and regulate CCUS and carbon dioxide removal (CDR) projects and technology. The bill requires CARB, on or before January 1, 2025, to adopt regulations creating a unified state permitting application for approval of CCUS and CDR projects. The bill also requires the Secretary of the Natural Resources Agency to publish a framework for governing agreements for two or more tracts of land overlying the same geologic storage reservoir for the purposes of a carbon sequestration project. The	No, the Project does not affect the ability of the CARB to create Carbon Capture, Removal, Utilization, or Storage programs.

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	2022 Scoping Plan modeling reflects both CCUS and CDR contributions to achieve carbon neutrality.	
Senate Bill 846 (SB 846) (Dodd, Chapter 239, Statutes of 2022) Diablo Canyon Powerplant: Extension of Operations	SB 846 extends the Diablo Canyon Power Plant's sunset date by up to five additional years for each of its two units and seeks to make the nuclear power plant eligible for federal loans. The bill requires that the California Public Utilities Commission (CPUC) not include and disallow a load-serving entity from including in their adopted resource plan, the energy, capacity, or any attribute from the Diablo Canyon power plant. The 2022 Scoping Plan explains the emissions impact of this legislation.	No, the Project does not impact the closure of the Diablo Canyon Power Plant.
Senate Bill 1020 (SB 1020) (Laird, Chapter 361, Statutes of 2022) Clean Energy, Jobs, and Affordability Act of 2022	SB 1020 adds interim renewable energy and zero carbon energy retail sales of electricity targets to California end-use customers set at 90 percent in 2035 and 95 percent in 2040. It accelerates the timeline required to have 100 percent renewable energy and zero carbon energy procured to serve state agencies from the original target year of 2045 to 2035. This bill requires each state agency to individually achieve the 100 percent goal by 2035 with specified requirements. This bill requires the CPUC, California Energy Commission (CEC), and CARB, on or before December 1, 2023, and annually thereafter, to issue a joint reliability progress report that reviews system and local reliability. The bill also modifies the requirement for CARB to hold a portion of its Scoping Plan workshops in regions of the state with the most significant exposure to air pollutants by further specifying that this includes communities with minority populations or low-income communities in areas designated as being in extreme federal non-attainment. The 2022 Scoping Plan describes the implications of this legislation on emissions.	No, the Project does not affect retail electricity sales targets.
Senate Bill 1137 (SB 1137) (Gonzales, Chapter 365, Statutes of 2022) Oil & Gas Operations: Location Restrictions: Notice of Intention: Health protection zone: Sensitive receptors	SB 1137 prohibits the development of new oil and gas wells or infrastructure in health protection zones, as defined, except for purposes of public health and safety or other limited exceptions. The bill requires operators of existing oil and gas wells or infrastructure within health protection zones to undertake specified monitoring, public notice, and nuisance requirements. The bill requires CARB to consult and concur with the California Geologic Energy Management Division (CalGEM) on leak detection and	No, the Project does not cause new oil and gas well development in a health protection zone.

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	repair plans for these facilities, adopt regulations as necessary to implement emission detection system standards, and collaborate with CalGEM on public access to emissions detection data.	
Senate Bill 1075 (SB 1075) (Skinner, Chapter 363, Statutes of 2022) Hydrogen: Green Hydrogen: Emissions of Greenhouse Gases	SB 1075 requires CARB, by June 1, 2024, to prepare an evaluation that includes: policy recommendations regarding the use of hydrogen, and specifically the use of green hydrogen, in California; a description of strategies supporting hydrogen infrastructure, including identifying policies that promote the reduction of GHGs and short-lived climate pollutants; a description of other forms of hydrogen to achieve emission reductions; an analysis of curtailed electricity; an estimate of GHG and emission reductions that could be achieved through deployment of green hydrogen through a variety of scenarios; an analysis of the potential for opportunities to integrate hydrogen production and applications with drinking water supply treatment needs; policy recommendations for regulatory and permitting processes associated with transmitting and distributing hydrogen from production sites to end uses; an analysis of the life-cycle GHG emissions from various forms of hydrogen production; and an analysis of air pollution and other environmental impacts from hydrogen distribution and end uses. This bill would inform the production of hydrogen at the scale called for in the 2022 Scoping Plan.	No, the Project does not impact CARB's ability to prepare evaluations.
Assembly Bill 1757 (AB 1757) (Garcia, Chapter 341, Statutes of 2022) California Global Warming Solutions Act of 2006: Climate Goal: Natural and Working Lands	AB 1757 requires the California Natural Resources Agency (CNRA), in collaboration with CARB, other state agencies, and an expert advisory committee, to determine a range of targets for natural carbon sequestration, and for nature-based climate solutions, that reduce GHG emissions in 2030, 2038, and 2045 by January 1, 2024. These targets must support state goals to achieve carbon neutrality and foster climate adaptation and resilience. This bill also requires CARB to develop standard methods for state agencies to consistently track GHG emissions and reductions, carbon sequestration, and additional benefits from natural and working lands over time. These methods will account for GHG emissions reductions of CO2, methane, and nitrous oxide related to natural and working	No, the Project does not impact CARB's ability to determine GHG reduction target ranges, methods, or standards.

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	lands and the potential impacts of climate change on the ability to reduce GHG emissions and sequester carbon from natural and working lands, where feasible. The 2022 Scoping Plan describes the next steps and implications of this legislation for the natural and working lands sector.	
Senate Bill 1206 (SB 1206) (Skinner, Chapter 884, Statutes of 2022) Hydrofluorocarbon gases: sale or distribution	SB 1206 mandates a stepped sales prohibition on newly produced high- global warming potential (GWP) HFCs to transition California's economy toward recycled and reclaimed HFCs for servicing existing HFC-based equipment. Additionally, SB 1206 also requires CARB to develop regulations to increase the adoption of very low-, i.e., GWP < 10, and no-GWP technologies in sectors that currently rely on higher-GWP HFCs.	No, the Project does not impact the prohibition of HFCs.
Senate Bill 27 (SB 27) (Skinner, Chapter 237, Statutes of 2021) Carbon Sequestration: State Goals: Natural and Working Lands: Registry of Projects	SB 27 requires CNRA, in coordination with other state agencies, to establish the Natural and Working Lands Climate Smart Strategy by July 1, 2023. This bill also requires CARB to establish specified CO_2 removal targets for 2030 and beyond as part of its Scoping Plan. Under SB 27, CNRA is to establish and maintain a registry to identify projects in the state that drive climate action on natural and working lands and are seeking funding. CNRA also must track carbon removal and GHG emission reduction benefits derived from projects funded through the registry. This bill is reflected directly in the 2022 Scoping Plan as CO2 removal targets for 2030 and 2045 in support of carbon neutrality.	No, the Project does not affect the ability of the CNRA or other state agencies to establish GHG strategies or CO_2 removal targets.
Senate Bill 596 (SB 596) (Becker, Chapter 246, Statutes of 2021) Greenhouse Gases: Cement Sector: Netzero Emissions Strategy	SB 596 requires CARB, by July 1, 2023, to develop a comprehensive strategy for the state's cement sector to achieve net-zero-emissions of GHGs associated with cement used within the state as soon as possible, but no later than December 31, 2045. The bill establishes an interim target of 40 percent below the 2019 average GHG intensity of cement by December 31, 2035. Under SB 596, CARB must: • Define a metric for GHG intensity and establish a baseline from which to measure GHG intensity reductions. • Evaluate the feasibility of the 2035 interim target (40 percent reduction in GHG intensity) by July 1, 2028. • Coordinate and consult with other state agencies. • Prioritize actions that leverage state and federal incentives. • Evaluate measures to support market demand and	No, the Project does not affect CARB's ability to develop a GHG emissions strategy.

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	financial incentives to encourage the production and use of cement with low GHG intensity. The 2022 Scoping Plan modeling is designed to achieve these outcomes.	
Executive Order N-82-20	Governor Newsom signed Executive Order N-82-20 in October 2020 to combat the climate and biodiversity crises by setting a statewide goal to conserve at least 30 percent of California's land and coastal waters by 2030. The Executive Order also instructed the CNRA, in consultation with other state agencies, to develop a Natural and Working Lands Climate Smart Strategy that serves as a framework to advance the state's carbon neutrality goal and build climate resilience. In addition to setting a statewide conservation goal, the Executive Order directed CARB to update the target for natural and working lands in support of carbon neutrality as part of this Scoping Plan, and to take into consideration the NWL Climate Smart Strategy. Executive Order N-82-20 also calls on the CNRA, in consultation with other state agencies, to establish the California Biodiversity Collaborative (Collaborative). The Collaborative shall be made up of governmental partners, California Native American tribes, experts, business and community leaders, and other stakeholders from across the state. State agencies will consult the Collaborative on efforts to: • Establish a baseline assessment of California's biodiversity that builds upon existing data and can be updated over time. • Analyze and project the impact of climate change and other stressors in California's biodiversity. • Inventory current biodiversity efforts across all sectors and highlight opportunities for additional action to preserve and enhance biodiversity. The Natural and Working Lands Climate Smart Strategy informs the 2022 Scoping Plan.	No, the Project does not impact the State's ability to set conservation goals or manage biodiversity.
Executive Order N-79-20	Governor Newsom signed Executive Order N-79-20 in September 2020 to establish targets for the transportation sector to support the state in its goal to achieve carbon neutrality by 2045. The targets established in this Executive Order are: • 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035. • 100 percent of medium- and heavy-duty vehicles will be zero-emission by 2045 for all operations where feasible, and by	No, the Project does not impact the ability of the State to establish targets for electric vehicle sales. The Project will comply with requirements established by the state

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	2035 for drayage trucks. • 100 percent of off-road vehicles and equipment will be zero-emission by 2035 where feasible. The Executive Order also tasked CARB to develop and propose regulations that require increasing volumes of zeroelectric passenger vehicles, medium- and heavy-duty vehicles, drayage trucks, and off-road vehicles toward their corresponding targets of 100 percent zero-emission by 2035 or 2045, as listed above. The 2022 Scoping Plan modeling reflects achieving these targets.	if purchasing on or off-road vehicles.
Executive Order N-19-19	Governor Newsom signed Executive Order N-19-19 in September 2019 to direct state government to redouble its efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy. This Executive Order instructs the Department of Finance to create a Climate Investment Framework that: • Includes a proactive strategy for the state's pension funds that reflects the increased risks to the economy and physical environment due to climate change. • Provides a timeline and criteria to shift investments to companies and industry sectors with greater growth potential based on their focus of reducing carbon emissions and adapting to the impacts of climate change. • Aligns with the fiduciary responsibilities of the California Public Employees' Retirement System, California State Teachers' Retirement System, and the University of California Retirement Program. The 2022 Scoping Plan modeling reflects efforts to accelerate ZEV deployment.	No, the Project does not impact the ability of the Department of Finance to create a Climate Investment Framework.
Senate Bill 576 (SB 576) (Umberg, Chapter 374, Statutes of 2019) Coastal Resources: Climate Ready Program and Coastal Climate Change Adaptation, Infrastructure and Readiness Program	Sea level rise, combined with storm-driven waves, poses a direct risk to the state's coastal resources, including public and private real property and infrastructure. Rising marine waters threaten sensitive coastal areas, habitats, the survival of threatened and endangered species, beaches, other recreation areas, and urban waterfronts. SB 576 mandates that the Ocean Protection Council develop and implement a coastal climate adaptation, infrastructure, and readiness program to improve the climate change resiliency of California's coastal communities, infrastructure, and habitat. This bill also instructs the State Coastal Conservancy to administer the Climate Ready Program, which addresses the impacts and potential	No, SB 576 is focused on costal climate adaptation, and the Project is not on the coast.

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	impacts of climate change on resources within the conservancy's jurisdiction.	
Assembly Bill 65 (AB 65) (PetrieNorris, Chapter 347, Statutes of 2019) Coastal Protection: Climate Adaption: Project Prioritization: Natural Infrastructure: Local General Plans	This bill requires the State Coastal Conservancy, when it allocates any funding appropriated pursuant to the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018, to prioritize projects that use natural infrastructure in coastal communities to help adapt to climate change. The bill requires the conservancy to provide information to the Office of Planning and Research on any projects funded pursuant to the above provision to be considered for inclusion into the clearinghouse for climate adaption information. The bill authorizes the conservancy to provide technical assistance to coastal communities to better assist them with their projects that use natural infrastructure.	No, the Project is not located on the coast or in a costal community.
Executive Order B-55-18	Governor Brown signed Executive Order B-55-18 in September 2018 to establish a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Policies and programs undertaken to achieve this goal shall: • Seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities. • Be implemented in a manner that supports climate adaptation and biodiversity, including protection of the state's water supply, water quality, and native plants and animals. This Executive Order also calls for CARB to: • Develop a framework for implementation and accounting that tracks progress toward this goal. • Ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The 2022 Scoping Plan is designed to achieve carbon neutrality no later than 2045 and the modeling includes technology and fuel transitions to achieve that outcome.	Potentially, the Project will comply with rules, regulations, or laws promulgated under Executive Order B-55-18 if applicable.
Senate Bill 100 (SB 100) (De León, Chapter 312, Statutes of 2018) California Renewables Portfolio Standard	SB 100 mandates that the CPUC, CEC, and CARB plan for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zerocarbon resources by December 31, 2045. This bill also updates the state's Renewables Portfolio Standard (RPS) to include the following interim targets: • 44% of retail sales	The Project does not sell electricity. The Project will comply with rules, regulations, or laws promulgated under SB

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
Program: emissions of greenhouse gases	procured from eligible renewable sources by December 31, 2024. • 52% of retail sales procured from eligible renewable sources by December 31, 2027. • 60% of retail sales procured from eligible renewable sources by December 31, 2030. Under SB 100, the CPUC, CEC, and CARB shall use programs under existing laws to achieve 100 percent clean electricity. The statute requires these agencies to issue a joint policy report on SB 100 every four years. The first of these reports was issued in 2021. The 2022 Scoping Plan reflects the SB 100 Core Scenario resource mix with a few minor updates.	100 when purchasing electricity.
Assembly Bill 2127 (AB 2127) (Ting, Chapter 365, Statutes of 2018) Electric Vehicle Charging Infrastructure: Assessment	This bill requires the CEC, working with CARB and the CPUC, to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least 5 million zero-emission vehicles on California roads by 2030 and of reducing emissions of GHGs to 40% below 1990 levels by 2030. The bill requires the CEC to regularly seek data and input from stakeholders relating to electric vehicle charging infrastructure. This bill supports the deployment of ZEVs as modeled in the 2022 Scoping Plan.	No, the Project will not impact electrical charging infrastructure.
Senate Bill 30 (SB 30) (Lara, Chapter 614, Statutes of 2018) Insurance: Climate Change	This bill requires the Insurance Commissioner to convene a working group to identify, assess, and recommend risk transfer market mechanisms that, among other things, promote investment in natural infrastructure to reduce the risks of climate change related to catastrophic events, create incentives for investment in natural infrastructure to reduce risks to communities, and provide mitigation incentives for private investment in natural lands to lessen exposure and reduce climate risks to public safety, property, utilities, and infrastructure. The bill requires the policies recommended to address specified questions.	No, the Project will not impact the Insurance Commissioner's ability to convene a working group.
Assembly Bill 2061 (AB 2061) (Frazier, Chapter 580, Statutes of 2018) Near-zero-emission and Zero-emission Vehicles	Existing state and federal law sets specified limits on the total gross weight imposed on the highway by a vehicle with any group of two or more consecutive axles. Under existing federal law, the maximum gross vehicle weight of that vehicle may not exceed 82,000 pounds. AB 2061 authorizes a near-zeroemission vehicle or a zero-emission vehicle to exceed the weight limits on the power unit by up	No, the Project will not impact highway gross weight limits or the deployment of cleaner trucks. The Project will comply with requirements

Bill/Executive Order	Summary/How it applies to the 2022 Scoping Plan	Applies to Project?
	to 2,000 pounds. This bill supports the deployment of cleaner trucks as modeled in the 2022 Scoping Plan.	established under AB 20161.

(CARB, 2022)

1.1.3.4 The 2022 ARB Climate Change Scoping Plan

The 2022 Scoping plan outlines updates that build on the successes of the previous 2017 Scoping Plan. As the updated plan notes, "Meeting the AB 32 2020 GHG emissions reduction target several years earlier than mandated demonstrated that developing mitigation strategies through a public process, where all stakeholders have a voice, leads to effective actions that address climate change and yields a series of additional economic and environmental co-benefits to the state."

The relationship between Statewide and local action is a major topic of the 2022 Scoping Plan. "When a local CAP complies with CEQA requirements, individual projects that comply with the CAP are allowed to streamline the project-specific GHG analysis… Jurisdictions without formal CAPs also have important opportunities within this context. These jurisdictions can still take actions that effectively translate key state plans, goals, and targets, including those articulated in this Scoping Plan for local action."

The proposed plan emphasizes that lead agencies are tasked with a large part of the CEQA process when it comes to GHG emissions, but are able to use state priorities as a guide. "One challenge local jurisdictions have faced is how to evaluate and adopt quantitative, locally appropriate goals that align with statewide goals. An effective response to this challenge is to focus on goals that can help implement overall state priorities—enabling the key transformations California needs."

It is also clear that the scoping plan places authority with the lead agency with regards to GHG emissions and mitigation, stating, "When a lead agency determines that a proposed project would result in potentially significant GHG impacts due to its GHG emissions or a conflict with state climate goals, the lead agency must impose feasible mitigation measures to minimize the impact. "The 2022 Scoping Plan Update assess progress towards achieving the SB 32 2030 target of a 40% GHG reduction and lay out a path to achieve carbon neutrality by 2045.

The 2022 Scoping Plan integrates ongoing efforts to transition away from fossil fuels by identifying and planning for the phase in of clean technologies and sustainable fuels. This comprehensive plan outlines a technologically feasible and cost-effective path to achieve carbon neutrality by 2045, aligning with California's goal to reduce GHG emissions by at least 40 percent below 1990 levels by 2030. The plan emphasizes the critical importance of the coming decade for transformative action and introduces new strategies, including the consideration of Natural and Working Lands as both emission sources and carbon sinks. It outlines specific actions, evaluates their impact on air quality and the economy, and emphasizes the importance of partnerships to drive investment in a low-carbon economy.

The 2022 Scoping Plan involves the following principles which inform the approach to addressing the climate challenge (CARB, 2022):

1. *Unprecedented Investments in a Sustainable Future*

   The California Climate Commitment is an initiative aimed at using investment as a tool to achieve 2030 and carbon neutrality goals. It allocates $10 billion for zero-emission vehicles, focusing on electric school buses and an accessible charging network, emphasizing heavy-duty vehicles and port electrification to reduce emissions in low-income communities. Additionally, it earmarks $2.1 billion for clean energy, $13.8 billion for transportation sector emissions reduction, over $720 million for climate innovation in higher education, nearly $1 billion for sustainable housing, and $9 billion for wildfire risk reduction and resilience. These investments incentivize emission reduction strategies and align with federal and state programs while ensuring market stability for automakers transitioning to zero-emission vehicles.

2. *Centering Equity*

   The plan aligns with the governor's Executive Order to embed equity considerations, focusing on historically underserved and marginalized communities. The plan emphasizes climate and air initiatives with the focus of prioritizing equity by reducing air pollution disparities, reducing costs for low-income residents, and fostering high-quality jobs. Per AB32, the development of the Scoping plan involves the convening of an Environmental Justice Advisory Committee comprised of representatives from communities with the most significant exposure to air pollution, including communities with minority populations and/or low-income populations. Moreover, the Plan reaffirms a commitment to partnering with the 109 federally recognized tribes and over 60 non-federally recognized tribes in California. Laws like Senate Bill 535 and AB 1550 guide investments to assist vulnerable communities, further reinforcing the state's commitment to a resilient, just, and equitable future while addressing the climate crisis.

3. *Maximizing Air Quality and Health Benefits*

   The Scoping Plan outlines actions that offer both immediate air quality improvements for communities with the highest exposure to pollution and long-term greenhouse gas (GHG) benefits. Many of these actions align with the 2022 State Strategy for the State Implementation Plan, which focuses on meeting federal air quality standards and reducing harmful air pollution.

4. *Economic Resilience*

   The state is investing in workforce training and supporting workers transitioning from fossil fuel industries. A $1 billion investment aims to create new jobs and assist communities during this transition. The Community Economic Resilience Fund Program focuses on sustainable job creation. To ensure a smooth shift, ongoing dialogue with workers and affected communities is a priority. Additionally, California is updating funding guidelines to reinforce job creation and workforce development within clean energy through Assembly Bill 680.

5. *Partnering Across Government*

   The federal government's Inflation Reduction Act of 2022 allocates $369 billion to bolster domestic energy production and manufacturing, with an expected 40 percent reduction in U.S. greenhouse gas emissions by 2030. This legislation includes incentives for clean vehicles, ENERGY STAR appliances, and enhancements in transportation and clean energy accessibility for underserved communities. State agencies are encouraged to use the Scoping Plan to assess and update their own programs and policies to align with the identified actions.

6. *Partnering with the Private Sector*

   The plan emphasizes that Public funds and clear policies should drive private-sector efforts in emissions reduction and community resilience. Governor Newsom aims to collaborate with businesses, including small ones, to leverage their innovation and resources in tackling climate challenges. The plan describes public private partnerships such as the Catalyst Fund, which has areas of investment including forest biomass management and utilization, climate-smart agriculture, and clean energy transmission.

7. *Supporting Innovation*

   The plan outlines the need for innovation in non-combustion technologies, clean energy, CO2 removal options, and alternatives to short lived climate pollutants. The plan emphasizes the impact of AB32 policies and programs which support both the supply and demand side to build new markets in California, especially in the fields of zero emissions vehicles, low carbon fuels, and small scale energy storage.

8. *Engagement with Partners to Develop, Coordinate, and Export Policies*

   The plan outlines cases in which California has collaborated with other states, tribal governments, the federal government, and international jurisdictions to develop effective strategies for reducing greenhouse gases (GHGs) and to manage GHG control programs. The goal is to create integrated and cost-effective GHG reduction initiatives at regional, national, and international levels.

9. *Working Toward Carbon Neutrality*

   The 2022 scoping plan has been expanded to include new sources and sinks within the context of achieving carbon neutrality. While natural and working lands have a crucial role in sequestering carbon, modeling indicates that they alone cannot achieve carbon neutrality by 2045. Therefore, the plan also explores the role of carbon capture and sequestration, along with biological and mechanical carbon sequestration processes outlined in the IPCC Sixth Assessment Report.

10. *Supporting Healthy and Resilient Lands*

    The plan focuses on the impact of natural and working lands. Healthy lands, including forests, grasslands, soils, and wetlands, can store carbon dioxide and reduce emissions. The plan addresses the need for climate-smart land management, which promotes healthy ecosystems and supports carbon neutrality, emission reduction, and climate resilience.

11. *Maintaining the Focus on Methane and Short-Lived Climate Pollutants*

    The plan identifies efforts to reduce short-lived climate pollutants (SLCPs) as a crucial part of the plan. SLCPs, such as methane, black carbon, and fluorinated gases (including hydrofluorocarbons or HFCs), are highly detrimental to both human health and the global climate. They have a more potent and immediate impact on climate change than CO2, despite having a shorter atmospheric lifespan. This makes them significant contributors to near-term climate change and global warming.

Actions identified in the 2022 Scoping plan are outlined in below, and project applicability to each action is determined.

Table 7. Actions for the Scoping Plan Scenario: AB 32 GHG Inventory Sectors

Sector	**Action**	**Statues, Executive Orders, Other Direction, Outcome**	**Does the Project Conflict with this element of the Scoping plan?**
GHG Emissions Reductions Relative to the SB 32 Target[133]	40% below 1990 levels by 2030	SB 32: Reduce statewide GHG emissions. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the project will follow rules and regulations promulgated by SB 32 and AB 197 to reduce statewide GHG emissions.
Smart Growth / Vehicle Miles Traveled (VMT)	VMT per capita reduced 25% below 2019 levels by 2030, and 30% below 2019 levels by 2045	SB 375: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. In response to Board direction and EJ Advisory Committee recommendations	No, the Project will not impact CARB's ability to work with local officials and municipalities to implement GHG reductions as outlined in SB 375.
Light-duty Vehicle (LDV) Zero Emission Vehicles (ZEVs)	100% of LDV sales are ZEV by 2035	EO N-79-20: Reduce demand for fossil transportation fuels and GHGs, and improve air	No, the Project will not impact ZEV sales.

Sector	Action	Statues, Executive Orders, Other Direction, Outcome	Does the Project Conflict with this element of the Scoping plan?
		quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory 2035 target aligns with the EJ Advisory Committee recommendation.	
Truck ZEVs	100% of medium-duty (MDV)/HDV sales are ZEV by 2040 (AB 74 University of California Institute of Transportation Studies [ITS] report)	EO N-79-20: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will not impact Truck ZEV sales.
Aviation	20% of aviation fuel demand is met by electricity (batteries) or hydrogen (fuel cells) in 2045. Sustainable aviation fuel meets most or the rest of the aviation fuel demand that has not already transitioned to hydrogen or batteries.	Reduce demand for petroleum aviation fuel and reduce GHGs. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter to CARB Chair Liane Randolph	No, the Project will not affect aviation fuel use.
Ocean-going Vessels (OGV)	2020 OGV At-Berth regulation fully implemented, with most OGVs utilizing shore power by 2027. 25% of OGVs utilize hydrogen fuel cell electric technology by 2045.	Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will not affect ocean going vessels.
Port Operations	100% of cargo handling	Executive Order N-79-20:	No, the Project will not affect port cargo

Sector	Action	Statues, Executive Orders, Other Direction, Outcome	Does the Project Conflict with this element of the Scoping plan?
	equipment is zero-emission by 2037. 100% of drayage trucks are zero emission by 2035.	Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	handling GHG emissions.
Freight and Passenger Rail	100% of passenger and other locomotive sales are ZEV by 2030. 100% of line haul locomotive sales are ZEV by 2035. Line haul and passenger rail rely primarily on hydrogen fuel cell technology, and others primarily utilize electricity.	Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will not impact emissions reductions rules for locomotives.
Oil and Gas Extraction	Reduce oil and gas extraction operations in line with petroleum demand by 2045.	Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will not interfere with the State's ability to direct reduce oil and gas extraction via direct emissions reductions.
Petroleum Refining	CCS on majority of operations by 2030, beginning in 2028 Production reduced in line with petroleum demand.	Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will not interfere with the State's regulation of petroleum.
Electricity Generation	Sector GHG target of 38 million metric tons of carbon dioxide equivalent (MMTCO2e) in 2030 and 30 MMTCO2e in 2035	SB 350 and SB 100: Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources	No, the Project will not impact the State's implementation of GHG reductions through electricity

Sector	Action	Statues, Executive Orders, Other Direction, Outcome	Does the Project Conflict with this element of the Scoping plan?
	Retail sales load coverage[134] 20 gigawatts (GW) of offshore wind by 2045 Meet increased demand for electrification without new fossil gas-fired resources.	covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter, Board direction, and EJ Advisory Committee recommendation	generation policies.
New Residential and Commercial Buildings	All electric appliances beginning 2026 (residential) and 2029 (commercial), contributing to 6 million heat pumps installed statewide by 2030	Reduce demand for fossil gas and GHGs, and improve ambient and indoor air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter	No, the Project is not a new residential or commercial building.
Existing Residential Buildings	80% of appliance sales are electric by 2030 and 100% of appliance sales are electric by 2035. Appliances are replaced at end of life such that by 2030 there are 3 million all-electric and electric-ready homes—and by 2035, 7 million homes—as well as contributing to 6 million heat pumps installed statewide by 2030.	Reduce demand for fossil gas and GHGs, and improve ambient and indoor air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory. In response to Governor Newsom's July 2022 letter	No, the Project is not a Residential building.
Existing Commercial Buildings	80% of appliance sales are electric by 2030, and 100% of appliance sales are electric by 2045. Appliances are replaced at end of life, contributing to 6 million heat pumps installed statewide by 2030.	Reduce demand for fossil gas and GHGs, and improve ambient and indoor air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable, and will not conflict with the State's ability to enact

Sector	Action	Statues, Executive Orders, Other Direction, Outcome	Does the Project Conflict with this element of the Scoping plan?
		In response to Governor Newsom's July 2022 letter	appliance sales mandates.
Food Products	7.5% of energy demand electrified directly and/or indirectly by 2030; 75% by 2045	Reduce demand for fossil gas and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Construction Equipment	25% of energy demand electrified by 2030 and 75% electrified by 2045	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Chemicals and Allied Products; Pulp and Paper	Electrify 0% of boilers by 2030 and 100% of boilers by 2045. Hydrogen for 25% of process heat by 2035 and 100% by 2045. Electrify 100% of other energy demand by 2045.	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Stone, Clay, Glass, and Cement	CCS on 40% of operations by 2035 and on all facilities by 2045 Process emissions reduced through alternative materials and CCS	SB 596: Reduce demand for fossil energy, process emissions, and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Other Industrial Manufacturing	0% energy demand electrified by 2030 and 50% by 2045	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.

Appendix B
Greenhouse Gases – Characteristics of Climate Pollutants, Regulatory Setting, and Project Applicability

Sector	Action	Statues, Executive Orders, Other Direction, Outcome	Does the Project Conflict with this element of the Scoping plan?
Combined Heat and Power	Facilities retire by 2040.	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Agriculture Energy Use	25% energy demand electrified by 2030 and 75% by 2045	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Low Carbon Fuels for Transportation	Biomass supply is used to produce conventional and advanced biofuels, as well as hydrogen.	Reduce demand for petroleum fuel and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Low Carbon Fuels for Buildings and Industry	In 2030s biomethane[135] blended in pipeline Renewable hydrogen blended in fossil gas pipeline at 7% energy (~20% by volume), ramping up between 2030 and 2040. In 2030s, dedicated hydrogen pipelines constructed to serve certain industrial clusters	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	No, the Project will comply with rules, regulations, or laws promulgated under AB 197 if applicable.
Non-combustion Methane Emissions	Increase landfill and dairy digester methane capture. Some alternative manure management deployed for smaller dairies. Moderate adoption of enteric strategies	SB 1383: Reduce short-lived climate pollutants.	No, the Project does not emit non-combustion methane.

Appendix B
Greenhouse Gases – Characteristics of Climate Pollutants, Regulatory Setting, and Project Applicability

Sector	Action	Statues, Executive Orders, Other Direction, Outcome	Does the Project Conflict with this element of the Scoping plan?
	by 2030. Divert 75% of organic waste from landfills by 2025. Oil and gas fugitive methane emissions reduced 50% by 2030 and further reductions as infrastructure components retire in line with reduced fossil gas demand.		
High GWP Potential Emissions	Low GWP refrigerants introduced as building electrification increases, mitigating HFC emissions	SB 1383: Reduce short-lived climate pollutants.	No, the Project will comply with rules, regulations, or laws promulgated underSB1383 if applicable

San Joaquin Valley
Air Pollution Control District

Zero Equivalency Policy
for
Greenhouse Gases

Approved By:	Signed David Warner Director of Permit Services	Date:	**March 24, 2010** **Revised January 24, 2012**

Purpose:

The purpose of this policy is to detail how small increases in greenhouse gas (GHG) emissions for permitted sources are handled during the application review process. This policy establishes a level below which project specific increases in greenhouse gas emissions are considered equivalent to zero for District permitting purposes. Establishment of this policy maximizes reductions in GHG emissions and improves efficiencies in the permitting process by identifying projects which have no potential to achieve substantial GHG emission reductions.

I. Applicability

This guidance is to be followed when processing Authority to Construct (ATC) applications for projects with potential increases in greenhouse gas emission and the District serves as Lead Agency for CEQA purposes.

II. Background

The California Environmental Quality Act (CEQA) and CEQA Guidelines require agencies to adopt procedures and guidelines for implementing CEQA. Consistent with those requirements, the District adopted its *Environmental Review Guidelines* (ERG), which provides District staff with guidance for streamlining the District's permitting process while assuring that environmental impacts related to District actions are thoroughly and consistently addressed. The ERG establishes specific District permitting actions which are ministerial approvals and not subject to CEQA; identifies specific permitting actions that have been determined to qualify for exemption under the "General Rule" that CEQA does not apply where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment; and identifies certain classes of projects that are most frequently categorically exempt from the provisions of CEQA.

On December 17.2009, the Valley Air District's Governing Board adopted the adopted the *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. The policy adopted December 17, 2009, applies to all District permitting projects that have an increase in GHG emissions, regardless of the magnitude of the increase. The adopted policy establishes the use of performance based standards (Best Performance Standards) as a means of determining the cumulative significance of project specific greenhouse gas emissions on global climate change. The policy requires District staff to establish Best Performance Standards (BPS) for each class and category of stationary source emissions and to evaluate the cumulative significance of project specific greenhouse gas emissions on global climate change. However, the policy also establishes that projects exempt from CEQA are not subject to further environmental review for greenhouse gas impacts.

It is conceivable that at least some projects which qualify for exemption per the District's adopted Environmental Review Guidelines will have some increase in greenhouse gas emissions. To ensure that these projects receive further environmental consideration and to ensure consistency in processing such ATC applications, this policy establishes a level of greenhouse emissions below which project specific increases in greenhouse gas emissions would be considered equivalent to zero for CEQA purposes. Projects with increases in greenhouse emissions that are non-zero would require further environmental review for greenhouse gas impacts.

To establish a zero equivalency level, the District considered greenhouse gas emissions associated with stationary sources that are so small that they are not subject to District prohibitory rules or District permit requirements. As indicated in the attached analysis, District staff evaluated greenhouse emissions from two permit-exempt emission sources; 5-mmbtu/hr gas-fired boilers and 50-horsepower diesel engines. The permit-exempt boiler has the potential to emit of more than 2,300 metric tons-CO_2e/year, while the permit-exempt internal combustion engine emitted slightly more than 230 metric tons-CO_2e/year

Therefore, choosing the more conservatively low of the two sources, the zero equivalency level is established at 230 metric tons-CO_2e/year.

III. Air District CEQA Implementation:

Greenhouse gas emissions of 230 metric tons-CO_2e/year or less are considered to be zero for District permitting purposes. When an Authority to Construct (ATC) application is received, and the District is the Lead Agency, District staff will follow established District policy and Environmental Review Guidelines to determine if the project is exempt from further environmental analysis. If the project would be exempt from further environmental review and if potential increases in stationary source greenhouse gas emissions are zero, the project will be determined to be exempt from further environmental review and the ATC will be processed consistent with existing District policies and procedures. Projects not meeting the above conditions will receive further environmental review, consistent with established District CEQA guidance.

Attachment A – GHG Emission Rate Evaluation for Two Permit-Exempt Equipment Categories

The District has evaluated potential greenhouse gas emissions from 1) internal combustion engines rated at 50 brake horsepower and 2) natural gas-fired boilers with a rated firing capacity of 5 MMBtu/hour.

50 bhp Internal Combustion Engine

Basis and Assumptions

- The engine is a compression-ignited unit fueled with diesel in agricultural equipment service.
- The engine operates at full rated power.
- Specific fuel consumption is 220 g/kWh (typical for engine type).
- Density of diesel fuel is 7.0 lb/gallon.
- Higher Heating Value (HHV) of diesel is 138,700 Btu/gallon.
- Engine operates 8,760 hours per year.
- Emission factors and global warming potentials (GWP) for diesel fuel are taken from the California Climate Change Action Registry (CCAR), Version 3.1, January, 2009 (Appendix C, Tables C.1, C.3 and C.6) :

CO2 10.15 kg/gallon (22.3 lb/gallon)
CH4 1.44 g/gallon (0.006 lb/gal)
N2O 0.26 g/gallon (0.001 lb/gal)

GWP for CH4 = 21 lb-CO_2e per lb-CH4
GWP for N2O = 310 lb-CO_2e per lb-N2O

Calculations

Diesel fuel consumption rate at full rated horsepower:

$$\frac{50}{\text{bhp}} \times \frac{0.7456\ \text{kW}}{\text{hp}} \times \frac{220\ \text{g}}{\text{kWh}} \times \frac{1\ \text{lb}}{453.6\ \text{g}} \times \frac{\text{gal}}{7\ \text{lb}} = 2.58\ \text{gal/hour}$$

Hourly Emissions

CO2 Emissions = 2.58 gal/hr x 22.3 lb/gal = 57.5 lb-CO_2e/hour
CH4 Emissions = 2.58 gal/hr x 0.006 lb/gal x 21 lb-CO_2e per lb-CH4 = 0.3 lb-CO_2e/hour
N2O Emissions = 2.58 gal/hr x 0.001 lb/gal x 310 lb-CO_2e per lb-N2O = 0.8 lb-CO_2e/hour

Total = 57.5 + 0.3 + 0.8 = 58.6 lb-CO_2e/hour

Annual Emissions

58.6 lb-CO_2e/hour x 8,760 hr/year ÷ 2,000 lb/ton = 257 short tons-CO_2e/year

Metric Conversion

257 short tons-CO_2e/year x 0.9072 metric tons/short ton = **233 metric tons**

5 MMBtu/hour Boiler

Basis and Assumptions

- The boiler is fired with natural gas at a rate of 5 MMBtu/hour (HHV)
- The boiler operates 8,760 hours per year and is in commercial/institutional service
- Emission factors and global warming potentials (GWP) are taken from the California Climate Change Action Registry (CCAR), Version 3.1, January, 2009 (Appendix C, Tables C.7 and C.8):

CO2 53.06 kg/MMBtu (HHV) natural gas (116.7 lb/MMBtu)
CH4 0.005 kg/MMBtu (HHV) natural gas (0.011 lb/MMBtu)
N2O 0.0001 kg/MMBtu (HHV) natural gas (0.00022 lb/MMBtu)

GWP for CH4 = 21 lb-CO_2e per lb-CH4
GWP for N2O = 310 lb-CO_2e per lb-N2O

Calculations

Hourly Emissions

CO2 Emissions = 5.0 MMBtu/hr x 116.7 lb/MMBtu = 583.5 lb-CO_2e/hour
CH4 Emissions = 5.0 MMBtu/hr x 0.011 lb/MMBtu x 21 lb-CO_2e per lb-CH4 = 1.2 lb-CO_2e/hour
N2O Emissions = 5.0 MMBtu/hr x 0.00022 lb/MMBtu x 310 lb-CO_2e per lb-N2O = 0.3 lb-CO_2e/hour

Total = 583.5 + 1.2 + 0.3 = 585.0 lb-CO_2e/hour

Annual Emissions

585.0 lb-CO_2e/hour x 8,760 hr/year ÷ 2,000 lb/ton = 2,562 tons-CO_2e/year

Metric Conversion

2,562 short tons-CO_2e/year x 0.9072 metric tons/short ton = **2,324 metric tons**

San Joaquin Valley
Air Pollution Control District

APR - 2025

CEQA Determinations of Significance for Projects Subject to ARB's GHG Cap-and-Trade Regulation

Approved By: Arnaud Marjollet
Arnaud Marjollet,
Director of Permit Services

Date: June 25, 2014

I. Purpose:

The District has a statutory obligation to fully comply with the provisions of CEQA before issuing an Authority to Construct (ATC). The purpose of this policy is to provide guidance to District staff on how to determine significance of greenhouse gas (GHG) emissions from projects subject to the California Air Resources Board Cap-and-Trade regulation or occurring at entities subject to the California Air Resources Board Cap-and-Trade regulation.

II. Applicability:

This policy is to be followed when processing ATC applications and when providing technical guidance to lead agencies and the public regarding significance of project specific GHG emissions.

III. Background:

Assembly Bill 32 (AB32)

Assembly Bill 32 (California Global Warming Solutions Act of 2006) is a key piece of California's effort to reduce its GHG emissions. AB32 requires the California Air Resources Board (ARB) to establish regulations designed to reduce California's GHG emissions to 1990 levels by 2020. On December 11, 2008, ARB adopted its AB32 Scoping Plan, setting forth a framework for future regulatory action on how California will achieve that goal through sector-by-sector regulation.

Cap-and-Trade

The AB 32 Scoping Plan identifies a Cap-and-Trade program as one of the strategies California will employ to reduce the greenhouse gas (GHG) emissions that cause climate change. The Cap-and-Trade program is implemented by the California Air Resources Board and caps GHG emissions from the industrial, utility, and transportation fuels sectors – which account for roughly 85% of the state's GHG emissions.

The program works by establishing a hard cap on about 85 percent of total statewide greenhouse gas emissions. The cap starts at expected business-as-usual emissions levels in 2012, and declines 2-3% per year through 2020. Fewer and fewer GHG emissions allowances are available each year, requiring covered sources to reduce their emissions or pay increasingly higher prices for those allowances. The cap level is set in 2020 to ensure California complies with AB 32's emission reduction target of returning to 1990 GHG emission levels.

The scope of GHG emission sources subject to Cap-and-Trade in the first compliance period (2013-2014), includes:

- All electricity generated and imported into California. The first deliverer of electricity into the state is the capped entity (the one that will have to purchase and surrender allowances).
- Large industrial facilities emitting more than 25,000 metric tons of GHG pollution/year. Examples include oil refineries and cement manufacturers.

The scope of GHG emission sources subject to Cap-and-Trade during the second compliance period (2015-2017), expands to include distributors of transportation fuels (including gasoline and diesel), natural gas, and other fuels. The regulated entity will be the fuel provider that distributes the fuel upstream (not the gas station). In total, the Cap-and-Trade program is expected to include roughly 350 large businesses, representing about 600 facilities. Individuals and small businesses will not be regulated.

Under the program, companies do not have individual or facility-specific reduction requirements. Rather, all companies covered by the regulation are required to turn in allowances in an amount equal to their total greenhouse gas emissions during each phase of the program. The program gives companies the flexibility to either trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more will have to turn in more allowances. Companies that can cut their emissions will have to turn in fewer allowances. Furthermore, as the cap declines, total GHG emissions are reduced.

On October 20, 2011, ARB's Board adopted the final Cap-and-Trade regulation and Resolution 11-32. As part of finalizing the regulation, the Board considered the related environmental analysis and, consistent with CEQA requirements, approved ARB's functionally equivalent document (FED).

CEQA Requirements

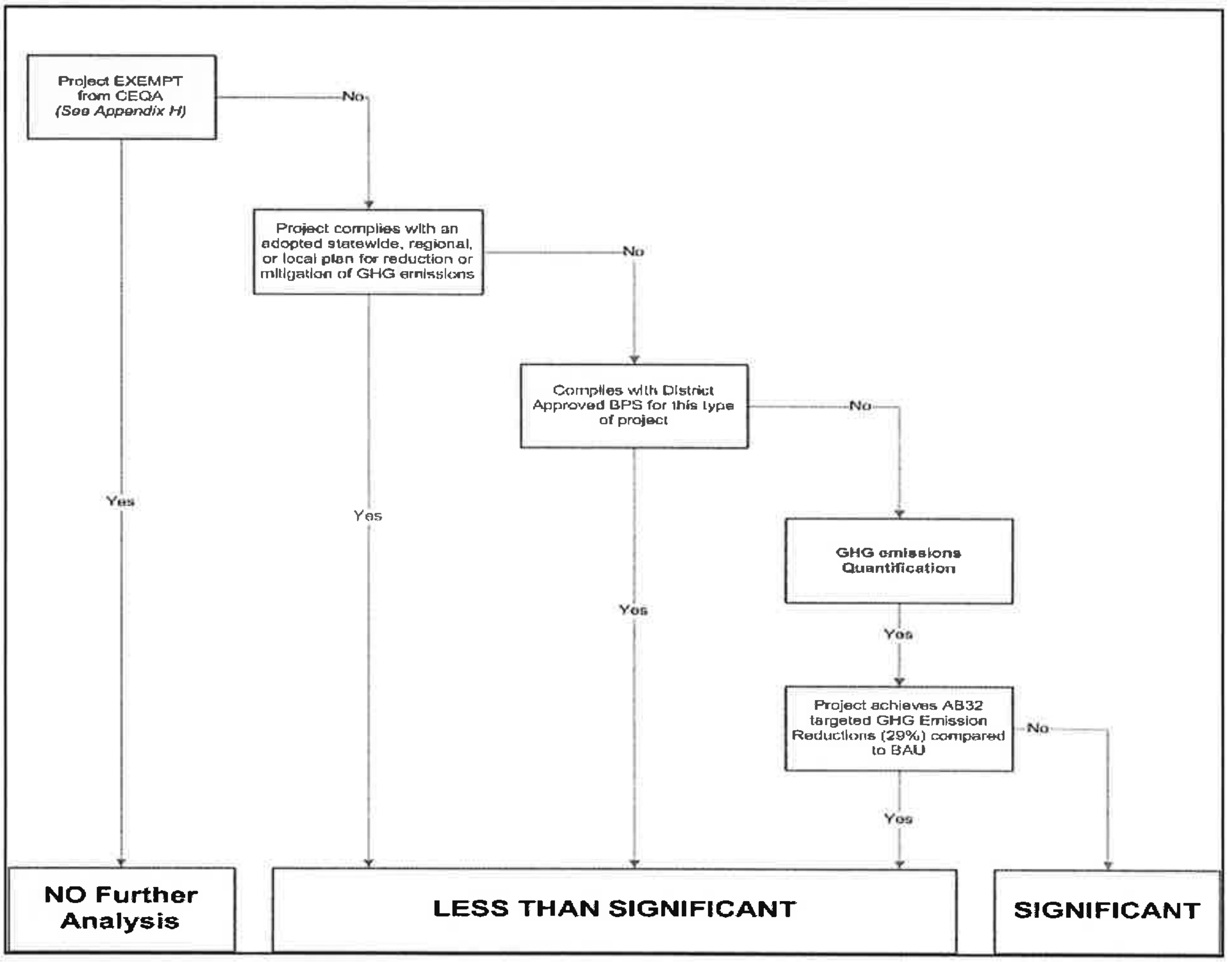
In December, 2009, the California Natural Resources Agency (NRA) amended the CEQA Guidelines to include Global Climate Change (GCC), which is now generally accepted by the scientific community to be occurring and caused by Greenhouse Gases (GHG). The amendments address analysis and mitigation of the potential effects of GHG emissions in CEQA documents. In their *Final Statement of Reasons for Regulatory Action,* NRA recognizes that the analysis of GHG emissions in a CEQA document presents unique challenges to lead agencies. NRA amended section 15064(h)(3) of the CEQA guidelines to add compliance with plans or regulations for the reduction of greenhouse gas emissions to the list of plans and programs that may be considered in a cumulative impacts analysis. In their *Final Statement of Reasons for Regulatory Action*, NRA discusses that AB32 requires ARB to adopt regulations that achieve the maximum technologically feasible and cost effective GHG reductions to reach the adopted state-wide emissions limit. NRA goes on to state that a lead agency may consider whether ARB's GHG reduction regulations satisfy the criteria in existing subdivision (h)(3).

District CEQA Policy

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. On December 17, 2009, the District's Governing Board adopted the District's policy, APR 2005, *Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency,* for addressing GHG emission impacts when the District is Lead Agency under CEQA and approved the District's guidance document for use by other agencies when addressing GHG impacts as lead agencies under CEQA. Under this policy, the District's determination of significance of project-specific GHG emissions is founded on the principal that projects with GHG emission reductions consistent with AB 32 emission reduction targets are considered to have a less than significant impact on global climate change.

As illustrated in Figure 1, the District's board-adopted policy for determining significance of project-specific GHG emissions employs a tiered approach. Of specific relevance to Cap-and-Trade is the provision that: "Projects complying with an approved GHG emission reduction plan or GHG mitigation program, which avoids or substantially reduces GHG emissions within the geographic area in which the project is located, would be determined to have a less than significant individual and cumulative impact for GHG emissions. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA compliant environmental review document adopted by the lead agency. Projects complying with an approved GHG emission reduction plan or GHG mitigation program would not be required to implement best performance standards (BPS)". Projects that do not comply with such a plan or program must implement best performance standards or undergo a project-specific analysis demonstrating that GHG emissions would be reduced by at least 29%, as compared to business-as-usual.

Figure 1: Determination of Significance for Stationary Source Projects



IV. Determination of Significance of GHG Emissions for Projects Subject to ARB's GHG Cap-and-Trade Regulation:

Significant GHG Emission increases under CEQA

The District has determined that GHG emissions increases that are covered under ARB's Cap-and-Trade regulation cannot constitute significant increases under CEQA, for two separate and distinct reasons:

1. *Cap-and-Trade Regulation is an Approved GHG Emissions Reduction Plan:*

   As discussed above, ARB's Cap-and-Trade regulation is an adopted statewide plan for reducing or mitigating GHG emissions from targeted industries and is supported by an environmental review process that has been successfully defended in court as equivalent to, and compliant with, CEQA requirements.

   Consistent with CCR §15064(h)(3), the District finds that compliance with ARB's Cap-and-Trade regulation would avoid or substantially lessen the impact of project-specific GHG emissions on global climate change. The District also finds that the ARB's Cap-and-Trade regulation was supported by an appropriate CEQA-equivalent analysis. The District therefore concludes that GHG emissions increases subject to ARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change., and

2. *Cap-and-Trade Regulation Requires Mitigation of GHG Increases:*

   GHG emissions addressed by the Cap-and-Trade regulation are subject to an industry-wide cap on overall GHG emissions. As such, any growth in emissions must be accounted for under that cap, such that a corresponding and equivalent reduction in emissions must occur to allow any increase. Further, the cap decreases over time, resulting in an overall decrease in GHG emissions. Therefore, it is reasonable to conclude that implementation of the Cap-and-Trade program will and must fully mitigate project-specific GHG emissions for emissions that are covered by the Cap-and-Trade regulation.

Regardless of and independent to the significance determination made above, the District finds that, through compliance with the Cap-and-Trade regulation, project-specific GHG emissions that are covered by the regulation will be fully mitigated. The District therefore concludes that GHG emissions increases subject to ARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change.

Entities Covered by this Policy

Industries covered by Cap-and-Trade are identified in the regulation under section 95811, *Covered Entities:*

1. *Group 1: Large industrial facilities*

   These types of facilities are subject to compliance obligations starting in 2013, and the specific companies covered are listed at http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm, Section 95811 (a), under the "Publically Available Market Information" section (list maintained by the California Air Resources Board,).

2. *Group 2: Electricity generation facilities located in California, or electricity importers*

   These types of facilities are subject to Cap and Trade (section 95811, b), with compliance obligations starting in 2013 (section 95851, a).

3. *Group 3: Suppliers of Natural Gas, Suppliers of Reformulated Gasoline Blendstock for Oxygenate Blending and Distillate Fuel Oil, Suppliers of Liquefied Petroleum Gas, and Suppliers of Blended Fuels*

   These entities are subject to compliance obligations starting in 2015, which obligations must cover all fuels (except jet fuels) identified in section 95811 (c) through (f) of the Cap-and-Trade regulation delivered to end users in California, less the fuel delivered to covered entities (group 1 above).

Under Cap-and-Trade regulation, the program expands to also include fuel distributors. As a result, combustion of fossil fuels including transportation fuels used in California (on and off road including locomotives), not directly covered at large sources, are subject to Cap-and-Trade requirements, with compliance obligations starting in 2015.

Fuel Supplier/Distributor Applicability Threshold

The threshold for a fuel supplier/distributor (Group 3) to be subject to the Cap-and-Trade regulation is 25,000 MT CO2e per year from the emissions of GHG that would result from the combustion or oxidation of the quantities of the specific fuels imported and/or delivered to California by the individual fuel supplier. Consequently, entities supplying fuels that would result in less than 25,000 MT CO2 annual GHG emissions are not subject to the Cap-and-Trade regulation.

Based on ARB's Reporting and Verification Summary, in the year 2012, there were 219 fuel suppliers in California not subject to the Cap-and-Trade regulation. Based on this data, and using the applicability threshold, the District has conservatively estimated that the GHG emissions resulting from the combustion of all fuels supplied by those fuel suppliers not subject to the Cap-and-Trade regulation would represent less than 1.0 % of the State's total Annual GHG emissions. As did the ARB when excluding such sources from the Cap-and-Trade regulation, the District considers GHG emissions resulting from the combustion of all fuels supplied by those fuel suppliers not subject to the Cap-and-Trade regulation to be insignificant. Therefore, it is reasonable to apply this policy to GHG emissions resulting from the combustion of all fuels in the State of California.

GHG Baseline Emissions and GHG Emission Increases

The GHG baseline emission levels of covered entities identified in Cap-and-Trade were established with the original Cap-and-Trade regulation. In addition, under Cap-and-Trade requirements, in order to maintain their GHG emissions below the established cap, facilities identified under "covered entities" are subject to mitigation requirements. Therefore, for the intent of this policy, under Cap-and-Trade requirements, mitigation is required for all GHG emission increases from "covered facilities".

V. Conclusion:

In conclusion, all GHG emission increases resulting from the combustion of any fuel produced, imported and/or delivered in California are mitigated under Cap-and-Trade, either directly by facilities identified under groups 1 or 2 (*section 95811(a) and (b)*), or by fuel suppliers identified under the group 3 (*section 95811(c) through (f)*). Therefore, GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA.

American Thoracic Society

What Constitutes an Adverse Health Effect of Air Pollution?

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY WAS ADOPTED BY THE ATS BOARD OF DIRECTORS, JULY 1999

PURPOSE OF THE STATEMENT

As the twentieth century ends, the health effects of outdoor air pollution remain a public health concern in developing and developed countries alike. In the United States, the principal pollutants monitored for regulatory purposes (carbon monoxide, nitrogen dioxide, sulfur dioxide, particles, ozone, and lead; see Table 1) show general trends of declining concentrations, although ozone pollution now affects many regions of the country besides southern California (1). Yet, even at levels of air pollution now measured in many cities of the United States, associations between air pollution levels and health indicators are being demonstrated at concentrations around those set by standards of the U.S. Environmental Protection Agency (2, 3). In many countries of the developing world, concentrations of air pollutants are rising with industrialization and the increasing numbers of motor vehicles (4, 5). Extremely large and densely populated urban areas, often referred to as "megacities," have the potential to generate unprecedented air quality problems.

There are common principles to air quality management throughout the world. Public health protection unifies all approaches, whether based on voluntary guidelines, mandated standards for concentrations, or source control. The intent is to limit or to avoid any impact of air pollution on the public's health. Air quality management is thus based on a scientific foundation built from the epidemiologic, toxicologic, and clinical evidence on health effects of air pollution. In interpreting this evidence for public health protection, there is a need to identify those effects that are considered "adverse" and to separate them from those effects not considered adverse.

The American Thoracic Society has previously provided guidance on the distinction between adverse and nonadverse health effects of air pollution in its 1985 statement, "Guidelines as to What Constitutes an Adverse Respiratory Health Effect" (6). Definitions of adverse effects have also been offered by the World Health Organization (7–10), but the guidance of the American Thoracic Society has received particular emphasis in the United States. Preparation of the original statement was intended to coincide with consideration of the passage of an amended Clean Air Act and to provide a framework for interpreting scientific evidence relevant to the mandate of the act. In particular, the Clean Air Act requires that the Administrator of the Environmental Protection Agency promulgate, for certain pollutants, standards that will be sufficient to protect against adverse effects of the air pollutants on health. The act is silent on the definition of "adverse effect" and, at the time of the 1985 statement, there was considerable controversy around the interpretation of this language as revision of the act was being considered. Recognizing the need of policy makers for expert guidance, the American Thoracic Society released the 1985 statement, which to date constitutes the sole set of recommendations on this issue from an expert panel convened by a health organization.

The American Thoracic Society has revised the 1985 statement because new scientific findings, published since the original statement, have again raised questions as to the boundary between adverse and nonadverse in considering health effects of air pollution. These new findings reflect improved sensitivity of research approaches and the application of biomarkers that can detect even subtle perturbations of biologic systems by air pollutants. Epidemiologic research designs have been refined and large sample sizes and increasingly accurate methods for exposure assessment have increased the sensitivity of epidemiologic data for detecting evidence of effects. New statistical approaches and advances in software and hardware have facilitated analyses of large databases of mortality and morbidity information. The design of clinical studies-including controlled exposures of volunteers-has also advanced and biologic specimens may be obtained after exposure, for example, by fiberoptic bronchoscopy, to identify changes in levels of markers of injury. Toxicologic studies have also gained in sophistication through incorporation of more sensitive indicators of effect and the careful tracing of the relationship between exposure and biologically relevant doses to target sites, which may now be considered at a molecular level.

New dimensions have been added to the array of outcome measures. Medical outcomes research now recognizes that patient well-being should be broadly conceptualized and measured rigorously, in addition to considering the biological process of the disease itself. As a result, health-related quality of life, the perception of well-being, is now considered a necessary component of outcomes research. Validated instruments have been developed to assess the impact of health-related symptoms and impairment on functional status and quality of life (11-14). The formalization of the concept of environmental justice acknowledges that the effects of specific pollutants cannot be evaluated in isolation without giving consideration to the overlapping exposures of populations, often minority group members of low socioeconomic status, who live in neighborhoods that are heavily exposed to multiple environmental contaminants (15).

This new statement, like the 1985 statement, is intended to provide guidance to policy makers and others who interpret the scientific evidence on the health effects of air pollution for the purpose of risk management. The statement does not offer strict rules or numerical criteria, but rather proposes principles to be used in weighing the evidence and setting boundaries between adverse and nonadverse health effects. Even if the technical tools were available for scaling the consequences of air pollution on the multiple relevant axes, the placement of dividing lines should be a societal judgment and consequently

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TABLE 1

U.S. NATIONAL AMBIENT AIR QUALITY STANDARDS*

Pollutant	NAAQS Concentration (ppm)	($\mu g/m^3$)	Standard Type
Particulate matter ≥ 10 Pm (PM,,)			
24-h average		150	Primary and secondary
Annual arithmetic mean		50	Primary and secondary
Particulate matter ≥ 2.5 μm(PM$_{25}$)			
24-h average		65	Primary and secondary
Annual arithmetic mean		15	Primary and secondary
Ozone (0,)			
24-h average	0.12	235	Primary and secondary
Annual arithmetic mean	0.08	157	Primary and secondary
Sulfur dioxide (SO,)			
24-h average	0.14	365	Primary
Annual arithmetic mean	0.03	80	Primary
3-h average	0.50	1,300	Secondary
Nitrogen dioxide (NO,)			
Annual arithmetic mean	0.053	100	Primary and secondary
Carbon monoxide (CO)			
1-h average	35	40	Primary
8-h average	9	10	Primary
Lead (Pb)			
Quarterly average		1.5	Primary and secondary

* For detailed information on scientific bases and policy considerations underlying decisions establishing the NAAQS listed here, see the AQCDs, staff papers, and NAAQS Promulgation notices cited in text. Such information can also be obtained from several internet websites (e.g., http://www.epa.giv/airs/criteria.html; http://www.epa.gov/oar/oaqps/publicat.html; and http://www.epa.gov/ncea/biblio.htm).

TABLE 2

ADVERSE RESPIRATORY HEALTH EFFECTS

A. Increased mortality (*Increased* as used here and subsequently means significantly [p <0.05] increased above that recorded in some standard, comparable population. In selected situation, $p < 0.1$ may be appropriate)

B. Increased incidence of cancer

C. Increased frequency of symptomatic asthmatic attacks

D. Increased incidence of lower respiratory tract infections

E. Increased exacerbations of disease in persons with chronic cardiopulmonary or other disease that could be reflected in a variety of ways
  1. Less able to cope with daily activities (i.e., shortness of breath or increased anginal episodes)
  2. Increased hospitalization, both frequency and duration
  3. Increased emergency ward or physician visits
  4. Increased pulmonary medication
  5. Decreased pulmonary function

F. Reduction in FEV$_1$ or FVC associated with clinical symptoms
  1. Chronic reduction in FEV, or FVC associated with clinical symptoms
  2. A significant increase in number of persons with FEV$_1$ below normal limits: chronically reduced FEV, is a ‘predictor of increased risk of mortality. Transient or reversible reductions that are not associated with an asthmatic attack appear to be less important. It should be emphasized that a small but significant reduction in a population mean FEV, or FEV, $_{75}$ is probably medically significant, as such a difference may indicate an increase in the number of persons with respiratory impairment in the population. In other words, a small part of the population may manifest a marked change that is medically significant to them, but when diluted with the rest of the population the change appears to be small
  3 An increased rate of decline in pulmonary function (FEV,) relative to the predicted value in adults with increasing age or failure of children to maintain their predicted FEV, growth curve. Such data must be standardized for sex, race, height, and other demographic and anthropometric factors

G. Increased prevalence of wheezing in the chest apart from colds, or of wheezing most days or nights. (The significance of wheezing with colds needs more study and evaluation.)

H. Increased prevalence or incidence of chest tightness

I. Increased prevalence or incidence of cough/phlegm production requiring medical attention

I. Increased incidence of acute upper respiratory infections that interfere with normal activity

K. Acute upper respiratory tract infections that do not interfere with normal activity

L. Eye, nose, and throat irritation that may interfere with normal activity (i.e., driving a car) if severe

M. Odors

this committee does not propose specific boundaries for separating adverse from nonadverse effects.

OVERVIEW OF THE 1985 STATEMENT

The 1985 statement of the American Thoracic Society was directed at respiratory health effects of air pollution and emphasized the interpretation of the epidemiologic evidence. The statement recognized the spectrum of responses to air pollution, which begins with exposure and evidence of exposure and ends at death. This spectrum has been characterized as a pyramid, based in the most common consequence-exposure-and having mortality, the least common and most severe consequence, at its tip. The statement included a table that lists adverse respiratory health effects, seemingly in order of declining severity (Table 2). The 1985 statement hinged the distinction between adverse and nonadverse effects on medical considerations. The committee recognized that the boundary is further influenced by societal considerations: “Where one draws the line to categorize it as an adverse health effect or an action level between pathophysiologic or physiologic change is probably best left to the individual or the community.”

The committee’s definition of adverse respiratory health effects was “. medically significant physiologic or pathologic changes generally evidenced by one or more of the following: (*1*) interference with the normal activity of the affected person or persons, (2) episodic respiratory illness, (3) incapacitating illness, (4) permanent respiratory injury, and/or (5) progressive respiratory dysfunction.” The committee noted that all changes are not adverse, citing the example of carboxyhemoglobin. The level of carboxyhemoglobin, beyond that from endogenous production, is indicative of exposure but it is not predictive of adverse effects until reaching threshold levels, depending on the effect and the susceptibility of the exposed person. The statement recognized that a distinction should be drawn between effects to individuals and effects to populations and that populations are heterogeneous in their susceptibility. The comment was offered that a change in a population could be “medically significant” for that group. The statement also provides guidance on interpretation of’reversible effects and on interpreting irreversible effects. In acknowledging that research would continue to address uncertainties, the committee recommended that the guidelines should be periodically reviewed and updated.

METHODOLOGY FOR DEVELOPING THIS STATEMENT

Following the recommendation of the committee that authored the 1985 statement, the Environmental and Occupational Health Assembly of the American Thoracic Society recognized a need to reconvene a group to review and revise the prior statement. The statement had been used for more than a decade and new investigative approaches were being used to identify effects of air pollution that were not considered by the first committee. In addition, societal perspectives had shifted since the early 1980s and a formal concern for the impact of air pollution on specific groups had been expressed through the environmental justice movement.

To revise the statement, a multidisciplinary committee was convened in 1997 that included expertise in pulmonary medicine, public health, epidemiology, both clinical and animal toxicology, biochemistry, and cellular and molecular biology. This committee conducted several planning meetings and consulted experts in environmental economics and in ethics. In addition, a multidisciplinary workshop was convened to gain input from the range of groups potentially interested in the statement and its application. The committee's approach was discussed at a symposium held at the 1999 Annual Meeting of the American Thoracic Society. After further revisions, the statement was reviewed and submitted to the Board of the American Thoracic Society.

BACKGROUND ON THE CLEAN AIR ACT

The preparation of the original statement was largely motivated by potential ambiguity in interpreting the language of the Clean Air Act, which addresses adverse effects of air pollution without providing clear guidance as to the distinction between adverse and nonadverse effects. In addition, questions regarding this distinction arise repeatedly in interpreting the findings of research studies, whether observational or experimental. Consequently, the 1985 statement has had broader application than just the interpretation of evidence on air pollution and health for the purpose of promulgating air quality regulations. Nonetheless, the committee found the legislative history of the Clean Air Act to be relevant to its charge.

The first national legislation on air pollution, the Air Pollution Control Act, was passed in the mid-1950s; the original Clean Air Act was passed in 1963 and last revised in 1990. The act is lengthy and complex in its provisions; most relevant to considerations in defining an adverse health effect are Sections 108 (Air Quality Criteria and Control Techniques), 109 (National Ambient Air Quality Standards), and 112 (Hazardous Air Pollutants). National Ambient Air Quality Standards (NAAQS) are set individually for six prevalent pollutants (Table 1), often referred to as "criteria pollutants." They are so designated because of the requirement for comprehensively reviewing relevant information in a criteria document. The primary NAAQS are to be set at a level that protects the public health with an adequate margin of safety, regardless of economic or technical feasibility of attainment. The secondary standards are concerned with welfare and environmental consequences.

The hazardous air pollutants, as defined in Section 112, are not covered under Sections 108 and 109 as criteria pollutants. In 1990, the Congress offered a list of 189 such pollutants and a process for listing and delisting substances. The 1990 Clean Air Act states: "The Administrator shall periodically review [and revise] the list [of 189 hazardous air pollutants] by. adding pollutants which present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic). ." Section 112(f)(2) further directs the Environmental Protection Agency to assess whether the emissions standards for the listed hazardous air pollutants required under other subsections "provide an ample margin of safety to protect public health" and if not, then the agency is to develop standards that will address the "remaining risk."

The historical record provides an indication of the intent of the Congress in framing the language of the Clean Air Act with regard to protection of the public's health. Research now shows that the most highly susceptible individuals may respond to common exposures that are often at or close to natural background pollutant levels.

With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment." The act further suggested that the adequacy of any standard could be tested in a statistically representative sample of sensitive individuals. The hearing record on the 1970 act is informative. Dr. Hon T. Middleton (Commissioner, National Air Pollution Control Administration, Department of Health, Education, and Welfare) addressed the Senate Subcommittee on Air and Water Pollution of the Committee on Public Works on May 27, 1970. He testified that the intent of any national air quality standard is to be "protective of health in all places" and set at a level below which effects have not been observed. Dr. Middleton recognized the difficulty of finding a demarcation point of exposure below which there is no effect and he noted that there may be subtle effects and evolving scientific understanding.

Further difficulties in the language of the Clean Air Act were later noted in ***A Legislative History of the Clean Air Act Amendments of 1977: A Continuation of the Clean Air Act Amendments of 1970.*** This document noted the difficulty of applying the margin of safety and the erosion of margins of safety by advancing scientific knowledge. The document also commented on the implicit assumption of a safe threshold in the language of the act and the implausibility of this assumption. The report questioned whether the NAAQS (I) protect against genetic mutations, birth defects, and cancer, (2) take sufficient account of the consequences of long-term low-level exposures or short-term peaks, and (3) sufficiently consider synergism among pollutants and the formation of secondary pollutants, e.g., sulfates, with their own toxicity. These considerations remain relevant more than 20 years later.

This selective review of the historical record indicates that Congress intended that the NAAQS would afford health protection not only to the general population but to subgroups with enhanced susceptibility to air pollution, including people with asthma and people with chronic obstructive lung disease. Nevertheless, it is also clear that some exquisitely susceptible individuals might remain outside the ambit of protection of the NAAQS. A margin of safety was to be provided but quantitative specification was not offered. The evolutionary nature of the supporting scientific evidence was repetitively acknowledged and the need to distinguish adverse from nonadverse effects was at least implicitly recognized. The current language of Section 112 explicitly acknowledges the possibility of shifting understanding of risks of specific hazardous air pollutants.

GENERAL CONSIDERATIONS

In preparing the statement, the committee identified several general considerations that are relevant to interpreting evidence on the health effects of air pollution. Each of these considerations and the committee's judgment as to their proper weighting are detailed below.

Population Health versus Individual Risk

The effects of air pollution can be viewed in the complementary contexts of the increment of an individual's risk for disease—the clinician's measure of impact-and of the additional risk incurred by a population, which is the public health perspective (16). Both perspectives are relevant to interpreting research findings on air pollution and to regulations that are protective of the public's health. Any risk incurred by an exposed individual beyond some boundary, determined by the individual or on a societal basis, could be deemed unacceptable. For example. prolonged exposure to a respiratory carcinogen could result in an individual-level incremental risk of exposure of 10^{-4}, more than two orders of magnitude lower than the baseline lifetime individual risk in the United States. Nevertheless, among an exposed population of IO', the estimated number of cancer cases that might result from such an exposure would number 10^3, illustrating that minute individual risks may be significant from the standpoint of population exposures.

Exposure could also enhance risk for a population to an unacceptable degree, perhaps without shifting the risks of any particular individuals to an unacceptable level. Figure 1 illustrates the distinction. In Figure 1 A, the population's distribution of exposure shifts toward a higher level and some members of the population cross the boundary to an unacceptable risk. In Figure 1B, the shift affects the position of the population distribution, but no individuals move to an unacceptable level of risk. Effects on persons with asthma are illustrative. A population of children with asthma could have a distribution of lung function such that no individual child has a level associated with significant impairment. Exposure to air pollution could shift the distribution toward lower levels without bringing any individual child to a level that is associated with clinically relevant consequences. Individuals within the population would, however, have diminished reserve function and are at potentially increased risk if affected by another agent, e.g., a viral infection. Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population. should be considered adverse, even in the absence of the immediate occurrence of frank illness.

Ethics and Equity

The past decade has brought increasing concern over the ethics of heterogeneous, inequitable distributions of environmental and occupational exposures (IS). Within the United States, some groups receive disproportionate exposures to environmental agents that are injurious to health; the environmental justice movement seeks to redress these inequities. The exposures of concern originate in breathing polluted outdoor air, living in substandard housing with indoor air pollution problems, including exposures to certain bioaerosols and combustion products, and working in jobs with occupational respiratory risks. Groups encompassed by this movement in the United States include various racial and ethnic minority populations. particularly those living within urban areas, and the socioeconomically disadvantaged. In the developing world, such exposures can occur at substantially higher levels and may, in some instances, extend to a majority of a given nation's population. Limited access to care and medications may enhance susceptibility to pollution.

The concept of environmental equity had not been formally voiced when the 1985 statement was written. The present committee viewed inequities of exposure as potentially representing a form of susceptibility to air pollution. In other words, individuals within the target groups may be at increased risk of experiencing adverse effects from a given level of ambient air pollution because their baseline risk level may have been raised by other exposures. Moreover, in some instances there may be genetic and nutritional factors enhancing susceptibility as well. It should be noted, however, that there are other exposure scenarios and other subpopulations with increased baseline risks that are not formally included within the environmental justice movement. The heterogeneity of populations needs full acknowledgment, whether it reflects disproportionate noxious exposures or other factors. Observing that there have been few investigations of the effects of other exposures, genetics, or nutrition on susceptibility to air pollution-related effects, either in the United States or internationally, the committee issued a call for additional research in these areas.

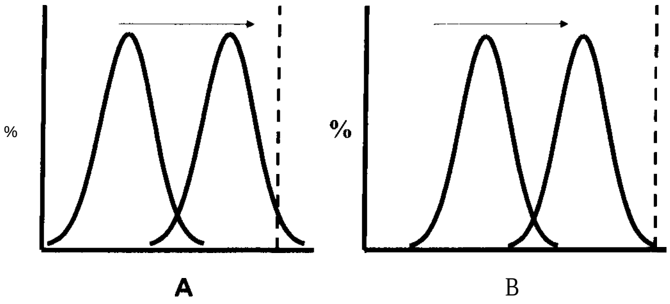

Figure 7. Hypothetical distributions **of exposure for two populations, *A* and *B*. (See text for explanation.)**

Economic Costs

Adverse health effects of air pollution incur costs, including direct costs of providing treatment for illness and indirect costs of lost work time and productivity. Cost-benefit analysis provides an estimate of the balancing of the costs of controls against the benefits; cost effectiveness analysis provides an indication of the level of control accomplished in relation to costs. Cost-benefit and cost-effectiveness analysis are assumption-laden tools now being used for policy-making purposes. Cost estimates depend on the valuation given to illness, lost work time and productivity, and even to lost life. It has been proposed that cost-benefit analysis may facilitate the process of deciding whether a given air pollution-related health impact should be considered adverse. The legislative history of the Clean Air Act explicitly excludes consideration of economic factors in setting ambient air quality standards or in developing emissions standards for hazardous air pollutants. In the context of air quality regulation, cost-benefit analysis is a multistep process involving the articulation of value judgments regarding potential costs (expenditures of public and private resources to reduce pollutant emissions and exposures) versus benefits (avoidance of specified adverse health impacts in a designated population). Benefits, in theory, should be quantified as the willingness of beneficiaries to pay to avoid the adverse impact. In practice, quantification of such health impacts from exposure to air pollution is often based on direct costs related to medical treatment and indirect costs such as school absenteeism, lost work time, decreased productivity, and, at the extreme, person-years of life lost. Valuations of a given effect may vary internationally, as differences in population age distributions, comorbidity, nutritional status, and other circumstances can affect this process. Ideally, cost–benefit analysis should make explicit the value judgments underlying these assessments, highlighting distinctions among alternative pollution control strategies to achieve specific air quality standards. Willingness of individuals to pay to avoid adverse health effects is also estimated from responses to contingent valuation surveys and from market data concerning choices about employment that carries health risks.

Nevertheless, the committee concurred that the specification of which health effects should be considered adverse must precede the application of cost-benefit analysis for evaluation of air pollution control strategies. That is, once a given outcome is designated as adverse, this information can be used as input to cost-benefit analysis. Estimates of costs associated with a given health outcome. while useful from a public policy perspective, cannot be translated into any clinical or biological framework to distinguish adverse from nonadverse effects. Therefore, the committee concluded that however valuable this economists' tool may be for regulatory decision-making, cost-benefit analysis lay outside the scope of this position paper and, indeed, the expertise of the American Thoracic Society.

Susceptibility

The issue of susceptibility has been recognized throughout the history of our initiatives to regulate outdoor air pollution. Susceptibility, broadly defined, may include extrinsic factors, including the profile of exposures to other pollutants, for example, in the workplace or at home, and intrinsic factors, for example, genotype. The size of the population of individuals susceptible to indoor air pollution is large, potentially including infants and the elderly, persons with chronic heart and lung diseases, and the immunocompromised. Persons with multiple deleterious exposures may also be considered as having heightened susceptibility, particularly if the combined effects of the agents are synergistic. Even with the populations considered as susceptible there is a distribution of the degree of susceptibility. For example, levels of nonspecific airway responsiveness in persons with asthma span several orders of magnitude.

The current explosive growth in knowledge of the genetic basis of lung disease, including responses to environmental agents, will provide increasing insights into the mechanistic basis of susceptibility and provide markers of risk status. We already have evidence of between-person variation in the pulmonary function response to ozone and interstrain variation in the pulmonary effects of environmental exposures, including criteria pollutants, in rodent species. As we develop the capacity to more precisely identify those at risk, we may find it increasingly challenging to assure protection for all individuals against adverse health effects.

The present committee agreed with the principle espoused in the Clean Air Act: that regulations should extend protection to include those with enhanced susceptibility to air pollution, recognizing that some highly susceptible individuals may still respond to low-level exposures. Research now shows that some highly susceptible individuals may respond to common exposures that are often unavoidable. Furthermore, by definition, susceptible individuals cannot have the same margin of safety as the nonsusceptible groups within the population.

Heterogeneity of Perspectives

In society there is an extraordinary range of views on environmental issues and tolerance of risk. Looking more globally to other developed countries and to the developing countries, the range of perspectives is even broader. The committee acknowledges that any defined boundaries for distinguishing adverse health effects may not be embraced by all groups. This heterogeneity and the possibility that some may reject the committee's proposal challenged the committee to recommend in principle that control measures should maximize public health benefits while assuring equity.

DIMENSIONS OF ADVERSE EFFECTS

Biomarkers

Biomarkers are indicators of exposure, effect, or susceptibility that are measured in biologic materials, such as blood or bronchoalveolar lavage fluid. The concept of biomarkers has been formalized since the 1985 statement (17) and since then. a continuously increasing number of candidate indicators of exposure, effect, and susceptibility have been developed and applied in laboratory studies of humans and animals and in both occupational and environmental population studies. The progressive refinement of techniques in the field of cellular and molecular biology, and the burgeoning understanding of the complex chemical intracellular and cell-to-cell signaling pathways collectively termed "cytokines" (18), have rapidly expanded the spectrum of candidate markers of effects. It is now possible to detect very early, or initiating phases of responses at the molecular level, such as the production of mRNA for cytokines. Similarly, the progressive development of genetic assays and understanding of the human genome have provided numerous candidate markers of both effects and susceptibility (19).

Biomarkers relevant to air pollution have been measured in blood, exhaled air, urine, sputum, and in bronchoalveolar lavage fluids and tissue specimens collected by bronchoscopy. Bronchoalveolar lavage fluids, for example, are now frequently analyzed for cell numbers and types, cytokines (e.g., several interleukins and tumor necrosis factor α), enzymes (e.g., lactate dehydrogenasc and β-glucoronidase), fibronectin, protein, arachidonic acid metabolites, and reactive oxygen species. Because many of the epithelial cell types of the nasopharyngeal region are similar to epithelia and responses in the trachea, bronchi, and bronchioles, responses of nasal cells have been examined as potential biomarkers for their ability to predict parallel responses in lung airways, which are more difficult to sample.

Biomarkers have been extensively applied in toxicologic studies of air pollution, both in animals and in clinical studies involving exposures of human volunteers. The biomarkers are examined for their ability to provide evidence of "biologically effective" doses, including the earliest phases of homeostatic responses, the occurrence of injury, outcomes that are intermediate between injury and disease, and the presence of established disease processes. Genetic markers of susceptibility have begun to be applied to the respiratory system, and this application will undoubtedly expand rapidly. A frequent goal of biomarker development is the ability to readily measure changes that precede and predict continued or progressive events leading to clinical effects and disease (Figure 2).

To date, although biomarkers have proved informative about homeostatic adjustments to exposure and the mechanisms of injury and disease, lack of validation against previously established measures of effect. such as clinical status or even physiologic impairment, remains an important weakness. We do not know if elevations of biomarkers during short-term experimental exposures signal risk for ongoing injury and clinical effects or simply indicate transient responses that can provide insights into mechanisms of injury. The utility of some older biomarkers is well established, such as the relationships among carboxyhemoglobin. exposure to carbon monoxide,

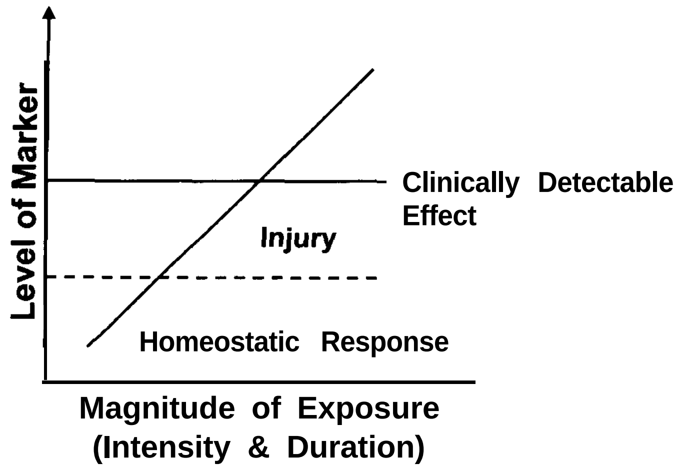

figure 2. Schema for considering biomarkers of response.

impairment of oxygen-carrying capacity, and the risk for angina in the presence of ischemic heart disease. However, the interpretative value for the majority of the many promising new cytokine and genetic biomarkers remains to be established. Not only is it difficult to assess the value of many biomarkers for distinguishing between physiological, homeostatic responses and injury, but it is also difficult to judge the value of changes during short-term exposures for predicting ongoing injury or risk for longer-term clinical effects.

The committee concluded that the continued development of biomarkers is an important need because of their considerable potential not only for detecting the adverse effects of air pollution exposure, but also for aiding the determination of the types and levels of response that should be considered adverse. We often do not know in a parallel, iterative manner, whether the exploration and validation of biomarkers will unquestionably advance our understanding of the mechanisms of homeostatic and injury responses. At this time, however, few of the rapidly growing list of candidate biomarkers have been validated to such an extent that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. Thus, we presently have only a very modest ability to translate evidence from biomarkers directly into a taxonomy of adverse health effects. Consequently, the committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.

Quality of Life

Health, in its broadest definition, includes not only the absence of disease but the attainment of well-being. Since the preparation of the 198.5 statement, the National Institutes of Health, the Centers of Disease Control, the Food and Drug Administration, and the World Health Organization have broadened their perspective of health to incorporate the concept of health-related quality of life as a valid and important health outcome. Health-related quality of life (HRQL) refers to the individual's perception of well-being, and includes such factors as self-care functioning, mental health, pain, and sense of overall well-being. Decreased health-related quality of life is widely accepted to be an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or the population in general, were consequently considered by this committee to be adverse health effects. Air pollution exposure can adversely affect several domains of quality of life including physical functioning (particularly for persons with respiratory or cardiovascular conditions) and general well-being. Stinging, watery eyes resulting from air pollution not only reflect a chronic physical symptom but may decrease overall quality of life. Outdoor air pollution and odors have been associated with psychiatric symptoms, including anxiety and depression. Increased levels of some air pollutants have been reported to be associated with an increase in psychiatric admissions. The potential effects of air pollution and respiratory symptoms on different domains of quality of life are illustrated in Figure 3.

Measurement of the impact of air pollution on health-related quality of life can be accomplished either by measuring specific domains that may be influenced by air quality (e.g., anxiety, functional status), or by using specific quality of life instruments designed to measure multiple health-related domains (e.g., MOS-SF-36, St. George's Respiratory Questionnaire). The cost-benefits of improved air quality on health-related quality of life could also be measured by the use of quality of life measures that employ utility rating scales. The effects of air pollution of a magnitude considered to be clinically significant with these instruments should be regarded as adverse in interpreting evidence on the health effects of air pollution, regardless of the affected dimension. Additional research is needed to develop an information base for interpreting data from new and more sensitive instruments directed specifically at air pollution.

Physiological impact

The 198.5 statement acknowledged a distinction between reversible and irreversible effects. Healthy persons may sustain transient reductions in pulmonary function associated with air pollution exposure, e.g., reduction of the forced vital capacity (FVC) with exercise at times of higher levels of ozone pollution. However, the committee recommends that a small, transient loss of lung function, by itself, should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered as adverse. This recommendation is consistent with the 1985 statement. The Environmental Protection Agency has also needed to address the interpretation of such data. The Envi-

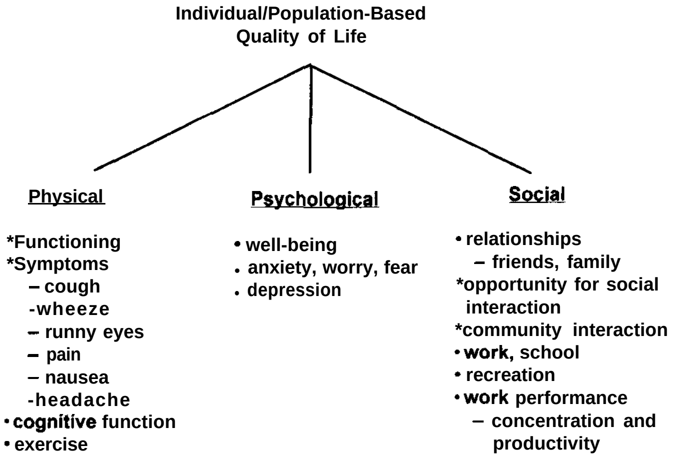

Figure 3. Quality of life domains vulnerable to the adverse health/respiratory effects of air pollution.

ronmental Protection Agency, in its 1989 review of ozone (20), offered a graded classification of lung function changes in persons with asthma. Reduction of the forced expiratory volume in 1 s (FEV_1) was graded as mild, moderate, or severe for reductions of less than 10%, 10–20%, and more than 20%, respectively. This classification has not been validated for acceptability or against other measures.

There is also epidemiologic evidence that air pollution may adversely affect lung growth or accelerate the age-related decline of lung function. Epidemiologic studies are limited in their power to detect such permanent effects and any evidence of association between air pollution exposure and permanent loss of function is indicative of an adverse effect at the population level. Some individuals may sustain clinically relevant, permanent losses of lung function. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered as adverse.

Symptoms

Air pollution exposure can evoke symptoms in persons without underlying chronic heart or lung conditions and also provoke or increase symptom rates in persons with asthma and chronic obstructive lung disease. The Environmental Protection Agency also offered a scale for cough and pain on taking a deep breath in its 1989 ozone review (20). “Infrequent cough” was classified as “None/Normal.”

Do all levels of increased symptom occurrence constitute an adverse health effect? The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered as adverse at the individual level. Characterizing the degree of symptomatology associated with diminished quality of life is an appropriate focus for research and a topic that could be investigated using new approaches for assessing quality of life. A change in clinical status can be appropriately set in a medical framework as one requiring medical care or a change in medication. At the population level, any detectable increment in symptom frequency should be considered as constituting an adverse health effect.

Clinical Outcomes

A wide range of clinical outcome measures has been considered in relation to air pollution, including population-level effects, such as increases in numbers of emergency room visits for asthma or hospitalizations for pneumonia, and individual-level effects, such as increased need for bronchodilator therapy. The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered adverse.

At the population level, the magnitude of the detectable air pollution effect will depend on the extent of the data available for evaluation and methodological aspects of the data, including the degree of error affecting exposure and outcome variables. With large databases, seemingly modest effects may be detectable. However, the committee recommends that no level of effect of air pollution on population-level clinical indicators can be considered acceptable.

Mortality

Following the development of new approaches for the analysis of time-series data, extensive analyses have now been reported on the relationship between daily mortality counts and levels of air pollution on the same or prior days. Several prospective cohort studies have also addressed the effect of longer-term indicators of air pollution exposure on mortality, controlling for relevant individual factors, including age, sex, cigarette smoking, and occupational exposures, among others. Cross-sectional studies-comparing mortality across locations having different levels of air pollution while controlling for a variety of potential confounding factors-have also been conducted. The air pollution-associated mortality findings figured prominently in the recent revision of the U.S. NAAQS for particulate matter.

Associations between air pollution levels and daily mortality counts have been interpreted by some as reflecting the impact of air pollution on a pool of frail individuals with severe underlying heart or lung disease. One explanation for the day-to-day associations attributes them to a brief advancement of the time of death for extremely frail individuals who would have been expected to die soon even in the absence of an air pollution-related insult (21). Work has shown, however, that while this phenomenon of advancement, referred to as mortality displacement, may occur, it cannot provide a full explanation of the associations repeatedly found between daily fluctuations of air pollution and mortality (22, J. Schwartz, “Harvesting and long term exposure effects in the relationship between air pollution and mortality” [1999, unpublished manuscript]). In addition, some mortality time-series studies have found effects across all age strata, not just among the elderly or the very young, suggesting potentially substantial effects on person-years of life lost. Finally, studies of long-term exposures have shown a gradient of mortality risk from cardiopulmonary disease as well as differences in life expectancy across cities with different long-term pollution levels. Thus, although we still have little insight into the extent to which mortality displacement occurs, the evidentiary ensemble from several types of study designs consistently shows that air pollution can shorten the life span to an unacceptable degree.

Risk Assessment

Since the publication of the 1985 statement, quantitative risk assessment has emerged as a key tool for summarizing information on risks to health from environmental agents. Quantitative risk assessment offers a framework for organizing information on risks within its four elements: hazard identification, exposure assessment, dose-response assessment, and risk characterization. The findings of a risk assessment, encompassed in the risk characterization component, may include an overall assessment of impact, a description of the distribution of risk in the population, and an evaluation of risk for susceptible persons within the population. Quantitative risk assessment has been a cornerstone in evaluating risks of environmental carcinogens and we anticipate increasing application to noncarcinogenic health effects of environmental agents, including air pollution.

In interpreting the findings of risk assessments, guidance can be found in precedents offered by key interpretations of regulatory requirements, including the Supreme Court’s decision on the benzene standard proposed by the Occupational Safety and Health Administration, and in pollutant-specific regulatory actions. Risks may be couched as the numbers of attributable events in the population and also as the level of risk incurred by individual members of the population.

The committee recognized the rising use and potential utility of quantitative risk assessment in characterizing the health effects of air pollution. However, the committee noted that the results of quantitative risk assessment can often be sensitive to assumptions regarding the distribution and magnitude of exposure, the choice of an appropriate dose-response relationship, and other input decisions. Judgments on acceptability of risk are societal and made through complex regulatory processes involving extensive public input. The committee did not consider that its mandate extended to offering specific guidance on acceptable risk levels for populations or individuals, nor is risk assessment an appropriate basis for determining what constitutes an adverse effect.

CONCLUSIONS

Since the preparation of the 1985 statement of the American Thoracic Society, there have been tremendous advances in the scientific methods used to investigate the health effects of air pollution. These advances range from the molecular to the behavioral levels of inquiry. As a result, this statement covers topics that are new since the 1985 statement. Yet, this committee, like the 1985 group, was confronted by a lack of formal research or investigation on the very topic of this statement: the boundary between adverse and nonadverse effects. Consequently, the committee needed to exercise its collective judgment on matters that should be based in some broader, societal decision-making process. Its recommendations are summarized below.

- ***Biomarkers.*** Few of the rapidly growing list of candidate biomarkers have been validated sufficiently that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. The committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.
- ***Quality of life.*** Decreased health-related quality of life is widely accepted as an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or for the population in general, were consequently considered to be adverse by this committee.
- ***Physiological impact.*** The committee recommends that a small, transient loss of lung function, by itself. should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered adverse. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered adverse.
- ***Symptoms.*** The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered adverse at the individual level.
- ***Clinical outcomes.*** The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered as adverse.
- ***Mortality.*** This committee agreed with the conclusion articulated by the 1985 group that any effect on mortality should be judged as adverse. In addition, we are now faced with the challenge of interpreting the findings of time-series studies of effects on short time frames. In interpreting this type of evidence, consideration needs to be given to the extent of life-shortening underlying the association.
- ***Population health versus individual risk.*** Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population, should be considered adverse, even in the absence of the immediate occurrence of frank illness.

This statement was prepared by an ad-hoc committee of the Assembly on Environmental and Occupational Health. Members of the committee are:

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APPENDIX C

BASELINE, FUTURE, and PROJECT EMISSIONS CALCULATIONS

Criteria Pollutants, Toxic Air Contaminants and Greenhouse Gasses

1. Emissions Calculations
2. Emissions Calculations (Mitigated)

	Baseline Tonnage Gross	**Project Tonnage Phase 1 (Sunset) 2023 - 2024** Gross	**Project Tonnage Phase 2 (Turner) 2025 - 2052** Gross
Max Annual	1,029,936	1,029,936	1,029,936
Max Daily	6,266	6,266	6,266
Max Hourly	783	783	783
Assumes Net Tonnage of :	80%		
Assumes Density (ton/yd^3)	*1.7*		

Equipment	Approximate HP	Baseline Opp-Hour/Ton	Phase 1 Opp-Hour/Ton	Phase 2 Opp-Hour/Ton	Load Factor
980 Loader	390	0.001501	0.001501	0.001501	0.36
390 Excavator	530	0.001277	0.001277	0.001277	0.38
Dozer	600	N/A*	N/A*	N/A*	0.38
Total Excavation Engines					
Water Truck	600	N/A*	N/A*	N/A*	0.38
Haul Truck	600	0.007999	0.005119	0.008815	0.38

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

For Project period of 2023 - 2024, CalEEMod Defualt equipment is conservatively estimated based on 2023 emission year (Appendix G-11)

For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Baseline Hp-Hr/Ton	Phase 1 Hp-Hr/Ton	Phase 2 Hp-Hr/Ton
980 Loader	390	0.21	0.21	0.21
390 Excavator	530	0.26	0.26	0.26
Dozer	600	N/A*	N/A*	N/A*
Total Excavation Engines				
Water Truck	600	N/A*	N/A*	N/A*
Haul Truck	600	1.82	1.17	2.01

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Baseline Excavation		
		Max Annual Hp-Hr	Max Daily Hp-Hr	Max Hour Hp-hr
980 Loader	390	217107	1320.79151	140.4
390 Excavator	530	264843	1611.2	201.4
Dozer	600	285326	1824	228
Total Excavation Engines				
Water Truck	600	228000	912	228
Haul Truck	600	1878348	11427.10985	228

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Future Phase 1 Excavation		
		Max Annual Hp-Hr	Max Daily Hp-Hr	Max Hour Hp - hr
980 Loader	390	217107	1320.79151	140.4
390 Excavator	530	264843	1611.2	201.4
Dozer	600	285326	1824	228
Total Excavation Engines				
Water Truck	600	228000	912	228
Haul Truck	600	1878348	7312.791223	228

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Future Phase 2 Excavation		
		Max Annual Hp-Hr	Max Daily Hp-Hr	Max Hour Hp-hr
980 Loader	390	217107	1320.79151	140.4
390 Excavator	530	264843	1611.2	201.4
Dozer	600	285326	1824	228
Total Excavation Engines				
Water Truck	600	228000	912	228
Haul Truck	600	1878348	12592.83346	228

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	2022 Baseline Emissions Factor (g/hp-hr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.244499	1.398741	2.277459	0.00485	0.085506	0.078666	525.2543	0.021307
390 Excavator	530	0.127093	1.051494	1.022023	0.004861	0.034366	0.031617	526.1008	0.021341
Dozer	600	0.220431	1.545434	2.377536	0.004869	0.092075	0.084709	527.18	0.021385
Total Excavation Engines									
Water Truck	600	0.194943	1.233524	1.489116	0.004876	0.053897	0.049585	527.9343	0.021415
Haul Truck	600	0.194943	1.233524	1.489116	0.004876	0.053897	0.049585	527.9343	0.021415

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day: 8
Dozer hours in maximum year: 1251
Water Truck Hours in maximum Day: 4
Water Truck Hours in Maximum Year 1000

Equipment	Approximate HP	2023 Phase 1 Future Emissions Factor (g/hp-hr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.224856	1.358366	1.965844	0.004856	0.073902	0.06799	525.8427	0.02133
390 Excavator	530	0.1219	1.042819	0.887567	0.004867	0.029981	0.027583	526.7832	0.021369
Dozer	600	0.20667	1.4937	2.111459	0.004874	0.082542	0.075938	527.7313	0.021407
Total Excavation Engines									
Water Truck	600	0.186132	1.210806	1.325121	0.004882	0.04772	0.043903	528.5692	0.021441
Haul Truck	600	0.186132	1.210806	1.325121	0.004882	0.04772	0.043903	528.5692	0.021441

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	2025 Phase 2 Future Emissions Factor (g/hp-hr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.196511	1.261366	1.458979	0.004869	0.054727	0.050348	527.1352	0.021383
390 Excavator	530	0.114786	1.043044	0.714268	0.004869	0.025209	0.023193	526.9882	0.021377
Dozer	600	0.180422	1.417454	1.629804	0.004878	0.064698	0.059523	528.0927	0.021422
Total Excavation Engines									
Water Truck	600	0.177476	1.174148	1.08595	0.004883	0.038496	0.035417	528.5874	0.021442
Haul Truck	600	0.177476	1.174148	1.08595	0.004883	0.038496	0.035417	528.5874	0.021442

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

	Approximate	2022 Baseline Emissions (g/year)							
Equipment	HP	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	53082.37	303676.4	494452.5	1053.007	18564.02	17078.9	1.14E+08	4625.816
390 Excavator	530	33659.81	278481.2	270675.9	1287.38	9101.555	8373.431	1.39E+08	5652.009
Dozer	600	62894.52	440952	678372.2	1389.13	26271.42	24169.71	1.5E+08	6101.612
Total Excavation Engines		149636.7	1023110	1443501	3729.517	53937	49622.04	4.04E+08	16379.44
Water Truck	600	44446.93	281243.5	339518.3	1111.769	12288.57	11305.49	1.2E+08	4882.694
Haul Truck	600	366170.2	2316987	2797077	9159.166	101237.8	93138.75	9.92E+08	40225.43

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

	Approximate	Phase 1 Future Emissions (g/year)							
Equipment	**HP**	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**
980 Loader	390	48817.77	294910.9	426798.5	1054.294	16044.6	14761.03	1.14E+08	4630.998
390 Excavator	530	32284.51	276183.7	235066.1	1289.085	7940.359	7305.13	1.4E+08	5659.34
Dozer	600	58968.32	426191.1	602453.6	1390.681	23551.27	21667.17	1.51E+08	6107.993
Total Excavation Engines		140070.6	997285.7	1264318	3734.061	47536.23	43733.33	4.04E+08	16398.33
Water Truck	600	42438.1	276063.7	302127.5	1113.157	10880.22	10009.8	1.21E+08	4888.566
Haul Truck	600	349620.7	2274314	2489038	9170.6	89635.27	82464.45	9.93E+08	40273.8

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day: 8
Dozer hours in maximum year: 1251
Water Truck Hours in maximum Day: 4
Water Truck Hours in Maximum Year 1000

Equipment	Approximate HP	Phase 2 Future Emissions (g/year)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	42663.87	273851.5	316754.7	1057.041	11881.53	10931	1.14E+08	4642.381
390 Excavator	530	30400.32	276243.2	189169.2	1289.634	6676.547	6142.423	1.4E+08	5661.543
Dozer	600	51478.94	404436.2	465024.9	1391.821	18460.14	16983.33	1.51E+08	6112.176
Total Excavation Engines		124543.1	954530.9	970948.7	3738.495	37018.21	34056.75	4.05E+08	16416.1
Water Truck	600	40464.49	267705.8	247596.6	1113.245	8777.175	8075.001	1.21E+08	4888.734
Haul Truck	600	333361.4	2205459	2039792	9171.32	72309.6	66524.83	9.93E+08	40275.19

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

For Project period of 2023 - 2024, CalEEMod Defualt equipment is conservatively estimated based on 2023 emission year (Appendix G-11)

For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	2022 Baseline Emissions (g/day)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	322.9317	1847.445	3008.049	6.40607	112.936	103.9011	693751.4	28.14159
390 Excavator	530	204.7727	1694.167	1646.683	7.831901	55.37018	50.94057	847653.6	34.38454
Dozer	600	402.0654	2818.871	4336.626	8.880281	167.9452	154.5096	961576.2	39.00574
Total Excavation Engines		929.7698	6360.483	8991.358	23.11825	336.2514	309.3513	2502981	101.5319
Water Truck	600	177.7877	1124.974	1358.073	4.447078	49.15428	45.22194	481476.1	19.53078
Haul Truck	600	2227.632	14095.61	17016.29	55.72066	615.8897	566.6185	6032764	244.7153

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

For Project period of 2023 - 2024, CalEEMod Defualt equipment is conservatively estimated based on 2023 emission year (Appendix G-11)

For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 1 Future Emissions (g/day)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	296.9876	1794.119	2596.47	6.413898	97.60885	89.80014	694528.6	28.17312
390 Excavator	530	196.4059	1680.19	1430.047	7.842274	48.30593	44.44146	848753.1	34.42914
Dozer	600	376.9664	2724.509	3851.301	8.890201	150.5561	138.5116	962581.9	39.04653
Total Excavation Engines		870.3599	6198.818	7877.818	23.14637	296.4709	272.7532	2505864	101.6488
Water Truck	600	169.7524	1104.255	1208.51	4.452629	43.52089	40.03922	482055.1	19.55426
Haul Truck	600	1361.144	8854.369	9690.332	35.70301	348.9684	321.0509	3865316	156.7941

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

	Approximate	Phase 2 Future Emissions (g/day)							
Equipment	**HP**	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**
980 Loader	390	259.5497	1666.002	1927.007	6.43061	72.28241	66.49981	696235.7	28.24237
390 Excavator	530	184.9432	1680.552	1150.829	7.845612	40.61741	37.36802	849083.4	34.44254
Dozer	600	329.0891	2585.437	2972.762	8.897483	118.01	108.5692	963241.1	39.07327
Total Excavation Engines		773.5821	5931.991	6050.598	23.1737	230.9098	212.437	2508560	101.7582
Water Truck	600	161.858	1070.823	990.3865	4.452979	35.1087	32.3	482071.7	19.55494
Haul Truck	600	2234.924	14785.86	13675.19	61.48642	484.7785	445.9962	6656412	270.0132

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day: 8
Dozer hours in maximum year: 1251
Water Truck Hours in maximum Day: 4
Water Truck Hours in Maximum Year 1000

Equipment	**Approximate HP**	**2022 Baseline Emissions (g/hr)**							
		ROG	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**
980 Loader	390	34.3276	196.3832	319.7553	0.680965	12.00509	11.04468	73745.71	2.991448
390 Excavator	530	25.59658	211.7709	205.8353	0.978988	6.921273	6.367571	105956.7	4.298067
Dozer	600	50.25818	352.3589	542.0782	1.110035	20.99315	19.31369	120197	4.875717
Total Excavation Engines		110.1824	760.513	1067.669	2.769987	39.9195	36.72594	299899.4	12.16523
Water Truck	600	44.44693	281.2435	339.5183	1.111769	12.28857	11.30549	120369	4.882694
Haul Truck	600	44.44693	281.2435	339.5183	1.111769	12.28857	11.30549	120369	4.882694

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day: 8
Dozer hours in maximum year: 1251
Water Truck Hours in maximum Day: 4
Water Truck Hours in Maximum Year 1000

Equipment	Approximate HP	Phase 1 Future Emissions (g/hr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	31.56975	190.7146	276.0044	0.681797	10.37581	9.545746	73828.32	2.994799
390 Excavator	530	24.55074	210.0238	178.7559	0.980284	6.038242	5.555182	106094.1	4.303642
Dozer	600	47.1208	340.5636	481.4127	1.111275	18.81951	17.31395	120322.7	4.880816
Total Excavation Engines		103.2413	741.302	936.173	2.773356	35.23356	32.41488	300245.2	12.17926
Water Truck	600	42.4381	276.0637	302.1275	1.113157	10.88022	10.0098	120513.8	4.888566
Haul Truck	600	42.4381	276.0637	302.1275	1.113157	10.88022	10.0098	120513.8	4.888566

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

	Approximate	Phase 2 Future Emissions (g/hr)							
Equipment	**HP**	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**
980 Loader	390	27.59011	177.0959	204.8407	0.683573	7.683612	7.068923	74009.79	3.002161
390 Excavator	530	23.1179	210.069	143.8536	0.980701	5.077177	4.671003	106135.4	4.305317
Dozer	600	41.13614	323.1796	371.5952	1.112185	14.75125	13.57115	120405.1	4.884159
Total Excavation Engines		91.84416	710.3445	720.2895	2.77646	27.51204	25.31108	300550.4	12.19164
Water Truck	600	40.46449	267.7058	247.5966	1.113245	8.777175	8.075001	120517.9	4.888734
Haul Truck	600	40.46449	267.7058	247.5966	1.113245	8.777175	8.075001	120517.9	4.888734

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	2022 Baseline Emissions (lb/year)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	117.0266	669.4919	1090.081	2.321483	40.92666	37.65253	251407.3	10.19818
390 Excavator	530	74.20717	613.9461	596.7382	2.838188	20.06549	18.46025	307179.6	12.46055
Dozer	600	138.6587	972.1327	1495.555	3.062507	57.91857	53.28509	331614.9	13.45175
Total Excavation Engines		329.8924	2255.571	3182.374	8.222177	118.9107	109.3979	890201.7	36.11048
Water Truck	600	97.98871	620.0357	748.5098	2.451032	27.09166	24.92433	265368.3	10.7645
Haul Truck	600	807.2671	5108.083	6166.5	20.1925	223.1911	205.3358	2186202	88.6819

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 1 Future Emissions (lb/year)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	107.6248	650.1673	940.9296	2.32432	35.37229	32.5425	251688.9	10.2096
390 Excavator	530	71.17516	608.8808	518.2321	2.841947	17.50549	16.10506	307578	12.47671
Dozer	600	130.0029	939.5905	1328.183	3.065928	51.92167	47.76794	331961.7	13.46582
Total Excavation Engines		308.8028	2198.639	2787.345	8.232194	104.7995	96.41549	891228.6	36.15213
Water Truck	600	93.55999	608.6163	666.0772	2.454092	23.98678	22.06784	265687.4	10.77744
Haul Truck	600	770.7816	5014.005	5487.389	20.21771	197.612	181.803	2188830	88.78854

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 2 Future Emissions (lb/yr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	94.05774	603.7393	698.3245	2.330376	26.19428	24.09874	252307.5	10.2347
390 Excavator	530	67.02122	609.012	417.0467	2.843156	14.71927	13.54173	307697.7	12.48156
Dozer	600	113.4916	891.6291	1025.204	3.068439	40.69763	37.44182	332189.1	13.47504
Total Excavation Engines		274.5706	2104.381	2140.576	8.241972	81.61118	75.08229	892194.3	36.1913
Water Truck	600	89.20893	590.1904	545.8571	2.454284	19.35036	17.80233	265696.5	10.77781
Haul Truck	600	734.9361	4862.206	4496.972	20.2193	159.4154	146.6621	2188906	88.79159

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

	Approximate	2022 Baseline Emissions (lb/day)							
Equipment	**HP**	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**
980 Loader	390	0.711942	4.072918	6.631613	0.014123	0.248981	0.229063	1529.46	0.062042
390 Excavator	530	0.451446	3.735	3.630314	0.017266	0.12207	0.112305	1868.756	0.075805
Dozer	600	0.886403	6.214547	9.560623	0.019578	0.370256	0.340635	2119.913	0.085993
Total Excavation Engines		2.049791	14.02246	19.82255	0.050967	0.741307	0.682003	5518.129	0.223839
Water Truck	600	0.391955	2.480143	2.994039	0.009804	0.108367	0.099697	1061.473	0.043058
Haul Truck	600	4.911087	31.07551	37.51449	0.122843	1.357804	1.24918	13299.97	0.539505

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 1 Future Emissions (lb/day)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.654745	3.955355	5.724236	0.01414	0.215191	0.197975	1531.173	0.062111
390 Excavator	530	0.433001	3.704185	3.152715	0.017289	0.106496	0.097977	1871.18	0.075903
Dozer	600	0.831069	6.006514	8.490666	0.0196	0.331919	0.305366	2122.13	0.086083
Total Excavation Engines		1.918815	13.66605	17.36762	0.051029	0.653606	0.601318	5524.484	0.224097
Water Truck	600	0.37424	2.434465	2.664309	0.009816	0.095947	0.088271	1062.75	0.04311
Haul Truck	600	3.00081	19.52054	21.36352	0.078712	0.769344	0.707796	8521.563	0.345672

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 2 Future Emissions (lb/day)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.572209	3.672906	4.248324	0.014177	0.159355	0.146607	1534.937	0.062264
390 Excavator	530	0.40773	3.704983	2.537144	0.017297	0.089546	0.082382	1871.908	0.075933
Dozer	600	0.725517	5.699912	6.553818	0.019616	0.260168	0.239354	2123.583	0.086142
Total Excavation Engines		1.705457	13.0778	13.33929	0.051089	0.509069	0.468343	5530.429	0.224338
Water Truck	600	0.356836	2.360761	2.183428	0.009817	0.077401	0.071209	1062.786	0.043111
Haul Truck	600	4.927163	32.59723	30.14863	0.135554	1.068754	0.983253	14674.88	0.595277

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	2022 Baseline Emissions (lb/hr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.075679	0.432951	0.70494	0.001501	0.026467	0.024349	162.5815	0.006595
390 Excavator	530	0.056431	0.466875	0.453789	0.002158	0.015259	0.014038	233.5945	0.009476
Dozer	600	0.1108	0.776818	1.195078	0.002447	0.046282	0.042579	264.9891	0.010749
Total Excavation Engines		0.242911	1.676644	2.353807	0.006107	0.088007	0.080967	661.1651	0.02682
Water Truck	600	0.097989	0.620036	0.74851	0.002451	0.027092	0.024924	265.3683	0.010764
Haul Truck	600	0.097989	0.620036	0.74851	0.002451	0.027092	0.024924	265.3683	0.010764

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 1 Future Emissions (lb/hr)							
		ROG	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**
980 Loader	390	0.069599	0.420454	0.608486	0.001503	0.022875	0.021045	162.7636	0.006602
390 Excavator	530	0.054125	0.463023	0.394089	0.002161	0.013312	0.012247	233.8975	0.009488
Dozer	600	0.103884	0.750814	1.061333	0.00245	0.04149	0.038171	265.2662	0.01076
Total Excavation Engines		0.227608	1.634291	2.063908	0.006114	0.077677	0.071463	661.9273	0.026851
Water Truck	600	0.09356	0.608616	0.666077	0.002454	0.023987	0.022068	265.6874	0.010777
Haul Truck	600	0.09356	0.608616	0.666077	0.002454	0.023987	0.022068	265.6874	0.010777

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

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*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Equipment	Approximate HP	Phase 2 Future Emissions (lb/hr)							
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
980 Loader	390	0.060826	0.39043	0.451596	0.001507	0.016939	0.015584	163.1636	0.006619
390 Excavator	530	0.050966	0.463123	0.317143	0.002162	0.011193	0.010298	233.9886	0.009492
Dozer	600	0.09069	0.712489	0.819227	0.002452	0.032521	0.029919	265.4479	0.010768
Total Excavation Engines		0.202482	1.566041	1.587967	0.006121	0.060654	0.055801	662.6001	0.026878
Water Truck	600	0.089209	0.59019	0.545857	0.002454	0.01935	0.017802	265.6965	0.010778
Haul Truck	600	0.089209	0.59019	0.545857	0.002454	0.01935	0.017802	265.6965	0.010778

Fleet estimated based on engineering assupmtions regarding standard fleet for alluvial mining

Load Factor Based on CalEEMod App G-12

For Baseline period, CalEEMod Default equipment is conservatively estimated based on the 2022 emission year (Appendix G-11)

For Project period of 2023 - 2024, CalEEMod Defualt equipment is conservatively estimated based on 2023 emission year (Appendix G-11)

For Project period of 2025 - 2052, CalEEMod Defualt equipment is conservatively estimated based on 2025 emission year (Appendix G-11)

*Due to variability of tonnage output associated with dozer and water truck activity activity, the following fixed operational scheudule is assumed:

Dozer hours in maximum day:	8
Dozer hours in maximum year:	1251
Water Truck Hours in maximum Day:	4
Water Truck Hours in Maximum Year	1000

Aggregates Fugitive Mining, Storage, and Drop Emissions

Drop, Mining, and Storage Pile Emissions Factors

Material Drop Emission Factor from AP42 13.2.4:

PM10 E.F. (lb/ton) = $k(0.0032)(U/5)^{1.3}/(M/2)^{1.4}$

k = particle size multiplier = 0.35

U = mean wind speed[1] = 6.3

M = material moisture content = 3

PM10 EF (lb/ton) = 0.00085

PM2.5 EF[2] (lb/ton) = 0.00025

Bulldozing Emission Factor, CalEEMod User Manual, Appendix A:

	Uncontrolled	Controlled
EF PM10 (lb/hr) = 1.0 * s^1.5 / 7.9^1.4 * 0.75 =	0.75	0.29
EF PM2.5 (lb/hr) = 5.7 * s^1.2 / 7.9^1.4 * 0.105 =	0.11	0.04

s (silt, %) = 6.9

Watering C.E. = 61% water every 3 hours if material is not already wet

days of rain = 51

Storage Pile Emissions Controlled Factor (SSP1610 - Agg. Processing)

lb PM10/acre/day 1.054

	Area (acres)	lbs PM10/hr	lbs PM10/day	lbs PM10/yr
Baseline Storage	1	0.0	1.1	384.7
Phase 1 Storage	1	0.0	1.1	384.7
Phase 2 Storage	1	0.0	1.1	384.7

Notes:

[1] Mean wind speed based on data for Merced in CalEEMod Appendix G-1 which states 2.8 m/s (equvalent to 6.26 mph).

[2] PM2.5 emission factor assumed to be 29.2% of PM10 for material drops based on SCAQMD's Updated CEIDARS Table with PM2.5 Fractions for mineral products - loading

[3] Emission Factor from San Diego Air Pollution Control District, *Quarry Operations, General* (https://bit.ly/2XXNWUI)

Drop and Mining Emissions - Baseline

	Throughput						PM10 Emissions			PM2.5 Emissions		
Activity	Peak Hour (tons)	Peak Day (tons)	Peak Annual (tons)	Peak Hour (hours)	Peak Day (hours)	Peak Annual (hours)	Peak Hour (lb/hr)	Peak Day (lb/day)	Peak Annual (lb/yr)	Peak Hour (lb/hr)	Peak Day (lb/day)	Peak Annual (lb/yr)
Excavation Dozing	N/A	N/A	N/A	1	8	1,251	0.29	2	367	0.04	0	51
Excavation to Pile Drop	783	6,266	1,029,936	N/A	N/A	N/A	0.7	5	876	0.2	2	256
Pile to Haul Truck Drop	783	6,266	1,029,936	N/A	N/A	N/A	0.7	5	876	0.2	2	256

Drop and Mining Emissions - Project Phase 1 (Sunset)

	Throughput						PM10 Emissions			PM2.5 Emissions		
Activity	Peak Hour (tons)	Peak Day (tons)	Peak Annual (tons)	Peak Hour (hours)	Peak Day (hours)	Peak Annual (hours)	Peak Hour (lb/hr)	Peak Day (lb/day)	Peak Annual (lb/yr)	Peak Hour (lb/hr)	Peak Day (lb/day)	Peak Annual (lb/yr)
Excavation Dozing	N/A	N/A	N/A	1	8	1,251	0.29	2	367	0.04	0	51
Excavation to Pile Drop	783	6,266	1,029,936	N/A	N/A	N/A	0.7	5	876	0.2	2	256
Pile to Haul Truck Drop	783	6,266	1,029,936	N/A	N/A	N/A	0.7	5	876	0.2	2	256

Drop and Mining Emissions - Project Phase 2-4 (Turner

	Throughput						PM10 Emissions			PM2.5 Emissions		
Activity	Peak Hour (tons)	Peak Day (tons)	Peak Annual (tons)	Peak Hour (hours)	Peak Day (hours)	Peak Annual (hours)	Peak Hour (lb/hr)	Peak Day (lb/day)	Peak Annual (lb/yr)	Peak Hour (lb/hr)	Peak Day (lb/day)	Peak Annual (lb/yr)
Excavation Dozing	N/A	N/A	N/A	1	8	1,251	0.29	2	367	0.04	0	51
Excavation to Pile Drop	783	6,266	1,029,936	N/A	N/A	N/A	0.7	5	876	0.2	2	256
Pile to Haul Truck Drop	783	6,266	1,029,936	N/A	N/A	N/A	0.7	5	876	0.2	2	256

Truck Loading and Maneuvering	**Baseline**	**Project Phase 1 (Sunset)**	**Project Phase 2-4 (Turner)**	**Units**	**Source**
Excavation Rate	783	783	783	tons/hour	4.3 cy bucket cycle time analysis
Truck payload	50	50	50	tons	
Time to load a truck	3.8	3.8	3.8	minutes	Calculation
Time to maneuver	0.8	0.8	0.8	minutes	Caterpillar Handbook (44 ed.)
Total time load and maneuver	4.6	4.6	4.6	minutes	Calculation
Haul Road Length	3.07	1.27	3.58	miles	Assumes avg. trip to be half of site length/longest path
Truck Haul Avg Speed	25.0	25.0	25.0	mph	
Haul Time	7.368	3.048	8.592	minutes	
Total Time Per Load	12.0	7.7	13.2	minutes	
VMT/Ton Transferred	0.1228	0.0508	0.1432		
Operating Hour/Ton Transferred	0.0080	0.0051	0.0088		
Vehicle HP	600	600	600		
HP-HR/Ton Transferred	4.80	3.07	5.29		
lb PM10 Ems/Ton Transferred	0.253	0.052	0.147	VMT/Ton Transferred Multiplied by PM Emission rate below	
lb PM2.5 Ems/Ton Transferred	0.054	0.011	0.031	VMT/Ton Transferred Multiplied by PM Emission rate below	
Rain Days Per year (CalEEMod Appendix G)	29	29	29		
Annual Rainfall Reduction Factor	0.920547945	0.920547945	0.920547945		

Basline Unpaved Road Emission Factors

Unpaved Road emissions factor from AP42 Section 13.2.2

EF (lb/VMT)= $4.9 * (S/12)^{0.7} * (W/3)^{0.45}$

	Mining Haul Trucks	
	PM10	**PM2.5**
S = silt content (%) =	4.8	
W_l = loaded truck wt (tons) =	90	
W_u = unloaded truck wt (tons) =	40	
W = avg truck weight	65	
EF (lb/VMT) =	10.30	2.18
Baseline C.E. =	80%	80%
Baseline EF (lb/VMT) =	**2.06**	**0.44**

Silt content based on mean Sand and Gravel Processing from AP-42 Table 13.2.2-1.

Control efficiency for unpaved roads in baseline is 80% for watering.

PM2.5 emissions are 21.2% of PM10 for unpaved roads (SCAQMD *Updated CEIDARS Table).*

Future Unpaved Road Emission Factors

Unpaved Road emissions factor from AP42 Section 13.2.2

EF (lb/VMT)= $4.9 * (S/12)^{0.7} * (W/3)^{0.45}$

	Mining Haul Trucks	
	PM10	**PM2.5**
S = silt content (%) =	4.8	
W_l = loaded truck wt (tons) =	90	
W_u = unloaded truck wt (tons) =	40	
W = avg truck weight	65	
EF (lb/VMT) =	10.30	2.18
Future C.E. =	90%	90%
Future EF (lb/VMT) =	**1.03**	**0.22**

Silt content based on mean Sand and Gravel Processing from AP-42 Table 13.2.2-1.

PM2.5 emissions are 21.2% of PM10 for unpaved roads (SCAQMD *Updated CEIDARS Table).*

Off-Road Emissions Emissions Calculations - Cycle Time Analyses

Assumptions

Parameters	**Truck Loading**
Loader Model	980H Loader
Travel Distance (avg) (meters)	15
Bucket Payload[1] (yd^3)	7.00
Bucket Payload in Tons	10.5
Material Type[2]	Uniform Agg > 1"
Bucket Fill Factor[2]	85%
Job Efficiency[3] (work 50 min/hr)	83%
Grade Resistance[4]	0%
Rolling Resistance[4]	3%
Total Resistance[4]	3%

Cycle Time (mins)

Hydraulic Cycle Time (mins) [5]	**Truck Loading**	
Average Cycle Time [6]		0.65
Material Handler?	Yes	-0.05
Materials:	3/4" to 6"	0.00
Pile:	Conveyor piled >10'	0.00
Truck Ownership:	Common	-0.04
Operation Cycle:	Constant	-0.04
Target Type:	N/A	0.00
Total Hydraulic Cycle Time		**0.52**

Total Cycle Time (mins)	**Truck Loading**
Hydraulic Cycle Time (min/cycle)	0.52
Travel with load[7] (min/cycle)	0.08
Travel empty[7] (min/cycle)	0.07
Total Cycle Time (min/cycle)	**0.67**

Rate Calculations

Production Calculations	**Truck Loading**
Cycles per Hour	74.6
Production Rate (tph)	666

[1] Bucket payload ranges based on activity type and equipment size. In this case, heaped bucket capacity for the 980H is roughly equal to the bucket capacity of a 988 that is equipped for digging. Thus, both loaders (980, 988) have similar expected production rates

[2] Material type and bucket fill factor from Caterpillar Performance Handbook Edition 41, January 2011

[3] Job efficiency accounts for operator skill, minor repairs and adjustments, personnel delays, and delays caused by job layout. CPH suggested 50 minutes (83%) (CPH page 12-80)

[4] Resisitance from CPH pg 22-5 and 22-6 and "Typical Rolling Resistance Factors" table on page 27-1

[5] Guidelines for "Selecting a Machine" on page 12-79 and 12-80 of CPH were used to determine the hydraulic cycle time.

[6] Average cycle time for this type of equipment is tabulated on page 12-80 of CPH.

[7] Figures on pages 12-149 through 12-156 in the CPH were used to estimate the travel times for theloaders.

Excavator Cycle Time Analysis

Assumptions

Excavator Bucket Size = 4.3 yd^3
Material Type = Sand and Gravel
Sand and Gravel density = 1.7 tons/yd^3

Cycle Time

From the Caterpillar Performance Handbook, Edition 41 (2011)
page 4-183 "Cycle Time Estimating Chart"
Based on the low end of the typical range due to the loose configuration of material to be moved.
Cycle Time = 0.28 minutes

Production Estimate

Production Rate = 691 yd^3/hour
Production Rate = 1175 tons/hour
Job Efficiency* = 67%
Production Rate = 783 tons/hour

* Job efficiency is estimated to be 40 minutes per hour to account for operator skill, minor delays, and periodic excavator transportation

		Baseline (lbs/year)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									385	112	384.71	112.34	0
Permit Exempt Sources	Excavation Emissions	330	2,256	3,182	8	119	109	890,202	36	367	51	486	161	891,213
	Aggregates Transfer/Drops									1,752	511	1,752	511	0
	Off-Road Vehicle Haul	905	5,728	6,915	23	250	230	2,451,570	99	239,789	50,835	240,039	51,066	2,454,354
	Total Emissions	**1,235**	**7,984**	**10,097**	**31**	**369**	**340**	**3,341,772**	**136**	**242,293**	**51,511**	**242,662**	**51,850**	**3,345,567**

		Baseline (lbs/day)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									1	0	1.05	0.31	0
Permit Exempt Sources	Excavation Emissions	2	14	20	0	1	1	5,518	0	2	0	3.09	1.01	5,524
	Aggregates Transfer/Drops									11	3	10.66	3.11	0
	Off-Road Vehicle Haul	5	34	41	0	1	1	14,361	1	1,459	309	1,460.25	310.61	14,378
	Total Emissions	**7**	**48**	**60**	**0**	**2**	**2**	**19,880**	**1**	**1,473**	**313**	**1,475**	**315**	**19,902**

		Baseline (lbs/hr)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									0.04	0	0.04	0.01	0
Permit Exempt Sources	Excavation Emissions	0.24	1.68	2.35	0.01	0.09	0.08	661.17	0.03	0	0	0.38	0.12	662
	Aggregates Transfer/Drops									1	0	1.33	0.39	0
	Off-Road Vehicle Haul	0.20	1.24	1.50	0.00	0.05	0.05	530.74	0.02	182	39	182.40	38.71	531
	Total Emissions	**0**	**3**	**4**	**0.0**	**0**	**0**	**1,192**	**0**	**184**	**39**	**184**	**39**	**1,193**

*CO2e Calculated based on IPCC Fifth Assessment Report (AR5)
Assumes GWP factor of: 28 for Methane

		Future Phase 1 (Sunset) Excavation (lbs/year)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									385	112	384.71	112.34	0
Permit Exempt Sources	Excavation Emissions	309	2,199	2,787	8	105	96	891,229	36	367	51	472.19	147.85	892,241
	Aggregates Transfer/Drops									1,752	511	1,751.52	511.45	0
	Off-Road Vehicle Haul	864	5,623	6,153	23	222	204	2,454,518	99.57	49,598	10,515	49,820	10,719	2,457,306
	Total Emissions	**1,173**	**7,821**	**8,941**	**31**	**326**	**300**	**3,345,747**	**136**	**52,102**	**11,190**	**52,428**	**11,490**	**3,349,547**

		Future Phase 1 (Sunset) Excavation (lbs/day)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									1	0	1.05	0.31	0
Permit Exempt Sources	Excavation Emissions	2	14	17	0	1	1	5,524	0	2	1	3.00	1.29	5,531
	Aggregates Transfer/Drops									11	3	10.66	3.11	0
	Off-Road Vehicle Haul	3	22	24	0.1	1	1	9,584	0.39	302	64	302.60	64.76	9,595
	Total Emissions	**5**	**36**	**41**	**0.14**	**2**	**1**	**15,109**	**1**	**316**	**68**	**317**	**69**	**15,126**

		Future Phase 1 (Sunset) Excavation (lbs/hr)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									0.04	0	0.04	0.01	0
Permit Exempt Sources	Excavation Emissions	0.23	1.63	2.06	0.01	0.08	0.07	661.93	0.03	0	0	0.37	0.16	663
	Aggregates Transfer/Drops									1.3	0.4	1.33	0.39	0
	Off-Road Vehicle Haul	0.19	1.22	1.33	0.00	0.05	0.04	531.37	0.02	38	8	37.76	8.04	532
	Total Emissions	**0**	**3**	**3**	**0.01**	**0**	**0**	**1,193**	**0**	**39**	**8**	**40**	**9**	**1,195**

Future Phase 2-4 (Turner) Excavation (lbs/year)

		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									385	112	384.71	112.34	0
Permit Exempt Sources	Excavation Emissions	275	2,104	2,141	8	82	75	892,194	36	367	51	449.00	126.52	893,208
	Aggregates Transfer/Drops									1,752	511	1,751.52	511.45	0
	Off-Road Vehicle Haul	824	5,452	5,043	23	179	164	2,454,602	99.57	139,812	29,640	139,991	29,805	2,457,390
	Total Emissions	**1,099**	**7,557**	**7,183**	**31**	**260**	**240**	**3,346,797**	**136**	**142,316**	**30,315**	**142,576**	**30,555**	**3,350,598**

Future Phase 2-4 (Turner) Excavation (lbs/day)

		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									1	0	1.05	0.31	0
Permit Exempt Sources	Excavation Emissions	2	13	13	0	1	0	5,530	0	2	0	2.86	0.80	5,537
	Aggregates Transfer/Drops									13	3	13.00	3.11	0
	Off-Road Vehicle Haul	10	65	60	0	2	2	29,350	1.19	851	180	853	182	29,383
	Total Emissions	**12**	**78**	**74**	**0.32**	**2.6**	**2.4**	**34,880**	**1.4**	**867.0**	**184.1**	**869.6**	**186.50**	**34,920**

Future Phase 2-4 (Turner) Excavation (lbs/hr)

		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage									0	0	0.04	0.01	0
Permit Exempt Sources	Excavation Emissions	0.20	1.57	1.59	0.01	0.06	0.06	662.60	0.03	0	0	0.35	0.10	663
	Aggregates Transfer/Drops									1	0	1.33	0.39	0
	Off-Road Vehicle Haul	0.18	1.18	1.09	0.00	0.04	0.04	531.39	0.02	106	23	106	23	532
	Total Emissions	**0.4**	**3**	**3**	**0.01**	**0.10**	**0.09**	**1,194**	**0.05**	**107.99**	**22.98**	**108.09**	**23.07**	**1,195**

		Baseline (ton/year)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage	—	—	—	—	—	—	—	—	0.19	0.06	0.19	0.06	—
Permit Exempt Sources	Excavation Emissions	0.16	1.13	1.59	0.00	0.06	0.05	445.10	0.02	0.18	0.03	0.24	0.08	445.61
	Aggregates Transfer/Drops	—	—	—	—	—	—	—	—	0.88	0.26	0.88	0.26	—
	Off-Road Vehicle Haul	0.45	2.86	3.46	0.01	0.13	0.12	1225.78	0.05	119.89	25.42	120.02	25.53	1227.18
	Total Emissions	**0.62**	**3.99**	**5.05**	**0.02**	**0.18**	**0.17**	**1670.89**	**0.07**	**121.15**	**25.76**	**121.33**	**25.93**	**1672.78**

		Future Phase 1 (Sunset) Excavation (ton/year)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage	—	—	—	—	—	—	—	—	0.19	0.06	0.19	0.06	—
Permit Exempt Sources	Excavation Emissions	0.15	1.10	1.39	0.00	0.05	0.05	445.61	0.02	0.18	0.03	0.24	0.07	446.12
	Aggregates Transfer/Drops	—	—	—	—	—	—	—	—	0.88	0.26	0.88	0.26	—
	Off-Road Vehicle Haul	0.43	2.81	3.08	0.01	0.11	0.10	1227.26	0.05	24.80	5.26	24.91	5.36	1228.65
	Total Emissions	**0.59**	**3.91**	**4.47**	**0.02**	**0.16**	**0.15**	**1672.87**	**0.07**	**26.05**	**5.60**	**26.21**	**5.75**	**1674.77**

		Future Phase 2-4 (Turner) Excavation (ton/year)												
		ROG	CO	NOX	SO2	PM10 (diesel)	PM2.5 (diesel)	CO2	CH4	PM10 Fugitive	PM2.5 Fugitive	PM10 Total	PM2.5 Total	CO2e
Stationary Sources	Aggregates Storage	—	—	—	—	—	—	—	—	0.19	0.06	0.19	0.06	—
Permit Exempt Sources	Excavation Emissions	0.14	1.05	1.07	0.00	0.04	0.04	446.10	0.02	0.18	0.03	0.22	0.06	446.60
	Aggregates Transfer/Drops	—	—	—	—	—	—	—	—	0.88	0.26	0.88	0.26	—
	Off-Road Vehicle Haul	0.41	2.73	2.52	0.01	0.09	0.08	1227.30	0.05	69.91	14.82	70.00	14.90	1228.70
	Total Emissions	**0.55**	**3.78**	**3.59**	**0.02**	**0.13**	**0.12**	**1673.40**	**0.07**	**71.16**	**15.16**	**71.29**	**15.28**	**1675.30**

	Baseline (lbs/yr)						
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0	0	0	0	385	112	0.0
Permit Exempt	1,235	7,984	10,097	31	242,277	51,738	3,345,567.3

	Baseline (tons/yr)						
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0.00	0.00	0.0	0.000	0.2	0.06	0.0
Permit Exempt	0.62	3.99	5.0	0.015	121.1	25.87	1672.8

	Baseline (lbs/day)						
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0.0	0.0	0.0	0.00	1.1	0.3	0.0
Permit Exempt	7	48	60	0	1,474.0	314.7	19,902.1

Max Future Phase 2-4 (Turner) (lbs/yr)

	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0	0	0	0	385	112	0.0
Permit Exempt	1,099	7,557	7,183	31	142,191	30,443	3,350,598.0

Max Future Phase 2-4 (Turner) (tons/yr)

	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0.00	0.00	0.00	0	0.2	0.1	0.0
Permit Exempt	0.55	3.78	3.59	0.015458	71.1	15.2	1675.3

Max Future Phase 2-4 (Turner) (lbs/day)

	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0	0	0	0	1.1	0.31	0.0
Permit Exempt	12	78	74	0	868.6	186.19	34,919.8

	Project (lbs/yr)					
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0	0	0	0	0	0	0
Permit Exempt	-136	-427	-2,914	0	-100,086.05	-21,295	5,031

	Project (tons/yr)						
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0	0	0	0	0.00	0.00	0.00
Permit Exempt	0	0	-1	0	-50.0	-10.6	2.5

	Project (lbs/day)						
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
Permitted	0	0	0	0	0.00	0.00	0.00
Permit Exempt	4	31	13	0	-605.43	-128.54	15,017.65

APPENDIX D

HEALTH RISK ASSESSMENT RESULTS

HARP2 OUTPUTS

REC	X	Y	Phase 1 Cancer Risk Sum	Phase 2 Cancer Risk Sum	Phase 1 Max Chronic Hazard Index	Phase 2 Max Chronic Hazard Index	Phase 1 Max Acute Hazard Index	Phase 2 Max Acute Hazard Index	Total Residential Cancer Risk Sum	Residential Cancer Risk Per Million Exposed	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
6635	686526.1	4099896	9.85E-06	-1.46E-06	0.24333	0	8.67E-02	0.00E+00	8.39E-06	8.4	0.24	0.09
6636	686521.2	4099958	6.25E-06	-1.35E-06	0.023074	0	7.80E-02	0.00E+00	4.89E-06	4.9	0.02	0.08
6637	686544.3	4100042	3.38E-06	-1.24E-06	0	0	8.87E-02	0.00E+00	2.13E-06	2.1	0.00	0.09
6638	686576.4	4100057	2.90E-06	-1.25E-06	0	0	9.03E-02	0.00E+00	1.65E-06	1.7	0.00	0.09
6639	686739.5	4100015	3.96E-06	-1.47E-06	0	0	4.20E-02	0.00E+00	2.49E-06	2.5	0.00	0.04
6640	686866.6	4100018	3.42E-06	-1.59E-06	0	0	5.63E-03	0.00E+00	1.83E-06	1.8	0.00	0.01
6641	686978.7	4100031	2.40E-06	-1.63E-06	0	0	0.00E+00	0.00E+00	7.72E-07	0.8	0.00	0.00
6642	687235.8	4100030	1.43E-06	-1.62E-06	0	0	0.00E+00	0.00E+00	-1.85E-07	-0.2	0.00	0.00
6643	687443.9	4100038	9.30E-07	-1.44E-06	0	0	0.00E+00	0.00E+00	-5.06E-07	-0.5	0.00	0.00
6644	687514.1	4100050	7.61E-07	-1.32E-06	0	0	0.00E+00	0.00E+00	-5.60E-07	-0.6	0.00	0.00
6645	687574.1	4100055	7.10E-07	-1.24E-06	0	0	0.00E+00	0.00E+00	-5.28E-07	-0.5	0.00	0.00
6646	687671.1	4100038	6.31E-07	-1.20E-06	0	0	0.00E+00	0.00E+00	-5.68E-07	-0.6	0.00	0.00
6647	687747.1	4100039	5.44E-07	-1.14E-06	0	0	0.00E+00	0.00E+00	-6.00E-07	-0.6	0.00	0.00
6648	687798.1	4100053	4.76E-07	-1.08E-06	0	0	0.00E+00	0.00E+00	-6.00E-07	-0.6	0.00	0.00
6649	688285.2	4099988	3.79E-07	-1.01E-06	0	0	1.98E-03	0.00E+00	-6.31E-07	-0.6	0.00	0.00
6650	687781.2	4099698	9.62E-07	-3.51E-06	0	0	0.00E+00	0.00E+00	-2.55E-06	-2.6	0.00	0.00
6651	687637.2	4099131	-7.63E-06	-5.77E-06	0	0	0.00E+00	0.00E+00	-1.34E-05	-13.4	0.00	0.00
6652	687682.2	4098517	-7.25E-06	-4.14E-06	0	0	0.00E+00	0.00E+00	-1.14E-05	-11.4	0.00	0.00
6653	687662.2	4097223	-2.43E-06	6.70E-07	0	0.012493	0.00E+00	0.00E+00	-1.76E-06	-1.8	0.01	0.00
6654	687586.2	4097164	-2.33E-06	9.01E-07	0	0.037933	0.00E+00	0.00E+00	-1.43E-06	-1.4	0.04	0.00
6655	687536.2	4096804	-1.60E-06	3.68E-07	0	0.0063047	0.00E+00	0.00E+00	-1.23E-06	-1.2	0.01	0.00
6656	686793.2	4096393	-1.03E-06	1.32E-07	0	0.0091274	0.00E+00	1.21E-02	-8.96E-07	-0.9	0.01	0.01
6657	686072.2	4097192	-2.21E-06	-6.58E-07	0	0.0092123	0.00E+00	0.00E+00	-2.87E-06	-2.9	0.01	0.00
6658	684993.2	4098959	-1.24E-06	-7.84E-07	0	0	0.00E+00	0.00E+00	-2.02E-06	-2.0	0.00	0.00
6659	685315.3	4099169	-1.49E-06	-9.36E-07	0	0	0.00E+00	0.00E+00	-2.43E-06	-2.4	0.00	0.00
6660	685965.3	4099456	-1.73E-06	-1.35E-06	0	0	0.00E+00	0.00E+00	-3.08E-06	-3.1	0.00	0.00
6661	686060.3	4099725	-6.60E-07	-1.18E-06	0	0	5.53E-03	0.00E+00	-1.84E-06	-1.8	0.00	0.01
6662	685929.3	4099821	-6.62E-07	-1.01E-06	0	0	6.09E-03	0.00E+00	-1.67E-06	-1.7	0.00	0.01
6663	686182.3	4099916	8.68E-07	-1.11E-06	0	0	1.67E-02	0.00E+00	-2.42E-07	-0.2	0.00	0.02
6664	686351.3	4100027	2.10E-06	-1.11E-06	0	0	2.89E-02	0.00E+00	9.85E-07	1.0	0.00	0.03
6692 (PMI)	686813.2	4099462	0.00022977	-3.89E-06	17.897	0	6.77E-01	0.00E+00	0.000225881	2.26E+02	17.897	0.67663

APPENDIX E

HRA MODELING DOCUMENTATION

AERMOD Input (ADI) files are attached below for the Cancer/Chronic AERMOD run and the Acute AERMOD run.

Full modeling files can be obtained by contacting:

Andre.almeida@trinityconsultants.com
or
Scott.cohen@trinityconsultants.com

```
**
****************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 10.2.1
** Lakes Environmental Software Inc.
** Date: 7/18/2022
** File: C:\Modeling\V_Los_Banos\V_Los_Banos.ADI
**
****************************************
**
**
****************************************
** AERMOD Control Pathway
****************************************
**
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CO STARTING
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   MODELOPT DFAULT CONC
   AVERTIME 1 PERIOD
   POLLUTID HRA
   RUNORNOT RUN
   ERRORFIL V_Los_Banos.err
CO FINISHED
**
****************************************
** AERMOD Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
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** DESCRSRC Baseline Mining Area
** ---------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = 1HAUL
** DESCRSRC Haul Road in Phase 1
** PREFIX
** Length of Side = 13.32
** Configuration = Adjacent
** Emission Rate = 1.0
** Vertical Dimension = 5.10
** SZINIT = 2.37
** Nodes = 16
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** 687155.925, 4099530.481, 49.66, 0.00, 6.19
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       LOCATION L0003927     VOLUME   687317.352 4099686.202 49.92
       LOCATION L0003928     VOLUME   687310.492 4099674.791 49.84
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       LOCATION L0003931     VOLUME   687285.887 4099643.425 49.66
       LOCATION L0003932     VOLUME   687277.331 4099633.222 49.66
       LOCATION L0003933     VOLUME   687268.776 4099623.019 49.66
       LOCATION L0003934     VOLUME   687259.690 4099613.318 49.66
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       LOCATION L0003936     VOLUME   687240.248 4099595.119 49.66
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       LOCATION L0003938     VOLUME   687220.807 4099576.921 49.66
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       LOCATION L0003940     VOLUME   687200.987 4099559.208 49.66
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       LOCATION L0003942     VOLUME   687178.532 4099544.893 49.66
       LOCATION L0003943     VOLUME   687167.304 4099537.735 49.66
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   LOCATION L0003999     VOLUME   686683.044 4099759.030 50.77
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** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = BHAUL
** DESCRSRC Baseline Haul Road
** PREFIX
** Length of Side = 13.32
** Configuration = Adjacent
** Emission Rate = 1.0
** Vertical Dimension = 5.10
** SZINIT = 2.37
** Nodes = 22
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   LOCATION L0000108     VOLUME   687233.027 4099493.328 52.31
   LOCATION L0000109     VOLUME   687227.250 4099481.331 52.58
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      LOCATION L0000126     VOLUME   687123.197 4099280.650 50.18
      LOCATION L0000127     VOLUME   687116.019 4099269.435 50.37
      LOCATION L0000128     VOLUME   687108.842 4099258.219 50.09
      LOCATION L0000129     VOLUME   687101.096 4099247.461 49.96
      LOCATION L0000130     VOLUME   687091.681 4099238.046 49.95
      LOCATION L0000131     VOLUME   687082.265 4099228.631 50.00
      LOCATION L0000132     VOLUME   687072.850 4099219.216 50.31
      LOCATION L0000133     VOLUME   687063.435 4099209.800 50.95
      LOCATION L0000134     VOLUME   687054.020 4099200.385 51.46
      LOCATION L0000135     VOLUME   687045.955 4099190.065 51.74
      LOCATION L0000136     VOLUME   687040.834 4099177.774 51.92
      LOCATION L0000137     VOLUME   687035.713 4099165.483 52.05
      LOCATION L0000138     VOLUME   687030.592 4099153.192 52.17
      LOCATION L0000139     VOLUME   687025.470 4099140.901 52.32
      LOCATION L0000140     VOLUME   687020.349 4099128.610 52.40
      LOCATION L0000141     VOLUME   687016.294 4099116.071 52.37
      LOCATION L0000142     VOLUME   687015.463 4099102.782 52.20
      LOCATION L0000143     VOLUME   687014.633 4099089.493 51.99
      LOCATION L0000144     VOLUME   687013.802 4099076.204 51.94
      LOCATION L0000145     VOLUME   687012.943 4099062.916 51.90
      LOCATION L0000146     VOLUME   687012.058 4099049.630 52.08
      LOCATION L0000147     VOLUME   687011.172 4099036.345 52.22
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      LOCATION L0000149     VOLUME   687002.896 4099011.981 52.57
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      LOCATION L0000151     VOLUME   686988.125 4098989.823 52.82
      LOCATION L0000152     VOLUME   686977.235 4098983.685 52.84
      LOCATION L0000153     VOLUME   686964.337 4098980.378 52.77
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LOCATION L0000451     VOLUME   686585.710 4097653.545 60.26
LOCATION L0000452     VOLUME   686583.805 4097640.366 60.26
LOCATION L0000453     VOLUME   686581.899 4097627.188 60.26
LOCATION L0000454     VOLUME   686579.994 4097614.010 60.24
LOCATION L0000455     VOLUME   686578.089 4097600.832 60.16
LOCATION L0000456     VOLUME   686576.183 4097587.654 60.17
LOCATION L0000457     VOLUME   686574.278 4097574.476 60.24
LOCATION L0000458     VOLUME   686572.372 4097561.297 60.31
LOCATION L0000459     VOLUME   686570.467 4097548.119 60.37
LOCATION L0000460     VOLUME   686568.561 4097534.941 60.36
LOCATION L0000461     VOLUME   686566.656 4097521.763 60.39
LOCATION L0000462     VOLUME   686564.751 4097508.585 60.46
LOCATION L0000463     VOLUME   686562.845 4097495.407 60.46
LOCATION L0000464     VOLUME   686560.940 4097482.229 60.49
LOCATION L0000465     VOLUME   686559.034 4097469.050 60.62
LOCATION L0000466     VOLUME   686557.129 4097455.872 60.66
LOCATION L0000467     VOLUME   686555.223 4097442.694 60.74
LOCATION L0000468     VOLUME   686553.318 4097429.516 60.77
LOCATION L0000469     VOLUME   686551.413 4097416.338 60.85
LOCATION L0000470     VOLUME   686549.507 4097403.160 60.93
LOCATION L0000471     VOLUME   686547.602 4097389.981 60.96
LOCATION L0000472     VOLUME   686545.696 4097376.803 61.04
LOCATION L0000473     VOLUME   686543.791 4097363.625 61.08
LOCATION L0000474     VOLUME   686541.885 4097350.447 61.21
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   LOCATION L0000475     VOLUME   686539.980 4097337.269 61.28
   LOCATION L0000476     VOLUME   686538.075 4097324.091 61.35
   LOCATION L0000477     VOLUME   686536.169 4097310.912 61.39
   LOCATION L0000478     VOLUME   686534.264 4097297.734 61.53
   LOCATION L0000479     VOLUME   686532.358 4097284.556 61.59
   LOCATION L0000480     VOLUME   686530.453 4097271.378 61.71
   LOCATION L0000481     VOLUME   686528.547 4097258.200 61.78
   LOCATION L0000482     VOLUME   686526.642 4097245.022 61.93
   LOCATION L0000483     VOLUME   686524.736 4097231.844 62.13
   LOCATION L0000484     VOLUME   686522.831 4097218.665 62.32
   LOCATION L0000485     VOLUME   686520.926 4097205.487 62.47
   LOCATION L0000486     VOLUME   686519.020 4097192.309 62.67
   LOCATION L0000487     VOLUME   686517.115 4097179.131 62.86
   LOCATION L0000488     VOLUME   686515.209 4097165.953 63.06
   LOCATION L0000489     VOLUME   686513.304 4097152.775 63.31
   LOCATION L0000490     VOLUME   686511.398 4097139.596 63.58
** End of LINE VOLUME Source ID = 2HAUL
   LOCATION 2MINE        AREAPOLY   686927.341  4098260.467       56.840
** DESCRSRC Mining Area Phases 2-4
   LOCATION 1MINE        AREAPOLY   686583.153  4099964.338       49.770
** DESCRSRC Mining Area Phase 1
   LOCATION BSTRG        VOLUME     685773.140  4098205.210       63.170
** DESCRSRC Baseline mine storage pile
   LOCATION 2STRG        VOLUME     686605.516  4097178.677       62.820
** DESCRSRC Phase 2 - 4 Mine Storage Piles
   LOCATION 1STRG        VOLUME     686653.852  4099823.858       50.460
** DESCRSRC Phase 1 Mine Storage Area
   LOCATION BDRP         VOLUME     685998.300  4097958.730       63.740
** DESCRSRC Baseline drop and material handling emissions
   LOCATION 2DRP         VOLUME     686537.388  4097156.706       63.190
** DESCRSRC Phase 2 Drop and material handling emissions
   LOCATION 1DRP         VOLUME     686661.435  4099728.633       50.870
** DESCRSRC Phase 1 Drop and material handling emissions
** Source Parameters **
   SRCPARAM BMINE        1.5722E-06     0.000         6
   AREAVERT BMINE        685544.948 4098325.571 685576.366 4097849.823
   AREAVERT BMINE        685915.223 4097396.517 686189.002 4097490.769
   AREAVERT BMINE        686346.089 4097816.162 686485.222 4098345.767
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   SRCPARAM L0003940     0.012987013      0.00      6.19      2.37
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   AREAVERT 2MINE        686927.341 4098260.467 687430.470 4098242.498
   AREAVERT 2MINE        687529.299 4097728.138 687527.053 4097658.509
   AREAVERT 2MINE        686797.066 4097647.278 686729.683 4097586.633
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   AREAVERT 2MINE        686722.945 4096901.569 686430.950 4096883.600
   AREAVERT 2MINE        686181.632 4097350.791 686426.458 4097779.799
   AREAVERT 2MINE        686502.826 4097907.827 686871.188 4097921.304
   SRCPARAM 1MINE        0.0000107358     0.000         4
   AREAVERT 1MINE        686583.153 4099964.338 686772.917 4099965.185
   AREAVERT 1MINE        686780.542 4099486.538 686581.458 4099484.843
   SRCPARAM BSTRG              1.0     3.000    14.884     0.698
   SRCPARAM 2STRG              1.0     3.000    14.884     0.698
   SRCPARAM 1STRG              1.0     3.000    14.884     0.698
   SRCPARAM BDRP               1.0     2.000     0.698     0.465
   SRCPARAM 2DRP               1.0     2.000     0.698     0.465
   SRCPARAM 1DRP               1.0     2.000     0.698     0.465

** Variable Emissions Type: "By Hour-of-Day (HROFDY)"
** Variable Emission Scenario: "Daytime_Ems"
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   EMISFACT 1DRP         HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT 1DRP         HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT 1DRP         HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
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   EMISFACT L0003923     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0003924     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
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   EMISFACT L0003924     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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EMISFACT L0000246     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000246     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000246     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000247     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
```

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   EMISFACT L0000247     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0000248     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
   EMISFACT L0000248     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000248     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000248     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
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   EMISFACT L0000249     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000249     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000249     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
   EMISFACT L0000250     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
   EMISFACT L0000250     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000250     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0000251     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0000252     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0000253     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000253     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0000254     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000254     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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   EMISFACT L0000261     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
   EMISFACT L0000262     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
   EMISFACT L0000262     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000262     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000262     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
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   EMISFACT L0000263     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
   EMISFACT L0000263     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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EMISFACT L0000263     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000264     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000264     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000264     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000264     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000265     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
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EMISFACT L0000265     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
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EMISFACT L0000266     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000266     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000266     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000266     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000267     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000267     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000267     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000267     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000268     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000268     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000268     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000268     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000269     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000269     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000269     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000269     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000270     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
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EMISFACT L0000270     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000270     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000271     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000271     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000271     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000271     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000272     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000272     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000272     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000272     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT L0000273     HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT L0000273     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000273     HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT L0000273     HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
EMISFACT BMINE        HROFDY 0.0 0.0 0.0 0.0 0.0 1.5
EMISFACT BMINE        HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT BMINE        HROFDY 1.5 1.5 1.5 1.5 1.5 1.5
EMISFACT BMINE        HROFDY 1.5 1.5 1.5 0.0 0.0 0.0
SRCGROUP 1DRP     1DRP
SRCGROUP 1HAUL    L0003923 L0003924 L0003925 L0003926 L0003927 L0003928
SRCGROUP 1HAUL    L0003929 L0003930 L0003931 L0003932 L0003933 L0003934
SRCGROUP 1HAUL    L0003935 L0003936 L0003937 L0003938 L0003939 L0003940
SRCGROUP 1HAUL    L0003941 L0003942 L0003943 L0003944 L0003945 L0003946
SRCGROUP 1HAUL    L0003947 L0003948 L0003949 L0003950 L0003951 L0003952
SRCGROUP 1HAUL    L0003953 L0003954 L0003955 L0003956 L0003957 L0003958
SRCGROUP 1HAUL    L0003959 L0003960 L0003961 L0003962 L0003963 L0003964
SRCGROUP 1HAUL    L0003965 L0003966 L0003967 L0003968 L0003969 L0003970
SRCGROUP 1HAUL    L0003971 L0003972 L0003973 L0003974 L0003975 L0003976
SRCGROUP 1HAUL    L0003977 L0003978 L0003979 L0003980 L0003981 L0003982
SRCGROUP 1HAUL    L0003983 L0003984 L0003985 L0003986 L0003987 L0003988
SRCGROUP 1HAUL    L0003989 L0003990 L0003991 L0003992 L0003993 L0003994
SRCGROUP 1HAUL    L0003995 L0003996 L0003997 L0003998 L0003999
SRCGROUP 1MINE    1MINE
SRCGROUP 1STRG    1STRG
SRCGROUP 2DRP     2DRP
SRCGROUP 2HAUL    L0000274 L0000275 L0000276 L0000277 L0000278 L0000279
SRCGROUP 2HAUL    L0000280 L0000281 L0000282 L0000283 L0000284 L0000285
SRCGROUP 2HAUL    L0000286 L0000287 L0000288 L0000289 L0000290 L0000291
SRCGROUP 2HAUL    L0000292 L0000293 L0000294 L0000295 L0000296 L0000297
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SRCGROUP 2HAUL    L0000316 L0000317 L0000318 L0000319 L0000320 L0000321
SRCGROUP 2HAUL    L0000322 L0000323 L0000324 L0000325 L0000326 L0000327
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SRCGROUP 2HAUL    L0000346 L0000347 L0000348 L0000349 L0000350 L0000351
SRCGROUP 2HAUL    L0000352 L0000353 L0000354 L0000355 L0000356 L0000357
SRCGROUP 2HAUL    L0000358 L0000359 L0000360 L0000361 L0000362 L0000363
SRCGROUP 2HAUL    L0000364 L0000365 L0000366 L0000367 L0000368 L0000369
SRCGROUP 2HAUL    L0000370 L0000371 L0000372 L0000373 L0000374 L0000375
SRCGROUP 2HAUL    L0000376 L0000377 L0000378 L0000379 L0000380 L0000381
SRCGROUP 2HAUL    L0000382 L0000383 L0000384 L0000385 L0000386 L0000387
SRCGROUP 2HAUL    L0000388 L0000389 L0000390 L0000391 L0000392 L0000393
SRCGROUP 2HAUL    L0000394 L0000395 L0000396 L0000397 L0000398 L0000399
SRCGROUP 2HAUL    L0000400 L0000401 L0000402 L0000403 L0000404 L0000405
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SRCGROUP 2HAUL    L0000418 L0000419 L0000420 L0000421 L0000422 L0000423
SRCGROUP 2HAUL    L0000424 L0000425 L0000426 L0000427 L0000428 L0000429
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SRCGROUP 2HAUL    L0000436 L0000437 L0000438 L0000439 L0000440 L0000441
SRCGROUP 2HAUL    L0000442 L0000443 L0000444 L0000445 L0000446 L0000447
SRCGROUP 2HAUL    L0000448 L0000449 L0000450 L0000451 L0000452 L0000453
SRCGROUP 2HAUL    L0000454 L0000455 L0000456 L0000457 L0000458 L0000459
SRCGROUP 2HAUL    L0000460 L0000461 L0000462 L0000463 L0000464 L0000465
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SRCGROUP 2HAUL    L0000472 L0000473 L0000474 L0000475 L0000476 L0000477
SRCGROUP 2HAUL    L0000478 L0000479 L0000480 L0000481 L0000482 L0000483
SRCGROUP 2HAUL    L0000484 L0000485 L0000486 L0000487 L0000488 L0000489
SRCGROUP 2HAUL    L0000490
SRCGROUP 2MINE    2MINE
SRCGROUP 2STRG    2STRG
SRCGROUP BDRP     BDRP
SRCGROUP BHAUL    L0000088 L0000089 L0000090 L0000091 L0000092 L0000093
SRCGROUP BHAUL    L0000094 L0000095 L0000096 L0000097 L0000098 L0000099
SRCGROUP BHAUL    L0000100 L0000101 L0000102 L0000103 L0000104 L0000105
SRCGROUP BHAUL    L0000106 L0000107 L0000108 L0000109 L0000110 L0000111
SRCGROUP BHAUL    L0000112 L0000113 L0000114 L0000115 L0000116 L0000117
SRCGROUP BHAUL    L0000118 L0000119 L0000120 L0000121 L0000122 L0000123
SRCGROUP BHAUL    L0000124 L0000125 L0000126 L0000127 L0000128 L0000129
SRCGROUP BHAUL    L0000130 L0000131 L0000132 L0000133 L0000134 L0000135
SRCGROUP BHAUL    L0000136 L0000137 L0000138 L0000139 L0000140 L0000141
SRCGROUP BHAUL    L0000142 L0000143 L0000144 L0000145 L0000146 L0000147
SRCGROUP BHAUL    L0000148 L0000149 L0000150 L0000151 L0000152 L0000153
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SRCGROUP BHAUL    L0000160 L0000161 L0000162 L0000163 L0000164 L0000165
SRCGROUP BHAUL    L0000166 L0000167 L0000168 L0000169 L0000170 L0000171
SRCGROUP BHAUL    L0000172 L0000173 L0000174 L0000175 L0000176 L0000177
SRCGROUP BHAUL    L0000178 L0000179 L0000180 L0000181 L0000182 L0000183
SRCGROUP BHAUL    L0000184 L0000185 L0000186 L0000187 L0000188 L0000189
SRCGROUP BHAUL    L0000190 L0000191 L0000192 L0000193 L0000194 L0000195
SRCGROUP BHAUL    L0000196 L0000197 L0000198 L0000199 L0000200 L0000201
SRCGROUP BHAUL    L0000202 L0000203 L0000204 L0000205 L0000206 L0000207
SRCGROUP BHAUL    L0000208 L0000209 L0000210 L0000211 L0000212 L0000213
SRCGROUP BHAUL    L0000214 L0000215 L0000216 L0000217 L0000218 L0000219
SRCGROUP BHAUL    L0000220 L0000221 L0000222 L0000223 L0000224 L0000225
SRCGROUP BHAUL    L0000226 L0000227 L0000228 L0000229 L0000230 L0000231
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SRCGROUP BHAUL    L0000238 L0000239 L0000240 L0000241 L0000242 L0000243
SRCGROUP BHAUL    L0000244 L0000245 L0000246 L0000247 L0000248 L0000249
SRCGROUP BHAUL    L0000250 L0000251 L0000252 L0000253 L0000254 L0000255
SRCGROUP BHAUL    L0000256 L0000257 L0000258 L0000259 L0000260 L0000261
SRCGROUP BHAUL    L0000262 L0000263 L0000264 L0000265 L0000266 L0000267
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```
   SRCGROUP BHAUL    L0000268 L0000269 L0000270 L0000271 L0000272 L0000273
   SRCGROUP BMINE    BMINE
   SRCGROUP BSTRG    BSTRG
   SRCGROUP ALL
SO FINISHED
**
****************************************
** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
   INCLUDED V_Los_Banos.rou
RE FINISHED
**
****************************************
** AERMOD Meteorology Pathway
****************************************
**
**
ME STARTING
   SURFFILE Los_Banos_MM5_99004\LosBanos_2004-2008.SFC
   PROFFILE Los_Banos_MM5_99004\LosBanos_2004-2008.PFL
   SURFDATA 99004 2004 Los_Banos
   UAIRDATA 66666 2004
   PROFBASE 42.0 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST V_LOS_BANOS.AD\01H1GALL.PLT 31
   PLOTFILE 1 1DRP 1ST V_LOS_BANOS.AD\01H1G001.PLT 32
   PLOTFILE 1 1HAUL 1ST V_LOS_BANOS.AD\01H1G002.PLT 33
   PLOTFILE 1 1MINE 1ST V_LOS_BANOS.AD\01H1G003.PLT 34
   PLOTFILE 1 1STRG 1ST V_LOS_BANOS.AD\01H1G004.PLT 35
   PLOTFILE 1 2DRP 1ST V_LOS_BANOS.AD\01H1G005.PLT 36
   PLOTFILE 1 2HAUL 1ST V_LOS_BANOS.AD\01H1G006.PLT 37
   PLOTFILE 1 2MINE 1ST V_LOS_BANOS.AD\01H1G007.PLT 38
   PLOTFILE 1 2STRG 1ST V_LOS_BANOS.AD\01H1G008.PLT 39
   PLOTFILE 1 BDRP 1ST V_LOS_BANOS.AD\01H1G009.PLT 40
   PLOTFILE 1 BHAUL 1ST V_LOS_BANOS.AD\01H1G010.PLT 41
   PLOTFILE 1 BMINE 1ST V_LOS_BANOS.AD\01H1G011.PLT 42
   PLOTFILE 1 BSTRG 1ST V_LOS_BANOS.AD\01H1G012.PLT 43
   PLOTFILE PERIOD ALL V_LOS_BANOS.AD\PE00GALL.PLT 44
   PLOTFILE PERIOD 1DRP V_LOS_BANOS.AD\PE00G001.PLT 45
   PLOTFILE PERIOD 1HAUL V_LOS_BANOS.AD\PE00G002.PLT 46
   PLOTFILE PERIOD 1MINE V_LOS_BANOS.AD\PE00G003.PLT 47
   PLOTFILE PERIOD 1STRG V_LOS_BANOS.AD\PE00G004.PLT 48
   PLOTFILE PERIOD 2DRP V_LOS_BANOS.AD\PE00G005.PLT 49
   PLOTFILE PERIOD 2HAUL V_LOS_BANOS.AD\PE00G006.PLT 50
   PLOTFILE PERIOD 2MINE V_LOS_BANOS.AD\PE00G007.PLT 51
   PLOTFILE PERIOD 2STRG V_LOS_BANOS.AD\PE00G008.PLT 52
   PLOTFILE PERIOD BDRP V_LOS_BANOS.AD\PE00G009.PLT 53
   PLOTFILE PERIOD BHAUL V_LOS_BANOS.AD\PE00G010.PLT 54
   PLOTFILE PERIOD BMINE V_LOS_BANOS.AD\PE00G011.PLT 55
   PLOTFILE PERIOD BSTRG V_LOS_BANOS.AD\PE00G012.PLT 56
   SUMMFILE V_Los_Banos.sum
OU FINISHED
**
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** Project Parameters
****************************************
** PROJCTN  CoordinateSystemUTM
** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS    m
** ZONE     10
** ZONEINX  0
**

```

```
**
****************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 10.2.1
** Lakes Environmental Software Inc.
** Date: 7/18/2022
** File: C:\Modeling\V_Los_Banos_Acute\V_Los_Banos_Acute.ADI
**
****************************************
**
**
****************************************
** AERMOD Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE C:\Modeling\V_Los_Banos_Acute\V_Los_Banos_Acute.isc
   MODELOPT DFAULT CONC
   AVERTIME 1 PERIOD
   POLLUTID HRA
   RUNORNOT RUN
   ERRORFIL V_Los_Banos_Acute.err
CO FINISHED
**
****************************************
** AERMOD Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION BMINE        AREAPOLY   685544.948  4098325.571       64.850
** DESCRSRC Baseline Mining Area
** ---------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = 1HAUL
** DESCRSRC Haul Road in Phase 1
** PREFIX
** Length of Side = 13.32
** Configuration = Adjacent
** Emission Rate = 1.0
** Vertical Dimension = 5.10
** SZINIT = 2.37
** Nodes = 16
** 687348.226, 4099737.554, 50.61, 0.00, 6.19
** 687306.198, 4099667.648, 49.85, 0.00, 6.19
** 687264.120, 4099617.465, 49.67, 0.00, 6.19
** 687203.802, 4099561.003, 49.66, 0.00, 6.19
** 687155.925, 4099530.481, 49.66, 0.00, 6.19
** 687108.703, 4099499.629, 49.66, 0.00, 6.19
** 687055.141, 4099450.501, 51.60, 0.00, 6.19
** 687020.349, 4099419.653, 51.66, 0.00, 6.19
** 686957.968, 4099433.305, 52.62, 0.00, 6.19
** 686861.306, 4099458.493, 52.66, 0.00, 6.19
** 686771.731, 4099492.342, 52.54, 0.00, 6.19
** 686756.226, 4099503.769, 52.39, 0.00, 6.19
** 686756.921, 4099584.054, 51.75, 0.00, 6.19
** 686757.971, 4099645.706, 51.37, 0.00, 6.19
** 686726.529, 4099693.867, 51.06, 0.00, 6.19
** 686681.362, 4099761.551, 50.77, 0.00, 6.19
** ---------------------------------------------------------------------
   LOCATION L0003923     VOLUME   687344.796 4099731.848 50.44
   LOCATION L0003924     VOLUME   687337.935 4099720.437 50.23
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LOCATION L0003925     VOLUME   687331.074 4099709.025 50.18
LOCATION L0003926     VOLUME   687324.213 4099697.614 50.03
LOCATION L0003927     VOLUME   687317.352 4099686.202 49.92
LOCATION L0003928     VOLUME   687310.492 4099674.791 49.84
LOCATION L0003929     VOLUME   687302.997 4099663.831 49.72
LOCATION L0003930     VOLUME   687294.442 4099653.628 49.69
LOCATION L0003931     VOLUME   687285.887 4099643.425 49.66
LOCATION L0003932     VOLUME   687277.331 4099633.222 49.66
LOCATION L0003933     VOLUME   687268.776 4099623.019 49.66
LOCATION L0003934     VOLUME   687259.690 4099613.318 49.66
LOCATION L0003935     VOLUME   687249.969 4099604.219 49.66
LOCATION L0003936     VOLUME   687240.248 4099595.119 49.66
LOCATION L0003937     VOLUME   687230.527 4099586.020 49.66
LOCATION L0003938     VOLUME   687220.807 4099576.921 49.66
LOCATION L0003939     VOLUME   687211.086 4099567.821 49.66
LOCATION L0003940     VOLUME   687200.987 4099559.208 49.66
LOCATION L0003941     VOLUME   687189.760 4099552.051 49.66
LOCATION L0003942     VOLUME   687178.532 4099544.893 49.66
LOCATION L0003943     VOLUME   687167.304 4099537.735 49.66
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LOCATION L0003945     VOLUME   687144.928 4099523.296 49.66
LOCATION L0003946     VOLUME   687133.781 4099516.014 49.66
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LOCATION L0003951     VOLUME   687081.716 4099474.876 50.91
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LOCATION L0003959     VOLUME   686996.940 4099424.776 52.14
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LOCATION L0003962     VOLUME   686957.919 4099433.318 52.61
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LOCATION L0003964     VOLUME   686932.149 4099440.033 52.67
LOCATION L0003965     VOLUME   686919.264 4099443.391 52.69
LOCATION L0003966     VOLUME   686906.379 4099446.748 52.72
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LOCATION L0003968     VOLUME   686880.609 4099453.463 52.68
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LOCATION L0003972     VOLUME   686830.144 4099470.269 52.62
LOCATION L0003973     VOLUME   686817.688 4099474.976 52.57
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** DESCRSRC Baseline Haul Road
** PREFIX
** Length of Side = 13.32
** Configuration = Adjacent
** Emission Rate = 1.0
** Vertical Dimension = 5.10
** SZINIT = 2.37
** Nodes = 22
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   LOCATION L0000117     VOLUME   687181.040 4099385.355 50.11
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   LOCATION L0000137     VOLUME   687035.713 4099165.483 52.05
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   LOCATION L0000159     VOLUME   686886.949 4098960.535 54.27
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   LOCATION L0000161     VOLUME   686861.206 4098953.738 54.43
   LOCATION L0000162     VOLUME   686848.524 4098949.680 54.20
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   LOCATION L0000165     VOLUME   686810.479 4098937.506 52.87
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   LOCATION L0000168     VOLUME   686776.454 4098918.987 52.74
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   LOCATION L0000186     VOLUME   686724.476 4098696.573 53.24
   LOCATION L0000187     VOLUME   686724.476 4098683.258 53.39
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   LOCATION L0000202     VOLUME   686694.796 4098491.221 54.13
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   LOCATION L0000219     VOLUME   686562.059 4098311.866 56.08
   LOCATION L0000220     VOLUME   686557.279 4098299.438 56.17
   LOCATION L0000221     VOLUME   686552.499 4098287.010 56.21
   LOCATION L0000222     VOLUME   686547.720 4098274.583 56.19
   LOCATION L0000223     VOLUME   686542.940 4098262.155 56.08
   LOCATION L0000224     VOLUME   686538.160 4098249.727 55.99
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   LOCATION L0000229     VOLUME   686510.314 4098189.558 55.79
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   LOCATION L0000238     VOLUME   686446.801 4098087.937 55.66
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   LOCATION L0000251     VOLUME   686303.026 4098010.189 55.73
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   LOCATION L0000259     VOLUME   686197.704 4097994.243 59.31
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** End of LINE VOLUME Source ID = BHAUL
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** Configuration = Adjacent
** Emission Rate = 1.0
** Vertical Dimension = 5.10
** SZINIT = 2.37
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   LOCATION L0000489     VOLUME   686513.304 4097152.775 63.31
   LOCATION L0000490     VOLUME   686511.398 4097139.596 63.58
** End of LINE VOLUME Source ID = 2HAUL
   LOCATION 2MINE        AREAPOLY   686927.341  4098260.467       56.840
** DESCRSRC Mining Area Phases 2-4
   LOCATION 1MINE        AREAPOLY   686583.153  4099964.338       49.770
** DESCRSRC Mining Area Phase 1
   LOCATION BSTRG        VOLUME     685773.140  4098205.210       63.170
** DESCRSRC Baseline mine storage pile
   LOCATION 2STRG        VOLUME     686605.516  4097178.677       62.820
** DESCRSRC Phase 2 - 4 Mine Storage Piles
   LOCATION 1STRG        VOLUME     686653.852  4099823.858       50.460
** DESCRSRC Phase 1 Mine Storage Area
   LOCATION BDRP         VOLUME     685998.300  4097958.730       63.740
** DESCRSRC Baseline drop and material handling emissions
   LOCATION 2DRP         VOLUME     686537.388  4097156.706       63.190
** DESCRSRC Phase 2 Drop and material handling emissions
   LOCATION 1DRP         VOLUME     686661.435  4099728.633       50.870
** DESCRSRC Phase 1 Drop and material handling emissions
** Source Parameters **
   SRCPARAM BMINE        1.5722E-06     0.000         6
   AREAVERT BMINE        685544.948 4098325.571 685576.366 4097849.823
   AREAVERT BMINE        685915.223 4097396.517 686189.002 4097490.769
   AREAVERT BMINE        686346.089 4097816.162 686485.222 4098345.767
** LINE VOLUME Source ID = 1HAUL
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   SRCPARAM L0003924     0.012987013      0.00      6.19      2.37
   SRCPARAM L0003925     0.012987013      0.00      6.19      2.37
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   SRCPARAM L0003928     0.012987013      0.00      6.19      2.37
   SRCPARAM L0003929     0.012987013      0.00      6.19      2.37
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   AREAVERT 2MINE        687529.299 4097728.138 687527.053 4097658.509
   AREAVERT 2MINE        686797.066 4097647.278 686729.683 4097586.633
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   AREAVERT 2MINE        686722.945 4096901.569 686430.950 4096883.600
   AREAVERT 2MINE        686181.632 4097350.791 686426.458 4097779.799
   AREAVERT 2MINE        686502.826 4097907.827 686871.188 4097921.304
   SRCPARAM 1MINE        0.0000107358     0.000         4
   AREAVERT 1MINE        686583.153 4099964.338 686772.917 4099965.185
   AREAVERT 1MINE        686780.542 4099486.538 686581.458 4099484.843
   SRCPARAM BSTRG              1.0     3.000    14.884     0.698
   SRCPARAM 2STRG              1.0     3.000    14.884     0.698
   SRCPARAM 1STRG              1.0     3.000    14.884     0.698
   SRCPARAM BDRP               1.0     2.000     0.698     0.465
   SRCPARAM 2DRP               1.0     2.000     0.698     0.465
   SRCPARAM 1DRP               1.0     2.000     0.698     0.465

** Variable Emissions Type: "By Hour-of-Day (HROFDY)"
** Variable Emission Scenario: "Daytime_Ems"
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EMISFACT L0000273     HROFDY 1.0 1.0 1.0 0.0 0.0 0.0
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EMISFACT BMINE        HROFDY 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT BMINE        HROFDY 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT BMINE        HROFDY 1.0 1.0 1.0 0.0 0.0 0.0
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SRCGROUP 1HAUL    L0003929 L0003930 L0003931 L0003932 L0003933 L0003934
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SRCGROUP 1STRG    1STRG
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   SRCGROUP BSTRG    BSTRG
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   SURFDATA 99004 2004 Los_Banos
   UAIRDATA 66666 2004
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   PLOTFILE 1 BSTRG 1ST V_LOS_BANOS_ACUTE.AD\01H1G012.PLT 43
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   PLOTFILE PERIOD 1DRP V_LOS_BANOS_ACUTE.AD\PE00G001.PLT 45
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** Project Parameters
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** PROJCTN  CoordinateSystemUTM
** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS    m
** ZONE     10
** ZONEINX  0
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APPENDIX F

CalEEMod OUTPUT FILE DOCUMENTATION

Los Banos Custom Report

Table of Contents

5.3.1. Unmitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Los Banos
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	21.4
Location	37.02608230450251, -120.8947429293573
County	Merced
City	Unincorporated
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2312
EDFZ	5
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
User Defined Industrial	1.00	User Defined Unit	10.0	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.81	4.05	39.8	36.5	0.05	1.81	7.99	9.79	1.66	4.00	5.66	—	5,435	5,435	0.22	0.05	0.02	5,455
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.34	0.29	2.74	2.69	< 0.005	0.13	0.46	0.58	0.12	0.22	0.34	—	402	402	0.02	< 0.005	0.03	404
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.06	0.05	0.50	0.49	< 0.005	0.02	0.08	0.11	0.02	0.04	0.06	—	66.6	66.6	< 0.005	< 0.005	< 0.005	66.9

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	4.81	4.05	39.8	36.5	0.05	1.81	7.99	9.79	1.66	4.00	5.66	—	5,435	5,435	0.22	0.05	0.02	5,455

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.34	0.29	2.74	2.69	< 0.005	0.13	0.46	0.58	0.12	0.22	0.34	—	402	402	0.02	< 0.005	0.03	404
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.06	0.05	0.50	0.49	< 0.005	0.02	0.08	0.11	0.02	0.04	0.06	—	66.6	66.6	< 0.005	< 0.005	< 0.005	66.9

3. Construction Emissions Details

3.1. Site Preparation (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.70	3.95	39.7	35.5	0.05	1.81	—	1.81	1.66	—	1.66	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	7.85	7.85	—	3.97	3.97	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	1.09	0.97	< 0.005	0.05	—	0.05	0.05	—	0.05	—	145	145	0.01	< 0.005	—	146

Dust From Material Movement	—	—	—	—	—	—	0.22	0.22	—	0.11	0.11	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.20	0.18	< 0.005	0.01	—	0.01	0.01	—	0.01	—	24.0	24.0	< 0.005	< 0.005	—	24.1
Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.10	1.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	140	140	0.01	0.01	0.02	142
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.95	3.95	< 0.005	< 0.005	0.01	4.01
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.65	0.65	< 0.005	< 0.005	< 0.005	0.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.43	2.04	20.0	19.7	0.03	0.94	—	0.94	0.87	—	0.87	—	2,958	2,958	0.12	0.02	—	2,968
Dust From Material Movemen	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.17	1.64	1.62	< 0.005	0.08	—	0.08	0.07	—	0.07	—	243	243	0.01	< 0.005	—	244
Dust From Material Movemen	—	—	—	—	—	—	0.23	0.23	—	0.11	0.11	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.30	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	40.3	40.3	< 0.005	< 0.005	—	40.4

Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	0.09	0.87	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	120	120	0.01	0.01	0.02	121
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	10.1	10.1	< 0.005	< 0.005	0.02	10.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.68	1.68	< 0.005	< 0.005	< 0.005	1.71
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

5. Activity Data

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	10.9	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.27	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	10.9	LDA,LDT1,LDT2
Grading	Vendor	—	8.27	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%

APPENDIX C

Biological Resource Report Assessment (ELMT, 2024)

TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY

MERCED COUNTY, CALIFORNIA

BIOLOGICAL RESOURCES ASSESSMENT

Prepared For:

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June 2022
Updated February 2024

TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY

MERCED COUNTY, CALIFORNIA

BIOLOGICAL RESOURCES ASSESSMENT

The undersigned certify that the statements furnished in this report and exhibits present data and information required for this biological evaluation, and the facts, statements, and information presented is a complete and accurate account of the findings and conclusions to the best of our knowledge and beliefs.

Travis J. McGill
Director

Thomas J. McGill, Ph.D.
Managing Director

June 2022
Updated February 2024

Table of Contents

EXHIBITS

APPENDIX

Section 1 Introduction

This report contains the findings of ELMT Consulting's (ELMT) Biological Resources Assessment for the Triangle Rock Products Los Banos Sand and Gravel Quarry (project site or site) located in Merced County, California. ELMT biologist Travis J. McGill inventoried and evaluated the condition of the habitat within the project site on February 9, 2022 to characterize existing site conditions and to assess the probability of occurrence of special-status[1] plant and wildlife species that could pose a constraint to project implementation. This report provides an in-depth assessment of the suitability of the on-site habitat to support special status wildlife species as well as special-status plant identified by the California Natural Diversity Data Base (CNDDB), the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California, as well as other electronic databases to identify species with the potential for occurring in the vicinity of the Project site.

The Project site was also evaluated for its potential to support natural drainage features that have the potential to fall under the regulatory authority of the United States Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), or California Department of Fish and Wildlife (CDFW) pursuant to Sections 404, 401of the Federal Clean Water Act (CWA) and the California Porter-Cologne Water Quality Control Act, and Section 1600 *et seq.* of the Fish and Game Code, respectively.

The results of the Biological Resources Assessment are summarized as follows:

- No special-status plant species were observed within the boundaries of the project site during the field investigation and are presumed absent. No additional special-status plant species surveys or mitigation is required.
- No special-status mammal species were observed within the boundaries of the project site during the field investigation and are presumed absent.
- California horned lark (*Eremophila alpestris actia*), with a CNDDB rank of S4, was the only special-status avian species observed onsite. No other avian species were observed within the boundaries of the project site during the field investigation and are presumed absent. The site has moderate potential to support nesting birds, and low potential to support Swainson's hawk. In order to ensure the Project does not result in any impacts, a pre-construction nesting bird clearance survey should be conducted if initial vegetation clearing/ground disturbance occurs during nesting season (February 1 – August 31).
- No jurisdictional drainage and/or wetland features are located within the project site.
- No special-status plant communities are present within the project site.
- Implementation of the proposed project will not disrupt or have any adverse effects on any migratory corridors or linkages in the surrounding area.

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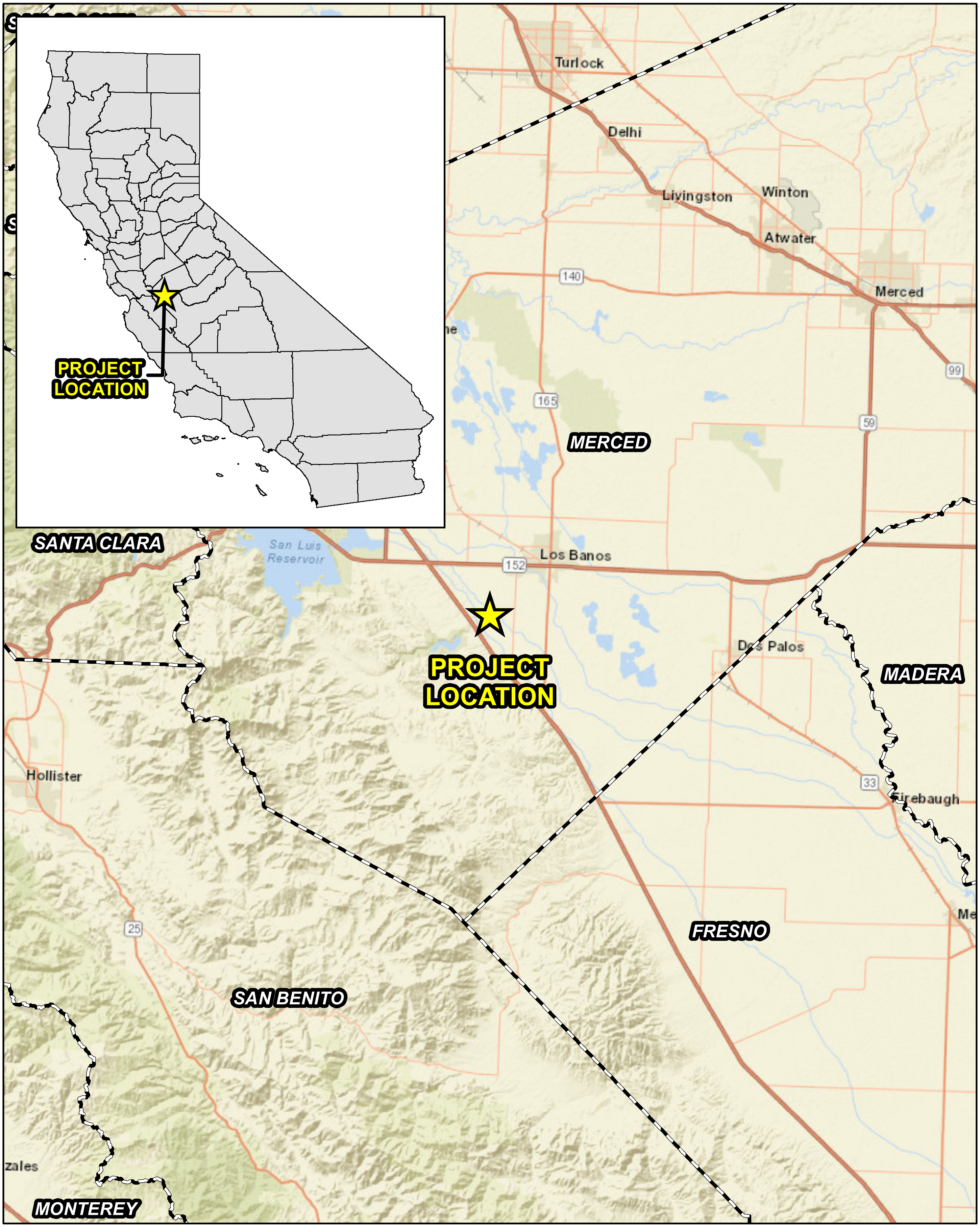
[1] As used in this report, "special-status" refers to plant and wildlife species that are federally or State listed, proposed, or candidates; plant species that have been designated a California Native Plant Society (CNPS) Rare Plant Rank; and wildlife species that are designated by the California Department of Fish and Wildlife (CDFW) as fully protected, species of special concern, or watch list species.

1.1 PROJECT LOCATION

The project site is generally located north and east of Interstate 5, west of State Route 165, and South of State Route 33, approximately 4 miles southwest of the City of Los Banos, Merced County, California (Exhibit 1, *Regional Vicinity*). The project site is depicted on the Volta quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map series in Section 32 of Township 10 South, Range 10 East, and Section 5 of Township 11 South, Range 10 East (Exhibit 2, *Site Vicinity*). The Sunset portion of the project site is located south of Sunset Avenue, west of S. Creek Road, east of Canyon Road and north of the Delta Mendota Canal within Assessor Parcel Number (APN) 083-210-033-000. The Turner portion of the project site is located west of S. Creek Road, east of Canyon Road, south of the Delta Mendota Canal, and north of Almond Drive within APNs 088-070-039-000, 088-070-079-000, and 088-070-086-000. Refer to Exhibit 3, *Project Site*.

1.2 PROJECT DESCRIPTION

The proposed project involves the continuation of mineral resource recovery operations in two undeveloped parcels of land, the Sunset and Turner properties, which are adjacent to Vulcan Material's existing Triangle Rock Products Los Banos Sand and Gravel Quarry (Refer to Exhibit 3).



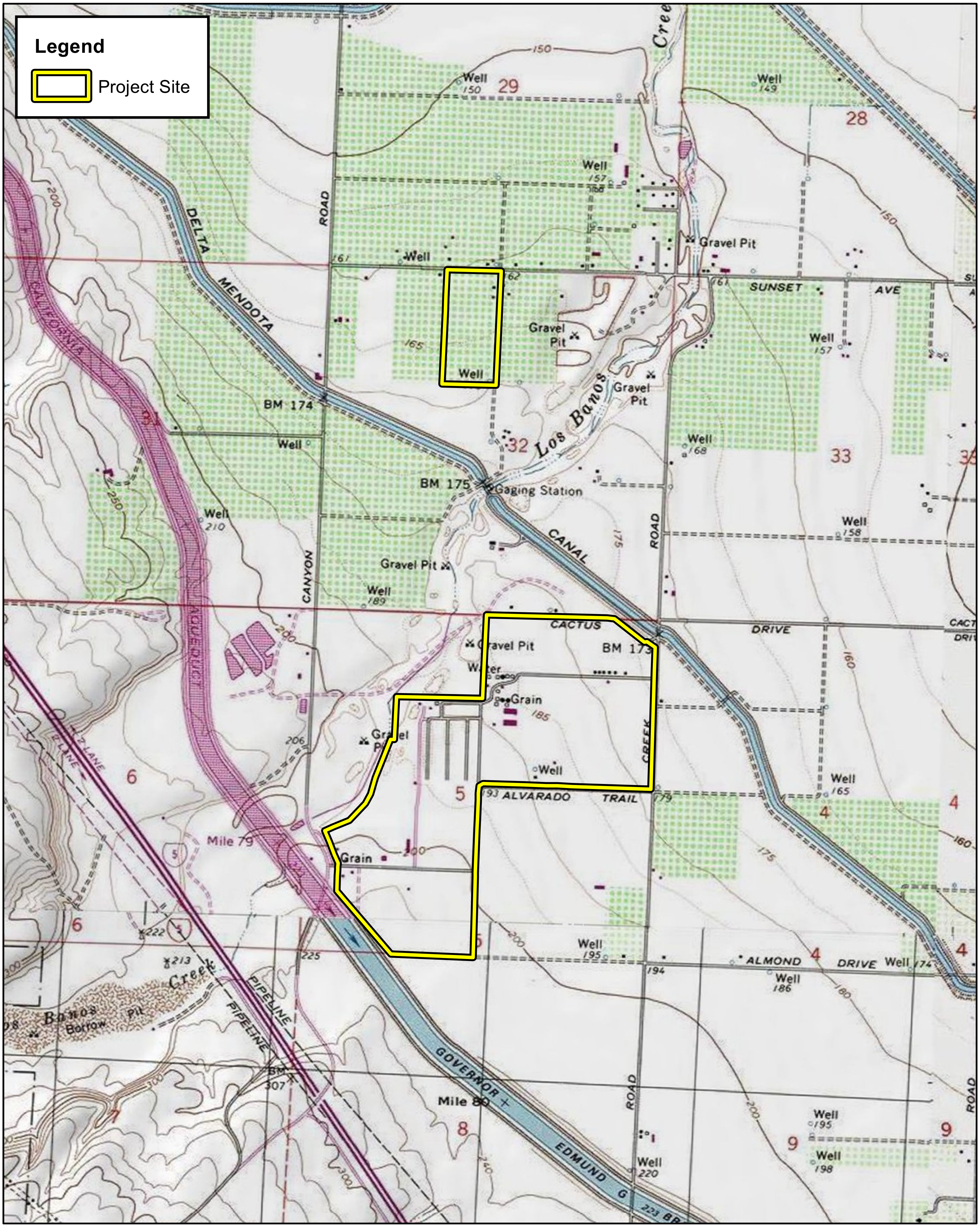
Source: World Street Map, Merced County

ELMT CONSULTING

LOS BANOS QUARRY
HABITAT ASSESSMENT

Regional Vicinity

Exhibit 1



ELMT CONSULTING

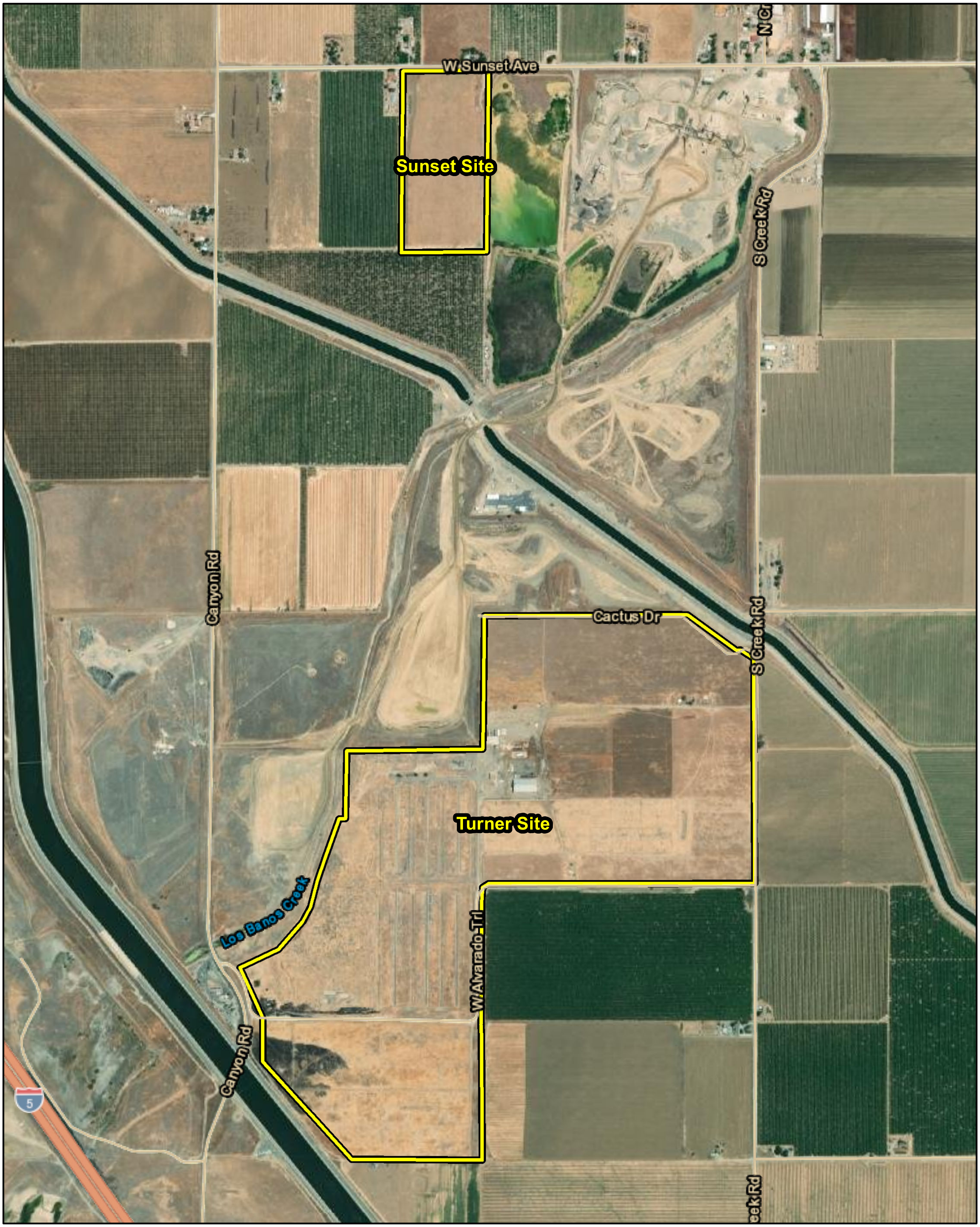
0 1,000 2,000 4,000 Feet

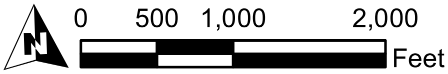
Source: USA Topographic Map, Merced County

LOS BANOS QUARRY
HABITAT ASSESSMENT

Site Vicinity

Exhibit 2





Source: ESRI Aerial Imagery, Merced County

LOS BANOS QUARRY
HABITAT ASSESSMENT

Project Site

Exhibit 3

Section 2 Methodology

ELMT conducted a thorough literature review and records search to determine whether special-status plant and wildlife species have the potential to occur on or within the general vicinity of the project site. In addition, a general field investigation of the project site was conducted and provided information on the existing conditions at the project site and potential for special-status plant and wildlife species to occur.

2.1 LITERATURE REVIEW

Prior to conducting the assessment, a literature review and records search was conducted for special-status biological resources potentially occurring on the project site and within the adjacent 4-quadrangles (Volta, Los Banos, Ortigalita Peak North West, and Charleston School USGS 7.5-minute quadrangles). Previously recorded occurrences of special-status plant and wildlife species and their proximity to the project site were determined through a query of the CDFW QuickView Tool in the Biogeographic Information and Observation System (BIOS), CNDDB Rarefind 5, the California Native Plant Society (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California, Calflora Database, compendia of special-status species published by CDFW, and the U.S. Fish and Wildlife Service (USFWS) species listings.

All available reports, survey results, and literature detailing the biological resources previously observed on or within the vicinity of the project site were reviewed to understand existing site conditions and note the extent of any disturbances that have occurred on the project site that would otherwise limit the distribution of special-status biological resources. Standard field guides and texts were reviewed for specific habitat requirements of special-status and non-special-status biological resources, as well as the following resources:

- Google Earth Pro historic aerial imagery (1985 – 2023);
- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (2023);
- USFWS Critical Habitat designations for Threatened and Endangered Species and Primary Constituent Elements (PCEs) for CTS and vernal pool fairy shrimp; and
- USFWS and CDFW Interim Guidance and Onsite Assessment and Field Surveys for Determining Presence or a Negative Finding of California Tiger Salamander. (2003).

The literature review provided a baseline from which to inventory the biological resources potentially occurring on the proposed distribution alignment. Additional recorded occurrences of these species found on or near the proposed distribution alignment were derived from database queries. The CNDDB ArcGIS database was used, in conjunction with ArcGIS software, to locate the nearest occurrence and determine the distance from the proposed distribution alignment.

2.2 FIELD INVESTIGATION

ELMT biologist Travis J. McGill inventoried and evaluated the extent and conditions of the existing plant communities found within the boundaries of the survey area between 0700 and 1100 hours on February 9, 2022. Plant communities identified on aerial photographs during the literature review were verified by walking meandering transects through the plant communities and along boundaries between plant communities. The plant communities were evaluated for their potential to support special-status plant and wildlife species. In addition, field staff identified natural corridors and linkages, if present, that may support the movement of wildlife through the area. Special attention was given to special-status habitats and/or undeveloped areas, which have higher potentials to support special-status plant and wildlife species.

All plant and wildlife species observed, as well as dominant plant species within each plant community, were recorded. Wildlife detections were made through observation of scat, trails, tracks, burrows, nests, and/or visual and aural observation. In addition, site characteristics such as soil condition, topography, hydrology, anthropogenic disturbances, indicator species, condition of on-site plant communities, and presence of potential jurisdictional drainage and/or wetland features were noted.

Special attention was paid to any special-status habitats and/or undeveloped, natural areas, which have a moderate or higher potential to support special-status plant and wildlife species. Areas determined to provide suitable habitat for special-status plant and wildlife species were closely surveyed for signs of presence during the field investigation. Attention was given to the suitability of habitats on the project site to support special-status species.

2.3 SOIL SERIES ASSESSMENT

On-site and adjoining soils were researched prior to the field visit using the USDA NRCS Custom Soil Resource Report for Merced County, California. In addition, a review of the local geological conditions and historical aerial photographs was conducted to assess the ecological changes and disturbances that have occurred on the project site.

2.4 PLANT COMMUNITIES

Plant communities were mapped using USGS 7.5-minute topographic maps for the Volta, Los Banos, Ortigalita Peak North West, and Charleston School quadrangles and aerial photography. The plant communities were classified in accordance with Sawyer, Keeler-Wolf and Evens (2009) and delineated on an aerial photograph, and then digitized into GIS ArcView. The ArcView application was used to compute the area of each plant community in acres.

2.5 PLANTS

Common plant species observed during the field investigation were identified by visual characteristics and morphology in the field and recorded in a field notebook. Unusual and unfamiliar plants were photographed in the field and identified in the laboratory using taxonomic guides. Taxonomic nomenclature used in this study follows the 2012 Jepson Manual. In this report, scientific names are provided immediately following common names of plant species (first reference only).

2.6 WILDLIFE

Wildlife species detected during the field investigation by sight, calls, tracks, scat, or other sign were recorded during surveys in a field notebook. Field guides used to assist with identification of species during surveys included The Sibley Guide to Birds (Sibley 2014) for birds, A Field Guide to Western Reptiles and Amphibians (Stebbins 2003) for herpetofauna, and A Field Guide to Mammals of North America (Reid 2006). Although common names of wildlife species are standardized, scientific names are provided immediately following common names in this report (first reference only).

2.7 JURISDICTIONAL DRAINAGES AND WETLANDS

Aerial photography was reviewed prior to conducting a field investigation in order to locate and inspect any potential natural drainage features, ponded areas, or water bodies that may fall under the jurisdiction of the Corps, Regional Board, and/or CDFW. In general, surface drainage features indicated as blue-line streams on USGS maps that are observed or expected to exhibit evidence of flow are considered potential riparian/riverine habitat and can also be subject to state and federal regulatory jurisdiction. In addition, ELMT reviewed jurisdictional waters information through examining historical aerial photographs to gain an understanding of the impact of land-use on natural drainage patterns in the area. The USFWS NWI and Environmental Protection Agency (EPA) Water Program "My Waters" data layers were also reviewed to determine whether any hydrologic features and wetland areas have been documented on or within the vicinity of the Project site.

Section 3 Existing Conditions

3.1 LOCAL CLIMATE

Merced County features a Mediterranean climate with warm, sunny, dry summers and cool, rainy, mild winters. Climatological data obtained for the City of Merced in Merced County indicates the average annual precipitation is 12.27 inches per year. Almost all the precipitation occurs in the months between November and March, with hardly any occurring between the months of July and August. The wettest month is January, with a monthly average total precipitation of 2.46 inches. The average maximum and minimum temperatures for Merced are 76.3 and 47.1 degrees Fahrenheit (F), respectively, with July being the hottest month (monthly average 97.1° F) and December being the coldest (monthly average 35.6° F). Temperatures during the site visits were in the mid-50s to low-60s (degrees Fahrenheit) with infrequent, light winds and little to no cloud cover.

3.2 TOPOGRAPHY AND SOILS

On-site surface elevation slightly slopes from southwest to northeast and ranges from approximately 160 to 210 feet above mean sea level. Based on the USDA NRCS Soil Survey, the project site is underlain by the following soil units: Carranza-Woo (0 to 2 percent slopes), Woo clay loam (0 to 2 percent slopes), and Xerofluvents, extremely gravelly. Refer to Exhibit 4, *Soils*.

3.3 SURROUNDING LAND USES

The project site is generally bordered by existing agricultural fields to the west, south and east, rural residential developments and active mineral extraction operations to the north. The Delta Mendota Canal and California Aqueduct flow in a northwest to southeast direction north and south of the project site. Additionally, Los Banos Creek flows in a southwest to northeast direction along the western boundary of the Turner portion of the project site. The City of Los Banos is located approximately 4 miles northeast of the project site.

ELMT CONSULTING

0 500 1,000 2,000
Feet

Source: ESRI Aerial Imagery, Soil Survey Geographic Database, Merced County

LOS BANOS QUARRY
HABITAT ASSESSMENT

Soils

Exhibit 4

Section 4 Discussion

4.1 SITE CONDITIONS

The project site, both the Sunset and Turner properties, consists of vacant, undeveloped land that has been subject to a variety of anthropogenic disturbances associated with historic agricultural and ranching activities, and routine weed abatement/disking activities. Historic aerials show these activities have been ongoing since at least 1946. Prior to conducting the field investigation, aerial photography was reviewed to document existing site conditions and document the changes to the project site and surrounding area.

The Turner site is bordered on the northeast by the Mendota canal and on the southwest by the California Aqueduct. The area between the canals and to the southeast of the property is comprised entirely of irrigated row crops under active cultivation. The area northwest and between the canals is the Los Banos Creek channel. This area appears to have undergone historical mining operations in the past but is not currently active. North of the creek channel is again active cultivation of irrigated fields. The Sunset site is located north of the Mendota canal and surrounded by existing agricultural fields, and rural residential land uses.

4.2 VEGETATION

Four (4) plant communities, rather land use types, were observed on site. These include, fallow agricultural, active agricultural, disturbed, and developed (refer to Exhibit 5, *Vegetation*). These plant communities, rather land use types, are described in further detail below. The Turner site supports disturbed grassland, agricultural, disturbed, and developed land cover types. The Sunset site supports agricultural and disturbed land cover types.

4.2.1 Fallow Agricultural

The majority of the project site, specifically the Turner site, supports a disturbed fallow agricultural plant community. Within this plant community are abandoned stock yard and affiliated uses. Most of the concrete foundations for the pens are still intact within this area. This plant community is frequently mowed/disked for weed abatement and reduced fire hazard activities. The disturbed fallow agricultural lands have also been used to dry and stockpile the manure generated by the stock operations. The plant community is dominated by non-native grasses and forbs. Plant species found in this plant community include wild barley (*Hordeum* ssp.), soft chess (*Bromus hordeaceus*), red brome (*Bromus rubens*), ripgut (*Bromus diandrus*), and wild oats (*Avena* ssp.).

4.2.2 Active Agricultural

The current farming operations primarily occur on the Sunset site, while the northeastern and southwestern portions of the Turner site historically supported agricultural fields that are now fallow, as discussed in Section 4.2.1.

4.2.3 Disturbed

Disturbed areas are found throughout the project site. These areas are routinely exposed to anthropogenic disturbances associated with the agricultural activities and vehicle traffic. Surface soils within these areas are generally devoid of vegetation and have been heavily disturbed/compacted from existing activities.

4.2.4 Developed

Developed areas occur throughout the site and includes remanent concrete slabs of former residences, as well as a larger outbuilding and bunkers on the Sunset property. Vegetation supported within developed areas is limited to ornamental landscaping and weedy/early successional species observed in the non-native grassland plant community.

4.3 WILDLIFE

Plant communities provide foraging habitat, nesting/denning sites, and shelter from adverse weather or predation. This section provides a discussion of those wildlife species that were observed or are expected to occur within the project site. The discussion is to be used a general reference and is limited by the season, time of day, and weather conditions in which the field survey was conducted. Wildlife detections were based on calls, songs, scat, tracks, burrows, and direct observation.

4.3.1 Fish

No fish or hydrogeomorphic features (e.g., perennial creeks, ponds, lakes, reservoirs) that would provide suitable habitat for fish were observed on the project site. Therefore, no fish are expected to occur and are presumed absent from the project site. However, it should be noted that fish occur in the California Aqueduct and Delta Mendota Canal adjacent to the project site; however, these features are not contained within nor will be impacted by the Project.

4.3.2 Amphibians

The majority of the project site is not expected to support amphibian species due to the lack of water and/or ponded areas. No amphibian species were observed during the field investigation. Amphibian species could occur during heavy rainfall and subsequent ponding of water, primarily along Los Banos Creek west of the Turner site and east of the Sunset site. Common amphibian species that could occur would include pacific chorus frogs (*Pseudacris sierra*) and western toad (*Anaxyrus boreas*). It should be noted that Los Banos Creek may contain water following larger storm events, but typically water present within the creek is the result of controlled releases by the local water agencies. However, the infrequency of occurrence of water within onsite drainage features has precluded amphibian species from establishing population's onsite. No special-status amphibian species were observed or are expected to occur onsite due to the lack of water and suitable refugia habitat and are presumed absent.

4.3.3 Reptiles

The project site has been subject to a high level of anthropogenic activities. Even though the plant communities on the project site have been heavily disturbed, the project site is primarily undeveloped and has the potential to support a number of reptiles adapted to these habitat conditions. Western side-blotched lizard (*Uta stansburiana elegans*) was the only reptilian species observed during the field investigation.

As noted, the project site is primarily composed of vacant, undeveloped lands that have been subjected to impacts over the years and continues to be subjected to a heavy degree of impacts from ongoing agricultural activities. Disturbed areas in the region, such as those present on the project site, have the potential to support a number of reptilian species including gopher snakes (*Pituophis catenifer*), garter snakes (*Thamnophis* ssp.), California kingsnake *(Lampropeltis getula californiae*), pacific rattlesnake (*Crotalus oreganus oreganus*), alligator lizards (*Elgaria multicarinata*), and side-blotched lizards (*Uta stansburiana*). Due to the high level of anthropogenic disturbances onsite, no special-status reptilian species were observed or are expected to occur on-site.

4.3.4 Avian

The project site provides suitable foraging and minimal nesting opportunities for a wide variety of avian species. Species observed and heard during the survey included mourning dove (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), northern mockingbird (*Mimus polyglottos*), Say's phoebe (*Sayornis saya*), western meadowlark (*Sturnella neglecta*), turkey vulture (*Cathartes aura*), American kestrel (*Falco sparverius*), European starling (*Sturnus vulgaris*), common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), killdeer (*Charadrius vociferous*), red-winged blackbird (*Agelaius phoeniceus*), house finch (*Haemorhous mexicanus*), and California scrub jay (*Aphelocoma californica*). California horned lark, was the only special-status avian species observed onsite.

4.3.5 Mammals

The plant communities within the project site are anticipated to provide suitable habitat for a number of mammalian species acclimated to heavy disturbance. However, most mammal species are nocturnal and are difficult to observe during a diurnal field visit. Mammals and or sign detected during the field assessment included coyote (*Canis latrans*), ground squirrel (*Otospermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), and cottontail rabbits (*Sylvilagus audubonii*). Common mammalian species expected to occur on the project site include California vole (*Microtis californicus*), deer mouse (*Peromyscus maniculatus*), western skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and opossum (*Didelphis virginiana*). No special-status mammal species were observed or are expected to occur on site and are presumed absent.

Bat species may forage over the project site, but are not expected to roost onsite due to the lack of suitable roosting habitat (i.e., suitable trees, crevices, abandoned structures) within and surrounding the project site. No bat species were observed on site during field surveys and are presumed absent.

4.4 NESTING BIRDS

No active nests or birds displaying nesting behavior were observed during the field investigation. The project site and surrounding areas within 500 feet provide limited foraging habitat for year-round and seasonal avian residents, as well as migrating songbirds that could occur in the area. Additionally, the disturbed northern portion of the project site has the potential to provide suitable nesting opportunities for birds that nest on the open ground and those acclimated to routine disturbances (e.g. killdeer (*Charadrius vociferus*), a common bird species that is not a special-status species), and limited riparian habitats associated with Los Banos Creek have the potential to provide suitable nesting opportunities.

Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (Sections 3503, 3503.5, 3511, and 3513 prohibit the take, possession, or destruction of birds, their nests or eggs). In order to ensure no impacts occur to birds protected under the MBTA, a nesting bird clearance survey is recommended to be conducted prior to vegetation removal activities, if these activities occur during the nesting season (February 1 – August 31).

4.5 MIGRATORY CORRIDORS AND LINKAGES

Habitat linkages provide links between larger habitat areas that are separated by development. Wildlife corridors are similar to linkages but provide specific opportunities for animals to disperse or migrate between areas. A corridor can be defined as a linear landscape feature of sufficient width to allow animal movement between two comparatively undisturbed habitat fragments. Adequate cover is essential for a corridor to function as a wildlife movement area. It is possible for a habitat corridor to be adequate for one species yet, inadequate for others. Wildlife corridors are significant features for dispersal, seasonal migration, breeding, and foraging. Additionally, open space can provide a buffer against both human disturbance and natural fluctuations in resources.

The California Aqueduct and Delta-Mendota Canal act as stepping stone refugia habitat for the dispersal of kit fox and other wildlife species in the region. These waterways provide travel corridors for wildlife species to connect to habitats located to the north and south of the project site. However, existing mining, agricultural, and ranching activities between the California Aqueduct and Delta Mendota Canal have limited wildlife movement opportunities through this immediate area due to existing anthropogenic disturbances. Implementation of the proposed project is not expected to substantially change the existing landscape, and is not expected to modify or compromise wildlife movement opportunities or prevent the surrounding habitat from continuing to support wildlife movement.

4.6 JURISDICTIONAL AREAS

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The U.S. Army Corps of Engineers (Corps) Regulatory Branch regulates discharge of dredge and/or fill materials into “waters of the United States” pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFW regulates alterations to streambed and associated plant communities pursuant to Section 1602 of the Fish and Game

Code, and the Regional Water Quality Control Board (Regional Board) regulates discharges into surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

A review of the USFWS National Wetlands Inventory (NWI) documented several aquatic resources adjacent to the project site. With the exception of Los Banos Creek, most of the classified aquatic resources are man-man (i.e., California Aqueduct, Delta Mendota Canal, and pits associated with existing mining activities).

No jurisdictional drainage and/or wetland features were observed on the project site or within the during the field investigation. Further, no blueline streams have been recorded on the project site. The Turner site is bordered on the northeast by the Mendota canal and on the southwest by the California Aqueduct. The area northwest and between the canals is the Los Banos Creek channel. This area appears to have undergone historical mining operations in the past but is not part of the current Los Banos operations. North of the Los Banos Creek are agricultural fields. The Sunset site is located north of the Mendota Canal.

Based on current site conditions and design plans, no impacts to Los Banos Creek, the California Aqueduct, or the Delta Mendota Canal are expected to occur from project implementation. However, if any of these resources will be impacted, the project applicant must obtain the following regulatory approvals prior to impacts occurring within the identified jurisdictional areas: Corps CWA Section 404 Permit, Regional Board CWA Section 401 Water Quality Certification, and/or CDFW Section 1602 Streambed Alteration Agreement (SAA).

4.7 SPECIAL-STATUS BIOLOGICAL RESOURCES

The CNDDB Rarefind 5, CNDDB Quickview Tool in BIOS, and the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California was queried for reported locations of special-status plant and wildlife species as well as special-status plant communities in the Volta, Los Banos, Ortigalita Peak North West, and Charleston School USGS 7.5-minute quadrangles. The field investigation evaluated the conditions of the habitat(s) within the boundaries of the project site to determine if the existing plant communities, at the time of the survey, have the potential to provide suitable habitat(s) for special-status plant and wildlife species.

The literature search identified twenty-one (21) special-status plant species, thirty-nine (39) special-status wildlife species, and four (4) special-status plant communities as having potential to occur within the Volta, Los Banos, Ortigalita Peak North West, and Charleston School USGS 7.5-minute quadrangles. Special-status plant and wildlife species were evaluated for their potential to occur within the project site based on habitat requirements, availability and quality of suitable habitat, and known distributions. Species determined to have the potential to occur within the general vicinity of the project site are presented in *Table B-1: Potentially Occurring Special-Status Biological Resources*, provided in Appendix B.

It should be noted that the majority of the special-status species in the vicinity of the project site have been documented west of Interstate 5 in the undeveloped foothills of the Diablo Mountain range. These areas west of Interstate 5 have not been subject to agricultural and stock land uses.

4.7.1 Special-Status Plant Species

Twenty-one (21) special-status plant species have been recorded in the CNDDB and CNPS in the Volta, Los Banos, Ortigalita Peak North West, and Charleston School USGS 7.5-minute quadrangles (refer to Appendix B). None of these special-status plant species were observed on-site during the field investigation. It should be noted that the field investigations was conducted outside of the blooming period for the majority of the special-status plant species identified in the literature search and database review. However, the project site has been subjected to a heavy regime of disturbances from agricultural and ranching activities for several decades. This sustained level of continuous disturbances has eliminated the naturally occurring plant communities that once occupied the project site. Based on habitat requirements for specific special-status plant species and the availability and quality of habitats needed by each species, it was determined that the project site does not provide suitable habitat for any of the special-status plant species known to occur in the area and are presumed to be absent from the project site and site-adjacent improvement areas. No focused surveys are recommended.

4.7.2 Special-Status Wildlife Species

Thirty-nine (39) special-status wildlife species have been reported by the CNDDB in the Volta, Los Banos, Ortigalita Peak North West, and Charleston School USGS 7.5-minute quadrangles (refer to Appendix B). California horned lark, with a CNDDB rank of S4, was the only special-status species observed onsite. Species with a CNDDB rank S4 are "Apparently Secure" and are "[a]t a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors." (CNDDB, Species Animals List, p. v (April 2022).)

Based on habitat requirements for specific special-status wildlife species and the availability and quality of habitats needed by each species, determinations for the potential occurrence of each species were made. It was determined that the project site has a moderate potential to provide suitable habitat for great egret (*Ardea alba*), great blue heron (*Ardea herodias*), norther harrier (*Circus hudsonius*), snowy egret (*Egretta thula*); and a low potential to provide suitable habitat for burrowing owl (*Athene cuincularia*), crackling (Aleutian Canada) goose (*Branta hutchinsii leucopareia*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), loggerhead shrike (*Lanius ludovicianus*), Yuma myotis (*Myotis yumanensis*), and long-billed curlew (*Numenius americanus*).

Notwithstanding, all special-status wildlife species are presumed to be absent based on habitat requirements, availability/quality of habitat needed by each species, known distributions, and field observations. Of the aforementioned species, Swainson's hawk is the only State listed species. All other species are not formally listed as federally or State threatened or endangered.

Based on regional significance and/or listing status, the potential occurrence of San Joaquin kit fox (*Vulpes macrotis mutica*) and Swainson's hawk to occur within the project site is described in further detail below.

San Joaquin Kit Fox

San Joaquin kit foxes inhabit grasslands and scrublands, many of which have been extensively modified. Types of modified habitats include those with oil exploration and extraction equipment and wind turbines, and agricultural mosaics of row crops, irrigated pastures, orchards, vineyards, and grazed annual grasslands. Oak woodland, alkali sink scrubland, and vernal pool and alkali meadow communities also provide habitat for kit foxes. Dens are scarce in areas with shallow soils because of the proximity to bedrock, high water tables, or impenetrable hardpan layers.

Kit foxes are active year-round and are primarily nocturnal. Dens are used for housing and protection. One fox may use several dens, particularly during the summer months. Females may change natal and pupping dens one or two times per month. Kit foxes construct their own dens, but they can also enlarge or modify burrows constructed by other animals, such as ground squirrels, badgers, and coyotes. They also den in human-made structures, such as culverts, abandoned pipes, and banks in roadbeds. Most dens, especially natal and pupping dens, have at least two entrances.

In the central portion of their range, their prey consists of white-footed mice, insects, California ground squirrels, kangaroo rats, San Joaquin antelope squirrels, black-tailed hares, and chukar (an introduced bird species). Although kit foxes are considered to be primarily nocturnal, they are commonly seen during the day in the late spring and early summer.

Based on the conclusions presented in the *Conservation of San Joaquin Kit Foxes in Western Merced County, California* report prepared by the California State University, Stanislaus Endangered Species Recovery Program, the area south of Santa Nella (south of State Route 152 and west of Interstate 5) support the most northerly self-sustaining kit fox population. This population is located west of the project site, west of Interstate 5 in the foothills of the Diablo mountains.

Additionally, as stated in the Candid Biology & Conservation research report *Quantity and Distribution of Suitable Habitat for Endangered San Joaquin Kit Foxes* (2013) high suitability areas generally are characterized by flat or gently rolling terrain (average <5% slopes), and suitability declines as terrain ruggedness and average slope increase, largely due to increase in predation. Kit foxes are adapted to arid environments with sparse vegetation and a high proportion of bare ground (habitat suitability decreases as vegetation density increases). High suitability habitats include saltbush scrub, grasslands dominated by red brome, whereas moderate suitability habitats include alkali sink scrublands and grasslands dominated by wild oats. Other habitat types include and altered anthropogenic lands (e.g. agricultural lands, urban areas) are considered low suitability.

It should be noted that Merced County and the USFWS have entered into a “management plan agreement.” The purpose of this agreement is to ensure that the County will require consultation with the USFWS on any projects that lie within this line. The property lies adjacent to this line, but outside the management plan agreement boundary. The property also lies on the border of the habitat range as recognized by USFWS and CDFW.

Even though San Joaquin kit foxes are known to use the California Aqueduct and Delta-Mendota Canal within the range as travel corridors, their main population is located west of Interstate 5, and existing mining, agricultural, and ranching activities between the California Aqueduct and Delta Mendota Canal on and immediately adjacent to the project site provide low suitability for San Joaquin kit fox. No kit fox or kit fox sign (dens, scat, etc.) were observed on site and the species is presumed absent. As a result, implementation of the proposed project is not expected to adversely affect San Joaquin kit fox movement or suitable habitat.

Swainson's hawk

The Swainson's hawk is listed as a California state threatened species under the California Endangered Species Act. It is not listed as threatened or endangered under the federal Endangered Species Act. It spends most of the year in the western United States extending into southwest Canada and south to west Texas. Foraging habitat includes dry land and irrigated pasture, alfalfa, fallow fields, low-growing row or field crops, new orchards, and cereal grain crops. Swainson's hawks may also forage in grasslands, Joshua tree woodlands, and other desert scrub habitats that support a suitable prey base. Gophers dominate the prey base of agriculturally based pairs while Swainson's hawks nesting in natural desert habitats consume a wider variety of prey species. California's Central Valley Swainson's hawk population winter in Mexico, Central America South America, and a small percentage in the Central Valley. Recent observations suggest that they may arrive in nesting territories generally later than the Central Valley population.

Breeding begins in March and April. In California's Central Valley, Swainson's Hawks nest in a variety of tree species, including oak (Quercus spp.), cottonwood (Populus spp.), willow (Salix spp.), and sycamore (Platanus spp.). These trees are typically located in riparian corridors, open grasslands, or agricultural areas where trees are present. The Central Valley's agricultural landscape, interspersed with these types of trees, provides an ideal habitat for Swainson's Hawks, allowing them access to ample foraging opportunities while offering suitable nesting sites.

The birds prefer nesting in large, mature trees that offer a wide view of the surrounding area for monitoring threats and detecting prey. The presence of suitable nesting trees within or adjacent to open fields is crucial, as these open areas are essential for their hunting activities. Swainson's Hawks have also adapted to nesting in proximity to human activities and may use trees along roadsides, edges of fields, or even within inhabited areas, provided there is sufficient open land nearby for foraging.

Although there is no nesting habitat present for Swainson's hawk on or immediately adjacent to the project site, there is suitable foraging habitat within the on-site vacant land and adjacent agricultural fields. In order to reduce the potential impacts to Swainson's hawk, a pre-construction nesting bird clearance survey shall be conducted prior to vegetation removal during the nesting season.

4.7.3 Special-Status Plant Communities

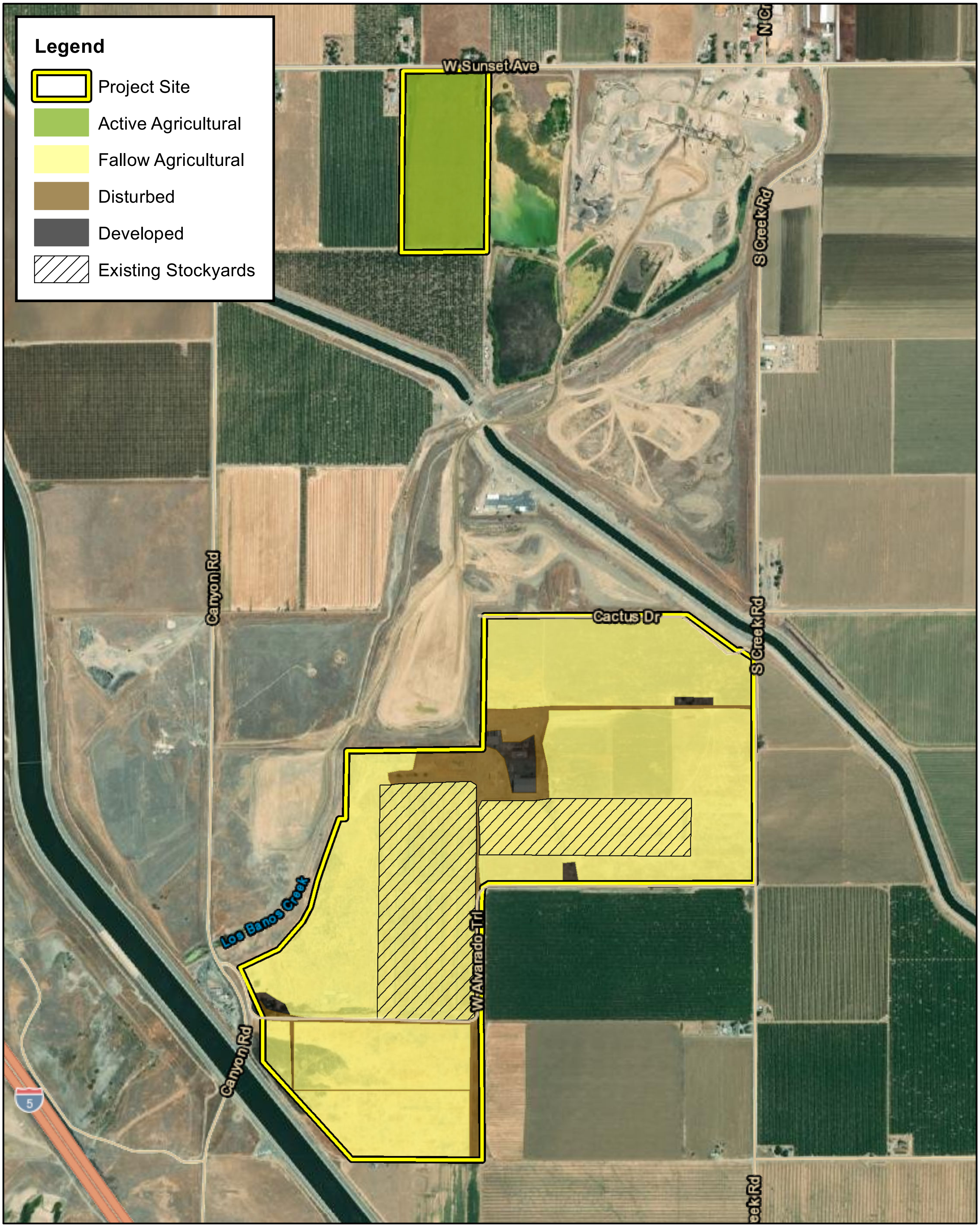
Four (4) special-status plant communities have been recorded in the Volta, Los Banos, Ortigalita Peak North West, and Charleston School 7.5-minute quadrangles: Alkali Seep, Cismontane Alkali Mar, Sycamore Alluvial Woodland, and Valley Sink Scrub. Based on the results of this field investigation, no special-status plant communities are present within the project site. Therefore, no special-status plant communities will be impacted by project implementation

4.7.4 Critical Habitat

Under the federal Endangered Species Act, "Critical Habitat" is designated at the time of listing of a species or within one year of listing. Critical Habitat refers to specific areas within the geographical range of a species at the time it is listed that include the physical or biological features that are essential to the survival and eventual recovery of that species. Maintenance of these physical and biological features requires special management considerations or protection, regardless of whether individuals or the species are present or not. All federal agencies are required to consult with the USFWS regarding activities they authorize, fund, or permit which may affect a federally listed species or its designated Critical Habitat. The purpose of the consultation is to ensure that projects will not jeopardize the continued existence of the listed species or adversely modify or destroy its designated Critical Habitat. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing is on federal lands, uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highways Administration or a Clean Water Act Permit from the United States Army Corps of Engineers). If a there is a federal nexus, then the federal agency that is responsible for providing the funding or permit would consult with the USFWS.

The project site is not located within federally designated Critical Habitat. The nearest designated Critical Habitat is located approximately 10 miles west of the project site for California red legged frog (*Rana draytonii*) and California tiger salamander (*Ambystoma californiense*), and approximately 15 miles northeast of the project site for Colusa grass (*Neostapfia colusana*), Conservancy fairy shrimp (*Branchinecta conservatio*), Hoover's spurge (*Euphorbia hooveri*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool fairy shrimp (*Branchinecta lynchi*), and vernal pool tadpole shrimp (*Lepidurus packardi*). Therefore, the loss or adverse modification of Critical Habitat from site development will not occur and consultation with the USFWS for impacts to Critical Habitat will not be required for implementation of the proposed project.

In addition, the historic severe and ongoing levels of disturbance of native habitats on and surrounding the project site by agricultural and mining activities have precluded the presence of suitable habitats to support any of these species.



ELMT CONSULTING

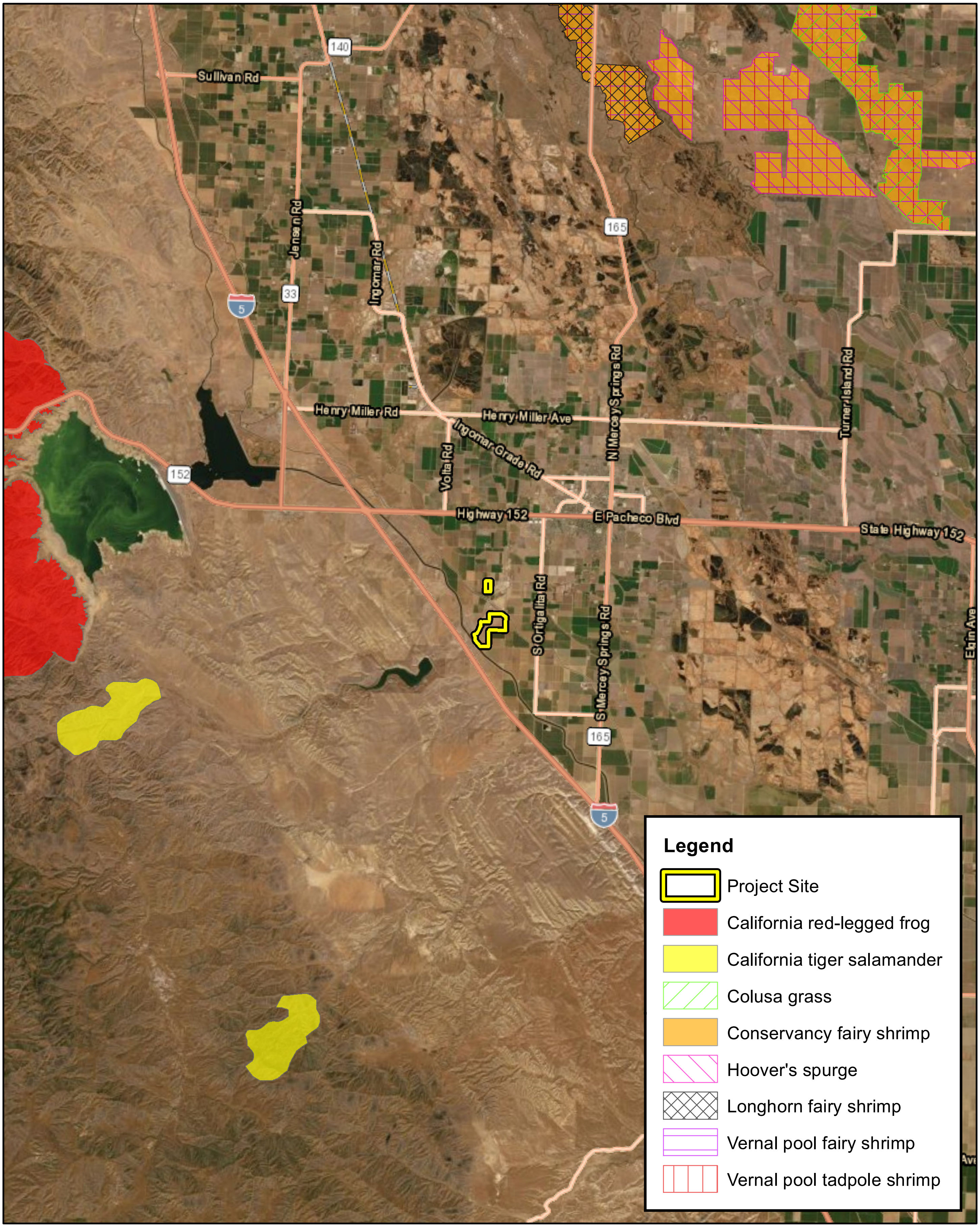
0 500 1,000 2,000
Feet

Source: ESRI Aerial Imagery, Merced County

LOS BANOS QUARRY
HABITAT ASSESSMENT

Vegetation

Exhibit 5



ELMT CONSULTING

0 1.25 2.5 5 Miles

LOS BANOS QUARRY
HABITAT ASSESSMENT

Critical Habitat

Source: USA Topographic Map, USFWS Critical Habitat, Merced County

Exhibit 6

Section 5 Conclusion and Recommendations

The project site, both the Sunset and Turner properties, consists of vacant, undeveloped land that has been subject to a variety of anthropogenic disturbances associated with historic agricultural and ranching activities, and routine weed abatement/disking activities. Historic aerials show these activities have been ongoing since at least 1946. Prior to conducting the field investigation, aerial photography was reviewed to document existing site conditions and document the changes to the project site and surrounding area.

Special-Status Plant Species

No special-status plant species were observed within the boundaries of the project site during the field investigation. Based on habitat requirements, availability/quality of habitat needed by each species, and known distributions, special-status plant species are not expected to occur on the project site and are presumed absent. The proposed project is not expected to result in impacts to special-status plant species and no additional special-status plant species surveys or mitigation are recommended.

Special-Status Wildlife Species

Based on habitat requirements for specific special-status wildlife species and the availability and quality of habitats needed by each species, determinations for the potential occurrence of each species were made. It was determined that the project site has a moderate potential to provide suitable habitat for great egret, great blue heron, norther harrier, snowy egret, and a low potential to provide suitable habitat for burrowing owl, crackling goose, ferruginous hawk, Swainson's hawk, prairie falcon, loggerhead shrike, Yuma myotis, and long-billed curlew. California horned lark (*Eremophila alpestris actia*), with a CNDDB rank of S4, was the only special-status species observed onsite. Species with a CNDDB rank S4 are "Apparently Secure" and are "[a]t a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences. All other remaining special-status wildlife species are presumed to be absent based on habitat requirements, availability/quality of habitat needed by each species, and known distributions.

Of the aforementioned species, Swainson's hawk is the only State listed species. All other species are not formally listed as federally or State threatened or endangered. The project site and immediately surrounding area do not provide suitable nesting opportunities for Swainson's hawk. In order to ensure impacts to the aforementioned species do not occur from implementation of the proposed project, a pre-construction nesting bird clearance survey shall be conducted prior to vegetation removal during the nesting season. With implementation of mitigation through the pre-construction nesting bird clearance survey, impacts to the aforementioned species will be less than significant.

No kit fox or kit fox sign (dens, scat, etc.) were observed on site and the species is presumed absent. As a result, implementation of the proposed project is not expected to substantially impact San Joaquin kit fox movement or suitable habitat.

Riparian Habitat and Special-Status Natural Communities

No jurisdictional drainage and/or wetland features were observed on the project site during the field investigation. Based on current site conditions and design plans, no impacts to Los Banos Creek, the

California Aqueduct, or the Delta Mendota Canal are expected to occur from project implementation. However, if any of these resources will be impacted, the project applicant must obtain the following regulatory approvals prior to impacts occurring within the identified jurisdictional areas: Corps CWA Section 404 Permit, Regional Board CWA Section 401 Water Quality Certification, and/or CDFW Section 1602 Streambed Alteration Agreement (SAA).

Wildlife Corridors and Linkages

The California Aqueduct and Delta-Mendota Canal provide travel corridors for wildlife species to connect to habitats located to the north and south of the project site. However, existing mining, agricultural, ranching activities between the California Aqueduct and Delta Mendota Canal have limited wildlife movement opportunities through this immediate area. Implementation of the proposed project is not expected to substantially change the existing landscape, and is not expected to modify or compromise wildlife movement opportunities or prevent the surrounding habitat from continuing to support wildlife movement. As a result, implementation of the proposed project will not disrupt or have any adverse effects on any migratory corridors or linkages in the surrounding area.

Migratory Bird Treaty Act and CDFW Fish and Game Code Compliance

Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (Sections 3503, 3503.3, 3511, and 3513 of the California Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs). If vegetation removal occurs between February 1st and August 31st, a pre-construction clearance survey for nesting birds should be conducted within three (3) days of the start of any vegetation removal to ensure that no nesting birds will be disturbed. The biologist conducting the clearance survey should document a negative survey with a brief letter report indicating that no impacts to active avian nests will occur. If an active avian nest is discovered during the pre-construction clearance survey, construction activities should stay outside of a 300-foot buffer around the active nest. For listed and raptor species, this buffer should be expanded to 500 feet. A biological monitor should be present to delineate the boundaries of the buffer area and monitor the active nest to ensure that nesting behavior is not adversely affected by construction activities. Once the young have fledged and left the nest, or the nest otherwise becomes inactive under natural conditions, construction activities within the buffer area can occur.

Section 6 References

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Appendix A Site Photographs

Photograph 1: From the southeast corner of the Turner site looking west at the eastern half of the Turner site.

Photograph 2: Existing stock concrete founding on the Turner site.

Photograph 3: Disturbed fallow agricultural lands on the eastern half of the Turner site.

Photograph 4: Looking south at the western half of the Turner site.

Photograph 5: Looking at the existing structure in the middle of the Turner site.

Photograph 6: Looking northwest across the western half of the Turner site.

Photograph 7: From the southwest corner of the Turner site looking north along the western boundary of the site.

Photograph 8: Looking northeast across the western half of the Turner site.

Photograph 9: From the northeast corner of the Turner site looking southwest across the eastern half of the site.

Photograph 10: From the northeast corner of the Sunset site looking southwest.

Photograph 11: From the southeast corner of the Sunset site looking north.

Photograph 12: From the southeast corner of the Sunset site looking west.

Photograph 13: From the northwest corner of the Sunset site looking south.

Photograph 14: From the middle of the eastern boundary of the Sunset site looking east.

Appendix B Potentially Occurring Special-Status Biological Resources

Table B-1: Potentially Occurring Special-Status Biological Resources

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
SPECIAL-STATUS WILDLIFE SPECIES				
Agelaius tricolor tricolored blackbird	Fed: None CA: **THR**/SSC	Range is limited to the coastal areas of the Pacific coast of North America, from Northern California to upper Baja California. Can be found in a wide variety of habitat including annual grasslands, wet and dry vernal pools and other seasonal wetlands, agricultural fields, cattle feedlots, and dairies. Occasionally forage in riparian scrub habitats along marsh borders. Basic habitat requirements for breeding include open accessible water, protected nesting substrate (freshwater marsh dominated by cattails, willows, and bulrushes [*Schoenoplectus* sp.]), and either flooded or thorny or spiny vegetation and suitable foraging space providing adequate insect prey.	No	**Presumed absent.** No suitable habitat is present within or adjacent to the project site.
Ambystoma californiense California tiger salamander	Fed: **THR** CA: **THR**/WL	Nocturnal, and fossorial, spending most time underground in animal burrows. Frequents grassland, oak savanna, and edges of mixed woodland and lower elevation coniferous forest.	No	**Presumed Absent** There is no suitable habitat within the survey area. No suitable aquatic habitats or refugia habitat on or adjacent to the project site.
Ammospermophilus nelsoni Nelson's (San Joaquin) antelope squirrel	Fed: None CA: **THR**	Permanent resident of the western San Joaquin Valley from 200-1200 ft elevation on dry, sparsely vegetated, loam soils. Found from southern Merced Co., south to Kern, Kings, and Tulare cos. Also occurs in portions of eastern San Luis Obispo Co.	No	**Presumed Absent** There is no suitable habitat within the survey area. The project site is at the lower elevational range for this species and is not expected to occur onsite dur to existing disturbances.
Anniella pulchra northern California legless lizard	Fed: None CA: SSC	Occurs in sparsely vegetated habitat types including coastal sand dunes, chaparral, pine-oak woodland, desert scrub, open grassland, and riparian areas. Requires sandy or loose loamy substrates conducive to burrowing.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Antigone canadensis tabida greater sandhill crane	Fed: **THR** CA: FP	Nest in open grasslands, such as wet meadows, and freshwater marshes or bogs. Prefer to be far from human habitation.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Anniella pulchra northern California legless lizard	Fed: None CA: SSC	Occurs in sparsely vegetated habitat types including coastal sand dunes, chaparral, pine-oak woodland, desert scrub, open grassland, and riparian areas. Requires sandy or loose loamy substrates conducive to burrowing.	No	**Presumed Absent** There is no suitable habitat within the survey area.

Scientific Name Common Name	Status	Habitat	Observed Onsite	Potential to Occur
Ardea alba great egret	Fed: None CA: None	Yearlong resident throughout California, except for the high mountains and deserts. Feeds and rests in fresh, and saline emergent wetlands, along the margins of estuaries, lakes, and slow-moving streams, on mudflats and salt ponds, and in irrigated croplands and pastures.	No	**Moderate** Suitable foraging habitat is present onsite. No suitable nesting habitat is present on the site.
Ardea herodias great blue heron	Fed: None CA: None	Fairly common all year throughout most of California, in shallow estuaries and fresh and saline emergent wetlands. Less common along riverine and rocky marine shores, in croplands, pastures, and in mountains about foothills.	No	**Moderate** Suitable foraging habitat is present onsite. No suitable nesting habitat is present on the site.
Athene cunicularia burrowing owl	Fed: None CA: SSC	Primarily a grassland species, but it persists and even thrives in some landscapes highly altered by human activity. Occurs in open, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. The overriding characteristics of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation.	No	**Low** The project site supports line-of-site opportunities favored by burrowing owls; however, this is due to the majority of the site recently being graded for tree crops.
Branchinecta longiantenna longhorn fairy shrimp	Fed: **END** CA: None	Typical habitats include vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats. Only 8 populations of the longhorn fairy shrimp are known (U.S. Fish and Wildlife Service 1996). Longhorn fairy shrimp occurrences are rare and highly disjunct with specific pool characteristics largely unknown (USFWS 2003).	No	**Presumed Absent** There is no suitable habitat within the survey area.
Branta hutchinsii leucopareia Crackling (Aleutian Canada) goose	Fed: Delisted CA: WL	Typically arrive in California in mid-October each year. The majority of the population goes right to its primary wintering areas in the Central Valley. Around late December, the geese wintering in the Central Valley begin moving north, and by mid-February, most of the Aleutian cackling goose population is located in northwestern California until they depart for the Aleutian Islands in mid-April.	No	**Low** This species my forage onsite during migration but is not expected to nest onsite.
Buteo regalis ferruginous hawk	Fed: None CA: WL	Occurs primarily in open grasslands and fields, but may be found in sagebrush flats, desert scrub, low foothills, or along the edges of pinyon-juniper woodland. Feeds primarily on small mammals and typically found in agricultural or open fields.	No	**Low** This species my forage onsite during migration but is not expected to nest onsite.
Buteo swainsoni Swainson's hawk	Fed: None CA: **THR**	Typical habitat is open desert, grassland, or cropland containing scattered, large trees or small groves. Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah in the Central Valley. Forages in adjacent grassland or suitable grain or alfalfa fields or livestock pastures.	No	**Low** This species my forage onsite during migration but is not expected to nest onsite.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Circus hudsonius northern harrier	Fed: None CA: SSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Mostly found in flat, or hummocky, open areas of tall, dense grasses moist or dry shrubs, and edges for nesting, cover, and feeding.	No	**Moderate** The project site and surrounding area provide suitable foraging and nesting habitat for this species. No nests were observed within the project site.
Coturnicops noveboracensis yellow rail	Fed: None CA: SSC	Shallow marshes, and wet meadows; in winter, drier fresh-water and brackish marshes, as well as dense, deep grass, and rice fields.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Dipodomy ingens giant kangaroo rat	Fed: **END** CA: **END**	Native to California's San Joaquin Valley. They occur in dry areas that have less than 15 centimeters of rain each year, in sandy well-drained soils with sparse annual grassland.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Egretta thula snowy egret	Fed: None CA: None	Widespread in California along shores of coastal estuaries, fresh and saline emergent wetlands, ponds, slow-moving rivers, irrigation ditches, and wet fields. In southern California, common yearlong in the Imperial Valley and along the Colorado River.	No	**Moderate** Suitable foraging habitat is present onsite. No suitable nesting habitat is present on the site.
Emys marmorata western pond turtle	Fed: None CA: SSC	Requires both aquatic and terrestrial habitats. Uses permanent and seasonal aquatic habitats including rivers, sloughs, lakes, reservoirs, ponds, and irrigation canals. Moves onto land for nesting, overwintering, dispersal, and basking.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Eremophila alpestris actia California horned lark	Fed: None CA: WL	Generally found in shortgrass prairies, grasslands, disturbed fields, or similar habitat types along the coast or in deserts. Trees are shrubs are usually scarce or absent. Generally rare in montane, coniferous, or chaparral habitats. Forms large flocks outside of the breeding season.	Yes	**Present** Was observed foraging onsite. The project site provides suitable foraging and nesting opportunities for this species when no being actively cultivated or subject to anthropogenic disturbances.
Falco mexicanus prairie falcon	Fed: None CA: WL	Commonly occur in arid and semiarid shrubland and grassland community types. Also occasionally found in open parklands within coniferous forests. During the breeding season, they are found commonly in foothills and mountains which provide cliffs and escarpments suitable for nest sites.	No	**Low** This species my forage onsite during migration but is not expected to nest onsite.
Gambelia sila blunt-nosed leopard lizard	Fed: **END** CA: **END, FP**	Semi-arid grasslands, alkali flats, and washes. Prefers flat areas with open space for running, avoiding densely vegetated areas. Use large shrubs with dense canopy for refuge and thermoregulations.	No	**Presumed Absent** There is no suitable habitat within or adjacent to the project site.

Scientific Name Common Name	Status	Habitat	Observed Onsite	Potential to Occur
Gonidea angulata Western ridged mussel	Fed: None CA: None	Occurs on the benthos of streams, rivers, and lakes with substrates that vary from gravel to firm mud, and include at least some sand, silt or clay.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Haliaeetus leucocephalus bald eagle	Fed: DL CA: **END**; FP	Occur primarily at or near seacoasts, rivers, swamps, and large lakes. Need ample foraging opportunities, typically near a large water source.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Ixobrychus exilis least bittern	Fed: None CA: SSC	Live mostly in freshwater and brackish marshes with tall stands of cattails or other vegetation.	No	**Presumed absent.** There is no suitable habitat present within or adjacent to the project site.
Lanius ludovicianus loggerhead shrike	Fed: None CA: SSC	Often found in broken woodlands, shrublands, and other habitats. Prefers open country with scattered perches for hunting and fairly dense brush for nesting.	No	**Low** This species my forage onsite during migration but is not expected to nest onsite.
Lepidurus packardi vernal pool tadpole shrimp	Fed: **END** CA: None	Inhabits vernal pools, ponds, reservoirs, ditches, road ruts, and other natural or artificial temporary water bodies.	No	**Presumed Absent** There is no suitable habitat within or adjacent to the project site.
Masticophis flagellum ruddocki San Joaquin coachwhip	Fed: **END** CA: None	Occurs in open, dry, treeless areas with little or no cover, including valley grassland and saltbush scrub. Avoids dense vegetation where it cannot move quickly, including mixed oak chaparral woodland. Takes refuge in rodent burrows, under shaded vegetation, and under surface objects.	No	**Presumed Absent** There is no suitable habitat within or adjacent to the project site.
Mustela frenata xanthogenys San Joaquin long-tailed weasel	Fed: None CA: None	Occurs in a wide variety of habitats, usually near water. Preferred habitats include brushland, open woodlands, field edges, riparian grasslands, swamps, and marshes. Dens in ground burrows, under stumps, or beneath rock piles. Usually uses abandoned burrows.	No	**Presumed Absent** There is no suitable habitat within or adjacent to the project site.
Myotis yumanensis Yuma myotis	Fed: None CA: None	Roots in buildings, mines, caves, or crevices. The species has also been seen roosting in abandoned swallow nests under bridges.	No	**Low** There is minimal foraging habitat onsite. No suitable nesting habitat on the project site.
Numenius americanus long-billed curlew	Fed: None CA: WL	Preferred winter habitats include large coastal estuaries, upland herbaceous areas, and croplands. On estuaries, feeding occurs mostly on intertidal mudflats.	No	**Low** There is minimal foraging habitat onsite. No suitable nesting habitat on the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Nycticorax nycticorax black-crowned night heron	Fed: None CA: None	Fairly common, yearlong resident in lowlands and foothills throughout most of California, including the Salton Sea and Colorado River areas, and very common locally in large nesting colonies. Feeds along the margins of lacustrine, large riverine, and fresh and saline emergent habitats and rarely, on kelp beds in marine sub tidal habitats. Nests and roosts in dense-foliaged trees and dense emergent wetlands.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Perognathus inornatus San Joaquin Pocket Mouse	Fed: None CA: None	Occurs in dry, open grasslands or scrub areas on fine-textures soils between 1,100 and 2,000 feet in the Central and Salinas valleys. Digs own burrow for cover.	No	**Presumed Absent** There is no suitable habitat within or adjacent to the project site; the site is out of the elevation range of this species.
Phrynosoma blainvillii coast horned lizard	Fed: None CA: CSC	Occurs in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest. In inland areas, this species is restricted to areas with pockets of open microhabitat, created by disturbance (i.e. fire, floods, roads, grazing, fire breaks). The key elements of such habitats are loose, fine soils with a high sand fraction; an abundance of native ants or other insects; and open areas with limited overstory for basking and low, but relatively dense shrubs for refuge.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Rana boylii foothill yellow-legged frog	Fed: None CA: **END**/SSC	Inhabits streams and rivers in woodland, chaparral, and forest habitats. Found near water, especially near riffles where there are rocks, rocky substrate, and sunny banks.	No	**Presumed Absent** There is no suitable habitat present within or adjacent to the project site.
Rana draytonii California red-legged frog	Fed: **THR** CA: SSC	Inhabits quiet pools of streams, marshes, and occasionally ponds. Occurs along the coast ranges from Mendocino County south and in portions of the Sierra Nevada and Cascades ranges.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Spea hammondii western spadefoot	Fed: None CA: CSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washed, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rain pools which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Taxidea taxus American badger	Fed: None CA: None	Primarily occupy grasslands, parklands, farms, tallgrass and shortgrass prairies, meadows, shrub-steppe communities and other treeless areas with sandy loam soils where it can dig more easily for its prey. Occasionally found in open chaparral (with less than 50% plant cover) and riparian zones.	No	**Presumed Absent** There is no suitable habitat within the survey area.
Thamnophis gigas giant garter snake	Fed: **THR** CA: **THR**	Inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley.	No	**Presumed Absent** There is no suitable habitat within the survey area.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Vulpes macrotis mutica San Joaquin kit fox	Fed: **END** CA: **THR**	Occur in a variety of habitats including grasslands, scrublands, vernal pool areas, alkali meadows and playas, and agricultural lands. Loose-textured soils are preferred. Utilized subsurface dens for shelter and reproduction. Tends to be absent or scarce in areas where soils are shallow due to high water tables, impenetrable hardpans, or proximity to bedrock.	No	**Presumed Absent** There are no suitable burrows within the survey area.
SPECIAL-STATUS PLANT SPECIES				
Amsinckia furcata Forked fiddleneck	Fed: None CA: None CNPS: 4.2	Cismontane woodland and valley and foothill grassland. Found at elevations ranging from sea 165 to 3,280 feet. Blooming period is from February to May.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Androsace elongata* ssp. *acuta California androsace	Fed: None CA: None CNPS: 4.2	Occurs in chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grasslands. Found at elevations ranging from 492 to 4,280 feet. Blooming period is from March to June.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Atriplex cordulata* car. *cordulata heartscaale	Fed: None CA: None CNPS: 1B.2	Chenopod scrub, meadows and seeps, and valley and foothill grassland. Found at elevations ranging from 0 to 1,835 feet. Blooming period is from April to October.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Atriplex coronate* var. *coronata crownscale	Fed: None CA: None CNPS: 4.2	Chenopod scrub, valley and foothill grassland, and vernal pools. Found at elevations ranging from 5 to 1,935 feet. Blooming period is from March to October.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Atriplex coronate* var. *vallicola Lost Hills crownscale	Fed: None CA: None CNPS: 1B.2	Chenopod scrub, valley and foothill grassland, and vernal pools. Found at elevations ranging from 165 to 2,085 feet. Blooming period is from April and September.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Atriplex minuscula Lesser saltscale	Fed: None CA: None CNPS: 1B.1	Chenopod scrub, playas, valley and foothill grassland. Found at elevations ranging from 50 to 655 feet. Blooming period is from May to October.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Caulanthus lemmonii Lemmon's jewelflower	Fed: None CA: None CNPS: 1B.2	Pinyon and juniper woodland, and valley and foothill grassland. Found at elevations ranging from 260 to 5,185 feet. Blooming period is from February to May.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Centromadia parryi* ssp. *rudis Parry's rough tarplant	Fed: None CA: None CNPS: 4.2	Valley and foothill grasslands, and vernal pools. Found at elevations ranging from 0 to 330 feet. Blooming period is from May to October.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Chloropyron molle* ssp. *hispidum Hispid salty bird's-beak	Fed: None CA: None CNPS: 1B.1	Meadows and seeps, playas, valley and foothill grasslands. Found at elevations ranging from 5 to 510 feet. Blooming period is from June to September.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.

Scientific Name Common Name	Status	Habitat	Observed Onsite	Potential to Occur
Delphinium recurvatum recurved larkspur	Fed: None CA: None CNPS: 1B.2	Grows in alkaline soils in chenopod scrub, cismontane woodland, and valley and foothill grasslands. Blooming period is from March to June. Grows in elevation from 10 to 2,592 feet.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Eriogonum nudum var. indictum protruding buckwheat	Fed: None CA: None CNPS: 4.2	Valley foothill grassland. Found at elevations ranging from 1,300 to 5,249 feet. Blooming period is from April to June.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Eriogonum vestitum Idria buckwheat	Fed: None CA: None CNPS: 4.3	Valley and foothill grassland. Found at elevations ranging from 770 to 2,955 feet. Blooming period is from April to August.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Eryngium spinosepalum spiny-sepaled button-celery	Fed: None CA: None CNPS: 1B.2	Grows within vernal pools and valley and foothill grassland habitats. Grows at elevations ranging from 262 to 3,199 feet. Blooming period is from April to June.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Lasthenia ferrisiae Ferris' goldfields	Fed: None CA: None CNPS: 4.2	Vernal pools (alkaline, clay). Found at elevations ranging from 65 to 2,295 feet. Blooming period is from February to May July.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Leptosiphon ambiguss serpentine leptosiphon	Fed: None CA: None CNPS: 4.2	Cismontane woodland, coastal scrub, and valley and foothill grassland. Found at elevations ranging from 395 to 3,710 feet. Blooming period is from March to June.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Navarretia prostrata prostrate vernal pool navarretia	Fed: None CA: None CNPS: 1B.2	Found in mesic soils in coastal scrub, meadows and seeps, valley and foothill grasslands (alkaline), and vernal pools. Found at elevations ranging from 65 to 2,100 feet. Blooming period is from April to July.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Puccinellia simplex California alkali grass	Fed: None CA: None CNPS: 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Blooming period is from March – May. Found at elevations ranging from 5 to 3,050 feet.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Sagittaria sanfordii Sanford's arrowhead	Fed: None CA: None CNPS: 1B.2	Habitats include marshes and swamps. Grows at elevations ranging from 0 to 2,133 feet. Blooming period is from May to November.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Senecio aphanactis chaparral ragwort	Fed: None CA: None CNPS: 2B.2	Found in sometimes alkaline soils in chaparral, cismontane woodland, and coastal scrub. Found at elevations ranging from 425 to 2,165 feet. Blooming period is from January to April.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
Streptanthus insignis ssp. lyonii Arburua Ranch jewelflower	Fed: None CA: None CNPS: 1B.2	Coastal scrub (sometimes serpentinite). Found at elevations ranging from 755 to 2,805 feet. Blooming period is from March to May.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**	**Potential to Occur**
Trichocoronis wrightii* var. *wrightii Wright's trichocoronis	Fed: None CA: None CNPS: 2B.1	Grows in alkaline soils in meadows and seeps, marshes and swamps, riparian forest, and vernal pools. Found at elevations ranging from 16 to 1,427 feet. Blooming period is from May to September.	No	**Presumed Absent** No suitable habitat is present within or adjacent to the project site.
SPECIAL-STATUS PLANT COMMUNITIES				
Alkali Seep	CDFW Sensitive Habitat	A seep of saline water, with an area of alkali salt crystals that form when the salty water reaches the surface and evaporates. Various types of water movement form saline seeps, including capillary action from a water table under the surface, and a water table being brought to the surface in a flow.	No	**Absent**
Cismontane Alkali Marsh	CDFW Sensitive Habitat	Cismontane alkali marsh is a wetland community dominated by low, perennial, herbaceous plants adapted to places where standing water or saturated soils are present for a considerable portion of the year. High evaporation and low input of freshwater render these marshes somewhat alkaline, especially during the summer.	No	**Absent**
Sycamore Alluvial Woodland	CDFW Sensitive Habitat	Open to moderately closed, winter-deciduous broad-leafed riparian woodland dominated by well-spaced California sycamore, often associated with intermittent, braided stream reaches with relatively stable groundwater levels and periodic flooding.	No	**Absent**
Valley Sink Scrub	CDFW Sensitive Habitat	Saline/alkaline playa-like depressions that typically occur in a matrix of mixed salt desert scrub. These areas are seasonally to intermittently flooded. They are not flooded every year and respond to localized thunderstorms. Soils typically are fine-textured with an impermeable caliche layer or clay pan. Salt encrustations are often deposited on the surface as the playa dries. Species are salt-tolerant and halophytic species.	No	**Absent**

U.S. Fish and Wildlife Service (USFWS) - Federal
END- Federal Endangered
THR- Federal Threatened
Candidate END – Under Review

California Department of Fish and Wildlife (CDFW) - California
END- California Endangered
CSC- California Species of Concern
WL- Watch List
FP- California Fully Protected

California Native Plant Society (CNPS)
California Rare Plant Rank
1A- Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B- Plants Rare, Threatened, or Endangered in California and Elsewhere
2B- Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere
4- Plants of Limited Distribution – A Watch List

Threat Ranks
0.1- Seriously threatened in California
0.2- Moderately threatened in California
0.3- Not very threatened in California

Appendix C Regulations

Special status species are native species that have been afforded special legal or management protection because of concern for their continued existence. There are several categories of protection at both federal and state levels, depending on the magnitude of threat to continued existence and existing knowledge of population levels.

Federal Regulations

Endangered Species Act of 1973

Federally listed threatened and endangered species and their habitats are protected under provisions of the Federal Endangered Species Act (ESA). Section 9 of the ESA prohibits "take" of threatened or endangered species. "Take" under the ESA is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct." The presence of any federally threatened or endangered species that are in a project area generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. Under the regulations of the ESA, the United States Fish and Wildlife Service (USFWS) may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

Critical Habitat is designated for the survival and recovery of species listed as threatened or endangered under the ESA. Critical Habitat includes those areas occupied by the species, in which are found physical and biological features that are essential to the conservation of an ESA listed species and which may require special management considerations or protection. Critical Habitat may also include unoccupied habitat if it is determined that the unoccupied habitat is essential for the conservation of the species.

Whenever federal agencies authorize, fund, or carry out actions that may adversely modify or destroy Critical Habitat, they must consult with USFWS under Section 7 of the ESA. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highway Administration or a permit from the U.S. Army Corps of Engineers (Corps)).

If USFWS determines that Critical Habitat will be adversely modified or destroyed from a proposed action, the USFWS will develop reasonable and prudent alternatives in cooperation with the federal institution to ensure the purpose of the proposed action can be achieved without loss of Critical Habitat. If the action is not likely to adversely modify or destroy Critical Habitat, USFWS will include a statement in its biological opinion concerning any incidental take that may be authorized and specify terms and conditions to ensure the agency is in compliance with the opinion.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S. Government Code [USC] 703) makes it unlawful to pursue, capture, kill, possess, or attempt to do the same to any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and the countries of the former Soviet Union, and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 10, 21).

The MBTA covers the taking of any nests or eggs of migratory birds, except as allowed by permit pursuant to 50 CFR, Part 21. Disturbances causing nest abandonment and/or loss of reproductive effort (i.e., killing or abandonment of eggs or young) may also be considered "take." This regulation seeks to protect migratory birds and active nests.

In 1972, the MBTA was amended to include protection for migratory birds of prey (e.g., raptors). Six families of raptors occurring in North America were included in the amendment: Accipitridae (kites, hawks, and eagles); Cathartidae (New World vultures); Falconidae (falcons and caracaras); Pandionidae (ospreys); Strigidae (typical owls); and Tytonidae (barn owls). The provisions of the 1972 amendment to the MBTA protects all species and subspecies of the families listed above. The MBTA protects over 800 species including geese, ducks, shorebirds, raptors, songbirds and many relatively common species.

State Regulations

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) provides for the protection of the environment within the State of California by establishing State policy to prevent significant, avoidable damage to the environment through the use of alternatives or mitigation measures for projects. It applies to actions directly undertaken, financed, or permitted by State lead agencies. If a project is determined to be subject to CEQA, the lead agency will be required to conduct an Initial Study (IS); if the IS determines that the project may have significant impacts on the environment, the lead agency will subsequently be required to write an Environmental Impact Report (EIR). A finding of non-significant effects will require either a Negative Declaration or a Mitigated Negative Declaration instead of an EIR. Section 15380 of the CEQA Guidelines independently defines "endangered" and "rare" species separately from the definitions of the California Endangered Species Act (CESA). Under CEQA, "endangered" species of plants or animals are defined as those whose survival and reproduction in the wild are in immediate jeopardy, while "rare" species are defined as those who are in such low numbers that they could become endangered if their environment worsens.

California Endangered Species Act (CESA)

In addition to federal laws, the state of California implements the CESA which is enforced by CDFW. The CESA program maintains a separate listing of species beyond the FESA, although the provisions of each act are similar.

State-listed threatened and endangered species are protected under provisions of the CESA. Activities that may result in "take" of individuals (defined in CESA as; "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") are regulated by CDFW. Habitat degradation or modification is not included in the definition of "take" under CESA. Nonetheless, CDFW has interpreted "take" to include the destruction of nesting, denning, or foraging habitat necessary to maintain a viable breeding population of protected species.

The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is considered as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management. A rare species is one that is considered present in such small numbers throughout its range that it may become endangered if its present environment worsens. State threatened and endangered species are fully protected against take, as defined above.

The CDFW has also produced a species of special concern list to serve as a species watch list. Species on this list are either of limited distribution or their habitats have been reduced substantially, such that a threat to their populations may be imminent. Species of special concern may receive special attention during environmental review, but they do not have formal statutory protection. At the federal level, USFWS also uses the label species of concern, as an informal term that refers to species which might be in need of concentrated conservation actions. As the Species of Concern designated by USFWS do not receive formal legal protection, the use of the term does not necessarily ensure that the species will be proposed for listing as a threatened or endangered species.

Fish and Game Code

Fish and Game Code Sections 3503, 3503.5, 3511, and 3513 are applicable to natural resource management. For example, Section 3503 of the Code makes it unlawful to destroy any birds' nest or any birds' eggs that are protected under the MBTA. Further, any birds in the orders Falconiformes or Strigiformes (Birds of Prey, such as hawks, eagles, and owls) are protected under Section 3503.5 of the Fish and Game Code which makes it unlawful to take, possess, or destroy their nest or eggs. A consultation with CDFW may be required prior to the removal of any bird of prey nest that may occur on a project site. Section 3511 of the Fish and Game Code lists fully protected bird species, where the CDFW is unable to authorize the issuance of permits or licenses to take these species. Pertinent species that are State fully protected by the State include golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*). Section 3513 of the Fish and Game Code makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

Native Plant Protection Act

Sections 1900–1913 of the Fish and Game Code were developed to preserve, protect, and enhance Rare and Endangered plants in the state of California. The act requires all state agencies to use their authority to carry out programs to conserve Endangered and Rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require notification of the CDFW at least ten days in advance of any change in land use which would adversely impact listed plants. This allows the CDFW to salvage listed plant species that would otherwise be destroyed.

California Native Plant Society Rare and Endangered Plant Species

Vascular plants listed as rare or endangered by the CNPS, but which have no designated status under FESA or CESA are defined as follows:

California Rare Plant Rank

1A- Plants Presumed Extirpated in California and either Rare or Extinct Elsewhere

1B- Plants Rare, Threatened, or Endangered in California and Elsewhere

2A- Plants Presumed Extirpated in California, But More Common Elsewhere

2B- Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

3- Plants about Which More Information is Needed - A Review List

4- Plants of Limited Distribution - A Watch List

Threat Ranks

.1- Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2- Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

.3- Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFG regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

Federal Regulations

Section 404 of the Clean Water Act

In accordance with the Revised Definition of "Waters of the United States"; Conforming (September 8, 2023), "waters of the United Sates" are defined as follows:

(a) ***Waters of the United States*** means:

(1) Waters which are:
(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(ii) The territorial seas; or
(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:
(i) Waters identified in paragraph (a)(1) of this section; or
(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted

cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;
(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (*e.g.,* gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) ***Wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) ***Adjacent*** means having a continuous surface connection

(3) ***High tide line*** means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) ***Ordinary high water mark*** means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) ***Tidal waters*** means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

Section 401 of the Clean Water Act

Pursuant to Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity which may result in any discharge to waters of the United States must provide certification from the State or Indian tribe in which the discharge originates. This certification provides for the protection of the physical, chemical, and biological integrity of waters, addresses impacts to water quality that may result from issuance of federal permits, and helps insure that federal actions will not violate water quality standards of the State or Indian tribe. In California, there are nine Regional Water Quality Control Boards (Regional Board) that issue or deny certification for discharges to waters of the United States and waters of the State, including wetlands, within their geographical jurisdiction. The State Water Resources Control Board assumed this responsibility when a project has the potential to result in the discharge to waters within multiple Regional Boards.

State Regulations

Fish and Game Code

Fish and Game Code Sections 1600 et. seq. establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;
(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or
(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. A Section 1602 Streambed Alteration Agreement would be required if impacts to identified CDFW jurisdictional areas occur.

Porter Cologne Act

The California *Porter-Cologne Water Quality Control Act* gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC and Rapanos regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

APPENDIX D

Cultural Resources Study (Tom Origer & Associates, 2024)

Cultural Resources Study for the
Vulcan Materials Company - Los Banos Facility Project
Los Banos, Merced County, California

Eileen Barrow, MA/RPA

May 9, 2022
Revised
January 16, 2024

Cultural Resources Study for the
Vulcan Materials Company - Los Banos Facility Project
Los Banos, Merced County, California

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May 9, 2022
Revised
January 16, 2024

ABSTRACT

Tom Origer & Associates conducted a cultural resources study for the Vulcan Materials Company - Los Banos Facility Project, Los Banos, Merced County, California. This study was conducted to meet the requirements of the California Environmental Quality Act and those of the County of Merced. The purpose of this report is to identify potential historical resources other than Tribal Cultural Resources, as defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B) and discussed in the Regulatory Context section, and analyze whether the proposed project would have a significant impact on any identified resources. Tribal Cultural Resources are defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B).

The project proponent is seeking to continue gravel mining operations by expanding into the current study area.

This study included archival research at the Central California Information Center, California State University - Stanislaus, examination of the library and files of Tom Origer & Associates, Native American contact, and field inspection of the study area. A site (P-24-000102) was previously documented within the study area. Archival research and a field survey showed that this site is not located within the study area. No cultural resources were found during the course of this study.

This report contains information about the locations of archaeological sites. For the protection of these resources, this report, and such location information, should not be publicly circulated.

Synopsis

Project:	Vulcan Materials
Location:	Near Los Banos, Merced County
APN:	083-210-033, 088-070-039, 088-070-079, and 088-070-086
Quadrangles:	Ortigalita Peak NW and Volta 7.5’ series
Study Type:	Intensive
Scope:	~330 acres
Field Hours:	45.25 person-hours
CCIC #:	12082I
TOA #:	2022-014
Finds:	Previously recorded site P-24-000102 is not located within the study area. No cultural resources were found during this study.

Key Personnel

Eileen Barrow conducted research, lead the field survey, and authored the report for this project. Ms. Barrow has been with Tom Origer & Associates since 2005. She holds a Master of Arts in cultural resources management from Sonoma State University. Ms. Barrow's experience includes work that has been completed in compliance with local ordinances, CEQA, NEPA, and Section 106 (NHPA) requirements. Her professional affiliations include the Society for American Archaeology, the Society for California Archaeology, the Sonoma County Historical Society, the Western Obsidian Focus Group, and the Register of Professional Archaeologists (#989269).

Janine Origer provided her architectural history expertise for this project. Ms. Origer has 30 years of experience in Northern California cultural resources management. She has been with Tom Origer & Associates since 1991. She has worked on both prehistoric and historical archaeological sites and has completed research and documentation of historical buildings. Ms. Origer has a Bachelor of Arts in Anthropology from Sonoma State University. She holds a Master of Arts in Archaeology and Heritage from the University of Leicester. She has completed extensive continuing education in regulatory compliance, planning local surveys, and identifying historical resources. She is affiliated with the American Historical Association, Society for California Archaeology (Secretary of the Executive Board 2004-2006), the International Association for Obsidian Studies, the Society for American Archaeology, the Society for Historical Archaeology, Society of Architectural Historians, Vernacular Architecture Forum, and the Register of Professional Archaeologists (#1066030).

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INTRODUCTION

This report describes a cultural resources study for the Vulcan Materials Company - Los Banos Facility Project, Los Banos, Merced County, California (Figure 1). This study was conducted to meet the requirements of the California Environmental Quality Act (CEQA) and those of the County of Merced. Documentation pertaining to this study is on file at Tom Origer & Associates (File No. 2022-014).

The project proponent is seeking to continue gravel mining operations by expanding into the Sunset and Turner properties (study area). Proposed mining operations within the study area would be typical of surface aggregate extraction operations and would be conducted in the same manner as currently occurs at the adjacent Los Banos Facility. Specifically, mining would be conducted by excavating pits, followed by the placement of process fines (clays, silts, and sands) into the previously excavated areas.

Consistent with the existing and ongoing operations currently occurring at the adjacent Los Banos Facility, mining within the study area would entail using mobile excavators, loaders, and transfer trucks to extract and move the materials from extraction basins located within the study area, where off-road haul trucks and scrapers would then transport the material to the existing processing plant located adjacent to the study area. Thus, blasting would not be required, nor would on-road haul trucks be needed to transfer the mined aggregate to the existing processing plant.

The Turner property is approximately 308 acres in size, located immediately south and east of the existing Los Banos Facility. The Sunset property is approximately 33 acres in size and is located immediately west of the existing Los Banos Facility. Recovery of aggregates at the Sunset and Turner properties are planned to occur at depths generally ranging from 27-feet to 72-feet below ground surface (bgs), depending on location, for an average target elevation of 125-feet above mean sea level (amsl); however, mining has been designed to remain above groundwater, and the final mining depth will ultimately be dependent upon underlying depth to groundwater.

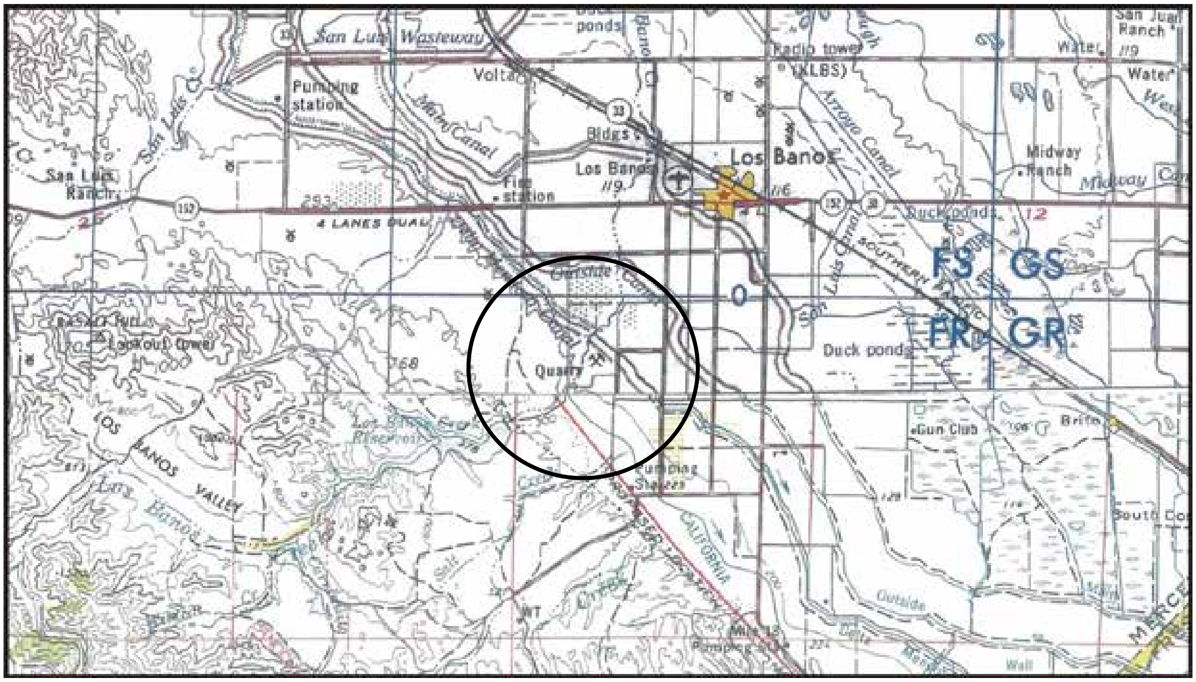

Figure 1. Project vicinity (adapted from the 1965 Santa Cruz and the 1969 San Jose 1:250,000-scale USGS map).

REGULATORY CONTEXT

The State of California requires that cultural resources be considered during the environmental review process. This process is outlined in CEQA and accomplished by an inventory of resources within a study area and by assessing the potential that historical resources could be affected by development. The term “Historical Resources” encompasses all forms of cultural resources including prehistoric and historical archaeological sites and built environment resources (e.g., buildings, bridges, canals), that would be eligible for inclusion on the California Register of Historical Resources (California Register). An additional category of resources is defined in CEQA under the term “Tribal Cultural Resources” (Public Resources Code Section 21074). They are not addressed in this report because Tribal Cultural Resources are resources that are of specific concern to California Native American tribes, and knowledge of such resources is limited to tribal people. Pursuant to CEQA, as revised in July 2015, such resources are to be identified by tribal people in direct, confidential consultation with the lead agency (PRC §21080.3.1).

This cultural resources study was designed to satisfy environmental issues specified in CEQA and its guidelines (Title 14 CCR §15064.5) by: (1) identifying historical resources within the project area; (2) offering a preliminary significance evaluation of the identified cultural resources; (3) assessing resource vulnerability to effects that could arise from project activities; and (4) offering suggestions designed to protect resource integrity, as warranted.

Resource Definitions

Historical resources are classified by the State Office of Historic Preservation (OHP) as sites, buildings, structures, objects and districts, and each is described by OHP (1995) as follows.

> **Site.** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
>
> **Building.** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. “Building” may also be used to refer to a historically and functionally related unit, such as a courthouse and jail, or a house and barn.
>
> **Structure.** The term “structure” is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
>
> **Object.** The term “object” is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
>
> **District.** A district possesses a significant concentration, linkage, or continuity of sites,

buildings, structures, or objects united historically or aesthetically by plan or physical development.

Significance Criteria

When a project might impact a cultural resource, the project proponent is required to conduct an assessment to determine whether the impact may be one that is significant. Consequently, it is necessary to determine the importance of resources that could be impacted. The importance of a resource is measured in terms of criteria for inclusion on the California Register. A resource may be important if it meets any one of the criteria, or if it is already listed on the California Register or a local register (Title 14 CCR, §4852).

An important resource is one which:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

2. Is associated with the lives of persons important to local, California, or national history.

3. Embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of a master or possesses high artistic values.

4. Has yielded, or may be likely to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, eligibility for the California Register requires that a resource retains sufficient integrity to convey a sense of its significance or importance. Seven elements are considered key in considering a property’s integrity: location, design, setting, materials, workmanship, feeling, and association.

The OHP advocates that all resources over 45 years old be recorded for inclusion in the OHP filing system (OHP 1995:2), although the use of professional judgment is urged in determining whether a resource warrants documentation.

PROJECT SETTING

Study Area Location and Description

The study area lies on the west side of the San Joaquin Valley, just before its interface with the Diablo Range of the South Coast Range. Los Banos Creek is just outside the study area and flows out of the Diablo Range roughly northward into the San Joaquin Valley. The San Joaquin Valley is a mosaic of ecosystems including oak woodlands, grasslands, riparian forests, vernal pools, and marshland. With the advent of Europeans and Euro-Americans, the great valley was developed into vast agricultural and rangelands which still comprise much of the valley today.

The study area consists of parcels 083-210-033, 088-070-039, 088-070-079, and 088-070-086. The study area is discontiguous; parcel 083-210-033 is located off of Sunset Avenue and is referred to as the Sunset Parcel. The remaining three parcels are referred to as the Turner Parcels and are located off of S. Creek Road and Alvarado Trail. Both study area locations are approximately 3.5 miles southwest of the city of Los Banos, Merced County, as shown on the Ortigalita Peak NW and Volta 7.5’ USGS topographic maps (Figure 2). This part of the county of Merced has been used mainly for agricultural purposes. The study area is primarily unused grassland that was used formerly for agricultural purposes (Figure 3).

The study area consists of approximately 330 acres primarily situated on level land with a percent slope of less than 1%. Los Banos Creek once flows adjacent to the Turner Parcel and approximately 250 meters from the Sunset Parcel.

The geology of the study area consists of alluvial gravel sand, and clay of valley areas formed during the Holocene epoch (11,700 years ago to the present) (Dibblee 2007a, 2007b).

Soils within the study area primarily belong to the Carranza-Woo complex with a small portion of the northeast end of the Sunset Parcel comprised of Woo loams (Nazar 1990: Sheet 8 and 14). Both soils are deep, well-draining soils found on alluvial fans. Carranza soils are gravelly loams while Woo soils are loams. In a natural state, these soils support the growth of annual and perennial grasses and forbs. Historically, parcels containing both Carranza and Woo soils have been used for growing irrigated crops (Nazar 1990:55, 56, 158, and 159).

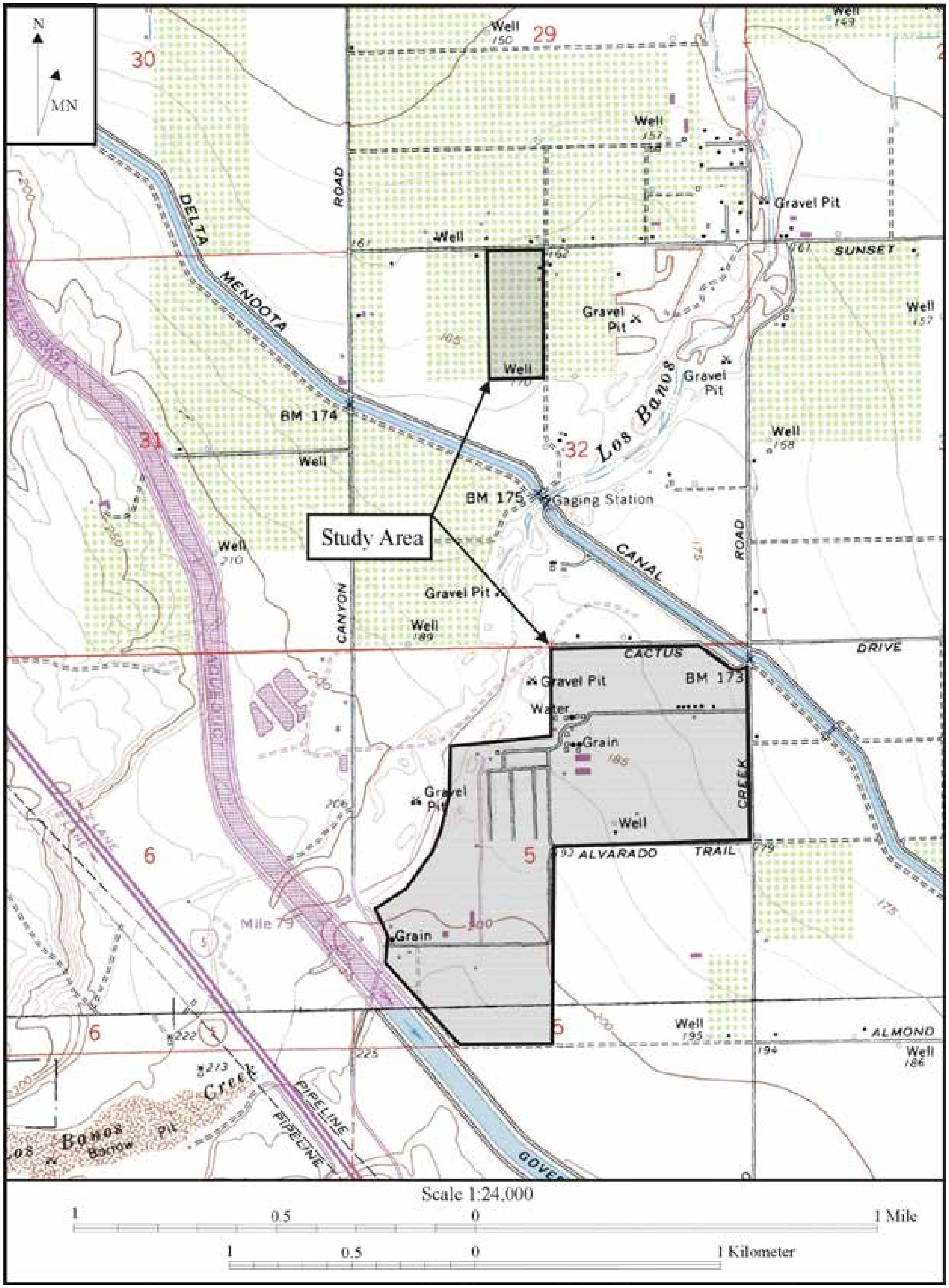

Figure 2. Study area location (adapted from the 2000 Ortigalita Peak NW and the 1971 Volta 7.5' USGS topographic maps).

Figure 3. Overview photo of the study area, facing southwest.

Cultural Setting

Prehistory

The concept of prehistory refers to the period of time before events were recorded in writing and vary worldwide. Because there is no written record, our understanding of California prehistory relies on archaeological materials and oral histories passed down through generations. Early archaeological research in this area began with the work of P. M. Jones, C. Hart Merriam, and Nels Nelson, all of them working in Kern County (Moratto 2004:174). P. M. Jones, among the earliest researchers,explored mounds in 1899. C. Hart Merriam heard that local resident James Stockton had found a rock shelter containing baskets a few miles east of Bakersfield. Merriam discovered that one of the baskets contained a mummified child and other items (Heizer 1951). A few years after Merriam's work, Nelson collected a cache of baskets and other items exposed in a dry creek bank in the Elk Hills east of Bakersfield (Moratto 2004:174). The first large-scale and more scientific study of the Central Valley occurred at either end of the San Joaquin Valley (Gifford and Schenck 1926; Schenck and Dawson 1929). In the southern part of the valley, Gifford and Schenck believed that because many of the artifacts they found were on or near the surface, the area had not been inhabited for a long period of time. Schenck and Dawson came to a similar conclusion during their study of the northern part of the Valley but for different reasons.

In the 1930s, archaeologists from Sacramento Junior College and the University of California began piecing together a sequence of cultures primarily based on burial patterns and ornamental artifacts from sites in the lower Sacramento Valley (Lillard *et al*. 1939; Heizer and Fenenga 1939). Their cultural sequence became known as the Central California Taxonomic System (CCTS), which identified three culture periods termed the Early, Middle, and Late Horizons, (later termed Windmiller, Berkeley, and Augustine patterns by Ragir 1972), but without offering date ranges. Refinement of the CCTS became a chief concern of archaeologists as the century progressed with publications by Richard Beardsley (1948, 1954) and Clement Meighan (1955) based on materials excavated by the University of California archaeological survey.

In 1973, David Fredrickson synthesized prior work, and in combination with his own research developed a chronology that is used to this day, albeit modified for locality-specific circumstances. Fredrickson's scheme shows that native peoples have occupied Central California for over 11,000 years (which is supported by Erlandson *et al.* 2007), and during that time, shifts took place in their social, political, and ideological regimes (Fredrickson 1973).

In addition, Fredrickson defined cultural patterns pertinent to the Central Valley (1973). Although Fredrickson's concept of a pattern has no temporal implications, the Windmiller, Berkeley, and Augustine patterns tend to be stratified (Moratto 2004: Figure 5.11).

After Fredrickson's definition of cultural chronology and patterns, Rosenthal *et al.* (2007) examined the body of archaeological work conducted in the Central Valley. They found that most of the substantial sites that would be able to provide chronological data over long periods had been excavated many years ago when standards were not the same as today. Given little new information had been obtained to refine Fredrickson's chronology, Rosenthal *et al.* were only able to summarize observations made to-date.

In 1960, the first study of obsidian hydration as a dating tool for archaeologists was published (Friedman and Smith 1960). This study showed that the chemical composition of the obsidian and temperature affect the hydration process. It was not until the 1980s that research into this dating method was conducted though the focus of the study was on obsidian from the north of San Francisco Bay which has four major obsidian sources. In 1987, Thomas Origer devised a hydration chronology for the north of San Francisco Bay (Origer 1987). This chronology was developed by pairing micron readings taken from obsidian specimens and pairing them with radiocarbon-dated artifacts and features. Origer was able to develop a hydration rate for Annadel and Napa Valley obsidian sources as a result of his study. Later, Tremaine (1989, 1993) was able to develop comparison constants among the four primary obsidian sources in the North Bay Area. The concept of comparison constants allows for the calculation of dates from hydration band measurements taken from obsidian specimens from sources with unknown hydration rates. Since these studies, much work has been done to model their work in other parts of California.

The development of obsidian hydration rates for central California obsidian sources has provided archaeologists the ability to obtain dates from sites that could not previously be dated due to a lack of diagnostic artifacts or organic material suitable for radiocarbon dating. Origer was able to support and refine Fredrickson's chronology dating tools diagnostic of certain periods (Origer 1987). Table 1 assimilates Fredrickson's (1973) chronology and patterns and the obsidian hydration dating scheme from Origer (1987).

Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and hand-stones, and mortars and pestles; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire-affected stones.

Table 1. Central Valley Chronology

Temporal Period[1]	Approximate Time Range[1]	~ Hydration Interval (μ)[2]	Patterns[3]
Historical	< A.D. 1800	<1.20	
Upper Emergent	A.D. 1800 to A.D. 1500	1.21 - 1.84	Augustine
Lower Emergent	A.D. 1500 to A.D. 1000	1.85 - 2.58	
Upper Archaic	A.D. 1000 to 500 B.C.	2.59 - 4.05	Berkeley
Middle Archaic	500 B.C. to 3000 B.C.	4.06 - 5.72	Windmiller
Lower Archaic	3000 B.C. to 6000 B.C.	5.73 - 7.23	
Paleo-Indian	6000 B.C. to 8000 B.C.	7.24 - 8.08+	

[1] based on Fredrickson (1994)
[2] based on Napa Glass Mountain rate by Origer (1987)
[3] based on Moratto (2004)

Ethnography

Linguists and ethnographers tracing the evolution of languages have found that most of the indigenous languages of the California region belong to one of five widespread North American language groups (the Hokan and Penutian phyla, and the Uto-Aztecan, Algic, and Athabaskan language families). The distribution and internal diversity of four of these groups suggest that their original centers of dispersal were outside, or peripheral to, the core territory of California, that is, the Central Valley, the Sierra Nevada, the Coast Range from Cape Mendocino to Point Conception, and the Southern California coast and islands. Only languages of the Hokan phylum can plausibly be traced back to populations inhabiting parts of this core region during the Archaic period, and there are hints of connections between certain branches of Hokan, such as that between Salinan and Seri, suggesting that at least some of the Hokan languages could have been brought into California by later immigrants, primarily from the Southwest and northwestern Mexico (Golla 2011).

In approximately 4000 BC, ancestors of the Penutian-based language speakers arrived in the Sacramento-San Joaquin Delta area, presumably from east of the Sierra Nevada. This coincides with the occurrence of the Windmiller Pattern in the same area. Within 2000 years, these Penutian speakers spread in all directions throughout California including south into the San Joaquin Valley and the hills on either side of it. When Europeans arrived in California, Penutian speakers made up the majority of the state (Moratto 2004:535-571 and Figures 11.6-11.9).

At the time of European settlement, the study area was situated in an area controlled by the Northern Valley Yokuts (Wallace 1978). The Northern Valley Yokuts were hunter-gatherers who lived in rich marsh and plains environments, which allowed for dense populations with complex social structures (Wallace 1978; Kroeber 1925). They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied throughout the year and generally were located on, or near, low mounds and the banks of large watercourses. Other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Populations were not evenly distributed, but rather clustered in a narrow strip of land along the San Joaquin and its main tributaries, in accordance with periodic flooding (Wallace 1978:463). This region provided variety and an abundance of fish, fowl, small and large game mammals, acorns, tule roots, and seeds as sources of subsistence.

History

Historically, the study area lies within the public lands southwest of the City of Los Banos. Early settlement in the vicinity of the study area occurred around the intersection of Highway 152 and Ortigalita Road (Ralph Milliken Museum Society 2002). The location was called Center Point (later Central Point). Because this was a major intersection of important roads, businesses around it prospered until the railroad was constructed to the east in 1889 and Los Banos became a more important transportation hub (Ralph Milliken Museum Society 2002). The area was important for cattle and sheep ranching as well as a variety of agricultural pursuits.

General Land Office records show that land containing the Sunset parcel was purchased by William Chapman in 1869 and the lands containing the Turner parcels were purchased by Emma Knight, Frank Potter, and William Wisenor in 1892 (GLO 1869, 1892a, 1892b, 1892c). There is no evidence that these people lived within the study area. Maps and aerial photos suggest that the study area was in the hands of small, private farms until the mid-20th century when a large portion of the Turner parcel was turned into a feedlot (UCSB 1957; USGS 1913, 1920, 1921, 1922, 1943, 1947, 1967, 1971a).

Archival research shows that the feedlot was owned by the Wolfsen family for many years. Henry Wolfsen, a German immigrant, followed the horde of others hoping to make their fortune in the California gold fields. His wife, Amelia, was born in England and also traveled to California where they met and married. In 1875, the Wolfsens moved to Merced County and leased a few different ranches until purchasing their own ranch west of Merced in 1880 (Outcalt 1925).

The Wolfsens had a large family, many of which also went into ranching in Merced County. The Wolfsen family continued to grow and as they did, so too did their business. Ranching and farming was the family’s primary pursuit; however, in the mid-20th century their business expanded into the related industry of meat processing and the family had a few feedlots, slaughterhouses, and at least one butcher shop (Santa Cruz Sentinel 1970, 1974; Tulare Advance Register 1983; United States Department of Agriculture 1974).

In 2008, the Wolfsen family sold the Turner parcel to Vulcan Lands, Inc. Based on review of aerial photos, the property had not been used as a feedlot since, at least 1998 (GoogleEarth 1998, 2004, 2006).

Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

STUDY PROCEDURES AND FINDINGS

Native American Contact

A request was sent to the State of California's Native American Heritage Commission (NAHC) seeking information from the Sacred Lands File and the names of Native American individuals and groups that would be appropriate to contact regarding this project. Letters were also sent to the following groups:

Amah Mutsun Tribal Band
Chicken Ranch Rancheria of Me-Wuk Indians
Dumna Wo-Wah Tribal Government
Nashville Enterprise Miwok-Maidu-Nishinam Tribe
North Valley Yokuts Tribe
Santa Rosa Rancheria Tachi Yokut Tribe
Southern Sierra Miwuk Nation
Tule River Indian Tribe
Wuksache Indian Tribe/Eshom Valley Band

This contact does not constitute consultation with tribes.

Native American Contact Results

The NAHC replied with a letter dated March 24, 2022, which indicated that the Sacred Lands File has no information about the presence of Native American cultural resources in the immediate project area. A list of additional contacts was provided.

Paige Berggren of the Santa Rosa Rancheria Tachi-Yokut Tribe responded on April 12, 2022. Ms. Berggren stated that the tribe would like to be notified of any cultural reports used or created for this project and they would like to monitor ground-disturbing activities up to 10 feet deep.

No other responses have been received as of the date of this report. A log of contact efforts is appended to this report, along with copies of correspondence (see Appendix A).

Archival Research Procedures

Archival research included an examination of the library and project files at Tom Origer & Associates. This research is meant to assess the potential to encounter archaeological sites and the built environment within the study area. Research was also completed to determine the potential for buried archaeological deposits.

A review (CCIC File No. 12082I) was completed of the archaeological site base maps and records, survey reports, and other materials on file at the Central California Information Center (CCIC), University of California, Stanislaus by CCIC staff. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places, California Historical

Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the OHP's *Historic Property Directory* (2012) and the *Built Environment Resources Directory* (2021).

The OHP has determined that structures in excess of 45 years of age could be important historical resources, and former building and structure locations could be important archaeological sites. Archival research included an examination of 19th and 20th-century maps and aerial photographs to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area.

Ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of this report.

A model for predicting a location's sensitivity for buried archaeological sites was formulated by Byrd *et al.* (2017) based on the age of the landform, slope, and proximity to water. A location is considered to have the highest sensitivity if the landform dates to the Holocene, has a slope of five percent or less, is within 150 meters of fresh water, and 150 meters of a confluence. Note, the Holocene Epoch is the current period of geologic time, which began about 11,700 years ago, and coincides with the emergence of human occupation of the area. A basic premise of the model is that archaeological deposits will not be buried within landforms that predate human colonization of the area. Calculating these factors using the buried site model (Byrd *et al.* 2017:Tables 11 and 12), a location's sensitivity is scored on a scale of 1 to 10 and classed as follows: lowest (<1); low (1-3); moderate (3-5.5); high (5.5-7.5); highest (>7.5). Incorporating King's (2004) analysis of buried site potential, the probability of encountering buried archaeological deposits for each class is as follows:

Sensitivity Score[1]	Classification[1]	Probability[2]
<1	Lowest	<1 %
1-3	Low	1-2 %
3-5.5	Moderate	2-3%
5.5-7.5	High	3-5%
>7.5	Highest	5-20%

[1] Byrd *et al.* 2017

[2] King 2004

Archival Research Findings

Archival research found that a portion of the study area had been previously subjected to a cultural resources survey (Moratto *et al.* 1990; Moratto *et al.* 1994). Twelve studies have been conducted within a half-mile of the study area (See Table 2).

One resource, P-24-000102 (CA-MER-001, has been recorded within the study area. (Krantz 1956). The resource was the reported location of a village where 170 mortars were collected. The record is not very descriptive and suggests that no archaeological materials were visible at the location when it was recorded in 1956 (Krantz 1956). In addition, the 1956 record states that there are farm buildings on the site and review of historical maps and aerial photos does not show that any buildings have been located at the location plotted on the CCIC's maps (GLO 1855a, 1855b, 1875; UCSB 1957; USGS 1913, 1920, 1921, 1947, 1960, 1961, 1967, 1971b). The site location was again visited in 1972 and as there was again no evidence of archaeological specimens or soils present, it was assumed that the site was destroyed by a stockyard and feed company (Malone 1972). There are 13 cultural resources within a half-mile of the study area (See Table 3).

Table 2. Studies within a Half-mile of the Study Area

Author	Date	ME#
Bailey	2009	7779
Boyer	1991	1544
Canaday *et al.*	1992	1846
Cartier	2005	6102
Carper	2014	8202
Chotkowski	2009	7150
Guerrero	2010	7164
Holson	2006	6312
Mikkelsen and Hildebrandt	1990	620
Napton	2003	5048
Weber	1978	699
Werner	1989	703

The majority of the cultural resources documented within a half-mile of the study area are isolated specimens. Two of the cultural resources are linear structures that do not have the potential to extend into the study area. The remaining two locations are Native American sites, one a lithic scatter, and one a possible rancheria; though no evidence of prehistoric or contact-period Native American specimens were found at the location. The number of isolated specimens shows that the area was used prehistorically; however, the immediate area was not extensively used for camps or habitation.

Table 3. Resources within a Half-mile of the Study Area

Author	Date	P#	Distance from Study Area	Resource Description
Berg	1990	P-24-000401	2,130 feet	Lithic scatter
Kile	2010	P-24-001703	92 feet	Delta-Mendota Canal
Latta	1950	P-24-000156	270 feet	Two metates
Knight and Manuel	1993	P-24-000161	2,430 feet	Possible rancheria
Mikkelsen	1990a	P-24-000054	1,915 feet	Isolate
Mikkelsen	1990b	P-24-000055	1,460 feet	Isolate
Mikkelsen	1990c	P-24-000056	1,740 feet	Isolate
Mikkelsen	1990d	P-24-000057	1,475 feet	Two flakes
Mikkelsen	1990e	P-24-000058	2,100 feet	Four flakes
Mikkelsen	1990f	P-24-000059	2,105 feet	Three flakes
Mikkelsen	1990g	P-24-000062	460 feet	Isolate
Mikkelsen	1990h	P-24-000063	550 feet	Isolate
Rogers	2017	P-24-001931	85 feet	California Aqueduct

No ethnographic villages have been reported within one mile of the study area (Kroeber 1925; Latta 1977; Wallace 1978).

A review of 19th and 20th-century maps show that the first features appear within the study area in 1921 and consist of two ditches, one on the Sunset Parcel and one on the Turner Parcel (GLO 1855a, 1855b, 1875; USGS 1913, 1920, 1921). By 1947, these two ditches are no longer shown (USGS 1947). A building appears in the northeast corner of the Sunset Parcel in 1947. It is no longer depicted by 1960, however, another building appears in the northwest corner and a well appears in the southwest corner

(USGS 1960). One additional building is shown near the building in the northwest corner in 1971 and by 2004 the buildings are demolished (GoogleEarth 2004; USGS 1971).

On the Turner Parcel, several agricultural and residential buildings and structures are shown on the property between 1947 and 1971 (USGS 1947, 1956a, 1956b, 1960, 1961, 1969, 1971b). Figure 4 shows the buildings depicted within the Turner parcel in 1956 and 1960 (USGS). Nearly every building and structure on the property was demolished by 2010; though several foundations are still visible (GoogleEarth 2010a, 2010b, 2010c). The only remaining building on the property is a large barn which was constructed between 1967 and 1971 (USGS 1967 and 1971a).

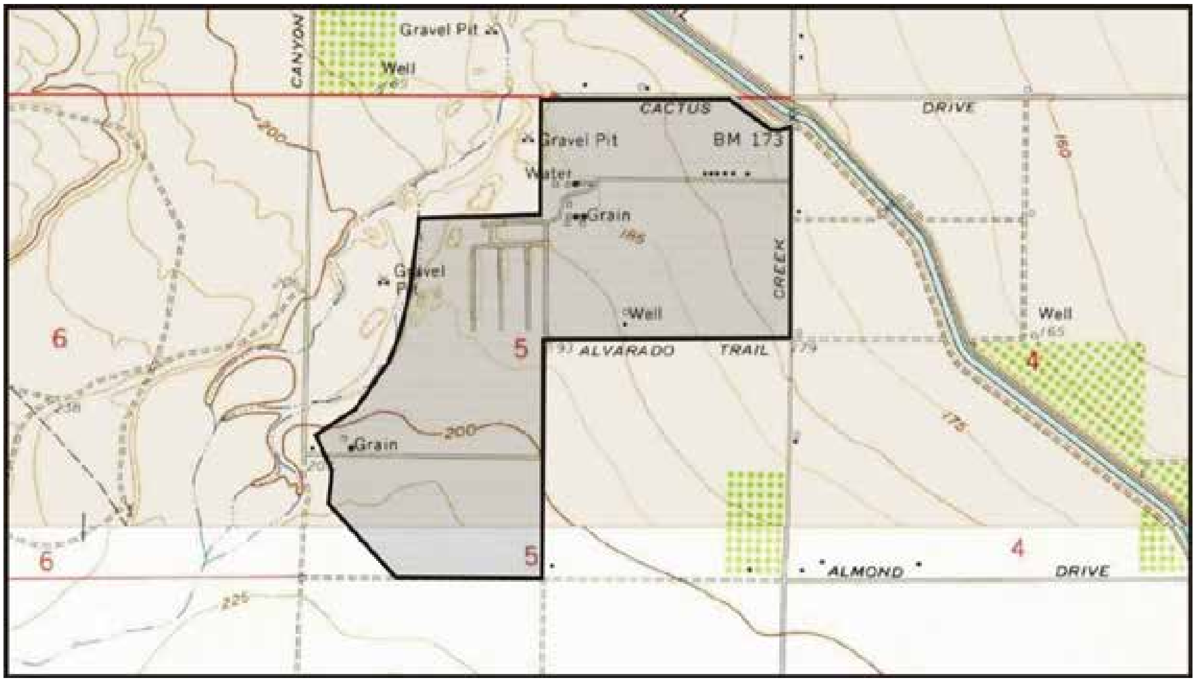

Figure 4. Buildings and structures depicted within the study area on the 1956 and 1960 maps (adapted from the 1956 Ortigalita Peak NW and the 1960 Volta 7.5' USGS topographic maps).

Based on landform age, our analysis of the environmental setting, and incorporating the Byrd *et al.* (2017) analysis of sensitivity for buried sites, there is a high potential for buried archaeological site indicators within 300 meters of Los Banos Creek. The remainder of the study area has a moderate to low potential for buried archaeological site indicators.

Field Survey Procedures

An intensive field survey was completed by Eileen Barrow, Bryan Karnowski, Julia Karnowski, and Lena Murphy on March 7, 8, and 9, 2022. Just over 45 hours were spent in the field and field conditions were warm and sunny. Surface examination consisted of walking in corridors spaced 15-meter apart, when possible. Hoes were used as needed to expose the ground surface. The majority of the study area is agricultural land. Parts of it had been disced somewhat recently which provided excellent visibility. Large ground-squirrel burrows were present throughout the study area, which also allowed for examination of surface and subsurface soils.

Special attention was made in the vicinity of the previously recorded archaeological site, as well as locations where buildings and structures were shown on historical maps and aerial photos.

In addition to our field survey, the banks of all ditches, pits, and Los Banos Creek were examined to look for buried archaeological site indicators. Ditches were as deep as 4.5 feet below the ground surface. One of the pits went as deep as 11 feet below the ground surface.

Field Survey Findings

Archaeology

No archaeological site indicators were found during our study. This included the location of previously documented site P-24-000102.

Built Environment

Field survey showed evidence of several buildings in the form of piles of concrete or concrete pads. The only extant building or structure constructed more than 45 years ago is a large barn in the center of the Turner Parcel.

DISCUSSION AND RECOMMENDATIONS

Application of the buried sites model indicates a high potential (per Byrd et al. 2017) for buried resources in the portions of the study area that lies within 300 meters of Los Banos Creek. Places where subsurface soils were visible included the bank of Los Banos Creek and several modern ditches or pits. These locations were examined and no evidence of buried archaeological site indicators was found. Since we were able to examine subsurface soils along places of high buried site sensitivity and saw no buried archaeological site indicators, the potential for buried archaeological sites within the study area is reduced to a moderate potential which corresponds to a 2-3% probability of there being buried sites within the study area.

It is the experience of the author that prehistoric archaeological sites are rarely “obliterated” as suggested in the record for P-24-000102. Unless an archaeological site is completely excavated and the soils removed, evidence of archaeological sites remain in the form of darkened or mottled soils, lithic debris, and other components of archaeological sites. Malone (1972) suggests that the former feedlot destroyed the site, but there was no evidence that the construction of the feedlot either dug up and removed soils or that soils were hauled in which could cover the site. In addition, the feedlot buildings and structures are located outside of the plotted location of P-24-000102. It is our opinion that the plotted location of the site by Krantz (1956) is incorrect and there was no archaeological site at this location. This is supported by the lack of archaeological specimens and soils on the surface at the plotted location of this site, the lack of archaeological specimens in animal burrows within and near the plotted location of this site, and the lack of archaeological specimens within the bank of the adjacent Los Banos Creek.

Several building pads and building remains were found throughout the study area. Though research showed that the Wolfsen family owned the study area, they did not live on-site, and this was one of many properties that the Wolfsen family owned. Though an argument could have been made that buildings and structures on the property would have been important for their association with the Wolfsen family’s business, these were largely removed from the property 14 years ago and they were removed at a point in time when the Wolfsen's had sold the property and it had not been utilized by them for 10 years at that point. The building and structure remains in the form of concrete pads and piles of rubble are not architecturally distinctive. There is no data potential from the building remains as there were no archaeological deposits or features found at these locations. While these building remains could be associated with the important theme of agriculture in the Central Valley, these building remains no longer convey anything important about this theme; therefore, these locations would not meet criteria for inclusion on the California Register.

Janine Origer of Tom Origer & Associates meets the Secretary of the Interior's Standards for architectural history and provided the following opinion regarding the built environment. The extant barn is a large building on a rectangular plan. The walls are comprised of concrete blocks and the gables and roof are covered with corrugated metal. The building is of simple design and not architecturally distinctive. Given the other buildings associated with this barn have been demolished, this barn would not meet criteria for inclusion on the California Register on its own merrits.

Archaeological Recommendations

It is our opinion that this project will have a less than significant impact on archaeological resources; therefore, no recommendations are warranted.

Built Environment Recommendations

It is our opinion that this project will have a less than significant impact on built environment resources; therefore, no recommendations are warranted.

Accidental Discovery

In keeping with the CEQA guidelines, if archaeological remains are uncovered, ground-disturbing work within 50 feet of the places of discovery shall be halted immediately until a qualified archaeologist can evaluate the find as required (§15064.5 [f]). Construction may continue on other parts of the site while evaluation of the find is made and mitigation of the find is conducted if needed. Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

The following actions are promulgated in the CEQA Guidelines Section 15064.5(d) through (e) and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the NAHC. The NAHC will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

SUMMARY

Tom Origer & Associates completed a cultural resources study for the Vulcan Materials Company - Los Banos Facility Project, Los Banos, Merced County, California. This study was conducted in compliance with the requirements of CEQA and those of the County of Merced. No cultural resources were found during this study; therefore, no recommendations are warranted. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2022-014).

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APPENDIX A

Native American Contact

Native American Contact Efforts
Vulcan Materials Company - Los Banos Facility Project
Los Banos, Merced County

Organization	Contact	Action	Results
Native American Heritage Commission		Email 2/15/22	The NAHC replied with a letter dated March 24, 2022, which indicated that the Sacred Lands File has no information about the presence of Native American cultural resources in the immediate project area. A list of additional contacts was provided.
Amah Mutsun Tribal Band	Valentin Lopez	Email 2/14/22	No response received as of the date of this report.
Chicken Ranch Rancheria of Me-Wuk Indians	Lloyd Mathiesen	Email 2/14/22	No response received as of the date of this report.
Dumna Wo-Wah Tribal Government	Robert Ledger	Email 3/25/22	No response received as of the date of this report.
Nashville Enterprise Miwok-Maidu-Nishinam Tribe	Cosme Valdez	Email 2/14/22	No response received as of the date of this report.
North Valley Yokuts Tribe	Katherine Perez Timothy Perez	Email 2/14/22	No response received as of the date of this report.
Santa Rosa Rancheria Tachi Yokut Tribe	Leo Sisco	Letter 3/25/22	Paige Berggren of the Santa Rosa Rancheria Tachi-Yokut Tribe responded on April 12, 2022. Ms. Berggren stated that the tribe would like to be notified of any cultural reports used or created for this project and they would like to monitor ground-disturbing activities up to 10 feet deep.
Southern Sierra Miwuk Nation	William Leonard	Email 2/14/22	No response received as of the date of this report.
Tule River Indian Tribe	Neil Peyron Kerri Vera	Email 2/14/22	No response received as of the date of this report.
Wuksache Indian Tribe/Eschom Valley Band	Kenneth Woodrow	Email 3/28/22	No response received as of the date of this report.

APPENDIX A

Native American Contact

Copies of Correspondence

Native American Contact Efforts
Vulcan Materials Company - Los Banos Facility Project
Los Banos, Merced County

Organization	Contact	Action	Results
Native American Heritage Commission		Email 2/15/22	No response received as of the date of this report.
Amah Mutsun Tribal Band	Valentin Lopez	Email 2/14/22	No response received as of the date of this report.
Chicken Ranch Rancheria of Me-Wuk Indians	Lloyd Mathiesen	Email 2/14/22	No response received as of the date of this report.
Nashville Enterprise Miwok-Maidu-Nishinam Tribe	Cosme Valdez	Email 2/14/22	No response received as of the date of this report.
North Valley Yokuts Tribe	Katherine Perez Timothy Perez	Email 2/14/22	No response received as of the date of this report.
Southern Sierra Miwuk Nation	William Leonard	Email 2/14/22	No response received as of the date of this report.
Tule River Indian Tribe	Neil Peyron Kerri Vera	Email 2/14/22	No response received as of the date of this report.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Vulcan Materials Company Project
County: Merced

USGS Quadrangles
Name: Ortigalita Peak NW and Volta
Township T10S Range R10E Section(s) 32 MDBM and

Township T11S Range R10E Section(s) 5 MDBM

Date: February 15, 2022
Company/Firm/Agency: Tom Origer & Associates
Contact Person: Eileen Barrow

Address: P.O. Box 1531
City: Rohnert Park Zip: 94927
Phone: (707) 584-8200 Fax: (707) 584-8300
Email: eileen@origer.com

Project Description: The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos.

STATE OF CALIFORNIA **Gavin Newsom, *Governor***

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

March 24, 2022

Eileen Barrow
Tom Origer & Associates

Via Email to: eileen@origer.com

Re: Vulcan Materials Company Project, Merced County

Dear Ms. Barrow:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Pricilla.Torres-Fuentes@nahc.ca.gov.

Sincerely,

Pricilla Torres-Fuentes

Pricilla Torres-Fuentes
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Merced County
3/24/2022

Amah Mutsun Tribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt, CA, 95632
Phone: (916) 743 - 5833
vlopez@amahmutsun.org
Costanoan
Northern Valley Yokut

Dumna Wo-Wah Tribal Government
Robert Ledger, Chairperson
2191 West Pico Ave.
Fresno, CA, 93705
Phone: (559) 540 - 6346
ledgerrobert@ymail.com
Foothill Yokut
Mono

North Valley Yokuts Tribe
Katherine Perez, Chairperson
P.O. Box 717
Linden, CA, 95236
Phone: (209) 887 - 3415
canutes@verizon.net
Costanoan
Northern Valley Yokut

North Valley Yokuts Tribe
Timothy Perez,
P.O. Box 717
Linden, CA, 95236
Phone: (209) 662 - 2788
huskanam@gmail.com
Costanoan
Northern Valley Yokut

Santa Rosa Rancheria Tachi Yokut Tribe
Leo Sisco, Chairperson
P.O. Box 8
Lemoore, CA, 93245
Phone: (559) 924 - 1278
Fax: (559) 924-3583
Southern Valley Yokut

Southern Sierra Miwuk Nation
Sandra Chapman, Chairperson
P.O. Box 186
Mariposa, CA, 95338
Phone: (559) 580 - 7871
sandra47roy@gmail.com
Miwok
Northern Valley Yokut
Paiute

Tule River Indian Tribe
Joey Garfield, Tribal Archaeologist
P. O. Box 589
Porterville, CA, 93258
Phone: (559) 783 - 8892
Fax: (559) 783-8932
joey.garfield@tulerivertribe-nsn.gov
Yokut

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589
Porterville, CA, 93258
Phone: (559) 781 - 4271
Fax: (559) 781-4610
neil.peyron@tulerivertribe-nsn.gov
Yokut

Tule River Indian Tribe
Kerri Vera, Environmental Department
P. O. Box 589
Porterville, CA, 93258
Phone: (559) 783 - 8892
Fax: (559) 783-8932
kerri.vera@tulerivertribe-nsn.gov
Yokut

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct.
Salinas, CA, 93906
Phone: (831) 443 - 9702
kwood8934@aol.com
Foothill Yokut
Mono

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Vulcan Materials Company Project, Merced County.

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Valentin Lopez
Amah Mutsun Tribal Band
P.O. Box 5272
Galt, CA 95632

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Mr. Lopez:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Lloyd Mathiesen
Chicken Ranch Rancheria of Me-Wuk Indians
P.O. Box 1159
Jamestown, CA 95327

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Mr. Mathiesen:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5’ USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Cosme Valdez
Nashville Enterprise Miwok-Maidu-Nishinam Tribe
P.O. Box 580986
Elk Grove, CA 95758-0017

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Mr. Valdez:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5’ USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Katherine Perez
North Valley Yojuts Tribe
P.O. Box 717
Linden, CA 95236

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Ms. Perez:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

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Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Timothy Perez
North Valley Yojuts Tribe
P.O. Box 717
Linden, CA 95236

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Mr. Perez:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5’ USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

William Leonard
Southern Sierra Miwuk Nation
P.O. Box 186
Mariposa, CA 95338

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Mr. Leonard:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Kerri Vera
Tule River Indian Tribe
P.O. Box 589
Porterville, CA 93258

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Ms. Vera:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 14, 2022

Neil Peyron
Tule River Indian Tribe
P.O. Box 589
Porterville, CA 93258

RE: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Dear Mr. Peyron:

I am writing to notify you of a proposed project within the County of Merced, for which our firm is conducting a cultural resources study. The project proponent is proposing to extract aggregate on approximately 330-acres near the city of Los Banos. This project will meet compliance with the California Environmental Quality Act.

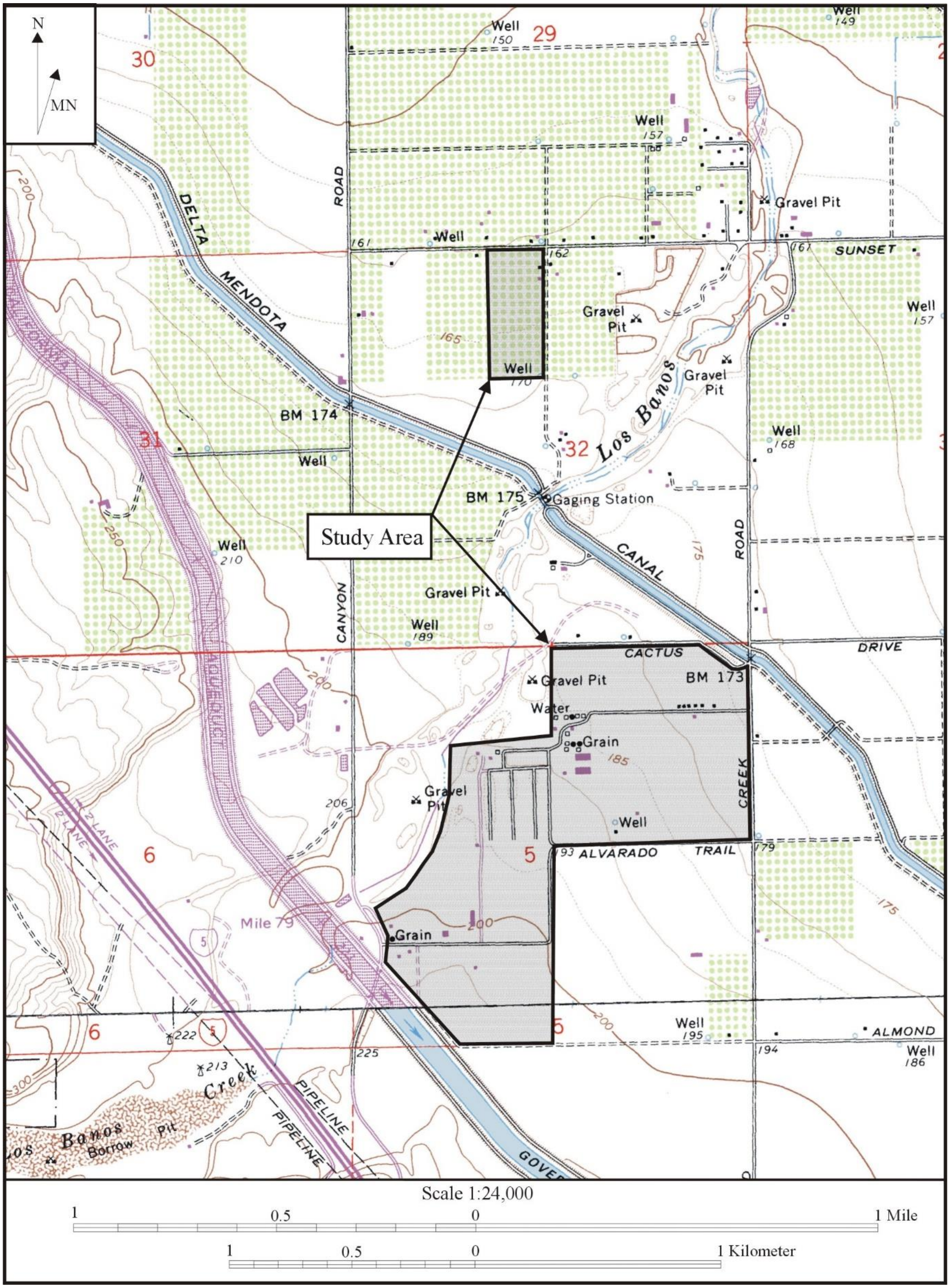
This letter serves as notification of the project and does not constitute consultation.

Enclosed are portions of the Ortigalita Peak NW and Volta, Calif. 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate


N
MN
Study Area
30
29
31
32
5
6
DELTA MENDOTA CANAL
CALIFORNIA AQUEDUCT
ROAD
CANYON
Los Banos
Los Banos Creek
SUNSET
CACTUS
DRIVE
ALVARADO TRAIL
CREEK ROAD
ALMOND
PIPELINE
Borrow Pit
Gravel Pit
Gaging Station
BM 174
BM 175
BM 173
Well
Water
Grain
Mile 79
2 LANE
Scale 1:24,000
1
0.5
0
1 Mile
1
0.5
0
1 Kilometer

From: Paige Berggren <pberggren@tachi-yokut-nsn.gov>
Sent: Tuesday, April 12, 2022 3:04 PM
To: janine@origer.com; lena@origer.com
Cc: Shana Powers; Samantha McCarty; Damion Cuara
Subject: Vulcan Materials Company, Inc Project, Los Banos, Merced County

Hello,

Thank you for contacting the Santa Rosa Rancheria Tachi-Yokut Tribe regarding the Vulcan Materials Company, Inc Project in Los Banos, CA. We received a letter for notification of the project dated March 25, 2022, but there is no email contact information. I went to the website and am sending this email to the address listed on the *Contact Us* page. I've also tried the same format of email with the name signed on the letter. Have I reached the correct inbox for communication regarding Tribal Resources on/within this Project area? Please advise.

The Tribe respectfully requests that any ground disturbance up to and including 10 feet deep be monitored by a Native American Tribal Monitor. We would also like to be notified of any cultural reports that are either used for research or created from any archaeological work done in the project area by your firm.

Respectfully,

Paige Berggren (she/her/hers)
Santa Rosa Rancheria Tachi-Yokut Tribe
Cultural Specialist Monitor I
PBerggren@tachi-yokut-nsn.gov
Office: (559) 924-1278 x 4092

APPENDIX B

DPR 523 Forms
Resource Documentation

Archaeological site location information should be kept confidential to protect sites from damage by vandals and collectors

PRIMARY RECORD

Primary # P-24-000102 (Update)
HRI #
Trinomial: CA-MER-1
Other Listings:
NRHP Status Code:
Review Code: **Reviewer:** **Date:**
Resource Name or #:
Page 1 **of 1**

P1. Other Identifier:

P2. Location: Restricted **a. County:** Merced
b. USGS 7.5' Quad: Volta **Date:** 1971
T 11**S**/**R** 10**E**; **1/4 of 1/4 of Sec.**; **MDBM**
c. Address: **City:** **Zip:**
d. UTM: Zone: 10 **mE** **mN**
e. Other Locational Information:

P3a. Description: It is the experience of the author that prehistoric archaeological sites are rarely "obliterated" as suggested in earlier iterations of this record. Unless an archaeological site is completely excavated and the soils removed, evidence of archaeological sites remain in the form of darkened or mottled soils, lithic debris, and other components of archaeological sites. Malone suggests that the former feedlot destroyed the site, but there was no evidence that the construction of the feedlot either dug up and removed soils or that soils were hauled in which could cover the site. It is our opinion that the plotted location of the site by Krantz is incorrect and that there was no archaeological site at this location.

P3b. Resource Attributes:

P4. Resources Present:

P5. Photograph or Drawing:

P5b. Description of Photo:

P6. Date Constructed/Age and Sources:
Prehistoric

P7. Owner and Address:

P8. Recorded by:
E. Barrow
Tom Origer & Associates
P.O. Box 1531
Rohnert Park, CA 94927

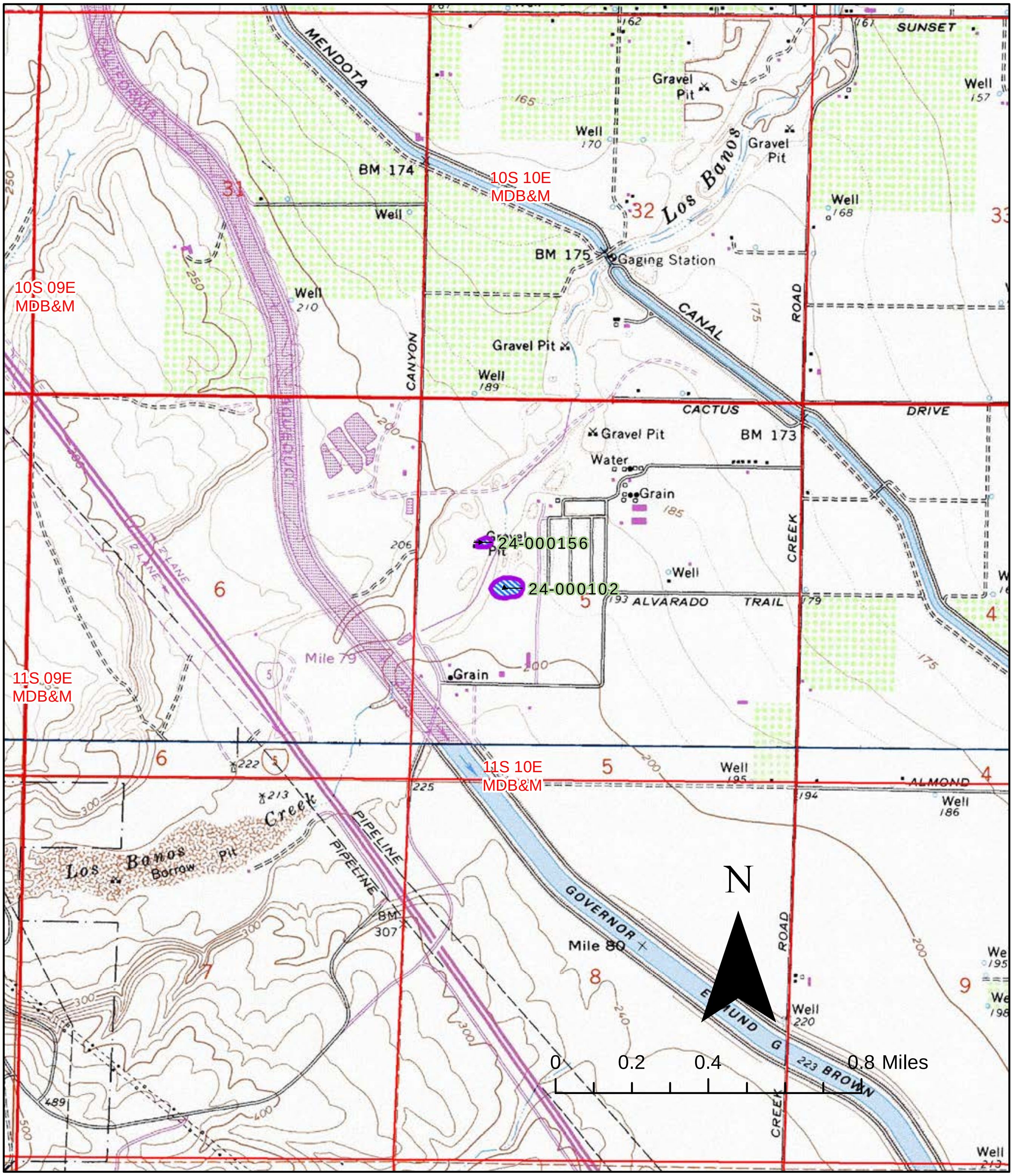
P9. Date Recorded:
March 2022

P10. Type of Survey:
Reconnaissance

P11. Report Citation:
Barrow, E.
2022 *Cultural Resources Study for the Vulcan Materials Company - Los Banos Facility Project, Los Banos, Merced County, California*

P12. Attachments: None

CCaIC 12105I Vulcan Materials
Approx. location of P-24-000102 and P-24-000156
1:24,000-scale Volta USGS 7.5' Quadrangle



Occ

State of California   Division of Beaches and Parks

P-24-000102

ARCHEOLOGICAL SITE SURVEY RECORD CA-MER-0001

1. Site Mer-1 2. Map Volta 7½ 3. County Merced

4. Twp. 11 S Range 10E ; NE ¼ of SW ¼ of Sec. 5

5. Location Large area on stream bank (Los Banos Creek)

UTM zone 10/686525 mE/4097460 mN

6. On contour elevation 200-205 ft.

7. Other designations for site X-1

8. Owner Vernon Freeman, Jr. 9. Address Los Banos (RFD)

10. Previous owners, dates Adam Knight - 1870's and 80's

11. Present tenant Caruso

12. Attitude toward excavation Favorable. Part of area is now bare ground

13. Description of site Nothing visible. Area indicated is the source of artifacts noted below. It is referred to as a "village" site.

14. Area undeterminable 15. Depth - 16. Height -

17. Vegetation - 18. Nearest water stream on N side of site

19. Soil of site confused by farm activities 20. Surrounding soil type alluvium over gravel

21. Previous excavation none except mortar collection during plowing.

22. Cultivation extensive 23. Erosion edge partly gone

24. Buildings, roads, etc. Farm buildings, barns, etc. on site.

25. Possibility of destruction Stream eroding one side slowly. Virtually destroyed anyway

26. House pits none noted

27. Other features none noted

28. Burials none noted

29. Artifacts Owner found ca. 170 mortars, 14 of which are cemented into a fireplace at farm on site. Typical mortar cavity 7 in. in diameter, 4½ in. deep. Owner also found two points, 3 in. and 1 in. in length.

30. Remarks Floods have been high enough to inundate much of the site

31. Published references

32. Accession No. 33. Sketch map over

34. Date Oct. 15, 1956 35. Recorded by G. Krantz 36. Photos none

P-24-000102

J & R Pope

CALIFORNIA STATE COLLEGE, STANISLAUS

Site Re-surveyed by Wm. Malone 1972.

P-24-000102

ARCHAEOLOGICAL SITE SURVEY RECORD

1. Site Ca-Mer-1 2. Map Volta 7.5 series 3. County Merced

4. Twp. 11 South Range 10 East, N.E. 1/4 of S.W. 1/4 of Sec. 5

5. Location Large area on Los Banos stream bank.

6. On contour elevation 200- 205 Feet.

7. Previous designations for site X-1

8. Owner Wolfsen Feed Co. 9. Address Pacheco Blvd.& I st. Los Banos

10. Previous owners, dates Vernon Freeman, Jr--1956, Adam Knight--1870's and 1880's

11. Present tenant Wolfsen Feed Co.

12. Attitude toward excavation Not known

13. Description of site Nothing visible. Area indicated is source of Artifacts noted below. It is refered to as a "Village Site".

OBLITERATED

14. Area Undeterminable 15. Depth -------- 16. Height --------

17. Vegetation None 18. Nearest water Los Banos Creek, North side.

19. Soil of site Confused by farm activities 20. Surrounding soil type Alluvium over gravel

21. Previous excavation None known except Mortor collection during plowing.

22. Cultivation Extensive. 23. Erosion Edge of site eroded by creek.

24. Buildings, roads, etc. Wolfsen feed co. buildings and stock yard now cover site.

25. Possibility of destruction Has been totally destroyed.

26. House pits None

27. Other features None

28. Burials None

29. Artifacts (1956 survey) Owner found ca. 170 Mortors, 14 of which are cemented into fireplace at farm on site. Typical mortor cavity 7 in. diameter, 4 1/2 in. deep. Owner also found two points, 3 in. and 1 in. in lenght.

30. Remarks No excavation possible as site is now obliterated.

31. Published references None known.

32. Accession No. ---------- 33. Sketch map Next page.

34. Date 8-28-72 35. Recorded by Wm. Malone 36. Photos Malone--Color

UPDATED 1972. Refer to attached sheet.

P-24-000102
occ

State of California
~~University of California~~

Division of Beaches and Parks
P-24-000102

ARCHAEOLOGICAL SITE SURVEY RECORD

1. Site Mer-1 2. Map Volta 7 1/2 3. County Merced

4. Twp. 11 S Range 10 E ; NE 1/4 of SW 1/4 of Sec. 5

5. Location Large area on stream bank (Los Banos Creek)

6. On contour elevation 200-205 ft.

7. Previous designations for site X-1

8. Owner Vernon Freeman, Jr. 9. Address Los Banos (RFD)

10. Previous owners, dates Adam Knight- 1870's and 80's

11. Present tenant Caruso

12. Attitude toward excavation Favorable. Part of area is now bare ground

13. Description of site Nothing visible. Area indicated is source of artifacts noted below. It is referred to as a "Village Site".

14. Area Undeterminable 15. Depth - 16. Height -

OBLITERATED

17. Vegetation - 18. Nearest water Stream on N side of site

19. Soil of site Confused by farm activities 20. Surrounding soil type Alluvium over gravel

21. Previous excavation None except mortor collection during plowing

22. Cultivation Extensive 23. Erosion Edge partly gone

24. Buildings, roads, etc. Farm buildings, barns, etc. on site

25. Possibility of destruction Stream eroding one side slowly. Virtually distroyed anyway

26. House pits None noted

27. Other features None noted

28. Burials None noted

29. Artifacts Owner found ca.170 mortors, 14 of which are cemented into fireplace at farm on site. Typical mortor cavity 7in. in diameter, 4 1/2 in. deep. Owner also found two points, 3in. and 1in in lenght.

30. Remarks Floods have been high enought to inundate much of the site

31. Published references

32. Accession No. 33. Sketch map over

34. Date Oct. 15,1956 35. Recorded by G. Krantz 36. Photos None

APPENDIX E

Geology and Soils Environmental Assessment(s) (Golder, 2022)

REPORT

Slope Stability Assessment for Triangle Rock Products

Los Banos Sand and Gravel Quarry - Merced County, California

Submitted to:

Vulcan Materials Company

22101 Sunset Avenue
Los Banos, CA 93635

Submitted by:

Golder Associates USA Inc.

7 Corporate Park, Suite 260
Irvine, CA 92606

31404284.000

December 9, 2022

December 9, 2022 Project No.: 31404284.000

Terry Marshall
Vulcan Materials Company
22101 Sunset Avenue
Los Banos, CA 93635

RE: SLOPE STABILITY ASSESSMENT FOR TRIANGLE ROCK PRODUCTS LOS BANOS SAND AND GRAVEL QUARRY – MERCED COUNTY, CALIFORNIA

Dear Mr. Marshall:

Golder Associates USA Inc. (Golder), a wholly owned subsidiary of WSP USA Inc., presents this report containing the results of our slope stability assessment for the Triangle Rock Products Los Banos Sand and Gravel Quarry facility located approximately four miles southwest of Los Banos in Merced County, California. This report has been prepared in accordance with our approved proposal dated February 9, 2022.

Based on the results of our data review, field reconnaissance and investigation, geotechnical laboratory testing, geotechnical analyses, and experience on similar projects, it is Golder's professional opinion that the proposed final pit slopes meet the California Surface Mining and Reclamation Act's (SMARA) prescriptive slope standards and will be globally stable at inclinations of 2H:1V (horizontal to vertical) or flatter for the proposed end use.

Golder appreciates the opportunity to be of service on this important project. If you have any questions, please contact the undersigned.

Sincerely,

Golder Associates USA Inc.

Meggy Gidula, PE
Senior Project Engineer

Donald Lowry, PG, CEG
Senior Engineering Geologist

CERTIFIED ENGINEERING GEOLOGIST
DONALD J. LOWRY
No. 2284
Exp: 1/31/2024
STATE OF CALIFORNIA

Ryan Hillman, PE
Senior Consultant

REGISTERED PROFESSIONAL ENGINEER
RYAN HILLMAN
No. C71988
CIVIL
STATE OF CALIFORNIA

Table of Contents

FIGURES

APPENDICES

1.0 EXECUTIVE SUMMARY

Triangle Rock Products, dba Vulcan Materials Company (VMC), currently operates an approximately 605-acre surface mining, processing, and hot mix asphalt production facility in Merced County ("County"), known as the Los Banos Sand and Gravel Quarry.

To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot-mix asphalt and ready-mix concrete products, VMC desires to augment the existing sand and gravel reserves by entitling two properties that adjoin the existing operations, known as the Turner and Sunset Properties.

The project mine plan generally follows the current plan for the Los Banos Sand and Gravel Quarry operation. Final pit wall slopes at the Sunset and Turner properties would be cut at a 2H:1V (horizontal to vertical) configuration, with all mining to occur above the groundwater table present at the time of mining. Once mining is complete at the Sunset property, process fines material (clays, silts, and fine sands) from the Los Banos processing plant would be placed in the mined pit, bringing the property to within approximately five feet of the current grades. The end use of the Sunset and Turner properties will be open space.

Although the project calls for final reclaimed slopes at the Sunset and Turner properties at a 2H:1V configuration, which meets the California Surface Mining and Reclamation Act's (SMARA) prescriptive standards and is presumptively stable [California Code of Regulations, Title 14, Sections 3704(d) and 3704(f)], VMC engaged Golder Associates USA Inc. (Golder), a wholly owned subsidiary of WSP USA Inc., to prepare this slope stability assessment to develop recommended maximum slope heights and inclinations that are expected to result in globally stable slopes for the mining activities on the Sunset and Turner properties.

Based on Golder's data review, site reconnaissance, and field investigation, Golder has concluded the following:

- The probability of surface fault rupture occurring at the Sunset or Turner properties is very low.
- The soils underlying the Turner property are not considered to be susceptible to significant liquefaction when subjected to the design (i.e., 475-year) peak ground acceleration (PGA).
- Final reclaimed pit slopes at the Sunset and Turner properties inclined no steeper than 2H:1V meet the slope stability criteria (including minimum factors of safety [FS] for the proposed end use of open space) and, therefore, are considered sufficiently stable following SMARA.
  - Final reclaimed slopes of up to 50 feet in height when final pit slopes and floors are underlain by predominantly fine-grained soils (e.g., Corcoran Clay or thick alluvial silt/clay layers with relatively low percentages of sand and gravel), were calculated to have a minimum FS of 1.5 for static conditions and 1.1 for pseudostatic loading.
  - Final reclaimed slopes up to 80 feet in height, when pit slopes and floors are underlain by predominantly coarse-grained alluvium, were calculated to have a minimum FS of 1.5 for static conditions and 1.1 for pseudostatic loading.

2.0 INTRODUCTION

2.1 Purpose of Report

This report presents the results of a slope stability assessment performed by Golder for the proposed final quarry slope configurations at the Triangle Rock Products Los Banos Sand and Gravel Quarry facility in Merced County, California (the site). This assessment was undertaken to develop recommended maximum slope heights and inclinations that are expected to result in globally stable slopes for the mining footprint at the site, which includes additional extraction areas referred to as the Sunset and Turner properties. This assessment was conducted in support of a revision to the site's reclamation plan that will be submitted to Merced County following the County's mining ordinance and SMARA.

2.2 Terminology

As described above, this report pertains to the Los Banos Sand and Gravel Quarry facility, whereas some of the existing site features are referred to as "pits" (as described in subsequent sections). Throughout this report, the terms "quarry" and "pit" are used interchangeably and should be understood to have the same meaning with respect to the slope stability assessment that was performed for this study.

2.3 Site Description

Triangle Rock Products, dba VMC, owns and operates the approximately 605-acre Los Banos Sand and Gravel Quarry facility (the "facility" or "Los Banos facility") where high-quality construction aggregates are mined using surface methods and processed on-site. The facility also includes hot-mix asphalt and ready-mix concrete batch plants. The Los Banos facility is generally located south of Sunset Avenue and West of Creek Road in an unincorporated area of southwestern Merced County in the San Joaquin Valley region of California, as shown in Figure 1. A relatively small portion of the site extends to the north of Sunset Avenue, but this area is not included in the current study and, therefore, is not shown in the figures in this report. The site's physical address is 22101 Sunset Avenue, Los Banos, California 93635. The site is currently permitted by Merced County under Conditional Use Permits (CUP) 3466 and 3383 and an approved Reclamation Plan (State Mine ID #91-24-0009).

Figure 2 shows the portion of the site that lies south of Sunset Avenue, which includes the vast majority of the site and all portions of the site that are of interest for this study. As shown in Figure 2, the site currently contains multiple existing pits (Pits 1 through 5, Pit 8 [the "Triangle Pit"], and Pit 10 in addition to Pit 9 which is located north of Sunset Avenue), a material processing plant area with equipment and stockpiles, process water ponds, access roads, buffer areas, and undeveloped areas. The conditions in the existing pits at the time of this study are described in detail in Section 4.2. The proposed additional sand and gravel extraction areas on the site include the following two properties:

1) Sunset Property: This rectangular-shaped property encompasses approximately 32.8 acres and is located along the south side of Sunset Avenue and immediately west of the existing Pit 5 (which is currently being used as a silt pond) by the site's materials processing area, as shown in Figure 2. The ground surface within this property is relatively flat, with a very gentle grade (i.e., less than 1%) that slopes down toward the north. The existing ground surface within this property ranges in elevation from approximately 162 to 170 feet above mean sea level (amsl). This property is currently vacant and undeveloped but was previously disturbed at the surface by various agricultural and livestock operations and related activities.

2) Turner Property: This irregularly shaped property encompasses approximately 307.6 acres and occupies the southern/southeastern portion of the site. The Turner Property is located between the Delta-Mendota Canal to the northeast and the San Luis Canal to the southwest and lies adjacent to and east of Los Banos Creek and adjacent to and south of Pit 4, as shown in Figure 2. The ground surface within this property is relatively flat, with a very gentle grade (i.e., less than 1%) that descends toward the northeast. This property is currently vacant and undeveloped, except for an outbuilding presently used by a tenant for dog food processing. The Turner property was previously disturbed at the surface by various agricultural operations, cattle ranching, and related activities. The existing ground surface within this property ranges in elevation from approximately 175 to 220 feet amsl.

As shown in Figure 2, the following surface water systems are located adjacent to and/or pass through the site:

- Los Banos Creek: This ephemeral creek runs through the site from the northeastern portion of the site to its southwestern portion. The creek is unlined and is typically dry, with flows being generally infrequent and largely dependent on releases by the local water authority.
- Delta-Mendota Canal: This lined canal traverses the central portion of the site in a northwest-to-southeast direction between Pit 4 and the Triangle Pit.
- San Luis Canal: This lined canal runs adjacent to the southwestern boundary of the site and forms a segment of the California Aqueduct.

2.4 Project Understanding

The site's current approved CUPs and Reclamation Plan do not allow for mining on the Sunset and Turner properties. In order to allow for the extraction of sand and gravel in these areas, VMC is amending the site Reclamation Plan to include these properties.

Figure 2 shows the planned horizontal limits of the proposed mining operations on the Sunset and Turner Properties. Extraction of the sand and gravel resource in these areas will occur as part of the overall mining operations, as needed to supply materials to the onsite processing plant. Once mining is complete at the Sunset property, the pit will be used for the placement of fines (silts and clays) generated from the aggregates processing plant. The locations and planned extraction limits of the various pits, including the Sunset and Turner areas, are shown in Figure 2.

Based on the mine plan prepared by VMC, the Sunset and Turner properties will be excavated such that the resulting final pit slopes will generally be straight-graded at inclinations of 2H:1V (horizontal to vertical). Mining will proceed downward toward the top of the Corcoran Clay, a stratigraphically persistent unit that occurs below the site at depths of up to 60 to 70 feet below ground surface (bgs), while staying above the existing groundwater table present at the time of mining. This proposed mine plan will provide for "dry-mining" methods, as excavation will remain above the regional groundwater table. Final pit slope heights and pit bottom elevations will depend on the location of groundwater at the time of excavation.

Golder understands that mining operations on the Sunset and Turner properties are planned to be performed in the same manner as the current mining at the site, which consists of using conventional earth-moving equipment (e.g., dozers, scrapers, excavators, loaders, off-road haul trucks, etc.) to extract and transfer the materials from the pits (blasting is not expected to be required). As previously noted, mining in the Sunset and Turner properties may occur concurrently with other ongoing extraction operations, as necessary to meet production requirements.

Once the sand and gravel resources are exhausted at the Sunset area, fines from the processing plant will be transferred and placed into this pit. Additionally, if needed, limited quantities of overburden may also be placed into the Sunset pit, as well as in the Turner pit, once those areas have been sufficiently mined to provide accommodation space. No material processing operations are planned for the Sunset and Turner properties (i.e., these properties will only be mined for aggregates, backfilled with process fines and/or overburden, and reclaimed).

VMC anticipates initiating mining at the Sunset Property, followed by material extraction at the Turner property. However, depending on market demand and product specifications, the operations may extract materials from both areas concurrently, along with the other pits. For the Sunset property, the mine plan calls for backfilling with fines into a settling basin within approximately 5 feet of the pre-mining ground surface. Therefore, from a slope stability perspective, the proposed pit within the Sunset mining area will essentially be completely backfilled. Golder understands that VMC anticipates partially backfilling some of the pit areas on the Turner property with overburden, along with process fines from the plant. The backfill in this area is planned to be approximately 20 to 30 feet thick.

Golder understands that the intended reclaimed end use for the entire site, including the Sunset and Turner properties, is non-irrigated open space. The final pits will be revegetated consistent with the approved reclamation plan.

2.5 Objective and Scope of Services

The primary objective of Golder’s current study was to assess and provide an engineering opinion on the global (i.e., gross or overall) stability of the proposed final pit slopes on the Sunset and Turner properties for incorporation into the site’s amended reclamation plan. To accomplish the primary objective of the current study, Golder undertook the following principal tasks:

1. Review the existing subsurface information for the site that was provided to Golder by VMC as part of the current study as well as available geotechnical/geologic literature from other sources (e.g., the California Geological Survey, other published literature, etc.).
2. Perform a field reconnaissance and investigation program that consisted of geologic site reconnaissance, geologic mapping of existing pit slopes at the site, and a limited (i.e., permit-level) geotechnical field investigation consisting of two borings to generally characterize the subsurface conditions within the Turner property.
3. Perform geotechnical laboratory tests on selected samples from the borings to confirm soil classifications and provide necessary parameters for slope stability and liquefaction analyses.
4. Analyze slope stability and liquefaction potential for the proposed pits on the Sunset and Turner Properties.
5. Prepare this report that summarizes the work undertaken for the global slope stability assessments of the proposed final reclaimed pits and that contains Golder’s findings, conclusions, and recommendations regarding these assessments.

This report has been prepared to serve as a technical study for incorporation into the site’s amended reclamation plan.

In addition to the scope of work outlined above, at the request of VMC, one of the geotechnical borings was advanced to groundwater and completed as a monitoring well, which Golder understands will be integrated into the site's groundwater monitoring program.

3.0 DATA REVIEW

As part of the current study, Golder reviewed existing available regional geologic and geotechnical information for the site. This information was obtained from the United States Geological Survey (USGS), the California Geological Survey (CGS), and other published and readily available sources. In addition, VMC provided Golder with the following documents and information for the site:

- Groundwater well logs and completion reports for the on-site wells.
- Boring logs for previous exploration drilling at the site.
- Fall 2020 groundwater report for the site prepared by Kenneth D. Schmidt and Associates (2020).
- Site maps showing the existing conditions and proposed excavation and final pit configurations.
- AutoCAD file of the site's topography and features.
- Draft Project Description for the proposed CUP and reclamation plan amendments for the site, prepared by Sespe Consulting, Inc. (Sespe) in 2022.

Of all the existing geologic and geotechnical data, documentation, and reports reviewed by Golder for this study, none contained quality data that could be used to ascertain the shear strength of the subsurface materials at the site. In particular, there were no reliable blow count, shear wave, cone penetration test, or geotechnical laboratory data from the previous field investigations or open literature that could be used to analyze soil strengths or liquefaction susceptibility. Hence, to fill this data gap, Golder completed a limited geotechnical investigation at the site (described in Section 4.3) as part of the current study.

4.0 SITE RECONNAISSANCE AND INVESTIGATION

4.1 General

As part of the current study, Golder performed a site reconnaissance and investigation program to support the slope stability assessment of the proposed final pits. The site reconnaissance and investigation program consisted of the following four components:

1) Geologic Site Reconnaissance.
2) Geotechnical Field Investigation.
3) Groundwater Observation Well Installation.
4) Geotechnical Laboratory Testing.

The above-listed components of the site reconnaissance and investigation program are discussed in Sections 4.2 through 4.5, respectively.

4.2 Geologic Site Reconnaissance

A Golder geologist performed geologic reconnaissance at the site on March 7 and 8, 2022. The primary purposes of the geologic site reconnaissance were to visually observe and geologically map the existing pit slopes at the site and to look for any signs of slope instability, water seeps, faulting, or other unusual or significant geologic features. The geologic mapping was focused on the following existing pits at the site where the subsurface stratigraphy was exposed:

- Triangle Pit.
- Pit 4.
- Pit 5.

Sections 4.2.1 through 4.2.3 describe the general subsurface conditions that were observed and mapped by Golder's geologist in the above-listed pits. Appendix A contains selected representative photographs of the existing pits that were taken by Golder's geologist during the site reconnaissance.

During the site reconnaissance:

- The Pits 1 through 3 areas and the site's material processing and stockpiling areas did not contain significantly exposed and readily-observable pit slopes and, therefore, these areas were not mapped.
- Golder's geologist performed a cursory surficial site reconnaissance of the Sunset and Turner properties. However, due to the undeveloped and vegetated condition of these properties at the time of the site reconnaissance, no significant geologic observations could be made regarding subsurface conditions.
- Golder's geologist did not note any unusual conditions exposed in the existing ground surfaces of the Sunset and Turner properties.
- Golder's geologist did not observe any obvious signs of slope instability within the existing pits at the site and did not note any site conditions that could be indicative of active faulting/surface rupture.
- Golder's geologist did not observe any groundwater seeps in the existing pit slopes at the site, although seepage attributed to leakage from the settling basin immediately to the north reports to a test trench located beneath the toe of the northern slope in the Triangle Pit, as discussed in Section 4.2.1.

4.2.1 Triangle Pit

The site's Triangle Pit is located along the northern edge of the Delta-Mendota Canal, as shown in Figure 2. At the time of Golder's site reconnaissance, this pit had been excavated down to floor elevations ranging from approximately 130 to 145 feet amsl. The existing interim pit slopes ranged in height from about 25 to 40 feet. The stratigraphic conditions observed in the pit slopes generally consisted of alternating layers of silty sand with gravel and sandy gravel that ranged from approximately 2- to 5-feet in thickness. The gravel content of these layers was visually estimated to range between approximately 30% and 70% and trace cobbles were observed. The gravel- and cobble-sized particles were typically rounded to sub-angular. Some crossbedding was observed within the sandy/gravelly layers and some laterally discontinuous silt and clay lenses ranging from approximately 1- to 2-feet in thickness were also observed in response to the process of erosion and deposition of coarser grained materials on the slope faces in scattered, random locations. On average, the existing interim slopes in this pit were inclined between approximately 1.5H:1V and 2H:1V, but some localized sections of the interim slopes were observed to have inclinations nearing 1H:1V.

An existing test trench (approximately 20 feet wide and 30 feet deep) was observed along the toe of the northern slope in the Triangle Pit at the location shown in Figure 2. This test trench exposed the top of the Corcoran Clay unit approximately 5 to 8 feet below the existing ground surface (bgs). At the time of Golder's inspection, seepage from the adjoining settling basin to the north was ponded at the bottom of the trench to a depth of about 2 to 3 feet (i.e., an elevation of around 125 feet amsl).

4.2.2 Pit 4

Pit 4 (also referred to as the Bunker Hill area) is located along the east side of Los Banos Creek and immediately north of the Turner property, as shown in Figure 2. The generalized subsurface conditions in this pit were observed to be similar to those in the Triangle Pit. Abundant gravel and some cobbles were noted in the existing slopes and were observed to generally be subrounded to subangular, with some being flattened and elongated. Trace amounts of boulders were observed, with sizes ranging from approximately 1 to 1.5 feet in maximum dimension.

The interim eastern slope was inclined at approximately 1.5H:1V with a maximum height of about 50 feet while the interim southern slope was inclined at approximately 2H:1V with a height of approximately 40 feet at the time of Golder's reconnaissance. The western slope was approximately 25 feet tall and inclined at approximately 2H:1V.

4.2.3 Pit 5

Pit 5 is currently being used as a process fines basin (i.e., silt pond) and it is located adjacent to and east of the Sunset property, as shown in Figure 2. Geologic mapping in Pit 5 focused on its approximately 15-foot tall western slope that was exposed above the silt level. This slope had an inclination of approximately 2H:1V at the time of mapping. Mapping of this cut slope indicated that the lithology was generally consistent with the geologic conditions observed in the Triangle Pit and Pit 4, although the cobbles (which were estimated to comprise roughly 10% of the ground mass on average) exposed in this slope appeared to be smaller on average than the cobbles in the other pits. Gravel observed in this slope ranged from fine- to coarse- grained and both gravel and cobbles were typically subrounded to subangular, with some of the cobbles being flattened and elongated.

4.3 Geotechnical Field Investigation

To obtain additional subsurface information for the Turner property, Golder performed a limited (i.e., permit-level) field investigation that consisted of drilling two geotechnical borings (B1 and B2) at the locations shown in Figure 2. Golder selected the locations of borings B1 and B2 to be near the lined San Luis and Delta-Mendota Canals, respectively, as these are considered critical locations with respect to slope stability given that the canals are the only significant existing infrastructure in close proximity to the proposed final pit slopes on the Sunset and Turner properties. No borings were drilled on the Sunset property because VMC is planning to backfill the proposed pit on this property to within 5 feet of the surrounding ground surface, as described in Section 2.4.

Before drilling, the boring locations were cleared of existing underground utilities by Underground Service Alert (i.e., the 811 call center). In addition, Golder subcontracted EXARO Technologies Corporation (EXARO) to use portable ground penetrating radar equipment to locate any existing underground utilities near each boring location. Before the start of drilling on March 15, 2022, and under the direct observation of Golder, EXARO verified that the area within a 10-foot radius of each boring location was clear of underground utilities. Golder also obtained the required well permits (Permit Nos. WP0018908 and WP0018909) from the Merced County Division of Environmental Health for borings B1 and B2.

Borings B1 and B2 were drilled on March 17 and March 15 through 17, 2022, respectively. Boring B1 was drilled to a depth of 80 feet bgs along the southwestern edge of the Turner property while boring B2 was drilled to its target depth of 91.5 feet bgs along the northeastern edge of the Turner property. Boring B1 was originally planned to be advanced to 90 feet bgs, but the boring was terminated at 80 feet bgs due to the Corcoran Clay unit being encountered from a depth of 41.3 feet bgs to the bottom of the boring.

The borings were drilled by Gulf Shore Investigation and Testing (Gulf Shore) of Rancho Cordova, California, under subcontract to and supervision of Golder. Both borings were drilled using a truck-mounted CME-75 drill rig equipped with hollow stem augers. The upper 2.5 feet in boring B1 and the upper 5 feet in boring B2 were pre-excavated using a hand auger as an additional measure to check that the drilling locations were clear of existing underground utilities before hollow stem auger drilling. A Golder engineer was present on-site full-time to oversee the drilling activities and log and sample the borings. Golder's engineer visually classified the soils in the field in accordance with the visual-manual procedure of ASTM D2488, which is based on the Unified Soil Classification System (USCS) per ASTM D2487.

Given the significant gravel content of most of the soils at the site, all of the soil samples from boring B2 and most of the soil samples from boring B1 were obtained using a Modified California (MC) split barrel sampler, which has an inner diameter that is approximately 70% larger than that of the standard penetration test (SPT) split spoon sampler. As a result of encountering hard silty material in the upper 12.5 feet of boring B1, the samples at 10 and 15 feet in boring B1 were obtained using the SPT sampler. The SPT sampler consisted of a 2.0-inch outside diameter (OD), 1.4-inch inside diameter (ID) split barrel while the MC sampler consisted of a 3.0-inch OD, 2.4-inch ID split barrel. The interiors of both the MC and SPT samplers were unlined. Soils collected inside the MC and SPT samplers were visually classified by Golder in the field, placed in sealed plastic bags, and stored for future reference and potential laboratory testing. Both samplers were driven a total of 18 inches into the soil at the bottom of the boring (or until refusal, where refusal was taken as 50 blows for 6 inches or less of penetration). In general, soil samples were collected every 5 vertical feet in the borings.

Both the MC and SPT samplers were driven into the soil using a 140-pound hydraulic wireline automatic hammer free-falling a vertical distance of 30 inches. According to the documentation provided by Gulf Shore, the efficiency of the drill rig's automatic hammer was measured to be 79% in April 2021. Due to the significant gravel content of the site's soils, the number of hammer blows for each 1-inch interval of sampler penetration was recorded by Golder's engineer (as opposed to the customary recording of hammer blows for every 6-inch interval of penetration). By recording the blow counts for every inch of penetration, the blow count data can be examined to assess whether a gravel/cobble particle influenced (i.e., "artificially" increased) the blow count value. The total number of hammer blows required to drive the SPT sampler the final 12 inches is termed the SPT resistance (N) value. For engineering analyses, blow count values from MC tests were multiplied by a factor of 0.65, per Burmister (1948), to convert them to equivalent SPT N values. The procedures employed in the field were generally consistent with those described in ASTM D1586 for SPT and ASTM D3550 for MC.

In addition to the MC and SPT samples, a thin-walled Shelby tube sample of the Corcoran Clay was collected from a depth of 78 to 80 feet in boring B1. The Shelby tube had a diameter of 3 inches and was pushed into the soil at the bottom of the boring using hydraulic down-pressure applied by the drill rig.

Appendix B contains the logs for the borings (Record of Borehole). The logs show the earth materials encountered, field blow count values, and the depths of soil samples. The logs also show the boring number, drilling date, and the name of the Golder engineer who logged the boring. The soils were described in general accordance with the USCS. The boundaries between different soil types shown on the logs are approximate because the actual transition between different soil layers may be gradual. The approximate coordinates of the borings as shown on the logs were recorded by Golder using a handheld GPS unit (with an accuracy of about 10 feet). The ground surface elevation at each boring location was estimated using the topographic maps of the site provided by VMC.

Due to the relatively small diameters of the MC and SPT samplers, the soil samples recovered from the borings during the field investigation might not always have been representative of the actual in-situ soil conditions. Cobbles, boulders, and even some coarse-grained gravel would not have been recoverable in the samplers unless they were broken up during the driving of the sampler. Additionally, it is possible that the samplers displaced some oversized particles as the sampler was advanced into the ground. Observations such as sampler refusal, fragments of what resemble fractured rock inside the sampler, and drilling measures are noted on the boring logs and could indicate that oversized particles were encountered. As the boring logs only describe the materials that were collected in the samplers, it is possible that the gradation of the in-situ materials was not well represented by the soils in the sampler. This should be considered when reading the boring logs in Appendix B. However, based on the results of Golder's geologic site observations and mapping, the soil samples retrieved from the borings were considered to generally be representative of the in-situ soil conditions.

Upon reaching its termination depth, a groundwater monitoring well was installed in boring B2, as described in Section 4.4. A groundwater monitoring well was also originally planned to be installed in boring B1, but VMC elected not to install a well in this boring because the Corcoran Clay was encountered at a depth of 41.3 feet bgs in this boring. Therefore, boring B1 was backfilled in its entirety with neat cement grout in accordance with the Merced County well permit. A representative from Merced County Environmental Health visited the site to record the location and stratigraphy of boring B1 before its grouting. Golder provided photographs of the grout mix and seal to the representative, who then provided approval for the grouting of boring B1. The soil cuttings from the borings were spread across the ground surface adjacent to each boring location.

4.4 Groundwater Observation Well Installation

At the request of VMC, a permanent groundwater observation well was installed in boring B2 upon the completion of drilling. VMC plans to use this well for long-term groundwater level monitoring. The groundwater monitoring well was installed in accordance with the Merced County well permit.

Boring B2 was drilled to its target depth of 91.5 feet bgs, and groundwater was encountered at approximately 80 feet bgs during drilling. The monitoring well construction consisted of installing a 20-foot long screened interval (0.02-inch slots) of 2-inch diameter PVC casing extending from 70 to 90 feet bgs, then blank 2-inch PVC casing extending from 70 feet bgs to 2.5 feet above the ground surface. The borehole annual space was backfilled with #3 Monterrey sand from 68 to 91.5 feet bgs, hydrated bentonite chips from 64 to 68 feet bgs, and neat cement grout from 64 feet bgs to within 1 foot of the ground surface. The well's surface completion consists of a yellow steel monument surrounded by four yellow bollards on a concrete pad. A representative from Merced County Environmental Health visited the site to record the well location and lithologic data prior to installing the well. Golder provided photographs of the grout mix seal and subsequently received approval from the representative before placing the steel monument. The representative also returned to the site to verify and document the completed well with the monument and bollards. Appendix B contains a construction diagram of the as-built well.

4.5 Geotechnical Laboratory Testing

Representative soil samples collected during the geotechnical investigation were selected by Golder and submitted to Geo-Logic Associates' geotechnical laboratory in Grass Valley, California, and Gulf Shore's geotechnical laboratory in Rancho Cordova, California, for the purposes of substantiating visual field classifications and evaluating engineering parameters. Laboratory testing consisted of in-situ moisture content (ASTM D2216), particle size analysis (ASTM D6913 and ASTM D7928), Atterberg limits (ASTM D4318), and direct shear (ASTM D3080). The results of the laboratory testing are presented in Appendix C.

5.0 GEOLOGIC CONDITIONS AND SITE STRATIGRAPHY

5.1 Physiography

With respect to the major physiographic regions of California, the site is located along the western extents of the central portion of the Great Valley geomorphic province (CGS 2002). The Great Valley encompasses the relatively low-lying alluvial plain within central and northern California that is approximately 50 miles wide on average and up to approximately 400 miles long. The eastern margin of the Great Valley is mostly coincident with the Sierra Nevada Mountain range. The Sierra Nevada comprises westward-dipping normal fault blocks that formed in response to crustal extension associated with the development of the Basin and Range geomorphic province to the east (DeCourten 2009). The western margin of the Great Valley abuts the Coast Ranges geomorphic province, which extends from the northwestern portion of California more than 600 miles southeastward to the Transverse Ranges geomorphic province. In the vicinity of the site, the Coast Ranges are represented by uplifted Mesozoic- through Cenozoic-aged bedrock units, which become progressively younger from west to east (Dibblee and Minch 2007).

5.2 Regional Geology

The surficial geology of the region surrounding the Los Banos facility has been mapped in detail by Lettis (1982). The hills of the Coast Ranges to the west of Interstate 5 are comprised of Tertiary Great Valley succession rocks (Cretaceous through early Paleogene in age) that are tilted toward the east. Younger Quaternary deposits unconformably overlap the Great Valley units with contacts exposed in the hills to the west (Lettis 1982).

The Tulare Formation (upper Pliocene and Pleistocene) comprises the earliest Quaternary-aged deposits in the western Great Valley region. This formation generally consists of alluvial silt, sand, and gravel deposits that were deposited as a series of contiguous alluvial fans blanketing the eastern slopes of the Diablo range in the Central Valley region (Lettis 1982). Much of the higher-elevation deposits have been eroded away, leaving scattered terraces of Tulare Formation materials along the flanks of the Coast Ranges. The Tulare Formation is thickest to the east of the site and contains the Corcoran Clay member, a widespread and continuous marker unit in the Central Valley.

5.3 Site Geology

In the vicinity of the site, the Tulare Formation is not well exposed at the ground surface. Lettis (1982) indicates that the Tulare Formation is largely blanketed by the lower and middle members of the San Luis Ranch alluvium (middle and late Pleistocene) along Interstate 5, with younger alluvial fans and recent channel deposits extending eastward from the hills that lie to the west of the site. The site is intersected by Los Banos Creek, which is an ephemeral drainage that is typically dry.

Lettis (1982) describes the following surficial geologic units that are encountered at the Los Banos facility, as shown in Figure 3:

- Q_{pc}: Coarse-grained stream deposits of Coast Range provenance. These are the youngest deposits and are within or near the present course of Los Banos Creek.
- Q_{p}: Terrace and upper fan deposits of Patterson alluvium. These deposits form the braided margins of Los Banos Creek and have been partially eroded by Q_{pc}.
- Q_{pf}: Fine-grained middle to lower Patterson alluvium. This represents the larger fan in which Q_{pc} and Q_{p} have been deposited. The Sunset property is wholly within Q_{pf} and portions of the Turner property are largely within this unit.
- Q_{sl}: Lower San Luis Ranch alluvium. The southern portion of the Turner property is located within this unit.

As discussed in Section 4.2, Golder's geologic observations and mapping in the existing pits at the site indicated the presence of discrete and discontinuous layers/lenses of alluvial outwash that include coarse-grained subangular to subrounded gravel and cobbles within a coarse-grained sand matrix, silty sands with gravel, and silt/clay.

5.4 Tectonic Setting and Active Faults

The present tectonic conditions and current plate deformation in the western United States began more than 150 million years ago (Ma) with the subduction of the Farallon Plate beneath North America. The Farallon Plate previously separated the Pacific and North American plates and, at the completion of its subduction beneath the North American plate 20 to 30 Ma, created the present-day Juan de Fuca, Gorda, and Cocos plates as well as the San Andreas fault (SAF) system (Wallace 1990).

Much of the current northwest-southeast alignment of the physiography in California is due, in large part, to the influence of complex tectonic conditions responsible for the formation of the SAF over the last 20 to 30 million years (i.e. since the cessation of subduction). The SAF is comprised of a variable width of subparallel fault structures that, together, take up a large portion of the total tectonic deformation along the plate boundary, while other faults within the western U.S. account for the remainder of motion (Atwater 1970, Wallace 1990, Powell et al. 1993). The SAF extends from Mendocino, California in the north (where it merges with the Cascadia Subduction Zone) to the Gulf of California/Sea of Cortez in the south, a distance of more than 700 miles.

The nearest mapped active (i.e., Holocene, less than 11,000 years old) fault to the site is the Ortigalita fault zone, which lies approximately 6 miles southwest of the southwestern boundary of the Los Banos facility (USGS 2006). The Ortigalita fault zone is a major dextral (i.e., right lateral) strike-slip fault in the central Coast Ranges and it is a part of the larger SAF system (Bryant and Cluett 2000). There are several older (late Pleistocene, less than 130,000 years old) fault structures mapped by USGS (2006) between the Ortigalita fault zone and the site, including the San Joaquin fault. The San Joaquin fault is part of the Great Valley thrust fault system that extends along much of the western edge of the San Joaquin Valley. These older faults are not considered active for the purposes of the current study.

5.5 Site Stratigraphy

As described in Section 5.3, the site is underlain by alluvium which generally consists of alternating discontinuous layers and/or depositional lenses of materials that have varying proportions of sand, gravel, silt, and clay. The results of borings B1 and B2 and of Golder’s geologic site reconnaissance and mapping indicate that the site is underlain by the following two primary deposits:

1) Predominantly coarse-grained deposits consisting of varying percentages of gravel, cobbles, and fines (i.e., silt and clay) within a sand matrix. The percentage of gravel and cobbles can be relatively high (estimated at up to 70%) in some areas underlying the site while the fines content is typically in the range of 5% to 25%. Blow count data from the borings suggest that these coarse-grained materials are usually dense to very dense. These deposits also contain layers/lenses of low to medium plasticity silt and clay that can locally have thicknesses on the order of 10 feet. These deposits were encountered to a depth of 41.3 feet bgs in boring B1 and for the full depth in boring B2.

2) Corcoran Clay, is generally a high plasticity clay layer having trace amounts of sand and a hard consistency. This unit was only encountered in boring B1 from 41.3 feet bgs to the termination depth of the boring at 80 feet bgs. Merced County (2015) indicates that the top of the Corcoran Clay dips down toward the northeast within and surrounding the site, which is consistent with the observed elevation of the top of the Corcoran Clay in the existing test trench in the Triangle Pit (see Section 4.2.1).

The subsurface conditions encountered in borings B1 and B2 and observed by Golder’s geologist during site reconnaissance and surface mapping agree well with those indicated on the logs of previous exploration holes drilled at the site that were provided to Golder (see Section 3.0). The Corcoran Clay was only encountered in two of the previous exploration logs, but the depths at which it was encountered are within the range of expected depths based on the results of Golder’s borings and the existing test trench in the Triangle Pit.

5.6 Groundwater

Groundwater was encountered in boring B2 at a depth of approximately 80.0 feet bgs (approximately elevation 97 feet amsl) during drilling on March 16, 2022. Two days later (March 18, 2022), the groundwater level in boring B2 was measured at approximately 78.5 feet bgs (approximately elevation 98.5 feet amsl). Groundwater was not observed in boring B1 at the time of drilling, although it is possible that groundwater may have been encountered but just not observed due to the low permeability of the Corcoran Clay, which was encountered from 41.3 feet bgs to the termination depth of 80 feet bgs.

The groundwater report by Kenneth D. Schmidt and Associates (KDSA 2020) contains a significant amount of historical groundwater level data for the site over a 30-year period from 1990 through 2020. The data in this report indicates that the groundwater flow direction is toward the east-northeast for the areas within and surrounding the site and that there is significant seasonal and temporal variation in groundwater levels.

Based on the results of the limited field investigation performed as part of the current study and on a review of the historical groundwater data presented in KDSA (2020), Golder considers a groundwater level of 40 feet bgs to be a reasonable estimate of the average historical high groundwater elevation across the site. Therefore, a historical high groundwater elevation of 40 feet bgs was used in the slope stability and liquefaction analyses for this study.

6.0 SEISMIC HAZARDS

The Los Banos facility is located along the western margin of the Central Valley region of California. Hence, the site has been and will continue to be exposed to moderate to strong earthquake ground motions. This section addresses seismic hazards as they relate to the Los Banos facility.

6.1 Surface Fault Rupture Potential

The Los Banos facility is not located within a State of California Alquist-Priolo Earthquake Fault Zone. As described in Section 5.4, the closest known active fault to the site is the Ortigalita fault zone, which is located approximately 6 miles southwest of the site's southwestern boundary. No known active fault strands or segments trend across or toward the Los Banos facility and Golder's geologist saw no signs of active faulting during the site reconnaissance and geologic mapping. Therefore, the probability of surface fault rupture occurring at the Los Banos facility is considered to be very low.

6.2 Design Peak Ground Acceleration

As part of the current study, Golder evaluated the design peak ground acceleration (PGA) to use in slope stability and liquefaction analyses. Given that the Los Banos facility is a sand and gravel quarry with intended end use of non-irrigated open space, Golder considers a design PGA having a 10% probability of exceedance in 50 years (i.e., having a mean return period of 475 years) to be appropriate for the slope stability and liquefaction analyses performed for the present study. To evaluate the 475-year PGA, Golder used the Unified Hazard Tool on the USGS website to perform a probabilistic seismic hazard analysis (PSHA) for the site. Based on the blow count values from borings B1 and B2, the site was considered to be Site Class D (i.e., stiff soil) in the PSHA. The results of the PSHA yielded a 475-year PGA of 0.44 g (where g is the Earth's gravitational acceleration) for the Los Banos site. A deaggregation of this 475-year PGA using the USGS's Unified Hazard Tool indicated that it corresponds to an earthquake having a moment magnitude of 6.4 located at a distance of 12.9 kilometers from the site.

6.3 Liquefaction Potential

As indicated in Section 2.4, VMC intends to mine down to depths near the top of regional groundwater such that portions of the final pit floors on the Turner property could be essentially at, or close to, the groundwater level (the proposed pit on the Sunset property is planned to be backfilled to within 5 feet of the pre-mining ground surface; hence, liquefaction is not a concern for the final configuration of the Sunset property). Therefore, Golder evaluated the liquefaction potential of the existing subsurface materials at the Turner property using the blow count data obtained from borings B1 and B2. The blow counts were converted to equivalent SPT blow counts and then used in the SPT-based liquefaction triggering evaluation method of Idriss and Boulanger (2008). The standard of practice in California is to analyze liquefaction potential using the historically high groundwater level (CGS 2008). Hence, the liquefaction triggering analyses considered the historically high groundwater level of 40 feet bgs (see Section 5.6) for each boring location.

No formal liquefaction triggering calculations were performed for boring B1 because the Corcoran Clay was encountered in this boring from 41.3 feet bgs to the boring termination depth of 80 feet bgs. The Corcoran Clay is not considered to be liquefiable due to its high plasticity (a sample of the Corcoran Clay from boring B1 had a plasticity index of 53, as shown on the laboratory test results in Appendix C) and its hard consistency. The approximately 1.3 feet of soils between the historical high groundwater level of 40 feet bgs and the top of the Corcoran Clay was logged as a well-graded sand that, according to its blow count value, is dense. Therefore, it is considered unlikely that this 1.3-foot thick layer will liquefy as dense sands are generally not susceptible to liquefaction.

Corcoran Clay was not encountered in boring B2 and, hence, Golder performed liquefaction-triggering analysis for the soils encountered in this boring. Appendix D presents the results of the liquefaction analysis for boring B2.

As can be seen in Appendix D, the soils in boring B2 have calculated factors of safety against liquefaction that exceed 1.1, which indicates that these soils are not susceptible to liquefaction.

Based on the above considerations and the results of the liquefaction triggering analysis contained in Appendix D, the soils underlying the Turner property are not expected to be susceptible to widespread liquefaction when subjected to the 475-year PGA. Considering the alluvial nature of the soil deposits at the site and the limited coverage of the geotechnical investigation performed for the current study, it is possible, that some relatively thin and/or discontinuous layers/lenses of potentially liquefiable soils exist in small and localized areas of the Turner property. However, the potential effect that these localized layers/lenses would have on global slope stability if they were to liquefy would likely be negligible given their limited extents.

7.0 SLOPE STABILITY ANALYSES

7.1 General

This section describes the slope stability criteria, analytical methods used, material properties assigned, cross-sections analyzed, and results of the pit slope stability analyses performed for Turner property. Static and pseudostatic stability analyses of the proposed final pit slopes were performed to assess the global stability of these slopes under static and seismic conditions. The results of these static and pseudostatic stability analyses form the basis of Golder's opinions regarding the overall stability of the proposed final slopes. The stability analyses of the proposed pit slopes were performed for final configurations only and address overall (i.e., gross) stability of the pit slopes. Local (i.e., sloughing, raveling, etc.) stability of the proposed final pit slopes does not affect global slope stability and, therefore, was not analyzed herein.

As described in Section 2.4, VMC plans to backfill the proposed pit on the Sunset property to within 5 feet of the pre-mining ground surface. Therefore, slope stability analyses for the Sunset property are not needed.

7.2 Pit Slope Stability Criteria

Final reclaimed slopes at the Sunset and Turner properties are proposed at a 2H:1V configuration, which meets the SMARA prescriptive standards and, therefore, are presumptively stable [California Code of Regulations, Title 14, Sections 3704(d) and 3704(f)], and the proposed slopes are suitable for the site's proposed end use of open space. Notwithstanding, in order to disclose all potentially relevant data, Golder analyzed the proposed final slopes to understand their global factors of safety (FS) under static and seismic loading conditions, when subjected to an appropriate site-specific seismic coefficient that is based on the 475-year PGA and the maximum allowable seismic displacement of the slopes. The evaluation of the site-specific seismic coefficient is described in Section 7.6.

7.3 Analytical Methodology

To evaluate the static and pseudostatic global stability of the proposed final pit slopes, Golder performed two-dimensional limit equilibrium slope stability analyses using the computer program SLIDE2 (Version 9.020) by Rocscience Inc. For both static and pseudostatic cases, SLIDE2 was used to generate a large number of trial shear surfaces and the FS of each trial surface was calculated using Spencer's method (Spencer 1967) to identify the trial surface with the minimum FS. Spencer's method was selected to calculate the FS because it satisfies both force and moment equilibrium. This iterative method involves successive assumptions for the FS and side force inclination (which is the same for all slices) until both force and moment equilibrium are satisfied. Both circular and noncircular shear surfaces were considered in the global stability analyses.

7.4 Cross-Sections Analyzed

Golder analyzed the following pit slope cross-sections for the current study:

- Back Analysis Cross-Section: A cross-section through the existing interim cutslope in the Triangle Pit was back-analyzed to evaluate the shear strength of the in-situ granular alluvium.
- Idealized Cross-Sections: Two idealized cross-sections, are described in the following sections.

7.4.1 Back Analysis Cross-Section

To estimate the in-situ shear strength of the in-situ granular (i.e., sandy and gravelly) alluvial materials at the site, Golder analyzed a cross-section (Cross-Section 1-1') through the existing interim southern cutslope in the Triangle Pit. The location of Cross-Section 1-1' is shown in Figure 2 and this cross-section location was selected as it was considered to be the most critical existing slope cross-section at the site, based on the site topographic maps provided by VMC and on Golder's field geologic observations. Specifically, this section had the steepest overall inclination of any of the existing slopes at the site, and, at approximately 55 to 60 feet in height, it was one of the tallest existing slope sections at the site. The granular materials observed in this slope were considered to be generally representative of those encountered throughout the site. The slope is inclined very steeply in its lower half (areas as steep as 1H:1V) and is flatter in its upper half (generally between 1.5H:1V and 2.5H:1V). This slope was modeled as being dry (i.e., no groundwater present) as the presence of a static horizontal groundwater surface would have little effect on the back-calculated shear strength since, as discussed below, the soil was assumed to be cohesionless.

As it was used solely for back-calculation of soil shear strength, Cross-Section 1-1' was analyzed for static conditions only. Given the very granular nature of the alluvial materials in the slope, the slope material was conservatively modeled as being a homogeneous cohesionless material (i.e., cohesion intercept of zero). It is likely that the portion of the slope above the groundwater table has at least a nominal amount of apparent cohesion, but Golder ignored the effects of apparent cohesion in the back-analysis of this cross-section as apparent cohesion is typically not relied upon over the long term in geotechnical design.

A major assumption in the back analysis of a slope that has not failed and has no signs of instability is what FS value to assume, as the assumed FS value will have a direct and significant effect on the back-calculated shear strength. Golder assumed that Cross-Section 1-1' had a static FS of 1.50, which is considered a reasonable assumption given that no signs of instability were observed in this slope.

The results of the back analysis for Cross-Section 1-1' are discussed in Section 7.5.1.

7.4.2 Idealized Cross-Sections

As discussed in Section 2.4, VMC plans to mine down to levels near groundwater on the Turner property; the conceptual depths of the final mine pit are shown in the excavation plan provided in Figure 2. In addition, VMC will not mine into the Corcoran Clay and the elevation of the top of the Corcoran Clay varies throughout the site. In light of these considerations, Golder analyzed the following two idealized cross-sections for the current study:

1) Case A: The idealized cross-section analyzed for this case consists of a straight-graded 2H:1V slope and a flat pit floor. The material in the slope (i.e., above the pit floor elevation) was modeled as coarse-grained alluvium (i.e., sand and gravel) while both the slope and pit floor are completely underlain by Corcoran Clay. The groundwater level is conservatively assumed to be at the pit floor elevation.

2) Case B: The idealized cross-section analyzed for this case consists of a straight-graded 2H:1V slope and a flat pit floor. The material both in the slope (i.e., above the pit floor elevation) and underlying the pit floor and slope was modeled as coarse-grained alluvium. Similar to Case A, the groundwater level is conservatively assumed to be at the pit floor elevation.

Each of the above-described idealized cross-sections was analyzed by varying the slope height in 5-foot increments until the maximum slope height that meets the slope stability criteria of Section 7.2 was found. To account for the level of uncertainty involved with the assumed site stratigraphy and groundwater levels, additional sensitivity analyses were performed by analyzing the following scenarios for both Cases A and B:

- Scenario 1: This is the “base case” and consists of the idealized slope cross-section models as described above. This case was analyzed assuming circular shear surfaces (since there are no relatively thin and weak layers in this scenario).
- Scenario 2: Same as Scenario 1 except that the groundwater level is at its historical high of 40 feet bgs (where bgs corresponds to the top of the slope).
- Scenario 3: Same as Scenario 1 except that the slope is modeled as containing a horizontal 10-foot thick alluvial clay layer at depth.
- Scenario 4: Same as Scenario 3 except that the shear surfaces analyzed were noncircular.
- Scenario 5: Same as Scenario 3 except that the groundwater level is at its historical high of 40 feet bgs (where bgs corresponds to the top of the slope).

The results of the slope stability analyses for each idealized case and scenario are discussed in Section 7.7.

7.5 Material Properties

The material properties used in the slope stability analyses are summarized in Table 1 and discussed in the following sections.

Table 1: Material Properties Used in Slope Stability Analyses

Material	Unit Weight (pcf)	Friction Angle (degrees)	Cohesion Intercept (psf)
Coarse-Grained Alluvium	130	40	0
Corcoran Clay	110	8.6	1,630
Fine-Grained Alluvium	120	N/A – see Section 7.5.3	

7.5.1 Coarse-Grained Alluvium

As described in Section 7.4.1, the critical existing interim cut slope in the Triangle Pit was back analyzed to evaluate the shear strength of the coarse-grained alluvium (i.e., sandy/gravelly materials). The results of this back analysis are presented in Appendix E and indicate that assuming the existing slope has a static FS of 1.50, the coarse-grained alluvium was calculated to have a friction angle of 48 degrees (assuming no cohesion intercept). This friction angle value is reasonable for a dense to very dense sandy gravel with cobbles, but Golder decided to model the coarse-grained alluvium using a reduced friction angle of 40 degrees in the analyses to account for potential material variability across the site.

As a check on the back-calculated friction angle, Golder also analyzed the blow count values from borings B1 and B2 for the coarse-grained alluvium. The average equivalent SPT blow count value for the coarse-grained alluvium in boring B1 was 45 and in boring B2 was 55 (these blow count values were corrected as necessary by examining the per-inch penetration data to remove the effects of encountering gravel, cobbles, and boulders). According to EPRI (1990), SPT blow counts of 45 to 55 for cohesionless soils correspond to friction angles in the range of 40 to 45 degrees, which is in general agreement with the back-calculated friction angle.

The unit weight of the coarse-grained alluvium was taken to be 130 pounds per cubic foot (pcf), which is based on Golder's engineering judgment and is typical for a dense to very dense and well-graded sandy/gravelly material.

7.5.2 Corcoran Clay

The drained (i.e., long-term) shear strength of the Corcoran Clay was evaluated by performing a drained direct shear test on a relatively undisturbed (i.e., Shelby tube) sample of this clay that was obtained from boring B1. As shown in Appendix C, the results of the direct shear test yielded a post-peak friction angle of 8.6 degrees with a cohesion intercept of 1,630 pounds per square foot (psf), which were used in the stability analyses. The unit weight of the Corcoran Clay was taken to be 110 pcf, which is based on the in-situ dry unit weight and moisture content for a sample of the Corcoran Clay (see the test results in Appendix C) in conjunction with Golder's experience with similar clayey materials.

7.5.3 Fine-Grained Alluvium

Distinct layers/lenses of fine-grained low to medium plasticity alluvium were occasionally encountered in the borings. For example, an approximately 10-foot thick layer of this fine-grained material was encountered at a depth of 55.8 feet bgs in boring B2; a sample from this layer was laboratory tested and found to have a liquid limit of 31 and a plasticity index of 14 (see Appendix C). The long-term drained shear strength of clay with medium plasticity will vary with normal stress, resulting in a nonlinear failure envelope. Hence, at higher normal stresses, the secant friction angle of a medium plasticity clay will be lower than at low normal stresses. Therefore, Golder used a nonlinear fully softened shear strength envelope for the fine-grained alluvium that was estimated using the relationship between fully softened shear strength, liquid limit, clay-size fraction, and normal stress developed by Stark and Hussain (2013). A liquid limit of 31 was used (based on the laboratory test results) and the clay-size fraction was assumed to be 25 to 45%. Because there was no sign of existing landslides or instability at the site, the use of fully softened shear strength for clays that have not previously experienced detrimental shear displacements is appropriate.

The unit weight of the fine-grained alluvium was taken to be 120 pcf, which is based on Golder's engineering judgment and is typical for a low to medium plasticity alluvial clay.

7.6 Seismic Coefficient

In order to perform a pseudostatic slope stability analysis, a seismic coefficient (k) is used to account for the inertial forces acting on a slope mass during seismic shaking. The seismic coefficient is applied to the weight of the slope mass in the horizontal direction (and sometimes also in the vertical direction) and acts as an additional force on the slope in the stability analyses.

A horizontal seismic coefficient of 0.15 was used in all of the pseudostatic slope stability analyses for the current study. This value was calculated from the site's 475-year PGA of 0.44 g (see Section 6.2) as modified per CGS (2008) to account for its effects on the proposed pit slopes and allowing for up to 6 inches (i.e., 15 centimeters) of permanent seismic displacement in the slopes, which is acceptable for the proposed final pit slopes at Los Banos. As shown in Figure 4, the site's 475-year PGA was multiplied by a factor of 0.335 to calculate the horizontal seismic coefficient. The factor of 0.335 is a function of PGA, earthquake magnitude, site-to-source distance, and allowable seismic displacement and was evaluated using the plot in Figure 4, which was taken from CGS (2008).

No vertical seismic coefficient was used in the analyses as the use of a vertical seismic coefficient has been shown to change the computed FS by no more than about 10% (NHI 1998). Furthermore, the use of a vertical seismic coefficient in a pseudostatic analysis would imply that it acts exactly in phase with the horizontal seismic coefficient. In the unlikely event this did occur, it would only last for a fraction of a second.

7.7 Results

The results of the slope stability analyses are summarized in Table 2. Detailed graphical representations showing the critical shear surface for each case and scenario are provided in Appendix E. As can be seen in Table 2, the design criteria (i.e., a minimum static FS of 1.5 and a minimum pseudostatic FS of 1.1) were achieved for each case and scenario that were analyzed.

Table 2: Summary of Slope Stability Analysis Results

Case	Scenario	Description	Static FS	Pseudostatic FS
A	1	Slope and pit floor underlain by Corcoran clay, groundwater level at pit floor	1.99	1.17
	2	Same as Scenario 1 but groundwater at historical high level	1.79	1.23
	3	Same as Scenario 1 but 10-foot thick alluvial clay layer in slope (circular shear surface)	1.69	1.18
	4	Same as Scenario 3 but noncircular shear surface	1.82	1.30
	5	Same as Scenario 3 but groundwater at historical high level	2.12	1.23
B	1	Slope and pit floor underlain by alluvial sand/gravel, groundwater level at pit floor	2.17	1.49
	2	Same as Scenario 1 but groundwater at historical high level	1.97	1.21
	3	Same as Scenario 1 but 10-foot thick alluvial clay layer in slope (circular shear surface)	1.97	1.39
	4	Same as Scenario 3 but noncircular shear surface	1.86	1.30
	5	Same as Scenario 3 but groundwater at historical high level	1.78	1.10

8.0 CONCLUSIONS

The primary conclusions of the current study are as follows:

- The probability of surface fault rupture occurring at the site is very low.
- The soils underlying the Turner property are not considered to be susceptible to significant liquefaction when subjected to the design (i.e., 475-year) PGA.
- Final pit slopes at the Sunset and Turner properties inclined no steeper than 2H:1V and meet the slope stability criteria, therefore, are considered sufficiently stable following the SMARA guidance, and are suitable for the site's proposed end use of open space.

9.0 RECOMMENDATIONS

9.1 Final Pit Slope Design

The following are Golder's recommendations for the design of the proposed final pit slopes on the Sunset and Turner properties:

- Develop the final pit slopes at the Sunset and Turner properties at inclinations of 2H:1V or flatter.
- Maintain all surcharge loads, such as those from stockpiles, heavy equipment, materials, and structures/foundations, away from the crests of the final pit slopes at an appropriate distance. Unless specifically designed otherwise by a qualified engineer, all large surcharge loads should be setback from the slope crest at a minimum horizontal distance equal to the vertical height of the pit slope at the location of the surcharge. Relatively short (i.e., approximately 8 feet) and narrow earthen berms for uses such as topsoil storage, surface water control, and safety are excluded from this requirement.
- Provide appropriate surface water controls around the crests of the slopes as needed to ensure that surface water will not flow uncontrolled over the slope crest and down the slope face. In particular, berms and/or ditches should be installed along slope crests as needed to convey surface water away from the slopes. The surface water controls should be regularly inspected and maintained, especially before the start of each rainy season, to ensure that these controls continue to provide the appropriate conveyance of surface water away from the slopes.
- Maintain an appropriate offset between the top of mining slopes and adjacent property lines.

The slope design recommendations provided in this report are based on the results of Golder's site reconnaissance and investigation program, regional literature, exploration drill logs, aerial photographs and ground proofing, and Golder's experience in similar environments.

9.2 Future Slope Monitoring

The slope stability analysis results described herein indicate that the proposed final pit slopes meet the minimum factors of safety in accordance with SMARA regulations. A systematic program of pit documentation and slope monitoring is consistent with VMC current practices and should be implemented during mining. Slopes should be monitored throughout their development for conformance with the geotechnical model summarized in this report and for any signs of instability.

10.0 LIMITATIONS

This report is intended to serve as a technical study in support of the permitting process for the proposed mining operations at the Los Banos sand and gravel quarry. The assessments, conclusions, and recommendations contained herein pertain to the proposed final pits at the site. If the scope of the project changes, then Golder should review the changes and, if necessary, revise the analyses and recommendations contained in this report. This report does not provide final or detailed pit designs for the proposed quarries and also does not consider the interim conditions that would occur during mining operations. The conclusions contained herein may require revision once development of the pits begins and the actual subsurface conditions within the pits are observed and/or tested.

The findings, conclusions, and recommendations presented in this report were prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the geotechnical engineering profession currently practicing under similar conditions subject to the time limits and financial, physical, and other constraints applicable to the scope of work. No warranty, express or implied, is made. In preparing this report's conclusions and recommendations, Golder has relied upon information provided by other parties, such as topographic data, operational parameters, subsurface and surface geology, etc. Golder is not responsible for errors or omissions in the information provided by the other parties.

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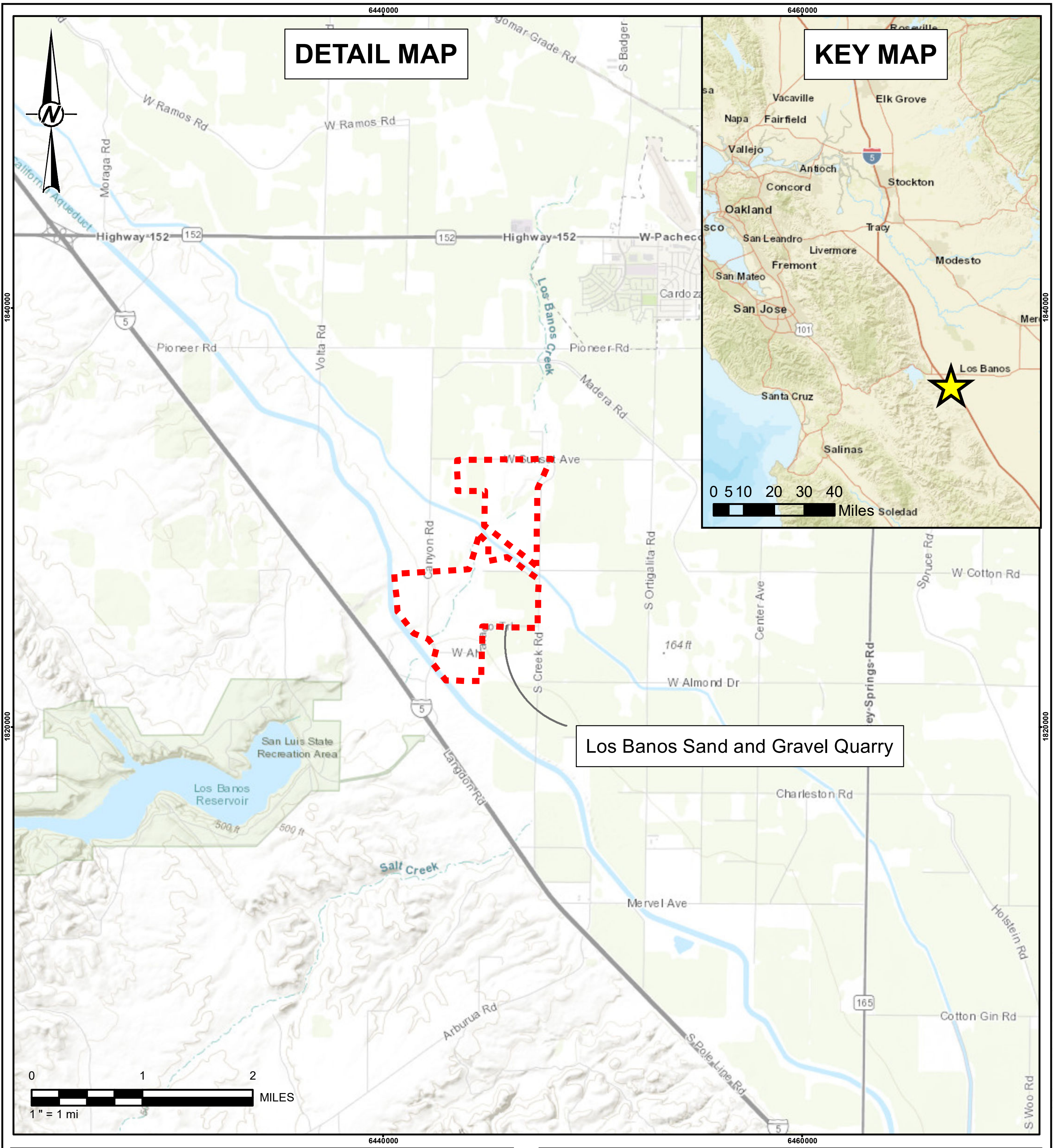
FIGURES



LEGEND

★ LOS BANOS SAND AND GRAVEL QUARRY

▨ APPROXIMATE PROPERTY BOUNDARY

REFERENCE(S)

1. ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANC SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

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22101 SUNSET AVENUE
LOS BANOS, CA 93635

PROJECT
VULCAN MATERIALS COMPANY
LOS BANOS SAND AND GRAVEL QUARRY
SLOPE STABILITY ASSESSMENT

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-11-13
DESIGNED	MCG
PREPARED	LHK
REVIEWED	MCG
APPROVED	RH

TITLE
SITE LOCATION MAP

PROJECT NO.	REV.	FIGURE
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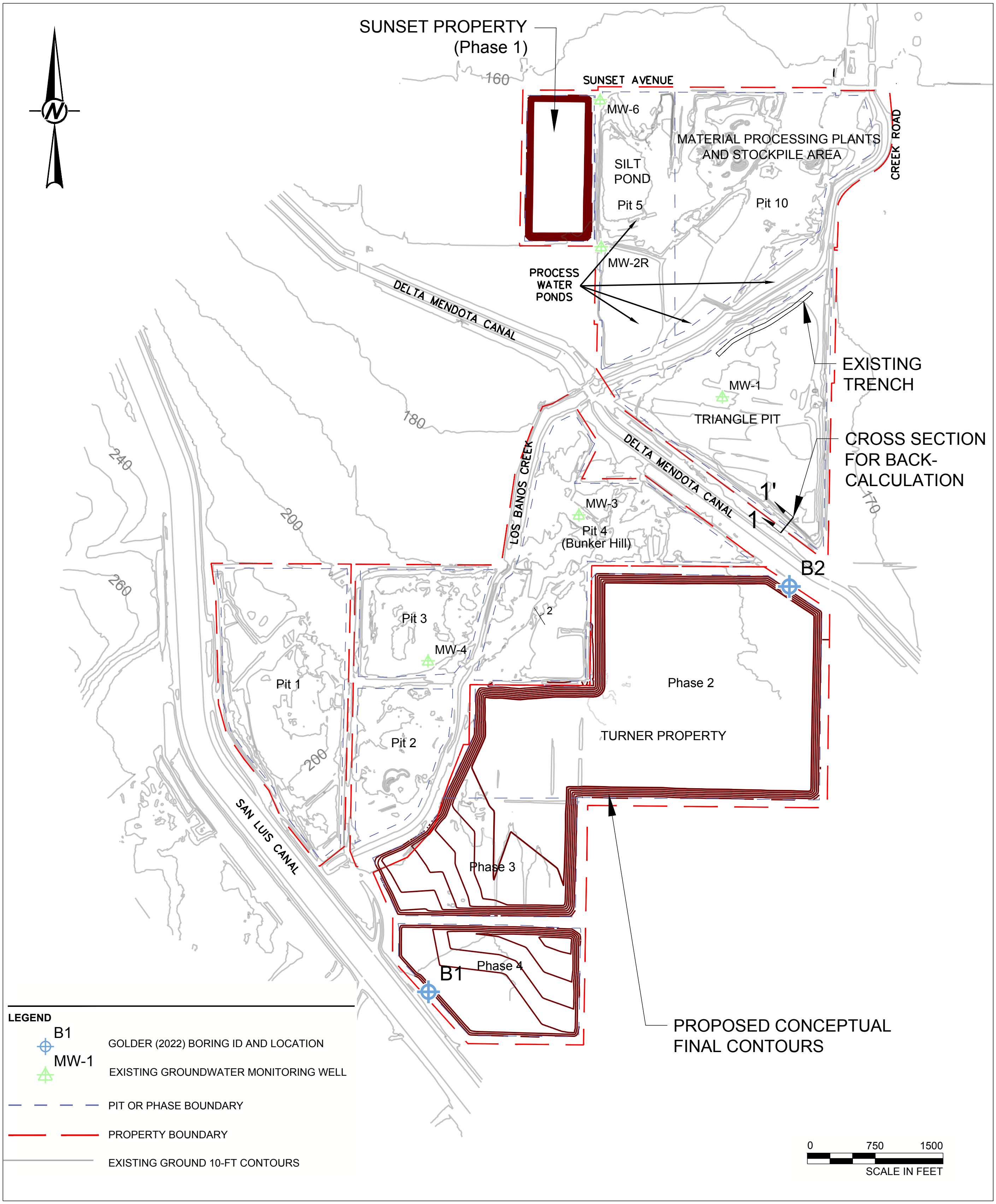

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SLOPE STABILITY ASSESSMENT

CONSULTANT

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YYYY-MM-DD	2022-11-13
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REVIEWED	RH
APPROVED	RH

TITLE
SITE PLAN AND BORING LOCATIONS

PROJECT NO.	REV.	FIGURE
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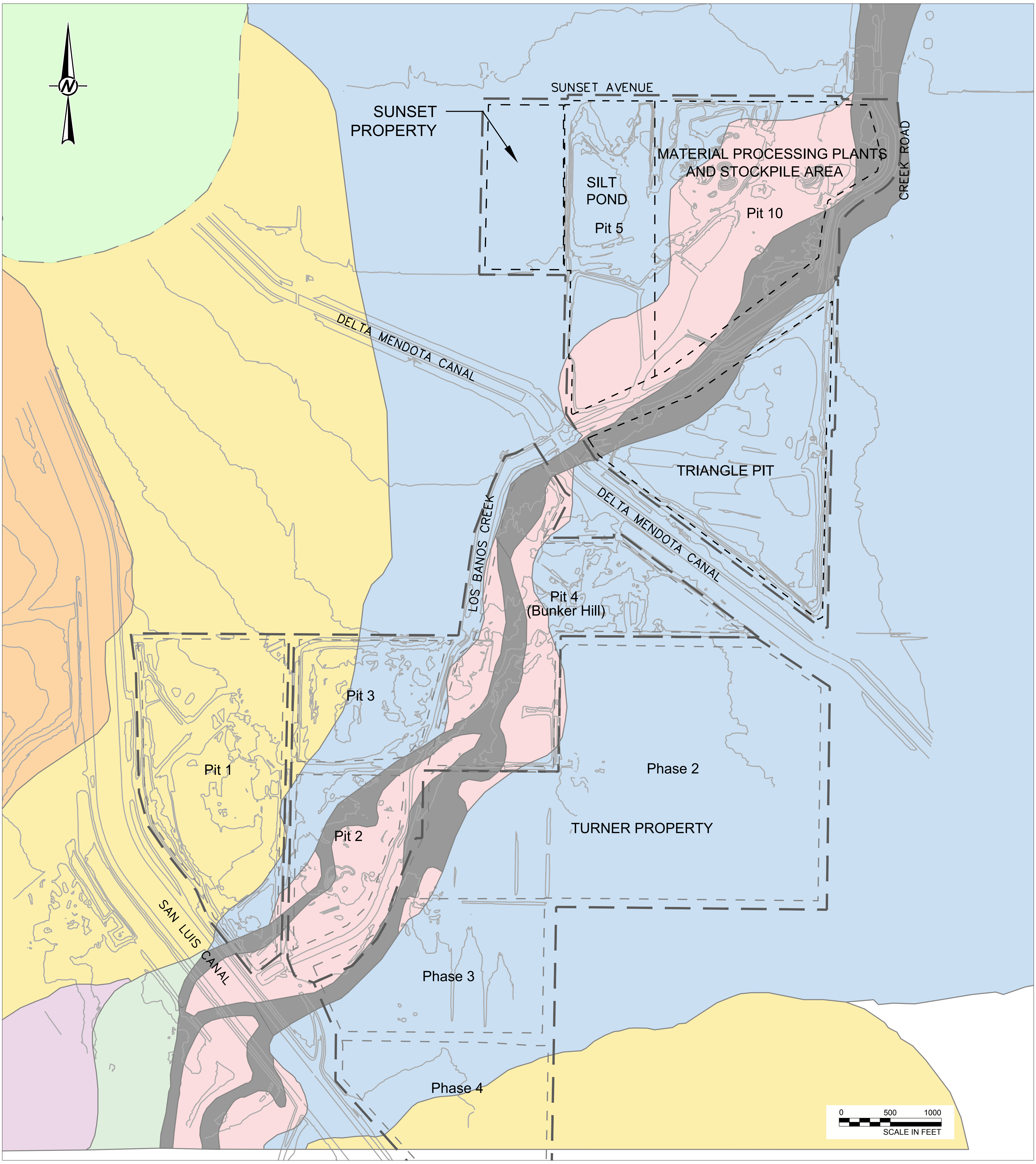

LEGEND

🟨 Q_{sl} - Lower San Luis Ranch alluvium

⬛ Q_{pc}- Coarse-grained deposits of Coast Range provenance

🟥 Q_{p} - Terrace and upper fan deposits of Patterson Alluvium

🟩 Q_{ps} - Patterson and San Luis Ranch undifferentiated

🟪 Q_{su} - Upper San Luis Ranch alluvium

🟦 Q_{pf} - Fine-grained middle to lower Patterson alluvium

🟧 Q_{lm} - Los Banos alluvium, middle member

– – – – Pit or Phase Boundary

— — Property Boundary

NOTE(S)

REFERENCE: GEOLOGIC MAP OF LATE CENOZOIC DEPOSITS OF THE WEST-CENTRAL SAN JOAQUIN VALLEY, CALIFORNIA BY W.R. Lettis 1982

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wsp GOLDER

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APPROVED	RH

PROJECT
VULCAN MATERIALS COMPANY
LOS BANOS SAND AND GRAVEL QUARRY
SLOPE STABILITY ASSESSMENT

TITLE
SURFACE GEOLOGY MAP

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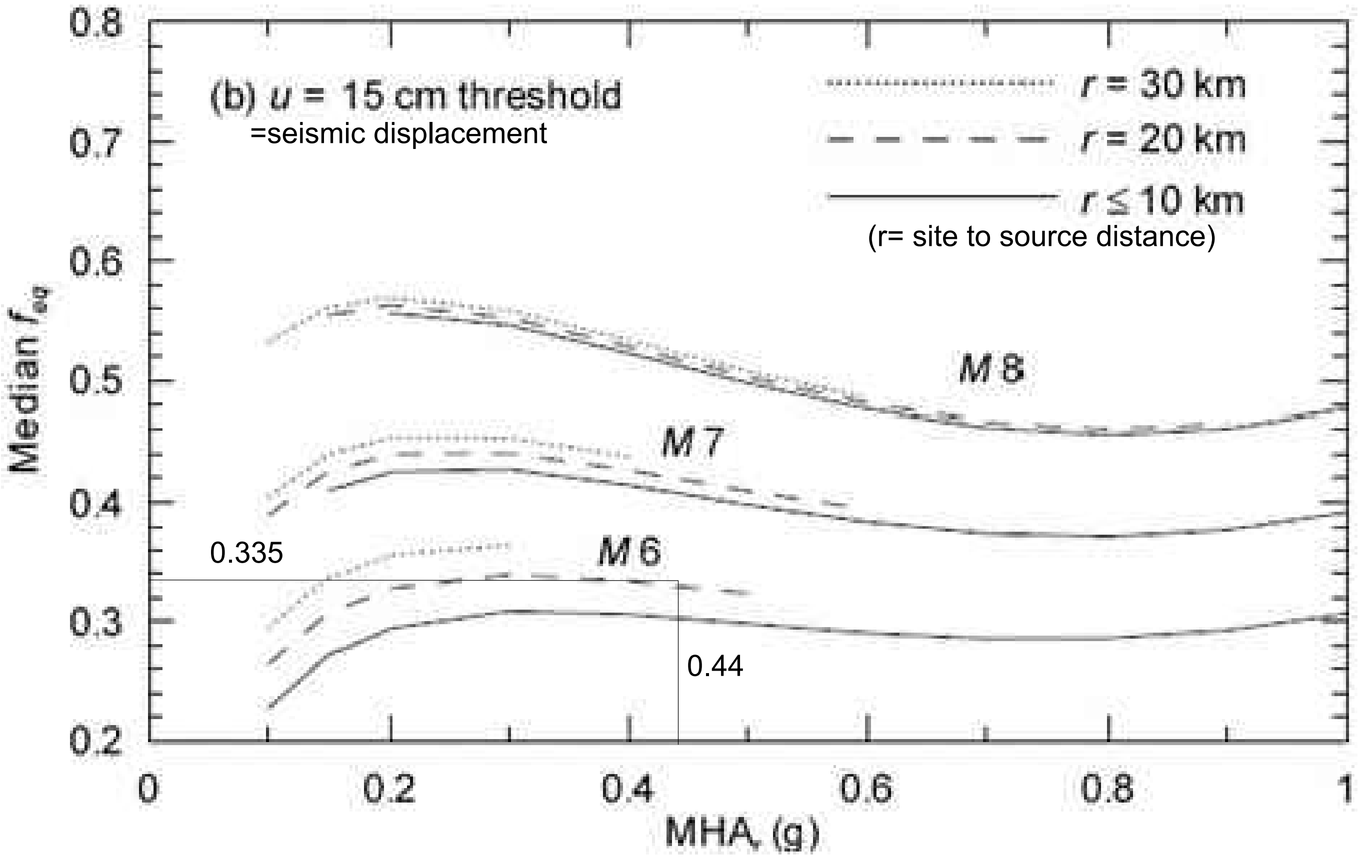
k=PGA*f_{eq}= (0.44g)(0.335) = 0.15g



Plot from CGS (2008)

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CONSULTANT

wsp GOLDER

YYYY-MM-DD	2022-11-13
DESIGNED	
PREPARED	MCG
REVIEWED	RH
APPROVED	RH

PROJECT
VULCAN MATERIALS COMPANY
LOS BANOS SAND AND GRAVEL QUARRY
SLOPE STABILITY ASSESSMENT

TITLE
EVALUATION OF SEISMIC COEFFICIENT

PROJECT NO.	REV.	FIGURE
31404284.000	0	4

APPENDIX A

Geologic Site Reconnaissance Photographs

Photo 1: Monitoring well MW-1 interior of Triangle Pit, looking East (taken 03-07-2022)

Photo 2: Historical exploratory test pit along northern toe of slope within the Triangle Pit that was used to determine the depth to the Corcoran Clay, looking North (taken 03-07-2022)

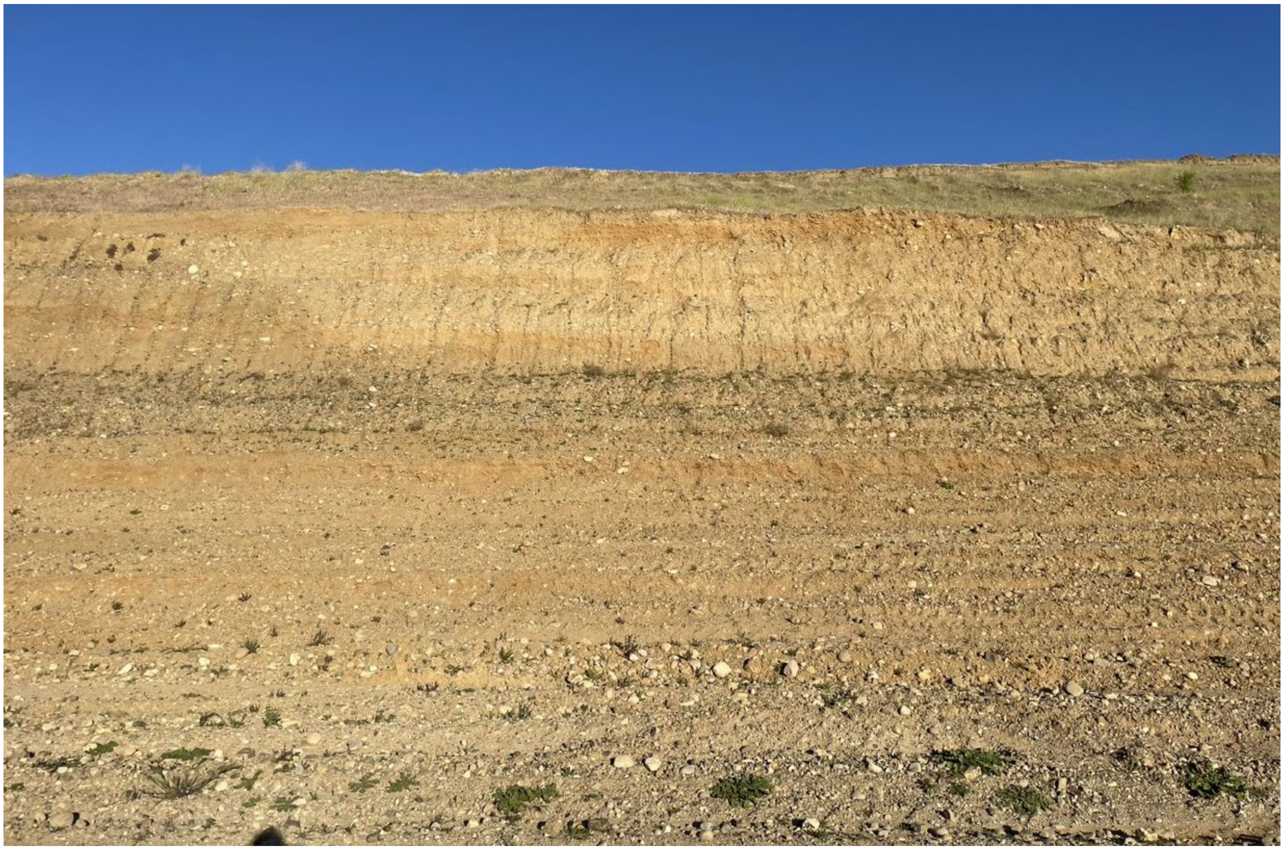


Photo 3: Eastern cutslope in Pit 4, looking east (taken 03-07-2022)

Photo 4: Delta Mendota Canal north of the Turner Property, looking north (taken 03-07-2022)

Photo 5: Pit 4 area with recent rainwater collected in bottom of the pit, looking south (taken 03-04-2022)

Photo 6: Sunset Property, looking southwest (taken 03-08-2022)

Photo 7: Silt Pond East of Sunset Property, looking Northeast (taken 03-08-2022)

Photo 8: Phase 4 area of the Turner Property, near B-1, looking North (taken 03-08-2022)

APPENDIX B

Boring Logs and Well Completion Diagram

RECORD OF BOREHOLE: Legend

CLIENT:	Vulcan Materials Company	DATE:	May 13, 2022	ELEVATION:	Feet above mean sea level
PROJECT:	Los Banos Quarry Slope Stability				
PROJECT NO:	31404284.000	INCLINATION:	-90.0°	COORD SYS:	Geographical Coordinates
LOCATION:	Merced County, CA	CONTRACTOR:	Gulf Shore Exploration	HORZ DATUM:	WGS84

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE				SAMPLES					GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. --------- DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		
	Drill Rig or Equipment	Drill or Excavation Method	MATERIAL DESCRIPTION FOR SOIL: Soil classifications are based on the Unified Soil Classificatiom System (USCS) per ASTM D2487.			0.0							
			AS: Auger sample.			3.0		AS					
			BS: Block sample.			4.0		BS					
			CS: Chunk sample.			5.0		CS					
			DO: Drive open (SPT).			6.0		DO	100	5-10-15	25		
			DP: Direct push.			7.5		DP	100				
			DS: Denison-type sample.			8.0		DS	80				
			FS: Foil sample.			8.5		FS					
			GS: Grab sample.			9.5		GS					
			MC: Modified California.			10.5		MC	100	10-15/6"			
			MS: Modified Shelby (for frozen soil).			11.5		MS	100				
			RC: Rock core.			12.0		RC	100				
			SC: Soil core.			13.0		SC	100				
			SS: Split spoon.			14.0		SS	100	5-10-15	25		
			ST: Slotted tube.			15.5		ST	100				
			TO: Thin-walled, open (Shelby tube).			16.5		TO	100				
			TP: Thin-walled, piston.			17.5		TP	100				
			WS: Wash sample.			18.5		WS					
			(GP): Graphic Log; Standard symbols for soil types. Other abbreviations: PL - Plastic Limit; PI - Plasticity Index; LL - Liquid Limit.	ML		19.5							
			Dashed boundary line represents an inferred boundary - actual material boundary may be gradual.	SW		21.0							
24			End of hole at 24.0 ft. Backfilled with neat cement grout to surface.										

HAMMER TYPE:

REV:

LOGGED: Lane Klansek DATE: May 13, 2022

CHECKED: Margaret Gidula DATE: May 13, 2022

RECORD OF BOREHOLE: B1

CLIENT:	Vulcan Materials Company	DATE:	March 17, 2022	ELEVATION:	218.5 ft (Ground)
PROJECT:	Los Banos Quarry Slope Stability			COORDINATES:	Lat: 37.0002° Long: -120.9064°
PROJECT NO:	31404284.000	INCLINATION:	-90.0°	COORD SYS:	Geographical Coordinates
LOCATION:	Merced County, California	CONTRACTOR:	Gulf Shore Exploration	HORZ DATUM:	WGS84

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE			SAMPLES					GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	ELEV. --------- DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		
0	CME-75	Hand Auger	(ML) Gravelly silt, few sand, mostly low plasticity; reddish brown; w < PL, hard.	ML	0.0							0.00 - 2.50 ft: Hand augered.
2.5		Hollow Stem Auger										
5							MC	100	50/2"			5.00 ft: Sample contained one cobble piece in shoe.
10							DO	50	12-29-39	68		
12.5			(GC) Clayey gravel with sand, some silt, mostly medium plasticity; tannish brown to reddish brown; dry to moist, very dense.	GC	206.0 12.5							
15							DO	75	32-50/6"			
20							MC	22	4-16-27	43		20.00 ft: Sample contained mostly rock.
22.5			(GC) Fines become medium to high plasticity.		196.0 22.5							
25												

Continued on Next Page

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Lane Klansek DATE: Mar 17, 2022

CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B1

CLIENT:	Vulcan Materials Company	DATE:	March 17, 2022	ELEVATION:	218.5 ft (Ground)
PROJECT:	Los Banos Quarry Slope Stability			COORDINATES:	Lat: 37.0002° Long: -120.9064°
PROJECT NO:	31404284.000	INCLINATION:	-90.0°	COORD SYS:	Geographical Coordinates
LOCATION:	Merced County, CA	CONTRACTOR:	Gulf Shore Exploration	HORZ DATUM:	WGS84

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE DESCRIPTION	USCS	ELEV. --------- DEPTH (ft)	SAMPLES NUMBER	TYPE	REC %	BLOWS	N-VALUE	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
	CME-75	Hollow Stem Auger	(GC) Fines become medium to high plasticity.	GC		CME-75	MC	100	31-50/6"			
			(SC) Clayey sand; mostly sand, some low plasticity fines; tannish brown; dry to moist, dense.	SC	191.0 27.5							
							MC	100	10-25-27	52		
			(SC) Becomes compact with iron oxide staining.		186.0 32.5							
							MC	100	17-19-25	44		
			(SW-SM) Well graded sand with silt; few gravel, mostly sand, few low plasticity fines; brown with some multicolored grains; moist, compact.	SW-SM	181.0 37.5							
							MC	100	16-27-28	55		
			(CH) Fat clay; mostly high plasticity fines, trace sand; light greenish tan, iron oxide staining; w < PL, hard; likely Corcoran clay.	CH	177.2 41.3							
							MC	100	8-12-44	56		

Depth scale: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50

Continued on Next Page

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

wsp GOLDER

LOGGED: Lane Klansek DATE: Mar 17, 2022

CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B1

CLIENT: Vulcan Materials Company
PROJECT: Los Banos Quarry Slope Stability
PROJECT NO: 31404284.000
LOCATION: Merced County, CA

DATE: March 17, 2022
INCLINATION: -90.0°
CONTRACTOR: Gulf Shore Exploration

ELEVATION: 218.5 ft (Ground)
COORDINATES: Lat: 37.0002° Long: -120.9064°
COORD SYS: Geographical Coordinates
HORZ DATUM: WGS84

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE				SAMPLES					GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. --------- DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		
			(CH) Fat clay; mostly high plasticity fines, trace sand; light greenish tan, iron oxide staining; w < PL, hard; likely Corcoran clay.					MC	100	7-14-19	33		
51													
52													
53													
54													
55													
56								MC	100	12-20-32	52		
57													
58			(CH) Becomes light gray, likely Corcoran clay.			161.0 57.5							
59													
60													
61								MC	100	7-23-34	57		
62	CME-75	Hollow Stem Auger		CH									
63													
64													
65													
66								MC	89	6-22-25	47		
67													
68			(CH) Becomes grayish blue, likely Corcoran clay.			151.0 67.5							
69													
70													
71								MC	100	12-22-50/5"			
72													
73													
74													
75													

Continued on Next Page

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Lane Klansek DATE: Mar 17, 2022
CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B1

CLIENT: Vulcan Materials Company
PROJECT: Los Banos Quarry Slope Stability
PROJECT NO: 31404284.000
LOCATION: Merced County, CA

DATE: March 17, 2022
INCLINATION: -90.0°
CONTRACTOR: Gulf Shore Exploration

ELEVATION: 218.5 ft (Ground)
COORDINATES: Lat: 37.0002° Long: -120.9064°
COORD SYS: Geographical Coordinates
HORZ DATUM: WGS84

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE				SAMPLES					GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. --------- DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		
76	CME-75	Hollow Stem Auger	(CH) Becomes grayish blue, likely Corcoran clay.	CH				MC	100	7-9-22	31		
77								MC	100	14-20-50/4"			
78 79						138.5		TO	100				
80			End of hole at 80 ft. Borehole backfilled with neat cement grout to surface.										
81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100													

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

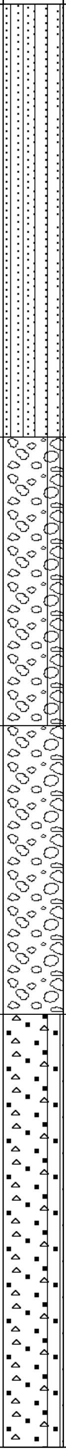
LOGGED: Lane Klansek DATE: Mar 17, 2022
CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B2

CLIENT: Vulcan Materials Company
PROJECT: Los Banos Quarry Slope Stability
PROJECT NO: 31404284.000
LOCATION: Merced County, CA

DATE: March 15, 2022
INCLINATION: -90.0°
CONTRACTOR: Gulf Shore Exploration

ELEVATION: 177.0 ft (Ground)
COORDINATES: Lat: 37.0123° Long: -120.8924°
COORD SYS: Geographical Coordinates
HORZ DATUM: WGS84



DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CME-75	Hand Auger	(SM) Silty sand with gravel; light brown; dry, very dense.	SM	0.0							0 - 5 ft: Hand augered.
5		Hollow Stem Auger					MC	100	8-87/6"			
7.5			(GP-GM) Poorly graded gravel with silt and sand; mostly gravel, little sand, few fines; light reddish brown; dry, very dense.	GP-GM	169.5 7.5							
10							MC	100	25-51-63	114		
12.5			(GP) Poorly graded gravel; mostly gravel, some sand; light bluish gray, strong cementation, dry, very dense;	GP	164.5 12.5							
15							MC	50	50/6"			15.00 ft: Sample contained mostly rock.
17.5			(SW-SM) Well graded sand with silt and gravel; some gravel, mostly sand, few fines; light brown; dry, compact; intermittent layers of silty sand with gravel and several large rock pieces (diameter of sampler).	SW-SM	159.5 17.5							
20							MC	99	50/5"			20.00 ft: 4-inch silty clay lens.
21.5												21.50 ft: Driller used hammer to break up large rock before continuing drilling.

Continued on Next Page

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Lane Klansek DATE: Mar 15, 2022
CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B2

CLIENT: Vulcan Materials Company
PROJECT: Los Banos Quarry Slope Stability
PROJECT NO: 31404284.000
LOCATION: Merced County, CA

DATE: March 15, 2022
INCLINATION: -90.0°
CONTRACTOR: Gulf Shore Exploration

ELEVATION: 177.0 ft (Ground)
COORDINATES: Lat: 37.0123° Long: -120.8924°
COORD SYS: Geographical Coordinates
HORZ DATUM: WGS84

DRILL RIG: CME-75
DRILL METHOD: Hollow Stem Auger

MATERIAL PROFILE

DESCRIPTION	USCS	ELEV. / DEPTH (ft)
(SW-SM) Well graded sand with silt and gravel; some gravel, mostly sand, few fines; light brown; dry, compact; intermittent layers of silty sand with gravel and several large rock pieces (diameter of sampler).	SW-SM	
(CL) Gravelly lean clay with sand; some gravel, little sand, mostly low plasticity fines; dark brown; w ~ PL, hard.	CL	149.5 27.5
(SC) Clayey sand with gravel; some gravel, some sand, little low plasticity fines; light reddish brown; moist, very dense; intermittent slate-like and quartz-like gravel or angular rock pieces.	SC	146.7 30.3
(GC) Clayey gravel with sand; mostly gravel, little sand, little low plasticity fines; dark brown; moist, dense.	GC	134.5 42.5
(GP-GC) Poorly graded gravel with clay and sand; mostly gravel, some sand, few low plasticity fines; dark brown; moist, dense; angular pieces of red rock.	GP-GC	131.2 45.8
(SC) Clayey sand with gravel; some gravel, some sand, and little low plasticity fines; dark brown; dry to moist, dense.	SC	129.5 47.5

SAMPLES

NUMBER	TYPE	REC %	BLOWS	N-VALUE
	MC	83	8-6-20/0"	
	MC	75	19-41/6"	
	MC	100	40-50/2"	
	MC	100	38-50/2"	
	MC	100	20-36-34	70

GROUNDWATER OBSERVATIONS

ADDITIONAL OBSERVATIONS

Continued on Next Page

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Lane Klansek DATE: Mar 15, 2022
CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B2

CLIENT: Vulcan Materials Company
PROJECT: Los Banos Quarry Slope Stability
PROJECT NO: 31404284.000
LOCATION: Merced County, CA

START DATE: March 15, 2022
INCLINATION: -90.0°
CONTRACTOR: Gulf Shore Exploration

ELEVATION: 177.0 ft (Ground)
COORDINATES: Lat: 37.0123° Long: -120.8924°
COORD SYS: Geographical Coordinates
HORZ DATUM: WGS84

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE				SAMPLES					GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. --------- DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE		
51 52	CME-75	Hollow Stem Auger	(SC) Clayey sand with gravel; some gravel, some sand, and little low plasticity fines; dark brown; dry to moist, dense.	SC				MC	100	5-43-34	77		
53 54 55			(GP-GC) Poorly graded gravel with clay and sand; mostly gravel, some sand, few low plasticity fines; brown; moist, compact.	GP-GC		124.5 52.5		MC	100	29-18-16	34		
56 57 58 59 60 61 62 63 64 65			(CL) Sandy lean clay; few gravel, few sand, mostly low plasticity fines; w < PL to w ~ PL, stiff, increasing percent volume of gravel with depth.	CL		121.2 55.8		MC	89	7-10-14	24		61.50 ft: Switched to new HSA drill bit due to rocky soils.
66 67			(GC) Clayey gravel with sand; mostly gravel, little sand, little low plasticity fines; dry, very dense, brown matrix soil with blue-gray gravel.	GC		111.8 65.2		MC	100	45-50/3"			
68 69 70			(SC) Clayey sand with gravel; some gravel, some sand, some low plasticity fines; brown; moist, very dense.	SC		109.5 67.5		MC	100	39-50/2"			
71 72			(SM) Silty sand with gravel; little gravel, mostly sand, little fines; brown; dry to moist, very dense.	SM		106.8 70.2							72.00 ft: Driller noted auger was stuck on a large rock.
73 74 75			(GC) Clayey gravel with sand; trace cobbles, mostly gravel, little sand, little low plasticity fines; reddish brown; dry to moist, very dense.	GC		104.5 72.5							

Continued on Next Page

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

WSP GOLDER

LOGGED: Lane Klansek DATE: Mar 15, 2022
CHECKED: Joel Broddon DATE: May 06, 2022

RECORD OF BOREHOLE: B2

CLIENT: Vulcan Materials Company
PROJECT: Los Banos Quarry Slope Stability
PROJECT NO: 31404284.000
LOCATION: Merced County, CA

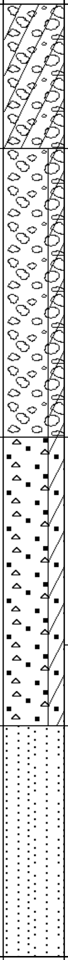
START DATE: March 15, 2022
INCLINATION: -90.0°
CONTRACTOR: Gulf Shore Exploration

ELEVATION: 177.0 ft (Ground)
COORDINATES: Lat: 37.0123° Long: -120.8924°
COORD SYS: Geographical Coordinates
HORZ DATUM: WGS84

DEPTH (ft): 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
CME-75	Hollow Stem Auger	(GC) Clayey gravel with sand; trace cobbles, mostly gravel, little sand, little low plasticity fines; reddish brown; dry to moist, very dense.	GC			MC	88	35-38-50/5"			
		(GP-GC) Poorly graded gravel with clay and sand; few cobbles, mostly gravel, few low plasticity fines; reddish brown; moist to wet, very dense.	GP-GC	99.5 77.5		MC	100	50/6"		18Mar22 ▼ 10:00 16Mar22 ▽ 15:00	
		(SW) Well graded sand with clay; few gravel, mostly sand, few low plasticity fines; brown with gray; wet, very dense.	SW-SC	94.5 82.5		MC	100	21-50/6"			
		(SW) Well graded sand with clay and gravel; little gravel, mostly sand, few low plasticity fines; multi-colored (brown, gray, red); wet, very dense.		90.9 86.1							
		(SP) Poorly graded sand; few gravel, mostly sand; brown; wet, dense.	SP	89.5 87.5		MC	22	8-16-35	51		
				85.5							
		End of hole at 91.5 ft. Groundwater monitoring well installed in borehole.									

STRATA PLOT



HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Lane Klansek DATE: Mar 15, 2022
CHECKED: Joel Broddon DATE: May 06, 2022

wsp GOLDER

WELL CONSTRUCTION DETAILS

BORING DESIGNATION: **B2**

INSTALLATION
DATE: 03/17/2022 BY: Gulfshore Construction Services Inc.

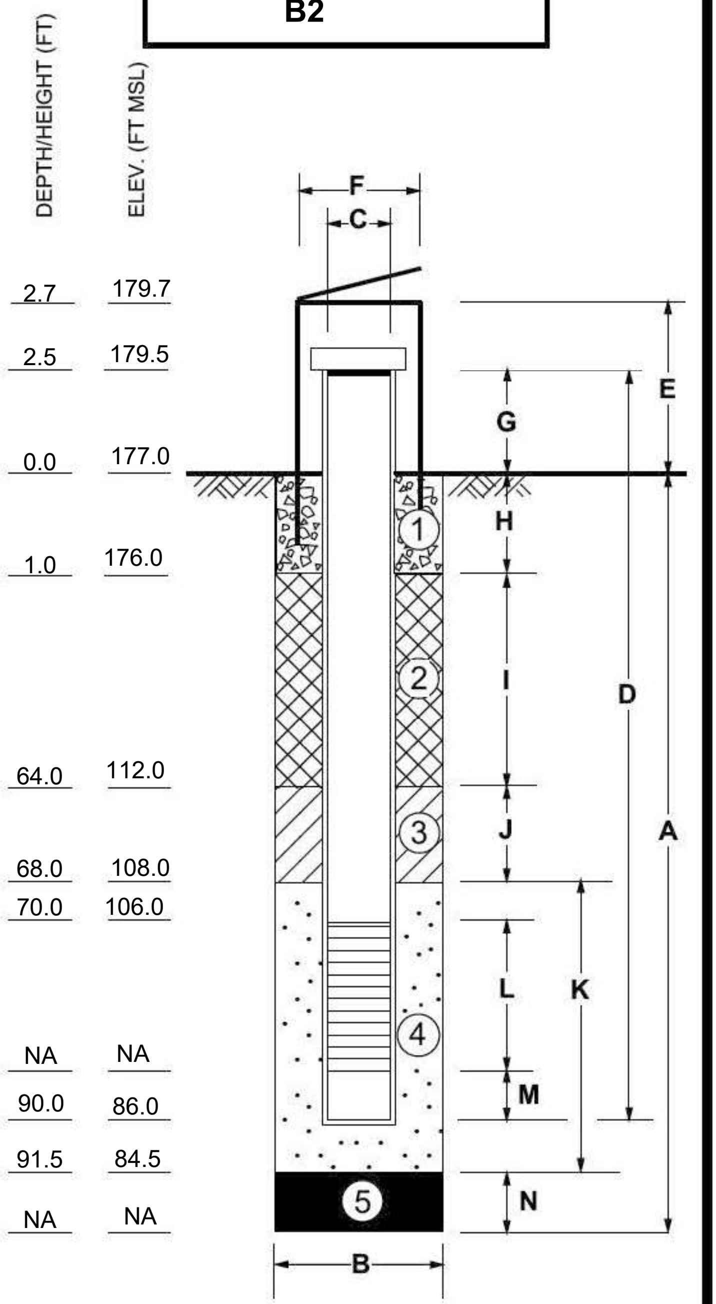
DIMENSIONS

A	Total Depth of Boring (ft.)	91.5
B	Borehole Diameter (in.)	8.0
C	Well Casing Diameter (in.)	2.0
D	Well Casing Length (ft.)	92.5
E	Protective Cover Height (ft.)	2.7
F	Protective Cover Diameter (in.)	8.5
G	Well Casing Height (ft.)	2.5
H	Annular Seal Interval (ft.)	0-1
I	Annular Seal Interval (ft.)	1-64
J	Annular Seal Interval (ft.)	64-68
K	Sand Pack Interval (ft.)	68-91.5
L	Well Casing Slotted Interval (ft.)	70-90
M	Well Casing End Cap or Sump (ft.)	NA
N	Bottom Material Interval (ft.)	NA
	Well Centralizer Depth(s) (ft.)	NA

MATERIALS DATA

Monument Footing	①	concrete
Annular Seal	②	cement grout
Annular Seal	③	hydrated bentonite chips
Sand Pack	④	#3 Monterey
Bottom Material	⑤	NA
Slotted Casing		0.020" machine slot
Well Casing		Sch. 40 PVC
Well Centralizers		stainless steel
Protective Cover		locking steel monument

WELL DESIGNATION
B2



SECTION VIEW
(not to scale)

NOTES:
14 bags of #3 Monterey Sand
2 bags of Bentonite chips for Bentonite Plug
3 Batches of grout (55 gal) = 35 gal of water + 7
50lbs bags of Portland + 1/4 bag of bentonite gel
8 bags of ready-mix for concrete pad

SITE: VMC Los Banos Sand and Gravel
PROJ. NO: 31404284.000
LOCATION: Los Banos, California
T.O.C. ELEV.: 179.7 ft
WELL PERMIT NO.: WP0018909

APPENDIX C

Geotechnical Laboratory Test Results

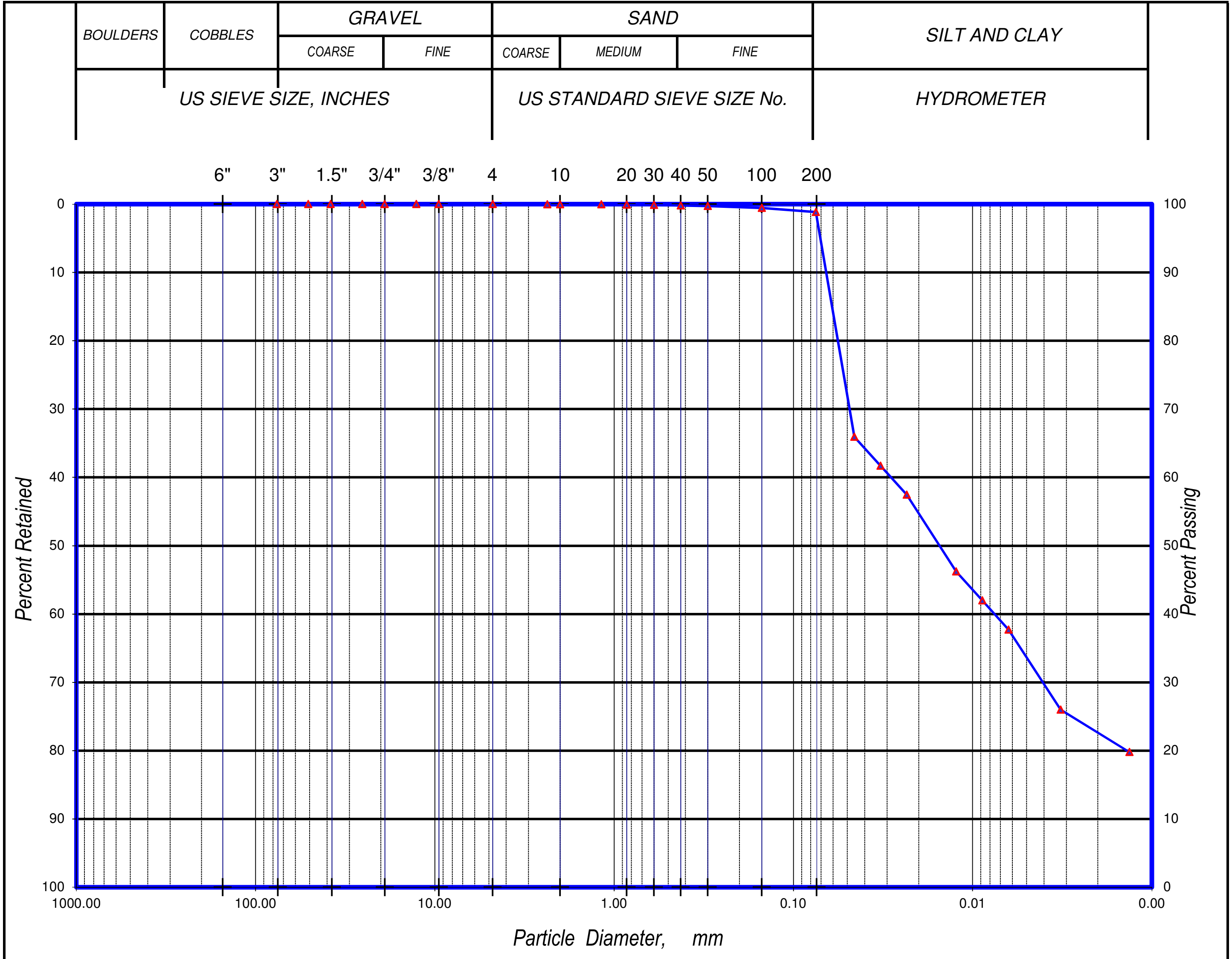
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client : GOLDER ASSOCIATES INC.
Project No: AU22.VMCLosBanos
Lab Sample No: **4830A**

Project Name: VMC LOS BANOS SAND & GRAVEL QUARRY SLOPE STABILITY ASSESSMENT
Report Date: April 14, 2022



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	B1, 80'	olive grey fat clay (CH)	0.0	1.2	98.8

Size Passing, mm D_{60} = 0.03 D_{30} = 0.00 D_{10} = N/A 5 micron (%) = 37

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 0.01

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

L : Labexcel \ Projects \ Client \ Client Name \ 4830 \ 4830A-ma
Print Date: 04/18/22
Entered By: PP
Reviewed By: MK
LSN: **4830A**

DCN: MA-rp (rev. 6/27/12)

DIRECT SHEAR REPORT

Consolidated - Drained Test

ASTM D- 3080

Client / Project Name: Golder Associates, Inc./ VMC Los Banos Sand & Gravel Quarry Slope Stability Assessment

Project No. : AU22.VCLosBanos

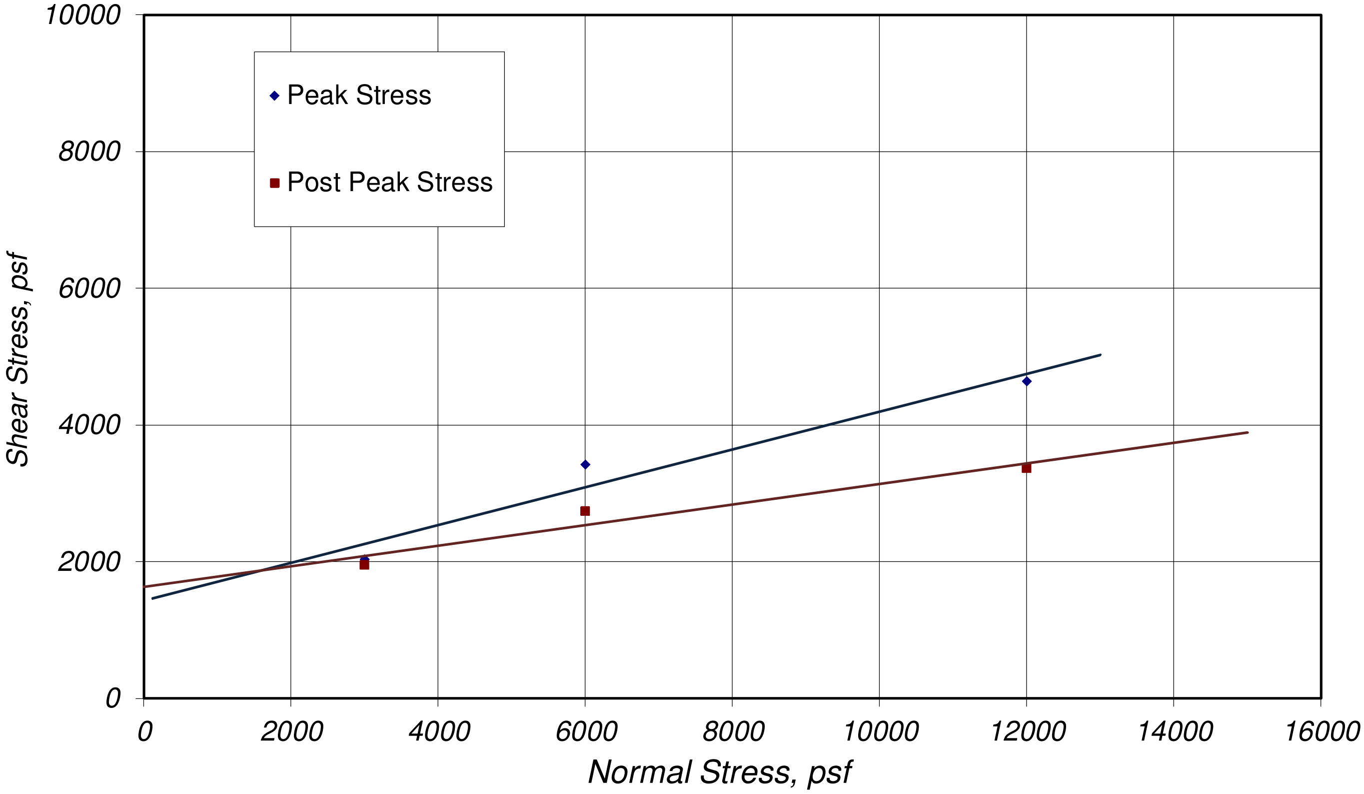
Lab Log: 4830A

Sample : B1, 80'

Soil Description: olive grey fat clay (CH)

Report Date: April 20, 2022

STRENGTH ENVELOPE



		Peak	Post Peak
Coefficient of Friction	:	0.277	0.150
Friction Angle	:	15.5	8.6
Cohesion, psf:	:	1430	1630

Point No.	Normal Stress psf	Shear Stress Peak psf	Shear Stress Post-Peak psf		Initial Water Content %	Initial Dry Density pcf	Final Water Content %	Final Dry Density pcf
1	3000	2035	1947		43.6	70.3	50.0	75.2
2	6000	3423	2733		43.5	68.4	51.6	75.4
3	12000	4637	3368		45.3	67.1	53.1	77.7

Horizontal Displacement Rate, in. / min. : 2E-04 *Sample Diameter, in.:* 2.50

Labexcel \ FORMS \ GLA Forms \ Reports \ AU22.VCLosBanos \ 4830A-SDS-RP"	Print Date:	Entered By:	Reviewed By:	LLN:
DCN: SDS-rp (rev. 03/23/10)	4/20/2022	PP	MK	**4830A**

DIRECT SHEAR REPORT

ASTM D- 3080

Client / Project Name:
Golder Associates, Inc./ VMC Los Banos Sand & Gravel Quarry Slope Stability Assessment

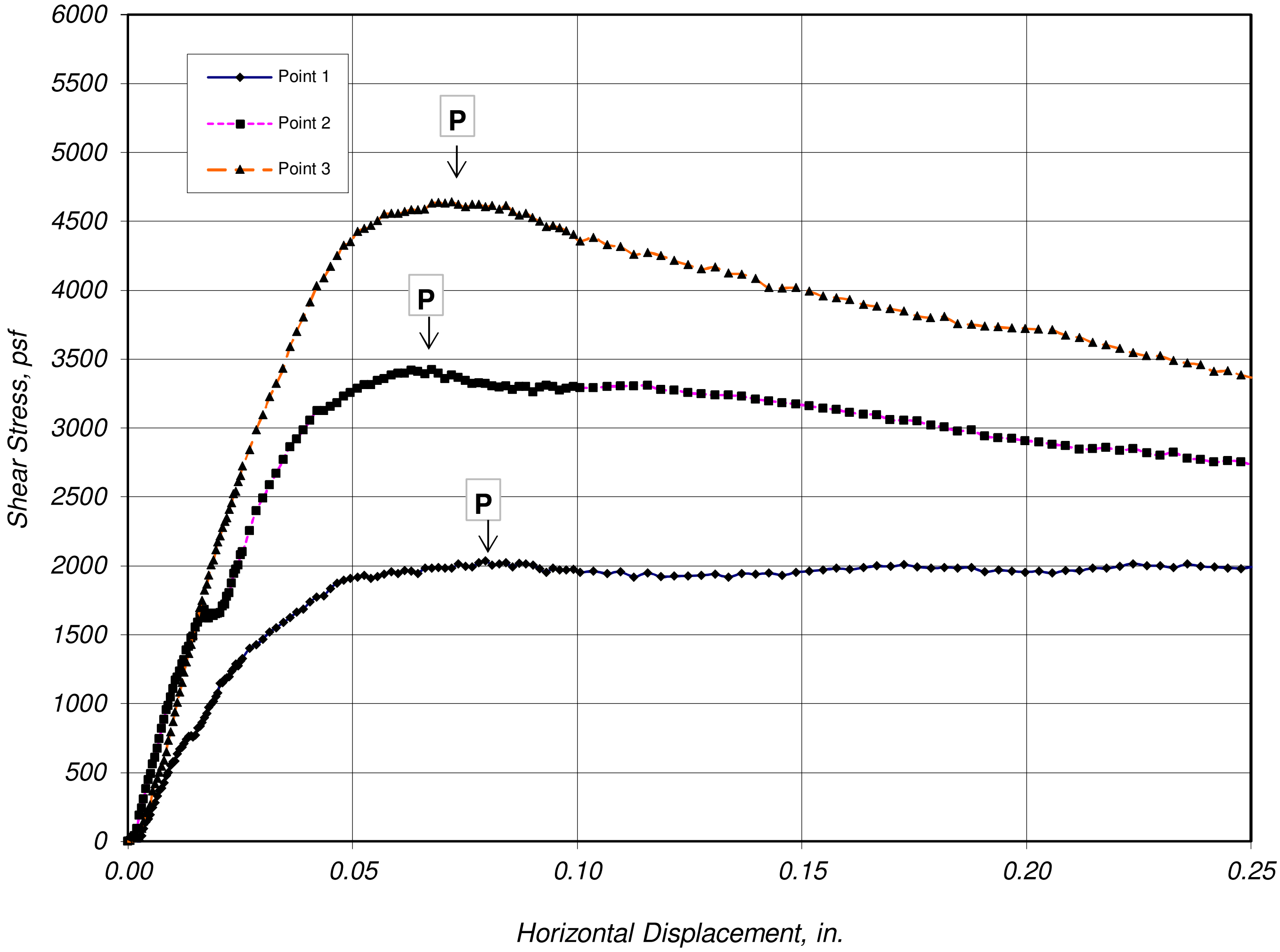
Project No. : AU22.VCLosBanos

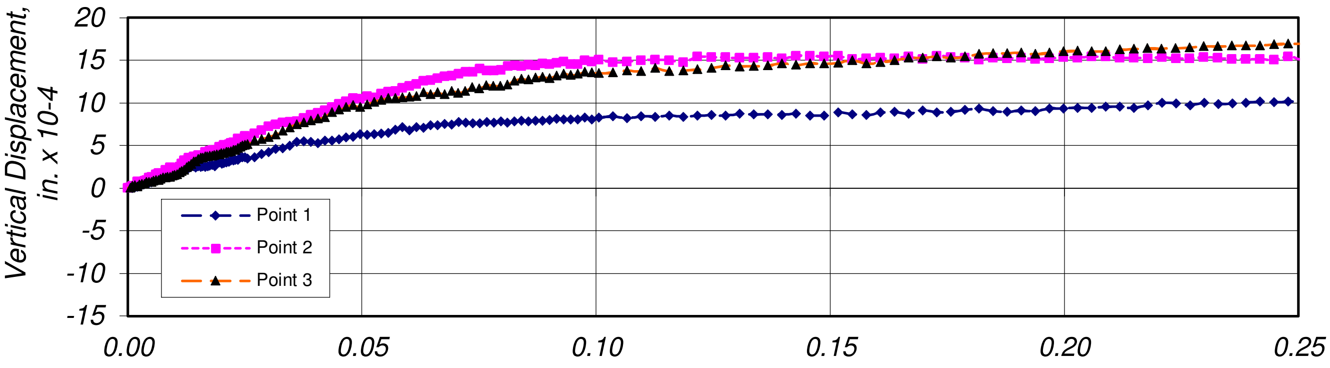
Lab Log: 4830A

Sample : B1, 80'

Soil Description: olive grey fat clay (CH)

Report Date: April 20, 2022





NORMAL STRESSES, psf : Point - 1 3000 Point - 2 6000 Point - 3 12000

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

Labexcel \ FORMS \ GLA Forms \ Reports \ AU22.VCLosBanos \ 4830A-SDS-RP"

Print Date: 4/20/2022

Entered By: PP

Reviewed By: MK

LLN: **4830A**

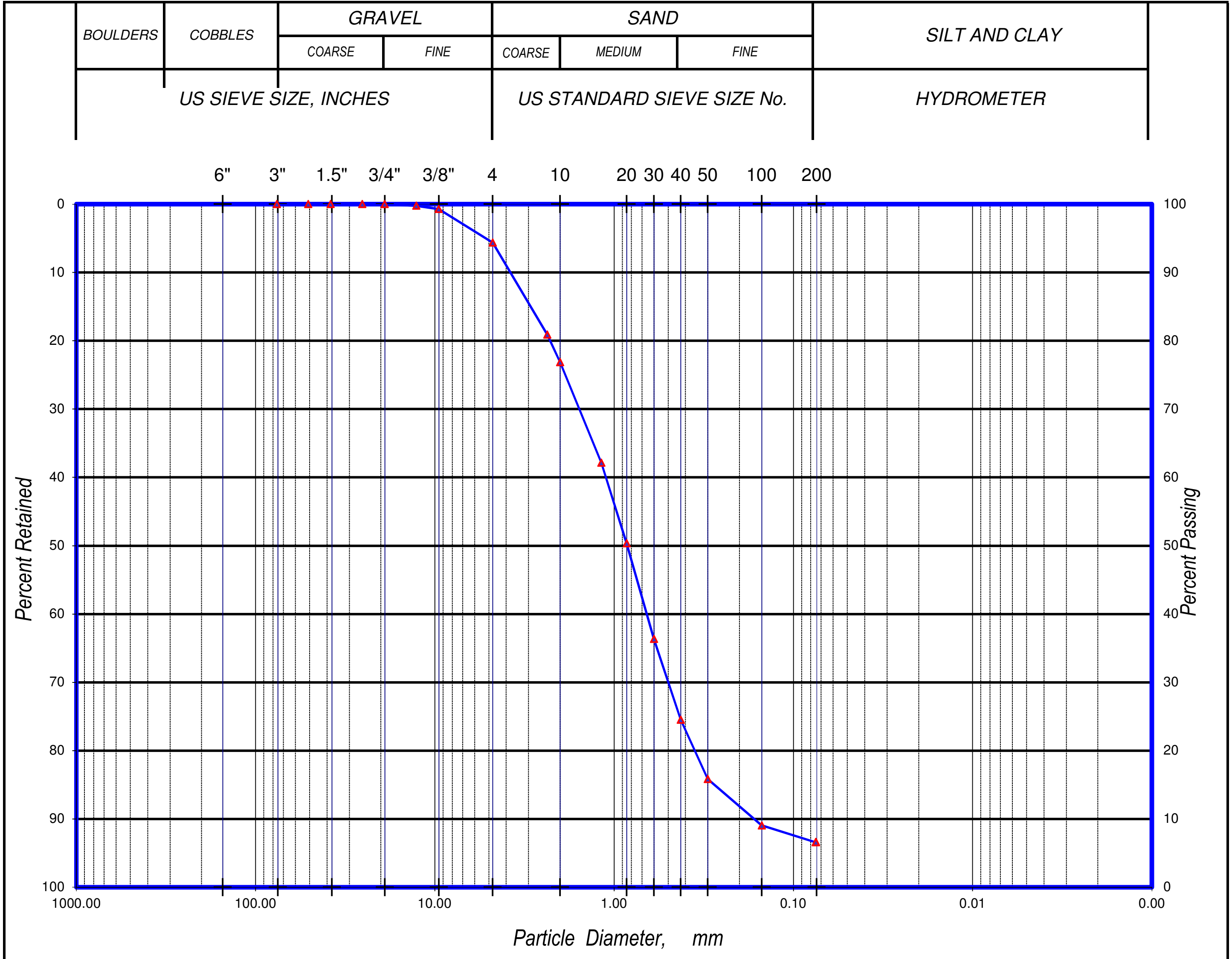
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client :	Project No:	Lab Sample No:
GOLDER ASSOCIATES INC.	AU22.VMCLosBanos	**4830B**

Project Name:	Report Date:
VMC LOS BANOS SAND & GRAVEL QUARRY SLOPE STABILITY ASSESSMENT	April 18, 2022



Symbol	Sample ID	* Description	% Gravel	% Sand	% Silt - Clay
▲	B2, 85'	brown well-graded sand w/ clay	5.6	87.8	6.6

Size Passing, mm D_{60} = 1.12 D_{30} = 0.51 D_{10} = 0.17

Coefficient of Curvature, C_c: 1.33 Coefficient of Uniformity, C_u: 6.53 Fineness Modulus = 3.02

* Visual Classification based on ASTM D-2488

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

L : Labexcel \ Projects \ Client \ Client Name \ 4830 \ 4830B-ma	Print Date:	Entered By:	Reviewed By:	LSN:
DCN: MA-rp (rev. 6/27/12)	04/18/22	PP	MK	**4830B**

Geo-Logic
ASSOCIATES

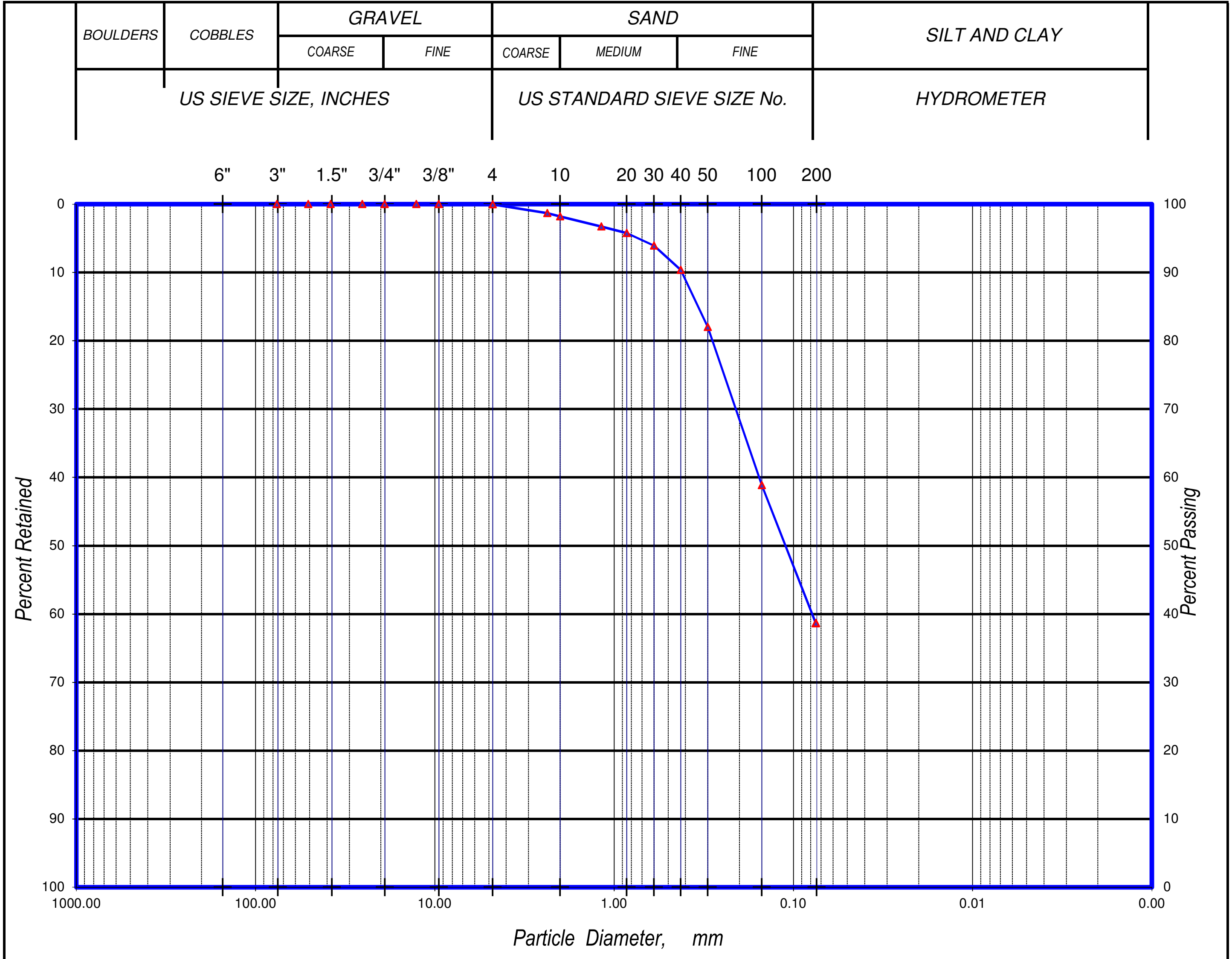
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client :	Project No:	Lab Sample No:
GOLDER ASSOCIATES INC.	AU22.VMCLosBanos	**4830C**

Project Name:	Report Date:
VMC LOS BANOS SAND & GRAVEL QUARRY SLOPE STABILITY ASSESSMENT	April 18, 2022



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	B1, 30'	brown clayey sand (SC)	0.0	61.3	38.7

Size Passing, mm D_{60} = 0.16 D_{30} = N/A D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 0.70

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

L : Labexcel \ Projects \ Client \ Client Name \ 4830 \ 4830C-ma	Print Date:	Entered By:	Reviewed By:	LSN:
DCN: MA-rp (rev. 6/27/12)	04/18/22	PP	MK	**4830C**

Geo-Logic
ASSOCIATES

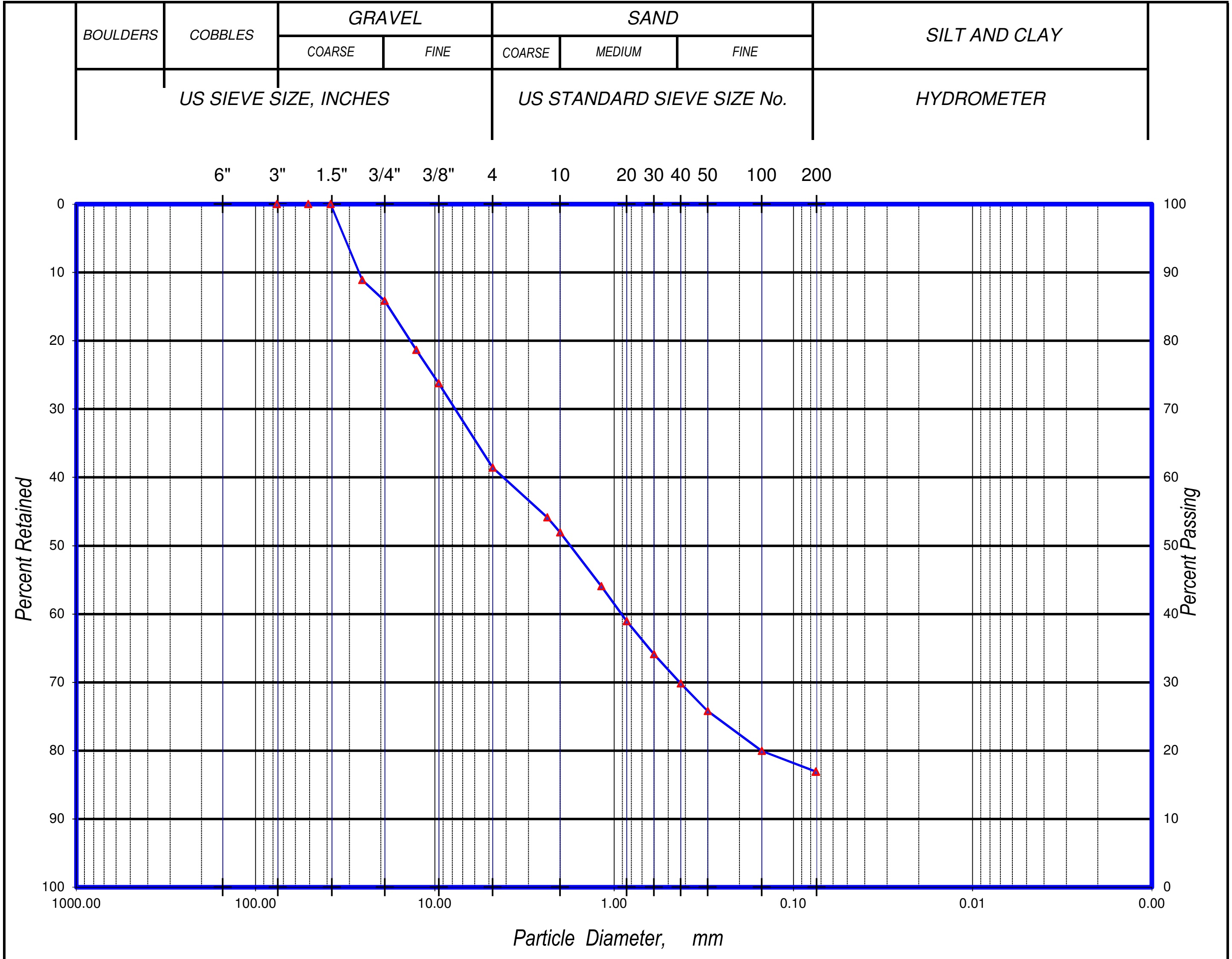
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client :	Project No:	Lab Sample No:
GOLDER ASSOCIATES INC.	AU22.VMCLosBanos	**4830D**

Project Name:	Report Date:
VMC LOS BANOS SAND & GRAVEL QUARRY SLOPE STABILITY ASSESSMENT	April 18, 2022



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	B2, 35'	brown clayey sand w/ gravel (SC)	38.6	44.5	16.9

Size Passing, mm D_{60} = 4.28 D_{30} = 0.43 D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 4.01

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

L : Labexcel \ Projects \ Client \ Client Name \ 4830 \ 4830D-ma	Print Date:	Entered By:	Reviewed By:	LSN:
DCN: MA-rp (rev. 6/27/12)	04/18/22	PP	MK	**4830D**

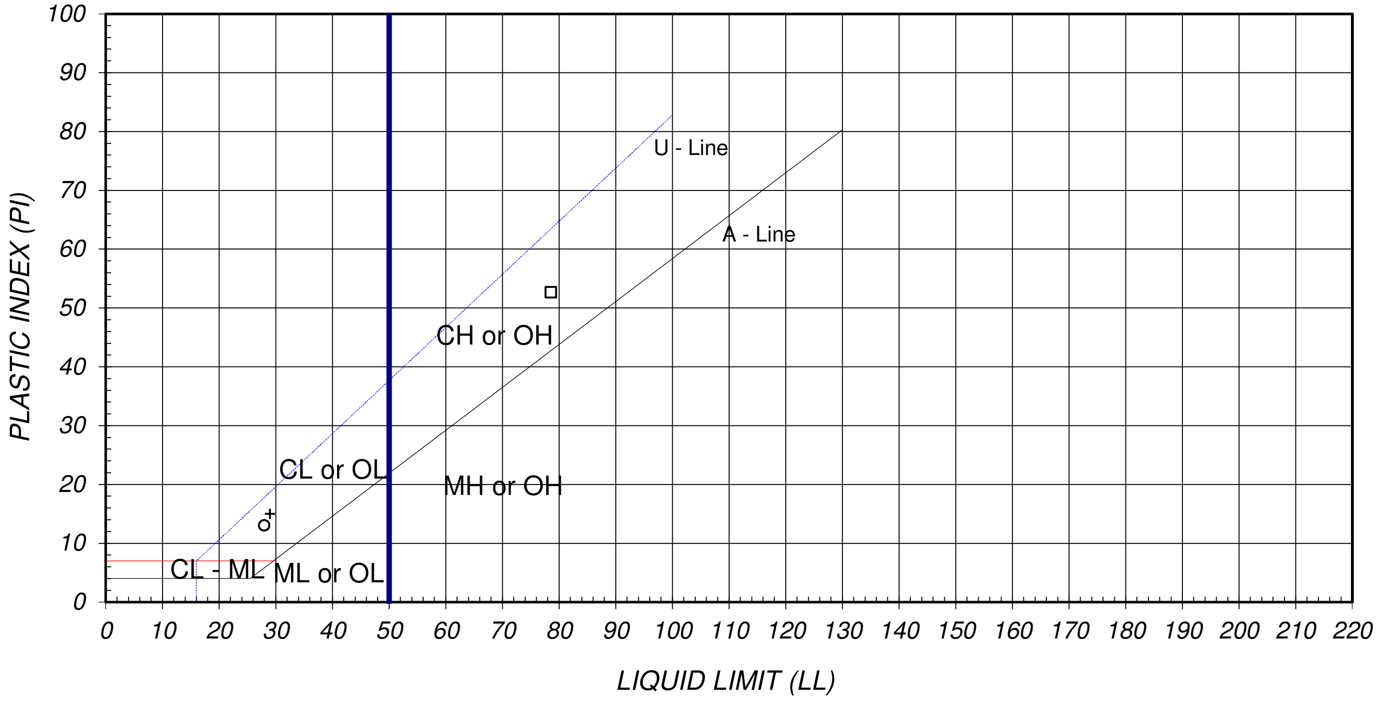
Geo-Logic
ASSOCIATES

ATTERBERG LIMITS
Summary Report
ASTM D-4318

Client : Golder Associates Inc.
Project No: AU22.VMCLosBanos
Lab Log No.: **4830**
Project Name: VMC Los Banos Sand & Gravel Quarry Slope Stability Assessment
Report Date: April 18, 2022

LSN	SYMBOL	SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX
4830A	☐	B1, 80'	olive grey fat clay (CH)	79	26	53
4830C	○	B1, 30'	brown clayey sand (SC)	28	15	13
4830D	+	B2, 35'	brown clayey sand w/ gravel (SC)	29	14	15

PLASTICITY CHART



L : Labexcel \ Projects \ Client \ Golder Associat \ AU22.VMCLosBa
Print Date: 04/18/22
Entered By: PP
Reviewed By: MK
LLN: **4830**

DCN: PI-rp (rev. 9/18/12)

Geo-Logic
ASSOCIATES

WATER CONTENT

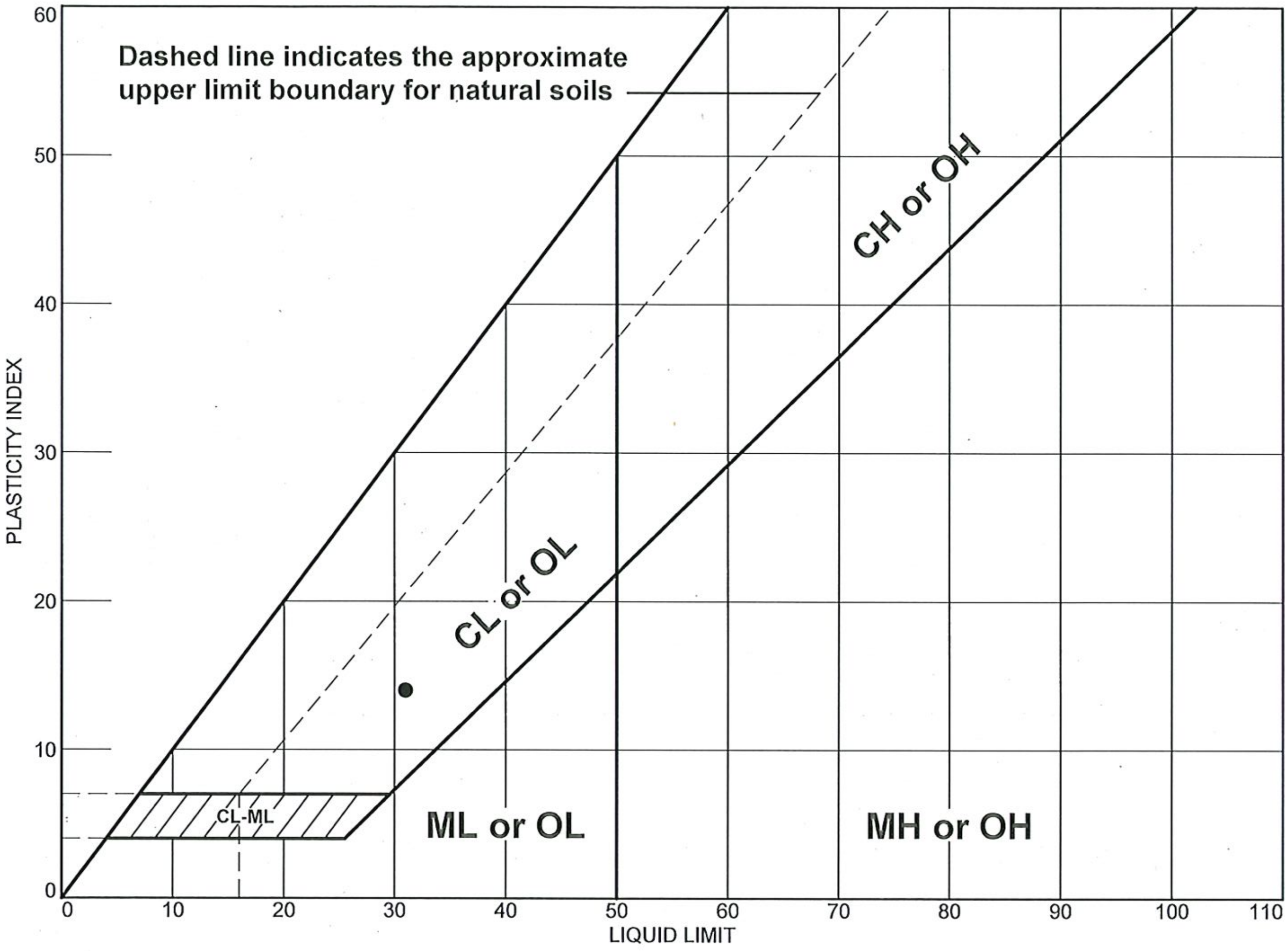
Client : Golder Associates Inc.
Project No: J22.VMCLosBanos
Lab Log: **4830**
Project Name: VMC Los Banos Sand & Gravel Quarry Slope Stability Assessment
Report Date: April 18, 2022

LSN	*Sample ID*	*Soil Classification ***	*Water Content %*				
4830A	B1, 80'	olive grey fat clay (CH)	46.3				
4830C	B1, 30'	brown clayey sand (SC)	17.3				
4830D	B2, 35'	brown clayey sand w/ gravel (SC)	7.4				

Notes: ** Classifications are based on ASTM D-2487 when appropriate test results are available and per ASTM D-2488 when visual

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		31	17	14			

Project No. 22-138 **Client:** Golder Associates

Project: VCM Los Banos

● **Location:** B-2, 60-61.5' **Depth:** - **Sample Number:** 77755

Remarks:

GS GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: VN **Checked By:** JML

APPENDIX D

Liquefaction Analysis Results

STANDARD PENETRATION TEST-BASED LIQUEFACTION ANALYSIS

References:

1 - Idriss, I.M. and Boulanger, R.W. (2008). *Soil Liquefaction During Earthquakes* , Earthquake Engineering Research Institute, EERI Publication MNO-12.

Project	**VMC Los Banos**
Test Boring No	**B2**

Test Boring Information:

Ground elevation		177 ft
Field water table elevation		99 ft
Depth to field water table		78 ft
Historic high water table elevation		138 ft
Depth to historic high ground water table		39 ft
Moist unit weight of soil	γ_m	130 pcf
Saturated unit weight of soil	γ_{sat}	135 pcf

Earthquake Information:

Earthquake magnitude	M_w	6.41
Peak horizontal ground surface acceleration	a_{max}	0.44 g
Number of equivalent cycles (Pradel, 1998)	N_c	6.7
Magnitude Scaling Factor	M_F	1.33

Input for N correction factors:

Is correction for non-standardized sampler required?	Yes	"No" or "Yes"
Borehole diameter	4 inch	
Energy ratio	79 %	

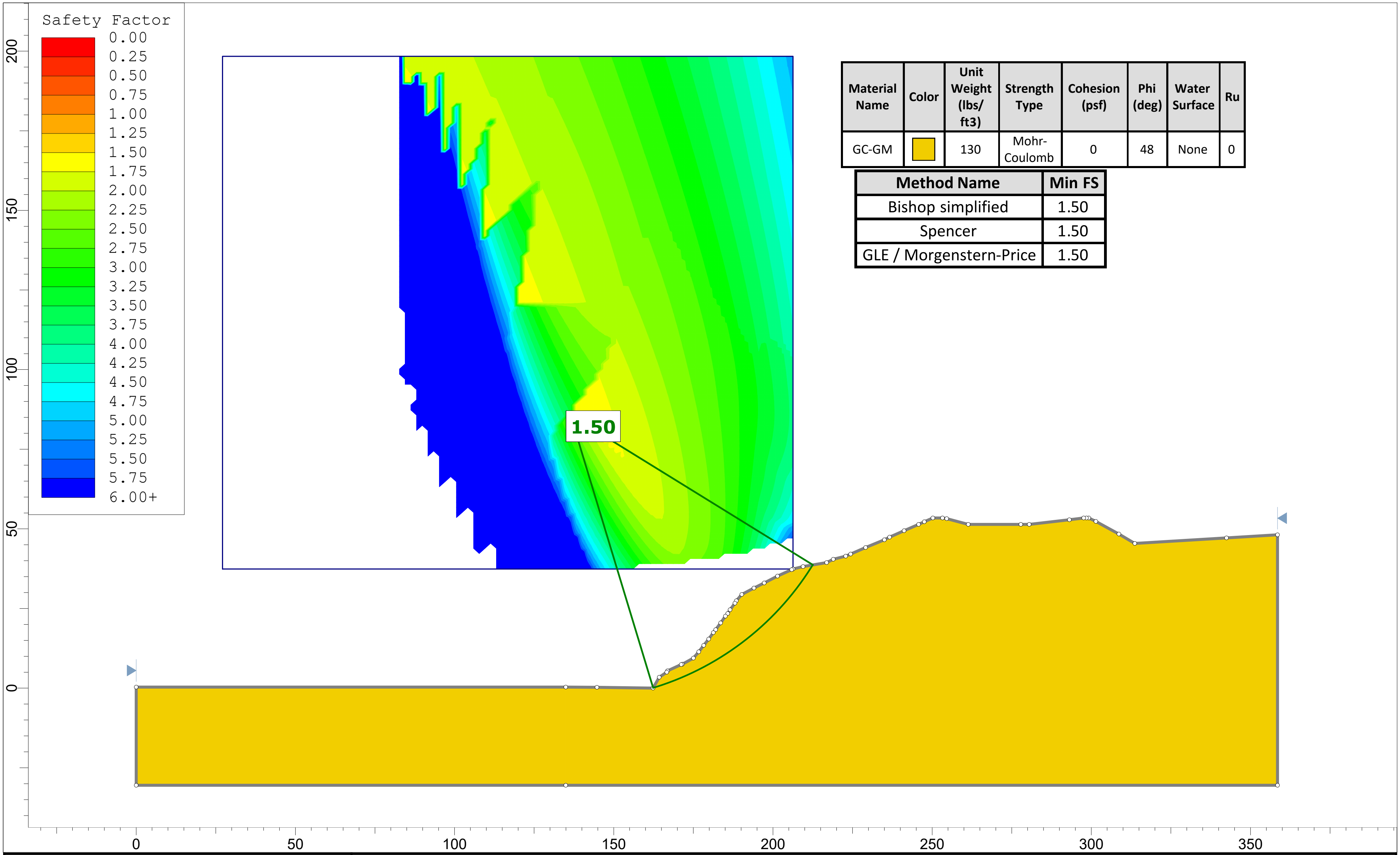
Factor of Safety Against Liquefaction

Based on Idriss & Boulanger (2008)

Depth, Z (ft)	N	Soil Type	Fines Content (%)	PI "< 7" or "> 7"	σ_{vc}, field (psf)	σ'_{vc}, field (psf)	σ_{vc}, HH (psf)	σ'_{vc}, HH (psf)	$\alpha(z)$	$\beta(z)$	r_d	CSR_{eq}	C_R	C_S	C_B	C_E	N_{60}	C_N	$N_{1,60}$	C_σ	K_σ	$\Delta(N_1)_{60}$	$(N_1)_{60cs}$	$CRR_{M=7.5}$ at σ'_{vc}=1	$(FS)_L$
5.75	90	silty sand	20	<7	747.5	747.5	747.5	747.5	-0.064	0.008	0.98	0.282	0.800	1.30	1.00	1.32	123	1.31	162	0.30	1.10	4.5	166.5	2.000	**UNSAT**
10.75	74	sandy gravel	10	<7	1397.5	1397.5	1397.5	1397.5	-0.151	0.017	0.96	0.275	0.850	1.30	1.00	1.32	108	1.12	120	0.30	1.10	1.1	121.2	2.000	**UNSAT**
15.75	52	sandy gravel	0	<7	2047.5	2047.5	2047.5	2047.5	-0.252	0.029	0.93	0.267	0.950	1.30	1.00	1.32	85	1.01	85	0.30	1.01	0.0	85.3	2.000	**UNSAT**
20.75	20	gravelly sand	50	<7	2697.5	2697.5	2697.5	2697.5	-0.366	0.041	0.90	0.258	0.950	1.20	1.00	1.32	30	0.92	27	0.18	0.96	5.6	33.1	0.772	**UNSAT**
25.75	16	gravelly sand	10	>7	3347.5	3347.5	3347.5	3347.5	-0.491	0.055	0.87	0.249	0.950	1.16	1.00	1.32	23	0.83	19	0.13	0.94	1.1	20.3	0.210	**UNSAT**
30.75	53	clayey sand	35	>7	3997.5	3997.5	3997.5	3997.5	-0.625	0.070	0.84	0.240	1.000	1.30	1.00	1.32	91	0.85	77	0.30	0.81	5.5	82.2	2.000	**UNSAT**
35.75	81	clayey sand	25	>7	4647.5	4647.5	4647.5	4647.5	-0.765	0.085	0.80	0.230	1.000	1.30	1.00	1.32	139	0.81	113	0.30	0.77	5.1	117.8	2.000	**UNSAT**
40.75	39	clayey sand	20	<7	5297.5	5297.5	5306.25	5197.05	-0.910	0.101	0.77	0.225	1.000	1.30	1.00	1.32	67	0.79	52	0.30	0.73	4.5	56.9	2.000	**8.69**
45.75	46	sandy gravel	20	<7	5947.5	5947.5	5981.25	5560.05	-1.056	0.117	0.74	0.227	1.000	1.30	1.00	1.32	79	0.76	60	0.30	0.71	4.5	64.5	2.000	**8.39**
50.75	48	clayey sand	20	<7	6597.5	6597.5	6656.25	5923.05	-1.201	0.133	0.71	0.227	1.000	1.30	1.00	1.32	82	0.74	61	0.30	0.70	4.5	65.4	2.000	**8.18**
55.75	21	sandy gravel	10	<7	7247.5	7247.5	7331.25	6286.05	-1.343	0.148	0.67	0.225	1.000	1.21	1.00	1.32	33	0.66	22	0.14	0.84	1.1	23.2	0.252	**1.26**
60.75	15	silty clay	80	>7	7897.5	7897.5	8006.25	6649.05	-1.480	0.163	0.65	0.222	1.000	1.15	1.00	1.32	23	0.58	13	0.10	0.88	5.5	18.6	0.190	**N/A**
65.75	66	clayey gravel	25	<7	8547.5	8547.5	8681.25	7012.05	-1.609	0.176	0.62	0.219	1.000	1.30	1.00	1.32	113	0.69	78	0.30	0.65	5.1	83.3	2.000	**7.86**
70.75	88	clayey sand	25	<7	9197.5	9197.5	9356.25	7375.05	-1.728	0.188	0.59	0.215	1.000	1.30	1.00	1.32	151	0.68	102	0.30	0.63	5.1	107.4	2.000	**7.81**
75.75	58	clayey gravel	15	<7	9847.5	9847.5	10031.3	7738.05	-1.834	0.199	0.57	0.212	1.000	1.30	1.00	1.32	99	0.67	66	0.30	0.62	3.3	69.5	2.000	**7.76**
80.75	56	gravel	10	<7	10511.3	10339.7	10706.3	8101.05	-1.927	0.208	0.55	0.209	1.000	1.30	1.00	1.32	96	0.66	63	0.30	0.60	1.1	64.3	2.000	**7.71**
85.75	67	sand	6.6	<7	11186.3	10702.7	11381.3	8464.05	-2.004	0.215	0.53	0.206	1.000	1.30	1.00	1.32	115	0.65	75	0.30	0.59	0.1	74.9	2.000	**7.66**
90.75	32	sand	6.6	<7	11861.3	11065.7	12056.3	8827.05	-2.065	0.220	0.52	0.203	1.000	1.30	1.00	1.32	55	0.65	35	0.27	0.62	0.1	35.5	1.238	**5.00**

APPENDIX E

Slope Stability Analysis Results



Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
GC-GM	🟨	130	Mohr-Coulomb	0	48	None	0

Method Name	Min FS
Bishop simplified	1.50
Spencer	1.50
GLE / Morgenstern-Price	1.50

WSP GOLDER

SLIDEINTERPRET 9.011

Project
Vulcan Los Banos Quarry

Back-Calculation of GC-GM Properties

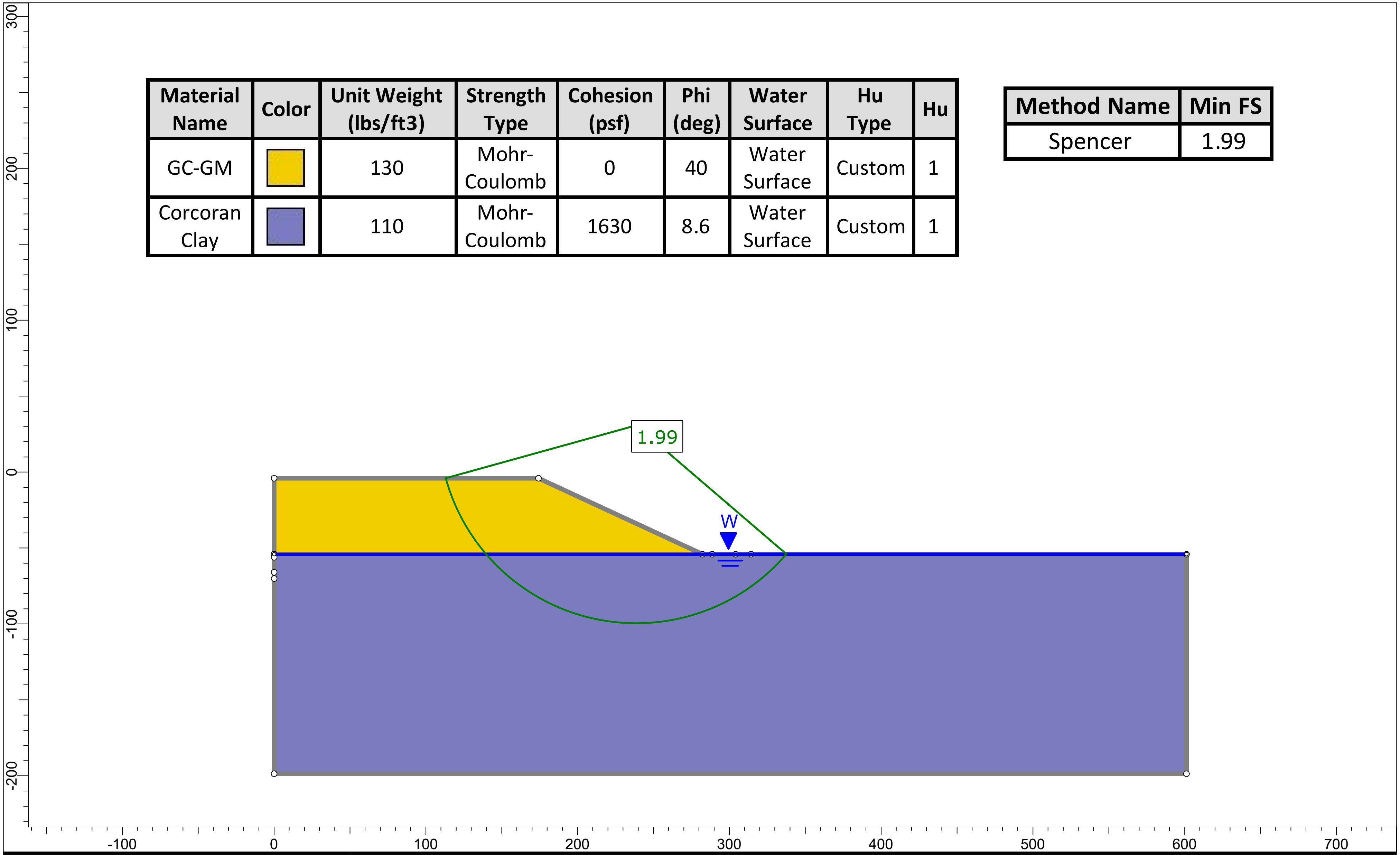
Scenario
-

Drawn By
MG

Company
Golder Associates USA Inc

Date
October 2022

File Name
Circular Failure, Static



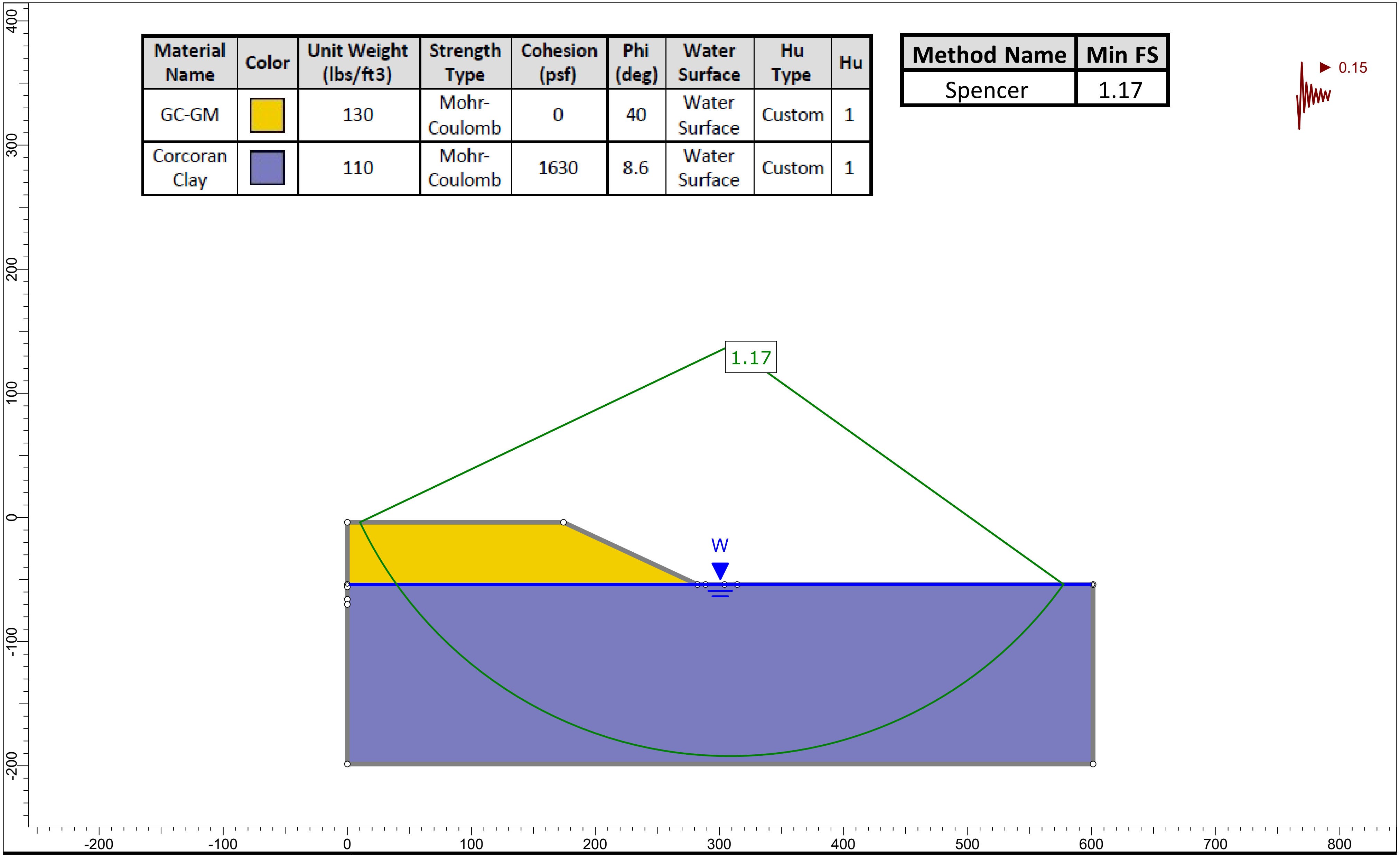
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.99

WSP GOLDER

SLIDEINTERPRET 9.002

Project	Vulcan Los Banos Quarry		
Slope and pit floor underlain by Corcoran clay, groundwater level at pit floor		*Scenario*	1 (Static)
Drawn By	MG	*Company*	Golder Associates USA Inc.
Date	October 2022	*File Name*	Case A



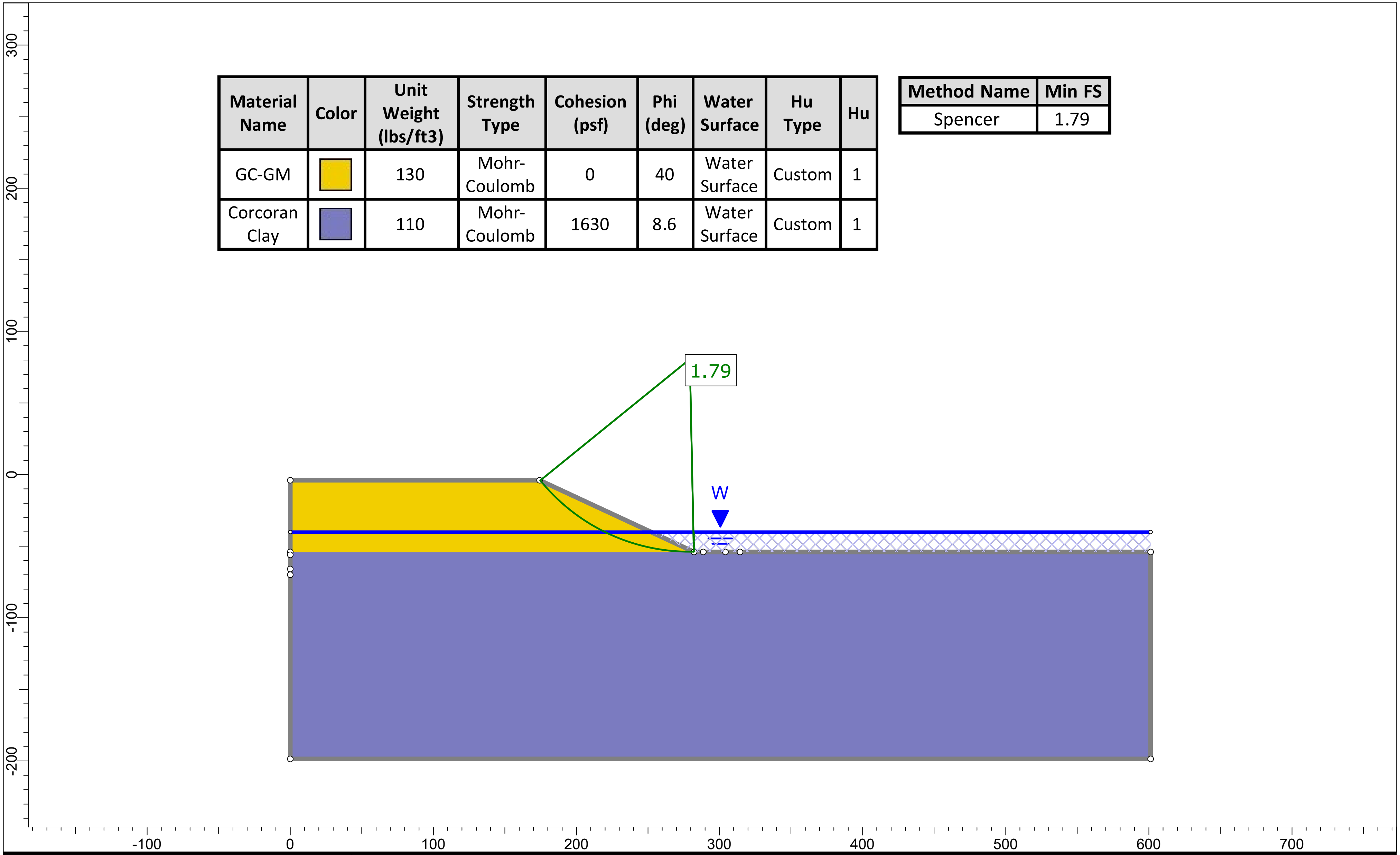
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.17

wsp GOLDER

SLIDEINTERPRET 9.002

Project	Vulcan Los Banos Quarry
Slope and pit floor underlain by Corcoran clay, groundwater level at pit floor	*Scenario* 1 (Pseudo-static)
Drawn By MG	*Company* Golder Associates USA Inc.
Date October 2022	*File Name* Case A



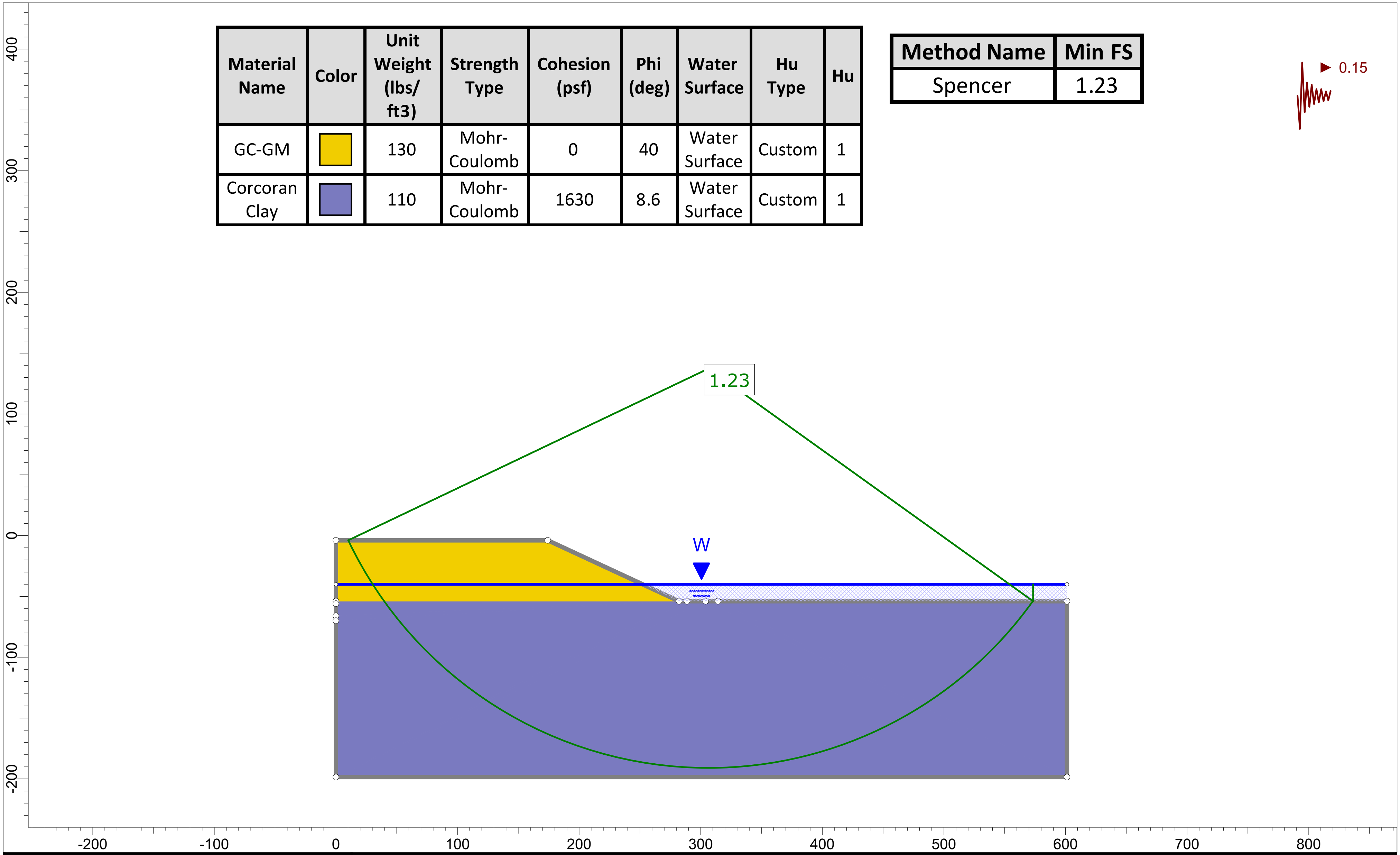
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.79

wsp GOLDER

SLIDEINTERPRET 9.002

Project	Vulcan Los Banos Quarry		
Same as Scenario 1 but groundwater at historical high level		*Scenario*	2 (Static)
Drawn By	MG	*Company*	Golder Associates USA Inc.
Date	October 2022	*File Name*	Case A



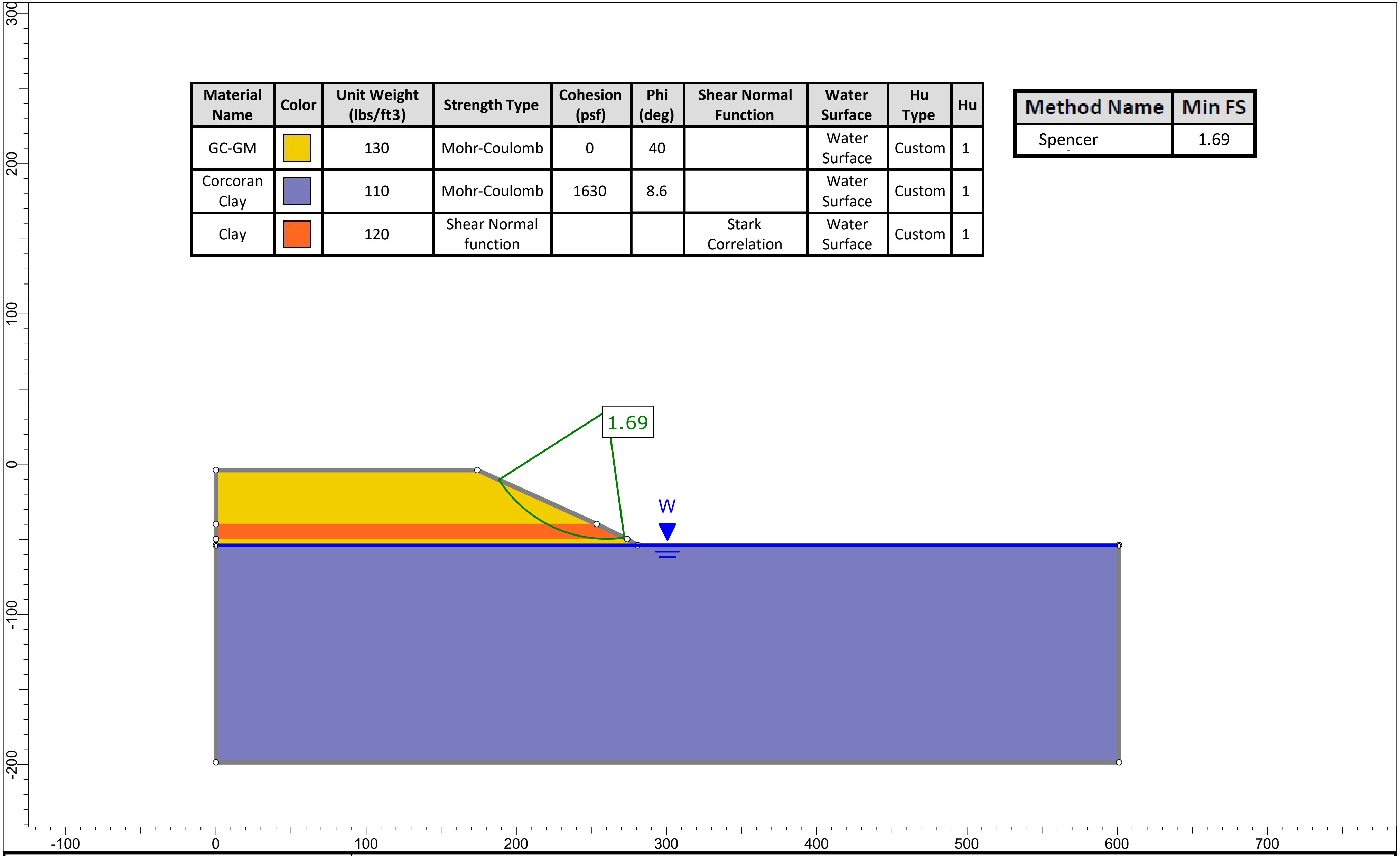
Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.23

wsp GOLDER

SLIDEINTERPRET 9.002

Project Vulcan Los Banos Quarry	
Same aas Scenario 1 but groundwater at historical high level	2 (Pseudo-static)
Drawn By MG	*Company* Golder Associates USA Inc.
Date October 2022	*File Name* Case A

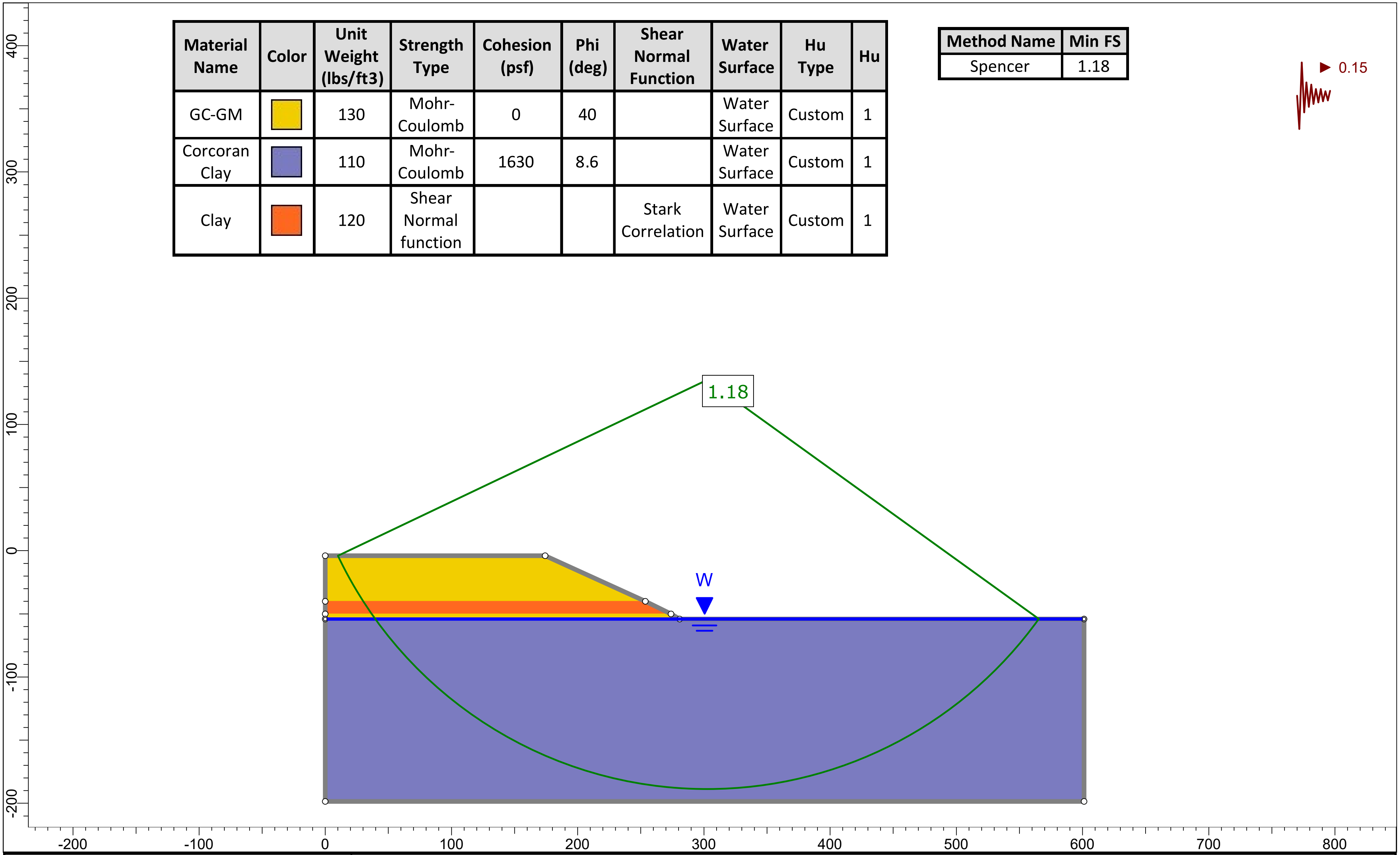


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.69

Project	Vulcan Los Banos Quarry
Group	Same as Scenario 1 but 10-foot thick alluvial clay layer in slope (circular shear surface)
Scenario	3 (Static)
Drawn By	MG
Company	Golder Associates USA Inc.
Date	October 2022
File Name	Case A

SLIDEINTERPRET 9.002



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.18

WSP GOLDER

Project Vulcan Los Banos Quarry

Group Same as Scenario 1 but 10-foot thick alluvial clay layer in slope (circular shear surface)

Scenario 3 (Pseudo-static)

Drawn By MG

Company Golder Associates USA Inc.

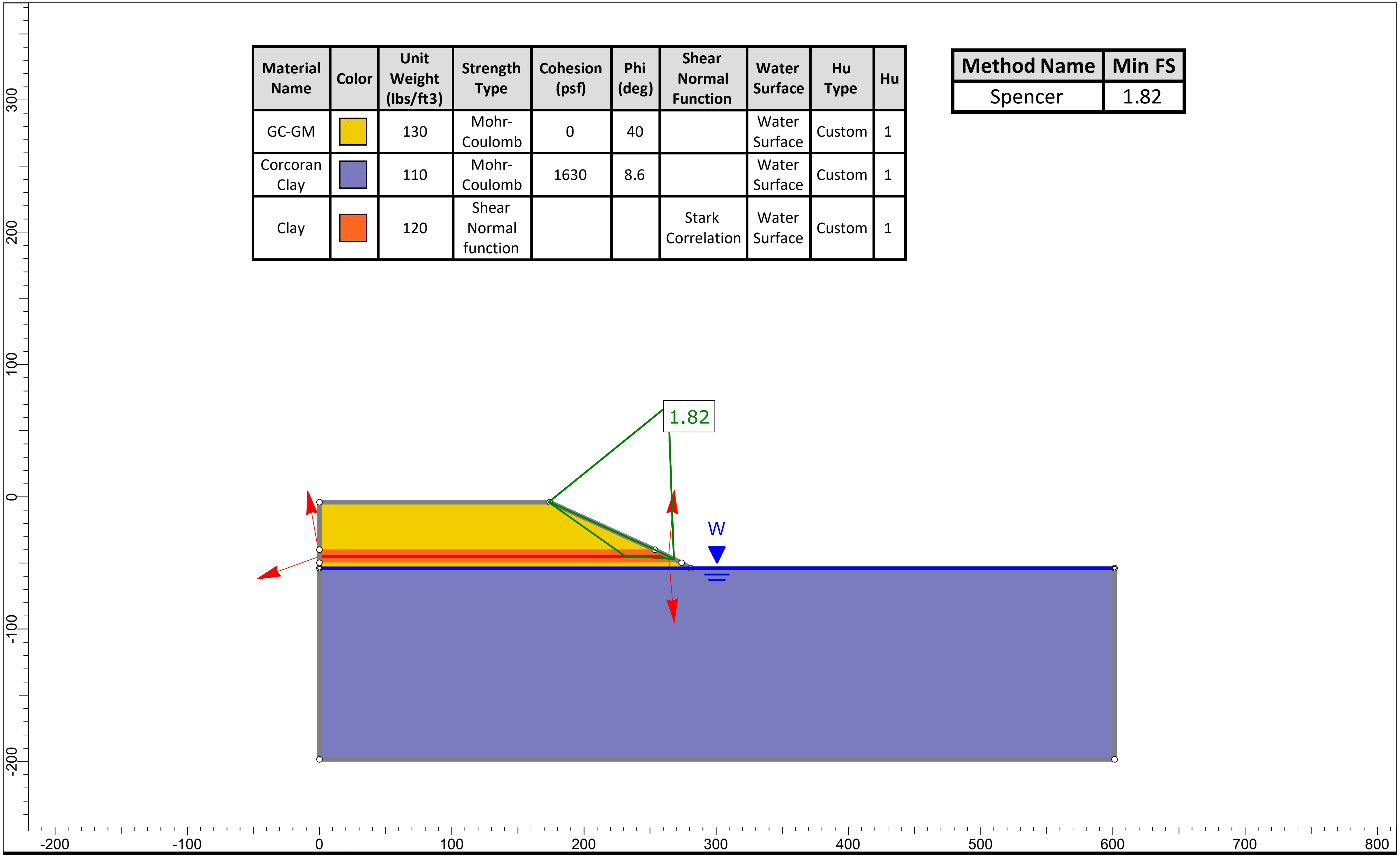
Date October 2022

File Name Case A

SLIDEINTERPRET 9.002

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.82



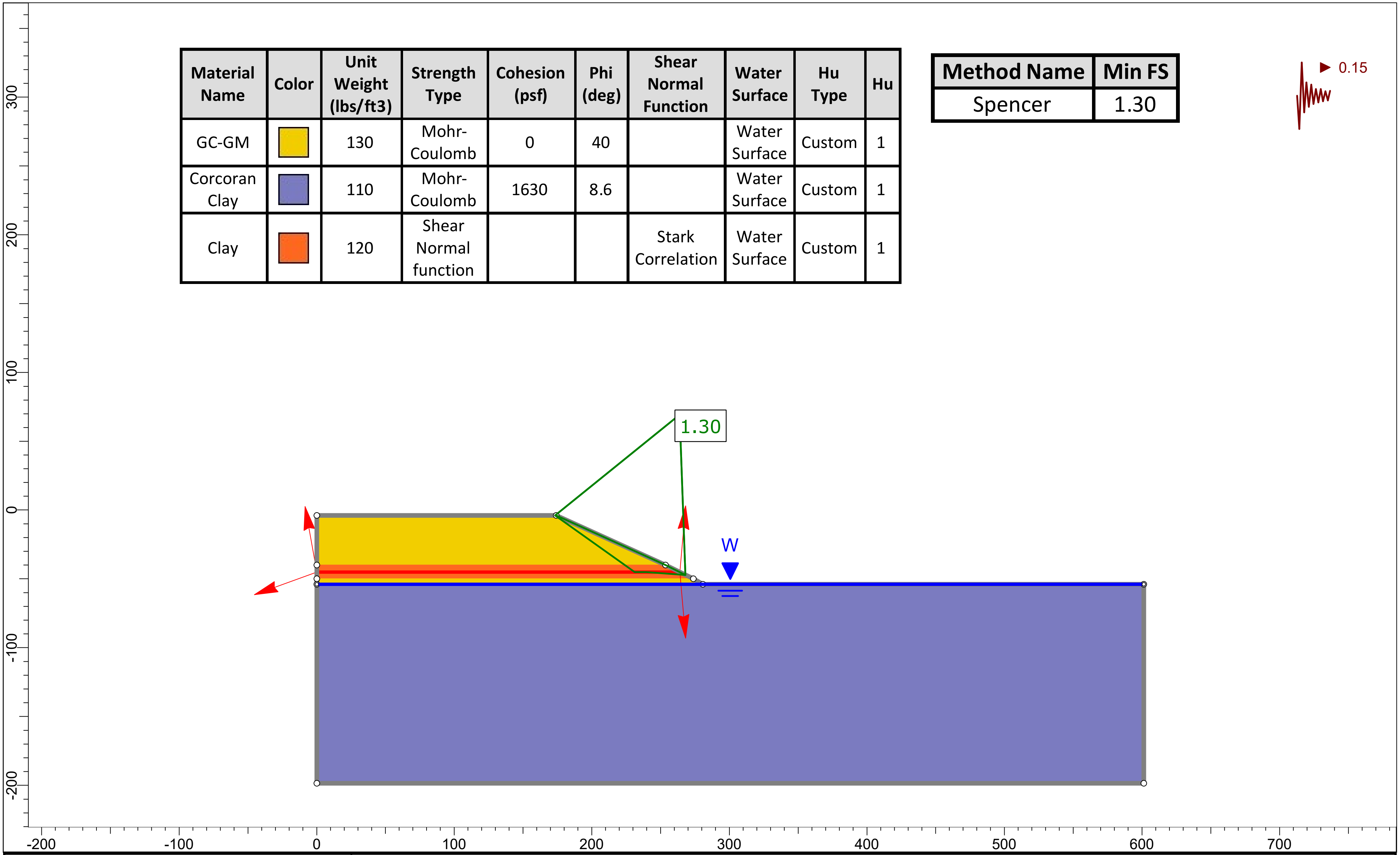
WSP GOLDER

Project	Vulcan Los Banos Quarry
Group	Same as Scenario 3 but noncircular shear surface
Scenario	4 (Static)
Drawn By	MG
Company	Golder Associates USA Inc.
Date	October 2022
File Name	Case A

SLIDEINTERPRET 9.002

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.30



wsp GOLDER

SLIDEINTERPRET 9.002

Project Vulcan Los Banos Quarry

Group Same as Scenario 3 but noncircular shear surface

Scenario 4 (Pseudo-static)

Drawn By MG

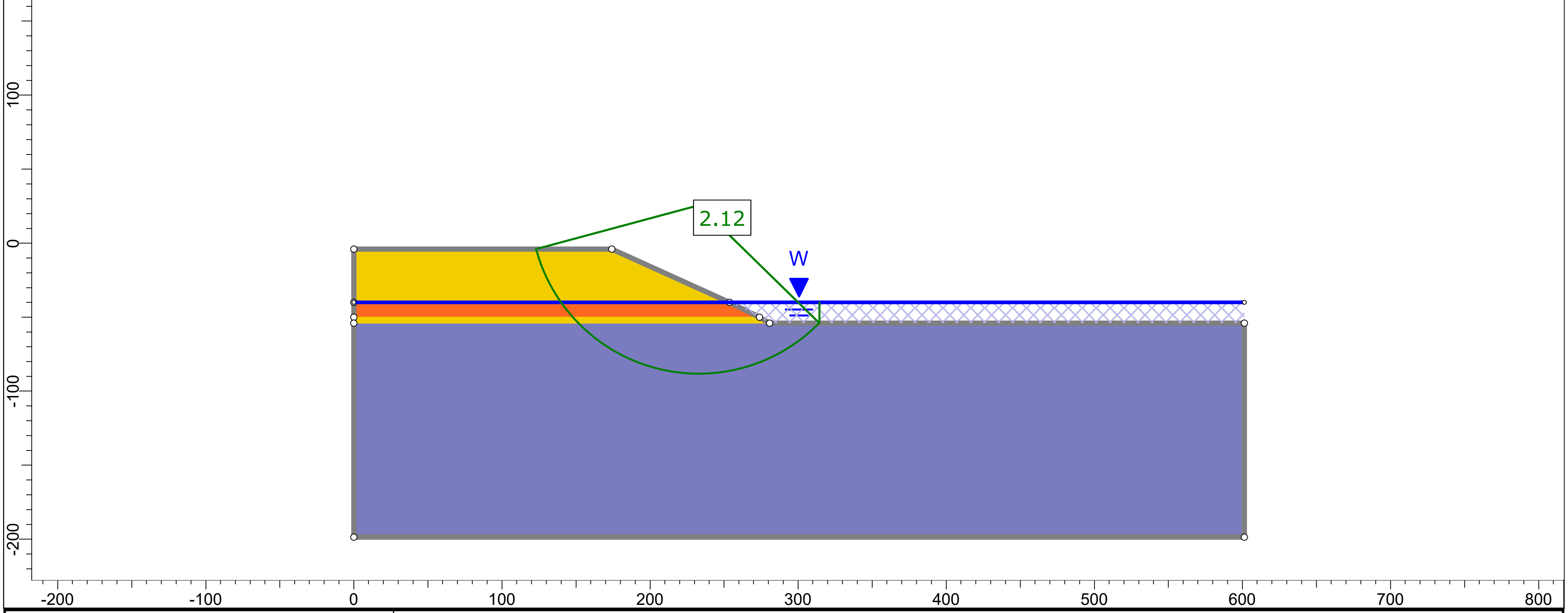
Company Golder Associates USA Inc.

Date October 2022

File Name Case A

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

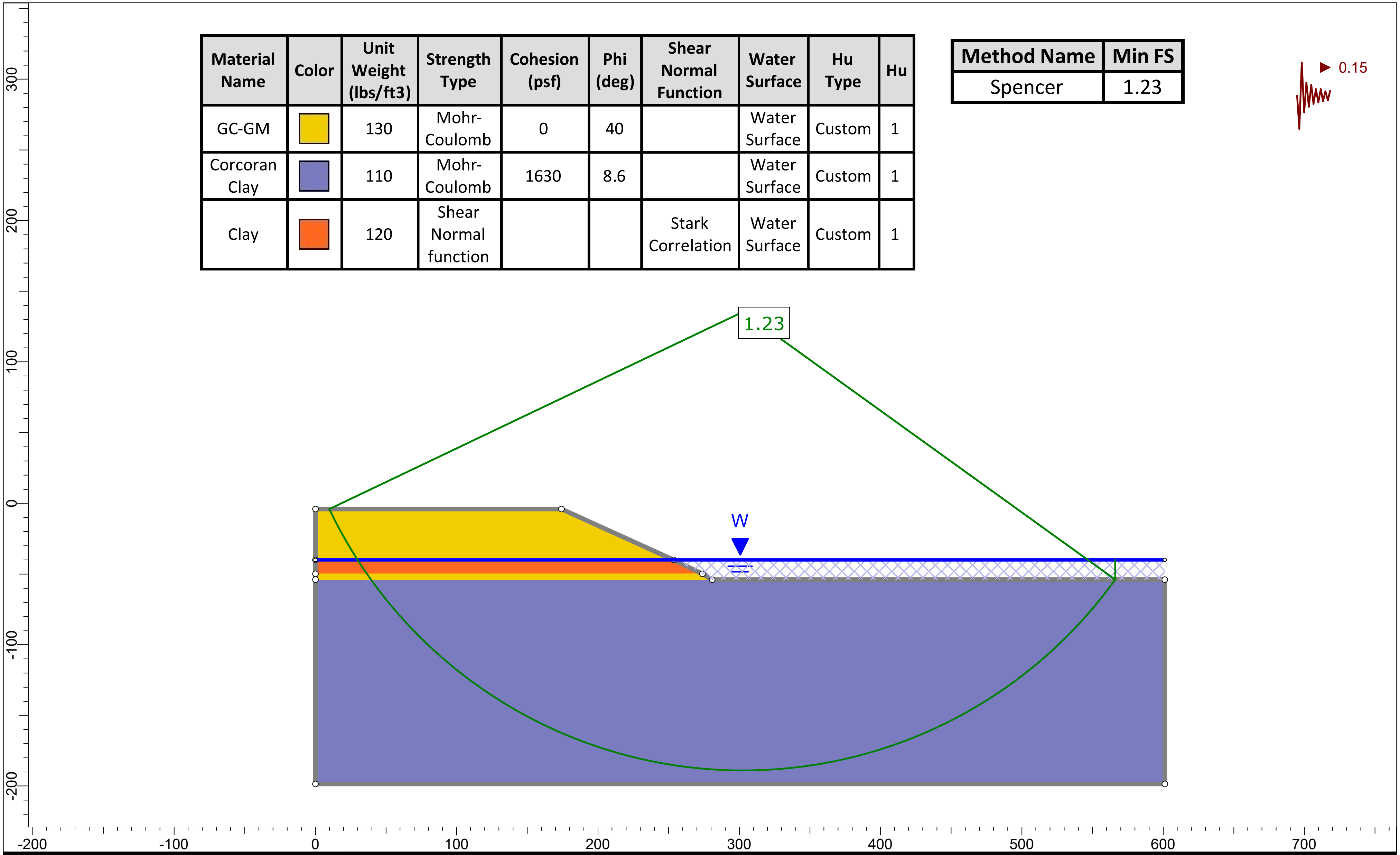
Method Name	Min FS
Spencer	2.12



WSP GOLDER

Project	Vulcan Los Banos Quarry		
Group	Same as Scenario 3 but groundwater at historical high level	*Scenario*	5 (Static)
Drawn By	MG	*Company*	Golder Associates USA Inc.
Date	October 2022	*File Name*	Case A

SLIDEINTERPRET 9.002

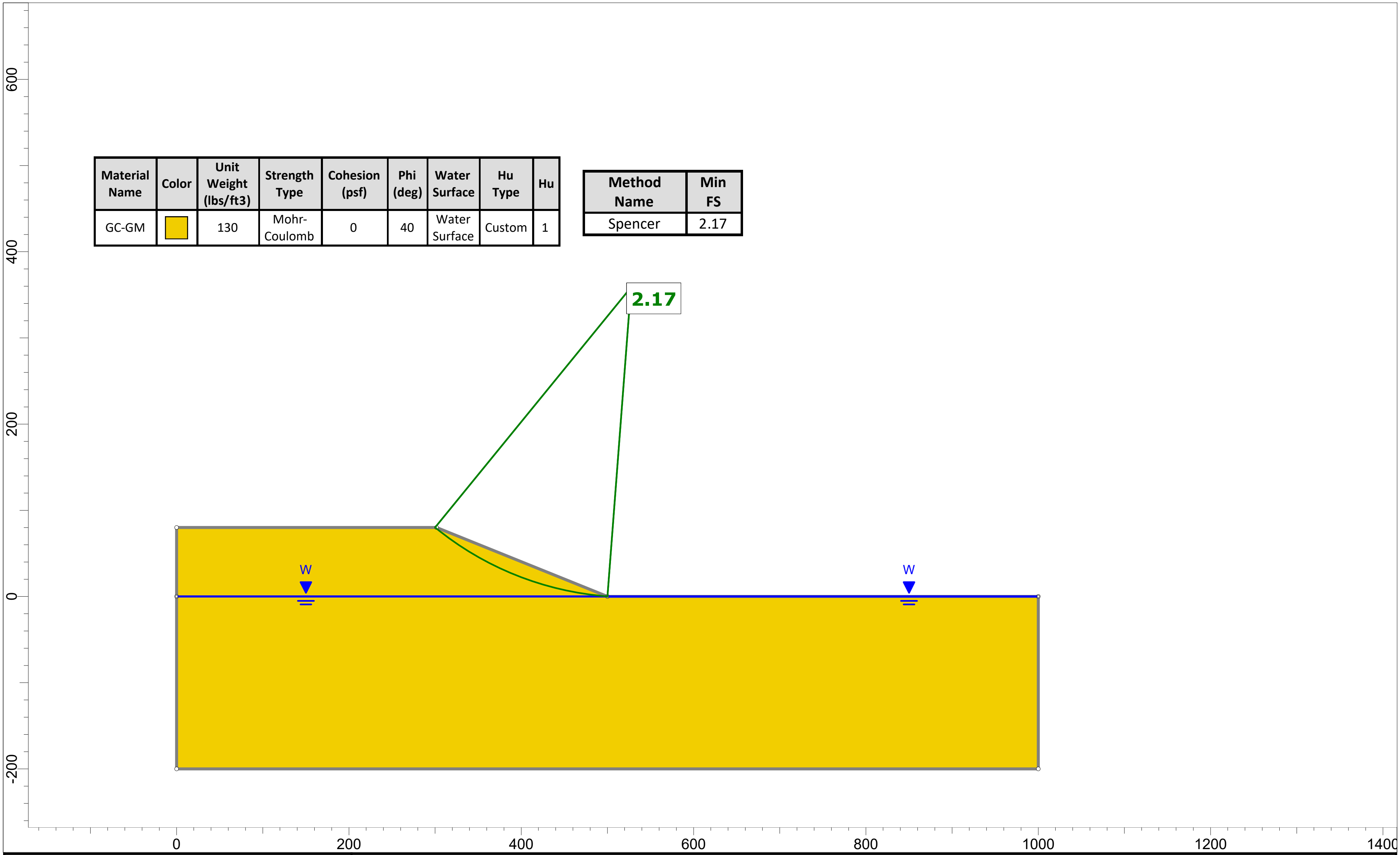


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Corcoran Clay	🟪	110	Mohr-Coulomb	1630	8.6		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.23

Project	Vulcan Los Banos Quarry
Group	Same as Scenario 3 but groundwater at historical high level
Scenario	5 (Pseudo-Static)
Drawn By	MG
Company	Golder Associates USA Inc.
Date	October 2022
File Name	Case A

SLIDEINTERPRET 9.002



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1

Method Name	Min FS
Spencer	2.17

WSP GOLDER

SLIDEINTERPRET 9.011

Project
Vulcan Los Banos Quarry

Slope and pit floor underlain by alluvial sand/gravel, groundwater at pit level

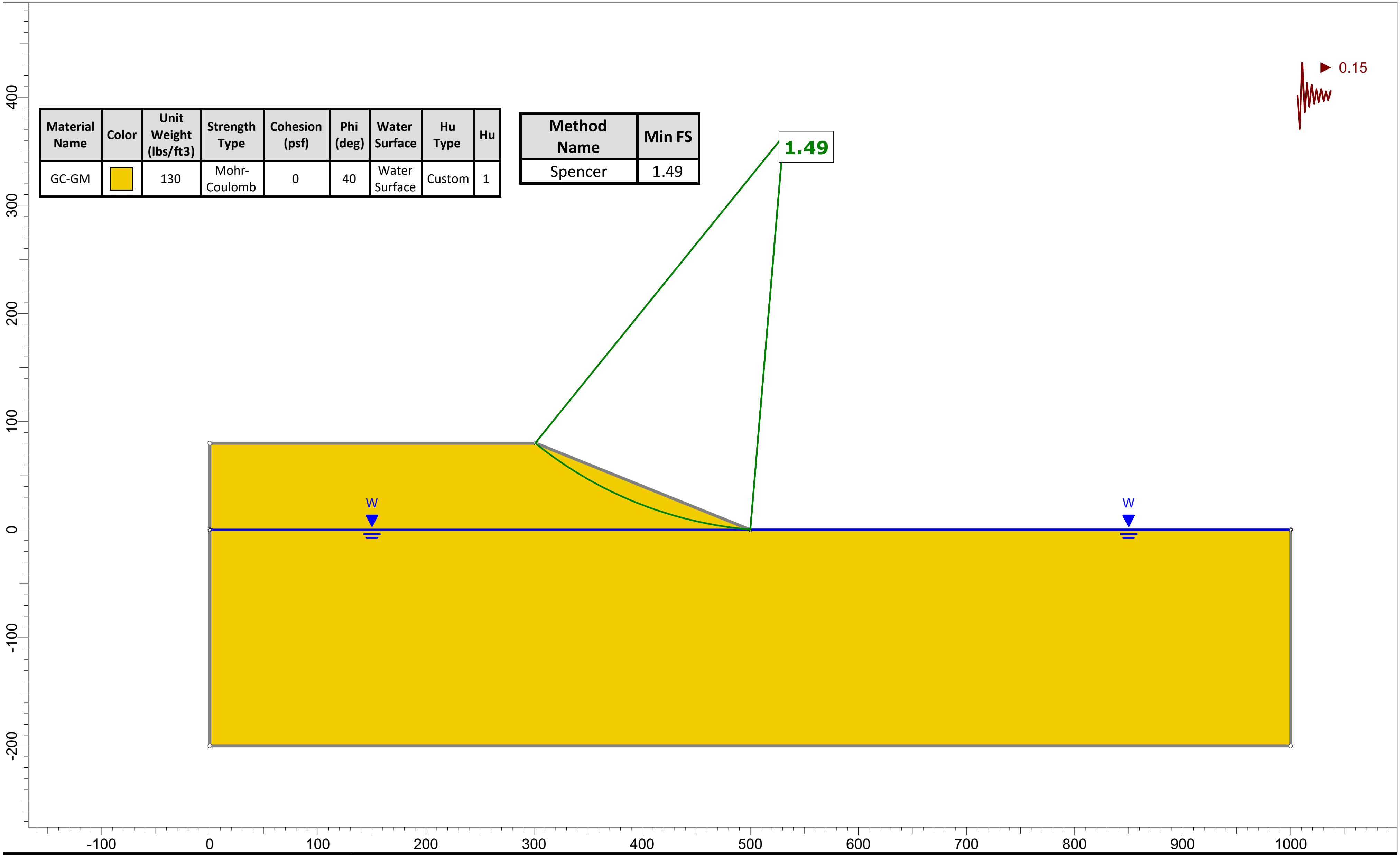
Scenario 1 (Static)

Drawn By MG

Company Golder Associates USA Inc

Date October 2022

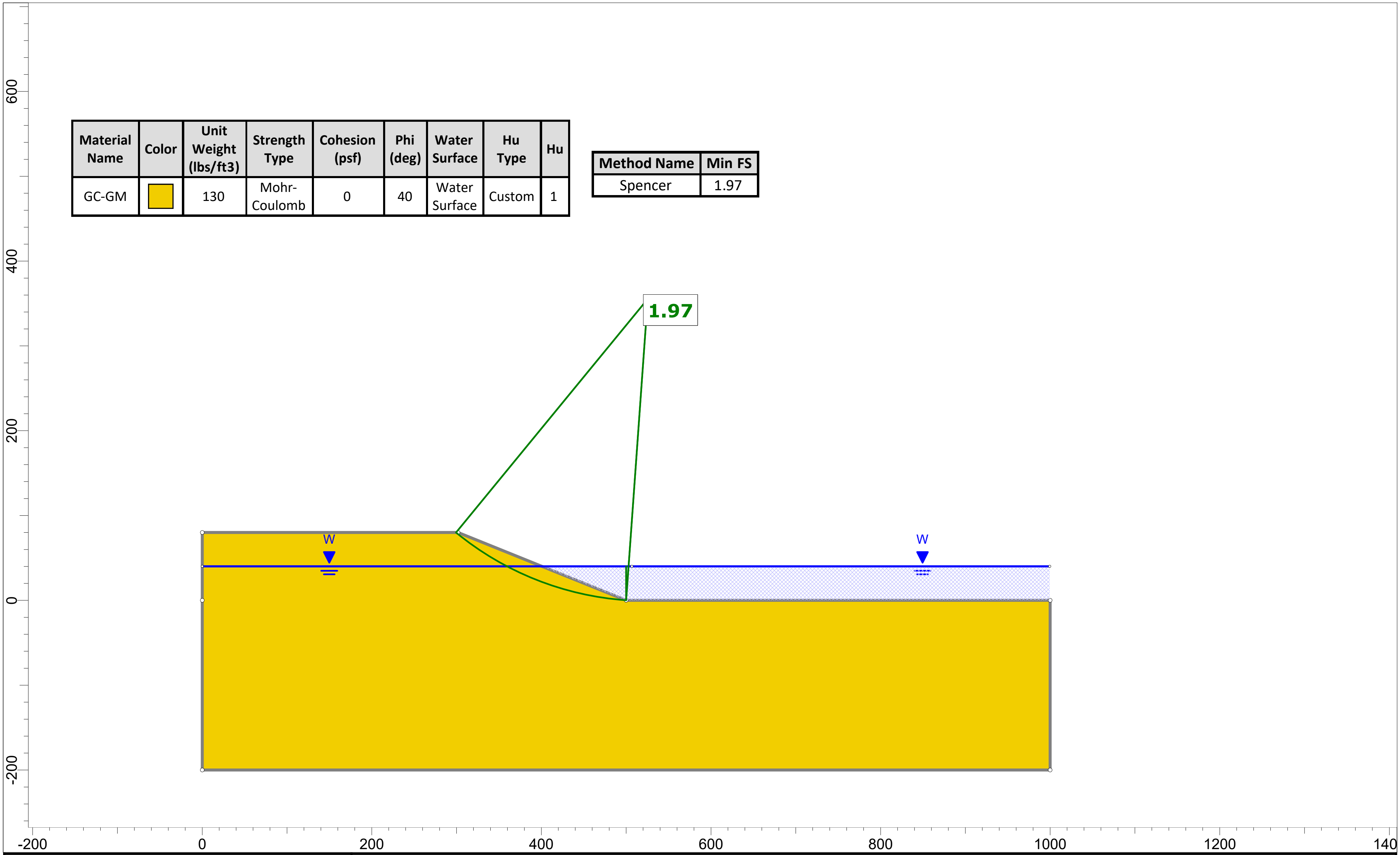
File Name Case B



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.49

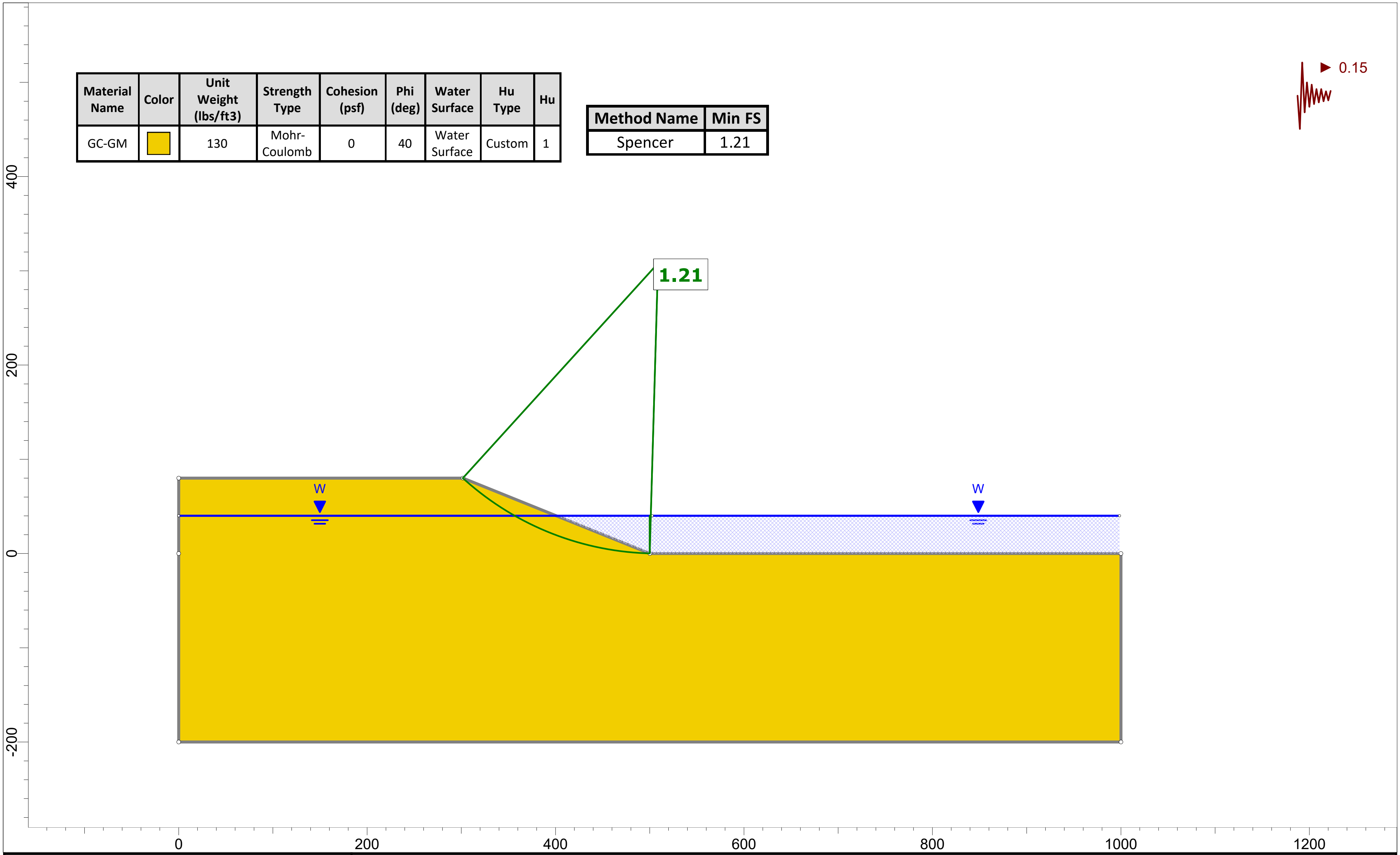
WSP GOLDER	*Project* Vulcan Los Banos Quarry		
	Slope and pit floor underlain by alluvial sand/gravel, groundwater at pit level floor	*Scenario*	1 (Psuedo-static)
	Drawn By MG	*Company*	Golder Associates USA Inc
SLIDEINTERPRET 9.011	*Date* October 2022	*File Name*	Case B



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.97

WSP GOLDER	*Project*	Vulcan Los Banos Quarry	
	Same as Scenario 1, but groundwater at historical high level	*Scenario*	2 (Static)
	Drawn By MG	*Company*	Golder Associates USA Inc
SLIDEINTERPRET 9.011	*Date* October 2022	*File Name*	Case B



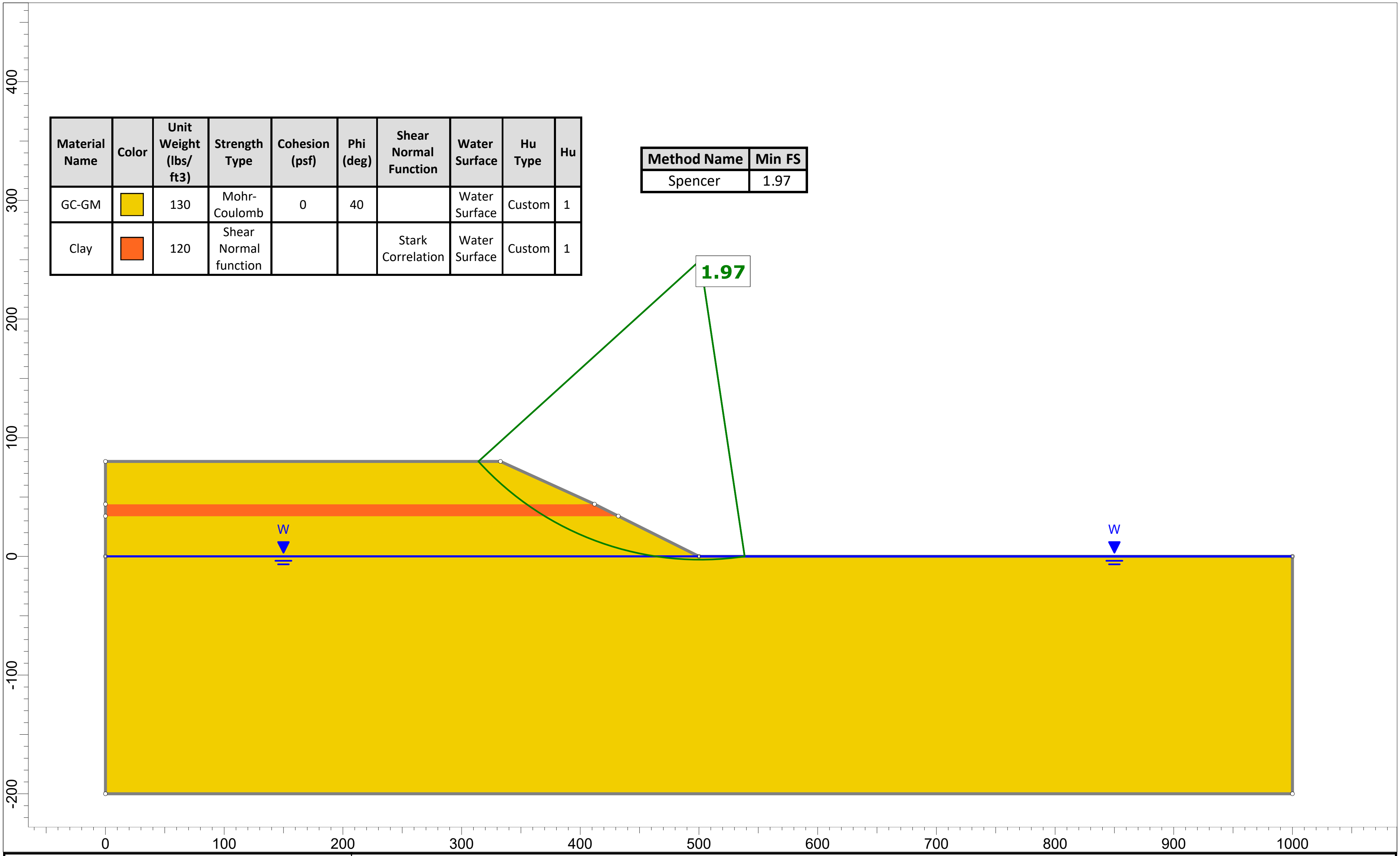
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.21

WSP GOLDER

SLIDEINTERPRET 9.011

Project	Vulcan Los Banos Quarry		
Same as Scenario 1, but groundwater at historical high level		*Scenario*	2 (Pseudo-static)
Drawn By	MG	*Company*	Golder Associates USA Inc
Date	October 2022	*File Name*	Case B



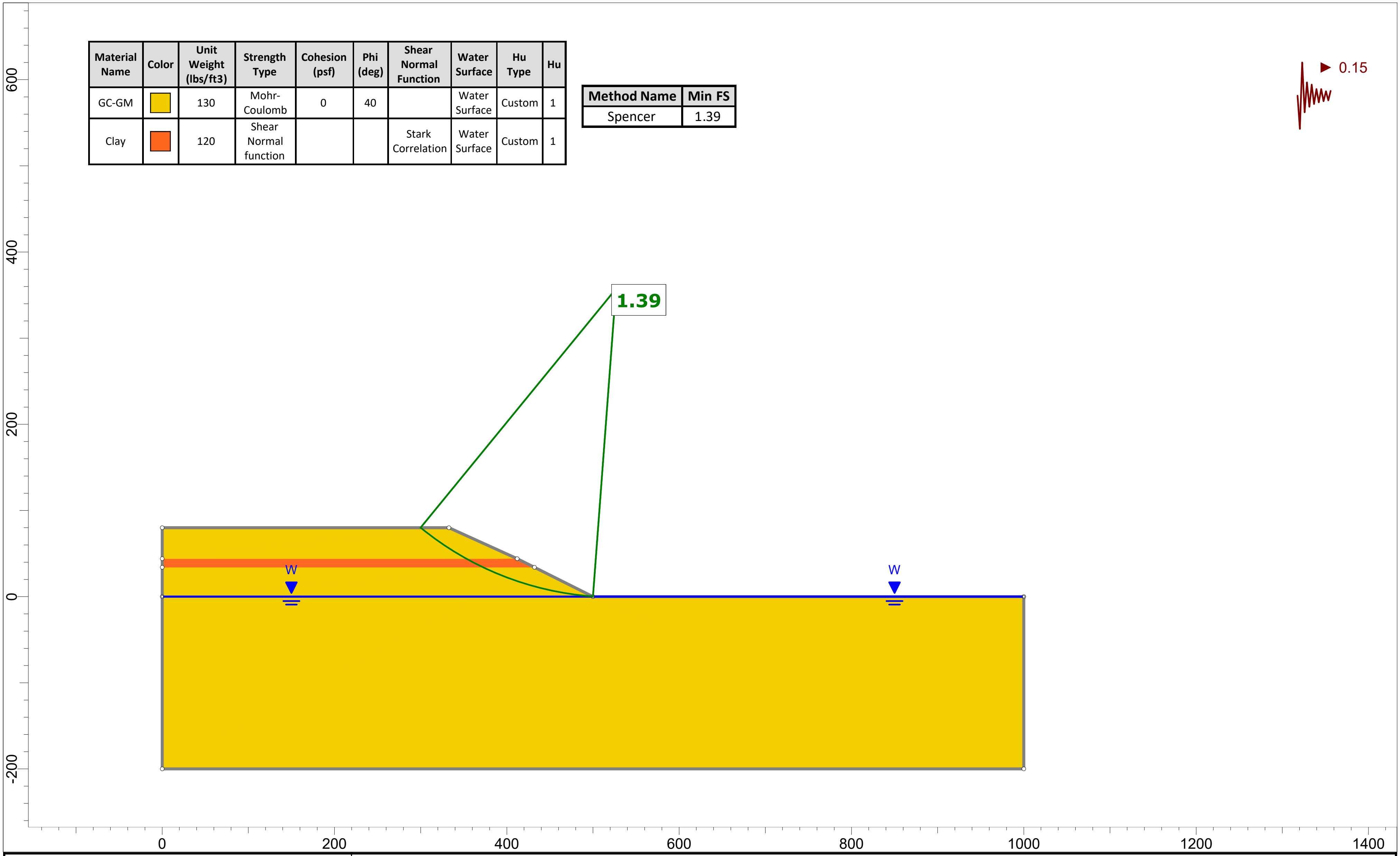
Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.97

WSP GOLDER

SLIDEINTERPRET 9.011

Project	Vulcan Los Banos Quarry
Same as Scenario 1, but with 10-foot thick alluvial clay layer in slope	*Scenario* 3 (Static)
Drawn By MG	*Company* Golder Associates USA Inc
Date October 2022	*File Name* Case B



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.39

WSP GOLDER

SLIDEINTERPRET 9.011

Project
Vulcan Los Banos Quarry

Same as Scenario 1, but with 10-foot thick alluvial clay layer in slope

Scenario
3 (Psuedo-static)

Drawn By
MG

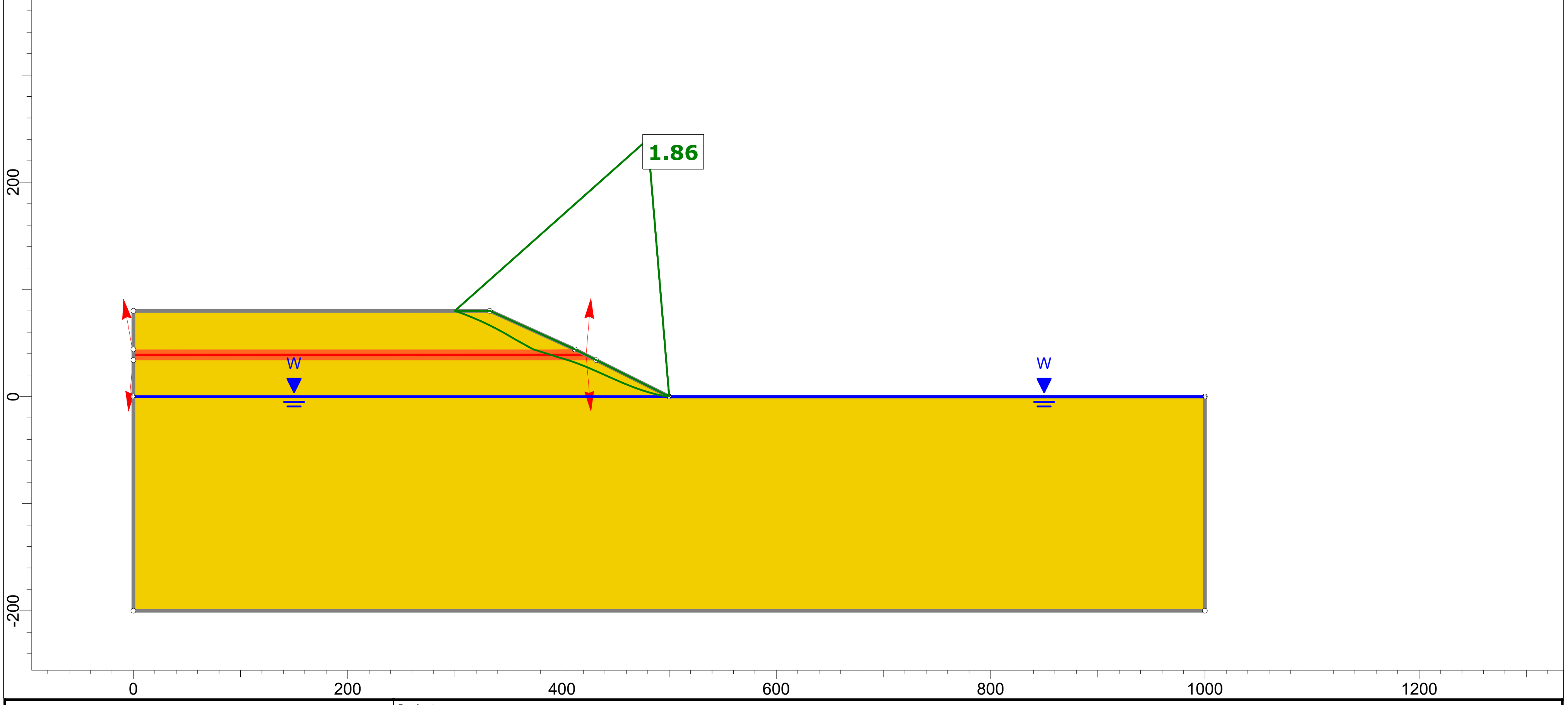
Company
Golder Associates USA Inc

Date
October 2022

File Name
Case B

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

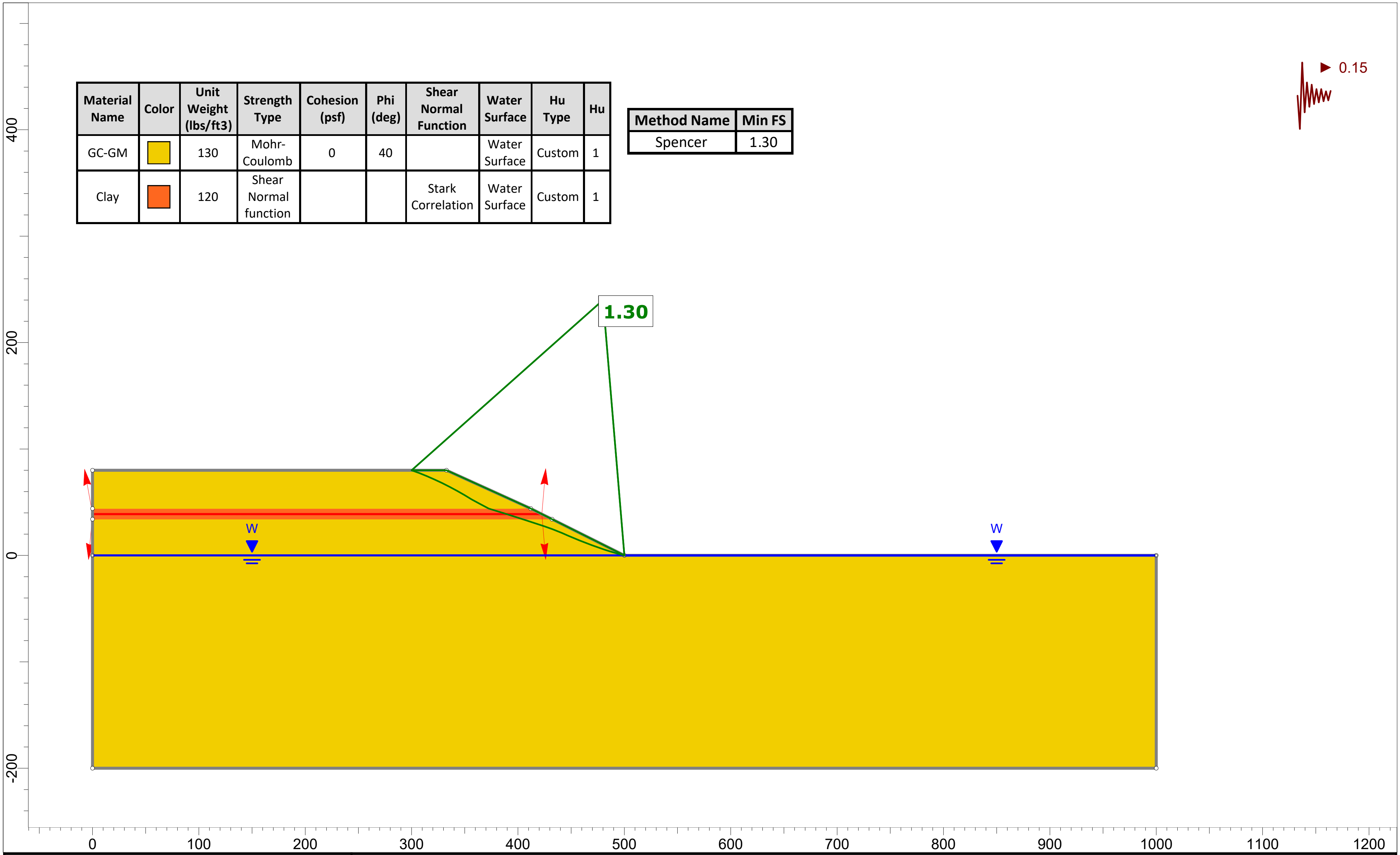
Method Name	Min FS
Spencer	1.86



WSP GOLDER

SLIDEINTERPRET 9.011

Project	Vulcan Los Banos Quarry		
Same as Scenario 3, but non-circular shear surface		*Scenario*	4 (Static)
Drawn By	MG	*Company*	Golder Associates USA Inc
Date	October 2022	*File Name*	Case B



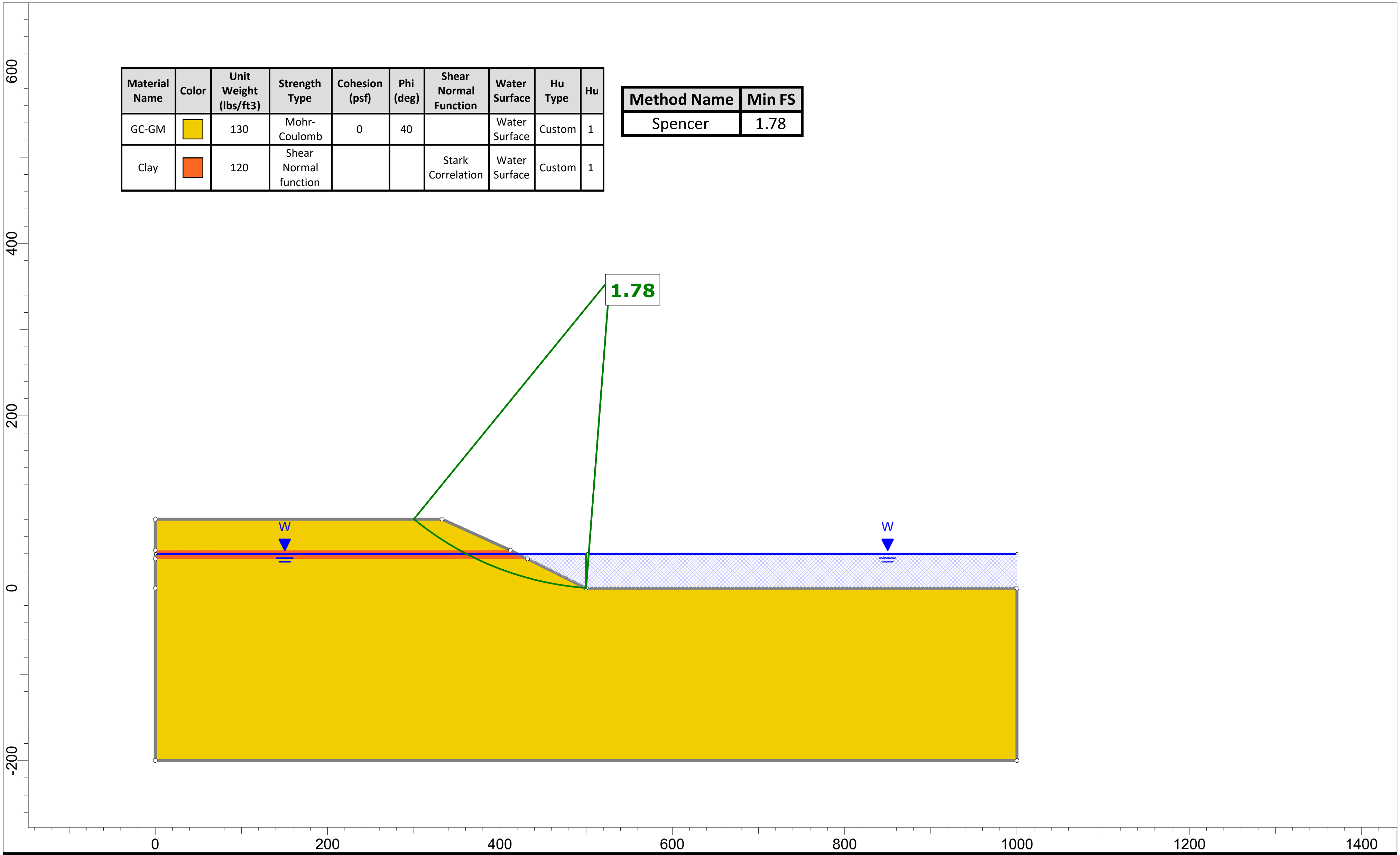
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.30

WSP GOLDER

SLIDEINTERPRET 9.011

Project	Vulcan Los Banos Quarry		
Same as Scenario 3, but non-circular shear surface		*Scenario*	4 (Psuedo-static)
Drawn By	MG	*Company*	Golder Associates USA Inc
Date	October 2022	*File Name*	Case B



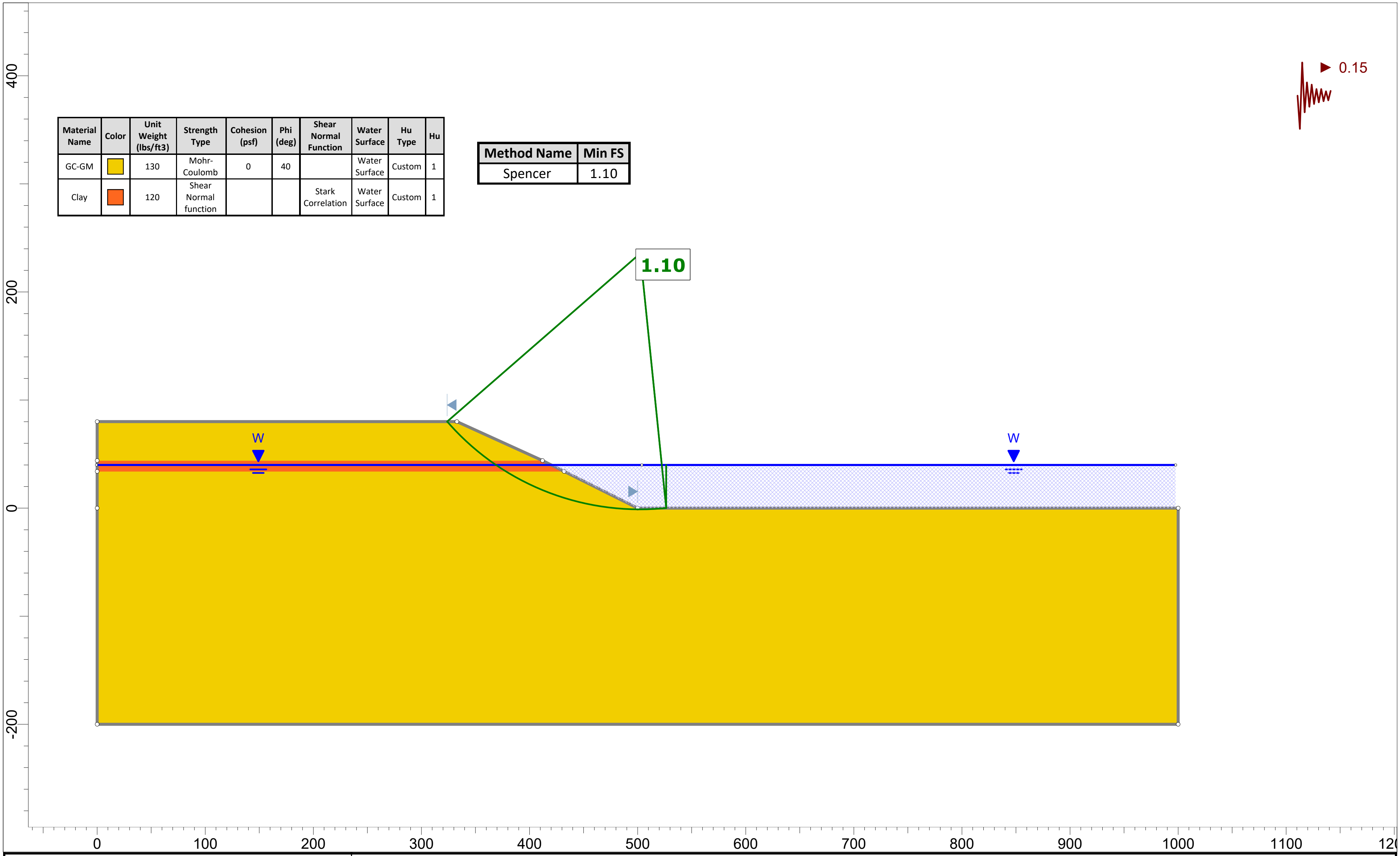
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.78

wsp GOLDER

SLIDEINTERPRET 9.011

Project	Vulcan Los Banos Quarry		
Same as Scenario 3, but groundwater at historical high level		*Scenario*	5 (Static)
Drawn By	MG	*Company*	Golder Associates USA Inc
Date	October 2022	*File Name*	Case B



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Shear Normal Function	Water Surface	Hu Type	Hu
GC-GM	🟨	130	Mohr-Coulomb	0	40		Water Surface	Custom	1
Clay	🟧	120	Shear Normal function			Stark Correlation	Water Surface	Custom	1

Method Name	Min FS
Spencer	1.10

wsp GOLDER

SLIDEINTERPRET 9.011

Project	Vulcan Los Banos Quarry		
Same as Scenario 3, but groundwater level at historical high level		*Scenario*	5 (Psuedo-static)
Drawn By	MG	*Company*	Golder Associates USA Inc
Date	October 2022	*File Name*	Case B

golder.com

REPORT

Geology and Soils Environmental Assessment

Los Banos Sand and Gravel Quarry - Merced County, California

Submitted to:

Vulcan Materials Company

22101 Sunset Avenue, Los Banos, CA 93635

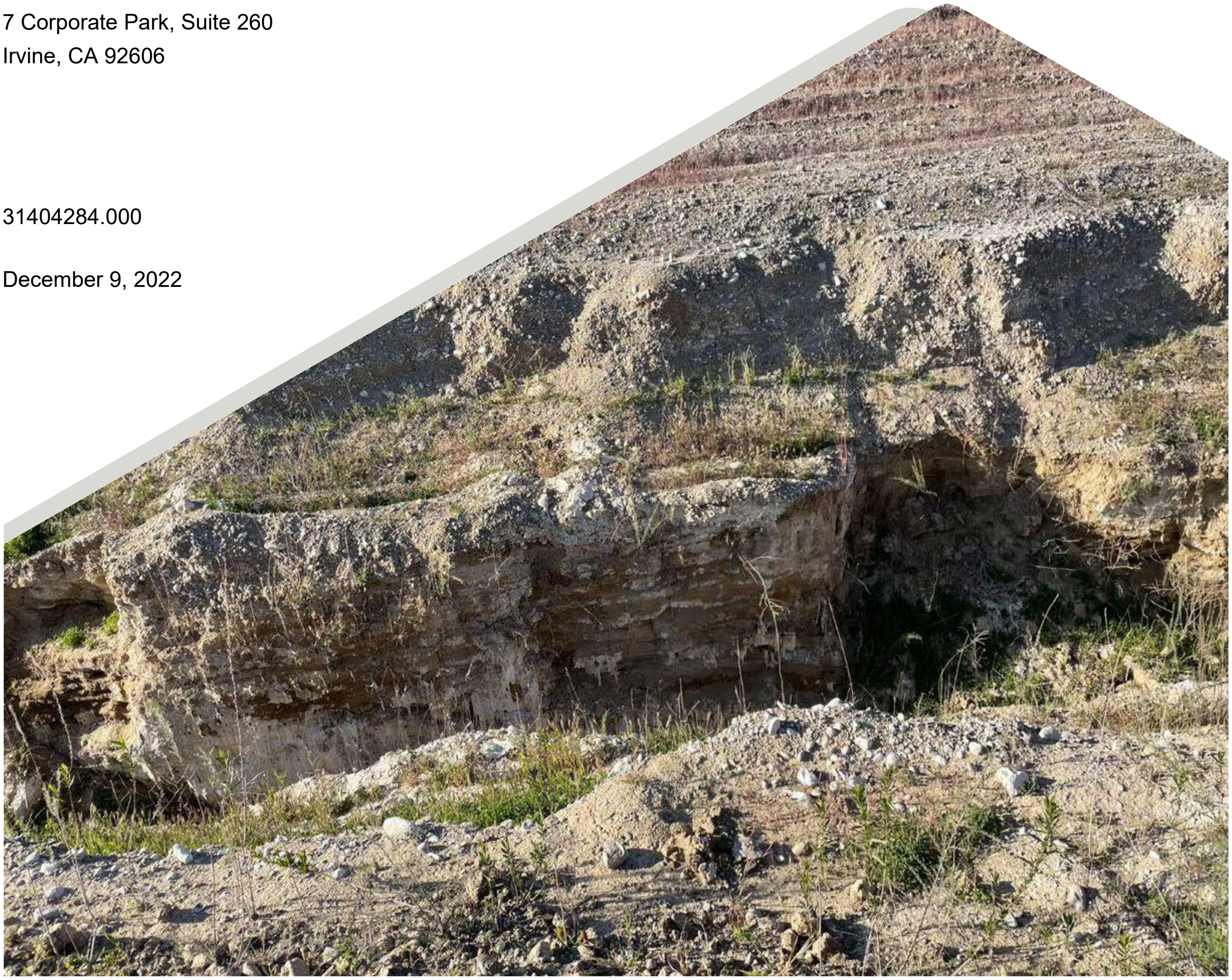
Submitted by:

Golder Associates USA Inc.

7 Corporate Park, Suite 260
Irvine, CA 92606

31404284.000

December 9, 2022



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FIGURES

1.0 EXECUTIVE SUMMARY

Triangle Rock Products, dba Vulcan Materials Company (VMC), currently operates an approximately 605-acre surface mining, processing, and hot mix asphalt production facility in Merced County (“County”) known as the Los Banos Sand and Gravel Quarry.

To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot mix asphalt and ready-mix concrete products, VMC desires to augment the existing sand and gravel reserves through entitling two properties that adjoin the existing operations, known as the Turner and Sunset properties.

The project mine plan generally follows the current plan for the Los Banos Sand and Gravel Quarry operation. Final pit wall slopes at the Sunset and Turner properties would be cut at a 2H:1V (horizontal to vertical) configuration, with all mining to occur above the existing groundwater table. Once mining is complete at the Sunset property, process fines material (clays, silts, and fine sands) from the Los Banos processing plant would be placed in the mined pit, bringing the property to within approximately five feet of the existing grade. The end use of the Sunset and Turner properties will be open space.

Although the project calls for final reclaimed slopes at a 2H:1V configuration at the Sunset and Turner properties, which meets the California Surface Mining and Reclamation Act’s (SMARA) prescriptive standards and is presumptively stable [California Code of Regulations, Title 14, Sections 3704(d) and 3704(f)], VMC engaged Golder Associates USA Inc. (Golder), a wholly owned subsidiary of WSP USA Inc., to assess slope stability of the proposed final pit configurations and to develop recommended maximum slope heights and inclinations that are expected to result in globally stable slopes for the mining activities on the Sunset and Turner properties.

Based on Golder’s data review, site reconnaissance, and field investigation, Golder has concluded the following:

- The probability of surface fault rupture occurring at the Sunset and Turner properties is very low.
- The soils underlaying the Turner property are not considered to be susceptible to significant liquefaction when subjected to the design (i.e., 475-year) peak ground acceleration (PGA).
- Final reclaimed pit slopes at the Sunset and Turner properties inclined no steeper than 2H:1V meet the slope stability criteria and, therefore, are considered sufficiently stable in accordance with SMARA and are suitable for the project site’s proposed end use of open space.

2.0 INTRODUCTION

The purpose of this assessment is to provide information needed to evaluate a project’s potential impacts, as described in Section VII, Geology and Soils of the California Environmental Quality Act (CEQA) Appendix G screening criteria. These criteria are used by lead agencies in support of preparing an Initial Study (IS), which provides an analysis of specific resource areas to determine if a project may have a significant effect on the environment.

2.1 Methodology

Preparation of this section was based on the review of various geologic reports, applicable laws and regulations, publications (including the Mineral Land Classification report [CGS 2021]), and geologic maps of the project site and vicinity. Additionally, Golder completed a geologic/geotechnical site reconnaissance and investigation program and prepared a report for the proposed pit slope design (Golder 2022).

Using the information obtained from the records review and the geological/geotechnical site reconnaissance, the Appendix G criteria for geology and soils was then used to determine impact significance levels. Specifically, this assessment addresses the following screening-level questions established for the geology and soils resource area:

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
   i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.
   ii) Strong seismic ground shaking?
   iii) Seismic-related ground failure, including liquefaction?
   iv) Landslides?

b) Result in substantial soil erosion or the loss of topsoil?

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

With the exception of criterion (f) above, which Golder understands will be evaluated separately, this assessment report presents the relevant background information, impact analysis and determination of level of significance for each of the criteria identified within the screening-level questions, pursuant to CEQA Appendix G. For background, provided below is a discussion of the regional and site-specific geologic setting, geologic hazards, and soil conditions in the project area.

3.0 EXISTING SITE CONDITIONS

3.1 Regional Geology

The surficial geology of the region surrounding the project site has been mapped in detail by Lettis (1982). The hills of the Coast Ranges to the west of Interstate 5 are comprised of Tertiary Great Valley Sequence rocks (Cretaceous through early Paleogene in age) that are tilted toward the east. Younger Quaternary deposits unconformably overlap the Great Valley Sequence with contacts exposed in the hills to the west (Lettis 1982).

The Tulare Formation (upper Pliocene and Pleistocene) comprises the earliest Quaternary-aged deposits in the western Great Valley region. This formation generally consists of alluvial silt, sand, and gravel deposits that were formed as a series of contiguous alluvial fans blanketing the eastern slopes of the Diablo range in the Central Valley region (Lettis 1982). Much of the higher-elevation deposits have been eroded away, leaving scattered terraces of Tulare Formation materials along the flanks of the Coast Ranges. The Tulare Formation is thickest to the east of the site and contains the Corcoran Clay member, a widespread and continuous marker unit in the Central Valley.

3.2 Site Geology

In the vicinity of the project site, the Tulare Formation is not well exposed at the ground surface. Lettis (1982) indicates that the Tulare Formation is largely blanketed by the lower and middle members of the San Luis Ranch alluvium (middle and late Pleistocene) along Interstate 5, with younger alluvial fans and recent channel deposits extending eastward from the hills that lie to the west of the site. The site is intersected by Los Banos Creek, which is an ephemeral drainage that is typically dry. Lettis (1982) describes the following surficial geologic units that are encountered at the Los Banos facility:

- Q_{pc}: Coarse-grained stream deposits of Coast Range provenance. These are the youngest deposits and are located within or near the present course of Los Banos Creek.
- Q_p: Terrace and upper fan deposits of Patterson alluvium. These deposits form the braided margin of Los Banos Creek and have been partially eroded by Q_{pc}.
- Q_{pf}: Fine-grained middle to lower Patterson alluvium. This represents the larger fan in which Q_{pc} and Q_p have been deposited.
- Q_{su}: Upper San Luis Ranch alluvium. Where present, this unit is only shown as a small exposure through Q_{pf}.
- Q_{sl}: Lower San Luis Ranch alluvium.

Golder’s geologic observations and mapping in the existing pits at the project site indicated the presence of discrete and discontinuous layers/lenses of alluvial outwash that include coarse-grained subangular to subrounded gravel and cobbles within a coarse-grained sand matrix, silty sands with gravel, and silt/clay.

3.3 Soil Conditions

Identified soil units are shown in Figure 1. Soil boundaries are approximate and based on the NRCS Web Soil Survey. The following soil types are included within the project boundary:

- **Carranza-Woo (map unit 148).** These soils are well drained loams derived from sedimentary rock. They are found in alluvial fans and generally have slopes of 0 to 2%.
- **Xerofluvents, extremely gravelly (map unit 284).** These soils are poorly drained gravelly loams derived from gravelly alluviums. They are found in fans and generally have slopes of 0 to 5%.

Expansive soils are typically composed of highly plastic clays and are characterized as soils with significant shrink-swell potential. When the moisture content of these soils increases, they expand. Conversely, they shrink as they dry. Expansive soils are primarily a concern for human occupied buildings, equipment or other structures which could be subjected to and damaged by swelling and/or shrinkage conditions. The project site does not include any features that would be impacted by expansive soils.

4.0 IMPACT DISCUSSION AND ANALYSIS

For each of the screening criteria outlined above, this section presents the impact area question contained in Appendix G, the relevant background pertaining to the project, and Golder's analysis of the significance of an impact, to the extent determined to be evident.

Criterion (a): Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to **ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf**.

The project site is not located within a State of California Alquist-Priolo (AP) Earthquake Fault Zone. The closest known active AP fault to the site is the Ortigalita fault zone, which is located approximately 6 miles southwest of the project site's southwestern boundary. No known active fault strands or segments trend across or toward the project site and Golder's geologist saw no signs of active faulting during geologic reconnaissance and mapping at the project site. Therefore, the probability of surface fault rupture occurring at the project site is considered to be very low.

Based on the seismic setting, the project site is situated in an area that has the potential for moderate ground shaking. Because there would be no buildings or structures constructed for occupancy, the potential for substantial adverse effects is less than significant. As described above, the nearest AP mapped fault zone, the Ortigalita fault zone, is mapped to the southwest and well-outside of the project boundary, so there would be no significant effect should a seismic event along the Ortigalita fault zone result in surface rupture. Thus, the project impact would be less than significant with respect to ground rupture.

ii) Strong seismic ground shaking, and
iii) Seismic-related ground failure, including liquefaction?

The project site is located in an area that is subject to seismic events of various magnitudes and intensities and has a moderate seismic hazard potential according to the 2016 Earthquake Shaking Potential for California map produced by Branum et al. (2016) for the California Geological Survey (CGS). Expected seismic activity within the project vicinity could result in seismically induced ground shaking. Ground shaking intensity is largely a function of distance from the earthquake epicenter and underlying geology.

Generally, the area of Merced County in which the site is located is an area with a moderate seismic hazard potential in comparison to most other regions in California (Branum et al. 2016). The nearest mapped active (i.e., Holocene) fault to the site is the Ortigalita fault zone, which lies approximately 6 miles southwest of the southwestern boundary of the project site. The Ortigalita fault zone is a major dextral (i.e., right lateral) strike-slip fault in the central Coast Ranges and it is a part of the larger San Andreas Fault system. Using the US Geological Survey's (USGS) web-based Unified Hazard Tool, a peak ground acceleration (PGA) of 0.44 g (where g is the Earth's gravitational acceleration) is associated with a 10% probability of exceedance in a 50-year period (i.e., a mean return period of 475 years) at the project site.

The most common impact associated with strong ground shaking is damage to structures; however, the project does not include the construction of structures or other features for occupancy. Rather, the primary seismic hazard relates to seismically induced ground failure of the proposed quarry slopes. As part of Golder's (2022) geotechnical evaluation, both static and pseudostatic analyses were performed for the design slope configurations for the Sunset and Turner properties. These analyses concluded that the proposed 2H:1V pit slopes are stable under both static and seismic conditions, given the acceptable factors of safety. Consequently, the potential impact of seismic hazards is not significant, and no mitigation measures are required.

With regard to the potential for ground failure such as subsidence (the lowering of the ground surface caused by factors like compaction or a decrease in groundwater level) or soil liquefaction, both natural and man-made features can be contributing factors. Natural phenomena that may induce subsidence include seismically induced settlement (liquefaction); soil consolidation; oxidation or dewatering of organic-rich soils; and collapse of subsurface cavities. Man-made activities such as withdrawing subsurface fluids through the pumping of groundwater or oil may also cause subsidence by decreasing pore pressure. Because the project does not involve withdrawal of any pore fluids and mining is planned to remain above the regional groundwater level, no ground subsidence associated with the planned mining operation would occur.

Furthermore, the project site's soil conditions generally consist of dense sandy/gravelly soils underlain by the Corcoran Clay, and are not expected to be susceptible to widespread liquefaction when subjected to the 475-year PGA. For these soil conditions, liquefaction of the sandy/gravelly layers would be the primary potential source of significant subsidence. However, a liquefaction analysis was completed for the project site based on subsurface conditions encountered in the geotechnical investigation, finding that while it is possible that some relatively thin and/or discontinuous layers/lenses of potentially liquifiable soils might exist in small areas of the Turner Property, the potential effect on global slope stability if they were to liquefy would likely be negligible. The subsurface materials at the site are not considered to be susceptible to significant liquefaction. The results of the liquefaction analysis are included in Golder (2022). Therefore, the project would not have a significant impact with respect to ground subsidence or liquefaction.

iv) Landslides?

Landslides and debris flows are forms of mass wasting, the movement of soils and rock under the influence of gravity. A landslide may occur if source material on a slope is triggered by some mechanism. Source materials include loose or relatively weak soils/rock. Triggering mechanisms include earthquakes, saturation from rainfall, and erosion.

The primary landslide risk for the project is associated with man-made excavation slopes from mining. Slope stability analyses were completed for the proposed mine pit slopes and are included in Golder (2022). The analyses indicate that the proposed 2H:1V quarry slopes are stable for the proposed end use. Given the otherwise relatively flat topography of the project site, and the demonstrated slope stability associated with the design pit slopes, it is Golder's opinion that the landslide risk at the site is minimal and therefore the potential impact is less than significant.

Criterion (b): Would the Project result in substantial soil erosion or the loss of topsoil?

As previously discussed, the soils in the project vicinity are generally characterized by poorly to well-drained sands and gravelly loams, based on NRCS Web Soil Survey data. The soil profiles tend to range upward of approximately 50 to 60 inches in total profile thickness and are underlain by alluvial deposits. Because the project would comply with SMARA and, therefore, salvage and maintain the topsoil/subsoil located on the Sunset and Turner properties before mining begins, there would be no loss of the onsite soils.

Erosion is the process by which soil and sediment are removed from one area and transported to another. The main natural erosion forces are rainfall, wind, percolation of water that slowly dissolves rock (water is known as the universal solvent because, given time, it will eventually dissolve or wear any rock or other surface materials), or landslides. Erosion of the surface caused by rainwater is known as sheet-wash. Sheet-wash is described as water flowing across land picking up particles of soil or organic materials and carrying them away. Additionally, rainwater flows can cause rilling, which is when runoff water forms shallow broad channels across an area. Both sheet-wash and rilling leave patches of deposited soil material as a result of decreasing water velocity that can result from diminishing land gradient or from slackening rainwater. Wind erosion picks up small soil particles or bounces or rolls large particles along the land surface. Wind erosion is most serious when the soil is bare and exposed to strong wind. Although all of these erosion processes are natural, human activity can often multiply the frequency and size of the erosion event. Human activities that can increase erosion include:

- Reducing the rate by which water can enter the soil (e.g., covering the land with impervious surfaces such as houses, roads, and shopping centers), and thereby, promote rapid runoff and greater erosive power of the water;
- Making drainage systems which concentrate runoff without controlling flow;
- Using poor agricultural practices such as overgrazing and cutting furrows down slope rather than with the natural contour of the land; and/or
- Excavating an area, which removes the vegetation and leaves the soil exposed to erosive factors.

The planned material excavation at the project site would be constrained to the two pit areas designed for the Sunset and Turner properties, both of which will include perimeter berms along portions of the public roadways bordering these areas. The berms are a design feature of the project, which would provide a visual buffer and also serve to store salvaged soil/topsoil that would be used for reclamation once mining is complete. Given the location and composition of the berms, these features would be allowed to naturally re-establish vegetation, providing a resistant surface cover. At the same time, the berms would contain surface flows along these boundary areas, reducing the potential for sediment entrainment and offsite deposition by erosion.

Based on the project's design features, including conformance with the Best Management Practices specified in the Los Banos Sand and Gravel Quarry site-wide Stormwater Pollution Prevention Plan, the project would have a less than significant impact with respect to erosion.

Criterion (c): Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

As was discussed and evaluated for screening criteria (a) and (b), the project is located on a relatively flat ground surface, comprised of alluvial deposits considered to be stable in their current condition. With implementation of the project, and notably excavation of the alluvium, the final landform would include the Sunset pit being excavated with slopes inclined at 2H:1V and then backfilled to within approximately 5 feet of the existing grade through placement of fines material from the aggregates plant, as well as partial backfill of overburden as necessary to achieve operational objectives. Similarly, a portion of the Turner area would be backfilled with fines and overburden to essentially the same grade. The remainder of the Turner area would be a pit with 2H:1V final slopes up to 50 to 80 feet in height (Golder 2022). Although the proposed slope configurations of 2H:1V meet SMARA's prescriptive standards and are presumptively stable, Golder (2022) conservatively performed static and pseudostatic stability analyses to disclose all potentially relevant slope data. In summary, the proposed slopes would be sufficiently stable to meet the applicable SMARA performance standards for the project. Accordingly, project impacts would be less than significant.

Criterion (d): Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

The project entails the excavation of alluvial materials, and subsequent backfilling portions of the mine pits with fines from the processing plant and overburden. No temporary or permanent structures would be built as part of the project, nor would the limits of the excavations be near any buildings or other structures that are occupied. Golder's review of the NRCS Web Soil Survey did not identify near-surface soils containing highly plastic clays or other characteristics indicative of a high shrink-swell potential. Given the lack of potential for expansive soils and considering that no buildings or other structures are located within or adjacent to the project footprint, there would be no impact with respect to Criterion (d).

Criterion (e): Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No conventional septic tanks and leach fields or other waste disposal systems will be installed as part of the project. While old septic tanks currently exist on the Turner property, the associated residential dwellings have been demolished and the septic systems are no longer active. These systems will be removed and properly disposed of as part of the mining project. Therefore, this screening-level criterion is not applicable to the project and, thus, there is no impact.

Criterion (f): Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

As noted previously, Golder understands the assessment of Criterion (f) will be addressed under a stand-alone study. However, with respect to unique geologic features, based on Golder's review of geologic literature and studies for the project area, these types of features are not mapped within or near the project boundary. Therefore, the project would not have any impact on known unique or special geologic structures or features exposed at the surface.

5.0 REFERENCES

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Signature Page

Golder Associates USA Inc.

REGISTERED PROFESSIONAL ENGINEER
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No. C71988
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Margaret Gidula, PE	Ryan Hillman, PE
Senior Project Engineer	*Senior Consultant*

MG/RH/lhk

ATTACHMENTS

Figure 1: Soil Map

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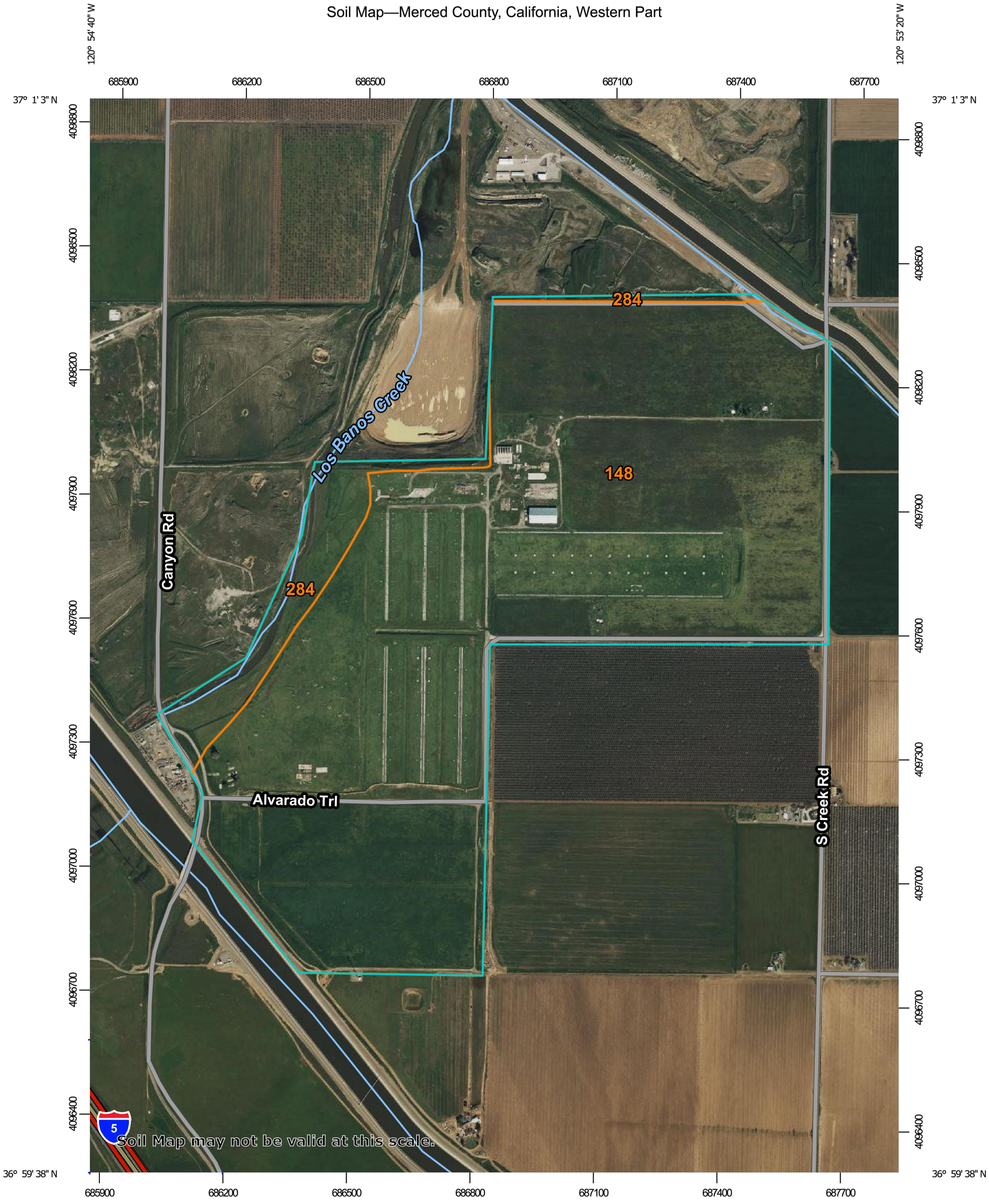
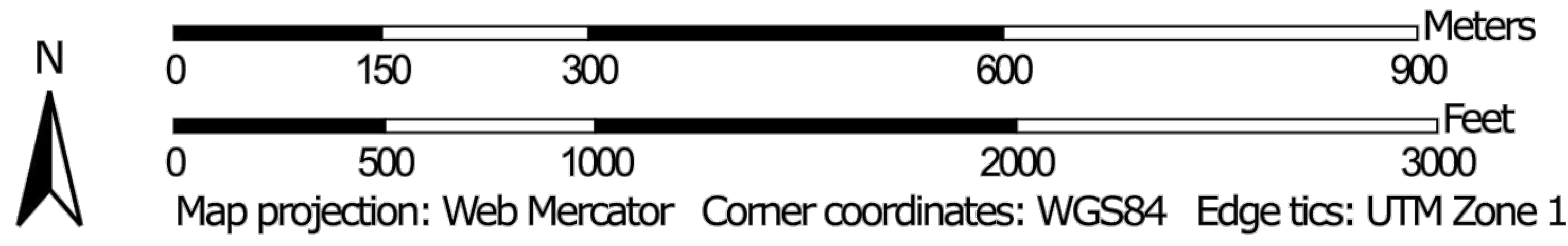
Soil Map—Merced County, California, Western Part



Map Scale: 1:12,700 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

5/11/2022
Page 1 of 3

CLIENT
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CONSULTANT

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PREPARED	MCG
REVIEWED	MCG
APPROVED	KH

PROJECT
VULCAN MATERIALS COMPANY
LOS BANOS SAND & GRAVEL QUARRY
SLOPE STABILITY ASSESSMENT

TITLE
SOIL MAP
NATURAL RESOURCES CONSERVATION SERVICE
WEB SOIL SURVEY

PROJECT NO.	PAGE	REV.	FIGURE
31404284.000	1	0	1

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Soil Map—Merced County, California, Western Part

MAP LEGEND

Area of Interest (AOI)
- ▭ Area of Interest (AOI)

Soils
- ▭ Soil Survey Areas
- ▭ Soil Map Unit Polygons
- 〰 Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features
- ◎ Blowout
- ⊠ Borrow Pit
- ✱ Clay Spot
- ◇ Closed Depression
- ✕ Gravel Pit
- ∴ Gravelly Spot
- ⊛ Landfill
- ⋀ Lava Flow
- ⩡ Marsh or swamp
- ⚒ Mine or Quarry
- ◎ Miscellaneous Water
- ○ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁘ Sandy Spot
- ⊖ Severely Eroded Spot
- ◇ Sinkhole
- ⋟ Slide or Slip
- ⊘ Sodic Spot
- ≣ Spoil Area
- ○ Stony Spot
- ⊚ Very Stony Spot
- ♆ Wet Spot
- △ Other
- ╌ Special Line Features

Water Features
- ∼ Streams and Canals

Transportation
- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background
- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Merced County, California, Western Part
Survey Area Data: Version 17, Sep 7, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 11, 2019—Nov 17, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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WSP GOLDER

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REVIEWED	MCG
APPROVED	KH

PROJECT
VULCAN MATERIALS COMPANY
LOS BANOS SAND & GRAVEL QUARRY
SLOPE STABILITY ASSESSMENT

TITLE
SOIL MAP
NATURAL RESOURCES CONSERVATION SERVICE
WEB SOIL SURVEY

PROJECT NO.	PAGE	REV.	FIGURE
31404284.000	2	0	1

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
148	Carranza-Woo , 0 to 2 percent slopes	327.6	92.6%
284	Xerofluvents, extremely gravelly	26.3	7.4%
Totals for Area of Interest		**353.9**	**100.0%**

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PROJECT NO.	PAGE	REV.	FIGURE
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APPENDIX F

Paleontological Resources Assessment (Sespe, 2024)

SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, California 93001

PALEONTOLOGICAL RESOURCES ASSESSMENT

TRIANGLE ROCK PRODUCTS LOS BANOS PROJECT

Triangle Rock Products, LLC
Merced County, California

January 26, 2024

Prepared for:	Triangle Rock Products, LLC 31 Rancho Camino Drive, Suite 300 Pomona, California 91766 (818) 553-8800
Prepared by:	Sespe Consulting, Inc. 374 Poli Street, Suite 200 Ventura, California 93001 (805) 275-1515

SESPE
CONSULTING, INC.

374 Poli Street, Suite 200 • Ventura, California 93001

PALEONTOLOGICAL RESOURCES ASSESSMENT

TRIANGLE ROCK PRODUCTS LOS BANOS PROJECT

Triangle Rock Products, LLC
Merced County, California

January 26, 2024

PROFESSIONAL GEOLOGIST
BRIAN G. ANDERSON
NO. 7509
Exp. 03-31-2024
STATE OF CALIFORNIA

Brian Anderson, P.G.
Principal Geologist/Paleontologist
Sespe Consulting, Inc.

Paleontological Resources Assessment
Triangle Rock Products Los Banos Project
January 26, 2024

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ATTACHMENTS

SESPE
CONSULTING, INC.

374 Poli Street, Suite 200 • Ventura, California 93001

PALEONTOLOGICAL RESOURCES ASSESSMENT

Triangle Rock Products Los Banos Project

January 26, 2024

1.0 INTRODUCTION

In accordance with the California Environmental Quality Act (CEQA), state and local public agencies are required to identify the environmental impacts of proposed discretionary activities or projects, determine if the impacts will be potentially significant, and identify alternatives and mitigation measures that will substantially eliminate or reduce, to the extent feasible, potentially significant impacts to the environment. Included in this environmental review is an analysis of the Triangle Rock Products, Los Banos Project's potential impacts on paleontological resources, which are the fossilized remains, traces or imprints of organisms preserved in or on the earth's crust that provide information about the history of life on earth and its evolution. Paleontological resources are considered limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under certain federal and state laws and regulations. This Paleontological Resources Assessment (PRA) identifies and summarizes existing paleontological data in the vicinity of the Project area, and classifies and discusses the relative significance of these resources in the context of Triangle Rock Product's, Los Banos permitting project ("Project"), which is described in the section that follows.

2.0 PROJECT DESCRIPTION

Triangle Rock Products dba Triangle Rock Products, LLC ("Triangle") currently operates an approximately 607-acre surface mining, processing, and hot mix asphalt production facility in Merced County ("County"), known as the Triangle Rock Products Los Banos Sand and Gravel operation ("Facility" or "Los Banos Facility"). The existing Facility is permitted by the County under Conditional Use Permits (CUP 3466 for mining and reclamation; CUP 3383 for an onsite hot mix asphalt [HMA] plant) and an approved site-wide Reclamation Plan.

To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot mix asphalt and ready-mix concrete (RMC) products, Triangle desires to augment the existing sand and gravel reserves through entitling two properties that adjoin the existing operations; the Turner and Sunset properties (herein referred to as the "Project site"). The purpose of this Project is therefore to secure the requisite approval from the County, which will permit extraction of the sand and gravel resources at these properties, along with ancillary activities that will allow for handling and conveyance of the excavated materials. Specifically, this Project would amend the existing Conditional Use Permit (CUP) 3466 and related Reclamation Plan for Triangle's existing Los Banos Sand and Gravel operation, to include proposed mining and reclamation at the Turner and Sunset properties.

The Project would not involve any changes to the existing operations other than allowing for mining of the sand and gravel resources at the Turner and Sunset properties, which are described in detail below. Consistent with Triangle's existing operations, the aggregate material extracted from the Project sites would be transferred via internal haul trucks and scrapers (no haul trucks would enter/exit public roads) to the existing processing plant at the Los Banos Facility. In the same manner as presently occurs, material would then be processed and shipped to delivery locations throughout the region, or used onsite to produce hot mix asphalt or transferred for use by a separately owned and operated ready-mix concrete plant. No material processing would occur on the Project site.

3.0 REGIONAL GEOLOGIC SETTING

The surrounding Project vicinity is situated with the San Joaquin Valley, which is part of the larger Great Valley Physiographic Province, an extensive alluvial plain about 50 miles wide and 400 miles long, located in the central part of California. The northern part is the Sacramento Valley, drained by the Sacramento River and its southern part is the San Joaquin Valley drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago).

A review of geologic literature for the surrounding Project area, indicates that the site is situated on Quaternary-age alluvium, likely sourced in part of the Diablo Range to the west (Lettis, 1982). Moreover, based on geologic exposures in the mining areas at the adjoining Los Banos Sand and Gravel operation, the subsurface materials exhibit lithologic characteristics, such as grain size, shape, and fabric, which are consistent with alluvial basin fill deposits. As such, the Sunset and Turner properties are anticipated to contain the same types of lithologies, specifically sand and gravel dominated facies with some clayey and silty fractions.

The Project area is located along the boundary between the San Joaquin Valley on the east and the Diablo Range on the west. The San Joaquin Valley comprises the southern half of California's Central Valley geomorphic province, while the Diablo Range is part of the Coast Ranges geomorphic province.

The Coast Ranges extend along the California coast from the Santa Ynez River in the south to the Klamath Range in the north (Norris and Webb, 1990). The discussion that follows regarding the regional geology of the Project area is taken from the geology, soils and minerals chapter of the Los Banos-Gates 50 kV transmission line project's Final Supplemental Environmental Impact Report (EIR) prepared by the California Public Utilities Commission (CPUC, 2001) and Lettis (1982).

The topography of the Project surroundings is varied, with low rolling to moderately steep slopes in the foothills of the Diablo Range and gentle to nearly level slopes on the alluvial fans and the valley floor. Elevations in the Project area range from about 175 feet in the valleys to over 1,200 feet along certain ridges in the foothills.

The Diablo Range is a series of low ridges reaching elevations of up to 3,000 feet. These mountains form a natural barrier against the coastal winds and fogs, creating a rain shadow on the western side of the valley. Numerous intermittent drainages such as Panoche, Little Panoche, Arroyo Hondo, Cantua, Silver, Domengine, and Los Gatos Creeks drain the eastern slopes of the Diablo Range. These creeks have a variable discharge, with periodic flooding that flushes sediments out of the mountains and foothills and deposits them on alluvial fans at the base of the foothills. Recent alluvial fan deposits may extend up to several miles into the valley, with larger, more extensive fans at the mouths of the larger drainages. The San Joaquin Valley is a deep structural basin, which was initially filled by Cretaceous and Tertiary age marine and continental sediments shed from the ancestral Sierra Nevada Range to the east. More recent tectonic forces including regional uplift and the associated folding and faulting of these basin deposits formed the Coast Ranges. The Cretaceous deposits comprise the Franciscan Complex and the Great Valley Sequence. The Tertiary sediments deposited on the Cretaceous sequence are predominately composed of sandstone and shale with minor conglomerate beds, and typically dip toward the San Joaquin Valley.

Pleistocene and younger deposits consist of the Pleistocene Tulare Formation, older alluvium and stream terrace deposits, younger alluvial fan and stream terrace deposits, landslide debris, alluvium, and stream gravel and channel deposits. These sediments are everywhere unconformable and are generally flat lying to gently dipping toward the valley to the east. They vary widely in thickness, composition, and areal extent as described below.

The Tulare Formation is the youngest of the deformed or tilted strata of the Great Valley deposits. The Tulare Formation is thought to have once formed a continuous blanket of sediments across the present foothill area and extending out into the valley, though the deposits have been extensively eroded. These deposits generally unconformably overlie older deposits and are in contact with most of the older bedrock units. The Tulare Formation consists of sand, silt, and clay in varying amounts with depth and forms the primary groundwater reservoir within the valley proper.

One member of the Tulare Formation of importance is the Corcoran Clay member, which varies in thickness across the San Joaquin Valley, and forms a confining layer for deeper sediments of the Tulare. This confining layer is absent in portions of the western valley margin and tilted and exposed at the surface along the Project alignment in the vicinity of Panoche Creek.

Older Alluvium is mapped as alluvial fan deposits in the inter-fan areas between the larger drainages of Ortigalita, Little Panoche, Panoche and Los Gatos Creeks, and around the nose of Anticline Ridge north and east of Coalinga. These deposits are characterized by poorly sorted, unconsolidated sand, silt, clay and minor gravel, which are moderately well dissected by streams and exhibit strong soil development. Except for their angular unconformity with the Tulare Formation, these deposits are very similar to the Tulare deposits, and it is very difficult to distinguish them in surface exposures.

Pleistocene age Terrace Deposits occupy the margins of the larger creek drainages but are only extensive enough to have been mapped along the margins of Cantua and Panoche Creeks. These terrace deposits are clearly older than present-day floodplain deposits due to their elevation above the floodplain and their extensive soil development. These deposits consist of boulders, gravel, sand, and silt deposits ranging from 2 to 20 feet in thickness.

Alluvial fan and stream floodplain deposits of Holocene age are present in the stream valleys and the uppermost layers of the alluvial fans. In general, these deposits consist of unconsolidated sand, silt, and clay, with minor gravel. Poor soil development and a lack of deeply incised stream channels dissecting the fan surface characterize Younger alluvial deposits. Holocene stream terraces are generally low-lying deposits with only a few feet of separation in elevation from modern floodplain deposits. These deposits exhibit moderate to poor soil development and are difficult to distinguish from more recent deposits of present-day streams.

Landslide deposits are generally found at the base of steep slopes and ridges. Extensive landslide hazard mapping has not been performed in the Project area due to the sparse population and limited hazard to life and property. Moreover, stream channel deposits are found in the active channels and floodplains of modern streams within the Project area. These deposits consist principally of gravel, sand, and silt, with minor clay, and are typically between 5 and 100 feet thick.

4.0 SITE GEOLOGY AND STRATIGRAPHIC FRAMEWORK

The Project site is underlain by Quaternary alluvium and associated deposits sourced from the Coast Range to the west. The Quaternary alluvial deposits are characterized by numerous lenses of fine to coarse grained sediments. They are locally known as the upper Tulare Formation (upper Pliocene and Pleistocene), Los Banos alluvium (middle and late Pleistocene), San Luis Ranch alluvium (late Pleistocene and early Holocene), and Patterson alluvium (early Holocene to modern). According to Lettis (1982), the San Luis Ranch and Patterson alluvium are part of the Tulare Formation and are mapped across the Project area. The San Luis Ranch alluvium consists principally coarse-grained terrace and upper-fan deposits; coarse to fine-grained mudflow deposits; and fine-grained middle and lower floodplain deposits. The Patterson alluvium is the uppermost unit exposed at the Project site. It consists of coarse-grained terrace and upper fan deposits; coarse-grained stream channel deposits; coarse to fine-grained mudflow deposits; and fine-grained middle and lower-fan deposits.

Underlying these alluvial deposits is the Corcoran Clay member of the Tulare Formation, which is one of the few depositional units in the Valley that can be regionally mapped and is commonly used to model the basin and was used to estimate the thickness of the overlying section of the Project site (Faunt, 2009). This unit is a low-permeability, laterally extensive lacustrine deposit (Johnson and other, 1968), ranging from 60 feet to 100 feet thick across the Project site. The thinnest and shallowest section of the Corcoran Clay is in the southwest corner of the Project and thickens towards the northeast. Based on the mine plan designed for the Project, extraction of the sand and gravel resource will occur in upper alluvial assemblage stratigraphically above the Corcoran Clay.

5.0 RELEVANT AND APPLICABLE REGULATORY FRAMEWORK

Paleontological resources can be scientifically and educationally significant and considered non-renewable resources. As such, paleontological resources are protected under certain federal, state, and local laws, regulations, and ordinances. Because the Project is located on privately owned property, federal statutes and regulations that protect these resources on public lands do not apply.

In California, however, paleontological resources are protected through CEQA as well as Public Resources Code (PRC) addressed under CEQA, and Public Resources Code Section 5097.5. Under CEQA, lead agencies (i.e., the County) are required to determine if a proposed project would have a potentially significant effect on the environment, including significant effects on paleontological resources. Guidelines for the Implementation of CEQA, as amended March 29, 1999 (California Code of Regulations [CCR], Title 14, Chapter 3, Section 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (14 CCR Section 15023, Appendix G, Section 14, Part a) the following:

> *"Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"*

In addition to CEQA, paleontological resources are protected under PRC Section 5097.5, which states the following:

> *No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.*

Certain lead agencies may have local policies that address the management of paleontological resources. Upon review of the Merced County General Plan, the following relevant and applicable land use policy applies:

> *Policy RCR-2.9: Historical and Cultural Resources Investigation, Assessment, and Mitigation Guidelines (RDR/MPSP).*

This policy requires that the County establish and adopt mandatory guidelines for use during the environmental review processes for private and public projects to identify and protect historical, cultural, archaeological, and paleontological resources, and unique geologic features. As adopted in the Merced County General Plan, Policy RCR-2.9 is implemented through preparing and formally adopting guidelines and standards for the preparation of assessments of historical, cultural, archaeological, and paleontological resources, and unique geologic features.

At a minimum, the guidelines shall include resource survey guidelines covering personnel qualifications, research and field techniques, investigation and documentation, data collection and recordation, and resource preservation, avoidance, minimization, and mitigation strategies.

The guidelines shall specify broad categories of acceptable mitigation consistent with Public Resources Code Section 21083.2 and State CEQA Guidelines Section 15126.4(b), as they may be amended for any identified adverse effects to historic and cultural resources, paleontological resources, or unique geologic features.

The scope of this PRA is consistent with the resource survey guidelines identified to implement General Plan Policy RCR-2.9.

6.0 METHODOLOGY AND APPROACH

For this PRA, the following methodology and approach was taken to evaluate the potential for the Project to effect paleontological resources.

As an initial step, Sespe performed a literature review of publicly available information pertaining to the local and regional geologic setting, stratigraphic framework, and relevant paleontological studies. This information was used to determine if the geologic materials proposed to be mined at the Project site are known to contain fossils, or there is a significant likelihood for discovery.

In addition to the literature review, a database research request we transmitted to the University of California Museum of Paleontology collections for listed fossil localities at the Project site, and in the vicinity (here, the contiguous four USGS 7.5” topographic quadrangle maps, inclusive of the site [Volta, Los Banos, Charleston School and Ortigalita Peak NW quadrangles]).

The PRA also included performing a pedestrian survey to observe for the presence paleontological resources, and if identified determine their significance with respect to taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic context. The pedestrian survey encompassed walking along transect lines across each property, visually sweeping side-to-side along each line to examine the ground surface for fossil evidence.

The transect pattern consisted of a series of generally parallel lines, typically spaced apart roughly 500 to 700 feet, and orientated in an east-west or north-south fashion. In a few instances, diagonal transects were also included. Since both the Sunset and Turner properties have power poles located along one or more perimeter boundaries, or along interior roads, these poles were used as points of reference where feasible to located and align the transects.

The pedestrian survey used a defined Practical Field of View (PFV), which represents the extent by which a person with normal vision can reasonably view the ground surface. The PFV is site-specific and dependent on a number of physical and environmental factors, such as soil type, texture, moisture and color, nature and extent of vegetative cover, time of day and lighting, as well as other physical setting conditions. For this site, a PFW of 10 feet was established; the observer examined the ground surface over an area of about 5 feet on either side of each transect line. With the PFV, the observer inspected the exposed ground for the presence of vertebrate and invertebrate fossil remains (bones, shell fragments, biogenic structures), and evidence of plant casts, molds of permineralized wood. Most of the ground has been previously disturbed, and thus any potential fossil material would lack stratigraphic context. Consequently, the pedestrian survey did not map soil series or surface geology.

Additionally, prior to initiating the pedestrian survey, mining pits 2 and 3 at the existing Los Banos operations were visually examined for possible paleontological resources, since there are freshly cut side walls slopes in these two pits, which expose alluvium to about 15 feet below native ground surface. At these two mining pits, the observer walked along the entire length of the western slopes to look for evidence of fossil remains.

In assessing the significance of paleontological resources, it is standard practice to utilize the generally accepted procedures and criteria established in the Society of Vertebrate Paleontology (SVP) Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010). The SVP standard is intended to be applicable to both private and public lands under the jurisdiction of local, city, county, regional, state, and federal agencies. In addition to providing guidance on the scope for proper assessment of paleontological resources and personnel qualifications, the SVP 2010 standard includes guidance concerning the formulation and implementation of measures to mitigate these adverse impacts, as well as for the collection, preservation, and curation of recovered fossils. Pursuant to the SVP 2010 guidelines, this PRA was conducted by Brian G. Anderson, a California licensed Professional Geologist and qualified Paleontologist, with Sespe Consulting, Inc. A copy of his *Curriculum Vitae* is included as Attachment A to this report.

Under the SVP 2010 guidelines, rock units are defined as having (a) high, (b) undetermined, (c) low, or (d) no potential for containing significant paleontological resources, which are described as follows:

High Potential

Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.).

Paleontological potential consists of both; (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils; and, (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

Undetermined Potential

Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

Low Potential

Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule (e.g., basalt flows or Recent colluvium). Rock units with low potential typically will not require impact mitigation measures to protect fossils.

No Potential

Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

As noted in the SVP 2010 guidelines, the limits of the entire rock unit, both areal and stratigraphic, define the extent of paleontological potential. Thus, in some instances a rock unit such as a marine limestone may be spatially extensive while an alluvial deposit is oftentimes chronostratigraphically limited and geometrically discontinuous. Moreover, the guidelines also indicate that the nature of occurrence of paleontological resources be considered; that is whether the resources are uniformly distributed throughout a rock unit or confined as localized concentrations to specific members or facies.

For this Project, the criteria detailed above were applied to the uppermost Quaternary alluvial facies, since these deposits are the stratigraphic units that would be subjected to material extraction. Specifically, as shown in the mine plan prepared for the Project (Figure 1), areas as observed at the surface along the transect lines, or in areas where subsurface deposits are exposed such as several of the trenches that occur on the Turner property, or along the cut slopes in the active mine pits located with the current Los Banos operations.

7.0 SUMMARY OF FINDINGS

As previously noted, Sespe contacted the University of California Museum of Paleontology (UCMP) at UC Berkeley to request a search of the museum's database for potential recorded fossil localities on the Project site, and within the general vicinity. The requested search domain encompassed the following USGS 7.5-minute topographic maps: Volta, Los Banos, Charleston School and Ortigalita Peak NW quadrangles. For any fossil localities identified through the database search, information pertaining to the stratigraphic context was also requested, to the extent available.

Based on the records search, the UCMP did not identify fossil localities on the Project site, nor in the immediate surrounding area. The closest locality reported is a vertebrate site approximately 10 miles south of Los Banos in the stretch of the California Aqueduct that parallels the highway there. During the excavation of the canal, isolated finds of fossil horses, camels, and mammoths were found and are recorded as a single locality (UCMP locality V6401). Most of these are fossils are reported as isolated bones (UCMP specimen numbers 66327-66330, 68027, and 86141), but the locality also includes a complete Columbian mammoth lower jaw (UCMP specimen number 86145). According to the information provided, the fossils occur in the Corcoran Clay, a distinct laterally extensive clay unit that occurs at depth below the Project site and surrounding area. No fossils were identified in the database search for localities within the Project vicinity from younger strata overlying the Corcoran Clay. Based on lithologic logs for exploratory boreholes and wells completed at the Los Banos operation, as well as lithologic logs for boreholes located at the Turner property, the Corcoran Clay is well constrained and lies below the limit of the proposed excavation, as presented in the Project's mine plan.

Prior to initiating the pedestrian survey, on April 13, 2022, Sespe performed a visual inspection of the shallow subsurface alluvial materials currently being mined in pits 2 and 3 at the adjoining Los Banos operations. The inspection consisted of walking along the toe of each slope, as well as periodically mid-slope to inspect for the presence of fossil material or biogenic structures. No paleontological resources were identified along the pit slopes.

At the Sunset and Turner properties, the pedestrian survey was conducted April 13 and 14, 2022, and consisted of 25 total transects; 7 east-west orientated lines across the Sunset property with one diagonal line extending from the southwest to northeast corner. The remaining 17 transect were completed on the Turner property. In general, the east-west transect lines were located at every other power pole, beginning with the pole at the northeast corner of the property. A map showing the approximate locations of the transects and associated observer path is provided as Figures 2 and 3 (Attachment B). Also included as Attachment C is a Photo Log, documenting findings along the transects.

At the Sunset property, no paleontological resources were identified along these transects within the PFV limits. A small, indiscriminate shell fragment (Photo Log 1) was observed on line 2 as float, however, it appears fresh and non-weathered, and shows no evidence of replacement mineralization. Two bleached, non-fossilized bones (Photo Logs 2 and 3) were found on transect lines 4 and 5, which included part of an avian femur. Both occur as surface float and therefore have no stratigraphic context. Non-descript recent-age, non-fossil bone fragments were also identified along transect 5 (Photo Log 4) and the diagonal transect (Photo Log 5) in the area between lines 5 and 6. As with all of these vertebrate remains, the bone material is well bleached, with one specimen with associated, soft desiccated tissue (see Photo Log 4). None of the bones exhibit indications of early diagenesis or permineralization.

At the Tuner property, transects were completed, beginning in the southwest corner and moving eastward to the southeast property boundary. Unlike the ground surface at the Sunset property, which could readily be observed through sparse to moderate grasses, the southern and western portions of the Turner property exhibited moderate to dense tufted and diffuse grasses, which made ground observations challenging at times. However, recent discing of soils on the property east of the larger outbuilding currently used for dog food processing created a more visible and uniform ground surface that permitted visual inspection within the PFV limits established for this PRA.

The initial transects on the Turner property were orientated generally in a north-south fashion. An east-west power pole line along Alvarado Trail was used to place the transects at a spacing equivalent to every other pole, except for the most easterly transect which is roughly midway between two poles. Alvarado Trail was used as a dividing point for individual transect lines, south to the property line and north to the edge of Los Banos Creek (refer to Figure 3). The survey moved progressively to the east, with transects north and south of Alvarado Trail. At the southeast corner of this part of the property, diagonal transect was completed terminating at the road. No fossils were identified with the PFV along these transects.

Where the property extends north to the fence line of the existing Los Banos operations, the survey included transects in the area where the historic cattle operations occurred, as evidenced by abandoned concrete channels and a series of water troughs. Transects completed in this part of the property are orientated generally parallel to the north-south segment of Alvarado Trial. A bleached, non-descript bone fragment (Photo Log 6) was found at a point roughly a third of the distance down-line along the transect 10 located just west of a series of abandoned cattle water troughs (see Figure 3). The bone represents surface float and shows no evidence of early preservation or permineralization. The most easterly transect in this area was initiated south of the concrete material bins near the outbuilding and extends across a north-south trench located immediately west of the road. The trench walls occur within the PFV, and thus facilitated visual inspection of shallow subsurface alluvial materials along the transect (Photo Log 7). The southern end of the trench appears to have been used for disposal of cow and sheep carcasses, as there are remains of individual animals in varying states of decay. Paleontological resources were not identified within the PFV for any of these transects.

The pedestrian survey continued with west-east orientated transects on the portion of the Turner property that contains the large outbuilding. A total of 6 transects were completed in this part of the property. Please refer to Figure 3 (Attachment B), which shows these lines. Over this area, ground visibility was generally better, as the discing exposed relatively fresh soils. In some locations, concrete pads likely associated with former residences or other outbuildings and small piles of broken concrete precluded observation in places; albeit these non-visible segments were di minimis given the number and length of transect lines completed.

Similar to the approach taken with the other transects, the power line along Creek Road at the eastern property boundary served as a reference for locating the transects, with lines spaced every other pole except for one line located adjacent to the Delta-Mendota Canal access road (see Figure 3, Attachment B). The two southern transect lines extended from roughly the edge of the interior access road leading to the outbuilding (specifically, where the white-pipe water line runs parallel to the road) to the edge of Creek Road. The next transect terminated near the north-east corner of the outbuilding, with the remaining three lines between the large soil berm located along the northwest side and Creek Road to the east. The transect next to the canal initiated at a point roughly midway between a monitor well vault and the property boundary. One non-descript piece of bone (Photo Log 8) was identified approximately 600 feet east of the toe of the soil berm. The bone occurred as surface float and did not exhibit any indications of diagenetic alteration or other preservation indicators. Paleontological resources were no identified in the PFV for any transects in this part of the property.

8.0 CONCLUSIONS

Sespe has prepared this PRA in accordance with ordinary and generally accepted standards of practice, using the SVP 2010 Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Based on the scope of our inquiry documented in this PRA report, paleontological resources were not identified at the Project site, nor is there reported occurrences of fossil material within the alluvium presently extracted at the adjoining Los Banos mining operations.

Moreover, a database search performed by the University of California Museum of Paleontology (UCMP) did not identify any recorded fossil localities within the Project vicinity; only one recorded vertebrate locality was found approximately 10 miles south of the site. The fossil material is documented a occurring on in the Corcoran Clay, which is stratigraphically below the bottom of the target alluvial resource proposed to be mined as part of the Project. Based on these findings, it is Sespe opinion the rock units that would be mined have Low Potential (SVP, 2010) for yielding significant fossils. Thus, the Project is not expected to directly or indirectly affect paleontological resources, and the impact level is less than significant, with no mitigation required.

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ATTACHMENT A

Paleontology *Curriculum Vitae* – Brian G. Anderson, P.G.

Curriculum Vitae

Paleontology

BRIAN G. ANDERSON, P.G.

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BIOGRAPHY

Brian G. Anderson is currently a principal consultant with Sespe Consulting, Inc., where he leads the firm's earth sciences practice, including paleontological resources studies. He is a licensed professional geologist and has worked as a research scientist, environmental consultant, and executive manager, overseeing professional engineers, scientists, planners and environmental permitting, and reclamation specialists. His broad array of expertise has been applied to land use and environmental projects throughout the western United States, Mexico, and Canada. Additionally, Mr. Anderson served on the California Department of Conservation's Special Review Panel, which was convened by the Director to assess the overall effectiveness and organizational management of the Office of Mine Reclamation. Following this assignment, he was appointed in 2014 by California Governor Brown to the State Mining and Geology Board, where he presently serves as the mineral resource conservation member.

As a research scientist, Mr. Anderson's interests are primarily focused on vertebrate taphonomy and ichnology, with emphasis on the interior Cretaceous seaway of North America. His work has specialized in utilizing biogenic sedimentary fabrics as paleoenvironmental indicators in response to sea-level change. While at Mesa Southwest Museum, he co-led the Southwest Paleontological Society, a nonprofit volunteer organization dedicated to educating the public about Arizona's geologic and fossil history through field-based and laboratory programs. He is recognized as an expert on the taphonomy of dinosaur skin impressions and other trace fossils. Additionally, Mr. Anderson has been published in numerous scholarly journals and books and consulted with Walt Disney Imagineering on *Dinoland* (part of Disney's Orlando, Florida Animal Kingdom project).

EDUCATION

- ***M.S., Geological Sciences**, University of California, Riverside*
- ***B.S., Geological Sciences,** University of Southern California*

PROFESSIONAL REGISTRATIONS AND LICENSES

- Professional Geologist, California (#7509)
- Professional Geologist, Idaho (#1028)
- Registered Geologist, Arizona (#3502)
- Registered Geologist, Oregon (#G2322)
- Licensed Hydrogeologist, Washington (#529)

PROFESSIONAL EXPERIENCE

University of California, Riverside, 1992, Researcher

- ***Paleontological Survey and Analysis of Eocene Ichnofabrics in the Torrey Pines Sandstone, University of California, Solana Beach, California***

  Conducted a detailed analysis of *Ophiomorpha*-dominated ichnofabrics preserved along a wave-cut terrace in north San Diego County, California. Developed a portable vertical grid system to collect ichnofabric index data and measure geometric configurations of fossil burrow systems.

University of California Research Expeditions Program, 1992-1993, Co-Leader

- ***Investigation, Excavation and Curation of Hadrosaur Skin Impressions, Thompson Canyon, Utah***

  Served as a co-leader for a twelve-person field crew to excavate the remains of a hadrosaur with preserved impressions of the integument. Specific duties included collecting field data, supervising crew work, and preparing large fossils specimens for helicopter transport. Served as the primary researcher with focused study on the taphonomy and paleoenvironment. The study integrated trace element and stable isotope geochemistry along with inchnology and stratigraphy to develop a model for preservation.

Mesa Southwest Museum, Mesa, AZ, 1997-1998, Adjunct Museum Curator

- ***Paleontological Excavation and Investigation of Hadrosaurian Dinosaur Remains, Playas Peak, New Mexico***

  Served as principal investigator on a newly discovered dinosaur with preserved skin impressions. Duties included directing volunteer staff during excavation, mapping the remains in the quarry, and overseeing the preparation of the specimens. Responsible for describing and conducting original research on the fossil material.

- ***Southwest Paleontological Society Volunteer Program, Mesa, AZ, Co-Leader***

  Provided training, education, and field direction in support of the museum-sponsored volunteer program, and encouraged public participation in the study and curation of fossils in Arizona. Duties included hands-on instruction in the use of laboratory equipment and tools for the preparation of fossil material, leading field trips, advising and editing Society newsletters and conference publications, and teaching members regional geology and paleontology.

- ***Paleontological Survey, Collection and Investigation of the Moreno Hill Formation, Mesa Southwest Museum, Zuni Basin Project, West-Central, New Mexico***

  Responsible for establishing grid-cell collection techniques for vertebrate material and conducting taphonomic studies of fossil material preserved in situ. Other duties included directing field crew members and assessing the viability of new fossil sites in the study area.

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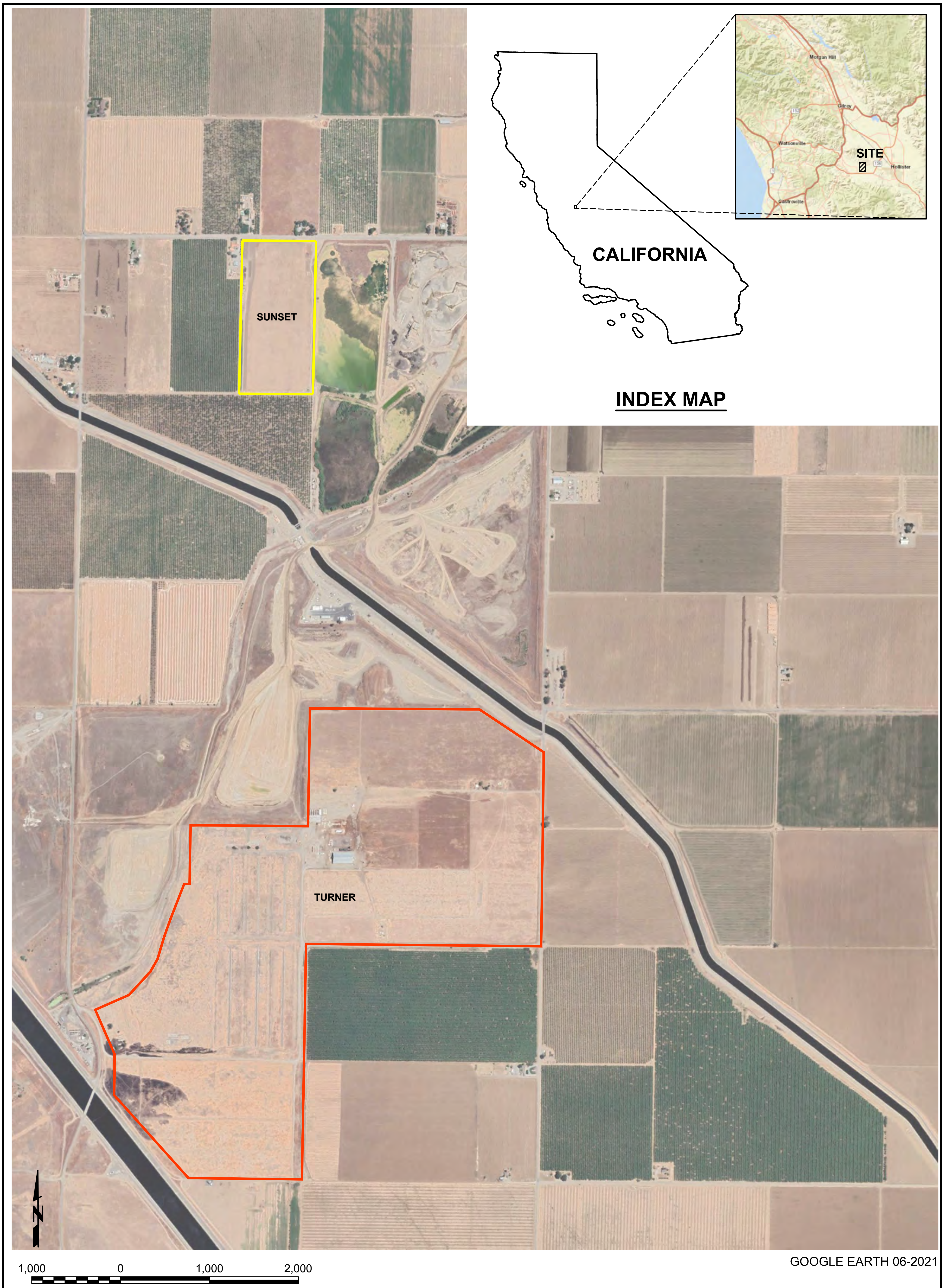
ATTACHMENT B

Figures/Transects



GOOGLE EARTH 06-2021

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VULCAN MATERIALS COMPANY
TRIANGLE ROCK PRODUCTS LOS BANOS
VICINITY MAP

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BA

FIGURE 1

DATE: APRIL 2022

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GOOGLE EARTH 06-2021

NOTE: 1) ALL LINE LOCATIONS ARE APPROXIMATE.
2) ARROWS DENOTE DIRECTION OF TRAVEL.

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VULCAN MATERIALS COMPANY
TRIANGLE ROCK PRODUCTS LOS BANOS
SUNSET TRANSECT LINES

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN

FIGURE 2

DRAWN BY: G.CAMUS
CHECKED BY: BA
DATE: APRIL 2022

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GOOGLE EARTH 06-2021

NOTE: 1) ALL LINE LOCATIONS ARE APPROXIMATE.
2) ARROWS DENOTE DIRECTION OF TRAVEL.

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VULCAN MATERIALS COMPANY
TRIANGLE ROCK PRODUCTS LOS BANOS
TURNER TRANSECT LINES

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BA

FIGURE 3

DATE: APRIL 2022

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ATTACHMENT C

Photo Log

Paleontological Resources Assessment
Triangle Rock Products Los Banos Project

Pedestrian Field Survey Photographic Log

Photo 1: Invertebrate shell fragment (at end of pen). Sunset property, east-west transect line 2.

Photo 2: Bleached avian femur bone. Sunset property, east-west transect line 4.

Photo 3: Bone fragment. Sunset property, east-west transect line 5.

Photo 4: Bone fragment with desiccated soft tissue. Sunset property, east-west transect line 5.

Photo 5: Bone fragment as surface float. Sunset property, diagonal transect.

Photo 6: Bleached bone as surface float. Turner property, north-south transect line 10.

Photo 7: View of north-south trench wall, facing southeast. Turner property, transect line 11.

Photo 8: Bone fragment as surface float. Turner property, east-west transect line 6.

APPENDIX G

Drainage Report (Sespe, 2022)

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DRAINAGE REPORT
TRIANGLE ROCK PRODUCTS – LOS BANOS SAND AND GRAVEL QUARRY

Vulcan Materials Company – Western Division
Merced County, California

December 2022

Prepared for:
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DRAINAGE REPORT

Vulcan Materials Company
Triangle Rock Products – Los Banos Sand and Gravel Quarry
Merced County, California

December 2022

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DRAINAGE REPORT

Vulcan Materials Company
Triangle Rock Products – Los Banos Sand and Gravel Quarry
Merced County, California

December 2022

1.0 INTRODUCTION

Triangle Rock Products, dba Vulcan Materials Company – Western Division (Vulcan) owns and operates the Los Banos Sand and Gravel Quarry, located approximately four (4) miles southwest of the City of Los Banos in Merced County, California. The existing quarry site is approximately 607 acres and includes an aggregate processing plant, hot mix asphalt plant, and a tenant-owned ready-mix concrete (RMC) batch plant. Collectively, these facilities comprise the Los Banos Operations. To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as furnish aggregates for hot mix asphalt and RMC products, Vulcan desires to augment the existing sand and gravel reserves through entitling two properties that adjoin the existing Los Banos Sand and Gravel Quarry, the Turner and Sunset properties. Vulcan has applied to the County of Merced (County) to conduct aggregate material extraction and ancillary activities on the 33-acre Sunset and 308-acre Turner properties located adjacent to the existing quarry (Project).

1.1 Purpose and Scope

This report has been prepared to satisfy the requirements of the Public Resources Code, Division 2, Chapter 9, Section 2710 et seq. (Surface Mining and Reclamation Act of 1975, as amended by Statutes of 1980 [SMARA]) and as a supplement to the proposed Reclamation Plan amendment. Please note that Merced County does not promulgate any guidance or requirements regarding hydrologic studies, so the analyses contained herein have been prepared using standard engineering practices and judgements. The scope of this report is as follows:

- Identification of the tributary watershed(s) to the Project site.
- Identification of floodplain(s) impacting the site.
- Calculation of the on-site runoff volumes and pit inundation depth for the maximum extent of mining.
- Calculation of the on-site runoff volumes and pit inundation depth for the final reclaimed condition.
- Summary of impacts and conclusions.

Note that the existing Los Banos Sand and Gravel Quarry operations are not part of the Project and have not been evaluated in this report.

2.0 PROJECT DETAILS

2.1 Project Location

The existing Los Banos Sand and Gravel Quarry is in the western part of Merced County, approximately four (4) miles southwest of the City of Los Banos at latitude 37.03° N and longitude 120.89° W. Surrounding land uses near the existing quarry include agricultural land and several rural residences. The Turner Property is located at 22338 Alvarado Trail, approximately five (5) miles southwest of the existing Los Banos Operations on approximately 308 acres adjacent to the existing quarry. The Sunset Property is a rectangular, approximately 33-acre parcel located west of the existing quarry, immediately south of Sunset Avenue. These areas are shown on Figure 1 in Attachment 1.

2.2 Project Overview

The Project consists of the addition of Sunset and Turner properties to the existing Los Banos Sand and Gravel Quarry operations. The addition will not involve changes to Vulcan's existing mining or processing operations, other than including the Sunset and Turner properties for eventual material extraction and fines/overburden placement. Aggregate material extraction activities on the Sunset and Turner properties will include:

- The surface will be prepared by removing the vegetative cover and recovering the soil horizon for storage and future re-use as a growing medium in support of reclamation. Topsoil and subsoil recovered from the Turner property will be stored in perimeter berms generally 4.5 to 5.5 feet high along Creek Road, Alvarado Trail, and along the southernmost boundary site at the edge of the Turner property. Topsoil and subsoil recovered from the Sunset property will be stored in berms along the northern and western sides of the Sunset pit in berms designed to be approximately 7 feet in height.
- Mineral resource extraction activities following site preparation at the Sunset and Turner properties, either concurrently or separately depending on the grade of the alluvial deposit, to a maximum depth of 72 feet below natural ground surface (bgs). Final slope configuration will be 2:1 (horizontal to vertical). The final mining depth will be dependent on topographic surface elevations as well as the depth to groundwater.
- Maintenance of a minimum 20-foot buffer between pit slopes and the top bank of Los Banos Creek at the Turner Property.
- Construction and maintenance of internal haul roads at the Sunset and Turner properties.
- Operation of materials trucks to move material from the Sunset and Turner properties to the existing processing plant. For the Sunset Property, the extracted material will be transported to the processing plant via existing access routes east of this mining area. For the Turner Property, materials will be conveyed across Alvarado Trail to the existing internal haul road that connects with the processing plant.

2.3 Reclamation

As previously stated, mining will continue in the same manner as present. Mining in the individual extraction areas is considered as a single operational wide phase, followed by site-wide reclamation once the resources are fully depleted at the quarry.

The final, reclaimed condition of the mining areas at the Sunset and Turner properties will consist of pits with a maximum depth of 72 feet bgs and side slope configuration of 2:1 (as described above). Once the maximum pit configurations have been reached, variable amounts of pit backfill consisting of silt, fines, over- or interburden, or other off-specification aggregate materials will be placed throughout the Sunset and Turner pits. Specifically, in the Sunset pit, fines from the processing plant will be transferred to the mining pits as a slurry; deposition of this material will continue to fill the exhausted portion of the pit until reaching a level approximately 5 feet from the pre-mining surface grade. Overburden materials will be handled within the Turner pit by creating discrete stockpiles and/or by buttress filling along pit slope walls; overburden placement in the central part of the northern Turner pit is expected to be approximately 20 feet thick. Final material placement elevations in all backfilled pits will remain below the pre-mining ground surface elevation.

At the completion of mining, topsoil and subsoil stored in perimeter berms will be regraded into the mined lands during reclamation to assist with re-vegetation. Revegetation of final slopes and the pit bottom will be conducted by hydroseeding. The end use for the mined lands has been designated entirely as open space.

3.0 EXISTING SETTING

3.1 Description of Existing Sunset and Turner Properties Study Area

The Sunset and Turner properties are adjacent to the existing quarry and have been historically used for agriculture, livestock, and rural residences. The Sunset Property is currently vacant. The property is surrounded by agricultural fields on its north, west, and south sides. Three rural residences are immediately adjacent to the Sunset Property, on the north side of Sunset Avenue. The Turner Property is vacant except for structures associated with an existing lease allowing agricultural-related buildings, storage, structures, and fencing related to previous agricultural operations. No rural residences are in the immediate vicinity of the Turner Property. The existing County zoning designation for both properties is Agricultural (A-1).

The Sunset and Turner properties and existing quarry sit at low-lying relatively flat area and are underlain by Quaternary-aged alluvial deposits. In general, the two properties and existing quarry slightly slope from southwest to northeast. Elevation ranges from approximately 160 to 210 feet above mean sea level (amsl).

There are three (3) water bodies in the immediate vicinity of the Sunset and Turner properties and existing quarry site: Los Banos Creek, the Delta-Mendota Canal (DMC), and Governor Edmund G. Brown California Aqueduct (California Aqueduct). Los Banos Creek transects the existing site and borders the northwestern side of the Turner Property. A portion of the Delta-Mendota Canal crosses through the quarry site. The California Aqueduct borders part of the southern edge of the existing quarry and the Turner property. Both the California Aqueduct and the Delta-Mendota Canal are elevated, lined surface water conveyance canals that do not receive or contribute to on site runoff. Please refer to Figure 1 (Attachment 1), which shows the existing site boundaries, Turner Property, and Sunset Property in relation to Los Banos Creek, the Delta-Mendota Canal, and the California Aqueduct.

The portion of Los Banos Creek that traverses the existing quarry site is an ephemeral stream, with a stream flow regime dependent on controlled releases from the Los Banos Creek Detention Dam and Reservoir. The Los Banos Creek Detention Reservoir is located approximately 1.6 miles upstream from the existing quarry site boundary. Los Banos Creek extends to the northeast from the reservoir and passes underneath the California Aqueduct via a series of concrete culverts before reaching the existing quarry site. The creek passes underneath the DMC through a pipe-arch culvert where water is also diverted from the creek into the canal by a pump. The diversion pump was recently installed as part of the US Bureau of Reclamation’s Los Banos Creek Diversion Project.

Los Banos Creek is listed on the Clean Water Act Section 303(d) list as an impaired waterway for sediment and water toxicity. Within the exiting quarry site, the Los Banos Creek alignment is within an engineered channel with a distinct bed and high banks.

3.2 Local Watersheds

The Turner property is coincident with two watersheds, the Lower Los Banos Creek (HUC 10: 1804000119) and Mud Slough (HUC 10: 1804000113). The Sunset property lies exclusively in the Lower Los Banos Creek watershed, and a small portion of the existing Los Banos Operations lie within the Mud Slough (San Joaquin River) watershed (HUC 10: 1804000121).

Water bodies in the Lower Los Banos Creek Watershed include Los Banos Creek, Garzas Creek, Mustang Creek, Quinto Creek, and the San Luis Holding Reservoir. The Mud Slough Watershed includes Laguna Seca Creek, Ortigalita Creek, Piedra Azul Creek, Salt Creek, Upper Ruth Lake-Mud Slough, and Wildcat Canyon. Both the Lower Los Banos Creek and Mud Slough watersheds belong to the Middle San Joaquin-Lower Chowchilla Watershed (HUC 8: 18040001). The watersheds are shown in Figure 1 (Attachment 1).

3.3 FEMA Floodplain

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 06047C0825G (Effective Date - December 2, 2008), the project site is impacted by a Zone X floodplain.

Zone X is identified by FEMA as areas of 0.2% (500-year) annual chance of flood; areas of 1% (100-Year) annual chance of flood with depths of less than 1 foot or areas with drainage areas less than 1 square mile; and areas protected by levees from 1% (100-year) annual chance of flood. The above referenced FIRM is included in Attachment 2.

Hydromodification of the contributing onsite basins is anticipated to reduce flows volumes in the downstream ephemeral drainages; however, quantification of the reduction in offsite flows due to the Project has not been analyzed in this report.

4.0 METHODOLOGY

The Surface Mining and Reclamation Act (SMARA) regulations (CCR, Title 14, Division 2, Chapter 8, Subchapter 1, §3503 and §3706) require surface mining and reclamation activities to be conducted in such a way to protect both on-site and downstream beneficial uses of water. In addition, erosion and sedimentation control is necessary during all phases of construction, operation, reclamation, and final closure of the mine. Per SMARA requirements, erosion control methods on site must be designed to handle runoff from not less than the 20-year, 1-hour storm. This report conservatively analyzes the 25-year, 1-hour storm, as well as the 25-year, 24-hour and 100-year, 24-hour storms for the mining operations at the Sunset and Turner properties.

Two modeling scenarios were performed for each of the three storm events. The first scenario assumes a maximum extent of mining condition featuring newly graded mine pits without established vegetation or backfilled material. The second scenario assumes a fully reclaimed condition with pits re-vegetated and backfilled in accordance with the reclamation plan.

4.1 General Methodology

Calculations in this report were performed using HydroCAD® storm water modeling software which utilizes the TR-20 methodology for watershed modeling developed by the Natural Resources Conservation Service (NRCS). For all modeled storm events, Antecedent Moisture Condition (AMC) II was used.

The TR-20 methodology scales a synthetic rainfall distribution based on a user provided rainfall depth. The NRCS has developed four synthetic rainfall distributions for use in runoff modeling. Merced County is within the Type I boundary, as identified in Exhibit 1 below.

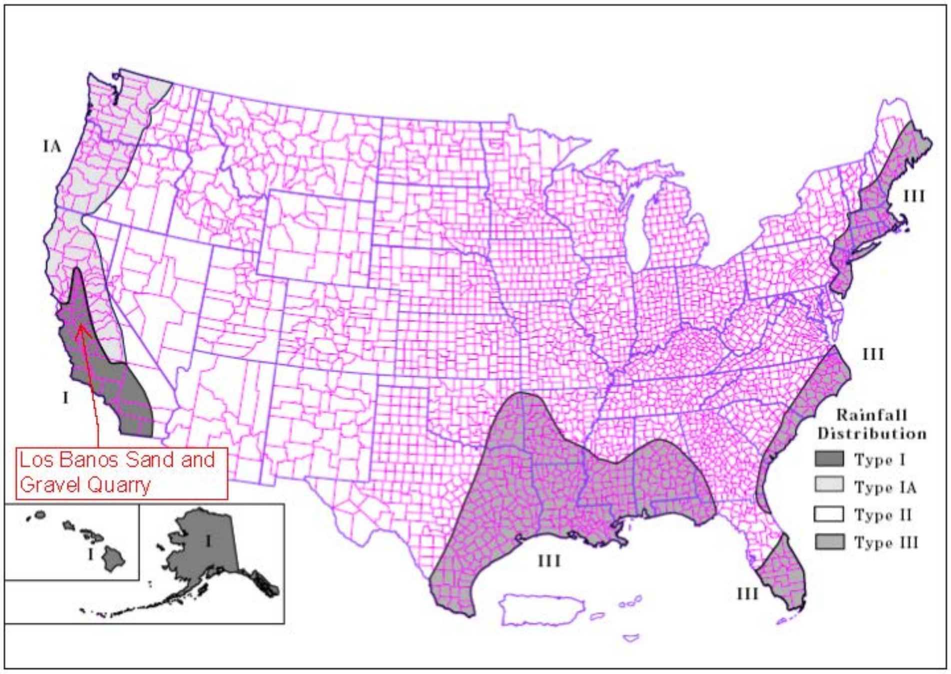


Exhibit 1: NRCS Synthetic Rainfall Distribution Areas

The TR-20 methodology uses curve numbers, which are parameters used to predict rainfall excess (i.e., runoff). Composite curve numbers were calculated in HydroCAD® based on the site's hydraulic soil group (HSG) and ground cover conditions.

Time of concentrations (Tc) values, the time required for runoff to travel from the hydraulically most distant point in the watershed to the outlet, were assumed to be zero (i.e., instantaneous) for the modeling in this report because run-off from the site was not of concern due to topographic conditions (large mining pits). The model consists of hydrologically disconnected drainage sub-catchments, thus treating Tc as zero models the instantaneous runoff from each catchment surface. For accurate results with short Tc values, the rainfall distribution must include enough detail to accurately indicate the rainfall intensity for the specified duration. HydroCAD®, the modeling software used in this report, uses a polynomial representation for the most common rainfall distributions (e.g., Type I, IA, II, III) to ensure that very short durations are well represented. In addition, while the Tc is a critical variable used in calculating the peak runoff flow rates, the Tc has little effect on the calculated total runoff volume—which was the primary focus of this analysis.

4.2 Hydrology

The Sunset and Turner properties are not expected to receive significant local run-on from the surrounding properties. As previously discussed, topsoil/subsoil berms will be placed along significant portions of the Turner and Sunset properties perimeters. Therefore, significant run-on is not expected during or after mining. Topsoil and subsoil stored in perimeter berms will be regraded into the mined lands during reclamation to assist with re-vegetation. Despite the absence of perimeter berms following reclamation, significant run-on is not expected due to the relatively flat topography and surrounding land uses. Additionally, Los Banos Creek, the California Aqueduct, and Delta-Mendota Canal (DMC) are not expected to contribute runoff to the Turner and Sunset properties during large storm events via floodplain activation. The California Aqueduct and DMC are concrete lined surface water conveyance systems with elevated channels that do not receive direct runoff. Los Banos Creek is a high-banked, engineered channel with flows predominantly controlled by releases from the Los Banos Detention Dam and Reservoir. The Los Banos Creek was dammed to detain floodwater to protect the City of Los Banos San Luis Canal, the DMC, the City of Los Banos and adjacent areas from damaging floods. Flood control releases from the Los Banos Creek Detention Reservoir are made according to United States Army Corp of Engineers flood control releases between September 20 and March 15. Waters released to Los Banos Creek are also intercepted by facilities at the DMC-Los Banos Creek intersection and diverted into the DMC.

Three (3) storm events were modeled for the Project site using HydroCAD®. The precipitation values used in the model were obtained from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 8, Version 2, Precipitation Frequency Data Server (PFDS). Because the NOAA PFDS does not have a 20-year, 1-hour storm precipitation estimate (the SMARA design storm standard), the 25-year, 1-hour point precipitation frequency estimate was used in its place. As previously discussed, the model also analyzed the 25-year, 24-hour and 100-year, 24-hour point precipitation frequency estimates (Table 1).

Table 1: Precipitation Values

Storm Frequency	Duration	Precipitation (inches)
25-year	1-hour	0.693
25-year	24-hour	2.14
100-year	24-hour	2.80

4.3 Maximum Extent of Mining Condition

Direct precipitation, and resulting runoff, will not flow from the Sunset or Turner properties when mined to the maximum extent. The mining pits on the Sunset and Turner properties will capture all on-site rainfall and any local run-on from the surrounding properties. Extremely nominal quantities of water may fall on the outside slopes of the perimeter berms located along Creek Road, Alvarado Trail, and along the southernmost boundary site at the edge of the Turner property. All berms are in non-industrial areas on the outer edge of the property. The berms are not expected to contribute significant runoff due to their small size. Additionally, the maintenance and management of the berms will be described in the site specific SWPPP implemented to comply with the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities (Industrial General Permit).

Composite curve numbers were calculated for the end of mining condition in HydroCAD® based on assigned ground cover designations and the site's hydraulic soil group (HSG) as determined by the NRCS web soil survey. Based on data gathered from the web soil survey, the Sunset and Turner Properties are underlain by clay loam/loam soils (HSG B and C). The existing condition land cover detail is shown in Table 2.

Table 2: Sunset and Turner Properties Vegetation Communities/Land Cover Types, Maximum Extent of Mining Condition

Area	HydroCAD® Land Cover Description	Area (acres)	SCS Curve Number (AMC II)
Sunset Property	Dirt Roads, HSG B	3.617	82
	Dirt Roads, HSG C	1.902	87
	Newly Graded Area, HSG B	19.913	86
	Newly Graded Area, HSG C	7.589	91
Turner Property	Dirt Roads, HSG B	15.465	82
	Newly Graded Area, HSG B	289.865	86

The HydroCAD® model used for the maximum extent of mining condition assumes that drainage to the Sunset Property is comprised of one (1) sub-catchment. The model assumes that drainage to the Turner Property consists of two (2) sub-catchments. Table 3 displays the model inputs and computed adjusted curve number and anticipated runoff from the end of mining site condition during the three (3) storm events. HydroCAD® model output files are included in Attachment 3.

Table 3: Sunset and Turner Properties Hydrologic Data, Maximum Extent of Mining Condition

Drainage Area	Area (acres)	Total Pit Capture Capacity (acre-feet)	Storm Event	Adjusted CN*	Total Runoff (acre-feet)
Sunset 1 (SU01)	33.02	786	25-year, 1-hour	87	0.22
			25-year, 24-hour		2.80
			100-year, 24-hour		4.31
Turner 2 (TU02)	249.24	7,859	25-year, 1-hour	86	1.38
			25-year, 24-hour		19.86
			100-year, 24-hour		31.00
Turner 3 (TU03)	56.09	1,080	25-year, 1-hour	85	0.25
			25-year, 24-hour		4.20
			100-year, 24-hour		6.65

* The adjusted CN is the composite curve number calculated based on the weighted CN values and areas shown in Table 2.

The inundation areas for the 100-year storm events are shown on Figure 2 (Attachment 1).

4.4 Reclaimed Condition

Direct precipitation, and resulting runoff, will not flow from the Sunset or Turner properties in their fully reclaimed condition. The reclaimed mining pits on the Sunset and Turner properties will capture all on-site rainfall and any local run-on from the surrounding properties.

The reclaimed condition land cover detail and subsequent curve numbers are shown in Table 4.

Table 4: Sunset and Turner Properties Land Cover Type, Reclaimed Condition

Area	HydroCAD® Land Cover Description	Area (acres)	SCS Curve Number (AMC II)
Sunset Property	Brush, Fair, HSG B	23.530	56
	Brush, Fair, HSG C	9.491	70
Turner Property	Brush, Fair, HSG B	305.33	56

The HydroCAD® model used for the reclaimed condition assumes that drainage to the Sunset Property is comprised of one (1) sub-catchment. The model assumes that drainage to the Turner Property consists of three (3) sub-catchments. Table 5 displays the model inputs and computed adjusted curve number and anticipated runoff from the reclaimed site condition during the three (3) storm events. HydroCAD® model output files are included in Attachment 3.

Table 5: Sunset and Turner Properties Hydrologic Data, Reclaimed Condition

Drainage Area	Area (acres)	Total Pit Capture Capacity (acre-feet)	Storm Event	Adjusted CN*	Total Runoff (acre-feet)
Sunset 1 (SU01)	33.02	127	25-year, 1-hour	60	0.00
			25-year, 24-hour		0.24
			100-year, 24-hour		0.73
Turner 2 (TU02)	133.24	5,670**	25-year, 1-hour	56	0.00
			25-year, 24-hour		0.43
			100-year, 24-hour		1.85
Turner 3 (TU03)	116.00		25-year, 1-hour	56	0.00
			25-year, 24-hour		0.37
			100-year, 24-hour		1.61
Turner 4 (TU04)	56.09	1,080	25-year, 1-hour	56	0.00
			25-year, 24-hour		0.18
			100-year, 24-hour		0.78

* The adjusted CN is the composite curve number calculated based on the weighted CN values and areas shown in Table 2.

**Reflects cumulative pit capture capacity for TU02 and TU03.

Note that, as modeled, the reclaimed site conditions are not expected to generate any quantifiable runoff during the 25-year storm event. The inundation areas for the 100-year storm events are shown on Figure 3 (Attachment 1).

5.0 SUMMARY OF IMPACTS

As identified below, implementation of the Project is in conformance with SMARA performance standards, which require surface mining and reclamation activities to be conducted in such a way to protect both on-site and downstream beneficial uses of water.

5.1 Potential Impacts to Surrounding Water Bodies

No direct encroachment into the surrounding water bodies (i.e., Los Banos Creek, the California Aqueduct, or Delta Mendota Canal) or existing floodplain is planned during the expansion of mining into the Sunset and Turner properties. Local drainage within the mining operation will be collected in the excavated pits and will not be released.

5.2 Potential Impacts on the Project Site Drainage

As shown on Figure 2 and Figure 3 (Attachment 1), the pit bottoms will retain all storm water from the modeled storm events on-site for both the maximum extent of mining and reclaimed conditions. The proposed mining pits will not contribute to off-site flow in either modeled condition. The pits from the mining operation will provide storage basins capable of capturing the full extents of the modeled storm events. Due to the small tributary area and nature of the soil, debris flows are anticipated to be negligible and to be contained within the pit. As such, the site is not expected to have any significant impacts to downstream areas.

6.0 REFERENCES

Custom Soil Resource Report for Los Banos Sand and Gravel Quarry (Merced County Western Part, California). United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soils Survey (Web). August 24, 2022.

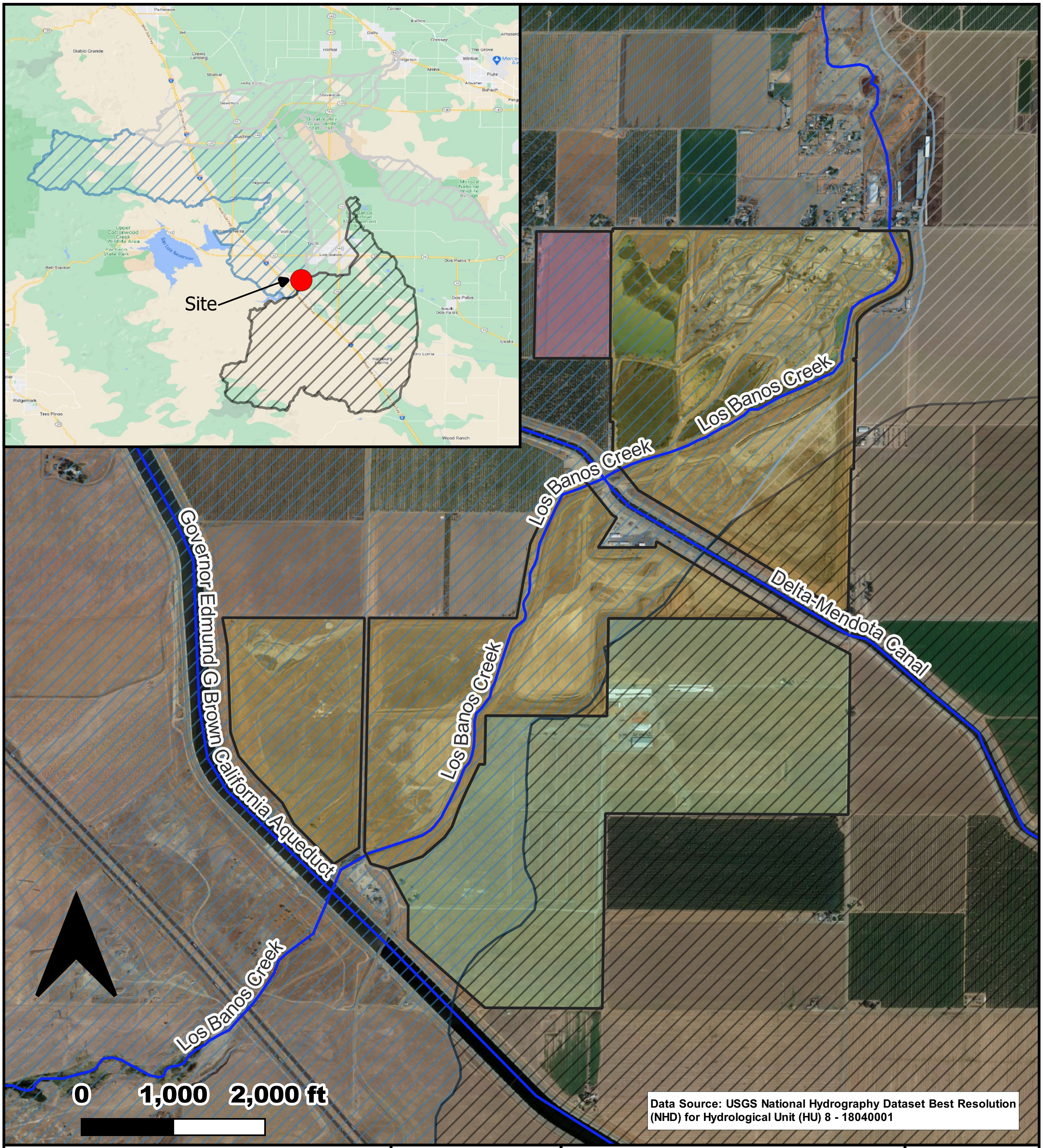
Federal Emergency Management Agency (FEMA) National Flood Insurance Program Flood Insurance Rate Map (FIRM). Flood Map Service Center (Web). Panel 825 of 1225, effective 08/02/2008.

Reclamation Plan, Triangle Rock Products Los Banos Sand and Gravel Quarry (Draft). Sespe Consulting, Inc., September 2022.

U.S. Geological Survey, 2022, National Hydrography Dataset (USGS National Hydrography Dataset Best Resolution (NHD) for Hydrological Unit (HU) 8 - 18040001 (published 20220812)), accessed August 21, 2022 at URL https://apps.nationalmap.gov/downloader/

ATTACHMENT 1

FIGURES



Data Source: USGS National Hydrography Dataset Best Resolution (NHD) for Hydrological Unit (HU) 8 - 18040001

🟪 SUNSET

🟩 TURNER

🟨 EXISTING SITE

HUC 10 WATERSHEDS

▨ LOWER LOS BANOS CREEK

▨ MUD SLOUGH

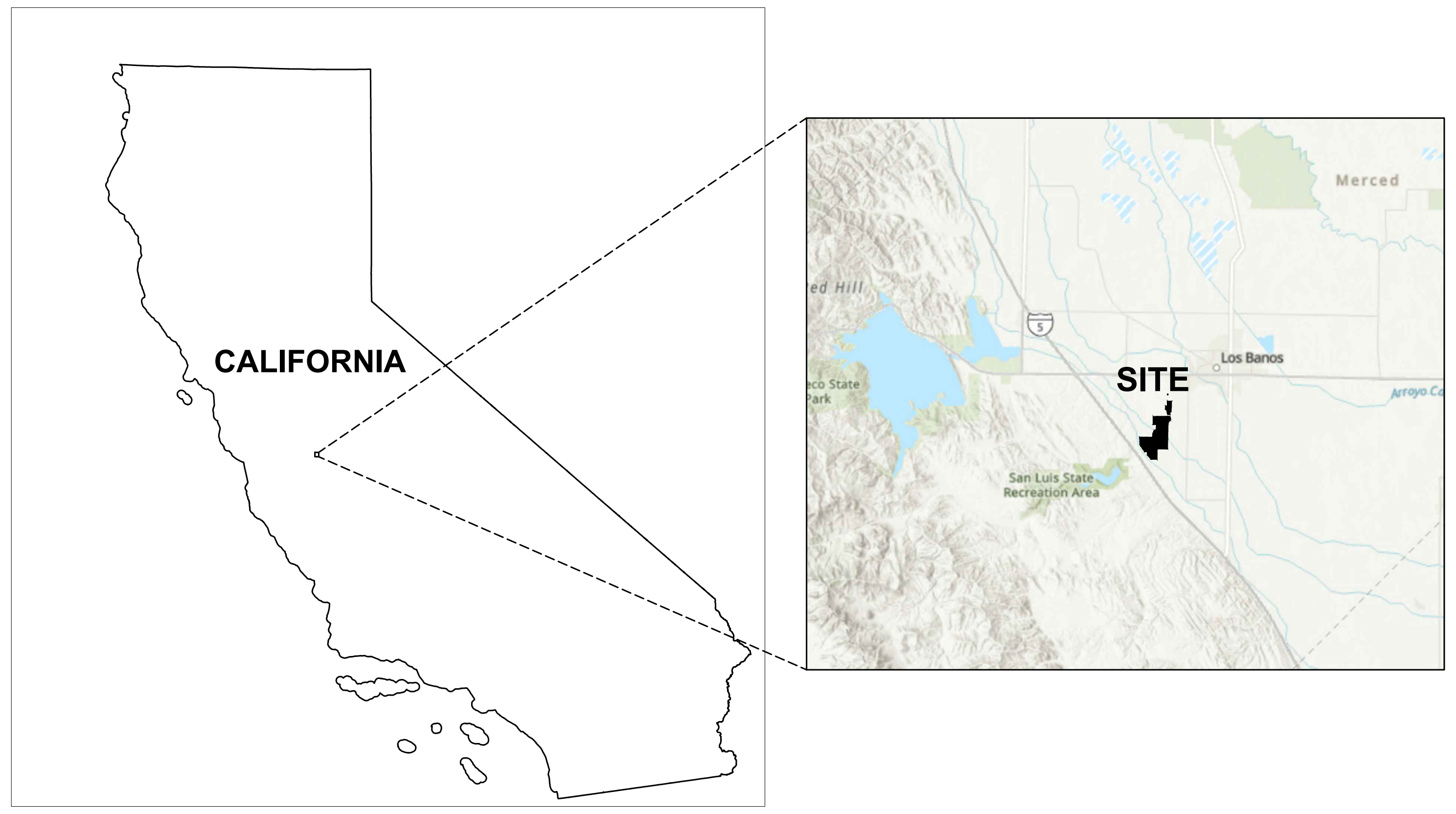
▨ MUD SLOUGH (SAN JOAQUIN RIVER)

SESPE
CONSULTING, INC.
A Trinity Consultants Company

LOCATION MAP
TRIANGLE ROCK PRODUCTS
LOS BANOS, CALIFORNIA

FIGURE 1

PROJECT #:	210509.0446	DATE:	09/20/2022
SCALE:	AS SHOWN	DRAWN BY:	SJM



INDEX MAP

NOT TO SCALE

LEGEND:

- - -	FACILITY BOUNDARY
═ 130 ═	EXISTING TOPOGRAPHY
═ 130 ═	EXISTING QUARRY MINING CONTOURS
═ 130 ═	SUNSET/TURNER MINING CONTOURS
🟩	NEW TOPSOIL/SUBSOIL BERMS
🟦	MAXIMUM INUNDATION AREA
─	DRAINAGE AREA BOUNDARY

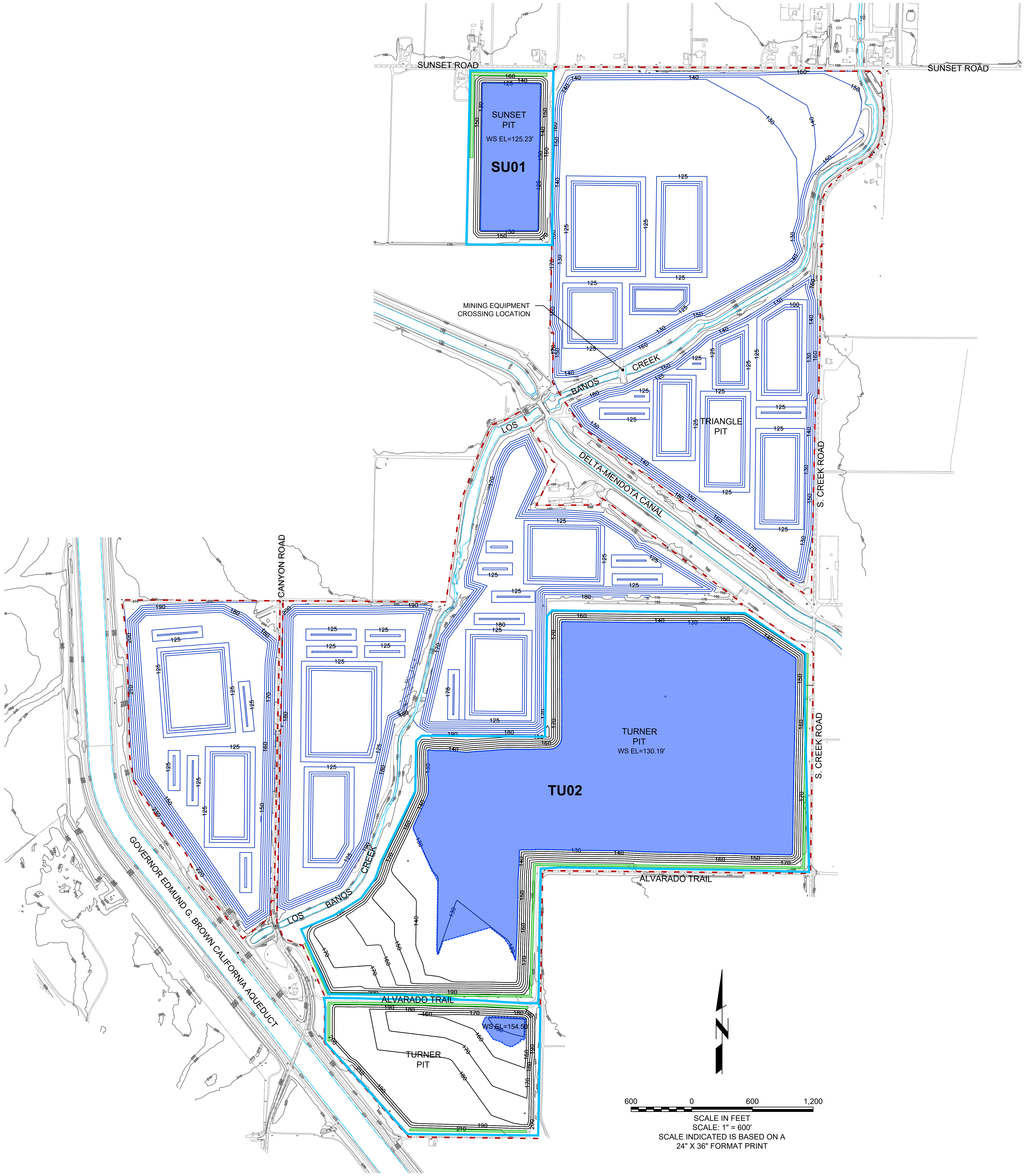
DRAINAGE ANALYSIS - MAXIMUM EXTENT OF MINING CONDITION:

ANALYSIS SUMMARY FOR THE 100-YEAR, 24-HOUR STORM (2.80 INCHES)

DRAINAGE SUB-CATCHMENT	AREA (ACRES)	TOTAL PIT CAPTURE CAPACITY (ACRE-FEET)	ADJUSTED CN	TOTAL RUNOFF (ACRE-FEET)	INUNDATION DEPTH (FEET)
SUNSET 1 (SU01)	33.02	786	87	4.31	0.23
TURNER 2 (TU02)	249.24	7,859	86	31.00	0.19
TURNER 3 (TU03)	56.09	1,080	85	6.65	0.50

NOTES:

1. THE DELINEATED DRAINAGE SUB-CATCHMENTS WERE DRAWN BASED ON THE LATEST AERIAL IMAGERY, TOPOGRAPHY, AND RECLAMATION PLAN DESIGN CONTOURS, AND ASSUME THAT THE SURROUNDING TOPOGRAPHY WILL NOT BE ALTERED SIGNIFICANTLY IN THE FUTURE.



SCALE IN FEET
SCALE: 1" = 600'
SCALE INDICATED IS BASED ON A
24" X 36" FORMAT PRINT

SOURCE DATA:

MINE DESIGN (EXISTING QUARRY AREA):
PROPOSED EXCAVATION PLAN, PLAT 4, LOS BANOS GRAVEL COMPANY, DEEM/SHININGTREE, 10/09/1989.

MINE DESIGN (SUNSET & TURNER):
RECLAMATION PLAN, TRIANGLE ROCK PRODUCTS - LOS BANOS SAND AND GRAVEL QUARRY, SESPE CONSULTING, INC., NOVEMBER 2022.

TOPOGRAPHY:
TURNER ISLAND: DIGITAL MAPPING, INC. FLIGHT DATE 06/02/2006. DENNIS HERBERT DILLMAN (CA PLS 5424).
ALL OTHER AREAS SHOWN: DIGITAL MAPPING, INC. FLIGHT DATE 02/16/2007. DENNIS HERBERT DILLMAN (CA PLS 5424).
CONTOUR INTERVAL: 10 FEET
DATUM: HORZ= NAD83, CALIFORNIA ZONE 3, US FOOT
VERT= NAVD88

Vulcan
Materials Company

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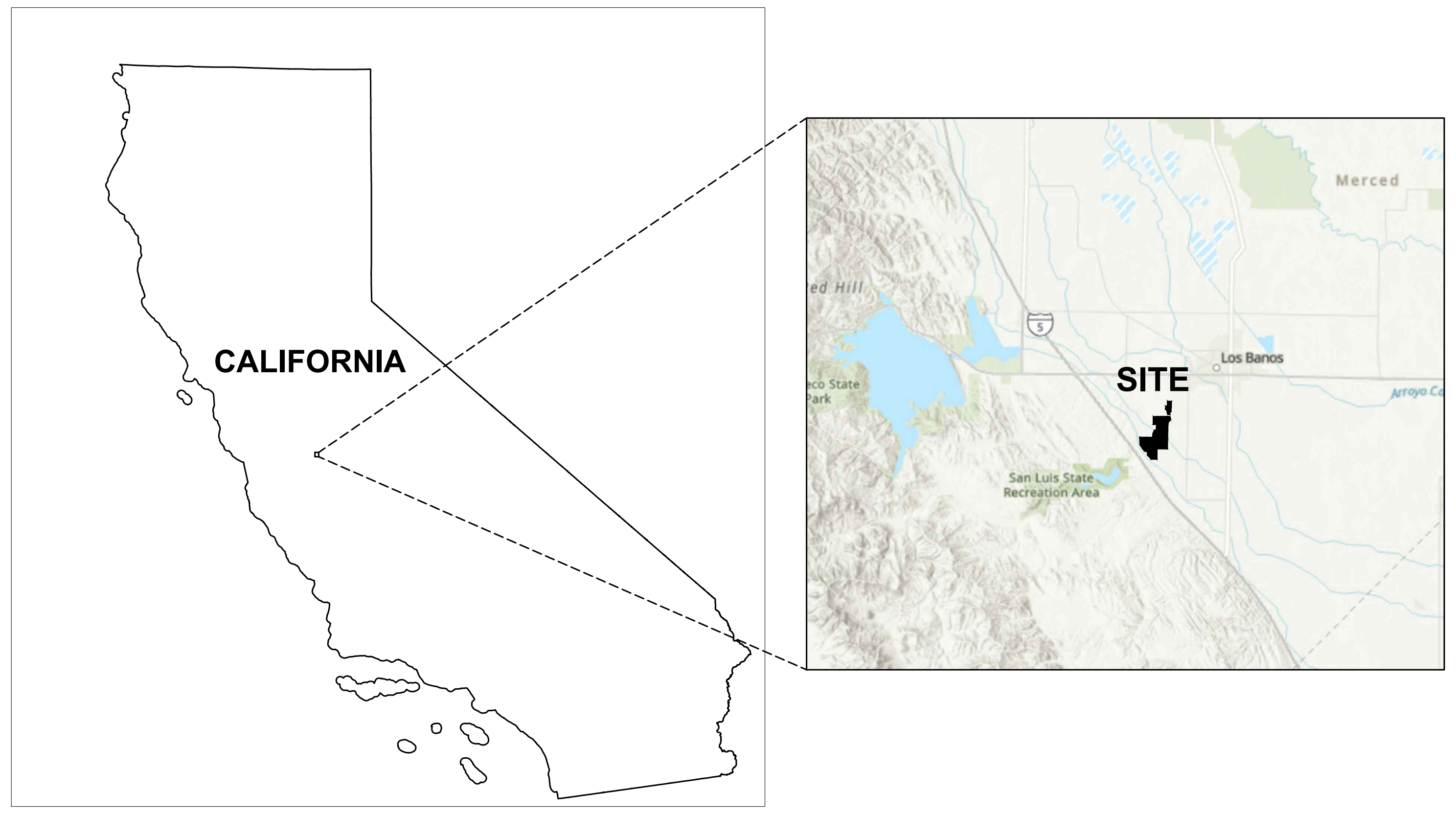
TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY

MAXIMUM EXTENT OF MINING CONDITIONS
100-YEAR, 24-HOUR STORM

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G. CAMUS
CHECKED BY: APS

FIGURE
2

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Los Banos\Technical Studies\Drainage\07 CAD–Maps\Vulcan–Los Banos_Drainage_Mining_WS_V1.1.dwg Dec 15, 2022, 6:16pm Pearce.Swerdfeger



INDEX MAP

NOT TO SCALE

LEGEND:

- FACILITY BOUNDARY
- EXISTING TOPOGRAPHY
- EXISTING QUARRY RECLAIMED CONTOURS
- SUNSET/TURNER RECLAIMED CONTOURS
- MAXIMUM INUNDATION AREA
- DRAINAGE AREA BOUNDARY

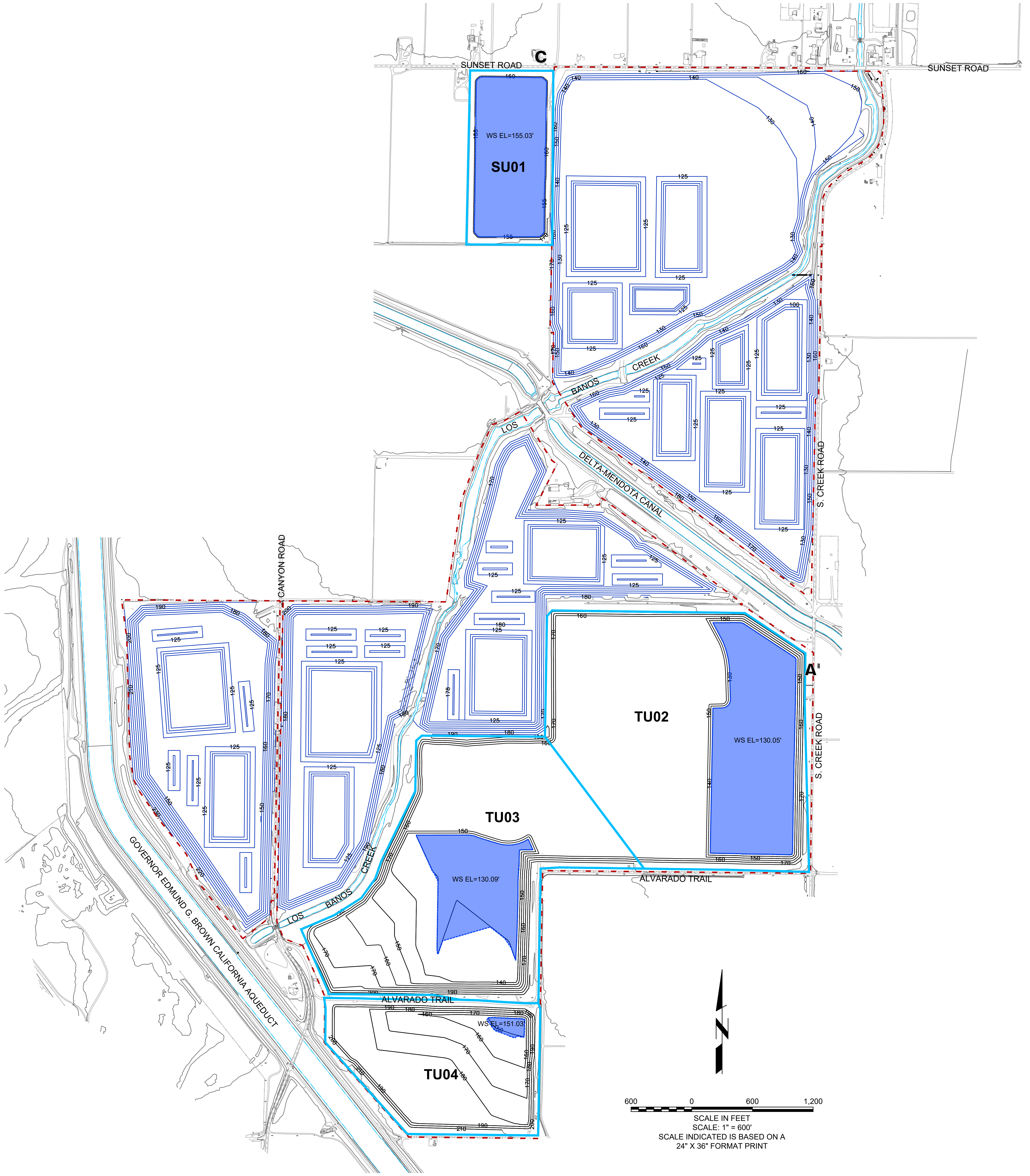
DRAINAGE ANALYSIS - RECLAIMED CONDITION:

ANALYSIS SUMMARY FOR THE 100-YEAR, 24-HOUR STORM (2.80 INCHES)

DRAINAGE SUB-CATCHMENT	AREA (ACRES)	TOTAL PIT CAPTURE CAPACITY (ACRE-FEET)	ADJUSTED CN	TOTAL RUNOFF (ACRE-FEET)	INUNDATION DEPTH (FEET)
SUNSET 1 (SU01)	33.02	127	60	0.73	0.03
TURNER 2 (TU02)	133.24	5,670	56	1.85	0.05
TURNER 3 (TU03)	116.0		56	1.61	0.09
TURNER 4 (TU04)	56.09	1,080	56	0.78	0.03

NOTES:

1. THE DELINEATED DRAINAGE SUB-CATCHMENTS WERE DRAWN BASED ON THE LATEST AERIAL IMAGERY, TOPOGRAPHY, AND RECLAMATION PLAN DESIGN CONTOURS, AND ASSUME THAT THE SURROUNDING TOPOGRAPHY WILL NOT BE ALTERED SIGNIFICANTLY IN THE FUTURE.



SOURCE DATA:

MINE DESIGN (EXISTING QUARRY AREA):
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TOPOGRAPHY:
TURNER ISLAND: DIGITAL MAPPING, INC. FLIGHT DATE 06/02/2006. DENNIS HERBERT DILLMAN (CA PLS 5424).
ALL OTHER AREAS SHOWN: DIGITAL MAPPING, INC. FLIGHT DATE 02/16/2007. DENNIS HERBERT DILLMAN (CA PLS 5424).
CONTOUR INTERVAL: 10 FEET
DATUM: HORZ= NAD83, CALIFORNIA ZONE 3, US FOOT
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TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY

RECLAIMED CONDITIONS
100-YEAR, 24-HOUR STORM

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G. CAMUS
CHECKED BY: APS

FIGURE
3

ATTACHMENT 2

FLOOD INSURANCE RATE MAP (FIRM)

drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey, SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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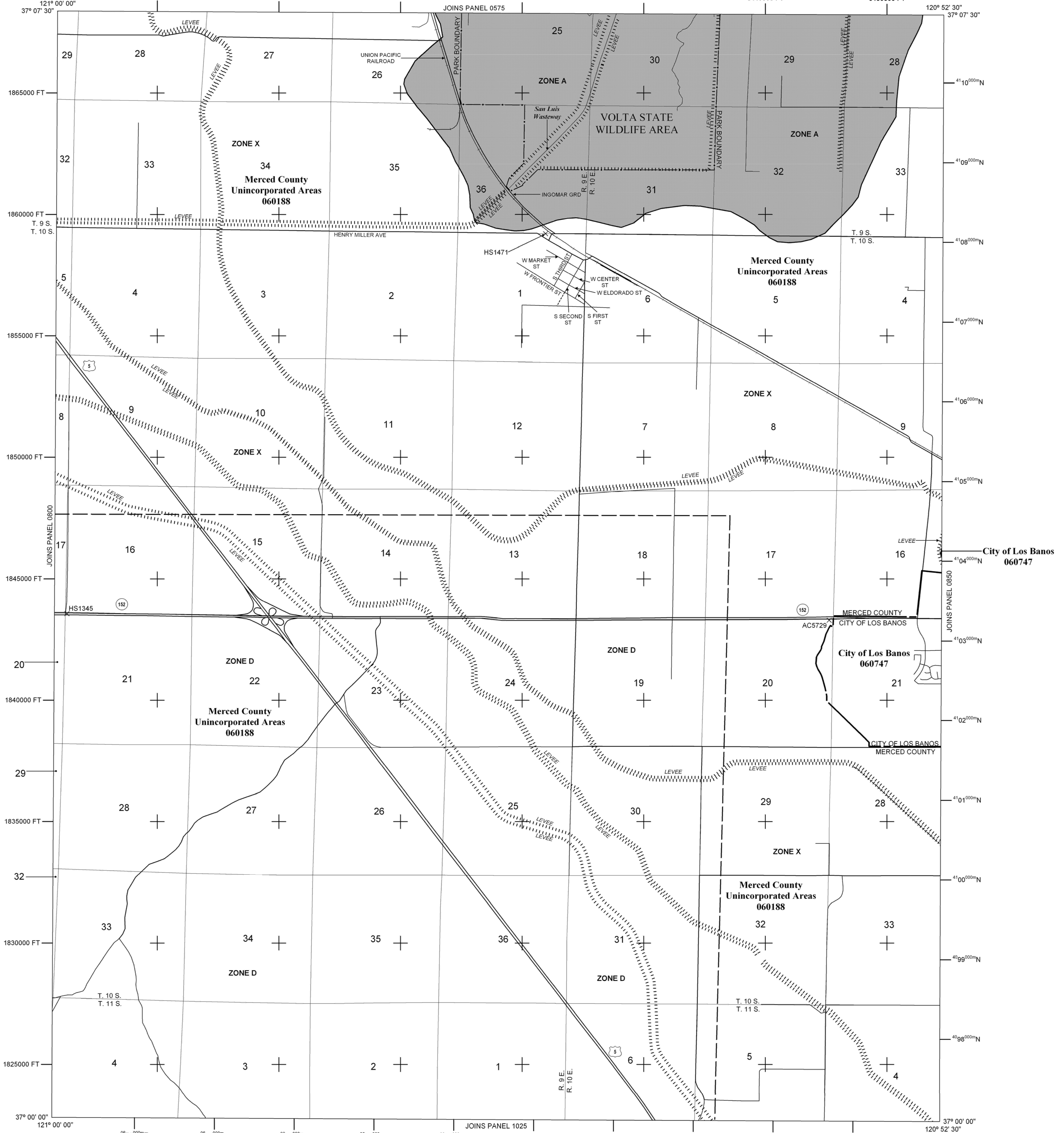

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
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ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▒ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

▧ COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

▧ OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	Floodplain boundary
— — —	Floodway boundary
— — — —	Zone D Boundary
••••••••••••••	CBRS and OPA Boundary
▬	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A ——— A	Cross section line
23 - - - - - 23	Transect line
97° 07' 30", 32° 22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000mE	1000-meter Universal Transverse Mercator grid values, zone 10
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone III (FIPSZONE 0403), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 2, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
January 5, 2006
December 2, 2008 — to update corporate limits, to change special flood hazard areas, to change zone designations, to add roads and road names, and to incorporate previously issued letters of map revision.

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N

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0825G

FIRM

FLOOD INSURANCE RATE MAP

MERCED COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 825 OF 1225

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS BANOS, CITY OF	060747	0825	G
MERCED COUNTY	060188	0825	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06047C0825G

MAP REVISED
DECEMBER 2, 2008

NOTES TO USERS

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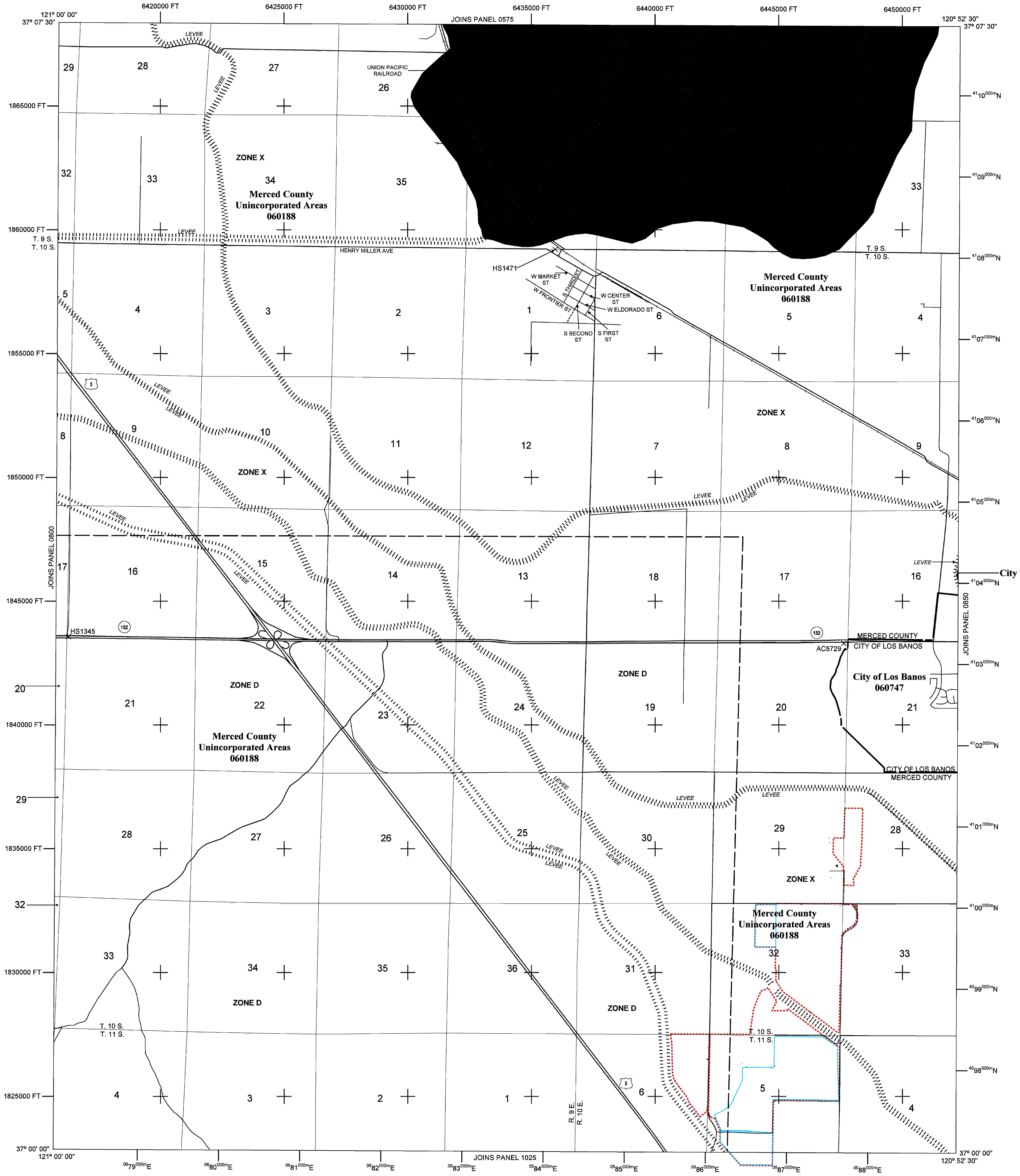

LEGEND

■ SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0825G

FIRM

FLOOD INSURANCE RATE MAP

MERCED COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 825 OF 1225

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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MAP NUMBER
06047C0825G

MAP REVISED
DECEMBER 2, 2008

Federal Emergency Management Agency

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan — Documents\CA Los Banos\Technical Studies\Drainage\07 CAD—Maps\Vulcan—Los Banos_FIRM.dwg Nov 17, 2022, 11:09am Pearce.Swerdfeger

ATTACHMENT 3

SUPPORTING DOCUMENTATION

HYDROCAD® MODEL OUTPUT FILES
NOAA PRECIPITATION ESTIMATES
NRCS SOIL REPORT

HYDROCAD® MODEL OUTPUT FILES
MAXIMUM EXTENT OF MINING CONDITION

TABLE OF CONTENTS

Project Reports

25-yr, 1-hr Event

25-yr, 24-hr Event

100-yr, 24-hr Event

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25-yr, 1-hr	Type I 24-hr		Default	24.00	1	0.69	2
2	25-yr, 24-hr	Type I 24-hr		Default	24.00	1	2.14	2
3	100-yr, 24-hr	Type I 24-hr		Default	24.00	1	2.80	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
19.082	82	Dirt roads, HSG B (SU01, TU02, TU03)
1.902	87	Dirt roads, HSG C (SU01)
309.777	86	Newly graded area, HSG B (SU01, TU02, TU03)
7.589	91	Newly graded area, HSG C (SU01)
338.351	**86**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	19.082	1.902	0.000	0.000	20.984	Dirt roads	SU01, TU02, TU03
0.000	309.777	7.589	0.000	0.000	317.366	Newly graded area	SU01, TU02, TU03
0.000	**328.860**	**9.491**	**0.000**	**0.000**	**338.351**	**TOTAL AREA**	

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SU01: Subcat SU01 Runoff Area=33.021 ac 0.00% Impervious Runoff Depth=0.08"
Tc=0.0 min CN=87 Runoff=0.67 cfs 0.223 af

Subcatchment TU02: Subcat TU02 Runoff Area=249.240 ac 0.00% Impervious Runoff Depth=0.07"
Tc=0.0 min CN=86 Runoff=1.86 cfs 1.384 af

Subcatchment TU03: Subcat TU03 Runoff Area=56.090 ac 0.00% Impervious Runoff Depth=0.05"
Tc=0.0 min CN=85 Runoff=0.26 cfs 0.253 af

Total Runoff Area = 338.351 ac Runoff Volume = 1.860 af Average Runoff Depth = 0.07"
100.00% Pervious = 338.351 ac 0.00% Impervious = 0.000 ac

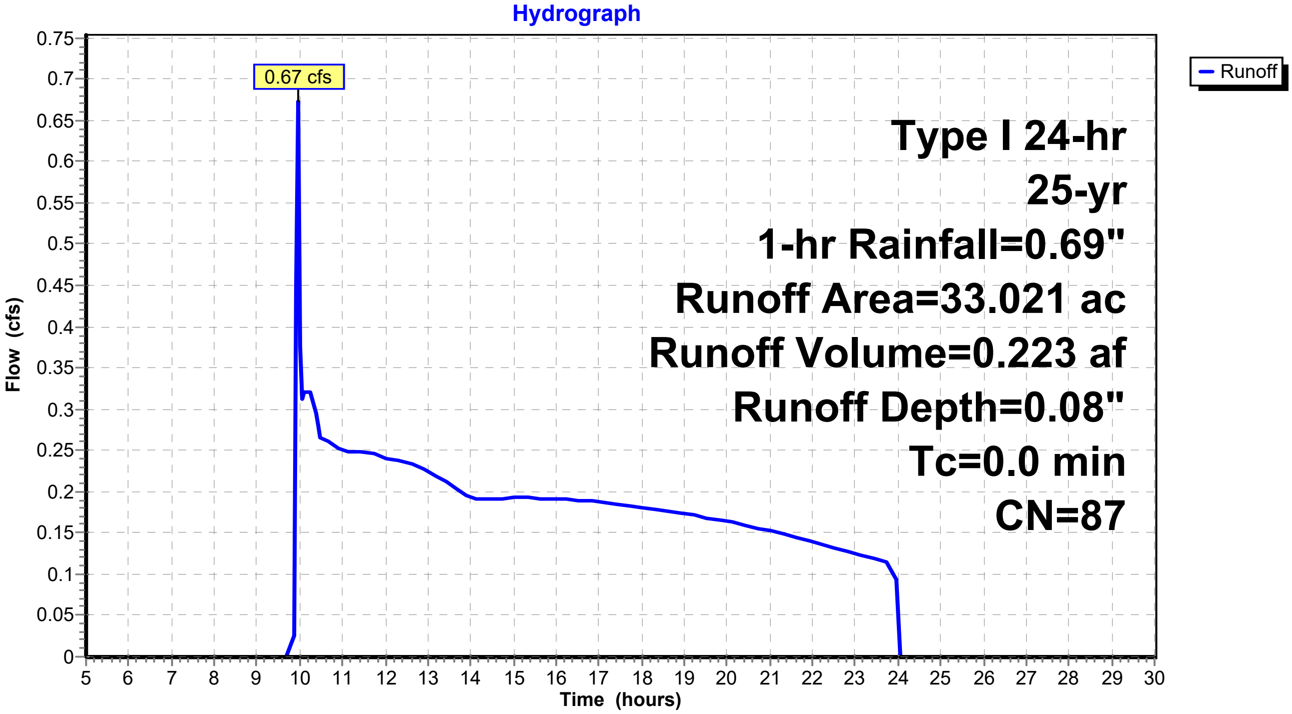
Summary for Subcatchment SU01: Subcat SU01

Runoff = 0.67 cfs @ 9.95 hrs, Volume= 0.223 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-yr, 1-hr Rainfall=0.69"

Area (ac)	CN	Description
3.617	82	Dirt roads, HSG B
1.902	87	Dirt roads, HSG C
19.913	86	Newly graded area, HSG B
7.589	91	Newly graded area, HSG C
33.021	87	Weighted Average
33.021		100.00% Pervious Area

Subcatchment SU01: Subcat SU01



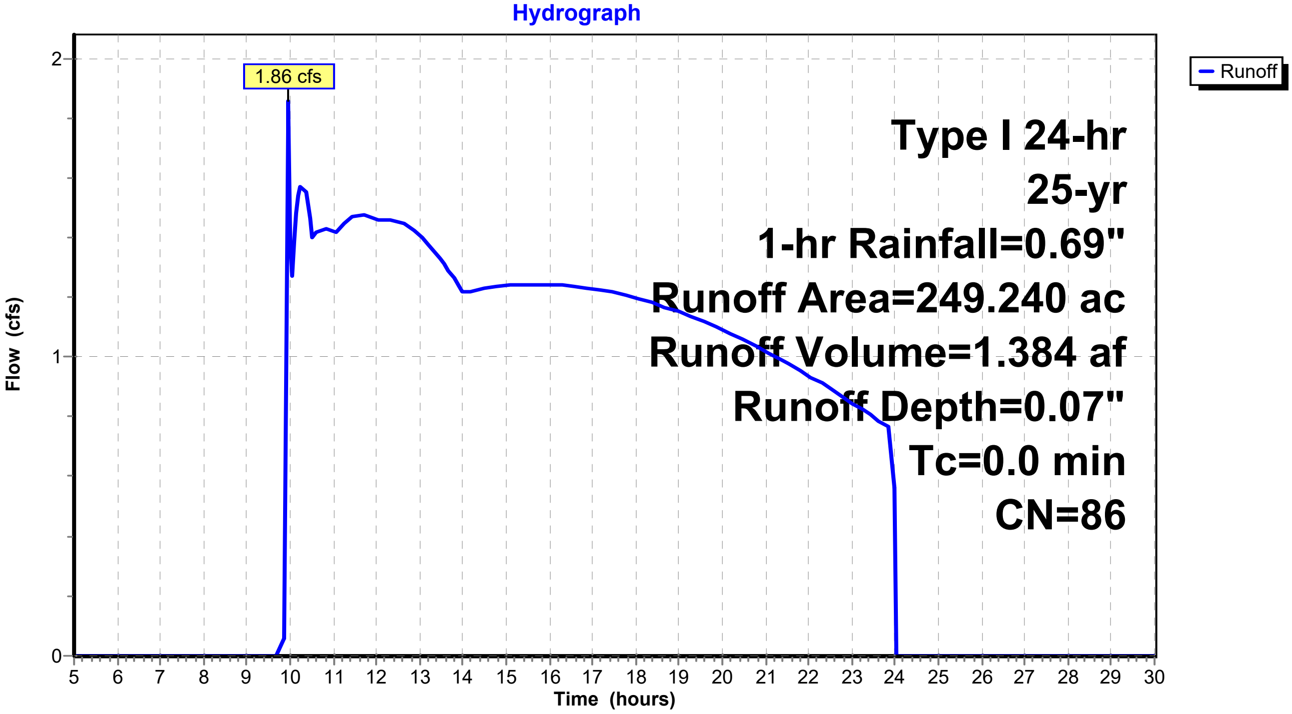
Summary for Subcatchment TU02: Subcat TU02

Runoff = 1.86 cfs @ 9.97 hrs, Volume= 1.384 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-yr, 1-hr Rainfall=0.69"

Area (ac)	CN	Description
8.362	82	Dirt roads, HSG B
240.878	86	Newly graded area, HSG B
249.240	86	Weighted Average
249.240		100.00% Pervious Area

Subcatchment TU02: Subcat TU02



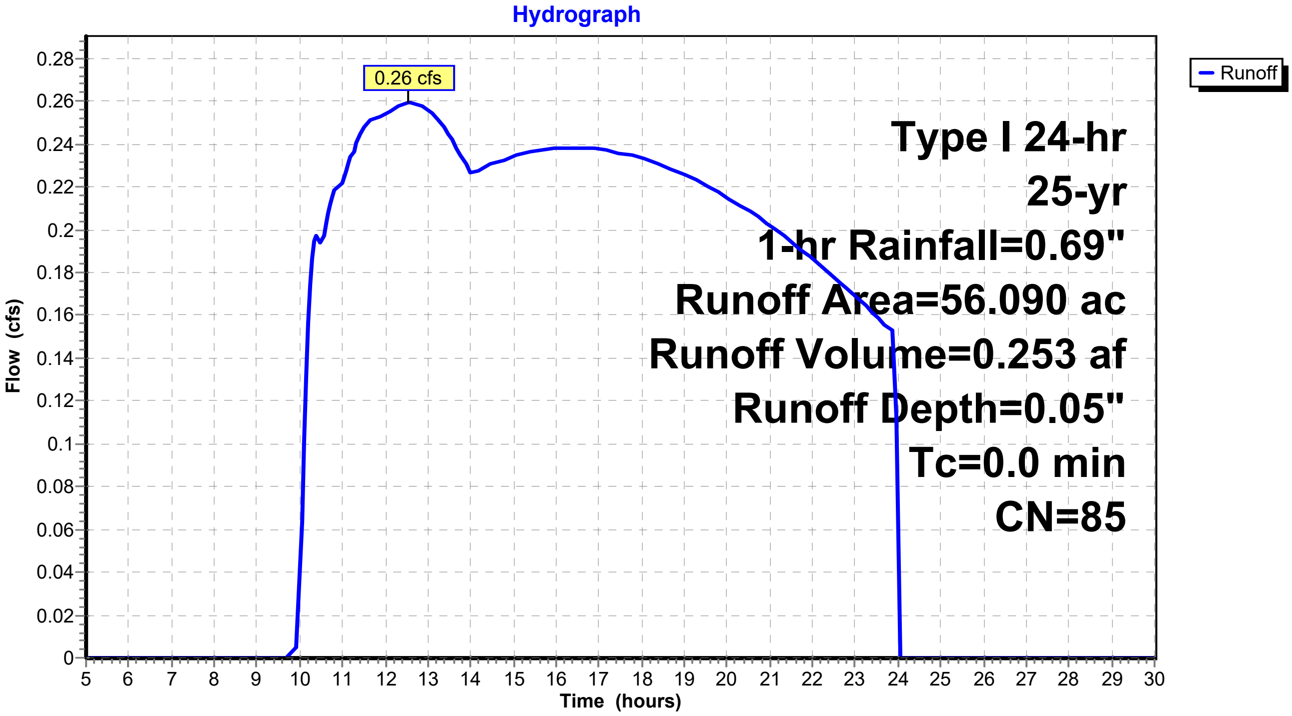
Summary for Subcatchment TU03: Subcat TU03

Runoff = 0.26 cfs @ 12.56 hrs, Volume= 0.253 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-yr, 1-hr Rainfall=0.69"

Area (ac)	CN	Description
7.103	82	Dirt roads, HSG B
48.987	86	Newly graded area, HSG B
56.090	85	Weighted Average
56.090		100.00% Pervious Area

Subcatchment TU03: Subcat TU03



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                    Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
                   Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
          Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment SU01: Subcat SU01         Runoff Area=33.021 ac   0.00% Impervious   Runoff Depth=1.02"
                                                 Tc=0.0 min   CN=87   Runoff=28.60 cfs  2.797 af

Subcatchment TU02: Subcat TU02        Runoff Area=249.240 ac   0.00% Impervious   Runoff Depth=0.96"
                                               Tc=0.0 min   CN=86   Runoff=200.47 cfs  19.864 af

Subcatchment TU03: Subcat TU03         Runoff Area=56.090 ac   0.00% Impervious   Runoff Depth=0.90"
                                                 Tc=0.0 min   CN=85   Runoff=41.78 cfs  4.203 af

           Total Runoff Area = 338.351 ac   Runoff Volume = 26.863 af   Average Runoff Depth = 0.95"
                                    100.00% Pervious = 338.351 ac     0.00% Impervious = 0.000 ac
```

Summary for Subcatchment SU01: Subcat SU01

Runoff = 28.60 cfs @ 9.88 hrs, Volume= 2.797 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-yr, 24-hr Rainfall=2.14"

Area (ac)	CN	Description
3.617	82	Dirt roads, HSG B
1.902	87	Dirt roads, HSG C
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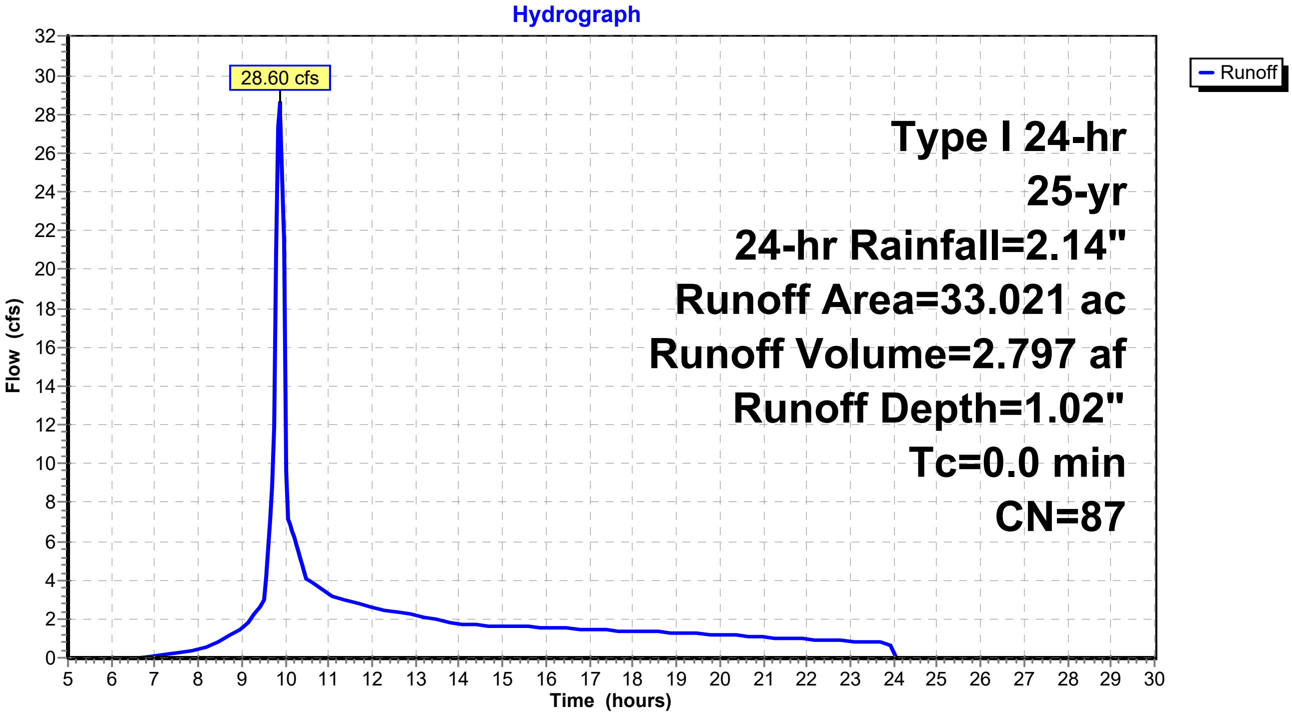
7.589	91	Newly graded area, HSG C
33.021	87	Weighted Average
33.021		100.00% Pervious Area

Subcatchment SU01: Subcat SU01



Summary for Subcatchment TU02: Subcat TU02

Runoff = 200.47 cfs @ 9.88 hrs, Volume= 19.864 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-yr, 24-hr Rainfall=2.14"

Area (ac)	CN	Description
8.362	82	Dirt roads, HSG B
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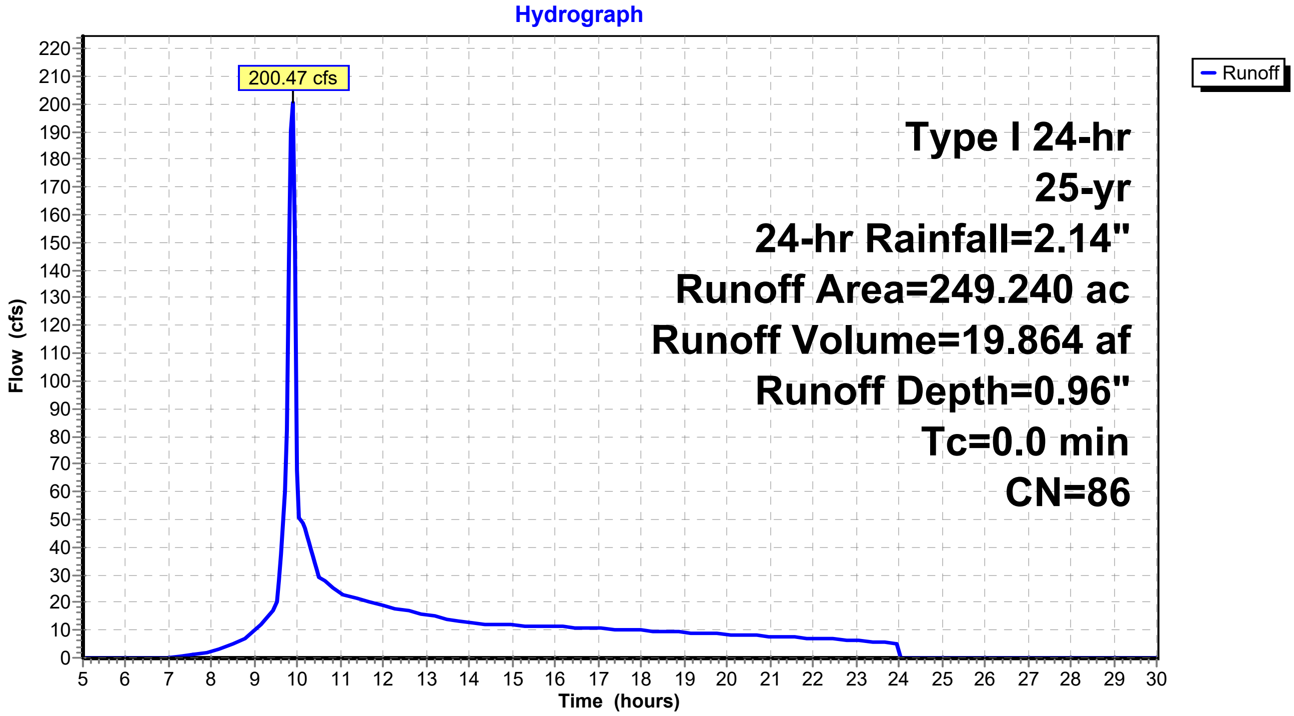


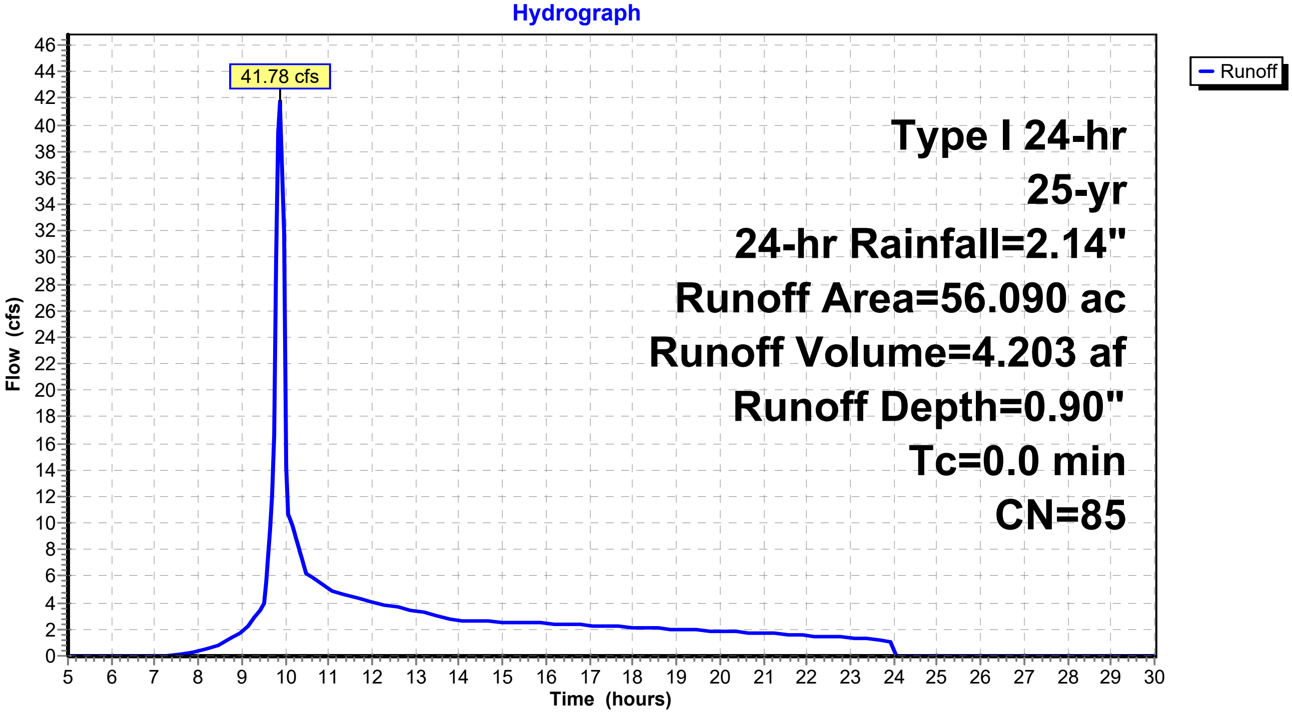
Summary for Subcatchment TU03: Subcat TU03

Runoff = 41.78 cfs @ 9.88 hrs, Volume= 4.203 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-yr, 24-hr Rainfall=2.14"

Area (ac)	CN	Description
7.103	82	Dirt roads, HSG B
48.987	86	Newly graded area, HSG B
56.090	85	Weighted Average
56.090		100.00% Pervious Area

Subcatchment TU03: Subcat TU03



```
                         Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
                       Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
              Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment SU01: Subcat SU01            Runoff Area=33.021 ac   0.00% Impervious   Runoff Depth=1.57"
                                                      Tc=0.0 min   CN=87   Runoff=45.31 cfs  4.308 af

Subcatchment TU02: Subcat TU02           Runoff Area=249.240 ac   0.00% Impervious   Runoff Depth=1.49"
                                                    Tc=0.0 min   CN=86   Runoff=323.74 cfs  30.999 af

Subcatchment TU03: Subcat TU03            Runoff Area=56.090 ac   0.00% Impervious   Runoff Depth=1.42"
                                                      Tc=0.0 min   CN=85   Runoff=68.84 cfs  6.646 af

          Total Runoff Area = 338.351 ac   Runoff Volume = 41.953 af   Average Runoff Depth = 1.49"
                                             100.00% Pervious = 338.351 ac     0.00% Impervious = 0.000 ac
```

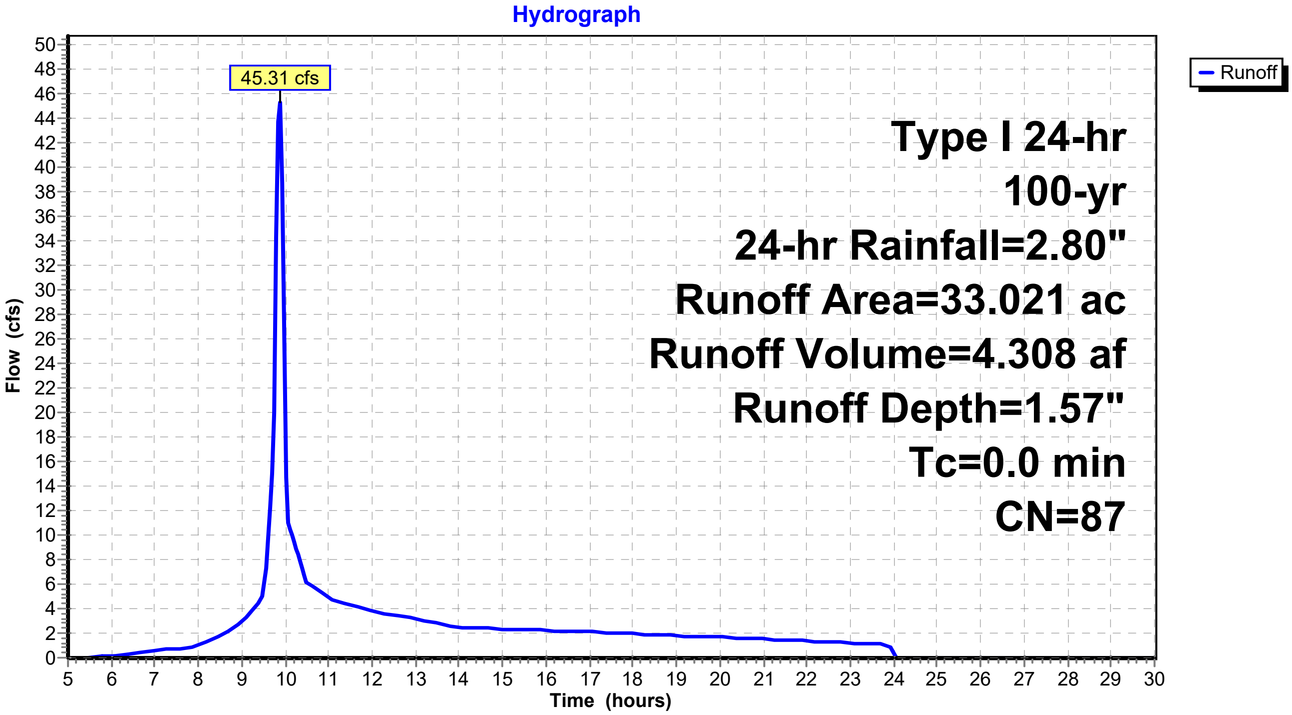
Summary for Subcatchment SU01: Subcat SU01

Runoff = 45.31 cfs @ 9.88 hrs, Volume= 4.308 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-yr, 24-hr Rainfall=2.80"

Area (ac)	CN	Description
3.617	82	Dirt roads, HSG B
1.902	87	Dirt roads, HSG C
19.913	86	Newly graded area, HSG B
7.589	91	Newly graded area, HSG C
33.021	87	Weighted Average
33.021		100.00% Pervious Area

Subcatchment SU01: Subcat SU01



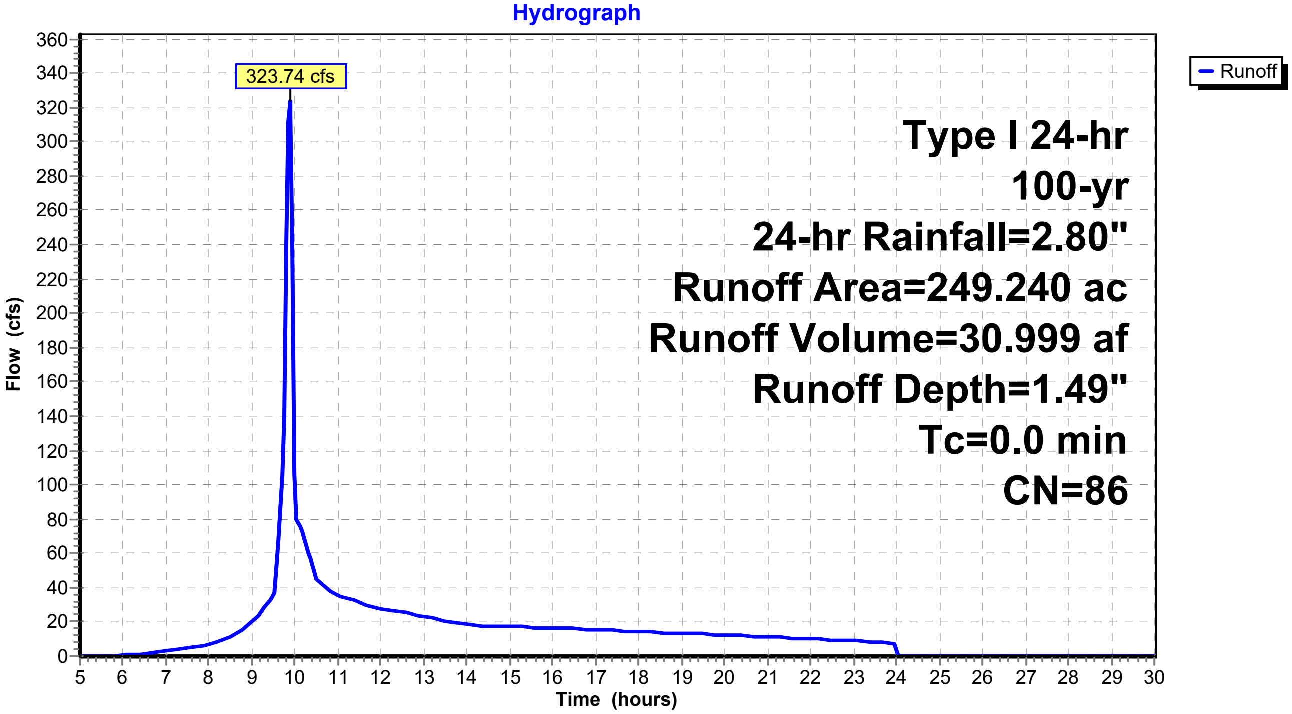
Summary for Subcatchment TU02: Subcat TU02

Runoff = 323.74 cfs @ 9.88 hrs, Volume= 30.999 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-yr, 24-hr Rainfall=2.80"

Area (ac)	CN	Description
8.362	82	Dirt roads, HSG B
240.878	86	Newly graded area, HSG B
249.240	86	Weighted Average
249.240		100.00% Pervious Area

Subcatchment TU02: Subcat TU02



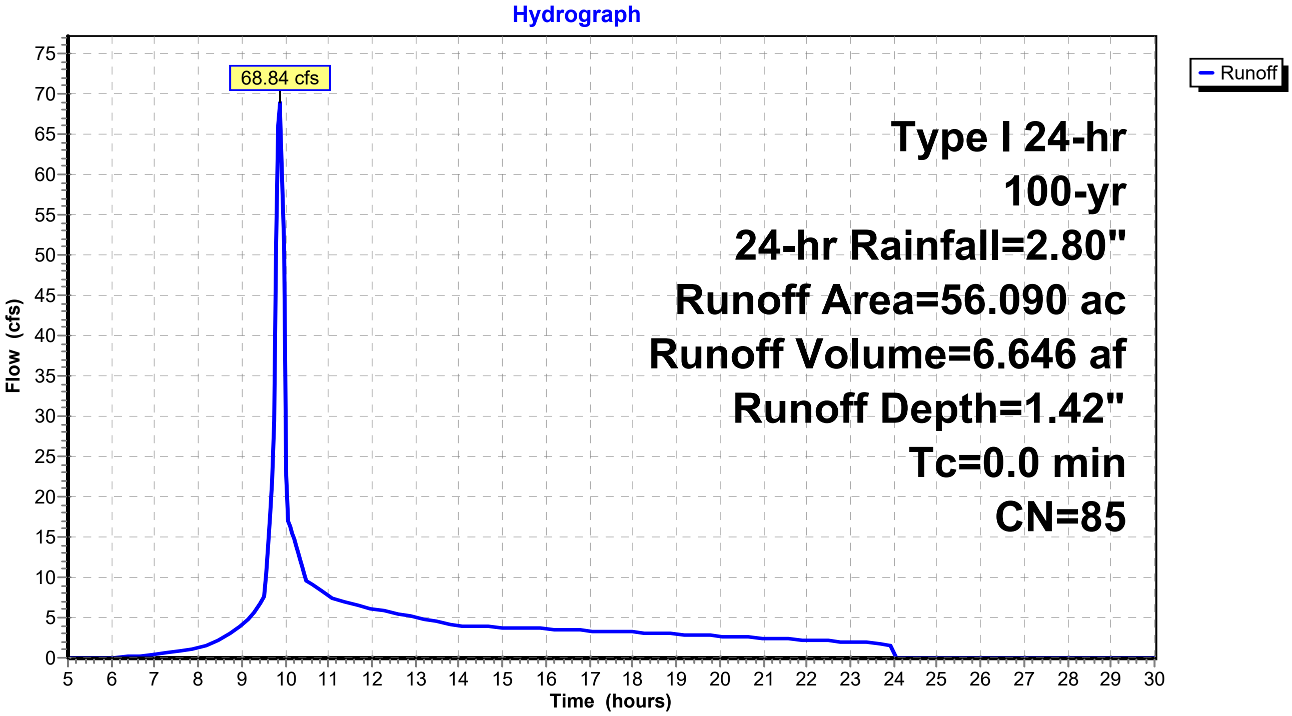
Summary for Subcatchment TU03: Subcat TU03

Runoff = 68.84 cfs @ 9.88 hrs, Volume= 6.646 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-yr, 24-hr Rainfall=2.80"

Area (ac)	CN	Description
7.103	82	Dirt roads, HSG B
48.987	86	Newly graded area, HSG B
56.090	85	Weighted Average
56.090		100.00% Pervious Area

Subcatchment TU03: Subcat TU03



HYDROCAD® MODEL OUTPUT FILES
RECLAIMED CONDITION

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25-YR, 1-HR	Type I 24-hr		Default	24.00	1	0.69	2
2	25-YR, 24-HR	Type I 24-hr		Default	24.00	1	2.14	2
3	100-YR, 24-HR	Type I 24-hr		Default	24.00	1	2.80	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
328.860	56	Brush, Fair, HSG B (SU01, TU02, TU03, TU04)
9.491	70	Brush, Fair, HSG C (SU01)
338.351	**56**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	328.860	9.491	0.000	0.000	338.351	Brush, Fair	SU01, TU02, TU03, TU04
0.000	**328.860**	**9.491**	**0.000**	**0.000**	**338.351**	**TOTAL AREA**	

Time span=5.00-28.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SU01: Subcat SU01 Runoff Area=33.021 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=60 Runoff=0.00 cfs 0.000 af

Subcatchment TU02: Subcat TU02 Runoff Area=133.241 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=56 Runoff=0.00 cfs 0.000 af

Subcatchment TU03: Subcat TU03 Runoff Area=115.998 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=56 Runoff=0.00 cfs 0.000 af

Subcatchment TU04: Subcat TU04 Runoff Area=56.090 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=56 Runoff=0.00 cfs 0.000 af

Total Runoff Area = 338.351 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 338.351 ac 0.00% Impervious = 0.000 ac

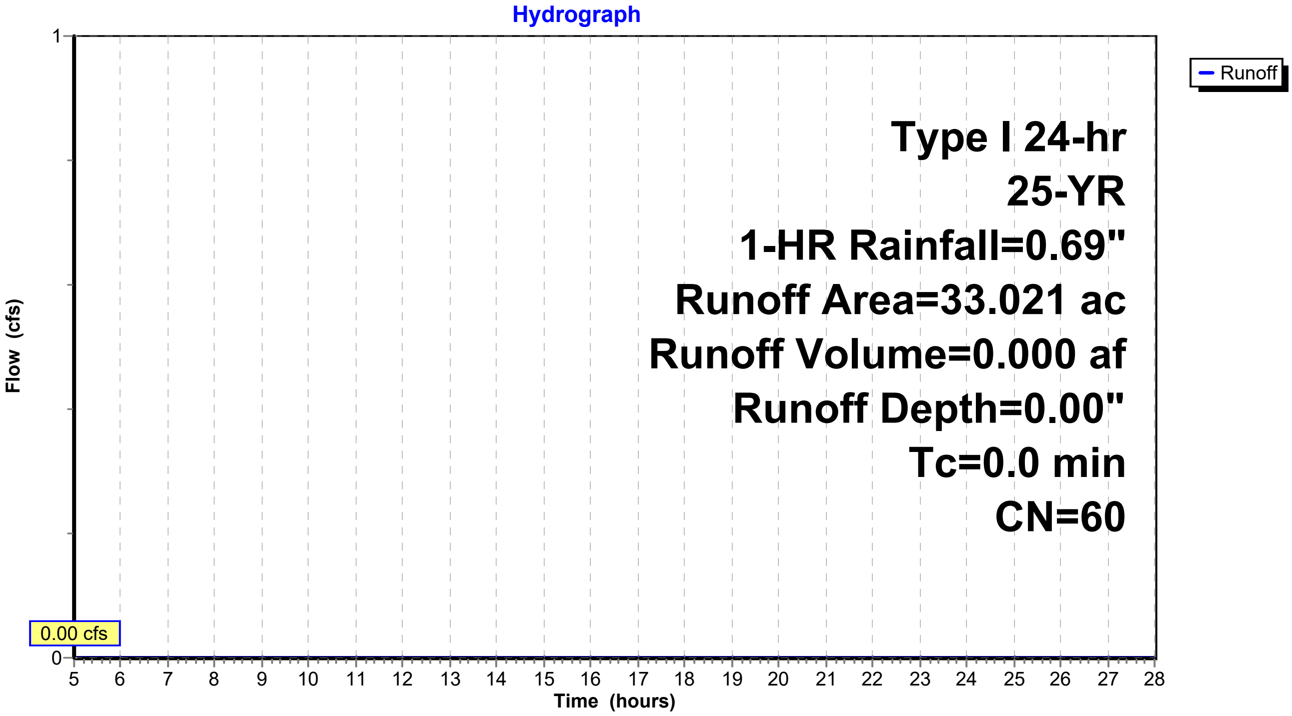
Summary for Subcatchment SU01: Subcat SU01

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 1-HR Rainfall=0.69"

Area (ac)	CN	Description
23.530	56	Brush, Fair, HSG B
9.491	70	Brush, Fair, HSG C
33.021	60	Weighted Average
33.021		100.00% Pervious Area

Subcatchment SU01: Subcat SU01



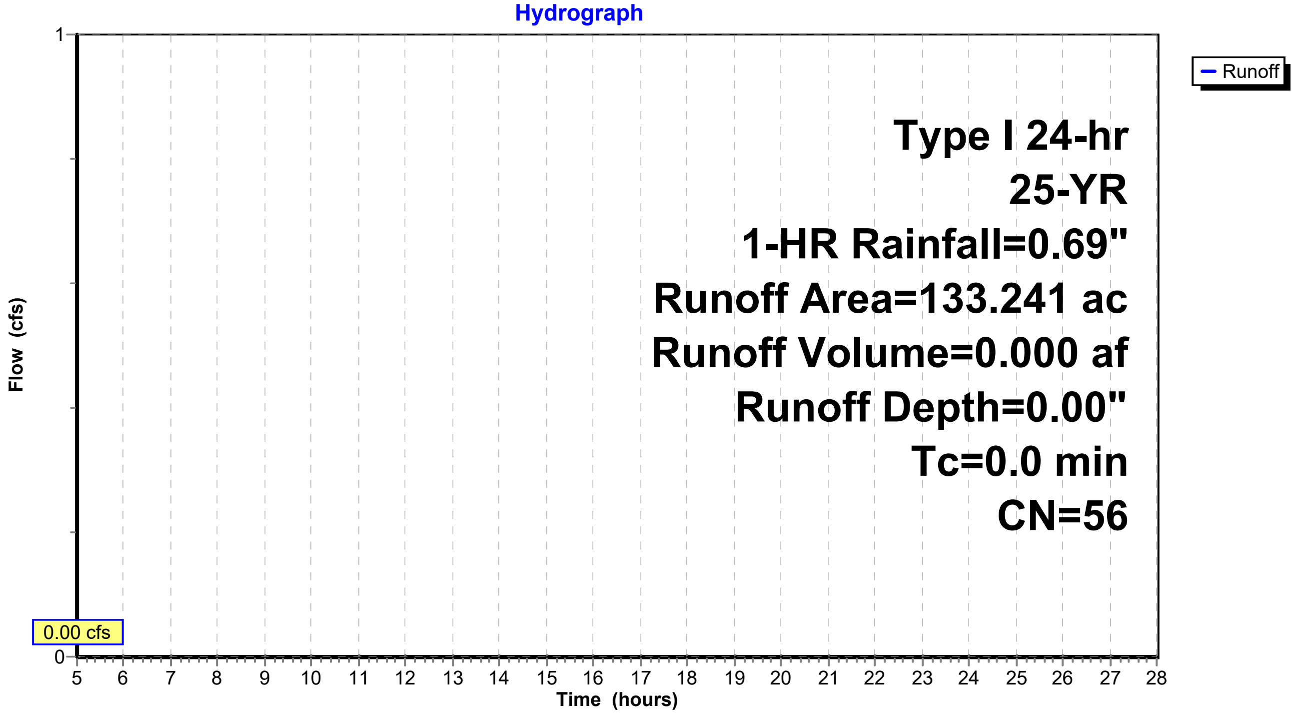
Summary for Subcatchment TU02: Subcat TU02

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 1-HR Rainfall=0.69"

Area (ac)	CN	Description
133.241	56	Brush, Fair, HSG B
133.241		100.00% Pervious Area

Subcatchment TU02: Subcat TU02



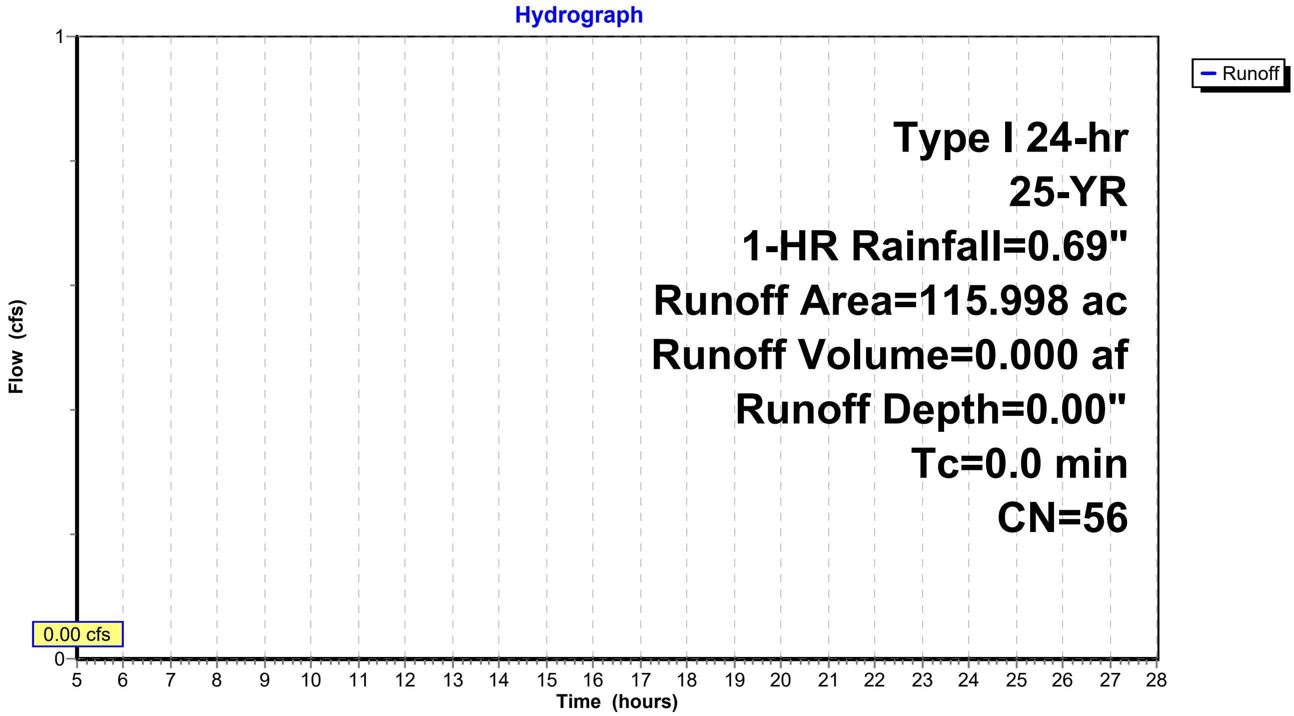
Summary for Subcatchment TU03: Subcat TU03

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 1-HR Rainfall=0.69"

Area (ac)	CN	Description
115.998	56	Brush, Fair, HSG B
115.998		100.00% Pervious Area

Subcatchment TU03: Subcat TU03



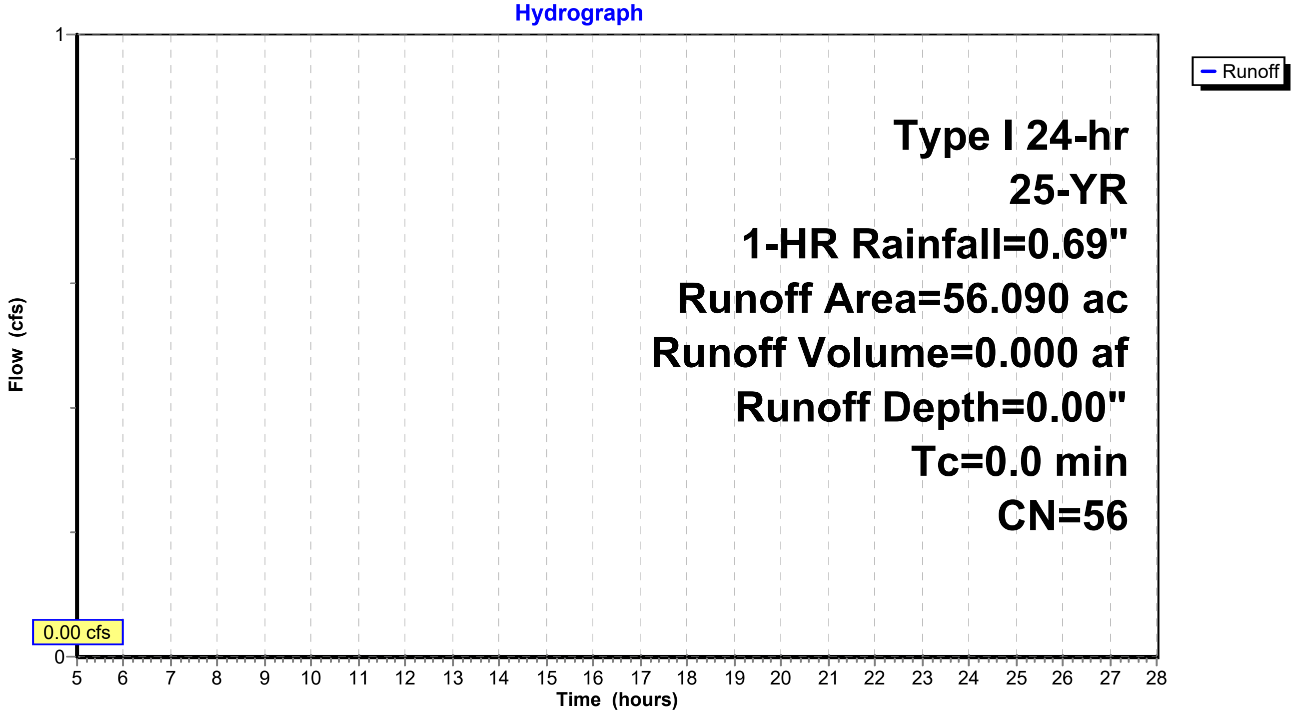
Summary for Subcatchment TU04: Subcat TU04

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 1-HR Rainfall=0.69"

Area (ac)	CN	Description
56.090	56	Brush, Fair, HSG B
56.090		100.00% Pervious Area

Subcatchment TU04: Subcat TU04



Time span=5.00-28.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SU01: Subcat SU01	Runoff Area=33.021 ac 0.00% Impervious Runoff Depth=0.09" Tc=0.0 min CN=60 Runoff=0.27 cfs 0.240 af
Subcatchment TU02: Subcat TU02	Runoff Area=133.241 ac 0.00% Impervious Runoff Depth=0.04" Tc=0.0 min CN=56 Runoff=0.60 cfs 0.426 af
Subcatchment TU03: Subcat TU03	Runoff Area=115.998 ac 0.00% Impervious Runoff Depth=0.04" Tc=0.0 min CN=56 Runoff=0.52 cfs 0.371 af
Subcatchment TU04: Subcat TU04	Runoff Area=56.090 ac 0.00% Impervious Runoff Depth=0.04" Tc=0.0 min CN=56 Runoff=0.25 cfs 0.179 af

Total Runoff Area = 338.351 ac Runoff Volume = 1.216 af Average Runoff Depth = 0.04"
100.00% Pervious = 338.351 ac 0.00% Impervious = 0.000 ac

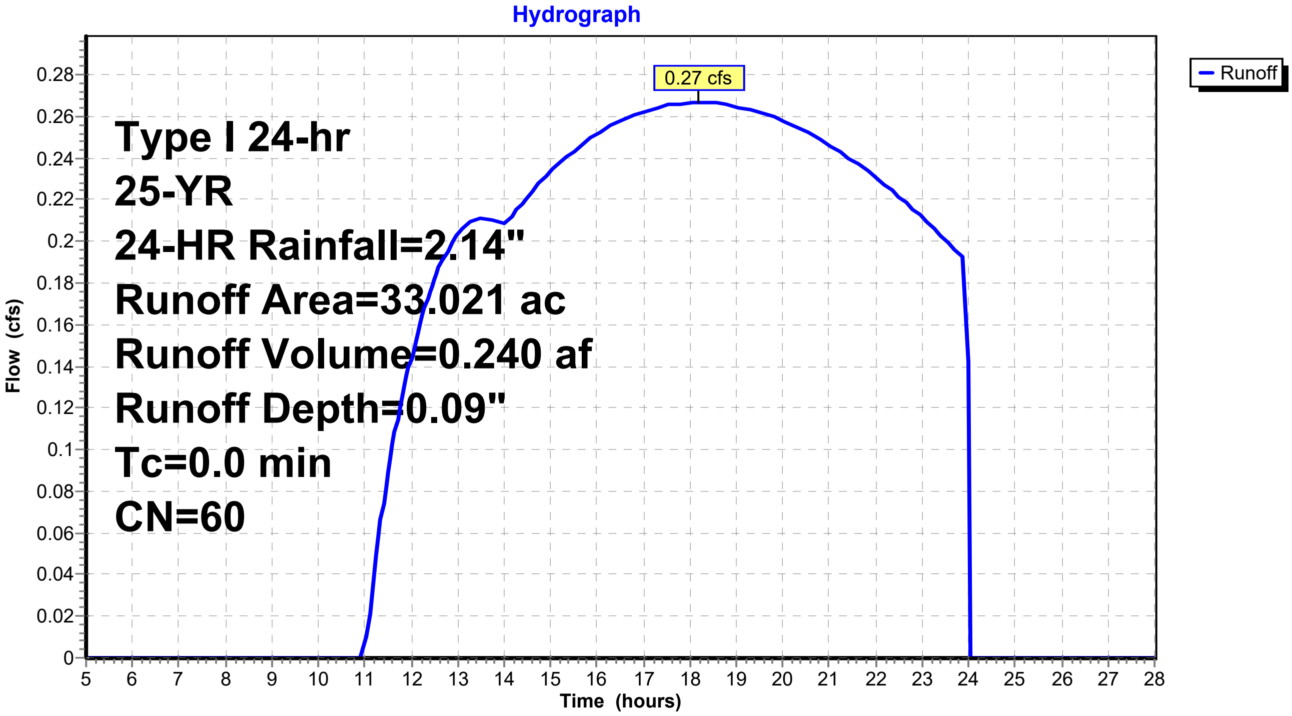
Summary for Subcatchment SU01: Subcat SU01

Runoff = 0.27 cfs @ 18.19 hrs, Volume= 0.240 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 24-HR Rainfall=2.14"

Area (ac)	CN	Description
23.530	56	Brush, Fair, HSG B
9.491	70	Brush, Fair, HSG C
33.021	60	Weighted Average
33.021		100.00% Pervious Area

Subcatchment SU01: Subcat SU01



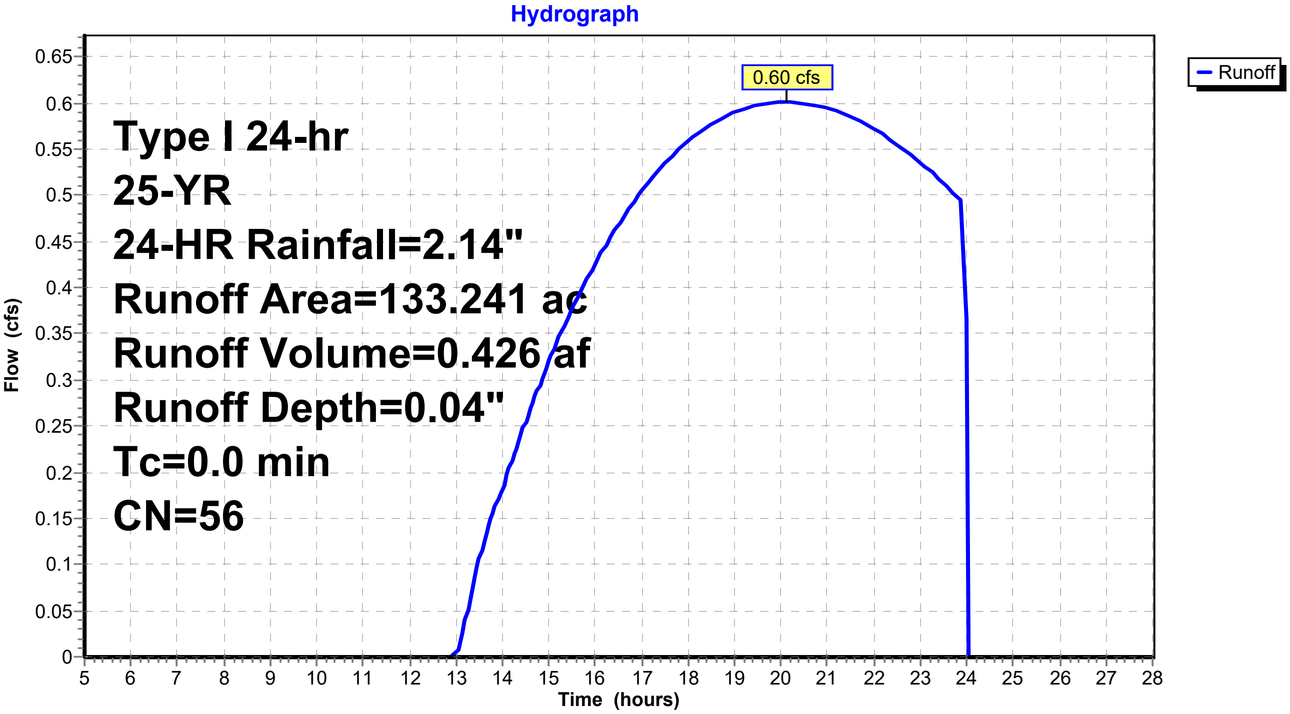
Summary for Subcatchment TU02: Subcat TU02

Runoff = 0.60 cfs @ 20.10 hrs, Volume= 0.426 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 24-HR Rainfall=2.14"

Area (ac)	CN	Description
133.241	56	Brush, Fair, HSG B
133.241		100.00% Pervious Area

Subcatchment TU02: Subcat TU02



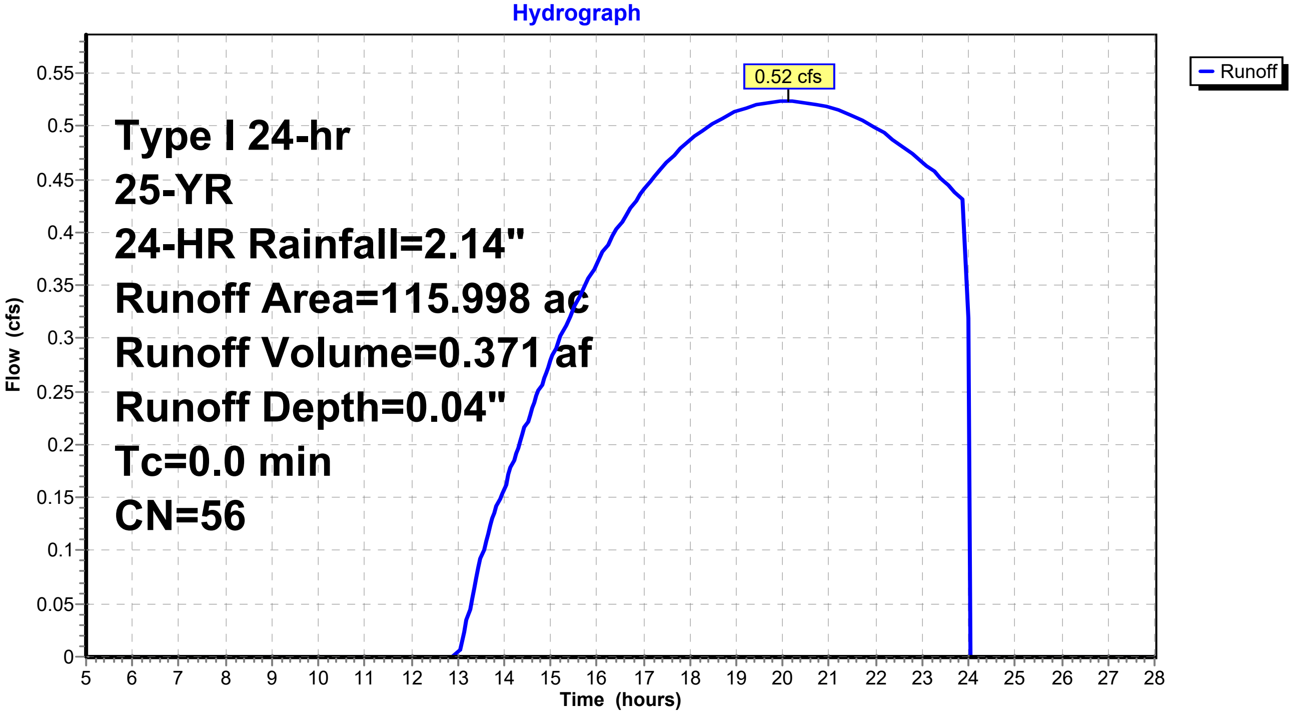
Summary for Subcatchment TU03: Subcat TU03

Runoff = 0.52 cfs @ 20.10 hrs, Volume= 0.371 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 24-HR Rainfall=2.14"

Area (ac)	CN	Description
115.998	56	Brush, Fair, HSG B
115.998		100.00% Pervious Area

Subcatchment TU03: Subcat TU03



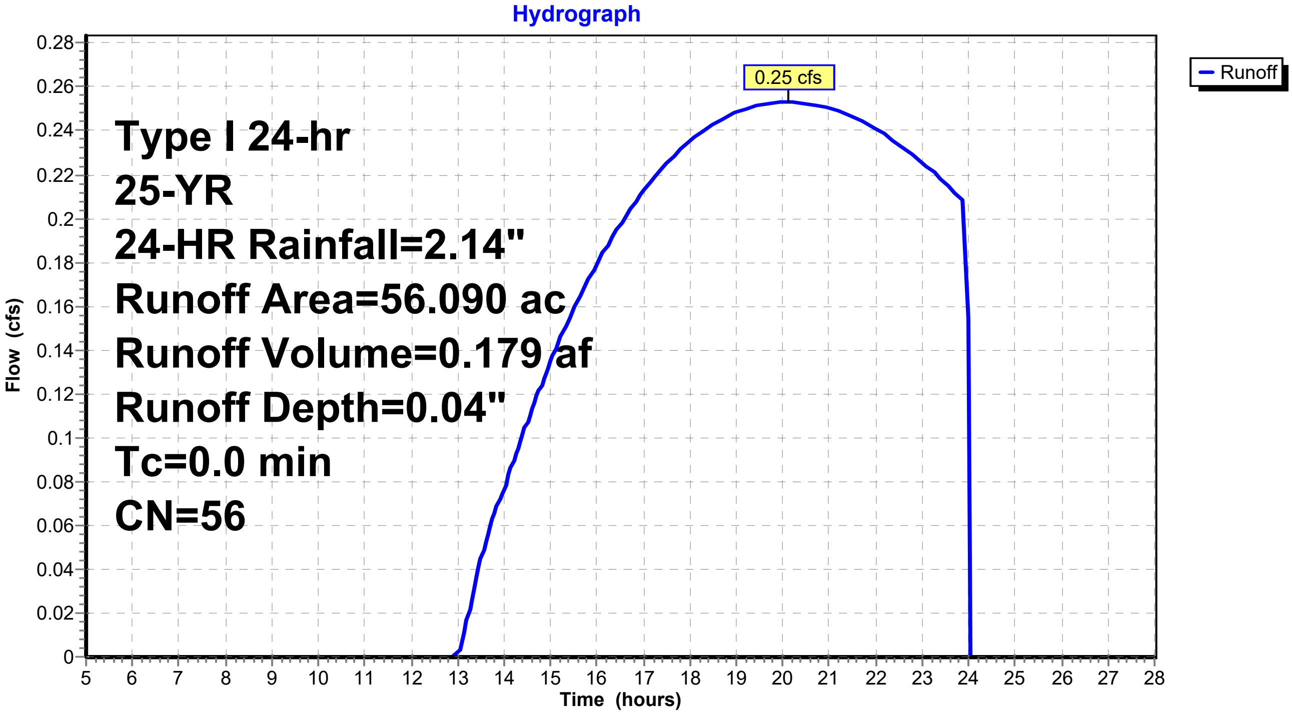
Summary for Subcatchment TU04: Subcat TU04

Runoff = 0.25 cfs @ 20.10 hrs, Volume= 0.179 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 25-YR, 24-HR Rainfall=2.14"

Area (ac)	CN	Description
56.090	56	Brush, Fair, HSG B
56.090		100.00% Pervious Area

Subcatchment TU04: Subcat TU04



Time span=5.00-28.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SU01: Subcat SU01 Runoff Area=33.021 ac 0.00% Impervious Runoff Depth=0.26"
Tc=0.0 min CN=60 Runoff=0.80 cfs 0.728 af

Subcatchment TU02: Subcat TU02 Runoff Area=133.241 ac 0.00% Impervious Runoff Depth=0.17"
Tc=0.0 min CN=56 Runoff=1.86 cfs 1.845 af

Subcatchment TU03: Subcat TU03 Runoff Area=115.998 ac 0.00% Impervious Runoff Depth=0.17"
Tc=0.0 min CN=56 Runoff=1.62 cfs 1.606 af

Subcatchment TU04: Subcat TU04 Runoff Area=56.090 ac 0.00% Impervious Runoff Depth=0.17"
Tc=0.0 min CN=56 Runoff=0.78 cfs 0.777 af

Total Runoff Area = 338.351 ac Runoff Volume = 4.955 af Average Runoff Depth = 0.18"
100.00% Pervious = 338.351 ac 0.00% Impervious = 0.000 ac

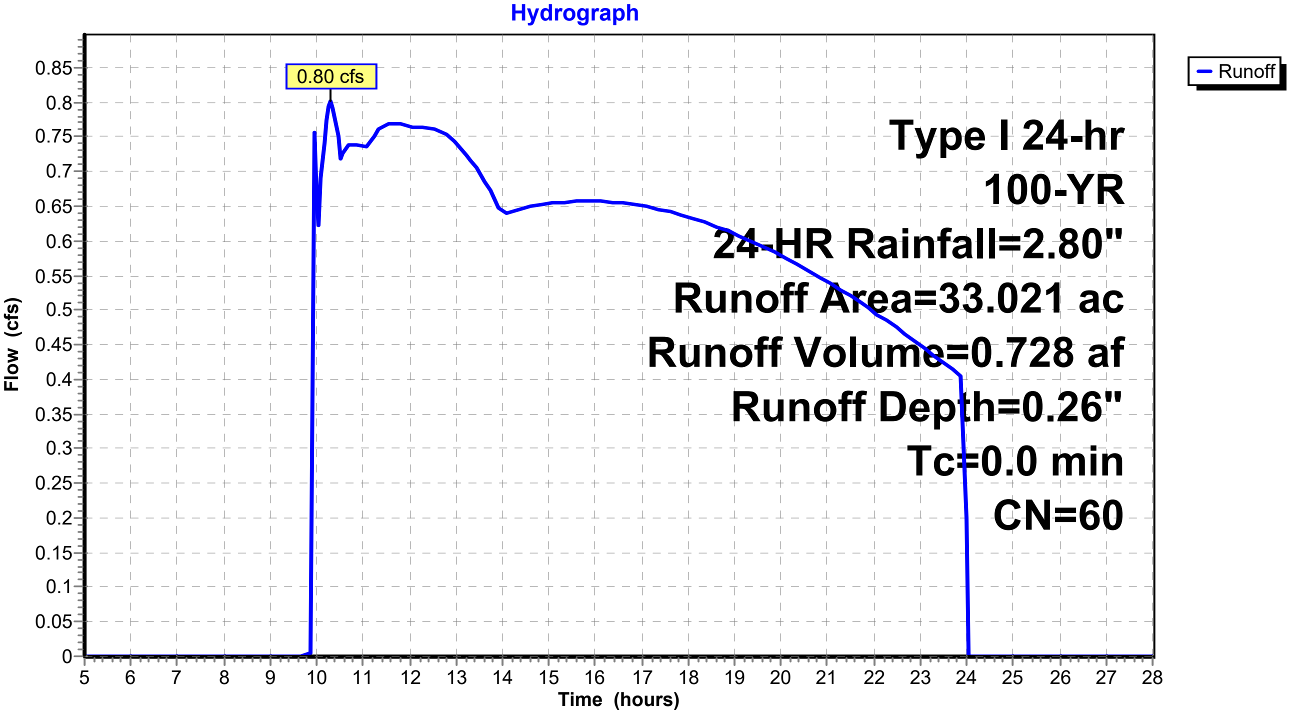
Summary for Subcatchment SU01: Subcat SU01

Runoff = 0.80 cfs @ 10.30 hrs, Volume= 0.728 af, Depth= 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-YR, 24-HR Rainfall=2.80"

Area (ac)	CN	Description
23.530	56	Brush, Fair, HSG B
9.491	70	Brush, Fair, HSG C
33.021	60	Weighted Average
33.021		100.00% Pervious Area

Subcatchment SU01: Subcat SU01



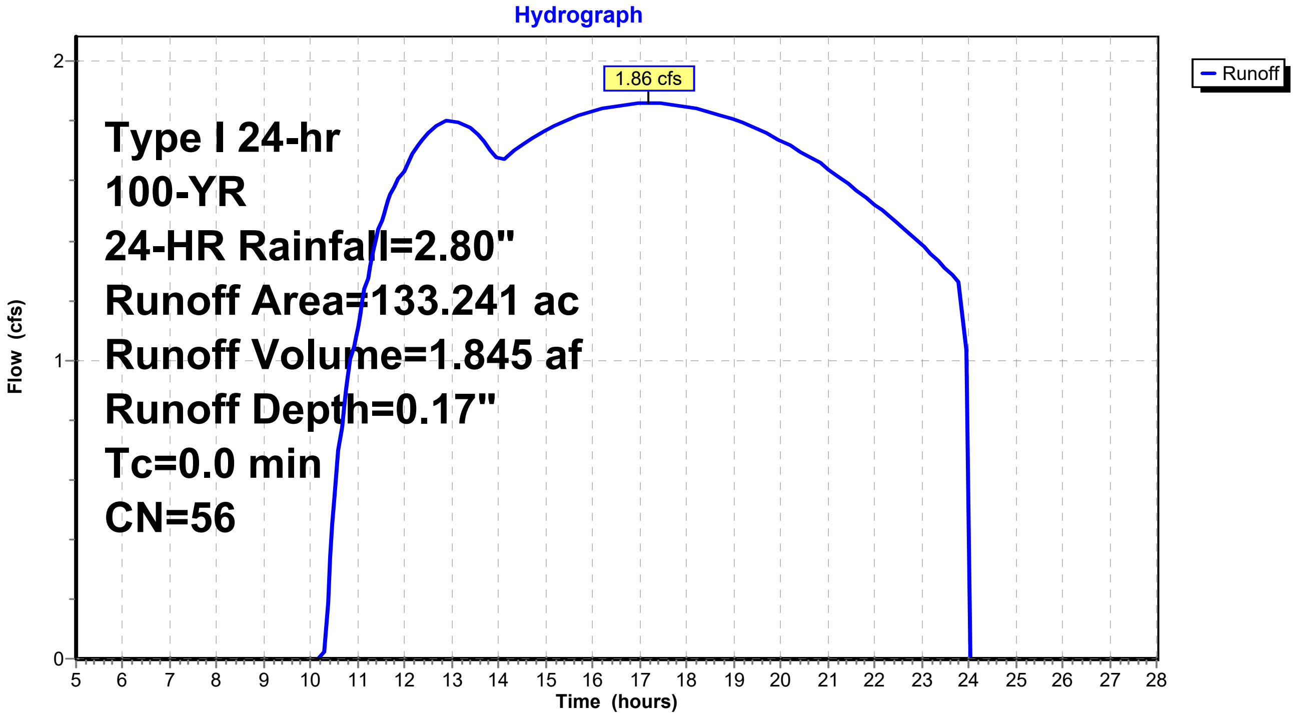
Summary for Subcatchment TU02: Subcat TU02

Runoff = 1.86 cfs @ 17.18 hrs, Volume= 1.845 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-YR, 24-HR Rainfall=2.80"

Area (ac)	CN	Description
133.241	56	Brush, Fair, HSG B
133.241		100.00% Pervious Area

Subcatchment TU02: Subcat TU02



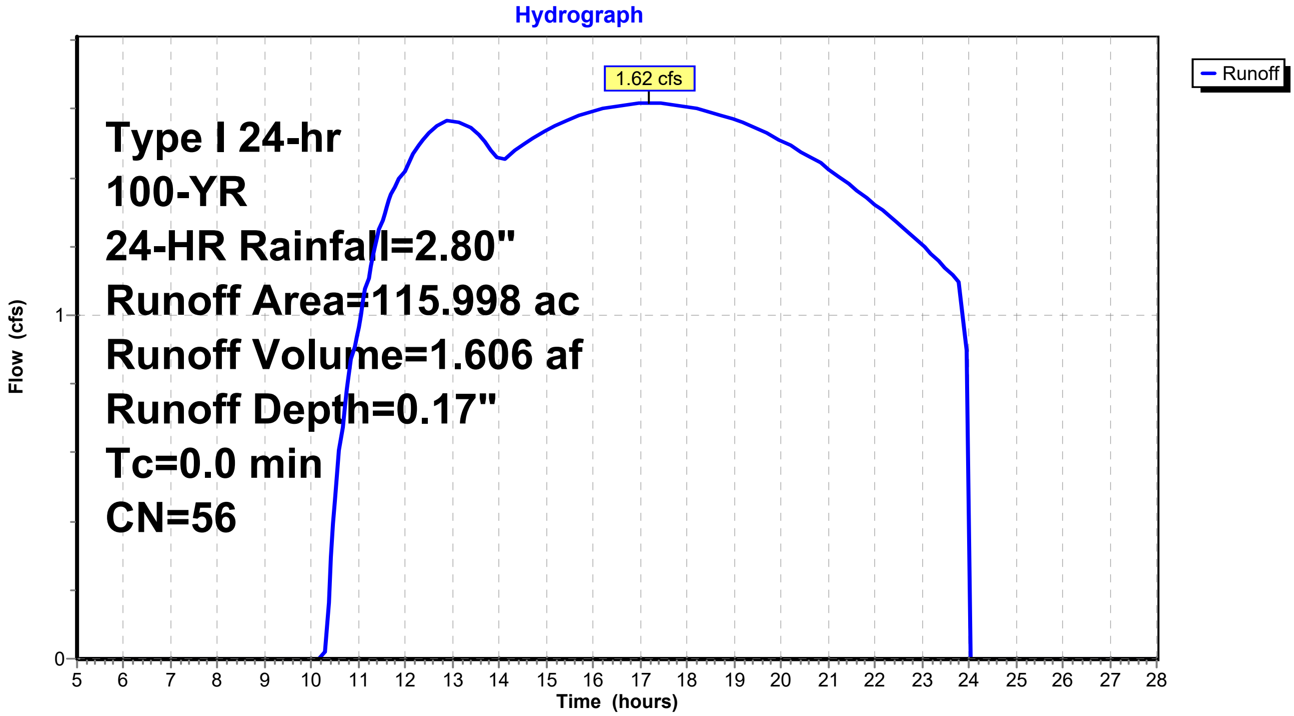
Summary for Subcatchment TU03: Subcat TU03

Runoff = 1.62 cfs @ 17.18 hrs, Volume= 1.606 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-YR, 24-HR Rainfall=2.80"

Area (ac)	CN	Description
115.998	56	Brush, Fair, HSG B
115.998		100.00% Pervious Area

Subcatchment TU03: Subcat TU03



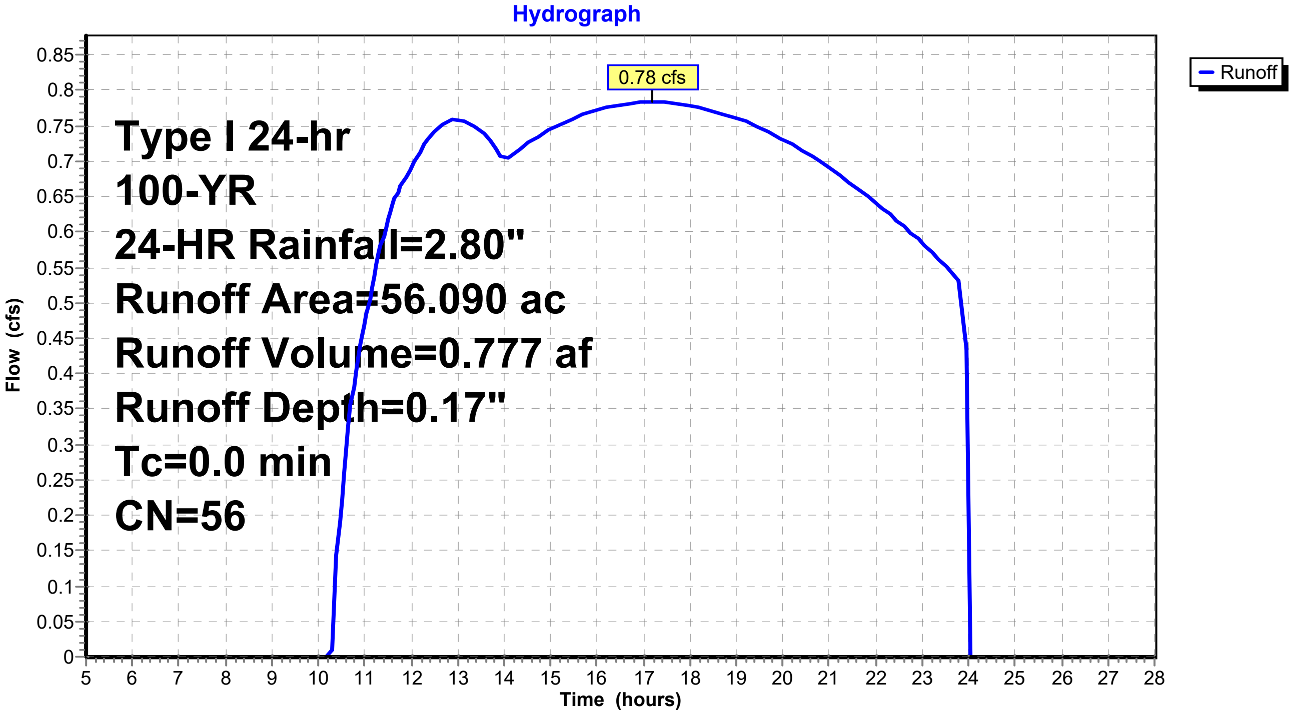
Summary for Subcatchment TU04: Subcat TU04

Runoff = 0.78 cfs @ 17.18 hrs, Volume= 0.777 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-28.00 hrs, dt= 0.05 hrs
Type I 24-hr 100-YR, 24-HR Rainfall=2.80"

Area (ac)	CN	Description
56.090	56	Brush, Fair, HSG B
56.090		100.00% Pervious Area

Subcatchment TU04: Subcat TU04



NOAA PRECIPITATION ESTIMATES

NOAA Atlas 14, Volume 6, Version 2
Location name: Los Banos, California, USA*
Latitude: 37.03°, Longitude: -120.89°
Elevation: 149.33 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.064** (0.055-0.076)	**0.088** (0.075-0.104)	**0.124** (0.105-0.147)	**0.157** (0.133-0.188)	**0.210** (0.170-0.262)	**0.257** (0.203-0.329)	**0.312** (0.240-0.411)	**0.377** (0.280-0.513)	**0.480** (0.339-0.686)	**0.574** (0.389-0.854)
10-min	**0.092** (0.079-0.109)	**0.126** (0.108-0.149)	**0.178** (0.151-0.211)	**0.225** (0.190-0.270)	**0.301** (0.244-0.376)	**0.369** (0.291-0.472)	**0.448** (0.343-0.590)	**0.540** (0.401-0.736)	**0.688** (0.486-0.984)	**0.823** (0.558-1.22)
15-min	**0.112** (0.096-0.132)	**0.153** (0.130-0.181)	**0.215** (0.183-0.255)	**0.273** (0.230-0.327)	**0.364** (0.295-0.454)	**0.446** (0.352-0.571)	**0.541** (0.415-0.713)	**0.654** (0.485-0.890)	**0.832** (0.588-1.19)	**0.995** (0.675-1.48)
30-min	**0.152** (0.130-0.180)	**0.208** (0.178-0.246)	**0.293** (0.249-0.348)	**0.372** (0.314-0.446)	**0.497** (0.402-0.620)	**0.609** (0.481-0.779)	**0.739** (0.567-0.972)	**0.892** (0.662-1.21)	**1.14** (0.802-1.62)	**1.36** (0.921-2.02)
60-min	**0.213** (0.182-0.251)	**0.291** (0.248-0.344)	**0.409** (0.348-0.485)	**0.519** (0.437-0.622)	**0.693** (0.561-0.864)	**0.849** (0.671-1.09)	**1.03** (0.790-1.36)	**1.24** (0.923-1.69)	**1.58** (1.12-2.26)	**1.89** (1.28-2.82)
2-hr	**0.328** (0.280-0.387)	**0.410** (0.350-0.485)	**0.538** (0.458-0.638)	**0.659** (0.556-0.790)	**0.854** (0.692-1.07)	**1.03** (0.815-1.32)	**1.24** (0.951-1.63)	**1.49** (1.10-2.02)	**1.88** (1.33-2.69)	**2.25** (1.53-3.35)
3-hr	**0.410** (0.351-0.484)	**0.501** (0.428-0.592)	**0.642** (0.546-0.761)	**0.776** (0.654-0.929)	**0.991** (0.803-1.24)	**1.19** (0.938-1.52)	**1.42** (1.09-1.87)	**1.69** (1.25-2.30)	**2.13** (1.50-3.04)	**2.53** (1.72-3.77)
6-hr	**0.560** (0.479-0.661)	**0.670** (0.573-0.792)	**0.838** (0.714-0.995)	**0.996** (0.840-1.19)	**1.25** (1.01-1.56)	**1.47** (1.16-1.88)	**1.73** (1.33-2.28)	**2.04** (1.51-2.78)	**2.53** (1.79-3.61)	**2.97** (2.01-4.42)
12-hr	**0.729** (0.624-0.861)	**0.882** (0.754-1.04)	**1.11** (0.942-1.31)	**1.31** (1.10-1.57)	**1.61** (1.31-2.01)	**1.88** (1.48-2.40)	**2.17** (1.66-2.85)	**2.50** (1.85-3.40)	**3.00** (2.12-4.28)	**3.43** (2.33-5.10)
24-hr	**0.942** (0.863-1.05)	**1.17** (1.07-1.30)	**1.48** (1.35-1.65)	**1.75** (1.59-1.97)	**2.14** (1.89-2.47)	**2.46** (2.13-2.89)	**2.80** (2.37-3.36)	**3.16** (2.62-3.89)	**3.70** (2.96-4.71)	**4.14** (3.22-5.43)
2-day	**1.15** (1.06-1.28)	**1.44** (1.32-1.60)	**1.82** (1.67-2.04)	**2.15** (1.95-2.42)	**2.61** (2.31-3.02)	**2.98** (2.59-3.51)	**3.37** (2.86-4.05)	**3.78** (3.14-4.66)	**4.37** (3.50-5.57)	**4.84** (3.76-6.35)
3-day	**1.31** (1.20-1.46)	**1.64** (1.50-1.82)	**2.08** (1.90-2.32)	**2.44** (2.22-2.75)	**2.96** (2.61-3.43)	**3.37** (2.92-3.97)	**3.80** (3.23-4.57)	**4.25** (3.53-5.23)	**4.89** (3.91-6.23)	**5.40** (4.20-7.09)

4-day	**1.42** (1.30-1.58)	**1.77** (1.62-1.97)	**2.25** (2.05-2.51)	**2.64** (2.40-2.97)	**3.19** (2.82-3.69)	**3.63** (3.15-4.27)	**4.08** (3.46-4.90)	**4.55** (3.78-5.60)	**5.21** (4.17-6.64)	**5.73** (4.46-7.52)
7-day	**1.71** (1.57-1.90)	**2.14** (1.96-2.39)	**2.71** (2.48-3.03)	**3.19** (2.89-3.58)	**3.84** (3.38-4.44)	**4.34** (3.76-5.11)	**4.86** (4.13-5.84)	**5.40** (4.48-6.64)	**6.14** (4.92-7.83)	**6.72** (5.23-8.82)
10-day	**1.88** (1.72-2.09)	**2.36** (2.16-2.63)	**2.99** (2.73-3.34)	**3.51** (3.18-3.94)	**4.21** (3.72-4.87)	**4.76** (4.12-5.60)	**5.32** (4.51-6.39)	**5.89** (4.89-7.25)	**6.68** (5.35-8.51)	**7.29** (5.67-9.57)
20-day	**2.40** (2.20-2.67)	**3.05** (2.79-3.39)	**3.88** (3.54-4.33)	**4.55** (4.13-5.12)	**5.45** (4.80-6.30)	**6.13** (5.31-7.21)	**6.81** (5.79-8.19)	**7.51** (6.23-9.24)	**8.45** (6.76-10.8)	**9.17** (7.13-12.0)
30-day	**2.86** (2.62-3.18)	**3.65** (3.34-4.06)	**4.65** (4.25-5.20)	**5.45** (4.94-6.13)	**6.51** (5.75-7.53)	**7.31** (6.34-8.60)	**8.10** (6.88-9.73)	**8.90** (7.38-11.0)	**9.96** (7.98-12.7)	**10.8** (8.37-14.1)
45-day	**3.53** (3.23-3.93)	**4.52** (4.14-5.04)	**5.77** (5.27-6.45)	**6.76** (6.13-7.60)	**8.05** (7.10-9.31)	**9.01** (7.81-10.6)	**9.95** (8.45-12.0)	**10.9** (9.04-13.4)	**12.1** (9.71-15.5)	**13.1** (10.1-17.1)
60-day	**4.17** (3.82-4.64)	**5.34** (4.89-5.95)	**6.80** (6.21-7.60)	**7.95** (7.21-8.94)	**9.44** (8.33-10.9)	**10.5** (9.14-12.4)	**11.6** (9.86-13.9)	**12.7** (10.5-15.6)	**14.0** (11.2-17.9)	**15.1** (11.7-19.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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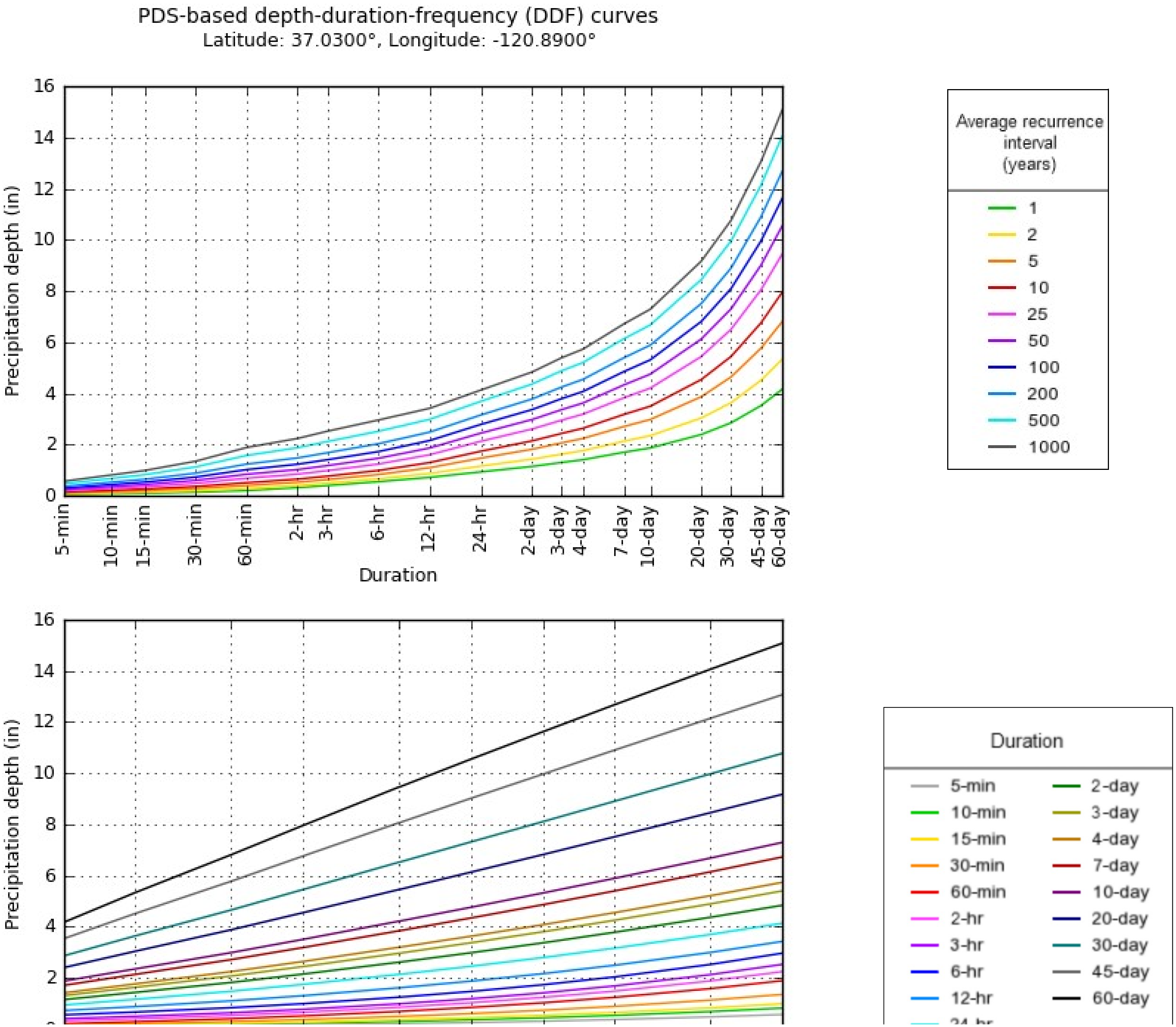
PF graphical


PDS-based depth-duration-frequency (DDF) curves
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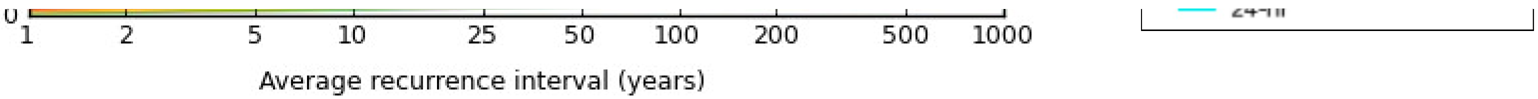

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Created (GMT): Fri Aug 12 18:10:27 2022

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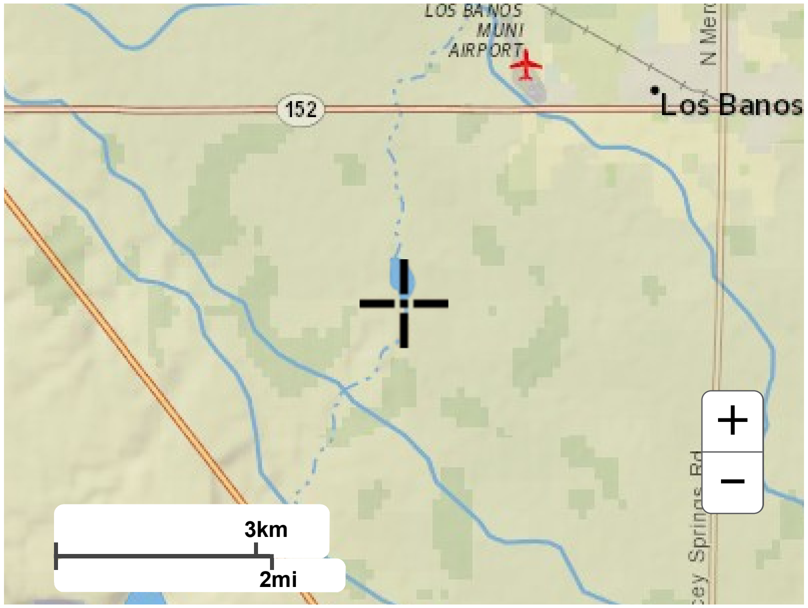
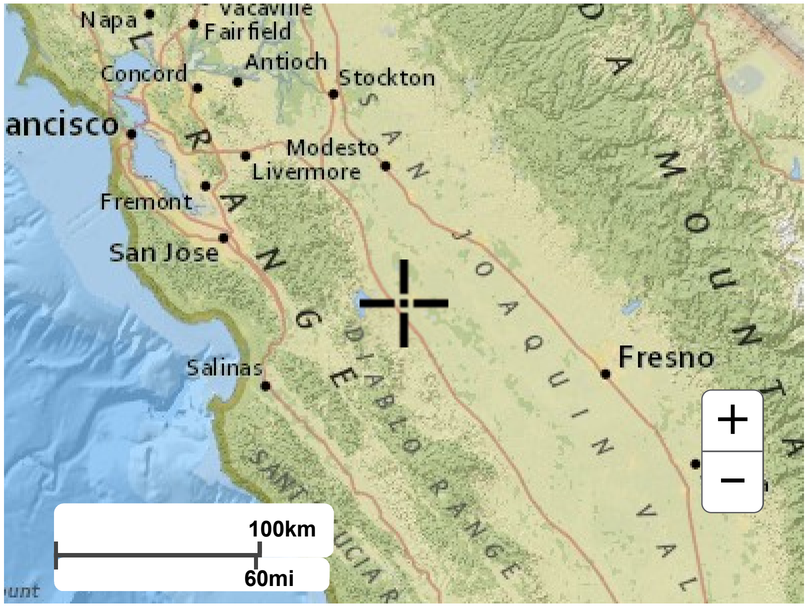
Maps & aerials

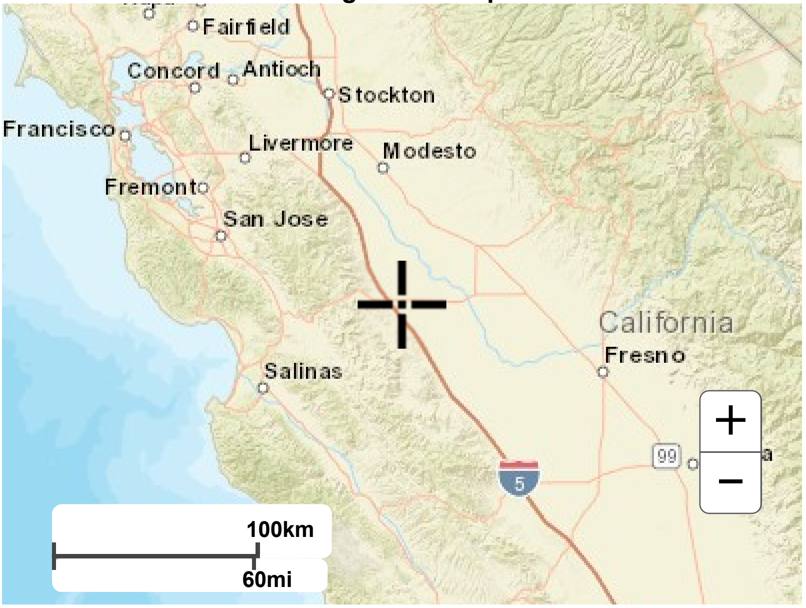
Small scale terrain



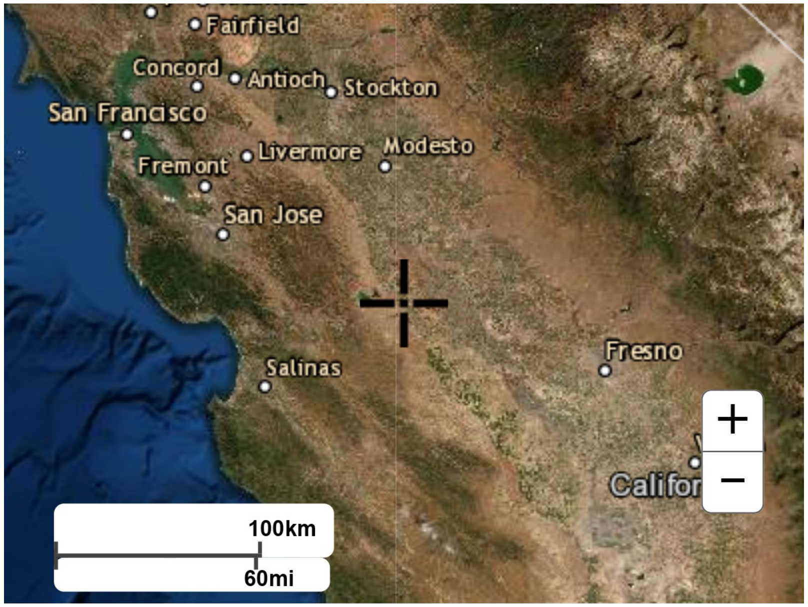
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NRCS SOIL REPORT

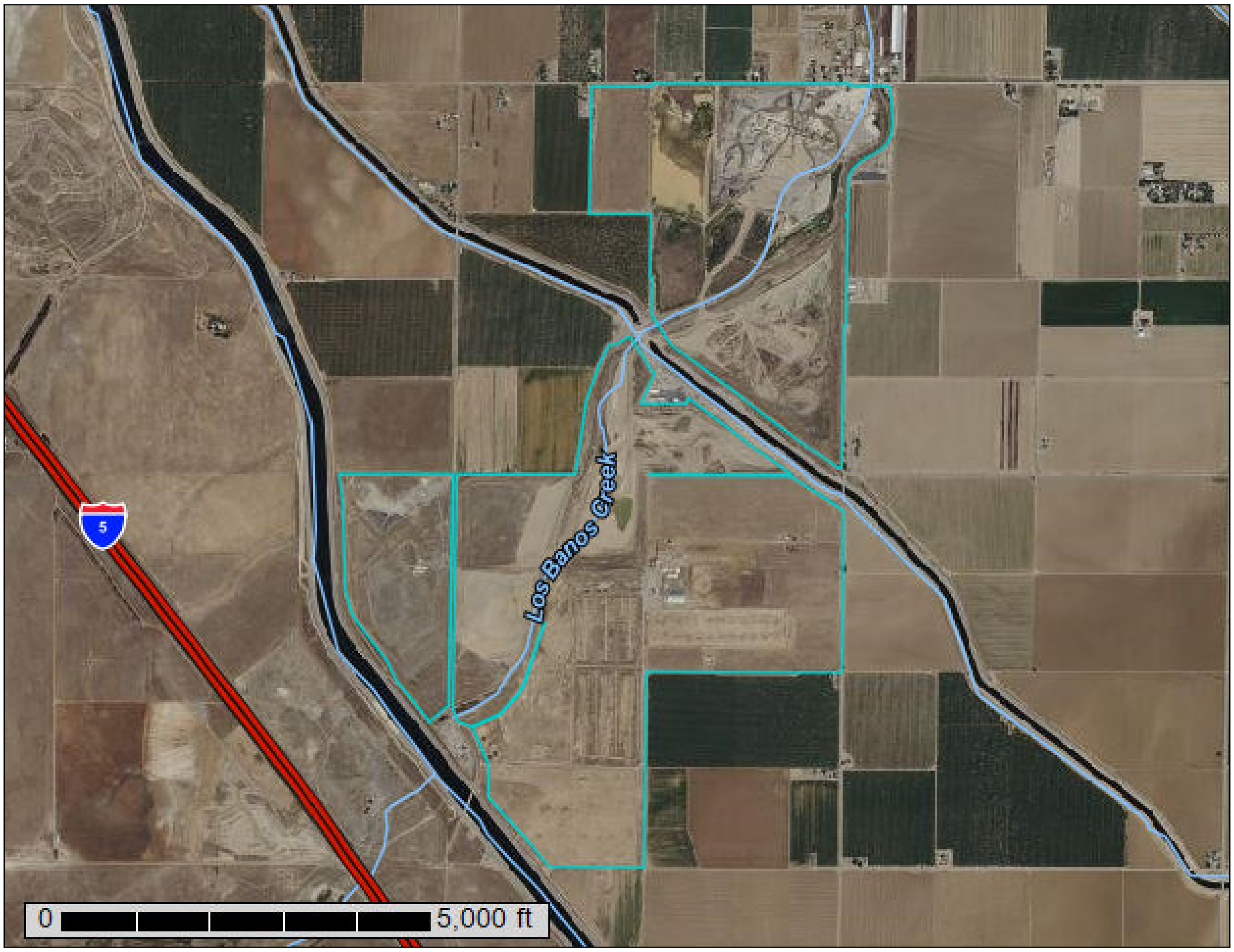
United States
Department of
Agriculture

Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Merced County, California, Western Part

Los Banos Sand and Gravel Quarry



August 24, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

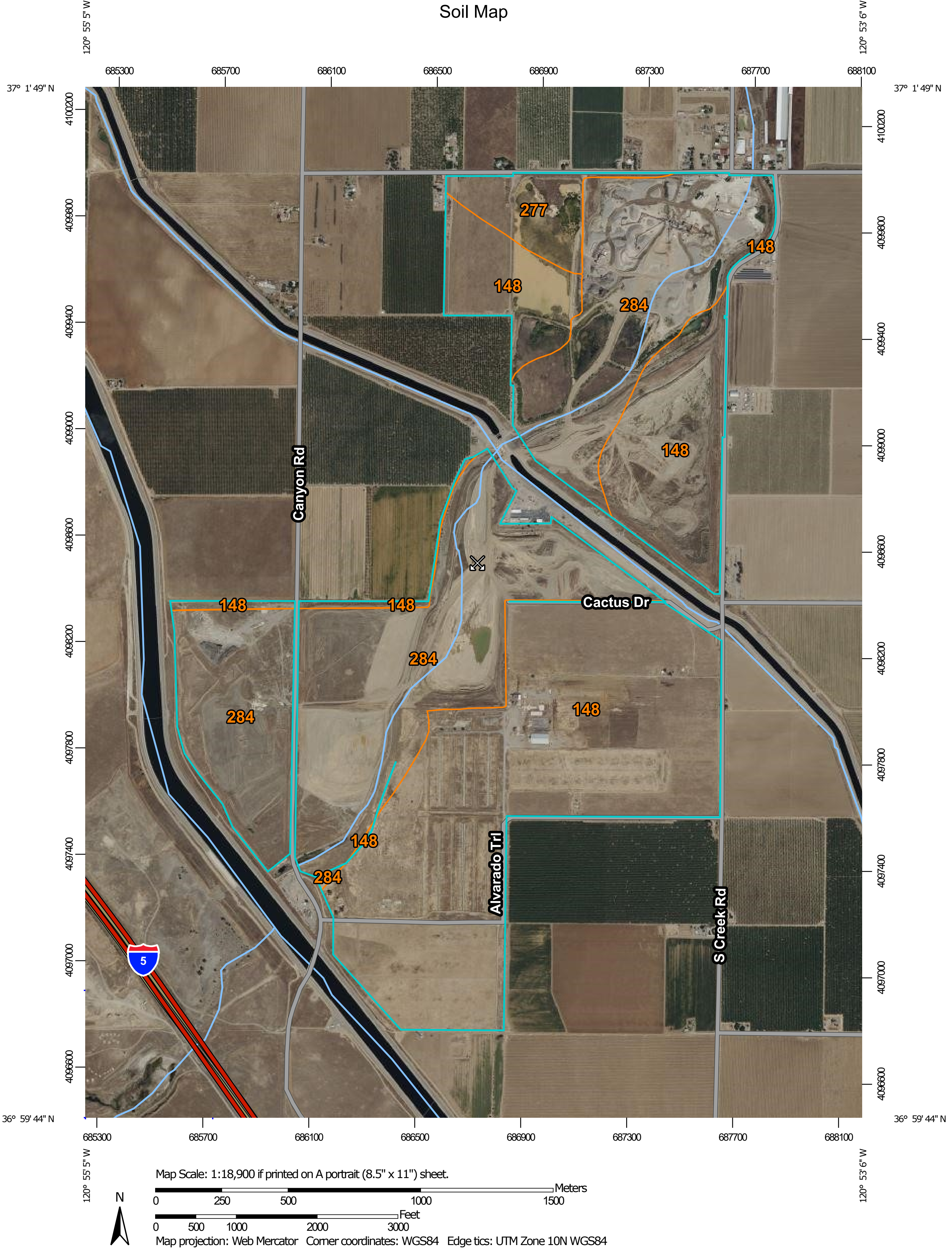
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:18,900 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Merced County, California, Western Part
Survey Area Data: Version 17, Sep 7, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 11, 2022—May 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
148	Carranza-Woo , 0 to 2 percent slopes	450.4	49.8%
277	Woo clay loam, 0 to 2 percent slopes	32.4	3.6%
284	Xerofluvents, extremely gravelly	421.1	46.6%
Totals for Area of Interest		**903.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Merced County, California, Western Part

148—Carranza-Woo , 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hjl1
Elevation: 70 to 1,800 feet
Mean annual precipitation: 11 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Carranza and similar soils: 45 percent
Woo and similar soils: 25 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carranza

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 22 inches: gravelly clay loam
H2 - 22 to 38 inches: gravelly sandy clay loam
H3 - 38 to 60 inches: stratified extremely gravelly loamy sand to extremely gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: R017XY904CA - Subirrigated Deep Alluvial Fans
Hydric soil rating: No

Description of Woo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 19 inches: clay loam
H2 - 19 to 38 inches: loam
H3 - 38 to 62 inches: stratified gravelly loamy sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: R017XY904CA - Subirrigated Deep Alluvial Fans
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

Xerofluvents

Percent of map unit: 10 percent
Landform: Fans
Landform position (three-dimensional): Tread
Hydric soil rating: Yes

Stanislaus

Percent of map unit: 10 percent
Ecological site: R017XY904CA - Subirrigated Deep Alluvial Fans
Hydric soil rating: No

277—Woo clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hjq6
Elevation: 70 to 340 feet
Mean annual precipitation: 11 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 210 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Woo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 15 inches: clay loam
H2 - 15 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Damluis
Percent of map unit: 3 percent
Hydric soil rating: No

Woo, clay
Percent of map unit: 3 percent
Hydric soil rating: No

Woo, clay loam
Percent of map unit: 3 percent
Hydric soil rating: No

Deldota, clay, partially drained
Percent of map unit: 3 percent
Hydric soil rating: No

Capay
Percent of map unit: 3 percent
Hydric soil rating: No

284—Xerofluvents, extremely gravelly

Map Unit Setting
National map unit symbol: hjqf
Elevation: 140 to 1,900 feet
Mean annual precipitation: 9 to 21 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 190 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition
Xerofluvents and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerofluvents

Setting
Landform: Fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile
H1 - 0 to 60 inches: very gravelly loam

Properties and qualities
Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Los banos

Percent of map unit: 3 percent
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Woo, clay loam

Percent of map unit: 3 percent
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Carranza

Percent of map unit: 3 percent
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Damluis

Percent of map unit: 3 percent
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Woo, loam

Percent of map unit: 3 percent
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Los Banos Sand and Gravel Quarry)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

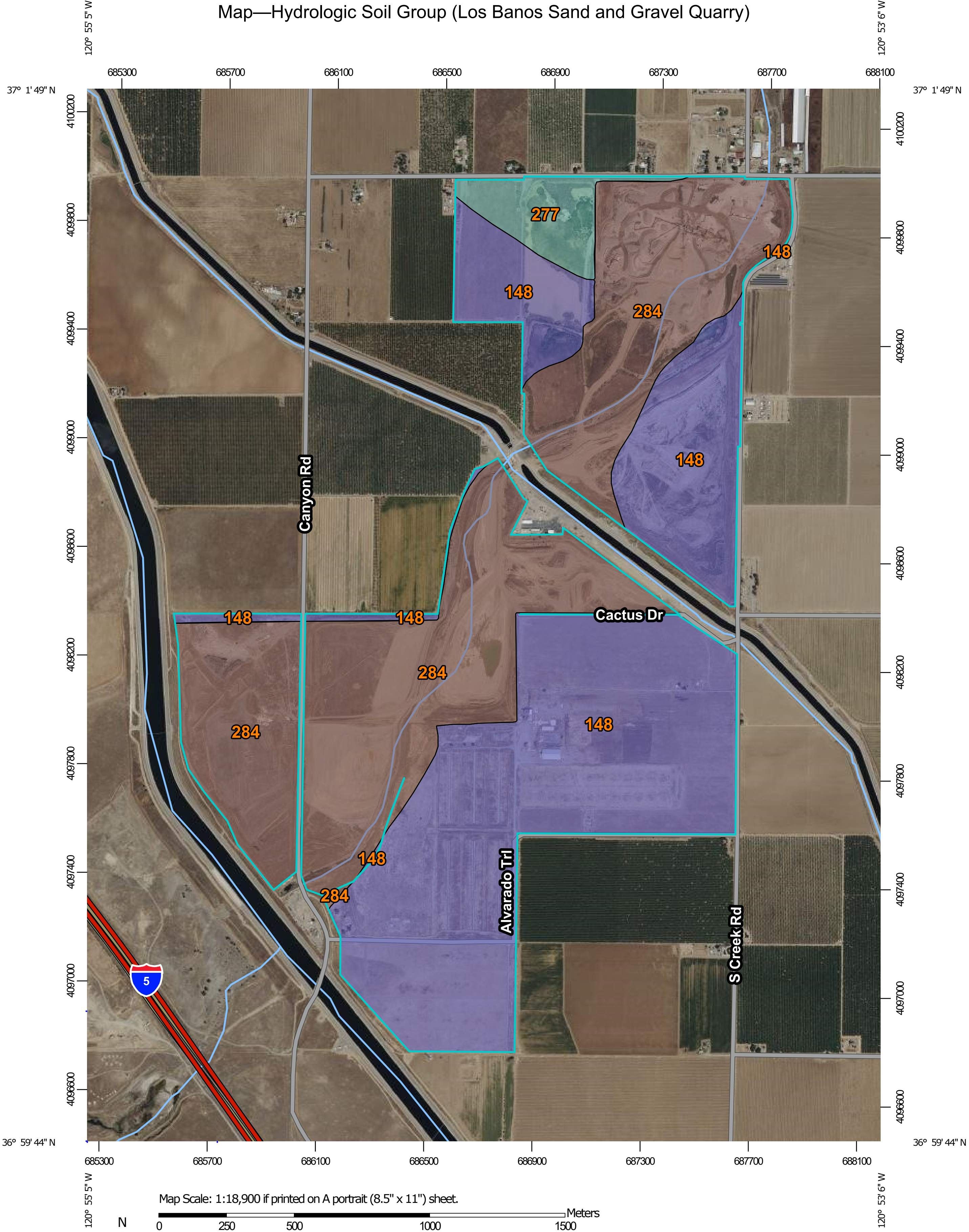
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group (Los Banos Sand and Gravel Quarry)



Map Scale: 1:18,900 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- ☐ Area of Interest (AOI)

Soils

Soil Rating Polygons

- 🟪 A
- 🟩 A/D
- 🟦 B
- 🟫 B/D
- 🟦 C
- 🟨 C/D
- 🟥 D
- ⬜ Not rated or not available

Soil Rating Lines

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

Soil Rating Points

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- ■ Not rated or not available

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Merced County, California, Western Part
Survey Area Data: Version 17, Sep 7, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 11, 2022—May 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (Los Banos Sand and Gravel Quarry)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
148	Carranza-Woo , 0 to 2 percent slopes	B	450.4	49.8%
277	Woo clay loam, 0 to 2 percent slopes	C	32.4	3.6%
284	Xerofluvents, extremely gravelly	B/D	421.1	46.6%
Totals for Area of Interest			**903.9**	**100.0%**

Rating Options—Hydrologic Soil Group (Los Banos Sand and Gravel Quarry)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX H

Water Supply Assessment (Sespe, 2024)

SESPE
CONSULTING, INC.
A Trinity Consultants Company
374 Poli Street, Suite 200 • Ventura, CA 93001 • (805) 275-1515

WATER SUPPLY ASSESSMENT

LOS BANOS SAND AND GRAVEL QUARRY

Triangle Rock Products, LLC
Merced County, California

State Mine I.D. 91-24-0009

February 6, 2024

Prepared for:
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31 Rancho Camino Drive, Suite 300
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BRIAN G. ANDERSON
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Exp. 03-31-2024

Lori Bryan

Brian G. Anderson, P.G.
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Project Geologist
Sespe Consulting, Inc.

Water Supply Assessment
Los Banos Sand and Gravel Quarry
Triangle Rock Products, LLC

February 19, 2024

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FIGURES

WATER SUPPLY ASSESSMENT

Los Banos Sand and Gravel Quarry
Triangle Rock Products, LLC

February 19, 2024

1.0 EXECUTIVE SUMMARY

Triangle Rock Products, LLC dba Vulcan Materials Company – Western Division (Triangle) operates the Los Banos Facility (Facility), an approximately 607-acre surface mining, processing, and hot mix asphalt (HMA) production facility in the County of Merced, California. Triangle seeks to incorporate two adjoining properties: Turner and Sunset properties to the existing sand and gravel operations (herein after the Project) to continue to provide a source of high-quality aggregate and HMA products to California's Central Valley Region. The purpose of this Project is to secure the requisite approval from the County, which will permit extraction of the sand and gravel resources at these properties, along with ancillary activities to handle and convey these materials. The existing Facility is permitted by the County under Conditional Use Permits (CUP 3466 for mining and reclamation; CUP 3383 for an onsite HMA plant) and an approved site-wide Reclamation Plan. Since the Project is a continuation of existing operations, and no operational changes are proposed, the Project impacts will be the same as "baseline" operations for water supply, which amounts to approximately 173 acre-feet per year.

More specifically, this Project would amend the current CUP 3466 and related Reclamation Plan for Triangle's existing Los Banos Sand and Gravel operations to include proposed mining and reclamation at the Turner and Sunset properties. The Project would not involve any significant changes to the existing operations other than allowing for continued mining of the sand and gravel resources at the Turner and Sunset Properties.

The Project site is in Merced County, approximately 4 miles southwest of the City of Los Banos, California. It consists of four assessor's parcels, one comprising the Sunset property and three encompass the Turner property as shown on Figure 1. Table 1 below lists the Assessor's Parcel Numbers (APN's) and corresponding property.

Table 1. APN's, Ownership and Zoning

Parcel Number	Property Owner	Zoning Designation
Sunset Property 083-210-033-000	CalMat Company[1] 1200 Urban Center Drive Birmingham, Alabama 35242	General Agriculture (A-1)
Turner Property 088-070-079-000	Vulcan Lands, Inc. P.O. Box 385014 Birmingham, Alabama 35235-3523	General Agriculture (A-1)
Turner Property 088-070-086-000	Vulcan Lands, Inc. P.O. Box 385014 Birmingham, Alabama 35235-3523	General Agriculture (A-1)

Parcel Number	Property Owner	Zoning Designation
Turner Property 088-070-039-000	Vulcan Lands, Inc. P.O. Box 385014 Birmingham, Alabama 35235-3523	General Agriculture (A-1)

[1]CalMat Company is a legal entity of VMC

The Project site lies within the boundaries of the Delta-Mendota Groundwater Subbasin (Delta-Mendota Subbasin or Subbasin), which is identified by DWR in Bulletin 118 as Subbasin No. 5-022.07 (DWR, 2021) The Subbasin is one of nine subbasins in the greater San Joaquin Valley Basin in the San Joaquin River Hydrologic Region of California. The Subbasin encompasses an area of approximately 750,000 acres, of which approximately 316,000 acres are in the Northern and Central Delta-Mendota Regions (Woodward & Curran, 2019). The Subbasin boundaries, as currently defined by DWR, are in San Joaquin, Stanislaus, Merced, Madera, Fresno, and San Benito Counties.

This Water Supply Assessment (WSA) is prepared in accordance with the California Water Code, as amended by SB 610, focusing on the Project's interaction with water resources and particularly its potential impact on groundwater. The analyses performed as part of the WSA, in line with the standards set forth by SB 610, indicate the proposed Project would not:

1) violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;
2) deplete groundwater supplies or interfere with groundwater recharge, resulting in an adverse effect on aquifer yield or groundwater levels;
3) conflict with or otherwise impede the implementation of a water quality control plan or sustainable groundwater management plan.
4) Increase water use above that of existing baseline conditions.

Collectively, comparison with these criteria demonstrate the Project would not increase water use or introduce a new water source, as it does not propose an increase in production, and accordingly require no mitigation and there will be sufficient water for the project during normal, single dry, and multiple dry years.

2.0 INTRODUCTION

2.1 Project Background

Triangle Rock Products, LLC (Triangle) operates an approximately 607-acre surface mining, processing, and hot mix asphalt facility in Merced County (County), referred to as the Triangle Los Banos Sand and Gravel Quarry ("Facility" or "Los Banos Facility"). The current Facility is permitted by the County under Conditional Use Permits (CUP 3466 for mining and reclamation; CUP 3383 for an onsite hot mix asphalt [HMA] plant and an approved site-wide Reclamation Plan. Triangle seeks to amend the existing Conditional Use Permits (CUP 3833, CUP 3466) and related Reclamation Plan to include mining and reclamation at the Turner and Sunset properties presented on Figure 1. Both properties will continue to provide a local source of high-quality aggregate materials to serve both the local and regional market and furnish aggregates for hot mix asphalt and ready-mix (RMC) products.

The purpose of this Project is to secure the necessary approvals from the County, which would permit extraction of the sand and gravel resources at these properties, along with ancillary activities that will allow for handling and conveyance of the extracted materials, and reclamation. More specifically, the Project would amend the current CUP 3466 and related Reclamation Plan for Triangle Rock Product's existing Los Banos Sand and Gravel operations, which currently use 173 acre-feet of water per year, to include mining and reclamation at the Turner and Sunset properties. The Project would not involve any changes to the existing operations.

This Water Supply Assessment (WSA) has been prepared for the Triangle Rock Products, LLC (Triangle) Los Banos Sand and Gravel Quarry in support of Merced County's environmental review of the Project, focusing on evaluating the Project's potential impacts related to water use in accordance with California Water Code § 10910. As there are no changes to the existing Los Banos Facility operations, other than proposed mining and reclamation of the Sunset and Turner properties, without increasing the operational capacity. This assessment provides the pertinent water supply information and aligns with the guidance provided in the *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning* (DWR, 2003).

The Project site consists of four assessor's parcels, one comprising the Sunset property and three encompassing the Turner property as shown in Figure 1. Table 1 lists the Assessor's Parcel Numbers (APN's) and corresponding property. The Turner site is located on approximately 308 acres of Triangle owned land directly south and east of the existing Facility. It lies between the Delta-Mendota Canal to the northeast and the California Aqueduct to the southwest. The Sunset property is located on nearly 33 acres of land Triangle owns immediately west of the current silt pond, south of Sunset Avenue. The Turner and Sunset properties will be mined to between approximately 27-feet to 72-feet below ground surface (bgs) depending on subsurface stratigraphic conditions and depth to groundwater. When implemented the Project would maintain the mining above the regional water table within the Turner and Sunset properties, as indicated by the onsite groundwater monitoring network. With this design, the Project will provide an estimated 36.3 million tons (MT) of quality sand and gravel.

The Project is located within San Joaquin Valley Groundwater Basin (SJGWB), which encompasses the Delta-Mendota Subbasin and falls in the jurisdictional boundaries of the Central Valley Regional Water Quality Control Board (CVRWQCB). The Delta-Mendota Subbasin has a surface area of approximately 750,000 acres in Stanislaus, Merced, Madera, and Fresno Counties.

California's Groundwater Bulletin 118 states the water bearing formations in the Delta-Mendota Subbasin comprise the Tulare Formation, alluvium, terrace deposits, and flood-basin deposits. It is bounded on the north by the Stanislaus - San Joaquin County line, and on the west by the Tertiary and older marine sediments of the Coast Ranges. The eastern boundary follows the San Joaquin River to Township 11 S, then it trends south through Township 14S Range 15E on the eastern side of the Fresno Slough, then follows the eastern, northern, and northwestern boundary of the San Joaquin Valley – Westside Groundwater Subbasin (DWR, 2006).

At present, Triangle's land holdings associated with the Los Banos Facility and aggregate plant have twelve water production wells, only two (DW1 and DW2) of which supply the Los Banos aggregate production facility. The remaining nine wells are remnants of historical agriculture operations. Regarding the Facility's current production wells, DW1 provides water for the mining operations and DW2 serves as the water source for processing

With respect to the existing setting, mining operations at the Sunset and Turner properties would be typical surface aggregate operations and would be conducted in the same manner as is currently occurring at the Los Banos Facility. It is anticipated that 36.3 MT (gross tons) of sand and gravel would be extracted from the Turner and Sunset properties over approximately 40 years, depending upon market conditions. the Project's annual extraction rates and quantities will not change above current baseline operations that are based on market demand.

2.2 Regulatory Content

Under the California Water Code statute as revised, and in addition to all the previously existing requirements for WSAs, if the proposed Project's water supply includes groundwater, the WSA must now also include the following as part of its informational content: a description of the groundwater basin(s) that will supply the project; for court- or SWRCB-adjudicated basins, a copy of the order or decree determining legal pumping rights; and, for unadjudicated basins designated as high- or medium-priority pursuant to the Sustainable Groundwater Management Act (SGMA), whether the California Department of Water Resources (DWR) has identified the basin as being subject to critical conditions of overdraft and whether a groundwater sustainability agency (GSA) has adopted a Groundwater Sustainability Plan (GSP) or approved alternative, and, if so, a copy of the same (Water Code, § 10910(f)(2)(A)-(C)). For unadjudicated basins designated low- or very low-priority pursuant to SGMA, the WSA must also now describe the basin(s), but the preexisting substantive content requirements for WSAs with respect to such basins otherwise remain the same.

The California Water Code Section 10912(a) requires preparation of a WSA if a proposed project meets any of the following criteria:

1) A proposed residential development of more than 500 dwelling units;
2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
4) A proposed hotel or motel, or both, having more than 500 rooms;
5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
6) A mixed-use project that includes one or more of the projects defined above; or
7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

The Project does not include any residential development, will not employ more than 1,000 persons, does not include any structures with more than 500,000 square feet of floor space, and does not include any hotel or motel structure. Given that the Project involves mining and exceeds the size threshold for industrial projects under criteria, it constitutes a “project” within the meaning of Water Code § 10912(a)(5), and thus requires preparation of a WSA.

As applied under CEQA, this WSA provides the relevant information needed to determine the significance of the environmental effects related to water resources. More specifically, when considering the Project’s potential impact to groundwater, the following criteria are of relevance:

1) As planned, is there sufficient supply available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?
2) Would the Project have an adverse effect on existing uses of groundwater, such as nearby supply wells?
3) If implemented, would the Project substantially deplete groundwater supplies or interfere with recharge such that sustainable groundwater management of a basin would be negatively impacted?
4) Would the Project conflict with or impede the implementation of a water quality control plan or sustainable groundwater management plan?

(Water Code, § 10910(c)(3); CEQA Guidelines, Appendix G.)

To address each of these criteria, the discussion that follows provides the technical background and basis for evaluating the Project’s potential impacts with respect to groundwater resources.

3.0 EXISTING SETTING

3.1 Physiography

The Los Banos mining site is situated within the San Joaquin Valley Groundwater Basin’s Delta-Mendota Subbasin, which is in a portion of the Great Valley Physiographic Province, a vast alluvial plain about 50 miles wide and 400 miles long, located in central California. The northern half of the Great Valley, sometimes referred to as the Central Valley, is the Sacramento Valley which is drained by the Sacramento River and the southern half is the San Joaquin Valley, drained by the San Joaquin River. The Great valley forms a trough where sediments have been continuously deposited since the Jurassic (approximately 160 million years ago). The Delta-Mendota Subbasin is situated in the northwestern portion of the San Joaquin Groundwater Basin (SJGWB) and adjoins nine other subbasins in the SJGWB (Figure 4) (DWR, 2021).

The Project site is in an area of varying topographic relief, with low rolling to moderately steep slopes in the foothills of the Diablo Range and gentle to nearly level slopes on the alluvial fans and the valley floor. The Diablo Range is a series of low ridges with elevations up to 3,000 ft. The Sunset and Turner properties are by and large flat, disturbed, open area lands that have been used in an assortment of agricultural and livestock operations and related activities. Based on Google Earth™ imagery, elevations at the site range from approximately 260 to 140 feet above mean sea level (amsl).

3.2 Climate

The climate is semiarid and characterized by warm, dry summers, mild winters, intermittent rainfall and comfortable humidities. The mean daily temperatures range from 48°F in the winter to 76°F in the summer (Weather Service, 2021). The majority (73 percent) of the annual precipitation occurs from December through March. Typical of Mediterranean climate catchments, river flows vary extensively annually and seasonally. Three major tributaries join the San Joaquin from the east: the Merced, Tuolumne, and Stanislaus Rivers. Smaller tributaries consist of the Fresno River, Chowchilla River, Bear Creek, and Fresno Slough (from the Kings River). At higher elevations, in the Sierra Nevadas, precipitation is chiefly snow, with rain in the middle and lower elevations of the Sierra foothills and in the Coast Range. Therefore, the natural hydrology is historically a blended runoff regime controlled by winter-spring rainfall runoff and spring-summer snowmelt runoff. Most flow originates from the Sierra Nevada snowmelt, with small amount of runoff added from the western side of the drainage basin in the rain shadow of the Coast Range. As average precipitation decreases from north to south, the San Joaquin River basin (including the Stanislaus, Tuolumne, and Merced Rivers) contributes about 22 percent of the total runoff to the Delta (DWR, 1998).

The Delta-Mendota Subbasin and Central Valley Region have experienced wet-dry cycles that can last several years with the most recent drought, from 2012 through 2016, resulting in near historic low groundwater levels during the height of the drought in 2014 and 2015. Similar groundwater trends were observed during the 1976 to 1977 and 1987 to 1992 droughts. Wetter conditions occurred in 2017 that brought groundwater conditions near historic highs. Table 1 below was generated from the California Irrigation Management Information System (CIMIS) website using the data from the Los Banos Station No. 56. Monthly average data for Temperature (F°), Precipitation (in.), and Standard ETo (in.) were derived from January 2012 through April 2022.

Table 2. Climate Data adapted from Los Banos Station ID 56 based on 10-year average (CIMIS, 2022).

Month	Average Max Temp (F°)	Average Min Temp (F°)	Average Total Precipitation (in.)	Average Total ETo (in.)
January	59	37	1.67	1.35
February	65	38	0.85	2.47
March	69	43	1.22	3.94
April	75	47	0.60	5.99
May	81	52	0.20	7.92
June	90	57	0.02	8.73
July	94	60	0.00	8.67
August	93	59	0.01	7.41
September	89	56	0.01	5.71
October	80	48	0.36	4.00
November	67	40	0.79	1.98
December	57	36	1.58	1.26
Total			7.31	59.44

3.3 Regional and Site-Specific Geology

The San Joaquin Valley is a sediment-filled basin, which is bound to the east by the Sierra Nevadas, and to the west by the California Coastal Ranges. It is classified as a forearc basin, and dates to the Mesozoic age (approximately 65 million years ago), when subduction was occurring off the coast of California. The plate tectonic configuration of western North America changed during the Tertiary, when the trench that once characterized the offshore California was transformed into a zone of right-lateral strike-slip motion known today as the San Andres Fault (Clark, 2021). Nevertheless, the San Joaquin Valley preserves several features that characterized it prior to the formation of the San Andreas transform (Clark, 2021).

The San Joaquin Valley was formed as an inland sea between two mountain ranges (Clark, 2021). As the volcanic formations of the Sierras were eroded off into the Valley below, and simultaneously, the Coastal Ranges were being worn down and deposited into the Valley, resulting in the filling of the inland sea by Cretaceous and Tertiary age marine and continental sediments, and creating the current continental basin (Clark, 2021). The Cretaceous deposits comprise the Franciscan Complex and the Great Valley Sequence. The Tertiary sediments deposited on the Cretaceous sequence are predominately composed of sandstone and shale with minor conglomerate beds, and typically dip toward the San Joaquin Valley (Clark, 2021).

The topography of the Project surroundings is varied, with low rolling to moderately steep slopes in the foothills of the Diablo Range and gentle to nearly level slopes on the alluvial fans and the valley floor. Elevations in the area surrounding the Project range from about 175 feet in the valleys to over 1,200 feet along certain ridges in the foothills.

The Project area is located along the boundary between the San Joaquin Valley on the east and the Diablo Range on the west. As previously stated, the San Joaquin Valley comprises the southern half of California’s Central Valley geomorphic province, while the Diablo Range is part of the California Coast Ranges geomorphic province. A review of geologic literature for the surrounding Project area, indicates that the site is situated on Quaternary-age alluvium, likely sourced from the Diablo Range to the west (Lettis, 1985).

The Diablo Range is a series of low ridges reaching elevations of up to 3,000 feet. These mountains form a natural barrier against the coastal winds and fogs, creating a rain shadow on the western side of the valley, an important factor in considering the source and distribution of ground-water recharge to the valley. Numerous intermittent drainages such as Panoche, Little Panoche, Arroyo Hondo, Cantua, Silver, Domengine, and Los Gatos Creeks drain the eastern slopes of the Diablo Range. These creeks have a variable discharge, with periodic flooding that flushes sediments out of the mountains and foothills and deposits them on alluvial fans at the base of the foothills. Recent alluvial fan deposits may extend up to several miles into the valley, with larger, more extensive fans at the mouths of the larger drainages (Lettis, 1985).

Based on geologic exposures in the mining areas at the adjoining Los Banos Facility, the subsurface materials exhibit lithologic characteristics, such as grain size, shape, and fabric, which are consistent with alluvial basin fill deposits. As such, the Sunset and Turner properties are anticipated to contain the same types of lithologies, specifically sand and gravel dominated facies with some clayey and silty portions.

The Tulare Formation underlies Holocene alluvium, representing the last episode of tectonic upheaval to take place in the Great Valley. The Tulare Formation is thought to have once formed a continuous blanket of sediments across the present foothill area and extending out into the valley, though the deposits have been extensively eroded. The formation has been folded and deformed on the basin margins, where it unconformably overlies older deposits and is in contact with most of the older bedrock units (Davis, 1959). The Tulare Formation consists of sand, silt, and clay in varying amounts with depth and forms the primary groundwater reservoir within the valley proper (Bartow, 1991).

One member of the Tulare Formation of importance is the Corcoran Clay member, which varies in thickness across the San Joaquin Valley, and forms a confining layer for deeper sediments of the Tulare. This confining layer is absent in portions of the western valley margin and tilted and exposed at the surface along the Project in the vicinity of Panoche Creek (Lettis, 1985).

Older Alluvium is mapped as alluvial fan deposits in the inter-fan areas between the larger drainages of Ortigalita, Little Panoche, Panoche and Los Gatos Creeks, and around the nose of Anticline Ridge north and east of Coalinga (Lettis, 1985). These deposits are characterized by poorly sorted, unconsolidated sand, silt, clay, and minor gravel, which are moderately well dissected by streams and exhibit strong soil development. Except for their angular unconformity with the Tulare Formation, these deposits are very similar to the Tulare deposits, and it is very difficult to distinguish them in surface exposures (Lettis, 1985). Pleistocene age Terrace Deposits occupy the margins of the larger creek drainages but are only extensive enough to have been mapped along the margins of Cantua and Panoche Creeks (Lettis, 1985). These terrace deposits are clearly older than present-day floodplain deposits due to their elevation above the floodplain and their extensive soil development (Lettis, 1985). These deposits consist of boulders, gravel, sand, and silt deposits ranging from 2 to 20 feet in thickness (Lettis, 1985).

Alluvial fan and stream floodplain deposits of Holocene age are present in the stream valleys and the uppermost layers of the alluvial fans. In general, these deposits consist of unconsolidated sand, silt, and clay, with minor gravel (Lettis, 1985). Poor soil development and a lack of deeply incised stream channels dissecting the fan surface characterize Younger alluvial deposits. Holocene stream terraces are generally low-lying deposits with only a few feet of separation in elevation from modern floodplain deposits (Lettis, 1985). These deposits exhibit moderate to poor soil development and are difficult to distinguish from more recent deposits of present-day streams.

Landslide deposits are generally found at the base of steep slopes and ridges. Extensive landslide hazard mapping has not been performed in the Project area due to the sparse population and limited hazard to life and property. Moreover, stream channel deposits are found in the active channels and floodplains of modern streams within the Project area. These deposits consist principally of gravel, sand, and silt, with minor clay, and are typically between 5 and 100 feet thick (Clark, 2021).

Locally, the Project site is underlain by Quaternary alluvium and associated deposits sourced from the Coast Range to the west. The Quaternary alluvial deposits are characterized by numerous lenses of fine to coarse grained sediments. They are locally known (in order of ascending age) as the Patterson alluvium (early Holocene to modern), San Luis Ranch alluvium (late Pleistocene and early Holocene), the Los Banos alluvium (middle and late Pleistocene), and Tulare Formation (upper Pliocene and Pleistocene) (Lettis, 1985). According to Lettis (1982), the Patterson alluvium is the uppermost unit exposed at the Project site and is comprised of unconsolidated, poorly to well sorted gravel, sand, silt, and silty clay. The San Luis Ranch alluvium consists principally coarse-grained terrace and upper-fan deposits; coarse to fine-grained mudflow deposits; and fine-grained middle and lower floodplain deposits (Lettis, 1985). The Los Banos alluvium is the informal name given to the unconsolidated deposits of gravel and sand covering the broad areas of the foothills of the Diablo Range and are demonstrably younger than the Tulare Formation and the surfaces are continuous with terraced deposits of sand and gravel bordering the major Diablo Range drainages and merge eastward with thick, unconsolidated deposits of gravel, sand, silt and clayey silt in SJV (Lettis, 1985). See Figure 3 for regional stratigraphic column.

Underlying these alluvial deposits is the Corcoran Clay member of the Tulare Formation, which is one of the few depositional units in the Valley that can be regionally mapped and is commonly used to model the basin and was used to estimate the thickness of the overlying section of the Project site (Faunt, 2022). This unit is a low-permeability, laterally extensive lacustrine deposit (Johnson, et al., 1968), ranging from 60 feet to 100 feet thick across the Project site. Groundwater in the Project area generally occurs below the Corcoran Clay, which is therefore considered as a regional aquitard. The thinnest and shallowest section of the Corcoran Clay is in the southwest corner of the Project and thickens towards the northeast. Based on the mine plan designed for the Project, extraction of the sand and gravel resource will occur in upper alluvial assemblage stratigraphically above the Corcoran Clay.

3.4 Area Hydrogeology and Groundwater Basins

The Department of Water Resources (DWR) has partitioned the State into 10 hydrologic regions which have been further divided into basins and subbasins. The 2006 update to California Groundwater Bulletin 118, describes the boundaries and properties of the Delta-Mendota Subbasin No. 5-022.07, within the San Joaquin Valley Groundwater Basin of the San Joaquin River Hydrologic Region. The discussion that follows will focus primarily on the DWR Bulletin 118 Delta-Mendota Subbasin description, Lettis (1982) and the 2019 Northern and Central Delta-Mendota GSP generated by the San Luis and Delta-Mendota Water Authority (SLDMWA).

The northern portion of the San Joaquin Valley drains towards the Delta via the San Joaquin River and its tributaries, including the Fresno, Merced, Tuolumne, and Stanislaus Rivers. The southern portion of the valley is internally drained by the Kings, Kaweah, Tulare, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes (DWR, 2006). According to the most recent 2018 Water Quality Control Plan (Basin Plan) for the Central Valley Regional Water Quality Control Board (CVRWQCB), the Delta-Mendota Subbasin’s groundwater has the following beneficial uses: municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO).

According to the DWR Bulletin 118, the geologic sections that comprise the groundwater reservoir in the Delta-Mendota Subbasin comprise the Tulare Formation, terrace deposits, alluvium, and flood-basin deposits. These alluvium, flood-basin, and terrace deposits were described in detail by Lettis (1982) and were previously covered in the Regional and Site-specific Geology portion of this report. The Tulare Formation is composed of beds, lenses, and tongues of clay, sand, and gravel that been alternatively deposited in oxidizing and reducing environments (Hotchkiss, 1971). The Corcoran Clay Member of the formation underlies the basin at depths ranging from about 100 to 500 feet and acts as a confining bed (Sneed, 2018).

Terrace deposits of the Pleistocene age lie up to several feet higher than present streambeds. They are composed of yellow, tan, and light-to-dark brown silt, sand, and gravel with a matrix that varies from sand to clay (Hotchkiss, 1971). In general, the water table is beneath the terrace deposits. The most recent DWR Bulletin 118 suggests these deposits have value as a possible recharge site due to their relatively large grain size which infers high porosity and permeability.

The alluvium section consists of interbedded, poorly to well-sorted clay, silt, sand, and gravel and is partitioned based on its degree of dissection and soil formation (DWR, 2006). The flood-basin deposits are generally composed of light-to-dark brown and gray clay, silt, sand, and organic materials with locally high concentrations of salts and alkali (DWR, 2006). Additionally, coarse sand and gravel stream channel deposits are included.

The Corcoran Clay layer is generally widespread throughout the Subbasin and essentially creates a two-aquifer system, a semi-confined aquifer above the Corcoran Clay, referred to as the Upper Aquifer and a confined aquifer below the Corcoran Clay, known as the Lower Aquifer. The Corcoran Clay layer largely inhibits vertical flow between the upper and lower aquifers, except in areas where the Corcoran Clay is thin, or wells perforated in both provides a conduit for vertical flow (Woodward & Curran, 2019). The prevailing groundwater flow within both aquifer systems in generally northeast from the Coast Range and parallel to the San Joaquin River (Woodward & Curran, 2019).

Groundwater in the Delta-Mendota Subbasin occurs in three water-bearing zones. These include the Lower Aquifer, which contains confined fresh water in the lower section of the Tulare Formation, the Upper Aquifer which locally contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and some younger alluvial deposits, as described in detail by Lettis (1982), that includes a shallow unconfined zone within roughly 25 feet of the ground surface (Davis, 1959). It is important to note however, this uppermost shallow zone may be locally constrained, and is thus not pervasive basin-wide (Davis, 1959).

The estimated specific yield of the Delta-Mendota Subbasin is 11.8 percent (based on DWR San Joaquin District internal data and Davis 1959), and historically has experienced subsidence in certain parts of the basin. Land subsidence up to about 16 feet has occurred in the southern portion of the basin due to artesian head decline (DWR, 2006). Large parts of the western San Joaquin Valley have been affected by subsidence resulting from extensive groundwater withdrawal that began in the 1920s; ground subsidence reached a maximum of 29.7-feet below historic ground surface levels in 1981 (Ireland, 1986). Subsidence has been mitigated by importation of surface water through major canals and the California Aqueduct in the 1950s through 1970s. By 1983, water levels throughout most of the San Joaquin Valley had recovered to 1940 to 1950 levels, and land subsidence in most of the San Joaquin Valley resulting from groundwater withdrawals seemed to have slowed or stopped (Ireland, 1986). However, average water levels in much of Merced County, including the project area, declined nearly 30-feet from 1970 through 2000 due to groundwater withdrawal (Sneed, 2018). Localized areas within the San Joaquin Valley continue to be subject to subsidence due to groundwater withdrawal and have been mapped in Merced County. The Project is not in an area experiencing recent subsidence (Refer to Figure 5).

3.5 Groundwater Management Framework

The California Water Code (Section 13240) requires the preparation and adoption of water quality control plans (Basin Plans). Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. California state law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050(f)). State law also requires that Basin Plans conform to the policies set forth in the Water Code beginning with Section 13000. The Project site is situated in the jurisdictional boundaries of the Central Valley Region and is coordinated through the Central Valley Regional Water Quality Control Board (Regional Water Board) which first adopted the Basin Plan in 1975 (CRWQCB, 2018).

The DWR Bulletin 118-80 recognizes 39 groundwater basins in the San Joaquin watershed area. The San Joaquin Valley floor is apportioned into 15 distinct groundwater basins, mostly determined by political boundaries (CRWQCB, 2018).

The Delta-Mendota Subbasin is one of 21 alluvial basins and subbasins identified by the California Department of Water Resources (DWR) as being in a state of critical overdraft. As such, the SGMA requires the preparation of a Groundwater Sustainability Plan (GSP) to address essential processes to achieve sustainable conditions in the Subbasin by 2040. In 2017, Groundwater Sustainability Agencies (GSAs) were formed within the Subbasin to focus on the long-term reliability of groundwater through the development of six Groundwater Sustainability Plans (GSPs) (DWR, 2021). The Project site is in the GSP developed by the Northern & Central Delta-Mendota Region GSA Group. All six GSPs have been prepared in a coordinated manner under the oversight of the Delta-Mendota Subbasin Coordination Committee (Coordination Committee) and in accordance with the Delta-Mendota Subbasin Coordination Agreement (Coordination Agreement) for the Subbasin.

Categorically, the Northern Delta-Mendota Region is comprised of the following GSAs: DM-II, Patterson Irrigation District, West Stanislaus Irrigation District, City of Patterson, and Northwestern Delta-Mendota. The Central Delta-Mendota Region is comprised of the following GSAs: Central Delta-Mendota, San Benito County (under a Memorandum of Understanding with the Central Delta-Mendota GSA), Oro Loma Water District, and Widren Water District (IRM, 2022). The Northern Delta-Mendota Management Committee and Central Delta-Mendota Management Committee coordinate on all aspects of GSP development and implementation through joint management committee meetings. At the Subbasin-level, representatives from the Northern and Central Delta-Mendota Region GSP Group participate as members on the Delta-Mendota Subbasin Coordination Committee during regular meetings, where all SGMA required coordination endeavors regarding GSP development and implementation occurs (IRM, 2022).

The Northern and Central Delta-Mendota Region GSP were developed in coordination with the eight GSAs comprising the six regions. All eight of these GSAs have their own organization and management structure as well as legal authority under which they operate to enforce SGMA and the contents of the Northern and Central Delta-Mendota Region GSP. The Northern Delta-Mendota Region and Central Delta-Mendota Region coordinate with the San Luis and Delta-Mendota Water Authority (SLDMWA) as Plan Manager to prepare and implement a single GSP for their portion of the Delta-Mendota Subbasin.

Within this regional framework, Triangle’s land holdings are straddling two different GSAs. To clarify, the land located north of Sunset Avenue falls under the jurisdiction of the San Joaquin River Exchange Contractors Water Authority GSA. On the other hand, the properties encompassing the existing Los Banos Sand and Gravel Quarry and the Turner and Sunset properties, which are located south of Sunset Avenue are governed by the Central Delta-Mendota GSA (IRM, 2022).

As previously mentioned, the Delta-Mendota Subbasin has been designated a high-priority basin due to the issues of groundwater overdraft and subsidence. These challenges arise when the rate of groundwater extraction exceeds natural recharge, necessitating dedicated efforts to ensure groundwater sustainability and mitigate the effects of overdraft and subsidence. These efforts include a set of recovery projects designed to facilitate the reversal of overdraft and subsidence as outlined in the 2019 Northern and Central Delta-Mendota Region GSP.

The beneficial use of water from 2017 through 2021 for aggregate production at the existing Facility was determined within the context of the existing Los Banos operations, estimated at approximately 173 acre-feet per year. To meet this beneficial use, Triangle has been using groundwater from the Delta-Mendota Subbasin within the greater SJGWB since the existing groundwater wells were installed from 1979 through 2005 (IRM, 2005). Importantly, it should be noted that the 173 acre-feet of water required for the Project's operations have already been accounted for in the groundwater budget outlined in the GSP. Therefore, the use of this water does not inhibit the implementation of the GSP or the reversal of overdraft and subsidence in the Delta-Mendota Groundwater Subbasin.

3.6 Historical and Current Conditions

The following information regarding the historical and existing conditions of critical overdraft is sourced from the most recent Northern & Central Delta-Mendota Region Groundwater Sustainability Plan (GSP) (2019, GSP):

Historic groundwater trends in the Delta-Mendota Subbasin reveal significant shifts in water use patterns over the years. Before the introduction of imported water deliveries via the Delta-Mendota Canal and California Aqueduct in the 1950s and 1970s, the region primarily relied on groundwater for irrigation. This period saw extensive groundwater pumping, leading to declines in water tables, increased pumping costs, and land subsidence. However, the arrival of imported surface water supplies marked a shift, resulting in reduced groundwater pumping and gradual water level recovery. Droughts in the late 20th century temporarily increased groundwater use but were followed by rapid water level recovery in subsequent years, especially in the Upper Aquifer. These historical trends underscore the changing dynamics of water usage in the subbasin.

Current groundwater conditions in the Delta-Mendota Subbasin reflect the impacts of recent drought periods and the subsequent recovery of groundwater levels. From 2012 to 2016, a drought period similar to those in the late 20th century led to increased groundwater pumping due to reduced imported surface water deliveries. This resulted in historic low groundwater levels in 2014 and 2015. However, wetter conditions in the following years allowed for groundwater recovery, reaching near-historic highs by 2017. The recovery was facilitated by improved surface water allocations and decreased groundwater pumping, particularly from the Lower Aquifer. Groundwater trends also show variations in water levels in different areas of the Subbasin, influenced by factors such as local streams, canal seepage, and seasonal groundwater recharge. While the Subbasin has experienced fluctuations in groundwater levels, the recent recovery underscores the importance of sustainable groundwater management.

4.0 PROJECT HYDROGEOLOGY

As previously mentioned, the Project site is situated in a section of the Delta-Mendota Subbasin which is a part of the San Joaquin River Basin. The groundwater basin is characterized as a two-aquifer system created by the Corcoran Clay layer, generating a confined aquitard. An upper aquifer occurs locally above the Corcoran Clay, as well as a lower groundwater aquifer (Davis, 1959). Subsurface hydrogeologic materials present on the project site contain unconsolidated layers of gravel, sand, and silty sand consistent with alluvium and terrace deposits. The unconsolidated alluvial deposits, principally those below the Corcoran Clay, constitute the primary reservoir for storing large quantities of water (Bertoldi, 1991).

The Subbasin water level has increased on average by 2.2 feet from 1970 through 2000 (DWR, 2006). The period from 1970 through 1985 showed an overall increase, maxing out in 1985 at 7.5 feet above the 1970 water level (DWR, 2006). The nine-year period from 1985 to 1994 saw general declines in groundwater levels, attaining the 1970 groundwater level in 1994 (DWR, 2006). Groundwater levels rose again in 1995 to about 2.2 feet above the 1970 groundwater level (DWR, 2006). Where water levels fluctuated around this value until 2000. (DWR, 2006)

However, it’s important to note that more recent data from the 2019 Groundwater Sustainability Plan (GSP) indicates significant changes in groundwater trends. From 2000 to 2019, there has been a shift in the groundwater levels. The GSP reports a period of recovery, especially after the 2012-2016 drought. Groundwater levels began to rebound and reached levels comparable to the pre-drought conditions by 2017 (Woodward & Curran, 2019). This recovery was attributed to factors such as increased allocations from the Central Valley Project (CVP), full water rights supplies from the San Joaquin River, and reduced groundwater pumping due to the availability of imported water supplies (Woodward & Curran, 2019).

Estimations of the total storage capacity of the Subbasin and the amount of water in storage as of 1995 were calculated using an estimated specific yield of 11.8 percent and water levels collected by DWR and cooperators (DWR, 2006). According to these calculations, the total storage capacity of this Subbasin is estimated to be 30,400,000-acre feet to a depth of 300 feet and 81,800,000 acre-feet to the base of fresh groundwater. Historical data, as cited in the Bulletin 118 Delta-Mendota Subbasin (2006) report, suggests that the amount of stored groundwater in the lower aquifer was approximately 51,000,000 acre-feet to a depth of less than 1,000 (Bulletin 118, 2006).

There are six onsite groundwater monitoring wells that have taken groundwater level measurements monthly for over 30 years. They illustrate that groundwater level fluctuations at the Project site vary widely from 21.3 to 47.7 below ground surface (bgs), depending on several factors, including the hydrostratigraphic framework, seasonality, and pumping. Seasonal fluctuations, such as precipitation, prolonged drought conditions, localized withdrawal rates, and flows in Los Banos Creek are a few of the factors affecting groundwater fluctuations.

The 2020 Kenneth D Schmidt and Associates Report states the groundwater flow in the northern portion of the site is generally to the east, while the southern portion of the site the gradient is largely toward the east-northeast and the average hydraulic gradient is about 4 feet per mile in the northern part of the site and 18 feet per mile in the south part of the area (Kenneth D. Schmidt & Associates, 2020). The report also states that chemical analyses concluded there is no evidence that gravel mining and processing has caused any change in groundwater quality at the onsite monitor wells.

5.0 PROJECT GROUNDWATER USE

The Sustainable Groundwater Management Act empowers local agencies to manage groundwater basins in a sustainable manner over a long-term period. SGMA requires local agencies to form Groundwater Sustainability Agencies (GSAs) and to develop a Groundwater Sustainability Plan (GSP) that will have a 20-year implementation horizon and a 50-year planning horizon, with the goal of achieving groundwater sustainability. Core provisions of the Act are the formation of GSAs, the creation of GSPs, DWR evaluation and assessment of GSPs and their implementation, and State agency intervention if the SGMA requirements are not fully implemented. SGMA exempts GSP preparation from California Environmental Quality Act [CEQA] (though it does not exempt the implementation of projects under a GSP from CEQA), and specifically states that it is the intent of the Act to “respect overlying and other proprietary rights to groundwater, consistent with Section 1200 of the California Water Code (CWC), and also to “preserve the security of water rights in the state to the greatest extent possible consistent with the sustainable management of groundwater.” Additionally, SGMA states that “nothing in this part or in any groundwater management plan adopted pursuant to this part, determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights.”

Based on a 2022 water resources study prepared by Integrated Resource Management, Inc. (IRM, 2022), Triangle maintains the right to continue to pump and use water from Delta-Mendota Subbasin for its mining and aggregates processing, as well as construction materials batching operations. In accordance with 2022 IRM report, the Los Banos Facility currently produces approximately 1.03 MT of finished aggregates annually, with an associated water usage of 173 acre-feet per year to support this production (IRM, 2022). As part of the Facility’s operations, water sourced from two onsite groundwater supply wells is used for mining, aggregates processing, dust suppression and irrigation. Groundwater pumped from these two wells is reused via onsite retention in the settling basins. For this Project, Triangle intends to continue sourcing its water from the existing onsite groundwater wells and storing it for reuse in settling basins.

6.0 SOURCE AND CERTAINTY OF WATER SUPPLY

For the Project, groundwater within the Delta-Mendota Subbasin will serve as the primary source for water supply. As previously described, the basin is characterized by alluvial aquifers. The primary process for groundwater recharge within the Central Valley floor area is from percolation of applied irrigation water, although some groundwater recharge does occur in the Delta-Mendota Subbasin along the western boundary due to mountain front recharge (Woodward & Curran, 2019). In almost all cases, recharge from applied water on irrigated lands recharges the Upper Aquifer of the Subbasin (Woodward & Curran, 2019). Both the California Aqueduct and Delta-Mendota Canal run the length of the Delta-Mendota Subbasin, primarily following the Interstate 5 corridor. The following water purveyors in the Delta-Mendota Subbasin receive water from the Central Valley Project via the Delta-Mendota Canal: Central California Irrigation District, Columbia Canal Company, Del Puerto Water District, Eagle Field Water District, Firebaugh Canal Water District, Fresno Slough Water District, Grassland Water District, Laguna Water District, Mercy Springs Water District, Oro Loma Water District, Pacheco Water District, Panoche Water District, Patterson Irrigation District, San Luis Canal Company, San Luis Water District, Tranquility Irrigation District, Turner Island Water District, West Stanislaus Irrigation District. Oak Flat Water District is the only recipient of State Water Project (SWP) water in the Delta-Mendota Subbasin.

Triangle has developed and maintained access to significant water resources at the Los Banos Facility. The Triangle Rock aggregate plant has two onsite supply wells, as shown in Figure 1. Groundwater well DW1 serves as the water source for the mining operations. This well and DW2 provide water for the processing circuit, which includes a recycled water line, as described above. Refer to Table 3 for a summary of relevant well completion data. The Project will source groundwater from DW1 for mining at the Sunset and Turner properties in the same manner as currently occurs at the Facility.

Table 3. Summary of Well Data

Well	Depth to Groundwater (ft)	Well Depth (ft.)	Screened Interval (ft)	Max Pump Capacity (GPM)	Well Type
DW1	35	295	120-270	2000	Groundwater
DW2	44	230	150-230	800	Groundwater

To determine if the Project would potentially interfere with pumping of groundwater from nearby wells, publicly available well records were reviewed, and the nearby wells were located. The closest groundwater well (not associated with the Facility) occurs at approximately 1,200 feet from the Project site. However, since the Project would not create demand above the existing baseline conditions, there would not be an adverse effect on nearby supply wells.

7.0 WATER DEMAND

The Project would continue to extract materials at the same rate as the current operations at the Los Banos Facility, which is approximately 1.03 MT per year. As such, since the rate of extraction would be the same, the annual water demand for aggregate processing, dust control and irrigation would be expected to remain unchanged. Thus, the Project would not create a new demand on groundwater resources in the Delta-Mendota Groundwater Subbasin.

The water demand established for the existing operations, which is based on the maximum annual demand associated with material extraction in the current mining area, was used to establish a baseline demand. Based on production volumes for the existing mining operations provided in Table 4, Sespe calculated an annual water demand of approximately 173 acre-feet per year. Thus, given that the usage would remain the same, the Project water demand would be 173 acre-feet annually.

The annual demand equates to 6,920 acre-feet over the 40-year life of the Project, inclusive of site reclamation activities following full exhaustion of the sand and gravel resource. This Project demand ties directly to the planned consumptive uses, which is principally for mining and ancillary uses such as dust control during mining and transport of the harvested materials to the plant site, and for periodic irrigation as needed to support revegetation as part of site reclamation.

Table 4: Five Year Groundwater Use for Los Banos Sand and Gravel Operations.

Year	Gross Tons	Water Production (AFY)[1, 2]
2017	644,142	108.02
2018	1,029,936	172.72
2019	979,760	164.31
2020	977,826	163.98
2021	943,350	158.20
Future	1,100,000	173.00

Notes:

[1] Water production volumes from Integrated Resource Management, Inc., 2021.

[2] Water use is for dust control and production of aggregates.

8.0 SUFFICIENCY ANALYSIS

In accordance with Govt. Code § 66473.7(a)(2), a sufficient water supply for a project constitutes the total supply of water available during normal, single dry and multiple dry years within a 20-year projected demand period. As previously stated, the existing groundwater supply wells draw from the Delta-Mendota Groundwater Subbasin.

SGMA defines sustainable yield (SY) as “the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, which can be withdrawn annually from a groundwater supply without causing an undesirable result.” The Delta-Mendota Technical Working Group developed sustainable yield estimates for the Upper and Lower Aquifer separately. Because the Project’s groundwater supply wells are not screened in the upper aquifer the SY estimates of 325,000 acre-feet/year to 480,000 acre-feet/year was not considered for this water supply assessment.

The Coordination Committee and the ad-hoc Technical Working Group of the Coordination Committee reached a consensus to establish a Lower Aquifer sustainable yield estimate for the Subbasin by evaluating studies previously conducted in adjoining subbasins (Woodward & Curran, 2019).

As of the 2019 Northern and Central Delta-Mendota Region GSP (2019 GSP), the sustainable yield for the lower aquifer had not been calculated within the Delta-Mendota Subbasin due to insufficient data. Therefore, the 2019 GSP used an analogy from the Westside Subbasin to estimate sustainable yield. The Westlands Water District GSA recently conducted a study using groundwater modeling, in conjunction with the Westside GSP development, to estimate sustainable yield for the Westside Subbasin. Based on an analysis of available data and an initial assumption of Lower Aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, Groundwater Management Strategy Concepts presentation to the WWD Board on October 16, 2018), the GSA estimates a sustainable yield of 230,000 to 250,000 acre-feet/year, with historic conditions suggesting a range from 250,000 to 300,000 acre-feet/year (Woodward & Curran, 2019). For this sufficiency analysis, Sespe used the sustainable yield (SY) ranges for the lower aquifer from the GSP as a proxy for normal, dry, and multiple dry years. (See Table 5 below)

The Delta-Mendota Coordination Committee recommended a slightly more conservative sustainable yield value of one-third (0.33) an acre foot per acre for the Delta-Mendota Subbasin (Woodward & Curran, 2019). Using this more conservative value, the estimated Lower Aquifer sustainable yield is approximately 250,000 acre-feet per year over the approximately 750,000-acre Subbasin (Woodward & Curran, 2019). The distribution of sustainable yield is not uniform throughout the Subbasin, and it will be the responsibility of each GSA in the Subbasin to manage Lower Aquifer pumping to prevent significant and unreasonable subsidence (Woodward & Curran, 2019).

Since DWR classified the Delta-Mendota Subbasin as a critically-overdraft basin due to subsidence issues, the more conservative acre-foot per acre value for a Lower Aquifer sustainable yield estimation is considered valid as a starting point for the Subbasin by the GSA (Woodward & Curran, 2019). Lower Aquifer groundwater extractions may be managed to a stricter criterion in some areas to reduce or eliminate the potential for future inelastic land subsidence on critical infrastructure.

Based on historic production rates the Project will use the maximum of 173 acre-feet annually as the most conservative approach under a “normal year”. Water requirements vary somewhat throughout the year, and with the amount of annual precipitation. In a year with below normal precipitation, the Project site can experience up to 29 percent less rainfall than in a normal year, based on precipitation data presented in Table 2.Therefore, to maintain equivalent control of dust generated during mining, it is assumed there would be a proportional increase water demand totaling 223 acre-feet annually for a dry year. Likewise, the Project demand for multiple dry years (two consecutive years) would be 446 acre-feet. By comparison with the lower aquifer sustainable yield, the increased water demand for single and multiple dry years is estimated at less than 1 percent. Therefore, the Project would not have any significant effect on the future use of the aquifer since it does not create any new demand and the continued use is well below the sustainable yield limit during normal, dry, and multiple dry years.

Based on historic production rates the Project will use the maximum of 173 acre-feet annually as the most conservative approach under a "normal year". Water requirements vary somewhat throughout the year, and with the amount of annual precipitation. In a year with below normal precipitation, the project site can experience up to 29 percent less rainfall than in a normal year, based on precipitation data presented in Table 2. Therefore, to maintain equivalent control of dust generated during mining, it is assumed there would be a proportional increase in water demand totaling 223 acre-feet annually for a dry year. Likewise, the Project demand for multiple dry years (two consecutive years) would be 446 acre-feet. By comparison with the lower aquifer sustainable yield, the increased water demand for normal, single and multiple dry years is estimated at less than 1 percent. Therefore, the Project would not have any significant effect on the future use of the aquifer since it does not create any new demand and the continued use is well below the sustainable yield limit during normal, dry, and multiple dry years.

Table 5: Water Supplies and Demands

Description	Hydrologic Year Type (AFY)		
	Normal	Dry	Multi-Dry
Annual Water Demands			
Existing Site Water Demands [1,3]	173	223	446
Groundwater Supply			
Lower Aquifer [2]	250,000	230,000	230,000
Percentage of Sustainable Yield	0.07%	0.09%	0.19%

Notes:

[1] Existing water demands assumes the maximum over the last five years and dry years assume 29% increase.

[2] The groundwater supply wells are screened in the lower aquifer; Groundwater Supply from GSP Lower Aquifer SY ranges for normal, dry, and multiple dry years.

[3] Dry and Multi-Dry years determined calculate percent difference between average of normal year precipitation and average of dry year precipitation. Data from Los Banos Station ID 56 from years 1905 through 2022 (CIMIS, 2022).

9.0 CONCLUSIONS

Sespe has performed this WSA in support of Merced County's environmental review of the Triangle Los Banos Project. The scope of this assessment provides the pertinent background and analysis required to prepare a CEQA impact determination with respect to the Project's effects on the groundwater planned as a water supply source. Based on the analysis included in this WSA, Sespe provides the following conclusions:

1. The Projects estimated water demand is estimated at 173 acre-feet annually, which is equivalent to the existing baseline for the current operations. Because the Project as designed would not result in an increase in water demand above the baseline there would be no net effect on the water supply.

2. Based on a 20-year sufficiency analysis the groundwater supply has the capacity to meet the Project's estimated Demand under normal, single, and multiple dry years.

3. The effect of continued pumping of the existing groundwater wells for the Project would be insignificant, when comparing the aquifer capacities of the Lower Aquifer of the Delta-Mendota Subbasin. Given that the subbasin is in a state of overdraft, this WSA used the sustainable yield (SY in lieu of the total aquifer capacity, which is estimated between 230,000 and 250,000 acre-feet (Woodward & Curran, 2019). Annual Project demand is less than 1 percent of the sustainable yield of the lower aquifer under normal, single and multiple dry years. Accordingly, the Project would not have any effect on the Delta-Mendota Basin Groundwater Sustainability Plan.

4. As previously mentioned, the 2020 Kenneth Schmidt and Associates report found there is no evidence that gravel mining and processing has caused any change in groundwater quality at the onsite monitor wells (Kenneth D. Schmidt & Associates, 2020). Therefore, the Project would not conflict or impede the implementation of a water quality control plan or sustainable groundwater management plan.

5. The Project's water use does not introduce new water demands and is included within the existing uses accounted for in the GSP, which has a total allocation of 173 acre-feet per year. Furthermore, according to the latest GSP, the Delta-Mendota Subbasin appears to be in a phase of recovery, as evidenced by the management strategies outlined in the GSP. Therefore, it can be concluded that the Project's water uses would not exacerbate overdraft or inhibit overdraft recovery, indicating that sufficient water is available for the Project.

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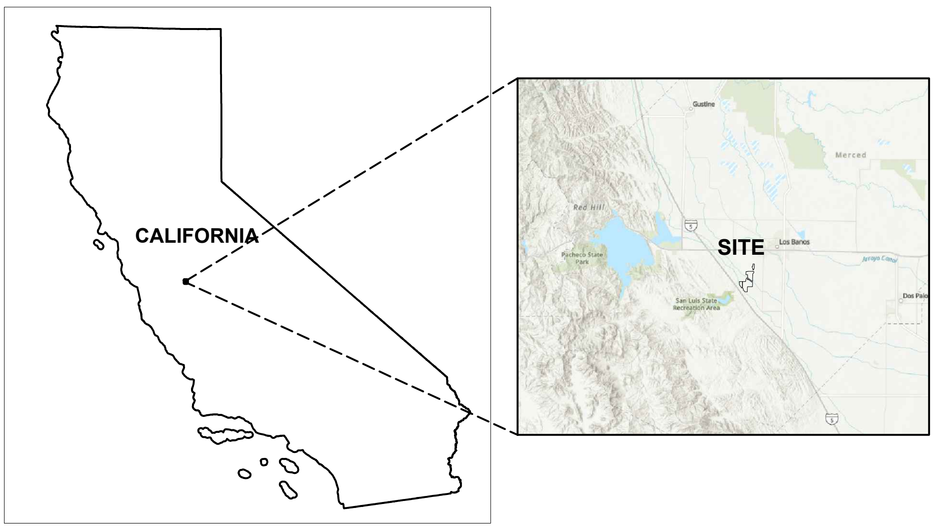
FIGURES



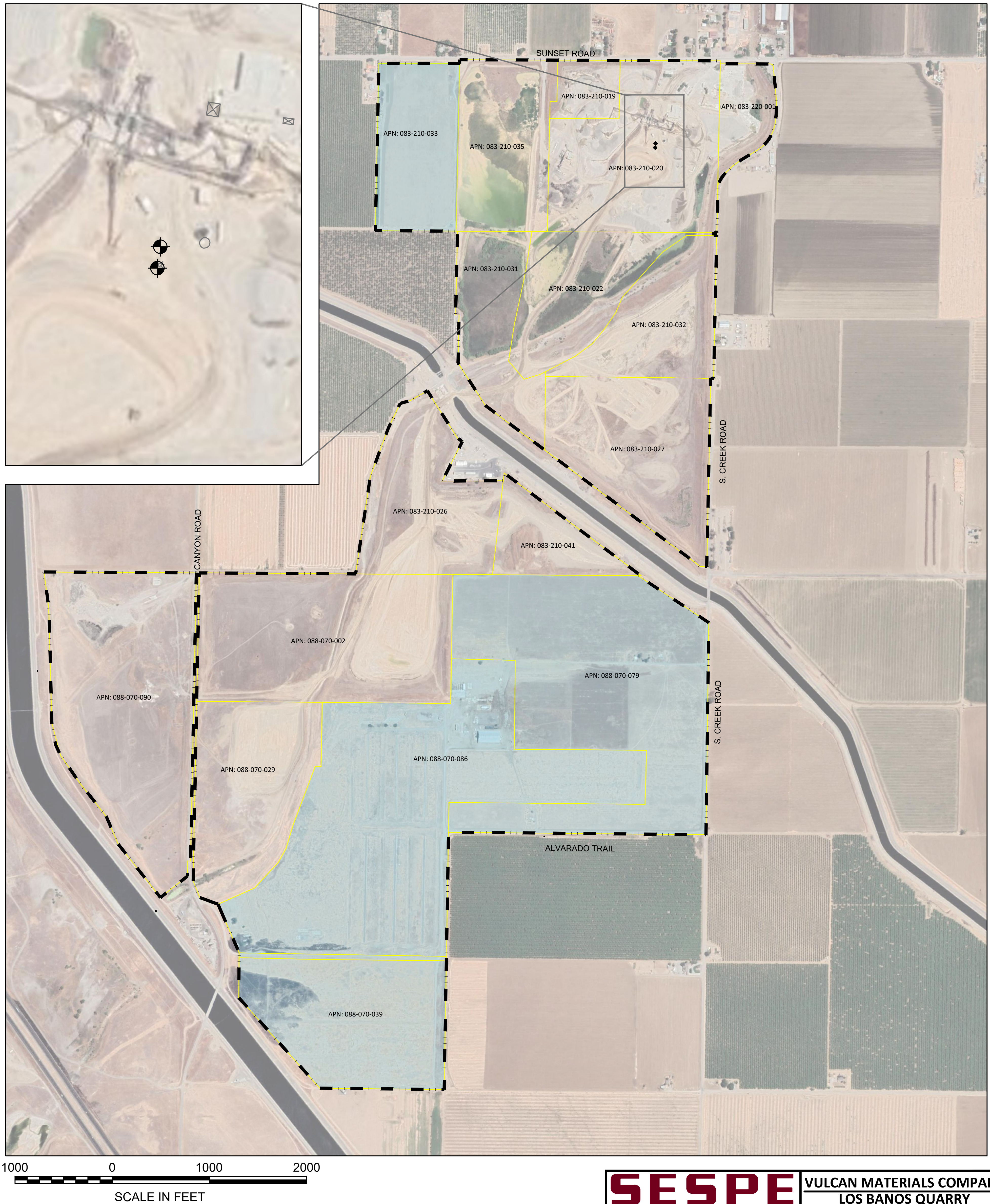
LEGEND:

— PARCEL LINES

- - · - PROJECT / RECLAMATION PLAN

⊕ BOUNDARY PRODUCTION WELL

▭ SUNSET / TURNER PROPERTIES



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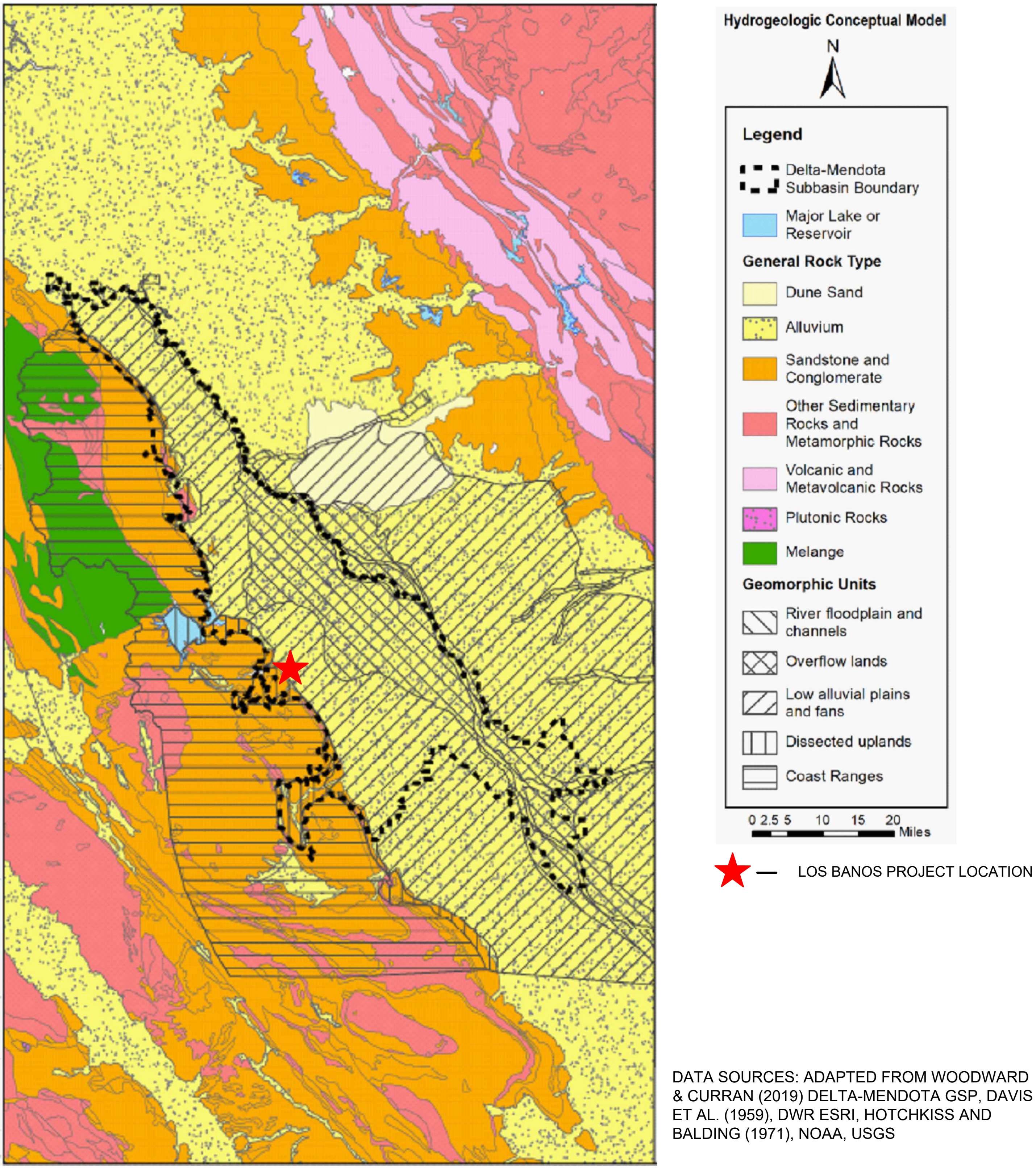
VULCAN MATERIALS COMPANY
LOS BANOS QUARRY
VICINITY MAP

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: LLB

FIGURE 1

DATE: OCTOBER 2022



DATA SOURCES: ADAPTED FROM WOODWARD & CURRAN (2019) DELTA-MENDOTA GSP, DAVIS ET AL. (1959), DWR ESRI, HOTCHKISS AND BALDING (1971), NOAA, USGS

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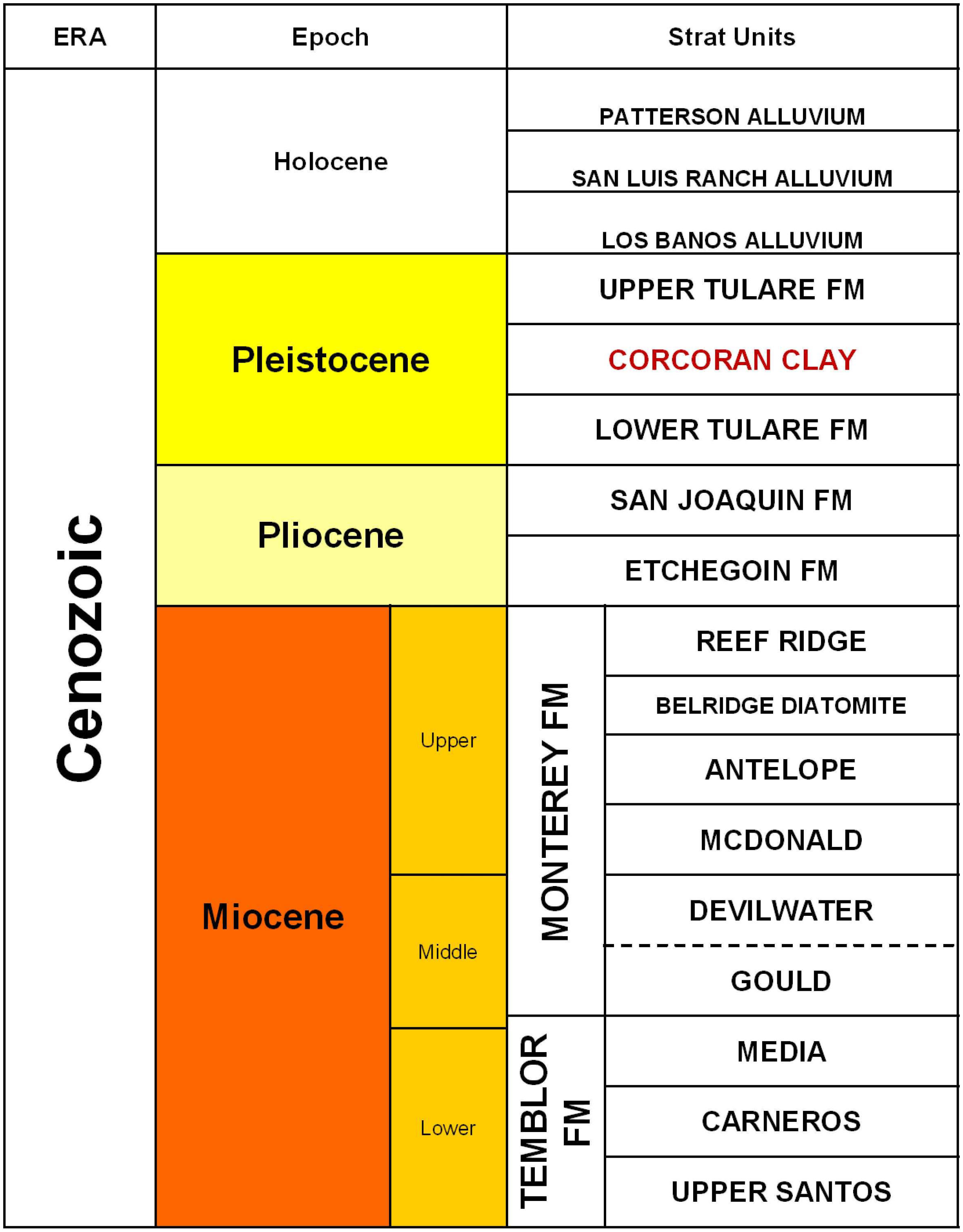
VULCAN MATERIALS COMPANY
GENERALIZED GEOLOGY MAP

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BA

FIGURE 2

DATE: SEPTEMBER 2022



ERA	Epoch		Strat Units	
Cenozoic	Holocene			PATTERSON ALLUVIUM
				SAN LUIS RANCH ALLUVIUM
				LOS BANOS ALLUVIUM
	Pleistocene			UPPER TULARE FM
				CORCORAN CLAY
				LOWER TULARE FM
	Pliocene			SAN JOAQUIN FM
				ETCHEGOIN FM
	Miocene	Upper	MONTEREY FM	REEF RIDGE
				BELRIDGE DIATOMITE
				ANTELOPE
				MCDONALD
		Middle		DEVILWATER
				GOULD
		Lower	TEMBLOR FM	MEDIA
				CARNEROS
				UPPER SANTOS

SAN JOAQUIN VALLEY STRATIGRAPHIC COLUMN
HOLOCENE THROUGH MIOCENE.

DATA SOURCES: ADAPTED FROM LETTIS (1985) AND
CLARK (2021).

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VULCAN MATERIALS COMPANY
GENERALIZED STRATIGRAPHIC COLUMN

SCALE: HORIZ. AS SHOWN
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CHECKED BY: BA

FIGURE 3

DATE: SEPTEMBER 2022

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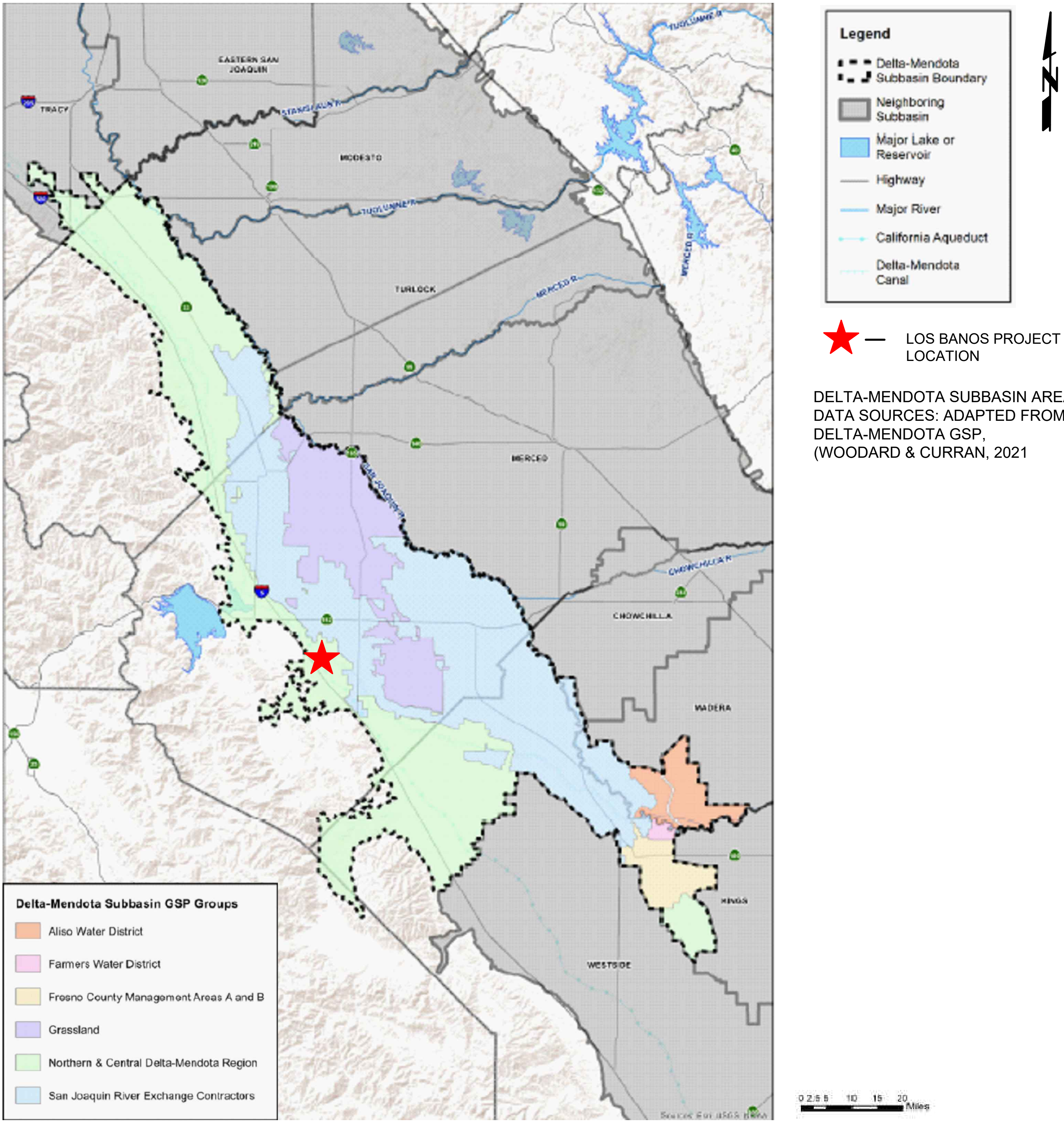

★ — LOS BANOS PROJECT LOCATION

DELTA-MENDOTA SUBBASIN AREA DATA SOURCES: ADAPTED FROM DELTA-MENDOTA GSP, (WOODARD & CURRAN, 2021

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VULCAN MATERIALS COMPANY
DELTA-MENDOTA SUBBASIN AREA

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BA

FIGURE 4
DATE: SEPTEMBER 2022

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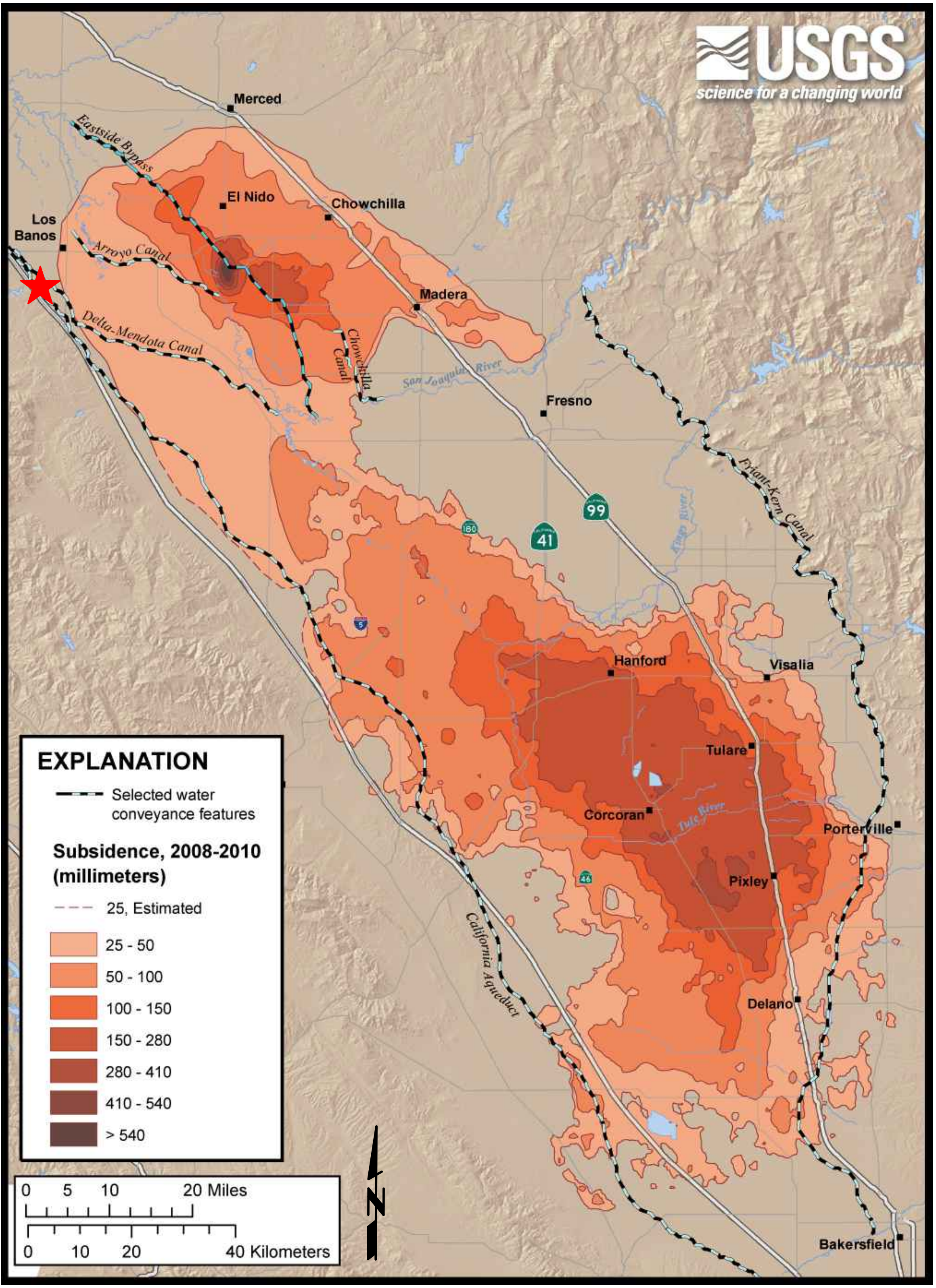

★ — LOS BANOS PROJECT LOCATION

SAN JOAQUIN VALLEY - REGIONS OF SUBSIDENCE
DATE SOURCES: USGS, 2018.

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VULCAN MATERIALS COMPANY
SJV - REGIONS OF SUBSIDENCE

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BA

FIGURE 5

DATE: SEPTEMBER 2022

APPENDIX I

Noise Impact Analysis (Sespe, 2024)

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CONSULTING, INC.

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NOISE IMPACT ANALYSIS

TRIANGLE ROCK PRODUCTS
LOS BANOS SAND AND GRAVEL QUARRY
CONDITIONAL USE PERMIT AMENDMENT, RECLAMATION PLAN AMENDMENT

Triangle Rock Products, LLC
Merced County, California

January 25, 2024

Prepared for:	Triangle Rock Products, LLC 31 Rancho Camino Drive, Suite 300 Pomona, California 91766 (818) 553-8800
Prepared by:	Sespe Consulting, Inc. 374 Poli Street, Suite 200 Ventura, California 93001 (805) 275-1515

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NOISE IMPACT ANALYSIS

TRIANGLE ROCK PRODUCTS
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Triangle Rock Products, LLC
Merced County, California

January 25, 2024

Graham P. Stephens
Project Manager
Sespe Consulting, Inc.

Noise Impact Analysis

Triangle Rock Products
Los Banos Sand and Gravel Quarry Project

January 25, 2024

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NOISE IMPACT ANALYSIS

Triangle Rock Products
Los Banos Sand and Gravel Quarry Project

January 25, 2024

EXECUTIVE SUMMARY

Triangle Rock Products dba Triangle Rock Products, LLC (Triangle) currently operates an approximately 607-acre aggregate surface mining, processing, and hot-mix asphalt production facility in Merced County (County), known as the Los Banos Sand and Gravel Operation (the "Los Banos Facility"). To continue providing a local source of high-quality aggregate products to the Central Valley region of California, as well as continue to furnish aggregates for hot-mix asphalt (HMA) and ready-mix concrete (RMC) products, Triangle desires to augment the existing sand and gravel reserves by extracting materials from two (2) adjoining properties, hereinafter the Turner and Sunset properties (the "Project"). Extraction of materials from these adjacent properties would maintain existing processing and export throughput levels at Triangle's existing Los Banos Facility.

This Noise Impact Analysis (NIA) has been prepared to quantify the results of ambient/background noise monitoring and identify potential noise effects at nearby sensitive receptors associated with the development and operation of the proposed Project (i.e., materials extraction, handling, and reclamation within the Turner and Sunset properties). Project noise levels are estimated and compared to applicable noise thresholds outlined within the Merced County General Plan and Zoning ordinance. In instances where estimated noise levels were found to potentially exceed applicable regulatory thresholds, feasible control measures are recommended.

This NIA has been developed to address the following specific impact statements within the California Environmental Quality Act (CEQA) Guidelines Appendix G Environmental Checklist Form (California Code of Regulations, Title 14, Division 6, Chapter 3, § 15000 – 15387):

a) *Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?* (See Section 6.1.1)

Project activities will generate both temporary construction and permanent noise levels. To address this CEQA Criteria, applicable Merced County 2030 *Merced County General Plan* (see Table 5 and Table 7) and *County Code* (see Table 6 and Table 8) numerical standards were utilized. Noise levels resulting from Project operations occurring within the Turner and Sunset properties were estimated and compared to the applicable County standards. Project noise levels experienced at sensitive receptors (i.e., nearby residences) adjacent to Sunset and Turner properties are expected to be in compliance with applicable County standards once perimeter berms are installed. Because mobile equipment needed to construct the perimeter berms would be operating at-grade within line-of-sight of nearby residences/sensitive receptors, berm construction activities would occur during daytime (7:00 a.m. – 6:00 p.m.) hours, Monday through Friday, only, consistent with Section 10.60.030 of the Merced County Code, which exempts construction noise during these periods when nearby residences would be less sensitive to noise generated by scrapers and dozers.

Once the perimeter berms are constructed, Project noise levels resulting from normal mining operations at all sensitive receptors would be acceptable per applicable Merced County standards. Therefore, upon completion of the approximately 7-foot-high perimeter berm at the Sunset property, specifically along the northern perimeter of the Sunset property adjacent to Sunset Avenue and the northern half of the western perimeter of the Sunset property, Project noise impacts to nearby receptors would be less than significant with no mitigation required. Furthermore, as the excavation pit deepens as mining activities progress (final pit depths estimated to be 27- to 72-feet below ground surface [bgs]), equipment noise would be further attenuated at nearby receptors throughout the life of the Project. For these reasons, Project noise levels would be well within the acceptable range per the applicable Merced County criteria at every receptor, with no additional control or mitigation measures required. Please see Section 6.1.1 and Appendix D for additional detail.

b) *Would the Project generate excessive groundborne vibration or groundborne noise levels?* (See Section 6.1.2)

To assess Project vibration impacts at each receptor location, a predicted Project Vibration (PPV) value of 0.089 inches per second (i.e., large bulldozer) was utilized (see Section 5.1 for discussion and Table 10 for summary of FTA guidance documentation that provides guidance and equipment reference levels for assessing vibration impacts resulting from construction activities). Estimated Project vibration levels experienced at nearby receptors are below the applicable Merced County significance criteria (See Table 13). Therefore, groundborne vibration impacts to nearby receptors resulting from Project operations would be less than significant with no mitigation required.

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?* (See Section 6.1.3)

The proposed Project site is not located within 2.0 miles of any private or public airports or airstrips, or in an area governed by an airport land use plan. Please see Figure 4 and Section 3.2.1 which note the closest private airstrip/airport, specifically the Los Banos Municipal Airport, is located approximately 2.7 miles to the northeast of the Sunset property. Additionally, the Project does not involve the creation of a new noise-sensitive land use (i.e., residences). Therefore, the Project would have no impact related to airport/airstrip noise levels.

In summary, this NIA concludes following:

- Construction of perimeter berms during the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, are exempt from the County's sound level limitations identified in County Code Section 10.60.030. Accordingly, temporary noise impacts generated during berm construction will comply with applicable Merced County requirements;
- With construction of the perimeter berms, noise impacts generated during the Project mining operations within the Sunset and Turner properties would comply with applicable Merced County requirements;

- As designed, the Project excavation and ancillary operations would generate noise levels that are less than significant at nearby receptors, with no mitigation required; and
- Project groundborne vibration impacts are less than significant at nearby receptors, with no mitigation required.

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NOISE IMPACT ANALYSIS

Triangle Rock Products
Los Banos Sand and Gravel Quarry Project

January 2024

1.0 INTRODUCTION

Sespe Consulting, Inc. (Sespe) has prepared the following Noise Impact Analysis (NIA) on behalf of Triangle Rock Products dba Triangle Rock Products, LLC (Triangle), to quantify the potential noise effects associated with the continued operation of the Triangle Rock Products Los Banos Sand and Gravel Quarry (also referred to as the "Los Banos Facility"), located in unincorporated Merced County (County), California. Triangle seeks to continue existing operations through augmentation of additional mineral resource reserves by entitling two new properties that adjoin the existing operations, specifically the Turner and Sunset properties (herein after the "Project sites"). Triangle is currently seeking the requisite approval from the County to permit mineral resource recovery at these properties, along with a revision to the site reclamation plan, which will allow for extraction, handling and conveyance of the mined materials to the existing processing plant. Specifically, this Project would amend Triangle's existing Conditional Use Permit (CUP) 3466 and related Reclamation Plan (Mine ID# 81-24-0009) for the existing Los Banos Facility operations, to include proposed mining and post-mining reclamation at the Turner and Sunset properties. See Figure 1 in Appendix A which shows the Project site(s) and surrounding setting.

This NIA quantifies the results of ambient/background noise monitoring and assesses the potential noise effects on nearby sensitive receptors associated with the development and operation of the proposed Project (i.e., materials extraction, handling, and reclamation within the Turner and Sunset properties). Project noise levels are estimated and compared to applicable County noise thresholds, and feasible control measures are recommended for instances where estimated noise levels were found to potentially exceed applicable regulatory thresholds.

The County is the lead agency for the purposes of administering the requirements of the California Environmental Quality Act (CEQA), and for preparing the appropriate CEQA environmental document. Sespe has prepared this NIA to be included as a technical appendix within the County's subsequent CEQA documentation.

In summary, this Noise Impact Assessment (NIA) concludes the following:

- Construction of perimeter berms during the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, are exempt from the County's sound level limitations identified in County Code Section 10.60.030. Accordingly, temporary noise impacts generated during berm construction will comply with applicable Merced County requirements and are less than significant;

- With construction of the perimeter berms, noise impacts generated during the Project mining operations within the Sunset and Turner properties would comply with applicable Merced County requirements;
- With feasible Project design measures implemented (i.e., installation of the perimeter berms), Project noise impacts resulting from excavation and ancillary operations are less than significant at nearby receptors; and
- Project groundborne vibration impacts are less than significant at nearby receptors, with no mitigation required.

2.0 PROJECT DESCRIPTION

Triangle currently extracts and processes aggregate materials at the existing Los Banos Sand and Gravel Quarry located immediately east of the Sunset property, and immediately north and west of the Turner property (Figure 1, Appendix A). The existing Los Banos Facility is permitted by the County under the following entitlements: CUP 3466 for mining and reclamation, CUP 3383 for an onsite hot-mix asphalt (HMA) plant, and an approved site-wide Reclamation Plan (Mine ID# 91-24-0009).

The Project would not involve any changes to the existing operations other than allowing for the continued mining of the sand and gravel resources at the adjacent Turner and Sunset properties and subsequent reclamation, which is described in greater detail below. Consistent with Triangle's existing operations, the aggregate material extracted from the Project sites would be transferred via internal haul trucks and scrapers to the existing processing plant located at the Los Banos Facility. Material would then be processed and shipped to delivery locations throughout the region in the same manner as presently occurs. Consistent with existing operations, extracted material would also be used onsite to produce hot-mix asphalt or transferred to a separately owned and operated ready-mix concrete plant. No material processing would occur on the Turner or Sunset properties. Additionally, no on-road haul trucks or other vehicles would enter or exit the Turner or Sunset properties onto public roadways, other than at a small crossing point designated at Alvarado Trail to permit travel from the southernmost part of the Turner property north to the processing plant. Additionally, the Project would not increase the number of haul trucks or number of employee vehicles travelling to/from the existing Los Banos Facility. Therefore, the Project would not generate any new transportation noise or vibration impacts.

Proposed mining operations at the Sunset and Turner properties would be typical of surface aggregate extraction operations and would be conducted in the same manner as currently occurs at the adjacent Los Banos Facility. Specifically, aggregate material would initially be extracted from the Sunset property in a single pit, followed by placement of process fines (clays, silts and sands) into the previously excavated areas. Subsequent mining at the Turner property would also occur within a single pit, daylighting with adjoining slopes within the existing Los Banos mining areas (Figure 1, Appendix A), followed by placement of overburden back into the excavated areas.

Consistent with ongoing operations, mining would entail the use of mobile excavators, loaders and transfer trucks to extract and move the materials from extraction basins located at the Turner and Sunset properties. Blasting would not be required, nor would on-road haul trucks be needed to transfer the mined aggregate to the existing processing plant(s). Annual extraction rates and quantities would also not change as a result of the Project. It is estimated that a total of approximately 36.3 million gross tons (inclusive of fines and overburden) of sand and gravel would be extracted from the Turner and Sunset properties over approximately 40 years; however, the life of the reserves will ultimately be dependent on market demand.

Both the Turner and Sunset properties are owned by Triangle and have been subject to historical surface disturbance due to past agricultural uses. The Turner property is approximately 308 acres in size, and is located immediately south and east of the existing Los Banos Facility. It is located between the Delta-Mendota Canal to the northeast, and the California Aqueduct to the southwest. The Sunset property is approximately 33 acres in size, and is located immediately west of the existing Los Banos Facility just south of Sunset Avenue. Refer to Figure 1 in Appendix A for an aerial map showing the existing Sunset and Turn properties in relation to Triangle's existing operations. Recovery of aggregates at the Turner and Sunset properties is planned to occur at depths generally ranging from approximately 27- to 72-feet below ground surface (bgs), depending on location; however, mining has been designed to remain above groundwater. The final mining depth will ultimately be dependent upon the underlying depth to groundwater, which is monitored by measuring water levels in onsite wells. As discussed above, the method of resource recovery would entail using conventional earth moving equipment (dozers, scrapers, excavators) in the same manner as currently occurs.

Prior to mining, the sites would be cleared, and the topsoil/subsoil and overburden would be removed. Consistent with Triangle's existing procedures at the Los Banos Facility, topsoil/subsoil would be salvaged and contained in perimeter earthen berms with approximate heights of 4.5- to 5.5-feet, except along the northern and northern half of the western boundaries along the Sunset property, where the berms will be approximately 7-feet in height. Additionally, a perimeter berm will be constructed along the southern boundary of the Turner property for topsoil/subsoil storage. During reclamation, topsoil and subsoil within the berms will be used to support revegetation in those Project areas where the vegetative community would be re-established following completion of mining. Overburden materials will be placed into the excavation areas, as well as fines recovered from the aggregates processing plant. Refer to Section 5.1 for additional detail regarding initial site preparation activities (i.e., topsoil/subsoil removal, berm formation) at both the Sunset and Turner properties.

After site preparation (i.e., removal of topsoil/subsoil and overburden), normal mining operations would commence and generally continue until reaching the respective design pit depth. At this time, Triangle is proposing to mine the Sunset property first, so that the excavation pit may be used to place excess fines from the Los Banos Facility processing plant following mining. These fines would be slurried via an overland pipe to the Sunset pit after mining there is complete, and continue until the slurry material reaches within approximately 5-feet of the native surface elevation. As mining occurs at the Sunset property, material excavation will initiate at the Turner property and will continue to the resource is depleted. Depending on market demand and product needs, blending may occur using materials from multiple areas, including the Sunset and Turner properties. As discussed above, both Project mining areas would use the same methods and equipment as is presently employed at the existing Los Banos Facility. Refer to Section 5.1 for additional detail regarding normal mining operations.

After the aggregate reserves are fully exhausted and mining ceases, reclamation of the Project would commence in accordance with the approved Los Banos Sand and Gravel Reclamation Plan, which will be amended to include both the Sunset and Turner properties. Project reclamation would follow the same procedures as currently in effect at the Los Banos Facility, and would generally involve regrading, re-soiling and revegetation of the mined lands to open space. The reclaimed end use would remain the same as that already approved for the Los Banos Facility (i.e., open space).

The major components of the proposed Project operations include the following activities at the Sunset and Turner properties. The potential noise and vibration effects of these operations have been considered within this NIA:

- Site preparation, including clearing the site, removal and salvaging of topsoil and subsoil;
- As needed, construction of perimeter earthen berms approximately 4.5- to 5.5-foot-high, except at the northern edge and northern half of the western side of Sunset Road, where the berm height will be approximately 7-feet high, for topsoil/subsoil salvage and storage;
- Surface mining and material conveyance;
- Placement of overburden and fines in the excavated areas;
- Temporary stockpiling and transfer of recovered material via haul truck;
- Operation of mobile and stationary mining equipment;
- Various site improvements for access, safety, and other requirements; and
- Post-mining reclamation and revegetation to open space.

The Project design and methodology is consistent with the current mining operations at the existing Los Banos Facility. The number of onsite employees and the hours of operation (excavation generally occurs between the hours of 7:00 a.m. and 7:00 p.m.) would remain the same. Once the Project commences, existing employees and mobile equipment would simply move to conduct mining on the Turner and Sunset properties. The Project mine and reclamation site design and slope configurations are consistent with the mining and reclamation operations at the existing Los Banos Facility.

3.0 EXISTING SETTING

The Project sites (i.e., Turner and Sunset properties) are located in unincorporated Merced County, approximately 4 miles southwest of the City of Los Banos, California. This area of California's central valley is dominated by agriculture, with many of the rural communities such as Los Banos serving as a local hub to farming and ranching enterprises.

As shown on Figure 2 (Appendix A), the approximate 33-acre Sunset property is flat, disturbed, rectangular shaped site, bounded by agricultural lands and several private residences to the north and west, agricultural land to the south, and Triangle's existing Los Banos Facility immediately to the east. Sunset Avenue runs east to west along the north boundary of the site. Currently, the Sunset property is vacant, and lacks development. The property has an Agricultural (A) County General Plan land use designation and a General Agriculture (A-1) Zoning classification.

As shown on Figure 3 (Appendix A), the approximate 308-acre Turner property is vacant, disturbed land that borders the southern/southeast boundary of the existing Los Banos Facility. A portion of the property has historically been leased for agricultural-related uses. At the northeast corner, the Delta-Mendota canal directly borders the property. The Turner property also has an Agricultural (A) General Plan land use designation, and a General Agriculture (A-1) Zoning classification.

The following sections discuss the existing regulatory and environmental settings applicable to the Project.

3.1 Regulatory Setting & Noise Fundamentals

Applicable noise and vibration standards described within the Merced County *2030 General Plan* (Merced County, 2013) and Merced *County Code* (Merced County, 2022) are summarized below. Noise and vibration standards from the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (FTA, 2018), the Federal Interagency Commission on Noise (FICON), and other applicable guidance from the California Department of Transportation's (Caltrans) are also discussed. Refer to Appendix B for relevant standards and excerpts taken from the applicable regulatory documents described in greater detail below.

3.1.1 Definitions

The following terms are employed in this NIA:

- **Decibel (dB):** A unit division, on a logarithmic scale, whose base is the tenth root of ten, used to represent ratios of quantities proportional to power. In simple terms, if the power is multiplied by a factor of ten, then ten is added to the representation of the power on the decibel scale. If 0 dB represents 1 unit of power, 30 dB represents one thousand units, 60 dB represents one million units, etc.
- **A-Weighted Sound Level (dBA):** Sound pressure level measured using the A-weighting network, a filter which discriminates against low and very high frequencies in a manner similar to the human hearing mechanism at moderate sound levels. The A-weighted sound level is generally used when discussing environmental noise impacts.
- **L_{50}, L_{25}, $L_{8.3}$, $L_{1.7}$:** The A-weighted noise level that is equaled to or exceeded by the designated percentage of time within the sample. In other words, L_{50} is the noise level that is exceeded 50% of the time (e.g., 30 minutes in a given hour), L_{25} is the noise level exceeded 25% of the time (e.g., 15 minutes in a given hour), $L_{8.3}$ is exceeded 8.3% of the time (e.g., 5 minutes in a given hour), etc.
- **Maximum Noise Level (L_{max}).** The instantaneous maximum noise level measured or determined during the designated sample/time period.
- **Equivalent Continuous Noise Level (L_{eq}).** The average noise level over a designated time period. This is often referred to as "equivalent sound level", hence the "eq" subscript. The "equivalence" is to a sound of constant level that has the same total acoustic energy content.
- **Ambient (i.e., Background) Noise Level:** The current noise level in the vicinity of the Project that results from the combination of all sources, near and far. Please note, ambient noise

measurements presented in this NIA include noise generated by Vulcan's existing Los Banos Facility (see Section 3.2).

- **Day-Night Average Level (L_{dn} – dBA):** The long-term time average sound level, weighted as follows:
  - Frequency response is filtered using the A-weighting network;
  - Daytime noise (7:00 a.m. – 10:00 p.m.) is not weighted; and
  - Nighttime noise (10:00 p.m. – 7:00 a.m.) is weighted by +10 dB.

3.1.2 Characteristics of Noise

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second) they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure), as a point of reference, defined as 0 decibels (dB). Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness as presented in Table 1.

The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the sound level pressures between 1,000 and 5,000 Hz, which represent the most sensitive frequencies perceived by a healthy human ear and coincidentally the natural frequency range of human speech. This weighting network is referred to as the A-scale. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this NIA are A-weighted. Table 1 provides sound pressure levels of typical noise sources in units of dBA and micropascals (μPa) of pressure.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour or less). The L_{eq} is also the foundation of the Day-Night Average Level (L_{dn}) noise descriptor described below, each of which has a strong correlation with community response to noise. The maximum sound level (L_{max}) represents the highest instantaneous noise level recorded over a given time period (usually one hour or less), and can also be utilized to assess community noise impacts.

Table 1 Typical A-Weighted Sound Levels of Common Noise Sources

Loudness Ratio	Micropascals (μPa)	dBA	Description
128	63,245,553	130	Threshold of Pain
64	20,000,000	120	Jet Aircraft Take-Off at 100-feet
32	6,324,555	110	Riveting Machine at Operator's Position
16	2,000,000	100	Shotgun at 200-feet
8	632,456	90	Bulldozer at 50-feet
4	200,000	80	Diesel Locomotive at 300-feet
2	63,246	70	Commercial Jet Aircraft Interior During Flight
1	20,000	60	Normal Conversation Speech at 5- to 10-feet
0.5	6,325	50	Open Office Background Level
0.25	2,000	40	Background Level Within a Residence
0.125	632	30	Soft Whisper at 2-feet
0.0625	200	20	Interior of Recording Studio

Sources: (EPA, 1971) and (FICON, 1992).

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to smooth out short-term variations in the noise environment. L_{dn} based noise standards are commonly used to assess noise impacts associated with variable noise sources, such as traffic, railroad and aircraft noise.

The maximum sound level (L_{max}) presents the highest instantaneous noise level recorded over a given period (usually one hour or less). This value is useful as it can reveal short-term, intermittent noise sources (e.g., railroads, aircraft noise) within a noise environment, which would be lost with the L_{eq} and L_{dn} noise descriptor.

3.1.3 Characteristics of Groundborne Vibration

Vibration is similar to noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through physical medium or structure. As with noise, vibration consists of an amplitude and frequency. A person's response to vibration depends on their individual sensitivity as well as the amplitude and frequency of the source. Additionally, damage to structures can occur when exposed to groundborne vibration.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (inches/second). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity. Vibration levels resulting from aggregate mining and ancillary operations are not expected to be significant for this Project, due to the relatively large distances between Project sources (i.e., mining equipment) and acoustically sensitive receivers, as well as the fact that no blasting would occur.

Nonetheless, an assessment of mining-related vibration levels is addressed in this NIA.

According to Caltran's *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2020) operation of construction equipment and construction techniques generate ground vibration. Traffic traveling on roadways can also be a source of such vibration. At high enough amplitudes, ground vibration has the potential to damage structures and/or cause cosmetic damage (e.g., crack plaster). Ground vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.

As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate by a few ten-thousandths to a few thousandths of an inch. Differences in subsurface geologic conditions and distance from the source of vibration would result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes would decrease with increasing distance. The maximum rate or velocity of particle movement is the commonly accepted descriptor of the vibration "strength." This is referred to as the peak particle velocity (PPV) and is typically measured in inches per second (in/sec).

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does frequency. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases. Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events.

3.1.4 Federal Standards

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972 (42 U.S.C. §4901 et seq.), which serves three purposes:

- Establish noise emission standards for interstate commerce.
- Assist state and local abatement efforts.
- Promote noise education and research.

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies, including the Federal Aviation Administration (FAA), Federal Transit Administration (FTA), and Federal Highway Administration (FHWA).

The FAA regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the FTA (formerly the Urban Mass Transit Administration). Transit noise is regulated by the FTA, while freeways that are part of the interstate highway system are regulated by the FHWA. Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the Federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, counties and cities are restricted to regulating noise generated by the transportation system through nuisance abatement ordinances and land use planning.

3.1.5 State Standards

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regulatory tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

Article 4 of the California Administrative Code (California Noise Insulation Standards, Title 24, Chapter 1) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that prevent interior Day-Night (L_{dn}) or CNEL noise levels from exceeding 45 dBA. When such structures are located within a 60-dBA Day-Night (L_{dn}) or CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA limit.

Government Code §65302 mandates that the legislative body of each county and city in California adopt a noise element as part of their comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Because the Project site is located within the County of Merced, the applicable County noise standards are utilized to determine the potential significance of Project noise levels within this NIA. Specifically, the Merced County *2030 General Plan* (Merced County, 2013) has adopted a Health and Safety Element (Section HS) that outlines various guidelines and requirements related to noise. In addition to the General Plan, Merced County's adopted *County Code* (Merced County, 2022) (i.e., County Code, Chapter 10.60 – Noise Control, Chapter 18.34 – Fences, Walls and Hedges, Chapter 18.40 – Performance Standards) regulates construction and operational noise and vibration from stationary and mobile sources.

3.1.6 Merced County – General Plan

The *2030 Merced County General Plan* (Merced County, 2013), Health and Safety (HS) Element, has a number of policies related to noise. County General Plan noise policies that apply to the Project are summarized below. Also see Appendix B for relevant excerpts.

Goal HS-7: *Protect residents, employees, and visitors from the harmful and annoying effects of exposure to excessive noise.*

Policy HS-7.1 – Noise Standards for New Land Uses (RDR): *Require new development projects to meet* *the standards shown in Tables HS-1 and HS-2, at the property line of the proposed use, through either project design or other noise mitigation techniques.*

TABLE HS-2
Non-Transportation Noise Standards
Median (L50) / Maximum (Lmax)[1]

Receiving Land Use	***Outdoor Area[2]***		***Interior[3]***	***Notes***
	Daytime	***Nighttime***	***Day or Night***	
All Residential	*55 / 75*	*50 / 70*	*35 / 55*	*---*
Transient Lodging	*55 / 75*	*---*	*35 / 55*	*4*
Hospitals & Nursing Homes	*55 / 75*	*---*	*35 / 55*	*5, 6*
Theaters & Auditoriums	*---*	*---*	*30 / 50*	*6*
Churches, Meeting Halls, Schools, Libraries, etc.	*55 / 75*	*---*	*35 / 60*	*6*
Office Buildings	*60 / 75*	*---*	*45 / 65*	*6*
Commercial Buildings	*55 / 75*	*---*	*45 / 65*	*6*
Playgrounds, Parks, etc.	*65 / 75*	*---*	*---*	*6*
Industry	*60 / 80*	*---*	*50 / 70*	*6*

Notes:

1. *These standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards in this table, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.*
2. *Sensitive Outdoor Areas include primary outdoor activity areas associated with any given land use at which noise-sensitivity exists and the location at which the County's exterior noise level standards are applied.*
3. *Sensitive Interior Areas includes any interior area associated with any given land use at which noise-sensitivity exists and the location at which the County's interior noise level standards are applied. Examples of sensitive interior spaces include, but are not limited to, all habitable rooms of residential and transient lodging facilities, hospital rooms, classrooms, library interiors, offices, worship spaces, theaters. Interior noise level standards are applied within noise-sensitive areas of the various land uses with windows and doors in the closed positions.*
4. *Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.*
5. *Since hospitals are often noise-generating uses, the exterior noise level standards are applicable only to clearly identified areas designated for outdoor relaxation by either hospital staff or patients.*
6. *The outdoor activity areas of these uses (if any) are not typically used during nighttime hours.*
7. *Where median (L50) noise level data is not available for a particular noise source, average (Leq) values may be substituted for the standards of this table provided the noise source operates for at least 30 minutes. If the source operates less than 30 minutes the maximum noise level standards shown shall apply.*

Policy HS-7.2 – Acoustical and Groundborne Vibration Analysis Requirements (RDR): *Require development project applicants to prepare an acoustical analysis as part of the environmental review process when noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels shown in Tables HS-1 and HS-2. Require an analysis of groundborne vibration for proposed residential and other sensitive projects (including but not limited to hospitals and schools) located within 1,000 feet of a rail line with at least 30 operations per day or an existing industrial groundborne vibration source. The acoustical and groundborne vibration analyses shall:*

- *a) Be the responsibility of the applicant;*
- *b) Be prepared by qualified persons experienced in the fields of environmental noise and groundborne vibration assessment and architectural acoustics;*
- *c) Include representative noise level measurements with sufficient sampling periods and locations*

to adequately describe local conditions;

- d) *Estimate projected future (20 year) noise levels relative to the standards shown in Tables HS-1 and HS-2 at the property line of the proposed use, and, as applicable, estimate project future groundborne vibration levels using a maximum vibration standard of 70 VdB;*
- e) *Recommend appropriate mitigation to achieve compliance with the adopted policies and standards in this element, including setbacks from groundborne vibration sources causing adverse levels of vibration; and*
- f) *Estimate interior and exterior noise, and groundborne vibration exposure after the prescribed mitigation measures have been implemented at the property line.*

Policy HS-7.4 – New Noise or Groundborne Vibration Generating Uses (RDR): *Require new commercial and industrial uses to minimize encroachment on incompatible noise or groundborne vibration sensitive land uses. Also consider the potential for encroachment by residential and other noise or groundborne vibration sensitive land uses on adjacent lands that could significantly impact the viability of the commercial or industrial areas.*

Policy HS-7.5 – Noise Generating Activities (RDR): *Limit noise generating activities, such as construction, to hours of normal business operation.*

Policy HS-7.7 – Noise or Vibration Impacted Residential Area Monitoring (RDR): *Consider any existing residential area "noise or vibration impacted" if the exposure to exterior noise exceeds the standards shown in Table HS-2 or if groundborne vibration levels exceed 70VdB. Identify and evaluate potential noise or groundborne vibration impacted areas and identify possible means to correct the identified noise/land use incompatibilities.*

Policy HS-7.8 – Project Design (RDR): *Require land use projects to comply with adopted noise and vibration standards through proper site and building design, such as building orientation, setbacks, natural barriers (e.g., earthen berms, vegetation), and building construction practices. Only consider the use of soundwalls after all design-related noise mitigation measures have been evaluated or integrated into the project or found infeasible.*

Policy HS-7.12 – New Project Noise Mitigation Requirements (RDR): *Require new projects to include appropriate noise mitigation measures to reduce noise levels in compliance with the Table HS-2 standards within sensitive areas. If a project includes the creation of new non-transportation noise sources, require the noise generation of those sources to be mitigated so they do not exceed the interior and exterior noise level standards of Table HS-2 at existing noise-sensitive areas in the project vicinity. However, if a noise-generating use is proposed adjacent to lands zoned for residential uses, then the noise generating use shall be responsible for mitigating its noise generation to a state of compliance with the standards shown in Table HS-2 at the property line of the generating use in anticipation of the future residential development.*

Policy HS-7.13 – Noise Exemptions (RDR): *Support the exemption of the following noise sources from the standards in this element:*

- a) *Emergency warning devices and equipment operated in conjunction with emergency situations, such as sirens and generators which are activated during power outages. The routine testing of such warning devices and equipment shall also be exempt provided such testing occurs during daytime hours.*

b) *Activities at schools, parks, or playgrounds, provided such activities occur during daytime hours.*
c) *Activities associated with County-permitted temporary events and festivals.*

Policy HS-7.15 – New Project Groundborne Vibration Mitigation Requirements (RDR): *For residential projects within 1,000 feet of a rail line with at least 30 operations per day, or an existing industrial or commercial groundborne vibration source, require new residential projects to include appropriate groundborne vibration mitigation measures to reduce groundborne vibration levels to less than 70 VdB within structures. However, if a groundborne vibration-generating use is proposed adjacent to lands zoned for residential uses, then the groundborne vibration-generating use shall be responsible for mitigating its groundborne vibration generation to a state of compliance with the 70 VdB standard at the property line of the generating use in anticipation of the future residential development.*

3.1.7 Merced County Code – Noise & Vibration Ordinances

The Merced *County Code* (Merced County, 2022), specifically Title 10 (Public Pearce, Morals and Welfare) and Title 18 (Zoning Code), also contains various provisions that regulate both construction and Project noise from stationary and mobile sources. As noted previously, the entirety of the Project sites has a County zoning designation of “General Agricultural (A-1)”. Applicable County Code noise and vibration standards and related information/policies are summarized below (see Appendix B for additional detail).

Chapter 10.60 – Noise Control

10.60.030 – Sound Level Limitations:

A. *No person shall cause, suffer, allow, or permit the operation of any sound source on private property in such a manner as to create a sound level that results in any of the following, when measured at or within the real property line of the receiving property:*
    1. *Exceeds the background sound level by at least ten (10) dBA during daytime hours (seven a.m. to ten p.m.) and by at least five dBA during nighttime hours (ten p.m. to seven a.m.). The background sound level for purposes of this section shall be determined as set forth in Section 10.60.060; or*
    2. *Exceeds sixty-five (65) dBA L_{dn} on residential real property or seventy (70) dBA L_{dn} on nonresidential real property; or*
    3. *Exceeds seventy-five (75) dBA L_{max} on residential real property or eighty (80) dBA $_{Lmax}$ on nonresidential real property.*

B. *The following are exempt from the sound level limits of Section 10.60.030(A):*
    1. *Noise from emergency signaling devices;*
    2. *Noise from an exterior burglar alarm of any building provided such burglar alarm shall terminate its operation within five minutes of its activation;*
    3. *Noise from domestic power tools, lawn mowers, and agricultural equipment when operated between seven a.m. and eight p.m. on weekdays and between eight a.m. and eight p.m. on weekends and legal holidays, provided they generate less than eighty-five (85) dBA at or within any real property line of a residential property;*
    4. *Sound from church bells and chimes when a part of a religious observance or service;*
    5. *Noise from construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained.*

Section 10.60.040 – Specific Prohibited Acts:

A. No person shall cause, suffer, allow, or permit to be made verbally or mechanically any noise disturbance.

B. No person shall cause, suffer, allow, or permit to the following acts:

   1. Operating, playing, or permitting the operation or playing of any stereo, radio, television, phonograph, or similar device that reproduces or amplifies sound in such a manner as to create a noise disturbance for any person other than the operator of the device;

   2. Using or operating any loudspeaker, public address system, or similar device between ten p.m. and eight a.m. the following day, such that the sound therefrom creates a noise disturbance across a residential real property line;

   3. Owning, possessing, or harboring any animal or bird that, frequently or for continued duration, generates sounds that create a noise disturbance across a residential real property line;

   4. Loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, liquids, garbage cans, refuse, or similar objects, or the pneumatic or pumped loading or unloading of bulk materials in liquid, gaseous, powder, or pellet form, or the compacting of refuse by persons engaged in the business of scavenging or garbage collection, whether private or municipal, between nine p.m. and seven a.m. the following day on a weekday and between nine p.m. and nine a.m. the following day on a weekend day or legal holiday except by permit, when the sound therefrom creates a noise disturbance across a residential real property line;

   5. Operating or permitting the operation of any tools or equipment used in construction, drilling, earthmoving, excavating, or demolition work between six p.m. and seven a.m. the following day on a weekday or at any time on a weekend day or legal holiday, except for emergency work, or when the sound level does not exceed any applicable relative or absolute limit specified in Section 10.60.030;

   6. Using, operating, or permitting the operation of one or more off-highway vehicles on private property such that the resulting sound creates a noise disturbance across a residential real property line.
   (Ord. 1869 § 3, 2009; Ord. 1726 § 1, 2004).

10.60.050 – Exemptions:

A. The provisions of this chapter shall not apply to:

   1. Activities conducted in public parks, public playgrounds, and public or private school grounds, including, but not limited to, school athletic and school entertainment events;

   2. Noise sources associated with agricultural activities or agricultural operations on agricultural property, including without limitation those specified in Section 18.56.010(B) of this Code;

   3. The generation of sound for the purpose of alerting persons to the existence of an emergency, except as provided in Section 10.60.030(D)(2);

   4. The generation of sound in the performance of emergency work;

   5. The generation of sound in situations within the jurisdiction of the federal Occupational Safety and Health Administration;

6. *Any land use for which a valid discretionary land use permit, such as a conditional use permit or an administrative permit, has been issued by the county prior to the effective date of the ordinance codified in this chapter, or which may be issued by the county, it being the intention of the county that the process for granting discretionary land use permits, including the imposition of conditions, be separate and independent of this chapter; or*
7. *Using, operating, or permitting the operation of one or more off-highway vehicles on public land, other than a highway, was described by California Vehicle Code Section 38001.*

10.60.060 – Sound Measurement Procedures:

- A. *Insofar as practicable, sound will be measured while the source under investigation is operating at normal, routine conditions and, as necessary, at other conditions, including, but not limited to, design, maximum, and fluctuating rates.*
- B. *All tests shall be conducted in accordance with the following procedures:*
    1. *To the extent practicable, all sources contributing sound to the point of measurement shall be identified.*
    2. *Measurements shall be taken at or within the real property line of the affected person.*
    3. *The measuring instrument must be calibrated using a calibrator recommended by the measuring instrument manufacturer before and after each series of readings.*
    4. *The measuring instrument must be recertified and the calibrator must be recalibrated at least once each year by the manufacturer or by a person that has been approved by the manufacturer. A copy of written documentation of such recertification and recalibration shall be kept with the equipment to which it refers.*
    5. *No outdoor measurements shall be taken:*
        - a. *During periods when wind speeds (including gusts) exceed fifteen (15) mph;*
        - b. *Without a windscreen, recommended by the measuring instrument manufacturer, properly attached to the measuring instrument;*
        - c. *Under any condition that allows the measuring instrument to become wet (e.g., rain, snow, or condensation); or*
        - d. *When the ambient temperature is out of the range of the tolerance of the measuring instrument.*
- C. *The report for each measurement session shall include:*
    1. *The date, day of the week, and times at which measurements are taken;*
    2. *The times of calibration;*
    3. *The weather conditions;*
    4. *The identification of all monitoring equipment by manufacturer, model number, and serial number;*
    5. *The normal operating cycle of the sources in question with a description of the sources;*
    6. *The ambient sound level, in dBA, with the sources in question operating;*
    7. *The background sound level, in dBA, without the sources in question operating; and*
    8. *A sketch of the measurement site, including measurement locations and relevant distances, containing sufficient information for another investigator to repeat the measurements under similar conditions.*
- D. *Prior to taking noise measurements the investigator shall explore the vicinity of the source in*

question to identify any other sound sources that could affect measurements, to establish the approximate location and character of the principal sound source, and to select suitable locations from which to measure the sound from the source in question.

E. *When measuring continuous sound, or sound that is sustained for more than one second at a time, the measuring instrument shall be set for A-weighting, slow response, and the range (if the measuring is designed to read levels over different ranges) shall be set to that range in which the meter reads closest to the middle of the scale. The minimum and maximum readings shall be recorded to indicate the range of monitored values along with the central tendency average most often displayed.*

F. *The measuring instrument shall be placed at a minimum height of three feet above the ground or from any reflective surface. When handheld, the microphone shall be held at arm's length and pointed at the source at the angle recommended by the measuring instrument's manufacturer.*

G. *If extraneous sound sources, such as aircraft flyovers or barking dogs, that are unrelated to the measurements increase the monitored sound levels, the measurements should be postponed until the extraneous sounds have become of such a level as not to increase the monitored sound levels of interest.*

H. *The monitoring session should last for a period of time sufficient to ensure that the sound levels measured are typical of the source in question.*

I. *The background sound levels shall be subtracted from the measured sound levels of the source of interest by using Table 2, to determine the sound levels from the source of interest alone. If the ambient sound level is less than 3 dBA higher than the background sound level, the source level cannot be derived and violation of the chapter cannot be substantiated.*

Table 2
Correction for Background Levels

Difference Between Ambient and Background Sound Levels	***Correction Factor to Be Subtracted from Ambient Level for Source Level***
3	*3*
4-5	*2*
6-9	*1*
10 or more	*0*

(Ord. 1726 § 1, 2004).

Chapter 18.34 – Fences, Walls and Hedges

Section 18.34.060 – Noise Barrier

B. ***Reduce Noise Impacts.*** *Projects located near noise impacted areas are required to incorporate measures into the project, such as building orientation, setbacks, and natural barriers (e.g., earthen berms and vegetation) that reduce the noise impacts to an acceptable level. When required by an acoustical analysis or an analysis of groundborne vibration, a noise barrier shall meet the following minimal structural requirements described in the acoustical analysis and may include:*
    a. ***Walls and Fences.*** *Walls and fences shall not exceed the allowable fence height of seven feet. A wall or fence shall also include landscaping to prevent graffiti and enhance aesthetics.*
    b. ***Trees and Shade Trees.***

  i. *Trees shall be provided at 30-foot intervals if adjacent to a wall or fence; or*
  ii. *Shade trees shall be provided at 30-foot intervals if the wall or fence is adjacent to a sidewalk or bike path.*

c. ***Screening.*** *A wall or fence shall be screened 50 percent, at maturity, with bushes or vines, and trees, when visible from the public rights-of-way. The landscaping may be used in combination with anti-graffiti paint until the landscaping has grown in to cover the wall.*

d. ***Required Fencing Materials.*** *Fence materials shall include one of the following types of materials:*
  i. *Masonry or stucco on both sides of a wooden frame;*
  ii. *Masonry walls; or*
  iii. *Board and batten wood fences.*

C. ***Landscaped Berm.*** *A berm may be used in combination with a wall and fence. The total berm/wall and fence height shall not exceed the allowable fence height of seven feet. The berm shall be landscaped to prevent erosion and add visual interest. See Figure 3-5 (Noise Barrier Wall/Berm with Landscaping).*
(Ord. 1976 § 2, 2019).

Chapter 18.40 – Performance Standards

Section 18.40.050 – Noise:

A. ***Applicability.*** *The following noise provisions, standards, and specifications apply to all properties, structures, uses, and activities in all zones, unless an exception is specifically noted. For additional noise standards see Chapter 10.60 (Noise Control) in the Merced County Code.*

B. ***Definitions.***
  1. ***dBA.*** *Decibel with "A" level weighting scale similar to the human ear.*
  2. **L_{dn}.** *Day/night average sound level during a 24-hour day.*
  3. **L_{max}.** *The maximum noise level during a single event.*

C. ***Noise Generated by Mechanical Equipment.*** *Buzzers, bells, loud speakers, or other noise generating devices shall comply with the noise standards below at any boundary line of the parcel, except fire protection devices, burglar alarms, and church bells. Merced County Code Chapter 10.60 (Noise Control) and the 2030 General Plan Standards for unacceptable noise levels shall apply:*
  1. *If the proposed use exceeds the background sound level by at least 10 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and by at least five dBA during nighttime hours (10:00 p.m. to 7:00 a.m.). The background sound level for purposes of this section shall be determined as set forth in MCC Section 10.60.060.*
  2. *If the proposed use is adjacent to a residential land use or property that is zoned for residential use, the allowable noise level shall not exceed 65 dBA L_{dn} or 75 dBA L_{max} at the property line.*
  3. *If the proposed use is not adjacent to a residential use or a parcel zoned for residential land use, the allowable noise level at the property line shall not exceed 70 dBA L_{dn} or 80 dBA L_{max} at the property line.*

D. ***Consistency with General Plan.*** *The maximum noise levels for all land uses shall be consistent* *with Table HS-1 (Noise Standards for New Uses Affected by Traffic, Railroad, and Airport Noise) and Table HS-2 (Non-Transportation Noise Standards) in the Health and Safety Element of the 2030 General Plan.*

E. ***Elevated Noise Level During Construction.*** *During construction, the noise level may be temporarily elevated. To minimize the impact, all construction in or adjacent to urban areas shall comply with the following procedures for noise control:*

1. *Construction hours shall be limited to the daytime hours between 7:00 a.m. and 6:00 p.m. daily;*
2. *Operating or permitting the operation of any tools or equipment used in construction, drilling, earthmoving, excavating, or demolition work between 6:00 p.m. and 7:00 a.m. on a weekday or at any time on a weekend day, or legal holiday, except for emergency work, or when the sound level exceeds any applicable relative or absolute limit specified in MCC Section 10.60.030 is prohibited; and*
3. *All construction equipment shall be properly muffled and maintained.*

F. ***Noise Barriers.*** *Refer to Section 18.34.060 (Noise Barrier) of this Zoning Code for design requirements if a noise barrier structure is required to meet the noise standards.*
(Ord. 1976 § 2, 2019).

18.40.080 – Vibration, Heat, Electrical Disturbance, and Glare

No use shall create any disturbing ground vibration, heat, glare, and electrical disturbances based on typical human reaction beyond the boundaries of the subject parcel. No use shall cause electromagnetic interference with normal radio or television reception or with the function of other electronic equipment beyond the property line of the parcel on which they are located. (Ord. 1976 § 2, 2019).

3.1.8 Project-Related Noise Level Increases

The subjective reactions to change in noise levels shown in Table 2 are commonly used to identify expected public reaction to changes in environmental noise levels. Table 2 was developed on the basis of test subjects' reaction to changes in the levels of steady-state pure tones or broad-band noise and to changes in noise levels resulting from a given noise source (e.g., mining equipment). Table 2 was taken from the *Fundamentals of Noise and Vibration Analysis for Engineers* (Norton & Karczub, 2003). As described within the reference materials, these changes are most applicable in the range of 50 to 70 decibels (dB), which is the usual range of human speech and building interior noise levels.

Table 2 Subjective Reaction to Changes in Noise Levels of Similar Sources

Change in Level (dBA)	Factor Change in Acoustical Energy	Subjective Reaction
+1	1.3	Imperceptible (Except for Tones)
+3	2.0	Just Barely Perceptible
+6	4.0	Clearly Noticeable
+10	10.0	About Twice (or half) as Loud

Source: *Fundamentals of Noise and Vibration Analysis for Engineers, 2nd Edition* (Norton & Karczub, 2003).

Although not used to determine the potential significance of the Project noise effects, the subjective reactions to changes in noise levels presented in Table 2 are useful for informational purposes, and provide additional context within the noise impact analysis in Section 6.1.1.

3.1.9 Vibration Criteria

As discussed in Section 3.1.6 and 3.1.7, Merced County requires new commercial and industrial uses that could potentially encroach on existing residential or other sensitive land uses (e.g., hospitals and schools) complete a groundborne vibration assessment. Per the County General Plan and County Code, a vibration level of 70 VdB (velocity level in decibels) is the maximum acceptable exposure limit for sensitive receptors, including residences. Therefore, a maximum vibration velocity level (VdB) of 70 is utilized to determine the significance of Project vibration impacts per CEQA Checklist item *b)*. Note that a 70 VdB level is equivalent to a peak particle velocity (PPV) of 0.003 inches per second (in/sec). See Appendix F for additional detail.

3.1.10 CEQA Guidelines

The CEQA Guidelines provide threshold criteria used to determine whether a discretional project would result in a significant impact to the environment. These criteria are found in the Environmental Checklist in Appendix G of the CEQA Guidelines. Section 13 of the Environmental Checklist outlines criteria for noise analysis, and these specific criteria are used in this NIA to determine potential significance of noise and vibration impacts associated with the proposed Project. See Sections 4.0 and 6.0 below for additional detail.

3.2 Environmental Setting

This section describes the noise environment and existing noise sources in and around the Project site (i.e., Sunset and Turner properties), the sensitive receptors of potential concern near the Project site, as well as the measured ambient noise levels in these areas. For this Project, the existing setting and ambient noise levels include current operations at Triangle's Los Banos Facility located adjacent to the Turner and Sunset properties (Figure 1, Appendix A).

3.2.1 Regional Setting

As discussed above, the Project site is located in a rural area of unincorporated Merced County, California, approximately 4 miles southwest of the City of Los Banos. The Project site is located in the San Joaquin Valley. This area of California's central valley is dominated by agriculture, with many of the rural communities such as Los Banos serving as a local hub to farming and ranching enterprises. Nearby prominent roadways include State Route 33 (SR-33) located approximately 2 miles to the north, and Interstate 5 (I-5) located approximately 0.4 miles to the southwest. Traffic on I-5 represents a low but constant source of background noise within the Project vicinity.

Lands surrounding the Sunset and Turner properties are either fallow agricultural lands, or presently active growing operations for various crops. As is typical for this area, the ranch-style residences occupy portions of the agricultural lands, with existing homes located to the east and north of the Sunset property and to the south and east of the Turner property. Water conveyance infrastructure, notably portions of the Delta-Mendota Canal and the Central Valley Aqueduct, are located within the Project area. The closest airport/airstrip is the Los Banos Municipal Airport located approximately 2.7 miles away to the northeast and has no appreciable influence on noise levels near the Project site. See Figure 1 through Figure 4 in Appendix A, which show the regional Project site setting and the locations of nearby residential receptors.

3.2.2 Local Vibration Environment

The existing ambient vibration environment in the immediate Project vicinity is extremely low, as would be expected in typical rural areas with no appreciable sources of local vibration. During field visits, Sespe staff could not detect any appreciable groundborne vibrations resulting from Triangle's existing mining/excavation pits and processing operations occurring at the Los Banos Facility. As such, existing background vibration levels around the Project perimeter are less than the threshold of perception.

3.2.3 Local Noise Environment

The existing ambient noise environment is consistent with that of typical rural areas. Existing noise sources near the Project site receptors include equipment noise from Triangle's existing Los Banos Facility (e.g., surface mining, aggregate processing, hot-mix asphalt production, etc.), agricultural noise from nearby operations, traffic noise from nearby roadways, natural sounds (e.g., wind, plants rustling, birds/insects, etc.), and occasional aircraft flyovers. Triangle's existing mining/processing operations and surrounding noise sources constitute the existing physical conditions. Sespe quantified the existing ambient noise levels consistent with the Merced County Zoning Ordinance Section 10.60.060, as discussed below.

To quantify the existing ambient (i.e., baseline) noise environment experienced by sensitive receptors closest to the Project site, a total of seven short-duration (1-hour) and one long-duration (24-hour) reference noise measurements were collected at seven locations (2 measurements were collected on consecutive days at a single location) surrounding the Project site from March 8th to March 9th, 2022 (Figure 1, Appendix A). The noise measurements were recorded using two (2) Quest™ DL SoundPro™, Type 2 noise meters (Serial #'s BGI04008, BIJ090010). Noise meters were programmed in "slow" mode, in "A" weighted form, and logging every minute. The microphones were equipped with a windscreen during measurements, and noise meters were calibrated using two (2) Quest™ QC-10 calibrators (Serial #'s QIB070141, QIJ090052) prior to, and following each, measurement taken. The noise meters and calibrators were factory calibrated by Engineering Dynamics, Inc. within the past year.

Consistent with Section 10.60.060 of the County Code, the baseline noise measurements were collected as close as practicable to the real property lines of the most-affected sensitive receptors. To mimic the approximate height of a human ear, the microphones were placed on tripods standing approximately 5-feet above the ground surface. During each monitoring day, Sespe observed moderate weather with little to no wind and no condensation or other climate conditions that could adversely affect the noise measurements. Additionally, the meters were located far from trees, foliage or other reflective surfaces (e.g., walls, buildings, etc.) that could contaminate the measured noise data. See the figures in Appendix A which display the approximate measurement locations.

Noise sensitive receptors are generally defined as "dwellings, schools, hospitals, nursing homes, churches, and libraries" within the CEQA Guidelines. The closest relevant receptor in each direction from the Turner and Sunset properties was included. Measurements at these closest receptors conservatively account for other potentially-affected receptors located farther from the Project noise sources. When appropriate, receptors are grouped together and the noise impact at the worst-case portion of the group was determined. The locations of the baseline noise measurement locations and the corresponding Project site receptors evaluated in this NIA are shown on Figure 1 through Figure 3 (Appendix A), and summarized in Table 3 below.

Table 3 Summary of Monitoring Locations

Receptor	Receptor Type	Description
R1	Residence	Residential receptor immediately adjacent to the northwest corner of the Sunset property.
R2	Residence	Residential receptor located northwest of the Sunset property, across Sunset Avenue.
R3	Residence	Residential receptor located north/northeast of the Sunset property, across Sunset Avenue.
R4	Residence	Residential receptor located approximately 0.3 miles east of the Sunset property, along Canyon Road.
R5	Residence	Residential receptor located approximately 0.2 miles south of the Turner property, along S. Creek Road.
R6	Residence	Residential receptor located approximately 0.2 miles south of the southern boundary of the Turner property, at the end of an unpaved road connecting to Alvarado Trail.
R7	Residence	Residential receptor located approximately 0.7 miles southeast of the Turner property, along S. Creek Road.
R8	Residence	Residential receptor located approximately 1 mile southwest of the Sunset property, located across the California Aqueduct.

Figure 1 through Figure 3 (Appendix A) show the locations described above.

Table 4 presents the ambient noise levels measured at the residential receptors in the Project site vicinity on March 8th and March 9th, 2022. Noise measurement logs and additional information regarding the background noise level determination are included in Appendix C.

To estimate nighttime and 24-hour L_{dn} noise levels for certain receptors, L_{eq}, L_{50} and L_{max} measurements collected at the long-duration (24-hour) reference location were compared to L_{eq}, L_{50} and L_{max} measurements at the other short-duration (1-hour) locations during the same period to estimate the decibel difference between the two points. For example, the noise levels measured at Location #7 between 10:20 a.m. and 11:20 a.m. when compared to the L_{eq}, L_{50}, and L_{max} values collected at the 24-hour (i.e., Location #1) during the same period show a measured noise level difference of -5.6 L_{eq} dBA, -9.8 L_{50} dBA, and +4.4 L_{max} dBA, respectively. The difference between these noise levels can be averaged and used as a correction factor to estimate the nighttime (10:00 p.m. – 7:00 a.m.) L_{eq} and L_{max}, as well as 24-hour L_{dn}, values at receptors where full 24-hour measurements were not collected. See Appendix C for additional details regarding these calculations.

Similarly, indoor noise levels at affected receptors were also estimated. Based on the Environmental Protection Agency's (EPA's) *Protective Noise Levels* (EPA, 1974) document (see excerpt in Appendix B), an outdoor to indoor attenuation of -20 dBA is assumed to estimate the interior noise levels experienced at the affected residences. This takes into account the average noise reduction provided while windows are closed (-25 dBA) and while windows are open (-15 dBA). This is believed to be a conservatively low estimate of indoor noise attenuation, as its assumed occupants of the nearby residences would generally keep windows closed, especially those facing sources of noise. Furthermore, the EPA study was conducted over 40 years ago (1974), and standard construction materials and practices have progressed considerably since then, and therefore it's also assumed the nearby residences were constructed using more modern materials and practices than those assessed by the EPA in 1974.

Using these concepts, Table 4 and shows the daytime (L_{eq}/L_{50}, and L_{max}), as well as 24-hour instantaneous maximum (L_{max}) and Day-Night (L_{dn}) noise levels at each receptor. As discussed in Section 2.0, mining within the Turner and Sunset properties would occur during daytime hours only (i.e., 7:00 a.m. – 7:00 p.m.) consistent with Triangle's existing Los Banos Facility operations. Therefore, only the daytime ambient noise levels at the affected receptors are presented in Table 4 below, as County nighttime (i.e., 10:00 p.m. – 7:00 a.m.) noise standards would not apply. Refer to Appendix C for additional detail.

Table 4 Ambient Noise in Project Vicinity

Receptor	Daytime (7:00 a.m. – 10:00 p.m.)					24-Hour Average (Outdoor)	
	Outdoor Area			Interior			
	L_{eq}	L_{50}	L_{max}	L_{50}	L_{max}	L_{max}	L_{dn}
R1	54.4	48.7	78.3	28.7	58.3	78.3	58.4
R2	54.4	48.7	78.3	28.7	58.3	78.3	58.4
R3	54.4	48.7	78.3	28.7	58.3	78.3	58.4
R4	51	34.9	77.9	14.9	57.9	77.9	56.6
R5	51	34.9	77.9	14.9	57.9	77.9	56.6
R6	37.6	35.8	53.6	15.8	33.6	53.6	43.8
R7	49.8	34.6	79.8	14.6	59.8	79.8	54.2
R8	51.4	33.8	81.6	13.8	61.6	81.5	55.5

See Figure 1 through Figure 3 in Appendix A, and the ambient noise data in Appendix C for additional detail.

4.0 SIGNIFICANCE THRESHOLDS

According to the Appendix G Checklist in the CEQA Guidelines (CCR, Title 14, Division 6, Chapter 3, §15000 – 15387), a Project could have a potentially significant effect if any of the following were true:

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies* (see Sections 6.1.1).

b) *Generation of excessive groundborne vibration or groundborne noise levels* (see Sections 0).

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels* (see Section 6.1.3).

4.1 Merced County Noise Regulations

As described in Sections 3.1.6 and 3.1.7, Merced County has adopted various guidelines, requirements and policies related to noise within their General Plan and County Code. Applicable Merced County noise thresholds are utilized to address CEQA Checklist item *a)*. Note that nighttime thresholds are excluded, as Project operations would occur during daytime hours only (i.e., 7:00 a.m. – 7:00 p.m.).

Table 5 and Table 6 presents the applicable unadjusted Merced County General Plan and County Code Project noise thresholds, which are derived from the regulatory criteria presented in Sections 3.1.6 and 3.1.7. Per Section 10.60.030 of the County Code, Project noise levels shall not exceed the numerical thresholds presented below.

Table 5 Merced County – Applicable General Plan Thresholds

Non-Transportation Noise Standards (Policy HS-7.1)				
Receiving Land Use	**Daytime**			
	Outdoor Area		**Interior**	
	Median (L_{50})	**Maximum (L_{max})**	**Median (L_{50})**	**Maximum (L_{max})**
All Residential	55	75	35	55

Source: Merced County – 2030 Merced County General Plan (Merced County, 2013)

Table 6 Merced County – Applicable County Code Thresholds

Noise Metric	Timeframe	Numeric Threshold (dBA)
Average (L_{eq})	Daytime (7:00 a.m. – 10:00 p.m.)	+10 decibels (above background)
Instantaneous Maximum (L_{max})	24-Hour	+75 decibels
Day-Night (L_{dn})	24-Hour	+65 decibels

Source: Merced County Code – Sections 10.60.030 (Sound Level Limitations) and Section 18.40.050 (Noise)

In instances where the measured ambient noise levels (see Table 4 above) exceed the applicable County noise thresholds, the threshold is adjusted by +3 dBA above measured noise levels to reflect the heightened ambient noise level. This is because if background ambient noise levels at certain receptors already exceed the unadjusted County threshold, it would be impossible for the Project to result in noise levels less than the applicable threshold, even if the Project were completely silent. For example, the measured maximum noise levels during both the daytime and 24-hour time periods already exceed the applicable County noise standards at all receptors. Therefore, the measured ambient noise level by +3 decibels is utilized as the threshold to determine the potential significance of Project noise impacts. This concept also corresponds with the change criterion described in Section 3.1.8, as a +3 dBA increase above the ambient is generally accepted as the minimum perceptible change in noise resulting from a source. Additionally, if measured ambient noise levels are within ±3 dBA of applicable County numeric standard, the noise level standards are increased by +3 dBA increments to encompass the ambient.

Applying this concept, Table 7 and Table 8 below presents the applicable Merced County significance thresholds for each receptor, adjusted as needed to encompass the ambient noise levels presented in

Table 4. Additional details regarding these calculations are included in Appendix C. The numeric significance criteria presented below are utilized to address CEQA Checklist item *a)* in Section 6.1.1.

4.2 Vibration Significance Thresholds

As discussed in Section 3.1.6 and 3.1.7, Merced County requires new commercial and industrial uses that could potentially encroach on existing residential or other sensitive land uses (e.g., hospitals and schools) complete a groundborne vibration assessment. Per the County General Plan and County Code, a vibration level of 70 VdB (velocity level in decibels) is the maximum acceptable exposure limit for sensitive receptors, including residences. Therefore, a maximum vibration velocity level (VdB) of 70 is utilized to determine the significance of Project vibration impacts per CEQA Checklist item *b)*. Note that a 70 VdB level is equivalent to a peak particle velocity (PPV) of 0.003 inches per second (in/sec). See Appendix F for additional detail.

Table 7 Project General Plan Numerical Thresholds

Receptor	Daytime (7:00 a.m. – 10:00 p.m.)											
	Outdoor Area						Interior					
	Median (L_{50})			Maximum (L_{max}) [B]			Median (L_{50})			Maximum (L_{max}) [B]		
	Ambient	County Threshold	Adjusted Threshold	Ambient	County Threshold	Adjusted Threshold	Ambient	County Threshold	Adjusted Threshold	Ambient	County Threshold	Adjusted Threshold
R1	48.7	55	55	78.3	75	81.3	28.7	35	35	58.3	55	61.3
R2	48.7	55	55	78.3	75	81.3	28.7	35	35	58.3	55	61.3
R3	48.7	55	55	78.3	75	81.3	28.7	35	35	58.3	55	61.3
R4	34.9	55	55	77.9	75	80.9	14.9	35	35	57.9	55	60.9
R5	34.9	55	55	77.9	75	80.9	14.9	35	35	57.9	55	60.9
R6	35.2	55	55	81.5	75	84.5	15.2	35	35	61.5	55	64.5
R7	34.6	55	55	79.8	75	82.8	14.6	35	35	59.8	55	62.8
R8	33.8	55	55	81.6	75	84.6	13.8	35	35	61.6	55	64.6

Table 8 Project County Code Numerical Thresholds

Receptor	Outdoor Area							
	Daytime (7:00 a.m. – 10:00 p.m.)		24-Hour					
	Average (L_{eq}) [A]		Maximum (L_{max}) [B]			Day-Night (L_{dn}) [B]		
	Ambient	County Threshold	Ambient	County Threshold	Adjusted Threshold	Ambient	County Threshold	Adjusted Threshold
R1	54.4	64.4	78.3	75	81.3	58.4	65	65
R2	54.4	64.4	78.3	75	81.3	58.4	65	65
R3	54.4	64.4	78.3	75	81.3	58.4	65	65
R4	51	61	77.9	75	80.9	56.6	65	65
R5	51	61	77.9	75	80.9	56.6	65	65
R6	51.1	61.1	81.5	75	84.5	55.5	65	65
R7	49.8	59.8	79.8	75	82.8	54.2	65	65
R8	51.4	61.4	81.5	75	84.5	55.5	65	65

Note: See calculations/footnotes within Appendix C for additional details.

A – Per Section 10.60.030 of the County Code, if a Project generates noise levels at nearby receivers that exceeds the background (i.e., ambient) sound level by at least ten (10) decibels (dBA) during daytime hours (7:00 a.m. – 10:00 p.m.), a potentially significant impact would result.

B - In instances where the measured ambient noise levels already exceed the applicable County noise thresholds, the threshold is adjusted by +3 dBA above the measured noise levels to reflect the heightened ambient noise level. This is because if background ambient noise levels at certain receptors already exceed the unadjusted County threshold, it would be impossible for the Project to result in noise levels less than the applicable threshold, even if the Project were completely silent.

5.0 METHODOLOGIES

5.1 Equipment Noise Sources

To quantify the noise and vibration levels generated by the Project noise sources (i.e., off-road mobile mining equipment) reference data was gathered from the Federal Highway Administration's (FHWA) *Roadway Construction Noise Model User Guide* (Federal Highway Administration, 2006) and the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (FTA, 2018). Specifically, average (L_{eq}) and maximum sound pressure level (L_{max}) FHWA reference data was utilized to quantify the equipment noise levels. Median (L_{50}) equipment noise levels were also estimated. The FTA's vibration reference levels (PPV – in/sec) for common types of construction equipment was also utilized. See Appendix B for relevant excerpts from the FHWA and FTA reference documents.

As discussed in Section 2.0, noise-generating activities within the Turner and Sunset properties would include the use of mobile excavators, loaders and transfer trucks to prepare the sites (e.g., remove and place topsoil/subsoil and overburden, construct perimeter berms, etc.) and extract and move the materials from extraction areas to the existing processing plant. Because they would involve different equipment and operating parameters, initial site preparation and subsequent mining/aggregate extraction operations have been evaluated separately in Section 6.1.1 below. Specifically, per information provided by Triangle, it was assumed that two (2) dozers and/or scrapers would be used initially to clear the mine areas and remove topsoil/subsoil from both the Sunset and Turner properties. Topsoil/subsoil would then be used to construct the approximate 7-foot-high earthen berm, along the northern side and northern half of the western edge of the Sunset property, as well as the other perimeter berms described previously. Per specifications provided by Triangle, it is assumed no other mining equipment or aggregate excavation equipment would operate during this initial Project phase, until the necessary berms have been fully constructed.

Following site preparation, extraction of the aggregate would commence at-grade within the selected mining area. Mining at both the Sunset and Turner sites would occur in one mining phase, reaching final depths of approximately 29-feet to 72-feet bgs dependent upon underlying depth to groundwater at a specific location. Consistent with existing Los Banos operations, material extraction activities at the Project sites will involve the use of two (2) dozers/scrapers, one (1) grader, and one (1) loader. Once extracted, mined materials will be transported via internal haul trucks and scrapers to the existing processing plant at the Los Banos Facility.

Table 9 summarizes the noise-generating equipment that would operate at the Turner and Sunset properties. In general, the usage fraction (%) and maximum sound pressure level (L_{max}) utilized represent FHWA default values for typical construction projects. Refer to the source noise calculations in Appendix D for additional detail.

Table 9 Off-Road Equipment Noise Reference Data

Noise Source	L_{max} @ 50-feet (dBA)	L_{50} @ 50-feet (dBA)	L_{eq} @ 50-feet (dBA)
Dozer	85	78	81
Scraper	85	78	81
Front-End Loader	80	73	76
Grader	85	78	81

Source: *Roadway Construction Noise Model User Guide* (Federal Highway Administration, 2006). See Appendix D for additional detail.

The FTA's *Transit Noise and Vibration Impact Assessment* (FTA, 2018) document provides guidelines for assessing vibration impacts resulting from construction activities. Table 10 below lists reference vibration source levels for common types of construction equipment, in terms of peak particle velocity (PPV) in units of inches per second (in/sec) at a reference distance of 25-feet.

Table 10 Vibration Source Level for Construction Equipment

Equipment	PPV (in/sec) @ 25-feet away
Vibratory Roller	0.210
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Vibratory Roller	0.210

Sources: *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2020)
Transit Noise and Vibration Impact Assessment Manual (FTA, 2018)

As discussed in Section 6.1.2 below, to assess Project vibration impacts at each receptor location, the reference PPV value of 0.089 inches per second (i.e., large bulldozer) is utilized, as it is assumed that nothing larger or more powerful than a large bulldozer would operate on the Project site in close proximity to nearby receptors. Refer to the source vibration calculations in Appendix F for additional detail.

5.2 Noise Attenuation due to Excavation Pit Walls

To determine worst-case Project noise impacts, it is assumed that the excavation equipment summarized in Table 9 would operate simultaneously at-grade throughout the Turner and Sunset properties (see Figure 2 and Figure 3, Appendix A). Therefore, shielding and noise attenuation due to distance and intervening topography resulting from mining was conservatively not accounted for in the initial impact calculations. In reality, as the excavation progresses, most of the mining equipment (e.g., excavators, loaders, etc.) would operate within the bottom of the pit. As the excavation pit deepens, significant noise attenuation will be provided by the pit walls as they would sufficiently break line-of-sight between Project excavation noise sources and nearby residential receptors. Moreover, taken in conjunction with the attenuation provided by the topsoil/subsoil perimeter berms (see Section 5.3 below), the pit walls would be expected to significantly reduce equipment noise over the life of the Project.

Barrier insertion loss calculations presented in Appendix E estimate that once excavation operations reach a minimum depth of approximate 7- to 8-feet bgs, assuming equipment is operating within the bottom of the pit, noise levels experienced at nearby receptors would be significantly attenuated (estimated to be an average reduction of -18 decibels at Receptors R1, R2 and R3). See the discussion in Section 6.1.1 below and the calculations in Appendix E for additional detail.

5.3 Noise Attenuation due to Perimeter Berms

In addition to the excavation pit walls, the perimeter earthen berms would also help attenuate Project equipment noise at certain receptors. As discussed in Section 2.0 above, prior to mining, topsoil/subsoil would be salvaged from both the Turner and Sunset sites and contained in perimeter earthen berms. Per the Project mine and reclamation site design and slope configurations consistent with the existing Los Banos Facility, berms of approximately 4.5- to 5.5-feet in height would be constructed in various locations along the Project boundary, except along the northern and northern half of the western boundaries along the Sunset property, where the berms will be approximately 7-feet in height, consistent with Section 18.34.060(C) of the County Code.

The approximate 7-foot berms along Sunset would be of sufficient length to break line-of-sight between the nearby residences (i.e., Receptors R1, R2 and R3) and the onsite excavation activities. Additionally, the berm would also be of sufficient height to break line-of-sight between the majority of the noisy components (e.g., engine block, blade, etc.) associated with the offroad mobile mining equipment. Therefore, to estimate the level of noise reduction provided by the approximate 7-foot-high perimeter berm, barrier insertion loss calculations were completed (Appendix E). As shown in Appendix E, it is estimate that the perimeter berm would reduce noise levels by approximately -11 decibels at Receptors R1, R2 and R3. See the discussion in Section 6.1.1 below and the calculations in Appendix E for additional detail.

5.4 Project Design Features & Assumptions Summary

Consistent with Merced County policies and recommendations specific to noise and vibration (see Sections 3.1.6 and 3.1.7), as well as Triangle's standard operating procedures at the existing Los Banos Facility, the following elements of the Project have been designed to minimize potentially adverse noise and vibration effects on surrounding land uses. These Project design features and control measures have been factor into the analysis. Also see the discussions above, as well as Appendices D and E for more details.

- Blasting would not occur.
- Consistent with Section 10.60.040(B)(5) of the County Code, construction of the perimeter berms during initial site preparation activities (i.e., prior to normal mining) would be limited to weekdays only, between the daytime hours 7:00 a.m. and 6:00 p.m. Until the perimeter berms are fully constructed at the Sunset property, onsite operations would be restricted to these hours only.
- Consistent with Triangle's existing protocols, normal mining operations within the Turner and Sunset properties would be limited to daytime hours (e.g., 7:00 a.m. and 7:00 p.m.), Monday through Saturday. Material extraction would not occur on Sunday or during nighttime hours as defined by Merced County (i.e., 10:00 p.m. – 7:00 a.m.).

- As discussed above, prior to material excavation, topsoil/subsoil would be salvaged from the sites using scrapers and stored within approximate 4.5- to 5.5-foot-high earthen berms along portions of the Project perimeters, except along the northern side and northern half of the western edge of the Sunset property, where the berm height will be approximately 7-feet. Although the specific locations and lengths of the perimeter berms at the Turner property would be dependent upon the quantity of topsoil/subsoil removed from each site, it is assumed that the berms would be constructed along South Creek Road.

  As discussed in Section 5.3, a reduction of -11 decibels is assumed at Receptors R1, R2 and R3 due to attenuation provided by the approximate 7-foot-high berm along the northern and northwestern perimeter of the Sunset property. While the other 4.5- to 5.5-foot-high perimeter berms would be expected to partially attenuate Project noise levels at other receptors (i.e., residences located east of the Turner property), conservatively this attenuation is not accounted for within the impact analysis presented in Section 6.1.

- No excavation would take place within designated setbacks, specifically thirty (30) feet of a public right-of-way or other non-Triangle controlled property boundary.
- No material processing would occur within the Turner and Sunset properties. All excavated material would be transported offsite to the existing Los Banos Facility.
- It’s assumed that the tallest portion of offroad mobile mining equipment with the potential to generate noise (i.e., the equipment exhaust) would extend approximately 7- to 8-feet above the ground surface.
- The number of onsite employees and associated employee vehicles would not increase above existing levels. Additionally, no on-road haul trucks or other vehicles would enter transport materials to the processing plant using public roadways. Therefore, transportation noise and vibration impacts are not assessed within this NIA.

6.0 PROJECT-LEVEL IMPACTS & MITIGATION MEASURES

6.1 Impact Assessment

6.1.1 Generation of Noise Levels in Excess of Applicable Standards

Impact Statement

Impact NO-1: *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?* **(Appendix G Threshold Criteria (a))**

Impact Analysis

Project activities will generate both temporary and permanent noise levels. To address the CEQA Criteria *a)*, applicable Merced County *2030 Merced County General Plan* (see Table 5 and Table 7) and *County Code* (see Table 6 and Table 8) numerical standards are utilized. Noise levels resulting from Project operations occurring within the Turner and Sunset properties are estimated and compared to the applicable County standards. Table 11 and Table 12 below shows the estimated daytime (7:00 a.m. – 10:00

p.m.) average (L_{eq}), median (L_{50}) and maximum (L_{max}), as well as the 24-hour instantaneous maximum (L_{max}) and Day-Night (L_{dn}) noise levels experienced at nearby residential receptors as a result of initial ground preparation/berm construction and subsequent Project mining operations/extraction of aggregates. As discussed in Section 5.2 above, Project noise levels shown below conservatively assumed onsite equipment, specifically two (2) scrapers/graders during initial site preparation and then two (2) dozers/scrapers, one (1) loader, and one (1) grader, would operate simultaneously at-grade throughout the Turner and Sunset properties.

Prior to mining, the sites would be cleared, and the topsoil/subsoil and overburden would be removed. Consistent with Triangle's existing procedures at the Los Banos Facility, Triangle will construct earthen berms with approximate heights of 4.5- to 5.5-feet, except along the northern and northern half of the western boundaries along the Sunset property, where the berms will be approximately 7-feet in height. Additionally, a perimeter berm will be constructed along the southern boundary of the Turner property for topsoil/subsoil storage.

Given their temporary nature, noise from construction activities are expressly exempted from the sound level limits identified in the Merced County Code (see Merced County Code, § 10.60.030(B)(5)). Moreover, the County General Plan's noise standards apply to "new land uses"—here, the ongoing surface mining operation. Accordingly, any short-term and temporary noise impacts associated with site preparation and berm construction will not generate noise levels in excess of any applicable standards. Once initial site preparation is complete and the berms have been constructed installed, noise attenuation can be assumed as the berm would sufficiently break line-of-sight between sources and receptor.

As shown in Table 11 and Table 12, estimated Project noise levels during normal mining operations/aggregate extraction would not exceed the applicable Merced County at any receptors located adjacent to the Sunset and Turner properties. See Appendix D and Appendix E which presents specific calculations and additional details (e.g., distance from equipment sources to receptor, receptor/equipment heights, noise transmission paths, etc.). Note that the estimated Project noise levels present in Table 11 and Table 12 below take into account noise attenuation provided by the approximate 7-foot-high berm proposed to be constructed along the northern side and northern half of the western edge of the Sunset property. Specifically, it was assumed Project noise levels experienced at Receptors R1, R2 and R3 would be reduced by approximately -11 decibels, due to the 7-foot berm blocking line-of-sight between the residences and the mining equipment operating within the Sunset property.

In conclusion, while initial site preparation and berm construction would create short-term temporary noise, these activities would occur during daytime (7:00 a.m. – 6:00 p.m.) hours, Monday through Friday, only when residences would be less sensitive to noise generated by the scrapers/dozers. All construction equipment used during site preparation/berm construction at the Sunset property will be properly muffled and maintained in accordance with County Code. Accordingly, these temporary construction activities are exempt from the County's sound level limitations identified in County Code Section 10.60.030. Specifically, Section 10.60.030(B)(5) states that "*construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained*" is considered exempt from the other Municipal Code noise standards (Merced County, 2022). Accordingly, temporary noise impacts will be less than significant with no mitigation required.

As shown on Table 11 and Table 12, once the perimeter berms are constructed, Project noise levels at all receptors would be acceptable per the applicable Merced County standards, and Project impacts would be less than significant. Therefore, upon completion of the approximately 7-foot-high perimeter berm at the Sunset property, Project noise impacts to nearby receptors would be **less than significant with no mitigation required**.

Furthermore, as the excavation pit deepens, equipment noise would be progressively attenuated by the pit walls as they would sufficiently break line-of-sight between mobile equipment and nearby residential receptors. For example, as discussed in Section 5.2, once the excavation reaches a minimum depth of 8-feet bgs at the Sunset property, noise is estimated to be reduced by an additional -18 decibels (dBA) at Receptors R1, R2 and R3. Therefore, once excavation reaches a minimum depth 7- to 8-feet bgs, Project noise levels would be well within the acceptable range per the applicable Merced County criteria at every receptor, and no additional control measures would not be required. Please see Section 5.2 above and Appendix F for additional detail.

Lastly, it is also important to note this analysis was designed to conservatively overestimate Project noise impacts at nearby receptors. In reality, when taking into account natural shielding and absorption effects from existing intervening topography and vegetation between sources (i.e., mining equipment) and receptors, as well as the fact that most mobile equipment would not operate onsite simultaneously at full power within direct line-of-sight of affected receptors (as was assumed in this analysis), noise levels are expected to be less than those calculated within this NIA.

Table 11 Project Operations Significance Determination – Merced County General Plan

Receptor	Daytime (7:00 a.m. – 10:00 p.m.)											
	Outdoor Area						Interior					
	Median (L_{50})			Maximum (L_{max})			Median (L_{50})			Maximum (L_{max})		
	Project Noise	Threshold	Potentially Significant?	Project Noise	Threshold [A]	Significant?	Project Noise	Threshold	Significant?	Project Noise	Threshold [A]	Significant?
R1	50.8	55	No	78.3	81.3	No	30.8	35	No	58.3	61.3	No
R2	50.6	55	No	78.3	81.3	No	30.6	35	No	58.3	61.3	No
R3	52.8	55	No	78.3	81.3	No	32.8	35	No	58.3	61.3	No
R4	51.9	55	No	77.9	80.9	No	31.9	35	No	57.9	60.9	No
R5	50.2	55	No	77.9	80.9	No	30.2	35	No	57.9	60.9	No
R6	49	55	No	81.5	84.5	No	29	35	No	61.5	64.5	No
R7	46.7	55	No	79.8	82.8	No	26.7	35	No	59.8	62.8	No
R8	48.6	55	No	81.6	84.6	No	28.6	35	No	61.6	64.6	No

Table 12 Project Operations Significance Determination – Merced County Code

Receptor	Outdoor Area								
	Daytime (7:00 a.m. – 10:00 p.m.)			24-Hour					
	Average (L_{eq})			Maximum (L_{max})			Day-Night (L_{dn})		
	Project Noise	Threshold [A]	Potentially Significant?	Project Noise	Threshold [A]	Potentially Significant?	Project Noise	Threshold	Potentially Significant?
R1	55.6	64.4	No	78.3	81.3	No	58.7	65	No
R2	55.5	64.4	No	78.3	81.3	No	58.7	65	No
R3	57	64.4	No	78.3	81.3	No	59.1	65	No
R4	56.3	61	No	77.9	80.9	No	57.9	65	No
R5	55.2	61	No	77.9	80.9	No	57.5	65	No
R6	54.5	61.1	No	81.5	84.5	No	56.4	65	No
R7	52.6	59.8	No	79.8	82.8	No	54.9	65	No
R8	54.4	61.4	No	81.5	84.5	No	56.3	65	No

Note: Values shown in **bold** represent an exceedance of the applicable Merced County significance threshold.

A - In instances where the measured ambient noise levels already exceed the applicable County noise thresholds, the threshold is adjusted by +3 dBA above the measured noise levels to reflect the heightened ambient noise level. This is because if background ambient noise levels at certain receptors already exceed the unadjusted County threshold, it would be impossible for the Project to result in noise levels less than the applicable threshold, even if the Project were completely silent (see Table 7 and Table 8 above).

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not Applicable.

6.1.2 Generation of Excessive Groundborne Vibration

Impact Statement

Impact NO-2: *Generation of excessive groundborne vibration or groundborne noise levels?* **(Appendix G Threshold Criteria (b))**

Impact Analysis

As discussed in Section 5.1 and summarized in Table 10 above, FTA guidance documents provide guidelines and equipment reference levels for assessing vibration impacts resulting from construction activities.

To assess Project vibration impacts at each receptor location, the reference PPV value of 0.089 inches per second (i.e., large bulldozer) is utilized, as it was assumed that nothing larger or more powerful than a large bulldozer would operate on the Project site in close proximity to nearby receptors, which is typical of Project activities. The distance shown represents the measured distance from the closest boundary of the active mining area to the nearest property line of the receptor. Using this information, Table 13 summarizes the predicted groundborne vibration impacts resulting from Project operations. Significance was determined by comparing the predicted change in groundborne vibration to the applicable Merced County vibration threshold of 0.003 PPV (see Section 4.2 for additional detail).

Table 13 Predicted Project Vibration Levels at Receptors

Receptors	Distance (feet)	Predicted Vibration – PPV (in/sec)	Applicable Merced County Threshold – PPV (in/sec)	Significant?
R1	955	0.002	> 0.003	No
R2	995	0.002	> 0.003	No
R3	600	0.003	> 0.003	No
R4	1,860	0.001	> 0.003	No
R5	2,265	0.001	> 0.003	No
R6	2,610	0.001	> 0.003	No
R7	3,450	0.000	> 0.003	No
R8	2,750	0.001	> 0.003	No

Note: See Appendix F for additional detail.

As shown in Table 13, estimated Project vibration levels experienced at nearby receptors are below the applicable Merced County significance criteria. Therefore, groundborne vibration impacts to nearby receptors resulting from Project operations would be **less than significant with no mitigation required**.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not Applicable.

6.1.3 Airport Land Use/Vicinity Analysis

Impact Statement

Impact NO-3: *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?* **(Appendix G Threshold Criteria (c))**

Impact Analysis

The proposed Project site is not located within 2.0 miles of any private or public airports or airstrips, or in an area governed by an airport land use plan. As discussed in Section 3.2.1, the closest airport/airstrip is the Los Banos Municipal Airport, located approximately 2.7 miles away to the northeast of the Sunset property. Please see Figure 4 which shows the location of this airport in relation to the Project site. Furthermore, the Project does not involve creation of a new noise-sensitive land uses (i.e., residences). Therefore, the Project would have **no impact** related to airport/airstrip noise levels.

Level of Significance Before Mitigation

No impact.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not Applicable.

7.0 FINDINGS

This Noise Impact Assessment (NIA) finds that:

- Construction of perimeter berms during the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, are exempt from the County’s sound level limitations identified in County Code Section 10.60.030. Accordingly, temporary noise impacts generated during berm construction will comply with applicable Merced County requirements and are less than significant;
- With construction of the perimeter berms, noise impacts generated during the Project operations within the Sunset and Turner properties would comply with applicable Merced County requirements;
- As designed, the Project excavation and ancillary operations would generate noise levels that are less than significant at nearby receptors, with no mitigation required; and
- Project groundborne vibration impacts are less than significant at nearby receptors, with no mitigation required.

8.0 REFERENCE

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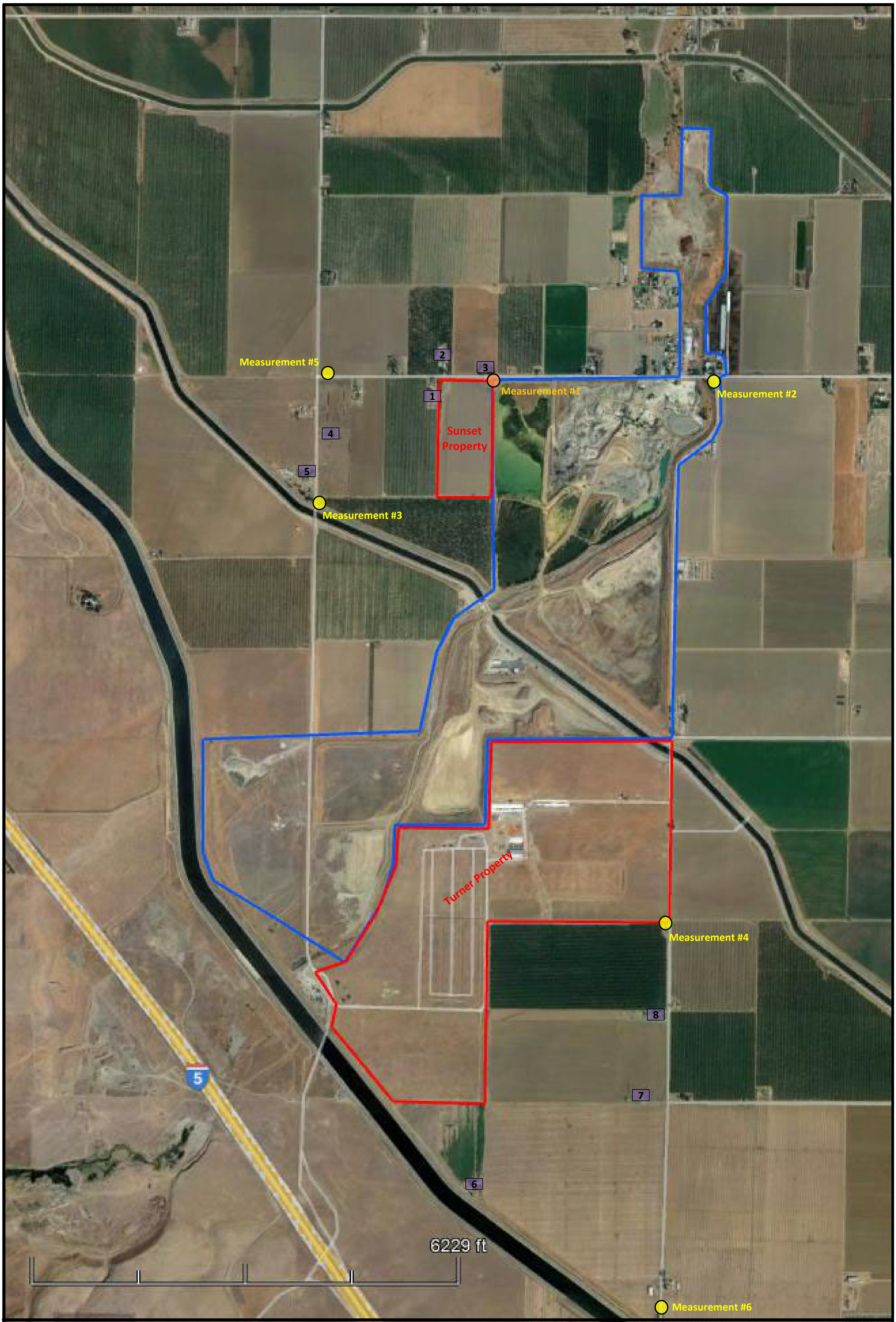
APPENDIX A

Figures



Source: Google Earth (2022)

N

▬ Existing Los Banos Facility Boundary (approx.)
▬ Proposed Project (Sunset & Turner Properties) Boundaries (approx.)
■ Receptors
● 24-Hour Noise Monitoring Location
● 1-Hour Noise Monitoring Location(s)

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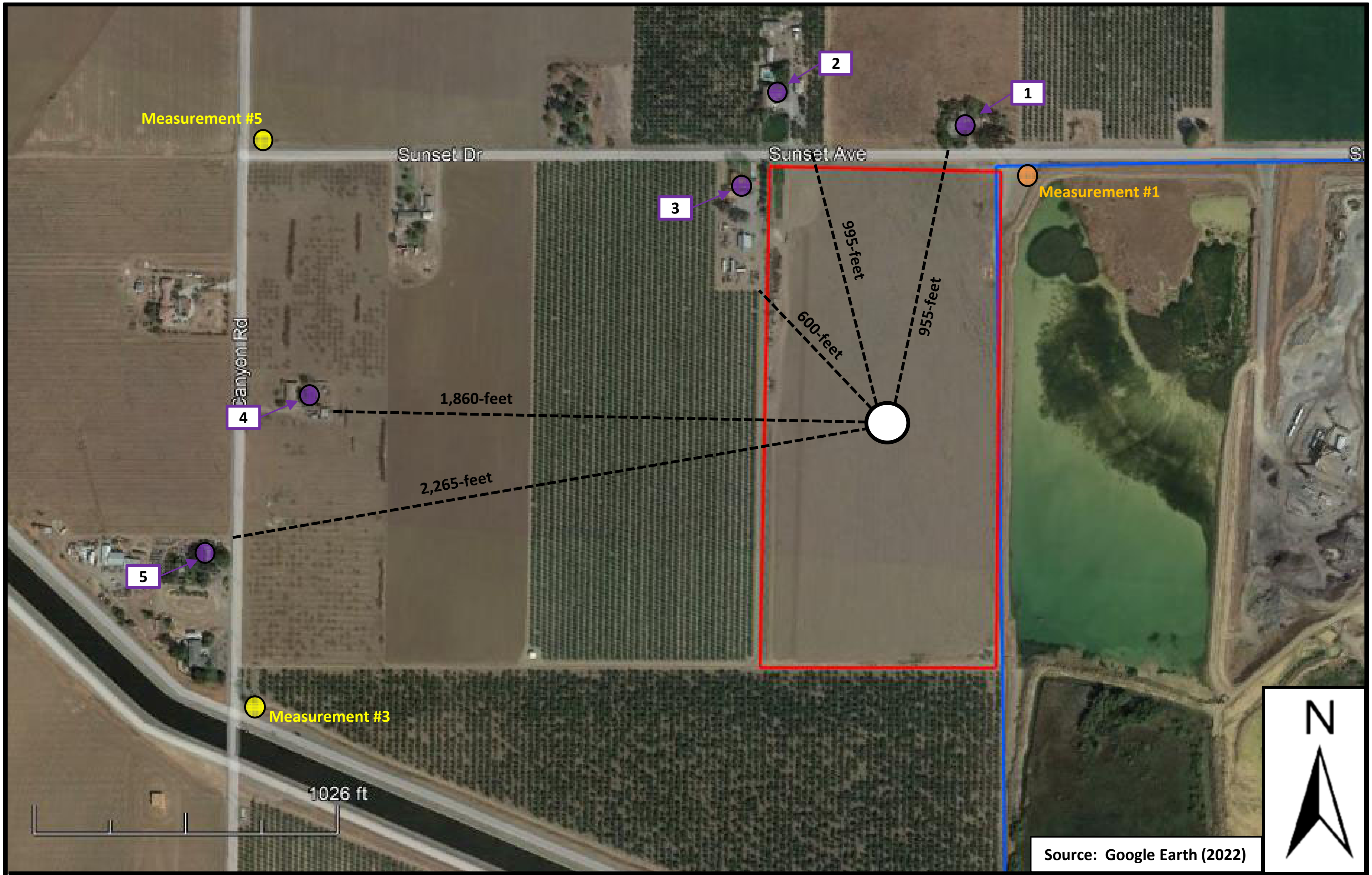
FIGURE **1**	**LOS BANOS - PROJECT OVERVIEW** Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
PROJECT #:	210509.0446	DATE:	3/20/22
SCALE:	See Above	DRAWN BY:	GPS



Source: Google Earth (2022)

- Existing Los Banos Facility Boundary (approx.)
- Proposed Project (Sunset & Turner Properties) Boundaries (approx.)
- ■ Receptors
- ● 24-Hour Noise Monitoring Location
- ● 1-Hour Noise Monitoring Location(s)
- ○ Assumed Center of Noise Generating Activities

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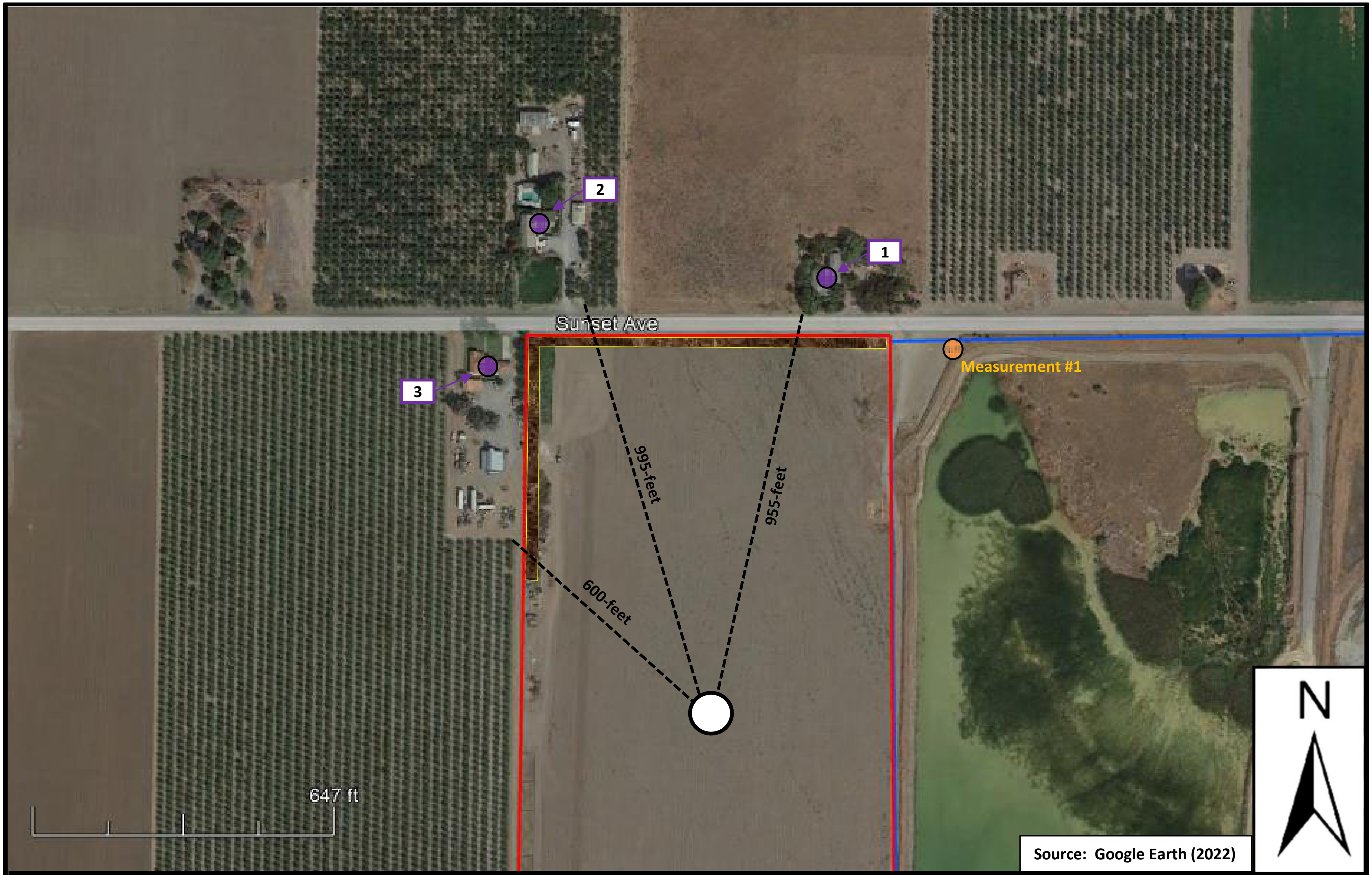
FIGURE **2A**	**LOS BANOS - SUNSET PROPERTY** Triangle Rock Products, LLC Los Banos Sand and Gravel Quarry Merced County, California		
PROJECT #:	210509.0446	DATE:	3/20/22
SCALE:	See Above	DRAWN BY:	GPS



Source: Google Earth (2022)

▬ Existing Los Banos Facility Boundary (approx.)
▬ Proposed Project (Sunset & Turner Properties) Boundaries (approx.)
■ Receptors
● 24-Hour Noise Monitoring Location
○ Assumed Center of Noise Generating Activities
▨ Proposed 8-Foot Earthen Berm (within 30-foot property setback)

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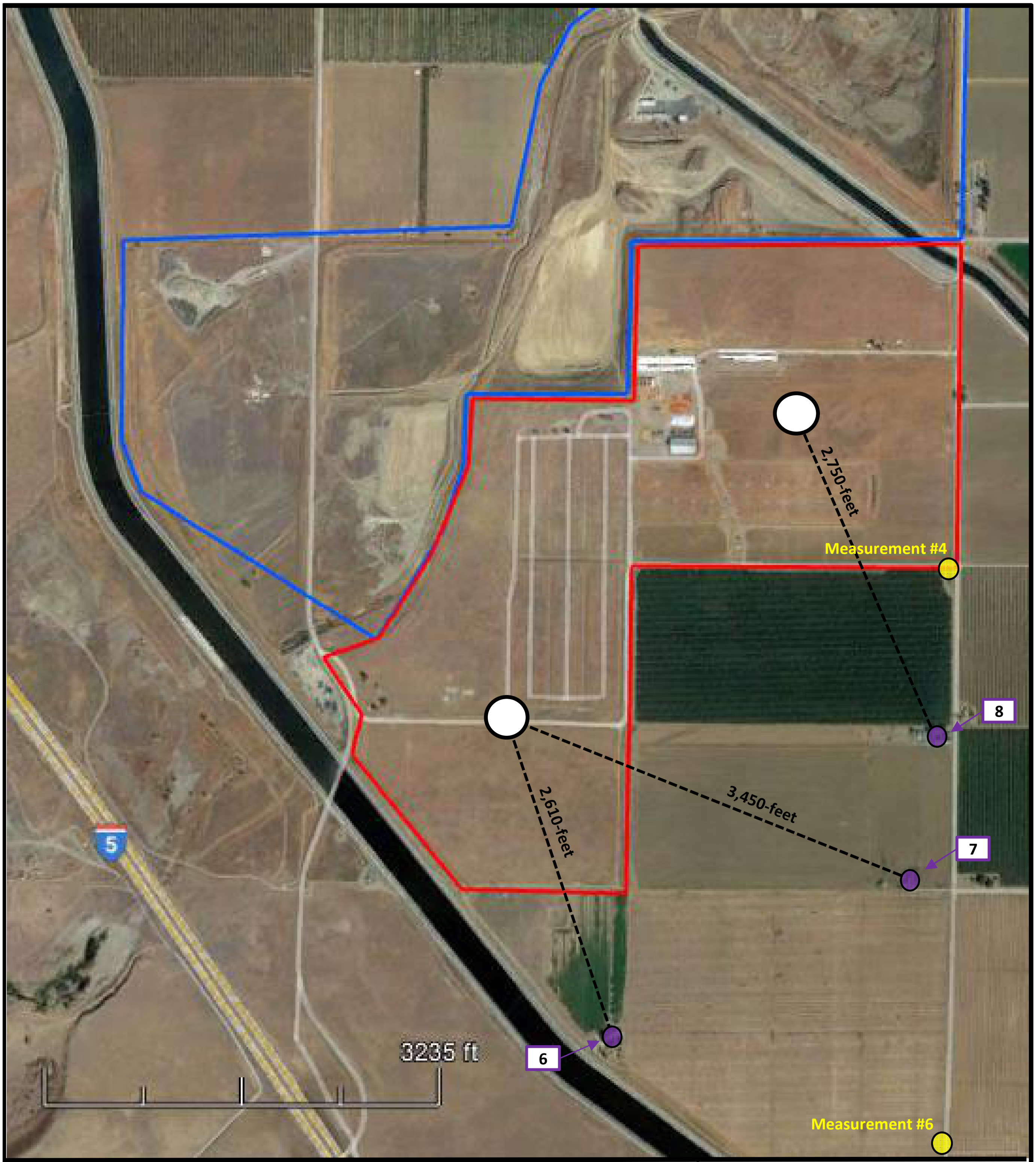
FIGURE

2B

LOS BANOS - SUNSET PROPERTY
Triangle Rock Products, LLC
Los Banos Sand and Gravel Quarry
Merced County, California

PROJECT #:	210509.0446	DATE:	3/20/22
SCALE:	See Above	DRAWN BY:	GPS



Source: Google Earth (2022)

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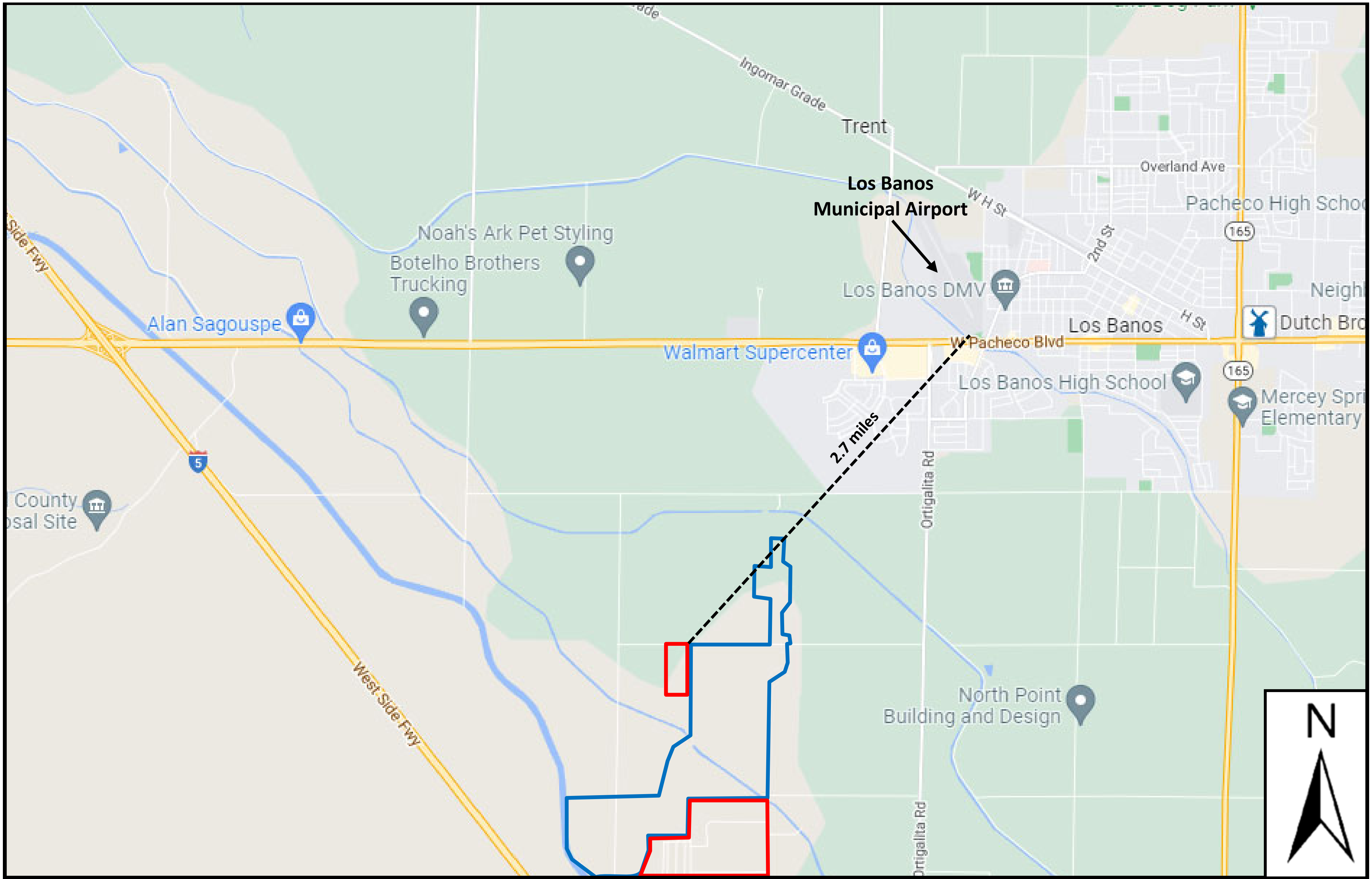
— Existing Los Banos Facility Boundary (approx.)
— Proposed Project (Sunset & Turner Properties) Boundaries (approx
🟪 Receptors
🟠 24-Hour Noise Monitoring Location
🟡 1-Hour Noise Monitoring Location(s)
○ Assumed Center of Noise Generating Activities

FIGURE
3

LOS BANOS - TURNER PROPERTY
Triangle Rock Products, LLC
Los Banos Sand and Gravel Quarry
Merced County, California

PROJECT #:	210509.0446	DATE:	3/20/22
SCALE:	See Above	DRAWN BY:	GPS



Source: Google Maps (2022)

Existing Los Banos Facility Boundary (approx.)

Proposed Project (Sunset & Turner Properties) Boundaries (approx.)

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FIGURE
4

LOS BANOS - AIRPORT MAP
Triangle Rock Products, LLC
Los Banos Sand and Gravel Quarry
Merced County, California

PROJECT #:	210509.0446	DATE:	3/20/22
SCALE:	N/A	DRAWN BY:	GPS

APPENDIX B

Regulatory References

NOISE

While most noise is common and frequently and integral part of daily living, exposure to excessive noise is often cited as a health problem in terms of general well-being and contribution to undue stress and annoyance. There are many sources of noise in the County including traffic on Interstate 5; State Routes 33, 59, 99, 140, and 152; local roads; railroad operations; aircraft operations; commercial uses; active recreation areas; and outdoor play areas.

The following noise level standards have been developed in order to quantify noise impacts in the County. Table HS-1 shows the noise level standards for noise-sensitive areas affected by traffic, railroad, or airport noise sources in the County. Table HS-2 shows the interior and exterior noise level standards for noise-sensitive areas affected by existing non-transportation noise sources in the County. In addition to these standards, the policies in this section address ways to reduce or eliminate existing and future conflicts between land uses and noise.

TABLE HS-1
Noise Standards for New Uses Affected by Traffic, Railroad, and Airport Noise

New Land Use	Sensitive[1] Outdoor Area - Ldn	Sensitive Interior[2] Area - Ldn	Notes
All Residential	65	45	3
Transient Lodging	65	45	3,4
Hospitals & Nursing Homes	65	45	3, 4, 5
Theaters & Auditoriums	---	35	4
Churches, Meeting Halls, Schools, Libraries, etc.	65 65	40 40	4 4
Office Buildings	65	45	4
Commercial Buildings	---	50	4
Playgrounds, Parks, etc.	70	---	
Industry	65	50	4

Notes:

1. Sensitive Outdoor Areas include primary outdoor activity areas associated with any given land use at which noise-sensitivity exists and the location at which the County's exterior noise level standards are applied.
2. Sensitive Interior Areas includes any interior area associated with any given land use at which noise-sensitivity exists and the location at which the County's interior noise level standards are applied. Examples of sensitive interior spaces include, but are not limited to, all habitable rooms of residential and transient lodging facilities, hospital rooms, classrooms, library interiors, offices, worship spaces, theaters. Interior noise level standards are applied within noise-sensitive areas of the various land uses with windows and doors in the closed positions.
3. Railroad warning horn usage shall not be included in the computation of Ldn.
4. Only the interior noise level standard shall apply if there are no sensitive exterior spaces proposed for these uses.
5. Since hospitals are often noise-generating uses, the exterior noise level standards are applicable only to clearly identified areas designated for outdoor relaxation by either hospital staff or patients.

TABLE HS-2
Non-Transportation Noise Standards
Median (L50) / Maximum (Lmax)[1]

Outdoor Area[2]			Interior[3]	
Receiving Land Use	**Daytime**	**Nighttime**	**Day or Night**	**Notes**
All Residential	55 / 75	50 / 70	35 / 55	
Transient Lodging	55 / 75	---	35 / 55	4
Hospitals & Nursing Homes	55 / 75	---	35 / 55	5, 6
Theaters & Auditoriums	---	---	30 / 50	6
Churches, Meeting Halls, Schools, Libraries, etc.	55 / 75	---	35 / 60	6
Office Buildings	60 / 75	---	45 / 65	6
Commercial Buildings	55 / 75	---	45 / 65	6
Playgrounds, Parks, etc.	65 / 75	---	---	6
Industry	60 / 80	---	50 / 70	6

Notes:

1. These standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards in this table, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.
2. Sensitive Outdoor Areas include primary outdoor activity areas associated with any given land use at which noise-sensitivity exists and the location at which the County's exterior noise level standards are applied.
3. Sensitive Interior Areas includes any interior area associated with any given land use at which noise-sensitivity exists and the location at which the County's interior noise level standards are applied. Examples of sensitive interior spaces include, but are not limited to, all habitable rooms of residential and transient lodging facilities, hospital rooms, classrooms, library interiors, offices, worship spaces, theaters. Interior noise level standards are applied within noise-sensitive areas of the various land uses with windows and doors in the closed positions.
4. Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.
5. Since hospitals are often noise-generating uses, the exterior noise level standards are applicable only to clearly identified areas designated for outdoor relaxation by either hospital staff or patients.
6. The outdoor activity areas of these uses (if any) are not typically used during nighttime hours.
7. Where median (L50) noise level data is not available for a particular noise source, average (Leq) values may be substituted for the standards of this table provided the noise source operates for at least 30 minutes. If the source operates less than 30 minutes the maximum noise level standards shown shall apply.

Goal HS-7 Protect residents, employees, and visitors from the harmful and annoying effects of exposure to excessive noise.

Policy HS-7.1: Noise Standards for New Land Uses (RDR)
Require new development projects to meet the standards shown in Tables HS-1 and HS-2, at the property line of the proposed use, through either project design or other noise mitigation techniques.

Policy HS-7.2: Acoustical and Groundborne Vibration Analysis Requirements (RDR)
Require development project applicants to prepare an acoustical analysis as part of the environmental review process when noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels shown in Tables HS-1 and HS-2. Require an analysis of groundborne vibration for proposed residential and other sensitive projects (including but not limited to hospitals and schools) located within 1,000 feet of a rail line with at least 30 operations per day or an existing industrial groundborne vibration source. The acoustical and groundborne vibration analyses shall:

a) Be the responsibility of the applicant;

b) Be prepared by qualified persons experienced in the fields of environmental noise and groundborne vibration assessment and architectural acoustics;

c) Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions;

d) Estimate projected future (20 year) noise levels relative to the standards shown in Tables HS-1 and HS-2 at the property line of the proposed use, and, as applicable, estimate project future groundborne vibration levels using a maximum vibration standard of 70 VdB;

e) Recommend appropriate mitigation to achieve compliance with the adopted policies and standards in this element, including setbacks from groundborne vibration sources causing adverse levels of vibration; and

f) Estimate interior and exterior noise, and groundborne vibration exposure after the prescribed mitigation measures have been implemented at the property line.

Policy HS-7.3: Existing Rural Sources (RDR)
Discourage new noise sensitive land uses in rural areas with authorized existing noise generating land uses.

Policy HS-7.4: New Noise or Groundborne Vibration Generating Uses (RDR)
Require new commercial and industrial uses to minimize encroachment on incompatible noise or groundborne vibration sensitive land uses. Also consider the potential for encroachment by residential and other noise or groundborne vibration sensitive land uses on adjacent lands that could significantly impact the viability of the commercial or industrial areas.

Policy HS-7.5: Noise Generating Activities (RDR)
Limit noise generating activities, such as construction, to hours of normal business operation.

Policy HS-7.6: Multi-Family Residential Noise Analysis (RDR)
Require noise analyses be prepared for proposed multi-family, town homes, mixed-use, condominiums, or other residential projects where floor ceiling assemblies or party-walls shall be common to different owners/occupants to assure compliance with the State of California Noise Insulation Standards.

Policy HS-7.7: Noise or Vibration Impacted Residential Area Monitoring (RDR)
Consider any existing residential area “noise or vibration impacted” if the exposure to exterior noise exceeds the standards shown in Table HS-2 or if groundborne vibration levels exceed 70VdB. Identify and evaluate potential noise or groundborne vibration impacted areas and identify possible means to correct the identified noise/land use incompatibilities.

Policy HS-7.8: Project Design (RDR)
Require land use projects to comply with adopted noise and vibration standards through proper site and building design, such as building orientation, setbacks, natural barriers (e.g., earthen berms, vegetation), and building construction practices. Only consider the use of soundwalls after all design-related noise mitigation measures have been evaluated or integrated into the project or found infeasible.

Policy HS-7.9: Transportation Project Construction/Improvements (RDR)
Require transportation project proponents to prepare all acoustical analysis for all roadway and railway construction projects in accordance with Policy HS-7.2; additionally, rail projects shall require the preparation of a groundborne vibration analysis in accordance with Policy HS-7.2. Consider noise mitigation measures to reduce traffic and/or rail noise levels to comply with Table HS-1 standards if pre-project noise levels already exceed the noise standards of Table HS-1 and the increase is significant. The County defines a significant increase as follows:

Pre-Project Noise Environment (Ldn)	Significant Increase
Less than 60 dB	5+ dB
60 - 65 dB	3+ dB
Greater than 65 dB	1.5+ dB

Policy HS-7.10: Aircraft Noise (RDR)
Prohibit new noise-sensitive development within the projected future 60 dB Ldn noise contours of any public or private airports.

Policy HS-7.11: Train Whistle Noise (IGC)
Support improvements to at-grade crossings in urban areas in order to eliminate the need for train whistle blasts near or within communities.

Policy HS-7.12: New Project Noise Mitigation Requirements (RDR)
Require new projects to include appropriate noise mitigation measures to reduce noise levels in compliance with the Table HS-2 standards within sensitive areas. If a project

includes the creation of new non-transportation noise sources, require the noise generation of those sources to be mitigated so they do not exceed the interior and exterior noise level standards of Table HS-2 at existing noise-sensitive areas in the project vicinity. However, if a noise-generating use is proposed adjacent to lands zoned for residential uses, then the noise generating use shall be responsible for mitigating its noise generation to a state of compliance with the standards shown in Table HS-2 at the property line of the generating use in anticipation of the future residential development.

Policy HS-7.13: Noise Exemptions (RDR)
Support the exemption of the following noise sources from the standards in this element:

a) Emergency warning devices and equipment operated in conjunction with emergency situations, such as sirens and generators which are activated during power outages. The routine testing of such warning devices and equipment shall also be exempt provided such testing occurs during daytime hours.

b) Activities at schools, parks, or playgrounds, provided such activities occur during daytime hours.

c) Activities associated with County-permitted temporary events and festivals.

Policy HS-7.14: Transportation Noise Mitigation Program (MPSP/SO)
Adopt a countywide transportation noise mitigation program to reduce transportation noise levels at existing sensitive land uses.

Policy HS-7.15: New Project Groundborne Vibration Mitigation Requirements (RDR)
For residential projects within 1,000 feet of a rail line with at least 30 operations per day, or an existing industrial or commercial groundborne vibration source, require new residential projects to include appropriate groundborne vibration mitigation measures to reduce groundborne vibration levels to less than 70 VdB within structures. However, if a groundborne vibration-generating use is proposed adjacent to lands zoned for residential uses, then the groundborne vibration-generating use shall be responsible for mitigating its groundborne vibration generation to a state of compliance with the 70 VdB standard at the property line of the generating use in anticipation of the future residential development.

ENVIRONMENTAL JUSTICE

Merced County is committed to making land use, environmental, and resource protection decisions that are predictable and fair. The policies in this section ensure that Merced County will make decisions that are fair and equitable for every resident, regardless of age, race, culture, or income.

Chapter 10.60 NOISE CONTROL

10.60.010 Legislative purpose and intent.

The board of supervisors finds and declares that:

A. Excessive noise is a serious hazard to the public health, welfare and safety of the people of the county of Merced, and is contrary to the public interest by interfering with restful sleep, communication, relaxation and the full use of one's property; and

B. Inadequately controlled excessive noise is a persistent danger to the health and welfare of the residents of the county of Merced, and the level and frequency of disturbing, excessive, offensive or unusually loud noise within the jurisdictional limits of the county of Merced threatens to increase unless reasonably controlled; and

C. The creation, making, causing, or continuation of such excessive noise that is prolonged or unusual in time, place and use will detrimentally affect the public health, comfort, convenience, safety, welfare, and quality of life of the residents of the county of Merced; and

D. Every person in the county of Merced is entitled to an environment where excessive noise is not detrimental to his or her life, health, and enjoyment of property; and

E. It is the intent of this chapter to prevent excessive noise that may jeopardize the health, welfare, or safety of the citizens of the county of Merced or degrade the quality of their lives, and thereby to promote and secure the protection of the public health, comfort, convenience, safety, welfare, prosperity, peace and quiet of the county of Merced and its people from excessive levels of noise. (Ord. 1726 § 1, 2004).

10.60.020 Definitions.

As used in this chapter, the following words, phrases and terms shall have the following meanings:

"Agricultural property" means land used for or devoted to the production of crops and livestock.

"Ambient sound level" means the total sound pressure in the area of interest including the noise source of interest.

"A-weighting" means the electronic filtering in sound level meters that models human hearing frequency sensitivity.

"Background sound level" means the total sound pressure level in the area of interest excluding the noise source of interest.

"Construction" means any site preparation, assembly, construction, erection, repair, enlargement, alteration, conversion or similar action, or demolition of any building, structure or land.

"C-weighting" means the electronic filtering in sound level meters that models a flat response (output equals input) over the range of maximum human hearing frequency sensitivity.

"dBA" means the A-weighted unit of sound pressure level.

"dBC" means the C-weighted unit of sound pressure level.

"Decibel" or "dB" means the unit of measurement for sound pressure level at a specified location.

"Emergency work" means any work or action necessary to deliver essential services, including, but not limited to, repairing water, gas, electric, telephone, sewer facilities, or public transportation facilities, removing fallen trees on public rights-of-way, or abating life-threatening conditions.

"Ldn" means the day/night average sound level during a twenty-four (24) hour day.

"Lmax" means the maximum noise level recorded during a single event.

"Measuring instrument" means an instrument such as a sound level meter, integrating sound level meter or dosimeter used to measure sound pressure levels conforming to Type 1 or Type 2 standards as specific in the latest version of American National Standard Institute S1.4-1983.

"Noise" means any sound of such level and duration as to be or tend to be injurious to human health or welfare, or which would unreasonably interfere with the enjoyment of life or property throughout the unincorporated county or in any portions thereof, but excludes all aspects of the employer-employee relationship concerning health and safety hazards within the confines of a place of employment.

"Noise disturbance" means any sound that:

1. Endangers the safety or health of any person;
2. Disturbs a reasonable person of normal sensitivities;
3. Endangers personal or real property; or
4. Violates the quantitative standards set forth in this chapter.

"Noise control officer" or "NCO" means the noise control officer of the county of Merced as designated from time to time by the Merced County board of supervisors, or a duly authorized designee.

"Off-highway vehicle" means motorcycles, sand buggies, dune buggies, all-terrain vehicles, jeeps, enduro bikes, motocross dirt bikes, mopeds, mini bikes, go-carts, or any similar vehicle as defined in Section 38006 of the California Vehicle Code. "Off-highway vehicle" specifically excludes self-propelled lawnmowers, agricultural equipment and such vehicles described in Section 38010(b) of the California Vehicle Code.

"Person" means any individual, corporation, company, association, society, firm partnership, or joint stock company, but shall not include the county of Merced.

"Public right-of-way" means any street, avenue, boulevard, road, highway, sidewalk, or alley that is leased to or owned by a government entity, licensed to a government entity, or subject to an easement granted to a government entity.

"Public space" means any real property or structures thereon that is owned, leased, or controlled by a government entity.

"Pure tone" means any sound that can be judged as a single pitch or set of single pitches by the NCO.

"Real property line" means the imaginary line, including its vertical extension, that separates one parcel of real property from another.

"Residential property" means property used for human habitation, including:

1. Private property used for human habitation;
2. Commercial living accommodations and commercial property used for human habitation;
3. Recreational and entertainment property used for human habitation; and
4. Community service property used for human habitation.

"Sound level" means the instantaneous sound pressure level measured in decibels with a sound level meter set for A-weighting on slow integration speed, unless otherwise noted.

"Sound pressure level" means twenty (20) multiplied by the logarithm, to the base 10, of the measured sound pressure divided by the sound pressure associated with the threshold of human hearing, in units of decibels.

"Weekday" is any day, Monday through Friday, that is not a legal holiday. (Ord. 1869 § 1, 2009; Ord. 1726 § 1, 2004).

10.60.030 Sound level limitations.

A. No person shall cause, suffer, allow, or permit the operation of any sound source on private property in such a manner as to create a sound level that results in any of the following, when measured at or within the real property line of the receiving property:

1. Exceeds the background sound level by at least ten (10) dBA during daytime hours (seven a.m. to ten p.m.) and by at least five dBA during nighttime hours (ten p.m. to seven a.m.). The background sound level for purposes of this section shall be determined as set forth in Section 10.60.060; or

2. Exceeds sixty-five (65) dBA Ldn on residential real property or seventy (70) dBA Ldn on nonresidential real property; or

3. Exceeds seventy-five (75) dBA Lmax on residential real property or eighty (80) dBA Lmax on nonresidential real property.

B. The following are exempt from the sound level limits of Section 10.60.030(A):

1. Noise from emergency signaling devices;

2. Noise from an exterior burglar alarm of any building provided such burglar alarm shall terminate its operation within five minutes of its activation;

3. Noise from domestic power tools, lawn mowers, and agricultural equipment when operated between seven a.m. and eight p.m. on weekdays and between eight a.m. and eight p.m. on weekends and legal holidays, provided they generate less than eighty-five (85) dBA at or within any real property line of a residential property;

4. Sound from church bells and chimes when a part of a religious observance or service;

5. Noise from construction activity, provided that all construction in or adjacent to urban areas shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained.

C. When the source being analyzed is a stereo system with low frequency signals as part of its output, the stereo shall not cause a C-weighted level of ten (10) dB or greater above the C-weighted ambient level at a distance of ten (10) feet from the source, or the complainant's real property line, whichever is greater. (Ord. 1869 § 2, 2009; Ord. 1726 § 1, 2004).

10.60.040 Specific prohibited acts.

A. No person shall cause, suffer, allow, or permit to be made verbally or mechanically any noise disturbance.

B. No person shall cause, suffer, allow, or permit to the following acts:

1. Operating, playing, or permitting the operation or playing of any stereo, radio, television, phonograph, or similar device that reproduces or amplifies sound in such a manner as to create a noise disturbance for any person other than the operator of the device;

2. Using or operating any loudspeaker, public address system, or similar device between ten p.m. and eight a.m. the following day, such that the sound therefrom creates a noise disturbance across a residential real property line;

3. Owning, possessing, or harboring any animal or bird that, frequently or for continued duration, generates sounds that create a noise disturbance across a residential real property line;

4. Loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, liquids, garbage cans, refuse, or similar objects, or the pneumatic or pumped loading or unloading of bulk materials in liquid, gaseous, powder, or pellet form, or the compacting of refuse by persons engaged in the business of scavenging or garbage collection, whether private or municipal, between nine p.m. and seven a.m. the following day on a weekday and between nine p.m. and nine a.m. the following day on a weekend day or legal holiday except by permit, when the sound therefrom creates a noise disturbance across a residential real property line;

5. Operating or permitting the operation of any tools or equipment used in construction, drilling, earthmoving, excavating, or demolition work between six p.m. and seven a.m. the following day on a weekday or at any time on a weekend day or legal holiday, except for emergency work, or when the sound level does not exceed any applicable relative or absolute limit specified in Section 10.60.030;

6. Using, operating, or permitting the operation of one or more off-highway vehicles on private property such that the resulting sound creates a noise disturbance across a residential real property line. (Ord. 1869 § 3, 2009; Ord. 1726 § 1, 2004).

10.60.050 Exemptions.

A. The provisions of this chapter shall not apply to:

1. Activities conducted in public parks, public playgrounds, and public or private school grounds, including, but not limited to, school athletic and school entertainment events;

2. Noise sources associated with agricultural activities or agricultural operations on agricultural property, including without limitation those specified in Section 18.56.010(B) of this Code;

3. The generation of sound for the purpose of alerting persons to the existence of an emergency, except as provided in Section 10.60.030(D)(2);

4. The generation of sound in the performance of emergency work;

5. The generation of sound in situations within the jurisdiction of the federal Occupational Safety and Health Administration;

6. Any land use for which a valid discretionary land use permit, such as a conditional use permit or an administrative permit, has been issued by the county prior to the effective date of the ordinance codified in this chapter, or which may be issued by the county, it being the intention of the county that the process for granting discretionary land use permits, including the imposition of conditions, be separate and independent of this chapter; or

7. Using, operating, or permitting the operation of one or more off-highway vehicles on public land, other than a highway, was described by California Vehicle Code Section 38001.

B. Noise generated from any county-sponsored or county-approved events or celebrations shall also be exempt from the provisions of this chapter. (Ord. 1869 § 4, 2009; Ord. 1726 § 1, 2004).

10.60.060 Sound measurement procedures.

A. Insofar as practicable, sound will be measured while the source under investigation is operating at normal, routine conditions and, as necessary, at other conditions, including, but not limited to, design, maximum, and fluctuating rates.

B. All tests shall be conducted in accordance with the following procedures:

1. To the extent practicable, all sources contributing sound to the point of measurement shall be identified.

2. Measurements shall be taken at or within the real property line of the affected person.

3. The measuring instrument must be calibrated using a calibrator recommended by the measuring instrument manufacturer before and after each series of readings.

4. The measuring instrument must be recertified and the calibrator must be recalibrated at least once each year by the manufacturer or by a person that has been approved by the manufacturer. A copy of written documentation of such recertification and recalibration shall be kept with the equipment to which it refers.

5. No outdoor measurements shall be taken:

a. During periods when wind speeds (including gusts) exceed fifteen (15) mph;

b. Without a windscreen, recommended by the measuring instrument manufacturer, properly attached to the measuring instrument;

c. Under any condition that allows the measuring instrument to become wet (e.g., rain, snow, or condensation); or

d. When the ambient temperature is out of the range of the tolerance of the measuring instrument.

C. The report for each measurement session shall include:

1. The date, day of the week, and times at which measurements are taken;

2. The times of calibration;

3. The weather conditions;

4. The identification of all monitoring equipment by manufacturer, model number, and serial number;

5. The normal operating cycle of the sources in question with a description of the sources;

6. The ambient sound level, in dBA, with the sources in question operating;

7. The background sound level, in dBA, without the sources in question operating; and

8. A sketch of the measurement site, including measurement locations and relevant distances, containing sufficient information for another investigator to repeat the measurements under similar conditions.

D. Prior to taking noise measurements the investigator shall explore the vicinity of the source in question to identify any other sound sources that could affect measurements, to establish the approximate location and character of the principal sound source, and to select suitable locations from which to measure the sound from the source in question.

E. When measuring continuous sound, or sound that is sustained for more than one second at a time, the measuring instrument shall be set for A-weighting, slow response, and the range (if the measuring is designed to read levels over different ranges) shall be set to that range in which the meter reads closest to the middle of the scale. The minimum and maximum readings shall be recorded to indicate the range of monitored values along with the central tendency average most often displayed.

F. The measuring instrument shall be placed at a minimum height of three feet above the ground or from any reflective surface. When handheld, the microphone shall be held at arm’s length and pointed at the source at the angle recommended by the measuring instrument’s manufacturer.

G. If extraneous sound sources, such as aircraft flyovers or barking dogs, that are unrelated to the measurements increase the monitored sound levels, the measurements should be postponed until the extraneous sounds have become of such a level as not to increase the monitored sound levels of interest.

H. The monitoring session should last for a period of time sufficient to ensure that the sound levels measured are typical of the source in question.

I. The background sound levels shall be subtracted from the measured sound levels of the source of interest by using Table 2, to determine the sound levels from the source of interest alone. If the ambient sound level is less than 3 dBA higher than the background sound level, the source level cannot be derived and violation of the chapter cannot be substantiated.

Table 2

Correction for Background Levels

Difference Between Ambient and Background Sound Levels	Correction Factor to Be Subtracted from Ambient Level for Source Level
3	3
4-5	2
6-9	1
10 or more	0

(Ord. 1726 § 1, 2004).

10.60.070 Violation—Enforcement.

A. The Merced County board of supervisors, or a duly authorized designee, shall from time to time, designate a noise control officer to enforce this chapter. Unless otherwise designated, the noise control officer for the county of Merced shall be the sheriff.

B. Any person violating any provision of this chapter is guilty of the offenses and subject to the penalties set forth in Chapter 1.28, Section 1.28.030, of the Merced County Code for the first violation, except that a second and any subsequent violations occurring within a year of the first violation may be charged as a misdemeanor and is subject to the penalties set forth in Chapter 1.28, Section 1.28.020, of the Merced County Code.

C. If the violation is of a continuing nature, each day during which it occurs shall constitute an additional, separate, and distinct offense, pursuant to Chapter 1.28, Section 1.28.040, of the Merced County Code.

D. The provisions of this chapter are enforceable pursuant to Chapter 1.20, Section 1.20.020, of the Merced County Code for the first violation, except that a second and any subsequent violations occurring within a year of the first violation are enforceable pursuant to Chapter 1.20, Section 1.20.010, of the Merced County Code.

E. The noise control officer is authorized to take all necessary actions to enforce the provisions of this chapter, including the issuance of stop orders to prohibit further violations of this chapter, and to carry out any other special enforcement programs initiated by order or resolution of the board of supervisors.

F. In the event that any person fails to abate a violation hereunder after notice of same and an opportunity to correct or end the violation, the noise control officer is authorized to request the county counsel or district attorney to apply to the Superior Court of this county for an order authorizing the noise control officer to undertake those actions necessary to abate the violation, or for a court order to immediately abate the violation, and requiring the violator to pay for the costs of any such undertaking.

G. No provision of this chapter shall be construed to impair any common law or statutory cause of action or legal remedy of any person, including the county, for injury or damage arising from any violation of this ordinance or from other law. (Ord. 1869 § 5, 2009; Ord. 1726 § 1, 2004).

10.60.080 Recovery of administrative costs.

A. The noise control officer shall maintain records of all administrative costs associated with enforcement and enforcement proceedings, and shall recover such costs from the property owner or person in control of the property from which the noise source originates, as provided herein.

B. The hourly rate charged for staff time shall from time to time be determined by resolution of the Merced County board of supervisors.

C. If the noise control officer determines that a violation of the provisions of this chapter exists, he or she shall give two notices to the property owner of record or any person in control of the property from which the noise source is originating, which notices shall state the existence of the violation, that the county intends to charge the property owner for all administrative costs associated with enforcement, and state the owner’s right to object to the imposition of such costs. The notices shall be in substantially the following form:

NOTICE OF VIOLATION

To: (Name of Property Owner of Record or Person in Control of the Property)

(Address)

The Noise Control Officer has determined that conditions exist at the property located at (specify address)___ that violate the provisions of Chapter 10.60 of the Merced County Code, “Noise Ordinance.” You must correct or remove such violation or violations no later than (specify date). Failure to correct or remove the violation by the date specified above will result in all cumulative administrative costs being charged against you in accordance with the provisions of Merced County Code, Chapter 10.60.080. If the violation is corrected or removed by the date specified, no administrative costs will be assessed.

FINAL NOTICE

To: (Name of Property Owner of Record or Person in Control of the Property)

(Address)

You were notified on (specify date) that a violation or violations of the provisions of Chapter 10.60 of the Merced County Code, “Noise Ordinance,” exists on property located at (specify address)___. You failed to correct or remove the violation within the time allotted in the prior notice given to you. You are hereby notified that as a part of the resolution of this matter, you will be required to pay an amount equal to all cumulative administrative costs incurred in this enforcement proceeding. Written notice of the charges will be given. You have the right to contest the amount charged. To contest the amount due, you must file a Notice of Contest with the Noise Control Officer by (specify date).

D. At the conclusion of the case, which shall occur upon termination of the enforcement action, the noise control officer shall send a written notice of charges to the property owner of record or person in control of the property setting forth a summary of time and hourly charges. The notice of charges shall be in substantially the following form:

NOTICE OF CHARGES

To: (Name of Property Owner of Record or Person in Control of the Property)
(Address)

The Noise Control Officer determined that the administrative costs incurred in the enforce-ment proceedings and actions taken in regard to the violation or violations of Chapter 10.60 of the Merced Ordinance Code existing on the property located at (specify address)___ are $___.

If you wish to contest these charges you must file a Request for Hearing together with an appeal fee with the Noise Control Officer by (specify date).

IF YOU FAIL TO TIMELY FILE A REQUEST FOR HEARING, YOUR RIGHT TO CONTEST THE ABOVE CHARGES WILL BE DEEMED WAIVED AND YOU WILL BE LIABLE TO THE COUNTY FOR THESE CHARGES, WHICH MAY BE RECOVERED IN A CIVIL ACTION FILED BY THE COUNTY IN A COURT OF COMPETENT JURISDICTION.

Dated:

Noise Control Officer:

E. If: (1) no request for hearing is timely filed; or (2) after a hearing the noise control officer affirms the validity of the costs, the property owner or person in control and possession shall be liable to the county in the amount stated in the notice of charges or any lesser amount as determined by the noise control officer. These costs shall be recoverable in a civil action in the name of the county in any court of competent jurisdiction. Any property owner, or other person having possession and control thereof, receiving a notice of charges shall have the right to contest the amount of said charges in accordance with the following procedures:

1. A request for hearing shall be filed with the noise control officer within ten (10) days of the date appearing on the notice of charges. The form for request for hearing may be obtained from the noise control officer. An appeal fee shall be charged by the noise control officer for filing the request for hearing.
2. Within thirty (30) days of the filing of the request for hearing and payment of the appeal fee, and on ten (10) days written notice to the property owner or other person having possession and control thereof, the noise control officer shall hold a hearing on the objections stated in the request for hearing, and determine the validity of the costs stated in the notice of charges and the objections thereto.
3. In determining the validity of the costs, the noise control officer shall consider whether the costs stated in the notice of charges are reasonable under the circumstances. Factors to be considered include, but are not limited to, the following: whether the present owner created the violation; whether there is a present ability to correct the violation; whether the owner moved promptly to correct the violation; the degree of cooperation provided by the owner; whether reasonable minds differ as to whether a violation exists.

4. The noise control officer’s decision is final and there no further appeal within the county. Any further review of the noise control officer’s decision must be pursued in a court of law. (Ord. 1869 § 6, 2009; Ord. 1726 § 1, 2004).

10.60.090 Administrative costs of sheriff’s personnel for noise control enforcement.

1.	Law Enforcement (Commander, Sheriff Sergeant, Deputy Sheriff I/II)	$90.00 per hour
2.	Law Enforcement Administrative Support (Dispatch, Records, Transcription, Accounting, Data Processing, Correspondence)	$60.00 per hour

Note: Items to be pro-rated based on actual time.

(Ord. 1726 § 1, 2004).

Merced County Code

Title 18 ZONING CODE

Article 3: Regulations Applicable to All Zones

Chapter 18.34 FENCES, WALLS, AND HEDGES

18.34.060 Noise Barrier

A. **Acoustical Analysis Required.** The General Plan Health and Safety Element requires development project applicants to prepare an acoustical analysis as part of the environmental review process, when noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels shown in Table HS-1 and/or Table HS-2 of the Health and Safety Element of the General Plan. Additionally, an analysis of groundborne vibration is required for proposed residential and other sensitive land uses (e.g., hospitals and schools) located within 1,000 feet of a rail line (with at least 30 operations per day), or an existing industrial groundborne vibration source.

B. **Reduce Noise Impacts.** Projects located near noise impacted areas are required to incorporate measures into the project, such as building orientation, setbacks, and natural barriers (e.g., earthen berms and vegetation) that reduce the noise impacts to an acceptable level. When required by an acoustical analysis or an analysis of groundborne vibration, a noise barrier shall meet the following minimal structural requirements described in the acoustical analysis and may include:

1. **Walls and Fences.** Walls and fences shall not exceed the allowable fence height of seven feet. A wall or fence shall also include landscaping to prevent graffiti and enhance aesthetics.
2. **Trees and Shade Trees.**
    a. Trees shall be provided at 30-foot intervals if adjacent to a wall or fence; or
    b. Shade trees shall be provided at 30-foot intervals if the wall or fence is adjacent to a sidewalk or bike path.
3. **Screening.** A wall or fence shall be screened 50 percent, at maturity, with bushes or vines, and trees, when visible from the public rights-of-way. The landscaping may be used in combination with anti-graffiti paint until the landscaping has grown in to cover the wall.
4. **Required Fencing Materials.** Fence materials shall include one of the following types of materials:
    a. Masonry or stucco on both sides of a wooden frame;
    b. Masonry walls; or
    c. Board and batten wood fences.

C. **Landscaped Berm.** A berm may be used in combination with a wall and fence. The total berm/wall and fence height shall not exceed the allowable fence height of seven feet. The berm shall be landscaped to prevent erosion and add visual interest. See Figure 3-5 (Noise Barrier Wall/Berm with Landscaping).

Figure 3-5

Noise Barrier Wall/Berm with Landscaping

(Ord. 1976 § 2, 2019).

18.40.050 Noise

A. **Applicability.** The following noise provisions, standards, and specifications apply to all properties, structures, uses, and activities in all zones, unless an exception is specifically noted. For additional noise standards see Chapter 10.60 (Noise Control) in the Merced County Code.

B. **Definitions.**

1. **dBA.** Decibel with "A" level weighting scale similar to the human ear.
2. **Ldn.** Day/night average sound level during a 24-hour day.
3. **Lmax.** The maximum noise level during a single event.

C. **Noise Generated by Mechanical Equipment.** Buzzers, bells, loud speakers, or other noise generating devices shall comply with the noise standards below at any boundary line of the parcel, except fire protection devices, burglar alarms, and church bells. Merced County Code Chapter 10.60 (Noise Control) and the 2030 General Plan Standards for unacceptable noise levels shall apply:

1. If the proposed use exceeds the background sound level by at least 10 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and by at least five dBA during nighttime hours (10:00 p.m. to 7:00 a.m.). The background sound level for purposes of this section shall be determined as set forth in MCC Section 10.60.060.
2. If the proposed use is adjacent to a residential land use or property that is zoned for residential use, the allowable noise level shall not exceed 65 dBA Ldn or 75 dBA Lmax at the property line.
3. If the proposed use is not adjacent to a residential use or a parcel zoned for residential land use, the allowable noise level at the property line shall not exceed 70 dBA Ldn or 80 dBA Lmax at the property line.

D. **Consistency with General Plan.** The maximum noise levels for all land uses shall be consistent with Table HS-1 (Noise Standards for New Uses Affected by Traffic, Railroad, and Airport Noise) and Table HS-2 (Non-Transportation Noise Standards) in the Health and Safety Element of the 2030 General Plan.

E. **Elevated Noise Level During Construction.** During construction, the noise level may be temporarily elevated. To minimize the impact, all construction in or adjacent to urban areas shall comply with the following procedures for noise control:

1. Construction hours shall be limited to the daytime hours between 7:00 a.m. and 6:00 p.m. daily;
2. Operating or permitting the operation of any tools or equipment used in construction, drilling, earthmoving, excavating, or demolition work between 6:00 p.m. and 7:00 a.m. on a weekday or at any time on a weekend day, or legal holiday, except for emergency work, or when the sound level exceeds any applicable relative or absolute limit specified in MCC Section 10.60.030 is prohibited; and
3. All construction equipment shall be properly muffled and maintained.

F. **Noise Barriers.** Refer to Section 18.34.060 (Noise Barrier) of this Zoning Code for design requirements if a noise barrier structure is required to meet the noise standards. (Ord. 1976 § 2, 2019).

Merced County Code

Title 18 ZONING CODE

Article 3: Regulations Applicable to All Zones

Chapter 18.40 PERFORMANCE STANDARDS

18.40.080 Vibration, Heat, Electrical Disturbance, and Glare

No use shall create any disturbing ground vibration, heat, glare, and electrical disturbances based on typical human reaction beyond the boundaries of the subject parcel. No use shall cause electromagnetic interference with normal radio or television reception or with the function of other electronic equipment beyond the property line of the parcel on which they are located. (Ord. 1976 § 2, 2019).

Table 1. CA/T equipment noise emissions and acoustical usage factors database.

CA/T Noise Emission Reference Levels and Usage Factors

filename: EQUIPLST.xls
revised: 7/26/05

Equipment Description	Impact Device ?	Acoustical Use Factor (%)	Spec 721.560 Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow) (samples averaged)	No. of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

Table 18. Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV at 25 ft. (in/sec)
Vibratory roller	0.210
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Crack-and-seat operations	2.4

Sources: Federal Transit Administration 2018 (except Hanson 2001 for vibratory rollers) and Caltrans 2000 for crack-and seat-operations.

Using these source levels, vibration from this equipment can be estimated by the following formula:

$$PPV_{Equipment} = PPV_{Ref}\,(25/D)^n \quad (in/sec) \qquad (Eq.\ 12)$$

Where:

PPV_{Ref} = *reference PPV at 25 ft.*

D = *distance from equipment to the receiver in ft.*

$n = 1.1$ *(the value related to the attenuation rate through ground)*

The suggested value for “n” is 1.1. Because vibration from this equipment originates primarily near the ground surface, modifying the value of “n” based on soil classification may not necessarily be applicable; however, a higher value of “n” based on site-specific soil conditions could be used for a less-conservative estimation of vibration amplitude. FTA recommends a value of “n” of 1.5 for vibration assessment. Using a value of 1.5 is less conservative than using a value of 1.4 or less (as indicated in Table 17) because it assumes that vibration will attenuate at a greater rate.

7.3 Evaluating Potential Vibration Impacts

As shown in Chapter 6, there is limited consistency between the categorization of effects and damage thresholds; however, it is apparent that damage thresholds for continuous sources are less than those for single-event or transient sources. It is also apparent that the vibration from traffic is continuous and that vibration from a single blasting event is a single transient event; however, many types of construction activities fall between a single event and a continuous source. An impact pile driver, for example, continuously generates single transient events. As a practical matter and based on the nature of available criteria, the criteria can only be reasonably separated into two categories: continuous and transient.

Relationship Between Indoor and Outdoor Levels

The contribution of outdoor noise to indoor noise levels is usually small. That pan of a sound level within a building caused by an outdoor source obviously depends on the source's intensity and the sound level reduction afforded by the building. Although the sound level reduction provided by different buildings differs greatly, dwellings can be categorized into two broad classes-- those built in warm climates and those built in cold climates. Further, the sound level reduction of a building is largely determined by whether its windows are open or closed. Table II shows typical sound level reductions for these categories of buildings and window conditions, as well as an approximate national average sound level reduction.

Table II
Typical Sound Level Reductions of Buildings

	Windows Opened	**Windows Closed**
Warm Climate	12dB	24dB
Cold Climate	17dB	27dB
Approximate National Average	15dB	25dB

Sample measurements of outdoor and indoor noise levels during 24-hour periods are depicted in Figure 7. Despite the sound level reduction of buildings, indoor levels are often comparable to or higher than levels measured outside. Thus, indoor levels often are influenced primarily by internal noise sources such as appliances, radio and television, heating and ventilating equipment, and people. However, many outdoor noises may still annoy people in their homes more than indoor noises do. Indeed, people sometimes turn on indoor sources to mask the noise coming from outdoors.

An example of the range of hourly sound levels measured inside living areas in plotted for each hour of the day in Figure 8. The figure shows the median levels and the range of levels observed for 80% of the data. During late night hours the typical hourly sound level was approximately 36 dB. This level was probably dominated by outdoor noise. However, during the day, the hourly average levels ranged from about 40 to 70 dB, indicating the wide range of activities in which people engage.

INDIVIDUAL NOISE EXPOSURE PATTERNS

During a 24-hour period, people are exposed to a wide range of noises, including noise at home, work, school, places of recreation, shopping establishments, and while enroute to these or other. locations. Clearly, no single exposure pattern can be typical of all people, or even of those people who follow a common life style. Figure 9 shows hypothetical exposure patterns for broad classes of people. From these levels and some assumptions about the hours spent at different daytime activities, 24-hour average sound levels can be estimated for factory and office workers, housewives, and preschool and school-age children. Estimates based on these assumptions are found in Table III.

3.5.1 Barrier Design Goals and Insertion Loss.

The first step in barrier design is to establish the design goals. Design goals may not be limited simply to noise reduction at receivers, but may also include other considerations of safety and maintenance as well. These other considerations are discussed later in Sections 4 through 13.

In this section, the acoustical design goals of noise reduction will be discussed. Acoustical design goals are usually referred to in terms of barrier *Insertion Loss* (IL). IL is defined as the sound level at a given receiver before the construction of a barrier minus the sound level at the same receiver after the construction of the barrier. The construction of a noise barrier usually results in a partial loss of soft-ground attenuation. This is due to the barrier forcing the sound to take a higher path relative to the ground plane. Therefore, barrier IL is the net effect of barrier diffraction, combined with this partial loss of soft-ground attenuation.

Typically, a 5-dB(A) IL can be expected for receivers whose line-of-sight to the roadway is just blocked by the barrier. A general rule-of-thumb is that each additional 1 m of barrier height above line-of-sight blockage will provide about 1.5 dB(A) of additional attenuation (see Figure 13).

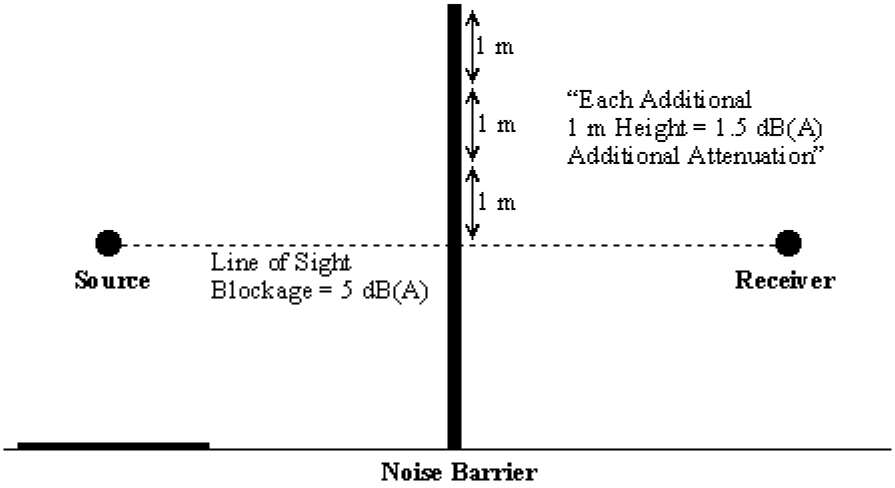

Figure 13. Line-of-sight

Properly-designed noise barriers should attain an IL approaching 10 dB(A), which is equivalent to a perceived halving in loudness for the first row of homes directly behind the barrier. For those residents not directly behind the barrier, a noise reduction of 3 to 5 dB(A) can typically be provided, which is just slightly perceptible to the human ear. Table 4 shows the relationship between barrier IL and design feasibility.

Table 4. Relationship between barrier insertion loss and design feasibility.

Barrier Insertion Loss	Design Feasibility	Reduction in Sound Energy	Relative Reduction in Loudness
5 dB(A)	Simple	68%	Readily perceptible
10 dB(A)	Attainable	90%	Half as loud
15 dB(A)	Very difficult	97%	One-third as loud
20 dB(A)	Nearly impossible	99%	One-fourth as loud

Source: Excerpt from the Federal Highway Administration's *Noise Barrier Design Handbook* (http://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/design00.cfm)

APPENDIX C

Ambient/Baseline Noise Measurements & Applicable County Thresholds

County Significance Thresholds

Merced County

Merced County – General Plan

Non-Transportation Noise Standards (Policy HS-7.1)

Median (L_{50}) / Maximum (L_{max})[1]

Receiving Land Use	Outdoor Area[2]		Interior[3]	Notes
	Daytime	Nighttime	Day or Night	
All Residential	55 / 75	50 / 70	35 / 55	---
Transient Lodging	55 / 75	---	35 / 55	4
Hospitals & Nursing Homes	55 / 75	---	35 / 55	5, 6
Theaters & Auditoriums	---	---	30 / 50	6
Churches, Meeting Halls, Schools, Libraries, etc.	55 / 75	---	35 / 60	6
Office Buildings	60 / 75	---	45 / 65	6
Commercial Buildings	55 / 75	---	45 / 65	6
Playgrounds, Parks, etc.	65 / 75	---	---	6
Industry	60 / 80	---	50 / 70	6

Footnotes:

1 - These standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards in this table, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.

2 - Sensitive Outdoor Areas include primary outdoor activity areas associated with any given land use at which noise-sensitivity exists and the location at which the County's exterior noise level standards are applied.

3 - Sensitive Interior Areas includes any interior area associated with any given land use at which noise-sensitivity exists and the location at which the County's interior noise level standards are applied. Examples of sensitive interior spaces include, but are not limited to, all habitable rooms of residential and transient lodging facilities, hospital rooms, classrooms, library interiors, offices, worship spaces, theaters. Interior noise level standards are applied within noise-sensitive areas of the various land uses with windows and doors in the closed positions.

4 - Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.

5 - Since hospitals are often noise-generating uses, the exterior noise level standards are applicable only to clearly identified areas designated for outdoor relaxation by either hospital staff or patients.

6 - The outdoor activity areas of these uses (if any) are not typically used during nighttime hours.

Merced County – Code of Ordinances

10.60.030 – Sound Level Limitations

Description	Metrics
No person shall cause, suffer, allow, or permit the operation of any sound source on private property in such a manner as to create a sound level that results in any of the following, when measured at or within the real property line of the receiving property.	Exceeds the background sound level by at least ten (10) dBA during daytime hours (seven a.m. to ten p.m.) and by at least five dBA during nighttime hours (ten p.m. to seven a.m.).
	Residential = +65 dBA L_{dn}
	Non-Residential = +70 dBA L_{dn}
	Residential = +75 dBA L_{max}
	Non-Residential = +80 dBA L_{max}

Ambient/Baseline Noise Measurements Summary + Applicable Significance Thresholds

1-Hour Adjustment Factors

Measurement	Location	Date	Start	Stop	Average (L_{eq})			Median (L_{50})			Maximum (L_{max})		
					1-Hour	24-Hour	Adjustment [A]	1-Hour	24-Hour	Adjustment	1-Hour	24-Hour	Adjustment
#2	Location #2	3/8/2022	11:04 AM	12:04 AM	56.2	51.3	4.9	53	43	10	72.7	64.1	8.6
#3	Location #3	3/8/2022	12:14 PM	1:14 PM	41.5	53.3	-11.8	36.5	45.5	-9	64.3	66.6	-2.3
#4	Location #4	3/8/2022	1:28 PM	2:28 PM	54	50.2	3.8	34.4	37.2	-2.8	84.5	64.6	19.9
#5	Location #5	3/8/2022	2:37 PM	3:37 PM	53.8	48.9	4.9	32.4	36.6	-4.2	80.8	61.8	19
#6	Location #6	3/9/2022	9:14 AM	10:14 AM	37.6	48.4	-10.8	35.8	42.7	-6.9	53.6	60.9	-7.3
#7	Location #4	3/9/2022	10:20 AM	11:20 AM	44.4	50	-5.6	33.1	42.9	-9.8	67.9	63.5	4.4

Footnotes:

A - The dBA change shown above was calculated by comparing the measured values (L_{eq}, L_{50} and L_{max}) at each short-duration (1-hour) measurement location to the measured noise level (i.e., L_{eq}, L_{50} and L_{max}) at the long-duration (24-hour) reference measurement location during the same time period. The difference (i.e., correction/adjustment factor) shown above is then applied to the measured 24-hour data points to quantify the nighttime (10:00 p.m. - 7:00 a.m.) L_{eq}, L_{50} and L_{max}, as well as the 24-hour Day-Night (L_{dn}) noise levels at each receptor location.

Ambient/Baseline Noise Measurement Summary

Receptor(s)	Measurement	Location	Date	Start	Stop	Daytime (7:00 a.m. - 10:00 p.m.) [A]			Nighttime (10:00 p.m. - 7:00 a.m.) [B]			Maximum (L_{max}) [B]	Day-Night (L_{dn}) [B, C]
						Average (L_{eq})	Median (L_{50})	Maximum (L_{max})	Average (L_{eq})	Median (L_{50})	Maximum (L_{max})		
R1 / R2 / R3	#1	Location #1	3/8/2022	10:51 AM	---	52.1	43.2	78.1	46.9	35.7	76.5	78.1	54.6
			3/9/2022	---	10:51 AM								
R1 / R2 / R3	#2	Location #2	3/8/2022	11:04 AM	12:04 AM	56.2	53	72.7	51.8	45.7	85.1	72.7	59.5
R4 / R5	#3	Location #3	3/8/2022	12:14 PM	1:14 PM	41.5	36.5	64.3	35.1	26.7	74.2	64.3	42.8
R6 / R7 / R8	#4	Location #4	3/8/2022	1:28 PM	2:28 PM	54	34.4	84.5	50.7	32.9	96.4	84.5	58.4
R1 / R2 / R3 / R4 / R5	#5	Location #5	3/8/2022	2:37 PM	3:37 PM	53.8	32.4	80.8	51.8	31.5	95.5	80.8	59.5
R6 / R7	#6	Location #6	3/9/2022	9:14 AM	10:14 AM	37.6	35.8	53.6	36.1	28.8	69.2	53.6	43.8
R7 / R8	#7	Location #4	3/9/2022	10:20 AM	11:20 AM	44.4	33.1	67.9	41.3	25.9	80.9	67.9	49

Footnotes:

A - Daytime noise levels shown for each receptor represent actual noise levels measured during daytime hours (7:00 a.m. - 10:00 p.m.) on 3/8/2022 and 3/9/2022.

B - Nighttime noise levels were both measured (see measurement Location #1) and estimated by comparing measured daytime values (i.e., L_{eq}, L_{50} and L_{max}) at short-duration measurement locations to the measured noise level at the 24-hour reference location during the identical time period. The difference between the values (i.e., correction/adjustment factor) is then applied to determine the applicable nighttime (i.e., L_{eq}, L_{50} and L_{max}) and 24-hour (i.e., L_{max} and L_{dn}) metric to estimate the appropriate noise levels at each receptor location.

C - Day-Night Average Noise Level (L_{dn}) is a long-term (i.e., 24-hour) average weighted sound level, where a +10 dBA weight is added to noise occurring during nighttime hours (10:00 p.m. - 7:00 a.m.). This noise metric is meant to account for the extra annoyance noise impacts cause during the quieter nighttime hours.

Ambient/Baseline Noise Levels @ Receptors (L_{eq})

Receptor	Outdoor Area [A]			
	Daytime	Threshold [B]	Nighttime	Threshold [B]
R1	54.4	64.4	50.7	55.7
R2	54.4	64.4	50.7	55.7
R3	54.4	64.4	50.7	55.7
R4	51.0	61	48.9	53.9
R5	51.0	61	48.9	53.9
R6	51.1	61.1	47.8	52.8
R7	49.8	59.8	46.5	51.5
R8	51.4	61.4	48.2	53.2

Footnotes:

A - Metric show above utilized to address Section 10.60.030(A)(1) of the Merced County Code.

B - If the measured/estimated ambient noise level exceeds or is within 3 decibels of the applicable standard, then the ambient noise level +3 dBA is utilized as the significant threshold. A +3 dB changes is generally accepted as the minimum change/increase in noise level perceptible to the human ear within an average noise environment (Bruel & Kjaer, 2002).

Ambient/Baseline Noise Levels @ Receptors (L_{50}, L_{max}, L_{dn})

Receptor	Median (L_{50})												Maximum (L_{max})												Maximum (L_{max})			Day-Night (L_{dn})		
	Outdoor Area						Interior Area						Outdoor Area						Interior Area											
	Daytime			Nighttime			Daytime			Nighttime			Daytime			Nighttime			Daytime			Nighttime								
	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold	Ambient	Threshold	Adjusted Threshold
R1	48.7	55	55	41.5	50	50	28.7	35	35	21.5	35	35	78.3	75	81.3	91.1	70	94.1	58.3	55	61.3	71.1	55	74.1	78.3	75	81.3	58.4	65	65
R2	48.7	55	55	41.5	50	50	28.7	35	35	21.5	35	35	78.3	75	81.3	91.1	70	94.1	58.3	55	61.3	71.1	55	74.1	78.3	75	81.3	58.4	65	65
R3	48.7	55	55	41.5	50	50	28.7	35	35	21.5	35	35	78.3	75	81.3	91.1	70	94.1	58.3	55	61.3	71.1	55	74.1	78.3	75	81.3	58.4	65	65
R4	34.9	55	55	29.7	50	50	14.9	35	35	9.7	35	35	77.9	75	80.9	92.5	70	95.5	57.9	55	60.9	72.5	55	75.5	77.9	75	80.9	56.6	65	65
R5	34.9	55	55	29.7	50	50	14.9	35	35	9.7	35	35	77.9	75	80.9	92.5	70	95.5	57.9	55	60.9	72.5	55	75.5	77.9	75	80.9	56.6	65	65
R6	35.2	55	55	31.4	50	50	15.2	35	35	11.4	35	35	81.5	75	84.5	93.4	70	96.4	61.5	55	64.5	73.4	55	55	81.5	75	84.5	55.5	65	65
R7	34.6	55	55	30.2	50	50	14.6	35	35	10.2	35	35	79.8	75	82.8	91.8	70	94.8	59.8	55	62.8	71.8	55	74.8	79.8	75	82.8	54.2	65	65
R8	33.8	55	55	30.7	50	50	13.8	35	35	10.7	35	35	81.6	75	84.6	93.6	70	96.6	61.6	55	64.6	73.6	55	76.6	81.5	75	84.5	55.5	65	65

24-Hour Ambient Measurement

Summary

Serial Number	BGI040008		UNIT REV	R12N
Start Time	10:51:08	08-Mar-2022		
Run Length	24:00:00	5529600		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114
	Date		10:44:57 08-Mar-2022
Post-Cal	Level	dB	
	Date		
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	24	24
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1 Broadband	Meter 2 Broadband
Lavg	dB	50.2	50.2
Lmax	dB	78.1	78
Lmin	dB	26.2	26.1
Lpk	dB	93.4	93.4
TWA	dB	55	55
PTWA	dB	55	55
DOSE	%	0.31	0.31
PDOSE	%	0.31	0.31
SEL	dB	99.6	99.5
EXP	p2s	4	4

Measurement	Units	Value
LDN	dB	54.6
CNEL	dB	54.3
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

Exceedence	Units	Value
L01	dB	63.2
L08	dB	51.7
L25	dB	42.4
L50	dB	37.4

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
Study 1	0:01:00	0:01:00		46.6	84.7	56.7	39
(24-Hour)	0:02:00	0:02:00		55.9	83.5	70.3	39.3
	0:03:00	0:03:00		52.5	76.7	68.7	36.5
	0:04:00	0:04:00		40.9	71.6	47.1	36.5
	0:05:00	0:05:00		41	74.9	51.7	38.4
	0:06:00	0:06:00		56.8	83.8	70.7	37.4
	0:07:00	0:07:00		43	71.1	53.3	37.6
	0:08:00	0:08:00		37.1	70.4	38.4	36
	0:09:00	0:09:00		37.7	53.2	39.5	36.4
	0:10:00	0:10:00		40.6	57.8	43	37.5
	0:11:00	0:11:00		56.7	86.7	71.1	37.5
	0:12:00	0:12:00		55.4	83.6	68.4	37.6
	0:13:00	0:13:00		39.8	57.9	44.7	37.2
	0:14:00	0:14:00		39	57.2	41.7	36.5
	0:15:00	0:15:00		54.2	81.5	67.2	38.6
	0:16:00	0:16:00		47	76.3	56.5	36.7
	0:17:00	0:17:00		53.7	82.7	67.3	36.4
	0:18:00	0:18:00		38.3	53.9	39.7	36.6
	0:19:00	0:19:00		44.7	75.5	60.9	38.1
	0:20:00	0:20:00		56.3	86.2	70.9	37.8
	0:21:00	0:21:00		52.5	80.9	66.4	38.2
	0:22:00	0:22:00		39.8	64.1	50.3	36.8
	0:23:00	0:23:00		57.5	84.9	71.7	37.9
	0:24:00	0:24:00		40.7	63.1	46.4	38.1
	0:25:00	0:25:00		39.4	66.9	43.7	36.4
	0:26:00	0:26:00		54.5	84.1	68.7	38.6
	0:27:00	0:27:00		49.2	80.2	57	41
	0:28:00	0:28:00		43.2	64.1	47.4	40
	0:29:00	0:29:00		45.4	69	50.8	41.8
	0:30:00	0:30:00		43.7	62.3	46.3	40.6
	0:31:00	0:31:00		43.7	63.8	46.4	41
	0:32:00	0:32:00		41.6	61.5	44.8	39.1
	0:33:00	0:33:00		40.8	60.1	43.8	37.5
	0:34:00	0:34:00		53.1	81.3	66.8	38.6
	0:35:00	0:35:00		60.5	86.8	72.6	39.8
	0:36:00	0:36:00		42.2	67.3	44.2	40.4
	0:37:00	0:37:00		42.6	60	45	39.9
	0:38:00	0:38:00		41.1	59.1	44.3	36.9
	0:39:00	0:39:00		40.3	60.7	46.3	37.3
	0:40:00	0:40:00		57.7	85.3	70.7	39.8
	0:41:00	0:41:00		40.6	59.7	43.6	38
	0:42:00	0:42:00		53.8	83.1	67.8	37.8
	0:43:00	0:43:00		43	62.3	45.8	40.8
	0:44:00	0:44:00		52.3	81.1	66.1	37.5
	0:45:00	0:45:00		41.9	60.7	44.9	37.9
	0:46:00	0:46:00		42.8	63.7	46.4	38.7
	0:47:00	0:47:00		40.8	58.7	44.3	38.5
	0:48:00	0:48:00		39.9	60.4	43	37.6
	0:49:00	0:49:00		38.6	57.9	40.9	36.8
	0:50:00	0:50:00		39.3	60.7	40.8	37.5
	0:51:00	0:51:00		39.8	60.9	43	37.3
	0:52:00	0:52:00		40	63.1	45	37.5
	0:53:00	0:53:00		38.5	59.1	44.5	35.7
	0:54:00	0:54:00		62.3	88.1	74.2	36.3
	0:55:00	0:55:00		47	67.4	56.7	38.7
	0:56:00	0:56:00		43	61.6	46.1	40.6
	0:57:00	0:57:00		48.1	73.4	59.4	38.8
	0:58:00	0:58:00		54.1	80.2	67.1	38
	0:59:00	0:59:00		40	58.1	42.2	38
	1:00:00	1:00:00		40.3	56.6	42.1	38.5
	1:01:00	1:01:00		53.3	81.3	67.2	37.9
	1:02:00	1:02:00		50.1	72	55.9	40.4
	1:03:00	1:03:00		44.7	66.4	52	39.7
	1:04:00	1:04:00		42.6	63.7	46.5	39.7
	1:05:00	1:05:00		52.1	83.5	65.7	41
	1:06:00	1:06:00		41	60.4	44.9	38.8
	1:07:00	1:07:00		39.3	57	42.4	37.6
	1:08:00	1:08:00		38.5	56.8	40.9	37.2
	1:09:00	1:09:00		41.2	63.1	44.9	38
	1:10:00	1:10:00		52.5	76.7	64.2	38.6
	1:11:00	1:11:00		50.3	78.8	63.9	37.5
	1:12:00	1:12:00		55.6	83.6	69.3	40.2
	1:13:00	1:13:00		39.1	57.9	42	37
	1:14:00	1:14:00		56.8	85.6	70.6	41.1
	1:15:00	1:15:00		51	79.5	64.7	37.5
	1:16:00	1:16:00		38.6	55.2	39.9	37
	1:17:00	1:17:00		47.7	74.2	60.2	37.3
	1:18:00	1:18:00		47.1	77.8	56.3	36.9
	1:19:00	1:19:00		38.3	62.8	42.3	36.4
	1:20:00	1:20:00		39	58.3	42.3	37.1
	1:21:00	1:21:00		39	55.2	40.8	37.3
	1:22:00	1:22:00		38.3	55.2	40.4	36.4

	Daytime	Nighttime
L_{eq}	52.1	46.9
L_{50}	43.2	35.7
L_{max}	78.1	76.5

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
		10:51 AM	
45708.82	467735.14	10:52 AM	#7
389045.14	10715193.05	10:53 AM	#7
177827.94	7413102.41	10:54 AM	#7
12302.69	51286.14	10:55 AM	#7
12589.25	147910.84	10:56 AM	#7
478630.09	11748975.55	10:57 AM	#7
19952.62	213796.21	10:58 AM	#7
5128.61	6918.31	10:59 AM	#7
5888.44	8912.51	11:00 AM	#7
11481.54	19952.62	11:01 AM	#7
467735.14	12882495.52	11:02 AM	#7
346736.85	6918309.71	11:03 AM	#7
9549.93	29512.09	11:04 AM	#7
7943.28	14791.08	11:05 AM	#2/#7
263026.80	5248074.60	11:06 AM	#2/#7
50118.72	446683.59	11:07 AM	#2/#7
234422.88	5370317.96	11:08 AM	#2/#7
6760.83	9332.54	11:09 AM	#2/#7
29512.09	1230268.77	11:10 AM	#2/#7
426579.52	12302687.71	11:11 AM	#2/#7
177827.94	4365158.32	11:12 AM	#2/#7
9549.93	107151.93	11:13 AM	#2/#7
562341.33	14791083.88	11:14 AM	#2/#7
11748.98	43651.58	11:15 AM	#2/#7
8709.64	23442.29	11:16 AM	#2/#7
281838.29	7413102.41	11:17 AM	#2/#7
83176.38	501187.23	11:18 AM	#2/#7
20892.96	54954.09	11:19 AM	#2/#7
34673.69	120226.44	11:20 AM	#2/#7
23442.29	42657.95	11:21 AM	#2
23442.29	43651.58	11:22 AM	#2
14454.40	30199.52	11:23 AM	#2
12022.64	23988.33	11:24 AM	#2
204173.79	4786300.92	11:25 AM	#2
1122018.45	18197008.59	11:26 AM	#2
16595.87	26302.68	11:27 AM	#2
18197.01	31622.78	11:28 AM	#2
12882.50	26915.35	11:29 AM	#2
10715.19	42657.95	11:30 AM	#2
588843.66	11748975.55	11:31 AM	#2
11481.54	22908.68	11:32 AM	#2
239883.29	6025595.86	11:33 AM	#2
19952.62	38018.94	11:34 AM	#2
169824.37	4073802.78	11:35 AM	#2
15488.17	30902.95	11:36 AM	#2
19054.61	43651.58	11:37 AM	#2
12022.64	26915.35	11:38 AM	#2
9772.37	19952.62	11:39 AM	#2
7244.36	12302.69	11:40 AM	#2
8511.38	12022.64	11:41 AM	#2
9549.93	19952.62	11:42 AM	#2
10000.00	31622.78	11:43 AM	#2
7079.46	28183.83	11:44 AM	#2
1698243.65	26302679.92	11:45 AM	#2
50118.72	467735.14	11:46 AM	#2
19952.62	40738.03	11:47 AM	#2
64565.42	870963.59	11:48 AM	#2
257039.58	5128613.84	11:49 AM	#2
10000.00	16595.87	11:50 AM	#2
10715.19	16218.10	11:51 AM	#2
213796.21	5248074.60	11:52 AM	#2
102329.30	389045.14	11:53 AM	#2
29512.09	158489.32	11:54 AM	#2
18197.01	44668.36	11:55 AM	#2
162181.01	3715352.29	11:56 AM	#2
12589.25	30902.95	11:57 AM	#2
8511.38	17378.01	11:58 AM	#2
7079.46	12302.69	11:59 AM	#2
13182.57	30902.95	12:00 PM	#2
177827.94	2630267.99	12:01 PM	#2
107151.93	2454708.92	12:02 PM	#2
363078.05	8511380.38	12:03 PM	#2
8128.31	15848.93	12:04 PM	#2
478630.09	11481536.21	12:05 PM	
125892.54	2951209.23	12:06 PM	
7244.36	9772.37	12:07 PM	
58884.37	1047128.55	12:08 PM	
51286.14	426579.52	12:09 PM	
6760.83	16982.44	12:10 PM	
7943.28	16982.44	12:11 PM	
7943.28	12022.64	12:12 PM	
6760.83	10964.78	12:13 PM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	1:23:00	1:23:00		50	77.4	63.5	37.5
	1:24:00	1:24:00		41.1	58.5	45.2	37.9
	1:25:00	1:25:00		55.2	80.8	67.4	35.9
	1:26:00	1:26:00		59.7	87.8	73.8	39.6
	1:27:00	1:27:00		40.3	59.8	42.6	38.3
	1:28:00	1:28:00		38.9	57.4	41.4	36.7
	1:29:00	1:29:00		49.5	75.4	61.9	35.3
	1:30:00	1:30:00		48.8	74.9	61.7	35.2
	1:31:00	1:31:00		40.4	63.4	49.8	36.6
	1:32:00	1:32:00		57.4	87.7	71.7	36.7
	1:33:00	1:33:00		39.5	61	43.3	34.4
	1:34:00	1:34:00		47.9	77.9	63.5	34.5
	1:35:00	1:35:00		47.9	71.8	63	35.5
	1:36:00	1:36:00		36.8	57.1	40.7	33.9
	1:37:00	1:37:00		37.2	56.5	41.5	34.2
	1:38:00	1:38:00		37.5	61.9	41.5	34.6
	1:39:00	1:39:00		46.6	71.6	53.6	35.7
	1:40:00	1:40:00		47.5	72.8	55.3	35.6
	1:41:00	1:41:00		58	86.8	71.2	34.3
	1:42:00	1:42:00		35.9	66.7	42	32.3
	1:43:00	1:43:00		42.4	75.4	60.7	31.4
	1:44:00	1:44:00		59	90.7	72.9	32.5
	1:45:00	1:45:00		37.1	57	41.4	33.6
	1:46:00	1:46:00		35.2	58.1	39.3	31.6
	1:47:00	1:47:00		34.8	57.4	41	31.3
	1:48:00	1:48:00		33.5	51.7	39.5	30.3
	1:49:00	1:49:00		37.4	55.4	44.8	32.2
	1:50:00	1:50:00		55.4	84	68.4	31.5
	1:51:00	1:51:00		54.9	81.6	68.3	30.8
	1:52:00	1:52:00		41.8	63	57.1	30.7
	1:53:00	1:53:00		50.9	77.2	63.5	33
	1:54:00	1:54:00		44	68.4	55.2	32.1
	1:55:00	1:55:00		58.5	85.5	71.7	34.3
	1:56:00	1:56:00		53.7	78.9	65.7	34.1
	1:57:00	1:57:00		59.5	88	73.1	32.5
	1:58:00	1:58:00		32.5	52.9	36.7	30.2
	1:59:00	1:59:00		33.9	60.3	39	31.8
	2:00:00	2:00:00		34	58.3	40	32
	2:01:00	2:01:00		33.7	56.5	36.3	31.5
	2:02:00	2:02:00		36.6	60.1	43.8	32.8
	2:03:00	2:03:00		41.8	63.7	48.3	34.4
	2:04:00	2:04:00		50.4	83	62.7	34.5
	2:05:00	2:05:00		55.1	84.9	69.6	36.7
	2:06:00	2:06:00		52.2	81.2	66.3	36.1
	2:07:00	2:07:00		48.9	79.6	65.5	33.7
	2:08:00	2:08:00		62.7	89	74.1	35.5
	2:09:00	2:09:00		38	62.1	45.4	32.1
	2:10:00	2:10:00		55.6	84.7	69.7	37
	2:11:00	2:11:00		59	88.1	72.5	35.3
	2:12:00	2:12:00		51.3	81.1	65.5	33.9
	2:13:00	2:13:00		57.2	86.4	71.6	33.1
	2:14:00	2:14:00		37.3	56.9	42.3	32.2
	2:15:00	2:15:00		39	58.4	49.1	32
	2:16:00	2:16:00		52.7	81.5	65.7	32.6
	2:17:00	2:17:00		34.9	56.8	39.8	31.7
	2:18:00	2:18:00		56.4	82.6	69.4	31.5
	2:19:00	2:19:00		58.9	86.6	72.7	31.1
	2:20:00	2:20:00		56.9	82.6	69.7	32.6
	2:21:00	2:21:00		40.7	60.3	50.1	31.4
	2:22:00	2:22:00		37	60.1	44.1	31.6
	2:23:00	2:23:00		33.3	54.9	35.5	31.5
	2:24:00	2:24:00		36.6	54.6	38.8	33.3
	2:25:00	2:25:00		38.7	55.3	42.2	35.7
	2:26:00	2:26:00		43.7	62.5	48.5	37
	2:27:00	2:27:00		36.9	60.5	48.3	31.9
	2:28:00	2:28:00		51	79.2	64.3	32.7
	2:29:00	2:29:00		33.4	50.3	37	31.5
	2:30:00	2:30:00		48.1	76.4	61.5	32.1
	2:31:00	2:31:00		34.3	53.4	39.6	31.3
	2:32:00	2:32:00		35.3	53.9	39.3	31.7
	2:33:00	2:33:00		34.1	53	37.5	32
	2:34:00	2:34:00		41.5	63.3	48.6	31.6
	2:35:00	2:35:00		37	55.5	41.3	31.2
	2:36:00	2:36:00		55.5	84.2	69.6	33.5
	2:37:00	2:37:00		54.8	80.1	67.1	32.3
	2:38:00	2:38:00		36.7	68	47.8	30.7
	2:39:00	2:39:00		35.2	59.7	41.5	31.2
	2:40:00	2:40:00		35.9	54.9	40.8	31.9
	2:41:00	2:41:00		33	53.1	36.8	31.6
	2:42:00	2:42:00		37.5	57.8	42.4	31.9
	2:43:00	2:43:00		54.2	82.4	67.6	33.8
	2:44:00	2:44:00		38.1	57.9	41.9	33.7
	2:45:00	2:45:00		39.4	60.3	45.6	33.6
	2:46:00	2:46:00		36.6	63.9	43.9	32.3

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
100000.00	2238721.14	12:14 PM	
12882.50	33113.11	12:15 PM	#3
331131.12	5495408.74	12:16 PM	#3
933254.30	23988329.19	12:17 PM	#3
10715.19	18197.01	12:18 PM	#3
7762.47	13803.84	12:19 PM	#3
89125.09	1548816.62	12:20 PM	#3
75857.76	1479108.39	12:21 PM	#3
10964.78	95499.26	12:22 PM	#3
549540.87	14791083.88	12:23 PM	#3
8912.51	21379.62	12:24 PM	#3
61659.50	2238721.14	12:25 PM	#3
61659.50	1995262.31	12:26 PM	#3
4786.30	11748.98	12:27 PM	#3
5248.07	14125.38	12:28 PM	#3
5623.41	14125.38	12:29 PM	#3
45708.82	229086.77	12:30 PM	#3
56234.13	338844.16	12:31 PM	#3
630957.34	13182567.39	12:32 PM	#3
3890.45	15848.93	12:33 PM	#3
17378.01	1174897.55	12:34 PM	#3
794328.23	19498446.00	12:35 PM	#3
5128.61	13803.84	12:36 PM	#3
3311.31	8511.38	12:37 PM	#3
3019.95	12589.25	12:38 PM	#3
2238.72	8912.51	12:39 PM	#3
5495.41	30199.52	12:40 PM	#3
346736.85	6918309.71	12:41 PM	#3
309029.54	6760829.75	12:42 PM	#3
15135.61	512861.38	12:43 PM	#3
123026.88	2238721.14	12:44 PM	#3
25118.86	331131.12	12:45 PM	#3
707945.78	14791083.88	12:46 PM	#3
234422.88	3715352.29	12:47 PM	#3
891250.94	20417379.45	12:48 PM	#3
1778.28	4677.35	12:49 PM	#3
2454.71	7943.28	12:50 PM	#3
2511.89	10000.00	12:51 PM	#3
2344.23	4265.80	12:52 PM	#3
4570.88	23988.33	12:53 PM	#3
15135.61	67608.30	12:54 PM	#3
109647.82	1862087.14	12:55 PM	#3
323593.66	9120108.39	12:56 PM	#3
165958.69	4265795.19	12:57 PM	#3
77624.71	3548133.89	12:58 PM	#3
1862087.14	25703957.83	12:59 PM	#3
6309.57	34673.69	1:00 PM	#3
363078.05	9332543.01	1:01 PM	#3
794328.23	17782794.10	1:02 PM	#3
134896.29	3548133.89	1:03 PM	#3
524807.46	14454397.71	1:04 PM	#3
5370.32	16982.44	1:05 PM	#3
7943.28	81283.05	1:06 PM	#3
186208.71	3715352.29	1:07 PM	#3
3090.30	9549.93	1:08 PM	#3
436515.83	8709635.90	1:09 PM	#3
776247.12	18620871.37	1:10 PM	#3
489778.82	9332543.01	1:11 PM	#3
11748.98	102329.30	1:12 PM	#3
5011.87	25703.96	1:13 PM	#3
2137.96	3548.13	1:14 PM	#3
4570.88	7585.78	1:15 PM	
7413.10	16595.87	1:16 PM	
23442.29	70794.58	1:17 PM	
4897.79	67608.30	1:18 PM	
125892.54	2691534.80	1:19 PM	
2187.76	5011.87	1:20 PM	
64565.42	1412537.54	1:21 PM	
2691.53	9120.11	1:22 PM	
3388.44	8511.38	1:23 PM	
2570.40	5623.41	1:24 PM	
14125.38	72443.60	1:25 PM	
5011.87	13489.63	1:26 PM	
354813.39	9120108.39	1:27 PM	
301995.17	5128613.84	1:28 PM	
4677.35	60255.96	1:29 PM	#4
3311.31	14125.38	1:30 PM	#4
3890.45	12022.64	1:31 PM	#4
1995.26	4786.30	1:32 PM	#4
5623.41	17378.01	1:33 PM	#4
263026.80	5754399.37	1:34 PM	#4
6456.54	15488.17	1:35 PM	#4
8709.64	36307.81	1:36 PM	#4
4570.88	24547.09	1:37 PM	#4

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	2:47:00	2:47:00		35.7	52.8	39.3	32.1
	2:48:00	2:48:00		31.8	48.8	34.9	30.7
	2:49:00	2:49:00		34.8	58	39.2	32
	2:50:00	2:50:00		52.2	82.3	66.7	34.8
	2:51:00	2:51:00		38	53.1	43.3	32.1
	2:52:00	2:52:00		36.9	53.7	40.6	32.1
	2:53:00	2:53:00		38.8	55.8	42.9	34.6
	2:54:00	2:54:00		34.6	51.6	37.9	31.5
	2:55:00	2:55:00		32.5	49.5	35.2	31.6
	2:56:00	2:56:00		33.6	50.6	36.4	31.3
	2:57:00	2:57:00		34.3	54.9	37.3	32
	2:58:00	2:58:00		34.5	56.2	39.1	32.8
	2:59:00	2:59:00		32.9	53.9	37	30.8
	3:00:00	3:00:00		55.4	81.2	67.3	31.8
	3:01:00	3:01:00		34.6	53.6	39.5	31.1
	3:02:00	3:02:00		55.4	83.7	68	32.2
	3:03:00	3:03:00		32.6	51	36	30.4
	3:04:00	3:04:00		35.5	53.4	41.2	31.1
	3:05:00	3:05:00		37.1	54.7	39.5	33.7
	3:06:00	3:06:00		34.8	58.8	41	30.6
	3:07:00	3:07:00		32.1	52	36.5	30.1
	3:08:00	3:08:00		33.4	51.8	36.5	30.5
	3:09:00	3:09:00		33.8	53.2	37.6	31.5
	3:10:00	3:10:00		36.7	60.9	46.5	32.6
	3:11:00	3:11:00		37.3	54.3	40.4	31.8
	3:12:00	3:12:00		57.6	87.2	72.4	32
	3:13:00	3:13:00		35.9	54	43.6	30.7
	3:14:00	3:14:00		57.3	90.4	75.4	31.3
	3:15:00	3:15:00		60.2	86.6	75.4	31.3
	3:16:00	3:16:00		49.7	78.4	63.6	32.1
	3:17:00	3:17:00		54.2	82.7	68.3	33
	3:18:00	3:18:00		48	78.6	61.9	32.7
	3:19:00	3:19:00		37.5	59.4	50.3	30.4
	3:20:00	3:20:00		32.3	50.3	35.6	29.7
	3:21:00	3:21:00		37.2	57.7	42.9	31.9
	3:22:00	3:22:00		33.8	52.4	39.2	31.4
	3:23:00	3:23:00		34.7	59.6	39.1	32.3
	3:24:00	3:24:00		54.9	84.9	71.3	31.2
	3:25:00	3:25:00		58.4	85.1	70.6	30.4
	3:26:00	3:26:00		49.8	79.3	63.7	32.6
	3:27:00	3:27:00		40.5	60.4	53.4	32.3
	3:28:00	3:28:00		37.7	58.6	45.3	33
	3:29:00	3:29:00		57.3	85	68.9	42.1
	3:30:00	3:30:00		49.8	76.6	59.3	36.5
	3:31:00	3:31:00		39.4	59.1	43.5	36
	3:32:00	3:32:00		38.5	60.8	44.8	33.5
	3:33:00	3:33:00		51.4	79.5	64.7	31.2
	3:34:00	3:34:00		32.3	54.2	37.2	30.3
	3:35:00	3:35:00		33.2	50.7	35.2	30.8
	3:36:00	3:36:00		57.4	83.9	70.8	29.9
	3:37:00	3:37:00		40.1	66.2	48.4	34.5
	3:38:00	3:38:00		36.8	56.9	40.3	31.9
	3:39:00	3:39:00		34.9	51.1	37.9	31.9
	3:40:00	3:40:00		32.6	53.5	35.2	31
	3:41:00	3:41:00		32.8	49.9	35.8	30.6
	3:42:00	3:42:00		32.7	52.2	36.4	30.9
	3:43:00	3:43:00		44.3	70	56.4	31.5
	3:44:00	3:44:00		44.5	78.4	62.2	31.1
	3:45:00	3:45:00		49.4	78.2	64.2	33.4
	3:46:00	3:46:00		36.3	58.1	41	31.6
	3:47:00	3:47:00		55.5	80.7	66.5	37.3
	3:48:00	3:48:00		51.5	79.7	63.5	34.1
	3:49:00	3:49:00		38.3	59.8	44.4	33.5
	3:50:00	3:50:00		53.7	81.6	67.8	31.9
	3:51:00	3:51:00		35.1	65.9	40.2	30.3
	3:52:00	3:52:00		34.3	60.2	40.4	31.5
	3:53:00	3:53:00		35.9	56.7	44.3	30.6
	3:54:00	3:54:00		52.7	78.6	64.1	33.7
	3:55:00	3:55:00		34.7	54.5	46.5	31.1
	3:56:00	3:56:00		36.5	57.7	43.4	32.7
	3:57:00	3:57:00		52.1	76.3	62.4	33.7
	3:58:00	3:58:00		51	79	64.9	32.8
	3:59:00	3:59:00		39.3	63.4	49.3	30.5
	4:00:00	4:00:00		36	77	49.4	30.5
	4:01:00	4:01:00		37.9	65.1	46.5	29.9
	4:02:00	4:02:00		34.9	66.9	41.1	30.3
	4:03:00	4:03:00		51.2	79.7	65.1	31.9
	4:04:00	4:04:00		39.9	63.3	48.1	31.6
	4:05:00	4:05:00		36.5	64.3	44.4	31.2
	4:06:00	4:06:00		36.7	65.2	45.1	31.1
	4:07:00	4:07:00		52.7	86.4	65.2	41
	4:08:00	4:08:00		51.9	79.2	65.2	31
	4:09:00	4:09:00		32.5	53.8	38.3	30.1
	4:10:00	4:10:00		36.1	59.6	42.2	31.6

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
3715.35	8511.38	1:38 PM	#4
1513.56	3090.30	1:39 PM	#4
3019.95	8317.64	1:40 PM	#4
165958.69	4677351.41	1:41 PM	#4
6309.57	21379.62	1:42 PM	#4
4897.79	11481.54	1:43 PM	#4
7585.78	19498.45	1:44 PM	#4
2884.03	6165.95	1:45 PM	#4
1778.28	3311.31	1:46 PM	#4
2290.87	4365.16	1:47 PM	#4
2691.53	5370.32	1:48 PM	#4
2818.38	8128.31	1:49 PM	#4
1949.84	5011.87	1:50 PM	#4
346736.85	5370317.96	1:51 PM	#4
2884.03	8912.51	1:52 PM	#4
346736.85	6309573.44	1:53 PM	#4
1819.70	3981.07	1:54 PM	#4
3548.13	13182.57	1:55 PM	#4
5128.61	8912.51	1:56 PM	#4
3019.95	12589.25	1:57 PM	#4
1621.81	4466.84	1:58 PM	#4
2187.76	4466.84	1:59 PM	#4
2398.83	5754.40	2:00 PM	#4
4677.35	44668.36	2:01 PM	#4
5370.32	10964.78	2:02 PM	#4
575439.94	17378008.29	2:03 PM	#4
3890.45	22908.68	2:04 PM	#4
537031.80	34673685.05	2:05 PM	#4
1047128.55	34673685.05	2:06 PM	#4
93325.43	2290867.65	2:07 PM	#4
263026.80	6760829.75	2:08 PM	#4
63095.73	1548816.62	2:09 PM	#4
5623.41	107151.93	2:10 PM	#4
1698.24	3630.78	2:11 PM	#4
5248.07	19498.45	2:12 PM	#4
2398.83	8317.64	2:13 PM	#4
2951.21	8128.31	2:14 PM	#4
309029.54	13489628.83	2:15 PM	#4
691830.97	11481536.21	2:16 PM	#4
95499.26	2344228.82	2:17 PM	#4
11220.18	218776.16	2:18 PM	#4
5888.44	33884.42	2:19 PM	#4
537031.80	7762471.17	2:20 PM	#4
95499.26	851138.04	2:21 PM	#4
8709.64	22387.21	2:22 PM	#4
7079.46	30199.52	2:23 PM	#4
138038.43	2951209.23	2:24 PM	#4
1698.24	5248.07	2:25 PM	#4
2089.30	3311.31	2:26 PM	#4
549540.87	12022644.35	2:27 PM	#4
10232.93	69183.10	2:28 PM	#4
4786.30	10715.19	2:29 PM	
3090.30	6165.95	2:30 PM	
1819.70	3311.31	2:31 PM	
1905.46	3801.89	2:32 PM	
1862.09	4365.16	2:33 PM	
26915.35	436515.83	2:34 PM	
28183.83	1659586.91	2:35 PM	
87096.36	2630267.99	2:36 PM	
4265.80	12589.25	2:37 PM	
354813.39	4466835.92	2:38 PM	#5
141253.75	2238721.14	2:39 PM	#5
6760.83	27542.29	2:40 PM	#5
234422.88	6025595.86	2:41 PM	#5
3235.94	10471.29	2:42 PM	#5
2691.53	10964.78	2:43 PM	#5
3890.45	26915.35	2:44 PM	#5
186208.71	2570395.78	2:45 PM	#5
2951.21	44668.36	2:46 PM	#5
4466.84	21877.62	2:47 PM	#5
162181.01	1737800.83	2:48 PM	#5
125892.54	3090295.43	2:49 PM	#5
8511.38	85113.80	2:50 PM	#5
3981.07	87096.36	2:51 PM	#5
6165.95	44668.36	2:52 PM	#5
3090.30	12882.50	2:53 PM	#5
131825.67	3235936.57	2:54 PM	#5
9772.37	64565.42	2:55 PM	#5
4466.84	27542.29	2:56 PM	#5
4677.35	32359.37	2:57 PM	#5
186208.71	3311311.21	2:58 PM	#5
154881.66	3311311.21	2:59 PM	#5
1778.28	6760.83	3:00 PM	#5
4073.80	16595.87	3:01 PM	#5

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	4:11:00	4:11:00		55.5	85.3	69.4	31.5
	4:12:00	4:12:00		36.4	69.2	41.5	32.4
	4:13:00	4:13:00		52.3	81.5	65.7	32.1
	4:14:00	4:14:00		39	60.9	46.2	32
	4:15:00	4:15:00		43.7	76.3	61.9	31.5
	4:16:00	4:16:00		55.1	84.3	69.2	33.1
	4:17:00	4:17:00		48.8	75.3	61.6	31.1
	4:18:00	4:18:00		35.5	56.9	41.5	31.3
	4:19:00	4:19:00		54.5	82.7	67.5	31.8
	4:20:00	4:20:00		45.1	70.1	55.3	33.4
	4:21:00	4:21:00		54.2	83.7	66.5	32.7
	4:22:00	4:22:00		38.6	61.3	46.1	31.3
	4:23:00	4:23:00		34.4	62.6	46.2	30.7
	4:24:00	4:24:00		58.2	85.3	71.1	38.5
	4:25:00	4:25:00		34.6	53	40.7	32
	4:26:00	4:26:00		34.8	56.1	39	32.5
	4:27:00	4:27:00		33.3	50.1	37.8	30.9
	4:28:00	4:28:00		38.2	58.8	43.3	32.8
	4:29:00	4:29:00		36.1	54.8	41.7	32.7
	4:30:00	4:30:00		33.7	51.1	37.5	30.5
	4:31:00	4:31:00		32.7	54.9	38.1	31
	4:32:00	4:32:00		34	53.4	37	31.4
	4:33:00	4:33:00		34.2	51.4	37.9	30.7
	4:34:00	4:34:00		34.2	55.9	40.8	31
	4:35:00	4:35:00		49.7	77	62.5	31.4
	4:36:00	4:36:00		35.5	54.9	44.7	30.9
	4:37:00	4:37:00		48.1	76.4	61	33
	4:38:00	4:38:00		37	57.3	42.9	31.7
	4:39:00	4:39:00		35.9	59.5	42	31
	4:40:00	4:40:00		33.6	57.3	38.9	30.4
	4:41:00	4:41:00		35.5	64.5	46.2	31.3
	4:42:00	4:42:00		35.7	64.8	45.4	30.6
	4:43:00	4:43:00		33.6	54.7	39.5	31
	4:44:00	4:44:00		34.3	60.3	42	30.7
	4:45:00	4:45:00		34.6	64	39.2	32.1
	4:46:00	4:46:00		56.4	85	70.2	34.7
	4:47:00	4:47:00		60.4	87.7	73.7	32.5
	4:48:00	4:48:00		34.1	56.8	40.6	30.7
	4:49:00	4:49:00		32.5	52.9	38.7	30
	4:50:00	4:50:00		46.9	74.6	59.5	30.5
	4:51:00	4:51:00		32.3	48.6	35.1	30.1
	4:52:00	4:52:00		34.4	62	42.8	30.8
	4:53:00	4:53:00		54.9	84.1	69.1	30.6
	4:54:00	4:54:00		35.2	63.5	41	31.9
	4:55:00	4:55:00		53.9	83.8	67.8	31.2
	4:56:00	4:56:00		58.5	83.3	71.2	30.6
	4:57:00	4:57:00		46.6	81.5	54.4	31.7
	4:58:00	4:58:00		33.9	54.5	37.5	31.8
	4:59:00	4:59:00		33.4	57.1	39	30.9
	5:00:00	5:00:00		33.1	49.3	37.5	30.5
	5:01:00	5:01:00		34.4	54.9	38.7	31.8
	5:02:00	5:02:00		56.7	81.9	68.6	32.6
	5:03:00	5:03:00		37.9	59.4	47.1	31.5
	5:04:00	5:04:00		53.4	82.6	67.4	31.9
	5:05:00	5:05:00		46.9	76	53.5	32.5
	5:06:00	5:06:00		40.2	69.2	53.8	31.7
	5:07:00	5:07:00		52.4	79.5	65.9	31.8
	5:08:00	5:08:00		55.4	83	69.1	31
	5:09:00	5:09:00		41.5	65.4	53.8	31.8
	5:10:00	5:10:00		33.8	53.4	38.3	31
	5:11:00	5:11:00		52.4	78.4	65.2	30.1
	5:12:00	5:12:00		33.3	59.8	38.4	30.4
	5:13:00	5:13:00		36.4	59.8	43.8	31.7
	5:14:00	5:14:00		62.2	86.7	72.5	34.4
	5:15:00	5:15:00		54.7	81.8	67.4	33.7
	5:16:00	5:16:00		33.8	52	36.7	31.9
	5:17:00	5:17:00		54.8	84.4	69.7	31.8
	5:18:00	5:18:00		55	81	66.5	36.1
	5:19:00	5:19:00		35.9	58.3	47	30.5
	5:20:00	5:20:00		35.4	59.6	43.7	31.2
	5:21:00	5:21:00		46.2	81	64.8	32.3
	5:22:00	5:22:00		58.1	85.4	69.5	33.6
	5:23:00	5:23:00		37.7	61.4	47.7	31.3
	5:24:00	5:24:00		35.9	58.2	40.5	31.7
	5:25:00	5:25:00		59.5	86.5	72.7	32
	5:26:00	5:26:00		34.3	55.6	37.8	31.6
	5:27:00	5:27:00		36.6	53.9	40.5	33.4
	5:28:00	5:28:00		31.9	54	38	30.2
	5:29:00	5:29:00		40.8	68.6	52.4	30.2
	5:30:00	5:30:00		53.2	79.9	65.8	32.7
	5:31:00	5:31:00		40.1	58.8	48.4	30.9
	5:32:00	5:32:00		33.3	66.3	44.5	30.4
	5:33:00	5:33:00		33.5	56.9	38.7	31.3
	5:34:00	5:34:00		35.9	57.2	40.1	32.4

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
354813.39	8709635.90	3:02 PM	#5
4365.16	14125.38	3:03 PM	#5
169824.37	3715352.29	3:04 PM	#5
7943.28	41686.94	3:05 PM	#5
23442.29	1548816.62	3:06 PM	#5
323593.66	8317637.71	3:07 PM	#5
75857.76	1445439.77	3:08 PM	#5
3548.13	14125.38	3:09 PM	#5
281838.29	5623413.25	3:10 PM	#5
32359.37	338844.16	3:11 PM	#5
263026.80	4466835.92	3:12 PM	#5
7244.36	40738.03	3:13 PM	#5
2754.23	41686.94	3:14 PM	#5
660693.45	12882495.52	3:15 PM	#5
2884.03	11748.98	3:16 PM	#5
3019.95	7943.28	3:17 PM	#5
2137.96	6025.60	3:18 PM	#5
6606.93	21379.62	3:19 PM	#5
4073.80	14791.08	3:20 PM	#5
2344.23	5623.41	3:21 PM	#5
1862.09	6456.54	3:22 PM	#5
2511.89	5011.87	3:23 PM	#5
2630.27	6165.95	3:24 PM	#5
2630.27	12022.64	3:25 PM	#5
93325.43	1778279.41	3:26 PM	#5
3548.13	29512.09	3:27 PM	#5
64565.42	1258925.41	3:28 PM	#5
5011.87	19498.45	3:29 PM	#5
3890.45	15848.93	3:30 PM	#5
2290.87	7762.47	3:31 PM	#5
3548.13	41686.94	3:32 PM	#5
3715.35	34673.69	3:33 PM	#5
2290.87	8912.51	3:34 PM	#5
2691.53	15848.93	3:35 PM	#5
2884.03	8317.64	3:36 PM	#5
436515.83	10471285.48	3:37 PM	#5
1096478.20	23442288.15	3:38 PM	
2570.40	11481.54	3:39 PM	
1778.28	7413.10	3:40 PM	
48977.88	891250.94	3:41 PM	
1698.24	3235.94	3:42 PM	
2754.23	19054.61	3:43 PM	
309029.54	8128305.16	3:44 PM	
3311.31	12589.25	3:45 PM	
245470.89	6025595.86	3:46 PM	
707945.78	13182567.39	3:47 PM	
45708.82	275422.87	3:48 PM	
2454.71	5623.41	3:49 PM	
2187.76	7943.28	3:50 PM	
2041.74	5623.41	3:51 PM	
2754.23	7413.10	3:52 PM	
467735.14	7244359.60	3:53 PM	
6165.95	51286.14	3:54 PM	
218776.16	5495408.74	3:55 PM	
48977.88	223872.11	3:56 PM	
10471.29	239883.29	3:57 PM	
173780.08	3890451.45	3:58 PM	
346736.85	8128305.16	3:59 PM	
14125.38	239883.29	4:00 PM	
2398.83	6760.83	4:01 PM	
173780.08	3311311.21	4:02 PM	
2137.96	6918.31	4:03 PM	
4365.16	23988.33	4:04 PM	
1659586.91	17782794.10	4:05 PM	
295120.92	5495408.74	4:06 PM	
2398.83	4677.35	4:07 PM	
301995.17	9332543.01	4:08 PM	
316227.77	4466835.92	4:09 PM	
3890.45	50118.72	4:10 PM	
3467.37	23442.29	4:11 PM	
41686.94	3019951.72	4:12 PM	
645654.23	8912509.38	4:13 PM	
5888.44	58884.37	4:14 PM	
3890.45	11220.18	4:15 PM	
891250.94	18620871.37	4:16 PM	
2691.53	6025.60	4:17 PM	
4570.88	11220.18	4:18 PM	
1548.82	6309.57	4:19 PM	
12022.64	173780.08	4:20 PM	
208929.61	3801893.96	4:21 PM	
10232.93	69183.10	4:22 PM	
2137.96	28183.83	4:23 PM	
2238.72	7413.10	4:24 PM	
3890.45	10232.93	4:25 PM	

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	5:35:00	5:35:00		60.9	90	75.6	33.4
	5:36:00	5:36:00		35.1	58.1	39.7	31.5
	5:37:00	5:37:00		32.6	53.2	37.5	30.6
	5:38:00	5:38:00		45.9	71.9	58.4	30.7
	5:39:00	5:39:00		36.9	66.8	51.5	30.2
	5:40:00	5:40:00		48.4	77.2	62.1	29.7
	5:41:00	5:41:00		36.1	56.2	42.8	31.6
	5:42:00	5:42:00		64.4	89.3	75.3	39.5
	5:43:00	5:43:00		52.2	80.8	65.7	30.6
	5:44:00	5:44:00		53.5	80.3	66.6	31.1
	5:45:00	5:45:00		61	86.6	73.4	37.1
	5:46:00	5:46:00		42.1	60.9	47.8	35.1
	5:47:00	5:47:00		50.8	76.5	60	42.6
	5:48:00	5:48:00		58.4	83.9	70.3	40.1
	5:49:00	5:49:00		40.2	77.3	49.8	35.2
	5:50:00	5:50:00		37.9	56.6	41.9	34.6
	5:51:00	5:51:00		37.5	61.8	39.8	34.9
	5:52:00	5:52:00		65.1	93.4	78.1	36
	5:53:00	5:53:00		35.5	55.8	42.6	31.8
	5:54:00	5:54:00		35.7	54.1	40.3	32.3
	5:55:00	5:55:00		59.7	84.3	71	35.5
	5:56:00	5:56:00		49.5	75.7	61.2	31.5
	5:57:00	5:57:00		34.1	55.8	41.3	30.3
	5:58:00	5:58:00		37.6	58.1	41.7	32.6
	5:59:00	5:59:00		47	64.9	51.5	36.1
	6:00:00	6:00:00		53.4	79.1	63.8	38.3
	6:01:00	6:01:00		59.9	86.2	73.4	35.5
	6:02:00	6:02:00		52.1	80.3	65.3	31.9
	6:03:00	6:03:00		38.2	61.6	45.9	30.2
	6:04:00	6:04:00		54.1	82.1	67	31.2
	6:05:00	6:05:00		60.2	86.6	73.8	30.1
	6:06:00	6:06:00		33.2	57.4	38.8	30.2
	6:07:00	6:07:00		33.5	56.4	39.7	30.4
	6:08:00	6:08:00		33.3	59.6	37.9	30.9
	6:09:00	6:09:00		35	61.9	41.7	31.2
	6:10:00	6:10:00		38.3	68.8	43.8	34.3
	6:11:00	6:11:00		33.7	56.4	37.3	31.3
	6:12:00	6:12:00		33.9	59.2	41.1	31.1
	6:13:00	6:13:00		35.7	58.5	40.2	31.6
	6:14:00	6:14:00		36	62.9	43.8	31.6
	6:15:00	6:15:00		57.7	84.4	69.5	34.1
	6:16:00	6:16:00		50.4	74.3	59.8	33.3
	6:17:00	6:17:00		59.9	83.7	68.9	40.8
	6:18:00	6:18:00		35.7	55.3	44.6	32.7
	6:19:00	6:19:00		34.5	62.6	41.2	31.2
	6:20:00	6:20:00		56.1	82.9	69.5	33.3
	6:21:00	6:21:00		36	57	39.2	33.7
	6:22:00	6:22:00		56.1	83.1	69.1	33.3
	6:23:00	6:23:00		51.8	77.9	64.7	32.6
	6:24:00	6:24:00		49	77.5	64.1	34
	6:25:00	6:25:00		57.3	84.5	70.4	35
	6:26:00	6:26:00		38.8	60.8	44.8	32
	6:27:00	6:27:00		53.6	84.1	66.8	34.4
	6:28:00	6:28:00		56.5	85.7	69	35.2
	6:29:00	6:29:00		41.2	66.2	49.3	32.4
	6:30:00	6:30:00		51.6	79.7	64	35.7
	6:31:00	6:31:00		45.5	68.9	56.6	32.9
	6:32:00	6:32:00		38.2	73.8	44.4	34.1
	6:33:00	6:33:00		50.5	76.9	61.9	31.6
	6:34:00	6:34:00		56.3	83.2	67.9	36.1
	6:35:00	6:35:00		41.7	61.3	53.5	34.1
	6:36:00	6:36:00		56.3	82.9	69.2	33.9
	6:37:00	6:37:00		37.9	66.3	46	32.1
	6:38:00	6:38:00		36	62	42.7	32.4
	6:39:00	6:39:00		36.1	59.1	40.8	31.8
	6:40:00	6:40:00		49.9	73.3	60	34.2
	6:41:00	6:41:00		55	84.5	68.9	32
	6:42:00	6:42:00		37.4	65.8	46	32.8
	6:43:00	6:43:00		37.8	71.8	47.1	32
	6:44:00	6:44:00		36.5	66.4	46.6	32.7
	6:45:00	6:45:00		58.4	83	69.8	34.4
	6:46:00	6:46:00		38	66.1	47.5	33.1
	6:47:00	6:47:00		37	63.2	46	31.9
	6:48:00	6:48:00		57.3	83.6	68.8	33.2
	6:49:00	6:49:00		39.6	63.9	45.3	34.5
	6:50:00	6:50:00		37.4	60.1	44.7	32.2
	6:51:00	6:51:00		58.1	88.8	71.4	31.7
	6:52:00	6:52:00		37.6	60.4	44.5	31.9
	6:53:00	6:53:00		35.3	55.2	39.2	32
	6:54:00	6:54:00		33.6	58.1	40.2	30.7
	6:55:00	6:55:00		52.5	79.5	65	30.5
	6:56:00	6:56:00		37.1	57.5	48.1	32.1
	6:57:00	6:57:00		34.1	54.9	38.9	31.5
	6:58:00	6:58:00		35.2	62.4	40.8	31.9

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
1230268.77	36307805.48	4:26 PM	
3235.94	9332.54	4:27 PM	
1819.70	5623.41	4:28 PM	
38904.51	691830.97	4:29 PM	
4897.79	141253.75	4:30 PM	
69183.10	1621810.10	4:31 PM	
4073.80	19054.61	4:32 PM	
2754228.70	33884415.61	4:33 PM	
165958.69	3715352.29	4:34 PM	
223872.11	4570881.90	4:35 PM	
1258925.41	21877616.24	4:36 PM	
16218.10	60255.96	4:37 PM	
120226.44	1000000.00	4:38 PM	
691830.97	10715193.05	4:39 PM	
10471.29	95499.26	4:40 PM	
6165.95	15488.17	4:41 PM	
5623.41	9549.93	4:42 PM	
3235936.57	64565422.90	4:43 PM	
3548.13	18197.01	4:44 PM	
3715.35	10715.19	4:45 PM	
933254.30	12589254.12	4:46 PM	
89125.09	1318256.74	4:47 PM	
2570.40	13489.63	4:48 PM	
5754.40	14791.08	4:49 PM	
50118.72	141253.75	4:50 PM	
218776.16	2398832.92	4:51 PM	
977237.22	21877616.24	4:52 PM	
162181.01	3388441.56	4:53 PM	
6606.93	38904.51	4:54 PM	
257039.58	5011872.34	4:55 PM	
1047128.55	23988329.19	4:56 PM	
2089.30	7585.78	4:57 PM	
2238.72	9332.54	4:58 PM	
2137.96	6165.95	4:59 PM	
3162.28	14791.08	5:00 PM	
6760.83	23988.33	5:01 PM	
2344.23	5370.32	5:02 PM	
2454.71	12882.50	5:03 PM	
3715.35	10471.29	5:04 PM	
3981.07	23988.33	5:05 PM	
588843.66	8912509.38	5:06 PM	
109647.82	954992.59	5:07 PM	
977237.22	7762471.17	5:08 PM	
3715.35	28840.32	5:09 PM	
2818.38	13182.57	5:10 PM	
407380.28	8912509.38	5:11 PM	
3981.07	8317.64	5:12 PM	
407380.28	8128305.16	5:13 PM	
151356.12	2951209.23	5:14 PM	
79432.82	2570395.78	5:15 PM	
537031.80	10964781.96	5:16 PM	
7585.78	30199.52	5:17 PM	
229086.77	4786300.92	5:18 PM	
446683.59	7943282.35	5:19 PM	
13182.57	85113.80	5:20 PM	
144543.98	2511886.43	5:21 PM	
35481.34	457088.19	5:22 PM	
6606.93	27542.29	5:23 PM	
112201.85	1548816.62	5:24 PM	
426579.52	6165950.02	5:25 PM	
14791.08	223872.11	5:26 PM	
426579.52	8317637.71	5:27 PM	
6165.95	39810.72	5:28 PM	
3981.07	18620.87	5:29 PM	
4073.80	12022.64	5:30 PM	
97723.72	1000000.00	5:31 PM	
316227.77	7762471.17	5:32 PM	
5495.41	39810.72	5:33 PM	
6025.60	51286.14	5:34 PM	
4466.84	45708.82	5:35 PM	
691830.97	9549925.86	5:36 PM	
6309.57	56234.13	5:37 PM	
5011.87	39810.72	5:38 PM	
537031.80	7585775.75	5:39 PM	
9120.11	33884.42	5:40 PM	
5495.41	29512.09	5:41 PM	
645654.23	13803842.65	5:42 PM	
5754.40	28183.83	5:43 PM	
3388.44	8317.64	5:44 PM	
2290.87	10471.29	5:45 PM	
177827.94	3162277.66	5:46 PM	
5128.61	64565.42	5:47 PM	
2570.40	7762.47	5:48 PM	
3311.31	12022.64	5:49 PM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1	L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
	6:59:00	6:59:00		40.4	66.4	47.1	31.2	10964.78	51286.14	5:50 PM	
	7:00:00	7:00:00		39.1	67.6	48.6	31.9	8128.31	72443.60	5:51 PM	
	7:01:00	7:01:00		37.1	62.5	43	31.7	5128.61	19952.62	5:52 PM	
	7:02:00	7:02:00		36.7	61.1	43.5	31.3	4677.35	22387.21	5:53 PM	
	7:03:00	7:03:00		36.9	58	41.3	33	4897.79	13489.63	5:54 PM	
	7:04:00	7:04:00		39.9	64.1	45.9	34.8	9772.37	38904.51	5:55 PM	
	7:05:00	7:05:00		56.9	85.8	68	38.6	489778.82	6309573.44	5:56 PM	
	7:06:00	7:06:00		54.4	81.8	67.6	34.4	275422.87	5754399.37	5:57 PM	
	7:07:00	7:07:00		35.8	61.4	40.7	33.2	3801.89	11748.98	5:58 PM	
	7:08:00	7:08:00		35.3	59.6	42.4	31.4	3388.44	17378.01	5:59 PM	
	7:09:00	7:09:00		48.5	76.6	61.4	32.3	70794.58	1380384.26	6:00 PM	
	7:10:00	7:10:00		44.1	72.8	52.9	32.2	25703.96	194984.46	6:01 PM	
	7:11:00	7:11:00		53.9	83.5	67.2	32.9	245470.89	5248074.60	6:02 PM	
	7:12:00	7:12:00		39	62.3	48.7	32.2	7943.28	74131.02	6:03 PM	
	7:13:00	7:13:00		49	81.2	55.5	35.9	79432.82	354813.39	6:04 PM	
	7:14:00	7:14:00		58.5	84.8	71.3	39.6	707945.78	13489628.83	6:05 PM	
	7:15:00	7:15:00		55.8	85.2	69.5	35.8	380189.40	8912509.38	6:06 PM	
	7:16:00	7:16:00		53.9	82.1	66.4	34.6	245470.89	4365158.32	6:07 PM	
	7:17:00	7:17:00		52.9	79.4	65.6	35.9	194984.46	3630780.55	6:08 PM	
	7:18:00	7:18:00		36.5	62.2	42.9	30.9	4466.84	19498.45	6:09 PM	
	7:19:00	7:19:00		34	59.5	43.6	30.7	2511.89	22908.68	6:10 PM	
	7:20:00	7:20:00		38	62.1	48.4	31.2	6309.57	69183.10	6:11 PM	
	7:21:00	7:21:00		53.3	80.2	65.9	33.2	213796.21	3890451.45	6:12 PM	
	7:22:00	7:22:00		34.9	63.6	40.7	32.1	3090.30	11748.98	6:13 PM	
	7:23:00	7:23:00		35.8	60	41.1	33.5	3801.89	12882.50	6:14 PM	
	7:24:00	7:24:00		37	57.5	40	34.7	5011.87	10000.00	6:15 PM	
	7:25:00	7:25:00		36.2	57.4	39.1	34.4	4168.69	8128.31	6:16 PM	
	7:26:00	7:26:00		54.2	83.4	67.7	34.6	263026.80	5888436.55	6:17 PM	
	7:27:00	7:27:00		52.2	80.4	64.6	36.5	165958.69	2884031.50	6:18 PM	
	7:28:00	7:28:00		58.3	85.3	72	37.4	676082.98	15848931.92	6:19 PM	
	7:29:00	7:29:00		36.8	56.5	42	34.6	4786.30	15848.93	6:20 PM	
	7:30:00	7:30:00		36.7	55.2	40.4	34.6	4677.35	10964.78	6:21 PM	
	7:31:00	7:31:00		37.8	55.2	41.5	35.5	6025.60	14125.38	6:22 PM	
	7:32:00	7:32:00		51.8	80.1	64.5	36.3	151356.12	2818382.93	6:23 PM	
	7:33:00	7:33:00		57.8	85.5	70.9	35.9	602559.59	12302687.71	6:24 PM	
	7:34:00	7:34:00		42	63.8	50.6	34.6	15848.93	114815.36	6:25 PM	
	7:35:00	7:35:00		60.3	83.1	71	44.1	1071519.31	12589254.12	6:26 PM	
	7:36:00	7:36:00		40.6	60.9	48.1	34.9	11481.54	64565.42	6:27 PM	
	7:37:00	7:37:00		37.8	59.5	43.4	34.6	6025.60	21877.62	6:28 PM	
	7:38:00	7:38:00		54.6	81	67.2	35.1	288403.15	5248074.60	6:29 PM	
	7:39:00	7:39:00		52.8	79.6	65.6	35.8	190546.07	3630780.55	6:30 PM	
	7:40:00	7:40:00		40	70.4	51.7	35.7	10000.00	147910.84	6:31 PM	
	7:41:00	7:41:00		38.7	62.7	44.1	35.1	7413.10	25703.96	6:32 PM	
	7:42:00	7:42:00		38.7	59	43	36.1	7413.10	19952.62	6:33 PM	
	7:43:00	7:43:00		37.6	63.3	40.7	35.3	5754.40	11748.98	6:34 PM	
	7:44:00	7:44:00		37.9	63.7	45.6	34.5	6165.95	36307.81	6:35 PM	
	7:45:00	7:45:00		36.7	60.2	42.5	34	4677.35	17782.79	6:36 PM	
	7:46:00	7:46:00		36.8	60.3	42	34.6	4786.30	15848.93	6:37 PM	
	7:47:00	7:47:00		37	55.9	39.8	35	5011.87	9549.93	6:38 PM	
	7:48:00	7:48:00		37.7	59.7	42.6	34.9	5888.44	18197.01	6:39 PM	
	7:49:00	7:49:00		35.8	57.8	40.9	33	3801.89	12302.69	6:40 PM	
	7:50:00	7:50:00		41.3	63.3	46.9	33.8	13489.63	48977.88	6:41 PM	
	7:51:00	7:51:00		57.5	84.4	70.6	33.7	562341.33	11481536.21	6:42 PM	
	7:52:00	7:52:00		55.9	85.6	68.7	37.4	389045.14	7413102.41	6:43 PM	
	7:53:00	7:53:00		37.9	60.8	42.7	34.8	6165.95	18620.87	6:44 PM	
	7:54:00	7:54:00		39.3	65.1	49.5	34.2	8511.38	89125.09	6:45 PM	
	7:55:00	7:55:00		37.8	64.6	45.9	33.9	6025.60	38904.51	6:46 PM	
	7:56:00	7:56:00		38.7	62.2	47.6	34.2	7413.10	57543.99	6:47 PM	
	7:57:00	7:57:00		38.7	59.2	44.4	34.7	7413.10	27542.29	6:48 PM	
	7:58:00	7:58:00		36.9	60.8	43	34.7	4897.79	19952.62	6:49 PM	
	7:59:00	7:59:00		52.8	80.6	65.6	34.8	190546.07	3630780.55	6:50 PM	
	8:00:00	8:00:00		41.1	69.1	44.9	35.7	12882.50	30902.95	6:51 PM	
	8:01:00	8:01:00		38.9	60.9	44.4	35.3	7762.47	27542.29	6:52 PM	
	8:02:00	8:02:00		37.9	60.3	43.4	33.4	6165.95	21877.62	6:53 PM	
	8:03:00	8:03:00		39.6	67	43.7	35.4	9120.11	23442.29	6:54 PM	
	8:04:00	8:04:00		37.6	60.6	41.6	33.8	5754.40	14454.40	6:55 PM	
	8:05:00	8:05:00		35.2	60.5	41.5	32.8	3311.31	14125.38	6:56 PM	
	8:06:00	8:06:00		35.7	59.7	41.1	32.6	3715.35	12882.50	6:57 PM	
	8:07:00	8:07:00		35.8	57.7	42	32.7	3801.89	15848.93	6:58 PM	
	8:08:00	8:08:00		41.4	62.7	49.7	34.3	13803.84	93325.43	6:59 PM	
	8:09:00	8:09:00		51	82.7	58.2	34	125892.54	660693.45	7:00 PM	
	8:10:00	8:10:00		34.4	54.3	38.1	32.5	2754.23	6456.54	7:01 PM	
	8:11:00	8:11:00		41.3	59.9	49.4	35	13489.63	87096.36	7:02 PM	
	8:12:00	8:12:00		52.2	77.4	59	44.6	165958.69	794328.23	7:03 PM	
	8:13:00	8:13:00		44.3	71.6	58.2	33	26915.35	660693.45	7:04 PM	
	8:14:00	8:14:00		36.4	64.1	46.8	32.3	4365.16	47863.01	7:05 PM	
	8:15:00	8:15:00		35.7	55.9	41.5	31.9	3715.35	14125.38	7:06 PM	
	8:16:00	8:16:00		47.7	73	57.5	31.5	58884.37	562341.33	7:07 PM	
	8:17:00	8:17:00		52.9	76.5	63.9	32.9	194984.46	2454708.92	7:08 PM	
	8:18:00	8:18:00		35.2	61.3	43.2	31.9	3311.31	20892.96	7:09 PM	
	8:19:00	8:19:00		35.9	55.5	37.8	34.7	3890.45	6025.60	7:10 PM	
	8:20:00	8:20:00		36.2	55.6	39.3	33.7	4168.69	8511.38	7:11 PM	
	8:21:00	8:21:00		37.4	58.7	40.8	34.6	5495.41	12022.64	7:12 PM	
	8:22:00	8:22:00		38.5	58.8	40.5	35.1	7079.46	11220.18	7:13 PM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	8:23:00	8:23:00		41.2	67.7	50.2	37.3
	8:24:00	8:24:00		56.3	84.1	69.3	37.5
	8:25:00	8:25:00		56.6	86.2	70.8	38.9
	8:26:00	8:26:00		60.4	80.8	69	40.1
	8:27:00	8:27:00		59.7	85.6	70.8	41.1
	8:28:00	8:28:00		43.6	61.8	51.9	39.6
	8:29:00	8:29:00		41.9	60.4	44.6	38.9
	8:30:00	8:30:00		41.8	67.9	49.5	38.1
	8:31:00	8:31:00		42.9	67.1	48.3	40.3
	8:32:00	8:32:00		41.5	66.7	49.1	34.6
	8:33:00	8:33:00		39.3	64.8	48.5	35.4
	8:34:00	8:34:00		56.5	79.9	65	35.1
	8:35:00	8:35:00		42.2	61.9	48.5	35.7
	8:36:00	8:36:00		59.1	87.8	72.3	36.1
	8:37:00	8:37:00		47.9	62.5	49.7	42.8
	8:38:00	8:38:00		48.4	63.8	50	45.5
	8:39:00	8:39:00		58.9	81	67.5	44.6
	8:40:00	8:40:00		47.5	63.7	49.8	44.1
	8:41:00	8:41:00		46.5	63	48.1	43.9
	8:42:00	8:42:00		46.7	63.4	49.4	43
	8:43:00	8:43:00		44.5	64.8	48.8	36.7
	8:44:00	8:44:00		39.3	63.8	46.3	34.5
	8:45:00	8:45:00		42.6	58.9	46.2	36.3
	8:46:00	8:46:00		44.1	58.8	46	41.3
	8:47:00	8:47:00		44.7	67	50.9	35.2
	8:48:00	8:48:00		39.5	67.6	50.9	34.2
	8:49:00	8:49:00		36.1	59.7	41.8	34.1
	8:50:00	8:50:00		34.6	55.4	37.9	33.5
	8:51:00	8:51:00		45	59.9	47.1	33.8
	8:52:00	8:52:00		45.8	63.4	48.2	43.4
	8:53:00	8:53:00		47.2	70.9	55.7	41.5
	8:54:00	8:54:00		56.5	85.9	69.2	36.1
	8:55:00	8:55:00		44.4	72.8	59.4	35.8
	8:56:00	8:56:00		54.6	78	65	33.2
	8:57:00	8:57:00		33.6	51.9	35.5	32.1
	8:58:00	8:58:00		33.7	49.8	35	31.2
	8:59:00	8:59:00		34.9	51.6	37.4	33.6
	9:00:00	9:00:00		35.6	51.2	38	33.5
	9:01:00	9:01:00		40.3	60.4	48	34.1
	9:02:00	9:02:00		47.7	63.3	49	45.1
	9:03:00	9:03:00		46.3	61.6	48.2	40.6
	9:04:00	9:04:00		42	60.3	46.9	33.4
	9:05:00	9:05:00		36.8	58.5	40.6	34.9
	9:06:00	9:06:00		36	57.7	39.8	32.9
	9:07:00	9:07:00		36.1	58.6	41.1	32.3
	9:08:00	9:08:00		33.6	49.1	34.7	32.8
	9:09:00	9:09:00		38.6	58.4	42.9	33.1
	9:10:00	9:10:00		38.9	59.7	44.6	34.6
	9:11:00	9:11:00		36	57.3	40.1	34.3
	9:12:00	9:12:00		40.2	64.2	45.7	34.8
	9:13:00	9:13:00		46	64.8	50.9	40.4
	9:14:00	9:14:00		43.6	60.5	45.6	40.4
	9:15:00	9:15:00		42.4	58	44.2	38.9
	9:16:00	9:16:00		41.9	58.4	44.5	35.6
	9:17:00	9:17:00		35.3	55.1	36.9	33.7
	9:18:00	9:18:00		36.5	53.9	39.4	34.7
	9:19:00	9:19:00		38.9	59.1	43.2	36.5
	9:20:00	9:20:00		38.3	62.7	42.3	34.4
	9:21:00	9:21:00		35.9	51.9	37.6	33.9
	9:22:00	9:22:00		37	54.9	40.3	35.6
	9:23:00	9:23:00		36.3	58.7	41	34.2
	9:24:00	9:24:00		41.3	56.8	42.9	39.1
	9:25:00	9:25:00		41.1	56.5	42.4	39.2
	9:26:00	9:26:00		40.4	57.4	42.1	38.1
	9:27:00	9:27:00		41.8	69.5	49.9	37.7
	9:28:00	9:28:00		53.1	78.9	65.8	35.1
	9:29:00	9:29:00		38.1	62.6	41.7	35.1
	9:30:00	9:30:00		46.5	72.6	56.1	36.6
	9:31:00	9:31:00		51.6	78.2	64	34.4
	9:32:00	9:32:00		45.4	68.1	54.3	34.4
	9:33:00	9:33:00		57.1	85.2	70.8	37.6
	9:34:00	9:34:00		39	54.4	40.8	36.5
	9:35:00	9:35:00		37.7	54.6	39.6	35.5
	9:36:00	9:36:00		42	65.1	47.8	37
	9:37:00	9:37:00		40.2	56.9	41.9	37
	9:38:00	9:38:00		41.8	58.2	44	39.6
	9:39:00	9:39:00		39	56.5	41.4	36
	9:40:00	9:40:00		38.4	61	41.1	36.5
	9:41:00	9:41:00		37	61.3	40.8	33.2
	9:42:00	9:42:00		38	62.2	43.1	34.8
	9:43:00	9:43:00		54.8	83	67.5	41.3
	9:44:00	9:44:00		44.2	63.1	50.1	39.6
	9:45:00	9:45:00		41.5	58.4	44.5	38.2
	9:46:00	9:46:00		39.1	59	43.1	37.2

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
13182.57	104712.85	7:14 PM	
426579.52	8511380.38	7:15 PM	
457088.19	12022644.35	7:16 PM	
1096478.20	7943282.35	7:17 PM	
933254.30	12022644.35	7:18 PM	
22908.68	154881.66	7:19 PM	
15488.17	28840.32	7:20 PM	
15135.61	89125.09	7:21 PM	
19498.45	67608.30	7:22 PM	
14125.38	81283.05	7:23 PM	
8511.38	70794.58	7:24 PM	
446683.59	3162277.66	7:25 PM	
16595.87	70794.58	7:26 PM	
812830.52	16982436.52	7:27 PM	
61659.50	93325.43	7:28 PM	
69183.10	100000.00	7:29 PM	
776247.12	5623413.25	7:30 PM	
56234.13	95499.26	7:31 PM	
44668.36	64565.42	7:32 PM	
46773.51	87096.36	7:33 PM	
28183.83	75857.76	7:34 PM	
8511.38	42657.95	7:35 PM	
18197.01	41686.94	7:36 PM	
25703.96	39810.72	7:37 PM	
29512.09	123026.88	7:38 PM	
8912.51	123026.88	7:39 PM	
4073.80	15135.61	7:40 PM	
2884.03	6165.95	7:41 PM	
31622.78	51286.14	7:42 PM	
38018.94	66069.34	7:43 PM	
52480.75	371535.23	7:44 PM	
446683.59	8317637.71	7:45 PM	
27542.29	870963.59	7:46 PM	
288403.15	3162277.66	7:47 PM	
2290.87	3548.13	7:48 PM	
2344.23	3162.28	7:49 PM	
3090.30	5495.41	7:50 PM	
3630.78	6309.57	7:51 PM	
10715.19	63095.73	7:52 PM	
58884.37	79432.82	7:53 PM	
42657.95	66069.34	7:54 PM	
15848.93	48977.88	7:55 PM	
4786.30	11481.54	7:56 PM	
3981.07	9549.93	7:57 PM	
4073.80	12882.50	7:58 PM	
2290.87	2951.21	7:59 PM	
7244.36	19498.45	8:00 PM	
7762.47	28840.32	8:01 PM	
3981.07	10232.93	8:02 PM	
10471.29	37153.52	8:03 PM	
39810.72	123026.88	8:04 PM	
22908.68	36307.81	8:05 PM	
17378.01	26302.68	8:06 PM	
15488.17	28183.83	8:07 PM	
3388.44	4897.79	8:08 PM	
4466.84	8709.64	8:09 PM	
7762.47	20892.96	8:10 PM	
6760.83	16982.44	8:11 PM	
3890.45	5754.40	8:12 PM	
5011.87	10715.19	8:13 PM	
4265.80	12589.25	8:14 PM	
13489.63	19498.45	8:15 PM	
12882.50	17378.01	8:16 PM	
10964.78	16218.10	8:17 PM	
15135.61	97723.72	8:18 PM	
204173.79	3801893.96	8:19 PM	
6456.54	14791.08	8:20 PM	
44668.36	407380.28	8:21 PM	
144543.98	2511886.43	8:22 PM	
34673.69	269153.48	8:23 PM	
512861.38	12022644.35	8:24 PM	
7943.28	12022.64	8:25 PM	
5888.44	9120.11	8:26 PM	
15848.93	60255.96	8:27 PM	
10471.29	15488.17	8:28 PM	
15135.61	25118.86	8:29 PM	
7943.28	13803.84	8:30 PM	
6918.31	12882.50	8:31 PM	
5011.87	12022.64	8:32 PM	
6309.57	20417.38	8:33 PM	
301995.17	5623413.25	8:34 PM	
26302.68	102329.30	8:35 PM	
14125.38	28183.83	8:36 PM	
8128.31	20417.38	8:37 PM	

24-Hour Ambient Measurement

Data

	Study	Session	OL	L_{avg}	L_{pk}	L_{max}	L_{min}				
Study	Time	Time	Status	Meter1	Meter1	Meter1	Meter1	L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
	9:47:00	9:47:00		37.9	59.6	40.8	35.1	6165.95	12022.64	8:38 PM	
	9:48:00	9:48:00		37.9	55.4	39.7	35.2	6165.95	9332.54	8:39 PM	
	9:49:00	9:49:00		39.1	58.3	40.9	37.4	8128.31	12302.69	8:40 PM	
	9:50:00	9:50:00		37.7	53.6	39	36.4	5888.44	7943.28	8:41 PM	
	9:51:00	9:51:00		37.7	54.3	39.1	35.6	5888.44	8128.31	8:42 PM	
	9:52:00	9:52:00		37.9	53.3	38.9	36.9	6165.95	7762.47	8:43 PM	
	9:53:00	9:53:00		37.6	53.2	39	35.4	5754.40	7943.28	8:44 PM	
	9:54:00	9:54:00		37.2	55.7	38.4	35	5248.07	6918.31	8:45 PM	
	9:55:00	9:55:00		37.8	56.2	39.7	36.5	6025.60	9332.54	8:46 PM	
	9:56:00	9:56:00		39.7	59.5	44.7	37.4	9332.54	29512.09	8:47 PM	
	9:57:00	9:57:00		55.8	83.5	69.2	36.3	380189.40	8317637.71	8:48 PM	
	9:58:00	9:58:00		38.2	59.4	42.3	35.7	6606.93	16982.44	8:49 PM	
	9:59:00	9:59:00		37.8	61.6	43.1	33.9	6025.60	20417.38	8:50 PM	
	10:00:00	10:00:00		37.5	58.7	40.4	35.2	5623.41	10964.78	8:51 PM	
	10:01:00	10:01:00		37.9	56	40	36.5	6165.95	10000.00	8:52 PM	
	10:02:00	10:02:00		37.6	62.9	42.1	34.8	5754.40	16218.10	8:53 PM	
	10:03:00	10:03:00		36.7	54.4	38.2	34.7	4677.35	6606.93	8:54 PM	
	10:04:00	10:04:00		36.5	58.5	38.8	35	4466.84	7585.78	8:55 PM	
	10:05:00	10:05:00		36.4	57.6	38.9	34.4	4365.16	7762.47	8:56 PM	
	10:06:00	10:06:00		35.5	52.4	39	33.2	3548.13	7943.28	8:57 PM	
	10:07:00	10:07:00		44.5	62.3	50.1	36.4	28183.83	102329.30	8:58 PM	
	10:08:00	10:08:00		36.2	59.5	41.8	33.7	4168.69	15135.61	8:59 PM	
	10:09:00	10:09:00		39.3	60.8	44.3	34.5	8511.38	26915.35	9:00 PM	
	10:10:00	10:10:00		36.3	55.1	39	33.9	4265.80	7943.28	9:01 PM	
	10:11:00	10:11:00		35	57.8	37.7	33.3	3162.28	5888.44	9:02 PM	
	10:12:00	10:12:00		35.9	53.2	38.4	33.2	3890.45	6918.31	9:03 PM	
	10:13:00	10:13:00		35.3	60.4	39.3	33.7	3388.44	8511.38	9:04 PM	
	10:14:00	10:14:00		36.5	60.3	41.1	33.5	4466.84	12882.50	9:05 PM	
	10:15:00	10:15:00		38.9	57.7	40.2	37.2	7762.47	10471.29	9:06 PM	
	10:16:00	10:16:00		38.9	55.1	40	36.1	7762.47	10000.00	9:07 PM	
	10:17:00	10:17:00		38.2	54	40.7	33.8	6606.93	11748.98	9:08 PM	
	10:18:00	10:18:00		37.9	55.5	41.2	36	6165.95	13182.57	9:09 PM	
	10:19:00	10:19:00		35.9	56.2	39	33.9	3890.45	7943.28	9:10 PM	
	10:20:00	10:20:00		35.5	58.3	43.5	33.8	3548.13	22387.21	9:11 PM	
	10:21:00	10:21:00		36.5	61.6	43.3	33.6	4466.84	21379.62	9:12 PM	
	10:22:00	10:22:00		38.8	60.5	46	33.9	7585.78	39810.72	9:13 PM	
	10:23:00	10:23:00		43.5	60.1	45.7	38.5	22387.21	37153.52	9:14 PM	
	10:24:00	10:24:00		42.4	59.5	44.4	38.5	17378.01	27542.29	9:15 PM	
	10:25:00	10:25:00		38.6	57.8	43.4	33.6	7244.36	21877.62	9:16 PM	
	10:26:00	10:26:00		36.8	58.1	40.6	33.9	4786.30	11481.54	9:17 PM	
	10:27:00	10:27:00		36	56	39.2	33.3	3981.07	8317.64	9:18 PM	
	10:28:00	10:28:00		36.4	62.9	42.2	33.8	4365.16	16595.87	9:19 PM	
	10:29:00	10:29:00		34.5	51.6	35.9	32.7	2818.38	3890.45	9:20 PM	
	10:30:00	10:30:00		34.3	52.2	37.9	32.7	2691.53	6165.95	9:21 PM	
	10:31:00	10:31:00		36.2	62.3	41.2	32.9	4168.69	13182.57	9:22 PM	
	10:32:00	10:32:00		55.3	81.5	67.6	35.1	338844.16	5754399.37	9:23 PM	
	10:33:00	10:33:00		51.4	67.6	58.7	36.8	138038.43	741310.24	9:24 PM	
	10:34:00	10:34:00		36.9	57.7	39.5	35	4897.79	8912.51	9:25 PM	
	10:35:00	10:35:00		36.8	55.2	40	32.8	4786.30	10000.00	9:26 PM	
	10:36:00	10:36:00		36.7	61.8	44.1	34.3	4677.35	25703.96	9:27 PM	
	10:37:00	10:37:00		35.9	60.6	41.3	33.1	3890.45	13489.63	9:28 PM	
	10:38:00	10:38:00		34.3	56.5	36.1	32.9	2691.53	4073.80	9:29 PM	
	10:39:00	10:39:00		35	58	40.7	32.3	3162.28	11748.98	9:30 PM	
	10:40:00	10:40:00		34.1	52.2	36.4	32	2570.40	4365.16	9:31 PM	
	10:41:00	10:41:00		53	82.1	66.4	28.8	199526.23	4365158.32	9:32 PM	
	10:42:00	10:42:00		32.5	52.4	35.1	28.9	1778.28	3235.94	9:33 PM	
	10:43:00	10:43:00		34.8	62.9	41.1	32.4	3019.95	12882.50	9:34 PM	
	10:44:00	10:44:00		35	63.3	41	32.9	3162.28	12589.25	9:35 PM	
	10:45:00	10:45:00		34.5	59.4	38.6	33.4	2818.38	7244.36	9:36 PM	
	10:46:00	10:46:00		34.2	51.8	36.6	32.9	2630.27	4570.88	9:37 PM	
	10:47:00	10:47:00		34	51.1	34.8	33.2	2511.89	3019.95	9:38 PM	
	10:48:00	10:48:00		33.5	51	37	31.5	2238.72	5011.87	9:39 PM	
	10:49:00	10:49:00		35.8	52.7	39.8	33.7	3801.89	9549.93	9:40 PM	
	10:50:00	10:50:00		37.3	53.8	42.2	33.5	5370.32	16595.87	9:41 PM	
	10:51:00	10:51:00		35.4	51.6	39.4	32.8	3467.37	8709.64	9:42 PM	
	10:52:00	10:52:00		36.4	56.2	40.6	33.1	4365.16	11481.54	9:43 PM	
	10:53:00	10:53:00		35.4	65.1	43.3	32.8	3467.37	21379.62	9:44 PM	
	10:54:00	10:54:00		33.3	50.9	34.7	32	2137.96	2951.21	9:45 PM	
	10:55:00	10:55:00		32.2	54.7	36.9	31.1	1659.59	4897.79	9:46 PM	
	10:56:00	10:56:00		32.1	48.8	33.5	31.1	1621.81	2238.72	9:47 PM	
	10:57:00	10:57:00		34.5	53.7	39.6	31.1	2818.38	9120.11	9:48 PM	
	10:58:00	10:58:00		35.8	51.9	37.6	33.7	3801.89	5754.40	9:49 PM	
	10:59:00	10:59:00		35.9	53.6	38	32.1	3890.45	6309.57	9:50 PM	
	11:00:00	11:00:00		55.6	81.9	67.1	33.2	363078.05	5128613.84	9:51 PM	
	11:01:00	11:01:00		35.5	58.5	40.2	31.9	3548.13	10471.29	9:52 PM	
	11:02:00	11:02:00		32.5	50.2	35	31.2	1778.28	3162.28	9:53 PM	
	11:03:00	11:03:00		33.6	67.5	47	31	2290.87	50118.72	9:54 PM	
	11:04:00	11:04:00		38.1	64.2	47.4	31.2	6456.54	54954.09	9:55 PM	
	11:05:00	11:05:00		56	81.6	68.1	32.9	398107.17	6456542.29	9:56 PM	
	11:06:00	11:06:00		35.1	57.5	43.5	31.3	3235.94	22387.21	9:57 PM	
	11:07:00	11:07:00		35.2	62.7	44.1	31.1	3311.31	25703.96	9:58 PM	
	11:08:00	11:08:00		36.5	59.4	41	32	4466.84	12589.25	9:59 PM	
	11:09:00	11:09:00		36.4	60.6	43.6	32.4	4365.16	22908.68	10:00 PM	
	11:10:00	11:10:00		34.5	53.9	36.6	32.5	2818.38	4570.88	10:01 PM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	11:11:00	11:11:00		34.9	54.6	39.3	32.8
	11:12:00	11:12:00		33.9	53.1	38.2	31.2
	11:13:00	11:13:00		32.8	50.1	34.1	31.2
	11:14:00	11:14:00		33.6	51.4	35.7	31.6
	11:15:00	11:15:00		36.6	55.9	41.1	33
	11:16:00	11:16:00		34	50.5	35.5	32.7
	11:17:00	11:17:00		33.7	53	35.2	32.2
	11:18:00	11:18:00		37.7	53.6	41.1	33.8
	11:19:00	11:19:00		34.3	53.6	37.6	32.5
	11:20:00	11:20:00		37.6	59.6	45.6	32
	11:21:00	11:21:00		33.5	54.2	38	31.8
	11:22:00	11:22:00		35.6	59.1	42.2	32.3
	11:23:00	11:23:00		33.4	51.4	34.8	32.5
	11:24:00	11:24:00		32.3	51.3	33.9	30.7
	11:25:00	11:25:00		33.5	59.8	38.3	32.1
	11:26:00	11:26:00		34.9	61	39.3	32
	11:27:00	11:27:00		34.7	60	39.1	32.8
	11:28:00	11:28:00		34.9	60.4	39.7	32.7
	11:29:00	11:29:00		34	54.1	39.9	32.3
	11:30:00	11:30:00		33.6	52.2	35.4	32.2
	11:31:00	11:31:00		33.3	53.8	35.9	31.7
	11:32:00	11:32:00		33.2	54.7	35.1	31.8
	11:33:00	11:33:00		34.2	53.1	36.9	32
	11:34:00	11:34:00		36.1	59.6	39.2	32.1
	11:35:00	11:35:00		35.4	53.1	37.4	32.3
	11:36:00	11:36:00		33.5	51.9	37	31.7
	11:37:00	11:37:00		33.2	53.2	35.1	32.1
	11:38:00	11:38:00		33	50.8	34.2	31.8
	11:39:00	11:39:00		33.4	51.9	35	31.8
	11:40:00	11:40:00		32	50.2	33.5	30.9
	11:41:00	11:41:00		32.3	50.1	34	31.4
	11:42:00	11:42:00		33	52.6	35.4	31.8
	11:43:00	11:43:00		33.6	52.3	35.3	32.3
	11:44:00	11:44:00		36	55.8	41.3	31.8
	11:45:00	11:45:00		34	60.3	39.4	31.8
	11:46:00	11:46:00		34.8	60.8	39.4	32.6
	11:47:00	11:47:00		33.2	49.9	34.5	32.1
	11:48:00	11:48:00		34.2	53.5	35.7	33
	11:49:00	11:49:00		33.7	51.5	36.7	32.9
	11:50:00	11:50:00		53.3	81.1	66.2	31.8
	11:51:00	11:51:00		40.6	62.1	54.2	31.9
	11:52:00	11:52:00		35	53.9	40.8	31.7
	11:53:00	11:53:00		34	50.2	36.2	32.5
	11:54:00	11:54:00		33.1	48.7	34.5	31.6
	11:55:00	11:55:00		34.3	54.5	36.7	32.2
	11:56:00	11:56:00		34.1	50.9	35	33.3
	11:57:00	11:57:00		33.8	49.7	34.9	33
	11:58:00	11:58:00		33.2	50	34.4	31.9
	11:59:00	11:59:00		33.7	50.5	36.6	32.4
	12:00:00	12:00:00		32.7	51.5	35.7	30.6
	12:01:00	12:01:00		32.4	51.3	33.9	31.1
	12:02:00	12:02:00		34.3	52.5	35.7	32.9
	12:03:00	12:03:00		33.9	50.4	35.7	31.9
	12:04:00	12:04:00		32.9	49.9	35	31.2
	12:05:00	12:05:00		32.1	49.8	34.4	30
	12:06:00	12:06:00		33.8	51.7	35.4	32.6
	12:07:00	12:07:00		33.5	50.1	34.8	32.1
	12:08:00	12:08:00		35	55.4	37	33.5
	12:09:00	12:09:00		33.7	52.7	35.3	32.2
	12:10:00	12:10:00		34	54.4	35.5	33.1
	12:11:00	12:11:00		34.1	50.8	35.3	32.5
	12:12:00	12:12:00		34	51.2	35.8	32.3
	12:13:00	12:13:00		33.8	51.7	35.8	32.4
	12:14:00	12:14:00		33.1	51.3	35.3	31.1
	12:15:00	12:15:00		57.1	84.1	70.4	33.4
	12:16:00	12:16:00		37.6	59.5	45.8	32
	12:17:00	12:17:00		34.1	52.1	35.4	32.9
	12:18:00	12:18:00		33.1	49.9	34.9	32.1
	12:19:00	12:19:00		32.2	50.3	33.2	31
	12:20:00	12:20:00		33.1	50.4	34.9	31.5
	12:21:00	12:21:00		33.4	51.5	34.8	32.1
	12:22:00	12:22:00		33.9	51.8	35	32.7
	12:23:00	12:23:00		34.3	50.8	36.4	31.6
	12:24:00	12:24:00		33	50.8	34.6	31.3
	12:25:00	12:25:00		33.9	50.3	35.6	32.9
	12:26:00	12:26:00		35	52	37.4	34.2
	12:27:00	12:27:00		33.8	54.2	35.2	32.6
	12:28:00	12:28:00		33.7	52.7	35.2	32.6
	12:29:00	12:29:00		33.8	50.9	35.1	32.4
	12:30:00	12:30:00		34.4	51.2	35.7	32.9
	12:31:00	12:31:00		52.5	80.5	65	34.1
	12:32:00	12:32:00		34.5	51.1	36.2	33.5
	12:33:00	12:33:00		33.9	49.9	34.8	32.8
	12:34:00	12:34:00		33.1	52.6	34.9	31.8

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
3090.30	8511.38	10:02 PM	
2454.71	6606.93	10:03 PM	
1905.46	2570.40	10:04 PM	
2290.87	3715.35	10:05 PM	
4570.88	12882.50	10:06 PM	
2511.89	3548.13	10:07 PM	
2344.23	3311.31	10:08 PM	
5888.44	12882.50	10:09 PM	
2691.53	5754.40	10:10 PM	
5754.40	36307.81	10:11 PM	
2238.72	6309.57	10:12 PM	
3630.78	16595.87	10:13 PM	
2187.76	3019.95	10:14 PM	
1698.24	2454.71	10:15 PM	
2238.72	6760.83	10:16 PM	
3090.30	8511.38	10:17 PM	
2951.21	8128.31	10:18 PM	
3090.30	9332.54	10:19 PM	
2511.89	9772.37	10:20 PM	
2290.87	3467.37	10:21 PM	
2137.96	3890.45	10:22 PM	
2089.30	3235.94	10:23 PM	
2630.27	4897.79	10:24 PM	
4073.80	8317.64	10:25 PM	
3467.37	5495.41	10:26 PM	
2238.72	5011.87	10:27 PM	
2089.30	3235.94	10:28 PM	
1995.26	2630.27	10:29 PM	
2187.76	3162.28	10:30 PM	
1584.89	2238.72	10:31 PM	
1698.24	2511.89	10:32 PM	
1995.26	3467.37	10:33 PM	
2290.87	3388.44	10:34 PM	
3981.07	13489.63	10:35 PM	
2511.89	8709.64	10:36 PM	
3019.95	8709.64	10:37 PM	
2089.30	2818.38	10:38 PM	
2630.27	3715.35	10:39 PM	
2344.23	4677.35	10:40 PM	
213796.21	4168693.83	10:41 PM	
11481.54	263026.80	10:42 PM	
3162.28	12022.64	10:43 PM	
2511.89	4168.69	10:44 PM	
2041.74	2818.38	10:45 PM	
2691.53	4677.35	10:46 PM	
2570.40	3162.28	10:47 PM	
2398.83	3090.30	10:48 PM	
2089.30	2754.23	10:49 PM	
2344.23	4570.88	10:50 PM	
1862.09	3715.35	10:51 PM	
1737.80	2454.71	10:52 PM	
2691.53	3715.35	10:53 PM	
2454.71	3715.35	10:54 PM	
1949.84	3162.28	10:55 PM	
1621.81	2754.23	10:56 PM	
2398.83	3467.37	10:57 PM	
2238.72	3019.95	10:58 PM	
3162.28	5011.87	10:59 PM	
2344.23	3388.44	11:00 PM	
2511.89	3548.13	11:01 PM	
2570.40	3388.44	11:02 PM	
2511.89	3801.89	11:03 PM	
2398.83	3801.89	11:04 PM	
2041.74	3388.44	11:05 PM	
512861.38	10964781.96	11:06 PM	
5754.40	38018.94	11:07 PM	
2570.40	3467.37	11:08 PM	
2041.74	3090.30	11:09 PM	
1659.59	2089.30	11:10 PM	
2041.74	3090.30	11:11 PM	
2187.76	3019.95	11:12 PM	
2454.71	3162.28	11:13 PM	
2691.53	4365.16	11:14 PM	
1995.26	2884.03	11:15 PM	
2454.71	3630.78	11:16 PM	
3162.28	5495.41	11:17 PM	
2398.83	3311.31	11:18 PM	
2344.23	3311.31	11:19 PM	
2398.83	3235.94	11:20 PM	
2754.23	3715.35	11:21 PM	
177827.94	3162277.66	11:22 PM	
2818.38	4168.69	11:23 PM	
2454.71	3019.95	11:24 PM	
2041.74	3090.30	11:25 PM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	12:35:00	12:35:00		34.1	60	40	32.2
	12:36:00	12:36:00		32.5	48.6	35.1	31.8
	12:37:00	12:37:00		34.4	61	40.5	31.9
	12:38:00	12:38:00		35.5	66.4	43.9	32.7
	12:39:00	12:39:00		32.9	54.8	34.7	31.3
	12:40:00	12:40:00		33	49.7	35.5	31.8
	12:41:00	12:41:00		32.5	48.8	33.4	31.7
	12:42:00	12:42:00		33.3	61.3	39	31.2
	12:43:00	12:43:00		31.1	47.3	32.6	30
	12:44:00	12:44:00		32.4	50.1	34.9	31.3
	12:45:00	12:45:00		32.6	53.1	37.2	30.1
	12:46:00	12:46:00		32.6	57.7	39.8	31.1
	12:47:00	12:47:00		33.3	62.7	41.7	30.7
	12:48:00	12:48:00		34.7	53.9	41.6	30.9
	12:49:00	12:49:00		32.2	48.6	33	31.5
	12:50:00	12:50:00		32.3	51.7	36.1	31
	12:51:00	12:51:00		32.1	54.4	35.6	31.2
	12:52:00	12:52:00		33.1	55.7	36.2	31.7
	12:53:00	12:53:00		33.2	52.6	37.3	31.7
	12:54:00	12:54:00		34.3	59.8	39.9	30.9
	12:55:00	12:55:00		33.2	58.8	38.9	29.8
	12:56:00	12:56:00		28.8	47.6	32	27.5
	12:57:00	12:57:00		33.5	51.1	36.8	29.5
	12:58:00	12:58:00		55.8	80.8	66.6	33.6
	12:59:00	12:59:00		34.1	51	37.3	30.8
	13:00:00	13:00:00		33.3	57	38.2	30.7
	13:01:00	13:01:00		35.7	52.7	38.2	34.1
	13:02:00	13:02:00		34	50.2	37.1	31.2
	13:03:00	13:03:00		35	52.6	38.2	31.8
	13:04:00	13:04:00		34.4	50.9	37.5	32.6
	13:05:00	13:05:00		31.6	47.1	33.6	30.6
	13:06:00	13:06:00		32	47.5	33.3	31.1
	13:07:00	13:07:00		32.3	49.8	33.5	31.5
	13:08:00	13:08:00		33	51.5	35.3	31.1
	13:09:00	13:09:00		31.3	47.6	32.5	29.5
	13:10:00	13:10:00		34.6	53.6	41.1	31.9
	13:11:00	13:11:00		32.3	49.3	36.7	29.2
	13:12:00	13:12:00		30.5	49.9	32.8	28.7
	13:13:00	13:13:00		31.6	52.1	34.3	29.1
	13:14:00	13:14:00		32.2	49.4	33.8	30.6
	13:15:00	13:15:00		32.2	49.5	33.6	31
	13:16:00	13:16:00		33.5	51.9	35	31.8
	13:17:00	13:17:00		33.5	53.4	35.4	32.1
	13:18:00	13:18:00		30.4	49.6	32.3	28.8
	13:19:00	13:19:00		31	56.3	37.5	28.1
	13:20:00	13:20:00		32.8	53.9	34.9	30.2
	13:21:00	13:21:00		32.6	52.1	34.7	31.4
	13:22:00	13:22:00		42	63	49.4	30.9
	13:23:00	13:23:00		32.5	51.7	34.5	31.4
	13:24:00	13:24:00		31.6	49.1	33.7	29.7
	13:25:00	13:25:00		32.2	48	33.2	30.9
	13:26:00	13:26:00		31.9	52.6	34.7	30.2
	13:27:00	13:27:00		33.8	54.9	39	31.7
	13:28:00	13:28:00		34.2	55.8	36.6	31.1
	13:29:00	13:29:00		31.4	48.1	32.7	30.3
	13:30:00	13:30:00		31.6	48.9	33.7	30.5
	13:31:00	13:31:00		32.2	50.6	34.3	31.1
	13:32:00	13:32:00		32.5	51.3	35.4	31
	13:33:00	13:33:00		31.9	50.8	34	30.6
	13:34:00	13:34:00		32.6	57.3	36.9	30.8
	13:35:00	13:35:00		32.5	56.7	35.5	30.8
	13:36:00	13:36:00		31.5	53.8	37.1	29.4
	13:37:00	13:37:00		33.1	52.7	36	31.2
	13:38:00	13:38:00		31.5	49.5	33.7	27.8
	13:39:00	13:39:00		29.6	48.1	32.4	27.3
	13:40:00	13:40:00		32.8	49.8	33.9	31.5
	13:41:00	13:41:00		32.5	53	34.3	30.3
	13:42:00	13:42:00		30.3	46.7	32	29.3
	13:43:00	13:43:00		32.4	49.8	33.6	30.2
	13:44:00	13:44:00		32.3	49.9	33.7	30.7
	13:45:00	13:45:00		32.5	50.5	34.7	31
	13:46:00	13:46:00		31.7	49	33.3	30.2
	13:47:00	13:47:00		30.7	48.6	32.8	29.2
	13:48:00	13:48:00		29.9	51	31.2	28.8
	13:49:00	13:49:00		32.3	50.6	34.9	29.7
	13:50:00	13:50:00		32.7	51.6	35.8	31
	13:51:00	13:51:00		31.3	47.8	32	30.4
	13:52:00	13:52:00		30.6	48.3	31.9	29.3
	13:53:00	13:53:00		30.8	48	32	29.4
	13:54:00	13:54:00		30.5	48.2	32.2	29.4
	13:55:00	13:55:00		31	50.6	33.7	29.6
	13:56:00	13:56:00		32.7	52	36.7	30.8
	13:57:00	13:57:00		32.1	51.7	36.1	29.2
	13:58:00	13:58:00		31.6	52.8	35.4	28.8

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
2570.40	10000.00	11:26 PM	
1778.28	3235.94	11:27 PM	
2754.23	11220.18	11:28 PM	
3548.13	24547.09	11:29 PM	
1949.84	2951.21	11:30 PM	
1995.26	3548.13	11:31 PM	
1778.28	2187.76	11:32 PM	
2137.96	7943.28	11:33 PM	
1288.25	1819.70	11:34 PM	
1737.80	3090.30	11:35 PM	
1819.70	5248.07	11:36 PM	
1819.70	9549.93	11:37 PM	
2137.96	14791.08	11:38 PM	
2951.21	14454.40	11:39 PM	
1659.59	1995.26	11:40 PM	
1698.24	4073.80	11:41 PM	
1621.81	3630.78	11:42 PM	
2041.74	4168.69	11:43 PM	
2089.30	5370.32	11:44 PM	
2691.53	9772.37	11:45 PM	
2089.30	7762.47	11:46 PM	
758.58	1584.89	11:47 PM	
2238.72	4786.30	11:48 PM	
380189.40	4570881.90	11:49 PM	
2570.40	5370.32	11:50 PM	
2137.96	6606.93	11:51 PM	
3715.35	6606.93	11:52 PM	
2511.89	5128.61	11:53 PM	
3162.28	6606.93	11:54 PM	
2754.23	5623.41	11:55 PM	
1445.44	2290.87	11:56 PM	
1584.89	2137.96	11:57 PM	
1698.24	2238.72	11:58 PM	
1995.26	3388.44	11:59 PM	
1348.96	1778.28	12:00 AM	
2884.03	12882.50	12:01 AM	
1698.24	4677.35	12:02 AM	
1122.02	1905.46	12:03 AM	
1445.44	2691.53	12:04 AM	
1659.59	2398.83	12:05 AM	
1659.59	2290.87	12:06 AM	
2238.72	3162.28	12:07 AM	
2238.72	3467.37	12:08 AM	
1096.48	1698.24	12:09 AM	
1258.93	5623.41	12:10 AM	
1905.46	3090.30	12:11 AM	
1819.70	2951.21	12:12 AM	
15848.93	87096.36	12:13 AM	
1778.28	2818.38	12:14 AM	
1445.44	2344.23	12:15 AM	
1659.59	2089.30	12:16 AM	
1548.82	2951.21	12:17 AM	
2398.83	7943.28	12:18 AM	
2630.27	4570.88	12:19 AM	
1380.38	1862.09	12:20 AM	
1445.44	2344.23	12:21 AM	
1659.59	2691.53	12:22 AM	
1778.28	3467.37	12:23 AM	
1548.82	2511.89	12:24 AM	
1819.70	4897.79	12:25 AM	
1778.28	3548.13	12:26 AM	
1412.54	5128.61	12:27 AM	
2041.74	3981.07	12:28 AM	
1412.54	2344.23	12:29 AM	
912.01	1737.80	12:30 AM	
1905.46	2454.71	12:31 AM	
1778.28	2691.53	12:32 AM	
1071.52	1584.89	12:33 AM	
1737.80	2290.87	12:34 AM	
1698.24	2344.23	12:35 AM	
1778.28	2951.21	12:36 AM	
1479.11	2137.96	12:37 AM	
1174.90	1905.46	12:38 AM	
977.24	1318.26	12:39 AM	
1698.24	3090.30	12:40 AM	
1862.09	3801.89	12:41 AM	
1348.96	1584.89	12:42 AM	
1148.15	1548.82	12:43 AM	
1202.26	1584.89	12:44 AM	
1122.02	1659.59	12:45 AM	
1258.93	2344.23	12:46 AM	
1862.09	4677.35	12:47 AM	
1621.81	4073.80	12:48 AM	
1445.44	3467.37	12:49 AM	

24-Hour Ambient Measurement
Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	13:59:00	13:59:00		34	55.3	39.8	31.1
	14:00:00	14:00:00		36.4	57.3	41.5	31.8
	14:01:00	14:01:00		33.3	54.9	36.8	30.1
	14:02:00	14:02:00		33.9	54.2	38.3	31.5
	14:03:00	14:03:00		34.4	60.9	40.2	31.2
	14:04:00	14:04:00		30.3	48.6	32.6	29.3
	14:05:00	14:05:00		30.2	57.8	35.8	28.8
	14:06:00	14:06:00		29.5	43.4	30.5	28.6
	14:07:00	14:07:00		31.7	50.1	34.2	28.8
	14:08:00	14:08:00		42.7	68.8	54.5	31.4
	14:09:00	14:09:00		52.2	78.5	64.9	29.2
	14:10:00	14:10:00		28.3	51.2	30.1	26.9
	14:11:00	14:11:00		30.6	54.3	37.9	28.3
	14:12:00	14:12:00		30.7	56.8	33.3	28.2
	14:13:00	14:13:00		31.1	48.7	32.8	29.7
	14:14:00	14:14:00		31.9	58.6	37	30.1
	14:15:00	14:15:00		31.8	49.7	34.2	30.4
	14:16:00	14:16:00		30.5	49.8	32.5	28.4
	14:17:00	14:17:00		29.2	43.6	30.8	28.1
	14:18:00	14:18:00		29.5	45.4	31	28.5
	14:19:00	14:19:00		31.1	48.9	33.7	28.7
	14:20:00	14:20:00		31.7	59.2	37.6	29.7
	14:21:00	14:21:00		29.9	46.6	32.6	28.4
	14:22:00	14:22:00		29.5	49	33	28.1
	14:23:00	14:23:00		30.5	48.8	32.5	28.8
	14:24:00	14:24:00		29.7	48.4	32.1	28
	14:25:00	14:25:00		30.1	48.8	32.2	28.9
	14:26:00	14:26:00		32	48.6	34.2	30.8
	14:27:00	14:27:00		29.4	51.7	33.1	26.5
	14:28:00	14:28:00		28.1	44.9	31.2	26.2
	14:29:00	14:29:00		31.9	47.8	34.2	29
	14:30:00	14:30:00		29.7	47.1	32.7	28.4
	14:31:00	14:31:00		29.7	46	31.5	27.9
	14:32:00	14:32:00		29.6	45.4	32.7	28
	14:33:00	14:33:00		33.1	50.6	37.2	30
	14:34:00	14:34:00		29.4	48.8	31.3	28.1
	14:35:00	14:35:00		28.1	45.4	29.9	26.4
	14:36:00	14:36:00		27	41.7	27.9	26.2
	14:37:00	14:37:00		28.4	43.7	30.1	27.2
	14:38:00	14:38:00		28.1	43.6	30.2	27.2
	14:39:00	14:39:00		28.3	47.7	30.5	27.2
	14:40:00	14:40:00		30.3	50.2	32.5	28.8
	14:41:00	14:41:00		29.8	56.8	34.9	27.3
	14:42:00	14:42:00		28.8	48	34.9	27.4
	14:43:00	14:43:00		28.2	43.1	30.2	27.4
	14:44:00	14:44:00		28	43.7	28.9	27.1
	14:45:00	14:45:00		29.5	49.7	31.8	28.3
	14:46:00	14:46:00		30.4	51.5	33	29
	14:47:00	14:47:00		32.5	62.7	39.6	28.4
	14:48:00	14:48:00		28.7	47.1	33.2	27.5
	14:49:00	14:49:00		27.9	47	29.8	26.6
	14:50:00	14:50:00		36.5	66	46	28.1
	14:51:00	14:51:00		32.4	63.5	41.3	28.3
	14:52:00	14:52:00		30.7	48.6	32.3	29.2
	14:53:00	14:53:00		30.2	49.7	32.5	28.4
	14:54:00	14:54:00		31.2	56.3	35.9	29.2
	14:55:00	14:55:00		29	47.4	30.7	27.3
	14:56:00	14:56:00		27.9	43.6	29.8	27.2
	14:57:00	14:57:00		28.1	43.2	28.8	27.4
	14:58:00	14:58:00		29.5	59.2	37.9	27.6
	14:59:00	14:59:00		31	59.9	38	28.8
	15:00:00	15:00:00		32.2	60.1	38.1	29.4
	15:01:00	15:01:00		31.2	50.5	32.8	29.8
	15:02:00	15:02:00		31.4	51.1	33.9	29.2
	15:03:00	15:03:00		29.7	46.8	31.1	28.9
	15:04:00	15:04:00		32.5	50.9	36.1	29.7
	15:05:00	15:05:00		33	52.2	36.4	29.2
	15:06:00	15:06:00		31.7	48.7	34.7	29.2
	15:07:00	15:07:00		30.3	47	31.7	29.5
	15:08:00	15:08:00		31.5	47.9	32.4	30.3
	15:09:00	15:09:00		31.5	48.9	33.9	29.3
	15:10:00	15:10:00		30.4	46.5	31.8	29.4
	15:11:00	15:11:00		30.5	48.5	32.3	28.9
	15:12:00	15:12:00		28.9	47.7	30.9	27.1
	15:13:00	15:13:00		29.5	50.1	31.2	28
	15:14:00	15:14:00		28.7	47.4	30.8	26.9
	15:15:00	15:15:00		29.5	46.6	31.4	28.1
	15:16:00	15:16:00		30.2	48.2	32.2	28.6
	15:17:00	15:17:00		31	50	32.7	29
	15:18:00	15:18:00		30.6	49.7	32.9	28.9
	15:19:00	15:19:00		31	48.8	33.2	29.4
	15:20:00	15:20:00		31.4	50.4	33.3	30
	15:21:00	15:21:00		31.3	50.1	33.8	30.2
	15:22:00	15:22:00		31.3	49.4	32.8	29.5

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
2511.89	9549.93	12:50 AM	
4365.16	14125.38	12:51 AM	
2137.96	4786.30	12:52 AM	
2454.71	6760.83	12:53 AM	
2754.23	10471.29	12:54 AM	
1071.52	1819.70	12:55 AM	
1047.13	3801.89	12:56 AM	
891.25	1122.02	12:57 AM	
1479.11	2630.27	12:58 AM	
18620.87	281838.29	12:59 AM	
165958.69	3090295.43	1:00 AM	
676.08	1023.29	1:01 AM	
1148.15	6165.95	1:02 AM	
1174.90	2137.96	1:03 AM	
1288.25	1905.46	1:04 AM	
1548.82	5011.87	1:05 AM	
1513.56	2630.27	1:06 AM	
1122.02	1778.28	1:07 AM	
831.76	1202.26	1:08 AM	
891.25	1258.93	1:09 AM	
1288.25	2344.23	1:10 AM	
1479.11	5754.40	1:11 AM	
977.24	1819.70	1:12 AM	
891.25	1995.26	1:13 AM	
1122.02	1778.28	1:14 AM	
933.25	1621.81	1:15 AM	
1023.29	1659.59	1:16 AM	
1584.89	2630.27	1:17 AM	
870.96	2041.74	1:18 AM	
645.65	1318.26	1:19 AM	
1548.82	2630.27	1:20 AM	
933.25	1862.09	1:21 AM	
933.25	1412.54	1:22 AM	
912.01	1862.09	1:23 AM	
2041.74	5248.07	1:24 AM	
870.96	1348.96	1:25 AM	
645.65	977.24	1:26 AM	
501.19	616.60	1:27 AM	
691.83	1023.29	1:28 AM	
645.65	1047.13	1:29 AM	
676.08	1122.02	1:30 AM	
1071.52	1778.28	1:31 AM	
954.99	3090.30	1:32 AM	
758.58	3090.30	1:33 AM	
660.69	1047.13	1:34 AM	
630.96	776.25	1:35 AM	
891.25	1513.56	1:36 AM	
1096.48	1995.26	1:37 AM	
1778.28	9120.11	1:38 AM	
741.31	2089.30	1:39 AM	
616.60	954.99	1:40 AM	
4466.84	39810.72	1:41 AM	
1737.80	13489.63	1:42 AM	
1174.90	1698.24	1:43 AM	
1047.13	1778.28	1:44 AM	
1318.26	3890.45	1:45 AM	
794.33	1174.90	1:46 AM	
616.60	954.99	1:47 AM	
645.65	758.58	1:48 AM	
891.25	6165.95	1:49 AM	
1258.93	6309.57	1:50 AM	
1659.59	6456.54	1:51 AM	
1318.26	1905.46	1:52 AM	
1380.38	2454.71	1:53 AM	
933.25	1288.25	1:54 AM	
1778.28	4073.80	1:55 AM	
1995.26	4365.16	1:56 AM	
1479.11	2951.21	1:57 AM	
1071.52	1479.11	1:58 AM	
1412.54	1737.80	1:59 AM	
1412.54	2454.71	2:00 AM	
1096.48	1513.56	2:01 AM	
1122.02	1698.24	2:02 AM	
776.25	1230.27	2:03 AM	
891.25	1318.26	2:04 AM	
741.31	1202.26	2:05 AM	
891.25	1380.38	2:06 AM	
1047.13	1659.59	2:07 AM	
1258.93	1862.09	2:08 AM	
1148.15	1949.84	2:09 AM	
1258.93	2089.30	2:10 AM	
1380.38	2137.96	2:11 AM	
1348.96	2398.83	2:12 AM	
1348.96	1905.46	2:13 AM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1	L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
	15:23:00	15:23:00		29.5	48.2	33	27.5	891.25	1995.26	2:14 AM	
	15:24:00	15:24:00		31.7	49.7	33.4	30.3	1479.11	2187.76	2:15 AM	
	15:25:00	15:25:00		33.6	49	36.5	31.1	2290.87	4466.84	2:16 AM	
	15:26:00	15:26:00		31.7	47	34.3	29.2	1479.11	2691.53	2:17 AM	
	15:27:00	15:27:00		30.2	48.5	31.8	29	1047.13	1513.56	2:18 AM	
	15:28:00	15:28:00		30.3	48.6	32.1	26.8	1071.52	1621.81	2:19 AM	
	15:29:00	15:29:00		27.1	41.5	27.8	26.7	512.86	602.56	2:20 AM	
	15:30:00	15:30:00		27.4	42.3	28.2	26.4	549.54	660.69	2:21 AM	
	15:31:00	15:31:00		28.9	44.8	30.6	27.3	776.25	1148.15	2:22 AM	
	15:32:00	15:32:00		29.4	46.7	31.4	28.2	870.96	1380.38	2:23 AM	
	15:33:00	15:33:00		30.9	48.5	33.5	28.9	1230.27	2238.72	2:24 AM	
	15:34:00	15:34:00		29.4	47.4	31.3	28.5	870.96	1348.96	2:25 AM	
	15:35:00	15:35:00		30.6	49.2	35.3	28.8	1148.15	3388.44	2:26 AM	
	15:36:00	15:36:00		32	49.4	36.5	28.2	1584.89	4466.84	2:27 AM	
	15:37:00	15:37:00		29.8	46.1	31.5	28.1	954.99	1412.54	2:28 AM	
	15:38:00	15:38:00		29.7	48.4	30.8	29	933.25	1202.26	2:29 AM	
	15:39:00	15:39:00		30.6	46.4	32	29.1	1148.15	1584.89	2:30 AM	
	15:40:00	15:40:00		30.5	60.4	33.5	28.8	1122.02	2238.72	2:31 AM	
	15:41:00	15:41:00		32.3	53.2	39.3	28.6	1698.24	8511.38	2:32 AM	
	15:42:00	15:42:00		28.9	52.5	31.2	27.6	776.25	1318.26	2:33 AM	
	15:43:00	15:43:00		30.5	51.8	31.8	28.8	1122.02	1513.56	2:34 AM	
	15:44:00	15:44:00		31.6	55.5	35.1	29.7	1445.44	3235.94	2:35 AM	
	15:45:00	15:45:00		31.1	47.4	33.1	29.8	1288.25	2041.74	2:36 AM	
	15:46:00	15:46:00		30.3	47.3	32.7	28.4	1071.52	1862.09	2:37 AM	
	15:47:00	15:47:00		29	47.6	31	27.7	794.33	1258.93	2:38 AM	
	15:48:00	15:48:00		30	50	31.2	29	1000.00	1318.26	2:39 AM	
	15:49:00	15:49:00		29.9	46.9	31.7	28.9	977.24	1479.11	2:40 AM	
	15:50:00	15:50:00		29.2	46.2	30.9	27.7	831.76	1230.27	2:41 AM	
	15:51:00	15:51:00		28.9	48.6	30.2	27.5	776.25	1047.13	2:42 AM	
	15:52:00	15:52:00		28.8	43.4	30.1	28	758.58	1023.29	2:43 AM	
	15:53:00	15:53:00		28.5	47.5	30.2	27.8	707.95	1047.13	2:44 AM	
	15:54:00	15:54:00		29.2	46.7	30.8	28.1	831.76	1202.26	2:45 AM	
	15:55:00	15:55:00		30.1	47.4	31.4	29.2	1023.29	1380.38	2:46 AM	
	15:56:00	15:56:00		31	50.1	34.7	29.4	1258.93	2951.21	2:47 AM	
	15:57:00	15:57:00		30.8	51.4	32.4	29.4	1202.26	1737.80	2:48 AM	
	15:58:00	15:58:00		31.4	47.4	33	30.3	1380.38	1995.26	2:49 AM	
	15:59:00	15:59:00		31.2	47.4	33.1	29.8	1318.26	2041.74	2:50 AM	
	16:00:00	16:00:00		30.9	48.5	32.3	29.6	1230.27	1698.24	2:51 AM	
	16:01:00	16:01:00		30.6	48.5	31.9	28.1	1148.15	1548.82	2:52 AM	
	16:02:00	16:02:00		29.9	47.5	31.2	28.3	977.24	1318.26	2:53 AM	
	16:03:00	16:03:00		29.9	50.2	32.1	28.5	977.24	1621.81	2:54 AM	
	16:04:00	16:04:00		29.4	47.3	30.7	27.9	870.96	1174.90	2:55 AM	
	16:05:00	16:05:00		28.2	42.1	28.7	27.5	660.69	741.31	2:56 AM	
	16:06:00	16:06:00		29.5	46.7	31.1	28.3	891.25	1288.25	2:57 AM	
	16:07:00	16:07:00		30.6	49.7	32	29.5	1148.15	1584.89	2:58 AM	
	16:08:00	16:08:00		31.1	49	32.3	30	1288.25	1698.24	2:59 AM	
	16:09:00	16:09:00		30.6	50.3	32.8	28.8	1148.15	1905.46	3:00 AM	
	16:10:00	16:10:00		29.4	47.4	31.5	27.9	870.96	1412.54	3:01 AM	
	16:11:00	16:11:00		31.1	59	36.3	29	1288.25	4265.80	3:02 AM	
	16:12:00	16:12:00		32.3	50.6	33.8	30.5	1698.24	2398.83	3:03 AM	
	16:13:00	16:13:00		32.5	53.5	35.4	30.9	1778.28	3467.37	3:04 AM	
	16:14:00	16:14:00		35.1	51.9	38.8	30.4	3235.94	7585.78	3:05 AM	
	16:15:00	16:15:00		58.2	86	71	29.4	660693.45	12589254.12	3:06 AM	
	16:16:00	16:16:00		46.2	66.4	57	31.6	41686.94	501187.23	3:07 AM	
	16:17:00	16:17:00		31.9	51.2	34.5	30.7	1548.82	2818.38	3:08 AM	
	16:18:00	16:18:00		30.4	46.8	31.9	28.5	1096.48	1548.82	3:09 AM	
	16:19:00	16:19:00		29	47	30.7	28.3	794.33	1174.90	3:10 AM	
	16:20:00	16:20:00		30.2	44.6	31.2	29.5	1047.13	1318.26	3:11 AM	
	16:21:00	16:21:00		31.3	47.5	32.9	30.1	1348.96	1949.84	3:12 AM	
	16:22:00	16:22:00		31.5	47.7	33.1	30.1	1412.54	2041.74	3:13 AM	
	16:23:00	16:23:00		32.5	48.4	34.7	31.1	1778.28	2951.21	3:14 AM	
	16:24:00	16:24:00		31.5	50	34.7	29.6	1412.54	2951.21	3:15 AM	
	16:25:00	16:25:00		32.4	49.8	35.8	30.2	1737.80	3801.89	3:16 AM	
	16:26:00	16:26:00		32.9	50.7	35.7	31.5	1949.84	3715.35	3:17 AM	
	16:27:00	16:27:00		31.6	50.4	35.9	30.3	1445.44	3890.45	3:18 AM	
	16:28:00	16:28:00		32.2	53.9	34.5	31	1659.59	2818.38	3:19 AM	
	16:29:00	16:29:00		35.6	52.7	38.4	33.7	3630.78	6918.31	3:20 AM	
	16:30:00	16:30:00		32.5	55.3	34.6	31.1	1778.28	2884.03	3:21 AM	
	16:31:00	16:31:00		33.5	49.7	36.1	31.3	2238.72	4073.80	3:22 AM	
	16:32:00	16:32:00		34.9	50.4	36.7	33.3	3090.30	4677.35	3:23 AM	
	16:33:00	16:33:00		35.7	53.1	38.9	33.4	3715.35	7762.47	3:24 AM	
	16:34:00	16:34:00		36.9	52.9	38.9	35.2	4897.79	7762.47	3:25 AM	
	16:35:00	16:35:00		35.7	53	37.7	34.3	3715.35	5888.44	3:26 AM	
	16:36:00	16:36:00		34	50.9	36	32.3	2511.89	3981.07	3:27 AM	
	16:37:00	16:37:00		33.5	50.9	35	32.3	2238.72	3162.28	3:28 AM	
	16:38:00	16:38:00		36.4	54.9	41.6	32.7	4365.16	14454.40	3:29 AM	
	16:39:00	16:39:00		34.6	52.1	38.9	31.5	2884.03	7762.47	3:30 AM	
	16:40:00	16:40:00		34	58	38	31.1	2511.89	6309.57	3:31 AM	
	16:41:00	16:41:00		35.4	50.8	37.5	33.4	3467.37	5623.41	3:32 AM	
	16:42:00	16:42:00		35.9	50.4	37.3	34.3	3890.45	5370.32	3:33 AM	
	16:43:00	16:43:00		35	49.6	36.7	33.6	3162.28	4677.35	3:34 AM	
	16:44:00	16:44:00		33.6	50.3	36.5	32	2290.87	4466.84	3:35 AM	
	16:45:00	16:45:00		34.1	51.7	39.7	32.4	2570.40	9332.54	3:36 AM	
	16:46:00	16:46:00		35.2	53.1	38.5	32	3311.31	7079.46	3:37 AM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	16:47:00	16:47:00		36.2	58.4	38.8	33.7
	16:48:00	16:48:00		37.6	56.2	42	32.3
	16:49:00	16:49:00		38	53.3	40.3	35.9
	16:50:00	16:50:00		37.6	52.6	40.5	34.8
	16:51:00	16:51:00		37.2	52.1	38.7	34.7
	16:52:00	16:52:00		39.4	56.5	44.1	35.5
	16:53:00	16:53:00		39	55.1	42.7	36.4
	16:54:00	16:54:00		36.8	52.1	39.1	34.8
	16:55:00	16:55:00		36.5	51.6	39.3	33.8
	16:56:00	16:56:00		36.5	51.9	39.6	34.7
	16:57:00	16:57:00		36.7	51.3	39	34.7
	16:58:00	16:58:00		37.5	54	40.8	34.6
	16:59:00	16:59:00		38.2	54.3	41.9	35.3
	17:00:00	17:00:00		36.2	55.4	40.8	34.1
	17:01:00	17:01:00		35.3	53.7	37.5	33.6
	17:02:00	17:02:00		36.2	51.9	38.7	34.8
	17:03:00	17:03:00		36.9	51.7	39.4	34.4
	17:04:00	17:04:00		34.9	51.1	37.6	33.4
	17:05:00	17:05:00		34.3	57.4	37.4	33.3
	17:06:00	17:06:00		35.1	50.8	37.5	34
	17:07:00	17:07:00		35.7	63.6	41	33.4
	17:08:00	17:08:00		34.8	66.7	43.8	32.9
	17:09:00	17:09:00		34.7	51	36.9	32.3
	17:10:00	17:10:00		38.8	54.7	42.9	35.7
	17:11:00	17:11:00		37.3	52.3	38.9	35.1
	17:12:00	17:12:00		36.1	50.6	37.8	34.9
	17:13:00	17:13:00		35.1	53.5	37.6	34
	17:14:00	17:14:00		35.8	50.4	37.8	34.3
	17:15:00	17:15:00		36.1	58	40.5	35.2
	17:16:00	17:16:00		38.6	55.9	42.3	36.2
	17:17:00	17:17:00		37.4	56.3	39.9	34.2
	17:18:00	17:18:00		35.9	52.8	40	34.2
	17:19:00	17:19:00		38.6	54.4	41.6	36
	17:20:00	17:20:00		39.5	55.5	42.6	36.1
	17:21:00	17:21:00		38.4	54.2	42.6	35.6
	17:22:00	17:22:00		39.5	55.6	41.1	38.1
	17:23:00	17:23:00		39	54.1	41	37.2
	17:24:00	17:24:00		39.5	54.7	41.5	38.1
	17:25:00	17:25:00		39.1	54.1	40.4	37.6
	17:26:00	17:26:00		38.7	54.2	41.6	36.7
	17:27:00	17:27:00		40.8	56	43.3	38.6
	17:28:00	17:28:00		56.4	80.8	65.9	39.9
	17:29:00	17:29:00		40.3	57.2	42.9	38.1
	17:30:00	17:30:00		38.6	53.5	41.1	35.8
	17:31:00	17:31:00		39.4	57.1	42.7	37
	17:32:00	17:32:00		51.5	76.7	62.3	37
	17:33:00	17:33:00		43.8	63.4	54.6	37.5
	17:34:00	17:34:00		43.4	66.3	50.9	36.3
	17:35:00	17:35:00		37.3	52.2	39.4	35.5
	17:36:00	17:36:00		39.1	52.9	40.4	37.9
	17:37:00	17:37:00		38.9	53.8	40.9	36.9
	17:38:00	17:38:00		37.1	52.3	39.6	35.3
	17:39:00	17:39:00		37	51.7	39.3	34.6
	17:40:00	17:40:00		36.6	51.9	39.4	34.2
	17:41:00	17:41:00		36.8	52.6	39	34.8
	17:42:00	17:42:00		37.5	52.6	38.5	36.4
	17:43:00	17:43:00		37.9	52.5	40.1	36.1
	17:44:00	17:44:00		38.2	53.9	39.6	36.2
	17:45:00	17:45:00		42	65.9	48.4	37.1
	17:46:00	17:46:00		40.1	63	46.4	36.1
	17:47:00	17:47:00		36.6	54	46	34.6
	17:48:00	17:48:00		36.7	58.9	40.9	34.1
	17:49:00	17:49:00		38.2	52.8	39.8	36.8
	17:50:00	17:50:00		41.2	58.9	46.6	38.2
	17:51:00	17:51:00		41.6	65.7	48.7	38.8
	17:52:00	17:52:00		41.3	57.2	44	39.4
	17:53:00	17:53:00		44	65.2	53.9	38.2
	17:54:00	17:54:00		41	57.8	46.5	37.8
	17:55:00	17:55:00		41.5	60.3	48	38.1
	17:56:00	17:56:00		42.7	60	48.8	38.1
	17:57:00	17:57:00		42.1	60.4	48	37.1
	17:58:00	17:58:00		42.9	63.9	47.8	38.8
	17:59:00	17:59:00		41.1	58.3	46.2	38.8
	18:00:00	18:00:00		43.4	63.9	47.5	39.9
	18:01:00	18:01:00		43.2	62.9	47.2	40.2
	18:02:00	18:02:00		57.7	76.6	66.6	43.7
	18:03:00	18:03:00		61.6	77.2	67.2	46
	18:04:00	18:04:00		56.6	73.4	62.6	45.8
	18:05:00	18:05:00		56.5	70.4	59.6	50.9
	18:06:00	18:06:00		57.7	72.1	62.6	49.8
	18:07:00	18:07:00		50.9	70.3	57	49.7
	18:08:00	18:08:00		55.9	73.2	61.2	50.1
	18:09:00	18:09:00		60.1	84.4	71.9	49.8
	18:10:00	18:10:00		56	77.2	58.2	53.1

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
4168.69	7585.78	3:38 AM	
5754.40	15848.93	3:39 AM	
6309.57	10715.19	3:40 AM	
5754.40	11220.18	3:41 AM	
5248.07	7413.10	3:42 AM	
8709.64	25703.96	3:43 AM	
7943.28	18620.87	3:44 AM	
4786.30	8128.31	3:45 AM	
4466.84	8511.38	3:46 AM	
4466.84	9120.11	3:47 AM	
4677.35	7943.28	3:48 AM	
5623.41	12022.64	3:49 AM	
6606.93	15488.17	3:50 AM	
4168.69	12022.64	3:51 AM	
3388.44	5623.41	3:52 AM	
4168.69	7413.10	3:53 AM	
4897.79	8709.64	3:54 AM	
3090.30	5754.40	3:55 AM	
2691.53	5495.41	3:56 AM	
3235.94	5623.41	3:57 AM	
3715.35	12589.25	3:58 AM	
3019.95	23988.33	3:59 AM	
2951.21	4897.79	4:00 AM	
7585.78	19498.45	4:01 AM	
5370.32	7762.47	4:02 AM	
4073.80	6025.60	4:03 AM	
3235.94	5754.40	4:04 AM	
3801.89	6025.60	4:05 AM	
4073.80	11220.18	4:06 AM	
7244.36	16982.44	4:07 AM	
5495.41	9772.37	4:08 AM	
3890.45	10000.00	4:09 AM	
7244.36	14454.40	4:10 AM	
8912.51	18197.01	4:11 AM	
6918.31	18197.01	4:12 AM	
8912.51	12882.50	4:13 AM	
7943.28	12589.25	4:14 AM	
8912.51	14125.38	4:15 AM	
8128.31	10964.78	4:16 AM	
7413.10	14454.40	4:17 AM	
12022.64	21379.62	4:18 AM	
436515.83	3890451.45	4:19 AM	
10715.19	19498.45	4:20 AM	
7244.36	12882.50	4:21 AM	
8709.64	18620.87	4:22 AM	
141253.75	1698243.65	4:23 AM	
23988.33	288403.15	4:24 AM	
21877.62	123026.88	4:25 AM	
5370.32	8709.64	4:26 AM	
8128.31	10964.78	4:27 AM	
7762.47	12302.69	4:28 AM	
5128.61	9120.11	4:29 AM	
5011.87	8511.38	4:30 AM	
4570.88	8709.64	4:31 AM	
4786.30	7943.28	4:32 AM	
5623.41	7079.46	4:33 AM	
6165.95	10232.93	4:34 AM	
6606.93	9120.11	4:35 AM	
15848.93	69183.10	4:36 AM	
10232.93	43651.58	4:37 AM	
4570.88	39810.72	4:38 AM	
4677.35	12302.69	4:39 AM	
6606.93	9549.93	4:40 AM	
13182.57	45708.82	4:41 AM	
14454.40	74131.02	4:42 AM	
13489.63	25118.86	4:43 AM	
25118.86	245470.89	4:44 AM	
12589.25	44668.36	4:45 AM	
14125.38	63095.73	4:46 AM	
18620.87	75857.76	4:47 AM	
16218.10	63095.73	4:48 AM	
19498.45	60255.96	4:49 AM	
12882.50	41686.94	4:50 AM	
21877.62	56234.13	4:51 AM	
20892.96	52480.75	4:52 AM	
588843.66	4570881.90	4:53 AM	
1445439.77	5248074.60	4:54 AM	
457088.19	1819700.86	4:55 AM	
446683.59	912010.84	4:56 AM	
588843.66	1819700.86	4:57 AM	
123026.88	501187.23	4:58 AM	
389045.14	1318256.74	4:59 AM	
1023292.99	15488166.19	5:00 AM	
398107.17	660693.45	5:01 AM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1	L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
	18:11:00	18:11:00		55.8	75.3	57.5	54	380189.40	562341.33	5:02 AM	
	18:12:00	18:12:00		55.6	74.6	62.9	53.1	363078.05	1949844.60	5:03 AM	
	18:13:00	18:13:00		55.1	72.2	60.9	53.1	323593.66	1230268.77	5:04 AM	
	18:14:00	18:14:00		53.6	69.3	55.4	51.9	229086.77	346736.85	5:05 AM	
	18:15:00	18:15:00		54.9	71	55.9	53.3	309029.54	389045.14	5:06 AM	
	18:16:00	18:16:00		53.8	73.9	56	52.7	239883.29	398107.17	5:07 AM	
	18:17:00	18:17:00		56.6	76	58.1	55.4	457088.19	645654.23	5:08 AM	
	18:18:00	18:18:00		56.4	74.8	59	54.6	436515.83	794328.23	5:09 AM	
	18:19:00	18:19:00		53.6	68.5	55.7	51.8	229086.77	371535.23	5:10 AM	
	18:20:00	18:20:00		53.4	76.8	56.1	50.1	218776.16	407380.28	5:11 AM	
	18:21:00	18:21:00		50	65.6	50.7	49.3	100000.00	117489.76	5:12 AM	
	18:22:00	18:22:00		50.4	68	52.6	48.4	109647.82	181970.09	5:13 AM	
	18:23:00	18:23:00		52.5	70.6	57.8	49.6	177827.94	602559.59	5:14 AM	
	18:24:00	18:24:00		49.5	68.1	52.3	47.5	89125.09	169824.37	5:15 AM	
	18:25:00	18:25:00		48.8	67.1	51.7	46.9	75857.76	147910.84	5:16 AM	
	18:26:00	18:26:00		50.7	68.7	52.9	48	117489.76	194984.46	5:17 AM	
	18:27:00	18:27:00		51.2	67.1	52.8	49.9	131825.67	190546.07	5:18 AM	
	18:28:00	18:28:00		50.7	68	52.9	48	117489.76	194984.46	5:19 AM	
	18:29:00	18:29:00		56.3	77.2	59.4	52.2	426579.52	870963.59	5:20 AM	
	18:30:00	18:30:00		51.3	73.7	58.5	44.6	134896.29	707945.78	5:21 AM	
	18:31:00	18:31:00		51.2	79.1	60.4	42.5	131825.67	1096478.20	5:22 AM	
	18:32:00	18:32:00		43.5	67.8	49	41.1	22387.21	79432.82	5:23 AM	
	18:33:00	18:33:00		43.8	64.8	48.7	39.1	23988.33	74131.02	5:24 AM	
	18:34:00	18:34:00		39	57	40.8	37.3	7943.28	12022.64	5:25 AM	
	18:35:00	18:35:00		37.8	52.1	39.5	36.9	6025.60	8912.51	5:26 AM	
	18:36:00	18:36:00		38.3	52.3	39.6	37.5	6760.83	9120.11	5:27 AM	
	18:37:00	18:37:00		38.2	52	39.4	37.6	6606.93	8709.64	5:28 AM	
	18:38:00	18:38:00		39.2	54.6	40.4	38.2	8317.64	10964.78	5:29 AM	
	18:39:00	18:39:00		39.8	54	40.8	38.7	9549.93	12022.64	5:30 AM	
	18:40:00	18:40:00		40.1	54.8	41	38.9	10232.93	12589.25	5:31 AM	
	18:41:00	18:41:00		41.1	57.4	42.5	40.1	12882.50	17782.79	5:32 AM	
	18:42:00	18:42:00		41.2	56.5	42.7	40.2	13182.57	18620.87	5:33 AM	
	18:43:00	18:43:00		40.2	54.2	41.6	39.1	10471.29	14454.40	5:34 AM	
	18:44:00	18:44:00		40.2	56	41.1	39.3	10471.29	12882.50	5:35 AM	
	18:45:00	18:45:00		40.4	57.9	41.7	38.6	10964.78	14791.08	5:36 AM	
	18:46:00	18:46:00		38.7	59.7	40.9	37.6	7413.10	12302.69	5:37 AM	
	18:47:00	18:47:00		39.2	55.5	40.7	38	8317.64	11748.98	5:38 AM	
	18:48:00	18:48:00		38.3	53	39.5	36.6	6760.83	8912.51	5:39 AM	
	18:49:00	18:49:00		37.3	53.1	38.8	36.5	5370.32	7585.78	5:40 AM	
	18:50:00	18:50:00		50	74.4	60.5	37	100000.00	1122018.45	5:41 AM	
	18:51:00	18:51:00		49.9	82.6	60.3	38.3	97723.72	1071519.31	5:42 AM	
	18:52:00	18:52:00		38.7	52.8	39.7	37.8	7413.10	9332.54	5:43 AM	
	18:53:00	18:53:00		40.6	56	43.2	38.8	11481.54	20892.96	5:44 AM	
	18:54:00	18:54:00		38	52.1	39.9	37.3	6309.57	9772.37	5:45 AM	
	18:55:00	18:55:00		49.8	84.8	60	37.3	95499.26	1000000.00	5:46 AM	
	18:56:00	18:56:00		45.9	68	54.7	38.8	38904.51	295120.92	5:47 AM	
	18:57:00	18:57:00		40.5	56.9	41.3	39.3	11220.18	13489.63	5:48 AM	
	18:58:00	18:58:00		40.1	59	40.7	39.2	10232.93	11748.98	5:49 AM	
	18:59:00	18:59:00		39.9	54.2	40.9	38.4	9772.37	12302.69	5:50 AM	
	19:00:00	19:00:00		40.3	54.4	42	38.4	10715.19	15848.93	5:51 AM	
	19:01:00	19:01:00		59.4	89	72.2	39.6	870963.59	16595869.07	5:52 AM	
	19:02:00	19:02:00		44.8	65.9	55.1	38.8	30199.52	323593.66	5:53 AM	
	19:03:00	19:03:00		40.3	55.1	41.9	39.1	10715.19	15488.17	5:54 AM	
	19:04:00	19:04:00		53.3	81.2	66.4	40.5	213796.21	4365158.32	5:55 AM	
	19:05:00	19:05:00		41.6	60.2	43.1	39.8	14454.40	20417.38	5:56 AM	
	19:06:00	19:06:00		41.1	60.5	42.2	39.6	12882.50	16595.87	5:57 AM	
	19:07:00	19:07:00		42.5	63.1	49.9	40.6	17782.79	97723.72	5:58 AM	
	19:08:00	19:08:00		48	74	59.8	40.4	63095.73	954992.59	5:59 AM	
	19:09:00	19:09:00		40.2	55.2	41.6	38.8	10471.29	14454.40	6:00 AM	
	19:10:00	19:10:00		41.2	57.8	42.3	40.5	13182.57	16982.44	6:01 AM	
	19:11:00	19:11:00		58.2	82.8	70.4	39.4	660693.45	10964781.96	6:02 AM	
	19:12:00	19:12:00		40.2	59.1	42.3	39.2	10471.29	16982.44	6:03 AM	
	19:13:00	19:13:00		41	56.4	42.4	39.6	12589.25	17378.01	6:04 AM	
	19:14:00	19:14:00		39.3	54.7	40.5	38.2	8511.38	11220.18	6:05 AM	
	19:15:00	19:15:00		40	57.5	43.6	38.4	10000.00	22908.68	6:06 AM	
	19:16:00	19:16:00		59.7	86.8	72.9	40.6	933254.30	19498446.00	6:07 AM	
	19:17:00	19:17:00		53.6	82.6	66.7	39.6	229086.77	4677351.41	6:08 AM	
	19:18:00	19:18:00		41.2	59.6	46.7	39.1	13182.57	46773.51	6:09 AM	
	19:19:00	19:19:00		53.9	80.3	66.9	37.3	245470.89	4897788.19	6:10 AM	
	19:20:00	19:20:00		50.6	79.1	62.9	37.4	114815.36	1949844.60	6:11 AM	
	19:21:00	19:21:00		46.6	73.6	58.9	36.9	45708.82	776247.12	6:12 AM	
	19:22:00	19:22:00		38.7	57	42.6	36.5	7413.10	18197.01	6:13 AM	
	19:23:00	19:23:00		36.8	53.8	37.4	35.9	4786.30	5495.41	6:14 AM	
	19:24:00	19:24:00		47	77.7	63.6	36.7	50118.72	2290867.65	6:15 AM	
	19:25:00	19:25:00		51.8	79.2	65.7	37.3	151356.12	3715352.29	6:16 AM	
	19:26:00	19:26:00		38.4	54.2	39.2	37.5	6918.31	8317.64	6:17 AM	
	19:27:00	19:27:00		38.6	52.7	39.6	37.7	7244.36	9120.11	6:18 AM	
	19:28:00	19:28:00		38.1	52.8	38.9	36.9	6456.54	7762.47	6:19 AM	
	19:29:00	19:29:00		37.6	55.1	38.3	36.8	5754.40	6760.83	6:20 AM	
	19:30:00	19:30:00		37.8	57	39.8	37	6025.60	9549.93	6:21 AM	
	19:31:00	19:31:00		38.3	53.8	39.6	37.4	6760.83	9120.11	6:22 AM	
	19:32:00	19:32:00		39.5	57.8	44.4	37.7	8912.51	27542.29	6:23 AM	
	19:33:00	19:33:00		54.9	82.4	67.7	38.1	309029.54	5888436.55	6:24 AM	
	19:34:00	19:34:00		38.5	53.4	39.2	37.8	7079.46	8317.64	6:25 AM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1	L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
	19:35:00	19:35:00		43.5	73.6	59.8	37.8	22387.21	954992.59	6:26 AM	
	19:36:00	19:36:00		57.7	84.1	70.8	37.4	588843.66	12022644.35	6:27 AM	
	19:37:00	19:37:00		39.5	54.6	41.9	38.1	8912.51	15488.17	6:28 AM	
	19:38:00	19:38:00		39.3	54.2	40.5	38.1	8511.38	11220.18	6:29 AM	
	19:39:00	19:39:00		40.1	60.9	47.6	38.1	10232.93	57543.99	6:30 AM	
	19:40:00	19:40:00		58.5	86.9	71.1	37.7	707945.78	12882495.52	6:31 AM	
	19:41:00	19:41:00		37.2	51.2	38.1	36.2	5248.07	6456.54	6:32 AM	
	19:42:00	19:42:00		38.1	53.8	40.1	37	6456.54	10232.93	6:33 AM	
	19:43:00	19:43:00		37.9	52.6	40	36.8	6165.95	10000.00	6:34 AM	
	19:44:00	19:44:00		38.4	55.6	39.8	37.7	6918.31	9549.93	6:35 AM	
	19:45:00	19:45:00		38.1	57.2	40.5	36.7	6456.54	11220.18	6:36 AM	
	19:46:00	19:46:00		38.4	54.1	40.2	37.4	6918.31	10471.29	6:37 AM	
	19:47:00	19:47:00		39.3	61.6	44.6	37.9	8511.38	28840.32	6:38 AM	
	19:48:00	19:48:00		53.3	83.4	68.9	38.5	213796.21	7762471.17	6:39 AM	
	19:49:00	19:49:00		52.2	73.3	66.9	39.2	165958.69	4897788.19	6:40 AM	
	19:50:00	19:50:00		41.6	57.5	43.9	39.2	14454.40	24547.09	6:41 AM	
	19:51:00	19:51:00		41.7	61.6	43.5	40.8	14791.08	22387.21	6:42 AM	
	19:52:00	19:52:00		43.5	65.4	49.9	41.4	22387.21	97723.72	6:43 AM	
	19:53:00	19:53:00		49.2	80.3	56	42.1	83176.38	398107.17	6:44 AM	
	19:54:00	19:54:00		56	81.9	68.2	40.7	398107.17	6606934.48	6:45 AM	
	19:55:00	19:55:00		42.9	62.1	46.2	41.6	19498.45	41686.94	6:46 AM	
	19:56:00	19:56:00		49.3	72	58.5	41.4	85113.80	707945.78	6:47 AM	
	19:57:00	19:57:00		56.6	84.7	69.8	42.5	457088.19	9549925.86	6:48 AM	
	19:58:00	19:58:00		43.4	61.8	44.9	42.1	21877.62	30902.95	6:49 AM	
	19:59:00	19:59:00		43.2	61.6	45.1	41.4	20892.96	32359.37	6:50 AM	
	20:00:00	20:00:00		43.5	61.4	46.3	41.7	22387.21	42657.95	6:51 AM	
	20:01:00	20:01:00		62.8	93.3	76.5	42.5	1905460.72	44668359.22	6:52 AM	
	20:02:00	20:02:00		44.8	61	47.6	43	30199.52	57543.99	6:53 AM	
	20:03:00	20:03:00		44.5	61.3	46.3	42.8	28183.83	42657.95	6:54 AM	
	20:04:00	20:04:00		45.2	66.6	49	43.5	33113.11	79432.82	6:55 AM	
	20:05:00	20:05:00		42.3	58.7	44.5	40.7	16982.44	28183.83	6:56 AM	
	20:06:00	20:06:00		41.9	63.3	48.1	40.3	15488.17	64565.42	6:57 AM	
	20:07:00	20:07:00		55.8	81.6	68.6	41.2	380189.40	7244359.60	6:58 AM	
	20:08:00	20:08:00		47.5	73.3	55	41.5	56234.13	316227.77	6:59 AM	
	20:09:00	20:09:00		63.2	89.6	76.8	40.2	2089296.13	47863009.23	7:00 AM	
	20:10:00	20:10:00		43.8	70.9	51.3	40.6	23988.33	134896.29	7:01 AM	
	20:11:00	20:11:00		42.8	62.6	46	41.4	19054.61	39810.72	7:02 AM	
	20:12:00	20:12:00		44.5	69	52.1	40.7	28183.83	162181.01	7:03 AM	
	20:13:00	20:13:00		42.6	64.8	46.1	40.4	18197.01	40738.03	7:04 AM	
	20:14:00	20:14:00		42.3	67.5	46.4	40.9	16982.44	43651.58	7:05 AM	
	20:15:00	20:15:00		44.5	69	49.4	40.9	28183.83	87096.36	7:06 AM	
	20:16:00	20:16:00		42.2	63.1	45.2	41.1	16595.87	33113.11	7:07 AM	
	20:17:00	20:17:00		42.4	63.7	45.3	40.6	17378.01	33884.42	7:08 AM	
	20:18:00	20:18:00		42.7	63.9	46.2	41.1	18620.87	41686.94	7:09 AM	
	20:19:00	20:19:00		44.3	63.6	45.5	43	26915.35	35481.34	7:10 AM	
	20:20:00	20:20:00		44.8	63.2	46.8	43.9	30199.52	47863.01	7:11 AM	
	20:21:00	20:21:00		48.2	66.1	52.6	45.8	66069.34	181970.09	7:12 AM	
	20:22:00	20:22:00		49	68.3	51.1	47.2	79432.82	128824.96	7:13 AM	
	20:23:00	20:23:00		56	84.1	69.6	47.6	398107.17	9120108.39	7:14 AM	
	20:24:00	20:24:00		54.6	74.5	64.6	50.6	288403.15	2884031.50	7:15 AM	
	20:25:00	20:25:00		53.1	72.9	54.9	52	204173.79	309029.54	7:16 AM	
	20:26:00	20:26:00		53.3	70.9	54.8	51.9	213796.21	301995.17	7:17 AM	
	20:27:00	20:27:00		52.1	70	53.7	50.2	162181.01	234422.88	7:18 AM	
	20:28:00	20:28:00		50.8	67.1	53	49.2	120226.44	199526.23	7:19 AM	
	20:29:00	20:29:00		49	66.8	50.7	47.5	79432.82	117489.76	7:20 AM	
	20:30:00	20:30:00		52.1	76.5	62.1	47.4	162181.01	1621810.10	7:21 AM	
	20:31:00	20:31:00		53.5	71.9	55.7	50.8	223872.11	371535.23	7:22 AM	
	20:32:00	20:32:00		51.9	68.1	53.6	50	154881.66	229086.77	7:23 AM	
	20:33:00	20:33:00		59	86.4	71.5	50.6	794328.23	14125375.45	7:24 AM	
	20:34:00	20:34:00		53.6	75.1	56.9	51.1	229086.77	489778.82	7:25 AM	
	20:35:00	20:35:00		54.7	70.9	56.1	52.9	295120.92	407380.28	7:26 AM	
	20:36:00	20:36:00		54.1	71.1	55.3	53.2	257039.58	338844.16	7:27 AM	
	20:37:00	20:37:00		53.9	69.2	55	53	245470.89	316227.77	7:28 AM	
	20:38:00	20:38:00		53.3	70.7	54.6	52.6	213796.21	288403.15	7:29 AM	
	20:39:00	20:39:00		58.1	81.4	67.8	51.6	645654.23	6025595.86	7:30 AM	
	20:40:00	20:40:00		53	68.6	55.1	51.3	199526.23	323593.66	7:31 AM	
	20:41:00	20:41:00		54.2	72.1	60.4	50.9	263026.80	1096478.20	7:32 AM	
	20:42:00	20:42:00		51.8	67.6	54	50.2	151356.12	251188.64	7:33 AM	
	20:43:00	20:43:00		51.8	67	52.9	50.7	151356.12	194984.46	7:34 AM	
	20:44:00	20:44:00		54.1	69.9	58.7	51.9	257039.58	741310.24	7:35 AM	
	20:45:00	20:45:00		55.6	71.2	58.9	52.7	363078.05	776247.12	7:36 AM	
	20:46:00	20:46:00		59.7	82.9	68.5	56.8	933254.30	7079457.84	7:37 AM	
	20:47:00	20:47:00		59.5	75.5	61.6	57.7	891250.94	1445439.77	7:38 AM	
	20:48:00	20:48:00		59.1	78.4	60.9	58.3	812830.52	1230268.77	7:39 AM	
	20:49:00	20:49:00		64.3	88.4	74.3	58.1	2691534.80	26915348.04	7:40 AM	
	20:50:00	20:50:00		60.1	77.1	62.2	56.4	1023292.99	1659586.91	7:41 AM	
	20:51:00	20:51:00		55.8	73.5	58.3	54.4	380189.40	676082.98	7:42 AM	
	20:52:00	20:52:00		61.5	85.5	70.5	55.9	1412537.54	11220184.54	7:43 AM	
	20:53:00	20:53:00		58.3	75.9	62.1	56.3	676082.98	1621810.10	7:44 AM	
	20:54:00	20:54:00		59.4	83.1	68.3	55.5	870963.59	6760829.75	7:45 AM	
	20:55:00	20:55:00		54.5	75.8	56.3	52	281838.29	426579.52	7:46 AM	
	20:56:00	20:56:00		54.6	75.2	56.2	53.3	288403.15	416869.38	7:47 AM	
	20:57:00	20:57:00		54.6	71.9	56.3	53.4	288403.15	426579.52	7:48 AM	
	20:58:00	20:58:00		56.8	80.7	66.4	52.4	478630.09	4365158.32	7:49 AM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	20:59:00	20:59:00		55.5	73.9	60.3	52.3
	21:00:00	21:00:00		53.6	71.7	58.8	51.8
	21:01:00	21:01:00		58.2	82.8	68.3	52.8
	21:02:00	21:02:00		62.2	88.7	74.2	54.5
	21:03:00	21:03:00		54.2	72.1	56.2	52.2
	21:04:00	21:04:00		57.7	82.3	67.4	52.4
	21:05:00	21:05:00		53.4	75.9	55.1	51.4
	21:06:00	21:06:00		62.4	89.5	74.8	53
	21:07:00	21:07:00		55.7	73.5	58.2	53.6
	21:08:00	21:08:00		56.2	80	65.3	47.4
	21:09:00	21:09:00		46.5	66.6	50.2	43.6
	21:10:00	21:10:00		57.8	85.8	70.9	43.9
	21:11:00	21:11:00		44.4	64.3	52.1	42
	21:12:00	21:12:00		43.6	67.5	49.1	41.4
	21:13:00	21:13:00		58.5	86.9	72.6	42.4
	21:14:00	21:14:00		58.6	85.4	71.5	42.1
	21:15:00	21:15:00		49.2	74	60.6	42.1
	21:16:00	21:16:00		58.2	86.9	71.7	44.1
	21:17:00	21:17:00		51.2	76.1	63.1	44.1
	21:18:00	21:18:00		50.3	68.3	55.2	45
	21:19:00	21:19:00		44.5	61.7	47.3	42.8
	21:20:00	21:20:00		44.6	63.2	48.2	43
	21:21:00	21:21:00		46.1	64.6	48.4	43.6
	21:22:00	21:22:00		47.4	63.7	51.5	44.7
	21:23:00	21:23:00		49	67.4	50.9	47.5
	21:24:00	21:24:00		49.1	66.4	51.4	47.1
	21:25:00	21:25:00		49.6	69	52	47.8
	21:26:00	21:26:00		48.8	64.7	52.1	47
	21:27:00	21:27:00		48.6	66.6	52.8	46.5
	21:28:00	21:28:00		50	69.4	53.8	45.7
	21:29:00	21:29:00		56.6	84.3	69.4	45.3
	21:30:00	21:30:00		48.3	65.5	51.6	45.2
	21:31:00	21:31:00		49.6	70.4	53.1	47
	21:32:00	21:32:00		47.1	64.1	50.3	43.8
	21:33:00	21:33:00		56.7	84.3	68.7	43.8
	21:34:00	21:34:00		47.6	65.8	50.5	45.3
	21:35:00	21:35:00		47.8	65.9	50	45.7
	21:36:00	21:36:00		47.2	69.3	49.7	44.9
	21:37:00	21:37:00		49	66.7	53	45.6
	21:38:00	21:38:00		45.2	63.6	48.8	42.5
	21:39:00	21:39:00		43.6	61.7	46.8	41.6
	21:40:00	21:40:00		54.7	82.4	68.2	43
	21:41:00	21:41:00		53.1	78.8	65.3	43.7
	21:42:00	21:42:00		43.6	62.3	45.5	42.3
	21:43:00	21:43:00		46.6	65.1	51.2	43.7
	21:44:00	21:44:00		46	66.4	51.7	42.7
	21:45:00	21:45:00		45.5	63.9	50	42.5
	21:46:00	21:46:00		45.4	70.5	49	43.5
	21:47:00	21:47:00		43.9	62.9	46.7	42.4
	21:48:00	21:48:00		45.5	64.8	47.7	42.8
	21:49:00	21:49:00		45	62.9	48.6	43.5
	21:50:00	21:50:00		50.8	83.8	67.6	43.7
	21:51:00	21:51:00		57.3	84.9	71.5	42.7
	21:52:00	21:52:00		46	70.9	54.7	42.8
	21:53:00	21:53:00		44.9	63.4	51	40.6
	21:54:00	21:54:00		41.6	60.7	46.1	39.8
	21:55:00	21:55:00		43.8	63.2	48.1	41.3
	21:56:00	21:56:00		57	87	70.6	43
	21:57:00	21:57:00		43.5	66	50.1	38.2
	21:58:00	21:58:00		53	78.9	65.4	37.6
	21:59:00	21:59:00		41.9	61.6	45.6	38.8
	22:00:00	22:00:00		41.1	60.3	43.6	39.2
	22:01:00	22:01:00		59.7	84.8	71	42
	22:02:00	22:02:00		44.1	65.2	48.8	39.6
	22:03:00	22:03:00		43.9	62.9	48.5	41
	22:04:00	22:04:00		44.8	66.2	50.3	41.1
	22:05:00	22:05:00		44.7	63.7	47.3	41
	22:06:00	22:06:00		56.5	79.5	66.1	42.5
	22:07:00	22:07:00		44.1	61.6	46.9	41.7
	22:08:00	22:08:00		43.1	62.9	45.6	41.3
	22:09:00	22:09:00		43	60.6	44.8	41.2
	22:10:00	22:10:00		43.2	62.8	45.7	41.6
	22:11:00	22:11:00		43.2	69.9	51.4	40.7
	22:12:00	22:12:00		45.2	73.6	50.9	42.6
	22:13:00	22:13:00		55.9	81.9	68.7	42.9
	22:14:00	22:14:00		47.4	67.4	61.6	42.4
	22:15:00	22:15:00		45.7	68.7	51.2	42.1
	22:16:00	22:16:00		47.8	64	53.9	43.1
	22:17:00	22:17:00		43.5	62.6	46.5	41.8
	22:18:00	22:18:00		42.3	62	45.3	40.3
	22:19:00	22:19:00		43.2	63.5	45.7	41
	22:20:00	22:20:00		54.7	83.6	67.8	41.7
	22:21:00	22:21:00		43.7	63.1	45.6	42
	22:22:00	22:22:00		43.3	63.8	45.7	41.4

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
354813.39	1071519.31	7:50 AM	
229086.77	758577.58	7:51 AM	
660693.45	6760829.75	7:52 AM	
1659586.91	26302679.92	7:53 AM	
263026.80	416869.38	7:54 AM	
588843.66	5495408.74	7:55 AM	
218776.16	323593.66	7:56 AM	
1737800.83	30199517.20	7:57 AM	
371535.23	660693.45	7:58 AM	
416869.38	3388441.56	7:59 AM	
44668.36	104712.85	8:00 AM	
602559.59	12302687.71	8:01 AM	
27542.29	162181.01	8:02 AM	
22908.68	81283.05	8:03 AM	
707945.78	18197008.59	8:04 AM	
724435.96	14125375.45	8:05 AM	
83176.38	1148153.62	8:06 AM	
660693.45	14791083.88	8:07 AM	
131825.67	2041737.94	8:08 AM	
107151.93	331131.12	8:09 AM	
28183.83	53703.18	8:10 AM	
28840.32	66069.34	8:11 AM	
40738.03	69183.10	8:12 AM	
54954.09	141253.75	8:13 AM	
79432.82	123026.88	8:14 AM	
81283.05	138038.43	8:15 AM	
91201.08	158489.32	8:16 AM	
75857.76	162181.01	8:17 AM	
72443.60	190546.07	8:18 AM	
100000.00	239883.29	8:19 AM	
457088.19	8709635.90	8:20 AM	
67608.30	144543.98	8:21 AM	
91201.08	204173.79	8:22 AM	
51286.14	107151.93	8:23 AM	
467735.14	7413102.41	8:24 AM	
57543.99	112201.85	8:25 AM	
60255.96	100000.00	8:26 AM	
52480.75	93325.43	8:27 AM	
79432.82	199526.23	8:28 AM	
33113.11	75857.76	8:29 AM	
22908.68	47863.01	8:30 AM	
295120.92	6606934.48	8:31 AM	
204173.79	3388441.56	8:32 AM	
22908.68	35481.34	8:33 AM	
45708.82	131825.67	8:34 AM	
39810.72	147910.84	8:35 AM	
35481.34	100000.00	8:36 AM	
34673.69	79432.82	8:37 AM	
24547.09	46773.51	8:38 AM	
35481.34	58884.37	8:39 AM	
31622.78	72443.60	8:40 AM	
120226.44	5754399.37	8:41 AM	
537031.80	14125375.45	8:42 AM	
39810.72	295120.92	8:43 AM	
30902.95	125892.54	8:44 AM	
14454.40	40738.03	8:45 AM	
23988.33	64565.42	8:46 AM	
501187.23	11481536.21	8:47 AM	
22387.21	102329.30	8:48 AM	
199526.23	3467368.50	8:49 AM	
15488.17	36307.81	8:50 AM	
12882.50	22908.68	8:51 AM	
933254.30	12589254.12	8:52 AM	
25703.96	75857.76	8:53 AM	
24547.09	70794.58	8:54 AM	
30199.52	107151.93	8:55 AM	
29512.09	53703.18	8:56 AM	
446683.59	4073802.78	8:57 AM	
25703.96	48977.88	8:58 AM	
20417.38	36307.81	8:59 AM	
19952.62	30199.52	9:00 AM	
20892.96	37153.52	9:01 AM	
20892.96	138038.43	9:02 AM	
33113.11	123026.88	9:03 AM	
389045.14	7413102.41	9:04 AM	
54954.09	1445439.77	9:05 AM	
37153.52	131825.67	9:06 AM	
60255.96	245470.89	9:07 AM	
22387.21	44668.36	9:08 AM	
16982.44	33884.42	9:09 AM	
20892.96	37153.52	9:10 AM	
295120.92	6025595.86	9:11 AM	
23442.29	36307.81	9:12 AM	
21379.62	37153.52	9:13 AM	

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	22:23:00	22:23:00		45.7	68.1	49.6	41.7
	22:24:00	22:24:00		54.2	81.4	67.6	42.9
	22:25:00	22:25:00		44.6	63.7	46.9	42.4
	22:26:00	22:26:00		43.7	66.6	47.9	41.4
	22:27:00	22:27:00		43.7	62.9	45.5	41.9
	22:28:00	22:28:00		46.3	67.6	50.6	43.6
	22:29:00	22:29:00		44.2	68.2	47.9	42
	22:30:00	22:30:00		43.4	61.8	45.9	41.5
	22:31:00	22:31:00		52.5	78.4	65	43.6
	22:32:00	22:32:00		53.1	81.4	66.7	44.1
	22:33:00	22:33:00		45.2	63.6	55.8	41.9
	22:34:00	22:34:00		42.5	64.3	46.9	40.9
	22:35:00	22:35:00		52.3	81.6	66.1	41.5
	22:36:00	22:36:00		55	83	69.1	40.6
	22:37:00	22:37:00		44.4	64.6	48.9	41.2
	22:38:00	22:38:00		44.8	72.9	50.9	41.9
	22:39:00	22:39:00		42.8	63.3	47.3	40.9
	22:40:00	22:40:00		42.8	61.9	44.6	41.3
	22:41:00	22:41:00		44.8	68	50	42.7
	22:42:00	22:42:00		43.5	60.7	46.1	41.3
	22:43:00	22:43:00		42.9	63	46.7	39.3
	22:44:00	22:44:00		41.6	62.7	45.4	39.3
	22:45:00	22:45:00		43.9	67.4	48.6	41.4
	22:46:00	22:46:00		43	64.4	48.9	39.5
	22:47:00	22:47:00		41.2	64.1	45.8	39.3
	22:48:00	22:48:00		41.6	61.5	44.5	40.1
	22:49:00	22:49:00		54.5	83.7	68.3	40.4
	22:50:00	22:50:00		44	64.8	47.1	41.8
	22:51:00	22:51:00		42.2	62.7	45.4	39.8
	22:52:00	22:52:00		41.9	69.8	47.7	39.5
	22:53:00	22:53:00		42.7	68.3	52.9	38.1
	22:54:00	22:54:00		39.5	61	43.9	37.9
	22:55:00	22:55:00		40.5	65	44.3	38.4
	22:56:00	22:56:00		39.9	61.7	45.2	38.1
	22:57:00	22:57:00		56.3	83.7	69.5	38.5
	22:58:00	22:58:00		40.4	62.8	45	38.7
	22:59:00	22:59:00		39.7	62.8	45.1	37.2
	23:00:00	23:00:00		39.9	61.5	45.5	36.7
	23:01:00	23:01:00		39.1	60.7	43.6	36.2
	23:02:00	23:02:00		37.4	60.2	43.2	35.3
	23:03:00	23:03:00		38.4	59.3	43.9	35.4
	23:04:00	23:04:00		38.7	59.5	44	35.9
	23:05:00	23:05:00		37.4	60.9	43.2	35
	23:06:00	23:06:00		37.6	59	42.3	35.6
	23:07:00	23:07:00		41.8	72.5	57.9	36
	23:08:00	23:08:00		50.7	78.8	64.4	36.2
	23:09:00	23:09:00		37.3	60.7	45.7	35.1
	23:10:00	23:10:00		37.3	59.4	43.1	34.8
	23:11:00	23:11:00		38.8	61.1	45.8	35
	23:12:00	23:12:00		37	58.5	41.5	34
	23:13:00	23:13:00		37.3	60.6	43.6	33.5
	23:14:00	23:14:00		37.2	61.6	43.7	33.5
	23:15:00	23:15:00		50.6	75.9	63.2	32.9
	23:16:00	23:16:00		36	61	44.8	31.7
	23:17:00	23:17:00		51.6	79.5	65.1	32.2
	23:18:00	23:18:00		35.1	60	41.1	32.1
	23:19:00	23:19:00		34.3	53.8	37.3	32.7
	23:20:00	23:20:00		32.7	53.6	36.4	31.2
	23:21:00	23:21:00		33.2	52.1	35.3	32.1
	23:22:00	23:22:00		51.7	81.1	66	32.5
	23:23:00	23:23:00		57.4	82.7	69.1	35.6
	23:24:00	23:24:00		57.5	83.6	70.5	33.7
	23:25:00	23:25:00		40.1	59.3	46.5	35.2
	23:26:00	23:26:00		53.7	81.7	67.9	37.4
	23:27:00	23:27:00		56.8	82.1	69.2	37.7
	23:28:00	23:28:00		41.1	61.9	45.4	37.3
	23:29:00	23:29:00		50.9	79.8	64.5	35.8
	23:30:00	23:30:00		40.9	60.8	44.8	35.3
	23:31:00	23:31:00		43.1	62.4	47.1	39
	23:32:00	23:32:00		52.5	80.6	64.9	38.6
	23:33:00	23:33:00		39.2	59	43	37.8
	23:34:00	23:34:00		39.8	61.1	45.3	37.7
	23:35:00	23:35:00		40.5	62.1	46.1	36.8
	23:36:00	23:36:00		39.6	60.2	44.6	37
	23:37:00	23:37:00		38.9	57.5	43	36
	23:38:00	23:38:00		41.2	64.5	48	37.1
	23:39:00	23:39:00		40.7	60.3	44.7	37.4
	23:40:00	23:40:00		43.5	61.4	46.6	37.6
	23:41:00	23:41:00		40.3	60.3	45	37.5
	23:42:00	23:42:00		38.7	59.1	43.7	35.5
	23:43:00	23:43:00		48.2	71.3	53.5	39
	23:44:00	23:44:00		53.7	80.7	67.1	37.5
	23:45:00	23:45:00		52.7	80.1	65.4	37.9
	23:46:00	23:46:00		42.5	67.6	47.7	39.4

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
37153.52	91201.08	9:14 AM	
263026.80	5754399.37	9:15 AM	#6
28840.32	48977.88	9:16 AM	#6
23442.29	61659.50	9:17 AM	#6
23442.29	35481.34	9:18 AM	#6
42657.95	114815.36	9:19 AM	#6
26302.68	61659.50	9:20 AM	#6
21877.62	38904.51	9:21 AM	#6
177827.94	3162277.66	9:22 AM	#6
204173.79	4677351.41	9:23 AM	#6
33113.11	380189.40	9:24 AM	#6
17782.79	48977.88	9:25 AM	#6
169824.37	4073802.78	9:26 AM	#6
316227.77	8128305.16	9:27 AM	#6
27542.29	77624.71	9:28 AM	#6
30199.52	123026.88	9:29 AM	#6
19054.61	53703.18	9:30 AM	#6
19054.61	28840.32	9:31 AM	#6
30199.52	100000.00	9:32 AM	#6
22387.21	40738.03	9:33 AM	#6
19498.45	46773.51	9:34 AM	#6
14454.40	34673.69	9:35 AM	#6
24547.09	72443.60	9:36 AM	#6
19952.62	77624.71	9:37 AM	#6
13182.57	38018.94	9:38 AM	#6
14454.40	28183.83	9:39 AM	#6
281838.29	6760829.75	9:40 AM	#6
25118.86	51286.14	9:41 AM	#6
16595.87	34673.69	9:42 AM	#6
15488.17	58884.37	9:43 AM	#6
18620.87	194984.46	9:44 AM	#6
8912.51	24547.09	9:45 AM	#6
11220.18	26915.35	9:46 AM	#6
9772.37	33113.11	9:47 AM	#6
426579.52	8912509.38	9:48 AM	#6
10964.78	31622.78	9:49 AM	#6
9332.54	32359.37	9:50 AM	#6
9772.37	35481.34	9:51 AM	#6
8128.31	22908.68	9:52 AM	#6
5495.41	20892.96	9:53 AM	#6
6918.31	24547.09	9:54 AM	#6
7413.10	25118.86	9:55 AM	#6
5495.41	20892.96	9:56 AM	#6
5754.40	16982.44	9:57 AM	#6
15135.61	616595.00	9:58 AM	#6
117489.76	2754228.70	9:59 AM	#6
5370.32	37153.52	10:00 AM	#6
5370.32	20417.38	10:01 AM	#6
7585.78	38018.94	10:02 AM	#6
5011.87	14125.38	10:03 AM	#6
5370.32	22908.68	10:04 AM	#6
5248.07	23442.29	10:05 AM	#6
114815.36	2089296.13	10:06 AM	#6
3981.07	30199.52	10:07 AM	#6
144543.98	3235936.57	10:08 AM	#6
3235.94	12882.50	10:09 AM	#6
2691.53	5370.32	10:10 AM	#6
1862.09	4365.16	10:11 AM	#6
2089.30	3388.44	10:12 AM	#6
147910.84	3981071.71	10:13 AM	#6
549540.87	8128305.16	10:14 AM	#6
562341.33	11220184.54	10:15 AM	#6
10232.93	44668.36	10:16 AM	
234422.88	6165950.02	10:17 AM	
478630.09	8317637.71	10:18 AM	
12882.50	34673.69	10:19 AM	
123026.88	2818382.93	10:20 AM	
12302.69	30199.52	10:21 AM	#7
20417.38	51286.14	10:22 AM	#7
177827.94	3090295.43	10:23 AM	#7
8317.64	19952.62	10:24 AM	#7
9549.93	33884.42	10:25 AM	#7
11220.18	40738.03	10:26 AM	#7
9120.11	28840.32	10:27 AM	#7
7762.47	19952.62	10:28 AM	#7
13182.57	63095.73	10:29 AM	#7
11748.98	29512.09	10:30 AM	#7
22387.21	45708.82	10:31 AM	#7
10715.19	31622.78	10:32 AM	#7
7413.10	23442.29	10:33 AM	#7
66069.34	223872.11	10:34 AM	#7
234422.88	5128613.84	10:35 AM	#7
186208.71	3467368.50	10:36 AM	#7
17782.79	58884.37	10:37 AM	#7

24-Hour Ambient Measurement

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
	23:47:00	23:47:00		44.7	73.3	59	38.1
	23:48:00	23:48:00		52.8	82	67.1	37.8
	23:49:00	23:49:00		41.2	65	49	36.8
	23:50:00	23:50:00		39.3	56.6	41.4	37.1
	23:51:00	23:51:00		49.8	76	61.7	38.6
	23:52:00	23:52:00		42.2	62.1	45.1	38.4
	23:53:00	23:53:00		38.2	56.1	42.6	36.3
	23:54:00	23:54:00		39.5	59.8	44.2	36.2
	23:55:00	23:55:00		51.7	78.2	64.9	40.4
	23:56:00	23:56:00		42.7	63.1	47	40.4
	23:57:00	23:57:00		53.1	80.8	66	41.2
	23:58:00	23:58:00		41.9	58.9	46.4	38.5
	23:59:00	23:59:00		40.9	63.3	46.1	37.3
	24:00:00	24:00:00		52.5	80.2	65.2	37.2

L_{eq} $10^{(X/10)}$	L_{max} $10^{(X/10)}$	Time	Measurement #
29512.09	794328.23	10:38 AM	#7
190546.07	5128613.84	10:39 AM	#7
13182.57	79432.82	10:40 AM	#7
8511.38	13803.84	10:41 AM	#7
95499.26	1479108.39	10:42 AM	#7
16595.87	32359.37	10:43 AM	#7
6606.93	18197.01	10:44 AM	#7
8912.51	26302.68	10:45 AM	#7
147910.84	3090295.43	10:46 AM	#7
18620.87	50118.72	10:47 AM	#7
204173.79	3981071.71	10:48 AM	#7
15488.17	43651.58	10:49 AM	#7
12302.69	40738.03	10:50 AM	#7
177827.94	3311311.21	10:51 AM	#7

1-Hour Ambient Measurement #1

Summary

Serial Number	BIJ090010	UNIT REV	R13B
Start Time	11:04:17 08-Mar-2022		
Run Length	1:00:00 230400		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114.2
	Date		11:02:16 08-Mar-2022
Post-Cal	Level	dB	114.3
	Date		12:04:41 08-Mar-2022
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	1	1
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	56.2	56.1
Lmax	dB	72.7	72.6
Lmin	dB	44.7	44.7
Lpk	dB	96.2	96.2
TWA	dB	47.1	47.1
PTWA	dB	47.1	47.1
DOSE	%	0.05	0.05
PDOSE	%	0.05	0.05
SEL	dB	91.7	91.7
EXP	p2s	1	1

Measurement	Units	Value
LDN	dB	56.2
CNEL	dB	56.2
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

1-Hour Ambient Measurement #1

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
Study 1	0:01:00	0:01:00		49.2	83.3	55.6	46.2
	0:02:00	0:02:00		50.1	70.3	56.6	44.7
	0:03:00	0:03:00		61.2	96.2	72.1	45.2
	0:04:00	0:04:00		55.7	77.1	64.2	50.8
	0:05:00	0:05:00		59.1	83.8	68.8	52.5
	0:06:00	0:06:00		55.9	75.5	62.6	49.1
	0:07:00	0:07:00		58.2	81.6	67.5	53.1
	0:08:00	0:08:00		52.7	72	55.8	49.3
	0:09:00	0:09:00		50.6	77.9	57.8	46.4
	0:10:00	0:10:00		50.9	76	59.9	45.4
	0:11:00	0:11:00		52.5	72.9	57.2	49.1
	0:12:00	0:12:00		51.2	72	57.1	48.4
	0:13:00	0:13:00		54.4	78.2	63.9	48.9
	0:14:00	0:14:00		52.8	71	55.3	48.4
	0:15:00	0:15:00		57.8	85.8	65.5	50.6
	0:16:00	0:16:00		54.2	77.6	62.6	50.7
	0:17:00	0:17:00		55.5	76.7	61.9	50.8
	0:18:00	0:18:00		54.1	73	56.8	51.3
	0:19:00	0:19:00		54.9	76.6	61.3	51.3
	0:20:00	0:20:00		54.6	75.3	61.3	51.7
	0:21:00	0:21:00		53.4	72.8	55.7	51.3
	0:22:00	0:22:00		53.6	80.6	60.8	48.9
	0:23:00	0:23:00		51.4	78.4	53.6	48.7
	0:24:00	0:24:00		52.5	79.3	57.2	46.9
	0:25:00	0:25:00		53.1	75.9	56.5	49.3
	0:26:00	0:26:00		57.7	86.1	68.5	50.1
	0:27:00	0:27:00		56.3	79.3	66.8	50.1
	0:28:00	0:28:00		55.3	77.2	63.8	51.8
	0:29:00	0:29:00		56.9	81.6	66.2	53
	0:30:00	0:30:00		56.2	84.6	64	51.9
	0:31:00	0:31:00		53.2	72.2	56.5	49.8
	0:32:00	0:32:00		52.9	72.4	54.9	50.4
	0:33:00	0:33:00		50.3	73.6	54.9	47.8
	0:34:00	0:34:00		49.9	69.7	53.5	46.7
	0:35:00	0:35:00		50.8	69.4	53.5	47.7
	0:36:00	0:36:00		52.9	73.5	56.2	48.8
	0:37:00	0:37:00		52.3	75.1	55.4	48.8
	0:38:00	0:38:00		54.5	74	59.7	50.3
	0:39:00	0:39:00		57.7	85.2	67.1	49.7
	0:40:00	0:40:00		53.6	76.2	56.2	50.2
	0:41:00	0:41:00		54.4	74.7	57.8	51.2
	0:42:00	0:42:00		58.1	83	68.6	51.3
	0:43:00	0:43:00		55.4	83.2	66.4	48.1
	0:44:00	0:44:00		53.7	78.7	57.1	48.9
	0:45:00	0:45:00		53.3	76.8	55.9	50.7
	0:46:00	0:46:00		58.9	81.8	69.5	49.8
	0:47:00	0:47:00		53.7	77.7	59.1	49.8
	0:48:00	0:48:00		59.7	85.9	68.7	52.4
	0:49:00	0:49:00		57.4	77.4	62.9	51.5
	0:50:00	0:50:00		51.9	73.1	58.3	46.1
	0:51:00	0:51:00		57.6	85.3	68.5	49.2
	0:52:00	0:52:00		58	85.4	69.2	50.2
	0:53:00	0:53:00		54.3	79.4	62.7	49.3
	0:54:00	0:54:00		52.8	73.9	55.9	50.4
	0:55:00	0:55:00		57.9	86	69.3	49.9
	0:56:00	0:56:00		52	70	54.8	49.2
	0:57:00	0:57:00		61.6	87.9	69.3	49.1
	0:58:00	0:58:00		55.8	85.2	61.4	51.4
	0:59:00	0:59:00		62.3	83.2	71.7	52.1
	1:00:00	1:00:00		63	84.8	72.7	50.2

1-Hour Ambient Measurement #2

Summary

Serial Number	BIJ090010	UNIT REV	R13B
Start Time	12:14:47 08-Mar-2022		
Run Length	1:00:00 230400		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114
	Date		12:12:57 08-Mar-2022
Post-Cal	Level	dB	114.1
	Date		13:15:07 08-Mar-2022
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	1	1
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	41.5	41.5
Lmax	dB	64.3	64.3
Lmin	dB	32.3	32.3
Lpk	dB	87.1	87.1
TWA	dB	32.5	32.4
PTWA	dB	32.5	32.4
DOSE	%	0	0
PDOSE	%	0	0
SEL	dB	77.1	77
EXP	p2s	0	0

Measurement	Units	Value
LDN	dB	41.5
CNEL	dB	41.5
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

1-Hour Ambient Measurement #2

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
Study 1	0:01:00	0:01:00		51.8	85.6	64.3	36.8
	0:02:00	0:02:00		43.5	78.9	57.7	36
	0:03:00	0:03:00		36.7	54.3	38.3	35
	0:04:00	0:04:00		38.3	60	42.9	35.2
	0:05:00	0:05:00		41.9	70.3	51.9	34.9
	0:06:00	0:06:00		37.5	55.3	40.9	34.8
	0:07:00	0:07:00		40	69.1	49.3	36.3
	0:08:00	0:08:00		40.3	56.1	44.6	36
	0:09:00	0:09:00		36.8	53.5	38.4	35.4
	0:10:00	0:10:00		36.3	55.6	39.4	34.8
	0:11:00	0:11:00		35.9	55.2	39	34.6
	0:12:00	0:12:00		37.1	56.1	40.7	35.4
	0:13:00	0:13:00		38.2	68.1	47.9	34.8
	0:14:00	0:14:00		36.3	52.5	38.4	34.4
	0:15:00	0:15:00		38.8	62.1	46.9	35.4
	0:16:00	0:16:00		49.9	72.6	59.8	38.8
	0:17:00	0:17:00		37.7	58.3	44	34.2
	0:18:00	0:18:00		37.1	61.3	41	34.3
	0:19:00	0:19:00		37	54.2	40	34.3
	0:20:00	0:20:00		37.2	54.1	40.6	33.9
	0:21:00	0:21:00		35	53	37.7	32.9
	0:22:00	0:22:00		34.9	50.2	36.9	33.3
	0:23:00	0:23:00		34.8	52.3	36.4	33.6
	0:24:00	0:24:00		35.9	54.2	39.7	33.4
	0:25:00	0:25:00		37.5	55.4	43.9	33.4
	0:26:00	0:26:00		38.5	57.2	43.4	33.5
	0:27:00	0:27:00		35.6	53.5	39.7	33.1
	0:28:00	0:28:00		36.9	57.8	42.9	33.4
	0:29:00	0:29:00		37.1	57.3	40.8	34.4
	0:30:00	0:30:00		37.9	57.7	42.1	34.9
	0:31:00	0:31:00		37	56.2	41.1	34.8
	0:32:00	0:32:00		39.9	60.9	46.3	35.4
	0:33:00	0:33:00		39.5	59.8	42.9	34.5
	0:34:00	0:34:00		36	54.7	38.6	32.8
	0:35:00	0:35:00		33.9	52	35.6	32.3
	0:36:00	0:36:00		34.7	53.8	37.4	32.6
	0:37:00	0:37:00		40.4	66	51.3	33.2
	0:38:00	0:38:00		38.3	62.1	47.5	34.9
	0:39:00	0:39:00		38.9	60	47.8	34.7
	0:40:00	0:40:00		42.9	61.3	47.1	37.1
	0:41:00	0:41:00		45	68.7	54.9	35
	0:42:00	0:42:00		36.7	54.3	38.7	34.9
	0:43:00	0:43:00		37.1	56	40.5	34
	0:44:00	0:44:00		45.6	70.1	54.9	34.5
	0:45:00	0:45:00		38.1	60.6	43.4	34.6
	0:46:00	0:46:00		42	67	47.8	36.3
	0:47:00	0:47:00		43.5	64.3	49.5	38.6
	0:48:00	0:48:00		37.3	55.6	41.2	35.1
	0:49:00	0:49:00		36.8	52.9	39	35.4
	0:50:00	0:50:00		34.6	51.4	36.5	33.3
	0:51:00	0:51:00		36.5	53.3	39	34.5
	0:52:00	0:52:00		35.9	56.9	41.1	33.7
	0:53:00	0:53:00		36.1	56.5	39.6	33.6
	0:54:00	0:54:00		36.8	54.8	39.5	34
	0:55:00	0:55:00		34.4	52.2	36.5	33.1
	0:56:00	0:56:00		39.2	59.6	46.9	33.8
	0:57:00	0:57:00		52.3	87.1	62.5	34.6
	0:58:00	0:58:00		36.1	61.6	38.3	34.8
	0:59:00	0:59:00		37.4	78.8	47	34.8
	1:00:00	1:00:00		35.5	58.1	36.7	34.5

1-Hour Ambient Measurement #3

Summary

Serial Number	BIJ090010	UNIT REV	R13B
Start Time	13:28:13 08-Mar-2022		
Run Length	1:00:00 230400		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114.1
	Date		13:27:14 08-Mar-2022
Post-Cal	Level	dB	114.1
	Date		14:28:38 08-Mar-2022
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	1	1
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	54	53.9
Lmax	dB	84.5	84.5
Lmin	dB	29.3	29.3
Lpk	dB	96.4	96.4
TWA	dB	44.9	44.9
PTWA	dB	44.9	44.9
DOSE	%	0.03	0.03
PDOSE	%	0.03	0.03
SEL	dB	89.5	89.5
EXP	p2s	0	0

Measurement	Units	Value
LDN	dB	54
CNEL	dB	54
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

1-Hour Ambient Measurement #3

Data

Study	**Study Time**	**Session Time**	**OL Status**	**L_{avg} Meter1**	**L_{pk} Meter1**	**L_{max} Meter1**	**L_{min} Meter1**
Study 1	0:01:00	0:01:00		43.8	89.2	59.1	30.6
	0:02:00	0:02:00		32.7	59.9	43.3	30.2
	0:03:00	0:03:00		33	61.1	36.2	30.2
	0:04:00	0:04:00		48.5	77.2	60.4	32.5
	0:05:00	0:05:00		38.7	82.5	49.5	32.3
	0:06:00	0:06:00		46.5	79.3	54.6	35.4
	0:07:00	0:07:00		35.5	60.2	39.6	32.9
	0:08:00	0:08:00		46.9	67.1	52.7	34.1
	0:09:00	0:09:00		45.2	67.4	50.3	42
	0:10:00	0:10:00		39.1	65.1	46.6	32.7
	0:11:00	0:11:00		34.2	54.9	39.6	31.9
	0:12:00	0:12:00		41.3	69.4	47.6	36.8
	0:13:00	0:13:00		39.8	76.6	51.3	35.7
	0:14:00	0:14:00		36.3	62.8	42	32
	0:15:00	0:15:00		39.4	66.8	48.7	31.3
	0:16:00	0:16:00		46.4	76	57.7	33
	0:17:00	0:17:00		35.6	62.8	39.9	32.7
	0:18:00	0:18:00		34.7	54.9	37.5	32.7
	0:19:00	0:19:00		33.6	58.7	36.5	31.5
	0:20:00	0:20:00		32.8	54.1	35.6	31.7
	0:21:00	0:21:00		34.1	55.8	37.4	31.4
	0:22:00	0:22:00		34.7	75	46	31.2
	0:23:00	0:23:00		34.7	51.5	37.5	32.7
	0:24:00	0:24:00		33.9	63.7	37.4	31.8
	0:25:00	0:25:00		33.1	54	35.7	31.6
	0:26:00	0:26:00		32.1	59.5	34.7	30.2
	0:27:00	0:27:00		34.9	54.4	41.9	30.7
	0:28:00	0:28:00		36.6	56.8	40.8	34
	0:29:00	0:29:00		43.8	71.8	54.2	32.5
	0:30:00	0:30:00		33.4	55.8	36.4	31.1
	0:31:00	0:31:00		52.4	77.9	64.9	32.6
	0:32:00	0:32:00		32.9	56.7	34.9	31.3
	0:33:00	0:33:00		62.1	89.3	74.6	32
	0:34:00	0:34:00		34.4	51.5	37.6	32
	0:35:00	0:35:00		34	55.9	38.2	31.7
	0:36:00	0:36:00		33.3	53.7	34.6	32
	0:37:00	0:37:00		32.9	50.6	35.7	30.8
	0:38:00	0:38:00		35	57.2	37.4	33
	0:39:00	0:39:00		32.2	54.9	35.7	30.2
	0:40:00	0:40:00		33.4	57.7	36.4	31.3
	0:41:00	0:41:00		40	75.5	48.8	31.8
	0:42:00	0:42:00		40.7	77.1	49.1	33.4
	0:43:00	0:43:00		36.5	83.8	48.2	29.6
	0:44:00	0:44:00		31.9	59.2	36.4	29.3
	0:45:00	0:45:00		35	59.2	41.2	31.3
	0:46:00	0:46:00		34.6	56.4	39.6	31.7
	0:47:00	0:47:00		35.3	62.3	42.3	32.8
	0:48:00	0:48:00		46	73.8	56.7	32.2
	0:49:00	0:49:00		33.6	58.2	38.8	31.6
	0:50:00	0:50:00		50.1	74.7	62	32.1
	0:51:00	0:51:00		58.6	86.3	72.8	34.2
	0:52:00	0:52:00		58.9	85.5	73	35.3
	0:53:00	0:53:00		42.2	60.7	45.9	38.5
	0:54:00	0:54:00		61	84	68.7	44.3
	0:55:00	0:55:00		69.9	96.4	84.5	33.6
	0:56:00	0:56:00		34.1	55.8	37.9	31.7
	0:57:00	0:57:00		33.4	59	37.2	31.6
	0:58:00	0:58:00		38.5	81.5	51.5	32.9
	0:59:00	0:59:00		35.8	63.4	42.2	32
	1:00:00	1:00:00		36.8	74.7	44.8	33.3

1-Hour Ambient Measurement #4

Summary

Serial Number	BIJ090010	UNIT REV	R13B
Start Time	14:37:23 08-Mar-2022		
Run Length	1:00:00 230400		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114
	Date		14:36:39 08-Mar-2022
Post-Cal	Level	dB	114.1
	Date		15:38:24 08-Mar-2022
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	1	1
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	53.8	53.8
Lmax	dB	80.8	80.8
Lmin	dB	28	28
Lpk	dB	91.9	91.9
TWA	dB	44.8	44.8
PTWA	dB	44.8	44.8
DOSE	%	0.03	0.03
PDOSE	%	0.03	0.03
SEL	dB	89.4	89.4
EXP	p2s	0	0

Measurement	Units	Value
LDN	dB	53.8
CNEL	dB	53.8
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

1-Hour Ambient Measurement #4

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
Study 1	0:01:00	0:01:00		53.2	80.1	65.1	32.3
	0:02:00	0:02:00		41.2	65.7	52.6	32.8
	0:03:00	0:03:00		63.4	89.6	75.8	31.8
	0:04:00	0:04:00		33	54.3	36.9	29.1
	0:05:00	0:05:00		33.8	55.1	39.9	28
	0:06:00	0:06:00		29	44.4	30.5	28.3
	0:07:00	0:07:00		29.2	49.6	31.5	28.6
	0:08:00	0:08:00		53.7	81.3	66.9	29
	0:09:00	0:09:00		36.5	60.1	47.1	29.7
	0:10:00	0:10:00		47.5	71.2	57.1	30.5
	0:11:00	0:11:00		50	75.6	62.1	29.5
	0:12:00	0:12:00		52.3	78.7	65.5	30.5
	0:13:00	0:13:00		30.2	44.9	31.9	28.9
	0:14:00	0:14:00		30.6	53.2	37.9	28.6
	0:15:00	0:15:00		30.2	53.1	35.6	28.5
	0:16:00	0:16:00		47.7	73	59.1	28.7
	0:17:00	0:17:00		29.7	62.6	34.1	28.5
	0:18:00	0:18:00		31.3	52.9	36.6	28.3
	0:19:00	0:19:00		44.4	70.9	56.8	28.4
	0:20:00	0:20:00		48.7	76.8	60.5	30.3
	0:21:00	0:21:00		34.5	59.6	42.3	29.8
	0:22:00	0:22:00		51.6	78	65	29.1
	0:23:00	0:23:00		34.6	53.6	41.1	29.7
	0:24:00	0:24:00		53.3	78.4	65.6	31
	0:25:00	0:25:00		29.5	48.2	33.1	28.4
	0:26:00	0:26:00		43.5	70.8	56.1	28.2
	0:27:00	0:27:00		53	75.4	62.4	33.3
	0:28:00	0:28:00		36.1	53.7	40.5	32.6
	0:29:00	0:29:00		53.8	79.1	65.9	33.1
	0:30:00	0:30:00		38.6	63.4	49.7	29.9
	0:31:00	0:31:00		36.8	60.7	44.6	28.9
	0:32:00	0:32:00		49.7	75.7	61.9	29
	0:33:00	0:33:00		33.7	55.9	40	30
	0:34:00	0:34:00		64.3	91.2	77.8	31.1
	0:35:00	0:35:00		36.9	60.4	44.6	30.2
	0:36:00	0:36:00		39.1	65.5	46.8	30
	0:37:00	0:37:00		34.3	57.5	40.3	29.7
	0:38:00	0:38:00		40.5	57.7	46.5	35.5
	0:39:00	0:39:00		66	91.9	80.8	33.7
	0:40:00	0:40:00		35.1	56.1	42.6	29.7
	0:41:00	0:41:00		30.1	51.1	33	29.1
	0:42:00	0:42:00		31.1	56.2	34.8	29.7
	0:43:00	0:43:00		31.2	54.2	37	28.4
	0:44:00	0:44:00		42.9	70.6	55.7	29.3
	0:45:00	0:45:00		45.6	71.1	57.9	29.1
	0:46:00	0:46:00		30.7	56.4	36.4	28.8
	0:47:00	0:47:00		29.5	49.7	31.1	28.6
	0:48:00	0:48:00		49.2	80.6	60.7	30.8
	0:49:00	0:49:00		42.8	85.3	54.4	31.5
	0:50:00	0:50:00		39.5	79.1	51	29
	0:51:00	0:51:00		40.3	63.7	50.8	29.2
	0:52:00	0:52:00		46.8	75.9	60	30.2
	0:53:00	0:53:00		29.7	53.9	32.4	28.7
	0:54:00	0:54:00		36.9	61	46.8	29.3
	0:55:00	0:55:00		32.1	55.1	40.3	28.7
	0:56:00	0:56:00		33	60.1	40.8	28.2
	0:57:00	0:57:00		30.5	53.8	39.2	28.7
	0:58:00	0:58:00		30.8	58.5	37	28.7
	0:59:00	0:59:00		31.5	57.3	36	28.2
	1:00:00	1:00:00		65.5	89.5	78	31.3

1-Hour Ambient Measurement #5

Summary

Serial Number	BIJ090010	UNIT REV	R13B
Start Time	09:14:05 09-Mar-2022		
Run Length	1:00:00 230400		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114.2
	Date		09:13:18 09-Mar-2022
Post-Cal	Level	dB	114.1
	Date		10:14:27 09-Mar-2022
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	1	1
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	37.6	37.5
Lmax	dB	53.6	53.6
Lmin	dB	31.6	31.6
Lpk	dB	82.7	82.7
TWA	dB	28.5	28.5
PTWA	dB	28.5	28.5
DOSE	%	0	0
PDOSE	%	0	0
SEL	dB	73.1	73.1
EXP	p2s	0	0

Measurement	Units	Value
LDN	dB	37.6
CNEL	dB	37.6
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

1-Hour Ambient Measurement #5

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
Study 1	0:01:00	0:01:00		39	77	47.5	35.4
	0:02:00	0:02:00		39.4	72.6	47.6	36.9
	0:03:00	0:03:00		38.6	55.1	40.5	37.4
	0:04:00	0:04:00		37.8	61.8	40	36.4
	0:05:00	0:05:00		37.1	52.7	38.7	35.9
	0:06:00	0:06:00		38.9	55.2	43.7	35.8
	0:07:00	0:07:00		38.3	57.4	40.7	35.4
	0:08:00	0:08:00		37.1	61.4	39.3	35.9
	0:09:00	0:09:00		36.8	52.6	38.6	35.7
	0:10:00	0:10:00		38.2	57.7	40	36.2
	0:11:00	0:11:00		38.5	55.8	40	37
	0:12:00	0:12:00		38.3	55.2	40.9	36.1
	0:13:00	0:13:00		38.8	64.2	45.6	35.4
	0:14:00	0:14:00		41.1	65.1	46.2	35.5
	0:15:00	0:15:00		44.3	70.4	52.5	37.3
	0:16:00	0:16:00		43.6	70.2	52.6	34.8
	0:17:00	0:17:00		36.5	57	38	35
	0:18:00	0:18:00		35.3	52.3	37.3	33.9
	0:19:00	0:19:00		35.5	52.1	36.9	34.6
	0:20:00	0:20:00		35.4	51.2	36.3	34.6
	0:21:00	0:21:00		35.8	53.9	37.9	34.2
	0:22:00	0:22:00		34.6	52.1	36.7	33.6
	0:23:00	0:23:00		34	53.6	35.2	32.6
	0:24:00	0:24:00		34	50.2	35.6	32.9
	0:25:00	0:25:00		34.1	58.1	37	32.6
	0:26:00	0:26:00		35.1	54.8	37.6	33.4
	0:27:00	0:27:00		35.8	53	38	34.3
	0:28:00	0:28:00		35.8	55.1	38.2	34.5
	0:29:00	0:29:00		37.8	59.6	44	34.8
	0:30:00	0:30:00		36.9	62.6	43.9	34.4
	0:31:00	0:31:00		36.8	60.2	42.6	34.2
	0:32:00	0:32:00		35.3	54.2	38.6	33.7
	0:33:00	0:33:00		36.4	55.9	40	34.6
	0:34:00	0:34:00		36.3	56.3	40.3	34.3
	0:35:00	0:35:00		35.5	55.2	39	33.5
	0:36:00	0:36:00		37.5	68.5	44.8	33.2
	0:37:00	0:37:00		36.3	62.6	43.8	34.4
	0:38:00	0:38:00		38.4	75.9	50.4	34.3
	0:39:00	0:39:00		39.3	77.5	49.9	35.5
	0:40:00	0:40:00		35.1	52.3	36.6	33.9
	0:41:00	0:41:00		35.4	55.7	39.5	33.6
	0:42:00	0:42:00		36	55.9	41	33.4
	0:43:00	0:43:00		35.8	52	37.5	33.6
	0:44:00	0:44:00		36	54.5	38.9	33.8
	0:45:00	0:45:00		36	54	37.8	34.5
	0:46:00	0:46:00		35.3	58.4	37.5	34
	0:47:00	0:47:00		36.6	55.7	39.1	34.7
	0:48:00	0:48:00		35	54.6	37.7	34
	0:49:00	0:49:00		42.9	69.3	53.6	34.3
	0:50:00	0:50:00		36.3	57.1	39.9	33.4
	0:51:00	0:51:00		35.3	58	40.1	32.8
	0:52:00	0:52:00		33.8	50.2	36.3	32.2
	0:53:00	0:53:00		33.8	51.2	35.1	32.3
	0:54:00	0:54:00		35.1	53.6	37.3	32.7
	0:55:00	0:55:00		34.6	56.2	38	31.6
	0:56:00	0:56:00		39.8	82.7	51.1	32.4
	0:57:00	0:57:00		36.5	71	42.6	33.4
	0:58:00	0:58:00		35.3	62.1	39.9	33.4
	0:59:00	0:59:00		34.6	54.4	36.7	32.9
	1:00:00	1:00:00		36.1	57	40.5	32.7

1-Hour Ambient Measurement #6

Summary

Serial Number	BIJ090010	UNIT REV	R13B
Start Time	10:20:00 09-Mar-2022		
Run Length	1:00:00 230400		

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Calibration Information			
Description		Units	Value
Pre-Cal	Level	dB	114
	Date		10:19:28 09-Mar-2022
Post-Cal	Level	dB	113.9
	Date		11:20:25 09-Mar-2022
ReCert	Date		Unavailable

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	80	80
Upper Limit Level	dB	140	140
Projected Time	Hrs	1	1
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	44.4	44.4
Lmax	dB	67.9	67.8
Lmin	dB	29.2	29.2
Lpk	dB	89.8	89.8
TWA	dB	35.4	35.4
PTWA	dB	35.4	35.4
DOSE	%	0	0
PDOSE	%	0	0
SEL	dB	80	79.9
EXP	p2s	0	0

Measurement	Units	Value
LDN	dB	44.4
CNEL	dB	44.4
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

1-Hour Ambient Measurement #6

Data

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{pk} Meter1	L_{max} Meter1	L_{min} Meter1
Study 1	0:01:00	0:01:00		53.2	78.8	65.4	33.7
	0:02:00	0:02:00		42.5	74	52.5	33.5
	0:03:00	0:03:00		39.7	73.4	50	33.2
	0:04:00	0:04:00		36.9	65.7	44.6	34.1
	0:05:00	0:05:00		37.2	61.6	40.8	33.6
	0:06:00	0:06:00		34.9	51.9	37.9	33
	0:07:00	0:07:00		33.8	50.5	37.1	32
	0:08:00	0:08:00		32.4	47.4	33.2	31.6
	0:09:00	0:09:00		33.4	49.2	34.8	32.5
	0:10:00	0:10:00		50.1	77.1	57	32.3
	0:11:00	0:11:00		37.4	58	44.7	32.8
	0:12:00	0:12:00		51.9	75.3	62.8	33.1
	0:13:00	0:13:00		33.7	60.2	38.5	32.5
	0:14:00	0:14:00		33.6	49.3	38.6	32.5
	0:15:00	0:15:00		36	52.2	40.6	32.5
	0:16:00	0:16:00		33.6	49.6	35.5	32.3
	0:17:00	0:17:00		33.9	49.1	36.1	32.6
	0:18:00	0:18:00		34.2	60.8	36.4	33.4
	0:19:00	0:19:00		35.5	61.3	45.4	32.4
	0:20:00	0:20:00		33.7	54	37	31.5
	0:21:00	0:21:00		33.4	49	34.4	32.4
	0:22:00	0:22:00		34.2	55.3	40.7	32.2
	0:23:00	0:23:00		37.2	55.7	40.5	33.5
	0:24:00	0:24:00		34.3	52.1	37.5	32.6
	0:25:00	0:25:00		53.2	80.1	65.8	32.3
	0:26:00	0:26:00		33	54.4	36.1	31.6
	0:27:00	0:27:00		41	59.4	47.1	32
	0:28:00	0:28:00		47.1	63	52.6	39.2
	0:29:00	0:29:00		40.7	58.3	48.9	32.3
	0:30:00	0:30:00		33	50.7	37.2	31.8
	0:31:00	0:31:00		31.1	47.2	32.6	30.3
	0:32:00	0:32:00		33.7	50.5	36.9	30.1
	0:33:00	0:33:00		40.8	74.2	50.4	31.7
	0:34:00	0:34:00		32.5	57.1	36.2	30.8
	0:35:00	0:35:00		56.4	89.8	67.9	34.1
	0:36:00	0:36:00		33.2	77.9	43	29.5
	0:37:00	0:37:00		32.3	76	42.2	29.3
	0:38:00	0:38:00		31.2	74.4	39.7	29.3
	0:39:00	0:39:00		31	54.1	36.8	29.7
	0:40:00	0:40:00		31.4	52	34	29.7
	0:41:00	0:41:00		31.3	58.1	33.9	29.2
	0:42:00	0:42:00		50.1	86.6	59.3	29.6
	0:43:00	0:43:00		49.9	88.4	61.3	30.9
	0:44:00	0:44:00		36.3	77	48.2	29.3
	0:45:00	0:45:00		31.3	57.9	39.9	29.7
	0:46:00	0:46:00		32.3	72	41.5	30.2
	0:47:00	0:47:00		32	50.2	34.7	29.6
	0:48:00	0:48:00		32.7	48.2	33.9	30.9
	0:49:00	0:49:00		32.8	47.5	35	30.9
	0:50:00	0:50:00		32.5	50.4	35.6	30.5
	0:51:00	0:51:00		31.9	50.8	33.8	30.1
	0:52:00	0:52:00		31.2	56.3	35.1	29.5
	0:53:00	0:53:00		31.6	60.1	33.5	30.5
	0:54:00	0:54:00		36.6	64.4	47.1	30.1
	0:55:00	0:55:00		32.9	51.4	35.5	31.3
	0:56:00	0:56:00		31.3	47.5	32.6	30.2
	0:57:00	0:57:00		33	56.5	37.2	30
	0:58:00	0:58:00		39.7	87	56.3	29.9
	0:59:00	0:59:00		40.8	87.2	56.3	30.7
	1:00:00	1:00:00		50.3	79.2	62.2	30

APPENDIX D

Project Noise Levels & Significance Determinations

Equipment Source Noise Summary

Site Preparation/Berm Formation - Equipment Noise References

Equipment	L_{max} @ 50-feet	Arithmetic SPL ($10^{(Leq/10)}$)	Acoustical Use Factor (%)	L_{eq} @ 50-feet	Arithmetic SPL ($10^{(Leq/10)}$)	Acoustical Use Factor (%)	L_{50} @ 50-feet	Arithmetic SPL ($10^{(Leq/10)}$)
Dozer/Scraper	85	316227766.02	40%	81	126491106.41	20%	78	63245553.20
Dozer/Scraper	85	316227766.02	40%	81	126491106.41	20%	78	63245553.20
Total Equipment L_{max} @ 50-feet:		**88**	**Total Equipment L_{eq} @ 50-feet:**		**84**	**Total Equipment L_{50} @ 50-feet:**		**81**

Mining/Extraction of Aggregate - Equipment Noise References

Equipment	L_{max} @ 50-feet	Arithmetic SPL ($10^{(Leq/10)}$)	Acoustical Use Factor (%)	L_{eq} @ 50-feet	Arithmetic SPL ($10^{(Leq/10)}$)	Acoustical Use Factor (%)	L_{50} @ 50-feet	Arithmetic SPL ($10^{(Leq/10)}$)
Dozer/Scraper	85	316227766.02	40%	81	126491106.41	20%	78	63245553.20
Dozer/Scraper	85	316227766.02	40%	81	126491106.41	20%	78	63245553.20
Loader	80	100000000.00	40%	76	40000000.00	20%	73	20000000.00
Grader	85	316227766.02	40%	81	126491106.41	20%	78	63245553.20
Total Equipment L_{max} @ 50-feet:		**90.2**	**Total Equipment L_{eq} @ 50-feet:**		**86.2**	**Total Equipment L_{50} @ 50-feet:**		**83.2**

Site Preparation/Berm Formation - Equipment Noise Levels @ Receptors

Receptor	Distance - Source to Receptor (feet)	Equipment Noise Levels @ Receptors (dBA)		
		Average - L_{eq}	Median - L_{50}	Maximum - L_{max}
R1	955	58.4	55.4	62.4
R2	995	58.1	55.0	62.0
R3	600	62.4	59.4	66.4
R4	1,860	52.6	49.6	56.6
R5	2,265	50.9	47.9	54.9
R6	2,610	49.7	46.7	53.7
R7	3,450	47.3	44.2	51.2
R8	2,750	49.2	46.2	53.2

Mining/Extraction of Aggregate - Equipment Noise Levels @ Receptors

Receptor	Distance - Source to Receptor (feet)	Equipment Noise Levels @ Receptors (dBA)		
		Average - L_{eq}	Median - L_{50}	Maximum - L_{max}
R1	955	60.6	57.6	64.6
R2	995	60.2	57.2	64.2
R3	600	64.6	61.6	68.6
R4	1,860	54.8	51.8	58.8
R5	2,265	53.1	50.1	57.1
R6	2,610	51.9	48.9	55.9
R7	3,450	49.5	46.4	53.4
R8	2,750	51.4	48.4	55.4

Day-Night Noise Levels @ Project Receptors

Initial Site Preparation

Site Preparation - Operational Parameter	
Operating Hours	7:00 a.m. - 6:00 p.m.
Max Hours/Day	11 hours

Site Preparation - Hourly (L_{eq}) Noise Level @ Receptors								
Receptor	**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**
Noise Level (L_{eq}) @ Receptor	58.4	58.1	62.4	52.6	50.9	49.7	47.3	49.2

Time/Hour	**R1**		**R2**		**R3**		**R4**		**R5**		**R6**		**R7**		**R8**	
	Hourly L_{eq} (dBA)	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**
12:00 AM	0.0	1.0	0.0	1.0	0.0		0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
1:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
2:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
3:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
4:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
5:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
6:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
7:00 AM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
8:00 AM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
9:00 AM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
10:00 AM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
11:00 AM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
12:00 PM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
1:00 PM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
2:00 PM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
3:00 PM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
4:00 PM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
5:00 PM	58.4	693462.9	58.1	638827.8	62.4	1756820.9	52.6	182811.8	50.9	123280.3	49.7	92843.0	47.3	53136.4	49.2	83630.5
6:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
7:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
8:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
9:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
10:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
11:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Day-Night (L_{dn}) Noise Level:	**55**		**54.7**		**59.2**		**49.2**		**47.5**		**46.3**		**43.9**		**45.8**	

Day-Night Noise Levels @ Project Receptors

Mining/Excavation

Excavation - Operational Parameter	
Operating Hours	7:00 a.m. - 7:00 p.m.
Max Hours/Day	12 hours

Excavation - Hourly (L_{eq}) Noise Level @ Receptors								
Receptor	**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**
Noise Level (L_{eq}) @ Receptor	60.6	60.2	64.6	54.8	53.1	51.9	49.5	51.4

Time/Hour	**R1**		**R2**		**R3**		**R4**		**R5**		**R6**		**R7**		**R8**	
	Hourly L_{eq} (dBA)	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**	**Hourly L_{eq} (dBA)**	**L_{eq} $10^{(Leq/10)}$**
12:00 AM	0.0	1.0	0.0	1.0	0.0		0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
1:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
2:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
3:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
4:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
5:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
6:00 AM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
7:00 AM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
8:00 AM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
9:00 AM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
10:00 AM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
11:00 AM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
12:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
1:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
2:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
3:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
4:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
5:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
6:00 PM	60.6	1149840.5	60.2	1059249.3	64.6	2913009.2	54.8	303122.7	53.1	204412.7	51.9	153944.2	49.5	88106.1	51.4	138668.9
7:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
8:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
9:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
10:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
11:00 PM	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
Day-Night (L_{dn}) Noise Level:	**57.6**		**57.2**		**61.8**		**51.8**		**50.1**		**48.9**		**46.4**		**48.4**	

Project Noise Levels Significance Determination

Mining/Excavation

Merced County - General Plan

Merced County General Plan - Non-Transportation Noise Standards (Policy HS-7.1)

Outdoor Daytime (7:00 a.m. - 10:00 p.m.) - Median (L_{50})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	48.7	46.6	50.8	55	Yes	-4.2
R2	48.7	46.2	50.6	55	Yes	-4
R3	48.7	50.6	52.8	55	Yes	-2.2
R4	34.9	51.8	51.9	55	Yes	-3.1
R5	34.9	50.1	50.2	55	Yes	-4.8
R6	35.2	48.9	49	55	Yes	-6
R7	34.6	46.4	46.7	55	Yes	-8.3
R8	33.8	48.4	48.6	55	Yes	-6.4

Merced County General Plan - Non-Transportation Noise Standards (Policy HS-7.1)

Outdoor Daytime (7:00 a.m. - 10:00 p.m.) - Maximum (L_{max})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	78.3	53.6	78.3	81.3	Yes	-3
R2	78.3	53.2	78.3	81.3	Yes	-3
R3	78.3	57.6	78.3	81.3	Yes	-3
R4	77.9	58.8	77.9	80.9	Yes	-2.9
R5	77.9	57.1	77.9	80.9	Yes	-3
R6	81.5	55.9	81.5	84.5	Yes	-3
R7	79.8	53.4	79.8	82.8	Yes	-3
R8	81.6	55.4	81.6	84.6	Yes	-3

Project Noise Levels Significance Determination

Mining/Excavation

Merced County - General Plan

Merced County General Plan - Non-Transportation Noise Standards (Policy HS-7.1)

Indoor Daytime (7:00 a.m. - 10:00 p.m.) - Median (L_{50})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	28.7	26.6	30.8	35	Yes	-4.2
R2	28.7	26.2	30.6	35	Yes	-4
R3	28.7	30.6	32.8	35	Yes	-2.2
R4	14.9	31.8	31.9	35	Yes	-3.1
R5	14.9	30.1	30.2	35	Yes	-4.8
R6	15.2	28.9	29	35	Yes	-6
R7	14.6	26.4	26.7	35	Yes	-8.3
R8	13.8	28.4	28.6	35	Yes	-6.4

Merced County General Plan - Non-Transportation Noise Standards (Policy HS-7.1)

Indoor Daytime (7:00 a.m. - 10:00 p.m.) - Maximum (L_{max})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	58.3	33.6	58.3	61.3	Yes	-3
R2	58.3	33.2	58.3	61.3	Yes	-3
R3	58.3	37.6	58.3	61.3	Yes	-3
R4	57.9	38.8	57.9	60.9	Yes	-2.9
R5	57.9	37.1	57.9	60.9	Yes	-3
R6	61.5	35.9	61.5	64.5	Yes	-3
R7	59.8	33.4	59.8	62.8	Yes	-3
R8	61.6	35.4	61.6	64.6	Yes	-3

Project Noise Levels Significance Determination

Mining/Excavation

Merced County - Code of Ordinances

Merced County-Code of Ordinances - 10.60.030 – Sound Level Limitations

Outdoor Daytime (7:00 a.m. - 10:00 p.m.) - Average (L_{eq})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	54.4	49.6	55.6	64.4	Yes	-8.7
R2	54.4	49.2	55.5	64.4	Yes	-8.8
R3	54.4	53.6	57	64.4	Yes	-7.3
R4	51	54.8	56.3	61	Yes	-4.7
R5	51	53.1	55.2	61	Yes	-5.8
R6	51.1	51.9	54.5	61.1	Yes	-6.6
R7	49.8	49.5	52.6	59.8	Yes	-7.1
R8	51.4	51.4	54.4	61.4	Yes	-7

Merced County-Code of Ordinances - 10.60.030 – Sound Level Limitations

Instantaneous Maximum (L_{max})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	78.3	53.6	78.3	81.3	Yes	-3
R2	78.3	53.2	78.3	81.3	Yes	-3
R3	78.3	57.6	78.3	81.3	Yes	-3
R4	77.9	58.8	77.9	80.9	Yes	-2.9
R5	77.9	57.1	77.9	80.9	Yes	-3
R6	81.5	55.9	81.5	84.5	Yes	-3
R7	79.8	53.4	79.8	82.8	Yes	-3
R8	81.5	55.4	81.5	84.5	Yes	-3

Merced County-Code of Ordinances - 10.60.030 – Sound Level Limitations

24-Hour Day-Night (L_{dn})

Receptor	Baseline (dBA)	Equipment (dBA)	Total (dBA)	Applicable Threshold	Compliance	Exceedance
R1	58.4	46.6	58.7	65	Yes	-6.3
R2	58.4	46.2	58.7	65	Yes	-6.3
R3	58.4	50.8	59.1	65	Yes	-5.9
R4	56.6	51.8	57.9	65	Yes	-7.1
R5	56.6	50.1	57.5	65	Yes	-7.5
R6	55.5	48.9	56.4	65	Yes	-8.6
R7	54.2	46.4	54.9	65	Yes	-10.1
R8	55.5	48.4	56.3	65	Yes	-8.7

APPENDIX E

Barrier/Berm Noise Attenuation Calculations

Berm Insertion Loss Calculations

Berm Sound Barrier Noise Attenuation

Insertion Loss Calculations @ Receptors 1/2/3 (R1/R2/R3)

Insertion Loss (IL) Equation = 5dB + 20log((√2πN)/tanh(√2pN))dB

Source: Center for Transportation Research's *Design Guide for Highway Noise Barriers* (2003)

Caltrans *Technical Noise Supplement* offers the following guidance (Caltrans, 2013):
"Given the same site cross section, distance between source and receiver, and barrier height, a berm allows greater barrier attenuation than the thin screen (wedge), such as a soundwall. In general the actual extra attenuation associated with a berm is somewhere between -1 and -3 dBA."

Fresnel Number (N): ((a + b - ʅ)ʃ)/c_0

Note: Fresnel number (N) is a nondimensional measure of how much farther the sound must travel as a result of the barrier.

ʅ - The original length of the direct path from source to receiver (ft.)
a - Path length from barrier to source (ft.)
b - Path length from barrier to receiver (ft.)
ʃ - Equipment sound frequency in hertz (Hz)
c_0 - Speed of sound propagation in air (approximately 1,100 ft./sec.)

Project Data [B]

ʅ -	150.03	feet	(average distance between mining equipment and R1/R2/R3)
a -	40.20	feet	(direct distance between the peak of the 7-foot perimeter earthen berm and top of mining equipment)
b -	110.00	feet	(direct distance between the peak of the 7-foot perimeter earthen berm and R1/R2/R3)
ʃ -	2,000	hertz	(2,000 is appropriate for crushing/screening)

Sound Berm Attenuation @ R1/R2/R3

Barrier Height (ft.)	Top of Barrier to Source (a)	Top of Barrier to Receiver (b)	Source to Receiver (c)	Fresnel Number (N)	Estimated Insertion Loss (dB) [A]
7	40.21	110.02	150.03	0.36	11.4
8	40.20	110.04	150.03	0.38	11.6
9	40.21	110.07	150.03	0.46	12.2
10	40.25	110.11	150.03	0.61	13.2
11	40.31	110.16	150.03	0.81	14.3
12	40.40	110.22	150.03	1.07	15.4
13	40.51	110.29	150.03	1.40	16.5
14	40.64	110.37	150.03	1.79	17.5

Footnotes:

Note - Mining equipment (e.g., graders, excavators, dozers, etc.) maximum height is estimated to be 8-feet (i.e., approximate height of exhaust outlet). Therefore, the proposed perimeter berm height of 7-feet would break line-of-sight between the majority of the nosiest components of the mining equipment and the nearby receiver/residences.

[A] Per Caltrans *Technical Noise Supplement* (2013) guidance referenced above, an additional -2 dB of noise attenuation is assumed due to barrier being constructed of "earthen berm" as opposed to a soundwall.

[B] Transmission path data presented assumes that receiver (i.e., nearby resident) height is 5-feet above the ground and equipment height is 8-feet above the ground.

Pit Wall Insertion Loss Calculations

Pit Wall Sound Barrier Noise Attenuation

Insertion Loss Calculations @ Receptors 1/2/3 (R1/R2/R3)

Insertion Loss (IL) Equation = 5dB + 20log((√2πN)/tanh(√2pN))dB

Source: Center for Transportation Research's *Design Guide for Highway Noise Barriers* (2003)

Caltrans *Technical Noise Supplement* offers the following guidance (Caltrans, 2013):
"Given the same site cross section, distance between source and receiver, and barrier height, a berm allows greater barrier attenuation than the thin screen (wedge), such as a soundwall. In general the actual extra attenuation associated with a berm is somewhere between -1 and -3 dBA."

Fresnel Number (N): ((a + b - ʅ)ʃ)/c_0

Note: Fresnel number (N) is a nondimensional measure of how much farther the sound must travel as a result of the barrier.

ʅ - The original length of the direct path from source to receiver (ft.)
a - Path length from barrier to source (ft.)
b - Path length from barrier to receiver (ft.)
ʃ - Equipment sound frequency in hertz (Hz)
c_0 - Speed of sound propagation in air (approximately 1,100 ft./sec.)

Insertion Length Estimates/Averages (feet)

Receptor	Total Distance (ʅ)	Perimeter - Equipment (a)	Receptor - Perimeter (b)
R1	110	30	80
R2	210	30	180
R3	70	30	40
Average	130	30	100

Project Data [B]

ʅ -	130.03	feet	(average distance between mining equipment and R1/R2/R3)
a -	31.05	feet	(direct distance between excavation pit perimeter and top of mining equipment)
b -	100.12	feet	(direct distance between excavation pit perimeter and R1/R2/R3)
ʃ -	2,000	hertz	(2,000 is appropriate for crushing/screening)

Sound Berm Attenuation @ R1/R2/R3

Barrier Height (ft.)	Top of Barrier to Source (a)	Top of Barrier to Receiver (b)	Source to Receiver (c)	Fresnel Number (N)	Estimated Insertion Loss (dB) [A]
8	31.05	100.17	130.03	2.15	18.3
9	31.06	100.20	130.03	2.24	18.5
10	31.11	100.25	130.03	2.41	18.8
11	31.19	100.30	130.03	2.66	19.2
12	31.30	100.37	130.03	2.98	19.7
13	31.45	100.44	130.03	3.38	20.3
14	31.62	100.53	130.03	3.85	20.8
15	31.83	100.62	130.03	4.39	21.4

FOOTNOTES:

Note - Mining equipment (e.g., graders, excavators, dozers, etc.) height is estimated to be 8-feet. Therefore, to ensure line-of-sight is broken between equipment and receiver, the minimum excavation pit depth analyzed here is 8-feet below ground surface (bgs).

A - Per Caltrans *Technical Noise Supplement* (2013) guidance referenced above, an additional -2 dB of noise attenuation is assumed due to barrier being constructed of "earthen berm" as opposed to a soundwall.

B - Transmission path data presented assumes that receiver (i.e., nearby resident) height is 5-feet above the ground and equipment height is 8-feet above the ground.

APPENDIX F

Project Vibration Levels & Significance Determinations

Vibration Impact Analysis

Equipment Reference Vibration Source (Caltrans)

Equipment	Reference Distance (feet)	PPV (in/sec)
Large Bulldozer	25	0.089

Source: *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2020)

Note: A "large Bulldozer" represents the largest, most powerful vibration source operating onsite (per Caltrans guidance). Therefore it is used to calculate worst-case vibration levels to nearby receptors.

Merced County - General Plan

Policy	Thresholds	
	Vibration Velocity Level (VdB)	PPV (in/sec)
Policy HS-7.2	70	0.003

Note: County 70 Vdb threshold converted to PPV (in/sec) using the following equation: $v = v_{ref} \times 10^{(Lv/20)}$

v = rms velocity amplitude (PPV - in/sec)

Vref = 1×10^{-6} (standard United States reference value)

Lv = vibration velocity level in decibels (VdB)

Source: *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2020)

Human Responses to Transient Vibration (Caltrans)

PPV (in/sec)	Human Response
2	Severe
0.9	Strongly Perceptible
0.24	Distinctly Perceptible
0.035	Barely Perceptible

Source: *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2020)

Project Vibration Levels @ Receptors

Receptor	Receiver Type	Distance (feet) [B]	Predicted Vibration PPV @ Receiver (in/sec) [A]	Applicable Merced County Threshold - PPV (in/sec) [C]	Significant?	Applicable Caltrans PPV Threshold (in/sec)	Predicted Human Response @ Receptor
R1	Residential	955	0.002	> 0.003	No	> 0.035	Barely Perceptible
R2	Residential	995	0.002	> 0.003	No	> 0.036	Barely Perceptible
R3	Residential	600	0.003	> 0.003	No	> 0.037	Barely Perceptible
R4	Residential	1,860	0.001	> 0.003	No	> 0.038	Barely Perceptible
R5	Residential	2,265	0.001	> 0.003	No	> 0.039	Barely Perceptible
R6	Residential	2,610	0.001	> 0.003	No	> 0.040	Barely Perceptible
R7	Residential	3,450	0.000	> 0.003	No	> 0.041	Barely Perceptible
R8	Residential	2,750	0.001	> 0.003	No	> 0.042	Barely Perceptible

Footnotes:

A - $PPV_{Equipment} = PPV_{Ref} (25/D)^n$. PPV_{Ref} = reference PPV @ 25-feet. D = distance from equipment to the receiver in feet. n = 1.1 (the value related to the attenuation rate through ground). Source is the Caltrans *Transportation and Construction Vibration Guidance Manual* (2020).

B - Distances estimated using Google Earth. Represents closest distance between active mining area and the receptor property boundary. A 30-foot setback from the Turner/Sunset property boundaries and the active mining areas is included, except for areas which abut Vulcan-owned property and/or where daylighting would occur. No excavation of material, topsoil/subsoil or overburden will take place within this setback area (i.e., 30-feet from other property lines). See the figures in Appendix A for additional detail.

C - The Merced County General Plan regulates both construction and Project vibration from stationary and mobile sources, and requires that "new commercial and industrial uses to minimize encroachment on incompatible noise or groundborne vibration sensitive land uses" and sets a general limit of 70 VdB (0.003 PPV) for residential receptors.